Note: Kern (1974) states that the species is extremely variable. The spikelets may all be solitary or clustered on the well-developed rays, or the inflorescence may be contracted into a single head; glumes, anthers, and style vary considerably in size; the nut may be biconvex or trigonous, smooth or verrucose.


Type: Ceylon Hb. Hermann (B.M.)

Tufted variable annual or perennial, 12 - 75 cm tall. Leaves flat, linear, with a spinulose tip. Inflorescence with solitary, apiculate spikelets. Glumes spiral, broadly oblong or ovate, minutely apiculate, 2-3 mm long. Stamens 1-3; anthers linear. Style 2-fid, with fimbriate margin, bearded at the base of the 2 stigmas. Nut lenticular obovoid.

Fls. and frts.: Jun. - Nov.

Ecology: On the sandy foreshores, wet soils of the wet places, grassy road-sides of the Teak forests.

n = 5 (Sachdeva, 1977)
n = 5 (Baquar, 1969)
n = 20 (Nijalingappa, 1972).


Specimen examined: Koraput Dist.: Kuthadiya Hill, 19 Aug. 1931, Narayanaswami 5892 (MH).

V. Narayanaswami and Carter (l.c.) and also Haines (l.c.) recorded this species from Barkuda, Chilka Lake and Saxena et al. (l.c.), from Bhubaneswar in Puri District.

Note: An exceedingly polymorphic species, burdened with a hundred of synonyms; one of the most widely distributed species of all warmer parts of the world very common in S. and E. Asia and throughout Malesia.

It is difficult to eradicate it completely.

Fimbristylis dipsacea (Rottb.) C.B. Clarke, FBI 6: 635.1893, et in Ill. Cyp.: t. 41, f. 4-7. 1909; Haines, Bot: 919; Rath et al., BBSI 21: 255.


Type: "India Orientalis", König.

Dwarf glabrous annual with tufted stems, to 3 cm long. Leaves few, capillary, filiform, to 0.4 mm broad. Inflorescence with about 15 spikelets. Bracts dilated at the base, with about 10 primary rays. Spikelets solitary. Glumes ob lanceolate,
keeled. Stamen 1; anther oblong, 0.3 mm long. Style dilated at the base, 0.2 mm long; stigmas 2, as along as style. Nut with clavate outgrowth, terete.

Rare! Fls. and frts.: Apr. - Jul.

Ecology: In muddy areas, river banks and wet rice-fields.

Distribution: India, S. E. Asia, Malaya (Madura, Bowean, E. Borneo, Celebes), New Guinea, Philippines, Tropical Africa.

Specimens examined: Nil.

Rath et al. (l.c.) recorded its occurrence from Bhubaneswar.

Note: The squarrose spikelets and linear-oblong glandular nuts are characteristic features of this species.


Type: "Habitat in India Orientali", Koenig.


Type: Nepalis, Royle vide Wallich 3520 a ex (K).

Fimbristyliis junciformis (Nees) Kunth. Enum. Pl. 2: 239. 1837;
Rhizomatous perennial covered with fibres of old leaf-sheaths. Stems leafy below. Leaves spreading, abruptly triangular tipped, 1.2-3 mm broad. Spikelets in umbellate clusters of 4-5 or solitary, several-flowered, 3-4 mm long, with broadly winged rachilla. Glumes with scarious margin, keeled. Stamens 3; anthers linear, with a bristly connective. Style-arms 3, with a pyramidally thickened base; stigmas 3, Nut trigonous, to 1 mm long.

Fls. and frts.: Apr. - Aug.

Ecology: Abundant in moist grassy localities.

$N = 11$ (Mehra and Sachdev, 1975).

Distribution: India, Nepal, Bangladesh, Sri Lanka, Indomalaysia, Indo-China (Thailand), Malesia, Philippines, Madagascar.

Specimens examined: Koraput Dist.: Menyeinkonda, 20 May 1959, R.S. Rao 18475 (CAL); Kathpahar, 1300 m, Sonabera, 16 Apr. 1949, Mooney 3322 (DD); Kalahandi Dist., near Arakperi, 550 m, 12 Jun. 1944, Mooney 2554; Lilgumma, 620 m, 1 Jun. 1944, Mooney 2433 (both DD); Puri Dist.: Puri beach, 8 Dec. 1936, sine lect s.n. (Accn. No. 625 - Rav. Coll. Herb.); Balukhand Reserve forest, 21 Apr. 1965, V. Abraham 86; sine loc. 20 Apr. 1965, V. Abraham 360; Konark, 2 Dec. 1965, T.A. Rao

Uses: Santals use the roots in dysentery.

Note: Roots are slightly aromatic.


ssp. ferruginea

Densely tufted perennial with caespitose stems. Leaves cauline, well developed, to 35 cm x 2 mm; leaf sheaths 2-4, pilose above, lower sheaths spathaceous, coriaceous bladeless. Inflorescence umbellate cyme with 5-10 spikelets. Bracts awl-shaped, lowest 10 - 15 cm long. Glumes ovate-elliptic, tomentose in the apical part, midrib ridged above, excurrent in an obtuse apiculus. Stamens 2; filaments flat, compressed; anthers linear. Style 2, longer and broader, flat, distantly fringed - ciliate. Nut ovoid - orbicular, compressed.

Ecology: In open muddy places and flourishing in warm weather.

\[ n = 5 \text{ (Mehra and Sachdeva, 1975)} \]
\[ 2n = 10 \text{ (Nijalingappa, 1972)} \]
\[ 2n = 20 \text{ (Sarkar et al., 1978)} \]

Distribution: India, Pakistan, Nepal, Bhutan, Sri Lanka, Asia, Malaysia, Indo-China, Malesia, Australia, New Zealand, America, West Indies.


Haines (l.c.) stated its probable occurrence in Orissa, whereas Mooney (l.c.) recorded its occurrence from Athmallik in Dhenkanal District and Malikudar, 110 m, in Kalahandi District, Rath et al. (l.c.) from Dolangir and Banerjee and Das et al. (1972) from Batighar (False point) in Cuttack District respectively.

Note: Clarke, Fl. Csp. 7: 201. 1898, referred F. siberiana Kunth to the synonymy of F. ferruginea (L.) Vahl, but Kern (l.c.) stated them to be quite distinct.

Note: Fimbristylis ferruginea (L.) Vahl ssp. ferruginea differs from F. ferruginea (L) Vahl ssp. siberiana (Kunth) Lye by the shorter cauline leaves (10-15) with coriaceous leaf-sheaths, shining brown, narrow style, and smaller indistinctly stipitate nut; glumes pubescent and ferrugineous.

Fimbristylis fusca (Nees) C.E. Clarke, FBI 6: 649. 1893; Haines,

Type: Nepalia, Wallich 3530 (CGE, holotype; iso-L, LD, P).

Perennials with horizontal rhizome, surrounded by the remnants of decayed leaf-sheaths. Stems tufted, glabrous, slender, 30-40 cm long. Leaves flat, linear, pubescent, 2-4 mm broad. Spikelets solitary compressed, 3-10-flowered, with winged rhachilla. Glumes boat-shaped, acute, puberulous, lowest 3 glumes empty; lowest 2 short, keeled, 1-veined. Stamens 2-3; anthers linear, 1.2-2 mm long. Style 3-fid, glabrous, deciduous with a pyramidal style-base; stigmas 3, shorter than the style. Nut cuneate at base.


Ecology: In open dry to wet grass lands and on dry sandy soil.

Distribution: India, Pakistan, Nepal, Bangladesh, Burma, Sri Lanka, China, Japan, Malaysia, Thailand, Malesian Islands, New Guinea, Philippines.

Specimens examined: Kalahandi Dist.: Khandual Mali; 1150-1200 m, Karlapat, 12 Jul. 1949, Mooney 3473; Sambalpur Dist.: Damita, 200 m, Pauri in Bamra, 29 Jun. 1949, Mooney 3448; Motijharan hills, 210 m, 5 Jul. 1950, Mooney 3821, 3825 (all DD).

Mooney (i.c.) also recorded the species from the summit of Champaband Mali 1200 m, in Kalahandi District and Rath et al.
Fimbristyliis globulosa (Retz.) Kunth, Enum. Pl. 2: 231. 1837; Clarke, FBI 6: 644. 1893; Mooney, Suppl. : 261.


Type-locality: “Habitat in India orientali”.

Glabrous perennial with tufted stems. Leaves cauline, tubular; leaves of the sterile shoots narrow. Inflorescence with 20-40 spikelets, rarely less. Bracts 2-3, 1-1.3 cm. Spikelets usually solitary, sometimes 2, dusky, 3.8 - 7 x 2.5 - 4 mm; rachilla with narrow wings. Glumes concave. Stamens often 2, rarely 3; anthers oblong-linear. Style 3-fid, as long as the nut, dilated at the base, deciduous, branches linear. Nut rounded trigonous or biconcave, longitudinally striate, verrucose, pale-brown.

Fls. and frts.: May – Aug.

Ecology: In open grasslands and rice-fields, sometimes colonising in marshy places.

Distribution: India, Pakistan, Nepal, Bangladesh, Burma, Sri Lanka, Eastern Asia to Malay Peninsula and from Malesian Islands to New Guinea.

Specimen examined: Cuttack Dist.: Marshalghai, Mahanadi delta, 3 Jun. 1949, Mooney 3336 (DD).

Rath et al. (1981) recorded its occurrence from Mancheswar in Puri District.
Uses: In Malaya and Malesian Islands this species is cultivated for good fine matting, hats, baskets and mats are the main products. The weaving is done as a domestic industry. Stems are used as strings.

Note: The leafless culms bearing large globular spikelets are quite characteristic.

Fimbristylis hookeri ana Boeck. in Linnaea 37: 22. 1877; Haines, Bot.: 922; Mooney, Suppl.: 261; Rath et al., BBSI 21: 159.

Type: Mont. Khasia, "Fimbristylis No. 22", Hooker and Thomson.

Tufted annuals with compressed stems. Leaves flat, narrow. Inflorescence compound or subdecompound, often 10 - 15 cm across; rays conspicuous. Bracts foliaceous, often overtopping the inflorescence. Spikelets 1-6 in cluster, rarely solitary, 1.25 cm long. Glumes adpressed, incurved, distinctly mucronate, keeled. Stamens usually 2. Style 2-fid, slightly dilated at base. Nut obovoid, 1-1.25 x 0.7 - 0.8 mm, short stalked, biconvex, squamose-tuberculate.

Rare! Fls. and frts.: Aug.-Oct.

Ecology: In the crevices of rocks retaining water.

Distribution: India (Bihar, Assam, Meghalaya, Orissa), Thailand, Cambodia.

Specimens Examined: Koraput Dist.: Sonabera Plateau, 700 - 800 m, 2 Oct. 1949, Mooney 3688; Sambalpur Dist.: Lahara -
Behra, in Barapahar, 450 m, 22 Sep. 1949, Mooney 3616 (both DD).

Fimbriystis littoralis Gaud. in Freyc., Voy. Bot.: 412. 1826; Rath et al., BBSI 21: 159; Saxena et al., Ind. J. For. 5(3): 103. 1982.


Erect herb with 20-30 cm long stem. Leaves distichous, striate, without distinct midrib, acuminate, 1-2.5 mm broad. Inflorescence compound, lax, with numerous flowers. Spikelets small, globose or cylindric. Glumes membranous, 3-veined. Stamens 1-2; anthers oblanceolate or linear. Style 3-fid, glabrous with swollen bases; stigmas 3, as long as style. Nut obovoid, transversely lineolate.

Fls. and frts.: May - Sep.

Ecology: In sandy swamps and wet rice-fields.

2n = 10 (Njalingappa, 1972).

Distribution: India, Nepal, Sri Lanka, China, Japan, Malesia.

Specimens examined: Ganjam Dist.: Parlakimedi, Sep. 1903, Grant, Candler and Burkill 20445 (BSIS); Mukundapur, 18 Oct. 1930, Narayanswami 4675 (MH); Aska, 16 Sep. 1922, sine lect E.n. (Accn. No. 83835 - MH); Cuttack Dist.: Marshaghai, Mahanadi delta, 3 Jun. 1949, Mooney 3335 (DD); Rajnagar,
3 Feb. 1961, Panigrah 23685 (ASSAM);

Saxena et al. (l.c.) recorded it from Bhubaneswar.

Use: Plants are used by the cattle, but the food value is indifferent.

Note: This species is distinguished by its equitant laterally flattened leaves and small globose spikelets.


*Sacrus miliaceus* L. Syst. Nat. 10: 858, 1759 ("excl. determinatione "miliaceus").


*Fimbristylis ovata* (Burm. f.) Kern in Blumea 15: 136. 1967, et Fl. Males. ser. 1, 7 (3); 565; Rath et al., BBSI 21: 159;

*Carex ovata* Burm. f., Fl. Ind. : 194. 1768.

Type: Missa ex Java, Burman f. s.n. (G).

*Gyperus monostachyus* L., Manl. 2: 180. 1771.

Type locality: "India orientali."

Shortly bulbous based rhizomatous perennial. Stems 10-40 cm long with thickened base. Leaves linear, filiform, smooth; sheaths broad, clasping, tapering abruptly. Inflorescence of 1-3 spikelets. Spikelets ovate or ovate-lanceolate, acute, ca 1.5 cm long. Glumes with excurrent keel, mucronate. Stamens 1-3; anthers 3-4 mm long. Style 3-fid; smooth, trigonous at the base. Nut stipitate-obovoid, trigonous, with pebbly surface.


Ecology: In marshy grassland preferably partly shaded.

2n = 10 (Nijalingappa, 1972).

Distribution: India, Sri Lanka, China, Japan, throughout Malesia.

Specimens examined: Ganjam Dist.: Parlakimedi, Sep. 1903, Grant, Candler and Burkill 20578 (BSIS); Bolangir Dist.: Sonepur, Pitamohul, 110 m, Mooney 3931 Puri Dist.: Sankhjori, Ranpur, 170 m, 4 Aug. 1940, Mooney 1346, Chilka Lake, near Barkul, 4 Jun. 1948, Mooney 3076; Cuttack Dist.: Marshaghai, Mahanadi delta, Kendrapara canal, 10 Jun. 1949, Mooney 3420; Dhenkanal Dist.: Kandhara, Hindol, 4 Jul. 1941, Mooney 1770 (all DD).

Haines (l.c.) and Fischer (l.c.) recorded this species from Ganjam.

F. tenera Schult. var. oxylepis (Steud.) Clarke, FBI 6: 642. 1893.

F. tenera var. verrucosum Clarke ex Haines, Bot. 91.

Type: Ranchi, 2000 ft., Clarke(k).

F. tenera sensu Mooney, Suppl.: 148; Panigrahi et al., EBSI 21: 160; non Schult., 1824.

Slender annual with 4-5-angular stems. Leaves about half as long as the stems, filiform, flat, glabrous. Inflorescence with 2-3 bristle-like bracts; rays 2-4, 2.5 cm long, bearing 1-3-spikelets. Spikelets distinct. Glumes broadly ovate or ovate-lanceolate, obtuse, acuminate, ca 2 mm long. Keels excurrent, strongly incurved at the base. Stamens 2. Style longer than the nut. Nut ovoid, trigonous with 2 ridges.

Fls. and frts.: Aug. - Nov.

Ecology: In damp sandy and stony places of the plains.

n = 20 (Mehra and Sachdeva, 1975).

Distribution: India, Pakistan, Bhutan, Sri Lanka.

Specimens examined: Orissa: sine loc., 1941, Mooney 1787; Sambalpur Dist.: Motijharan hills, 220 m, 16 Aug. 1949, Mooney 3567 B, 3569 (all DD); Cuttack Dist.: Lion's rump, Sandkud, 14 Feb. 1961, Panigrahi 23343 (CAL).

Mooney (l.c.) recorded the species from Rairakhol and Panigrahi et al., (l.c.), from Bhatipathar in Sambalpur.
District and Rath et al. (l.c.), from Vani Vihar, Bhubaneswar.

*Fimbristylis paupercula* Boeck., *Linnaea* 38: 1874; Rath et al., BBSI 21: 159.

Type: Deccan Peninsula: Pulney Mountains, Wight 2896 (CAL, P, B).

Nearly glabrous annual, with short, erect rhizomes. Stems slender, erect, 4-5-angular, pilose. Leaves about half the length of the stem, narrow. Umbels simple with a cluster of spikelets, rays 4-5, 2.5 cm long. Bracts 3, the lowest often longer than the inflorescence, spinulose, scabrid. Spikelets 2-7 in a cluster, 1.25 cm long. Glumes ovate; keel slightly excurrent as a mucro, glandular upwards, sometimes puberulous. Style 3-fid (-4-fid). Nut obovoid, tuberculate, brown to black.

Fls. and frts.: Sep. - Dec.

Ecology: In damp and muddy soil.

2n = 44 (Nijalingappa, 1972).

Distribution: India (Orissa, Tamil Nadu).

Specimens examined: Nil.

Rath et al. (l.c.) recorded its occurrence from Kandarpur in Cuttack District.

Lectotype: "No. 8. Scirpus, Tentsuki, Japonia, v. Siebold"
(L. sub No. 902. 79 - 52) (vide Kern, Blumea 8: 112. 1955).

Creeping glabrous perennial with woody rhizomes. Stems few leaved at the base, slender 20-80 cm long. Leaves dark-green, rigid, flat, acute. Inflorescence simple or once compound, with 4-12- spikelets. Spikelets solitary; rhachilla with broad wings. Glumes adpressed, boat-shaped, ovate, keeled with 3-veins. Stamens 3 (-2); anthers linear, 1-2 mm long. Style 3-fid, deciduous, with narrow style - base; stigmas 3, shorter than the style. Nut ovoid, trigonous, straw-coloured.

Fls. and frts.: May - Nov.

Ecology: Slopes of the hills, with grasses on laterite soil, at 1550 m.

Distribution: India, Nepal, Japan, Korea, Philippines and S - E Asia.

Specimen examined: Koraput Dist.: Sirimanda Parbat, near Potangi, 10 Jul. 1950, Mooney 3832 (DD).


Scirpus polytrichoides Retz., Obs. 4: 11. 1786.


Slender glabrous perennials with stems few leaved at the
base. Leaves dark green, rigid, flat, setaceous. Inflorescence simple or once compound, with 4-12 spikelets. Bracts short, 1.5 cm long, lanceolate, with suberect smooth rays. Glumes many, the lowest 2 sterile, acute. Stamens 1-3; anthers linear. Style 2-fid, shorter, sparsely fimbriate at the top and dilated at the base; stigmas 2. Nut greyish-brown.


Ecology: In open wet places of the rice-fields; muddy shore and among mangroves.

Distribution: India, Bangladesh, Sri Lanka, E. Asia, Malay Peninsula, Malesian Islands, Philippines, New Guinea, Australia, Tropical Africa.

Specimens examined: Puri Dist.: Barkuda, Chilka Lake, 17 Apr. 1920, Annandale 1473 (BSIS); Cuttack Dist.: Marshaghai, Mahanadi delta, 10 Jun. 1949, Mooney 3421 (DD).

Saxena and Brahman (l.c.) recorded this species from Bhitar Kanika in Cuttack District.


Type: Presumably South India, Koenig (C).

Caespitose tufted plant with quadrangular axillary stems. leaves several, 2-3 mm broad, distichous, equitant; fertile
leaves reduced to bladeless membranous sheaths. Inflorescence slender, with 1-3-spikelets. Spikelets globose; rachilla ragged with scalelike wings after the fall of the glumes. Bracts much shorter than the inflorescence. Glumes spiral, emarginate, apiculate, keeled. Stamens 1 or 2; anthers less than 1 mm long. Style 3-fid; stigmas 3. Nut apiculate, with usually more prominent vertical ribs, verruculose.


Ecology: Common on marshy damp places, usually on the banks of ponds, lakes or river-banks and lightly shaded wet places.

2n = 10 (Nijalingappa, 1972).

Distribution: India, Pakistan, Sri Lanka, China, Formosa, Thailand, Malesian Islands, Philippines, New Guinea, Australia, Madagascar, Nigeria.

Specimens examined: Phulbani Dist.: Sitalpani in Bara, at the bank of Mahanadi river, 19 Apr. 1944, Mooney 2407, Koraput Dist.: Medeng Gandi, 1150 m, 14 Jul. 1950, Mooney 3918; Ganjam Dist.: Parakimedi, Sep. 1903, Burkhill, Candler and Grant 30505; Kalahandi Dist.: Phulchuna, in Lanjigarh, Bhalupodar valley, 1250 m, Jul. 1950, Mooney 3876; 700 m, 16 May 1944, Mooney 2451 (all DD); Kanghattra, 23 Sep. 1956, S.K. Mukherjee 4121; Sambalpur Dist.: Padampur, 31 Oct. 1959, Panigrahi 20552; Puri Dist.: Khurda, 1889, Walsh s.n. (Accn. No. 507775, 507776, 507871, in 1938, 507868, 507869, all CAL); Balukhand R.F. 21 Apr. 1965, V. Abraham 183; Cuttack Dist.: Central Rice
Note: Kern (1951) selected the second specimen in LINN as the
lectotype of *F. miliacea* L. and this lectotypification
reduces *F. quinquangularis* Vahl as a synonym. According to
Kern, *F. miliacea* sensu Vahl, non (L.) Vahl must be treated
as a synonym of *F. littoralis* Gaud.

*Fimbristylis sericea* R. Br., Prodr.: 228, 1810; Haines,

*F. decorata* Nees at Meyen ex Nees in Wight, Contrib. Ind.: 101.
1834.

Type: "In China, Meyen, Potts"

Rhizomes with varnish smell when bruised. Stems rigid,
striate. Leaves flat with incurved edges, silky - pubescent
beneath, 1.5 - 3.5 mm broad. Inflorescence loose, with 2-6
rays. Spikelets 3-6 in clusters, densely flowered, silvery
grey. Glumes papery, keeled, pubescent. Stamens 2-3; anthers
1 mm long, linear. Style 2-fid, villous below bifurcation,
papillose, deciduous with style base; stigmas 2(-3 in Australian spp.) almost equal to the style. Nut biconvex, obovate, smooth, 1 mm long.


Ecology: Common on sandy sea-shore and margins of fresh water lakes.

Distribution: India, China, Japan, Formosa, Malay Peninsula, Thailand, Malasia, Australia.

Specimens examined: Nil.

Lawson and Gamble recorded its occurrence from Ganjam, Prain (l.c.), from Orissa coast, Haines (l.c.), from Puri and Biswas and Choudhury (l.c.), from Ganjam and Puri respectively.

Note: The rhizome when bruised smells of varnish.


Type: "India Orientali," Koenig (C).

(Or.: Pimpala).

Stems compressed. Leaves narrow with incurved edges, ligulate; sheaths inflated at the top. Inflorescence of 1-2
spikelets; rays 1-2. Bracts glumeceous, the lowest 3-4 cm long. Spikelets solitary, rarely 2-3, many-flowered, with winged rachilla. Glumes broadly ovate, obtuse, apiculate. Stamens 3 (-2), oblong-linear, not crested. Style-arms 2, 0.6 mm long; stigmas 2, shorter than the style. Nut biconvex, smooth, brown.

Fls. and frts.: Jul. - Nov.

Ecology: In open grassy and muddy places and wet rice-fields of lower altitudes.

2n = 10 (Nijalingappa, 1972).

n = 5 (Mehra and Sachdeva, 1975).

Distribution: India, Pakistan, Nepal, Bangladesh, Sri Lanka, China, Malaya, Thailand, Malaysia, Philippines, Australia, America.

Specimens examined: Orissa: s.n., 1888, Walsh s.n. (Accn. No. 507106 - CAL); Ganjam Dist.: Mukundapur, 18 Oct. 1930, V. Narayanashwami 4674 (MH); Sambalpur Dist.: Motigharan Hill, 4 Sep. 1940, Mooney 1378 (DD); Padampur, 7 Nov. 1959, Panigrahi 21074; 31 Oct. 1959, Panigrahi 20539 (both CAL); Cuttack Dist.: Mukitola end point, 1 Feb. 1961, Panigrahi 23602 (ASSAM), Panigrahi 23625 (CAL).

Haines (l.c.) recorded its occurrence from Orissa, without citing the precise locality, and Mooney (l.c.), from Sambalpur, Redhakhol, Athgarh in Dhenkanal District, Keonjhar and Saxena et al., from Bhubaneswar.
Uses: In Malaya this weed of dry rice-fallows gets turned in at ploughing time to make green manure.


var. squarrosa


Caespitose annual with compressed slender stems. Leaves 1 mm broad, flat, filiform, prominently and evenly veined, pubescent. Inflorescence loose with many spikelets. Bracts 3-7, linear-lanceolate, dilated at base, hairy. Glumes with sharp excurrent keel. Anthers 0.5 mm long, oblong. Style 2-fid, hairy at the base; stigmas 2. Nut lenticular - obovoid, to 1 mm long, pale brown.

Fls. and frts.: Feb. - Apr.

Ecology: Shores of lakes, on sandy soil and open marshy places.

n = 10 (Mehra and Sachdeva, 1971).

Distribution: India, Pakistan, Nepal, Bangladesh, Japan, Korea, Thailand, Indo-China, NE - E China, S. Korea, Polynesia, Australia and New Zealand, Malesia, Africa, America.

Haines (l.c.) recorded it from the United Provinces to Lower Bengal and Bihar only.

Note: Kern (1957) distinguishes var. squarrosa from var. esquarrosa Makino (1903) and states that the latter occurs in the eastern range of the species from Thailand to New Zealand but var. squarrosa absent from Malesia. But Hooper (l.c.) points out that the glume acumen incompletely defines F. squarrosa and F. squarrosa var. esquarrosa and that the distribution separation between the two varieties is not possible. She records var. esquarrosa from Karnataka. If so, var. esquarrosa Makino must be treated as a synonym of var. squarrosa Vahl. Tanaka states that the chromosome number in var. squarrosa is n = 10 and in var. esquarrosa is n = 12.

Fimbristylis tetragona R. Br., Prodr. : 226. 1810; Haines, Bot. : 918; Mooney, Suppl. : 149, 261; Panigrahi et al., BBSI 6: 261; Rath et al., BBSI 21: 160.

Type-locality: "Littora Novae Hollandiae intra tropicum. Endeavour River et Bay of Inlets".

Caespitose robust annual and perennial, with quadrangular stems, 10 - 60 cm high. Leaves usually absent. Spikelets solitary, terminal, ovoid-globose or conical, 4 - 8 mm across. Glumes spirally disposed; nearly flat, with 2-3 lowest
glumae empty, not keeled. Anthers 2. Style persistent, base hairy; stigmas 2-3. Nut stipitate, 1.3 - 2 mm long, tuberculate, straw-coloured.

Fls. and frts.: Aug. - Dec.

Ecology: In open swampy places and rice-fields.

2n = 10 (Bijalingappa, 1979).

Distribution: India, Sri Lanka, China, Formosa, Malay Peninsula, Thailand, Maleesian Islands, Philippines, New Guinea.

Specimens examined: Crissa: ssp loc., Oct. 1941, Mooney
5 (Acc. No. 20007 - DD); Koraput Dist.: Sonabera plateau, 720 m, 30 Sep. 1949, Mooney 3676; Sambalpur Dist.: Bedrana, 330 m, Berma, 18 Oct. 1949, Mooney 3751; Keonjhar Dist.: Champa 450 m, 27 Sep. 1960, Mooney 4016 (all DD).

Mooney (i.e.) also recorded the species from Guzro, 259 m, in Sambalpur District and Panigrahi et al. (i.e.), from Kori Shanker in Bolangir District and Rath et al. (i.e.), from Bhubaneswar.

Note: The leafless quadrangular stems with solitary spikelets and linear-oblong nuts are very distinctive.


Type: "ex India Orientali" (C)

P. podocarpa Nees et Mayen ex Nees in Wt., Contrib. Bot. Ind.: 98. 1834, pp. typ.; Heine, Bot. 920; Mooney, Suppl.: 260; Raju, BESI 6: 234; Rath et al., BESI 31 : 160.
Type: China, Meyen.


F. diphylla (Retz.) Vahl var. pluristriata sensu Clarke, FBI 6: 637, 1893, et Ill. Cyp. t. 42, f. 3-4. 1909; Haines Bot.: 930; Mooney, Suppl.: 149; Panigrahi et al., BBSI 6: 261, non Back., 1849.

Caespitose annual with angular stems, 30 - 75 cm. tall. Leaves flat, acuminate, 2- 5 mm broad, ligulate; leaf-sheaths broad, tomentose. Inflorescence lax, with about 20 spikelets. Bracts foliaceous, hairy. Spikelets many flowered, with narrowly winged rhachilla. Glumes glabrous or pubescent on the midrib, 2.5 - 3 mm long. Stamens 2 (-1); anthers 2, linear. Style 2-fid, flattened, fimbriate; stigmas 2, shorter than the style. Nut slightly apiculate, lenticular.

Fls. and frts.: Jun. - Nov.

Ecology: In moist open places in light shade especially on the banks of the river and ponds and also in shades in forest margins.

2n = 10 (James W. Kessler, Taxon 32: 323. 1983).


Specimens examined: Kalahandi Dist.: Jantiabandha Mali, 1250 m, 17 Jul. 1949, Mooney s.n.; Sambalpur Dist.: Ambadhona, 250 m,
Rath et al. (l.c.) recorded this species from Bhubaneswar.

Note: Kern (1974) states "F. pluristriata (C.B.Clarke) Berh. and ........." are superfluous names of the African plant and specifically can not be separated from F. tomentosa. Although Kern (1955, 1974) and Kral (1971) consider F. podocarpa Nees, F. diphylla (Retz.) Vahl var. pluristriata Clarke conspecific with F. tomentosa Vahl, but Rath et al. (l.c.) pointed out that F. podocarpa Nees is distinct from F. diphylla var. pluristriata Clarke and that var. pluristriata Clarke should be given a distinct specific status both on morphological and cytological grounds. The plants with very shining hairy leaves and stems and characterized by many striated nuts are hexaploid with n = 15 in contrast to n = 5 in F. dichotoma (L.) Vahl and n = 10 in F. bisumbellata (Forssk.) Bob. and the confusion is substantially solved.

Fimbristylis tristachya R. Br., Prodr.: 226. 1810.

Type: Australia: Littora Novae Hollandiae intra tropicum, Robert-Brown - 5941 (K)

Stems, to 90 cm tall compressed. Leaves, narrow, rigidly pointed margins spinulose, scabrid towards the base, tough. Inflorescence with about 1-6 spikelets, lax. Bracts 1-2, rigid. Spikelets solitary, with winged rachilla. Glumes broadly ovate, obtuse, strongly cuspidate. Stamens 3; anthers filiform, 1 - 2 mm long; stigmas 2, shorter. Nut obovoid,
1.5 mm long, tuberculate.

Rare: Fls. and frts.: Jul. - Sep.

Ecology: Open grassy damp heaths and rice-fields between 200 - 500 m.

Distribution: From India to Micronesia and tropical Australia.

Specimens examined: Ganjam, Aug. 1804, Fischer and Gage 68 (CAL).

New Record for Orissa.

Note: F. sub-bispicata Nees at Meyen ex Nees and F. pacifica Ohwi are closely related to F. tristachya and hence were reduced to varieties of F. tristachya by Koyama, J. Fac. Sci. Univ. Tokyo III, 8: 114. 1961.

If sub-bispicata Nees indicated as a Synonym of F. tristachya then, this has been collected by Haines (Bot: 919. 1924, from Puri).


Type: F. umbellata Rottb.

1a. Perennial with creeping rhizomes; leaves with 3-5 veins.

1b. Annual; tufted or shortly rhizomatous; leaves with many subequal veins:
2a. Glumes few per spikelet, each with a stout, recurved, apical acumen; rhachilla obsolete; claw of scales shorter than the blade. ... ... F. uncinata

2b. Glumes many per spikelet, each with a ciliate, sub-apical arista, rhachilla slender; claw of scales as long as blade. ... ... F. ciliaris


Annuals. Stems obtuse - angular, terete or with rounded angles, pubescent at the top or often throughout. Leaves weak, pubescent. Spikelets many, terete. Glumes pubescent on the back, ca 1.7 mm long, with a sub-apical arista. Perianth biseriate; hypogynous scales cordate or hastate. Rhachilla slender. Anthers oblong. Style 3-fid; stigmas 3, as long as the style. Nut 0.8 - 1.2 mm long, smooth, surrounded by 3 long bristles and 3 quadrate scales.


Ecology: Common in marshy areas, rice-fields and river banks.

2n = 28 (Mijalingappa, 1977).
Distributions: India, Pakistan, Nepal, Burma, Sri Lanka, China, Japan, Malay Peninsula, Malasia to Australia.


Haines (l.c.) recorded the species from Sambalpur, Rath et al., (l.c.), from Ganjam and Khurda and Barmunda and Saxena et al. (l.c.), from Bhubaneswar in Puri District.


Type-locality: Surianam.

Robust, tufted, leafy perennials. Stems stout, bulbous at base. Leaves rigid. Inflorescence usually in round clusters of many spikelets. Spikelets pentangular when young, acute, but rounded in very dense clusters, squarrose. Glumes pubescent, 2-3 mm long with a recurved awn; Stamens usually 3 (-2); anthers linear-oblong to linear-lanceolate, 1-1.5 mm long.
Rare! Fls.: Aug.; frts.: Dec.

Ecology: In swampy grasslands, marshy rice-fields and sandy banks.

n = 38 (Nijalingappa, 1977).

Distribution: India, Pakistan, Burma, Sri Lanka, East Asia, Malaya, Malesia, North America.

Specimens examined: Ganjam Dist.: Dasingabadi, Feb. 1900, Barber 142 (MH); Dhenkanal Dist.: Jambua, 165 m, P1 Lahara, Mooney 3771 (DD).

Fischer (l.c.) recorded its occurrence from Ganjam, Rath et al. (l.c.), from Barmunda and Saxena et al. (l.c.), from Bhubaneswar in Puri District.

Note: Fulrena umbellata Rottb. is usually stouter and more glabrous than F. ciliaris (L.) Roxb., with broader leaves and much more compound inflorescence, but these characters are highly variable. Specimens with strongly pilose stems, leaf-blades and sheaths are very rare. The two species can always be distinguished with certainty by the quite different shape of the hypogynous scales: in F. umbellata Rottb. hypogynous scales about as long as the nut, subsessile (with a very short curved claw), obovate, narrowed at the base, truncate at the somewhat thickened top, the mid-nerve usually excurrent into a short curled mucro minutely ciliolate at the apex, 3-nerved, brown and in F. ciliaris (L.) Roxb., scales distinctly clawed, subquadrate, cordate or hastate at the base with 3 minute
teeth at the distinctly thickened top (central tooth largest), glabrous or minutely hairy at the apex.


_Scirpus uncinatus_ Willd., _Sp. Pl._ 1: 300. 1798.

**Type locality:** "Habitat in India."

A small annual with tufted stems. Leaves linear, acuminate, 3-5-ribbed. Spikelets few-flowered, in 1-3 simple or lobed clusters, ovoid, 3.5 - 5 mm long. Glumes few, each with a stout, recurved apical acumen. Rachilla obsolete. Style longer than the nut; stigmas 3. Nut surrounded by 3 short bristles, with hairy apex, investing the beak.


Ecology: On wet sandy banks of the river and sea.

**Zn = 36** (Nijasingappa, 1977).

Distribution: India, Pakistan, Bangladesh, Burma, Sri Lanka.

Specimens examined: Puri Dist.: Balukhand, near Puri, 25 May 1948, Mooney 3034 (DD).

Fischer (l.c.) recorded its occurrence from Ganjam; Mooney (l.c.), from Sar Lake 'Cut' at Balukhand near Puri and Rath et al. (l.c.), from Barmunda in Puri District.
Type: *L. argentea* R. Br., nom. illegit. \( \text{syn. } \text{Hypaealyptum argenteum} \) Vahl, nom. illegit.; = *Scirpus senegalensis* Lam.;

- *Lipocarpha senegalensis* (Lam.) Th. & H. Durand; ( = *L. chinensis* (Osbeck) Kern ) \( \text{syn. } \text{Hypaealyptum} \)


Species 15, tropical, American, African, Asiatic; 2 species occur in India including Orissa.

Note: The most important character of the genus lies in the two median, very thin hypogynous scales, adhering to the nut and they represent the perianth. These scales are homologous with the bristles in *Scirpus* L. and *Lipocarpha* R. Br.

The genus is divided into two sections. Sect. *Lipocarpha* includes *L. chinensis* (Osbeck) Kern.

Ecology: Semi-aquatic and marsh plants inhabiting wet muddy places along streams or swamped shallow water of ponds.

1a. Tracteoles 1.8 - 2.7 mm long, whitish; spikes whitish; achenes not beaked at apex. heads greyish-white or green or silvery; scales distinctly longer than the nut; glumes more than 2 mm long; style about half or more as long
as the nut. ... ... ... L. chinensis

lb. Bracteoles 1.2 - 1.5 mm long, glaucous green and stained with dark purple - brown on upper 1/3 to 1/4, hence spikes purplish-brown; achenes beaked at apex; heads red-brown or dark - brown; scales about as long as the nut; glumes less than 2 mm long; style less than half as long as the nut. ... ... ... L. sphacelata

Lipocarpha chinensis (Osb.) Kern, Blumea (Suppl.) 4: 167.1958,
Ceylons 5: 251. 1935.


Lectotype: Malabar, Osbeck s.n. (LUND) /– by Kern, l.c.J


Type: E. Senegal, D. Rousillon s.n. (P - Lam.).

1805, non Clarke, 1902.

Hypaelyptum argenteum Vahl, Enum. Pl. 2: 283. 1806, nom. illegit.

Type: Same as for Scirpus senegalensis Lam.


Type: Same as for Scirpus senegalensis Lam.

Lipocarpha argentea R. Br. in Tuckey, Narr. Exped. Congo :
477. 1819; Baines, : 929; Mooney, Suppl. : 151; Panigrahi et al.,
BBSI 6: 261, nom. illeg.

Type: Same as for Scirpus senegalensis Lam.


Stems 12 - 45 cm x 1 - 2 mm, stiff. Leaves rather stiff, spreading, flat or involute, 2 - 4 mm broad, smooth. Inflorescence a head. Spikelets 5-10, ovoid to ovoid-oblong, obtuse. Glumes membranous with triangular tips; scales much exceeding the nuts. Stamens 1-2; anthers ovoid to linear, to 1 mm long. Style 2-3-fid. Nut slightly curved, minutely apiculate.


Ecology: Abundant at the side of foot hills especially in swamps and rice-fields, rooting in mud close to water and not so common on lower altitudes.

2n = 26 (Nijalingappa et al., 1978).

Distribution: India, Pakistan, Nepal, Bhutan, Bangladesh, Sri Lanka, Eastern Asia to South Africa.

Specimens examined: Sambalpur Dist.: Sankaridih, 560 m, Pauri hills, Bamra, 27 Jun. 1949, Mooney 3442 (DD).

Haines (l.c.) recorded it from Barkuda in Chilka Lake, Rath et al. (l.c.), from Barmunda in Puri District and Panigrahi et al. (l.c.), from Harishankar (Panigrahi 21096) in Bolangir District and from Palaspal (Panigrahi 8484) and Baitarani source, Keonjhar District. (Panigrahi 8724) in Keonjhar District.
Note: Hypolytrum senegalensis (Lam.) L.C. Rich., (1805) based on Scirpus senegalensis Lam., (1791) is one of the syntype species of Hypolytrum L.C. Rich., (1805). Its inclusion in Lipocarpha R. Br. (1818), nom. cons. would have rendered the latter as a superfluous name (Art. 7.11 and Art. 63.1), but for the fact that Hypolytrum L. C. Rich. was lectotypified with H. latifolium L.C. Rich. to maintain their current usage as two good genera (vide Panigrahi, Taxon 34: 510-512, 1985).


Hypaelyptum sphacelatum Vahl, Enum. Pl. 2: 283, 1805.

Syntypes: Habitat prope Tranquebar, Koenig, Rottler.

Type: Coromandelia, Wight 1858.

Stems trigonous, compressed, 10 - 35 cm high. Leaves shorter than the stems with sphacelate apex. Heads reddish-brown or dark-brown; inflorescence - lobes 2-5. Spikelets usually 3-10, 3 - 6 mm long, ovoid. Glumes cuspidate, with triangular apex; hypogynous scales about equalling the nut. Stamens 2, linear; anthers erect, linear. Style 2; stigmas 3, shortly exerted. Nut ca 1.3 mm long, dark brown.

Fls. & frts.: Sep. - Nov.

Ecology: In moist grassy areas and marshy grounds in forest.
glades.

$2n = 38$ (Nijalingappa, 1978).

**Distribution:** India, Nepal, Sri Lanka, Thailand, to Central America.

Specimens examined: Ganjam Dist.: Gopalpur Road, 20 Oct. 1930, V. Narayanaswamy 4703 (MH); Sambalpur Dist.: Rout Para, Sambalpur, 340 m, 26 Sep. 1949, Mooney 2734; Badrama 330 m, Bamra, 18 Oct. 1949, Mooney 3720; Keonjhar Dist.: Champua, 430 m, 26 Sep. 1950, Mooney 4014 (all in DD).

Fischer (l.c.) recorded the species from Ganjam; Mooney (l.c.), from Bargarh plain, 250 m, in Sambalpur District and Rath et al. (l.c.), from Baliguda in Phulbani District.

**RHYNCHOSPORA** Vahl, Enum. 2: 229. 1805


Type: R. alba (L.) Vahl \( \times \) (Schoenus albus L.) (typ. cons.).

Species about 200, cosmopolitan in distribution, especially tropical, 8 species are found in India and only 3 in Orissa.

**Note:** Although Verma and Chandra (1982) record *R. gracillima* Thw. from Orissa, on the authority of Mooney (1950), the latter recorded this species only from Jashpur state, now a part of Madhya Pradesh.
la. Nuts laterally compressed, with its edge towards the axis of the spikelet, about as broad as long or narrower; bristles 6 or 0, scabrous, shorter or longer than the nut. ... ... R. rubra

lb. Nuts dorsiventrally compressed, with one of its faces towards the axis of the spikelet, always narrower than long; bristles at least some always longer than the nut:

2a. Bristles all scabrid in the upper part only, the 3 inner ones plumose at base; nut - beak with a median groove on each side; spikelets 1.25 cm long. ... ... R. longisetis

2b. Bristles all scabrid throughout, non plumose; nut-beak not grooved; spikelets 0.6 - 1 cm long. ... ... R. Nightiana


Type: "Littora Novas Hollandiae", R. Brown.

Slender, tufted annual, 10 - 55 cm high with glabrous stems. Inflorescence terminal, subglobose, rusty brown head. Bracts 5-6, spreading or reflexed, dilated and densely ciliate at the base. Spikelets numerous; lower female; upper male. Glumes 6-7, subdistichous, acute, keeled. Nut-bearing glumes 8-11 mm long; hypogynous bristles 3-6, all introsely scabrous.
Stamens 2; anthers linear. Style very shortly 2-fid, ca 5 mm long. Nuts sessile, with median groove on each side.

Rare: Fls. and frts.: Sep. - Dec.

Ecology: On grassy places especially on moist sandy soil.

Distribution: India, S-E Asia, Australia.

Specimens examined: Nil.

Mooney (l.c.) recorded the species from Redhakhol in Sambalpur District. Although Verma and Chandra (1982) cite "Kalahandi, Mooney 3675; Sambalpur, Motijhara hills, Mooney 2734" (DD) under this species, Mooney (1950) identified these specimens as R. wightiana Steud. and provided a key to diagnose the trop. species.

Rhynchospora rubra (Lour.) Makino in Bot. Mag. Tokyo 17: 130. t. 7f. la, b. 1903.

Type: Cochinchina, Lour.


Syntype-localities: Nepal, Ceylon, Amboina, China, Mauritius.

Perennial tufted herbs with stems leafy at the base only. Leaves many, half as long as the stems, narrowly linear, acute, strongly keeled. Spikelets numerous, densely clustered;
lower flowers female or bisexual, upper male. Glumes 5-8, lowest 3-4 short, subdistichous. Stamens 2-3; anthers linear-oblong, apiculate. Style very slender, scarcely bifid, 7-10 mm long; stigmas 2, longer or shorter than the style. Nut truncate, 1.5 — 3 mm long, blackish brown.

Rare ! Fls. and frts. : Jun. - Sep.

Ecology: Among the grasses of moist sandy or clayey soil, on grassy hills, in savannah forests etc.

Distribution: India, Pakistan, Nepal, Bangladesh, Sri Lanka, China, Japan, Mauritius, Amboina, Malaya, S. -E. Asia, Australia, Trop. Africa.

Specimens examined: Sambalpur Dist.: Suani, 210 m, Rairakhol, 3 Sep. 1950, Mooney 3993; Burhamal, 350 m, Rairakhol, 5 Sep. 1950, Mooney 3995 (both DD).

Note: The solitary, terminal, brown heads, with stellately spreading bracts are quite characteristic.

Rhynchospora wightiana (Nees) Steud., Syn. 2 : 148. 1855;
Mooney, Suppl. : 152, Kern'm Fl. Males. ser. 1, 7 (3) : 718;
Rath et al., BBSI 21 : 161.


Tufted annual with slender, striate, glabrous stems. Leaves many at the base of the stem only, flat or conduplicate. Inflorescence a terminal subglobose head; bracts 3-6, spreading
or reflexed. Spikelets numerous, 6 – 10 mm long. Glumes 6–7, subdistichous, keeled, acute, 3 or 4 lowest empty.
Stamens 2-3; anthers linear ca 1.5 mm long. Style very slender, scarcely or shortly bifid; stigmas 2, minute. Nut tuberculate, 2- 2.5 mm long, with compressed beak.

Fls. and frts.: Aug. - Dec.

Ecology: On moist sandy waste lands of the forests and also in rice-fields.

Distribution: India, Sri Lanka, Japan, Thailand to Vietnam, Malesia.

Specimens examined: Kalahandi Dist.: Junagarh, 250 m, 15 Dec. 1948, Mooney 3765; Sambalpur Dist.: Motijharan hills 310 m, 1 Sep. 1946, Mooney 2734 (both DD).

Rath et al. (l.c.) also recorded its occurrence from Sambalpur University Campus, Burla in Sambalpur District.

Scirpus L., Sp. Pl. 46. 1753; Haines, Bot. : 924.


S. lacustris L. has also been chosen as lectotype (vide N.L. Britton et A. Brown, Ill. Fl. N. US. ed. 2, 1: 336, Jun. 1913); this however, is not an historical acceptable selection.

Types *Scirpus maritimus* (L.) Palla (Scirpus maritimus L.).


Type: *H. isolepis* Nees.

*Isolepis* R. Br., Prodr. : 221. 1810.

Type: non designatus.


Type: *R. rehmanii* (Ridl.) J. Raynal (= *Scirpus rehmanii* Ridl.)


Type: *S. lacustris* (L.) Palla (Scirpus lacustris L.)(typ. cons.)


Note: Although Hooper (1976) and Koyama (1978) treat *Bulboschoenus* (Aschers.) Palla, *Isolepis* R. Br., *Rikiella* J. Raynal, *Hemicarpha* Nees and *Schoenoplectus* (Reichb.f.) Palla, (nom. cons.) as distinct genera, segregated from *Scirpus* L., they observe that further work is recommended to establish satisfactory boundaries for some of these genera.
whose justification at present depends on differences in embryo structure. Although *Schoenoplectus* (Reichb.f.) Palla (1828) is a nom. cons. against three other genera published in 1819 and 1831, its reduction is congeneric with *Scirpus* L. as may be justified on taxonomic grounds. Further, on accepting *Hemicarpha* Nees as a good genus, S. Hooper (1976) states, "belonging to a group of species, at present placed variously in *Scirpus*, *Cyperus* and *Lipocarpha*, which requires generic revision."

Nees (1834) established *Hemicarpha* Nees as a monotypic genus based on "*H. isolepis* N. ab. E. Wight, Prodr. Pl. Penin. Ind. Or." and described the genus as "*Perianthium propium univalve squamae oppositum*". Therefore, both *Hemicarpha* Nees and *Hemicarpha isolepis* Nees must be considered as validly described and the latter is not an illegitimate name for "*Scirpus hemisphaericus* A.M. Roth" as commented upon by Farr et al. (1979). Since the genus is validly described by Nees by June 1834 (cf. Hooper, 1976) attributing the authority for the genus to Nees ex Arnott (cf. Farr et al., l.c.) or to Nees et Arnott (cf. Airy Shaw, 1973) does not arise.

However, Kern (1974) in accepting *Scirpus* L. as a comprehensive genus states "The genus in comparison with other genera of this family is heterogenous. It comprises all the species of the Subfamily Cyperoideae left after the more or less homogenous genera have been taken out. The only characteristic of *Scirpus* L. as the spirally arranged glumes and the style not articulated with the ovary."
Several attempts have been made to split it up into a number of smaller genera, or to divide it into subgenera. These efforts have failed . . . . " as the resulting genera or subgenera are just as well heterogeneous and often a glomeratus of very dissimilar species. The only way out is to distinguish a numbers of sections, each comprising a set of probably allied species. Chermezon in Fl. Madagasc. Fam. 39: 141, 144. 1937; follows the same procedure.

We follow Kern's treatment and include all species from Orissa referable to the genera Bulboschoenus, Hemicarpha, Rikleiella and Schoenoplectypus, under Scirpus L. sensu lato. The 10 species of Orissa are referred to five of the 10 sections recognised by Kern as and diagnose the sections as follows:

Key to the Sections of Scirpus represented in Orissa
la. Spikelet not squarrose; perennial, or annual with nut more than 0.5 mm long;

2a. Involucral bracts several, foliaceous, flat; hypogynous bristles inconspicuous, shorter than the glumes or absent:

3a. Stem nodeless; leaves basal . . . . 1. Sect. Actinoscirpus (S. grossus L.f.)

3b. Stem noded, leafy. . . . . . . 2. Sect. Maritimi

S. maritimus ssp. affinis (Roth) Norl. J
2b. Involucral bracts non-folious, single, either looking like a continuation of stem, or glume-like, or absent:

4a. Stem tall, usually stout; bristles usually present; nut (1-) 1.5 - 2.5 mm long, smooth or transversely ridged. ... ... 8. Sect. Schoenoplectus (5 spp.)

4b. Stem low, setaceous; bristles absent; nut smooth, 0.75 - 1.5 mm long. ... ... 9. Sect. Isolepis.

(\item *S. setaceus* L.)

S. isolepis (Nees) Boeck.

1b. Spikelet squarrose by the recurved mucros of the glumes; small tufted annual with nut ca 0.5 mm long.

...... 10. Sect. Micranthi

(S. squarrosus L.)

Key to the species of Scirpus

1a. Inflorescence capitate or reduced to a solitary spikelet; glumes aristate or obtuse:

2a. Bracts narrow, to 2.5 cm long; glumes oblong-ovoid, obtuse; nut ovoid; hypogynous bristles absent. ...

...... S. setaceus

2b. Bracts foliaceous, 2.5 - 5 cm long; glumes ovoid-rhomboid, acute; nut ovoid-oblong; hypogynous bristles present or absent. ...... S. squarrosus
lb. Inflorescence anthelate, and if capitate or reduced to a solitary spike, then the glumes acute or mucronate:

3a. Hypogynous bristles/scales present:

4a. Inflorescence distinctly pseudolateral because of the solitary stem-like bract appearing as though a continuation of stem:

5a. Stems sharply triquetrous, usually stout; stigmas 3 (rarely 2) ........ \textit{S. mucronatus}

5b. Stems terete, usually slender; stigmas 2 ........ \textit{S. juncoides}

4b. Inflorescence distinctly terminal with 3-7 glumaceous or foliaceous bracts:

6a. Hypogynous scales ligulate-spathulate, plumosely fringed with antrorsed hairs ........ \textit{S. littoralis}

7a. Stems trigonous, acute ........ \textit{ssp. littoralis}

7b. Stems terete throughout, trigonous below the inflorescence ........ \textit{ssp. thermalis}

6b. Hypogynous bristles restrorsely scabrous:

8a. Leaves all basal; stem nodeless; stigmas 3; nut trigonous; glumes never 2-fid at the apex ........ \textit{S. grossus}

9a. Glumes with small mucro; bristles scabrous; stem smooth or slightly scaberulous at the top ........ \textit{var. grossus}
9b. Glumes more distinctly mucronate; weaker bristles villous to plumose; stem scabrous at the top. ... var. kysoor

8b. Stems noded, leafy; glumes 2-fid at the apex.

... S. maritimus

10a. Glumes reddish or dark-brown; nut plano-convex or trigonous.

... ssp. maritimus

10b. Glumes whitish-yellow, stramineous or silvery - membranous; nut lenticular.

... ssp. affinis

3b. Hypogynous bristles/scales: absent:

11a. Stems flowering nearer to the base. ... S. articulatus

11b. Stems flowering nearer to the top:

12a. Annual; flowering stems bearing 1-6 spikelets; style 2-fid. ... S. isolepis

12b. Annual or perennial; flowering stem bearing numerous (about 10) spikelets; style 3-fid.

... S. lateriflorus


Type: "Habitat in Malabariae aquosis arenosis, LINN 71. 4 (holotype, LINN; photo, p) (Cf. Raynal).
Fig. 25a. *SCIRPUS ARTICULATUS* L.

S. incurvatus Roxb., Fl. Ind. 1: 217. 1820.


Syntypes: Pen. India, Roxburgh; Wight; Silhet; Sagsen, Iravadi river; Kumaon, Wallich.

Stems fistular, to 60 cm long, spongy, smooth. Leaves indistinct, reduced to 1-2 bladeless, scarious, consisting of numerous spikelets. Spikelets terete, acutish, densely many-flowered, 5-15 mm long. Glumes ovate, entire, slightly keeled. Stamen usually 3; anthers oblong. Style slender with 3 branches; stigmas 3, shorter than the style. Nuts obovoid, 1.2-1.8 mm long, narrowed towards the base, apiculate(Fig. 25a).


Ecology: Mostly found in marshy ground, rice fields and along ponds.

Distribution: India, Pakistan, Nepal, Bangladesh, Burma, Sri Lanka, Australia, Malesia to Madagascar.


Saxena et al. (l.c.) recorded its occurrence from Bhubaneswar in Puri District. Haines (l.c.) cited its probable occurrence in Sambalpur.

Uses: It is used for mat making and medicinally it is used as a purgative.


Var. grossus
Stout perennial with rather long stolons ending in small tubers. Stems erect, sharply triquamous with concave sides, glabrous. Leaves 50 - 180 x 1 - 3 cm, stout. Inflorescence large corymbiform depressed, divaricate. Spikelets numerous, sessile and produced, ovoid to oblong-ovoid, densely many-flowered, 4 - 10 x 3 - 4 mm. Glumes ovate, membranous, with a small mucro. Stamens 3; anthers linear, scarcely crested. Style long, glabrous, 3-fid. Nut trigonous-obovoid, apiculate.

Fls. and frts.: Sep. - Dec.

Ecology: In swampy areas and along the streams and rice-fields.

Distribution: India, Bangladesh, Sri Lanka, Pakistan, S-E Asia, S. China, Bonin Islands, Malay Peninsula, Malesia.


Mooney (l.c.) recorded its occurrence from Baramba and Cuttack in Cuttack District; Rath et al., (l.c.), from Mancheswar and Saxena et al., (l.c.), from Bhubaneswar in Puri District.

Note: var. grossus. Leaves all basal, stem pubescent, stigmas 3; nut trigonous.
Uses: Coarse sleeping mats, bags and baskets are made from the plant. Stems are dried after removal one of the ribs and bleached in the sun.


Type: Roxb. Icon. : t 2017.


Type locality: Bengal.


Glumes more distinctly mucronate, the weaker bristles 6 villous to almost plumose by longer weaker hairs (but not multi-cellular) and the stems usually scabrous at the top. Stolons sometimes bearing black tubers 18 cm in diam.

Distribution: India (Bihar, Bengal, Assam, Orissa, Maharashtra). Endemic.

Specimens examined: Nil.

Haines (I.c.) cited its probable occurrence from Sambalpur.

Scirpus isolapis (Nees) Boeck., Linnaea 36: 498. 1870; Haines, Bot.: 994; Mooney, Suppl. : 150.

Type: non designatus.


Glabrous annuals with stems to 10.0 cm long, slender, clustered on a short rhizome, setaceous. Leaves 1-3, shorter than the stems, filiform, obtuse, 0.6-2.5 cm long, with red-brown sheaths. Spikelets rectangularly divericate, 20-40-flowered. Bracts erect, as though continuing stem. Glumes obovate, truncate, rarely mucronate. Stamen 1, lateral. Style very short, 2-fid, base dilated, deciduous; stigmas 2. Nut narrowly obovate, smooth, reticulate, black.

Rare; Fls. and frts.: Oct. - Jan.

Ecology: In exposed sandy grassy places.

Distribution: India, Thailand, Tropical Africa.


*Scirpus juncoides* Roxb., Fl. Ind. 1: 218. 1820.

Type: India (I)

*Scirpus erectus* sensu Clarke, FBI 6: 656. 1833; Haines, Bot.: 1250, 1258; Mooney, Suppl.: 150; Panigrahi et al., BBSI 6: 261. non Poiret, 1805.

*S. junceiformis* Nees in Wight, Contrib. Bot. Ind. 112. 1834, non Retz. (1791), nom. illegit.

Type: Same as for *Scirpus juncoides* Roxb.

Annual. Stems slender, 20 - 85 cm high, flaccid or rigid, terete. Leaves reduced to sheaths with an oblique, usually shortly cuspidate mouth. Inflorescence bearing clusters of spikelets, lateral on the stem, capitate. Glumes suborbicular-ovate with strong midrib. Spikelets sessile, ovoid or oblong-ovoid, 2-5 in a cluster, rarely solitary. Bristles 5-6, retrospectly hispid. Style 2-fid; stigmas 2. Nut broadly obovate or suborbicular, biconvex, apiculate.

Fls. and frts.: Most of the year.

Ecology: In marshy lands, especially in rice-fields, ditches etc.

n = 37 (Mehra and Sachdeva, 1979)

2n = 76 (Nijalingappa, 1972, 1976)

Distribution: India, Pakistan, Bhutan, E. Asia to Malesia, Philippines, New Guinea, Hawai, Madagascar.

Specimens examined: Koraput Dist.: Medeng Gandi, 1120 m, Jul. 1950, Mooney 3928; Kalahandi Dist.: Ampodar, 1130 m, 25 Dec. 1948, Mooney 3220; Puri Dist.: Taminda, 600 m, in Daspalla, 8 Mar. 1948, Mooney 1687; Dhenkanal Dist.: Kurab, 330 m, in Athmallik, 8 May 1947, Mooney 2867 (all DD).

Panigrahi et al. (l.c.) recorded its occurrence from Padmpur (Panigrahi - 21075) in Sambalpur District.
**Note:** *Scirpus erectus* Poir. which was hitherto considered as the correct name for this taxon is an African species and it is the correct name for *Isolepis uninodis* Del.


**Type:** Ceylon, Koenig s.n. (LD).


Tufted annual with weak, slender, terete, stems. One leaf-blade often developed, but usually leaves reduced to 2-3 sheaths. Inflorescence pseudolateral, with about 10 spikelets, sometimes capitate. One of the spikelets peduncled but all others sessile, oblong-ovoid, angular, acute, ca 6 x 2 mm, densely many-flowered. Glumes ovate, membranous, distinctly keeled, mid-vein distinct, nerveless. Stamens 3; anthers oblong with a produced connective, papillose-bristly at the top. Stigmas 3, as long as the style. Nut broadly elliptic to orbicular, 1.2 mm long, sharply
transversely rigid, black.

Fls. and frts.: Nov. - Jan.

Ecology: In plains and muddy rice-fields up to 300 m, often half submerged.

2n = 30 (Nijalingappa, 1972, 1974).

Distribution: India, Sri Lanka, E. Asia to Madagascar.


Mooney (l.c.) recorded this species from Talcher in Dhenkanal District, Panigrahi et al. (l.c.), from Bhatipather in Sambalpur District (Panigrahi 20655); and Saxena et al. (l.c.), from Bhubaneswar in Puri District and Rath et al., (l.c.), from Talcher in Dhenkanal District and Vani Vihar, Bhubaneswar in Puri District.

Note: Koyama (1978), distinguishes Schoenoplectus supinus (L.) Palla ssp. supinus from ssp. lateriflorus (J.F. Gmelin) Koyama as:

Achenes 1-1.3 mm with more weakly rugose sides and generally more obtuse glumes, amphicarps on basal sheaths usually present, bristles present ... subsp. supinus
Distrib.: Europe and W. Asia.

Achenes 1.4 - 1.5 mm long with pronounced rugose sides and less obtuse glumes and amphicarps on basal sheaths absent; bristles absent. ... subsp. lateriflorus

Distrib. India, Ceylon.

The type locality of *S. supinus* L. is Paris and it is restricted to Europe, whereas for *S. lateriflorus* J. F. Gmelin, Ceylon is the type locality.

Kern (1974) pointed out that *S. lateriflorus* J. F. Gmelin, belongs to a group of related species, which needs critical revision.

*Scirpus littoralis* Schrad. ssp. *thermalis* (Trabut), comb. nov.


Type: Biskra (K).


*Scirpus subulatus* Vahl, *Enum.* 2: 268. 1805; Robus and Tocernay,
S. littoralis sensu Haines, Bot. 927; Rath et al., BBSI 21: 161, non Schrad. 1806.

Perennial with stout rhizome and fibrous roots. Stems as thick as a crow-quill near the top, to 120 cm, terete throughout. Leaves 15 - 60 cm long, grass-like, membranous, often reduced to sheaths. Spikelets corymbose, pedicellate. Glumes elliptic-oblong, membranous, notched at the top, mucronate; keel produced into a cusp. Stamens 2 or 3, to 5 mm long, filaments broad; anthers slender, tipped with a red appendage. Style deeply 2-fid; stigmas 2, as long as style. Nut elliptic to obovate, smooth, 2.0 x 1.5 mm, long apiculate.

Fls. and frts.: Feb. - Apr.

Ecology: In shallow standing water.

2n = 36 (Baquar, 1969)
2n = 36 (Nijalingappa, 1972).

Distribution: India, Pakistan, Sri Lanka, S.-E. Asia to Australia.

Specimens examined: Sambalpur, Twiet 81515 (CAL); Puri Dist.: Chilka Lake, Feb. 1881, J.S. Gamble 9344 (CAL, DD); Puri Dist.: Cheraiakuda, Chilka Lake, 24 Apr. 1920, Annandale 9469 (BSIS).

Haines (l.c.) also recorded its occurrence from shallow waters of Chilka Lake in Puri District.
Note: Townsend (1962), Kern (1974) and S. Hooper (1976) all agree that *ssp. litoralis* Schrad. is subtropical in distribution from the Mediterranean to Japan, whereas *ssp. thermalis* occurs in the more tropical, warmer regions. Since no one has combined with grade of subspecies *thermalis* Trab. with *Scirpus litoralis* Schrad., the new combination proposed is called for *ssp. thermalis* is characterised by terete culms throughout except below the inflorescence whereas *ssp. litoralis* has sharply trigonous acute-culms throughout.


**Type locality:** India : United Provinces.


**Type locality:** India : Native of the soft, wet banks of Ganges.


Rhizomes creeping, woody, divided, nodes dilating into tubers. Stems slender, trigonous, 20 cm high, often covered some way up by sheaths. Leaves grass-like. Umbellate inflorescence very variable in development, compound, simple or capitate.
Spikelets large, 3-8 or solitary in each ray, or umbel rarely reduced to a head of 3-1 spikelets; lowest bracts often 7.5-30 cm long. Glumes erect, sparingly hairy. Stamens 3; anthers red-crested. Style long; stigmas 2. Nut smaller, obtusely trigonous, smooth.

Rare: FIs. and fits.: Feb. - Jul.

Ecology: On sandy bed and very often in saline soil.

Distribution: India, Pakistan, Nepal, Bhutan, Burma, Bangladesh, China, Thailand, Vietnam, Indonesia, Turkey, Afghanistan.


Mooney (l.c.) also recorded this species from sandy bed of Mahanadi in Sonepur in Bolangir District.

Uses: Root is used as an astringent and diuretic.

Note: Clarke (1896) described S. maritimus L. var. affinis (Roth) Clarke different from the typical variety (S. maritimus L. var. maritimus) by its few pale large spikelets and 2-fid style. Although Kern (1961) listed Scirpus affinis Roth as a good species, he (1974) observed, "In my opinion . . . . .
nor *Scirpus affinis* can be separated specifically from *Scirpus maritimus* L."

*Scirpus mucronatus* L., Sp. Pl.: 50. 1753; Haines, Bot.: 926; Mooney, Suppl.: 150.

*Type locality:* Southern Europe. (Type in London) (Cf. Fl. USSR).

*S. triangulatus* Roxb., Fl. Ind. 1: 219. 1820.

*Type:* Native of Chittagong, Roxburgh.


*ssp. mucronatus*

Perennial with robust stems. Leaves radical or reduced to sheaths with oblique rounded mouth. Inflorescence borne above the middle of the stems, pseudolateral, capitate. Spikelets few to many in a cluster, ovoid to oblong-ovoid. Glumes broadly ovate, acute, often apiculate; keel inconspicuous. Style 3-fid, puberulous, 2-2.5 mm long; stigmas 3, rarely 2. Nut broadly obovate, apiculate, bicnövex, plano-convex or subtrigonoous.

*Fls. and frts.*: Nov. - Feb.

*Ecology:* In swamy grasslands and rice-fields, often half submerged.

*n = 22* (Bir et al., 1981)

*Distribution:* India, Pakistan, Nepal, Bhutan, Bangladesh.
Burma, Sri Lanka, E. Asia to Thailand, Madagascar, Mediterranean Europe.

Specimens examined: Koraput Dist.: sine loc. 19 Dec. 1963, G. V. Subba Rao 30387 (CAL); Sundargarh Dist.: near Toda, 700 m, in Bonal, 25 Feb. 1946, Mooney 2612; Mayurbhanj Dist.: Similipal, 850 m, 15 Apr. 1939, Mooney s.n. (both DD).

Uses: Stems are dried and flattened for making cheap durable mats, bags and the strings. In Sumatra (West Coast) the species is cultivated for this purpose.

The two sub-species are distinguished as follows:

la. Glumes moderately adpressed and tightly imbricated with flat back and margins; much larger plants both vegetative and in flower parts — ssp. robustus.

lb. Glumes smaller and with convex back and involute margins; much smaller plants both in vegetative and floral parts... ssp. mucronatus

Note: Vivipary has been observed by Rao and Verma in a collection from Manipur (Panigrahi 13485).


Type locality: Europe.

Isolepis setacea (Linn.) R. Br., Prodr. : 78. 1810.

Annuals with slender tufted roots. Stems slender. Sheaths of lower leaves purple, with narrow conduplicate blades. Inflorescence, containing a simple pseudo-lateral 1-spikelet, small; involucral bracts erect, appearing as continuation of the stems, to 2.5 cm long. Spikelets obovoid-ovoid, 2-4 mm long. Glumes dark purple, with a broad green stipe, 1.5 - 2.0 mm long. Stamens 1-2. Stigmas 3. Nut ovoid with convex faces, trigonous, prominently longitudinally ribbed, transversely striate.

Very rare in our locality. Fls. and frts. : Jul.-Sep.

Ecology: Near water and wet sandy soil.

Distribution: India, (Kashmir, Punjab, Himachal Pradesh, Uttar Pradesh, West Bengal, Sikkim, Arunachal Pradesh, Assam, Nagaland, Mizoram, Manipur, Meghalaya, Tripura, Orissa); Pakistan, Nepal, Bhutan, Bangladesh, China, U.S.S.R., Australia, Africa, Iran, Mediterranean Europe.

Specimens examined: Puri Dist.: Khurda Road, 25 Aug. 1906, Burkill 27442 (BSIS).

New record for Orissa.

Type: Inde, Koenig in Linn'e 71. 49 (Holotype-LINN.; Photo-P).


Tufted annuals with capillary fibrous roots. Stems to 30 cm high, filiform, terete, striate. Leaves shorter than the stems, filiform, ca 1 mm broad, acuminate, erect. Involucral bracts usually 2, one is erect and the other if present, patent to reflexed. Spikelets sessile, ovoid to subcylindric, obtuse. Glumes closely imbricate, squarrosely spreading and recurved, narrowed above into a curved awn. Stamens 1 or 2; anthers minute, oblong, apiculate, yellow. Style indistinctly 3-fid; stigmas 3, minute, recurved. Nut trigonous, ca 0.5 mm thick, brownish black.

Fls. and frts.: Sep. – Apr.

Ecology: Occasionally found in grass-fields near water.

n = 20 (Mehra and Sachdeva, 1971)


Specimens examined: Ganjam Dist.: Gopalpur, 19 Dec. 1889; Prain s.n. (CAL); Kalahandi Dist.: Champabandh Mali, 1200 m,
17 Sep. 1949, **Mooney** 3515 (DD); Sambalpur Dist.: Malda, 29
Oct. 1959, **Panigrahi** 20596; Puri Dist.: Kharuda, 1889, **Walsh**
S.n.; Balukhand Reserve Forest, 31 Apr. 1965, **V. Abraham** 201;
Konark, Coast, 4 Dec. 1965, T.A. Rao 5963 (all CAL); Puri
beach 8 Dec. 1926, **N.K.C. Patnaik** s.n. (Rev. Coll. Herb.);
Cuttack Dist.: C.R.R.I., Cuttack, 18 Sep. 1961, **G.N. Mitra** s.n.
(CAL); Sandkud, 13 Feb. 1961, **Panigrahi** 23843 (ASSAM).

Mooney (l.c.) also recorded it from Sambalpur, Kapoor (l.c.),
from Mahendragiri hills in Ganjam District and Rath et al.
(l.c.), from Hanspal in Puri District and Saxena et al. (l.c.)
from Bhubaneswar in Puri District.

*SCLERIA* Bergius, Kongl. Vetuske Acad.
Handl. 26 : 142, t. 4, 5. 1765; Haines, Bot. : 930; Mooney,
Suppl. : 153.

Type: *S. flagellum - nigrorus* Berg.

Key to the Sections of *Scleria* Berg.

1a. Perennial:

2a. Hypogynous disk well developed. ... 2. Sect. *Scleria*

2b. Hypogynous disk much reduced, obsolete. Nut bearing
(or all) spikelets bisexual; nut trigonal with 3 basal
depressions. ... 3. Sect. *Corymbosae*

1b. Annual:

3a. Inflorescence linear, spiciform, unbranched, without
leafy bracts. ... ... 5. Sect. *Hypoporum*
3b. Inflorescence otherwise with leafy bracts:
   4a. Nut-bearing spikelets with at least 3 glumes.
       ... 6. Sect. Tessellatae
   4b. Nut-bearing spikelets with 2 glumes.
       ... 7. Sect. Diplacrum

Oriissa plants belong to 5 section out of 8 proposed by Kern (1974).

Key to the species

1a. Annual; inflorescence spiciform; spikelets in clusters of 2-5:

2a. Cluster of spikelets subtended by a foliaceous bract;
    female glume tridentate. ...  S. caricina

2b. Cluster of spikelets subtended by a glumaceous bract;
    female glume entire. ... ...  S. pergracile

1b. Annual or perennial; inflorescence paniculate, of a terminal and usually also of lateral partial panicles;
    spikelets solitary or in clusters:

3a. Glumes clothed with long spreading hairs.
    ...  S. rugosa

3b. Glumes glabrous or puberulous:

4a. Hypogynous disc reduced to a narrow band.
    ...  S. lithosperma

   (i) Plants slender to medium; nut smooth, white.
    ...  var. lithosperma
(ii) Plants stouter; nut larger with pyramidal acute apex and transversely ridged surface, ferrugineus. ... var. linearis

4b. Hypogynous disk well developed, usually 8-lobed.

5a. Hypogynous disk-lobes hemispherical, rounded at the top:

6a. Contraligule with cartilaginous, incrassate margin, not appended; nut ovoid or broadly ovoid, 3-3.5 mm long, obtuse. ... S. psilorrhiza

6b. Contraligule with a scarious, brown band-like appendage; nut ovoid or globose, 2.5-3 mm long, apiculate. ... S. terrestris

5b. Hypogynous disk-lobes ovate-lanceolate, acute, mucronate or notched at the apex, or disk not lobed:

7a. Perennials with distinctly woody rhizome. S. levis

7b. Annuals with fibrous red roots:

8a. Disk triangular with rounded angles, not lobed. ... S. annularis

8b. Disk deeply lobed:

9a. Nut with purplish-black beak, the lacunae on the surface of the nut square to broader than long. ... S. biflora

9b. Nut with white beak, the lacunae on the surface of the nut mostly longitudinally elongate:
10a. Lateral panicles erect; peduncles rigid, usually short. ... ... S. tessellata

10b. Lateral panicles pendulous; peduncles long and flexuous. ... ... S. parvula

Scleria annualris \(/-\) Kunth, \(\text{Novum. Pl.}\) 2: 359. 1837, \(\text{nom. nud.}\)/
Nees ex Steud., \(\text{Syn.}\) 2: 176. 1855; Boeck, \(\text{Linnaea}\) 38. 456. 1874;
Haines, \(\text{Bot.}\) : 932; Mooney, \(\text{Suppl.}\) : 153; Rath \(\text{et al.}\), \(\text{BBSI}\) 21: 161.

**Type:** "India orientali, no specimen mentioned, Boeck. (l.c.)
cites "Hooker et Thoms" hb. Ind. or." (P).

**Hypoporum annulare** Nees, \(\text{Linnaea}\) 9: 303. 1835, \(\text{nom. nud.}\).

Annual with slightly hairy rhizomes. Stems triquetrous, 
retrosely scabrous on the angles. Leaves gradually narrowed 
to the obtuse tip, antrorsely scabrous on the margins. Sheaths 
not winged or indistinctly 3-winged, to 3 mm long. Bracts erect, 
much longer than the panicle, exerted. Spikelets almost sessile, 
glabrous, bisexual; male spikelets lanceolate, ca 3 mm long; 
female or nut-bearing spikelets 4 mm long. Glumes broadly 
ovate-lanceolate, mucronulate, scabrid on the keel. Stamens 
2-3; anthers linear. Style 3-fid; stigmas 3. Nut ovoid.

**Rare! Fls. and Frts.:** Aug. - Nov.

**Ecology:** In swamy shallow grass land and sandy soil.

**Distribution:** India, Central China, Malesia, New Guinea 
(discontinuous distribution).
Specimens examined: Koraput Dist.: Sonabera plateau, 780 m, 2 Oct. 1949, Mooney 3690 (DD).

Haines (l.c.) cited its probable occurrence in Sambalpur.

Note: Very similar in Habit to S. tessellata Willd. but is differentiated in dense compound panicle, truncate disk and quite smooth shining white nut.


Type: Bengal, Roxburgh (BM).

S. tessellata var. biflora (Roxb.) Clarke, Ill. Cyp. 127.1909.

ssp. biflora

Glabrous annual with slender, smooth, tufted, leafy stems. Leaves weak, abruptly pilose; sheaths narrowly winged, membranous, with ciliate margins. Inflorescence narrow, elongate, consisting of 2-4 panicles, with 3 lower branches remote; terminal panicle 2-4 cm long, somewhat longer than the lateral ones; bracts erect, longer than the panicle. Spikelets either male or female; male spikelets lanceolate, 3-4 mm long. Stamens 2-3; anthers ca 1 mm. Female or nut-bearing spikelets obovoid, 4-4.5 mm long with 1-2-male or barren flowers at the base. Nut globose or slightly depressed, tessellate, beaked with the black or purplish style-base.

Fls. and frts.: Jul. - Dec.
Ecology: In moist grasslands by the side of the stream and pond, mostly during rainy season. Also in gravelly substratum.

Distribution: India, Nepal, Sri Lanka, E. Asia to Malaysia, Philippines.

Specimens examined: Sambalpur Dist.: Motijheran forests, 210 m, 3 Sep. 1948, Mooney 3105; Dechuan, 350 m, Barapahar, 18 Jul. 1949, Mooney 3598 (both DD).

Mooney (l.c.) also recorded it from Sambalpur.

Uses: In Java, it is eaten with rice for its fragrance.

Note: Kern (l.c.) points out that the species can well be distinguished by its globose, deeply cancellate, black-tipped nut, deeply pitted between the long disk-lobes and strong camphor-smell of the roots.

This species resembles, S. tessellata Willd., but can be distinguished as follows:

The lobes of the disk-margins are short, ovate, erect, thin, pale in S. tessellata Willd., whereas lobes of the disk-margins are lanceolate, acute or subulate, erect, stout, ferruginous brown in Scleria biflora Roxb.


Diplacrum carolinum R. Br., Prodr.: 241. 1810; Mooney, Suppl.: 154; Rath et al., BBSI 21: 158.

Type: Endeavour river, Banks and Solander (BM).
D. zeylanicum Nees in Wight, Cotrib. Bot. Ind. : 119. 1834; 
sensu Mooney, Suppl. : 153, non Poir., 1806.

Very slender glabrous plant with tufted stems. Leaves 1-5 cm x 
2 - 5 mm, lanceolate, rather abruptly narrowed into the acute 
tip; sheaths trigonous. Spikelets all unisexual, terminal 
spikelets female and lateral females, 1-2 mm long, few flowered;
female spikelets without a trace of male flowers, finally almost 
cylindric, 2 - 3 mm long. Glumes 2, ovate-lanceolate, boat­
shaped, obtuse or marginate, 3-lobed. Stamen 1; anthers oblong, 
ca 0.3 mm long. Style 3-fid; stigmas 3. Nut depressed-globular 
to ovoid-globular, irregularly ribbed.


Ecology: In moist open grass lands, sunny road sides and 
river banks, up to 1200 m.

Distribution: India, Burma, Sri Lanka, China, Japan, 
Micronesia, Malaya, Malesia, Australia, Africa.

Specimens examined : Sambalpur Dist.: Gumloi, 250 m, 23 
Nov. 1947, Mooney 2976 ; Motijheran, 220 m, 30 Nov. 1947, 
Mooney 3982 ( both DD ).

Note: In this species the epidermal cells on the upper side 
of the glumes of the male spikelets are much inflated.

Scleria levis Retz., Obs. 4: 13. 1786; Rath et al., BBSI 21: 
161; Koyama, in Dassn. et Fosb., Rev. Handb. Fl. Ceylon 5 : 

Type: Ex India Orientali, dudum habin (LD).


Type: In Ceylon insula, Macrae (CGE).

*S. habecarpia var. pubescens* (Steud.) Clarke, *Fl.* 6: 689.

Perennial with woody nodose rhizomes and stout root-fibres. Stems 30 - 100 cm high or more, triquetrous, rather stout. Leaves rigid, narrowed to the obtuse tip, flat, multistriate with usually scabrous margins, 3-veined. Sheaths closed, sharply trigonous, the mouth truncate with an ovate, coriaceous, pubescent ligule. Spikelets all unisexual, solitary or in small clusters; male lanceolate, 3-4 mm long; females 4-6 mm long. Glumes 3, ovate, acute, mucronate, 3-4 mm long; disk 3-lobed, developed. Stamens 3. Nut reticulate, globose to broadly ellipsoid.


Ecology: In wet ground or shady places, among tall grasses and bushes, to 1500 m.

Distribution: India (Uttar Pradesh, Bihar, West Bengal, Assam, Arunachal Pradesh, Meghalaya, Nagaland, Orissa, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh, Tamil Nadu, Karnataka, Kerala); Pakistan, Nepal, Sri Lanka, E. Asia to tropical Africa.
Specimen examined: Sambalpur Dist.; Motijharan Hills, 280 m, 3 Sep. 1948, Mooney 3013 (DD).

Mooney (l.c.) also recorded the species from Sambalpur, Hindol in Dhenkanal District.

Note: A small and slender species among its relatives and for this reason sometimes confused with S. lithosperma, but easily distinguishable by the presence of a well-developed hypogynous disk.


var. lithosperma


Perennials with hard, nodose, rhizome, up to 90 cm high. Stems not tufted, 45-90 cm long, very slender, trigonous, smooth. Leaves somewhat aggregated towards the middle, narrowly linear, 1-4 mm broad; sheaths closed. Inflorescence paniculate. Spikelets few, mostly bisexual, with 1 female flower and a few to several male ones, ca 3.5 mm long. Glumes ovate-lanceolate, mucronulate. Stamens 1-2. Style short; stigmas 3, longer than the style. Nut ovoid to oblong-ovoid, obtusely trigonous,
hypogynous disk minutely glandular.


Ecology: In moist sandy places of semi-evergreen forests.

Distribution: India, Sri Lanka, Thailand to Australia.

Specimen examined: Ganjam Dist.: Parlakimedi, 29 Sep. 1903, Grant, Candler and Burkhill 20422 (SSIS).

Rath et al (l.c.) reported its occurrence from Lanjigarh in Kalahandi District.


Type: Queensland: Brisbane R.: F. Muller (K)


Hypopoporum roxburghii Nees Mss.

Type: Ceylon, Thwaites C.F. 2687 (CGE, BM, 80, K, P).

Plants rather stouter. Panicles, much more rigid, subpyroidal. Clusters of spikelets more numerous and dense. Transverse ridged surface making the nut large with pyramidal sub-acute apex, transversely wrinkled by ferrugeneous glands; ovoid-viscidous in upper margins.

Ecology: Preferably growing in moist semi-evergreen forests.
Distribution: India, Sri Lanka, Thailand to New Guinea.

Distribution: India, Sri Lanka to tropical Australia.

Specimen examined: Nil.

Fischer (l.c.) recorded it from Ganjam.

Note: Kern (1961) pointed out that the additional characters often given for distinction were unreliable.


Type: India, Hohenacker 1295 (BM, K, L, P, M, UPS).


S. uliginosa Hochst. ex Boeck., Linnaea 38: 471, 1874.

Type: India, Hohenacker 1295 (BM, K, L, P, M, UPS) (Cr. : Cachura).

Stems slender. Leaves rather suddenly narrowed to the obtuse tip, glabrous; sheaths rather loose, winged; contraligula short, rounded or truncate, with narrow, membranous, ciliate margins. Inflorescence a narrow panicle oblong. Spikelets unisexual; male spikelets shortly peduncled, lanceolate, 4-5 mm long; female spikelets 5-7 mm long, without a barren or male flower besides the female one. Glumes ovate or ovate-lanceolate, acute or mucronulate, stramineous. Stamens 2-3; anthers linear, to 1.5 mm long. Nut shorter than the glumes,
ellipsoid or subglobose.

Fls. and frts. : Sep. - Nov.

Ecology: Occasionally found in moist grass-fields of low altitude, preferably in waste lands.


Specimens examined : Nil.

Panigrahi et al. (l.c.) recorded the plant from Saptadhar in Keonjhar District (Panigrahi 21013).


Type: Sylhet, Wallich 3406 (K, OGE; dupl. in L, P).

A very slender, lemon-scented annual. Stems glabrous, smooth, leafy throughout. Leaves bright green, narrowly linear, acutish, glabrous, scabrid towards the top, 0.5-2 mm broad; sheaths narrow, not winged. Inflorescence linear, unbranched, spiciform, 5 - 15 cm long, consisting of 5-25 sessile clusters of spikelets. Spikelets numerous, bisexual. Glumes ovate-lanceolate, boat-shaped, those of the male flowers thinly membranous. Stamens 2; anthers linear, ca 1 mm long. Nut shorter than the glumes,
trigonous, tuberculate.

Fls. and frts.: Sep. - Dec.

Ecology: In slopes, swampy grounds and in rice-fields.

Distribution: India, (Uttar Pradesh, Bihar, West Bengal, Assam, Nagaland, Meghalaya, Orissa, Madhya Pradesh, Karnataka), Pakistan, Nepal, Bangladesh, Sri Lanka, S.-E. Asia to N-E New Guinea, Australia.

Specimens examined: Koraput Dist.: Barara, 780 m, in Sonabera, 1 Oct. 1949, Mooney 3683 (DD).

Uses: Lemon-scented leaves are used to drive away mosquitoes; leaf-juice is used against fever, foot and mouth diseases. In New Guinea, they are eaten with salt.


Type: "A Calcutta communica"a, specimen in fine fruit (K)

Robust glabrous, perennial, with creeping stolons clothed, long, lanceolate, striate, purplish sheaths. Stems wiry slender, creeping or erect, triquetrous. Leaves chartaceous, flat, rather gradually narrowed to the slender acute tip, or premorse. Inflorescence dense, narrow, consisting of a terminal panicle up to 7-10 x 1.5 - 2.5 cm long, and often - 2 smaller lateral ones. Spikelets female (or bisexual) and male, 2-3-together, reddish brown; male spikelets shortly peduncled, lanceolate;
nut-bearing spikelets broadly ovoid, 5 mm long, with a sterile or male flower besides the females one. Disk triangular, reflexed, shallowly or hardly 3-lobed, lobes very obtuse. Nut large, ovoid or broadly ovoid, smooth, very shining.


Ecology: In small glade in Sal forests, and in moist grass-lands.

Distribution: India (West Bengal, Orissa, Madhya Pradesh), Thailand, Cambodia, W. Java, Philippines, New Guinea, N. Australia.

Specimens examined: Sambalpur Dist.: Near Brahmani village in Reirakhhol, 13 Sep. 1950, Mooney 4012 (DD).

New Record for Orissa.

Note: The only Asian species sometimes showing the curious characters of the 'premorse' leaves in which the lower part broadens by a continuation of the wings of the leaf-sheath, with 5 principal veins. Leaves become suddenly narrow towards the apex. The distal part is therefore more narrower than proximal part with only 3 principal veins.


Type: Australia, Endeavour River, Banks and Solander (BM).

S. zeylanica sensu Nees in Wight, Contrib.: 118. 1834, p.p., excl. syn., S. thwaitesiana, non Poir. 1806.
Annual with slender, obliquely erect or decumbent stems. Leaves rather abruptly narrowed; sheaths loose, from sharply triquetrous to distinctly winged. Inflorescence consisting of a terminal (pseudolateral) panicle and 1-2-lateral, remote fascicles of panicles not markedly different from the terminal one. Spikelets unisexual. Glumes ovate, acute or mucronulate. Stamen 1; anther oblong, 0.5–0.6 mm long. Style 3-fid; stigmas 3. Nut shorter than the glumes, globose or slightly depressed, terete, apiculate.


Ecology: In open swampy places and abundant rice-fields; and also on stony ground.

Distribution: India, (Assam, Orissa, Madhya Pradesh, Andaman, and Nicobar Islands), Burma, Sri Lanka, E. Asia to New Caledonia.

Specimen examined: Sambalpur Dist.: Motijharan forest, 310m, 3 Sep. 1948, Mooney 3103 (DD).

Note: A very variable species. The plants may be almost glabrous or softly pilose all over; the nuts smooth or tuberculate-rugose; the leaf-sheaths wingless or broadly winged. It is clearly distinct from Scleria thwaitesiana Boeck. (1874), the latter with stiffly erect stems, the rigid, narrow leaves, the very short contraligule, the setaceous peduncles of the lateral panicles, the obtusely trigonous, muticus nuts and hardly lobed disk (Kern, 1974).

Scleria terrestris (L.) Fasset., Rhodora 26: 169. 1924; Rath


*Type:* "Habitat in Malabarae, Katu - Tsolam", Rheed, Hort. Mal. 12: 113, t. 60. 1703.

*Diaphora cochinchinensis* Lour, Fl. Cochinch. 1: 578. 1790.

*Type:* "Habitat inculta in agres Cochin - Chinae." (BM).


Tall perennial. Stems slender to very robust, scabrid, leafy throughout. Leaves scattered, 5-35 mm wide. Inflorescence branched, very variable in size; panicles single at nodes. Spikelets not crowded, unisexual, solitary or 2-3-together; male spikelets lanceolate; female spikelets broadly ovate. Stamens 3; anthers linear. Nut ovoid, white, with a quadrately tassellate or reticulate pattern of hairy ridges.

Ecology: Common on swampy and sandy alluvial banks near the streams of the forests under shade.

Distribution: India, Nepal, Bhutan, Sri Lanka, E. Asia to Australia.

Specimens examined: Koraput Dist.: Bhalupadar valley, 1300 m, near Potangi, 14 Jul. 1950, Mooney 3939 (DD); Ganjam Dist.: Chamundya, 19 Oct. 1931, V. Narayanaswami 8734 (MH); Sambalpur Dist.: Bhatipathar, 1 Nov. 1959, Panigrahi 20816; Keonjhar Dist.: Keonjihargarh, 8 Jul. 1957, Panigrahi 8734 (both CAL).

Haines (l.c.) recorded the occurrence of the plant from Mayurbhanj; Fischer (l.c.), from Mahendragiri, 1450 m, in Ganjam District; Mooney (l.c.), from Rontha plateau, 880-950 m, Bonai and Gangpur, 700 m in Sundargarh District and from Kalahandi - 1050 - 1600 m; and Rath et al. (l.c.) from Baikunthpur, Bhadrak Sub-Division in Balasore District, Mayurbhanj and also from Barmunda in Puri District.

Note: On critical studies of the herbaria of N-E India deposited in ASSAM, Rao and Verma (1982) have concluded that the species being polymorphic in nature, has been confused, and led the cyperologists to give several names to this species.


Type: "Habitat in India Orientali." Herb. Willdenow 17323,
Annual with black red fibrous roots. Stems slender, 30-60 cm high, triquetrous. Leaves linear-acuminate, with subobtuse tip. Panicle subracemose, narrow, 2.5 - 5 cm long, glabrous. Spikelets clustered in the axils of rigidly acuminate keeled bracts averaging ca 1.25 cm long with margins and keel scabrid; bisexual spikelets few, or 0. Anthers with a large apiculus; female spikelets ferrugineous-green, glabrous, 4 mm long; female glume broadly ovate-cymbiform, cuspidate; disk small, salver-shaped, 3-lobes of margins triangular. Styles 2-fid; stigmas 3. Nut glabrous, 2.5 mm long and 2 mm in diam., white, tessellate.


Ecology: Seasonally on damp ground.

Distribution: India, Nepal, China, Japan, Malay, trop. Africa.

Specimens examined: Sambalpur Dist.: Mrisingnath temple, 11 Nov. 1959, Panigrahi 210136; Keonjhar Dist. Saptadhar, 600 m, 8 Nov. 1959, Panigrahi 21018, 21013 (all CAL).

Note: This species is characterised by male spikelets almost sessile, distinctly larger than peduncles; nuts cylindrical, less lacunose with narrower wall between the pits; disk-lobes broad, very obtuse, almost rectangular (Kern., 1961).
As a result of critical studies involving the Monocot flora of Orissa, it has been possible to sort out the reported occurrence of more than 260 species belonging to as many as 99 genera of the Poaceae Barnhart within the boundaries of the modern Orissa state.

In the arrangement of the 90 odd genera of the Gramineae Juss., Haines (1921) followed largely Stapf in Flora of Tropical Africa (1919) and classified the genera in 10 groups (= tribes), 10 Groups (= Subtribes), plus 17 genera, each according to him, constituting an unnamed unigeneric tribe. He could not bring himself to recognise subfamilies within the Poaceae. Bor (1960) excluded Bambusa and its allies from his treatment of the Grasses of Burma, Ceylon, India and Pakistan and classified the remaining genera of the grasses from the area in two GROUPS (subfamilies): the Panicoideae and the Pooideae. While recognised three tribes in the former, he recognised as many as 17 or more tribes in the latter (Pooideae), and of which, the tribe No. 12 Oryzeae comprised Hygroryza, Oryza and Leersia and the tribe no. 16 Triticeae included Triticum and Hordeum. Airy Shaw (1973) stated that 50 to 60 tribes have been recognised and grouped
into varying number (2-13) of subfamilies in the past and that at present it seems preferable to arrange the tribes tentatively in 19 GROUPS, the tribe Bambuseae representing the Group I and the Group 19 comprising 3 tribes, the tribe no. 59 Maydeae culminating his classificatory system of the Gramineae Juss.

It is clear then, that the classification of the Poaceae Barnhart with the partial exception of Bor (1960), who did not deal with the subfam. Bambusoideae, is not in conformity with Arts. 4 and 5 of the ICBN (1983).

Realising such a lacuna in the classification of the cosmopolitan family Poaceae Barnhart is a bottle-neck to the progress of science, Clayton and Renvoize (1986) have proposed a new system of classification of the family in which they recognise 651 genera in the world flora. In proposing the system, they not only took into cognisance the spikelet structure, the anatomy, cytology and physiology to discern parallel evolution, but also the photosynthetic metabolism of the taxon involved. The insight thus gained, has opened the way for fresh approach to the classification of grasses in which physiology stands alongside classical morphology, they state and propose a phylogenetic system in which three lines radiate from a common ancestor (of Fig. 5).

Within the Poaceae Barnhart, Clayton and Renvoize (1986) recognise six subfamilies, 40 tribes and 22 additional subtribes limited to only six tribes, the other tribes being more or less uniform to make it unnecessary to split them into subtribes.
More than 80 genera of the Poaceae reported from Orissa to-date are shown below in the classificatory system of Clayton and Renvoize (l.c.) to allow researchers on the flora of Orissa to arrange and publish their data in a most modern phylogenetic system not easily accessible within India.

I. Subfamily Bambusoideae Asch. & Graeb.

Tribe Bambuseae Nees


Tribe Pooideae Dumort.


II. Subfam. Pooidae Macfarlane & Watson

Tribe Aveneae Dumort.


Tribe Triticeae Dumort.


III. Subfam. Centothecoideae Soderstrom

Tribe Centothecae Ridley


IV. Subfam. Arundinoideae Tateoka

Tribe Arundineae Dumort.


Tribe Thysanolaenae C. E. Hubbard

17. Thysanolaena Nees
Tribe Aristideae C.E. Hubbard

18. Aristida L.

V. Subfam. Chloridoideae Rouy

Tribe Eragrostideae Stapf

19. Leptochloa P. Beauv. (Diplachne P. Beauv.)
20. Cropetium
21. Fragrostis Wolf. 22. Eragrostiella Bor
Wild. 26. Desmostachya (Hook. f.) Stapf 27. Sporobolus
R. Br. 28. Myriostachya (Benth.) Hook. f. 29. Tripogon
Roem. et Schult.

Tribe Cynodonteae Dumort.

33. Microchloa R. Br. 34. Melanotrichis Nees (Gracilea

VI. Subfam. Panicoideae R. Br.

Tribe Paniceae R. Br.

40. Panicum L. 41. Cyrtococcos Stapf 42. Alloteropsis Presl
43. Brachiaria (Trin.) Griseb. 44. Echinochloa P. Beauv.
45. Sacciolepis Nash 46. Urochloa P. Beauv. 47. Paspalum L.
Hall. 51. Paspalidium Stapf 52. Pseudoraphis Griff.
56. Spinifex L.

Tribe Isachneae Benth.

57. Isachne R. Br. 58. Coelschne R. Br.
Tribe Arundinelleae Stapf

59. Garnotia Brongn. 60. Arundinella Radii 61. Jansenella Bor

Tribe Andropogoneae Dumort.

62. Saccharum L. 63. Miscanthus Anderss. (Sclerostachya
(Hack.) A. Camus 64. Imperata Cyr. 65. Eulalia Kunth
(Puliculum Haines; Pseudopogonatherum A. Camus)
66. Pogonatherum P. Beauv. 67. Eulaliopsis Honda (Mar. 1924)
(Pollinidium Haines, Apr. 1924) 68. Microstegium Nees
69. Sorghum Moench. 70. Pseudosorghum A. Camus
71. Chrysopogon Trin. (Pollinia Spreng.) 72. Dichanthium
Milletet 73. Vetiveria Bory 74. Capillipedium Stapf
75. Bothriochloa Kuntz. (Amphilophis Nash) 76. Euclasta
French. 77. Apocopes Nees 78. Escaemenum L. 79. Apluda L.
80. Sehima Forssk. 81. Dimeria R. Br. 82. Andropogon L.
(Hypogynium Nees; Dietomus Kunth) 83. Cymbopogon Spreng.
84. Schizachyrium Nees 85. Arthraxon P. Beauv. 86. Lophopogon
Hack. 87. Ophiuros Geertn. 88. Iseilema Anderss. 89. Themeda
Forssk. 90. Pseudanthistiria (Hack.) Hook.f. 91. Coelorachis
94. Rottboellia L.f. 95. Hackelochlos Kuntze 96. Mesithea
99. Coix L.

It may be seen that of the six subfamilies of the Poaceae
Barnhart, the Subfam. Panicoideae A. Br., with 64 of the 99 genera
is the most dominant one, followed by the subfam. Chloridoideae
Rouy with 20 genera, the remaining subfamilies accounting for
only 18 genera. Another point of interest is that the genera
Ofyza L., Hygroryza Nees and Leersia Sw. are segregated from the Pooideae sensu Bor (1960) to the subfam. Bambusoideae Asch. & Griseb. on the basis of fusoid anatomy and embryo structures.

As many as 11 genera sensu Haines (1934) are reduced as congeneric synonyms: Cephalestachyum Munro (= Schizostachyum Nees); Diplachne Beauv. (= Leptochloa Beauv.); Gracilea Hook.f. (= Melanocenchris Nees); Plicatum Haines (= Eulalia Kunth);
Pseudopogonatherum A. Camus (= Eulalia Kunth); Pollinia Spreng. nom. rejic. (= Chrysopogon Trin.); Pollinidium Haines (Apr. 1934) (= Eulaliopsis Honda (Mar. 1934); Amphilophis Nash (= Bothriochloa Kuntze) Hypogynium Nees and Dictomics Kunth, nom. cons. (= Andropogon L.); and Euchlaena Schard. (= Zea L.).

The genus Oxytenanthera Munro is now treated as monotypic—

T. abysinica (A. Rich.) Munro is restricted to Tropical Africa.

Cultivated species: Sorghum bicolor (L.) Moench.; S. cernuum Host. var. globosum (Hack.) Snowden; S. roxburghii Stapf var. fulvum (Hack) Snowden, S. Stapf var. nanum Snowden, S. cernuum Host. var. yemense (Koern) Snowden, S. conspicuum var. orientale Snowden, S. conspicuum var. usaramense (Busse et Pilger) Snowden; S. miliiforme (Hack.) Snowden; S. miliiforme (Hack.) Snowden var. rotundulum, S. nervosum Busse ex Schult., Zea mays L., Setaria italicca (L.) P. Beauv., Triticum aestivum L. are cultivated throughout for grains and fodder.

N.B. While the Thesis is ready for submission, the following species of grasses viz. Pseudodraphis spinescens (R.Br.) Vick.; Selerostachya fusca (Roxb.) A. Camus; Pspsalum canaree (Steud.) Veldk. var. fimbriatum (Bor) Veldk.; Cropetium thomaeum (L.f.) Trin., Eudlasta clarkei (Hack.) T. A. Cope are reported as New Records for Orissa (Panda et Choudhury, 1984).
Key to the Genera of the Tribe Baunbuseae

1a. Ovary appendage long, stiff, tapering...Schizostachyum
1b. Ovary appendage broadly conical and fleshy:
  2a. Florets separated by a rhachilla internode, of if 1-flowered then rhachilla extension present..........................Bambusa
  2b. Florets arising at almost the same level and deciduous together, if 1-flowered then rhachilla extension absent:
  3a. Palea of all florets 2-Keel...Gigantochloa.
  3b. Palea of sole or uppermost floret rounded on back..................Dendrocalamus

Key to the genera of the Tribe Oryzaceae

1a. Spikelet with 2 sterile lemmas below the fertile floret, bisexual:
  2a. Leaf- margins tuberculate - spiny........Porteresia
  2b. Leaf- margins smooth or scabrid ........Oryza
1b. Spikelets strictly 1- flowered:
  3a. Leaf- blades linear; floret not acuminate, not stipitate..................Leer-sia
  3b. Leaf- blades elliplic; floret acuminate, stipitate..........................Hygroryza

II POCIDAE

Genus of the Tribe Festae ..............Lolium
Genus of the Tribe Avenae ............Avena

Key to the genera of the Tribe Triticeae

1a. Spikelets in group of 2 or more at each node of raceme ..................Hordeum
1b. Spikelets borne singly at each node... *Triticum*

**III - CENTOTHECOIDEAE**

Genus of the Tribe Centothiceae... *Centotheca*

**IV - ARONDINOIDAE**

Key to the genera of the Tribe Arundineae:

1a. Plants tufted with basal leaves... *Elytrophrus*

1b. Plants reed-like with cauline leaves:

2a. Lowest floret bisexual; callus not elongated, glabrous... *Arundo*

2b. Lowest floret male or empty; callus elongated with silky hairs... *Phragmitis*

Genus of the Tribe Thysanolaenaneae... *Thysanolaena*

Genus of the Tribe Aristideae... *Aristida*

**V - CHLORIDOIDEAE**

Key to the genera of the Tribe Eragrostideae (11 genera)

1a. Spikelet with 1 fertile floret, sunk in the rhachis of a solitary raceme, edge way on, covered by upper glume; lower glume small or suppressed... *Oropetium*

1b. Not as above:

2a. Spikelets strictly 1-flowered, rarely with rhachilla extension; inflorescence a panicle... *Sporobolus*

2a. Spikelets 2- or more-flowered (rarely 1-flowered but then the inflorescence of racemes... *Leptochloa*):

3a. Tip of lemma emarginate to 2-3-lobed of flanks hairy between lateral nerve and margin or florets conspicuously bearded from Callus.
4a. Inflorescence a panicle or head, sometimes much reduced...........................Eragrostis

4b. Inflorescence composed of distinct racemes: ..............................................

5a. Inflorescence of single racemes, these not deciduous; spikelets glabrous.........Tripogon

5b. Inflorescence of 2- many racemes, sometimes single, but then the lemmas hairy:

6a. Rhachilla persistent, or upper part of spikelet shed as a whole; pericarp free.....Acrach

6b. Rhachilla disarticulating between florets:

7a. Raceme rhachis terminating in a bristle.........Eragrostis

7b. Raceme rhachis terminating in a spikelet ......

8a. Spikelets laterally compressed, small, 1.5-5(≈7) mm long; usually imbricate, on clearly secund racemes..................Leptochloa

8b. Spikelets subterete, large, 5-15 mm long, usually distant, on indistinctly secund racemes...Diplachne

9a. Raceme single ......................................................Eragrostiella

9b. Racemes 2 or more:

10a. Inflorescence digitate or ± whorled; fruit with free pericarp :

11a. Racemes terminaling in a fertile spikelet; grain trigonous .........................Eleusine

11b. Racemes terminaling in an abortive spikelet or bare point.

12a. Paleas or some of them, remaining on rhachilla........Acrach
Palea falling with lemmas..............Dactylocteniam
Inflorescence of racemes disposed singly along a central axis:
Racemes persistent; glumes acute........Desmostachya
Racemes deciduous; glumes awned........Myriostachya
Key to genera of the Tribe Cynodonteae (8 genera)
Fertile lemma 3-awned or with 3 triangular lobes,
with or without short additional lobes; inflorescence of solitary or scattered racemes....Melanocenchris
Fertile lemma entire to bilobed, with or without a single awn, rarely 3-awned and then either racemes subdigitate or lemma deeply cleft into 2 hyaline lobes:
Racemes deciduous or spikelets falling entire:
Lower glume well developed..................Perotis
Lower glume very small or suppressed:
Spikelets 2 or more on short racemelets.....Tragus
Spikelets borne singly on the central axis...Zoysia
Racemes persistent; spikelets breaking up at maturity:
Lemma concealed; both glumes exceeding and closed around florets:......................Microchloa
Lemma exposed; one or both glumes shorter than florets, or if longer than divergent:
Leaf-blades narrowly lanceolate, without midrib, distichous; glumes subequal, as long as spikelet..Gymnopogon
Leaf-blades linear to filiform with midrib, not clearly distichous; glumes, or at least the lower, shorter than spikelet:
Spikelet 1-flowered; lemmas awnless............Cynodon
7b. Spikelet 2- several - flowered, or the lemma
sinurously awned ............................................. Chloris

VI. PANICOIDEAE

Key to the genera of the Tribe Paniceae

1a. Inflorescence compound, forming a dense head
or fascicle intermingled with subtending sheaths........ Spinitex

1b. Inflorescence simple, rarely ( Pennisetum ) borne
on axillary branches and aggregated into a loose
compound panicle:

2a. Spikelets, singly or in clusters, subtended by 1 or
more bristles; bracts or sterile spikelets and
deciduous with them:

3a. Inflorescence with distant or conjugate raceme-
like branches; involucre ± spinous................. Trachys

3b. Inflorescence spiciform; involucre composed of
several to many bristles:

2b. Spikelets not subtended by bristles, or if so
these persistent on branches:

4a. Upper lemma cartilaginous to chartaceous or rarely
hyaline, the margins flat and usually hyaline:

5a. Branches of the inflorescence ending in a long
bristle....................................................... Pseudoraphis

5b. Branches of the inflorescence ending in a spikelet:

6a. Inflorescence a panicle................................. Hymenachne

6b. Inflorescence of racemes............................. Digitaria

4b. Upper lemma coriaceous to bony at maturity with
m inrolled or flat margins, sometimes thinner but
then margins inrolled:
7a. Spikelets, at least those terminating a branch, subtended by 1 or more bristles, or the raceme rhachis prolonged into an often obscure point:

8a. Inflorescence usually a panicle all or most of the spikelets subtended by bristles............ Setaria

8b. Inflorescence of racemes, only the terminal spikelets subtended by an inconspicuous bristle or point ........................................... Paspalidium

7b. Spikelets not subtended by bristles, nor raceme rhachis prolonged into a subulate point:

9a. Upper floret laterally compressed............. Cyrtococcum

9b. Upper lemma dorsally compressed or gibbously terete:

10a. Upper lemma with decurrent wings or scars at the base:

11a. Glumes rounded; spikelets dorsally compressed... Panicum

11b. Glumes keeled; spikelets laterally compressed.. Ichnanthus

10b. Upper lemma without basal wings or scars:

12a. Spikelets supported on a globular bead.......... Eriochloa

12b. Spikelets without a bead, though sometimes with a cylindrical stipe:

13a. Inflorescence a panicle, sometimes irregularly contracted about primary branches............ Sacciolepis

13b. Inflorescence of + unilateral racemes, the spikelets usually single or paired but sometimes in irregular clusters or short secondary racemelets:

14a. Glumes or lemmas awned:

15a. Spikelets laterally compressed, in 2 rows, often sticky............................................ Oplismenus

15b. Spikelets dorsally compressed:
16a. Upper lemma awned, crisply chartaceous......Alloteropsis
16b. Upper lemma awnless, ceriaceous ............Echinochloa
18b. Upper lemma rarely mucronate and then spikelets plump.........................Brachiaria
17a. Lower glume absent, rarely minute.............Paspalum
17b. Lower glume present :
18a. Upper lemma mucronate; spikelets plano-convex, cuspidate.........................Urochloa
18b. Upper lemma rarely mucronate and then spikelets Plump..........................Brachiaria

Key to the genera of the Tribe Isachneae
1a. Upper lemma indurated .....................Isachne
1b. Upper lemma membranous....................Coelachne

Key to the genera of the Tribe Arundinelleae
1a. Spikelets 1-flowered, falling entire........Garnotia
1b. Spikelets 2-flowered, usually breaking up:
2a. Upper lemma hairy ......................Jansenella
2b. Upper lemma scaberulous ................Arundinella

Key to the Genera of the Tribe Andropogoneae
1a. Spikelets not paired, unaccompanied by a vestige:
2a. Raceme rhachis tough .....................Dimeria
2b. Raceme rhachis fragile ....................Arthraxon
1b. Spikelets paired, but sometimes one of them vestigial:
3a. Spikelets or at least one of each pair bisexual:
4a. Rhachis internodes and pedicels slender, sometimes thickened upwards but then the upper lemma awned or the callus rufously bearded:
5a. Pedicelled spikelet similar to the sessile, both fertile (Occasionally the pedicelled O in. Microstegium):
6a. Inflorescence a panicle, with elongated central axis:
7a. Raceme rhachis fragile; one spikelet of the pair sessile..........................Saccharum

7b. Raceme rhachis tough; both spikelets pedicelled...Imperata

6b. Inflorescence of single or subdigitate racemes:

8a. Inflorescences axillary:

9a. Spikelets laterally compressed.......................Pogonatherum

9b. Spikelets dorsally compressed; never a lower glume raised...............................Bulaliopsis

8b. Inflorescence terminal:

10a. Lower glume convex to flat, rarely slightly concave; erect grasses with narrow leaf-blades; spikelets conspicuously hairy:

11a. Upper glume not awned it awned, then the awn not more than 0.3 cm long.........................Eulalia.

11b. Upper glume awned, awn 0.7-1.5 cm long........Pseudopogonatherum

10b. Lower glume concave to grooved along median line; rambling grasses with broad leaf-blades; spikelets seldom copiously hairy............................Microstegium

5b. Pedicelled spikelet differing from the sessile in shape and sex:

12a. Inflorescence a panicle with elongated central axis; raceme internodes never with translucent median line:

13a. Lower glume of the sessile spikelet dorsally compressed:

14a. Glumes of the sessile spikelet coriaceous; panicle usually loose, of short racemes.............Sorghum

14b. Glumes of sessile spikelet firmly cartilaginous; panicle dense, of moderately long racemes....

...............Pseudosorghum
13b. Lower glume of the sessile spikelet laterally compressed:

15a. Raceme compressed of several to many spikelet pairs; awns slender or inconspicuous......* Vetiveria

15b. Raceme reduced to a triad; awns usually prominent.......* Chrysopogon

12b. Inflorescence of single or subdigitate racemes, with an elongated central axis but then raceme internodes with a translucent median line:

16a. Sessile spikelet fused to exxtriform cruciform homologous pairs and awned..................* Iseliema

16b. Sessile spikelet separately deciduous (rarely attached to homologous pairs but then awnless):

17a. Pedicels and internodes with a translucent median line:

18a. Inflorescence a panicle; racemes of 1-5(-8) sessile spikelets .....................* Capillipedium

18b. Inflorescence of single or subdigitate racemes, rarely paniculate and then 2 racemes bearing more than 8 sessile spikelets.............* Bothriochloa

17b. Pedicels and internodes without a translucent median line:

19a. Lower floret of sessile spikelet male, with a palea:

20a. Pedicel barren..........................* Apocopis

20b. Pedicel bearing a spikelet:

21a. Ligule a line of hairs ......................* Sehima

21b. Ligule membranous:

22a. Sessile spikelet dorsally compressed; racemes usually 2 or more.................* Ischaemum

22b. Sessile spikelets laterally compressed;
racemes single, spathe......................* Apluda
19b. Lower floret of sessile spikelet barren and reduced to a lemma.

23a. Upper lemma of sessile spikelet awned from low down on back....................Arthraxon

23b. Upper lemma awned from tip, or sinus of bilobed tip, rarely awnless.

24a. Lower glume of sessile spikelet 2-keeled (merely sharply inflexed in some species of Schizachyrium); Callus ± inserted in hollowed internode tip.

25a. Racemes single; lower glume of the sessile spikelet ± convex, the keels lateral to frontal, with intercarinal nerves...........Schizachyrium

25b. Racemes digitate or paired, rarely single and then the lower glume nerveless along the midline; lower glume of sessile spikelet concave or grooved between the keels, theses these lateral or dorsal (rarely slightly convex):

26a. Racemes not deflexed (except A.pumilus), borne upon unequal terete raceme- bases; leaves not aromatic...........................................Andropogon

26b. Racemes usually deflexed at maturity and borne upon subequal flattened raceme- bases, seldom exceeding the spathiole in length; leaves nearly always aromatic; compound panicle dense; profusely branched...........Cymbopogon

24b. Lower glume of the sessile spikelet convexly ± rounded without keels, sometimes with a median groove but then the callus applied obliquely to the internode with its tip free (or raceme
reduced to a single spikelet); internodes and pedicels linear:

27a. Raceme with or without homogamous pairs, if present not forming an involucre:

27b. Raceme with or without homogamous pairs, not forming an involucre:

28a. Sessile spikelet subterete; the callus pungent. *Hetropogon*

28b. Sessile spikelet dorsally compressed; the callus obtuse:

29a. Inflorescence spathate .................... *Pseudanthistiria*

29b. Inflorescence terminal, sometimes axillary but then subtending sheath not inflated............. *Dichanthium*

4b. Rhachis internodes and pedicels stout, thickening upwards; upper lemma awnless:

30a. Pedicels free from internodes................... *Coelorachis*

30b. Pedicels fused to internode, sometimes only in lower half or tip:

31a. Pedicelled spikelet absent....................... *Mnesithea*

31b. Pedicelled spikelet present:

32a. Rhachis of raceme tough ...................... *Hemarthria*

32b. Rhachis of raceme fragile:

33a. Lower floret male; spikelets always smooth... *Rottboellia*

33b. Lower floret barren; spikelets usually sculptured.....

........... *Hackelochloa*

3b. Spikelets unisexual, with male and female spikelets in separate inflorescences or in different parts of the same inflorescence:

34a. Internode broader than and + enclosing female spikelet... *Zea*

34b. Internode narrower than and + enclosed by female spikelet:

35a. Sheath subtending raceme herbaceous............ *Chionachne*

35b. Sheath subtending racemes indurated and forming an ovoid utricle around the female spikelet........... *Coix*
Fig. 26. Aerachne racemosa. A. Plant.  
B. Inflorescence. C. Spikelot.  
D. Upper glume. E. Lemma.  
F. Palea. G. Stamens and Pistil.
Acrachne R. Wright et Arnott ex Chiovenda


Type: A. verticillata (Roxb.) Chiov. (Fleusiana verticillata Roxb.).
Monotypic, distributed in India, Abyssinia, Thailand, Vietnam, Indomalaya, Australia.

Acrachne racemosa (Hayne ex Roem. et Schult.) Ohwi, Bull. Tokyo Sci. Mus. n. 18: 1, 1947; Bor, Grass.: 487.

Fleusiana racemosa Hayne ex Roem. et Schult., Syst. Veg. 2: 583, 1817.

Type: "Habitat in India Orientali", Hayne (B).

Tufted erect annual. Culms 15-95 cm high. Leaves flat, rather broad, flaccid, blades 7-30 x 0.3 - 1.25 cm, rounded at the base, tapering to a fine hair-like tip; sheaths compressed; ligule closely ciliate, hyaline. Spike up to 15 cm long. Spikelets 6-25-flowered, 5.5 - 13 mm long, overlapping, shining. Glumes unequal; the lower linear-oblong, 1.2-2.9 mm long, acute and mucronate; the upper lanceolate, 1.5-3 mm long, acuminate, glabrous, awned; lemmas narrowly ovate, 2.1-2.8 (-5) mm long; keel excurrent; lateral veins ending in small teeth; lowest lemma 0.3-3.5 mm long, truncate or 2-toothed, caudate. Stamens 3; anthers oblong. Styles 2; free. Grain black, oblong, 0.8 - 1.1 mm long, rugose (Fig. 26).

Fls.: Aug.

Ecology: Preferably growing in plains.

2n = 36 (Bor l.c.)

Distribution: India, Pakistan, Burma, Sri Lanka, Tropical Africa, Australia, Southeast Asia, Afghanistan.

Uses: It is a good fodder liked by cattle.

Note: Ligule although characteristically membranous, is derived from the ciliate type, as in _Fragostis_. The outer surface is pilose, so that the whole structure appears to be composed of hairs which have partially fused to form a membrane.


_Type:_ A. distachya K.B. Presl.

1a. Perennial; base of the culm very thick, covered with silky bases of old sheaths; leaf-blades linear to linear-lanceolate, narrow, flat at base; spikes subdigitate; spikelets lanceolate, 6 mm long, often dark brown; upper lemma with a long arista . . . . A. semialata

1b. Annual; base of the culm not as above; leaf-blades ovate to ovate-lanceolate, rounded-cordate at base; spikes subverticillate; spikelets 3-4 mm long, usually green; upper lemma abruptly or shortly aristate... . . . . A. cimicina


1919; Haines, Bot. 1009; Bal, RBSI 6(10): 118, 1942; Mooney, Suppl. 172; Bor, Grass. 276; Cope, in Nasir et Ali, Fl. Pakistan. 143 :214. 1982.

_Milium cimicinum_ L., Hort. All. 2 : 184. 1771.

_Type:_ "India; Habitat in Malabariae at oppidi Johannis Platteis", Koenig 55 (LD).
**Panicum cimicinurn (L.) Retz., Obs. Bot. 3: 9. 1783.**

Annual. Culms to 100 cm high, branches ascending from the root. Leaves ovate or ovate-lanceolate, 1.25 - 11 x 0.4 - 1.6 cm, with cordate base, bulbose-based or tubercle-based hairs on the margins; sheaths and ligules hairy. Spikes simple or 2-furcate, 4-8 in a terminal whorl, 5-23 cm long. Spikelets 3-6 mm long, dorsally compressed, 1-3-nate on short slender pedicels, excluding the slender awns, ovate to ovate-lanceolate. Upper glume fringed with dense pink hairs; upper lemma, membranous, slightly hardening in fruit, with a very slenderawn 0.5 - 1 mm long. Lodicules 2, cuneate. Stamens 3; anthers long. Styles 2, distinct, free; stigmas plumose. Grain small, sub-orbicular, dorsally compressed.

Fls. and Frts.: Jun.-Oct.

Ecology: Common in abandoned grasslands and other moist places in the rainy season under light shade.

Distribution: Throughout India and Old World tropics.

Specimens Examined: Koraput Dist.: Ganupur, 17 Jul. 1949, Mooney 3537; Mayurbhanj Dist.: Bhanjpur Railway line, 27 Jun. 1940, *sine lect* 858 (both DD); Bhanjpur, 45 m, 27 Jun. 1940, *sine lect* 856 (all BSIS).


Type locality: Australia.

Perennial grasses, 60-90 cm high arising from a bulbous root-stock, clothed with densely pilose sheaths. Stems glabrous, nodes bearded, base thickened by silky remains of old sheaths. Leaves linear-lanceolate, 7.5-25 x 0.7 - 1 cm, sparsely hairy; sheaths silky or hairy along the margins, ligule membranous. Spikes 2-5, digitate or sub-digitate, 3.75-
15 cm long; rhachis hairy or villous. Spikelet lanceolate, 5-6 mm long, vary from 1-4-nate. Lower glume 2.5 mm long, purplish, scarious, ovate; other glumes subequal; upper glume elliptic, strongly 5-veined, ciliate, cuspidate; lower lemma lanceolate, 3-veined, with hyaline palea. Lodicles 2. Stamens 3. Style 2, distinct, with plumose stigmas. Grain small, suborbicular.


Ecology: A grass of open deciduous forests, at about 1000 m.

Distribution: India, Australia, and Tropical Africa.

Specimen Examined: Mayurbhanj Dist.: Jaranda, Similipahar, 5 May 1981, Saxena et Brahman 4369 ( RRL, Bhubaneswar).


Lectotype: A distachya L. (Vide Clayton et Renvoize, l.c.)

1a. Racemes 2, secund, 1.25 - 2.5 cm long; lower glume of the sessile spikelet concave, strongly compressed so that the margins almost meet in the middle line; upper glume mucronate or minutely cuspidate; awn of upper lemma 0.7-1.5 cm long; glumes and lemma of the pedicelled spikelet muticous; culms up to 60 cm high; leaves 2.5 - 20 cm long, 2.5 - 5 mm wide, quite glabrous . . . . . . . . . . . . . . . . . A. pumilus

1b. Racemes 3-5 (rarely 2), 2.5 - 6.5 cm long; lower glume of the sessile spikelet shallowly concave, flat or slightly convex, with a slit
Andropogon ascinodis C.B. Clarke, J. Linn. Soc. (Bot.) 25: 87, t. 36, 1889; Fischer in Gamble, Fl. Madras: 1758, 1934; Mooney, Suppl.: 189; Bor, Grass.: 90.

Type: Jakpho, C.B. Clarke 41890.

A. apricus sensu Hook. f., FBI. 7:169, 1896; Haines, Bot.: 1044; non Trin., 1836.

Perennial. Culms clustered, branched above, lower leaves 30-90 cm long, upper 25-50 x 0.5-0.7 cm, cauline, thinly hairy on the veins above, those on shoots pubescent; ligule oblong, truncate, ciliolate; branches with slender peduncles sheathed with a spatheform leaf-sheath bearing racemes. Sessile spikelets 4-5 mm long, callus shortly bearded. Lower glume 4-4.7 mm long, linear to linear-oblong; keels not winged; upper 3-7.5 mm long with firm awn, cymbiform, hyaline 1-veined; lower lemma narrow; upper lemma shortly 2-fid. Lodicules 2. Stamens 3. Styles 2 with exerted stigmas. Pedicalled spikelets + dorsally compressed, never concave or channelled. Lower glume bicuspidate from the shortly excurrent keels and often with a fine scabrid awn, 0.6-1 cm long; keels ciliate. Upper lemma short, hyaline, finely awned with 3 stamens and a 3-fid quadrate scale.


Ecology: Sporadic in mixed deciduous hill forests.

Distribution: India, Endemic.

Mooney (l.c.) recorded this species from Jorjam forest, Gangpur in Sundargarh District and from Sonabera plateau in Koraput District respectively.

Uses: It is readily eaten by cattle.

Fl. Ind. 1: 277. 1820; Haines, Bot.: 1044; Mooney, Suppl.: 189;
Bor, Grass.: 93.

Type: A native of Coromandel, Roxb. Lc. 2020 (K; CAL).

Small, tufted grass, with culms 10-60 cm high, slender, decumbent below, quite glabrous. Leaves linear, acuminate; sheaths compressed. Ligule short, truncate, membranous, glabrous. Racemes in nearly equal pairs on a very slender peduncle arise from a narrow, flattened, glabrous spathe, 0.6 - 1.25 cm long. Sessile spikelets 4-5 mm long, dorsally compressed; callus glabrous. Glumes 4; lower glume 4-5 mm long, linear to linear-lanceolate, acuminate, membranous, bicuspidate, with strong keels awned; upper glume chartaceous. Lemma hardly 3 mm long, linear-lanceolate, subacute upper ca 2 mm long, narrowly linear. Pedicelled spikelets 3-6 mm long, not awned; pedicels 3 mm long with ciliate margins. Glumes 3; lower 4-5 mm long, ovate-lanceolate, acuminate, 5-veined; upper glume as long as lower, scarcely keeled, 3-veined. Palea hyaline, 4-veined, muticous, lanceolate obtuse.

Ecology: In rather drier localities of our area.

2n = 20 (Bor l.c.)

Distribution: India, Endemic.

Specimens Examined: Nil.

Haines (l.c.) recorded it from Sambalpur.
Use: A good fodder grass liked by the cattle.

*Use s A good fodder grass liked by the cattle*

*Apluda* L., Sp. Pl. 182. 1753; Haines, Bot.: 1056; Mooney, Suppl. 192; Bor., Grass.: 93.

**Type:** *A. mutica* L.

**Note:** Although Airy Shaw (1973) attributes 11 species to the genus, Clayton and Renvoize (1986) consider the genus monotypic in Tropical Asia.

*Apluda mutica* L., Sp. Pl. 182. 1753; Mooney, Suppl. 192; Bor., Grass.: 93; Panigrahi et al., BBSI.6: 261; Saxena et Brahman, Ind. J. For. 186. 1978.

**Type locality:** India.


**Type locality:** India.

*A. varia* Hack. in DC., Monogr. Androp.: 196. 1889; Haines, Bot.1057.

**Type locality:** Asia.


A very variable slender rambling perennial, 1-2 m tall or more. Leaves flat, linear-lanceolate, 30 x 1.5 cm., glabrous. Panicle with slender flexuous branches bearing distant narrow spathe, each bearing 3 or more fascicles of spikes. Spike bears 3 spikelets each within the spathe. Sessile spikelet narrowly ovate, 11-13 veined, 4.6 mm long. Upper glume imperfectly 7-veined, boat-shaped; lower lemma filicoid, hyaline; palea hyaline, with marginal flower, enclosing 3 small stamens; anthers yellow, 3 mm long; upper lemma hyaline, deeply notched, 3-veined, with twisted awn; palea...
ovate, hyaline scale, 1.4 mm long. Anthers 3, 2.2 mm long. Styles 2, distinct; stigmas plumose. Perfect pedicelled spikelet differs from the upper spikelet in upper lemma being entire, narrowly ovate-acute, 3-veined, not notched, male only; pedicel 3 mm long; lemma paleate.

Fls. and Frts.: Jul. - Feb.

Ecology: A grass of dry mixed forests of the plains and hills and also on muddy banks of rice-fields.

2n = 20, 40 (Bor. l.c.)

Distribution: India, Pakistan, Bangladesh, Sri Lanka, Malaya, extends into South-east Asia and Australia.


Mooney (l.c.) also recorded from grassy hill-tops of South Kalahandi between 900-1050 m, and also from Sambalpur, and Bara; Panigrahi et al. (l.c.), from Champagarh in Mayurbhanj District and Saxena and Brahman (l.c.), from Mahendragiri hills in Ganjam District.

Uses: A very good fodder grass when young.

Note: Linnaeus described the awned form of this grass under the name Aristida mutica L. and unawned as Aristida aristata L. Hackel (1889) gave a new name Apluda varia, of which he had two sub-species, ssp. aristata and ssp. mutica which were divided by him into varieties and sub-varieties. Since these varieties pass into several intermediates which may lead in making
a large number of combinations. There is no sharp distinction between awn and awnless forms; all varieties have now been kept under *Apluda mutica* L.

This is an interesting variable grass peculiar in development of the upper lemma.


**Type**: *A. royleanus* Nees.

**Apocopsis** Meisner, Gen. 1 : 429 ; 2 : 328. 1943 (Orth. Var.).

1a. Annual; culms 10 - 20 cm tall; leaves not more than 3.5 cm long; lower glume 3.5 cm long, 2 mm broad; anthers small, 0.7 - 1 mm; pedicels of the pedicelled spikelets up to 1.5 mm long... A. vaginata

1b. Perennial; culms much more than 20 (up to 80) cm tall; leaves to 12.5 cm long; lower glume 3.5 - 5 cm long, 2.5 - 3 mm broad; anthers 2.5 mm or more; pedicels of the pedicelled spikelets 2.5 - 3 mm long;

2a. Outer pair of the veins on both sides anastomosing and produce beyond the upper region of the lower glumes as two points; lower glume 4.5 x 2.25 mm, ciliate, dark red-brown; upper glume 4.5 x 2 mm, culms up to 80 cm tall; ligule very short, cuneate... A. paleacea

2b. Lower glumes not as above, 4.5 - 5 x 2.5 mm, more hairy, darker; culms up to 60 cm tall; ligule membranous, 1.5 - 2 mm long... A. courtallumensis
Apocopis courtallumensis (Steud.) Henr., Blumea 4:524. 1941; Bor, 732
Kew Bull. 1952:114. 1953, et Grass.:95; Raman. in Sald. et Nicols.,


Syntypes: Courtallum, Aug. 1835, Wight 1048, 2352.

Apocopis wightii Nees ex Thwaites, Enum. Pl. Zeyl. 365. 1864. nom. superf. illegit. (Art. 63.1); Haines, Bot.:1024.

Type: As for Andropogon courtallumensis Steud.

Tufted perennial. Culms 6.25 - 60 cm high, creeping and rooting
at nodes. Leaves densely imbricate or distant, blade 1.25 - 12.5 cm long,
2.5 - 6.3 cm wide, involute; sheaths hairy at mouth; ligule a ciliate
membrane. Racemes usually 2. 1.25 - 4.25 cm long, rachis and pedicels
rufous-hairy. Lower glume 3-5 mm long, obcordate or obovate-truncate, -
rufous-hairy, 7-veined, dark-brown with a yellowish tip or yellow with
red-brown tip; awn geniculate, to 20 cm long; upper glume with inflexing
margins, hairy below middle; upper lemma with awn from sinus, 4.2 mm
excluding the awn. Anthers linear. Styles 2, short.

Fls. and Frts.: Jul. - Dec.

Ecology: Growing preferably on the slopes of the hilly forests in moist
habitat.

Distribution: India (Orissa, Andhra Pradesh, Tamil Nadu, Karnataka, Kerala),
Sri Lanka.

Specimens Examined: Ganjam Dist.: Kulada, Dec. 1889, J. S. Gamble 21722,
ibid. J. S. Gamble 21627 (both K).

However, Saxena et Brahman (l.c.) recorded its occurrence from Orissa,
without citing the locality.

Note: Thwaites (1864) cited Apocopis wightii Nees ex Thwaites and kept
Andropogon courtallumensis Steud. in synonymy and thereby created a superfluous illegitimate name (Art. 63.1).

**Apoecis paleacea** (Trin.) Hochr., Bull. N.Y. Bot. Gard. 6 : 262. 1910;

**Ischaemus paleaceum** Trin. in Mem. Acad. Petersb. ser. 6, 2 : 293. 1832.

*Type locality:* "Nepal".


*Type:* India, Royle (CAL).


A tall grass with branched, glabrous, smooth culms. Leaves linear-lanceolate, acute or acuminate, with a distinct midrib, covered with bulbous-based hairs; sheaths clasping the stems. Inflorescence a spiciform raceme. Sessile spikelets fertile. Lower glume oblong-obovate-truncate, 7-veins; upper glume 3-veined, oblong-truncate with erose apex. Lower floret male; lemma hyaline, oblong-obtuse or ovate-obtuse or truncate, 1-veined; palea similar to lemma, vainless. Stamens 2; upper floret 0, rarely bisexual; lemma 3.5 x 1.5 mm, 1-veined, obtusely 2-toothed; palea 2.5 mm long, long-truncate, hyaline, vainless. Stamens usually 0, rarely 3. Pedicelled spikelets barren, pedicels slender, curved, hairs to 3 mm long; spikelets absent.

**Ecology:** In gravel soil and open hilly forests.

**Distribution:** India, Eastern Asia, U.S.S.R., Malaysia and Thailand.

**Specimens Examined:** Dhenkanal Dist.: Malyagiri, 1100 m, Pal Lahara, 20 Apr. 1950 ; Mooney 3775 (DD); Sambalpur Dist.: Titalya, along the Mahanadi, Sept. 1868. S. Kurz (DMK).

**Syntype:** Hazaribagh 470 m, 12 Oct. 1883, C.B. Clarke 33849 B et 33849 J.

Low, decumbent grass with much branched culms often geniculate at base, 10-20 cm tall. Leaves linear – acute or lanceolate acute, covered by bulbous-based hairs; sheaths larger than the internodes; ligule small, very narrow, membranous. Inflorescence a pair of closely appressed racemes, ca 2 cm long; rhachis fragile, joints 1.5 mm long. Spikelets both sessile spikelets. Lower glume oblong-obovate or oblong-truncate covered with dense golden hairs at the back; upper glume 3.5 – 4 mm long, oblong-truncate; lower floret male; lower lemma and palea veinless, hyaline scales ca 3 mm long; stamens 2; anthers caught in the stigmas; upper floret female; upper lemma narrowly oblong, 3-4 mm long, 2-lobed at the top; palea a veinless scale, 2 mm long; awn 1-8 – 2.4 cm long; column 8-12 mm long, brown, minutely hairy. Pedicelled spikelets; pedicel slender, covered with long brownish hairs.

**Ecology:** On sandy clayey soil of the forests.

**Distribution:** India, Endemic.

**Specimens Examined:** Koraput Dist.: near Sonabera, 660 m, 3 Oct. 1949; Mooney 3692; Sundargarh Dist.: Telkudar, 330 m, Gangpur, 21 Nov. 1947; Mooney 2940; Sambalpur Dist.: Charmal, 165 m, Rairakhol, 24 Oct. 1948; Mooney 3128 (all DD).

**Uses:** It has got a little fodder value.

1754; Haines, Bot. 976,1924; Moorey, Suppl. : 165,1950; Bor.Grass.
1960; Lazarides in Brumonia 3 : 271 : 1980; Clayton et

Type : A. adscensionis L.

Note : Presence of tripartite awn distinguishes it from all
other grasses.

1a. Lower glume 20 mm long ; articulation
present between the lemmas and the
awns .................................................. A. funiculata

1b. Lower glume 19 mm long and less ; articu­
lation absent between lemmas and awns :

2a. Lateral awns much reduced and of a
different texture from the third awn,
sometimes absent .................................. A. redacta

2b. Lateral awns well developed, if shorter
than the central awn, of the same texture :

3a. A small annual, less than 20 cm ; lower
glume 2 - 5 mm ; upper glume 3 mm long;
lemma 1.5 mm long ; long awn unequal,
central 5 mm long .................................. A. cumingiana

3b. Annual or perennial ; lower glume, upper
glume, lemma and awn, all are much larger :

4a. Panicle not contracted, effuse, often as
broad as long ...................................... A. hystrix

4b. Panicle contracted ;
5a. Glumes long-awned, with awns 3-5 mm long; lower glume up to 17 mm long; upper glume much larger, up to 20 mm long.............. A. setacea

5b. Glumes not long-awned; awns at most 2 mm long; lower glume 5-8 mm long; upper glume much smaller, 9 mm long or less:

6a. Glumes distinctly unequal; the lower up to 6 mm long, not more than two thirds of the length of the upper, which is 8.5 - 9 mm long; awns of glumes 2 mm long; lemma 8-8.5 mm long, shorter than the upper glume; grains 6-9 mm long ........ A. depressa

6b. Glumes almost equal; lower glume up to 8 mm long, more than two-thirds of the length of the upper, which is 6-9 mm long; glumes not awned but upper emarginate with a very short mucro between the lobes; lemma 10 mm long, longer than the upper glume; grains 10 mm long .............. A. adscensionis


*Type:* Ascension Islands, Osbeck (LINN. 98. 1; microfiche in CAL).

A densely tufted, grass. Culms 22-60 cm long, very slender, smooth. Leaves 3.7 - 25 cm long, 1-2 mm broad, convolute, filiform; sheaths smooth with rounded auricless, ligule a ridge of soft hairs. Inflorescence a small, spiciform panicle; rachis filiform; lateral pedicels short, capillary. Spikelets erect, 6-8 mm long, 1-flowered, often purplish. Glumes linear to linear-lanceolate, muticous, acute or sub-obtuse, 1-veined; the lower membranous, often purple with a scaberulous keel; upper glume 7.5-8 mm long, 2-toothed and apiculate at tip, with smooth keels; lemma linear, laterally compressed, 3-veined; callus 0.5-0.8 mm long; palea obtuse, less than 1 mm long. Lodicules 2, 2-3-veined. Anthers to 2 mm. Grain as long as the lemma.

Ecology: A less common species of dry situations.

2n = 22 (Bor, l.c.).

Distribution: India, Pantropics.

Specimens Examined: Sambalpur Dist. : Motijharan, 10 Oct. 1937 ; Mooney 600; Mayurbhanj Dist. : Bakrakata, 23 Apr. 1940, sinealect 572 (both DD).

Mooney (l.c.) has also recorded its occurrence from Sambalpur, Singh et Verma (l.c.), from Angul in Dhenkanal District and Behera et al. (l.c.), from Bhubaneswar in Puri District.

Use: Tender grass is grazed by cattle.


Type: Philippines, Cuming 671; Lugonz (Nee ex Cavan.).

A. capillacea Cavan., Icon. et Descr. Pl. 5 : 43. 1799, non Lam. 1797.
A dwarf annual with slender, tufted smooth stems, 7.5-30 cm high. Leaves convolute, filiform at least at or near the base, 2.5-7.5 cm long. Panicle very slender, narrow, loosely branched, capillary, scaberulous; pedicels capillary, scaberulous. Spikelets 2-2.5 mm long; at the ends of the capillary branches and pedicels; awn inarticulate at the base, very fine, central branch longest, ca 5 mm. Glumes acuminate; lower glume 1.2 - 1.8 mm long; upper longest, 2-2.5 mm long; lemma 1-1.25 mm, scaberulous; palea minute or 0. Lodicules 2. Styles 2, distinct; stigmas 2, plumose, exerted. Grain slender, narrow free within the convolute glume.


Ecology: Irupen grasslands especially on sandy soil.

Distribution: India, Burma, China, Philippines, Tropical Africa.

Specimens Examined: Koraput Dist. : Sirdaguda, Jeypore, 16 Dec. 1960, P.C. Nanda 2383; on the way to Kashipur (about 12 km. from Sirdaguda), P.C. Nanda 2401 (both CAL); Sambalpur Dist. : Gursung, 140 m, Bamra, 13 Oct. 1946, Mooney 2830; Keonjhar Dist. : Sirkagutu, 900 m, 1 Oct. 1946, Mooney 2761; Pudhaipada, 600 m, 5 Oct. 1946, Mooney 2814; Orissa: sineloc., Oct. 1941, Mooney 1613 (all DD).

Haines (loc.) also recorded it from Sambalpur and Mooney (loc.), from Sonepur in Bolangir District.


Type locality: India : Malabar, König.

A slender annual with terete culms, 30 - 120 cm high, erect or geniculately ascending from the base, with glabrous nodes. Leaf-sheaths to 9 cm long, compressed, keeled, glabrous; ligule a ring of fine hairs. Panicle contracted, oblong, 8-30 cm long; branches subsecund, short,
smooth pedicels short, capillary, often crowded on branches. Glumes muticous; lower glume membranous, nearly oblong, 3.5-5 mm long; keel scabrid, running into a very short awn or arista; upper glume similar to lower, 7-9 mm long, 3-veined. Callus of the lemma 0.5-0.7 mm long, pungent, villous. Lemma inarticulated, 7.5-11 mm long, terminating into 3 subequal setae, the middle one longest, 20-23 mm long. Palea hyaline, narrowly oblong. Lodicules 2. Stamens 3. Styles 2, distinct; stigmas plumose. Grain cylindric, 6-9 mm long, brown.


Ecology: In overgrazed situations.

2n = 44 (Cf. Bor, l.c.).

Distribution: India, Burma, Sri Lanka.


New Record for Orissa.

Uses: Tender grass is grazed by cattle. Flowers used in itch and ringworm.


_Type_: Senegal, Leprieur (P).

_A. royleana_ Trin. et Rupr., l.c.: 160. 1842; Bor, Grass. 412.

_Type_: "India orientalis sup", Royle s.n.

Var. _funiculata_

slender annual with radiating culms 25–60 cm long. Leaves flat or convolute, narrowly linear-acuminate, 3.5–7.5 cm long, with long scattered hairs on the upper surface and tufts of long hairs at
the mouth; leaf-sheaths glabrous and cylindrical; ligule a short, ciliate membrane. Inflorescence a narrow, lax, contracted panicle, \textit{with short, erect, capillary branches. Spikelets vary from 1.25 - 1.7 cm in length. Glumes aristate or awned; lower glume 2 - 2.3 cm long, linear- lanceolate, acute, 1-veined; upper glume narrower and shorter, 1.25 cm or slightly longer; lower lemma very shortly elongate-fusiform, attenuate upwards, forming a twisted column, towards the apex, ca 2.5 cm long, jointed at base, the middle one being longer; palea short. Lodicules obliquely trinicate. Anthers 3, small and purple. Styles 2, distinct, branches purple; stigmas plumose. Grain cylindric.

Ecology: In open dry places.

Distribution: India, Pakistan, tropical East and North Africa, Arabia, Baluchistan.

Specimens Examined: Nil.

Mooney (l.c.) recorded its occurrence from Sithalpani village, 310 m, Kharia in Sambalpur District.

Note: Through Bor (1960) treats \textit{A. funiculata} Trin. et Rupr. and \textit{A. royleana} Trin. as distinct species, Cope (1982) reduced them as conspecific.

Use: Tender grass is eaten by animals.

\textit{A. hystrix} L.f., Suppl. : 113. 1782; Mooney Suppl. : 116; Bor, Grass. : 410, non Thunb, 1781/1782.

Diffuse perennial with a creeping rootstock. Culms stout, often proliferous; branches densely crowded, erect, curved, varying in length from 15-60 cm, with glabrous nodes. Leaf-blades flat, subulate, curved, convolute, narrowly lanceolate-linear, finely acuminate, 5-22.5 cm long, prominently veined; sheath glabrous,
cylindric; ligule a ridge of closest hairs. Inflorescence is an effuse panicle, 3.7 - 22.5 cm long; rachis stout, finely scabrid. Spikelets ca 1 cm long, excluding the awn. Lower glume, 1 - 1.25 cm long, chartaceous, lanceolate to ovate-lanceolate including the awn, scarious, with finely scabrid keel; upper glume 1.25 - 2 cm long including the awn, chartaceous, lanceolate, terminating in a sessile awn; with smooth keel; the callus of the lower lemma short, pointed and villous; lower lemmas 0.6-1 cm long including the awn, chartaceous, finely scabrid, 3-veined, 3-lobed at the apex. Lodicules 3 mm long and obliquely lanceolate. Stamens 3; anthers pale or purplish. Styles 2, branches purplish.


Ecology: A grass of hot dry exposed localities, sometimes growing on rocks.

Distribution: India, Pakistan, Sri Lanka.

Specimens Examined: Nil.

Mooney (l.c.) reported its occurrence from Sambalpur, Bolangir and Patna in Bolangir District.

Note: We follow Bor (1960) in treating Aristide hystrix L.f. (1782), non Thumb. (1782) and A. hystericula Edgew. (1842) as two distinct species, although Cope (1982) treats them as conspecific.


Syntypes: "India: from the Western Ghats to Eastern Chhattanagpur; Bombay Presidency, Lisbon, Woodrow; Central Provinces, Nagpur District, Dutchie 106 05; Bengal Presidency, Burdwan District, near Durgapur, C.B.Clarke 21, 115".
Annual, rarely perennial. Culms tufted, terete, 20-90 cm long, erect; nodes glabrous; leaf-sheaths compressed, keeled, 1.5-17 cm long, glabrous; ligule narrow, a fringe of hairs. Leaf-blades very slender, narrowly linear, of 7-30 x 0.1-0.2 cm, acuminate. Panicle effuse, 10-40 x 5-10 cm, branches 0 or very short, usually binate. Spikelets purple to straw-coloured at maturity. Lower glume subequal, membranous, narrowly elate, upper glume lanceolate, finely acuminate, 10-17 mm long, glabrous; keel running into an arista; upper glume subequal and similar to the lower; callus pungent, bearded; lemma often with indistinct articulations. Column twisted, 3-veined, acuminate, gradually passing into 1 or 3 very unequal setae. Lodicules 2. Stamens 3. Styles 2, free; stigmas plumose. Grain black, cylindric.

Fls. and frts.: Aug.-Dec.

Ecology: In open grasslands.

Distribution: India, Endemic.

Specimens Examined: Sambalpur District, Sitalpani, 370m, 28 Sept. 1949, Mooney 3638 (DD).

New Record for Orissa.


Type: India; Malabar, Koenig (LUND).

Ghora Lenji (Or.)

Horses tail (Eng.)
Tufted perennial. Culms to 1 m tall, erect stout or with wiry root-fibres. Ligule a ring of short, stiff hairs. Inflorescence a terminal panicle, 7.5 - 38 cm long; branches ca 4 cm long, angular, scabrid; rachis slender, smooth. Spikelets 1-flowered. Lower glume 1-25 cm including the awn, narrowly linear lanceolate-acuminate, 1-veined; upper glume 1.7 cm long including the awn, linear-lanceolate, 1-veined; lemma 1.1 cm long, 3-veined, convolute around the palea and organs below. Callus sharp, bearded with white hairs, 1.25 - 2 mm long; palea veinless, linear-acute, hyaline, 1.3 mm long. Lodicoles 2, hyaline. Stamens 3; anthers 2.5 mm long, yellow. Ovary fusiform; styles 2, distinct; stigmas plumose.

Fls. and frts.: Sep. - Apr.

Ecology: Common on dry sandy soil, especially near the ditches.

Distribution: India, Burma, Sri Lanka, Malaya to Mascarene Islands.


Haines (l.c.) recorded its occurrence from Puri, Angul, (Dhenkanal Dist.) and Sambalpur; Mooney (1950), from Sambalpur; Fischer (1931), from Ganjam and Saxena et al. (l.c.), from Bhubaneswar respectively.

Uses: Culms are used in making frames for paper manufacture.

Type: A. ciliar P. Beauv., as ("Ciliar") ║ = A. hispidus (Thunb.) Makino var. hispidus

1a. Marginal nerves of the lower glume of the sessile spikelet with hairy wings:

2a. Joints at least the upper ones, often long pilose hairs; sessile spikelets narrow, 0.3 - 1.1 mm wide; upper glume with an acuminate to erose, sometimes short to long-awned apex; pedicelled spikelets usually present in at least at the upper part of the inflorescence and then represented by at least well-developed lower glume, rarely absent (stipe still present) ....... .... .... .... .... .... A. lancifolius

2b. Joints glabrous to short pilose, rarely long pilose; sessile spikelet usually relatively broad, 0.3 - 2 mm wide; upper glume with an acuminate to erose apex, but never awned; pedicelled spikelets usually absent (stipe still present), rarely present, then reduced to vestigial lower glumes:

3a. Upper glume with relatively broad, 0.1 - 0.3 mm wide membranous margins; margins of the lemmas pilose, palea present; anthers 3 .... .... .... A. castratus
3b. Upper glume with relatively broad, 0.1 - 1 mm membranous margins; margins of the lemmas glabrous; palea absent; anthers

1b. At least the marginal nerves of the lower glume of the sessile spikelet with broad-based spicules

4a. Marginal and submarginal nerves of the lower glume of the sessile spikelet with broad-based spicules

4b. All nerves of the lower glume of the sessile spikelet with broad-based spicules

Arthraxon castratus (Griff.) Narayanaswami ex Bor in Fl. Assam, 5: 375. 1940; et in Grass. 99; Welzen, Blumea 27 (1): 263; 1981.

Andropogon castratus Griff., Natul. 3: 89. 1815.

Type: "Siddiyah in Campis graminoses," Griffith 293 (K).

Arthraxon rudis Hochst. in Flora 39: 188. 1856; HK f., Fl. Brit. Ind. 7: 144. 1897; Mooney, Suppl.: 188.


Type: Sylheti, Wellich 8837 (P.n.v. (K), iso in, BM, K.W., IDC. 7394).

Annual grass with stems 25-50 (-120) cm tall from a prostrate, widely rambling and rooting base. Leaves 5-10 cm long, 3.5 - 15 mm wide, smooth above and rough below; margins scarcely thickened scarcely long ciliate with tuberculate base, 2.5 - 10 cm long, by 0.5 - 1.5 cm broad; sheaths terete, smooth; ligule 2.5 mm long, membranous, decurrent into the sheaths. Racemes many, shortly exerted
or spathaceously sheathed. Spikes few; spikelets linear-lanceolate or ovoid in profile, very slightly oblique, 3-5 mm long (red brown); glumes naked. Lower glume of sessile spikelets lanceolate or compressed-convex, entire or minutely 2-toothed. Lower glume lanceolate or ovate, acute convex; upper glume membranous, compressed, scabrid on the upper third of the keel, 3-nerved. Lower florets: lemma 2.5 mm long, lanceolate, hyaline. Upper florets: lemma 2.5 mm long, lanceolate, hyaline, glabrous, awned from near the base; awn 7.5 mm long.


Ecology: In moist open places near streams in moist deciduous forest; sunny to slightly shaded roadsides, edges of bushes, in grasslands, scrubs, swamps, and in deserted tea-plantation usually on moist, not very fertile soil. Rather rare, occasionally common 240-1900 m/alt.

n = 8 (Mehra and Kalia, 1974); n = 18 (Gould and Soderstrom, 1974).


Specimens Examined: Nil.

Growing in Association with Rottboellia exaltata (L.) Lf. Sambalpur Dist. near Kholgaon, 250 m, (Mooney, l.c.).

Uses: According to Backs (1950), it has low feeding values.

Note: V. Narayanaswami and later Bor mentioned that Hooker's description of A. rudis Hochst. in Flora of British India 7 : 144, 1897 to a greater extent taken from Griffith's description of Andropogon castratus Griff., and refer to this plant in his synonymy and also to Wallichian sheet No. 8837 (Bor in Assam Flora). Since A. castratus has got priority over A. rudis, the former has been cited as correct name.

Use: A fodder for cattle.

Phalaris hispida Thunb., Fl. Japan 44: 1784.

Type: Thunberg Hb. No. 1776 sub. Phalaris Leersia (UPS, IDC 1036) Japan, see also No. 1995 sub. "Leersia".


Type: Richard s.n. (P) cultive par son oncle a Trianen' see note: A. ciliaris s.s.: joints glabrous or nearly so; stipe usually long.


Var. hispidus

Herb up to 45 (-100) cm high with weak stems tufted and branched from the base. Leaves ovate to lanceolate, 0.8 - 7.5 x 0.2 - 0.8 cm, margin with bulbous based hairs; sheaths with ciliate margins. Inflorescence a spike, (0.4 - ) 1.25 - 7.5 (-8.1) x 0.2 - 5.3 cm, few to many, on long naked or spatheceous sheathed, glabrous peduncles 0.15 - 0.8 mm across. Spikelets ovate-lanceolate to ovate-linear-lanceolate, (1.9 - ) 3-5(-7.9) by 0.4 - 1.5 mm; callus naked or shortly bearded. Lower glume 1.7 - 7.7 x 0.3 - 1.4 mm, dorsally smooth or with spicules along the nerves; upper glume 2.5 - 7.5 x 0.3 - 1.4 mm. Anthers 2 or rarely 3. Pedicelled spikelets sometimes present as a vestigial lower glume up to 2.5 x 0.4 mm, 3-6-nerved, rarely well developed.

Ecology: A weed of open shaded grass lands, along rice-fields and sea-shores of usually moderately dry soil.

n = 5 (Sindhe et al., 1975)

n = 9 (Mehra et Kalia, 1975)
**Distribution:** India, C-E Australia. Introduced in Hawai and E.N. and C. America.

**Specimens Examined:** Koraput Dist.: near Potangi, 10 Oct. 1950, Mooney 4093 (DD); Maimikundla, Laxmipura, 14 Dec. 1960, P.C. Nanda 2390 (CAL); Sambalpur Dist.: near Kholgaon, 250 m, 28 Oct. 1947, Mooney 2933 (DD).

Haines (l.c.) recorded its occurrence from Sikkim and Burma; Mooney (l.c.), from Medeng-Gandi in Koraput-District and Saxena et Brahman (l.c.), from Mahendragiri hills of Ganjam District.

**Use:** A fodder for cattle.


Fl. Ind. 1: 262. 1820.

**Type:** "Cormandel", Roxburgh.

**Var. lanceolatus**

A tall much branched grass, 30-90 cm high. Stem polished, thicker than a crow quill. Leaves very variable, broadly ovate to narrowly lanceolate, 1.25 - 10 x 0.5 - 1.25 cm, caudate-acuminate; nerves obscure; ligule rounded. Spikes 3-5 or more, 1.25 - 5 cm; rachis sparsely hairy; joints about half as long as the spikelet, at least the upper ones, often long pilose. Spikelets sessile, linear-lanceolate 4.2 - 8.3 x 0.5 - 2.2 cm, often purple; callus very short, not bearded. Glumes 4; upper glume with an acuminate to erose, sometimes with awned apex; lower glume hyaline; awn 1.5 - 1.6 cm long. Stamens 3, perfect; anthers 3, 1.8 - 4.3 x 0.2 - 0.8 mm. Grains narrowly linear or fusiform.
Pedicalled spikelets awnless, linear-lanceolate, bearing a male flower with hispidulous keel.


Ecology: On sunny to slightly shaded localities between 30-2600 m.

n = 8 ( Mehra and Kalia, 1975, a curious count); n = 18 (Tateoka, 1965).

Distribution: India, East Africa; S-W. Arabia, from W. Pakistan to the east coast of China and from Himalaya and North China to S-E Asia, Malesia, Malaya, and Lesser Sunda Island.

Specimens Examined: Nil.

Mooney (l.c.) recorded it from Chhatam forest, 550-850 m, Kholgaon in Sambalpur District and Panigrahi et al., recorded it from Gurguria in Mayurbhanj District respectively.

Note: A. prionodes sensu Hook.f. (1897), non Dandy (1956) is closely related to A. lanceolatus (Roxb.) Hochst, a species, confirmed to Southern India and is frequently misnamed as such (e.g. Hook.f., Fl. Brit. Ind. 7: 143, 1897 as mentioned by Cope (1982). The latter has the lower glume of the sessile spikelet almost flat on the back and strongly nerved.

Uses: Used as a hay and fodder.


Lectotype: India: Madras Wight KD 1685 (K, proposed by Walzen, 1891).

Arthraxon echinatus (Nees) Hochst., Flora 39 : 188. 1856; Raizada, JBNHS 48: 679. 1949; Mooney, Suppl. : 264; Bor, Grass. : 99; Panigrahi et al., BBSI 6: 261.

Annual grass with stem 30-90 cm, branched, rooting at nodes below.
Leaves 2.5 - 5 cm x 0.7 - 1 cm, linear-oblong-lanceolate, acuminate,
flaccid, ciliate with terminal erect sheath 3.75-5 x 0.25-0.6 cm, membranous, green, usually overtopping the panicle; ligule short. Panicles usually in long spathiform, narrow sheaths. Spikes few, 0.5-1.25 cm long, very pale; pedicels and joints sparsely hairy. Sessile spikelets oblong-lanceolate, 5-7-nerved. Upper spikelets male, lower glume armed, 5 (-7)-nerved, with broad-based spicules on all of them, glabrous. Stamens 3, more than half as long as the lower glume, linear; anthers 3, immeasurable.

Figs. and frts.: Sep. - Feb.

Ecology: On open grasslands under light shade among quartzite boulders and calcareous walls.

n = 9 (Mehra and Kalia, 1974); 2n = 36 (Tateoka, 1953).

Distribution: India, Nepal, Orient, Caucasus, China, Manchuria.

Specimens Examined: Sambalpur Dist.: Usha Kothi Valley, 350 m, near Lohara-Behera in Barapahar, 22 Sep. 1949, Mooney 3614 (DD).

Mooney (l.c.) also recorded its occurrence from Sonabera, 800 m in Koraput District.

Note: Welzen (1981) pointed out that Ritchie 796 in Hb. Munro cited as a syntype of A. spathaceus by Hook.f. is perhaps A. hispidus var. hispidus as his description of the plant lacks pedicelled spikelets.


Type: Nepal (LE).

Arthraxon microphyllus sensu Hook. f., FBI 7: 147; 1897 pp.;
Haines, Bot.: 1026; non (Trin.) Hochsh., 1856.

A. sikkimensis sensu Behera et al., JBNHS (Suppl.) 7: 651; 1979,
non Bor, 1960.

A small delicate diffuse leafy herb with branched, filiform
stems, hairy at nodes. Leaves short, oblong or oblong-lanceolate,
1.25 - 3.75 cm long, finely acuminate; base amplexicaul cordate.
Spikes usually 2 - 10, short, slender, 0.7 - 1.75 (-2.5 cm) long
with villous, strict rachis at the end of filiform peduncles;
joints half the spikelets or shorter. Sessile spikelets 2-4 mm long,
pilose, often with 2 barren glumes. Lower glumes narrowly-linear,
dorsally scabrid, faintly 2-4-nerved, scabrous above the middle, 2-
toothed or aristulate at tip; margins of the lower glume inflexed or
enrolled, with hairy wings; nerves of the lower glume if present,
ovate, linear-lanceolate, acuminate or aristate, laterally compressed;
the awn sometimes as long as the dorsally scabrid keel, sides hyaline,
2-toothed.

Fls. and frts.: Oct. - Nov.

Ecology: In open to light shaded places, in crevices of rocks,
old walls, on decaying trunks and on poor soil.

Chr. no.: n = 9 (Mehra et Sharma, 1972); n = 10 (Khosla et Song;
n = 9 (Behera et al., 1979); n = 18 (Mehra et Kalia, 1975).

Distribution: India, Burma, Sri Lanka, China, Cape Verde Isles,
E. Africa, Muscat and Oman, Socotra, Comores, Sri Lanka to S-E Asia,
Malesia, Java, Lesser Sunda Isl. (Bali, Lombok, Sumbawa), Philippines,
S-W. Celebes, East Papua, New Guinea.

Specimens Examined: Bolangir Dist.: Patna, 8 Nov. 1959,
Panigrahi 20976b; Sambalpur Dist.: Bhatipathar, Panigrahi 20672,
2097A (all CAL.).
Mooney (l.c.) recorded it from Sambalpur, Gangpur, up to 1250 m, in Sundargarh District; Choudhury and Patnaik (l.c.) from Hundaswami Math in Khandagiri and Behera et al. (l.c.), from Bhubaneswar in Puri District.

Note: A. lancifolius (Trin.) Hochst. and A. microphyllus (Trin.) Hochst. though distinct species, but have usually been confused in the past, because the type of A. microphyllus was not studied by earlier workers (Bor, 1972). For this reason, the later was kept as a synonym under the former (cf. Haines, l.c. and Mooney, l.c.). The type specimen of A. microphyllus is annotated 'Nepal, Wallich (1) Budge*. Jain (1971) and Bor (1972), were the persons to discover the confusion between the two species; Jain (1971) showed five differentiating characters of which the three were overlapping, while two other characters viz. presence or absence of the pedicelled spikelets and the nervation of the lower glumes, are distinctive. A. microphyllus has always paired spikelets, with a protruding nervation of the lower glume, while A. lancifolius often lacks the pedicelled spikelets in any case in the lower part of the inflorescence, while the lower glumes are inconspicuously nerved. Moreover, the pedicelled spikelet of A. microphyllus is very narrowly linear, consisting of a lower glume only, and is always without anthers, while A. lancifolius has ovate-linear-lanceolate pedicelled spikelets, usually consisting of more than the lower glumes only, sometimes with the abortive anthers only.

Jain (1972) described the var. hindustanicus of which the upper glume of the sessile spikelet has a long awn. There is a distinct disjunction in the length of the awns between Jain's specimens and most of others. Apparently this form occurs locally here and there and as there are no other distinctive features, it does not seem to warrant a taxonomical status as supported by Walzen (1981).
Further, Behera et al. (l.c.) cited the occurrence of *A. sikkimensis* Bor (synonymous to *A. microphylla* (Trin.) Hochst. in Orissa is an error as the species confined to the Nepal, Sikkim and Assam Himalayas. They misidentified the ill preserves specimen, seems to be *A. lancifolius* (Trin.) Hochst. from the study of the specimens by Choudhury and Patnaik (1983).

Use: Cattle relish this grass.
Arundinella Raddi, Agrast. Brass. 36, t1, f.
1986.

Type: A. brasiliensis Raddi.

1a. Plants glabrous at base; spikelets larger, 6.5 - 7.5 mm long; upper lemma with 2 setae, one on either side of the awn at the top. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. A. setosa

1b. Plants hirsute or silky at base; spikelets small, 3.5 mm long or less; upper lemma with a single awn or the awns absent.

2a. Perennials; leaves 30-60 cm long; upper lemma not awned or if occasionally present, awn not more than 2 mm long; base of upper lemma naked. .. .. .. .. .. .. .. .. .. .. .. .. .. .. A. bengalensis

2b. Annuals; leaves 5-25 cm long; upper lemma with a geniculate awn; more than 2 mm long;

3a. Panicles effuse, 10-30 cm long with many spikelets; spikelets small, not more than 2 mm long; glumes without bristles but with sparse bulbous-based hairs; upper lemma 1 mm; leaf-blades up to 25 cm long, 25 mm wide. .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. A. pumila
3b. Panicles compact, 3-5 cm long with densely arranged spikelets; spikelets large, 3.5 mm long; glumes very densely covered with tubercle-based bristles on the back; upper lemma 1.5 - 2.5 mm; leaf-blades up to 3.5 cm long, 14 mm wide ... ........... A. ciliata


Type: India: Bengal, Roxburgh, Icon. 1326 (K, CAL).


Type: Nepal, Wallich Numer. List No. 8669 A, B.

A robust perennial grass with stout, erect culms, 30 cm to 2 m tall, nodes glabrous or thickly bearded. Leaves radical in small forms, extremely variable, 30-60 x 10-20 cm, lanceolate or linear, acuminate, with a distinct midrib, hairy; sheaths scabrid or villous, striate, clasping, with tubercle-based hairs; ligule a narrow membrane. Inflorescence a dense, elongate, contracted panicle, 10-30 (-45) x 2-3 cm with a grooved axis, carrying binate spikelets, 2.3 - 2.75 mm long. Lower ovate or oblong-elliptic, acute, scabrid, 3-5-veined; upper glume ovate-elliptic, acute or acuminate, 2.2-3.3 mm long, 4-veined. Lower floret 0 or neuter; lemma lanceolate, 2.3 - 3.5 mm long, acute, smooth, glabrous, 5-veined; palea lanceolate, acute, 2-keeled with flaps flattened at the base. Stamens 3; anthers 1-1.25 mm long. Upper
florae: bisexual. Lemma, oblong, 2 mm long, awned or unawned, 3-veined; somewhat indurated at maturity, glabrous; callus shortly bearded; stamens 3; anthers 1.5 mm long. Styles 2, distinct; stigmas plumose.

Fls. and frts.: Jul.-Jan.

Ecology: Grows in the moist soil and also found in the crevices of rocks.

Distribution: India, Bangladesh, Burma, Indo-China.

Specimens Examined: Koraput Dist.: Siriamanda Parbat, Pottangi, 10 Jul. 1950, Mooney 3838; Borara in Sonabera plateau, 1 Oct. 1949, Mooney, 3684 (both DD); Ganjam Dist.: Mahendragiri, 17 Aug. 1931, Narayanaswami 5714 (MH); Kalahandi Dist.: Tapang forest, 180 m, near Baul river, 22 Dec. 1939, Mooney 1186; Sambalpur Dist.: near Brahmani village, 800 m, Rairakhol, 13 Sep. 1950, Mooney 4009 (both DD); South Keonjhar, 29 Sep. 1939, Mooney 1145 (CAL).

Note: The regular habit of the plant, dense panicle with its ascending short branches covered with second spikelets distinguish it from other species.


Holcus ciliatus Roxb., Fl. Ind. 1: 321. 1820.

Type: "A native of Coromandel". Roxb., Ic. 2031 (K, CAL).

Arundinella holcoides sensu Mooney, Suppl.: 168, non (Kunth) Trin., 1836.

Culms slender or stout, to 60 cm high growing erect from a narrow or thickened base. Leaves flat, flaccid, lanceolate or oblong-acute; sheaths softly hairy, often overlapping, clasping, striate, covered with tubercle-based hairs, fulvously ciliate at margins; ligule a narrow membrane or a ridge of hairs, 1 mm broad. Panicle erect, ovoid or oblong, with alternately arranged branches. Spikelets bristly. Glumes usually more than 1.75 mm long; lower glume ovate-acuminate to elliptic-acute with tip produced into a short seta, 2.5-3.5 mm long, 3-veined, anastomosing at the tip, often covered with tubercle-based hairs; upper glume elliptic-acuminate to ovate, 3-veined; lemma elliptic-oblong-acuminate or ovate-lanceolate-acuminate, awned; palea elliptic, obtuse, 0.6-1.5 mm long; median awn 5 mm long. Lodicules 2, minute. Stamens 3 (−2); anthers minute, 0.25 mm long, linear-oblong. Upper floret 0. Lemma 1−1.5 mm long, whitish, smooth below, papillose-scabrid above; palea of same texture and colour, elliptic, 2-keeled. Styles 2, distinct; stigmas plumose, laterally exerted. Grain oblong or ellipsoid.


Ecology: On dry slopes above 100 m.

Distribution: India, Endemic.

Specimens Examined: Kalahandi Dist.: Karlapat, 900 m, 28 Dec. 1939, Mooney 1214 (DD).

Note: Bor (1956, 1960) discusses the nomenclature and distribution of A. holcoides (Kunth) Trin. and A. agrostoides Trin. and considers the Indian plant as A. ciliata (Roxb.) Miq. Mooney (1950) records this species (as A. holcoides) from the dry slopes of Mitkuni village in the Kalahandi District.
Ebr (1956) described *A. ciliata* (Roxb.) Miq. as having its lower glume exceeding by a great deal the tip of the lower lemma and the glumes very densely covered in the lower half with tubercle-based bristles in panicles, very dense, linear or rather open. Mooney (1950) described the "glumes usually more than 1.75 mm long....", lemma 2.5 mm long and the panicle compact, ovoid or oblong, crowded, the lower half often bristly. *A. holcoide* has its range from Burma to Philippines.


*Type locality:* Abyssinia.


*Syntype:* Peninsular India, Madras, *Wight & 76* (*Herb. Wight*); Royle 268.

A delicate grass with culms 15 - 60 cm tall, smooth, hairy at nodes. Leaves broadly linear-elliptic, acute or acuminate; sheaths overlapping, striate, smooth; ligule a narrow membrane. Panicle delicate, fan-shaped, copiously branched; exis erect, angled, with a few tubercle-based hairs at base, scabrid at tip; rachis and branches capillary, spreading, scaberulous; pedicels longer than the spikelets. Spikelets usually 1, often in pairs. Lower elliptic-acuminate, 1.75 x 1 mm, 3-veined. Lower floret male or neuter; lemma broadly elliptic-acute, 3-veined; palea a 2-veined hyaline scale. Stamens 0 or 3; anthers 0.2-0.3 mm long; column 1-1.5 mm long, twisted. Stamens 3; anthers very minute.
Ecology: An ornamental species of the moist rocky places.

Distribution: India, Burma, Sri Lanka, extending to south-east Asia, Abyssinia, Nigeria.

Specimens Examined: Pottangi, up to 1350 m, 10 Oct. 1950, Mooney 4068 (DD); Marunikunda (Jeypore), 17 Dec. 1960, P.C. Nanda 2389; Telkui hilly slopes, 23 Dec. 1960, P.C. Nanda 2472 (both CAL); Ganjam Dist.: Mahendragiri, 1200 m, 22 Nov. 1904, Fischer et Gage 112 (CAL, K); Bolangir Dist.: Patnagarh, 8 Nov. 1959, Panigrahi 20994 (CAL); Karlapat, 1000 m, 28 Dec. 1939, Mooney 1213; Keonjhar Dist.: Sirkagutu, 1050 m, 3 Oct. 1946, Mooney 2796 (both DD).

Mooney (loc.) also recorded its occurrence on the hilly slopes of Siji and Tij Mali at 900 - 960 m, in Kalahandi District.

Note: An extremely handsome species recognised by its effuse, often very large panicles, very minute spikelets and thin papyry leaves.

Use: This grass is used as a forage.


Type: Nepal, Lindley.

A caespitose slender perennial, 90-120 cm tall with thick stoloniferous, nodose rootstock. Stems terete, smooth, glabrous, striate, erect, very rarely branched low down. Leaves flat or involute, setaceous, blade very narrow, linear, acuminate, 7-27 x 0.2 - 0.5 cm; sheaths clasping the culms; ligule a short membrane, with caducous cilia, truncate. Inflorescence a dropping panicle, 7.5 - 30 cm long, 7.5-15.5 cm long; rhachis terete, striate; pedicels slender, scaberulous, dilated
below the spikelet. Spikelets very variable in size. Glumes narrow, glabrous or setose; lower glume cymbiform or elliptic, acuminate, 3.5-5 mm long, awned, strongly 3-veined; upper glume elliptic, acuminate, 5.5 - 7 mm long, awned, 5-veined. Lower floret male or neuter; lower lemma oblong-obtuse, chartaceous, with 2 apical setae, 1-5 -2.5 mm long, smooth, glabrous, 3-5-veined; upper lemma scabrous, 2-3 mm long, hairy at base, awn 6 - 8.75 mm long; palea elliptic, obtuse, shorter and narrower than lemma, 2-veined, 2-keels. Stamens 3; anthers 1.5 mm long. Upper floret 0 ; lemma upto 3 mm long, with a hairy callus; awn of the palea up to 9.5 mm long, perfect. Column twisted, 3.5 mm long. Stamens 3; anthers 1.5 -2 mm long. Styles 2; stigmas plumose, exerted.


Ecology: On the rocky ground of the hilly forests.

2n = 20 (Bor, l.c.)

Distribution: India, Pakistan, Nepal, Burma, Sri Lanka, China, Indomalaysia, Philippines.

Specimens Examined: Koraput Dist. : on way to Telkui, 23 Dec. 1960, P.C. Nanda 2473; Ganjam Dist.: Mahendragiri, 1400 m, 8 Apr. 1904, Fischer 116 (both CAL); Mahendragiri, 1260 m, 9 Apr. 1904, Fischer et Gage 112 (K, CAL); Kalahandi Dist.: Khandual hill, 1020 m, Karlapat, 12 Jul. 1949, Mooney 3474 (DD); Keonjhar Dist. : Nigirdah, 18 Feb. 1958, Panigrahi 12572 (CAL).

Haines (l.c.) recorded its occurrence from Sambalpur, Mooney (l.c.) from Pal Lahara, 1400 m, and Singh at Verma (l.c.) from Angul in Dhenkanal District, respectively.

Use: Plant is used for making brooms and is eaten in scarcity.

**Lectotype:** *Arundo donax* Linn. (vide N.L. Britton, Fl. Bermuda : 29. 1918).


**Type locality:** "In Hispania colloprowincia", Spain.


**Type:** "Habitat ad margines stagnorum et fossarum in India oriental: Cal. König. (LUND).

Nala (Or).

A tall, stout grass, 1.8 - 3 m high with fistular stem (rhizomes) creeping below, more or less reed-like. Leaves ensiform with amplexicaule base, 20 - 60 x 1.25 - 5 cm; ligule of long hairs. Panicles erect, thyrsiform, decompound, 30 - 60 cm long, with scaberulous branches. Spikelets 0.7 - 1.25 cm long. Lower and upper glumes lanceolate, 0.6 - 1 cm, arist - acuminate or obtuse and acuminate; lemmas 2-4, the upper most empty when more than 3, lowest 1-1.2 cm long silky pilose, lateral veins produced into 2 slender awn - like teeth each side of the central awn; palea 5 mm long, oblong; rachilla shortly produced between the glumes. Lodicules 2, obovate. Stamens 3. Styles distinctly 2 with plumose stigmas. Grain oblong. Often cultivated.

**Fls. and frts.:** Sep. - Oct.

**Ecology:** It preferably grows in moist habitat, when established it is planted in dry areas. Often grown in gardens.

2n = 100, 110 (Bor, l.c.).
**Distribution:** India, Pakistan, Nepal, Bangladesh, Burma, Sri Lanka, N. Asia, N. Africa, Europe.

A native of Lower Himalayas.

**Specimens Examined:** Puri Dist.: Nelbana Island in Chilka, 22 Jun. 1908, *sinelect s.n.* (Accn. No. 39818 - BSIS).

Saxena *et al.* (l.c.) recorded it from Bhubaneswar.

**Uses:** It is sometimes grown as ornamental grass in clumps in gardens and lawns. It has poor fodder value, but the young leaves are eaten by cattle. The culms are used in thatching; mats, baskets and musical pipes. A pulp of high cellulose content derived from stalks and leaves used for rayon manufacture and writing paper.


Type: Persia, Kotschyi Herb. nr. 162.

*A. trichophylla* Koch, Linnaea 21 : 393. 1848.

Type locality: Caucasus: In der Schirwan'schen Ebene auf Kalk und Mergelboden".

Winter Wild Oat (Eng.).
A slender coarse annual with stout, culms reaching a height of ca 1 m. Leaf-blades up to 30 cm long, 10 mm broad, linear-acuminate. Panicle very lax, nodding, inarticulate on the pedicels; rachis having spikelets 2-3-flowered. Glumes (18-25) 30 mm long; lemma pubescent, 16-25 mm long, bifid at the apex; densely bearded at the base, without awns or bristles; the lowest lemma only with a thickened callus, appressed hairy all over except the tips, muticus, articulate on the rachilla, the remainder not articulated; rachilla continuous and tough between the lemmas; awns geniculate with twisted base from middle or below the back; palea hyaline; keels 2, ciliate. Stamens 3. Grains villous except at the apex.

Rare! Fls. and frts.: Jan.-May.

Ecology: Found both on cultivated and waste lands.

2n = 42 (Bor, l.c.).

Distribution: India,

Exotic weed probably introduced in W. C. and E. Europe.


Note: Bor (1960) points out that Avena persica Steud. and A. ludoviciana Dur. are conspecific, and the former is an earlier name for the species. Further, A. trichophylla C. Koch which is suspected to be the same species still has an earlier name. As some authorities still consider A. ludoviciana Dur. to be a subspecies of A. sterilis L., the nomenclatural part remains still to be solved and a critical analytical study is necessary to settle the nomenclatural dilemma.
Bambusa arundinacea (Retz) Roxb. in Nandan Kanan Botanical Garden.

Type: Bambos arundinacea Retzius.

1a. Branches armed with spines; large bamboos, ca 1 m high, 10 - 17.5 cm diam.; nodes of the branches with 2-3 curved spines; lemmas 5-9 mm long:

2a. Rachis of inflorescence glabrous, hard, shining; spikelets 6-12-flowered. ... B. arundinacea var. arundinacea

2b. Rachis of inflorescence glaucous-green, angled, almost soft; spikelets 5-6-flowered. ... B. arundinacea var. orientalis

1b. Branches unarmed; bamboos less than 1 m high, not more than 10 cm diam.; nodes of the branches devoid of spines; lemmas less than 5 mm long:

3a. Culms solitary; palea long-ciliate; anthers apiculate; ligule long, obtuse, hairy. ... B. nutans

3b. Culms caespitose; paleas not ciliate; anthers obtuse; ligule short, narrow or obscure:

4a. Stem-sheaths with a triangular reniform or cordate blade; leaves larger, linear-lanceolate, up to 25 cm long; veins 6-10 pairs; paleae 5-7-veined between the keels; ovary ovate-oblong. ... B. tulda
'4b. Stem - sheaths with a very long or imperfect-blade; leaves smaller, narrow, up to 20 cm long; veins 4-6 pairs; auricles 0 or minute; palea 3-5-veined between the keels; ovary narrowed into a hairy style.

... B. pallida


Type: "Ind. Orient", Koenig (Missing from Retzius Herb. at LUND).


Type: Plate 47 in Wendl., (l.c.)


*B. arundinacea* var. *spinosa* (Roxb.) Haines, Bot.: 951.

Kanta Baunso; Gol
Munari, Sundragai (Or.)
Thorny bamboo. (Eng.)

var. *arundinacea*

A giant thorny, caespitose bamboo with stout rootstock.
Stems (culms) about 30 metres in height, 10 - 20 cm in diam., green and shining when young, zigzag, becoming straight and golden-yellow, branched from the base, branches curving, bearing spines, nodes prominent, internodes short 30 cm to 45 cm; stem-sheaths 13.5 - 20 x 1.25 - 1.8 cm, coriaceous. Leaves ca 20 x 2.5 cm, linear or linear-lanceolate, with stiff tip; midrib narrow; leaf-sheath ends in a thick callus and shortly bristly auricled; ligule short, narrow. Inflorescence an enormous panicle; branchlets bearing loose clusters of spikelets, 1.25 - 2.5 cm long. Glumes 2 or 0, ovate-lanceolate, acute or mucronate, many-veined, empty; lemmas 5-10 mm long, the upper-most 1-3 male or neuter; lower bisexual; keels 2 ciliate. Lodicules 3, small, ovate, hyaline. Anthers yellow, obtuse, sometimes apiculate, 5 mm long. Ovary glabrous; style short. Grain 0.5-1.25 cm long, oblong, beaked by the style base, grooved on one side (Plate 9, Photo 10).

Fls.: Nov.

Ecology: A bamboo of the forests and moist valleys. Sometimes occur all along the streams.

Distribution: Throughout India, Pakistan, Bangladesh, Sri Lanka, Commonly cultivated in gardens.

Specimens examined: Crissa: Sine loc, Wallich 5023 A (CAL); Parlakimedi, 300 m, Mar. 1884, Gamble 14139 (CAL, DD, HH); Pilingi (or Tislingi), Dec. 1889, Gamble 20563; Puri Dist.: Khurda, Jul. 1893, Babu Sreedhar Chakraborty 5722 (CAL); Cuttack Dist.: Balijhari, 20 Feb. 1962, Panigrahi 23962 (CAL);
Beddome (1877) recorded its occurrence from Jeypore in Koraput District; Haines (l.c.) & J.D. Hooker (1893), from Ganjam; Panigrahi et al. (l.c.), from Kapildaar in Keonjhar District. Singh et Verma (1963-64), from Payagada, Purnakote, Bolang (Angul), Mujhipara and Baghmunda, Angul in Dhenkanal District; Haines, from Angul, Athmallik in Dhenkanal District, and also from Arang and Choudhury et Patnaik (1975), from Bhubaneswar in Puri District respectively.

Uses: Used for buildings, scaffolding and for many domestic purposes; for floating heavy timber, the spicate culms are woven into mats, baskets, fans etc. The grains when available are often eaten by man.

Note: Gamble states that the species is not native to India.


Bambusa orientalis Nees in Linnaea 9: 475. 1834.

Type locality: "India Orientalis".

Petioles hairy, leaf-sheaths hairy with white cilia. Spikelets membranous, 5-8-flowered; rachis glaucous green, angled, almost soft.

Distribution: India.
Specimen examined: Nil.

Haines (l.c.) recorded its occurrence from Khurda in Puri District.

Note: Haines (l.c.) remarked that the specimen collected in 1893 from Khurda was identified as spinosa but the rhachilla is very evident with swollen ciliate nodes, the spikelets are few-fld., the leaf-sheaths have long bristles and are hairy.

But Gamble (1896) did not recognise Bambusa speciosa Roxb. (1832) as any way distinct from B. arundinacea Nees and stated that both the small and large varieties of B. arundinacea occur in Orissa but specifically, the "almost dwarf, thick-branched, very thorny small-culmed variety which grows gregariously in the low hills and laterite downs of Orissa and Ganjam and extends to lower Bengal..... and is probably the one which Roxburgh means as B. spinosa". He had received both the large and small varieties from Khurda, Orissa under the obvious name Kanta bans (thorny bamboo).

Gamble did not recognise three varieties as attributed to him by Haines (l.c.)

Bambusa nutans Wall. ex Munro, Trans. Linn. Soc. 26: 92. 1858;
Haines, Bot.: 949; Panigrahi et al., BBSI 6: 261; Jain et al., JBNHS 72 (3): 766.

Syntype: "Habit in Ind. or."; Nepal: Nag-Arjoon, Wallich Num. list No. 5031; Silhet ..... De Costa in Wallich 5030 A.
Stems solitary from a creeping rhizome, with scattered culms 50 - 100 x 3.75 - 10 cm and to be less hairy and bristly. Stem sheaths 15 - 30 cm, top rounded, truncate. Leaves softly downy (white when dry), 15 - 13 x 2.5 - 3.8 cm, linear-lanceolate, 7 - 10-veined; sheath ending in a smooth callus and falcate auricles with long bristles; ligule long, obtuse, hairy. Inflorescence a stiff panicle with spiciform branches. Spikelets in bracteate fascicles, fertile few, 2-2.5 cm long, 2-3 lowest glumes neuter, 3-7 fertile, all ovate, acute, mucronate, many-veined, puberulous within; palea shorter, flattened, ovate; keels overlapping, long-ciliate. Lodicules 3, long-fimbriate. Anthers 3, tips apiculate or slightly penicillate. Ovary stipitate, sub-ovoid, glabrous; style long; stigmas 3. Grain nearly ellipsoid, furrowed on one side.

Ecology: On trap rocks of the hills.

Distribution: India, Nepal.

Cultivated by hill tribes.


Panigrahi (l.c.) also recorded its occurrence from Hianjabasa, in Similipal hills of Mayurbhanj District.

Bambusa pallida Munro, Trans. Linn. Soc. 27 : 97. 1868; Jain et al., JBNHS 72 (3) : 767.

Syntypes: India: Bengal, Pundua, Silhet; (Cult.) Cachar ...
Khasia, Jawye, 3500 ft. sin e lect no. 602, et 607, Hooker et
Thomson (K).

Gaespitose bamboo with graceful stems, 13-20 m high and 5-8 cm diam., olive green with indistinct nodes; stem-sheaths 17.5 - 30 x ca 25 cm, with truncate top; blade up to 35 cm long, triangular, acuminate; ligule very small. Leaves 10-20 x 1.25 - 1.8 cm, linear-lanceolate, glabrous above, often white-hirsute beneath; sheaths glabrous, ending in a smooth callus and a rounded erect fringed auricle, ligule very short. Panicle very large, pale. Spikelets 2.5 - 4 cm, fertile and neuter on the spiciform branches of a large panicles. Rhachilla short, clavate. 1 or 2 lowest glumes ovate, acute, empty, then one male or gemmiparous followed by 3-8 flowering and 3-5 imperfect; lemmas ovate, acute, many-veined; palea much shorter, acute. Lodicules 3. Anther - tip 1-2-setose or naked. Ovary narrowed into the hairy style; stigmas 3.

Ecology: In moist valleys and forests.

Distribution: India, Burma, Pegu.


Haines and Mooney do not record this species from Bihar and Orissa; it is included here on the authority of Jain et al. (1975).

Note: B. pallida Munro differs from B. tulda Roxb. by the attenuated ovary in the latter. Very few of the spiculae (sometimes only 2-3 on a branch appear to be perfect; the
sterile spiculae are numerous and very much smaller.


_Type:_ Bengal (Tulda Bans), _Roxburgh_ 5030 C.

_Iconotype:_ Roxb Icon. 1403 (CAL).

Baubso (Or.)

A very large thornless bamboo, 7 - 30 m high, 5-10 cm in diam., caespitose; internodes 30 - 60 cm, stem - sheaths 15 - 22.5 x 15 - 25 cm; blade of culm-sheath sparingly hairy within. Leaves 15 - 25 x 1.5 - 3.8 cm, linear-oblong or lanceolate, the base usually rounded; petiole often hairy; sheath glabrous, ending in a smooth callus and oblong, long-fringed auricle; ligule narrow, obscure. Inflorescence very variable, from an immense radical leafless panicle to a short leafy panicle or spiciform branch; rachilla clavate, flattened, fragile. Spikelets 2.5 - 7.5 cm long in interrupted clusters or loose heads mixed with chaffy bracts. Lowest 3-4 glumes acute, many-veined, usually gemmiparous; lemmas 1.25 - 2.5 cm long, ovate, acute, acuminate or mucronate; palea shorter, cymbiform, 5-7-veined between the keels, tip penicillate. Lodicules 3. Anthers obtuse, glabrous, purple. Ovary obovate-oblong, glabrous.

Widely cultivated. Often wild.
Ecology: Often common in dry soil.

Distribution: India, Burma.

Specimen examined: Nil.

Panigrahi et al (l.c.) recorded its occurrence from Similipalgarh in Mayurbhanj District and Choudhury et Patnaik (l.c.) from Bhubaneswar in Puri District.

Uses: In our area it is widely used in preparation of mats and baskets and sometimes used for buildings and scaffoldings. Young buds consumed as a vegetable. This bamboo is a good source of paper pulp.


Type: B. anamitica O. Kuntze. (= B. bladhii (Retz.) Clayton).

Type: A. torreyanus (Studel) Nash (Andropogon torreyanus Steudel).

1a. Lower racemes longer than the main rachis; joints and pedicels with densely long silky hairs; lower lemma of the sessile spikelet as long as the lower glume; plants up to 60 cm high; leaf-sheaths glabrous or villous;
pedicelled spikelets equal to the sessile; upper glume 3-5-veined. ... ... B. pertusa

1b. Lower racemes shorter than the main rachis; joints and pedicels not so silky or glabrous; lower lemma of the sessile spikelet one-fourth the length of the lower glume; plants up to 100 cm high; leaf-sheaths glabrous; pedicelled spikelets usually shorter than the sessile; upper glume obscurely 3-veined. ... B. glabra

2a. Panicle with subverticillate branches, each bearing 4-8-spikes; spikelets not purple:

3a. Leaves glabrous, 3-5-veined on each side of the midrib; lower glumes usually glabrous, pitted or not.

... var. glabra

3b. Leaves glabrous and 3-veined on each side of the midrib; lower glumes hairy below, pitted. ... var. haenkei

2b. Panicle with opposite branches, each bearing 1 spike, very rarely 2 spikes; spikelets purple:

4a. Sessile spikelets 3.5 - 4 mm long; keels rigidly ciliolate; lower glume thinly hairy or not in the middle. ... ... var. punctata

4b. Sessile spikelets not more than 3.2 mm long; keels scabrid; lower glume with back shortly uniformly hairy or hispid. ... ... var. hirta

Bothriochloa glabra (Roxb.) A. camus, Ann. Soc. Linn. Lyon 1930 n.s. 76: 164. 1931; Bor, Grass. : 107.
Andropogon glaber Roxb., (Hort. Beng. : 7. 1814, nom. nud.)
Fl. Ind. 1 : 271. 1820.

Type: India : Bengal in elevated spots, Roxburgh s.n. (Roxb.,
Ic. 1194, CAL, K).

Andropogon montanus Roxb., (Hort. Beng. : 82. 1814, nom. nud)
Fl. Ind. 1 : 271. 1820.

Type: India, "A native of mountainous countries" Roxb. s.n.
(Roxb., Icon. 892, CAL).

7 : 175. 1897, non R. Br., 1810.

Amphilophis glabra (Roxb.) Stapf in Freyn, Fl. Trop. Afr. 9 :
172. 1917; Haines, Bot. : 1028; p.p. incl. var. genuina; Fischer
in Gamble Fl. Madras : 1731 (1200) 1934.

118. 1942; Bor, Grass. : 103; Behera et al., JENHS Suppl. 74 :
651. 1979; non (R. Br.) A. Camus.


Dichanthium glabrum (Roxb.) Jain et Deshpande in Bull. Bot.
Surv. Ind. 20 : 134. 1978 (1979) et Fasc. Fl. Ind. 15 : 13 :
1984.

var. glabra

Gonda Bena (Cr.)
Perennial variable grass 30 to 180 cm high. Culms tufted, covered with dense ring of hairs at nodes. Leaves 14-40 x 0.6 - 1.2 cm, narrowly to broadly linear, with a setaceous tip, midvein strong; ligule short, truncate. Inflorescence a panicle, 10-20 cm long, lower racemes simple or branched. Spikes with joints and pedicels subequal, compressed, bearded on margins, 2.5 - 3.5 mm long. Sessile spikelets 3-4 mm long. Glumes equal. Lower glume 3-4 mm long, 2-keeled, with narrowly inflexed margins; upper glume cymbiform, rarely ciliolate; lower lemma ca 2.5 mm long, broadly oblong or lanceolate, hyaline, obtuse, veinless, glabrous; upper lemma reduced to the narrow base, 1-1.8 cm long; palea 0. Lodicules 2, minute. Stamens 3; anthers brown, 0.13 mm. Ovary minute; styles 2, free; stigmas plumose, exerted; grain oblong, 2 mm long. Pedicelled spikelets 2.5 - 3.25 mm long, linear, usually shorter than the sessile spikelets. Lower glume similar.


Ecology: Common in open grass lands and sandy bunds.

Specimens examined: Koraput Dist.: Kuthadya hill, 19 Aug. 1931, V. Narayanaswami 5882 (MH); Summit of Indragiri, Kasipur, 27 Jan. 1949, Mooney 3289 (DD); Ganjam Dist.: Chatrapur, Nov. 1889, Gamble 21502; Rambha, Dec. 1889, Gamble 21637 (both DD); Gopalpur Road Railway crossing near Pathora, 20 Oct. 1930, V. Narayanaswami 4686 (MH); Orissa s sine loc, Oct. 1941.

Fischer 91.c.) recorded its occurrence from Ganjam; Haines (l.c.), from Sambalpur, Panigrahi et al. (l.c.), from Madhupur in Sambalpur District; Behera et al. (l.c.), Choudhury et Patnaik (l.c.) and also Saxena et al. (l.c.), from Bhubaneswar, respectively.

Note: de Wet and Harlan (1970) in a paper entitled "Bothriochloa intermedia a taxonomic dilemma" discuss the introgressive nature within two species of Bothriochloa Ktze., Capillipedium parviflorum (R. Br.) Stapf. and Dichanthium annulatum (Forssk.) Stapf and suggested that Bothriochloa intermedia (R. Br.) A. camus should be treated as compilospecies.

Although these species are genetically isolated from each other, they are bridged over through B. intermedia (R. Br.) A. Camus. They suggested that the hybrid derivatives should be included in B. intermedia suct., a compilospecies non (R. Br.) A Camus a hybrid complex with B. intermedia at its centre.

Capillipedium assimile (Steud.) A. Camus and C. parviflorum (R. Br.) Stapf represent sexual diploids and facultatively apomictic tetraploid races. They are isolated at diploid level although cross at tetraploid level. They suggested that Bothriochloa glabra (Roxb.) A. camus is a tetraploid fertile
hybrid between C. parviflorum (4n) and B. intermedia (4n) and that introgressive hybridization occurs in nature between B. glabra and B. intermedia hybrid complex. They also suggested that: (a) B. grahamii (Haines) Bor is a fertile sexual species between B. intermedia (R. Br.) A. camus and Dichanthium annulatum (Forssk.) Stapf; (b) original B. intermedia (R. Br.) A. camus may be an autoploid from B. longifolia (Hack.) Bor (2n) and crosses freely producing 3n, 5n hybrids and (c) the original B. intermedia (4n) exists as widely scattered colonies and is a good species. We, therefore, treat B. glabra (Roxb.) A. camus (= B. intermedia auct. mult.) as distinct from B. intermedia (R. Br.) A. camus.

Clayton (1978) in making the combination Dichanthium bladhii (Retz.) Clayton, did not cite any synonymy other than the basionym and whether D. bladhii is conspecific with Bothriochloa intermedia (R. Br.) A. camus, is difficult for us to comment.

Uses: Young grass eaten by cattle. It also yields a good pulp for paper-making.

var. punctata (Roxb.) comb. nov.


Type: India: "a mountain grass". Roxburgh s.n. (Roxb., Icon. 892, CAL).

Bothriochloa intermedia (R. Br.) A. camus var. punctata (Roxb.) Keng., Clav. Gram. Prim. Sin. : 244. 1957; Bor, Grass. : 108;
Dichanthium glabrum (Roxb.) Jain et Deshpande var. punctatum

Amphilophis glabra (Roxb.) Stepf. var. punctatus (Hack.) Haines,
Bot. : 1030.

Bothriochloa intermedia forma punctata (Roxb.) A camus, Ann.
Soc. Linn. Lyon NS 76 : 164. 1931; Mooney, Suppl. : 187;
Panigrahi et al., BBSI 6 : 262.

Gondabena (Or.)

Panicle usually thin, compound, 10 - 15 cm; lower racemes
are shorter than the 2 spikes. Spikelets usually purple 3.5 -
4 mm long. Lower glume thinly hairy or not hairy below middle,
1-3-pitted in many spikelets, both sessile and pedicelled;
keels rigidly ciliolate.


Ecology: In open grassy lands.

Distribution: India, Africa.

Specimens examined : Koraput Dist.: Summit of Indragiri,
Siji Mali in Kasipur, 27 Jan. 1949, Mooney 3259; Orissa, sine
lect, Oct. 1941, Mooney 1618; Kalahandi, 1170 m, 28 Dec. 1939,
Mooney 1222 (all DD); Dhenkanal Dist.: Angul, 8 Jan. 1962,
D. M. Verma 1590 (CAL).

Fischer (1931) recorded it from Ganjam and Panigrahi et al.,
from Madhupur (Panlgrahl 8667) in Keonjhar District.

Note: Deshpande (1984) in making the combination with Dichanthium glebhum observed that Andropogon intermedius R. Br. is conspecific with Dichanthium bladhii (Retz.) Clayton and that in Roxb. Icon. 892, the lower glumes are shorter than the central axis and it resembles Andropogon glaberum Roxb. more closely; hence she transferred to Dichanthium glebhum.

var. hoenkei (J.S. Presl ex C.B. Presl) comb. nov.

Andropogon hoenkei J.S. Presl ex C.B. Presl, Rel. Hoenk. 1: 340. 1830; Bor, Grass.: 107, prosyn.

Syntype: China, pr. Macao, Vahella; pr. Canton, Sampson; Luzon, Hoenke s.n.; Cuming 1400; Ceylon, Thwaites 411 exp.

Andropogon (subg. Amphilophis) intermedius (R. Br.) Hack. var. haenkei (Presl) Hack. in DC., Monograph. 6: 486. 1889.

Amphilophis haenkei (Hack.) Haines Bot.: 1030 (as Haenkii).

Panicle not purple, 12.5 - 15 cm long, compound, dense with many subverticillate branches, bearing 4-8 spikes, with generally a sessile spikelet at each fork (without pedicel companion). Lower glume rarely pitted, slightly depressed along the middle line and somewhat hairy below; keels slightly ciliolate.


Ecology: In grass lands.

Distribution: India, Sri Lanka.
Specimen examined: Nil.

Haines (1.c.) recorded its occurrence on the authority of Walsh's specimen from Orissa, without citing the specific locality.

Note: Haines (1924) recognised two distinct groups within Amphilophis glabra var. Haenkei and cited Walsh s.n. from Orissa. He described the taxon as having leaves glabrous or ciliate below; usually narrow and 5-veined on each side; panicles 17 cm long; keels of lower glume scabrid only. Bar (1960) reduced Andropogon haenkei J.S. Presl ex C.B. Presl as conspecific with B. glabra. In view of Haines observation that he would regard it as distinct species as it is easily distinguished in the field, we reduce it as a var. of B. glabra.

var. hirta (Haines), comb. nov.

Amphilophis glabra (Roxb.) Stapf var. hirta Haines, Bot.: 1030.

Type locality: Sambalpur.

Haines (1.c.) described the variety as "Panicle usually thin, branches opposite, each bearing only one spike, spikelets purple; glume 1, with back shortly uniformly hairy or hispid; stem tall, 5 mm in diam., much branched above; leaves 7-10 mm wide, sparsely hairy towards base and strigose behind ligule; sessile spikelets 2-3 mm; glume with back shortly uniformly hairy or hispid; keels scabrid; awn 10 mm long."

Ecology: In open grass lands.

Distribution: India (Orissa). Endemic

Specimen examined: Nil.

Haines (l.c.) recorded its occurrence from Sambalpur.

Bothriochloa pertusa (Linn.) A. Camus, Ann. Soc. Linn. Lyon 1930 n.s. 76: 164. 1931; Bal, BRSI 6(10) : 118; 1942; Mooney, Suppl. : 187 (as "(Willd.) A. Camus"); Bor, Grass. : 109;

Panigrahi et al., BRSI 6: 262; Behra et al., JNHS 74: 651;

Holcus pertusus L., Mant. 2: 301. 1771.

Type: "East India Orientalis", Linnaeus (mircrofiche no.1212
16, CAL, K).


Basana (Or.)

Sour grass, Pitted Blue Grass (Eng.).

A creeping, very variable grass, with nodes densely bearded. Leaf-sheaths glabrous or villous. Leaves pubescent; lower leaves short, crowded at the base; upper ca 30 cm long, acute or acuminate; ligule short, membranous, truncate. Racemes(1-),
digitate or sub-digitate. Spikes usually 3-9. Sessile spikelets 3.5 - 5 mm long, oblong-lanceolate, hispid; callus obtuse.
Lower glume elliptic-oblong, obtuse or truncate, 2.5-3.5 mm long; awns 9-20 mm long; upper glume lanceolate or cymbiform, acute or acuminate, keeled, 3-5-veined; lower lemma narrow, lanceolate, hyaline; upper lemma slightly dilated at base.
Lodicules 2. Stamens 3. Styles 2, free; stigmas plumose, exerted. Grain oblong, slightly compressed. Pedicelled spikelets narrower than the sessile, glabrous. Lower glume keeled; keels sometimes minutely produced, ciliolate; upper glume flat, obtuse; lower lemma linear-oblong to broadly oblong, glabrous.

Fls. and frts.: Sep. - Feb.

Ecology: A dominant grass of the open grass lands, rice-fields and often on saline soils.

n = 40 (de Wet et al., Caryologia 16: 47-85. 1963).
2n = 60 (Bor, l.c.)

Distribution: India, Pakistan, Burma, Sri Lanka, Arabia, eastwards to south-east Asia, tropical Africa.

Specimens examined: Ganjam Dist.: Ganjam, Dec. 1849, W. Wight 3027 (CAL); Kala Sonapur, Aska, 17 Oct. 1930, Narayanaswami 4657; Gopalpur Road 20 Oct. 1930, Narayanaswami 4688; Berhampur, 20 Oct. 1930, Narayanaswami 4720 (all MH); Dhenkanal Dist.: Majhupura, 8 Jan. 1963, J. S. Singh 1530 (CAL); Orissa: sine loc. Oct. 1888, Walsh s.n. (Accn. no. 530358-CAL); Puri Dist.: near Puri, 1889, Walsh s.n. (Accn. no. 530357-CAL); Khurda,
1889, Walsh 13 (CAL); Cuttack Dist.: Kujang, 13 Dec. 1960, P.C. Nanda 2330 (CAL); Mayurbhanj Dist.: Sakohura, 14 Apr. 1940, sine lect 539 ; Chahala, 21 Apr. 1939, sine lect 233 (both DD); Odanapahad, 600 m, 11 Nov. 1940, sine lect s.n. (BSIS); Lulung-Kochudahan, 160-457 m, 24 Feb. 1958, Panigrahi 18762 (CAL).

Haines (l.c.) recorded it from Puri and again without district; Ghoudhury et Patnaik (l.c.), Behera et al. (l.c.) and Saxena et al. (l.c.) from Bhubaneswar in Puri District. Mooney (l.c.) recorded it from Madhya Pradesh only.

Uses: It is used as a good fodder and hay.


Type: Panicum caucasicum Trinius.


Note: Brachiaria setigera (Retz.) C.E. Hubb. (= Urochloa setigera (Retz.) Stapf, included by Haines, as also Mooney, is not reported from Orissa.

1a. A stout perennial; rachis ± ribbon - like, flat.

... ... B. mutica
1b. Stout or slender annuals, a few perennials; rachis sometimes filiform, triquetrous:

2a. Panicle linear with erect racemes of closely crowded, spikelets sometimes tipped with purple. ... *B. eruciformis*

2b. Panicle various, oblong, lanceolate or spreading; lower glume up to half as long as the spikelet; spikelets not tipped with purple:

3a. Spikelets 1.25 - 2 mm long. ... *B. reptans*

3b. Spikelets 2.5 - 4.5 mm long or longer:

4a. Spikelets turgid, broadly elliptic-oblong or broadly obovate-elliptic, apiculate, glabrous or hairy. ... ... ... *B. ramosa*

4b. Spikelets not turgid, or if so, rachis not triquetrous, elliptic-ovate, elliptic-ovate-lanceolate rarely, elliptic; acute or apiculate; glabrous:

5a. Spikelets distant on the branches of a loose panicle; spikes usually numerous up to 10 cm long; culms straggling. ... ... ... *B. remotata*

5b. Spikelets minute; crowded; racemes 2-6, up to 8.8 cm long; culms prostrate or straggling.

... *B. distachya*

*Brachiaria distachya* (L.) Stapf. in Prain, Fl. Trop. Africa 9 : 565. 1919; Haines, Bot.: 1004; Bor. Grass.: 281; Srin. et Rao, JBNHS 58 (2) : 418; Saxena et al., Ind. J. For. 5
Panicum distachyam L., Mant. 2: 183. 1771.

Type: "Habitat in India, orientali", Koenig (LINN.: 80. 41; microfiche CAL).

A slender, decumbent grass with ascending culms, 20 - 50 cm long. Leaves flat, lanceolate to linear, 5 - 15 x 0.3 - 0.8 cm, cordate at base, clasping; leaf-sheaths keeled; ligule a fringed membrane, 0.5 mm deep. Inflorescence of 2-6 spiciform racemes, the main axis somewhat winged, glabrous. Spikes 2.5 - 6 cm long, erect; glabrous; rachis ca 1 mm wide with very short, stiff hairs on the edges. Spikelets attached singly on either side of the median ridge. Lower glume broad, clasping, 7-9-veined, truncate, 1.8 mm long; upper glume boat-shaped, pointed, 2.6 mm long, 5-7 veined; lower lemma similar to the upper glume, sterile, boat-shaped, 2.5 mm long, 5-veined; palea hyaline, narrowly 2.2 mm long, 2-veined; upper lemma ellipsoid, obuse or rounded, 2.2 mm long, hermaphrodite. Stamens 3, anthers yellow, 1 mm long. Stigmas purple. Grain oval, 1.6 mm long, flattened, light yellow.

Fls. and frts.: Jun. - Nov.

Ecology: A weed of damp placed in plains.

2n = 36 (Krishnaswamy, 1948).

Distribution: India, Pakistan, Bangladesh, Burma, Sri Lanka, Malesia, Thailand, China, Malacca, Australia, introduced into...
Africa.

Specimens examined: Ganjam Dist.: Parlakimedi, Sep. 1903, Burkill, Candler et Grant 20583 (BSIS); Gopalpur Road, 20 Oct. 1930, V. Narayanaswami 4711 (MH); Puri Dist.: near Puri, 1939, Dr. Walsh s.n. (Accn. no. 520283 - CAL); Puri beach, 16 Jun. 1936, sine lect s.n. (Accn. no. 853 - Rav. Coll. Herb.).

Saxena et al. (l.c.) recorded its occurrence from Bhubaneswar.

Uses: This being a good fodder, liked by cattle.

Brachiaria eruciformis (J.E. Sm.) Griseb. in Ledeb., Fl. Ross. 4: 469. 1853; Mooney, Suppl.: 177; Bor, Grass.: 283; Panigrahi et al., BBSI 6: 262. Behera et al., JBNHS (Suppl.) 74: 653. 1979.


Type: Greece: Junonis in insula Samo, Sibthorp. (OXF).


Panicum isachne Roth ex Roem. et Schult., Syst. Veg.: 458. 1817.

Type: "India orientali, Heyne."

Culms 30 - 60 cm long, ascending from a decumbent or creeping and rooting base, geniculate, with bearded nodes. Leaves 2.5-5 mm wide, linear-lanceolate, base rounded, acute; sheaths ciliate on the upper part; ligule a fringe of hairs. Inflorescence
a spiciform raceme, 5 - 7.5 cm long, erect consisting of 6-12 second racemosly arranged spikes appressed to the trigonous, slender, hairy rachis, 0.5 - 2.5 cm long. Spikelets imbricate or approximate, second, 1.5 - 2.5 mm long, elliptic to broadly oblong, softly hairy; pedicels very short. Lower glume ca 0.5 mm long, triangular, glabrous; upper 1.5 mm long, oblong, obtuse, 5-veined, pilose, rarely glabrous; lower lemma narrower, 3-veined, paleate, neuter or sometimes male, with hyaline palea; upper lemma shorter, dorsally flattened, glabrous, shining, bisexual, with coriaceous palea. Lodicules 2. Stamens 3. Styles 2, distinct; stigmas plumose. Grain broadly oblong or elliptic.

Fls. and frts.: Sep. - Jan.


2n = 18 (Avdulov, 1931).

Distribution: India, Pakistan, S. Africa to Mediterranean, Iraq, Afghanistan, Persea.

Specimens examined: Sambalpur, 180 m, 29 Oct, 1963, Panigrahi 20634 (CAL); Keonjhar Dist.: Champua, 490 m, 21 Sep. 1946, Mooney 2745 (DD).

Behera et al. (I.c.) recorded its occurrence from Bhubaneswar.

Use: It is a moderate fodder for cattle.


Type locality: Egypt. "Rosettae".

Para Grass, Mauritius Grass, Buffalo Grass (Eng.)

A grass of about 2 m or more tall. Culms stout, stoloniferous to 10 m long, ascending from a leafy base, nodes bearded. Leaves to 30 x 2 cm, linear-lanceolate, acuminate to a slender point, with cordate, hairy base; leaf-sheaths loose, 11-14 cm long; ligule a tomentose ridge, ca 0.8 mm deep. Panicle ca 20 cm long, erect, compound; rachis stout, smooth, angular with many short spikes, the upper ones being racemes 5-7.5 cm long. Spikelets very many, ca 3.2 mm long. Lower glume 1/3 to 1/3 as long as lower lemma, ovate to ovate-oblong hyaline, 1-veined, 1 mm long, not clasping; upper glume boat-shaped, pointed with purple tip, 3.2 mm long, glabrous, 5-veined; lower floret paleate, usually male; lemma 3 mm long, more pointed; palea hyaline, 2.8 mm long; upper floret hermaphrodite, shorter than the lower one; lemma light yellow-brown, indurated, boat-shaped with a distinct epiculus, 2.4 mm long, enclosing palea, 2 mm long. Stamens 3; anthers 1.6 mm long. Style 2; stigmas deep purple.

Fls. and frts.: Sep. - Jan.

Ecology: An occasional grass of moist localities.

2n = 36 (Bor, l.c.).

Native of W. Africa and S. America but widely introduced into many parts of the tropics.

Specimen examined: Nil.

Pal and Banerjee (l.c.) cited the specimen from Koraput (Raju 1520).

Use: A best pasture grass of the tropics having a good fodder value.


**Panicum ramosum** L., Mant. 1: 29. 1767.

Type: India, cult. at Uppasala (LINN)


**Panicum Kurzii** Hook.f., Fl. Brit. Ind. 7: 38. 1896.

Type: India: Lower Bengal plant found at Seebpere, close to Calcutta Bot. Garden, Wallich Numrl. list. No.8745(CAL,K).

Culms terete, 30 - 90 cm tall, erect or ascending, leafy, decumbent with erect branches, nodes pubescent. Leaves narrowly linear-lanceolate to ovate-lanceolate, sometimes linear-
amplexicaul, blade 7.5 - 30 x 1.5 - 3 cm, cordate at base, glabrous, scaberulous at margins, abruptly acuminate; sheaths subcompressed, 8-12 cm long, loose, glabrous, but ciliate along margins; ligule a fringe of short hairs. Panicle 5-many, 3 (-5) - 8 (-15) cm long, suberect; rachis triquetrous, slender, puberulous; margins scabrid. Spikes erect or spreading, 2.5 - 5 cm long. Spikelets loosely imbricate, obovate, 2.5 - 3.7 mm long, paired or lower in threes, solitary above, usually pubescent, sessile and pedicelled; pedicel pubescent and setose with long white hairs. Lower glume membranous, ca 1 mm long, ovate, subacute, clasping at base, 3-5-veined; upper glume very membranous, glabrous or finely pubescent, acute at apex, 7-veined; lower lemma similar to the upper glume, empty, broadly ovate, spiculate, 5-veined; palea narrowly oblong, hyaline, muticous; upper lemma ovoid-oblone or ovate, 2.3 - 2.6 cm long, palea similar, flat, enclosed in its lemma. Lodicules 2. Stamens 3. Styles 2; stigmas 2, plumose.


Ecology: A grass of the waste places.

Distribution: India, Pakistan, Sri Lanka, Senegal to Yemen and Southwards to Malawi, Rhodesia to S. Africa, trop. Asia, Afghanistan.

Specimens examined: Ganjam Dist.: Rambha, Khallikote, 12 Aug. 1913, D. Hooper 39648 (BSIS); Curangi, 19 Aug. 1931, Narayanaswami 5800 (MH); Kalahendi Dist.: Kanghatta, 23 Sep. 1956, S. K. Mukherjee 4423 (CAL); Sambalpur Dist.: Motijharan
Behera et al. (l.c.) and Saxena et al. (l.c.) recorded it from Bhubaneswar and Choudhury et Patnaik (l.c.) from Khandagiri Udayagiri hills in Puri District respectively.

Uses: A good fodder grass relish by cattle.

Note: Haines (1924) and Bot (1960) treated B. ramosa (L.) Stapf and B. kurzii (Hook.f.) A camus as distinct species, but Cope (1982) without finding any remarkable differences treated them to be conspecific. Haines recorded B. kurzii from Bihar (Parasnath) only.

Brachiaria remote (Retz.) Haines, Bot. : 1005; Fischer in Gamble, Fl. Madras : 1769; Bor, Grass. : 285.


Type: "E. Tranquebaria misit opt." König.

A very slender, straggling grass, with culms 30 - 60 cm long, flaccid, much branched, internodes 2.5 - 5 cm, nodes glabrous. Leaves 2.5 - 10 cm, very narrowly linear to linear-lanceolate, acuminate, flat, membranous, glabrous; sheaths quite glabrous; ligule very short. Inflorescence a spiciform panicle, 2.5 - 7.5 cm long. Spikes usually 6-8, distant, 2-6-flowered, slender, spreading, capillary, 1.25 - 3.75 cm long; rhachis filiform. Spikelets loosely scattered, solitary or binate, 2.5 - 3 mm long. Glumes thin, pale with green veins; lower glume adaxial,
orbicular, 1 - 1.25 mm, 3-5-veined; upper glume subequal, ovate, 5-7-veined; lower lemma equal to upper glume, acute or subapiculate, 5-veined, paleate, empty; palea smaller than the lemma, narrow; upper lemma elliptic, obvoid or oblong, acute or apiculate or mucronulate, smooth, coraceous, minutely transversely regulose. Lodicules 2. Stamina 3. Styles 2, distinct; stigmas plumose. Grain free within lemma and palea.

Fls. and frts. : Jul. - Nov.

Ecology: Preferably in thick shade.

Distribution : India (Bihar, West Bengal, Orissa, Tamil Nadu), Bangladesh, Sri Lanka.

Specimens examined : Puri, 1888 Walsh s.n. (Accn. No. 521369- CAL); Cuttack Dist. : Ravenshaw College compound, Cuttack, 1 Aug. 1936, Bhikari 573 ( Rev. Coll. Herb.)

Fischer (l.c.) recorded the species from Chatrapur in Ganjam District.

Brachiaria reptans (L.) Gard. et C. E. Hubb. in Hook., Icon.Pl. sub. tab.: 3363. 1938; Mooney, Suppl. : 177; Bor, Grass.: 285; Panigrahi et al., BBSI 6 : 262; Saxena et al., Ind. J. For. 5 (2) : 103. 1982.


Type: West Indies : Jamaica, Browne (LINN; microfiche CAL!).

A small caespitose grass with slender culms, basally decumbent, 10 - 40 cm tall, rooting freely. Leaves amplexicaule, lanceolate, cordate, with blade 2-5 x 0.5 - 1 cm, clasping, narrowing steadily to an acuminate point; leaf-sheaths 1.5 - 2.5 cm long, terete, minutely hairy with a thick fringe along the margin; ligule a shallow fringed membrane, ca 1 mm deep. Inflorescence distinctly well exerted closely packed 6-8 spiciform racemes, 1.5 - 3 cm long. Spikelets numerous, pale, rather turgid, small, ca 2 mm long, unequally pedicelled. Lower glume very short, 0.5 mm long, clasping, hyaline; upper glume boat-shaped, pointed, 2 mm long, 5-9 veined; lower lemma rather narrow, acute, 1.8 mm long, strongly 5-veined, with neuter or male floret; palea thin; upper floret bisexual; lemma indurated golden brown, boat-shaped with a minute apex, 1.6 mm long, 3-veined, thinly coriaceous; minutely rugulose; palea clasped by the lemma, 1.4 mm long. Stamens 3; anthers 0.3 mm long, yellow. Style 2, free; stigmas plumose, purple. Grain 1.2 mm long, oval, slightly flattened.


Ecology : A weed of open wet places.

2n = 14 (For l.c.)

Distribution : India, Sri Lanka, Pakistan, tropical Asia, tropics of the New and Old World, Polynesia, Australia.

Specimens examined : Koraput Dist. : Iping village, Parikud,
19 Dec. 1960, P.C. Nanda 2425; Ganjam Dist.: Ganjam, Dec. 1849, Wight 3024; Makthrels, Sep. 1891, Munro 25; Sambalpur Dist.: Malda, 1 Nov. 1959, Panigrahi 20635; Puri Dist.: Khurda, 1889, Walsh 33 (all CAL), Raipur a, Ranpur, 6 Oct. 1942, Mooney 2110; Salia forest, Nayagarh, 16 Aug. 1946, Mooney 2694 (both DD); Cuttack Dist.: Rajnagar Lion's rump, 12 Feb. 1961, Panigrahi 23812 (CAL, ASSAM).

Saxena et al. (l.c.) reported its occurrence from Bhubaneswar.

Uses: Grains are used as famine food. A good fodder grass liked by animals.


1a. Plant 1.5 - 3 m high; nodes glabrous; panicle pyramidal, sessile spikelets shorter than the pedicelled spikelet; pedicelled spikelet 5 - 10 mm long, with 3 glumes.

... *C. assimile*

1b. Plant 0.75 - 1.5 m high; nodes bearded; panicle oblong; sessile spikelet as long as the pedicelled spikelet; pedicelled spikelet 2.5 - 4.5 mm long, with 4 glumes:

2a. Culms usually slender; leaves setaceous; sheaths villous at the junction with the blade; lower glume of the sessile spikelet scapulose or slightly hairy
2b. Culms much stouter; leaves hispidly hairy; sheaths bearded at the nodes; lower glumes of the spikelet often hispidulous. ...C. parviflorum var. villosulum


Type: Java, Zollinger 859 (P, holotype).


Capillipedium glaucopsis (Steud.) Stapf in Hook., Icon. Pl. sub.-tab. t. 3085. 1922; Fischer in Gamble, Fl. Madras: 1730. 1934; Raju, BBSI 6: 294.


A suffruticose stiff, erect perennial, rooting at nodes. Leaf-blades 4-20 x 0.2 - 0.6 cm, linear-lanceolate, finely
acuminate, with a white, strong midvein; the upper sheaths appressed, the lower open, often divericate; ligule short, hairy, rarely membranous. Inflorescence a lax, spiciform panicle, branched, 4-15 cm long, racemes (spikes) 7-10 mm long; joints with translucent centre, joints and pedicels filiform, 1.5 - 2.5 mm long. Sessile spikelets 2 (-2.5) - 3 mm long, pale green or reddish, ovoid-oblong; callus small, shortly bearded. Lower glume 2-2.5 mm long, linear-oblong or ovate-oblong, shortly truncate; awn 6-12 mm long; upper glume as long as the lower, lanceolate, acute; lower lemma shorter, linear, obtuse; upper lemma reduced to the scarcely flattened base of the awn; awn 10 - 12.5 mm long, the upper half yellowish-white, lower brown. Pedicelled spikelets linear-lanceolate, awnless; pedicels ca 2 mm long, sparsely ciliate.

Lower glume lanceolate, acute, the margins incurved and the keels ciliate in the upper part, 5-7-veined; upper glume similar, but slightly smaller, 3-veined; lower lemma hyaline, ovate-oblong, ciliate at apex; upper 0. Lodicles 2. Stamens 3; anthers 1.5 mm long. Styles 2; stigmas plumose. Grain ellipsoid-oblong.

Fls. and frts.: Sep. - Apr.

Ecology: Common in scrub and forest clearings and hilly grass lands.

n = 10 ( Khosla and Mehra in Taxon 22: 647-654. 1973 )
2n = 20 ( de Wet et al., 1963)
2n = 40 ( Largen, 1963 ).
**Distribution**: India, Pakistan, Nepal, Bhutan, Bangladesh, Burma, Thailand, China, Japan, Java.

Specimens examined: Ganjam Dist.: Kubarimba, Dec. 1889, Gamble 21632 (CAL); Sambalpur Dist.: Podadih, 600 - 720 m, Bamra, 24 Dec. 1949, Mooney 3733 (DD); Mahadeojharan, 8 Nov. 1959, Panigrahi 20836; Bolangir Dist.: Patna, Panigrahi 20986; Mayurbhanj Dist.: Bhanjbasasa, 15 Feb. 1958, Panigrahi 12317 (all CAL);

Fischer (l.c.) reported its occurrence from Ganjam, Kapoor (l.c.), from Mahendragiri hills in Ganjam District and Panigrahi (l.c.), from Gurguria in Mayurbhanj District respectively.


**Andropogon microanthus** Kunth var. *villosulus* (Steud.) Hack. in DC. Monogr. 6: 490. 1889.


**Type locality**: Nepal.

Tufted perennial. Culms ca 1 - 1.5 m high, simple or sparingly branched, usually slender with bearded nodes. Leaves setaceously acuminate, blade 7-30 x 0.3 - 1 cm, tapering to a point; sheaths glabrous, villous at the junction with the blade. Inflorescence a spreading branched panicle, 10 - 25 cm long, distinctly and
rather unpleasantly scented when fresh; racemes reduced to 1 sessile and 2 pedicelled spikelets. **Sessile spikelets** 3-4.5 mm long, oblong; callus of the sessile spikelet shortly bearded. Lower glume ca 2.7 mm long, scaberulous or slightly hairy on the inflexed margins, slightly depressed on the median line; awns 1.25 (-1.5) - (1.75-) 2 mm long. Anthers 2 mm long, red. Grain oblong. **Pedicelled spikelets** 2.5 - 4.5 mm long, narrower than the sessile spikelet. Glumes 2.5 mm long, scarcely keeled.

**Fls. and frts.** : May - Jan.

**Ecology** : Common on hills, but also observed among the grass of waste places in plains.

**Distribution** : India, Pakistan, Burma, China, Japan, Malaya, Java, Australia and Africa.

**Specimens examined** : Koraput Dist.: Sonabera, 29 Sep. 1949, Mooney 3663; Pottangi, 900 m, near Nelpadu, 8 Oct. 1950, Mooney 4037 (both DD).

Mooney (l.c.) also recorded the species from Kujam, South of Rajgangpur in Gangpur and Bonai in Sundargarh District and in Bamra hills, over 700 m, in Sambalpur District respectively.

**Note** : *Capillipedium huegelii* (Hack.) Stapf has been reported by Despande (1984) from all the states surrounding Orissa and is therefore likely to occur in Orissa (Cf. Mooney. 187. 1950).

Jackson's Index Kewensis cites Nees ex Steud., *Syst. Pl. Glum.* 1 : 397. 1854, but not made there. "Nees' manuscript sub *Raphis*" given by Steudel under his *Andropogon villosulum*
Steud. Therefore, Chase and Niles (1962) in Index Gr.Sp.3:

213 cite Rhaphis villosula Nees ex Steud. ex Jacks., Ind. Kew, 704, 1896.


Type: R. Philippensis Merr.


Type: China, 25 Oct. 1751, Osbeck s.n. (S?)

**Cenchrus lappaceus** L., Sp. Pl. ed. 2: 1488, 1763.

Type: India, Hb. Linne (LINN. 1212.15, microfiche CAL)


A stout, erect perennial, with proliferously branched stems,
15 to 150 cm high, arising from a simple or branched creeping rhizome. Leaves narrowly lanceolate to ovate-lanceolate, or ovate, 5 - 25 x 1 - 3.5 cm, acute or acuminate; sheaths glabrous or hairy at the mouth, prominently striate; ligule short, lacerate. Panicles lax 8 - 35 cm long and broad; rhachis glabrous or hairy at the nodes, minutely scaberulous upwards; pedicels capillary, unequal, scaberulous or pubescent. Spikelets oblong, oblong-lanceolate or ovate-oblong, ca 6 mm, acute, loosely 2-3-flowered; rhachilla produced bearing a rudimentary floret. Glumes distant, narrowly lanceolate or oblong-lanceolate, acute, keeled, persistent; the upper the longer; lemmas oblong-acute or ovate obtuse, apiculate; upper florets with rigid, reflexed, bulbous-based hairs near the margins; paleas shorter, narrowly lanceolate, often decurrent on the rhachilla. Lodicules 0. Stamens 2-3; anthers short, linear, ovary with 2 distinct short styles; stigmas plumose, short, hairy. Grain (caryopsis): ovoid-acute.

Fls. and frts.: Oct. - Nov.

Ecology: In swamps and open moist places under light shade.

2n = 24 (Bor, l.c.)

Distribution: India, Bangladesh, Burma, Sri Lanka, China, Malaya, and Australia, Africa to Polynesia.

Specimens examined: Ganjam Dist.: Daspania, 240 m, Jan. 1884, J.S. Gamble 13730; Bolangir Dist.: Harishanker, Panighati 21103 (both CAL); Sambalpur Dist.: Gandhamardan hill, above Nrusinghnath, 750 m, 5 Oct. 1949, Mooney 3711; Poradih, 750 m,
Bamra, 25 Oct. 1949, Mooney 3731 (both DD); Khadeojharan, 8 Nov. 1959, Panigrahi 20832; Dhenkanal Dist.: foot of Mayagiri hills, 22 Dec. 1960, P.C. Nanda 2480 (both CAL).

Mooney (l.c.) also recorded its occurrence from Gangupur, Chhatam forest in Sundargarh District; Bamra in Sambalpur District and Nayagarh in Puri District between 60 - 600 m and Saxena et Brahman (l.c.), from Mahendragiri hills in Ganjam District.

Note: Trinius (1820) described the plant *Cenotheca latifolia* without citing the basionym. Bor (1960) considered it nomen superfl. illegit. as the species was based on *Cenchrus lappaceus* L. (1763). Trinius (1831) cited the basionym *Holcus latifolius* Osbeck. (1757) for his species which he missed earlier. Since Osbeck's epithet has priority for the species, the name *Cenotheca latifolia* (Osbeck) Trinius for the monotypic genus is followed here.

Bor (1960) considers *Cenotheca latifolia* Trin., Fund. Agrost.: 141. 1820 as Superfluous and illegitimate because he based his name not on *Holcus latifolius* Osbeck but on *Cenchrus lappaceus* Trin. (Fund. Agrost.: 141. 1820). The epithet *latifolius* became illegitimate in *Cenotheca* and the species must be known by Desvaux combination. But Froideville (1971) argues that Trinius knew the basionym was *Holcus latifolius* Osbeck, because he used *latifolia* here and cites *Holcus latifolius* in a later (1831) work. The fact that Trinius (1820) did not cite his basionym is not as impressive as the fact that "latifolia" is this priorable epithet for the species of this monotypic genus and that Trinius does cite the basionym.

Type: *C. muricata* (Retzius) Brongniart (*Aegilops muricata* Retzius).


Type: Bihar, Chotanagpur, Parasnath, 600m, Oct. 1873, C. P. Clarke 21075C (CAL).

**Manisuris clarkei** (Hack.) Bör apud Santapau, RBSI (Flora of Khandala) 16(1): 357, 1953;

A small annual grass. Stem 20-60 cm tall, erect, nodes bearded with a ring of small hairs. Leaves 10-15 x 0.75-1.25 cm, linear-lanceolate, acuminate; sheaths compressed, thinly ciliate; ligule membranous, hairy. Solitary raceme
1.25-2.5 cm long, supported by a spathe; rachis fragile. Sessile spikelets ca 2.5 mm long with a cylindric callus, lower glume with a coriaceous disc and hyaline wings; upper glume similar to lower glume, ovate-oblong, glabrous; upper lemma smaller, oblong, obtuse, hyaline. Pedicelled spikelets with a solitary glume, ca 0.25mm long; pedicels flat, pyriform.

Fls: Sep.-Nov.

Ecology: In moist situations under light shade.

Distribution: Peninsular India (extending northwards only up to Gujarat, Madhya Pradesh, Bihar and Orissa). Endemic.

Specimen examined: Sundergarh Dist.: Ruthupiri, 340 m, 13 Oct. 1939, Mooney 2119 (DD).

Jain et al. (l.c.) cited its occurrence in Orissa without any specific locality.

Note: Clayton (1981) transferred all other species of Manisuris excepting M. clarkei (Hack.) Bor to Glyphochloa clayan (1981). In consequence, the correct name for M. clarkei (Hack.) Bor ( Rottboellia clarkei Hack.) with one sessile and one pedicelled spikelet per node and the pedicel not fused with the joint, is Coelorachis clarkei ( Hack.) Blatt. et Mc Cann ( 1927 ). ( of Pani- grahi et Dubey, l.c.).

Type: C. barbata (Roxb.) Bentham (Coix barbata Roxb.).

Species 6, Indomalaysian; 2 species are distributed in India and 1 in Orissa.

Chionachne koenigii (Spreng.) Thwaites, Enum. Pl. Zeyl. : 357. 1864; Mooney, Suppl. : 194; Bor, Grass.: 262; Panigrahi et al., BBSI 6 : 262.

Coix koenigii Spreng., Syst. 1 : 239. 1825.

Type locality: India.


Type: "found in the rice-fields and on the banks of water courses, in a moist, rich soil in the Northern Circars", Roxburgh s.n.


Phultainr (Or.)
A tall coarse grass, 1.8 - 2.5 m high. Stems hollow or solid, purple or straw-coloured, often 7.5 mm diam. at base; sheaths with deciduous dense hairs. Leaves 15 - 90 x 0.6 - 1.25 cm, linear, acuminate, scabrid above; sheaths long, smooth, glabrous or hairy; ligule a very short, narrow ridge. Inflorescence paniculate spikes, 2.5 - 3.8 cm long, on slender panicles; spathiform spathes 2.5 cm or more in length, with a long awn at the tip; rachis usually glabrous. Male spikelets 0.6 - 10 mm long; lower glume 7 x 4 mm, ovate or oblong, acute or obtuse concave, pubescent, 9-veined, margins inflexed, keeled; upper glume lanceolate, white, margins inflexed, 7-veined; lower lemma lanceolate, hyaline, 3-veined, staminate, upper similar but narrower; palea of both as long as glume. Female spikelets solitary, 4 - 7.5 mm long, glabrous, pale; lower glume thickly coriaceous, white shining, closely wrapped round the rachis of the spike, keeled tip entire; other glumes obscurely many-veined, tip entire.

Fls. and frts.: Aug. - May.

Ecology: Common on hot and moist forest floors in open situations.

Specimens examined: Koraput Dist.: Bandamamidi, 24 May 1959, R.S. Rao 18540; Chitrakonda, 24 Apr. 1963, D.C.S. Raju 337, Orkel, 8 Nov. 1963, D.C.S. Raju 999; Ganjam Dist.: Aska, Dec. 1889, J.S. Gamble 21715 (all CAL); Kalahandi Dist.: Sirmur hill, Junagarh, sine lect s.n. (Accn. No.46082-BSIS); Dhenkanal Dist.: Angul, 70 m, 19 Mar. 1943, E. Biswas 6158 (CAL); Mayurbhanj Dist.: Simlipahar Forest, 300 m, 16 Dec. 1902, J. H. Lace 2603 (CAL, DD).
Haines (l.c.) recorded its occurrence from Sambalpur; Panigrahi et al. (l.c.), from Dudruchampa in Mayurbhanj District and Raju (l.c.), from Balimela in Koraput district respectively.

Uses: The fruit cases used for rosaries, beads, ornamental trays, baskets and boxes. Cattle feed on it when the plant is young.


1a. Empty lemmas above the fertile floret 3-4 ... C. barbata
1b. Empty lemma above the fertile floret solitary, well-developed or rudimentary:

2a. Plant erect from the base; spikes long, up to 25 cm long, widely spreading, flexuous and drooping; spikelets narrowly lanceolate, up to 6.5 mm long, dorsally compressed; upper glume 5-7.5 mm long; empty lemma represented by a fine awn up to 1.25 cm long. ... C. dolichostachya

2b. Plants often prostrate, rooting at nodes and sending up flowering culms; spikes shorter, not more than 13 cm long, closely crowded, not spreading, more or less ascending; spikelets more or less ovate, rarely exceeding 3.5 mm in length, laterally compressed; upper glume 3 - 3.5 mm
long, aristulate; empty lemma oblanceolate, truncate with an arista, 4 mm or more long ... \( C. \) virgata

Chloris barbata Swartz, Fl. Ind. Occ. 1: 200. 1797; Haines, Bot.: 969; Bor, Grass.: 465; Panigrahi et al. EESI 6: 262; Cope in Nasir et Ali, Fl. Pakistan 143: 121. 1982.

**Type**: East Indies (LINN, holotype)

Andropogon barbatus L., Mant. 2: 302. 1771, non Linn. 1759, nom. illegit.

Chloris inflata Link, Enum. Pl. 1: 105. 1821.

**Type**: USA; Habitat in California, Culti at Berlin, Chamissos (B, holotype).

Annual or short-lived perennial. Culms erect or decumbent, 30 - 90 cm long, leafy below nodes 3-5, often bearing equitant tufts of leaves, 15-25 (-45) cm long, narrowly linear to obovate, acuminate or obtuse; leaf-sheaths usually less than half as long as the internodes; ligule a very narrow membrane, ca 0.5 mm long. Spikes 4-20, 2-9 cm long, digitately arranged in a truncate fascicle; peduncle slender, often purplish; rhachis scaberulous. Spikelets 3-awned, green or purple; rhachilla produced but not beyond the fertile glume. Glumes hyaline, lanceolate to lanceolate-elliptic, acute, awnless; lower glume, 1.5 - 2 mm long, scabrid on the keel or smooth; upper glume 2.5 - 3.25 mm long, florets almost always 3, often purple; rhachilla internode ca 0.5 mm long; lowest lemma 2-3 mm long, obovate, obtuse, cartilaginous, 1.15 mm long in the upper
half, glabrous on the lower margins, or sparsely hairy, entire or obscurely 2-lobed; awn 4.5 - 7 mm long; callus bearded with hairs ca 1 mm long; second lemma inflated, ca 1 mm long, truncate; third lemma smaller, but similar to the second, often glabrous, the awn slightly shorter than second lemma.

Stamens 3. Ovary glabrous; styles 2, distinct, short; stigmas laterally exerted. Grain 1.5 - 2 mm long, unequally trigonous, narrowly-oblongolate, obtuse, reddish-brown.

Fls. and frts.: Jun. - Nov.

Ecology: Common in the wet places of the disturbed land.

2n = 20, 40 (Darlington and Wylie, 1955)

Distribution: India, throughout the tropics of S.E. Asia. Considered to be a native of tropical America.

Specimens examined: Ganjam Dist.: Gopalpur Road, 20 Oct. 1920, Narayanaswami 4694 (MH); Ganjam, Dec. 1949, W. Wight 3030, 3032; Puri Dist.: near Puri, 1889, Walsh s.n. (Accn No. 538027- CAL); Khurda, 1889, Walsh 34; Cuttack Dist.: Jambu, bank of Kendrapaara canal, 2 Feb. 1961, Panigrahi 23666; Balijhuri, 20 Feb. 1961, Panigrahi 23967 (all CAL); Ravenshaw College ground, Cuttack, 24 Apr. 1953, N.K.C. Patnaik 17465 (Rav. Coll. Herb.).

Haines (i.c.) recorded the species from Puri, Choudhury et Patnaik (1982, 1983), from Khandagiri-Udayagiri hills and Ramyshwarpatna, Behera et al. (1979) and Saxena and Brahman (1982), from Bhubaneswar respectively.
Uses: It is not a good fodder. Animals eat it before flowering.

Note: This species is characterised by the loosely appressed spikes; 3-flowered; often purple spikelet; obscurely lobed lemmas of the perfect florets; relatively broad grain; lowest floret with long bearded callus; shortly exerted palea and submarginal fringe of stiff hairs on the upper half of the lemma.

Andropogon barbatus L. (1771) being a later homonym of A. barbatus L. (1759), is illegitimate. The epithet barbatus is not illegitimate in the genus Chloris and the author citation Chloris barbata Swartz is perfectly used here.


Type:Philippines: "Hab. in Philipp. insulis, D. ludovicus Nee' legit" (? MA or FI).


Type locality: "Habitat in India Orientali".

Perennial grass culms erect, sometimes procumbent, 30(-75) - 90 (-150) cm high, tussock-forming branched. Leaves 5-55 x 0.2 - 1 cm, flat or involute, long-acuminate, glabrous or
hispid, usually scabrous; sheaths loose, smooth, glabrous or hispid; bearded at the mouth with stiff hairs; 2 - 4 mm long; ligule of long hairs. Spikes usually 2 - 7 in terminal whorls, 5 - 13 ( - 26.25 ) cm long, divericate, rather stiff; rhachis filiform, scabrid. Spikelets ca 5 mm long, excluding the awns; rhachilla slender, 0.15 mm long, with a tuft of hairs at the base, terminated by a long awn, ca 1 cm long. Lower glume 1.8 - 2.5 (-3) mm long, entire, muticuous or cuspidate; upper glume 3 - 6.5 (-9.5) mm long, entire or notched at the apex, cuspidate or aristulate; lower lemma 2.5 - 5 mm long, membranous, oblong-elliptic to oblong-lanceolate; palea as long as or somewhat shorter than the lemma, acute or acuminate, entire, scabrous between the keels; callus bearded. Lodicules 2, minute. Stamens 3. Ovary glabrous; styles 2, free; stigmas plumose, exerted laterally. Grain 2.5 - 3 mm long, concave on the ventral surface, golden - brown.


Ecology : On loamy soil under moderate shade and often found among the bushes.

Distribution: India, Pakistan, Burma, Sri Lanka to Southeast Asia, China and Northern Australia.

Specimens examined : Ganjam Dist.: Mojugado, Dec. 1889, Gamble 21618; Puri Dist.: Khurda, 1889, Walsh 19 (both CAL); Kalahandi Dist.: Karlapat, 450 m, Dec. 1939, Mooney 1190; Sambalpur Dist.: Badrama forest, 300 m, Barara, 21 Oct. 1949, Mooney 3722 (both DD).
Kapoor (l.c.) recorded it from Mahendragiri hills in Ganjam District.

Uses: Animals eat the grass when young and before flowering.

Note: The species is distinguished by its larger spikelets; absence of a collar; rhachilla densely bearded at the base of the lower lemma.


Type: West Indies: Antiqua, Hb. Swartz (S, holotype).

"Provenit in Antiqua", West Indies.


Type: Mexico, Humboldt et Bonpland (P, holotype; microfiche, K).


Annual grass, with erect or decumbent culms 7.5 - 45 (-95) cm high, glabrous, often grooved, 3-6-noded. Leaf-blade 9-20 cm
Fig. 27. Chloris virgata. A. Plant. B. Spikelet (glumes removed). C. Upper glume. D. Lower glume.
long, linear to linear-lanceolate, acuminate; leaf-sheath about 1/2 as long as the internode, broad; ligule ca 0.8 mm long. Inflorescence an umbelmed spiciform raceme, (4-) 7-12 (-19) cm long, stiff, erect; rachis hairy. Glumes usually hyaline, linearly-lanceolate, acuminate, keel scabrous or smooth; upper glume (2-) 3.8 - 4.5 mm long, bilobed, cuspidate or aristulate; lower glume ca 2 mm long, entire, cuspidate or muticous; florets usually 2, often 1 perfect; rachilla-internode ca 0.5 mm long; lemmas obovate, acute; lower lemma 2.8 - 3.5 mm long, smooth, cartilaginous; grooved between the margins and midvein; palea scarious, acute. Stamina 3. Styles 2, distinct; stigmas plumose. Grain unequally trigonous 1.5 - 2 mm long, narrow, obtuse. Upper lemma ca 2 mm long, glabrous, smooth, truncate, the awn slightly shorter than that of the lower lemma (Fig: 27).

Fls. and frts.: Sep. - Jan.

Ecology: By the edge of the field in the waste lands of the plain and hilly tracts, preferably in wetish places under shade.

Distribution: India, throughout the tropics of both the hemispheres.

Specimens examined: Sambalpur Dist.: Mundhakati, 210 m, in Barapahar, 16 Sep. 1949, Mooney 3590 (DD).

New record for Orissa.

Note: This species is distinct from other species in having the sheaths and leaves covered with irritating hairs, margins
of the leaves razor shaped; compressed herbaceous culms; appressed spikes, 2-flowered; spikelets and 2-lobed; upper glume; 2 lemmas awned and prominently lobed, upper truncate, lower has narrow hyaline margins, a submarginal fringe of long, stiff white hairs and groove between the median and lateral veins.


Type : C. gryllus (L.) Trin. (Andropogon gryllus L.) (typ. cons.).

1a. Pedicels half the length of the sessile spikelets or longer:

2a. Pedicels glabrous or nearly so . . . . . . C. aciculatus

2b. Pedicels villous with rusty or pale hairs:

3a. Leaves smooth above and below; sheaths rounded on the back; lower glume with a long awn; upper glume not or very shortly awned. ... C. lancearius

3b. Leaves spinulose on the margins; sheaths abruptly keeled; lower and upper glumes of pedicelled spikelets both awned. ... ... C. orientalis

1b. Pedicels shorter than half the length of sessile spikelet:
4a. Upper glume of sessile spikelet keeled, pectinate-ciliate in the lower 2/3 or 3/4 with long, golden or golden-brown rigid hairs; lower glume of pedicelled spikelet pubescent and awned; sessile spikelets 4.6 mm long; pedicelled spikelets 4 mm long. ... C. fulvus

4b. Upper glume of the sessile spikelet glabrous on the back, rounded in the lower 3/4; keeled and ciliate in the upper 1/4 only; sessile spikelets 6-7 mm long; pedicelled spikelets 6 - 7 mm long .... C. serrulatus

Glycosopogon aciculatus (Retz.) Trin., Fund. Agrest. : 188.
1820; Haines, Bot. : 1035; Panigrahi et al., EBSI 6 : 262.


Type locality: "Malay Archipelago".

Small, woody, leafy grass, 12.5 - 60 cm high, with creeping rootstock. Stems erect or ascending, creeping below, slender; nodes glabrous. Leaves mostly basal, densely tufted, short, 2.5 - 12.5 x 0.3 - 0.5 cm, linear, glaucous; sheaths terete, not auricled; ligule a very short, narrow, ciliate membrane. Panicle very narrow, 2.5 - 8.8 cm long. Sessile spikelets very narrow, 3.4 mm long, dorsally compressed; callus very long, acicular. Lower glume chartaceous, linear-acuminate or minutely 2-cuspidate; keels scabrid; upper glume as long as lower glume, lanceolate, acuminate or aristaulate, 4.5 mm long with a small awn, 1-veined; keel hispid or ciliate above; lower lemma shorter, 2.5 mm, linear-oblong; upper lemma narrowly linear, acuminate,
awn scabrid, 5 - 7.5 mm long; palea oblong, obtuse, hyaline. Pedicelled spikelets ca 5 mm long, lanceolate, cuspidately acuminate; pedicels slender, 2.5 mm; lower glume thin, lanceolate, acuminate; lower lemma hyaline, oblong, acuminate, shorter than the lower glume; upper lemma small, broad, ciliate, 3-veined.

Fls. and frts.: Jul. - Dec.

Ecology: Commonly occurring in open drier habitats.

Distribution: India, Pakistan, Bangladesh, Burma, Sri Lanka, Australia and Polynesia.

Specimens examined: Koraput Dist.: Kuthadya hills, 19 Aug. 1931, Narayanaswami 5927 (MH); Ganjam Dist.: Chatrapur, Nov. 1889, Gamble 21501; Aug. 1904, Fischer 48 (both CAL, DD); Puri Dist.: Dephari Island, Chilka Lake, 9 Aug. 1913, D. Hooper 39578 (CAL); Cuttack Dist.: Ravenshaw College Campus, Cuttack, 24 m, N.K.C. Patnaik 174 (Rev. Coll. Herb.); Keonjhar Dist.: Burhipada, 3 Jul. 1957, Panigrahi 8559 (CAL).

Fischer (1905) recorded its occurrence from Ganjam and Srinivasan and Subba Rao (1964), from Parakhimedi in Ganjam District; Behera et al. (1979), Choudhury and Patnaik (1982, 1983), and Saxena et al. (1982) from Bhubaneswar and Khandagiri - Udayagiri hills respectively.

Uses: Young plants are eaten by cattle. The ripe fruits with sharp basal callus causes extensive ulceration.
Chrysopogon fulvus (Trin. ex Spreng.) Chiov., Fl. Somalia 1: 327. 1829; Bor, Grass.: 116; Panigrahi et al., BBSI 6: 262; Cope in Nasir et Ali, Fl. Pakistan 143: 303. 1982.

Pollinia fulva Spreng., Pugill. 2: 10. 1815.

Type: India: Habitat in Bengali; Sprengel.


Type-locality: "Habitat in India Orientali".


Type-locality: "In India Orientali".

Chrysopogon monticola (Schult. ex Roem. et Schult.) Haines, Ind. For. 40: 495. 1914.

Perennial grass. Stems erect or ascending, usually very slender, densely tufted, 30 - 120 cm high. Leaves 5-45 x 1.25 mm, erect, linear, acute or acuminate, flat; the upper sheaths terete, the lower compressed; ligule a belt of short ciliate membrane.

Panicle 5 - 15 cm long, ovate or oblong. Spike very variable, reduced to a single sessile female and 2 pedicelled spikelets.

Sessile spikelets pale, 4 - 7 mm long, callus hairs white to rusty red. Lower glume 5 mm long, linear, complete, characeous, 2-toothed at the apex, 4-veined, scaberulous; upper glume 6.5 mm long, ovate-lanceolate, much broader than the lower, convolute, pectinate-ciliate, ending in 2 short rounded lobes, with short
recurved awn; keel obtuse, glabrous to hirsute; awn 7.5 mm long; lower lemma short, 4.5 mm long, hyaline, oblong, obtuse, ciliate; upper lemma narrowly linear, hyaline, midrib gradually passing into the awn from the middle, 1.2 - 3.8 cm long. Pedicelled spikelets 5 - 10 mm long, neuter or male, from ovate to linear-lanceolate, acuminate; pedicels ca 2.5 mm long, cuneate. Lower glume thin, lanceolate, acute, acuminate or awned, equalling or shorter than the glume, scaberulous, 7-veined; upper glume lanceolate, acuminate or very shortly awned, ciliate; lower lemma hyaline, oblong, obtuse, 2-veined or veinless. Stamens usually 3.

Fls. and frts.: Sep. - Dec.

Ecology: Common on laterite soil, particularly in the dry slopes of the hills.

n = 40 (Mehra, 1955)


Specimens examined: Kalahandi Dist.: Karlapat, 1150 - 1200 m, 28 Dec. 1939, Mooney 1216 (DD); Sambalpur Dist.: Kapildhar, 11 Nov. 1959, Panigrahi 21019 (CAL).

Heines (l.c.) recorded its occurrence from Angul (Durgapur range) in Dhenkanal District, and Sambalpur; Singh and Verma (1963-64) from Angul in Dhenkanal District and Choudhury et Patnaik (1982) from Utkal University Campus, Vani Vihar, Bhubaneswar.

Uses: A good fodder grass which can also be made into hey.
Note: A polymorphic species which sometimes leads to confusion for its variability in vegetative as well as in the size of the spikelets and anthers. Hackel, Hooker and Haines list a number of varieties which appear to run into one another and for this reason Hole and later on Bor (1960) state that the forms are not worth maintaining.

*Chrysopogon lancearius* (Hook. f.) Haines, *Bt.*: 1036; Bal RBSI 6 (10): 119. 1942; Bor, Grass. : 118; Panigrahi et al., RBSI 6: 262.

*Andropogon lancearius* Hook. f., FBI 7: 190. 1896.

**Syntype:** India: Sikkim Himalaya, at the floor of Punkabaree Kurz; Chotanagpur; Ramghur Ghat, 1750 ft., Clarke.

A tall coarse grass 60 - 180 cm or more in height. Stems leafy upwards, nodes glabrous. Leaves 45 - 60 x 0.7 - 3.8 cm, narrowly lanceolate, acuminate; sheaths keeled; ligule a row of fine short silky hairs. Panicle 15 - 30 cm long, oblong, many - rayed, bearing solitary erect spikes. **Sessile spikelets** 6.2 mm long; callus 1.2 mm long, glabrous in front. Lower glume ca 6.5 mm long, conduplicate, chartaceous, tip oblique, truncate or notched; awn usually ca 6.25 mm long; upper glume as long as lower, but much broader, shortly ciliate on the keels, cleft at the apex into 2 acute lobes, with an awn 2.5 - 3 mm long; lower lemma ca 5 mm long, linear-oblong, obtuse; upper lemma ca 2.5 mm long, linear, hyaline, with an awn 3.75 - 4.5 cm long. **Pedicelled spikelets** 0.7 - 1 cm (excluding the awn), lanceolate, compressed,
awned; pedicels ca 1 mm long, flattened; lower glume lanceolate, acute or acuminate, with an awn ca 6.5 mm long between the acicular teeth, membranous, glabrous; upper glume as long as the lower; lower lemma shorter, 3.5 - 6.5 mm long, linear-oblong, obtuse; upper lemma similar to lower, with an awn 2.5 cm long.

Fls. and frts. : Nov. - Jan.

Ecology : At the foot of the hills under shade.

Distribution: India. Endemic.

Specimens examined: Koraput Dist.: Supkon Dongar, 750 - 810 m, Sonabera, 29 Sep. 1949, Mooney 3664; Sambalpur Dist.: near Debrigarh, Barapahar, 24 Sep. 1949, Mooney 3694; Dhenkanal Dist.: Kapilas Hills, 600 m, 30 Aug. 1946, Mooney 2731; Mayurbhanj Dist.: Balidiha, 10 Sep. 1940, sine lect 918 (all DD).

Haines (l.c.) also recorded its occurrence from Sambalpur and Panigrahi et al. (l.c.), from Saptadhar, Mrusinghnath and Satyamba in Sambalpur District respectively.

Uses: It is said to be a good fodder grass liked by cattle.

Chrysopogon orientalis (Desv.) A. camus in E & A. Camus, Lecomte Fl. Gen. Indo - Chine 7 : 332. 1922; Bor, Grass.: 118; Mishra, Dubey et Panigrahi, Ind. J. For. 6 (4) : 295. 1983.

Rhapis orientalis Desv., Opusc. : 69. 1831.

Type locality: "India orientalis".

**Type**: Ind. Or. Wight s.n. (? K).

A very variable grass, with short or long, slender, erect or ascending stem developing from a creeping rhizome, attaining a height of about 90 cm high. Leaves 4.4 - 35 cm long and 2.5 - 7.5 mm wide, linear, rigid; sheaths glabrous; ligule very short, villous. Panicle 5 - 7, 7.5 - 12.5 cm long, contracted, rachis and branches minutely hairy. Spikelets solitary. Sessile spikelets with a callus 2.3 - 5 mm long, sub-cylindric, callus long with rusty hairs. Lower glume 4.5 - 5.5 mm long, tip 2-toothed; upper glume chartaceous, tip 2-lobed, with usually an awn, ca 1 cm long, hispid above on the keel and sides; lower lemma linear-oblhng, 2-veined, ciliate; upper lemma with an awn 3.75 - 6.5 cm long, narrowly dilated 2-lobed base; column hispid. Pedicelled spikelet ca 1.25 cm long, lanceolate, pubescent; pedicel truncate, margin shortly villous; lower glume 6-8 mm long, glabrous or pubescent, 7-veined, awn longer than the glume; keels ciliate; upper glume lanceolate, 3-veined, ciliate, awn 6.5-15.5 mm long; upper lemma very narrow, veinless, ciliate, finely acuminate, muticous or mucronate.

**Fls. and frts.**: Sep. - Dec.

**Ecology**: On shady slopes of the hill.

**Distribution**: India, Indomalaysia.

**Specimen examined**: Ganjam Dist.: Mahendragiri hills, 1020 - 1350 m, 18 Nov. 1904, Fischer 95 (CAL).
New Record for Orissa.

Uses: It is regarded as an useful fodder grass radily eaten by the cattle.


Type locality: Nepal.


Type locality: Same as for *Chrysopogon serruletus* Trin.


A rather coarse perennial, with slender, erect or ascending stem, 30 - 100 cm high. Leaves 15 - 45 cm long, very narrow, finely acuminate, occasionally with a few tubercle-based hairs, not puberulous. Panicle 5 - 10 cm long; rachis flexuous. Spikes variable in size. Spikelets few; pedicels shorter than half the length of sessile spikelets. Sessile spikelets 6 - 7 mm long. Upper glume rounded in lower three quarters, glabrous on the back or slightly ciliate on the upper quarter only; branches in whorls of 3 - 12 or more, smooth or scaberulous. Pedicelled spikelets 6 - 7 mm long, a little shorter than, equal to or longer than the sessile, neuter or male; pedicels cuneate, margin villous, hairs golden or golden-brown or if rufous-
brown, then fewer glumes of pedicelled spikelets awned; keels smooth.

Fls. and frts. : Aug. - Nov.

Ecology : This grass apparently occurs in the shady localities especially at the foot of the hills.

Distribution : India, Pakistan, Nepal, Burma, tropical Africa, Afghanistan.


New Record for Orissa.

Uses: A good fodder.


Type : C. pulchella R. Brown.

Species ca 10 in the tropics and subtropics of the Old World, 3 species in India and 1 species in Orissa ( 1 species and 1 variety endemic to India ).


**Type:** Ceylong, Wight 2044 (K, Photo - CAL).


**Syntypes:** Nepal, Wallich Num. List No. 8908, Chotanagpur, Clarke, S. India Wight 3376.

Small, annual, marshland plant, pubescent at nodes. Leaves 0.5 - 3.8 x 0.15 - 0.6 cm, linear-lanceolate, minutely scaberulous above; sheaths often loose, striate; ligule a rim of hairs. Panicle 1.5 - 10 cm long, many-flowered; rhachis, pedicels and rhachilla terete. Spikelets sessile or shortly pedicillate; 1.5 - 2.5 (-3.0) mm long, lanceolate, ovoid or globose, commonly 3-5r. Glumes glabrous; lower glume 0.8-1 cm long, herbaceous, subrobicular; upper glume 1 - 1.5 mm long, herbaceous, suborbicular; lower lemma longest, 1.5 - 2.5 mm long, rounded on back, coriaceous; palea similar but narrower, 2 mm long, margins incurved. Lodicles 2, minute. Stamens 3; anthers barren, oblong, 0.3 - 0.4 mm long. Ovary glabrous; styles 2, distinct, terminal; stigmas plumose, laterally exerted, in upper near apex. Grain ellipsoid, loose between lemma and palea. Upper lemma and palea 1-2 mm long, imperfect, neuter or female, veinless, 2-keeled, hairy along keels and on dorsal surface; callus of upper lemma glabrous.

**Fls. and frts.**: Throughout the year.
Ecology: In marshy places and damp ground, a weed in rice-fields growing gregariously.

\[2n = 36\] (Gould et Soderstrom, Canad. J. Bot. 52: 1075-1090. 1974)


**Distribution:** India, Nepal, Burma, Sri Lanka, China, Thailand, Laos (Indo-China), Java, Australia, Malagasy (Madagascar).

**Specimens examined:** Koraput Dist.: Kasipur, 870 m, 26 Jan. 1949, Mooney 3241; Kalahandi Dist.: Upper Kalura, 870 m, 7 Apr. 1941, Mooney 1711; Sundargarh Dist.: Bonai, near Toda, 600 m, 25 Feb. 1946, Mooney 2620 (all DD).

**Note:** This species is very variable in its size, spikelets and in the form of panicles. It is closely allied to *C. pulchella* and thus J.D. Hooker (l.c.) placed Indian specimens under 3 varieties of the latter. But *C. pulchella* R. Br. is known from Queensland, Australia and was insufficiently described until Hubbard (1943) redescribed it.

Mooney (l.c.) also recorded its occurrence from Kalahandi, between 600-1050 m.

**Coix L., Sp. Pl.:** 972. 1753; Haines, Bot.: 1063. 1924;

Bor, Grass.: 264. 1960; Clayton et Renvoize, Kew Bull.


Job's tears (Eng.)

1a. Annuals; lower glumes of the male spikelets narrowly or broadly winged; spikelets 2-3 mm wide. ... ... ... ... C. *lacryma-jobi*  

1b. Perennials; lower glume of the male spikelets broadly winged; spikelets 5-6 mm broad:

2a. Floating and creeping plants with succulent stems and floating roots at the nodes; upper surface of the leaves densely covered with conspicuous glands which bear bristle-like hairs; ripe involucre abruptly constricted at the neck into a beak

2n = 10. ... ... ... ... C. *aquatica*  

2b. Erect plants; upper surface of the leaves without numerous conspicuous glands; involucre not abruptly constricted at the neck into a beak; 2n = 20, 40. ... C. *gigantea*  


Type: India: "A native of the lower parts of Bengal, where it is generally found floating on lankes and along their margins to a very great extent." Roxburgh.
Iconotype: Roxb Icon. No. 1908 (CAL)

Floating or creeping perennial, 15 - 35 cm long, with stems jointed, round, smooth, filled with pith, about as thick as man's fore-finger; shoots arising in an oblique direction to 1.3 - 2 m above the surface. Leaves linear to linear-lanceolate or ensiform, 30 - 90 x 2.5 - 3.8 cm, acute or long-acuminate, margins hispid. Spikes terminal and developing from exterior axils, peduncled, solitary or in pairs, drooping, many-flowered, 3-nate, 2 sessile and 1 central pedicellate female; female usually solitary at the base; involucre turbinate, perforated; involucral bract has a well-developed laina, 5 - 12.5 cm long, corollate. Corolla 6-7-valved. Lodicules 2. Stamens 3 (-2). Ovary oblong with 3 short abortive staminodes. Seeds turbinate.

Fls. and frts.: Sep. - Dec.

Ecology: Occasionally observed in swampy places.

2n = 10 (Bor, l.c.)

Distribution: India, Afghanistan.

Specimen examined: Mayurbhanj Dist.: Manbhanj, 11 Nov. 1959, Panigrahi 21036 (CAL).

Haines (l.c.) has also recorded its occurrence from Balasore.

Use: Involucres are readily eaten by villagers and also liked by buffaloes.
Coix gigantea Koenig ex Roxb. (Hort. Beng. : 66. 1814, nom.nud.),
Fl. Ind. ed. 2, 3 : 570. 1832; Prain, Beng. Fl.: 1810. 1903;
Haines, Bot. : 1064; Panigrahi et al., BBSI 6 : 262; Jain et

Syntypes : "It grows chiefly in the valleys amongst the
Circar mountains and in Bengal".

Iconotype : Roxb., Icon. No. 872 (CAL).

Tall, erect perennial grass, 5 m high, 1.75 cm in diam. at
base, terete and polished. Leaves linear, more erect, lower
30 - 120 x 0.3 - 2.5 cm, base narrowed, obtuse or subcordate,
margins scabrid and cutting; upper leaves erect, narrowly-
lanceolate, ca 20 x 2 cm or longer and narrower. Male spikes
1.75 - 6.3 cm long; large outer glumes form 6 imbricate rows
on the spike which is ultimately drooping and with a long
internode between the female and the lowest female spikelet.
Spikelets usually 3-nate. Sessile spikelets : lower glume
elliptic or obovate with broad wings, 0.5 - 1.0 mm wide, somewhat
cymbiform but with rounded keel, 1.25 cm long; upper glume
smaller, lanceolate, pale; upper lemma included in lower glume,
pale, hyaline with a raised, plicate longitudinal ridge inside,
bearing 2 large, pulvinate lodicules between which arise 3
stamens; palea as large; lower lemma smaller, hyaline with
2 large, erect, quadrate lodicules and large palea, bearing
a rudimentary ovary. Bract of female with a distinct ligule,
only comical in fruit, including also 2 rudimentary pedicelled
spikelets. Fruit sub-globose or ellipsoid enclosed in the bract.

Ecology: Occasionally found on the swampy slopes.

Distribution: India, Burma, Sri Lanka, Malay Peninsula, Afghanistan and few parts of S.E. Asia.


Prain (l.c.) and Haines (l.c.) however, recorded its occurrence from Orissa without citing any specific locality.

Uses: Involucres are used in making ornaments and also for decoration and the grains taken out of the involucres are fed to poultry.


Type: Indies (Linn.: 1098.1; microfiche-CAL !).

Coix lacryma L., Syst. Nat. ed. 10: 1261. 1759.

Type: non designatus.

C. agrestis Lour., Fl. Cochinch.: 551. 1790.

Type locality: Cochinchina (Cf. Chase et Miles, 1962).
var. lachryma - jobi.

Job's tears (Eng.)
Guda-guda, Gargada (Or.)

A stout, annual. Stems 1-2 m high, leafy, internodes, smooth, polished, rooting at the nodes. Leaves 10-45 x 2.5-5 cm, linear-lanceolate, wavy, acuminate, spinulose-serrate margins; midrib stout; sheaths long, smooth; ligule a very narrow glabrous membrane. Spikes 5-7.5 cm, suberect, with peduncles 2.5-6.4 cm long; rachis within the bract slender, above the bract stout, notched at the nodes. Male spikelets 3 or 2, with an imperfect one, 1-5 cm long, glabrous, erect or nodding, subsecund imbricating. Spikelets sessile and one pedicelled. Lower glume ca 1 cm, elliptic-lanceolate, acute, with a narrow wing 0.7-1.5 mm wide, arising from a little above the edge of the margin with many branched, green veins; upper glume similar to the lower but not winged, 5-9-veined; lower lemma oblong-lanceolate, hyaline, paleate, triandrous, faintly 3-5-veined; upper lemma similar, paleate, triandrous or empty. Stamens 3; anthers 5 mm long, orange-coloured. Style long, deeply 2-fid, exerted from the mouth of the sheathing bract. Fruit ovoid to spherical, 6-10 mm long, smooth, polished.

Fls. and frts.: Sep. - Feb.

Ecology: Frequent along water courses, rice-fields, ditches, ravine-slopes and moist spots.

Distribution: India, Pakistan, Sri Lanka, Tropical Asia, Malaya, cultivated in Africa and America, Iraq, Persea, Afghanistan.
Native of Tropical Asia, now widely distributed in tropics.


Haines (l.c.) who recorded its occurrence from Puri.

Uses: Villagers brew a beer from it. Beads used for ornamental purposes. Grains can be used for porridge or its capsules are made into beads. Leaves and stems are useful fodder. Fruits are used as blood purifying tonic. This species is cultivated for edible fruits, for baking, mixed with wheat flour in making beer. Horses are fond of the leaves but soon tire of it. A poor fodder for cattle.


Species about 60 distributed in the tropical and sub-tropical
regions of Africa and Asia, 20 species occur in India and only 10 species in Orissa. Several yield essential aromatic oils.

1a. Sessile spikelets not awned or not visible outside or awn reduced to a bristle:

2a. Panicle large, decompound, spreading, loose, nodding; lower glumes with 3 definite intracarinal veins, concave or flat on the back, 3.5 - 5.5 x 1 - 1.2 mm. .... C. winterianus

2b. Panicle much congested, often interrupted, not loose or spreading, finally drooping; lower glumes without obvious intracarinal veins, flat in the upper half, 4 - 4.5 x 1 - 1.1 mm .... C. nardus

3a. Spathes shorter, 1.25 - 1.8 cm long. .... var. nardus

3b. Spathes much longer, 3.5 - 7.5 cm long. ... var. grandis

1b. Sessile spikelets awned:

4a. Lower glume of the sessile spikelet with a deep slot-like depression occupying most of its length. .... C. giderba

4b. Lower glume without a slot, either flat, convex, shallowly concave or with a deep narrow slit on the lower half:

5a. Lower glume of sessile spikelet with a narrow slit in the lower half which appears as a rib on the
inner surface:

6a. Leaves cordate and amplexicaule at base, linear-
lanceolate to lanceolate, tapering. ... C. martini

6b. Leaves linear-acuminate, not cordate, narrow,
rounded at base. ................. C. caesius

5b. Lower glume of the sessile spikelet flat, slightly
convex, shallowly concave, wrinkled or with 1-3
very shallow depressions:

7a. Pedicel of the lowest pedicelled spikelet in the
sessile raceme grotesquely swollen. .... C. coloratus

7b. Pedicel of the lowest pedicelled spikelet in the
sessile raceme not swollen:

8a. Sessile spikelets 6-8 mm long; lower glume of the
sessile spikelet with a concave groove from base
to near apex. .... .... C. pendulus

8b. Sessile spikelets less than 6 mm long; lower
glume of the sessile spikelet flat, puckered or
wrinkled, without a concave groove:

9a. Leaves normally 6.25 mm broad; panicle with filiform
branches bearing congested raceme pairs; joints
and pedicels slender with cilia 1.25 - 2 mm long.

.... var. flexuosus

9b. Leaves normally 10 mm broad; panicle with filiform
branches bearing 1 or 2 racemes; joints and pedicels
with cilia 2 - 2.25 mm long. ... var. microstachys


Type: India: Madras, Wight 1700 (K).

Perennial, densely tufted, more or less glaucous herb. Stems slender, up to 1 m high. Leaves very narrowly linear, 7.5 - 30 cm long, 3.7 - 7.5 mm wide, base not dilated. Panicle simple, 10 - 20 cm long, glaucous or straw - coloured when mature; joints of rachis and pedicels nearly glabrous. Glumes 3-4 mm long; lower glume of sessile spikelets truncate, narrowly winged; dorsal channel deep or shallow; lowest pedicels of the sessile spikes slightly swollen and connate to the base of the rachis. Lodicules 2. Stamens 3. Styles 2, free; stigmas plumose. Lower glume of the fertile spikelet deeply channelled; channel of glume in lower half, very narrow corresponding to the rib on the inner side; fertile spikelets bearing a slender geniculate awn 0.7 - 1.8 cm long.


Ecology: Occasionally found at the top of the hill.

 Chr. No. 2n = 20 (Bor, l.c.).

Distribution: India, Pakistan, Sri Lanka, Africa, Arabia,
America.

Specimens examined: Nil.

Panigrahi et al., (l.c.) reported its occurrence for the first time from Lulung in Mayurbhanj District (Panigrahi, 12209).

Uses: Animals eat the grass when young. Plant is widely used for thatching purpose.


_Andropogon nardus_ L. var. _coloratus_ Hook.f., FBI 7 : 206.

_Lectotype_: India: Madras State, Wight 1703 'Labelled _Andropogon coloratus_ N.E. (K)' (selected by Bor 1960 as type).

_A. coloratus_ Nees in Wight, Cal. No. 1703, 1833, nom. nud.

Perennial grass, with stem subsimple, 30 - 120 m high. Leaves chiefly radical, 15 - 62.5 cm long, 1.2 - 8 mm wide, broad, glaucous beneath, not narrowed to the base. Panicles often very large, erect, narrow, decompound or compound, often interrupted; hairs of joints and pedicels, white, often conspicuously contrasting with the pale-brown spikelets. Sessile spikelets 5 - 6 mm long, concave at the base; nodes bearded, awned. Lower glume without a slot, either flat, convex, shallowly concave, or wrinkled or with 1 - 3 very shallow depressions; pedicels of lowest pedicelled spikelets in the sessile raceme grotesquely swollen; lower glume of the fertile spikelets 3.7 - 5 mm long,
its back flat or slightly depressed below the middle; awns 7 - 15 mm long. Stamens 3, perfect.

Fls. and frts. : Nov. - Apr.

Ecology : Occurs in shady localities.

2n = 40 ( Bor, l.c.).

Distribution : India, endemic.

Sometimes cultivated.

Specimens examined : Mayurbhanj Dist.: Jamsola, 120 m, 4 April 1940, sine lect 501 (BSIS).

New Record for Orissa.

Uses : The grass is used for thatch and is said to possess an essential aromatic oil.

Note : G. coloratus (Hook.f.) Stapf differs from G. flexuosus Stapf in its much smaller habit, narrow blade and leaf sheaths, dense and erect panicles, more conspicuously bearded rachis-joints and pedicels - the white hairs contrasting vividly with brownish spathes and much swollen pedicels at the base of racemes.


Hook. f., FBI 7 : 208. 1896.
Type: In montibus Mongger (Monghyr), Hamilton ex Wallich,
Numerl. List No. 8797 (K-Wall.)


Slender annual. Stem 1.3 - 2 m high with glabrous nodes. Leaves 30 - 60.5 cm long, 2.5 - 5 mm broad, very narrow, finely acuminate; sheaths terete, glabrous; ligule short, 2.5 mm long, scarious, glabrous, truncate, appressed to the culm. Panicles very slender, strict, erect, branches simple or lower divided; spathe 1.25 - 3 cm long, narrowly lanceolate, about twice as long as the peduncle. Spikes 1.25 - 2.5 cm, strict, at length deflexed, heterogamous throughout, the more sessile one with lowest sessile spikelet differing from the others and made; joints and pedicels clavate, rather stout, basal sometimes very stout, flattened and concave, sometimes even conduplicate and embracing the lowest sessile spikelets on one side. Sessile spikelets 3 - 5 mm long, pale or dark green, with sometimes a dorsal circular pit above the middle, margins raised; callus glabrous or nearly so. Lower glume 3 - 3.5 mm long, linear-lanceolate, 2-toothed, dorsally deeply concave below the middle; keels scaberulous, scarcely excurrent, not nerved between; in most spikelets there is a deep fit in the callus at the base of lower glume; upper glume cymiform acute, 1-veined; lower lemma lanceolate, 2-veined; upper narrow, 2-cleft, lobes subulate-ciliate; awns 1-1.25 cm long, capillary. Lodicules 2. Stamens 3. Stigmas plumose.

Pedicelled spikelets rather longer than the sessile, lanceolate, acute, glabrous.
Fls. and frts.: Jul. - Dec.

Ecology: On very shallow soil.

Distribution: India. Endemic.

Specimens examined: Koraput Dist.: Borara, 700 m, Sonebura,
1 Oct. 1949, Mooney 3681 (DD); Ganjam Dist.: Kuthada hill,
19 Aug. 1931, Narayanaswami 5906 (MH); Kalahandi Dist.: Summit
of Tejbandh Mali, 1100 m, 20 Dec. 1948, Mooney 3186 (DD).

Mooney (l.c.) also recorded its occurrence from the summit
of Champabandh Mali, 1080 m, in Kalahandi District.

Use: An inferior fodder taken by animals during scarcity only.

Note: Leaves and inflorescence turn deep-red to purple.

_Gympopogon flexuosus_ (Nees ex Steud.) Watson in Atkins., Gaz.
N.W. Prov. Ind. 10: 392. 1882; Bor, Grass.: 127.


Type: Madras, Wight 1704 (K). According to Chase and Mile
(1962). R. Thomas s.n. from Uttar Pradesh (K) is the type.


_Gympopogon nardus_ Rendl. var. _flexuosus_ (Nees ex Steud,) Hack.
in DC, Monogr. Phan. 6: 603. 1889; Haines, Bot.: 1047; Mooney,
Suppl.: 189.

var. _flexuosus_
Malabar or Cochin grass; the Ginger grass; Lemon - grass oil (Eng.)

A tall aromatic perennial, with slender stem, 1 - 2 m high, red. Leaves 20 - 150 x 0.25 - 2 cm. Panicle decomposed, with raceme pairs in masses, very lax, greyish or greyish-green, with numerous slender, flexuous branches, almost zig-zag; outer spathes 1.2 - 3.5 cm, much larger and foliaceous on main branches. Spikes unequal, very short, with 2-4 pairs of spikelets; spatheoles ca 1.75 mm long; longer spikes subsessile; joints and pedicels slender, laxly ciliate, 1.25 - 2 mm long, with spreading hairs. Sessile spikelets 3.5 - 5 mm long, resembling the pedicelled one, lanceolate. Lower glume acuminate, bicuspidate; lower glume strongly 2-keeled, ending in 2 small cusps above; keels scabrous towards tip; margins narrowly incurved throughout, back, black, pale, flat, veinless (or, 2 very obscure veins); upper glume cymbiform, its keel well-developed and scabrid above but scarcely winged, tip acuminate; lower lemma 4.5 mm long, hyaline, ciliate; upper lemma insignificant, to 2 mm long, narrowly-linear, 2-toothed, with sparsely ciliate at tip, with a short, fine, geniculate awn 4.5 - 5 mm long. Grain 2.5 mm long, terete.

Fls. and frts.: Sep. - Jan.

Ecology: Commonly found in cool, moist, sheltered situations. Also cultivated for "Malabar lemon - gross oil". The plantations of this grass are situated at the foots of the Ghats. Northern districts are alleged to produce a better quality oil.

Distribution: India, Bhutan, Burma, Thailand, and many tropical
and subtropical parts of Asia and America.

Specimens examined: Nil.

Mooney (l.c.) has however, recorded its occurrence from Champabandha Mali, 1050 - 1300 m, in Kalahandi District.

Use: An important source of aromatic lemon-grass oil.

\textit{Andropogon nardus var. microstachys} (Hook.f.) Bor, JBNHS 52: 162, 1954; et Grass.: 127.

\textit{Andropogon nardus var. microstachys} Hook.f., FBI 7: 207, 1896.

Type: Uttar Pradesh: Forests of Ough, R. Thomson s.n. (K).

Tall, very slender grass with leaves. Panicle long, slender, erect, bearing a very few distant solitary, erect, filiform branches with one or two very small epinastically deflexed racemes; sheaths very narrow, tubular, erect, 1.2 - 1.8 cm. Spikes 4 - 7 mm; joints 2 - 3; pedicels rather stout, shortly ciliate. Spikelets ovate-oblong or lanceolate. Lower glume dorsally flat or concave below the middle, rather broadly winged; keels margined, winged-veins obscure or 0; awn short; upper lemma very narrow, lobes ciliate.

Fls. and frts.: Sep. - Dec.

Ecology: In the shady sites of the hills.

Distribution: India. Endemic.

Specimens examined: Mayurbhanj Dist.: Dhatiri, Baripada,

New Record for Orissa.


**Andropogon jwarancusa** Jones in A&Lat. Res. 4: 109. 1795.

**Type:** India, Lucknow, near Rapti River, tab. lb in Blane in Phil. Trans. 80: 284. 1790.

Caespitose perennial, with simple, slender, terete, glabrous culms. Leaves to 30 cm long, 2 mm broad, filiform, scabrid; sheaths smooth, glabrous; ligules 2-3 mm long, membranous. Inflorescence a narrow panicle, up to 30 cm long, 4-7-noded. Racemes 15 mm long, divericate, white-villous, often tinged with purple. Fertile spikelets elliptic-lanceolate, acuminate, 4-5 mm long, with short bearded callus. Lower glume shallowly concave on the back, 2-keeled; upper glume equal in length, 3-veined, boat-shaped, keeled in the upper half; lower floret empty; lemma 4 mm long, oblong-acute, hyaline; palea absent; upper floret 0; lemma linear, hyaline, awned in sinus; palea absent, awn 10 mm long. Column 3 mm long twisted, brown. Stamens 3; anthers 1.5 mm long. Styles 2; stigmas plumose. Pedicelled spikelets narrowly oblong-elliptic-acute, 4.5 mm long, male; lower glume 2-keeled in the upper half, scabrid on the keels,
strongly nerved; upper glume 3-veined; puberulous or glabrous.

Stamens 3; anthers 1.5 - 3 mm long.


Ecology: Common on moist valleys. Rare in our area.

Distribution: India, Pakistan, Bangladesh, Afghanistan.

Specimens examined: Nil.

Jain et al. (l.c.) however cited its occurrence from Orissa without citing any specific locality.

Uses: The yield of oil is low with an odour of peppermint mainly of di-piperitoline, which may amount to 77%. Varying amount of sesquiterpene alcohol with rose-like odour may be present. Perhaps this is used by villagers in all kinds of fever, especially Malaria.

Notes: The specific name is derived from two Indian words: Jwór - fever; ankus - a forked instrument for controlling the elephant by Māhūt. The roots are reputed as medicine, used in cough, chronic rheumatism, cholera, dyspepsia, and gout.

Cymbopogon martini (Roxb.) Watson in Atkins., Gaz. N.W. Prov. Ind. 10: 392. 1883; Haines, Bot.: 1046; Bor, Grass.: 129;

Type: "A native of the high lands of Ballaghat, General Martin collected the seeds". (K).

A. schoenanthus Linn. var. martinii (Roxb.) Hook. f., Fl. Brit. Ind. 7: 204. 1896.

Rosa-oil grass; the Geranium grass (Eng.)
Dhaniyatri, Magarlata (Or.)

A tall sweet scented perennial grass 1.5 - 3 m high, with straw-coloured leafy stems. Leaves 7.5 - 45 x 0.5 - 3 cm, lanceolate or linear-lanceolate, finely caudate, acute or acuminate, glabrous, margins scabrid. Panicles decompound or compound geminate. Spikes 10 - 30 mm long, turning reddish, often very bright when mature, oblique or divaricate or less often diflexed; joints and pedicels not long hairy; spathes and spikelets pale or spikelets reddish; joint and pedicels clavate, tips with lanceolate tooth or 3-toothed, margins long-villoose. Sessile spikelets 3.5 - 5 mm long; callus obtuse. Lower glume (above the lowest spikelets) 3-4 mm long, with a narrow slot-like depression in the lower half, awns 7.5 - 10 mm long; upper glume cymbiform, with the dorsal keels winged above, minutely ciliate below, lower lemma deeply channelled; Stamens 3. Styles 2, free. Pedicelled spikelets oblong-lanceolate, obtuse or acute, pedicel of the lowest pedicelled spikelets swollen. Lower glume glabrous or puberulous; keels rarely ciliate; upper glume ovate, acute, 3-veined; lower lemma oblong, ciliate, 2-veined.

Wild, sometimes cultivated.
Fls. and frts.: Sep. - Dec.

Ecology: Locally abundant in rather dry shady slopes of the hills.

Sofia: 2n = 20

Motia: 2n = 40

(Bor, l.c.)

Distribution: India, Pakistan, Bangladesh, South-east Asia.

Wild. Cultivated in the tropics.

Specimens examined: Sambalpur Dist.: Kapildhar, Satyamba Pat in Gandhamardan Plateau, 900 m, 7 Nov. 1959, Panigrahi 20936 (b) (CAL).

There is a specimen from Gumsur, Beddom (i) at BM (vide Stapf, Kew Bull. 1906: 306. 1906).

Haines (l.c.) also recorded its occurrence from the shady sides of the hills of Angul in Dhenkanal District and also from Sambalpur, Bal (1942), from Mardbasa, 300 m, in Mayurbhanj District and Saxena et al (1982), from Bhubaneswar.

Uses: Motia is an essential source of valuable palmarose oil which is exported in large quantity every year for its growing demand. "Sofia" is a source of ginger-grass oil which contains only about 1/3 to 1/2 the quantity of geraniol that is obtained in palmarosa.

The essence of the oil is used for bathing in fever and jaundice and is also given during pneumonia by the hill-tribes of Sambalpur District.
Note: This grass is an essential source of Rusa oil, which are of two kinds the "Motia and Sofia". Though these two forms are difficult to distinguish in the dried specimens but in the field they can be distinguished as follows:

(i) grass grows in scattered patches, mostly in sunny places and less moisture; upper surface of the culm-leaves makes a right or obtuse angle with the culm; presence of few radical leaves at the base; \(2n = 40\) var Motia

(ii) The grass grows in dense masses, mostly in moist places and less sunny areas, the upper surface of the culm-leaves makes an acute angle with the culm; presence of many radical leaves at the base; \(2n = 20\) var Sofia

Fischer (1931) also described that the two kinds Motia and Sofia, which though differing chemically appear to be derived from separate, morphologically indistinguishable races of this species. Therefore, it requires further critical studies to give proper status.

_Cymbopogon nardus_ (L.) Rendl in Cat. Welw. Afr. Pl. 2: 155. 1899; Haines, Bot.: 1046; Mooney, Suppl.: 189; Bor, Grass.: 130.

_Andropogon nardus_ L., Sp. Pl. 1: 1046. 1753.

_Type_: Habitat in India. Fl. Zeyl. 45* (Savage Cat.)

_var. nardus_

_Citronella grass (Eng.)_
A tall leafy perennial grass, 1-2.5 m high, copiously branched, above. Culms up to 1 m high and 1 cm diam. at the base, solid. Leaves 1 m or more in length, ca 1.5 cm wide. Panicle pyramidal or linear-oblong, much congested; spathes laxly or closely imbricate lanceolate; proper spathes 1.25 - 1.8 cm. Spikes with 4-5 spikelets; joints and pedicels ciliate with swollen base.

Sessile spikelets 3.5 - 5.5 mm long; lanceolate, oblong-lanceolate, oblong, lanceolate-oblong, acute, without an awn or the awn reduced to a bristle not visible outside the spikelet, flat on the back. Lower glume flat, slightly convex or shallowly concave; without obvious intracarinal veins, 4-4.5 x 1-1.1 mm, awn long or short; lower glume of the fertile spikelets lanceolate, acute, flat, keels 2, narrowly winged, 4 - 4.5 mm long.

Cultivated and wild.

Fls. and frts.: Jul.-Dec.

Ecology: On moist shady localities growing apparently in wild condition.

2n = 20 (Bor, l.c.)

Distribution: India, South-east Asia.

Specimens examined: Kalahandi Dist.: Jantibandh Mali, 1200 m, bordering Gunupur, 17 Jul. 1949, Mooney 3581 (DD); Dhenkanal Dist.: Kapilas, 9 Nov. 1934, Parija 444; Cuttack Dist.: Planted in Ravenshaw College Botanic Garden, Cuttack, sine lect s.n. (both Rav. Coll. Herb.).
Use: Though wild, it is now widely cultivated for its aromatic citronella oil.


Type: Rajmahal, Mokim.

A stout grass 8.6 m long with leaves 60 - 90 x 0.7 - 1.25 cm. Panicle narrow with loosely arranged often drooping, distant branches; outer spathes 3.5 - 7.5 cm; spathiles 2.5 - 3 cm; joints and pedicels shortly ciliate. Sessile spikelets 4-5 mm long, oblong-lanceolate, obtuse, dorsally flat or slightly concave below; keels margined or winged above the middle, veins obscure; keels of upper glume sometimes shortly winged above the middle; lobes of lower lemma ciliate, awn 7.5 - 1.25 mm long.

Fls. and frts.: Jul. - Dec.

Ecology: On moist shady locality.

Distribution: Eastern India, Nepal.

Specimens examined: Nil.

Mooney (I.c.) recorded its occurrence from Jantiabandh Mali, 1250 m, in Kalahandi District.

Note: It is distinguished by very long outer spathes (3.75 - 7.5 cm).


Type : Nepal, Wallich 8794 G (K).

A stout caespitose perennial grass, with culms very tall. Leaves up to 1 m in length, 1.25 m wide, with a median nerve very thick at the base. Spathiole up to 2 cm, exceeding the peduncle. Inflorescence a narrow, drooping spiciform raceme 30 - 50 cm long, oblong, lax, compound; branches equal, somewhat nodding, flexuous. Spikes 2 - 2.5 cm long, joints 4-5 with long hairs. Male spikelets violet or reddish at the summit. Asexual spikelets, 5-6 mm long, with a 9 - 11 mm long awn. Lower glume narrowly winged, 4-veined, shallowly 2-pitted at the base.


Ecology : In sal forests under light shade.

Distribution : Eastern India, Nepal.

Specimen examined : Kalahandi District : Tejbandh, 1110 m, 20 Dec. 1948, Mooney 1183 (DD).

Saxena et al. (l.c.) also recorded its occurrence from Bhubaneswar.

Use : For its nice sweet smell, it is kept in the house.

Type: Ceylon: Pillagodda Valley, Buddegama S.P., 50 m, 11 Feb. 1908, A. W. Winter s.n. (K).

Old Citronella grass, Wintered grass (Eng.)

A tufted aromatic perennial with erect, stout stem, 2 m or more in height, terete, smooth, glabrous at the node; leaf-sheaths-linear, up to 100 x 1.5 cm, acuminate; sheaths smooth and glabrous, shorter than the internode, clasping the culms; ligule scarious or lacerate, ciliate. Inflorescence spiciform decompound raceme, 30 cm or more long, erect, finally drooping; spathes 10-12 mm long, narrow. Spikes 20 cm long, one shorter sessile, other longer-pedicelled. Sessile spikelets bisexual, 3.5-5.5 mm long, oblong-acute; lower glume as long as the spikelet, flat, 2-keeled, 1-3-veined, glabrous; upper glume glabrous, keeled in the upper leaf rounded below on the dorsal surface, 3-veined; lower floret empty; lemma a hyaline lanceolate scale, 3 mm long, ciliate on the above margins; upper floret bisexual; lemma hyaline, narrow, 3 mm long, ciliately bilobed; palea absent, awn 3 mm long. Stamens 3; anthers 1 mm long. Style 2; stigmas plumose. Pedicelled spikelets 3.5 mm long, lanceolate acute. Lodicules 2. Stamens 3; anthers 2 mm long.

Fls. and frts.: Sep. - Jan.

Ecology: Growing in moist cultivated soil. Also wild in our area.
Distribution: Throughout the world. Often cultivated; rarely wild.

Specimen examined: Nil.

Saxena et al. (l.c.) recorded it from Bhubaneswar.

Uses: Extensively cultivated for its valuable Citronella oil.


Type: *C. dactylon* (L.) Persoon (*Panicum dactylon* L.)

1a. Plants rhizomatous; ligule a ring of white hairs; upper glume shorter than lemma; hairs on the keel and margins of lemma simple, not clavellate; palea not hairy on keels; anthers 1 - 1.25 mm or more in length. ... *C. dactylon*

1b. Plants not rhizomatous; ligule membranous, sometimes ciliate or laciniate; upper glume longer or shorter than the lemma; hairs on lemma clavellate; anthers small, 0.5 mm in length.

2a. Leaf-sheaths strongly compressed; leaves usually small, obtuse; spikes 3-5, 2-5 cm long; upper glume longer than or subequal to lemma; hairs on lemma and palea characteristically clavate, globular or swollen at tip. ... ... ... ... *C. barberi*

2b. Leaf-sheaths lightly compressed; leaves long, linear,
generally pointed; spikes 4-8, 5-10 cm long; upper glume distinctly shorter than lemma; hairs on lemma slightly thickened at tips; palea devoid of hairs. ... C. arcuatus


Type locality: "Habitat in Luzonia", Philippine Isl.


Syntype: "Collected at Gokavaram in Godavari District (No. 8262), in Chingleput (No. 11488), Tinnevelly District (Nos. 13129 & 13259) and at Kellar on the Nilgiris (No. 13983).


C. dactylon (Linn.) Pers. var. suberectus Haines, Bot. Bih. & Or.: 967.

Syntype: Bihar: Singhbhum; Rajmahal Hills, Kurz s.n.


Stout, erect, tufted perennial, 17 - 100 cm high, with widely long, spreading stolons and without rhizomes. Stems erect, slender, creeping below, not more than 30 cm tall. Leaves 2.5 - 11.5 x 0.4 - 1.2 cm, narrowly ensiform, acute, flat, strongly 3-veined on either
side of the midrib, leaf-auricles or orifices glabrous or pilose, but not bearded; ligule membranous, ciliolate on the upper edge. Inflorescence of digitate or umbellate spikes. Spikes usually 5-10, up to 10 cm long, flexuous, usually spreading and curved. Spikelets 2.2 mm long, 1-seriate, imbricate. Glumes as long as or slightly shorter than the lemma. Lower glume 1 mm long; upper 1.25 - 1.5 mm long; lemmas longer than the upper glume, broadly boat-shaped, 2 - 2.5 mm long, hairs on lemmas somewhat ciliolate; palea as long, 2-veined. Lodicules 2, short. Anthers large, ca 0.5 mm long. Styles distinct. Grains oblong, free within the glumes.

Fls. and frts.: Probably throughout the year.

Ecology: In fallow field and on the roads of semievergreen forests under shade.

Distribution: Throughout India, Pakistan, Nepal, Bangladesh, Burma, Malaya, Southeast Asia, Northern Australia, Madagascar.

Specimens examined: Koraput Dist.: Gunupur, 730 m, 19 Jul. 1949, Mooney 3541 (DD); Ganjam Dist.: Mahendragiri, 300 m, Saran and Prusty 38323 (LWG); Puri Dist.: Khurda, 1889, Walsh s.n. (Accn. No. 538687 - CAL); RNPur, 22 Aug. 1946, Mooney 2695 (CAL).

Uses: Cattle relish this grass very much.

Note: This grass is closely allied to Cynodon dactylon L., but differs in the absence of rhizome and in the presence of a membranous ligule. According to deWet et Harlan (1970), C. arcuatus
being a tetraploid is well distinguished from other species of
*Cynodon*.


Type: "Collected by Dr. C. A. Barber in the Districts of Tinnevelly and Godavari during 1901 and 1902 .......

Lectotype: South India: Agricultural College, Central Farm, Coimbatore, Aug. 1916, South India Flora No. 13715 (CAL) (Vide Jain, BBSI 8: 205. 1966).

Perennial creeping, slender grasses with erect culms, 10 - 30 cm high, without rhizomes. Leaves short, narrow, not fully pointed, flat, 1.5 - 6.3 cm long, 2.5 - 5 mm wide. Inflorescence of digitate or umbellate spikes; rhachis slender. Spikes 3 - 5, 1.5 - 3.5 cm long. Spikelets all alike, sessile, laterally compressed, alternately 2-seriate, imbricate, not jointed at the base, 1-flowered; rhachilla disarticulating at the base, rarely produced beyond the lemma. Lower glume 1 - 2 mm long; upper 2 - 2.5 mm long; lemmas equal to, shorter or slightly longer than the upper glume, firmly membranous, boat-shaped, 2 cm long, 3-veined; hairs clavellate on lemma and keels, often minutely knobbed on the keels, awnless; palea 2-keeled, containing a bisexual floret. Lodicules 2, minute. Stamens 3. Styles 2, free. Grains oblong, free within the glumes.

Fls. and frts.: Probably throughout the year.

Ecology: A rather less common plant growing on the forest floors of the semiexposed areas.
Distribution: India, Bangladesh, Burma.

Specimens examined: Parla KLmedi, Sep. 1903, Grant, Candler et Burkhill 20584 (BSIS); Ganjam Dist. near Charmaria, 17 Oct. 1930, Narayanswami 4664 (MH); Puri Dist.: Kalpendi, Nov. 1889, Walsh s.n. (CAL);

Uses: It is a good pasture grass and animals take it during scarcity.

Note: Bor (1960), however, records it as endemic to Madras.

Jain (1966) records two forms, forma barberi and forma longifolium Jain (Type: Orissa, Puri, 1889, Walsh s.n. - CAL) in C. barberi. But we do not wish to recognise any infraspecific taxon beyond the rank subspecies and varieties.


Holotype: Portugal (LINN: 80.35; microfiche-CAL!).


Dubbalo Ghaso, Dubs, Dubo Ghaso (Or,)
Dog's tooth, Bermuda
Grass or Star Grass (Eng.)

A very variable perennial creeping grass with slender, branches, 7.5 - 30 cm long. Leaves 2-10 cm long, very short, narrowly -
lanceolate, subulate, spreading glaucous, finely acute or acuminate; sheaths tight, glabrous or hairy, sometimes bearded at the mouth; ligule a ring of white hairs. Digitate or umbellate spikes 2-6, radiating from the top of the slender peduncle, 1.25 - 3 cm long, green or purplish; rhachis very slender, flattened, sometimes slightly winged, scaberulous. Spikelets very close, 1.5 - 2.5 mm long. Lower glume 1.5 mm long, narrow, conduplicate, acute; upper glume 0.7 - 1 mm long, similar; lower lemma largest; palea much narrow, ca 2.2 mm long, strongly 2-veined; rhachilla sometimes produced to half the length of the lower lemma. Lodicules 2, short, obovate-cuneate, glabrous. Stamens 3; anthers oblong. Ovary glabrous; styles distinct, slightly shorter than the plumose stigmas. Grains oblong or fusiform - oblong, 1 - 1.25 mm long, laterally compressed, subterete, free within the glumes.

Fls. and frts. : Throughout the year.

Ecology : Common on sandy loam and alluvial soil everywhere.

2n = 18, 2n = 36 (Clayton, 1974)
2n = 30, 36, 40 (Bor, l.c.)

Distribution : Throughout India, Pakistan, Burma, Sri Lanka, throughout the warm temperate regions of the world, Australia.

Specimens examined : Koraput Dist. : Kondakamberu, 25 Apr. 1963, D.C.S. Raju 848 (CAL); Ganjam Dist.: Parlakimedi, Sep. 1903, Burkill, Candler and Grant 20584 (BSIS); Charmaria hill-base, 17 Oct. 1930, Narayanaswami 4666 (MH); Ganjam, 1949, Wight 3034 (CAL);

Fischer (l.c.) recorded its occurrence from Ganjam and Kapoor (1961), from Mahendragiri hills from Ganjam District: Narayanaswami, from Burkuda; Choudhury et Patnaik (1983), from Khandagiri - Udayagiri hills and Utkal University Campus, Vani Vihar, Bhubaneswar, Patnaik (1956), from Cuttack and Bal (l.c.), from Chahala, 710 m, in Mayurbhanj District respectively.

Uses: It is highly esteemed as a lawn grass. Santals use a preparation of this grass in the spaces between the toes caused by a parasite. It is also used as a diuretic and urinary sedative in cystitis and other diseases. The fresh express juice is widely used as an astringent and is also used to stop bleeding caused due to injury.

Note: It is one of the very variable species and can only be distinguished by the underground rhizomes.
**Cyrtococcum** Stapf in D. Prain, Fl. Trop. Africa

*Cyrtococcum* oxyphyllum (Hochst. ex Steud.) Stapf in Hook., Icon. Pl. sub. tab. : 3096. 1922; Mooney, Suppl. : 174; Bor, Grass. : 291.


"Ind. Or.: Prov. Canara, Hohenacker nr. 627".

A tall gregarious perennial grass with culms, geniculately
ascending from a slender, creeping, branching base, lower nodes rooting, upper pubescent, leaves acuminate, glabrous or sparsely hairy above, puberulous beneath, base narrow; sheath glabrous or ciliate, mouth hairy; ligule rounded, panicle contracted, branches rather remote, short, erect or spreading with slender silky hairs on the pedicels; pedicels short, as long as the spikelets; spikelets brown, very shortly pedicelled. Lower glume about the half the length of the lemma, obtuse 3-veined; lower lemma 5-veined; upper lemma white, its palea white, narrow, patent, hard. Lodicules 2. Stamens 3. Styles 2.

Fls. and frts.: Sep. - Dec.

Ecology: In open grasslands and forests under shade.

Distribution: India, Burma, Sri Lanka, China, Malaya, Tonkin, Australia, Madagascar, Mascarene Islands, Pacific Islands.

Specimens examined: Kalahandi, 870 m, Dec. 1939, Mooney s.n. (Accn. No. 83892 - DD); Puri Dist. Ragini forest, 11 Nov. 1902, J.H. Lace 2471 (DD).

Mooney (l.c.) also recorded its occurrence from Pustiguda valley, 720 m, in Kalahandi District and Kapoor (1964), from Mahendragiri hill in Ganjam District.


Type Locality: "Habitat in India".

A tall, slender, perennial grass with culms 20 - 45 cm tall; nodes glabrous, the lower emitting long, solitary wiry roots. Leaves ca 2-8 x 0.6-1 cm, ovate to linear-lanceolate, finely acuminate, thin; sheaths with ciliate margins and mouth; ligule membranous, rounded. Panicle 5 - 12.5 cm long, with usually inclined, spreading. Spikelets 1-5 mm long or less, glabrous, laterally compressed; pedicels shorter, capillary. Glumes herbaceous, membranous; lower glume half the length of the spikelet, 0.5-1.25 mm long, cordate ovate or oblong, concave; spikelets if longer glumes cuspidate, membranous, glabrous brown, 3-5-veined; upper glume 0.7 - 1.5 mm long, helmet-shaped, elliptic-oblong, gibbous, concave, keeled; lower lemma 1.75 mm long, elliptic, obtuse, concave; palea short, ovate-lanceolate, acuminate; upper lemma bisexual, 1.75 mm long, mucronate, finely punctate; palea 1.75 mm long, elliptic with incurved margins, mucronulate. Lodicules 2, quadrangular, shorter than the ovary. Grain minute, obovoid.


Ecology: Usually found in hill-forests under shade, above 700 m.

Distribution: India, Burma and Southeast Asia.

Specimens examined: Mil.

Mooney (l.c.) recorded its occurrence from Narasighpur in Cuttack District.

Note: A very variable and widely distributed species.


*Type locality:* India.

**P. difformae** Roth ex Roem. et Schult., *Syst. Veg.* 2: 433. 1817.

*Type locality:* "In India orientali".

A perennial herb, with slender stems, branches erect, decumbent, interlaced below. Leaves 2.5 - 10 mm wide linear-lanceolate, glabrous or laxly hairy; sheaths glabrous or with ciliate margins; ligule rounded. Panicle contracted with few suberect, glabrous branches. Spikelets few, very shortly pedicelled, rarely as long as the spikelets. Lower glume about half the length of the lower lemma, obtuse or acute, 3-veined, pale brown; lower lemma 5-veined, pale brown, tip of the upper lemma naked or bearded. Lodicules 2. Stamens 3. Styles 2, distinct. Grain small, rounded.

**Fls. and frts.** : Aug. - Dec.

**Ecology:** A mat forming grass of damp places under shade.

**Distribution:** India, Bangladesh, Sri Lanka, extending to S.E. Asia, Java.

**Specimens examined** 1 fl. ml.

Kapoor (1964) however, recorded its occurrence from Mahendragiri hills in Ganjam District and Saxena et al., (1982), from Bhubaneswar respectively.
Species 10, distributed in all warm countries of the world, 5 species occur in India and only one in Orissa.


\textit{Vide} Hitchcock, U.S.D.A. Bull. (1915 - 23) 772: 175. 20 Mar. 1920

Stoloniferous annual with variable habit, to 75 cm high. Stems sometimes prostrate, rooting from nodes, geniculately ascending, compressed, glaucous, smooth. Leaves 2.5 - 25 x 0.2 - 1 cm, linear, tapering to a fine point, flat, glaucous; sheath hairy or ciliate.
above; ligule a slightly ciliolate line. Spikes 1-7, digitately radiating, stout, 2-5 cm long, peduncle hairy at base of spikes; rachis rigid, tip shortly produced, up to 2 mm long. Spikelets many 3-5-flowered. Glumes divaricate; lower glume ovate, acute or acuminate, ca 2.5 mm long, scabrid on keel; upper glume as long as lower, excluding the awn, suborbicular or broadly ovate when unfloded, suddenly contracted to a squarrose awn, ca 5 cm including the awn; lemmas gibbously obovate, up to 3 mm long, mucronate or awned; keel scabrid; palea rather shorter than the glume, ovate-oblong, obtuse or 2-fid (notched); veins hispid. Anthers ca 1.3 mm long. Grain subglobose, 0.7 - 1 mm diam., reddish, very rugose.


Ecology : A weed of cultivated and waste lands.

$2n = 20, 36, 48$ (Darlington et Wylie, 1955);

$2n = 40$ (Takeoka, 1965)


Distribution : India, Pakistan, Bangladesh, Burma, Sri Lanka, widely distributed in the tropical and temperate regions of the Old World and introduced into America.

Specimens examined : Ganjam Dist.: Curangi, 19 Aug. 1931, Narayanaswami 5797; Gopalpur Road, 20 Oct. 1930, Narayanaswami 4710 (both MH); Ganjam, Dec. 1949, W. Might 3025 (CAL); Kalahandi Dist.: Sambodala, 27 Sep. 1956, S. K. Mukherjee 4328 (CAL); Puri Dist. Khurda, Oct. 1888, Walsh s.n. (Accn. No. 539674 - CAL);

Srinivasan et Subba Rao (1961) recorded its occurrence from Pariskmedi in Ganjam District; Saxena et al., (1982) and Behera et al. (1979), from Bhubaneswar; Choudhury and Patnaik (1982-83), from Boraghar, Khandagiri - Udayagiri in Puri District respectively.

Uses: It is a good fodder. Grains are used as food in scarcity, but has an unpleasant taste and is said to cause internal disorders. As the grass is rich in cyanogenic glycosides and therefore, dangerous to stock at times.

Dendrocalamus Nees, Linnaea 9 : 476. 1835

Type : D. strictus (Roxb.) Nees.

Dendrocalamus strictus (Roxb.) Nees, Linnaea 9 : 476. 1834;
A deciduous, more or less caespitose bamboo with strong stems (culms), to ca 2 m high, 2.5 - 7.5 cm diam., the central cavity comparatively narrow, sometimes 0 ; lower stem - sheaths 7.5 - 30 cm, oblong, striate, ciliate on the margins, slightly auricled; ligule very narrow inside. Leaves 2.5 - 25 x 1.25 - 3.8 cm, narrowly oblong, rounded, suddenly at the base into a short-petiole, gradually narrowed upward into an acuminate point, hairy margins scabrous; leaf-sheaths striate, hairy or glabrous; callus prominent, auricle short, ciliate with a few wavy deciduous hairs; ligule narrow, serrate. Inflorescence a large branching panicle with dense lobular heads, 2.5 cm in diam, 3.5 - 5 cm apart; rachis rounded, smooth. Spikelets 0.6 - 1.25 long, forming spinescent; fertile and sterile spikelets intermixed. Glumes ovate; lemmas ovate, spinescent and pubescent at tip; palea ovate or obovate, emarginate; the lower palea 2-keeled; the upper palea keel-less. Stamens 6, long exerted, filaments free; anthers shortly apiculate. Ovary turbinate; style long; stigma simple, plumose. Grain ca 7 mm long, ovoid or subglobose, with persistent style-base.

Ecology: Common on outskirts of forests and also frequent on river banks.

Distribution: India, Pakistan, Nepal, Bhutan, Bangladesh, Burma, Sri Lanka, Singapore to Java.

Specimens examined: Koraput Dist.: Balimela, 200 - 550 m, 23 May 1909, R. S. Rao 18533 (CAL); Purnabeda, Dec. 1966, T. Das FRI - I (Accn. No. FRI - 109 (DD); Barli Road, 450 m, Jan. 1967, T. Das 117 (DD); Ganjam Dist.: Tilirangi, Dec. 1899, Gamble 21562 (CAL, DD); Khondburua, 500 m, Feb. 1894 Gamble 13778 (CAL, DD); Chandragiri Range, 600 m, 19 Feb. 1976, T. Das s.n. (Accn. No. R/GII/159750-DD), Magudi, 6 Feb. 1900, Berber 1431, Rukkinda, 24 Aug. 1931, Narayanaswami s.n. (Accn. No. 82852 - MH), Gumsur, 10 Mar. 1903, sinelect s.n. (Accn. No. 40898 - BSIS); Kalahandi Dist.: Gourkella, 4 May 1956, S. K. Mukherjee 4267 (CAL); Sambalpur Dist.: Bhatipathar, Panighrahi 20800; Manbhang, Panighrahi 21026 (CAL); Dhenkanal Dist.: Bongola, 2 J. 1962, D. M. Verma 1521 (CAL); Khinda, 6 Dec. 1902, J. H. Lace 2549 (CAL); Angul, 19 Mar. 1943, K. Biswas 6154 (CAL); Puri Dist.: Khurda, Jul. 1893, Babu Shreedhur Chakraborty 3 (CAL).

Uses: The stems (culms) are much used for construction of houses, poles, rafters, lance-shafts, lathis, baskets and matting. The new shoots are eaten by the tribal people.

Stapfiola O. Ktze. in Post et O. Ktze, Lexic. Gen. Phan.: 532
1903, nom. nov. pro Desmostachya.

Type: D. bipinnata (L.) Stapf. (Briza bipinnata L.)

A monotypic genus distributed throughout the Middle East to
Indo-China, North and Tropical Africa, India.

Desmostachya bipinnata (L.) Stapf in Thiselt. - Dyer, Fl. Cap. 7: 632. 1900; Mooney, Suppl.: 160; Bor, Grass.: 491; Cope in

Briza bipinnata L., Syst. Nat. ed. 10, 2. 275. 1759.

Type: Egypt, Hasselguist.

Desmostachya cynosuroides (Retz.) Stapf in Haines, Bot.: 962.


Type: "Habitat in aridis sterilioribus Ind. Or. Cel. Koenig."

Kusa (Cr.)

A tufted perennial, 30 - 100 cm high, branching from a thick
scaly root-stock which sends out rhizomes in all directions,
stolons rather very stout, smooth, covered with shining sheaths.
Leaves many, the basal 45 - 50 cm long, 1-4 mm wide, acuminate;
mouth of the sheath with or without long hairs; ligule a line
of hairs. Panicle strict racemi-form, linear or oblong, 15 - 45 x
1.5 - 4 cm, greyish green bearing densely secondly arranged
spikelets; rachis puberulous. Spikelets up to 30-flowered, to
1.5 cm long, sessile, secund, 2-seriate and crowded; rachilla
tough. Glumes very unequal; lower glume 1 - 1.5 mm long; upper glume twice as large as lower glume, obtuse; lemma 1.5 - 2 mm long, ovate, acute, coriaceous; keels scaberulous; palea shorter than its glume, subcoriaceous, with minutely scabrid keels. Stamens 3; anthers 0.8 mm long. Grain 0.5 - 0.7 mm long, obliquely ovoid, laterally compressed, obscurely 3 - gonous.


Ecology: Commonly growing on moist sandy soil.

Distribution: India, Pakistan, Bangladesh, Burma, Persia, Arabia, Syria, North Africa to Tropical Africa.

Specimens examined: Dhenkanal Dist.: Jhara, 120 m, 9 Jun. 1948, Mooney 3077 (DD); Cuttack Dist.: Kazalpatia, 30 Jan. 1961, Panigrahi 23521 (ASSAM); Gorapara, Gobra ravine, 29 May 1967, M.K. Ghosh (CAL); Mayurbhanj Dist.: Palbani, 16 Apr. 1940, sine lect 551 (DD; BSIS).

Choudhury and Patnaik (l.c.) however, also recorded it from Nuagaon, near Bhubaneswar.

Uses: An excellent sand-binder. It has a good fodder value in arid zones and is sometimes mixed with other grains and wheat and fed to stock. It is also used in Hindu ceremonies. During shraddha, a ring of it is worn and mats are woven from the corpses.

Note: Kuntze (1903) proposed the new generic name Stapfiola for Desmostachya Stapf, owing to the existence of the genus Desmostachys.
Planch 1883 (Olacinaceae). It is, however, expressly stated in the Art. 75 ICBN that Desmostachya is not likely to be confused with the Desmostachya and thus, is to be maintained as a valid generic name.


**Type**: D. nodosum Willemet, nomen illegit. (Andropogon annulatum Forssk, D. annulatum (Forssk.) Stapf (etem vide Bor, Kew Bull. 1954: 73. 1954 ).

**Note**: Ohwi (1941) combined Capillipedium with Bothriochloa. While Roberty (1960) recognised the former as a distinct genus, he combined Bothriochloa with Dichanthium, recognising the former as a separate section. de Wet and Harlan (1966, 1969) suggested that the three genera, Bothriochloa C. Ktze. (1891), Capillipedium Stapf (1917) be combined and recognised as sections of *Dichanthium Willemet* (1796). In a subsequent publication de Wet and Harlan (1970) reconsidered the problem and observed, "Although Capillipedium is genetically isolated from Dichanthium, but several members of both the genera can cross with Bothriochloa intermedia (R. Br.)
A. camus . . . . . . . . . ." The taxa Bothriochloa, 
Capillipedium and Dichanthium evidently belong to one taxonomic 
unit, but whether this unit must be assigned generic status 
is a matter of conjecture. Several other examples are known in 
Poaceae where major taxonomic units usually recognised as genera, 
can cross".

Although Clayton (1973) and Despande (1984) followed de Wet 
and Harlan (1966, 1968) and transferred a number of species from 
the former two genera to Dichanthium Willemet. Ramamoorthy (in 
Saldanha and Nicolson’s, Flora Hassan District: 722, 1976) and 
Cope (1982), considered it more appropriate to keep these three 
genera distinct.

1a. Lower glume of sessile or of pedicelled or of both 
spikelets pitted, if both spikelets not pitted then 
margins of lower glume of pedicelled spikelets armed 
with bulbous based hairs. . . . . . . . . . . D. foveolatum

1b. Lower glume of spikelet not pitted; lower glume of 
the pedicelled spikelet armed with bulbous based hairs:

2a. Stem below the inflorescence and peduncle of racemes 

hairy. . . . . . . . . . . . . . . . . . . . . . . . . . . . D. aristatum

2b. Stem below the inflorescence and peduncle of racemes 
glabrous:

3a. Annual small creeping species; racemes solitary, 2.5 cm 
or less long, lower glume of the sessile spikelet with 
a shallow longitudinal furrow. . . . . . . . . D. pallidum
3b. Perennial large erect or ascending species; racemes various, not solitary, more than 2.5 cm long; lower glume of the sessile spikelet not furrowed:

4a. Lower glume of the sessile spikelet oblong, obtuse or truncate; keel not winged; bulbous based hairs present on the keels and near the apex; pedicels of the pedicelled spikelets longer than sessile spikelets; sheaths terete; ligule longish .............................................................. D. annulatum

4b. Lower glume of the sessile spikelet ovate or oblong-truncate; hairs without bulbous bases on the dorsal surface of the glume; pedicels of the pedicelled spikelets less than half the length of the sessile spikelets; sheaths compressed; ligule a short ciliolate membrane .............................................................. D. caricosum


Type: Egypt, "Ad ripas Nile", *Forsskal s.n.* (C; LD, Photo).

*Caespitose, perennial, ca 1 m high with simple culms; nodes patently hairy. Leaves linear, finely caudate, acuminate, 5(7.5)-
15(-30) x 0.25 - 0.6 cm, often with tubercle-based hairs; sheaths bearded at the tip; ligule 1-1.5 mm long, scarious, short, glabrous. Inflorescence a digitate or subdigitate raceme, 2-9, 2.5 - 8 cm long; peduncles glabrous, 4-15 mm long; joints and pedicels 1.2 - 2 mm long, sparingly hairy. Sessile spikelets 4 - 5 mm long, elliptic to elliptic-oblong; callus thick, shortly bearded at the base. Glumes equal; lower glume elliptic-oblong, obtuse; keels ciliate, the back hairy or glabrous, 5-9 veined; upper glume equal to lower, but narrows, lanceolate, acute or acuminate, 3-veined, keeled in the centre; awn 1.5 - 2.5 cm long; lower lemma similar to upper glume, linear-oblong, obtuse, veinless; upper lemma much to an awn, 1.5 - 1.8 cm long. Lodicules 2, minute. Stamens 3. Styles 2, free; stigmas plumose, exerted. Grain oblong-ellipsoid or oblong. Pedicelled spikelets as long as the sessile; lower glume elliptic-oblong, obtuse, 7-11-veined, with bristly keels; upper glume narrower, 3-veined; lower lemma ciliate; upper smaller or obsolete.


Ecology: Common at low elevations.

Sn = 20 (de Wet et Harlan, l.c.)

Distribution: India, widely distributed from Western N. Africa to Indonesia, Australia.

Specimens examined: Koraput Dist.: Kondakamberu, 25 Apr. 1962, D.C.S. Raju 842; Ghatkuda forest, 8 Dec. 1962, G.V.S. Rao 30067 (both CAL); Ganjam Dist.: Kuthadya hills, 19 Aug. 1931, Narayanswami
Raju (l.c.) recorded its occurrence from Balimela in Koraput District.

**Use:** A fair fodder, selectively eaten by cattle.


**Type:** "Cette plants a'ete' observes a l'ille-de-France par Commerson (V.S. in herb. Desfont.)"

Perennial, 25-100 cm high. Culms leafy; nodes softly patently hairy, sometimes glabrous. Leaves 7.5 - 30 cm long, 2.5 - 6 mm wide, finely acuminate; ligule a short ciliate membrane. Racemes 1-6, solitary, 3-8.75 cm long, binate or digitate; peduncle below the inflorescence and pedicels of the racemes hairy; joints and pedicels 1 - 1.5 mm long, solid, hairy on one side. Sessile spikelets 2.5 - 5 mm long. Lower glume obovate or oblong, 2.5-4.5 mm long, 3-7-nerved, apex rounded or narrowed and obtuse; keels winged near the apex, dorsally hairy; awns 1.75 - 2.5 cm long. Pedicelled spikelets nearly as long as the sessile, awnless.

**Fls. and frts.:** Sep. - Dec.
Ecology: A grass of low elevations.

Distribution: India, Burma, China, Malaysia, Thailand, Laos, Indonesia, Singapore, Siam, introduced into Australia, Africa and America.

Specimen examined: Sambalpur Dist.: Malda, 4 Nov. 1959, Panigrahi 20520 (CAL).

Use: An excellent fodder grass.


*Andropogon caricosus* L., Sp. Pl. ed. 2: 1480. 1763; (incl. var. *mollicomus* Hack in DC., Monogr. Phan. 6: 569. 1889.)

Type: "Habitat in India," *Linnaeus* s.n. (?)

Perennial herb. Culms erect or ascending from a creeping base, forming tufts of rooting nodes, 25 - 100 cm high, nodes glabrous, sometimes bearded, grooved on one side, leafy. Leaves 4-30 x 0.12-0.6 cm, flat, linear, finely acuminate; sheaths compressed, glabrous, not auricled; ligule a short-ciliate membrane. Spiciform racemes 1 - 6, 2.5 - 10 cm long, solitary or sometimes 2-nate, or digitate; joints and pedicels about 1/8 as long as the sessile spikelets, 1 - 1.5 mm long, solid, hairy on one side. Sessile spikelets ca 3.5 mm long; callus short, bearded. Lower glume 2 mm
long, ovate or oblong, concave, ciliate at apex; keels winged near the apex; dorsally hairy, with ca 2 mm long awn; upper glume longer ovate-lanceolate, acute, often apiculate, ciliate, 3-veined; lower lemma as long as the lower glume, ovate-oblong, hyaline, ciliate; upper lemma represented by a hyaline awn of ca 2.3 cm long, the hyaline base ca 2 mm long. Lodicules 2, small. Stamens 3. Styles 2, distinct; stigmas plumose. Grain oblong or oblong-ellipsoid.


Ecology: On comparatively dry soil of the ridge between the rice-fields.

$2n = 20$ (de Wet et Harlan, l.c.)

Distribution: India, Bangladesh, Burma, Sri Lanka, China, Malaysia, Thailand, Laos, Indonesia, Singapore, Siam, Africa.

Specimens examined: Koraput Dist.: Rayagada Station, 14 Mar. 1943, Mooney 2212 (CAL); Munda Guda (Jeypore), 16 Dec. 1960, P.C. Nanda 2374 (CAL); Ganjam, 110 m, 12 Mar. 1943, Mooney 2212 (DD); Mayurbhanj Dist.: Simlipal, 17 Feb. 1958, Panigrahi 12531 (CAL).

Haines (l.c.) cited Walsh's specimen from Orissa.

Use: It is eaten by the stock.


Andropogon foveolatus Del., Fl. Aegypti 16, t. 1812.
**Type**: Egypt, Delile (K).

**Eremopogon foveolatus** (Del.) Stapf in Prain, Fl. Trop. Afr. 9 : 183. 1917
Mooney, Suppl. : 190, (as Stapf); Bor, Grass.: 148.

**Hypogynium faveolatum** (Del.) Haines, Bot. : 1041.

A tufted annual, with culms 15 - 75 cm high, usually decumbent at base, branched, nodes bearded. Leaves 3.25 - 15 cm long, 1.5 - 2.5 mm wide, very narrow, acuminate; sheaths finely silky at base of the stem; ligule short, truncate, hyaline, ciliate. Spikes 2.5 - 3.4 cm long, solitary, peduncles often 3-6, each with its own proper; joints and pedicels slender, villous on opposite sides. Spikelets equal or subequal, 2.5 mm long, linear-oblong to oblong-lanceolate. Glumes 2 - 3.5 mm long; lower glume ca 5 mm long, flat, lanceolate-oblong, glabrous, subobtuse, with narrowly involute margins, 4-veined; upper glume as long as the lower, obscurely 3-veined; lower lemma much shorter, veinless; upper lemma much reduced to anawn 1.25 - 2.5 cm long, hispid. Anthers ca 2.5 mm long. **Pedicelled spikelets**: Pedicels ca 2.5 mm long. Glumes 2, 1 sometimes pitted; lower glume 3.3 mm long, lanceolate, acute; keels aculeately scabrid above, 5-veined; upper glume linear-lanceolate, acute, 3-veined.


Ecology : On clayey soil of the forests under partial shade.

2n = 20 (Bor, l.c.)

**Distribution** : India, Pakistan, Sri Lanka, Kenya, Mali and North
Africa, eastwards through the Middle East and Somalia.

Specimens examined: Ganjam Dist.: Ghatrapur, Dec. 1889, Gamble 21546; Aug. 1904, Fischer 59 (both CAL); Dhenkanal Dist.: near Lodhajhari, 160 m Talcher, 13 Oct. 1940, Mooney 1642 (CAL, DD).

Haines (l.c.) recorded it from Ganjam and therefore, he expected its occurrence in Puri, though there are no reports from the region.

Use: A good fodder grass relished by cattle.

Note: Hackel (1889) considers Andropogon strictus Roxb. as a variety of A. faveolatus Del. Rajaza and Jain (1988) and Cope (1982) has shown that it can not be satisfactorily distinguished from Dichanthium foveolatum (Del.) Roberty.

Dichanthium pallidum (Hook.f.) Stepf ex Fischer in Gamble, Fl. Madras, 1741 (1207). 1934; Bor, Grass.: 135.

Apocops pallida Hook.f., FBI 7: 143. 1890.

Type: Madras: Nilgiri hills, Foulkes (K).

Annual. Stem leafy, slender, stiff, creeping and rooting, apical, 5 - 15 cm high, with usually glabrous nodes. Leaves 2.25 - 5 cm long, linear, acuminate, smooth, glabrous or sparsely hairy, margins thickened, raphes ciliate; sheath open; ligule 0. Spiciform racemes solitary or 2-nate, 1.25 - 2.5 cm long, very pale; rachis slender, ciliate. Spikelets 2.5 mm long. Lower glume broadly cuneiform, obovate or obovate-oblong, to 4 mm
long, bearded, 7-9-veined; upper glume oblong, obtuse, 3-veined, lateral veins submarginal; keels ciliate; lower lemma oblong or lanceolate, glabrous veinless; upper lemma reduced to a slender awn, 1.25 - 2.5 cm long, dilated at the base, brown; palea 0.

Pedicelled spikelets: Lower glume spatulate, truncate, villous, sides recurved; upper glume similar to sessile spikelets.

Fls. and frts.: Nov. - Jan.

Ecology: Comparatively dry soils of low elevations.

\[2n = 20\] (de Wet et Harlan, op. cit.)

Distribution: India. Endemic.


New Record for Orissa.

Note: Bor (1960) treats D. pallidum as endemic to Nilgiri Hills, but Deshpande (1984) reduces it doubtfully as conspecific with D. caricosum (L.) A. Camus. Bhattacharya and Uniyal (1973) reports its occurrence in West Bengal and Andhra Pradesh. The collection W. Wight 3023 from Ganjam (CAL) is a new record of this species for Orissa.


Type: D. fastigiata (Swartz) Beauvois. According to Farr et al.
(1979) the combination is to be attributed to (Sw.) Kunth. (Andropogon fastigiatus Swartz "fastigiatum") (Typ. cons.)


*Type*: *D. fasciculata* Beauv. [*IUBN*: 313, 1983].

A monotypic genus distributed in the tropics of both hemispheres.

Note: Stafleu (1963) states: Both Kunth and Beauvois cited *Andropogon fastigiatus* Swartz (erroneously attributed to Linnaeus by Beauvois). Although Beauvois' use of *D. fasciculata* Beauv. was evidently an error for *A. fastigiata* Sw; the combination *Diectomis fastigiata* is to be retained (Art. 55.2) when the transfer of *Andropogon fastigiatus* Sw. is made to the genus *Diectomis*. This is why Kunth correctly cited *D. fastigiata* (Sw.) Beauv. The reason for the conservation was perhaps that Kunth's genus is really the one based on *Andropogon fastigiatus* Sw. and that Beauvois' generic diagnosis was in conflict with this. Clayton et Renvoiz (1986) reduce *Diectomis* Kunth (nom. cons.) as a taxonomic synonym of *Andropogon* L. without any comment. We adopt *Diectomis* Kunth, nom. cons. as generically distinct from *Andropogon* L.

*Diectomis fastigiata* (Sw.) Beauv., Essai. Agrost.: 132, 160. 1812; Haines, Bot.: 1042; Mooney, Suppl.: 190; Bor, Grass.: 135.

*Andropogon fastigiatus* Sw., Prodr. Veg. Ind. Occ.: 26. 1788 (as "fastigiatum").

*Type* locality: Africa?
Perennial (often annual) grass with erect or decumbent fastigately branched culms, 30 - 60 cm high. Leaves narrowly linear, acuminate, scabrid, 7.5 - 45 cm long and 1-5 mm, broad, upper leaves rudimentary; leaf-sheaths glabrous; ligule 10 - 13 mm long, acute, elongate. Spathes linear-lanceolate, often very slender, 5-7 cm long; peduncle variable, 0.9 - 7.5 cm long, with cupular tip. Inflorescence a spiciform raceme, 2 (-2.5) - (5-) 7 cm, joints 3 - 4.5 mm long. Sessile spikelets 4.5 - 5.5 mm long. Lower glume linear, acuminate (sometimes appearing 2-cuspidate), upper glume membranous, pointed towards the base 4 x 1 mm, bifid, with a very slender awn; lower lemma with ciliate veins; upper lemma cymbiform, ciliate at margins. Lodicules 2, small, cuneate. Stamens 3. Styles 2, free; stigmas 3, exerted laterally. Grain oblong-obovate, laterally compressed. Pedicelled spikelets neuter; lower glume pubescent, with slender terminal awn, 4-6 mm long; upper glume 4 mm long with 1-4 mm awn, thin, acuminate; lower lemma ca 3 mm long, oblong, hyaline.

Fls. and frts.: Sep. - Dec.

Ecology: Common in arid rocky places and grassy plains.

2n = 20 (Bor, l.c.)

Distribution: India, Burma, Java, China, Africa, Trop. America.

Specimens examined: Koraput Dist.: Laupada (Gandhamardon Parbat), 22 Dec. 1960, P.C. Nanda 2445 (CAL); Aurar, 700 m, in Sonabera, 30 Oct. 1949, Mooney 3693; Sambalpur Dist.: Motijharan hills, 21 Oct. 1947, Mooney 2921; Charmal, 160 m, in Rairakhol, 24 Oct. 1948 (all DD).
Mooney (l.c.) also recorded the species from Gangpur in Sundargarh District; Redhakhol and Bamra in Sambalpur District; Choudhury et Patnaik (1983), from Khandagiri - Udayagiri hills at Bhubaneswar respectively.

Use: Animals relish it as a good fodder grass before theawn formation.


Type: D. sanguinalis (L.) Scopoli, Pl. Carn. ed. 2, 1: 52. 1771 (= Paspalum sanguinale Lam.), (typ. cons.).

Digitaria- Heister ex Fabricius, Enum.: 207. 1759, nom. rej.

Type: non designatus / Paspalum sp. /

Note: Distributed and grassy places, often as pioneers, occasionally vegetation forming, sometimes along beaches, mainly in the lowlands.

Chr. Nos. 2n = 18, 36, 54, 72 (x = 9) (Veldkamp. l.c.)

1a. Rachis triquetrous to narrowly winged, lateral wings less than half as wide as the midrib; abscission of pedicels discoid to cupuliform . . . . . . . D. abludens

1b. Rachis distinctly winged, the lateral wings at least
half as wide as the midrib; abscission of pedicels truncate:

2a. Spikelets in groups of two ('binate') in the whole inflorescence, no trace of arrested spikelets at the base of the pedicels, the solitary ones excepted; abscission of pedicels truncate:

23a. Lower glume absent or very small, less than 0.25 mm long:

4a. Spikelets either homomorphous and all sterile lemma in the second interspace with yellowish bristles (appressed in anthesis !) or heteromorphous; i.e. sterile lemma of the sessile spikelet glabrous and nerves equidistant to slightly pubescent and nerves inequidistant. (The basal spikelets may be homomorphous and glabrous !) .................................................. D. bicornis.

4b. Spikelets homomorphous in the entire raceme, never bristled. ........................................... D. setigera

3B. Lower glume distinct, at least 0.25 mm long:

5a. Spikelets either homosporous and bristled, or heteromorphous. ........................................... D. bicornis

5b. Spikelets homosporous in entire raceme, never bristled. ........................................... D. ciliaris

2b. Spikelets in groups of three ('ternate'), at least in the middle of the racemes; sometimes apparently binate;
the pedicel of the third spikelet apparently solitary (but pedicelled), or pedicels with an arrested spikelet at base; abscission of pedicels discoid to disciform:

6a. Fertile lemma persistently yellowish to brownish in fruit; racemes 2-4, common axis only very rarely developed (up to 1 cm long):

7a. Hairs of spikelets always verrucose ........ D. longiflora

7b. Hairs of spikelets, if any, never verrucose .......... D. stricta

6b. Fertile lemma fuscous to chestnut - coloured in fruit; racemes 2-10(-14), common axis usually well developed, up to 6 (-9.5) cm long :

8a. Distal spicules of pedicel elongated, forming a cornula under the spikelet; upper glume 0.5 - 0.75 times as long as the spikelet ........ D. ternata

8b. Spicules of pedicel minute, not forming a cornula; upper glume 0.9 - 1 times as long as the spikelet. .......... D. violascens

Digitaria ablundens (Roem. et Schult.) Vald., Blumea 21: 53, f. 110, 12. 1973; Saxena et al., Ind. J. For. 5 (2) : 103. 1982;


Type: India, Heyne s.n. in Hb. Roth (B, holo; BM)

Paspalum granulare Trin. in Spreng., New Entd. 2: 47. 1821.

Digitaria granularis (Trin.) Henr., Mono. Dig.: 302, fig. 891. 1950; Bor, Kew Bull. 1954: 547. 1954; et Grass.: 301; Panigrahi et al., ESI 6: 232.


Type: Roxb. s.n. (BM) holo, (K), Icon. f. 816 (K).

Digitaria pedicellaris (Trin. ex Hook.f.) Prain, Bengal Pl.:1183. 1903; Haines, Bot.: 1009; Mooney, Suppl.:172;

An erect slender herb with tufted stems, leafy, branched from the base, 15 - 45 (-75) cm tall. Leaves narrowly linear-lanceolate, flat or rolled, 5-15 cm x 2 (-2.5) -4 (-6) mm, finely acuminate, margins minutely scabrid; sheath narrow, the lower hairy; ligules short, scarious. Inflorescence of 5-10 spikes or racemes on slender peduncle, lax, slender, 2.5 - 10 cm long; rachis very slender, triquetrous; pedicels 2-5-nate, unequal, slightly swollen at the tip, scaberulous. Spikelets 1.25 - 2.5 mm long, elliptic, acute, mucronate, spaced, the upper conceals the lower spikelet in length. Lower glume absent, upper 1 mm long, elliptic, acute or ovate-oblong, membranous, 5-nerved; lower floret sterile; lemma 1-1.25 mm long, membranous, ovate-oblong, acute, coriaceous, brownish or yellowish, mucronate, margins incurved, 5-nerved, pubescent; upper floret hermaphrodite. Anthers purple, 0.4-0.65 mm long.

Ecology: Common in forests, fields, foot hills and in crevices of rocks.

$2n = 36$ (Gupta et Shrivastava, 1969; Gupta, 1969).

Distribution: Throughout India, Pakistan, Nepal, Burma, to Malesia, Thailand, Indonesia to Philippine and New Guinea.

Specimens examined: Ganjam Dist.: Paralakhemundi, Sep. 1903, Burkill, Candler, Grant 20543 (BSIS), Bharanvariya, 17 Oct. 1930, Narayanaswamy 4667; Askali, 19 Sep. 1932, sine lect s.n. [Accn. No. 85392 (both MH)]; Sambalpur Dist.: Kanchanpur in Redhakhol, 26 Jul. 1941, Mooney 1795; Dhenkanal Dist.: Dhenkanal hills, 29 Aug. 1946, Mooney 2718 (both DD).

Panigrahi et al. (l.c.) from Melda in Sambalpur District; Saxena (l.c.) from Bhubaneswar and Choudhury et Patnaik (l.c.), from Budheswar Colony, Bhubaneswar in Puri District respectively.

Digitaria bicornis (Lam.) Roem. et Schult. ex Loud., Syst. 2: 470. 1870; Bor, Grass.: 297; Veldk., Blumea 21 (1): 30, fig. 3C, d. t. l. 1973; Cope in Nasir et al., Fl. Pakistan 143: 230.1982.

Paspalum bicornum Lam., Encyclop. 1: 176. 1791.

Type: India; Sonnerat in Hb. Lamarck (P, holo).


Annual. Culms rooting at the nodes, forming loose mats; flowering culms ascendingly erect, up to 60 cm high; cataphylls absent; sheaths moderately pilose to glabrous; ligule 1-3.5 mm long, truncate, erose. Blades linear, 2.5 - 13.5 (-23) cm long, patent to ascending, soft, usually scabrous on both sides. Peduncle up to 40 cm long, glabrous. Racemes 2 - 5 (-10), longest 3.5 - 14.5 cm long; rachis winged, serrate; spicules rarely with some setae at base ('rachiseta'); abscission of pedicels truncate. Sessile spikelets glabrous to slightly pubescent; the pedicelled ones pubescent, lanceolate, 2.75 - 3.5 mm long; hairs smooth, acute. Lower glume very variable, 0.15 - 0.4 (-0.75) mm long, acute to bifid; upper glume 1 - 2.75 mm long, 0.35 - 0.8 times as long as the spikelets, nerves 3, sterile lemmas as long as the spikelet, that of the sessile spikelet usually glabrous and equidistantly 7-nerved; fertile lemma slightly shorter than the spikelet, yellowish in fruit. Anthers 0.5 - 0.6 mm long, purple. Stigma purple.

Fls. and frts.: Jun. - Nov.

Ecology: In fallow fields, wet places, along the shores and dunes.

2n = 72 (Reeder, 1967).

Distribution: India, Tropics and sub-tropics, throughout Malesia, rare in Africa.

Specimens examined: Koraput Dist.: Gunupur, 18 Jul. 1949, Mooney 3538 (DD); Puri Dist.: Puri beach, 3 Jun. 1926, sine lect

Jain et al. (1979), however, treat as two distinct species D. bicorns and D. biformis, record occurrence of both from Orissa without citing specific locality.


Syntypes: Java et China, Wennerberg s.n. in Hb. Retz. Canton (LD).

Digitaria adscendens (H.B.K.) Henr., Blumea 1 : 92. 1934; Bor. Grass. 298.


Type: Guayaquil, Mexico, Humboldt s.n. (P, holo; lecto, Hb. Willd. 1663 1, B; BM).


Type: "Habitat in Brasilia" Cult. Hb. Link 97 (B, holo; left side of sheet).


Type localities: "Habitat in Brasilia".

Type locality : "Habitat in China ".

D. sanguinalis Scop. var. ciliaris (Retz.) Hook.f., FBJ 7 : 15. 1897; Pandgrahi et al., BBSI 6 : 263.

D. sanguinalis Scop. f. ciliaris (Retz.) Hook.f. ex Haines, Bot.: 1008.

Annuals or short living perennials, without cataphylls. Stems tall, 90 cm long or more, slender, ascending from a geniculate or prostrate, branched, rooting bases, glabrous. Leaves 5 - 25 cm x 0.2 - 0.9 cm, linear or linear-lanceolate, acute, flat, with scabrous margins; sheaths long, loose. Spikes few (3-8), 7.5-15 cm long; rachis distinctly winged. Spikelets binate in the whole inflorescence, 2.5 - 4.5 mm long, homosporous in entire raceme, never bristled; pedicels twin, one short, the other much longer, triquetrous with scabrid margins; abscission of pedicels truncate. Glumes 4; the lower glume distinct, at least 0.25 mm long; the upper involucre glume about 1/2 as long as the lower floral glume, membranous; the lower floral glume ovate, acute, membranous, 3-5-nerved; the upper floral glume as long, subchartaceous; barren lemma similar to the upper glume and like it with lines of fine appressed, ultimately spreading hairs between the nerves. Grain ovalong, whitish.
Ecology: A weed of abandoned fields and waste lands of sandy floor and on meadows.

Distribution: Throughout India, Pakistan, tropics and subtropics, throughout Malesia, rare in Africa.

Specimens examined: Ganjam Dist.: Chatrapur, Jul. 1904, Fischer 33 (CAL); Mahendragiri, 1580 m, 17 Aug. 1931, Narayanaswamy 5749 (MH); Kalahandi Dist.: Shembageni, 2100 m, Oct. 1955, sine lect 15; Kanghatta, 22 Jul. 1956, S.K. Mukherjee 4323; 23 Sep. 1956, S.K. Mukherjee 4410; Sambalpur Dist.: Sambalpur, sine lect s.n. (Accn. No. 518340 – all CAL); Khandijharan, 7 Nov. 1959, Panigrahi 20920 (CAL); Sambalpur, 20 Sep. 1940, Mooney 1381 (DD); Puri, Walsh s.n. (CAL); Cuttack Dist.: Ravenshaw College Campus, south of Botany Department, 20 Jul. 1925, sine lect 2 (Rev.Coll.Herb.); Lion’s rump, 13 Feb. 1961, Panigrahi 23824; Jatadhar Muhano, 16 Feb. 1961, Panigrahi 23871 (both ASSAM); Sandapur, 19 May 1966, M.K. Ghosh 156 (CAL).

Fischer (l.c.) recorded it from Ganjam; Saxena et al (1983), and Behera et al. (1979) from Bhubaneswar and Udayagiri in Puri District.

Use: It is used in India as a good fodder.

Note: D. ciliaris (Retz.) Koel, a polymorphic widely spread tropical weed had previously been known as D. adscendens (H.B.K.) Henr., The type species of Panicum ciliare Retz. has only recently been
found and this unfortunately necessitates a name change in this common species and is now known as *Digitaria ciliaris* (Retz.) Koel.


**Type**: India, Koernig, sub *Milium setaceum* (LD, holotype, MB, K).

(Or.: Duba)

Stems slender, creeping and rooting base, ascending or suberect, 15-45 cm, glabrous with many nodes, leafy. Leaves 1.25 - 10 cm x 0.2 - 0.4 cm, linear-lanceolate, acute, spreading, flat or in short-leaves, pungent, glabrous, rarely hairy; sheaths rather tight, smooth or hairy; ligule very short, truncate, membranous. Racemes 2-10 (-14), terminal, very slender, 2.5 - 10 cm long, erect or spreading; rachis distinctly narrowly winged, glabrous, the lateral wings at least half as wide as the midrib; pedicels 2- (rarely 3-) nate. Spikelets 1.3 - 4.7 mm long, elliptic to elliptic-oblong, appressed to the rachis, obtuse, puberulous to pubescent. Lower glume absent or rudimentary; upper glume as long as the spikelet, sterile lemma with 5 - 7 inequidistant nerves, fertile lemma persistently yellowish to brownish in fruit; lower floral glume similar and subsequent to the upper glume, 3-5-nerved, upper floral glume subchartaceous, ovate-oblong, slightly shorter
than the lower, pale brown, smooth; palea with inflexed flaps. Grain ellipsoid, whitish.

Fls. and frts.: Probably throughout the year.

Ecology: On sand dunes or rocky beds towards river side.

$2n = 18$ (Bor, l.c.)

Distribution: Throughout India, Tropical and subtropical regions of the whole world, throughout Malesia, introduced into the New World.

Specimens examined: Koraput Dist.: Gunupur, 850 m, 19 Jul. 1949, Mooney 3541a (DD); Ganjam Dist.: Kaliamba, Dec. 1889, Gamble 21629 (DD); Sambalpur Dist.: Mehadeojharan, Panigrahi 20845 (CAL); Puri Dist.: Balugaon, Chilka Lake, 8 Aug. 1913, D. Hooper 39516 (CAL); Cuttack Dist.: Ravenshaw College Campus, Cuttack, 20 Jul. 1925, sine lect 4 (Rev. Coll. Herb.); Hukitola P.F., 29 Jan. 1961, Panigrahi 23477 (CAL); Jatadh&R Muhana, 1 Feb. 1961, Panigrahi 23903 (ASSAM); Chamundis Mahanadi, 20 Mar. 1943, K. Biswas 6255 (CAL); Hulem, 26 Jul. 1958, D. Chatterjee 767 (CAL); Orissa, sine loc., 20 Apr. 1965, Abraham 357 (CAL); Mahenuddee, 10 May 1850, Hook.f. & Thomson s.n. (K, CAL).

Mooney (l.c.) recorded its occurrence from Champua, 470 m, in Keonjhar District and Saxena et al (1982), from Bhubaneswar in respectively.

Uses: Grown for rapidly covering disturbed places, but not well resistant against extremely dry or wet weather. Also a good
fodder grass.


var. setigera

Type: India orientalis, Heyne s.n. in hb. Roth (B, holo; K).

Panicum pruriens Fischer ex Trin., Diss. Alt.: 77. 1826.

Type: Langsdorff s.n. in Hb. Trinius (LE, holo; lecto, BM); Chamisso s.n. in Hb. Trinius (LE, K; MAU).


Panicum sanquinale var. extensum Hook.f., FBI 7: 15. 1896.

Type: Wight Cat. 2340 (K, holo; MB).

D. sanquinalis Scop.f. extensa (Hook.f.) Hook.f. ex Haines, Bot.: 5: 1007.

Stems decumbent and creeping at the base, branched, nodes few. Leaves 2.5 - 15 cm x 0.4 - 0.6 cm, linear-lanceolate, very acute; sheaths rather loose and more or less hirsute especially the lower; ligules membranous, 2 mm long, truncate. Inflorescence a panicle of 3-9(-12) false spikes, erect, contracted, green; rachis narrow, 0.3 - 0.5 mm, flexuous, distinctly winged; pedicels 2-nate, the smaller 0.5 mm long, the other 2.2 - 2.5 mm long; abscission
of pedicels truncate. Spikelets binate in whole inflorescence, 3 mm long, linear-lanceolate, or lanceolate-elliptic, acute, appressed. Lower glume very small or absent, if present, less than 0.25 mm long; upper glume 0.8 - 1.2 mm long, oblong, 3-nerved; lemma of lower floret 3 mm long, linear-lanceolate, acute, 7-nerved; palea absent; upper floret hermaphrodite; lemma coriaceous and finally white, cartilaginous, glebrous, 2.8 mm long, convex elliptic-lanceolate, acuminate; palea of the same texture as the lemma, 2.8 mm long.

Fls. and frts.: Aug. - Dec.

Ecology: On wet places, up to 2750 m.

Distribution: India, Pakistan, Nepal, Burma, and Sri Lanka to Pacific, N. Australia, Kermadec Isl., throughout Malesia, introduced elsewhere, e.g. Honduras, Costa Rica, Jamaica, Surinam, Oman, Africa.

Specimen examined: Sambalpur Dist.: Khandijharan, 7 Nov. 1963, Panigrahi 20930 (CAL).

Kapoor (1964) recorded its occurrence from Mahendragiri Hills in Ganjam District.

Use: A good fodder liked by animals.

Note: Chase and Mile (1962) pointed out that "the description of D. setigera Roth ex Roem. et Schult. is identical with Roth's, published later (1821) but notes differ in wording".

According to Henrard, Monogr. Digitaria: 685. 1950, Roth
included a specimen D. horizontalis Willd. in his description but his name 1821 is invalidated by Roem. et Schult. (1817).

Bor, in his letter of June 9, 1953, examined Roth's specimen from Berlin, and reports "it is what we have been calling D. corymbosa (Roxb.) Mans. "Z. Roxb., 1820." 


Type: "In India, orientali", Heyne (B). 


Digitaria royleana (Nees ex Hk. f.) Prain, Beng. Fl.: 1182. 1903; Haines, Bot.: 1008; Mooney, Suppl.: 171.

var. stricta

Annual. Stems geniculate at the base, tufted, 40 - 50 (-60) cm tall, very slender, smooth, glabrous. Leaf-blades linear to lanceolate, tapering gradually to a fine point, flat, flaccid, usually 6 - 30 cm long, midrib prominent, margins minutely scabrid; sheaths rather loose, striate; ligules reduced to amembranous rim, rounded, membranous, ciliate or not. Inflorescence a panicle made up of 3 - 15 racemes, usually alternate; racemes 14 - 18 cm long (in robust specimens up to 20 cm), ascending, finally recurved;
rachis flat, flexuous, winged, pedicels 1-3-nate, usually 2-nate, spicules of pedicels 1.25 mm long. Spikelets 1-1.25 mm long, elliptic, laterally oblong, acute, very numerous. Lower glume absent; upper glume absent or represented by a few hairs; lower floret neuter; lemma membranous, equalling the spikelet in size and shape, hyaline; palea absent; upper floret hermaphrodite; lemma subcoriaceous, brown or black, longitudinally spicate, elliptic-oblong, subacute, margins overlapping.

Fls. and frts.: Sep. - Jan.

Ecology: On open grassland and on forest roads.

Distribution: Throughout India, Pakistan, Nepal, Burma, Sri Lanka, and Oman, Africa.

Specimens examined: Sundargarh Dist.: Chhatam, 450 m, Gangpur. 3 Nov. 1947, Mooney 2942 (DD); Sambalpur Dist.: Malda, 1 Nov. 1959, Panigrahi 20676 (CAL).

Note: This species, the typical form of which is extremely common in India and which is distinguished by a dense covering of clavate hairs on the spikelet. Cope (1932) states that var. glabrescens occurs only in Pakistan, but there is a specimen of Mooney deposited in DD from Sambalpur.

It can be easily distinguished from D. longiflora by the mealy pubescens on the lower lemma and on the upper glume if present.

Digitaria ternate (A. Rich.) Stapf ex Dyer, Fl. Cap. 7: 376. 1898; Bor, Grass.: 306.

Type locality: Abyssinia


Annual. Stems 60 - 100 cm high, tufted, slender, erect from a geniculate base. Leaves up to 25 cm long, linear to linear-lanceolate; mouth of the sheaths ciliate; ligules membranous.
Racemes 2-14, in a pyramidal panicle; rachis narrowly winged.
Spikelets 2-3-nate, 2.3 mm or more long, closed appressed to the rachis; pedicels shortly hairy towards the tips. Lower glume very small or 0; upper tender, 3-veined, the sides villous with clavate hairs; barren lemma similar to the upper glume. Stamens 3. Styles 2, distinct. Grain oblong.

Fls. and frts.: Sep. - Dec.

Ecology: In waste places.

Distribution: India, (Assam, Meghalaya, Nagaland, Orissa, Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra), Burma, China, Tropical East and South Africa, Abyssinia.

Specimen examined: Cuttack Dist.: Ravenshaw College Compound, Cuttack, 20 Jul. 1925, sine lect 4 (Rev. Coll. Herb.).

Use: A good fodder.

Annual. Culms up to 45 cm long, from a prestrate and straggling base, rooting at the nodes, smooth and glabrous. Leaf-blade 6-20 cm long, 4-7 mm wide, linear to linear-lanceolate, tapering to a very fine point, somewhat rough on both surfaces, flat, faccid; sheaths rather loose; ligules short, membranous, truncate. Inflorescence made up of 2-10 (-14) spikes or racemes, very often subdigitate, slender, 8-13 cm long, erect or slightly curved outwards, common axis usually well-developed, up to 6(-95) cm long; rachis 0.8 mm wide; peduncle 2-nate, one larger than the spikelet and the other shorter. Spikelets ternate, sometimes apparently binate, elliptic-oblong, acute, puberulous to pubescent, at least along the margins of the upper glume and sterile lemma, 1.2 -1.7 mm long; fertile lemma fuscous to chestnut coloured; spicules of pedicels minute, not forming a corunula. Lower glume very short or absent; upper glume 0.9 - 1 time as long as the spikelet, 1.2-1.7 mm long, convex, ovate-oblong, silky, hairs thin and appressed; lower floret sterile; upper floret hermaphrodite, 0.8 - 1.5 mm long, oblong-lanceolate, acute; palea a little shorter than the lemma, of the same texture and substance; margins strongly incurved.
Ecology: In moist open ground.

n = 36 (Hern, 1971).

Distribution: Throughout India, Pakistan, Burma, Sri Lanka, Trop. and subtrop. Asia, Australia and America, introduced and naturalized in Tanzania.

Specimens examined: Ganjam Dist.: Ganjam, 1889, J.S.Gamble 21629 (MH, K); Mahendragiri, 1500, Narayanaswami 5746 (MH); Sambalpur Dist.: Malda, 1 Nov. 1950; Pandigrahi 20636 (CAL).

New Record for Orissa.

Note: *D. violascens* Link is closely allied to *D. longiflora* (Retz.) Pers. The two species intergrade to some extent, and there are no infallible characters for separating them. Typically *D. violascens* is a more erect plant with 3 or more slender racemes, scabrid pedicels, a small upper glume (commonly 3-nerved and noticeably shorter than the spikelet) and a dark-coloured fruit.

1a. Upper glume awned; racemes solitary; anthers 0.9 mm long;
2a. Upper glume not winged along the back, if winged at all, at the tip only; culms 12 cm tall; leaves 1.5 - 2 mm broad; ligule 1 mm and anthers 0.5 mm long. ........................................... D. acutipes

2b. Upper glume winged from base to apex; culms more than 12 cm tall; leaves 2-3 mm broad; ligule 0.5 - 6 mm and anthers 0.8 - 0.9 mm long:

3a. Leaves up to 8 cm long; rachis of the racemes flat on the back, winged, ciliate on the margins, 0.75 mm wide; callus very short; pedicels compressed, narrowly oblong, acuminate, thickly ciliate along the keel; upper glume elliptic, acuminate, tip recurved, with distinct corky wing. ..................................... D. lawsonii

3b. Leaves up to 5 cm long; rachis of the racemes very narrow, 0.4 mm long; callus up to 1.5 mm long; pedicels obconic, truncate, bearded at the tips; upper glume oblong, acute, strongly compressed; tip not recurved, glabrous, with papery wings. ........................................... D. avenacea

1b. Upper glume awnless, sometimes mucronate; racemes more than 1; anthers less than 0.5 mm long:

4a. Perennials; leaves up to 16.5 cm long; rachis undulate or zig-zag:

5a. Leaves glabrous or nearly so; racemes 1-10; spikelets sessile; upper glume with a broad papery wing; anthers 1-1.5 mm long. ........................................... D. lehmanii
5b. Leaves covered with bulbous-based villous hairs on both the surfaces; racemes 2, rarely solitary; spikelets pedicelled; upper glume without a wing or the wing confined to an area just below the tip; anthers ca 2 mm long. ...................................................... D. trimeni

4b. Annuals, leaves up to 7.5 cm long; rachis straight or flexuous:

6a. Upper glume not winged; plants up to 50 cm tall. .................................................... D. ornithopoda

6b. Upper glume winged all along or at least at the tip; plants up to 25 cm tall:

7a. Upper glume narrowly winged all along the keel; rachis narrow, 0.75 mm wide; racemes rarely divergent; spikelets 3.5 - 4 mm long. ..................................................... D. connivens

7b. Upper glume broadly winged on the keel; rachis broader, 1 - 1.25 mm wide; racemes usually divergent:

8a. Wing of the upper glume corky; lower glume 5 mm long; sheaths loosely clasping the stem; spikelets up to 6.5 mm long; pedicels 0.5 - 0.75 mm long; anthers 1 mm or more in length. ..................................................... D. mooneyii

8b. Upper glume winged just below the tip only; lower glume 3 mm long; sheath lightly clasping the stem; spikelets up to 4.25 mm long; pedicels 0.5 mm or less in length; anthers less than 1 mm long. ..................................................... D. orissae
PLATE - 10

TYPE

Dimeria acutipes Bor.

Type: Ind. Or.: Madras paddy fields, Sep. 1898, Bourne 35 (K, holotype).

Annual grass with culms arising from the base, up to 12 cm tall, very slender, terete, smooth, bearded at the nodes. Leaves 3-4 cm long, 1.5 - 2 mm broad, linear-acuminate, minutely scabrid, either thickly villous with white, tubercle-based hairs; ligule 1 mm long, membranous, truncate, ciliate on the margin. Inflorescence a solitary raceme, 30 cm long; rachis narrow, flat, 0.3 mm wide, much narrower than spikelets; pedicels flat, articulated, densely bearded on the outer edge. Spikelets 4-5 mm long (excluding the awn), linear-oblong, much compressed; callus 1.5 mm long, densely bearded with golden hairs. Lower glume 4 mm long, ending in a very short arista; upper glume 5 mm long, long-awned, hyaline on the margins, not winged; lower floret empty; lemma oblanceolate, 1.5 - 2 mm long, ciliate on the upper region; palea absent; upper floret bisexual; lemma 3.5 mm long, elliptic-obtuse; awned in the sinus; palea absent; awn ca 15 mm long. Stamens 2, anthers ca 0.5 mm long. Styles 2; stigmas plumose (Fig. 11).

Fls. and frts.: Sep. - Dec.

Ecology: Found in fairly well saturated moist situations and paddy fields.

Distribution: India (Orissa, Tamil Nadu), Endemic.
Note: Bor (l.c.) recorded this species endemic to Madras only, but its occurrence in Orissa extends the range of distribution towards the eastern India.


**var. avenacea**


Type: India, Tranquebar, Koenig (LUND).


Type: Ceylon: 'Hab. Kokotodua, Garnder' Thwaites ('C.F.957').

Annual grass with culms 15 - 22 cm high, filiform, smooth and glabrous, very leafy on the lower half, minutely bearded at the nodes. Leaves 2.5 - 5 cm long, 2 - 2.5 mm wide, linear, acuminate, glabrous or minutely scabrid on both the surfaces and on the margins; sheaths keeled, glabrous, hyaline on the margins; ligule 0.5 - 0.6 mm long, membranous. Inflorescence a single raceme, 2 - 4.5 cm long, terminating the long exerted peduncle; rachis narrow, 0.4 mm wide; pedicels obconic-truncate, bearded at the tips, 0.5 mm long. Spikelets 1 mm long (excluding the awn); callus more or less flattened or ciliate on the 2 edges and at the base.
Lower glume 6 mm long, rounded, coriaceous, coarsely scabrid near the tip; upper glume 9 mm long, oblong, acute, strongly compressed, smooth and glabrous, broadly winged from base to apex, wing papery, scabrid on the free edge; lower floret empty; lemma 2.5 mm long, extremely narrow, oblanceolate, ciliate on the upper margin; palea absent; upper floret bisexual; lemma oblong, acute, shortly bifid at the tip, hyaline, glabrous, 3.5 mm long; awn 13 mm long. Lodicules 2, minute. Stamens 2; anthers 0.8 mm long. Styles 2; stigmas plumose.


Ecology : In wet localities.

Distribution : India (Orissa, Andhra Pradesh, Tamil Nadu), Sri Lanka.

Specimen examined : Nil.

Fischer (l.c.) and Kapoor (l.c.) recorded it only from Mahendraigiri hills in Ganjam District.


Type : Bihar : "Ranchi, 600 m, annual, Bihar and Orissa. Found in grassy glades in the forest and in pasture land. 25 Oct. 1873, C. B. Clarke 20607 A (K) ".

Tufted annual with leaves mostly at the base of the stem. Stems ascending, 10 - 25 cm high, nodes minutely bearded. Leaves linear,
1.25 - 7.5 cm long, up to 3.8 mm broad, linear, acuminate, with tubercle-based hair, chiefly on the margins. Raceme more than one, rarely divergent; spike 2.5 - 3.8 cm long, erect, parallel; rachis flattened, straight or flexuous, narrow, 0.75 mm wide, ciliate. Spikelets 3-4 mm long excluding the 7.5 mm long awn; callus minutely villous. Lower glume very slender, shorter than spikelets, finely pointed, dorsally sparsely ciliate; awn as long as the spikelet; upper glume as long as the spikelets, oblong-lanceolate, acuminate, 1 mm broad, finely pointed, narrowly winged, all along the keel, ciliate, awnless, sometimes mucronate; upper lemma hyaline, 2-fid. Lodicules 2, minute. Stamens 2. Styles 2; stigmas plumose. Grain 2.5 cm long, linear, slightly curved.


Ecology: Growing on grassy glades.

Distribution: India. Endemic?

Specimens examined: Koraput Dist.: Sonabera, 650 m, 29 Sep. 1949, Mooney 3658 (DD); Sambalpur Dist.: Rengali fire lines, Jan. 1917, H.H. Haines 5303 (CAL, K); Barapahar hills, Lahra Behera, 210 m, 20 Sep. 1949, Mooney 3610 (DD); Sambalpur, 200 m, 5 Sep. 1940, Mooney 1830 (K); Motijharan hills, 200 m, 30 Nov. 1947, Mooney 2981 (CAL, K); Satyamaha, 7 Nov. 1959, Pardhara 20952 (CAL); Keonjhar Dist.: Bhotadih, 100 m, in Sirkagutu, 3 Oct. 1940, Mooney 2794 (K, DD);

Note: Bor (1952) reports that the type is at Kew and bears the following in Hackel's handwriting, "mingled with other grasses..."

P. pusilla Thwait. var. lawsonii Hook.f., FBI 7 : 103. 1896.  

Type: Madras State, Wynaad, 24 Nov. 1888, Lawson 22 (K).  

Annual. Culms up to 26 (-30) cm tall, slender, leafy, smooth, glabrous; shortly bearded at the nodes. Leaves up to 8 cm long, 2 - 3 mm broad, linear, acuminate, glabrous, bulbous - based hairs on the lower third of the upper surface, minutely scabrid; sheaths very loose, glabrous, striate, obscurely keeled; ligule an opaque, ciliate, lacerate membrane, 0.5 mm long. Raceme usually solitary 1.75 - 3.5 cm long, terminal pedicels compressed, narrowly oblong, acuminate. Upper glume 5.5 mm long, 1.6 mm wide, with distinct corky wing, elliptic-acuminate, keeled, densely ciliate all along the keel; lower floret empty; lemma an oblanceolate, hyaline scale, 2-3 mm long; upper floret bisexual; 2.5 - 3.25 mm long, 1 mm broad, oblong, with an obtuse bifid tip; awn 3.5 mm long. Lodicules 2, small. Stamens 2; anthers 0.8 - 0.9 mm long. Styles 2; stigmas plumose.  

Fls. and frts.: Sep. - Dec.  

Ecology: In the crevices of granite rocks in moist situations.  

Distribution: India (Orissa, Tamil Nadu, Karnataka, Kerala).
Endemic.

Specimen examined: Nil.

Saxena and Brahman (l.c.) recorded its occurrence only from Mahendragiri hills in Ganjam District.

Note: Bor (l.c.) recorded it endemic to Madras only though it occurs in other places of South Indian viz. Malabar and Karnatak. Its occurrence in Orissa is a further extension towards eastern region.

Dimeria lehmanii (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6: 82. 1889; Raizada, JBNHS 58: 679. 1949; Bor, Kew Bull. 1952: 587. 1953, et Grass. : 142.


Type: "Ind. Or." Ceylon, Thwaites 952 (K)

A perennial grass with culms 25 - 45 cm tall. Leaves 2.5 - 16.5 cm long, glabrous or nearly so. Racemes 1-10, 2-to 3-nate, rachis undulate, 5 - 12.5 cm long, straight or flexuous, glabrous, flattened or triangular in section; spikes slender, spreading. Spikelets sessile, 4 - 7 mm long, often acuminate or acute, ciliate, sometimes narrowly winged at apex, pale, often reddish to dark brown, awn 7.5 - 8 mm long; rachis ciliate to densely pilose on the margins, flattened; callus very shortly bearded. Lower glume 2.5 - 3 mm long, narrowly linear, sub-acute to obtuse; keel ciliate; upper glume with a papery wing. Lodicules 2. Anthers 1 - 1.5 mm long;
stamens 2. Styles 2, distinct; stigmas plumose.


Ecology: Growing in the dry hilly tracts.

Distribution: India (Orissa, Tamil Nadu), Sri Lanka.

Specimen examined: Koraput Dist.: Sonabera, 800 m, bordering Khariar, 29 Sep. 1949, Mooney 3658 (DD).

Dimeria mooneyi Raizada ex Mooney, Suppl. Bot.: 263; Bor, Grass.: 142.

Holotype: Orissa: Southeast of Sambalpur district, close to Sonabera village, 700 m, in crevices of massive quartzite outcrop, Sep.-Oct. 1949, H.F. Mooney 3652, H.F. Mooney 3657 (K, DD)

Annual grass, with stiff, slender stem, up to 16 cm tall; nodes glabrous. Leaves erect, linear, acuminate, base rounded, margins with tubercle-based villous hairs, otherwise glabrous on both surfaces; sheaths loose, the upper most spathiform, the lower short, striate; ligule very short, ciliate. Inflorescence of 2 racemes, 5 cm long, silky; rachis linear, 1.5 mm broad, winged, green; pedicels 0.5 - 0.75 mm long, thick. Spikelets 7.5 - x 2 mm; callus 1 mm long, densely bearded. Lower glume 5 mm long, strongly compressed, keeled, lower 2/3 thickly winged, ciliate, bearded at the base; upper glume 6.5 mm long, oblong, strongly compressed, keel broadly winged, hairy above, margins hyaline, ciliate; lower floret empty; lemma 3.5 mm long, oblong, hyaline, ciliate on the margins; palea absent; upper floret bisexual; lemma 4.25 mm long,
PLATE - 11

**TYPE**

![Image of Dimeria mooneyi](image)

Phlb

11-Dimeria mooneyi Raizada ex Mooney.
Plate 12

Dimeria orissae Bor.
hyaline, apex cleft, 2-lobed, with an awn 10 mm long, arising from the sinus; palea 1.5 - 2 mm long, very narrow. Lodicules 2, minute, triangular. Stamens 2; anthers 1.75 mm long. Styles 2 (Hatam, Pw 12).

Fls. and frts.: Sep. - Dec.

Ecology: In the crevices of granite and quartzite rocks of arid habitats.

Distribution: India (Orissa, Madras, Karnataka). Endemic.

Specimens examined: Koraput Dist.: Sonabera, 800 m, Khariar, Sambalpur, 29 Sep. 1949, Mooney 3652, 3657 (DD, K); near Raisilli Village, 1000 m, not far from Laxminpur, 25 Oct. 1950, Mooney 4390 (K, DD).

Note: A species close to D. avenacea (Retz.) C.E.C. Fischer, but is distinct with solitary spikes.


Type: Orissa: Keonjhar State, Pipokhuri, 1000 m, in Sal forest undergrowth, 1 Oct. 1946, H.F. Mooney 2758 (K).

Annual grass with slender unbranched culms, to 22 cm tall, closely invested with the sheaths, glabrous at nodes. Leaves 3-7 cm long, 2-3 mm broad, linear, acuminate, erect, with tubercle-based hairs on the margins, scabrid; sheaths tightly clasping the stems, keeled in the upper half; ligule a short lacerate membrane, ca 0.5 mm long. Inflorescence consisting of 2 terminating racemes, 3-5.5 cm long, with a broadly winged rachis, 1.25 mm broad; pedicels 0.5 mm
long; rachis straight, scabrid on the margins. Spikelets 4 - 4.25 mm long, compressed, awned, not winged. Lower glume 3 mm long, linear, acute, compressed; upper glume 4 mm long, strongly compressed, strongly keeled, scabrid, hyaline on the margins, flat on the back; lower floret empty; lemma a minute hyaline scale, 2 mm long, oblancoolate, acute, margins ciliate above; palea absent; upper floret bisexual; lemma 2 mm long, elliptic, acute, hyaline, with 2 short, lobes, awned at the sinus; palea absent. Stamens 2; anthers 0.5 mm long. Styles 2 (Pl. 12, Photo 13).

Fls. and frts.: Sep. - Dec.

Ecology: A subgregarious grass growing on shallow grassy depressions of the sal forests under shade and on the thin soil caps of the hills in Koraput district where it grows gregariously.

Distribution: India (Orissa). Endemic.

Specimens examined: Koraput Dist.: Malakotta Parbat, Nelpada, 1300 m, near Pottangi, 8 Oct. 1950, Mooney 4039 (DD);

Bor (l.c.) recorded it from Laxmipur in Koraput District. (Mooney 4212, K.).

Note: This species is very much closely related to D. connivens Hack., but can be distinguished in the absence of the broad wing to the upper glume of that species, the glume bears a conspicuous wing at the tip only.

Dimeria ornithopoda Trin., Fund. Agrost.: 167, t. 14. 1820; Haines, Bot.: 1015; Mooney, Suppl.: 192; Bor, Kew Bull. 1952: 572, Pl. 5,
Fl. Ind. 1 : 260. 1820, nom. illegit., non Pers. (1805).


Type : "India, Bengal, (same as for Andropogon filiformis Roxb.)"

Dimeria tenera Trin. in Mem. Acad. Petersb., ser 6, 2 : 335. 1832;
Mooney, Suppl. : 191.

Syntype = localities : "V. spp. Manill. et Nepal."

var. ornithopoda

A slender tufted annual, 7.5 - 50 cm high. Leaves 2 - 7.5 cm long, 2.5 - 5 mm wide; linear, finely acuminate, hairy or ciliate; sheaths hairy or glabrous. Inflorescence 3 - 3 spiciform racemes, very slender, 1.25 - 3.75 (-5) cm long; rachis slender, flexuous, 0.75 mm wide, stout, angular, sometimes keeled on one face. Spikelets 1 - 3.5 mm long, linear, acuminate, with a penicile of hairs at their base; callus villous with short, white hairs. Lower glume ca 2.5 mm long, slender, linear, acute; upper glume 2.5 - 5 mm long, linear, acuminate, coriaceous, with hyaline margins, pubescent on the back, not winged; lower - lemma ca 2.4 mm long, linear, acute; upper lemma 1.25 - 1.7 mm long, very narrow, hyaline, with a terminal awn 6.25 - 10 mm long; palea absent. Grain 1.7 mm long, linear.
Fls. and frts.: Sep. - Nov.

Ecology: Growing on rocks in moist depressions.

Distribution: Throughout India, Tropics of Asia and extending up to Australia.

Specimens examined: Koraput Dist.: Malakotta Parbat, 8 Oct. 1950, Mooney 4040 (DD); Koraput Dist.: Champabandha Mali, 1200 m, Gunupur, 20 Dec. 1948, Mooney 3191 (K, DD); Bolangir Dist.: Patna, 8 Nov. 1959, Panigrahi 20976 (CAL); Sambalpur Dist.: Garpati Forest, near Gumloi, 21 Oct. 1947, Mooney 2918 (K, DD), 2210 (DD); By the side of Kholgaon - Larsara Road, near Kholgaon, 26 Oct. 1947, Mooney 2922 (K, DD); Puri Dist.: Khordsa, 1889, Walsh s.n. (K, DD); Puri beach, 18 Dec. 1936, sine lect s.n. (Accn. No. 630 - Rev. Coll. Herb.).

Note: Bor (1953) who examined the type of Dimeria tenera Trin. at Kew, merged as conspecific with D. ornithopoda Trin. var. genuina Hack. (= var. 'ornithopodas') and stated D. ornithopoda Trin. is a taller and more lax plant than D. tenera . . . . these can not be satisfactorily separated even as varieties.


D. ornithopoda var. V. Trin. Mss.

Type: "Hab. ? (Trimen) Elpiliya Patana (Pearson)"
Perennial grass with stout culms, up to 80 cm tall, erect from the base, profusely branched. Leaves up to 15 cm long, 5 mm broad, linear, acuminate, erect, covered with bulbous based villous hairs on both the surfaces; sheaths tightly clasping the culms; ligule 0.5 - 1 mm long, membranous, truncate or rounded above. Inflorescence of twin racemes, rarely solitary, 6.5 cm long, terminal, smooth, glabrous; rachis 1 - 1.5 mm wide, flat on the back, undulate or zig-zag, winged; pedicels cuneate. Spikelets 4.5 mm long including bearded callus. Lower glume 3.5 mm long, narrowly oblong, acute, compressed, dorsal surface hairy from the base to apex, narrowly winged at the keeled tip; upper glume 4 mm long, compressed, keeled, covered with dense white hairs on the back, sparsely hairy on the sides, ciliate on the margins; lower floret empty; lemma an obovate, acute, hyaline scale, smooth, glabrous, with an awn, 3 mm long; palea absent, awn perfect, 8 mm long. Column 2 mm long. Stamens 2, anthers 2 mm long.


Ecology : Growing on moist shady localities.

Distribution : India (Orissa), Sri Lanka.

Specimen examined : Mil.

Jain (l.c.) and Ved Prakash et al (l.c.) recorded its occurrence from Orissa without citing specific locality.

Note : Bor (1953) cites "Pasdunkorale [Paroloon corti (Sic.)], Sep. 1864, Thwaites 956 p.p. (as types presumably at Peradeniya, duplicate in herbarium Kew)."

Type: D. fascicularis (Lam.) Beauv. (Festuca fascicularis Lam.)

Species ca 15, distributed in the tropical and subtropical regions of the world, 1 species found in India and Orissa.

Diplachne fusca (L.) P. Beauv. ex Roem. et Schult., Syst. Veg. 2: 615. 1817; Haines, Bot.: 962; Bor, Grass.: 492; Mishra, Dubey et Panigrahi, Ind. J. For. 6 (4) : 295. 1983.


Type: "Palestine", Hasselguist (LINN-holotype).

A tall perennial grass (60-) 90 - 150 cm high with stems tufted, stout, terete. Leaves 15-25 cm long, 1.25 - 2.5 mm wide, flat or convolute, narrow, strict, erect, finely acuminate, smooth; sheaths smooth with truncate mouth; ligule large, oblong, membranous, lacerate. Panicle 15 - 45 cm long, erect, narrowly oblong; rachis smooth; branches spike-like, the lower 2.5 - 10 cm long. Spikelets 4 - 10 flowered, 7.5 - 12.5 mm long; linear-oblong, distant; rachilla slender; callus hairy. Lower glumes ca 1.2 mm long, oblong-lanceolate with erose tips, 1-veined; keels nearly smooth; upper glume ca 4 mm long, ovate-oblong, subacute, broader than the lower; lemmas ca 3 mm long (including mucro), elliptic, thinly coriaceous, with 4-toothed tip; palea oblong, obtuse, the keels silkily hairy. Lodicules broad. Stamens 3 with short anthers, ca 1 mm long. Styles
2. free. Grain obovoid-oblong, free within the glumes and palea.

Fls. and frts.: Aug. - Dec.

Ecology: Growing in swampy ditches and rice-fields.

Distribution: India, Pakistan, Burma, Sri Lanka, tropical and subtropical regions of the Old World and Australia.


New Record for Orissa.

Use: Buffaloes readily eat this grass.

Note: Haines (l.c.) recorded it from Herbarium only.

Echinochloa Beauv., Essai Agrost.: 53. 1812;


1a. Ligule represented by a fringe of stiff hairs; spikelets 5 - 7.5 mm long... E. stagnina

1b. Ligule absent; spikelets 2.5 - 4.5 mm long:

2a. Cultivated. Spikelets up to 4 mm long, densely crowded; tall, robust grass; spikes thickened, often incurved;
grains not deciduous .................................................. E. frumentacea

2b. Wild. Spikelets up to 5 mm long; slender more or less decumbent grass; spike suberect, usually distant; grain deciduous:

3a. Tufted annuals, up to 60 cm high; lower lemma and upper glume usually acute or cuspidate, not awned; spikes rather distant, 1-2 cm long; spikelets 2.5 - 3 mm long; lower glume 1 - 1.25 cm long .................................................. E. colonum

3b. Annuals or perennials up to 100 cm high; lower lemma and upper glume acuminate, cuspidate; lower lemma prolonged into a long awn; panicle 2-5 cm long; spikelets 3 - 4.5(-5) mm long (excluding the awn); lower glume 1.75 - 3 mm long .................................................. E. crus-galli


Type: Jamaica, Browne (LINN. : 91. 11; microfische-CAL).
Jungle rice, Deccan 
grass, Millet rice, Corn 
panic grass (Eng.)

A tufted annual with stems 30 - 60 cm high, slender, decumbent or shortly creeping below. Leaves 5 - 20 cm long, 3.75 - 12.5 mm wide, narrowly lanceolate or linear, acuminate, flat, glabrous, with scaberulous margins; sheaths up to 15 cm long; ligule 0. Spikes 8 - 20, simple, distant, suberect, 0.8 - 2 cm long. Spikelets 2.5 - 3 mm long, hispidly pubescent, 3-5-seriate. Lower glume about 1/2 the lower lemma, 1-1.25 mm long, membranous, 3-veined, ciliolate; upper glume 2.25 - 2.8 mm long, concave, broadly ovate, acute or cuspidate, hairy, 5-7-veined; lower lemma empty or with a male floret, acute or cuspidate; palea hyaline; upper lemma, broadly ovate, turgid, acute, polished, yellowish-white, with a coriaceous palea. Grain deciduous.

Fls. and frts.: Jul. - Nov.

Ecology: Frequent in damp soils of waste places, and it also grown as a weed of cultivation.

Sn = 36, 48, 54, 72 (Bor, l.c.)

Distribution: India, Pakistan, Burma, Iraq, Perse, Afghanistan. Perhaps throughout the tropics and sub-tropics.

Biswa et al. (l.c.) recorded its occurrence from Balugaon, Chilka Lake in Choudhury et Patnaik from Bargarh; Saxena et al. (l.c.) and Behera et al. (l.c.) from Bhubaneswar in Puri District and Kapoor (l.c.) from Mahendragiri hills in Ganjam District respectively.

**Uses**: A good fodder for poultry. The grain is frequently eaten by poor.


*var. crusgalli*


*Type locality*: "Habitat in Europae Virginiæ cults."


*Type*: "Ex. India oriental misit honor., Koenig (LD)


Annual or perennial grass, erect or with a creeping and rooting base. Stems 30 - 100 cm high, 7.5 mm diam., spongy below. Leaves
7.5 - 30 (52.5) cm long, 5 - 15.5 mm wide at the base, linear or lanceolate, flat; ligule 0. Panicle erect and stiff, 2-5 cm long; rachis frequently with groups of bristles at the insertion of spikes, angular with grooves opposite the spikes. Spikelets 3 - 4.5 mm long (excluding the cusp or awn), conspicuously hispid, 3-5-seriate. Lower glume 1.75 - 3 mm long, convex, ovate, acute or cuspidate, with a long awn, 2.25 mm long; upper glume 3.3 - 3.8 mm long, very concave, strongly 5-veined, shortly cuspidate or aristulate; lower lemma empty, 3.3 - 4.5 mm long, 7-veined, veins hispid, paleate, male or neuter, with a distinct long awn, 5 cm long; upper lemma 3-4 mm long, elliptic-ovate, smooth, shining.

Fls. and frts.: Jul. - Nov.


Distribution: Throughout India and warm temperate to tropical regions of the world.

Specimens examined: Nil.

The species included here on the authority of Haines, who cited Walsh s.n. from Orissa under this species.

Uses: A good fodder grass for cattle and the grains are consumed by poor.

Echinochloa frumentacea Link, Hort. Bot. Berol. 1: 204. 1827; Bor, Grass.: 311.

Type: India, Roxburgh (K).
Panicum frumentaceum Roxb., Fl. Ind. 1: 307. 1820, non Salisb. 1796.


Sawa, Samu (Or.)

Tall robust annual with erect culms, 60 - 120 cm high. Ligule absent. Spikes dense, corymbose, erect or sometimes incurved. Spikelets mostly 3-nate, 3-4 mm long, crowded unequally pedicelled, one at least sessile, awnless. Upper guleme and lower lemma cuspidate or scarcely acuminate. Grain ca 2.5 mm long, flat, convex-ovoid, margined on one face, sometimes slightly ridged down the centre of the convex side, cream-coloured.


Ecology: Commonly cultivated.

2n = 36, 56 (Bor, l.c.)

Distribution: Cultivated throughout India and hotter parts of Asia and Africa. Introduced into America as a fodder.

Specimens examined: Nil.

Haines (l.c.) recorded its occurrence from Angul in Dhenkanal District and Bonai in Sundargarh District respectively. I have seen its cultivation throughout the state.

Uses: It is grown for its grains and valuable fodder. It grows more quickly than other millets and can be harvested within two
months.


Type : "Indiae orientali", Koenig (LD).

Perennial, rarely annual aquatic grass with erect spongy culms arising from a geniculate base, 1-2 m high, sometimes rooting from the nodes. Leaves 7.5 - 45 x 0.5 - 1.3 cm, flat, rigid, linear, tapering to a fine point, sheaths striate; ligule a pronounced fringe of stiff hairs. Spiciform panicle more or less branched, 2-10; 10-25 cm long; rachis slender, flexuous, angular, grooved; branches alternate, suberect, 2.5 - 5 cm long; pedicels usually 2-nate. Spikelets 5-7.5 mm long, ovate, ovate-lanceolate to oblong, acuminate. Glumes thin, minutely pubescent; lower glume 2.5 mm long; upper glume 5 mm long including the mucro; lower lemma with a male floret or empty, flat or depressed at the back, with an awn 5 - 25 mm long; palea oblong with scabrous veins; upper lemma bisexual, 3.75 - 6.25 mm long, straw-coloured, shining; palea oblong with scaberulous veins. Stamens 3, 0.25 mm long, translucent, dotted. Grain ovate-oblong, 3 mm long, white.


Ecology : Common in marshy places.
$2n = 54$ (Bor, l.c.)

Distribution: India, Burma, also in Tropical Asia and Africa.


Saxena et al. (l.c.) recorded it from Bhubaneswar and Choudhury et Patnaik (l.c.), from Kaushalyaganj in Puri District respectively.

Uses: Grains are much used by the people in famine and is also good fodder for abundant sugar content.

Note: Haínes (1924) diagnosed the wild forms in which ligule is represented by a distinct fringe of stiff hairs as *E. stagnine* and the cultivated species of *Echinochloa* as var. *fruntenacea* and the latter as a derivation of *E. colona* Link.


1a. Spikes stout, incurged, 9 - 15 mm wide; rachis glabrous; peduncle of inflorescence hairy; spikelets non-shattering; very closely overlapping; culms usually stout; leaves up
to 12.5 mm wide; lowest lemma 3.75 - 4.25 mm long; paleas winged on the keel; seeds plump, globose, usually brown, often exposed between the gapping lemma and palea when ripe (cultivated cereal) ............................................. E. coracana

lb. Spikes slender, 3-7 mm wide; rachis with scabrid margins; peduncle of inflorescence glabrous; spikelets disarticulating between the florets; culms not very stout; leaves up to 6.5 mm wide; lowest lemma 3 - 3.5 mm long; paleas not winged on the keel, seeds elliptic, bluntly triangular, blackish, never exposed when ripe (common weed) ............................................. E. indica


Type locality: "East Indies".

Iconotype: t. 9 f. 5 in Plukenet, Phytographia: 1691.

Ragi, Mandia, Mandua (Or.)

African Millet;

Finger Millet; (Eng.)
Annual grass. Culms 30 - 150 cm high, stout, erect. Leaves 3.75 - 50 cm long, 2.5 - 6.3 mm wide, broad; basal sheaths glabrous at base; ligule of hairs. Spikes 4 - many, 2.5 - 10 cm long, ca 1 cm wide in one whorl, umbellled or scattered, stout; hairy at base; rachis often pubescent at base, somewhat trigonous or flattened at back. Spikelets 6-flowered more congested, trigonous, awnless. Glumes entire; lower lemma up to 2.5 mm long, broadly ovate, glabrous, with 1 - 2 veins in the sides; paleas winged on the keels, glabrous. Seeds globose, laterally compressed, narrowed at the ends, 1.75 mm diam., with a depressed black hilum.


Ecology: Much cultivated in hilly areas, up to 1700 m.

Distribution: Widely cultivated in India, tropics and subtropics of the Old World. Introduced into the New World.


Haines (l.c.) also recorded its occurrence from Puri, Raju (l.c.), from Belimela in Koraput District; Saxena et al., (l.c.), and Behera et al. (l.c.), from Bhubaneswar; Choudhury et Patnaik
Uses: Grain is an important article of the food for the poorer classes. A kind of porridge or alcoholic beverage is also prepared from it. The culms and leaves are often used as fodder for cattle.

Note: Clayton (1974) pointed out its resemblance with E. indica (L.) Gaertn., but distinguished by its broad spikes of closely packed, non-sheathing spikelets.


Type: "Habitat in India" illustration in Burman, Thees. Zeyl.: 106, t. 47, f. 1. 1737, is selected as lectotype (Cope, l.c.).

Erect, robust, tufted, annual, with culms 30 - 90 cm high, slightly compressed, glabrous. Leaves 7.5 - 30 cm long, 2.5 - 6.5 mm wide, distichous, flat or folded, linear, with smooth margins; sheaths loose, compressed; ligule a thin hairy membrane. Spikes 2 (3) - 7 or more, narrow, 5 - 12.5 cm long, ca 5 mm wide, incurved, hairy at base; rachis flattened. Spikelets variable in size, 2.5 - 6.5 mm long, 3 - 6 - flowered, glabrous. Glumes unequal,
membranous, entire; lower glume 1.5 - 1.8 mm long, ovate-oblong, acute, 1-veined; upper glume 2.5 mm long, ovate-acute, subacute, very shortly apiculate, with 3-7 green veins close to the keel, not awned; lowest lemma 3-4 mm long; palea shorter than the glume, oblong-lanceolate, subacute, 2-veined, glabrous. Grain oblong, obtusely trigonous, 2.5 - 3 mm long, chestnut, rugose.


Ecology: Common on waste places especially in black sandy soils.

2n = 18 (Bor, l.c.)

Distribution: Throughout India, tropical and subtropical regions of the world. In Australia and America, it is grown as pasture grass.


Uses: It grows rapidly on the disturbed grounds and therefore, useful as a soil binder. A fairly nutritious fodder for cattle, when fresh; hay and silage are made from it. But when it will contain cyanogenic glycosides in the leaves, and is dangerous to cattle.

Type: E. articulatus Palisot de Beauvois.


Type: Cites: "Pluk. Phytog. t. 190. f. 6. " "Wachat an der malabarischen Kuste bu tangore and Reussackern."


Type: "Gramen alopecuroides Maderastanum, etc., Plukenet.

A tufted erect annual, 15-60cm long, with linear, acute leaves, 1.25-60cm long, up to 2.5mm wide, smooth, flaccid, base narrow; sheath membranous, loose; ligule small, membranous, lacerate. Spiciform racemes 1-7, often flowering to the base, cylindric; 15-30cm long, 5-10mm wide or in oblong clusters, bright green. Spikelets 2.5mm long including the awn, as broad as long. Lower glume 2.5mm long; lamos ovate-lanceolate, sub-falcate, strongly cuspidate; lowest 3-3.5mm long; palea 2.5mm long, broadly oblong, truncate 3-lobed. Lodicules entire; ciliate. Stamens 1-3; very short;
anthers minute. Styles free, long; stigmas hairy. Grain minute, fusiform to narrowly oblong.

Fls. and frts: Nov.–Feb.

Ecology: Gregariously growing in marshy places of pools and ditches.

Distribution: India, Burma, Ceylon, Pantropies.

Specimens examined: Ganjam Dist.: Kulada, Dec. 1889, Gamble 21730; Kalahandi Dist.: Jamchua, 600m, 22 Jan. 1943, Mooney 2180; Ampodar, 660m, 25 Dec. 1948, Mooney 3218 (all DD); Sambalpur, Griffith s.n. (Accn. No. 54072- Cal.).

Choudhury et Patnaik (l.c.) recorded its occurrence from Patia in Bhubaneswar.


Type: **E. leioptera** (Stapf) Bor (**Eragrostis leioptera** stapf).

1a. Keels of the pala very distinctly winged; leaves very long, narrow, rolled or folded, reaching to the base of the inflorescence:

2a. Spikelets 10–20 flowered; rachis angular; glumes tumid; Keels of the pales broadly winged; wings hyaline, smooth; leaves up to 30cm long, pungent; lemmas 2.5mm long; anthers 1.5–2mm long... ... ... **E. leioptera**

2b. Spikelets 20–32 flowered; rachis terete; glumes turgid; keels of the pales narrowly winged; wings ciliate; leaves up to 22.5cm long, not pungent; lemmas 1.7–2mm long; anthers ca 1.2mm long... ... ... **E. nardoides**
1b. Keels of the palea indistinct or obscurely winged; leaves from the basal sheaths very much shorter, never reaching the base of the inflorescence, often only a few centimetres long:

3a. Keels of the pales broadly winged; leaves very narrow, slender, almost filiform when rolled or folded, apex finely acuminate, puberulous above; glumes 1.75 - 3.5mm long, lower usually acuminate. .... E. bifaria

3b. Keels of the palea not broadly winged; leaves rather rigid, convolute, filiform, broader and shorter, apex rounded, glabrous, complicate; glumes 1.25 - 1.3mm long, obtuse or sub-acute. E. brachyphylla

Eragrostiella bifaria (Vahl) Bor in Ind. For. 66: 270, 1940; Raizada, JBNHS 48: 680, 1949; Mooney, Suppl.: 161; Bor., Grass: 494.


Type: "India Orientali", sine lect s.n. (C, holotype: microfiche-K, CAL).


Type locality: Trankebar nach Madras."

Eragrostis coromandeliana (Koen. ex Rottb.) Trin., Mem. Acad. Sci., Peters' b. ser. 6, 1: 415, 1830 per errorem corromandelina;

Haines, Bot.: 961.

Catapodium bifarium (Vahl) Link, Hort., Bot. Berol. 2: 194, 1833, in Obs.

Tufted perennial with stems 30-100 cm high, erect, simple, compressed, glabrous, clothed with the soft fibres of the old
sheaths at the base. Leaves 5-10 cm long, narrow, linear, finely acuminate, sparsely hairy; sheaths glabrous, keeled; ligule a pubescent line. Spikes 10-30 cm long. Spikelets secund, compressed, linear to ovate-oblong, 6-10x2-4.5 mm. Lower glume 1.7-3.5 mm long, usually acuminate, with scaberulous keel; upper glume 2.5 mm long, with stout rounded keel; lemmas 15-53, broadly ovate, 2.5-2.75 mm long, keeled obtuse or apiculate; palea slightly shorter than the glume, with winged, ciliate keels. Lodicules 2. Stamens 3; styles 2, free; stigmas plumose. Grain ellipsoid or subglobose, often obtusely trigonous. (Fig. 28).

**Pls.** and **Figs.** : Jul.-Jan.

**Ecology**: Common on the clayey soil of the plains.

**Chromosome No.**: 2n = 40 (Bor, l.c.)

**Distribution**: India, Burma, Sri Lanka, Tropical Africa.

**Specimen examined**: Sundargarh Dist.: Gangpur, 240 m, 28 Jul. 1948, Mooney 3086 (DD).

Mooney (l.c.) also recorded its occurrence from Gunupur in Koraput District, Redhakhol, Sambalpur, Champua in Keonjhar District and Jharan in Dhenkanal District respectively.

**Use**: It is regarded as a good fodder grass much liked by cattle.

**Eragrostiella brachyphylla** (Stapf) Bor, Ind. For. 66: 270. 1940; Mooney, Suppl.: 161; Bor, Grass.: 494; Panigrahi et al., BBSI 6: 262.

**Eragrostis brachyphylla** Stapf in Hook. f., FBI 7. 327. 1896;

Haines, Bot.: 961; Bal, RBSI 6 (10): 119. 1942.

**Syntype**: "From Bihar and the Central provinces, Southward to the Nilgiris, Wight, Perrottet."

An erect perennial grass, 25-45 cm high. Leaves 5-10 cm long, 2-2.5 mm wide, short, linear, flat or conduplicate, obtuse or
subacute, coriaceous, plicate, glabrous above. Spikelets 5-19 mm long, closely set, secund, linear to linear-oblung, biseriate, slightly compressed, olive green. Glumes closely imbricate, subequal. Lower glume 1-1.5 mm long, subequal, acutely keeled; upper glume similar, obtuse, dorsally rounded; lemmas 2-2.5 mm long, broadly ovate, obtuse, midrib minutely scabrid, lateral veins very weak, scabrid; pales obovate, concave towards rachilla; keels narrow, scabrid. Grain ca 6 mm long, subglobose-ovoid, terete, epicarp coarsely reticulate, obscurely triquetrous.

Fls.: and Frts.: Jul-Oct.

Ecology: On sandy sal open grass lands and also by the side of the path.

Distribution & India: Endemic.

Specimens examined: Koraput Dist.: Gunupur, 850 m, 19 Jul., 1949, Mooney 3542 (DD); Sambalpur Dist.: Rampur, 13 Jul., 1941 Mooney 1846 (CAL); Motijharan, 120 m, 6 Jul., 1948, Mooney 3452 (DD); Keonjhar Dist.: Madhupur, in palaspal, 1 Jul., 1957, Panigrahi 8560 (CAL); Mayurbhanj Dist.: Seraikhela, 13 Jul., 1940, sine lect 865 (DD).

Mooney (l.c.) also recorded it occurrence from Redhakhol in Sambalpur District.

Eragrostiella leiopoda (Stapf) Bor, Ind. For. 66: 270, 1940, et Grass.: 495; Panigrahi et al., BBSI 6: 262.

Eragrostis leiopota Stapf in Hook. fl, FBI 7: 325, 1896.

Type: Khasi Hills, 1300-1700 m, Griffith s.n.

A perennial grass with stems 30-60 cm high, densely tufted, erect, very slender, stout. Leaves 20-30 cm long from the basal Sheaths, stout, terete, pungent; sheaths short. Inflorescence a spike terminal, 15-20 cm long, stout, erect, with smooth
angular rachis. Spikelets 0.7-1.25 cm long, 10-20 flowered, compressed, secund, distichously spreading. Glumes tumid; subequal or lower one shorter, acute, keeled; upper dorsally rounded; lemmas broadly ovate, obtuse or subacute, 2.5 mm long; keels of the palea broadly winged, hyaline, smooth. Anthers 1.5-2 mm long.

Rare! Fls. and frts.: Aug-Nov.

Ecology: Usually found in valleys.

Distribution: India (West Bengal, Assam, Meghalaya, Orissa), Endemic.

Specimens examined: Nil.

Panigrahi et al. (l.c.) recorded it from a single locality, Patna (Panigrahi-20978) in Bolangir District.


Type locality: "V. spp. Nepal".


Type locality: "Habitat in Nepalin".

A densely tufted filiform perennial grass with stems 30-45 cm high. Leaves 7.5-22.5 cm long, filiform, erect, with delicate, white hairs projecting from between the convolute margins. Spike 15-25 cm long, slender, straight or sub-flexuous; rachis terete, smooth. Spikelets 0.7-1.25 cm long, 1.5 mm broad, close-set, erectopatent, laterally compressed, olive green. Lower glume ca 2 mm, obtusely keeled; lemmas turgid, ca 1.7-2 mm long, ovate, acute or subobtuse; veins faine; keels of the
palea narrowly winged, ciliate. Anthers ca.1.2cm long. Grain 0.5mm or more, ellipsoid-oblong, with obliquely triquetrous striolate base, with finely reticulate epicarp.

Rare ! Fls. and frts.: Jul.-Nov.

Ecology: Occurring in the shady regions of the hills.

Distribution: India, Nepal.

Specimens examined: Nil.

Haines(l.c.) and Mooney(l.c.) recorded its occurrence from Bihar only. Saxena et al.(l.c.) however, mention its occurrence in Orissa without any specific locality.


Type: D. namaquensis(Hees) de Winter.

Note: Koch(1978) discusses the generic diagnostic characters of Diandrochloa de Winter from E.ciliaris and suggests that the former can be distinguished by the presence of only one character,viz.,membranaceous ligules of hairs in Eragrostis.

1a. Spikelets breaking up from above downwards; rachis fragile:

2a. Lemmas ciliate on the margins:
3a. Lemmas obtuse, 1-2mm long; cilia on the margins often reduced to a few at the base; keels of palea short to long ciliate; leaves with long hairs towards the mouth of sheaths. .......... E. coarctata

3b. Lemmas acuminate, mucronate or cuspidate, 2-3 mm long, margins very ciliate; keels of the palea long ciliate; leaves glabrous.

4a. Panicle clavate, dense, shining, sometimes shortly interrupted at the base; lemmas 2.5-3mm long, very straight on the keel, shortly ciliate with firm margins; keels of the palea narrowly winged. .................. E. daccanensis

4b. Panicle cylindric, compact; spikelets rather dull, matt; lemmas 2-2.5mm long, long-ciliate on the margins, rather soft; keels of palea not winged. .................. E. ciliata

2b. Lemmas not ciliate on the margins:

5a. Keels of the palea more or less ciliate:

6a. Panicles spiciform or very dense. .......... E. riparia

6b. Panicle offuse:

7a. Culms and leaves more or less viscosous. .......... E. viscosa

7b. Culms and leaves not viscosous. ............ E. tenella.

5b. Keels of the palea scabrid or smooth, not ciliate;

8a. Panicles thyrsiform or very broadly oblong, with numerous capillary branches bearing long or short- pedicelled spikelets; more than 15 cm wide. .................. E. aspera
8b. Panicles oblong or almost linear, not thyrsiform, less than 15 cm wide:

9a. Stem stout, branches 5-12 cm long........E. diplachnoides

9b. Stem slender, branches not more than 5 cm long:

10a. Branches of the panicle more or less whorled; spikelets loose, scattered, few-flowered;

10b. Branches of the panicle mostly solitary; spikelets densely clustered, 6-14-flowered; lemma less than 1 mm long.............E. japonica

11a. Annuals:

12a. Lammas up to 1.5 mm long;

13a. Plant eglandular; spikelets more or less fascicled or shortly pedicelled, close, forward; lateral pedicels 5 mm long............E. gangetica

13b. Plants glandular; the glands may be raised on the keels of the lemma or on the margins of the leaves and sheaths, or are sunk or band-like on the pedicel or band-like patches on the culms below the nodes; spikelets scattered, not fascicled spreading or pendulous; long pedicelled or divaricate when ripe:

14a. Lowest branches of the panicle not whorled; leaf-margins glandular.........................E. minor

14b. Lowest branches of the panicle fascicled or sub-whorled, with pitted glands just above and below the lowest nodes; glandular band below culm-nodes; leaf-margins eglandular...E. pilosa
12b. Lemmas over 1.5mm long;

15a. Spikelets 0.75 - 2 mm wide linear...... *E. tremula*

15b. Spikelets 2mm or more wide, ovate or ovate- oblong;

16a. Paleas deciduous; spikelets ovate to ovate-oblong, green to reddish-purple; lemmas ovate or ovate- elliptic, 2mm long; lateral veins at an angle of 60° or more to the axis; sheaths not bearded at the mouth; grain obovoid or ellipsoid, compressed.........*E. unioloides*

16b. Paleas persistent; spikelets narrowly oblong or ovate-oblong, leaden-grey in colour; lemmas ovate to ovate-oblong, 2-2.3mm long; lateral veins at most at 40° to the axis; sheaths bearded at the mouth; normally glandular on keels of lemmas and at the leaf- margins; grains subglobose..............................*E. cilianensis*

17a. Perennials;

18a. Spikelets 1.75-2.5mm wide; paleas deciduous with the lemmas; panicle up to 20cm long, 8.- 9 cm wide.........................*E. atrovirens*

18b. Spikelets 1-1.25 mm wide; paleas persistent; panicle up to 12 cm long, not more than 3cm wide.....*E. nutans*

17b. Lemmas 2 mm long or more:

19a. Pedicels of the spikelets with a white glandular band; mouth of sheath naked; upper glumes not veined.................*F. tenuifolia*
19b. Pedicels of spikelets devoid of a white glandular band; mouth of sheath bearded upper glumes usually 1-veined.

20a. Spikelets more or less fascicled in groups on the primary or secondary branches; pedicels very short, not more than 2 mm long; lemmas 2-2.5 mm long. ........................................... _E. zeylanica_.

20b. Spikelets panicled; panicle dense and narrow of diffuse; often whorled; pedicels ≤ 3-9 mm; lemmas 1.5 mm long. ........................................... _E. nigra_


*Type*: Cultivated in Europe, seeds from India (W.Holo; K iso.)

**P. paniculata** Roxb., _Fl. Ind._ 1 : 341, 1820.

*Type locality*: "India".


Annual. Stems 20-65 cm high, usually tufted, stout, suberect, smooth and shining, with glabrous nodes. Leaves 20-45 cm x 0.5-1 cm, linear, flat, keeled, glabrous; sheaths villously bearded at the mouth, otherwise glabrous; ligule a fringe of long hairs. Panicle 20-60 cm long, 35 cm wide, thyrsiform, lax, oblong to obovate-oblong, branches numerous, capillary, scaberulous, longer than the spikelets. Spikelets panicled, breaking up at maturity from above downwards, linear-oblong, erect, 4-16-flowered. Glumes 1-1.25 mm long, obtuse, 1-veined; lemmas 1.5 mm long, truncate, obtuse or emarginate, not ciliate on margins; paleas obscurely and obtusely 3-lobed; keels scabrid
or smooth, not ciliate. Stamens 3: anthers 0.5mm long.
Grain ca 0.5mm long, subglobose.

Fls. and frts: Sep.- Jan.

Ecology: In open grasslands.

2n = 20 (Bor, l.c.)

Distribution: India, Sri Lanka, France, Mascarene Islands, Tropical Africa.

Specimens examined: Nil.

Saxena et Brahman (l.c.) for the first time recorded its occurrence from Mahendragiri hills in Ganjam District.

Use: Poorly known about its fodder value, but the cattle eat the grass when young.


Holotype: Algeria, La Calle, Desfontaines (FI)

A perennial eglandular grass with erect or ascending stems and linear leaves. Inflorescence a contracted, more or less effuse. Panicle of shortly pedicelled spikelets, 2-many-flowered up to 20 x 8-9cm, pedicels 1-3mm long. Spikelets 5-9 x 2-2.5 mm, oblong-acute, breaking up from below upwards; rachis tough. Glumes subequal; lemmas 1.5 - 1.8 x 1.5mm, elliptic-oblong, acute, falling away with or without paleas; palea hyaline, 2-keeled. Lodicules 2. Stamens 3. Styles 2, free; stigmas plumose. Grain 0.6mm long, oblong.

Fls. and frts.: Jun.-Nov.

Ecology: A grass commonly found in the waste places of the plains.
2n = 40 (Bor, l.c.)

**Distribution**: Throughout India, Burma, Sri Lanka, Malaysia, Mascarene, Tropical Asia and Africa.

**Specimen examined**: Nil.

Saxena et Brhmam (l.c.) recorded its occurrence from Mahendragiri hills in Ganjam District only.

**Use**: It is an appreciable fodder grass.

**Note**: *E. nutans* (Retz.) Nees ex Steud. (1840)"spikelets smaller (*Lemma 1.25 mm long vs. ca 2 mm long*), paleae falling off with lemma and caryopsis and the contracted panicle; /

*E. alrovirens* (Desf.) Trin. ex Steud., vs. open panicle.

*Eragrostis cilianensis* (All.) Vignolo- Lutati ex F.T. Hubb., Philipp. J. Sc. C, Bot. 8: 159. 1913; Bor, Grass.: 503. 1960; (as "Vignolo- Lutati"); Panigrahi et al., BBSI 6: 262.

**Isotype**: Italy, Bellardi (Tö)

*Poa cilianensis* All., Fl. Pedem. 2: 246, t. 91, f. 2. 1785.

*Eragrostis major* Host., Gram. Austr. 4: 14, t. 24. 1809; Haines, Bot.: 959.

**Holotype**: Southern Europe, Burser (UPS, microfiche-CAL 1)

Stinct Grass (Eng.)

Annual, erect or ascending glandular grass, 20-120 mm, high.

Culms much branched; with glands conical or pitted below the panicle. Leaves 17.5-35 cm long, 4.5-8 mm wide, flat, linear, acuminate; sheaths with irregularly distributed pitted glands.

Panicle oblong or ellipsoid, usually open, 10-32.5 cm long, rather stiff; lateral pedicale 1-3 mm long, without a creteriform gland. Spikelets 6-9 x 2-4 mm, oblong or ovoid-oblong, pale, often slate or leaden-grey; pedicel mostly under
2.5mm long. Lower glume 1-3- veined; upper 3-veined, ovate; lemmas 19-30, rather large, 1.5 - 3.25mm long, broadly ovate, lanceolate or ovate- oblong- obtuse and concave; keels with raised glands; paleas remarkably persistent, often clothing the entire rachilla after fall of the glumes. Grains 0.5mm in diam., globose, slightly striolate brown.

Fls. and frts.: May- Nov.

Ecology: Frequently found on the road-side and dry hills.

Distribution: Throughout India, Tropical and warm temperate regions of the old world. Introduced into the new world.

Specimens examined: Koraput Dist.: near Pottangi, 1000m, a weed in upland on dry crops at Nelpodar, 8 Oct. 1950, Mooney 4029; by path on hills side above Medeng Gandhi, 1250 m, near Pottangi, 13 Jul. 1950, Mooney 3894 (both DD).

Panigrahi et al. (l.c.) recorded its occurrence from Harishankar (Panigrahi 21076) in Bolangir District.

Uses: It is used as a fodder.

Note: This species is easily recognised by leaves with sheaths sparingly bearded; crateriform glands on the leaf-margins and the rather stiff, effuse panicles of yellowish green or leaden-gray spikelets.

Eragrostis ciliata (Roxb.) Nees, Agrost., Brass.; 512. 1829;
Haines, Bot.: 956; Fischer in Gamble, Fl. Madras: 1825(1263), 1934; Bor, Grass.: 506.

Poa ciliata Roxb.; Fl. Ind. 1: 336. 1820.

Type locality: "India, - is generally found on a poor dry soil".

P. rupestris Roth, Nov. Pl. Sp. 71. 1821; Roem. et Schult. ex Staff in Hook. f., FBI 7; 313. 1896; non Withering, 1796.

Eragrostis ciliaris Sensu Behera et al., JBNHS (Suppl. I) 74: 654. 1979, non (L.) H.Br., 1754.

A perennial grass with tufted erect or ascending stems, 20-100 cm high from a nodose base. Leaves short, 3-22.5 cm long, 2.5-7.5 mm wide, linear or linear-lanceolate, finely acuminate, spreading and suberect, smooth, glabrous; sheath bearded below the mouth; ligule a few hairs. Panicles spiciform, dense, compact, cylindrical, clavate, sometimes shortly interrupted at the base, shining, 2 (-3.75)-7.5 cm long, 2.5-5 mm in diam., branches hirsute. Spikelets rather dull, matt, 2.5-4.5 mm long much compressed, 6-12-flowered; rachilla breaking up at maturity from above downwards; rachis fragile. Glumes 1-1.5 mm long, acute, ciliate; lemmas 2 (-2.5)-3 mm long, acuminate, mucronate or cuspidate, straight, very ciliate on the margins, rather soft; keels of the pales scaberulous, margins with fine rather long cilia except at the apex, not winged. Grains ovoid to ellipsoid, terete, 0.5 mm long.


Ecology: Common on sandy river banks, waste and grassy lands.

Distribution: India, Burma, Sri Lanka to Indo-China.

Specimens examined: Ganjam Dist.: Mojagado, Dec. 1889, Gamble 21619 (DD); Berhampur, 20 Oct. 1930, Narayanaswami 4719 (MH); Cuttack Dist.: Narasinghpur, 300 m, 18 Mar. 1943, K. Biswas 61 29 (CAL).

Fischer (l.c.) recorded it from Ganjam: Choudhury et Patnaik (1982, 1983), from Baragarh, and Behera et al. (1979).
from Bhubaneswar respectively.

**Eragrostis coarctata** Stapf in Hook. f., **FBI** 7: 313.
1896; Haines, Bot.: 956.

**Syntype**: From the upper Gangetic plain, Moradabad, Thomson; to Sikkim, Bihar, Chittagong, Aracan and Burma, Central provinces and Chotangpur, Clarke.

**E. maderapatana** Sensu Behera et al., JBNHS (Suppl.) 74: 654. 1979; non Bor, 1960.

**Glira Munja**; **Pitachura Kuta** (Or.)

A tufted wiry, erect or ascending perennial, 10-90cm high, base clothed with short-hard sheaths. Leaves linear, spreading horizontally, 2.5 (-10)-12.5(-25)cm long, 3.8mm wide, with long hairs towards the mouth of the sheath, finely acuminate above, glabrous, quite smooth, glaucous; sheath bearded below the mouth; ligule very short. **Paniclæ** 3 - 12.5 X 1.25cm, often lobed, cylindrical, compact, subspiciform, white, often red, branched, hispid; rachis fragiles bearded at the nodes. Spikelets panicked, breaking down at maturity from above downwards, ca 1.2mm long, 6-10-flowered, slightly compressed. Glumes subequal; lemmas 5-10, 1-2mm long, obtuse, margins long or short ciliate, membranous, with prominent veins; keels of palea short or long ciliate. Anthers 0.5mm long. Grain 0.5mm long, terete, highly polished and brown.

**Fls. and Fts.**: Sep. - Jun.

**Ecology**: A very common weed of moist pastures and gardens and also in the sand dunes.
Distribution: India, Bangladesh, Burma.


Panigrahi et al. (1965) also recorded its occurrence from Dukura in Mayurbhanj District: Raju (1965) from Balimela in Koraput District; Saxena et Brahman (1978) from Mahendragiri hills in Ganjam District; Behera et al. (1979) from Bhubaneswar and Choudhury et Patnaik (1983) from Nandan Kanan in Puri District respectively.


Type: Southern India. Heyne in Wallich Num. list No. 5015 (K-W).
E. phleoides Stapf ex Hook. f., FBI 7 : 313. 1896, non Hillebrand, 1888.


A densely tufted perennial with culms 10-90 cm high, erect or geniculately ascending, very slender. Leaves 3-14 cm long, 2.5-6.25 mm wide, linear-lanceolate, finely acuminate, spreading, flat, with rounded base, glabrous; sheaths bearded below the mouth; ligule a line of few hairs. Spiciform panicle compact, clavate, dense, 2-10 cm long, 3-4 mm diam. branches very short, villous at the nodes. Silver green spikelets 5 X 1 mm, panicled in 12 or fewer-flowered, 3-6 X 2.5 mm moderately compressed. Glumes 1.5 - 2.5 mm long, subequal, acute or obtuse, mucronate; lemmas 2.5 - 2.8 mm long, membranous, ciliate along margins; paleas 1/4 shorter than its glume; keels narrowly winged, long-ciliate. Anthers ca 4 mm long. Grain, 2.5 - 10 mm long, elongate, ellipsoid.

Fls. and frts.: May-Nov.

Ecology: India (Orissa Andhra pradesh, Tamil Nadu, Karnataka). Endemic.

Specimens examined: Nil.

Fischer (l.c.) recorded this species from Ganjam.

Uses: A fodder for cattle.

Eragrostis diarrhens (Schult.) Steud., Syn. Pl. Glum. 1: 266. 1854; Bor, Grass.: 507; Raju, BBSI 6: 294.
**POa diarrhena** Schult., *Syst. veg.* 2, Mant. 2: 616, 1827, a new name for *POa diandra* Roxb.; 1820 non A. Br. (1810)

**Type locality:** "A native of Bengal".


**Type:** "Ind. Orientalis", Heyne.


A slender tufted perennials, with culms 30-90 cm high or more, smooth and polished. Leaves 7.5–25 cm long, 3-6 mm wide, narrow, flat or conduplicate, glabrous; sheaths close, glabrous; ligule a fimbriate membrane. Panicle 15–60 x 10-15 cm oblong to linear, erect, long, narrow, contracted, with pseudo-whorls, giving the panicle a verticillate appearance, branches up to 5 cm long, usually solitary. Spikelets 6-14-flowered, small, 2-3.7 mm long, smooth, often tinged with red, pedicillate, densely clustered; rachilla articulate between the flowering glumes, glabrous, disarticulating from above downwards. Glumes subequal, ca 5 mm long, ovate-oblong, obtuse, hyaline, 1-veined; lemmas <1 mm long, ovate-oblong, obtuse, not ciliate on the margins; palea linear-oblong with keels smooth or scabrid, not ciliate. Stamens 2: small. Grain 0.25 mm diam., obovate.


**Ecology:** This commonly grows as a weed in moist sandy cultivated land.

**Distribution:** India (throughout), Ceylon, Tropical Asia and Africa.

**Specimens examined:** Koraput Dist.: Mundagudar, Jeypore,
16 Dec. 1960, P.C. Nanda 2376 (CAL); Ganjam Dist.:
82960-MH); Gubrej, 150 m, Jan. 1884, J.S. Gamble -
13687 (MH); Cuttack Dist. Chamundia Mahanadi area, 20 Mar.
1943, K. Biswas 6249 (CAL).

Haines (l.c.) recorded the species from Puri and Raju
(l.c.), from Sibru in Koraput District.

Uses: Brooms are prepared from culms and the grass is
relished by cattle.

Note: Beauvois (1812) did not base his species Ergrostis
interrupta on Poa interrupta of Lamark but from a
different species of Ergrostis. Bor (1960) points
out that E. interrupta (R.Br.) P. Beauv. is an
Australian grass quite distinct from E. diarrhena
(Schult.) Steud.

1854; Bor, Grass.: 508.

Type: Nubia, Hochstetter 346.

E. leprieurii Steud., loc. cit.: 269.

Type: "Africa: Senegal, (Leprieur hrbr. 1831)",
E. interrupta var. diplachnoides (Steud.) Stapf in Hook. f.,
FBI 7: 316. 1896; Haines, Bot.: 958.

A slender perennial grass with stout, branched culms, up
to 50 cm tall. Leaves 8-30 cm long, linear, flat or conduplicate,
glabrous; sheaths not ciliate; ligule membranous. Panicles
often over 30 cm long, linear, effuse or contracted, flaccid,
branches solitary or 2-3 in a whorl, elongate, 2-5-15 cm
long, usually simple, often bare at the base, bearing small
spikelets. Spikelets 6-12-flowered, breaking up from above downwards; rachis and pedicels often scabrid, not ciliate;
lemmas obtuse, not ciliate on the margins; palea linear-oblong; keels scabrid or smooth, not ciliate. Anthers 2.
Grain obovoid.

Fls. and frts.: Sept.-Dec.

Ecology: This weed commonly grows in waste land.

Distribution: India (Bihar, W. Bengal, Orissa, Madhya Pradesh, Maharashtra), Sri Lanka, Trop. and sub-trop. Asia to Africa.

Specimens examined: Kalahandi; Dec. 1939, Mooney 1182 (DD); Dhenkanal Dist.: Angul, Khinda, 200m, 5 Dec. 1902, J.H. Lace s.n. (Accn. No. 541559 - CAL!); Puri Dist.: Khurda 1889, Walsh 12, 17 (both CAL).

Haines (l.c) recorded it from Puri and Behera et al. (1979) from Bhubaneswar.

Eragrostis gangetica (Roxb.) Steud., Syn. Pl. Glum. 1: 266. 1854; Bor, Grass: 508; Panigrahi et al., BBSI 6: 262;


Poa gangetica Roxb., Fl. Ind. 1: 341. 1820.

Holotype: "Bengal" A native of the banks of the Ganges (BM).


Part. 2: 27, 1851; Haines, Bot.: 959.

Type: "Prope urbe Mangalore lecta (Metz. n. 664)."

A very slender, tufted eglandular annual, with erect or geniculate stem, 12.5-40 cm high, often stout. Leaves 3-30 cm long, 4.2 mm wide, erect, flat or subconvolute, glabrous or
with a few hairs at the base and mouth of sheath, glaucous.

Panicle 5-30 cm long, narrow. Spikelets 5-7.5 mm long.

+ fascicled on the primary or secondary branches, all pointing forward or shortly pedicelled in narrow, linear or linear-oblong, slightly compressed, breaking up at maturity from below upwards; rachis tough; rachilla zigzag with distinct internode; lemmas 1-1.25 mm long, not closely imbricate with overlapping margins, not particularly broad, tips, acute or obtuse, side-veins conspicuous, lemmas falling away with or without paleas; palea 0.7-1.3 mm long, marginal keels scabrid. Grain 0.6 mm long, oblong or ellipsoid, shining light brown.


Ecology: On grassy banks or sandy river beds.

Distribution: Throughout India, Tropical Asia and Africa.

Panigrahi and Panigrahi et al. recorded it from Mokabari in Mayurbhanj District, Saxena et al. (1982) and Choudhury et Patnaik (1983) from Bhubaneswar.

**Uses**: Readily eaten by the cattle. The warm mixture of the roots pounded with mustard oil is applied in rheumatism by the natives.


**Poa japonica** Thunb., Fl. Japan: 51. 1784.

**Type**: Japan: Nagasaki, Thunberg (UPS).

**E. tenuissima** Schrad. ex Nees, Fl. Afr. – Austr.: 410. 1841.

**Type locality**: "India orientali".

**E. interrupta** var. tenuissima (Schrad. ex Nees) Stapf ex H. Wink. f., FBI 7: 316. 1896; Haines, Bot.: 958.

A very variable, slender, tufted perennial, with culms geniculate and ascending, 15-60 cm high. Leaves 10-35 cm long, 3-6 mm wide, flat or conduplicate, slender, glabrous; sheaths not ciliate at the mouth. Panicle 60 cm long, to 15 cm wide, oblong or linear, branches of the panicle up to 5 cm long, + whorled, spreading. Spikelets 2-7, 1.5-6.25 mm long, few flowered, (sometimes up to 9 flowered), loose, scattered, breaking up at maturity from above downwards; rachis fragile
Glumes 0.4 cm long, very obtuse; lemmas ca 1 mm long or less, obtuse, not ciliate on the margins; veins slender; keels of the palea scabrid or smooth, not ciliate. Stamens 2. Grain obovoid, brown, polished.

**Fls. and frts.**: Sept.–Dec.

**Ecology**: A weed of sandy places under shade.

2n = 20 (Bor. l.c.).

**Distribution**: India (throughout), Trop. Asia.


Haines (l.c.) recorded it from Puri, Mooney (l.c.), from Redhakhol in Sambalpur District; Narayanswami and Carter (1942), from Barkuda, Chilka Lake and Choudhury at Patnaik (1983), from Balainta, Naharkanta, near Bhubaneswar.


**Type**: Same as for *Poa eragrostis* L.

**Poa eragrostis** L., Sp.Pl.1: 68. 1753.

**Holotype**: Habitat in Italia Sypra muros; D. Backer s.n. (LINN; Microfiche = CAL).


**Eragrostis poaeoides** P. Beauv. ex Roem. et Schult., Syst. Veg. 2: 574. 1817; Bor, Grass.: 512; Saxena et al., Ind. J. Fox. 5 (2): 103. 1982.
Type: Same as *Poa aragrosis* L.


A delicate small glandular annual with slender tufted culms 15-45 cm high. Leaves 3.75 - 17.5 X 2-5 cm, sometimes incurved, finely acuminate, margins glandular. Panicle rather stiff, 7.5 - 17.5 cm long, ovate or oblong, open, branches solitary axillary, lower branches not whorled. Spikelets 3-7.5 X 1.5 - 2 mm, many-flowered, pale green or purplish, often curved. Lower glume 0.5 - 0.75 mm long or more, narrow, elliptic or lanceolate-ovate; upper 1 mm long; mid-vein reaches the margins; both the glumes 1-veined; lemmas 1.7-2 mm long, broadly elliptic, acute, falling away with or without paleas; palea persistent. Grain 6-9 mm long, globose or ellipsoid - globose, truncate at both ends, dorsally grooved, striolate.

Fls. and frts.: Apr.-Dec.

Ecology: On hot dry sandy soil.

2n = 20 (Bor. l.c.)

Distribution: Widely distributed in India, Pakistan to E. Africa extending to Mediterranean region.


New Record for Orissa.

Haines (l.c.) recorded from Bihar only.
Note: Although Cope (1982) treats *E. Minor* and *E. pappiana* as conspecific accepting *E. minor* Hochst. as the correct, I follow Bor (1960) in treating the two as distinct. They differ from each other as "Plant glandular; lemmas up to 1.5 mm long; broadly ovate- obtuse; spikelets 2-2.5 mm wide in *E. minor*" and "Plants eglandular; lemmas over 1.5 mm long, narrower, elliptic - or lanceolate- acute; spikelets 1.5-2 mm wide in *E. pappiana*"

*E. pappiana* is a species confined to East Africa to North West India, whereas *E. minor* is widely distributed in India.

1854; *Haines, Bot.: 1251, 1258; Bor, Grass.: 511.*

*Type locality*: "Penins. Ind. Orientalis".

*E. atropurpurea* Hochst. ex Steud., *l.c.: 267.*

*Type locality*: "(In Hohenacker Hrbr. Ind. Or. 938) Montes Nilagiri".


A erect, stout, slender perennial with culms 15 (-17.5) -75 (-90) cm high. Leaves 8.7-42.5 cm long, 2.5-5 mm wide, not long or filiform with curved lips; mouth of sheath bearded. Panicle dense, effuse, large, 20-40 cm long, open, lax- flowered, oblong to ovate; rachis tough, glabrous at the nodes. Spikelets 3.75 - 6 x 2 mm, 3-9-flowered, linear to oblong, breaking up at maturity from below upwards; pedicles of the spikelets devoid of glandular band, slaty- grey to black. Glumes 2-2.5 mm long, subequal; upper slightly the longer, membranous, acuminate, strongly 1-veined with
scabrid keel; lemmas 1.5-2.5mm long, ovate-acute, lateral veins faint; palea obtuse, denticulate, sometimes falling away with lemma. Grain subquadrate, truncate at both ends.

**Fls.:** Aug.

**Ecology:** Growing in the waste soil of the hill.

**Distribution:** India, Sri Lanka and extending to China.

**Specimens examined:** Koraput Dist.: Kuthadya Hill, 19 Aug. 1931, V. Narayanaswami 5917 (MH). Haines 91.c.) recorded it from Bihar only.

**New Records for Orissa.**

*Eragrostis nutans* (Retz.) Nees ex Steud., Nomen. Bot. ed. 2: 563. 1840; Bor, Grass.: 511; Panigrahi et al.

*BBSI* 6: 262.

*Poa nutans* Retz., Obs. Bot. 4: 19 1786.

**Lectotype:** "Tranquebaria misit Cel. König sheet no. 2 (LD) vide Bor, 1960.

*E. gangetica* sensu Haines Bot.: 958; 1924 non (Roxb.) Steud., 1854.

*Eragrostis stenophylla* sensu Hook. f., FBI 7: 318. 1896, p.p. non Hochst. ex. Miq. 1851 (include perennial element)

Lucha Bena, Kala Barins (Or.)

A perennial grass with tufted culms, 7.5-90mm high, geniculately ascending. Leaves short, 5-15cm long, 1.5-3mm wide, pahetic
t contracted up to 12 X 3 cm, offuse, oblong, branches usually solitary, short. Spikelets linear or linear-oblong, slightly compressed, fascicled, close, straight, 1mm wide; rachilla tough. Glumes subequal, acute, 1-veined; lemmas 1.25 X 1mm, oblong-acute; lateral veins straight, tip of lemma overlapping palea, persistent, caducous with the glumes. Stamens 3, anthers minute. Grain 3.5mm long, ellipsoidal-globose,
circular in section.

Fls. and frts.: Oct. - May.

Ecology: Common in open fields and also along the margins of small streams on the stoney grounds of the forest.

Distribution: India, Burma, Sri Lanka.

Specimens examined: Orissa, sine loc., 1889, Walsh s.n. (Accn. 541773-CAL); Koraput Dist.: Korukonda, 250-300m, 25 May 1959, R.S. Rao 18579 (CAL); Ganjam Dist.: Nanpada, 15 Dec., 1902, Burkhill 18111 (CAL); Sambalpur Dist.: Motijharan, 250 m, 23 Aug. 1949, Mooney 3512 b (DD); Puri, 1889 Walsh s.n. (Accn. No. 541773-CAL); Cuttack Dist.: Chamundia, 23 Mar. 1943, K. Biswas 6847 (CAL); False point 30 Jan., 1961, Panigrahi 23540 (CAL).

Panigrahi et al. (l.c.) also recorded its occurrence from Malda in Sambalpur District.

Use: Cattle eat it in scarcity of better grass.

Note: This species is frequently confused with E. gangetica but the latter is an annual.

Eragrostis pilosa (L.) P. Beauv., Ess. Agrost. 71: 162, 175. 1812; Haines, Bot.: 960; Bor, Grass.: 512; Panigrahi et al.

BBSI 6: 262.


Type: Italy, Bologna, Triumphfetus (Where abouts unc...)

Eng. Indian Love grass.

A very slender eglandular annual with simple culms 7.5-90 cm high, tufted, flaccid. Leaves 5-22.5 cm long, 2.5-3 mm wide; usually short and narrow, tapering from base to apex, convolute; sheaths appressed, glabrous, bearded at
the mouth; ligule a softly hairy ridge. Panicles 5-15 cm long, open rachis filiform. Spikelets 3.7-5 mm, 0.75-2 mm, straight, breaking up from below upwards; rachilla tough, smooth, flexuous. Glumes all hyaline, unequal, lower 0.3-0.5 mm long; upper much ovate-lanceolate, acuminate lammas 1-1.5 mm long, ovate, acute; palea with recurved sides, sub-persistent, others quickly falling; keels scaberulous or nearly smooth. Stamens 3, anthers violet. Grain 0.5-1 mm long, ellipsoid or oblong, base laterally apiculate, brown.

Fls. and frts.: May-Oct.

Ecology: A casual weed of sandy waste places.

2n = 40 (Bor, l.c.)

Distribution: Throughout India, Pakistan, Burma, Ceylon, widely distributed in tropical and subtropical regions of the old world, introduced to New World.

Specimens examined: Orissa: sine lect., 1888, Walsh s.n. (Accn. No. 542186 - CAL); Sambalpur Dist.: Motijharan hill 200 m, Sep. 1946, Mooney 2737 (DD); puri Dist.: Puri Beach, 30 May 1936 sine lect. s.n.; Cuttack Dist.: Ravenshaw College, Campus, 19 Sep.: 1925 sine lect. 23 (both Rav. Coll. Herb.); North of Mahanadi Shore at Cuttack, 15 May 1966, M.K. Ghosh 45 (CAL).

Panigrahi et al. (l.c.) recorded its occurrence from Ghatagaon in Keonjhar District and Saxena et al. (1982) from Bhubaneswar.


1829; Bor, Grass.: 513.


*Type locality:* "Madras".

**Megastachya riparia** (Willd.) Nees, Agrost. Brass.: 512. 1829.

*B. tenella* (L.) P. Beauv. var. riparia (Willd.) Stapf ex Hook. f., FBI 7: 315. 1896; Haines, Bot.: 956.

Eglanular, tufted perennial with lax wiry culms, 12.5-50 mm high, geniculate at base rather from an elongated rootstock. Leaves often at right angles to the culm. Panicle spiciform, 1.2-5.5 cm long, 6.25-7.5 mm broad, oblong to ovate-oblong, very dense, cylindric, delicate, contracted, very narrow, sometimes tinged with pink. Spikelets 3 x 1.5 mm, oblong, crowded, breaking up from above downwards; rachis fragile, bearded or not. Glumes unequal; upper sometimes longer; lemmas 1.25 mm long, rounded at apex; paleas 1-1.25 mm long, cilia of keels stiff, shorter than the width of expanded palea. Anthers ca 0.25 mm long, very minute. Grain ca 0.4 mm long, broadly ovoid, brown.

**Fls. and frts:** Aug. - Jan.

**Ecology:** Found across the sandy tracts.

**Distribution:** India, Sri Lanka.

**Specimen examined:** Puri, Dr. Walsh 5 (CAL)


**Poa tenella** L., Sp. Pl. 1: 69. 1753.

*Holotype:* India, Linn. herb. "14 tenella" by Linnaeus;

(LINN; microfiche - CAL: )

**Syntype**: India, Plukenet, Alm. Bot. tab. 300, fig. 21. 1696 (selected by Koch, Rhodora 8 : 399.1978).


**Holotype**: E. Tranquebar, König (LD).


E. tenella var. plumosa (Retz.) Stapf in Hook.f., FBE 7 : 315. 1896.


A very variable annual with culms densely tufted, slender up to 45 cm high, not viscous. Leaves ca 12.5 cm long, 5.5 mm wide, narrow, not viscous; sheaths villous at the mouth.

Panicle 5 - 20 cm long, decomposed, effuse, delicate, open, oblong-ovate or cylindric. Spikelets 1.25 - 4.2 mm long, up to 1 mm broad. Glumes subequal, the lower ± shorter than the upper, 1.25 mm long, obtuse, convex; lemmas 1.25 mm long, oblique, with veins remote from the margins; Keels of pales ± ciliate. Stamens 3; anthers minute. Grain ca 4 mm long, broadly obovoid, pale brown, polished.

Fls. and frts.: Sept. - Feb.

Ecology: Growing on open sandy bed and wet ground.

**Distribution**: India (throughout), widely distributed in the tropics of the old world, introduced into America.

Haines (l.c.) recorded it from Puri; Narayanaswami et Carter (1942) from Barkuda, Chilka Lake, Behera et al. (1979) from Bhubaneswar in Puri District; Panigrahi et al. (1965) from Dukura in Mayurbhanj District; Singh et Verma (1963-64) from Angul in Dhenkanal District respectively.

Uses: A very nutritious grass relished by cattle both fresh and dry.

Note: Roem. et Schult. (1817) first considered Poa amabilis L. (1753) and E. tenella (L.) Beauv. (1817) based on Poa tenella L. (1753) as conspecific accepting the latter for the combined taxon (Art. 57.2). Therefore, E. amabilis (L.) Wt. & Arn. (1834) is not correct. This species, therefore, must
be known as *E. tenella* (L.) Beauv. and the name *E. amabilis* (L.) Wt. et Arn. caeses to be a legitimate name (Art. 57.1).

**Eragrostis tenuifolia** (A. Rich.) Hochst. ex Steud., Syn.

Pl. Glum. 1 : 268. 1857; Mooney, Suppl.: 160; Bor, Grass.: 514.


**Type**: "Africa et" in Locis in cultis vallium Prope Adous Schimper

**Eragrostis collocarpa** K. Schum, ex Engl. in Abh., Preuss. Acad. Wiss. 64. 1894.

**Type**: Africa Usagara (Holst. Or. 54. 3228, 8923/Tanganyika

A slender, erect, perennial with branched culms 10-90 cm high. Leaves 5-33.8 cm long, 2.5-3 mm wide, very narrow; mouth of sheath naked. Panicle up to 15 x 6 cm, oblong to ovate, very open; rachis glabrous; branches up to 4 cm long, solitary or 2 nate, distant. Spikelets 0.7-2 cm long; pedicels with a glandular brand. Glumes unequal; lower 5-15-flowered; linear; hyaline, minute, less than 1 mm long; upper larger than the lower, ca 7.5 mm long; lemmas 2 x 1.5 mm, obtuse, subacute or apiculate, almost mucronate; palea shorter, strongly curved, persistent, with scabrid-keels. Stamens 3: anthers ca 1 mm long. Grain slightly compressed, dorsally grooved, ca 2 mm long, obovoid - oblong.

**Fls.**: Nov. - Dec.

**Distribution**: India, Tropical Africa.


Haines (1924) did not describe the species but Mooney

**Type:** Nubia, Hochstetter 6.

Poa tremula Lam., Tab. Ex Encycl. 1: 185. 1791, non E. tremula Hochst. ex Steud., 1854.

**Type:** "E. Senegal, D. Roussillon (Holop)

P. multiflora Roxb., Fl. Ind. 1: 340. 1820, non Forssk., 1775.


**Type:** Same as P. tremula Lam.

A slender, tufted annual grass with sub-erect culms 15-60 cm long. Leaves 5-22.5 cm long, 2.5-4 mm wide, convolute, linear-lanceolate, tapering; ligule a minutely hairy line. Panicles 10-30 cm long, on capillary solitary pedicels, ovoid, effuse, lax, branches solitary, filiform. Spikelets many-flowered (10-70), seated on pedicels, over 5 mm long, linear, narrower upwards. Glumes 1.5-2 mm long, subequal, subglobose, 1-veined; rachilla tough; lemmas 1.7-2 mm long; palea shorter than glumes, broadly ovate-acute, persistent, with scabrid keels. Stamens 3; anthers minute. Grain ca 5 mm long, ± globose.

Fls. and frts.: Mar.-Dec.

Ecology: In dry sandy places of extensive back-shore.

Distribution: India, Burma, Afghanistan, Trop. Africa.
Specimens examined: Puri Dist.: Puri, 1889 Walsh s.n.;
20 Apr. 1965, Abraham 316, 337; 2 Dec. 1965, T.A. Rao,
5679 (all CAL); Puri beach, 8 Dec. 1956, sine lect s.n.
Cuttack Dist.: Vidyadharpur, 15 Sep. 1936, sine lect s.n.
(both Rav. Coll. Herb.)

Haines (l.c.) also recorded the species from Sambalpur
and Cuttack and Rao et Mukherjee (l.c.) from back shore of
Konark to Chilka Lake in Puri Dist.

Uses: Though it is regarded as a good fodder but is
scantily available. The seeds are eaten by poor in famine.

Note: The slender pedicels allow the spikelets to stir
with slightest movement of the air and in that
respect it resembles the European Quaker-grass.

Eragrostis unioloides (Retz.) Nees ex Steudel, Syn. Pl. Glum. 1:
264, 1854; Biswas and Choudhury, J. As Soc. Bengal 21 (1): 63,
1955; Bor, Grasses: 515 Panigrahi et al., BBSI 6: 262.

E. unioloides Retz., Obs. Bot. 5: 19. 1789, non Roxb. (1820)

Type: India; Communicavit Honor "Koenig" (LD).

E. amabilis sensu Hook. f., FBI 7: 317. 1896, sensu Wtt et Arn.,
non (L.) Wt. et Arn. 1838; Haines, Bot.: 958; 1924; Panigrahi
et al., BBSI 6: 262.

An eglandular, sporadic annual with slender culms, 12.5-60.5
cm high; leafy at base. Leaves 2.5-15 (-17.5) cm long, 2.5-6.25 mm
broad, mostly convolute; sheaths smooth; ligule 0 or obscure.
Panicle 2-25 cm long, narrowly obovate or ovoid, with alternate
spreading branches; rachis and nodes glabrous. Spikelets 3.75-16.25
X 2-4.5 mm, ovate or ovate- oblong, much compressed, 20-40-
flowered, shortly pedicellate; rachilla tough. Glumes 1-5- 2.5mm long, elliptic or ovate- acute; lammas ca 2 mm long, ovate or ovate- elliptic, lateral veins prominent, at an angle of 60° or more to the axis; paleas very narrowly winged or not, deciduous, falling with the lemmas; keel of the paleas scabrid. Stamens 3: anthers minute. Grain ca 0.7mm long, ellipsoid or ovovoid, compressed, smooth, orange-brown.

Fls. and frts. : Feb.-Dec.

Ecology: Commonly growing in wet sandy localities.

Distribution: Throughout India, Southeast Asia, Oriental Africa.

Specimens examined: Koraput Dist.: Nuanai, 14 Dec. 1960
C.R. Rao 2359 (CAL); Ganjam Dist.: Gopalpur Road, 20 Oct. 1930
Narasayanamati 4706 (MH); Mahendragiri hill, Fischer s.n.
(CAL); Kalahandi Dist.: Tejbandh Mali, 1300 m, 20 Dec. 1948,
Mooney 3187 (DD); Kanghutta, 22 Sep. 1956, S.K. Mukherjee
4332 (CAL); Sambalpur Dist.: Malda, 20 Oct. 1959, Panigrahi
20580, 20630; Dhenkanal Dist.: Khinda, 200 m, in Angul,
J.H. Lace 2547 (CAL); Puri Dist.: Khurda, 1889, Walsh 29;
6036 (both CAL); Cuttack Dist.: Bhitar Kanika, 6 Feb. 1961,
Panigrahi 23740 (CAL, ASSAM); Kajalpatia, false point, 31 Jan.
1961, Panigrahi 23593 (ASSAM); Balasore Dist.: Balaramgudi,
30 Nov. 1965, T.A. Rao 5642 (CAL); Keonjhar Dist.: Rebna-
Palaspal, 30 Jun. 1957, Panigrahi 8742 (CAL); Mayurbhanj
Dist.: Dukura, 12 Feb. 1958, Panigrahi 12247 (CAL); Orissa:
sine lect. 1889, Walsh s.n. (Accn. No. 541680-CAL).

Srinivasan et Rao (1.c.) recorded the species from
Parlakimedi in Ganjam Dist.: Choudhury et Patnaik (1983)
from Nuapali and Behera et al. (1979) and Saxena et al. (1982) from Bhubaneswar.

Note: Though *E. uniorumdes* (Retz.) Nees ex Steud. is a variable species but can be distinguished by the pinkish or purplish or sometimes pale spikelets; the size of lemma varies greatly. Hook.f. (1896) and Haines (1924') described the keels of palea acabrid, not ciliate, as in *E. tenella* (L.) P. Beauv. (see Bor, 1960)


Holotype: India: Malabar, Koenig (LD)


A viscous and sticky perennial with culms tufted, 15-37.5 cm high, ca 5 cm wide, more or less viscid below the panicle. Leaves (1:75-2.5-7.5(-12.5) cm long, 2.5-5 mm wide, usually convolute; base and mouth of the sheaths with very long cilia; panicle (2.5-) 7.5-12.5 (-17.5) X 1.75-3.75 cm, affuse, dense, cylindric or oblong, glands scattered on pedicels and glumes which render the plant viscid and sweet-scented; lower part of the rachis ± viscid, fragile, glabrous, rarely bearded at the nodes. Spikelets 5-20-flowered, 3 mm long, often purplish; rachilla breaking up from above downwards. Glumes subequal, 0.75 - 1.25 mm long obtuse; lemmas 1-1.25 mm long,
broadly ellipsoid, obtuse, emarginate or rounded with scaberulous keels, not ciliate on the margins; Palea + as long as glumes, rigidly ciliate on the keels. Anthers 3, ca 0.2 mm long. Grain 0.5 mm long, ovoid, brown, polished.

Fls. and frts.: Sep-Dec.

Ecology: Commonly growing on the paddy fields in the plain.

Distribution: India (throughout) to Thailand, Nigeria, Philippines, Tropical and South Africa, Tropical America.


Haines (l.c.) recorded this species from Sambalpur.

Use: Opinions differ about its fodder value. Haines (l.c.) and Fischer (l.c.) mention that the grass is disliked by cattle whereas Cope (1982) recorded as being eaten by the cattle both fresh and dry.

Note: Due to its very viscidly sticky nature and sweet balsamic odour, it is easily recognised in the field.


Type: "In Ceylon, Macrae, July 1829." (? K).

E. elongata sensu Hook.f., FBI 7: 319. 1896; sensu Haines, Bot. 959, non (Wild.) Jacq., 1813.

A variable tufted perennial with culms 15-60 cm high, Leaves very narrow, flat or convolute, basal leaves filiform,
strict, bearded at the base; mouth of the sheath bearded.

Panicle 5-17.5 cm long, erect, oblong or ovate, very lax, filiform branches up to 2.5 cm long, 2 mm wide, 10-15 flowered; pedicels short, not more than 2 mm long; rachilla rather stout, with short inter-nodes, angular. Glumes small, 1-veined; lemmas 1.75-2.25 x 2 mm, ovate-acute or acuminate, nearly flat; palea shorter than the glumes, linear-oblong, obtuse, curved, persistent; keels very stout, scabrid, broadly ellipsoid to subglobose, orange-brown.

Fls. and frts.: Sep.-Feb.

Ecology: A weed of abandoned but moist cultivated land.

Distribution: India, Bangladesh, Burma, Sri Lanka, Tropical Asia, Malaya, Australia, N. Caledonia.


New Record for Orissa.

Haines (l.c.) recorded it from Bengal and Bihar only.


**Eriochloa procer a** (Retz.) C.E., Hubbard in Kew Bull. Misc. 1930.
256 1930; Bor, Grass: 312; Choudh. et Patn., J. Econ. Tax. Bot. 4: 564. 1983.


Type: India. In graminosis subhumidis Malabariae frequens. Koenig (LD).


Type locality: Ex Indiae Orientali.


A slender, erect or ascending perennial, 20-150 cm high; leaves 7.5-25 X 0.4-1 cm, linear, acuminate, glabrous or hairy; ligule very short; spikes forming narrow second panicle, 5-15 cm long; rhachis trigonous, spikelets shortly pedicelled, 2.5-3.5 mm long, elliptic-acute or ovate-acute, not awned. Lower glume absent; upper glume usually silky, sometimes villous, 3-5 veined; lower lemma shortest, punctulate, with a barbellate cusp, 2 mm long. Lodicules 2. Stamens 3. Styles 2, free; stigmas plumose. Grain oblong, free within the hardened glume.

Fls. and frts.: Aug.-Nov.

Ecology: In paddy fields and other damp places of the plains.

Distribution: India, Burma, Sri Lanka and S.E. Asia and also in Tropical Africa.

Specimens examined: Ganjam Dist.: Chatrapur, Jul. 1904, Fischer s.n. (Accn. No. 519267- CAL); Aug. 1904, Fischer 63, 97 (CAL); Cuttack Dist.: Talchua, 8 Feb. 1961, Panigrahi 23785 (CAL; ASSAM).

Haines (l.c.) also recorded its occurrence from Orissa without
citing specific locality and Choudhury et Patnaik (l.c.) recorded it from Rasulgarh, Bhubaneswar.

**Use:** A good fodder grass relished by animals.

**Note:** Fischer reduced *E. polystachya* H.B.K. to a synonym of *E. procera* (Retz.) C.Hubb., but Baker and Bakh. (Fl. Java) however, distinguish it from *E. procera* and many authors follow them as two distinct species.

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**Type:** *E. aurea* (Borey de St. Vincent) Kunth (= *Andropogon aureum* Borey de St. Vincent).

1a. Rachis and pedicels covered with white hairs; stem decumbent below; leaves not contracted or petioled on the sheath; lower glume shorter than upper glume; upper glume narrowly truncate; lower lemma absent or present; sessile spikelets 2.5-3.5 (-4) mm long... ... ... ... ... .... E. trispicata

1b. Rachis and pedicels coloured, not white; stem erect; leaves not conspicuously constricted or petioled above the sheath; lower glume equal to upper glume, narrowly truncate; lower lemma or its palea present; sessile spikelets 4-6.5 mm long.
2a. Leaves narrow, 4-5 mm wide; acuminate, filiform at tip; lower glume of sessile spikelet narrowly elliptic-acute with narrow flaps.................................. *E. quadrinervis*

2b. Leaves broad, 8-12 mm wide, acuminate-filiform at tip; lower glume of sessile spikelet oblong-elliptic with very broad flaps.............................................. *E. wightii*


*Pollinia quadrinervis* Hook. in DC., Monogr. Phan. 6: 158. 1889.

Type locality: Hongkong, China.


A perennial grass, with stems 30-60 cm high, leafy above, glabrous at nodes. Leaves often narrow, 4-5 mm wide; glabrous or pubescent, with fine acuminate tip, basal sheaths glabrous; ligule oblong. Inflorescence a spike, 5-15 cm long, erect or flexuous. Spikelets to 6.5 mm long, oblong-lanceolate, pale yellow brown hairs on the rachis; callus hairs long, white. Sessile spikelets awned; lower lower glume of the sessile spikelet dorsally concave, narrowly elliptic-acute with narrow flaps, 4-veined; keels hispid golden brown in colour, acute or truncate at the tip; upper glume without an arista, acute, minutely apiculate, with smooth keel and ciliate margins; lower lemma linear-oblong, glabrous, long-ciliate above; upper lemma short, broadly deeply obcordate, with adnate awn
forked at base, lobes rounded ciliolate; awn 3-4-times as long as the spikelet; palea short, broadly lanceolate, ciliolate.

Flg.: and frts.: Feb.–Jun.

Ecology: In ditches of the hills.

Distribution: India, Nepal, Burma, Siam, China.

Specimens Orissa: Nil.

Saxena at Brahmap (l.c.) reported its occurrence from Orissa, without specific locality.

Note: This is a Himalayan species growing between 1000-2000m and its occurrence in Orissa seems to be doubtful.

Eulalia trispicata (J.A. Schult.) Henr., Blume: 3: 453. 1940; Bor, Grass.: 157; Panigrahi et al., BBSI 6: 262;


A. trispicatus J.A. Schultes, Mant. 2: 452. 1824.

Type: "India: found on newly laid down pasture ground in the vicinity of Calcutta" Roxburgh.


A tall slender perennial (rarely annual) with a root stock from which arise many stems, 60-150cm high; leafy.
Leaves 30-60cm long, 2.5-6.5mm broad, convolute, finely acuminate, with scattered long soft hairs, towards the base; ligule short, bearded. Racemes many (2-17), short or subdigitate; spikes mostly 3.5-20 cm long, flexuous; rachis and pedicels slender, villous with silvery or white, hairs; joints and pedicels 2-3 mm long. Spikelets 2-nate, dorsally compressed 2.5 mm long, linear-oblong, pale.

Lower glume linear-oblong, brown 2.5-4mm long, 2-keeled, narrowly truncate, or acuminate white-hairs on keels, edges inflexed, dorsally flattened; upper glume as long as the lower glume, polished, keeled, acuminate to narrowly truncate tip, margin sparsely ciliate; lower lemma lanceolate, hyaline; upper lemma 1.8 mm long, hyaline; awn 1.3-1.5mm long. Lodicles 2. Stamen: 3. Styles 2, free; stigmas plumose, linear, laterally exerted. Grain oblong.

Fls. and frts: Sep. - Feb.

Ecology: Growing in plains and hills with hard soil.

Distribution: India, Pakistan, Nepal, Burma, Sri Lanka, China, Malaya, Australia.

Specimens examined: Keonjhar Dist. Purhaipada, 600 m, 5 Oct. 1946, Mooney 2831 (DD).

Haines (l.c.) recorded it from Sambalpur and Panigrahi et al. (l.c.) from Nabara in Mayurbhanj District respectively.

Use: It is regarded as a good fodder when young.

Note: Bor (1960) treated E. trispicata (Schult) Henr. and E. leschenaultiana (Donn.) Ohwi as two district species, whereas Cope (1982) kept the latter as a synonym of the former.
Eulalia wightii (Hook.f.) Bor, Grass.: 158. 1960.

Type: Madras: Pulneys, Wight 3390 (K, holotype).

A perennial tall grass with culms 60-90cm high, stout, erect, silky below the panicle. Leaves 7.5-22.5cm long, 8-12mm wide, broad, flat, acute at the tip; basal sheaths glabrous. Inflorescence panicle of digitate or fascicled racemes. Spikes 4-8, 5-20cm or more long; joints and pedicels 3.5-4mm long. Spikelets 2-nate, similar, one pedicelled, other sessile. Sessile spikelets 4-6.5mm long, awned; hairs on the rachis and pedicels coloured, not white. Glumes subequal, membranous or chartaceous. Lower glume oblong-elliptic, acute with very broad flaps, 4-veined, hispid on the keels, golden-brown in colour, acute or truncate at the tip, awned; upper glume without an arista; lemmas hyaline, dissimilar; lower lemma 0 or empty, sometimes suppressed, rarely with a palea; upper lemma much shorter, 2-5-3.8mm long, broader, deeply bifid, its awn 1-1.8mm long, usually without palea, enclosing a bisexual floret. Lodicules 2. Stamens usually 3. Styles 2, free; stigmas plumose. Grain oblong to obovate-oblong.

Fls. and frts.: Aug.-Dec.

Ecology: Common on the hill tops.

Distribution: India (Orissa, Madras). Endemic.
Specimens examined: Koraput Dist.: near Pottangi, on the summit of Turia-Konda, 1350 - 1700 m, 8 Dec. 1949, Mooney 4066 (DD); Kuthadya hill, 19 Oct. 1931, Narayanaswamy 5910 (MH).

New Record for Orissa.

Note: It is allied to E. quadrinervis (Hack.) O. Ktze. but differs in leaves being broader; lower leaves on the nodes very much crowded; the lower glume of the sessile spikelet larger, narrowly allipec- acute with very broad flaps.

EULALIOPISE


Type: Same as for Eulaliopsis.

Note: Species 2, distributed in India, China, Formosa, Philippines; both the species occur in India, but a single species in Orissa.

Eulaliopsis binata (Retz.) C.E. Hubbard in Hook., Icon. Pl. 33. t. 3262. 1935; Bal, RBSI 6 (10): 41, 119. 1942; Mooney, Suppl.: 264; Bor, Grass.: 158; 1960.


Type: India. Tschandranconae, Koenig s.n.

Type: Same as for A. binatus Retz.

Ischaemum angustifolium Hack. in DC., Monogr. Phan. 6: 241. 1889; Fischer, JBNHS 15 (9): 555. 1904.

Pollinidium angustifolium Haines, Bot.: 1020.


Babui, Bagali; Babai, Babuli. (Or.) Baib, Bobol grass (Eng.)

A perennial grass, with densely tufted culms, 30 - 90 cm high, rootstock and basal sheaths woolly. Leaves up to 90 cm long and ca 4 mm wide, convolute when old, long drooping, wiry, base obtuse; sheaths glabrous; ligule a tuft of short hairs. Racemes 2-4, on axillary and terminal filiform peduncles. Spikes (1.7-)- 2.5 - (4.25-) 5 cm long, compound. Spikelets 3.7 - 4.5 cm long excluding the awns. Lower glume 3.25 - 4 mm long, narrowly oblong, hairy at base; upper glume normally ovate-lanceolate or cymbiform - cuspidate or shortly awned, scaberulous on the keel above and ciliate on the margins towards the tip; lower lemma elliptic or oblong, obtuse, hyaline 2.7 - 3.5 mm long searsely ciliate above, male, with 2 stamens and ciliolate palea; upper lemma 2.7 - 3.5 mm long, narrow, conduplicate; awn 4 - 7.5 mm long; palea broad, densely ciliate at the top. Stigmas narrow, penicillate, exerted.
Grain oblong or lanceolate.


Ecology : Common in hilly forests especially on dry lime soils.

Distribution : India, Pakistan, Nepal, Burma, China, Thailand (Siam), Phillipines, Afghanistan.

Specimens examined : Cuttack Dist. : Balijhuri, 20 Feb. 1961, Pani grahi 23966 (ASSAM); Mayurbjanj Dist. : Baripada, Tubutang village, 30 Dec. 1911, D. Hooper 37804; Palbali, 48 m. 26 Apr. 1940, sine lect s.n. (DD) BSIS).

Fischer (l.c.) recorded its occurrence from Ganjam; Haines (l.c.), from Puri, chiefly on Kankar (Haripur forest); Angul, Baghmuda, Tikapara and Durgapor forests in Dehnkanal Dist. and also from Mayurbhanj District respectively.

Uses : This Sabai grass is largely cultivated for paper making. It is used for stringgs, ropes and mats by the local people. It is also eaten by cattle when young, but the opinions differ for its suitability as a fodder. The roots are supposed to withstand forest fires.

Type: G. stricta a.T. Brongniart.


Type: India: Peninsula Indiae Orientalis., EIC, Wight 2599 (?). A note by Hubbard on Wight 3243 from Peninsula Indiae Orientalis, states "represents the same species as the type (Wight 2599) (Photo-CAL) (CAL-)".

Garnotia stricta auct. non Brongn., 1832; Hook. f., FBI 7: 243. 1897; Haines, Bot.: 975; Mooney, Suppl.: 165; CCS; Panigrahi et al., BBSI 262, pro parte.

Annual tufted grass with branched, culms, to 90 cm high, often rooting at lower nodes. Leaves flat or convolute, 1-20 x ( -21 ) x 0.2-1.5 cm, lanceolate or linear-lanceolate or linear acute, hispid with papilla-based hairs; leaf-sheaths glabrous, sometimes ciliate at margins; ligule a narrow ciliate membrane. Inflorescence a narrowly contracted panicle, 3 (-5) - 28 cm long, in distant fascicles, scabrid. Spikelets pale, 2-5 mm long, narrowly lanceolate, scabrid, auricled on their pedicels, Glumes unequal; lower glume as long as the spikelet, finely acuminate;
awn 2-4 mm long; upper shorter, ca 2-4 mm long, acuminate or obtuse; awn 0.5 - 4 mm long; lemma bisexual, narrow; terete, awn 5 - 12 mm long; palea dilated into auricles which grasp the grain. Lodicules 2, small, cuneate. Stamens 3; anthers linear. Ovary linear; styles 2, distinct; stigmas with simple hairs, plumose, laterally exerted. Grain oblong.

Rare. | Fls. and frts.: Aug. - Dec.

Ecology: A rare species growing especially in shady banks.

\[ n = 10, 20; n = 18 \] (Mehra & Sood, Taxon, 23: 808, 1974).
\[ n = 30 \] (Mehra et Sharma, Cytologia 40: 453 - 462, 1976).
\[ 2n = 20 \] (Christopher et Abraham, Cytologia 36: 385, 1971).
\[ 2n = 40 \] (Sinde et Narayana, Taxon 25: 158, 1976).

Distribution: India, Nepal, Burma, Bangladesh, Sumatra, Java, N. Vietnam, Thailand, Malaya, W. Malaysia, Sumbawa.

Specimens examined: Koraput Dist.: Sonabera Plateau, 1100 m, 14 Apr. 1949, Mooney 3298 (DD,K); near Gottangi, 1020 m, above Nelpadu, 8 Oct. 1950; Mooney 4031 (DD, GH, K); Sambalpur Dist.: Kapildhar, 16 Nov. 1959, Panigrahi 21021 (CAL); above Debrigar in Barapahar, also noted on Gandhamardan Hill above Nrisingh Nath, 750 m, 24 Sep. 1949, Mooney 3625 (DD, GH, K, NY); Dehnkanal Dist.: Kapilas Hill, 600 m, 30 Aug. 1946, Mooney 2732 (DD, K), Keonhar Dist.: Sirkagutu, 950 m, in Khandadhar Valley, 2 Oct. 1946, Mooney 2776 (DD, K); Kardhana, Mooney 1826 (DD, K).

Specimens cited as deposited at K are on the basis of the data available at CAL.


Species ± 15, Indomalayan; 2 species occur in India; 1 species in Orissa.

Gigantochoia nigrociliata (Büse) Kurz, Ind. For.1 : 345.
Oxytenanthera nigrociliate sensu Haines, Bot. : 951. 1924; non (A. Rich) Munro 1868.

Type locality : "Habitat Insulae Javae prope Tjiberam., Jungh". Bolangig (Or.)

An unarmed arborescent bamboo, living in colonies, evergreen, sometimes scendent, with stoloniferous rhizomes, culms 10-15 m tall, 1.35 - 5 cm diam., robust, caespitose, internodes 40-70 x 5-10 cm; stemsheaths 15-40 cm long, rounded truncate towards the tip. Leaves 15-35 x 2.5 - 5 cm, lanceolate, attenuate at the base into a short petiole, scabrid above; sheaths stiff, hairy, smooth. Panicles spicate, both fertile and sterile. Fertile spikelets narrow, 1.25 - 3 cm long. Lanceolate, with dark cilia, 5-7-florets, the lower 2-3 imperfect, the middle one bisexual, the upper imperfect. Glumes 1-3. dense, often dark ciliate. 2-5.4 cm high,
ovate, acute or mucronate, ciliate on the margins; paleas narrow, 3-keeled, ciliate on the keels. Lodicules 0. Stamens 6, long, monadelphous, exerted, tube finally 1 cm long or longer. Anthers 6-8 mm. Ovary narrow, ovoid, acuminate, pubescent style long; stigmas short, plumose. Caryopsis 6.25–8.75 mm long, linear-oblong, truncate.

Ecology: In slightly moist sandy soil.

Distribution: India, Bangladesh, Burma, Sumatra, Java, Africa.


Haines (†.c.) recorded it from Mals of Puri and Malley (1922) from Khurda forests in Puri District.

Uses: Mats, brooms and pillars are prepared from this bamboo. A valuable bamboo used for making poles and small culms are used in weaving baskets and furniture.

Note: 1. Gigantochloa macrostachya Kurz is the second Indian species of Gigantochloa Munro restricted to Bangladesh, Assam, Burma.

GYMONOPON Beauv., Essai Agrost. 41 : 164.

Chloris deliciatula C. B. Clerke ex Hook. f., FBI 7 : 290. 1896;
Haines, Bot. 968; Mooney, Suppl.:164.

Syntypes: India: Bihar, "Chotanagpur; Mandu in Hazaribagh,
C. B. Clarke 33855 (K); Peguyomah, Herb. Kurz".

Lectotype: India, Bihar, " Chotangpur; Mandu in Hazaribagh,
C. B. Clarke 33855 (K) 
Selected here as lectotype.

Annual grass; Stem simple or with 1-2 erect branches from
the base, 7.5 - 30 cm high. Leaves cauline, 1.25 - 2.5 cm long,
short, spreading; ligule of hairs. Spikes 5 - 10, very slender,
erect, 3.75 - 6.25 long, closely spicate; rhachis capillary,
scabrid. Spikelets ca 2.5 mm long including the subaristate tip
of upper glume. Lower glume very narrow, almost subulate, turned
towards the axis, slender, acuminate, awnless; upper glume
broader, setaceously acuminate; keels scaberulous; lower lemma 1.5 mm long, oblong, finely hairy at the back, with a 2-lobed tip, rhachilla produced and half as long as the glume; paleas very narrow, 2-toothed; keels glabrous. Grains very narrow, cylindric.


Ecology: On higher altitudes and in moist forest glades.

Distribution: India (Bihar, West Bengal, Orissa), Burma.

Specimen examined: Ml.

Mooney (l.c.) recorded its from Talkudar, 300 m, near Rajgangpur in Sundargarh District and also expected its occurrence in Bamra, Bonai and Sambalpur.

Note: Hook. f. (l.c.) stated that pegu specimens collected by Kurz, are comparatively larger than Clarkes; I therefore, select C. B. Clarke 33855 (K) as the lectotype.

Type: *H. granularis* (L.) O.Kuntze, (Genchus granularis L.)


A monotypic species growing in the tropics, to S. China and S. U.S.


Type locality: "Habitat in India Orientali" (LINN: 1217.12).


Tufted annuals with branched culms, (3.7-) 10-75 cm high, leafy, slender, compressed, nodes hairy. Leaves 3-10 cm long, 2.5-12.5 mm broad, lanceolate to linear-lanceolate, base cordate, hairy; sheaths much shorter than the internodes, keeled at the back, hispid with bulbous-based hairs; ligule membranous, densely ciliate. Spikes 5.17 (-25) mm long, each sheathed at the base, resembling a string of minute beads. Sessile spikelets subsecund, ca 1 mm diam., in two rows, globoss; callus tumid, glabrous. Lower glumes 1-2 mm long, deeply pitted; upper glume elliptic-oblong, obtuse, 1-veined; lower lemma shorter than the upper glume, hyaline; upper lemma + equal to the upper glume, broadly obtuse; palea similar, but shorter. Pedicelled spikelets 2.2-2.25 mm long, green, distichous; lower glume broadly ovate or suborbicular, obtuse or subacute, 5-7-veined, with winged keels; upper
Glume boat-shaped, laterally compressed, with winged keels; lemmas when present hyaline, empty or the upper containing a male floret. Anthers minute. Styles free; stigmas short. Grain subglobose.


Ecology: Common in hilly jungles and sandy places.

Distribution: India (throughout the hotter parts), pantropics.

Specimens examined: Ganjam Dist.: Bharmaniya hill-slopes, 17 Oct. 1930; Narayanaswami 4668; Sabakata, 13 Aug. 1931, Narayanaswami 5550 (both MH); Paralakemedi, Sep. 1903, Grant, Candler & Burkill 20473 (BSIS); Kalahandi Dist.: Konghatta, 23 Sept. 1956, S.K. Mukherjee 4415; Sambalpur Dist.: Balan, 5 Sep. 1950; Mooney 3996 (both CAL); Santhara, 210 m, in Barapahar, 17 Sep. 1949, Mooney 3593 (DD); Malda, Borasambar, 1 Nov. 1956, Panigrahi 20617 (CAL); Mayurbhanj Dist.: Baripada, 30 Dec. 1911, D. Hooper 57806 (BSIS); Bankura-Similipal, 17 Feb. 1958, Panigrahi 12540 (CAL).

Mooney (l.c.) also recorded it from Gangpur in Sundargarh District and Keonjhar respectively.

Uses: A moderately good fodder and in Africa it is also suitable for hay.


Note: Possibly a native of America.


_Rottboellia compressa_ L.f., _Suppl._ Pl.: 154, 1782.

_Type locality_: Indies.

_Rglabrum_ Roxb., _Fl._ Ind. 1: 355, 1820.

_Type_: A native of Bengal " _Roxb._, _Icon._ No. 1332 ( _CAL, K_)

_Hemarthria coronandiana_ Steud., _Pl._ Plum. 1: 356, 1854.

_nom. superfl. illeg._, based on _R.compressa_ L.f., _Nlaxa_ Rees ex _Stud._ _l.c._: 358, 1854.

_Type_: Same as for _Rottboellia compressa_ Roxb.

_Nlaxa_ Rees ex _Stud._ _l.c._: 358.

_Type_: Ind. Oz.: Wall. Num. list no. 8871.

_Rottboellia compressa_ Roxb. _Corom._ 1: 181 or 156.

_Type_: Coromandel: _Roxb._ _Icon._ No. 659 ( _K, CAL_).

_Very variable erect or scandent perennials with ck culms up to 1.5 m high glabrous, leaves 2.5 - 12.5 cm long, 2-5.5 mm wide, linear, acute or acuminate, flat, glabrous, mouth of sheaths hairy; ligule short, membraneous, ciliatate, spikes 3.75 - 13.5 cm long, dark green; rachis almost inarticulate, coherent, ending in an acute tip. Sessile Spikelets 2.5-3.75 (-5) mm long; callus small, naked. Lower glume 4-4.5 mm long, constricted suddenly at the apex into a very blunt, often bifid point, 2-keeled; upper glume as long as the lower, linear - oblong, acute, membranous; lammas subequal, ca 4.5 mm long, lanceolate, acute, hyaline; palea 2.5 mm long, linear. Pediuncled spikelets narrower and longer than the sessile; narrowly lanceolate.
acutely acuminata, tip scabrid; upper glume chartaceous; lemmas similar to sessile spikelets.

**Fls. and Frts.:** Jul.

**Ecology:** A weed of damp places, in or near water.

**Distribution:** India (throughout hotter parts), Pakistan, Burma, Sri Lanka, China, Malaysia, Indo-China, Iraq, Afghanistan. Introduced into Australia.

**Specimen examined:** Cuttack, *sine lect.* g. n. (Accn. No. 56435-All).

Mooney (1940) recorded it from Karlapat, 480 m in Kajlahandi District.

**Use:** It is a fodder liked by cattle.

**Note:** Roxburgh (1820) states this to be a scendent species ca. 7 m long.

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**Lectotype:** *H. hirtus* Persoon, nom. illeg. ( = *Andropogon contortus* L.)

**Note:** *Pers.* can be taken as the type. Although he did not mention the species *H. hirtus* Pers. & *Farr et al.* (1979), consider *H. hirtus* Pers. as equally an illegitimate name for *Andropogon contortus* L.; both *H. glaber* Pers. nom. illeg. and *H. hirtus* Pers. nom. illeg. are considered conspecific by *Pers.* (1960). *Persoon* (1863) described only two species.
Although Nash (1912) had selected *H. glaber* as the lectotype of *Heteropogon*, the generic description ("Aristae longissime hirsutae") compares more favourably with the description of *H. hirtus* (culm, ramoso, spike hirta....glume pilosis). Therefore, Bor's lectotypification may supersede Nash's (1912) lectotypification (Art. 8.2):

In *Heteropogon* the sessile spikelet is fertile and awned and the pedicellate one male and sterile and unawned.

1a. Perennial, up to 1.2m tall; leaves 10-30cm long,

2.5-5 mm wide; sheaths compressed, keeled; ligule truncate, ciliolate; spikes 3.75-6.5cm long;

*H. contortus*

1b. Annual, up to 2.1m tall; leaves 30-60cm long,

6-12.5 mm wide; sheaths of upper leaves with scabridiculate keels; ligule rounded, glabrous;

spikes 1.5-2.5 cm long; sessile spikelets

*H. contortus* long, callus long, rufous-bearded...

*Heteropogon contortus* (L.) P. Beauv. ex Heem. et Schult.,

_Syst. Veg._ 2: 836, 1817; _Haines, Bot._ 1040; _Bor._ : 163;

Panigrahi et al., _BSBI_ 6: 262;


_Type_ : India, Illustration in _Eulukanet, Phyt._, t. 191/5, 1892.


_Type localities_ : Europe.

*Type:* Same as for *Andropogon contortus* Linn.

H. glaber Pers., L.c. : 533, non illeg.

*Type:* Same as for *Andropogon Illionis* DC.


Sukla (Sambalpur);

Dawaria, Sinkola, Sinko, Sinkulo ghaso a (Or.).

The Spear-grass (Eng.)

A tufted, perennial, 15-112.5 cm high, slender, stout. Leaves 10-30 cm long, 2.5-5 mm wide, linear, acute or acuminate, rarely obtuse, flat; sheaths compressed, keeled, the mouth shortly auricled; ligule short, ciliolate. Spikes 3.75-6.5 cm long. (without awn) on filiform peduncles, 10-15 cm with awn bristly hairy. Spikelets closely ibriching, subsecund; lower pairs of sublinal spikelets 4-8, green; male with 3 minute sterile anthers, the upper sessile spikelets, narrow, long-awned, 1 mm female. Sessile spikelets (female) 5-6.5 mm long with elongated, barbed, pungent callus, bearded with reddish-brown hairs. Lower glume linear-oblong, terete; upper glume slightly longer, linear, obtuse; lower lemma short, oblong, truncate; upper lemma represented by the subulate white base of hirsute awn, 7.5 cm or more long. Pedicellata, spikelets ca 1.25 cm long, with short pedicel. Lower glume lanceolate, usually obliquely twisted, margins x winged, serrulate; upper glume oblong-lanceolate, acuminate; margins hyaline; lower lemma oblong; upper obovate-oblong, ciliate. Lodicules 2, stamens 3; styles 2; x
stigmas plumose.

Fls. and frts: Nov.-Feb.

Ecology: A variable species growing in wide variety of soils.

2n = 20, 44, 60 (Bot. l.c.).

Distribution: India (throughout), tropical and warm temperate regions of the world.


Bolangir Dist.: Patna, 8 Nov. 1959, PANigrahi 20980, 20991

Pambalpur Dist.: Malda, 1 Nov. 1959, PANigrahi 20626, 20598

(All CAL); Puri Dist.: Bhubaneswar, 30 Dec. sine lect. s.n.

(Sav. Coll. Herb.); Cuttack Dist.: Baraj, 12 Nov. 1933, P.Parkia 370 (Sav. Coll. Herb.); Mayurbhanj Dist.: Saripada, 3 Dec. 1911, D.Hooper 37802; Murgadahi, 48 m, 16 Apr. 1946, sine lect. 549 (both BSTIS); M.K.C.Pathak 846 (Sav. Coll. Herb.);

Saripada, Podadhia, 122 m, 12 Feb. 1958, PANigrahi 12210; Jenasib, 16 Feb. 1958, PANigrahi - 12498 (both CAL); Orissa;

Sine l.c., 1958, G.V.S.Rao - 30897 (CAL).

Haines (l.c.) also recorded it from Angul in Bhukanal District; PANigrahi et al. (l.c.), from Bhajebasa in Mayurbhanj District; Raju (l.c.), from Balimela in Koraput District respectively.

Uses: It is considered to be a good fodder grass before flowering stage and suitable for hay making and said to keep for many years. It stage and suitable for thatching and lasting longer than rice straw.
Note: A well known from its gregarious character and the annoyance of the pungent barbed fruits which penetrate the clothing and man. Animals are seriously injured by the sharp callus which, aided by the hygroscopic awns, burrow into the flesh causing septic sores, lameness or more serious harm. It has also an adverse effect on the animal health, the commercial value of their hides is much reduced by these injuries. It is also a great annoyance to sportsmen, who come out of a patch of the grass with their lower garments covered with the awns.

**Heteropogon melanocarpus** (Ell.) Benth., J. Linn. Soc. 19: 71. 1881; Mooney, Suppl.: 191; Bor, Grass.: 165; Jain et al., JBNHS 72 (3): 761. 1971 (1975).


**Type locality:** "On the specimens collected by R. Habersham Esq. in the pine barrens between Fort Barrington in the Alatamaha and Jefferson on the Satils, Georgia."

**Cymbopogon melanocarpus** (Ell.) Spreng; Syst. 1: 289. 1825.

Very robust tall erect annuals with stilt roots, up to 2.2m high. Stems 6.25 mm thick, fastigiately branched above, stout. Leaves 30-60 X 0.6-1.25 cm linear-lanceolate, setaceously acuminate, scabrid above; sheaths compressed, glabrous; ligule rounded, glabrous. Spikes 1.25-2.5 cm long excluding the awn; lower 1-3 pairs of spikelets male or neuter with coherent glabrous joints; upper pairs with fragile bearded joints. **Sessile** (female or bisexual) spikelets 0.75-15 mm long, terete, hirsute with long rufous bearded callus. Lower glume linear-oblong.
3-nate, with hispid keels; lower lemma shorter, oblong, veinless; upper lemma with a stout awn; column hirsute.

Pedicelled spikelets 15 - 25 mm long, obliquely lanceolate, acuminate, with very short pedicels. Lower glume glabrous, many-veined; keels serrulate, ciliate; upper glume lanceolate, acute; lower lemma much shorter, ciliate, veinless; upper lemma (Pelea) minute, linear.

Rare! Fls. and Frts: R Oct. - Jan.

Ecology: Grows in grassy plots of sal forest.

Distribution: India (Central and East India including Orissa and upper Gangetic plains), Tropical and subtropical Africa and America.

Specimen examined: Kalahandi Dist.: Taparang forest, 200m, Madanpur - Rampur, 20 Dec. 1939, Mooney 1183 (DD).

Jain et al. (l.c.) recorded it from Orissa without citing specific locality.


Bor, Grass.: 677, 1960.

Lectotype: Savage Cat. 132, 1037 (LINN; microfiche+CALi)

Jau (Or.)

Barley(Eng.)
Cultivated annuals, 60–100 cm tall with tough central axis. Leaves flat, scaberulous on nerves. Spikes terminal, solitary, simple, cylindric with 6 rows of fertile spikelets; rachis excavate or pointed. Spikelets 2–3 nate, 1–2.25 cm to the base of the long awn, 1-flowered, lateral spikelets fertile, its awn projecting, ca 10–12.5 cm beyond the bar, stout, flattened and spinulosely scabrid; 1 abortive spikelets pubescent, ending in filiform awn. Glumes persistent, narrow; lemmas lanceolate, ending in a long straight or recurved awn, pinnate paleas 2–keeled, containing a bisexual floret, or in the lateral spikelets a male floret or empty or much reduced; when present florets are persistent, Lodicules 2, ciliate. Stamens 3; Styles 2, short. Grain ovoid or narrowly oblong, grooved in front with villous tip, tightly enclosed in lemma and palea.

**Fls.** : November.

**Ecology** : Occasionally cultivated in our area in suitable climatic conditions.

2n = 14, 28 (Bor, i.c.).

**Distribution**: Cultivated in India and elsewhere. De Candolle cited its origin from western temperate Asia.

**Specimen examined**: Cuttack Dist.: Barabati, 20 Nov. 1953 D.K. Ray 463 (Rev. Coll. Herb.)

**Uses**: It is used as food and tonic.

Type: *H. aristata* (Retzius) Nees ex Wight et Arnott

(Pharus *aristatus* Retzius);


(Orth. Var.)

A monotypic genus distributed in Indomalayan regions including India. Floating in water.


Type Locality: India.


Type: Same as for *P. aristatus* Retz.


Floating glabrous annuals, with whorled, feathery green roots from the nodes. Culms 30 cm or more long, spongy.

Leaves 1.75 (2.5)-7.5 X (0.5-)1.25-1.75 cm, ovate-oblong, ovate- lanceolate or oblong, obtuse, scaberulous above, smooth and glaucous beneath. Sheaths inflated, smooth or pubescent, + auricled at mouth, compressed with ciliate margins; ligule 0, or narrowly membranous. Panicles (2.5-)5-7.5 cm long and broad, triangular, with few spreading branches, stiff smooth, spikelets few, very narrow, 0.75-1 cm long, long-pedicelled, very rarely sessile, hermaphrodite. Glumes absent; lemma 5.75-7.5 mm long, narrowly lanceolate, tapering into a long, scaberulous awn, 0.6-1.4 cm long; palea 6.25-7.5 mm long, with bisexual pedicels articulate far below the tip.
Lodicules 2, gibbous. Stamens 6; anthers long, slender. Styles 2, short, free. Grains narrowly oblong, free with the lemma and palea.


Ecology: It is found in lakes, ditches, and slow streams forming a mat on the water surface.

2n = 24 (Bor, l.c.)

Distribution: India (throughout), Pakistan, Bangladesh, Burma, Sri Lanka, Malaya, Tonkin (Indo-China) and Southeast Asia generally.


Choudhury et Patnaik (l.c.) recorded it from Vani Vihar Lake, Bhubaneswar.

Uses: The grass with the grains is relished by the cattle. The grains are readily consumed by the poor. It is cultivated in Assam by the local people living near the river-side, for fodder in cold weather.


(Selected by Chase 1908 vide Bor, Grass.: 357, 1960).


Holotype: Malacca, Cumings 2287 (K) Sphalm. Ins.

1861; Mooney, Suppl.: 8 172; Bot. Grass.: 313; Behera et al., JBNHS (Suppl.) 74: 653. 1979.

Syntype: India orientalis, Bengalia et Malacca, Griffith, of these, Malacca, Griffith 6471 (K).

991, non Lam. (1791).

Creeping or floating grasses usually found in swamps, bheels or on the margins of slow-moving streams, with soft and spengy culms, 60-150cm tall, from the nodes of which numerous feathery rootlets develop. Leaves 20-45 x 1-2.5cm, base rounded or cordate, acuminate; sheath glabrous or ciliate; ligule short, hyaline. Panicles 11.25 - 20 x ca 2.5cm, very densely compound, narrow, with closely appressed branches. Spikelets 4-6.5 mm long, narrowly lanceolate. Lower glume 1.5-2 mm long, narrow from an amplexicaule base, aristulate, hispidulous on keel and cusp; upper glume 4-4.5 mm long, narrowly lanceolate, acuminate-caudate, subaristate; lower lemma 4-5-5 mm long, narrowly lanceolate, acuminate, terminating into an arista or a awn; upper lemma 3-3.25 mm long, narrow, finely acuminate. Lodicules.

Fls. and frts.: Sep.-Jan.

Ecology: Commonly growing in swampy places, lakes and slow streams.
Distribution: India, Burma, Malaya to Indo-China and Polynesia.

Specimen examined: Koraput Dist.: Kasipur, 870m, 27 Jan. 1949, Mooney 3246 (DD).

Choudhury et Patnaik (l.c.) recorded this species from Nuagaon and Behera et al. (l.c.), from Bhubaneswar.

Though Mooney did not collect the specimens from Mahanadi delta, but he was confident of its occurrence there.

Note: Bor in agreement with Hook. f. (1896), cited Panicum myuros sensu Hook. f., 1896, non Lam. 1791, as a synonym of Hymenachne pseudointerrupta C. Muell. and P. myuros Lam., Tab. Encycl. Meth. Bot. 1: 172, 1791 (Sphalm. myuros) as a synonym of Sacciolepis indica (L.) A. Chase, 1908.

However, Farr et al. (1979) cite "Hymenachne myuros (Lam.) P. Beauv. (= Panicum myuros Lam.) as the type species of Hymenachne P. Beauv. Hence, citation of P. myuros Lam. by Bor (1960) as a synonym of S. indica cannot be correct and whether the correct name of this species should be H. myuros (Lam.) P. Beauv. needs further study.


Type: I. Panicoides Palisot de Beauvois.

ICHNANTHUS vicinus (F. M. Bail.) Merr., Enum. Philipp. Fl. Pl. 1: 70, 1923; Bor, Grass.: 314; Panigrahi et al., BBSI 6: 262.


Type loc. Australia: "Hab. : Harvey's Greek, Bussell River, on rich scrub land".

ICHNANTHUS P. Beauvois, Essai Agrost.:
A creeping annual with terete, branched culms, 20-40 cm long, rooting at base, often with long and very slender aerial roots; leaf-sheaths ca 1.5 cm long with soft bulbous-based hairs; ligule a very short membrane with a fringe of hairs, 1.2-2 mm long, truncate. Inflorescence exerted, laxly paniculate, 2.3-15.5 cm long, long-hairy at base; rhachis not jointed and disarticulating. Spikelets narrow; pedicel 1-3 mm long. Glumes ovate-oblong, thinly membranous; lower glume 2-6 - 3.5 mm long, hairy on the back, drawn out into a short arista, 0.6 mm long; upper glume 4 mm long, hairy on the back, 5-veined; lower lemma neuter or male ovate-acuminate, boat-shaped, ca 3.5-4 mm long; palea shorter, 2-4 mm long, hyaline, narrowly-acute; upper floret bisexual on a very short, slender, winged stalk; upper lemma ovate or oblong with obtuse-rounded tip, ca 2.5 mm long including cuneate to stipitate base; palea of same colour; appendages below upper lemma reduced to very narrow rim or scar-like. Lodicules 2, very small. Stamens 3; anthers yellow, 1.2-1.5 mm long. Styles 2, free; stigmas plumose, exerted. Grain oblong, often twisted, lightly enclosed.

Fls. and frts.: Dec. - Feb.

Distribution: India (West Bengal, Sikkim, Assam, Meghalaya, Orissa), Bangladesh, Sri Lanka, Malaysia, Polynesia to Philippines, Australia (Queensland).

Specimens examined: Nil.

Panigrahi et al. (l.c.) recorded it from Nigirda in Mayurbhanj District.

Uses: Animals relish this grass.
**Imperata** Cyrille, Pl.Rar.Neap. 2: 26, t.11.

1792; Haines, Bot.: 1015. 1924; Bor, Grass.: 169. 1960;

*Type:* *I. arundinacea* Cyrille, nom. illegit. (Lagurus Cylindricus Linnaeus, *I. Cylindrica* (L.) Raeuschel.)

*Imperata cylindrica* (L.) Raeuschel var. *major* (Nees)


*Type:* Africa "In valle prope Fukoskreal inter Omgaziana et Omsemwubo alt. 1500' - 2000' (Drege)."


*Imperata cylindrica* Sensu Bal, RBSI 6 (10): 53, 118.
1942; sensu Panigrahi et al., BBSI 6: 262; sensu Raju, BBSI 6: 294; sensu Saxena et Brahmam, Ind. J. Bot. 1: 86.

*I. arundinacea* sensu Haines, Bot.: 1015, non Cyrill. 1792.

Juna ghas (Or.)

Cotton grass (Eng.)

Caespitose coarse annuals with often creeping stoloniferous root stock. Culms 30-90 (-120) cm high, solid, thick, puberulous or wobly at base, glabrous above, nodes hairy. Leaves 5-45 cm or more long, 2-5-15 mm wide, narrowly linear, finely acuminate, smooth above scaberulous beneath and on the margins; sheaths thinly hairy, glabrous at maturity,
loose; ligule of soft hairs. Panicles 2.5(5)-15 (-21.25) cm long, subcylindric. Spikelets 2.5 (-3) -3.75 (-5) mm long, lanceolate, unequally pedicelled; hairs on callus twice as long as the spikelet. Glumes ovate-lanceolate, subequal, obtuse with ciliate tips; lower lemma smaller than upper glume, oblong, obtuse, denticulate, ciliate; upper lemma ovate, glabrous, veinless with one faint vein. Lodicules 0. Stamens 1-2; anthers 2.5 mm long, dark or orange, among the hairs. Styles 2, connate below; stigmas 3-4.25 mm long, purple; among the hairs. Grain oblong.

Fls. and frts.: Apr.-May; Oct.-Dec.

Ecology: Gregarious, growing especially on clayey or loamy soils of low lying areas.

Distribution: India (throughout the better parts); Tropical Asia and Australia, also possibly parts of tropical East and South Africa.

Specimens examined: Ganjam Dist.: Mahendragiri, 9 Apr. 1904, Fischer 115 (CAL); Bolangir Dist.: Harishankar, Panigrahi 21091 (CAL); Cuttack Dist.: Hukitela, Muhano, 1 Feb. 1961, Panigrahi 23608 (CAL, ASSAM); Mayurbhanj Dist.: Baripada, 3 Dec. 1911, D. Hooper 37801 (BSIS);

Palbani, 48 m, 18 Apr. 1940, sine lect. 557 (BSIS).

Panigrahi et al. (l.c.) recorded its occurrence from Palaspal in Keonjhar District, Raju (l.c.), from Kendam-Kamberu in Koraput District and Saxena et al. (l.c.), from Bhubaneswar in Puri District respectively.

Uses: Animals graze it when young and is also an excellent thatching grass and also used in paper making. Experiments
in Philippines that Imperata prepares a way for the growth of Laucaena leucocephala, a small leguminous tree and can be used to prepare the way for valuable timber crops.

var. major grows in our area which is closely allied to var. cylindrica and both are distinguished as follows:

1a. Spikelets 4.5 - 5.5 mm long; panicle extremely dense; leaves roiled, cylindric, erect; nodes very rarely hairy..........................var. cylindrica.

1b. Spikelets 2.5 - 4.5 mm long; panicle often becoming loose; leaves lanceolate, flat and spreading, sometimes ciliolate towards base; nodes hairy...........

var. major (= var. koenigii)

Note: This var. major flourishes in annual fires. The white succulent rhizomes are tenacious of life and is difficult to eradicate and thus renders tree plantations almost difficult without weeding. The light seeds enclosed in glumes and lemmas surrounded by long silky hairs carried to great distances by winds and on bare areas of hillslopes and grass-lands are immediately taken possession of. At the varietal rank var. major Nees (1814) has priority over var. Koenigii Dur. et Schinz (1894).

Type: I. australis R. Brown.

Note: 18 species endemic in India.
1a. Plants up to 150 cm high; florets equal in size or nearly so and of same tecture; panicles decompound, densely flowered, spikelets 1-1.8 mm long; lemmas equal, similar in outline and structure.............................\textit{I. albens}

1b. Plants less than 80 cm high; florets unequal in size and of different texture, the lower more delicate; panicles not densely flowered; spikelets 1.8 – 2.8 mm long; lemmas unequal, dissimilar in outline and structure.

2a. Anthers of the lower floret 2.5 mm long; leaf-blades up to 12 cm long; ligules 1.5–3.5 mm long, hairy, nodes glabrous; pedicels with white-banded glands.............................\textit{I. globosa}

2b. Anthers of the lower floret 0.75 – 1 mm long; leaf-blades up to 6 cm long; ligules 0.8–2 mm long hairs; nodes hairy; pedicels without glands.............................\textit{I. miliacea}


\textbf{Type loc.}: Nepal : Sanko, Aug. 1821, Wallich s.n. , Wall.

\textbf{Num. List. No.} 8656 ( CAL 1;K,Photo ).

\textbf{var. albens}

A tall perennial herb, with slender to robust culms, 20-150 cm high. Leaf-blades 5-20 (-24.5) X0.5 (-06) 2.5 cm, flat, linear-lanceolate to broadly lanceolate, minutely toothed; sheaths loose, smooth, striate; ligule a ridge of stiff
hairs. Inflorescence a spiciform panicle, decompound, 7(-7.5)-
37.5 (-40)cm long, to 17.5 cm broad; branches capillary,
at first erect, ultimately spreading, densely flowered,
e glandular. Spikelets minute, (1)1.2-1.6(-2.5)mm long, globously
obovoid or oblong. Glumes subequal; lower glume 1 mm long,
thin, orbicular, glabrous, equalling the upper glume; lemmas
similar, pubescent on the dorsal surface, margins infolded;
florets ± 0.8 - 1.3 mm long; lower floret male; upper
bisexual; paleas shorter than the lemmas, hyaline. Lodicules
2. Stamens 3. Styles 2, distinct; stigmas 2. Grain elliptic
or obovate.

Pls. and frts. Throughout the year.

Ecology: Marshy places and forest margins.

n = 20 (Mehra et Sharma, Taxon 22: 217, 1973)

Distribution: India, Nepal, Bhutan, Bangladesh, Burma, Malaysia,
Thailand, China. Widely distributed between 300-2000m altitudes.

Specimens examined: Nil.

Mooney (1950) recorded it from Singhbhum district and
Panigrahi et al. (l.c.), from Gurguria (Panigrahi 12494)
in Mayurbhanj District.

Use: Cattle readily eat this grass.

1891; Bor, Grass.: 580; Ved Prakash et Jain, Fasc. Fl. Ind.

var. globosa


Type: Japan, Thumberg s.n. (WdK UPS; microfiche No.
2041- CAL).

Isachne australis R. Br., Prodr.: 196, 1810; Haines, Bot: 984.
Type locality: "Inclusis ripis aestuarii Hunter's River, Coal River, Australia."

I. elegans sensu Mooney, Suppl. : 170; Panigrahi et al., BBSI 6 : 263, non Dalz. 1861.

A slender, tufted, branched grass, with erect or ascending culms from a creeping rootstock, 20-80 cm high, leafy nodes glabrous. Leaf-blades 2-5-12 X 0.3-1.2 cm, linear-lanceolate to ovate-lanceolate, acuminate; sheaths 1.8-3.75 cm long, striate; ligule a tuft of long slender erect white hairs. Panicle 2.5-18 cm long, compact or effuse, flexuous, to 9 cm long, pedicels ca 0.6 mm long; rachis angular, smooth. Spikelets (1.8-)2-2.5(-2.8) mm long, globose or globosely-ovoid. Glumes suborbicular or broader than long, 0.13-0.25 mm long; lower floret as long as spikelet; upper 1.5-2.4 mm long; lemmas usually unequal; lower lemma 0.15-0.25 mm long, elliptic or ovate, obtuse, glabrous; upper 0.12-0.2 mm long, ovate-elliptic, concave; palea glabrous. Stamens 3; anthers 2.5 mm long. Styles 2, free. Grain elliptic to ovate.

Pls. and frts.: Throughout the year.

Ecology: Grows gregariously in wet and marshy habitats, preferably in shade.

2n = 60 (Tateoka, Curr. Sci. 28: 78-79: 1959)

Distribution: India, Sri Lanka, Burma, China, Japan, Malaysia, Samatra, Java, Australia, New Zealand.

Specimens examined: Koraput Dist.: near Pottangi, 960 m, at Medeng Gandi, 9 Oct. 1950, Mooney 4047 (DD); Ganjam Dist.: Rambha, Dec. 1889, Gamble 21621 (CAL); Kalahandi Dist.: Postiguda, 720 m, 30 Dec. 1939, Mooney 1246 (DD).
Sambalpur Dist.: Padampur, 1 Nov. 1959 Banigrahl 20554; (CAL).

Mooney (l.c.) recorded this species from Gharmal, 210m, in Sambalpur District.

Uses: Grass is readily eaten by grazing animals when young; also used for paper making and locally for file, cordage and mat. It is ploughed in as green manure and tender tops are eaten in Java.

Note: A polymorphic species. Mooney (l.c.) and Panigrahi et al. (l.c.) identified it as I. elegans Dalz., which is endemic to Western Ghats only. On critical examination of some of the Indian specimens, Ved Prakash et Jain (1984) identified them to be I. globosa (Thunb.) Kuntz.

The Indian plants assigned to I. disper Trin. in Indian Herbaria and Floras, actually belong either to I. globosa or I. miliacea. Leaf blades in I. disper Trin. restricted to Nepal are short, mostly ovate-lanceolate or ovate-elliptic, leaves with conspicuous cartilaginous thickening in undulate margins.


Type: India orientali, 1814, B. Heyne s.n. (B, holotype, photo). I. disper sensu Mooney, Suppl. 171, non Trin. 1828.

A slender perennial, with culms 8-30 (-50) cm high, rooting at base. Leaves small, ovate-lanceolate to linear-
lanceolate, 1-7.5 x 0.25 - 0.75 cm, mostly obtuse, rather distant, glabrous or sparsely hairy. Spikelets 1.4-2 mm long, globose or obovoid, few and distant. Glumes sub-orbicular 0.12 - 0.23 mm long, hemispheric, obscurely 6-7-veined; upper much more deeply concave; lower floret as long as the spikelet, upper 1-1.6 mm long; lower lemma rather longer than the upper, ovate-oblanceolate, membranous, male; upper lemma smaller, hemispheric, broadly ovate to sub-orbicular, chartaceous, puberulous at least on the margins, 0.1-0.2 mm long, female; palea glabrous. Lodicles 2, small. Styles 2. Grain elliptic to orbicular.

Fls. and frts.: Aug.-Nov.

Ecology: Growing usually in wet and swampy places.

n = 10 (Christopher et Abraham in Cytologia 41: 621-637, 1976).
2n = 40 (Munniyama et Narayan, Taxon 24: 367, 1975)
2n = 40 (Sindha, Taxon 26: 268, 1977).

Distribution: India, Burma, Sri Lanka, Thailand, China, Malaysia, Sumatra, Java.

Specimens examined: Nil.

Saxena and Brahmam (l.c.) recorded its occurrence from Orissa without citing specific locality.

Haines (l.c.) and Mooney (l.c.) recorded it from Bihar only.

Note: This species is closely related to I.globosa (Thunb.) O.Kuntz, and the more reliable distinct characters between the two species are as follows:

1a. Spikelets usually 1.5-2 mm long............I.miliacea
1b. Spikelets 2.2-2.8 mm long............I.globosa
I.miliacea identified by Haines (l.c.), Mooney (l.c.) and saxena at Brahmam (l.c.) is more confused with I.pulchella Roth, a widespread species in India.

The grass referred to as I.disper Trin. in Indian Floras (including Mooney's Supplement, 1950) has been wrongly identified. Critical studies reveal that it actually belongs either to I.globoea or to I.miliacea.

Mooney (1950) described I.disper Trin. as having leaves 5-12.5cm long, leaf-blades lanceolate or linear-lanceolate with serrated margins, the characters I.miliacea Roth ex Roem. et Schult. In I.dispar Trin., the leaf is ovate-lanceolate with cartilaginous thickening on the undulate margins.

Ved Prakash et Jain (1984) record I.pulchella Roth ex Roem. et Schult. doubtfully from Orissa as the species occurs in all sides surrounding Orissa. But we have no species in record.

ISCHAEUM L.Ssp.Pl.: 1049 . 1 Mai 1753,


1a. Pedicels of the pedicelled spikelets as long as the sessile spikelets; margins of the lower glume of the sessile spikelet expanded below the middle.

2a. Spikes up to 5cm, rather stout; keel of the
1008
a. Upper glume of the sessile spikelet winged above the middle; flower lemma oblong, 1-3-veined; palea with hyaline wings; culms up to 90 cm tall..............................I. indicum.

2b. Spikes up to 10 cm, rather slender, keel of the upper glume of the sessile spikelet not winged above the middle; lower lemma oblong-lanceolate, 3-veined; palea with ciliate wings; culms up to 60 cm tall...............I. hirtum.

1b. Pedicels of the pedicelled spikelets less than one-third of the length of the sessile spikelets; margins of the lower glume of the sessile spikelet narrowly and evenly turned from base to apex:

3a. Rather a stout, robust perennial; spikes 2-3; spikelets up to 7.5 mm long, + villous; lower glume of the sessile spikelet coriaceous with nodules on the rounded keels.....................I. barbatum.

3b. Rather a slender annual; spikes 1-2; spikelets up to 6 mm long, hirsute on the upper half; lower glume of the sessile spikelet crustaceous with lateral nodules joined by sharp ridges or chartaceous with very obscure nodes and ridges...I. rugosum.


Type: Java, Retzius (L D).

I. goebellii Hackel, Desterr., Bot. Zeit. 2,51 ; 149.1901; Bor, Grass.: 179,1960.
**Type:** "Ceylon in Humidis prope Colombo, Leg. Goebel" (M) (Grown in Munich Bot. Garden, sent to Hackel 1900).

Tall perennial with terete culms, more than 50 cm long, terete, smooth, glabrous. Leaves 5-5.5 cm long, 7-8 mm broad, lanceolate, tapering to an acute tip, cordate, without a petiole; sheaths striate, tight, smooth, glabrous; ligule 2 mm long, chartaceous; Inflorescence of 2 false racemes, 7 cm long, terminal; rachis fragile, joints of raceme 4-5 mm long, inflated at top, triangular, ciliate on angles; callus ca 1 mm long. **Sessile spikelets** 5.5-7 mm long. Lower glume 6 mm long, chartaceous below with 2-3 nudes on the rounded winged keels. Spikelets bisexual. Anthers 3 mm long. **Pedicelled spikelets** seated on a pedicel, ca 1 mm long. Lower glume 1.25 mm wide at the base, 5 X 2 mm, dimidiate-ovate, acute, with convex edge narrowly or broadly winged, many-veined, margins of the wing and the keels scabrid.

Rare! Fls. and frts.: Oct.-May.

**Ecology:** Occur in open moist places.

**Distribution:** India, (Assam, Meghalaya, Orissa, Madhya Pradesh, Karnataka), Bangladesh, Burma, Sri Lanka, throughout the Malaya Peninsula, Thailand, China and Japan, Indonesia to Philippines.

**Specimen examined:** Nil.

Choudhury et Patnaik (l.c.) recorded this species from Bhubaneswar.

**Uses:** This robust leafy grass is used as fodder.

*Ischaemum hirtum* Hack. in DC., Monogr. Phan. 6 : 228, 1889, Pro parte; Haines, Bot.: Max, 1023; Bor, Grass: 179;

Stout perennials, with culms 60-90 cm high, nodes bearded. Leaves 7.5(-10)-20x0.6-2.5 cm, linear-lanceolate, acuminate; sheaths sparsely hairy; ligule short, ciliate. Spikes clustered, not more than 3, erect 2.5-6.25 (-10) cm long. Sessile spikelets 2.25-7 mm long; callus long-bearded. Lower glume boat-shaped, but with rounded back below and 2-keeled above; upper glume boat-shaped, inserted below the lower glume on the callus, slightly exceeding the lower glume; lower lemma as long as the lower glume, boat-shaped or oblong-lanceolate, acuminate, membranous; palea similar, male or neuter, oblong or chartaceous with ciliate wings; upper lemma as long as the lower, oblong, acutely 2-lobed, ciliate; awn from the sinus, slender. 5-2.25 mm long, confluent with the glume, base semilunar; paleas as long as the glumes, lanceolate. Pedicellated spikelets with awned lower glumes. Lodicules 2, cuneate-quadrate. Grains 2 mm long, ellipsoid.

Rare: Fls. and frts.: Oct.-Jan.

Ecology: Growing on rocks in streams and sandy soil.

Distribution: India (Bihar, Assam, Meghalaya, Orissa).

Endemic. Originally reported from Meghalaya.

A New Record for Orissa.

Specimens examined: Ganjam Dist.: Mahendra giri hill, Fischer s.n. (Accn. No. 574580- CAL); Cuttack Dist.: Hetamundia forest, 30 Jan. 1961, Pandirahi 23562.
Kajalpatia, near False point, 30 Jan. 1961, Panigrahi 23520 (both CAL); Panigrahi 23542 (CAL, ASSAM).

Note: This species is distinguished from allied I. rivale Thw. ex Hack. as follows:

1a. Leaves hairy on both the surfaces; spikes 2-3; lower glumes of the sessile spikelets hirsute on the upper half, chartaceous-lanceolate with 7-9 veins.......................... I. hirtum

1b. Leaves quite glabrous; spikes about 4; lower glumes of the sessile spikelets hairy on the margins only, chartaceous with 6-7 veins...... I. rivale

Ischaemum indicum (Houtt.) Merrill., J. Arn. Arb. 19:320. 1938; Bor. Grass.: 180; Panigrahi et al., BBSI 6:263.


f. 2. 1782.

Type: Java, Houttuyn


Ischaemum ciliare Retz. var. prorepens (Hack., in DC., Monogr. Phan. 6:226. 1889.

Tufted grass, 60 cm high, leafy, nodes glabrous or bearded. Leaves 5-15 cm long, 2.5-12.5 mm wide, linear or linear-lanceolate, acuminate, flat, with scabrid margins; sheaths compressed; ligules short, ciliate. Inflorescence of 2-3 short spikes, 1.75-5 cm long. Sessile spikelets 5-6 mm long, oblong or ovoid, with awns ca 12 mm long. Lower glumes up to 6 mm long, bicuspidate, with broad wings; upper glumes ca 5 mm long, lanceolate, acuminate, shortly awned.
with a winged keel above the middle; lower lemmas ovate-lanceolate, acuminate, ciliate at tip; the paleas with hyaline wings; upper lemmas with glabrous or ciliate lobes; female; paleas lanceolate, awned. Lodicules 2. Stigmas 2; anthers 3 mm long. Styles 2, short, free; stigmas short. Grain oblong or lanceolate, often compressed. Pedicelled spikelets similar to sessile ones; upper lemmas ± awned.


Ecology: Common in dry fields and muddy places.

Distribution: India (more or less throughout), Southeast Asia.

Specimens Examined: Bolangir Dist.: Harishankar, 8 Nov. 1959, Panigrahi 21080; Patna, 8 Nov. 1959, Panigrahi 20998; Sambalpur Dist.: Padampur, 31 Oct. 1959, Panigrahi 20535; Malda, 1 Nov. 1959, Panigrahi 20637, Khandigharan, 7 Nov. 1959, Panigrahi 20893; Puri Dist.: Khurda, 1889, Walsh 14 (all CAL).

Haines (l.c.) recorded its occurrence from Puri, Mooney (l.c.), from Siji Mali in Kalahandi District and Bhatodih in Keonjhar District; Choudhury et Patnaik (1983) and Bhattacharya in Saxena et al. (1982), from Baramuda and Bhubaneswar in Puri District.

Note: Ischaemum aristatum L. described as "awned-seed" species is represented by two sheets in LINN (1214.2 and 1214.3); of these, Hubbard (cf. Bor, 1960) selected 1214.2 (Osbeck s.n. from China) as the lectotype and 1214.3 is the one which matches with \textit{I. ciliare} Retz.
Bor (l.c.) considers I. aristatum L. similar in structure as I. crassipes Nakai ex Honda (1930) from Japan, non (Steud.) Thell.

*Ischaemum rugosum* Salisb., *Icon. Stirp.* 1: t. 1.1791; Haines, *Bot.* 1021; Bor, *Grass.* 184; Panigrahi et al.

*BBSI* 6: 263.

*Type:* "India - Gaertn. Carp. Suppl. P.1, t.181" cited.

Ascending leafy, slender stems, 30-60 cm high. Leaves (6.25-10 - 15 (-25) x 0.4 (-0.5) - 1.25 cm, linear-lanceolate, acuminate, base of the lower leaves acute, without a petiole; sheaths rather inflated, compressed, glabrous; ligules truncate, erect, 2.5-5 mm long. Spikes 1-2 together, 2-5-6.75 cm long, erect, rachis trigonous, ciliate on the dorsal angle. Spikelets linear-oblong, pressed together. Sessile spikelets up to 6 mm long. Lower glumes broadly oblong, being transversely rugose, ridged or folded for 2/3-3/4 of the length from the base, the upper third flattened, membranous; upper glumes oblong-lanceolate, acuminate, keeled, the outer margin winged; lower lemma ovate-lanceolate, acuminate, hyaline, male or empty, paleate, the palea hyaline and narrow; upper lemma ca 2.5 mm long, 2-fid to below the middle; palea linear-lanceolate; awns ca 1.25 cm long. Pedicelled spikelets variable, rather shorter than the sessile; pedicels less than one-third of the length of the sessile spikelets; upper lemmas oblong, obtuse, not awned.

Rare ! Fls. and frts: Aug.- Jan.

Ecology: In wet and dry habitats of the paddy fields.
Distribution: India (throughout the plains and low hills) Burma, Malaya, Siam to China.


Saxena et al. (1982) recorded its occurrence from Bhubaneswar.

Uses: It is relished by horses and cattle when young. Grains are consumed by the poor at the time of scarcity in Madhya Pradesh and Orissa.

Note: Bor (1960) recognises two varieties in *I. rugosum* Salisb. var. *rugosum* in which the pedicelled spikelets are well-developed; and var. *segetum* Hack. (1889) in which the pedicelled spikelets are much reduced. Haines' (1924) description of *I. regosum* Salisb. includes both the varieties. The fact that Wallich 8864, F, from Nepal, 8864 G from Kumaon and Voigt s.n. from Serampur are included by Hackel in var. *genuina* and Wallich 8864 H from Silhet and g Voigt s.n. from Serampur are referred to var. *segetum*, shows that the two varieties are rather difficult to be distinguished.

Type: *I. prostratus* (L.) Anderss.

Note: It has a long polyploid series of chromosome numbers, including the unusual diploid counts of 698; probably not primitive, but derived from a basic number of 5 (Rao, *Nature* 255: 220-221, 1975).

1a. Pedicels of the involucral spikelet as broad at apex as long, sides and base densely bearded; glumes of the sessile spikelets ovate-obtuse, pubescent on the back, upper pedicels 3-3.75 mm long, capillary, glabrous..................*I. antheophoroides*.

1b. Pedicels of the involucral spikelets longer than broad; glabrous, glumes of sessile spikelets lanceolate, glabrous on the back; upper pedicels 1.25 - 2.5 mm long, slender, sparsely hairy:

2a. Pedicels of the involucral spikelets longer than they are broad at the apex; lower glume of the hermaphrodite spikelet glabrous at base, appressed hairy above and ciliate on the margin below; nodes more or less glabrous; hermaphrodite spikelets 4-6 mm long; spathes comparatively broad, devoid of tubercles; peduncle 2-2.5 mm long, not exerted, devoid of tubercles; pedicelled spikelets 4-25-5.25 mm long; glumes of sessile spikelets 3-25-5 mm and awns 1.1-1.25 cm long..................*I. laxum*

2b. Pedicels of the involucral spikelets much more longer than broad; lower glume of hermaphrodite
spikelet glabrous and ciliate on the lower quarter; nodes bearded; hermaphrodite spikelets 3.5-4.5 mm long; spathe very narrow, rarely without minute tubercles on the keels and margins; peduncle 7-12.5 mm long, very slender, often very exerted, tuberculate at apex; pedicelled spikelets 3.5 mm long; glumes of sessile spikelets 2.75-4 mm and awns 1 mm long.

*I. prostratum*


**Syntype**: "India Or. (Wall. Cat. No. 8767A), Peninsula (Wight. 2335) ........ Cuddappah, sine lect. pr Scholapur....."

Tufted perennial (very rarely annual) with culm 7.5-75 cm high, leafy below. Leaves short, 2.5-12.5 cm long, 1.7-4.5 mm wide, blades with margins scabrid, ligule of short fine hairs. Spathe usually glabrous, sometimes sparsely ciliate from rather large tubercles. Panicles long; peduncles very short, 2.5-5 mm. *Involucral spikelets* 4.5-6.5 mm long, broadly oblong, acute or acuminate, long-ciliate on the margins, their pedicels 2-2.25 mm long, compressed. Glumes coriaceous, 5.75-6.75 mm long, longitudinally depressed on each side of the midvein. Sessile spikelets 5-5.5 mm long, beak longer than the lower broader part. Glumes beaked, beak 2-keeled. Lower glume 5.5-6 mm long, appressed hairy at the base;
upper glume slightly shorter, flat, obtuse, 1-keeled, awn 1.3 cm long; lower lemma very narrow, ciliate. Anthers 2.2 mm long, yellow.


Ecology: Commonly found along the path especially on the red soil.

Distribution: India (Bihar, West Bengal, Orissa, Madhya Pradesh, Maharashtra, Andhra Pradesh, Tamil Nadu). Endemic.

Specimens examined: Nil.

Haines (l.c.) recorded its occurrence from Angul in Dhenkanal district and cited its probable occurrence in Sambalpur; Fischer (l.c.), from Ganjam coast and Mooney (l.c.), from Korlapat in Kalahandi District.

Uses: Regarded as an excellent fodder.


Syntype: India Orient. P. Patna et Munco (Wall. Numer list No. 8767 B. C., Peninsula Wight 1711, 167), Pondichery, Perrott. s.n. etc.

I. laxum Hack. forma ciliatum Haines, Bot.: 1056.

Type locality: Puri.

Panda Suali (Or.)

Perennial grasses. Stem 30-90 cm, ascending from a stout, rootstock, slender, weak. Leaves 3-17.5 cm long, 1.25-2.5 mm wide, sheaths lax, glabrous; ligule short, Panicle racemiform, long, narrow, with distant axillary pedunculate fascicles,
6.25–1.25cm long; outer spathes 6.2–2.5cm long, lanceolate, devoid of tubercles. **Involucral spikelets** 4–5 mm long; truly whorled, pedicellate, oblong-lanceolate, acute. Lower involucral glumes acute, sparsely ciliate, upper involucral glumes, oblong-lanceolate, acuminate, sparsely ciliate, lower lemma linear, glabrous, hyaline. Lodicules cuneate, retuse. Anthers long narrow. **Pedicelled spikelets** on long hairy pedicels, lanceolate, glabrous. **Bisexual spikelets** 4–6 mm long, narrowly lanceolate, glabrous; lower glume chartaceous, 2–fid, glabrous at the base, appressed-hairy above; upper glume lanceolate, acuminate, tip scaberulous; upper lemma slender, with a geniculate awn, to 1.25 cm long; the column equaling the subulate part.

**Fls. and frts.**: Jul. - Mar.

**Ecology**: Common on cotton soil.

**n**: 2n = 8 (Bor, l.c.)

**Distribution**: India, Pakistan, Sri Lanka, Australia.

**Specimens examined**: Orissa: *sine lect.* 1889, Walsh s.n. (Accn. No. 533006 - CAL); Ganjam Dist.: Chatrapur, Nov. 1899, Gamble 21521 (DD); Kalahandi Dist.: Annigarh, 20 Mar., 1943, K. Biswas 6202 (CAL); Karlapat, 600m, 10 Jul., 1949, Mooney 3457 (DD); Dhenkanal Dist.: Telkui Malyagiri Hills, 23 Dec., 1960, C.R. Rao 2469 (CAL).

Fischer (l.c.) also recorded it from Ganjam; Haines (l.c.), from Puri and Singh et Verma (l.c.), from Angul in Dhenkanal District.

**Use**: It is regarded as the best Indian fodder for cattle.

Andropogon prostratus L., Mant. 2: 304. 1771.

Type: "Habitat in India Orientali" Koenig.


Slender tufted leafy perennials, 30-90 cm tall. Stems often prostrate and rooting at base, nodes bearded. Leaves 3-20 (-22.5) cm long, 1.25-2.5(-3.8) mm wide, very slender, linear acute; sheaths lax; ligules short. Panicle linear-oblong compound, erect, spreading; spathes 0.7-1.25 cm long, linear-lanceolate, peduncles very slender. Involucral spikelets 3.5-4.5 mm long, male or neuter, shortly pedicellate. Lower glume subacute with 5 elevated ribs on the back, sulcate between the ribs; upper glabrous with broadly infolded margins; lower lemma shortest, 2-3-toothed, glabrous. Anthers 1.5 mm long. Pedicelled spikelets 3.5 mm long, with very slender pedicels. Bisexual spikelets 3.5-4.5 mm long. Lower glume flat or depressed longitudinally, acute; upper glumes like the lower, elliptic-lanceolate, acute or subobtuse, often mucronate, obtusely keeled on the back, glabrous; upper lemma with an awn, 0.6-1.25 cm long; the column exceeding the subulate part. Lodicules 2; cuneate, retuse. Stamens 3; anthers violet. Grains oblong, dorsally compressed.

Fls. and frts.: Jul.-Dec.
Ecology: Common in stagnant water and low lying ground of the plains.

Distribution: Throughout India, Pakistan, Burma, Sri Lanka.

Specimens examined: Ganjam, Dec. 1949, W. Wight 3047 (CUL); Kalahandi Dist.: Champabandh Mali, 660m, 17 Jul. 1949, Mooney 3533 (DD).

Choudhury & Patnaik (l.c.) recorded it from Hanspal, Bhubaneswar.

Use: Regarded as an excellent fodder in South India.

**JANSENELLA** Bor, Kew Bull. 1955: 96.


Type: *J. griffithiana* (C.Muell.) Bor (*Panthonia griffithiana* C.Muell.).

Monotypic species, distributed in India, Burma, and Sri Lanka.


Type: India, or. Khasya, Griffith s.n.

A weak annual, with leafy culms, 15-30 cm tall, often decumbent, smooth, glabrous. Leaf-blades linear to ovate, acuminate, 6 x 1.4 cm, softly hairy, ending in a sharp scabrid point, veins prominent on upper surface, with a few scattered hairs; sheaths loose, rounded on the back;
ligule very narrow, minutely ciliate. Inflorescence a compact panicle of crowded spikelets, ovoid-oblong, 1-3cm long. Spikelets often in pairs, one short- and one long-pedicelled, 6-9 mm long including the arista of the glumes. Glumes narrow. Lower glume ca 4-5mm long, ovate, acuminate, setose, ending in a short arista, membranous; upper glume elliptic-oblong, acuminate, up to 2 mm long, ending in a scabrid arista; lower floret or barren; lemma obtuse at the tip; palea elliptic-oblong to oblanceolate, 3 mm long, 2 keels narrowly winged, auriculate at the base of the flaps; upper lemma awned, bearing 2 apical setae. Lodicules 2, minute, cuneate. Stamens 3, anthers 0.7-1.7 mm long. Ovary if present rudimentary or well developed. Upper floret always bisexual; lemma deeply fissured x in bifid; awn up to 15mm long; column flat 5 mm long, tightly twisted when dry. Lodicules 2, minute, cuneate. Stamens 3; anthers 0.7-1.7 mm long. Ovary glabrous; styles 2, free; stigmas plumose. Grain oblong-obovate, 1.35 - 1.5 x 0.75 mm, glabrous.

**Fig. and frts.:** Aug.-Nov.

**Ecology:** On exposed situations among the grass and often on marshes and low banks.

**Distribution:** India, Burma, Sri Lanka.

**Specimens examined:** Koraput Dist.: Potangi, Mooney4082(DD).

**New Record for Orissa.**

**Uses:** Animals relish this grass.
Fig. 29. Lepisida hexandra. A. Plant.

**Type**: *L. oryzoides* (L.) Swartz (*phalaris oryzoides* (typi 0 cons.).


**Note**: The genus closely allied to *Oryza* L., but readily distinguished only by the absence of sterile lemmas.

**Leersia hexandra** Swartz, Prodr. Veg. Ind. Occ.: 21. 1788; Haines, Bot.: 981; Mooney, Suppl. 167; Bor, Grass.: 599, fig. 68.

**Type locality**: Jamaica.

Aquatic perennial grass. Stems slender, 60-120 cm high, rooting from geniculate base, nodes pubescent. Leaves stiff, 7.5-30 cm long, 2.5-10 mm wide, narrowed at base, acuminate, very scabrid; sheaths striate, scabrid; ligule truncate. Panicle not exceeding 10 cm, with slender distant branches, flexuous; tips of the pedicels not much dilated; rachis zig-zag. Spikelets closely imbricate, 2-5-4 mm long, oblong, planes-plano-convex, smooth on the sides, green. Lemmas obliquely - oblong, ca 3 mm long, 5-ribbed, unawned; palea much more slender, 3-veined; keels bristle-ciliate. Stamens 3 or 6 (Fig. 29).

**Common Fls. and frts.**: Oct. - Dec.

**Ecology**: In tanks and swampy places.

2n = 48 (Bor, l.c.).

**Distribution**: India, tropics of the Old and New worlds.
Specimens examined: Koraput Dist.: Pottangi, 900m, Nelpada, 8 Oct. 1950, Mooney 4026 (DD); Ganjam Dist.: Chatrapur, Nov. 1889, Gamble 21517 (DD, CAL); Kalahandi Dist.: Junagarh, 210 m, 17 Dec. 1948, Mooney 4171; Keonjhar Dist.: Sirkagutu, 900 m, 17 Dec. 1948, Mooney 2795 (both DD).

Mooney (l.c.) also recorded its occurrence from Bhatodih, 1000m, in Keonjhar District and Saxena et al. (1982) from Bhubaneswar.

Haines (l.c.) recorded it from Bihar and West Bengal only.

Uses: A good fodder for cattle.


Note: Annual or perennial herbs; spikelets may-flowered in 2-ranked spikes and placed edgewise.

**Lolium temulentum** L., Sp. Pl.: 83. 1753; Bor, Grass.: 546; Saxena et al., Ind. J. For. 5 (2): 103. 1982.

var. temulentum

Annual. Stems 15-45 cm tall, erect, stout. Leaves 3-8 mm long, linear, broad, flat; sheaths smooth or scaberulous; ligules very short. Spikes 15-25 cm long, strict, with stout rachis. Spikelets 3-8-flowered, oblong-cuneate, very variable in size and shape. Glumes linear, equalling or exceeding the spikelets, many-veined; lower glume 0.7-1.8 cm long, erect,
rigid; upper glume reaching near to or exceeding the upper lemma, ovate, at least half the length of the spikelet; lemma 6-8 mm long, elliptic to ovate, rounded on the back, very turgid, awned from the tip. Lodicules 2, fleshy. Stamens 3. Ovary glabrous; styles 2, terminal, free, feathery to the base; stigmas plumose. Grains elliptic-oblong, glabrous, adherent to the lemma and palea.


Note: Saxena et al. (1982) reported the temperate species from Bhubaneswar; its identity is doubtful, unless its seeds got mixed up with some crop.
to the spikelet; ligules arose or setosely lacerate; lemma minutely hairy on the back; terrestrial ......................... L. Panicea


Type: India, " (Possibly an error for China)" Osbeck (LINN, holotype).

Stouter aquatic or semiaquatic short-lived perennials, 30-120 m high. Culms rooting at the base, erect or geniculate, sometimes stoloniferous, compressed, branched. Leaves narrowly linear, flat or convolute, 6.5-45 cm X 2.5 mm, scaberulous; leaf-sheaths subequal, broad and loose, complicate, glabrous, smooth; ligule short, 1-2 mm long, lacerate. Panicles usually 25-40 X 6-10 mm, loose, shortly exerted. Racemes 3.5-10 cm long, bearing usually solitary. Spikelets; pedicels 0.5-0.8 mm long. Spikelets 2.5-3.5 mm long, with 3-7 flowers. Glumes 5-6, unequal, shorter than the spikelets; lower glume, 1-1.5 mm long, narrowly ovate, acuminate, cuspidate; upper 1.5-2.3 mm long, ovate; lemma 1.3-1.5 mm long, elliptic, obtuse, entire or emarginate, muticous, strongly keeled, scaberulous on the keel upwards; palea shorter, pubescent all over or glabrous between the keels. Lodicules 2, cuneate. Anther 3, short. Styles 2, free. Grain loose, 0.5-0.8 mm long, elliptic or elliptic-oblong, obtuse, dorsally compressed, striate and rugulose.


Ecology: A weed of roadside and river-beds in moist places.
Distribution: India, Pakistan, Nepal, Bangladesh, Burma, Sri Lanka, China, Japan, Malaya, Thailand, Indonesia, Philippines, New Guinea, East Africa.


Note: This species is characterized by the dorsally compressed grain, pubescent lemma and palea, 5-6-flowered scarcely contiguous spikelets, somewhat similar glumes, short, relative to the spikelet, distinctly fimbriate ligule and hollow herbaceous culms with geniculate rooting nodes and aquatic habit.

Leptochloa panicea (Retz.) Ohwi, Bot. Mag. Tokyo 55:311. 1941; Bor, Grass. 517.


Type: China, Bladh (LD, Holo.)

Leptochloa filiformia sensu Hook. f., FBI 7: 298. 1896; Haines, Bot.: 972; (as Roem. et Schult.) non (Lam.) Beauv. 1912.

Annuals or short-lived perennials, 30-60 cm high. Culms thin, slender, erect or ascending. Leaves flat, 3.5-12 cm x 2-5 mm; leaf-sheaths usually shorter than their internodes, bilose to hirsute with weak tubercled-based hairs, 2-3 mm long; ligule 0.5-1.3 mm long, erose or setosely lacerate. Panicle 5-29 x 1.5-10 cm, loose. Racemes very slender, 2-5-9 cm long. Spikelets 1-2 mm long, 2-3-flowered. Glumes subequal; lower glume 0.75-1 mm long, narrowly ovate or linear-lanceolate, acuminate cuspidate; upper glume ca 1.3 mm long, narrowly oblong, acute, muticous; lowest lemma 0.2-1 mm long.
broadly elliptic or elliptic- oblong, obtuse, palea rather shorter, reduplicate, broadly ovate, obtuse, pubescent between the keels and on the submargins. Grain ca0.5 mm long, fusiform- oblong or obtusely trigonous, concave on the front; pericarp slightly produced each end.

Fls. and frts.: Jul.-Nov.

Ecology: A weed of the meadows and waste places.

Distribution: India, Pakistan, Bangladesh, Sri Lanka, China, Japan, Thailand, Indonesia, Phillipines, West Africa.

Native to tropical S.E. Asia.

Specimen examined: Puri Dist.: Khurda, 1889, Walsh 24 (CAL); Orissa: sine loc., 1888, Walsh s.n. (Accn. No. 539882 - CAL); Cuttack Dist.: Ravenshaw College ground, Cuttack, 24 Jul. 1916, sine lect s.n. (Rav.Coll.Herb.).

Note: This species is characterised by the plumb trigonous grain; pubescent lemma and palea; few flowered (2-3) spikelets; subequal glumes, long, relative to the spikelet and hairy leaf-sheaths.

Clayton et Rennoize (1986) reduce Diplachne P. Beauv. (1812) as a congeneric synonym of Leptochloa P. Beauv. (1812). But we treat the two genera as distinct.


Type: M. royleana Nees (= M. jacquemontii Jaub. et Spach.)

Type: G. nutans Hook. f. (=M. monocca (Rottl.) C.C. Fischer).

Melanocenchris jacquemontii Jaub. et Spach. Ill. Pl. Br. 4: 36, t. 325. 1851; Bor, Grass.: 473.
Type: India, Jacquement. (K, P)

*M. royleana* Nees (in Ann. Mag. Nat. Hist. 7: 221, 1841, nomen,)

Type: India, Royle


A small annual grass. Stems 7.5-20 cm high, densely tufted, very slender, with convolute, very narrow leaves, not aggregated at the base, 2.5-5 cm long, margins ciliate; sheaths with a few long scattered hairs; ligule a hairy ridge. Spikes filiform, 1.25-5 cm long, rachis flexuous. 3- gonous, smooth. Upper spikelets in the cluster sometimes imperfect, to 8 mm long including the awns, green or purple. Glumes 4-6; lower glume &7.5 mm long with its awn, densely ciliate; awns of the glumes longer, whereas the awns of the lemmas are shorter. Lodicules 2, cuneiform. Stamens 3; anthers small. Styles 2, free; stigmas plumose. Grains ca 1.5 mm long.


Ecology: Commonly found in dry desert area.

Distribution: India, Pakistan, Socotra, Nubia.

Specimens examined: Bolangir Dist.: Bhalu Dungari Hills 180 m, Tarwa in Sonepur, 6 Apr. 1944, Mooney 2403 (DD).

Mooney (l.c.) also recorded its occurrence from the western boundary of Sambalpur.

Note: Steudel (1854) ascribed *M. royleana* to Nees (Ann. Nat. Herb. 7: 221.) and described the species.

MICROCHLOA
1810; Haines, Bot. Bih. & Or.: 964 (1010) 1924; Bor, Grasses:  

Type: \textit{M. setacea} R.Brown, nom. illeg./\textit{Nardus indica}  
L.f., \textit{M. indica} (L.f.) Hackel.

1a. Annual; loosely caespitose, 7.5-20 cm high;  
leaves up to 2 cm long, glabrous or nearly so;  
spikelets up to 2 mm long; anthers ca 0.6-1 mm  
long. \textit{M. indica}.

1b. Perennial densely caespitose, 25-60(-80) cm high,  
the base clothed with fibrous remains of leaf-  
sheaths; leaves up to 10 cm long, minutely  
scabrid on both surfaces; spikelets up to 3 mm  
long; anthers ca 1 mm long. \textit{M. kunthii}.

Pl.: 13, t. 2018, 1812; Mooney, Suppl.: 164; Bor, Grass:  
473.

Type: "Habitat in Tranquebaria in India", Koenig" (LINN.,  
microfiche CAL !).

\textit{Rottboellia setacea} Roxb., Cor. Pl. 2: 17, t. 132. 1798,  
nom. superfl. illegit.

Type: Same as for \textit{Nardus indica} L.f.

\textit{Microchloa setacea} R.Br., Prodr.: 208. 1810; Haines, Bot.:  
964, nom. superfl. illegit.

Very small annuals, 7.5-15 (-20) cm high, with tufted  
slender stems, branched or almost simple, compressed below,
glabrous, smooth. Leaves 0.7-4 cm long, filiform, crowded at the base, plicate, usually glabrous, with 2 fine raised veins. Spikes solitary 2-5-10(-15) cm long, very slender, usually curved; rachis flattened with rounded back, minutely ciliate, with sessile spikelets inserted on either margin. Spikelets 1-flowered, dorsally compressed, in a single row, 1-5-2 mm long, erect, close-set, glabrous. Lower and upper glumes subequal, 2-2.5 mm long, lanceolate-oblong, acute or acuminate; lemma 1.5 mm long, shortly acuminate, with very minute rachilla; palea villous on the veins. Anthers ca 0.6 mm long. Grains oblong, free within hyaline glumes.

*Gls.* and *frts.*: Aug.-Dec.

**Ecology:** On sand dunes, old walls and also growing on well-drained soils.

**Distribution:** Throughout India, Pantropics.

**Specimens examined:** Koraput Dist.: Udayagiri, 14 Dec.
1960 P.C. Nanda, 2346 (CAL); Kalahandi Dist.: Junagarh, 140 m, 22 Jul. 1949, Mooney 3555; Kalahandi, Aug. 1949, Mooney 3568; Sambalpur Dist.: Mundkati, 210m, Barapahar, 16 Sept. 1949, Mooney 3584; Motijharan, 11 Sep. 1949, Mooney 3575; Sambalpur, 2 Sep. 1946, Mooney 2736; Bhatli, Barapahar Division, 15 Sep. 1949, Mooney 3577; Rairakhol, Kuakholl, 120m, 24 Aug. 1950, Mooney 3972; Sambalpur, Mooney 3099; Dhenkanal Dist.: Angul, 150 m, 1 Sep. 1949, Mooney 3574; Dhenkanal, 120m, 29 Aug. 1946, Mooney 2719 (all DD); Puri Dist.: Ratanpur, 25 m, 21 Nov. 1954, N.K.C. Patnaik 845 (Rav. Coll. Herb.); Cuttack Dist., Mahanadi embankment, Cuttack, 15 m, 25 Aug. 1946, Mooney 2704 (DD).
Mooney (l.c.) also recorded it from Jankia Road, 30 m, Ranpur in Puri District; Champua, Keonjhar, and Anandpur in Keonjhar District and Gangpur and Sundargarh.

**Microchloa Kunthii Desv.,** Opusc.: 75. 1831; Mooney, Suppl.: 262; Bor, Grass.: 473.

**Holotype:** Tropical America, Desvaux (P).

*M. elongata* R. Br. in Wall. Nümer. List. No. 3807 (1831), nom. nud.

Perennial. Culms ca 80 cm high, slender, densely caespitose, terete, glabrous. Leaves ca 10 cm long, 4 mm wide, involute or plicate, rarely flat, scabrid; sheaths clasping the stems, smooth, glabrous or scaberulous, keeled; ligule ca 1 mm long, ciliate. Spike up to 15 cm long on a glabrous peduncle; rachis rough, slender. Spikelets 2-seriate, up to 3 mm long, subulate-lanceolate. Lower glume as long as spikelet, narrowly lanceolate, 1-veined, keeled; upper glume similar. Lemma 1.25 mm long, covered on the back with hairs ca 1 mm long, hyaline; palea hyaline, 2-veined; keel hairy. Lodicules 2. Stamens 3; anthers 1 mm long. Grains oblong.

**Rate & Fls. and Frts.** : August-Nov.

**Ecology:** In sandy shallow soil of waste land.

**Distribution:** North-eastern India and Madras hill, Burma, China, Malaya, Tropics of Africa and South America.

**Specimen examined:** Koraput Dist.: Sonabera, 750 m, 20 Sep. 1949, Mooney 3659 (DD).

**MICROSTEGIUM** C. G. D. Nees in J. Lindley,


1a. Leaves 20—30 X 2-2.5 cm, narrow; spikes 8-10, up to 4 cm long; joints about as long as the spikelets; spikelets 5 mm long, pale green; lower glume linear-oblong; keel-apex truncate; palea oblong-lanceolate, ciliate; upper lemma well developed, split to the middle into two long, glabrous triangular lobes. *M. petiolare*

1b. Leaves 2.5—15 X 0.5—1.25 cm, narrowly lanceolate; spikes 2-10; joints shorter than the spikelets; spikelets 2-3.5 mm long, pale, lower glume lanceolate to lanceolae-oblong; keel-apex ciliate; palea ovate or oblong, hyaline; upper lemma small, very shortly 2-lobed or entire. *M. ciliatum*


Type: "Nepal", Wallich s.n. (K)


Type: "Ind. Or., Wallich Numer. List. No. 8819" (K-W).

*Microstegium monanthum* (Nees ex Steud.).


A slender gregarious grass with much branched stem, 30-120 mm, tall, nodes rather thickened, glabrous and the internodes
terete, polished. Leaves 2.5-15 x 0.5 - 1.25 cm, narrowly lanceolate, tapering both ends, acuminate, sometimes shortly petiolated, base contracted, rather flaccid. Spikes 2-10, fascicled, 3-75-10 mm long, very slender, pale green or yellowish-brown. Spikelets sessile and pedicellate, 2-3.5 mm long, pale, nodes glabrous; callus short, blunt, bearded. Lower glume lanceolate to lanceolate-oblong, flattened dorsally and grooved, margins inflexed; keels scabrid-ciliate and tips ciliate; upper glume cymbiform, acuminate; keels scabrid-ciliate; lower lemma absent; upper minute, hyaline, rounded, 2-toothed, with an awn, ca 1 cm long; palea 1 mm long. Very minute, ovate or oblong, hyaline. Anthers large, 1-1.8 mm long, linear.


Ecology: Gregariously growing under shade, particularly in dense sal forests.

Distribution: India, Pakistan, Nepal, Bangladesh, Burma, Sri Lanka.

Specimen examined: Kalahandi Dist.: Bichnapatra ravine near Karlapat, 710 m, 25 Dec. 1939, Mooney 1202 (DD).

Note: Mooney (l.c.) treats *M. ciliatum* A. Camus and *M. monanthum* A. Camus as two distinct species as cited below:

1a. Lower floret absent; spikelets 2-2.5 mm long... *M. monanthum*

1b. Lower floret present; spikelets 2.5-4 mm long... *M. ciliatum*


Tall stout grass, 60-100 cm high, pubescent below the spikes. Leaves 20-30 x 2-2.5 cm, narrowed, sectaceously acuminate, hairy, margins scabrid; sheaths glabrous or margins ciliate; ligule oblong, truncate, stiff. Spikes 8-20, 1.25-4 cm long, subpaniculately fascicled; rachis glabrous; axils bearded; joints and pedicels flattened. Spikelets 5 mm long, oblong-lanceolate, pale greenish; callus minute, shortly bearded;

Lower glume linear-oblong, chartaceous; upper glume cymbiform acuminate or mucronate, chartaceous; keel scabrid, 3-veined; upper lemma well developed, split to the middle into two long, glabrous, triangular lobes; palea oblong-lanceolate, 2-veined, ciliate.


Ecology: A scrambling true forest grass.

Distribution: India (Uttar pradesh, Assam, Meghalaya, Orissa), Nepal, Burma.

Specimen examined: Nil.

Panigrahi et al. (l.c.) recorded its occurrence only from Patna (Panigrahi 21001) in Bolangir District.

Note: This species is characterized by the large lemma which divides into two acuminate lobes.

Mnesithea Künth, Reg. Gram. 1: 153. 1829; Haines, Bot.: 1060, 1924; Bor, Grass.: 196, 1960;


Type: M. laevis (Retz.) Kunth (Rottboellia laevis Retz.)

Mnesithea laevis (Retz.) Kunth, Reg. Gram. 1: 154, 1829;
Mooney, Suppl. : 194 ; Bor, Grass. : 197.


Type : India : "Misit Tranquebaria", Koenig.


Type locality : "it grows on low rich pasture ground of coast of Coromandel ".

Mnesithea perforata (Roxb.) Haines, Bot. : 1060.

Perennial erect or somewhat decumbent grass. Culms 30-120 cm high, with distant glabrous nodes. Leaves 2-5-50(-75) cm long, 2-5-9 mm wide, very narrow, linear, flat or conduplicate, with glabrous or scaberulous margins and midrib; sheaths villous at the mouth. Spikes 5-12 cm long; joints 3-5-4.5 mm long. Lower glume 2.5-3.8 mm long, oblong-rounded at the tip, coriaceous; upper hyaline. Lodicules 0. Stamens 3.

Grains oblong.


Ecology : In depressions and moist soils.

Distribution : India (Punjab, Uttar Pradesh, Bihar, West Bengal, Orissa), Pakistan, Burma, Sri Lanka, Afghanistan, Thailand, Malaya Islands, Indo-China, Indonesia, Afghanistan.


Mooney (l.c.) also recorded its occurrence from Gunupur in Koraput District.

Uses : Young plants are eaten by cattle.


Type: M. wightiana (Nees ex Steud.) J.D.Hooker, (Leptochloa wightiana Nees ex Steud.).

Note: A monotypic genus.


Type: "India Orientalis, Wight herb." (Labelled) Dinebra Verticillata Wight ex Steud., nomen.

var. wightiana

Tall, stout, perennial grass. Culms up to 3.5 m high; rootstock sheathed, sometimes floating, with long, thick, more or less branched roots. Leaves 1.25 - 1.7 cm wide, narrowly linear, acuminate, quite smooth; sheaths very long, narrow, broad and compound near the lower leaves; ligule. Panicles (Spikelets) 30-60 x 2.5-3.8 cm; rachis smooth, branches 2.5-3.8 cm, crowded, fascicled, whorled, erectopatent, flowering to base. Spikelets 4-8-flowered, 6.2-8 mm long. Glumes 2.4-6 mm long, coriaceous, persistent, subequal, lanceolate, terminating into a stout awn, 1-veined; lemmas ovate-lanceolate, narrowed into a very short, scabrid awn, 3-veined, keels smooth; paleas equal to keels, acuminate, chartaceous, 2-toothed, 2-keeled; Keels ciliate, containing each a bisexual floret. Lodicules 2, small, Stamens 3; anthers minute. Styles 2, free. Grain ovoid or obliquely ovoid, sub-erect.

Fls. and frts.: Aug. - Nov.

Ecology: In muddy soils of tidal forests.

Distribution: India, Burma, Sri Lanka, Malaya, Siam (Thailand), Indo China.

Specimen examined: Light house (Batighar), Paradeep, 2 Sep. 1968, L.K. Banerjee 571 (CAL).

Note: Bor (1960) recognises two varieties of which var. wightiana occurs in Orissa.
OPLISMENUS P. Beauvois, Fl. Oware et Benin 2:
14. t. 58, Sep. 1810 ("1807"), nom. cons.; Haines, Bot.: 999.
1924; Bor. Grass.: 315. 1960; Clayton et Renvoize, Kew Bull.

Type: O. africanus P. Beauvois.

rej.

Type: O. compositus (L.) R. Br.

Note: Weak grasses with stems decumbent below and 1-flowered
spikelets. This grass exhibits an unusual means of fruit
dispersal due to sticky secretion on the awn.

1a. A tall perennial branching grass; culms slender
to robust, up to 90 cm high; leaves 2-17.5 x 0.6-
2.5 cm; panicles up to 30 cm long; spikes distant,
few to many, up to 7.5 cm; rachis of the spike
without long white hairs; spikelets over 2.5 mm
long; lower lemma longest, ca 5 mm; awn purple
or reddish, smooth, viscid, filiform stiff.

... O. compositus

1b. A small diffuse annual; culms slender up to
45 cm high; leaves 1.25 - 5.5 x 0.5 - 1.3 cm;
panicles up to 10 cm long; spikes distant or close,
few up to 1.75 cm, rachis of the spike with long
white hairs; spikelets 2.5 mm long or less; lower lemma up to 2.5 mm; awn pale, barbellate, capillary, often flexuous ..... O. burmannii

**Oplismenus burmannii** (Retz.) P. Beauv., Easai Agrost. 54: 168, 169. 1812; Haines, Bot.: 999; Bor, Grass.: 317.


**Holotype**: India, Koenig (LD)

**Panicum hirtellum** Burm. f., Fl. Ind.: 24, t. 12. fig. 1, 1768, non Linn. 1753.

**Type locality**: India.

Slender delicate annual up to 45 cm high with diffuse branching; nodes glabrous or hairy. Leaves 1.25 - 5.5 cm long, 5-13 mm wide. Ovate or ovate-lanceolate, acuminate, sparsely pilose on both sides with long slender white hairs; sheaths ciliate. Panicle 2.5 - 10 cm long. Spikes few, distant or close, sub - sessile, up to 1.75 cm long. Spikelets 1.75-2.5 cm
long excluding the awn, 1-2-nate on short hairy pedicels, awns capillary, up to 1 cm long, Lower glume obtuse; upper glume equal, but subequal to the lower, awn 2-5-5mm long; lower lemma up to 2.5 mm long excluding the awn, ovate, subobtuse, empty, epaleate; upper lemma as longer as the lower, ovate, acute, membranous, with incurved margins; pales as long as the glume, membranous, ovate-oblong, acute, with strongly involute margins. Lodicules 2, minute, cuneate. Stamens 3. Styles distinct, long; stigmas exerted at the top of the glume.

**Fls. and frts.** : Sep.- Oct.

**Ecology** : A shade loving grass of xeric places.

2n = 72 (Bor, l.c.).

**Distribution** : India (throughout), tropics of both hemispheres.

**Specimens examined** : Koraput Dist.: near Sonabera plateau, 650 m, Mooney 3656 (DD); Ganjam Dist.: Mukundapur, 18Oct. 1930, Narayanaswami 4682 (MH); Sambalpur, 19Oct. 1936, Mooney 2 (CAL); Puri Dist.: Khurda, 1889, Walsh s.n. (Accn. No. 523782 CAL); Khandagiri, 19 Sep. 1936, *sine lect.* s.n. (Rav. Coll. Herb.).

Haines (l.c.) cited Walsh's specimen collected from Puri; Singh et Verma (1963-64), from Angul in Dhenkanal District and Choudhury et Patnaik (1983), from Khandagiri - Udayagiri hills of Puri District respectively.

**Uses** : A good hay making and fodder grass liked by cattle.

**Oplismenus compositus** (L.) P. Beauv., Essai Agrost.: 54.168, 169. 1912; Haines, Bot.: 999; Mooney, Suppl.: 176; Bor, Grass.: 317.

**Holotype**: "Habitat in Zeylona" (Ceylon), Hermann (BM)

Kau-guria (Or.)

Perennial grass in gregarious patches with diffuse branches. Stems 15–20 cm high, slender to rather robust, rooting below and then ascending, glabrous. Leaves 2–17.5 × 0.6–2.5 cm, ovate to ovate-lanceolate or lanceolate, acuminate; sheaths with ciliate margins; ligule short, membranous. Panicle up to 30 mm long, spikes distant, few to many. Spikelets 1–2-nate, distant, 3–4.5 mm long, lanceolate-ellipsoid, green; awns acicular, up to 11.25 mm long, smooth; pedicels very short. Glumes silky or hispidous; lower glume 1.25–2.5 mm, ovate-lanceolate, acuminate, with a viscid stout awn, 3–7–10 mm long; upper glume ca 3 mm long including a short mucro or awn, broader, membranous; lower lemma longest, ca 5 mm long, broadly ovate or lanceolate to elliptic, sub-acute; palea narrow; upper lemma similar to lower but coriaceous. Lodicules 2; minute. Staminens 3. Stigmas exerted. Grains oblong-ellipsoid, free within the hardened glume and palea.

**Pls. and frts**: Aug. – Jan.

**Ecology**: This forest grass in glades and open shady damp places.

2n = 72 (Bor, l.c.)

**Distribution**: India (throughout), tropical regions of the world.

**Specimens examined**: Ganjam Dist.: Parlakimedi, Sep. 1903, Grant, Candler et Burkill 20548 (BSIS); Sambalpur Dist.:
Usha Kothi Block, Bamra, 540 m, 20 Oct. 1949, Mooney 3730
(DDB); Dhenkanal Dist.: Bolong in Angul, 2 Jan. 1962,
D.M. Verma 1512 (CAL).

Mooney (l.c.) recorded it from Kalahandi, Kapoor (1965),
from Mahendragiri hills of Ganjam District and Saxena et al.
(1982), from Bhubaneswar.

Note: The sticky awns become attached to animals and
thus seeds are distributed in this manner.

Oropetium Trinius, Rund. Agrost.: 98: t.3:1822
("1820"); Haines, Bot.: 964. 1924; Bor, Grass.: 474.

Type: O. thomaeum (l.f.) Trin. (Nardus thomae L.f.)

Note: The grass is recognised by its small size, densely
tufted erect stem with narrow filiform leaves and spicate
inflarescences with minute spikelets.

1a. Mostly perennial; culms large, 2.5-10 cm high;
leaves up to 7.5 cm long; sheaths pubescent; spikes
2.5-8.75 cm long; spikelets 1-2-flowered, completely
enclosed within the cavities of the flattened rachis;
lower glume 1-veined; grains narrowly linear...O.roxb...

............O. roxburghianum

1b. Small tufted annual; culms very small, 1.25-3.75 cm
high; leaves up to 2.5 cm long; sheaths with
hyaline margins; spikes 1.25 - 1.5 cm long;
spikelets 1-flowered, embedded in the depression
of the rachis, not completely enclosed; lower
glume 3-veined; grains oblong.............O. villosulum


Type locality: "A native of peninsula of India"

Rottboellia biflora Roxb., Pl.Ind. 1 : 357.1820, non Roth, 1802.

Type locality: Same as for Lepturus roxburghianus Steud.


A peculiar small perennial green grass with stems 2.5-10 cm high. Leaves 1.25-7x.5cm long, narrow, linear-lanceolate, setaceous, flexuous, flattened, margins ciliate; sheaths very short, pubescent; ligule minute, 2-auricled. Spikes 2.5-8.75 cm long, terminal, stout, strict, erect. Spikelets completely enclosed within the cavities of the flattened rachis, but they are still sometimes 2-flowered, when 1-flowered, an extension of rachilla is clearly visible. Lower glume 0.75mm long; sunk in the hollow of the rachis, obliquely ovate, 1-veined, hyaline, with a long awn or arista; upper glume ca 3.2 mm long, linear-oblong, obtuse; lemmas 2.5mm long, minutely 3-toothed; palea not winged. Lodicules 2, minute. Stamens 3, anthers very short, filaments long. Ovary short; styles 2, short, free, bases remote, divergent. Grain very narrow, free within the lemma and palea.

Fls. : Jul.

Ecology: In shallow moist or dry localities.

Distribution: India (Punjab, Orissa, Maharashtra, Andhra-Pradesh, Tamil Nadu), Endemic.

Specimen examined: Kalahandi Dist.: Jantibandh Mali, 1100 m, in Karlapat, 17 Jul. 1949, Mooney 3530 (DD.).
Note: *Oropetium roxburghianum* (Steud.) Phillips was misplaced under *Tripogon* Roem. et Schult. It has been excluded from *Oropetium* Trin. chiefly because it is often 2-flowered, and when 1-flowered, has an extension of rachilla. There is no justification for placing this species in *Tripogon* Roem. et Schult.

The latter has triguetrous rachis bearing exposed, several-flowered spikelets with membranous glumes, both well developed, and membranous lemmas without inflected margins. Steudel (1854) described *Lepturus (?) roxburghianus* Steud. and cited *Rottboellia biflora* Roxb., Fl. Ind.: 357. 1820, Ind. Or. as an obligate synonym. Although he did not refer to *Rottboellia biflora* Roth Neue Betr. (?) Zur. Bot. (? 1802) and did not state why he proposed a new name. Therefore, *L. roxburghianum* Steud. may be accepted as an *nom. nov.* (Art. 72.1).

*Oropetium villosulum* Stapf ex Bor, Kew Bull. 1949: 571. 1950;
Mooney, Suppl.: 261; Bor, Grass.: 474.

Type: India, Central provinces: "Rocky bed of stream below Humar, Nemar District", 21 Dec. 1888, J. F. Duthie 8523 (K, holotype; isotype, CAL).

A very small tufted annual, 1.25-3.75 cm high, with caespitose stems. Leaves up to 2.5 cm long, linear, acute, rigid; sheaths striate, glabrous; ligule extremely small. Spikes 1.25-1.5 cm long, slender, simple, terminal. Spikelets 1-flowered, embedded in the depressions of the rachis, 1-1.5 mm long, solitary, sessile. Lower glume up to 1 mm long or 0, minute, hemispherical, veinless, hyaline; upper glume 2 mm long, rigid, ovate-obtuse; lemmas 1.5 mm long, elliptic, hirsute 3-veined; palea equal to lemma, 2-keeled. Lodicules 2, very small. Stamens 3. Styles 2.
stigmas plumose. **Terminal spikelet** 3.75mm long. Glumes equal, lanceolate, long, coriaceous, acuminate with recurved tips. Grains oblong, terete, glabrous.

**very rare grass. Fls. and fts.:** Aug.- Dec.

**Ecology:** In very arid situations of the hills.

**Distribution:** India (Uttar pradesh, Orissa, Madhya pradesh, Gujarat, Maharashtra, Andhra pradesh), Endemic.

**Specimen examined:** Koraput Dist.: Sonabera 660m, 29 Sep. 1949, Mooney 3660 (DD,K).

Bor (l.c.) has cited the specimen (H.F.Mooney 3560 in K and CAL) collected from Sambalpur.


**Type:** Q. sativa L.

**Note:** Q. xx xxx xxx. The grasses are characterised by flat or convoluted leaves; spikelets loosely panicled, 1-flowered.

**Oryza sativa L.** along with its several varieties are cultivated throughout the province. A south- east Asiatic origin.

1a. Ligule of the lower leaves very long, 15-45 mm long.......................... Q rufipogon

1b. Ligule of the lower leaves much shorter, not more than 6 mm long;

2a. Panicle narrow; branches 2-3 cm long, spikelets 5-6.5 mm long, ovate-oblong, grey, absolutely glabrous, rarely awned; surface of the fertile lemma and palea coarsely irregularly granulate. Q. meyerina

2b. Panicle broader; branches more than 3 cm long; spikelets 8-9 mm long, oblong, yellow, dark brown
or black, hispid or pectinate-ciliate on the keels; surface of the fertile lemma and palea smooth, very finely and regularly vertically and horizontally striate...........................O. jeyporensis.

234 - 236. 1958; Bor. Grass.: 606.

Type locality: Jeypore tract along cultivated rice-fields near Papadahandi village of Nawarangpur sub-division of Koraput district.

An annual grass of ca 1 m high with showy, broad leaves and lax panicles, auricles white, 12.5 - 20 mm long; internodes 20 - 25 cm long. Leaves 30-32.5 X 1.5-1.8 cm, broadly lanceolate, acute; ligule 0.3-0.5 mm long, triangular. Panicles erect, exerted, 21.8 - 26.2 cm long. Spikelets 7-8.5 X 2-2.5 mm, awns 3-6.5 cm long. Sterile lemma acute, larger than the fertile lemma, 5-veined. Grains not glutinous.

Fls. and frts.: May-Nov.

Ecology: Growing along the tract of cultivated rice-fields.

2n = 24 (Bor, l.c.).

Distribution: India (Orissa). Endemic.

Specimen examined: Nil.

This species was reported by Govindaswami and Krishnamurthy (l.c.) from Papadahandi village of Nawarangpur, in Jeypore tract of Koraput District.

Oryza meyeriana (Zoll. et Mor. ex Steud.) Baill., Hist.Pl. 12:
166. 1893. 1894; Mooney, Suppl.: 167; Jain et al., JBNHS 72 (3); 770. 1971 (1975).

Type: "Javae prope Tjikoyar, 27 Nov. 1842. No.718."


Syntype: Madras, Wight Cat. n. 2354 ex Wall. Number List No.8634"

Slender, tufted grass of about 60 - 100 cm long. Leaves 7.5-15 cm, thin, with distinct veins; sheaths very long; ligule very short, about 6 mm. Panicle narrow; branches 2-3 cm long, spikes slender on very long slender peduncles. Spikelets 5-6.5 mm long, ovate-oblong, grey. Glumes minute or 0; surface of the fertile lemma and palea coarsely and irregularly granulate. Stamen 6; anthers linear. Styles short, free; stigmas laterally exerted. Grains narrow.


Ecology: In scrub jungle, especially in most habitat under moderate shade.

2n = 24 (Bor, l.c.)

Distribution: India, Burma to Malaysia.

Specimen examined: Dhenkanal Dist.: near Deogarh, 10 Sep. 1942, Mooney 2044 (DD).

Mooney (l.c.) also recorded it from Saptasajya hill, 450 m, in Dhenkanal District and from Niyamgiri, 630 m in Kalahandi District respectively.

Haines (l.c.) recorded from Bihar only.

Oryza rufipogon Griffith, Notul. 3:5. Pl. 145, f. 2, 1851; Bor, Grass.: 605; Sharma et Shastri, BBSI 6:211.1964 (1965);


Type: East Bengal: Hubbegunge et Nubbegunge (now spelt as Habiganj and Nabiganj), 1 Oct. 1835, Griffith.

O. sativa Linn. var. fatua prain, Bengal Pl. 2: 1184.1903.

Syntype localities: Orissa; Sundaribans; W.Bengal: N.Bengal

Wild rice, Wild grass (Eng.)

Annual grass with culms up to 2 m high, spongy below, rootlets developing from the nodes below the water. Leaves 10-40X0.5-1 cm, linear, flat, distinctly veined, margins scabrid; sheaths, striate, markedly inflated at the base, smooth; ligules ca 1 cm long, membranous, finally splitting. Panicles effuse, joints bearded, pedicels minutely scabrid. Spikelets caducous. Lower lemma ca 2.5 mm long, empty, 1-veined; upper lemma cymbiform, compressed, with a conical callus; palea similar to lemma; awn purple. Stamens 6. Stigmas exerted. Grains linear or linear oblong.

Fls. and frts: Sep.-Dec.

Ecology: Common on swampy and watery places of the plains.

Distribution: India, Bangladesh, Burma, Sri Lanka.

Specimen examined: Mayurbhanj Dist.: Kuchai, 25 Aug. 1940, sine lect 889 (DD).

Choudhury et Patnaik (l.c.) recorded this species from Nandankanan and Bhubaneswar, and Misra and Misra (l.c.) from Parlakimedi in Ganjam District respectively.

Use: The grains are also eaten at the times of scarcity and cattle also eat where no other fodder is available.

Note: A noxious weed of rice-fields and is difficult to eradicate. It freely hybridizes with cultivated rice.


1a. Leaves oblong- lanceolate or ovate- acuminate, a.mplexicaul asymmatric at base; spikelets somewhat gibbous. ........ *P. brevifolium*.

1b. Leaves linear to narrowly lanceolate; symmetrical at base; spikelets symmetrical ;

2a. Spikelets 4-5 mm long, sharply acute, ovate to elliptic in back view. .......... *P. miliaceum*.

2b. Spikelets up to 3.5 mm long, rarely up to 4 mm, and if so, with narrow-lanceolate spikelet :

3a. Spikelets ca 1.5 mm long ........ *P. walense*.

3b. Spikelets over 1.5 mm long :

4a. Lower glumes cuspidate - acuminate, gaping ........... *P. trypheron*.

4b. Lower glumes not cuspidate-acuminate, not gaping :

5a. Spikelets narrowly lanceolate to lanceolate oblong, acute ;

6a. Lower glume ovate, acute or obtuse, one-third the length of the spikelet ; spikelets 2 - 2.25 mm long ; panicle-branches densely spiculate ..... *P. auritum*. 
6b. Lower glume orbicular, rounded or truncate, one-sixth to one-fourth the length of the spikelet; spikelets 2.5 - 4 mm long; panicle-branches loosely to closely spiculate:

7a. Culms spongy, floating; leaf-blades broad, flat, green; spikelets 3 mm long, narrowly lanceolate; floating glume orbicular in outline, almost cup-shaped in the spikelet .......... P. paludosum.

7b. Culms tough, rhizomatous; leaf-blades narrow, often hirsute, glaucous; spikelets lanceolate to lanceolate-oblong; lower glume as above .......... P. repens.

5b. Spikelets oblong, ovate-oblong to elliptic, acute or obtuse:

8a. Lower glume one-half to three-quarters the length of the spikelet or more .......... P. notatum.

8b. Lower glume one-quarter to half the length of the spikelet:


9b. Nodes and leaf-sheaths glabrous:

10a. Perennial; stem creeping in all directions .......... P. antidotale.

10b. Annual; culms erect or geniculate; leaf-blades linear:

11a. Leaves narrow, tapering from the base or with tapering upper half; panicle 4 - 15 cm long, contorted, nodding; spikelets 2 - 3.5 mm long, persistent; lower glume orbicular, apiculate; upper lemma up to 2.5 mm (Cult.) .......... P. sumatrense.
11b. Leaves without long tapering upper half; panicle effuse, often diseased; spikelets 2-3 mm long, giant and deformed, deciduous; lower glume ovate-apiculate; upper lemma 1.75 mm long (Wild) ......... P. psilopodium.


Type: "India; Malabar," Koenig (1)

(Colitur in hortis Malabarorum, Honor. )

**P. miliare** Lam., Tab Encycl. 1: 173. 1791; non auctt. mult; e.g. Bor, Grass, 322. 1960.

Type: Ex India, Sonnerat (P- LA).

Pani Kuhuri, Suniva (Or.)

The Little Millet (Eng)

A tall perennial grass, ca 150 cm high. Culms solid, woody, terete, smooth, arising from a villous root-stock, creeping and sending extravaginal stolons in all directions; nodes thickened, glabrous. Leaves 15 - 60 x 0.6 - 2 cm, linear, very finely acuminate; sheaths inflated. Panicles large, effuse, pyramidal; pedicels slender, branches usually fascicled, filiform, spreading, drooping, branchlets capillary. Spikelets 3 - 3.25 x 1.3 - 1.5 mm, ovoid, oblong or ovate-oblong to elliptic, acute. Lower glume smaller than the spikelets. Styles 2, conspicuous, very plumose. Grains enclosed between the hardened glumes and paleas, biconvex.

Flowering and fruiting: Aug - Dec.

Ecology: Cultivated, feral and wild grass grows in dry sandy places.
2n = 18 (Bor, l.c.)

Distribution: Throughout India, Pakistan, Nepal, Bangladesh, Burma, trop. Africa, Arabia, Iran and Afghanistan.

Specimens examined: Koraput Dist.: Iping village, Parikud, 19 Dec. 1960, P.C. Nanda 2412 (CAL); Ganjam Dist.:
Devagiri in Parlakimedi, 12 Dec. 1902, sile lect s.n. (Accn. No. 35872 to 35874 - BSIS).

Behera et al. (l.c.) recorded its occurrence from Bhubaneswar.

Uses: It is extensively cultivated for its edible grains and fodder. It is medicinally used for ulcers. This grass is also reputed as an excellent sandbinder.

1829; Hook., f., FBI 7 : 40. 1896; Haines, Bot. : 996;
Mooney, Suppl. : 174; Bor, Grass. : 324.

Syntype: "Habitat in regio Mexicano. ? et in Luzon insula "
( Haenke ) V.S.

An erect tall grass with broadly linear to narrowly lanceolate leaves, 20 - 35 x 1.7 - 3 cm. Panicles with densely spiculate branches and symmetrical spikelets, 2 - 2.25 mm long, sessile or shortly pedicelled, strongly veined.
Lower glume ovate, acute or obtuse, one-third the length of the spikelet; upper glume and lower lemma of the upper floret quite smooth. Lodicules 2, cuneate. Stamens 2.
Styles distinct. Grains biconcave.

Flg. and frts.: Jun. - Nov.

Ecology: In muddy soil by the edge of perennial pool under shade.
**Distribution**: India (Bihar, West Bengal, Nagaland, Orissa, Gujarat, Maharashtra, Kerala), tropics of South-east Asia.

**Specimen examined**: Sambalpur Dist.: Sankardih, 510 m, Pauri hill, Bamra, 26 Jun 1949, **Mooney** 3439 (DD)

**Panicum brevifolium** L., *Sp. Pl.* 59, 1753; Mooney, **Suppl.** 173.; **Bor**, *Grass.* 324; **BBSI**. 6 : 294;

Saxena et al., **Ind. J. For.** 1 : 86. 1978.

**Type**: "Habitat in India" (LINN. 80, 47, microfiche - CAL).

Slender, decumbent, weak perennial creeping over the soil, to 90 cm long, rooting at the nodes. Leaves 2.5 - 7.5 x 1.25 - 2.5 cm, ovate to ovate - elliptic, acute or acuminate, amplexicaul with a cordate base; sheath glabrous or sparsely hairy beneath, mouth bearded; ligule very narrow, short, ciliate. Panicles effuse, 7.5 cm long; rachis, branches and pedicels capillary. Spikelets solitary, 1.7 - 2.3 mm long, ovate, acute, gibbous upper. Glumes 1.5 - 2 mm long, broadly ovate, gibbous; lower glume equal to lemma; lemma flat, obtuse; palea large, oblong, acute, dorsally rounded, smooth, margins narrowly reflexed. Lodicules 2, small.


**Flg. and frts.**: Sep.-Feb.

**Ecology**: In moist shady places.

**Distribution**: India (throughout), Tropical Asia and Africa.
Specimens examined: Koraput Dist.: Mugal putta, 12 Dec. 1962, G.V.S. Rao 30220; Ganjam, Alcock 6493; Cuttack Dist.: Jatadhar Muhana, 16 Feb. 1961, Panighati 23576; Baligjori, 20 Feb. 1961, Panighati 23968; Dhenkanal Dist.: Majhupara in Angul, 8 Jan. 1962, D.M. Verma 1584 (all CAL); Keonjhar Dist.: Kuanr, 630 m, 24 Nov. 1941, Mooney 2003 (DD)

Mooney (l.c.) also recorded its occurrence from Athgarh in Cuttack District, Rampur in Puri Dist. and Kalahandi, 60 - 180 m; Raju (l.c.), from Balimela in Koraput Dist.; and Saxena et Brahmam (l.c.), from Mahendragiri hills in Ganjam District respectively.

Note: This species is easily distinguished by its ovate-elliptic, acute leaves and slightly gibbous spikelets.


Type: "Habitat in India" (LINN. 80, 49, microfiche CAL:).


Type: Same as for *P. miliaceum* L.

Rala (Or.)

Common Millet (Eng.).

Annual hairy grass with stems 30 - 120 cm high tufted, hirsute below the nodes. Leaves 10 - 30 (-35) x 0.6 - 2 cm, linear. Spikelets 5 - 6.5 mm long, symmetrical, oblong, ovate-oblong to elliptic, acute or abtuse, persistent
Lower glume, three-quarters the length of the spikelets, 4–5 mm long, ovate, acuminate; upper glume larger than the lower, veins 5, conspicuous; lower lemma similar, paleate, with 5 conspicuous veins; upper lemma ovate, 3.5–0.4 mm long, brown shining, usually with 5 pale-brown veins; palea similar with 2 vein lines.

Lodicules 2, cuneate. Stamens 2. Styles distinct; stigmas plumose.

Cultivated: Fig. and Frts.: Oct. – Jan.

Ecology: It is cultivated as a hot weather crop both for food and fodder.

2n = 36, 42, 72 (Bor, l.c.).

Distribution: India (cultivated throughout India especially in North-Western regions), Pakistan, Sri Lanka, Central and Eastern Asia, Africa, Europe, South America, Australia.

A native of Egypt and Arabia.

Specimen examined: Nil.

Haines (l.c.) however, recorded its cultivation in Balasore and Cuttack to obtain edible grains.

Uses: This grass is much cultivated for profuse growth of leaves used as fodder for cattle and also for edible grains. In Western Ghats a preparation of the grains constitutes a favourite food at marriage ceremonies.

Type: "In Sumatra lectum dedit nuper nominatus, D. Wennerberg" (LD)

Panicum monatanum Roxb., Fl. Ind. 1: 315, 1820;
Haines, Bot.: 996; Bor, Grass.: 329; Panigrahi et al.,
BBSI 6: 263.

Type locality: "A Native of the Cifear mountains."

Glum. 1: 83, 1854.

Type: "India Orientali, Herb. Wight nr. 1011, 1012, 1013."

Perennial grass. Culms 1-3 m high, erect from a woody rootstock, sparingly branched, lower nodes strike long fibrous roots. Leaves 9-22 x 1-3 cm, linear-oblong to lanceolate, acuminate, with deeply cordate, broad base, sheaths short; ligule of soft long hairs. Panicles 20-38 cm long, effuse, copiously branched. Spikelets 2.5-3 mm long, solitary, distant, ellipsoid, obtuse; pedicels capillary. Lower glume ca half as long as the spikelet, ovate, subacute with ciliate margins; upper glume subequal to the lower lemma, not gibbous, ovate, obtuse; lower lemma slightly longer than the upper glume. Ovate, obtuse, epaleate; upper lemma elliptic, subacute; palea elliptic with inflexed margins. Lodicules 2. Stamens 2, short, distant, stigmas plumose.

Fig. and frts.: Sep. - Feb.

Ecology: In plains and hills of the hotter parts.
**Distribution**: India, Pakistan, Nepal, Bangladesh, Burma, Sri Lanka, Malaya, China, Philippines.

Specimens examined: Koraput Dist.: Miamikunda, Laxmipur 17 Dec. 1960, P.C. Nanda 2385; Laupada, Gandhamardan, 22 Dec. 1960, P.C. Nanda 2449 (both CAL); Ganjam Dist.: Parlakimedi, Sep. 1903, Grant, Candler et Burkell 20436 (BSIS); Sambalpur Dist.: Bhatipathar, Panigrahi 20685; Satyamba, Panigrahi 20928; Mayurbhanj Dist.: Similipal, 17 Feb. 1958, Panigrahi 12529 (CAL)

Bal (1942) recorded its occurrence from Mayurbhanj and Saxena et al. (l.c.), from Bhubaneswar.

**Note**: Rounded base of the leaf is decorated with tubercled based hairs.

**Panicum paludosum** Roxb. ( Hort. Beng.: 8, 1814, nom. nud.)

*Fl.* Ind. 1: 310. 1820; Fischer in Gamble, *Fl. Madras*: 1783 (1235), 1934; Mooney, Suppl. Bot.: 173; Bor, Grass: 329.

**Type locality**: "India: It grows generally in sweet water amongst the Circair mountaines."

**P. proliferum** Sensu Haines, Bot.: 995. 1924; non Lam. (1797).

Perennial. Culms, 60 - 90 cm high, ascending from a creeping spongy rhizome, leafy, nodes thickened, puberulous, woody below. Leaves 10 - 30 x 0.6 - 1 cm, linear or ensiform, acute or acuminate, flat, glabrous; sheath inflated; ligule a ridge of fine hairs. Panicles 7.5 - 25 cm long, with many erectopatent branches, sessile or very shortly pedunculate. Spikelets 3 - 4 mm long, lanceolate, acuminate.
Lower glume smaller than the upper, orbicular or reniform hyaline; upper glume ovate to ovate-lanceolate, acuminate, 7-veined; lower lemma similar, 9-veined, paleate or epaleate; upper lemma smaller than the lower, oblong, acute, with incurved margins; paleate. Lodicules 2, broadly cuneate. Stamens 2. Styles distinct, free. Grains almost biconvex.

Fls.: May - Sep.; Frts.: Sep. - Jan.

Ecology: In marshy places and still waters of tanks.

Distribution: India (throughout the low countries, especially in Eastern India), South-east Asia, tropical Australia and tropical Africa.


Fischer (l.c.) recorded this species from Janjam, Mooney (l.c.) recorded its occurrence from Junagarh in Kalarahandi District and Ranpur; Behera et al. (1979) from Ranpur and Choudhury et Patnaik (1983) from Bhubaneswar.

Used: A grass which grows thickly is relished by buffaloes and elephants.

Note: The species is often confused with P. repens L. and may even be an aquatic form of the latter. Whether P. repense L. can be induced to grow in water and to develop the thick spongy under water stems of P. paludosum Roxb., awaits investigation.

This species is allied to P. sarmentosum Roxb., from which it can be distinguished by rounded base of the leaf decorated with tubercled
based hairs.


Haines, Bot. : 993; Mooney, Suppl. : 173; Bor, Grass. : 329.

**Type locality:** "India Orientali".

*(Lindley s.n. Pan. ramosi Koen. et Pan. Virgati Roxb.)*

Tufted annuals, Culms (15 - ) - 20 - 55 cm high, slender, erect or quickly ascending. Leaves 5 (-7,5) - 15 (-20) x 0.6 - 1 cm, lanceolate, acuminate, symmetrical at base; sheaths glabrous; ligule of hairs. Panicles 5 - 12.5 cm long somewhat spreading, effuse; branches and pedicels capillary. Spikelets ca 3 mm long, ovate-oblong to elliptic, acute. Lower glume 0.75 - 1.5 mm long, ovate, not cuspidate - acuminate, glabrous; upper glume oblong - ovate, minutely cuspidate; lower lemma similar to upper glume, with delicate oblong margined palea; upper lemma ca 2 mm long, narrowly ellipsoid, acute smooth and polished. Lodicules 2. Stamens 3. Styles 2, free. Grains tightly enclosed within hardened lemma and palea.

**Flowering and fruiting:** July - December.

**Ecology:** Common in waste marshy lands and cultivated soils.

2n = 54 (Bor, l.c.)

**Distribution:** India, Pakistan, Burma, Sri Lanka, Malaysia.

5914 (all CAL); Cuttack: Ravenshaw College Campus, 20 Aug. 1925, sine lect 3 (Rav.jiColl. Herb.)

Choudhury et Patnaik (1983), Behera et al. (1979) and Saxena et al. (1982) recorded the species from Bhubaneswar.

Note: Haines (l.c.) and also Bor (l.c.) recognise two varieties var. psilopodium with greenish panicles and var. coloratum Hook. f. with purplish spikelets.

Bor (1960) lists P. flexuosum Retz. (1783) (nom. dubium) as a synonym of P. psilopodium Trin. (1826) a priorable epithet. Clayton and also Ramamoorthy (l.c.) indicate, "that no one has seen the type and is not certain at all what it is. Therefore, this name should be treated a name of uncertain application."


Type: Habitat in Hispania? Sinde missum a Claud.

Alstrammer (LINN 80: 47; microfiche CAL)

Reda, Pani-dal (Or.)

Ginger grass;

Topedo grass in U.S.A. (Eng)

Perennials, with culms 30-150 cm high, creeping at the base, stoloniferous. Leaves 6.5 - 32.5 cm long, 3.5 - 8 mm wide, linear to linear-lanceolate, distichous, rigid, sheaths ciliate above; ligule ciliate.

Panicle contracted, branches 2-3-nate, 7.5 - 20 cm long.
Spikelets 2.5 - 3.25 mm long, lanceolate to lanceolate-oblong, mostly paired, unequally shortly pedicelled. Lower glume orbicular, 1-1.5 mm long; upper glume membranous, broadly ovate, acuminate, 5-7-veined; lower lemma hyaline or white; lower lemma similar, hyaline or white, male or neuter, paleate; palea truncate, 2-veined; upper lemma 2.2 mm long, elliptic-acute, veinless, polished, sides embracing the palea. Lodicules 2. Stamens 3. Styles 2, free; stigmas plumose. Grains elliptic-oblong, dorsally compressed.

Fls. and frts.: May - Feb.

Ecology: In sandy tracts and also in standing water.

2n=40 (Bor, l.c.).

Distribution: India, common in Tropics and Sub-tropics.


Uses: A nutritive pasture grass much liked by cattle and is regarded to stimulate the yield of milk. In U.S.A. it is very nutritious and production pasture.
Note: It is a pernicious weed. The sharp pointed rhizomes penetrate the soil to a distance of 7 m from the parent plant. It should be restricted to the grazing field.


**Type**: Sumatra, Heyne.


Pani Kuhuri (Or.)

Slender annuals with culms 30-90 cm, long, erect, leafy, leaves 15 - 60 x 0.4 - 2.5 (in cultivated forms sometimes much longer), linear, finely acuminate, smooth, hairy. Panicles contracted, 4-15 (- 25) cm long, branches and pedicels moderately slender; spikelets 2-3.5 mm long, persistent, suddenly acute or slightly cuspidate, lower glume orbicular, apiculate, 1-2.3 mm long; upper glume elliptic, obtuse, 9-veined; lower lemma similar to upper glume; upper lemma 2-3 mm long, acute or subacute, dark brown at maturity, often with paler veins, lodicules 2. stamens 2, styles 2, free. Grains dark-brown when ripe, enclosed tightly within hardened lemma and palea.

Cultivated and wild. **Fig. and Frts.**: Aug. - Dec.

Ecology: Often cultivated and grown in the poor soil.

2n = 36 (Bor, l.c.)
Distribution: India (throughout), Southeast Asia and Malaysia.


Choudhury et Patnaik (l.c.) recorded this species from Nandan Kanan, near Bhubaneswar.

Uses: This is sometimes used as a fodder grass as the cattle are very fond of it. The grains are also eaten by the poor.

Note: This species is allied to Panicum psilopodium Trin. and is thus regarded as a cultivated form of the latter but is distinguished by much larger panicle; sub-persistent spikelets or at least the grains, hairy leaves and larger grains.

Panicum trifodon Schult., Syst. Veg. 2: Mant.: 244. 1824;
Haines, Bot.: 995; Mooney, Suppl.: 173; Bor, Grass.: 331;
Samena et al., Ind. J. For. 5 (2): 103. 1982.

Type locality: "India, grows on pasture ground, border of cultivated land and ....".

Tufted perennial. Stems erect or ascending, 15-90 cm high leafy only at base, stout or slender; nodes glabrous; internodes 5-12.5 cm long. Leaves 5-25 cm long, narrowly lanceolate or linear, hairy, margins oftenciliate; sheaths long, with ciliate margins towards the tip; ligules short, fimbriate. Panicles 10-25 cm long, effuse; rachis filiform, scaberulous; branches capillary. Spikelets ca 3 mm long, gaping widely at anthesis, ovoid, acuminate, glabrous; pedicles glabrous.
Lower glume 1.2 - 2.5 mm long, cuspidate-acuminate, 4-5-veined; upper glume elliptic, long acuminate or aristulate, 9-veined; lower lemma similar, but acumen rather shorter, palea, neuter; upper lemma obtuse, 1.7 - 2.5 mm long, yellow, 5-veined, Lodicules 2, cuneate. Stamens 3. Style distinct; stigmas laterally exerted near the top of the spikelet. Grains free, but tightly enclosed within lemma and palea.

Fig. and frts.: Jun. - Sep.

Ecology: On plains and hills especially common during rainy season.

Distribution: India (throughout), Southeast Asia, Borneo, Tropical Africa.

Specimens examined: Ganjam Dist.: Chatrapur, Jul. 1904, Fischer 22; Puri Dist.: Chammundia, Mahanddi, Daspalle, 22 Mar. 1943, S.K. Mukherjee 6297 (both CAL); Cuttack Dist.: Ravenshaw College, Campus, Cuttack 8 Aug., sine lect s.n. (Rev. Coll. Herb); Mayurbhanj Dist.: Tikrapara, 27 Jun. 1940, sine lect 848 (DD)

Note: This species is easily distinguished by its gaping spikelets with cuspidate glumes.

**Type**: Wolo, in Senegal, Leprieur (B).

*P. humile* Nees ex Steud., *Syn. Pl. Glum.*, 1: 84. 1854;

**Type locality**: Ceylon.

*P. austroasiaticum* Ohwi in *Act. Phytotax. Geobot.*, 2: 45. 1942; Bor, *Grass.*: 324; Panigrahi *et al.*, *BBSI* 6: 263;
Behera *et al.*, *JBNHS* (Suppl.) 74: 653.

**Type**: Same as for *panicum humile* Nees ex Steud.

Dwarf annual. Stems 4-45 cm high, much branched. Leaves 2.5 - 15 cm long, very narrow from a narrow base; sheaths glabrous. Panicles broad, effuse, branches delicate, lax-flowered. Spikelets 1.5 - 2 mm long, pale or purplish. Lower glume distinct, 1-2mm long, broadly ovate, acuinate or minutely mucronate, 3-veined; upper 3-veined; lower lemma distinctly shorter than the upper glums, paleate; upper lemma 1 mm long, ellipsoid-obtuse, pale polished. Lodicles 2, broadly cuneate. Stamens 2. Styles distinct, free; stigmas plumose.

**Fls. and frts.**: Aug.-Nov.

**Ecology**: In hilly slopes and moist grounds.

**Distribution**: India, Pakistan, Bangladesh, Burma, Sri Lanka, Tropics of South-east Asia, and North Tropical Africa.

**Specimens examined**: Bolangir Dist.: Patna, 7 Nov. 1959, Panigrahi 20992; Sambalpur Dist.: Malola, 1 Nov. 1959, Panigrahi 20623 (Both CAL); Keonjhar Dist.: Sirkagut, 960 m, 3 Oct. 1946, Mooney 2797 (DD).

Panigrahi *et al.* (l.c.) also recorded its occurrence.
from Bhatodih, 970 m in Keonjhar District; Behera et al., (l.c.) and Choudhury et Patnaik (l.c.), from Bhubaneswar in Puri District respectively.

Use: A good fodder for cattle.

Note: Panicum walense Mez. with an Asiatic distribution from India to China and Malaysia was originally described as *P. humile* Nees ex Steud., which is a later homonym and two new names based on the original type. Bor (1960) first described it under *P. austroasiaticum* Ohwi (1942) but later in the App. page- II. corrected this as *P. walense* Mez.


1a. Spikes shorter than the internodes; spikelets elliptoid or subglobose, obtuse or acute, hardly compressed; lower glume 1.25 - 1.75 mm long, broadly ovate or suborbicular, rounded.....*P. flavidum*

1b. Spikes as long as or longer than the internodes; spikelets ovate to ovate- lanceolate, acute or apiculate, flattened; lower glume ca 0.75mm long, truncate, retuse or undulate;

2a. Annual; in marshes, often floating; leaves 12.3 17.5 - 30 cm long, 5-7.5 mm wide, broadly ovate, apiculate; rachis of the spikes not produced into a sharp point; upper glume 1.75 - 2 mm
nearly as long as the upper lemma; lower lemma spiculate, 2-2.25 mm long; upper lemma 2.25 mm long, granular, smooth and shining........P. geminatum

2b. Perennial; often aquatic; leaves 5.4-22.5 cm long, 2.5-3.75 mm wide, acuminate; rachis of the spikes produced into a sharp point; upper glume 1.75 mm long, half the length of the upper lemma or more; lower lemma acute or apiculate, 2.25-2.75 mm long; upper lemma punctate, rugulose....P. punctatum

Paspalidium flavidum (Retz.) A. Camus in Lecomte, Fl. Gen.

'Indo-Chine 7: 419. 1922; Haines, Bot.: 1002; Bailey, RBSI 6 (10): 118. 1942; Bor, Grass.: 333.


Type: Ceylong, Koenig (LD).

Annual. Stems up to 120 cm long, slender, ascending from a short decumbent base, nodes glabrous. Leaves 2.5-3.25 X 0.2-1 cm, narrowly linear to lanceolate, acuminate to often rounded apex, sub-bifarious, ciliate near the base; sheaths compressed, glabrous, ligule a ridge of long hairs. Spikes shorter than the internodes, distant, erect). 7-3.3 cm long; rachis flattened, glabrous. Spikelets 2.2-3.3 mm long, ovoid or subglobose, obtuse, or acute, glabrous. Lower glume 1.25-1.75 mm long, broadly ovate or suborbicular, rounded; upper glume broadly ovate, acute, 7-veined; lemmas 2-3 mm long, smooth; palea striolate. Lodices 2, cuneate. Stamens 3. Styles distinct; stigmas laterally exerted near the top of the spikelet. Grain free but tightly enclosed within hardened glume and palea (Fig. 30).
Fig. 30.

*Paspelidium flavidum.* A. Plant.
B. Spikelet. C. Lower glume.
D. Upper glume. E. Lower lemma.
Fls. and frts. : Jun-Oct.

Ecology : Common on marshy places along the edges of water.

Distribution : India (throughout ), Tropical Asia.


Behera et al. ( 1979 ), Choudhury et Patnaik ( 1983 ) and Saxena et al. ( 1982 ) recorded the species from Sishupalgarh, in Bhubaneswar.

Use : A good fodder grass.


Type : "Egypt, Ad littora Nili, Forskal" ( C )

Type : "India : Misit Claris, Koenig."

Type : "Habitat in India ."

Annual or perennial, with often spongy culms, 30-120cm long from a stout creeping base, lower stems 1 cm or more in diam., rooting at the nodes. Leaves 10-30 cm long, 5-7.5 mm wide, lanceolate, acuminate, glabrous, sheaths larger, loose, glabrous, lower sheaths dilated; ligule a ridge of
hairs. Spikes erect, 1.25-3.75 cm long, appressed to the 
setulose rachis. Spikelets less than 2 mm long, ovate to 
ovate-lanceolate, acute or apiculate, glabrous, distinctly 
flattened. Lower glumes 0.7 - 1.25 mm long, broader than 
long, thinly membranous, veinless; upper glume 1.75 - 2 mm 
long, as long as the upper lemma, ovate to broadly oblong, 
obtuse, 5-7-veined; lower lemma 2-2.3 mm long, apiculate, 
paleate, 5-7-veined, empty or male; upper lemma granular, 
smooth and shining, palea with inflexed membranous margins. 

Fls. and frts.: Aug.-Mar.

Ecology: In swampy ground, ponds, streams and lakes.

Distribution: India (throughout), Asia and Tropical Africa.

Specimens examined: Ganjam Dist.: Back water of Chatrapur, 
19 Mar. 1889, Alcock s.n. (Accn. No.567372 - CAL);
Kalahandi Dist.: Junagarh, 210 m, 17 Dec. 1948, Mooney 3168 
(DD).

Prain (l.c.) et Haines (l.c.) recorded it from salt water 
of Chilka lake and Choudhury et Patnaik (1983), from Utkal 
University Campus, Bhubaneswar.

Usex: Succulent stems and leaves are readily eaten by cattle.

Note: Mooney (l.c.) mentions that the species has character-
istically scabrid margins and the plants turn deep red with age.

Paspalidium punctatum (Burm. f.) A. camus in Lecomte, Fl.
Gen. 'Indo-Chine 7: 419. 1922; Haines, Bot.: 1002; Bor,

Type: "Habitat in India", Plukenet (BM).
Perennial glabrous grass, with stems 30–90 cm long, basal internodes of considerable thickness in species occurring along the margins of streams. Leaves 3.5 – 22.5 cm long, 2.5–7.5 mm wide; linear, acute and acuminate, with a narrow base; lower sheaths inflated; ligule a ridge of hairs. Spikes many, but internodes of panicle shorter, 1.25 – 3.25 cm long; rachis triquetrous, produced into a sharp point. Spikelets 2.5–12 mm long, sessile, 2-seriate, ovoid-oblong. Lower glume ± 1 mm long, broader than long, truncate, retuse or undulate; upper glume half the length of upper lemma or more, membranous, 5-veined; lower lemma 2.25 – 2.75 mm long, acute or apiculate, 3-5-veined neuter; upper lemma smooth or rugulose, cuspidately acuminate; pleas coraceous with inflexed membranous sides. Lodicules 2. Stems 3. Styles 2, free. Grains tightly enclosed in the more or less hardened lemma and palea.

Rare / Fls. and frts.: Jul.–Dec.

Ecology: A grass of marshy places and is often found in water.

Distribution: India (throughout), Tropical Asia.

Specimens examined: Ganjam, Dec. 1949, W. Night 3033, 3037 (both CAL); Cuttack Dist.: Nahar Pukur, 4 Jul. 1913, sine lect s.n. (Rav. Coll. Herb.).

Haines (l.c.) collected this species from Bihar only.

Use: This is a good fodder for animals.

Paspalum Syst. Nat. ed. 10.855: 1359, 1759;

Lectotype: P. dimidiatum L., nom. illegit. superfl.

Type: Pluk., Almagest........................Mantissa (v.94, t.350, f.2. 1700).

1a. Spikelets 1.5-1.75 mm long, 4-ranked, fringed with fine white hairs from the margins of the upper glume and lemmas..................P.conjugatum

1b. Spikelets 2.25 mm or more long, usually 2-ranked, glabrous or pubescent, not ciliate on the margins; glumes and lemmas glabrous:

2a. Spikelets up to 3.25 mm long, rotund-elliptic, broadly obovate-elliptic to almost orbicular.............P.scrobiculatum

2b. Spikelets up to 4.5 mm long; elliptic to ovate elliptic, acute; aquatic grassess with rhizomes and long stolons:

3a. Plant usually erect or geniculate; racemes often long, up to 9 cm; spikelets planoconvex, normally ovate for elliptic, twice as long as broad; lower glume either absent or a truncate or subulate scale; upper glume and lower lemma leathery, puberulous, with a prominent mid-vein........P.distichum

3b. Plant with prostrate stems rooting at nodes; racemes short, not above 4 cm long; spikelets narrowwy ovate-elliptic or broadly lanceolate and flat, three times as long as broad; lower glume absent; upper glume and lower lemma thinly papery; and glabrous...P.vaginatum.

Lectotype: Surinam, Rolander s.n. in Herb. Berg.
(SBT, n.v.; xerox in L.).

A perennial stoloniferous grass with culms up to 100 cm high.
Leaves to 20 x 0.8-1.5 cm, lanceolate, acuminate, glabrous.
Racemes usually 2, 3.2-12.5 cm long; rachis flat, margins
cartilaginous and smooth or scaberulous. Spikelets in 2 rows,
1.4-2 mm long, compressed, plano-convex, subobtuse, apiculate
or shortly acute, white - ciliate along margins, yellowish-green.
Glumes ciliate with rather long white hairs; upper
glume hyaline, margins villous; lower lemma coriaceous, apiculate,
white; barren lemma glabrous. Lodicules 2, cuneate. Stamens 3.
Styles 2, distinct; stigmas plumose.

Fls. and frts.: Aug.-Nov.

Ecology: Usually found in cultivated sandy soils under shade.
Distribution: India, Burma, Sri Lanka, Pantropics of old world,
hotter parts of America and Africa.

An adventive weed from South America, perhaps introduced
from West Indies.

Specimen examined: Nil.

Saxena et Brahman (l.c.) however recorded its occurrence
from Orissa without any specific locality.

Uses: A prominent weed in crops sometimes used as fodder in
areas of poor soil fertility. Crushed spikelets are used in
the treatment of cuts, wounds and sores due to the presence
of a haemostatic glucosid with which reduces the time for
the clotting of the body by 50%.


**Digitaria paspaloides** Michx., *Fl. Bor. Amer.* 1: 46, 1803.

**Type**: South Carolina, U.S.A., *Herb. Michaux* (p.n.v.).


Erect perennial, with rhizomes and long creeping stolons and geniculate culms, sheathed throughout. Leaves 5-10 cm long, 1.2-5 mm broad, linear-lanceolate, acute, involute of flat, spreading, glabrous; sheaths thin, with bearded mouth; ligules very short, truncate. Racemes up to 9 cm long. Spikelets in 2 rows, 2.5–4.5 mm long, glabrous or pubescent, not ciliate on margins, broadly elliptic, twice as long as broad. Lower glume 0 or truncate or subulate; upper glumes membranous; lower lemma with a prominent mid-vein; palea 0 or obscurely auricled. Lodicules 2. Anthers 1.2–1.5 mm long. Grains tightly enclosed within lemma and palea.

**Fls. and frts.**: May–Nov.

**Ecology**: A weed of rice-fields, sea coasts and wet places.

2n = 40, 48, 60 (Koening et Sosef, l.c.)

**Distribution**: India, Tropics and Sub-tropic of the world.

**Specimens examined**: Puri beach, 30 May 1936, *sine lect. s.n.* Cuttack Dist.: Central Rice Research Institute, Cuttack, 24 m, 28 Aug. 1954, *N.K.C.Patnaik s.n.* (both Rav. Coll. Herb.)

New Record for Orissa.
use: A valuable pasture grass on useful flat and a good sandbinder on the banks of streams.

Note: Panicum paspaloides (Michx.) Scribn. has plano-convex ovate, spikelets; somewhat leathery upper glume and lower lemma and the upper glume minutely puberulous, whereas spikelets are narrowly ovate-elliptic and flattened, the upper glume and lower lemma are thinly papery and glabrous in Panicum vaginatum Sw.


Type: "Habitat in India Orientali ". Cultivated at Uppsala (LINN: 79, 4, HU, holotype; microfiche - CAL).

P. commersonii Lam., Tab. Encycl. Meth. Bot. 1: 175, fig. 43/1 1791; Saxena et al., Ind. J. For. 5 (2): 103. 1982.

Type: Mauritius, Commerson (p, holotype). "Ex Insula Franciae, Commerson".

Kodus, Kado, Kodra, Khoddi (Or.)

Annual grass with short rhizomes, erect, leafy, glabrous. Leaves 30-45 x 0.4-1 cm, bifarious, erect or sub-erect, finely acuminate, glabrous, with setaceous margins; sheath 10-20 cm long, loose, compressed, glabrous or softly hairy. Spikes 2-5, rarely solitary, 2-12 cm long, sessile, often distant and spreading; rachis broad, elliptic or orbicular. Spikelets in 2 rows, up to 2-5 mm long, orbicular or ovate-orbicular, obtuse. Lower glume often absent, upper convex, 3-7-veined; lower lemma flat, membranous, 7-veined; upper lemma thickly coriaceous, shining; palea tumid, orbicular, inflexed below, coriaceous, embracing the grain.
Fls. and frts.: Jul. - Dec.

Ecology: Common in marshy places and also grown as a hot weather crop.

Distribution: India (throughout), Tropics of the Old world.


Fischer (1931) recorded its occurrence from Ganjam; Choudhury et Patnaik (l.c.), from Baragarh, Saxena et al. (l.c.), from Bhubaneswar in Puri District and Mooney (l.c.) from Khariar in Sambalpur District, Kalahandi and Patna in Bolangir District respectively.

Uses: Cultivated for grains which are eaten with caution. Bor (l.c.) noted that the elephants eating the crop died due to depredations. Deshabandhu (1966) informs that storage of more than six months seems to remove the poisonous principle.

Note: Clayton (Kew Bull. 30: 101-103, 1975) subjected eight characters of P. commersonii Lam. and P. polystachyum R. Br. to principal component analysis and compared the data.
with *P. scrobiculatum* L. and *P. orbiculare* Forst.f. and concluded all the four species from a single species. He supported Singh (in Rev. Biol. 5: 75-83, 1965) that the four species probably from a hybrid swarm.

**Paspalum vaginatum** Sw., Prod. Veg. Ind. Occ. 21, 1788; Bor, Grass.: 341; Koning and Sosef in Blumea 30(2): 311, 1985.

*Holotype:* Jamaica, Swartz s.n. (S)


*Lectotype:* incl. LINN 79.9, 3rd. specimen in a sheet from the left, with "Br." written by Linnaeus.

Erect aquatic perennial with rhizomes and long creeping stolons. Stems up to 32.5 cm high, sheathed throughout, leaves 2.3-10.8 cm long, 1.7-4 mm wide, flat or involute, linear-lanceolate, acuminate, distichous, stiff and pungent; sheaths thin, with bearded mouth; ligule extremely short, truncate. Spikes often long, up to 9 cm long, 2-nate, very rarely 3-nate, shortly pedunculate and articulate at the top of the stem; rachis herbaceous. Spikelets in 2 rows, 2.5-4.5 mm long, glabrous or pubescent, not ciliate on the margins, broadly elliptic, twice as long as broad. Lower glume absent or truncate or a subulate scale; upper glume membranous, covered with very short hairs; lower with a prominent midvein; upper lemma shorter, elliptic, smooth; palea absent or obscurely auricled. Lodicules 2. Stemens 3, styles 2, distinctly free. Grains biconvex, tightly enclosed in the hardened lemma and palea.

**Fls. and frts.:** Aug.-Dec.

**Ecology:** A weed of clayey loamy soils of the rice-fields and river banks.

2n = 20, 40, 60 (Sosef and Koning, l.c.).
Distribution: India, Tropical and Sub-Tropical regions of the world.

Specimens examined: *Ex* puri beach, 30 May 1936, *sine lect* s.n.; Cuttack, Central Rice Research Institute, 24 m, 28 Aug. 1954, N.K.C.Patnaik s.n. (both Rev. Coll. Herb.)

New Record for Orissa.

Uses: It has a good nutritional value as a fodder on swampy, saline soils and readily eaten by cattle. An important soil-binder.


1a. Rachis faintly ribbed, villous or woolly, ribs not winged; upper florets persistent, lemmas more or less alike, lower not 3-lobed:

2a. Culms up to 2 m high; spikes to 30 cm long; lodicules 0; anther cells bearded at the apex............................*P. purpureum*
2b. Culms up to 1.3 m high; spikes to 17.5 cm long; lodicules 2; anther-cells not bearded at the apex. 

1b. Rachis with decurrent wings on the ribs below the pedicels; upper florets readily disarticulating; lemmas heteromorphous.

3a. Spikelets solitary and pedicelled or in groups of 2-5, with one sessile and other pedicelled; bristles usually very woolly; lower glume at least half the length of lower lemma.

3b. Spikelets sessile or solitary; lower glume minute or small, rarely, if ever, half as long as the lower lemma.

4a. Annual; bristles glabrous, scaberulous.

4b. Annual or perennial; bristles densely plumose or at least the inner plumose.

5a. Annual; culms much branched; leaves up to 45 cm long; lemmas 3-4 mm long.

5b. Perennial; culms not or sparingly branched; leaves up to 25 cm long; lemmas 2.5 mm long.


Type locality: "Habitat in America" (No specimen in LINN).

Type: LINN 1212. 1 (HU)
LINN 1212. 2 (HU)

Alopecurus typhoides Burm.f., Pl. Ind.: 271768.

Type: "Indiae orientalis. Pluk. almag. 174, t. 32.f.4". "Raj.Hist.600".

**Type locality:** "Habitat in India".


**Bairi, Bajra, Gantiya (or.)**

: Bull-rush millet,

Spiked Millet,

Pearl Millet (Eng)

A much cultivated annual, with stout, slender culms up to 2 m high, leafy only at the base. Leaves 5-60 cm long, 0.5-3.8 cm wide, narrow-lanceolate or linear, copiously hairy with tubercle-based hairs. Panicles well developed, open, up to 22.5 cm long. Spikelets 2 or 3, 3 mm long, crowded, gaping and exposing the grain, pedicelled. Lower glume usually absent, if present, with amplexicaul base, acuminate or cuspidate, 4-5-veined; upper glume elliptic, long acuminate or cuspidate, 4-5-veined; upper glume elliptic, long acuminate aristulate or 0; lemmas subequal; lower lemma 3-3.3 mm long, sometimes suppressed, paleate, neuter; upper lemma ca 0.2.3 mm long, oblong, narrowed to the rounded tip. Lodicules 0.3 mm. Stamens 3. Styles distinct or more or less connate. Grain narrowly oblong to orbicular.

**Fls. and frts.: Oct.-Jan.**

**Ecology:** Found in moist cultivated soil as well as on escape here and there.

**Distribution:** India (cultivated more or less throughout India, especially in North-West regions), Pakistan and Tropical Africa.
Probably a native of Africa.

Specimens examined: Ganjam Dist.: Devagiri in Parlakimedi, Cultivated hill side, 30-915 m, Dec. 1902, Burkill 17962, 17969 (both BSIS).

Note: Botanists applying the basionym *panicum americanum* L., to Pearl Millet have used the combination *Pennisetum americanum* (L.) Schum. Schumann (1895), however, made it quite clear that he was using *P. spicatum* (L.) Koern. as correct, and was rejecting *P. americanum* (Burm.f.) Stapf et C.E. Hubb. as the correct name for Pearl Millet, discusses the typifications of various taxa involved, considers that a large number of races are known, quote Stapf and Hubbard who reduce *Panicum americanum* L. and *Panicillaria spicata* (L.) Willd. *Holcus spicatus* L., 1759 as synonyms of *Pennisetum spicatum* (L.) Koern. and Koern. and who simultaneously treat *P. typhoides* as taxonomically distinct. But *Holcus spicatus* L., is nom. Superfl. illeg. for *Panicum americanum* because Linnaeus cites reference to "Clus. hist." 2 p. 215 both 1753 and also 1762 and Dunk. t. 32, f. 4 in 1759 and in 1762. He considers the differences between the two taxa as varietal only "if this be accepted, the correct name for the Pearl Millet would be *Pennisetum americanum* (L.) K. Schum. Terrell (1976) has discussed the typification of various elements involved and accepted *P. americanum* (L.) Leeke (1907) as the correct name for the Pearl Millet.


Type: India: "In montibus Nilagiri", Hohenacker 930(K).

Some in Kalahandi (Or.)

A densely tufted perennial, with stout, erect culms, up to
to 1 m high; branching fastigiate. Leaves 7.5-75 cm long, very narrow, convolute, glabrous, usually with a tuft of hairs at the base; sheaths + glabrous; ligule a ring of small hairs. Panicles 7.5-17.5 cm long, linear, pale green; rachis angular, flexuous, involucres sub-sessile, bristles scabrid. Spikelets solitary, 2-flowered, ± 7.5 mm long, lanceolate, acute. Lower glume reduced and scaly, ca 1 mm long, oblong-acute or obtuse, often truncate; upper glume 2-3.8 mm long, ovate, 3-4-veined; lower lemma up to 7.5 mm long, (9)-13-veined, upper lemma; upper 5-7-veined, with a 2-keeled palea. Lodicules 2. Stamens 3; anthers linear. Styles 2, long, distinct. Grain narrowly oblong to orbicular, free.


Ecology: On sandy soil near the stream and often cultivated between the ridges of the rice fields in the valleys.

2n = 18 (Bor, l.c.)

Distribution: Pakistan, Tropical Africa, Madagascar.


Mooney (l.c.) recorded it from the Southern hills of Kalahandi, above 650 m.

Uses: Often used as brooms and cordage by thex villagers.

Pennisetum hordeoides (Lam.) Steud., Syn. Pl. Glum. 1: 103. 1854; Bor, Grass.: 345; Panigrahi et al., BBSI 6: 263.


Type locality: "Africa - E. Sierra - Leona".

Pennisetum parviflorum R.Br., Prodr. Fl. Nov. Holl.: 192, 1810

Trin., Gram. panic.: 65, 1826; Haines, Bot., non Spreng. (1825).
Type: "(J)v.v. apud pøtum Jackson, includis ripis aestuwdi Hunters River vel Coal River " ( J ).

Erect slender grass, 30 - 150 cm high, with fastigiate branches arising from the base, often glabrous. Leaves 10-25 cm long, 4-5 - 7.5 mm wide, linear, subrect; sheaths hairy. Panicles 7.5 - 12.5 X 1 cm, narrow, erect, tapering. Spikelets sessile, solitary, 3-3.5 mm long; rachis with decurrent wings on the ribs below the pedicels; lower glume minute, half as long as the lower lemma, sub-orbicular; upper glume as long as the spikelets, truncate cuspitate, 5-veined; lemmas heteromorphous; lower lemma truncate, often 3-lobed, 5-veined, paleate, male; upper lanceolate, obtuse, shining, veinless. Stamens 3; anthers linear. Styles 2. Grain oblong.

Fls. and frts.: Jun. - Nov.

Ecology: Common swampy soil.

Distribution: India (Bihar, West Bengal, Orissa, Rajasthan), Western Africa.

Specimen from Orissa examined: Sambalpur Dist.: Malda, 3 Nov. 1959, Panigrahi 20626 (CAL).

Haines (l.c.) recorded from Bihar and West Bengal only.


Type Locality: Africa.


Type Locality: "Grows among the granite rocks on the hills about Banda ".
Annual grass, 30 - 150 cm high with branching from the base and fastigate branches above, leafy. Leaves (7.5) - 15 - 25X 0.6 - 2.3 cm, flaccid, glabrous or sparsely hairy; sheaths glabrous; ligule a shortly ciliate membrane. Panicle (2 - 5) - 3.2 - 7.5 (-20) cm long, dense, linear, slender, distinct by the tufts of plumose bristles; rachis glabrous, with decurrent wings on the ribs below the pedicels. Spikelets solitary and pedicelled or in groups of 2 - 5, with one sessile and others pedicelled, ± 5 mm long. Lower glume at least half the length of lower lemma, wolly; upper glume oblong-lanceolate, apiculate, ± 5 mm long, 7-veined, hyaline; lemmas heteromorphous; lower lemmas often 3-lobed, oblong, truncate; upper lemma ovate-oblong, with a fimbriately ciliate tip; palea toothed, fimbriate. Lodicules 2, small or 0. Stamens 3; anthers sometimes penicillate at the tip. Styles 2, free. Grain oblong.


Ecology: In rocky xeric places.

Distribution: India, West Africa.


Choudhury et Patnaik (l.c.) et Saxena et al. (l.c.) recorded its occurrence from Bhubaneswar (Brunei hills).

Haines (l.c.) recorded it from Bihar and West Bengal only.

Uses: At times this grass is grazed by the cattle.

Pennisetum polystachyon (L.) Schult., Syst. Ver. Mant. 2:146. 1824; Bor. Grass.: 346; Pahigrahi et al., BBSI 6:263.
Panicum polystachyon L., Syst. Nat. ed. 10, 2:870,1759 (as 'Polystachion').

Type: Rumph. 6. t. 7: f. 28.
**Perennial or rarely an annual**, with erect or geniculately ascending culms, 2 m or more in height. Leaves up to 45 cm long, 3-15 mm wide, linear or lanceolate, flaccid, densely hirsute behind the ligule. Spikelets 4.5 mm long, oblong-acute, solitary, sessile, hyaline. Lower glume 0.5-1 mm long, linear to lanceolate, acuminate to mucronate, or 3-lobed, 5-7-veined; lemma 3-4 mm long, 3-lobed; palea ± 3.5 mm long, linear, obtuse, with scaberulous keels, or palea D. Lodicules O. Stamens 3; anthers 1.75-2 mm long, with glabrous tips. Styles 2, free or connate. Grain 2 mm long, oblong to elliptic-oblong.

**Fls. and frts.**: Oct.-Jan.

**Ecology**: Frequent on hill slopes.

2n = 54 (Bor, l.c.)

**Distribution**: India, Tropics of the Old World.

**Specimen examined**: Nil.

Panigrahi et al. (l.c.) recorded its occurrence from Hirakud Dam site in Sambalpur District only.

**Uses**: It is used as a hey and an excellent fodder for cattle.

**Pennisetum purpureum** K. Schum. & Thonn., Beskr. Guin. Pl. 44. 1827; Mooney, Suppl.: 180; Bor, Grass.: 348.

**Type**: Ghana, collected between 1799 and 1803 by Peter Thonninng s.n. (C, holotype; isotype, BM).

"Elephant Grass and Napier's Fodder" (Eng.)

An erect perennial grass arising from a creeping rhizome. Culm tufted, ca 3 m high, 1.25 - 2.5 cm in diameter at the base. Leaf-blades 30-60 (-75) X 2-2.5 cm, linear, with a setaceous point, glabrous; sheaths terete, clasping the stem; ligule
a narrow rim of white hairs, 2-3 mm long. Spike erect, 8-30x1.5 cm, dense cylindric. Spikelets sessile, spreading, solitary; rachis straight; bristles 10-18 mm long. Lower glume suppressed or rudimentary; upper glume 0.5-1(-2) mm long, ovate to ovate lanceolate, 1-veined or veinless; Lower lemma half as long as upper glume, male or more often barren; palea linear-lanceolate, 1-veined; upper lemma bisexual, usually 5-veined, palea narrowly linear, tips minutely 2-toothed. Lodicules 0. Anthers 2.5 - 3 mm long, with minutely penicillate tips. Styles united; stigmas very slender, up to 5 mm long, exerted.

Fls. and frts.: Sep.-Dec.

Ecology: Growing on moist cultivated soil.

Distribution: India (Uttar pradesh, Bihar, West Bengal, Orissa), Pakistan, Burma, Sri Lanka, indigenous in Tropical Africa, now introduced into many tropical countries.

Specimen examined: Cuttack Dist.: Bidyadharpur Farm, Cuttack 31 Dec. 1936, H.L. Dutt 639 (Rav. Coll. Herb.).

Jain et al., (l.c.) however, recorded its occurrence from Orissa without citing the specific locality.

Haines and Mooney did not report it from Orissa.

Uses: A very variable fodder grass, often used as an excellent hay. Mature reed-like stems can be used as fences and walls of huts etc.


**Cenchrus setosus** Swartz, Prodr. Veg. Ind. Occ. 1:26.1788.

**Type locality:** "Habitat in Jamaica, alusque, infulia Indie Occidentalis, folo cretacea".
A handsome perennial grass. Culms not or sparingly branched, green or purplish. Leaves 15-25 x 0.6-1 cm, linear, finely acuminate; sheaths glabrous; ligule a line of soft hairs. Spikes 5-10 cm long; rachis with decurrent wings on the ribs below the pedicels. Spikelets always solitary, 4 mm long. Lower glume minute or small, rarely, if ever, half as long as the lower lemma; upper hyaline; Lemmas bisexual; lower lemma ± 2 mm long, oblong, obtuse, often 3-lobed; upper lemma readily disarticulating, 2.5 mm long, narrowly oblong, hyaline; palea as long as the glume, oblong, truncate. Anthers ± 2.3 mm long.

Styles ± 3 mm long, much exerted beyond the spikelets.

Fls. and frts.: Sep.-Dec.

Ecology: In open forest floors and cultivated lands of the hills.

2n = 54 (Bor l.c.)

Distribution: India, Pakistan, Africa and America.

Specimens examined: Orissa: sine loc., 1889, Walsh. (Accn. No. 524919-CAL); Ganjam Dist.: Paralakimedi, hill jungle, Sep. 1903, Grant, Candler and Burkill, 20468 (BSIS); Kalahandi Dist.: Karpapat, 900-1800 m, 24 Dec. 1939, Mooney 1188; Sambalpur Dist.: Kholgaon, growing on Talboi Hill, 300-700 m, 27 Oct. 1947, Mooney 2928 (both DD).

Uses: It constitutes a valuable fodder and hay in Tropical America and Africa and also forms on open savannah.


Type: P. latifolia Aiton, nom. illegit.


1953; Box Grass.: 611; Behera et al., JBNHS (Suppl.) 74:354.


**Anthoxanthin indicum** L., Sp. Pl. 28:1753.

- **Type**: Ceylon, Hermann (EM)

**Saccharum spicatum** L., Sp. Pl. 54:1753.

- **Type locality**: "Habitat in Indiae petrosis".
- **Iconotype**: Illustration in Rheed, Hort. Malabar.:12, fig.

1703.

**Perotis latifolia** Ait., Hort. Kew. 1:85.1789; nom. superfl., Haines, Bot.: 978.

- **Type**: Same as for *S. spicatum* L.

A small prostrate grass, 5-45cm long, branching from the root. Stems leafy, glabrous. Leaves 0.7 - 5.5 x 0.37 - 1 cm, ovate-lanceolate, margins spinulose-ciliate. Spikes slender, 6-18 cm long, linear-lanceolate, feathery, owing to the long awn; rachis glabrous. Spikelets 1.5 - 2 mm long, narrowly linear, scaberulous, awned. Glumes hyaline; solitary, narrowly linear, laterally compressed; awns 7.5-14.5 mm long, usually purplish; palea hyaline. Lodicules hyaline. Stamens 2-3; anthers short or long. Styles short, connate at base; stigmas short, plumose, laterally exerted. Grain cylindrical, linear, terete, free within the glumes.

**Fls. and frts.**: May - Dec.

**Ecology**: In open places and sandy sea-shore.

**Distribution**: India (throughout India), Pakistan, Bangladesh, Burma, Sri Lanka, Malaya to South-East Asia, and Tropical Africa.

Mooney (l.c.) recorded its occurrence from Sambalpur, Nayagarh in Puri District and Keonjhar; Behera et al. (l.c.) and Choudhury et al. (l.c.) from Khandagiri-Udayagiri hills of Bhubaneswar.

Note: Clayton (1974) states that the common Asiatic species are characterised by usually densely packed spikes, deceptively loose; the narrow mid-vein is not noticeably more scabrid than the body of the glume and the terete grains.

It is very similar to P. hordeiformis Nees except that in P. indica the callus is more pronounced, 0.2-0.5 mm long and the hairs on the glumes are scattered instead of being in rows.


_Type_: "In India Orientali vulgatissima ad tecta Indorum utitur, Koenig (LD)."

**Arundo karka** sensu Roxb., Pl. Ind. 1: 348. 1820, _non_ Retz. 1786.

Noto, Ananta (Or.)

A tall perennial grass usually near water and often gregarious. Culms rhizomatous, creeping, flowering ones often erect, robust, up to 7 m high. Leaves 50 x 1.5 cm, bifarious, linear, acuminate, stiff, semi-erect, glabrous; sheaths auricled, glabrous; ligule filiform, not more than 0.5 mm long. Panicles up to 62.5 cm long. Spikelets ca 1.25 cm broad; pedicels glabrous; joints of the rachilla 0.8 mm long. Lower glume 3-4 mm long; upper 5.5-6 mm long; lowest lemma 9-13 mm long. Stamens 1-3; anthers ca 2 mm long. Styles 2, terminal, free; stigmas plumose. Grains oblong, semiterete.

_Fls._ and _frts._: Sep. - Feb.

**Ecology**: Gregarious in large colonies near water and swampy soil.

2n = 36 (Borr., l.c.)

**Distribution**: More or less throughout India, Pakistan, Bangladesh, Burma, Sri Lanka, Polynesia, N. Australia and Tropical Asia, Africa.

**Specimens examined**: Puri Dist.: Duparia hillock, in Chilka, 2 Oct. 1939, _sine lect._ s.n.; Sunkud, 17 Nov. 1935, P. Parija
Mooney (l.c.) recorded its occurrence in southern tract of Kalahandi, 1000 m and Choudhury et Patnaik (l.c.), from Utkal University Campus, Vani Vihar, Bhubaneswar.

Uses: Stems are used in making Shepherd's pipes, mats, fish-traps and also for thatching. The tender shoots are liked by horses.

Note: Bor (l.c.) distinguishes this species by the presence of silky beard below the lowest panicle branches.


Type: *P. saccharoideum* Beauv., nom. illegit. (*Saccharum paniceum* Lam., *P. paniceum* Lam., *P. paniceum* (Lam.) Hack.)

1a. Racemes more than 4 cm long; spikelets 4-5 mm long............................*P. rufo-barbatum*.

1b. Racemes up to 4 cm long; spikelets up to 3 mm long.

2a. Stems up to 65 cm long; spikelets 2-5-3 mm tall;
callus- hairs up to 1.5 mm; glumes subequal; awn up to 1.75 mm long; lower floret male; upper floret with 2 (rarely 1) stamens........*P. paniceum*.

2b. Stems up to 30 cm long; spikelets not more than 2 mm tall; callus hairs ca 2 mm; upper glume longer than lower; awn up to 2.25 cm long; lower awn up to 2.25 cm long; lower floret empty or obsolete; upper floret with 1 (rarely 2) stamens...*P. crinitum*


**Type locality:** Japan, No. 100 as given.

A delicate slender perennial, often gregarious grass, with densely tufted stems, 15 - 30 cm long. Leaves 2-5-7.5 cm long, 0.25 - 0.5 mm broad, linear-lanceolate, acuminate, hairy; sheaths lax, glabrous; ligule of long hairs. Spikes up to 4 cm long; nodes bearded. Spikelets up to 2 mm long, usually monandrous; callus hairs ca 2 mm long. Glumes veinless, hyaline; lower glume oblong, ciliate; upper longer than the lower, ovate, keeled; lower lemma empty or obsolete; upper with 1 or 2-stamens. Anthers long. Style slender. Grain oblong, free.

**Fls. and frts.**: Jul.-Nov.

**Ecology:** Found along the roads, rivers and streams, usually under shade.

2n = 40 (Bor l.c.)

**Distribution:** India, Pakistan, Burma, Sri Lanka, to Japan and Solomon Islands, Malays to Afghanistan.

**Specimens examined:** NIL.

Jain et al. (l.c.) however, recorded its occurrence from Orissa without citing any specific locality.

Mooney (l.c.) recorded from Bihar only.

**Note:** It is distinguished from the allied *P. panicum* in being less robust with smaller spikelets and longer callus hairs.

*Pogonatherum panicum* (Lam.) Hack., Allg. Bot. Zeit. Syst. 12: 196. 1906;Bal, RBSI 6 (10): 118. 1942; Mooney, Suppl.: 185; Bor, Grass.: 202; Panigrahi et al., BBSI 6: 263; Behera et al.
Bamboo Grass (Eng.)

Slender perennial, usually 15 - 65 cm long with stems densely tufted, nodes bearded. Leaves 2.5 - 6.25 (-7.5) cm long, linear to linear-lanceolate, acuminate. Spikes 1.25 - 4 cm long; rachis subtrigonal, joints and flat pedicels 0.7 - 1.3 mm long, ciliate; hairs of callus up to 1.5 mm long, shorter than the spikelet, white. Spikelets 2.5 - 3.5 mm long, with 2 long fine scaberulous awns 1.5 - 2.5 mm long. Lower glume lanceolate or narrowly oblong, retuse or tip rounded, bearded, faintly 2 - 4 veined; upper glume largest, conduplicate, 2.5 mm long, 1 veined; keel produced into a long awn, tip densely ciliate. Lower lemma sometimes absent; palea of upper glume broadly ovate-oblong. Lodicules 0. Stamens 2, rarely 1; anthers long. Style 2; stigmas slender.

Fls. and frts.: Jul. - May.

Ecology: Abundant along the margins of streams and tanks, often in tufts on rocky banks.

2n = 20 ( Bor, l.c.)

Distribution: India (throughout the hilly tracts), Pakistan.
Nepal, Burma, Sri Lanka, to Japan and Solomon Islands, Afghanistan.

Specimens examined: Kalahandi Dist.: Sungi, 660 m, in Karlapat, 19 May 1944, Mooney 2466 (DD); Mayurbhanj Dist.: Bakua to Similipal, 17 Feb. 1958, Panigrahi 12541 (CAL).

Haines (l.c.) recorded its occurrence from Puri, Panigrahi et al. (l.c.) from Baitarani source, Keonjhargarh; Choudhury et patnaik (l.c.) and Behera et al. (l.c.) from Bhubaneswar.

Mooney (l.c.) recorded its occurrence from Madhya Pradesh only.

Note: This Bamboo Grass is sometimes grown in gardens.

*Pogonatherum rufobarbatum* Griff., *Not. Pl. Asiat.* 3 : 81. 1851; et Pl. 155 f. 2. 1847; Bor, *Grass.* 202; Panigrahi et al., BBSI 6 : 263; Jain et al., *JBNHS* 72 (3) ; 762.

Type locality: In aquosis; Moosmai, 18 Oct. 1835, It. Ass. 159 (Iter Assam). A very tough perennial grass up to 2 m high, with glabrous nodes. Leaves 2.5-10 X 0.5-0.6 cm broad. Spikes more than 4 cm long, hairs of callus shorter than the spikelets. Spikelets 4-5 mm long. Lower glume broadly 2-lobed, but hardly 2-auricled; lower lemma villous at the tip; upper lemma and its palea ciliate. Lodicules 0. Stamens 2, very rarely 1; anthers long. Styles 2, distinct; stigmas slender. Grain ovate-oblong.

Fls. and frts.: Feb. - Mar.

Ecology: Common along the clefts of moist rocks.

Distribution: India (Assam, Orissa). Endemic.

Specimen from Orissa examined: Borheipani, 21 Feb. 1958, Panigrahi 12706 (CAL).
Note: Bor (l.c.) states this to be endemic to Khasi Hills, Assam only. But its occurrence from the rocky clefts of Orissa hill is interesting one.


*Andropogon umbellatus* Hack. in DC., Monogr. Phan. 6: 401. 1889.

Type: Ceylon: "Communis in regione altiore provinciae centralis" Thwaites - 963.

Delicate densely tufted perennial (very rarely annual) grass, with erect, leafy culms, 30 - 60 cm long, branching near the apex and rooting at the nodes. Leaves 2. 25 - 6 cm long, 2.5 - 7. 5 mm wide, distant, linear - oblong or lanceolate, glabrous on both the surfaces or with a few scattered tubercle based white hairs; sheaths shorter than the blade. Spathes 1 - 1. 35 mm long. Spikes 3 - 6 in fascicle. Involucral spikelets absent; fascicles of spikelets axillary, few up
to 1.25 cm broad, margins finely ciliate. Peduncles 1-25 - 3 mm long, hairy. Lower glume of sessile spikelets 3.5 - 4.5 mm long, 7 -veined, with back slightly sulcate on each side of the midvein; awns 1.7 - 2.5 mm long. Lodicules 2, large. Stamens 3. Lower glume of the pedicelled spikelets 5-6 mm long, not setose.

Rare! Fls. and frts.: Jul.- Dec.

Ecology: It grows near the hill in moist soil up to 1350m.

Distribution: India, Sri Lanka to Thailand.

Specimen examined: Bolangir Dist.: Patna 8 Nov. 1959, Panigrahi 20997 (CAL).

Note: Haines (1925) and Mooney (1950) did not record its occurrence in Orissa. Uniyal and Shrivastava (l.c.) think that it is not rare in Orissa and sometimes confused with Thysanolaena from which it is distinguished by the absence of involucral spikelets.


**Puliculum** Stapf ex Haines, *Bot.*: 1018. 1924.

**Type**: *P. articulata* Stapf ex Haines, *But nomen illeg.*

*(Pollinia articulata* Trin.*nom. illeg., *Pogonatherum contortum* Brongn.)*


**Type Locality**: "Molucca Islands - Lec. Bourou, dans. les Eles Moluques ".


**Type**: Same as for *Pogonatherum contortum* Brongn.

**Puliculum articulatum** Stapf ex Haines, *Bot.*: 1018 (as *(Trin ) Staff ex Haines )* *nom. illeg.*
An erect tufted grass up to 100 cm high. Leaves 10-25 cm long 1.25 - 1.75 mm wide, filiform to lanceolate, acuminate, hairy inside. Ligule a tuft of hairs. Racemes 4-13, 2.5- 6.5 cm long, densely contracted; rachis fragile or tough. Spikelets sessile and pedicelled. Lower glume ca 2 mm long, aristate; upper glume 3- 4.5 mm long, aristate, veinless; lower lemma obsolete, awn geniculate, 1.75- 2 cm long. Lodicles 2. Stamens 3. Styles, 2, free; stigmas plumose. Grain oblong to oblong-oblong.


Ecology: Gregarious on open grassy hill slopes and forests.

Distribution: India, Burma, China, Indomalaysia, S.E Asia to Australia.


Fischer ([l.c.]) recorded its occurrence from Gumsur in Ganjam District and Bal ([l.c.]), from Mayurbhanj respectively.

Note: A most variable species for which several sub-species and varieties have been established by Hakckel based upon the rachis whether fragile or tough; spikelets whether all or only one is pedicelled. The varieties are sometimes separated into three species, but as the characters seem to merge into one another, three "species are under P. contortum, but the question needs further investigation to give a reasonable status to these taxa.

Type: *P. brunoniana* (W. Griffith) W. Griffith (*Panicum brunoniana* W. Griffith).

1a. Culms up to 90 cm and leaves up to 18.8 cm long.
   spikelets 8-10 mm, 1-3 on each branch of the rachis;
   upper glume 7.5-10 mm long; lemma of the lower
   floret acuminate - aristate................................. *P. brunoniana*

1b. Culms up to 30 cm and leaves up to 23.75 cm long;
   spikelets 2.5-4 mm, inflorescence congested, upper
   glume 2.5-4 mm long; lemma of the lower floret
   subacute............................................................... *P.minuta*


**Type locality:** "In acquis currentibus, profundis, Bengal, Goalnugur, 28 Sep. 1935 ".


A floating grass with culms up to 90 cm long, much branched, striate, lower nodes geniculate. Leaves linear-lanceolate, scabrid, narrow at the base; sheaths long, lax with adpressed tubercles; ligules membranous, rarely hairy. *Panicles* 5-7.5 cm long, terminal flexuous; pedicels short and thick. *Spikelets* 1-3 on each branch of the axis, 8-10 mm long, with long awns.

Lower glume minute, orbicular or truncate; upper 7.5-10 mm long. Lower lemma empty or with a male floret; upper bisexual.

Lodicules 2, small or 0. Stamens 3; anthers often with penicillate tip. Styles 2, free or connate. Grain ovate-oblong to orbicular.
Fls. and frts : Throughout the season.

Ecology : Common in swampy places adjacent to ponds, pools and lakes.

Distribution : India, Bangladesh, Burma, Sri Lanka, Malaysia, Tonkin, Australia.

Specimens examined : Koraput Dist.: In ponds near Subuliya, 27 Aug. 1950, Mooney 3980; Sambalpur Dist.: Rengali, 16 Sept. 1947, Mooney 2896, 2897; Cuttack Dist.: Narasinghpur, 5 Aug. 1946, Mooney 2687 (all CAL, DD).

Mooney (l.c.) also recorded its occurrence from Junagarh in Kalahandi District and Saxena et al. (l.c.) from Bhubaneswar.


Syntype : "Tonkin prope Hamoi .............. (Balansa n. 1592, 1593, 4779); Burma (Kurz); Cachar (Keenan); Bengalia inferior prope Daccan (Clarke n. 17040)."

A delicate extremely pretty perennial gregarious grass, with geniculate and rooting nodes. Culms 15 - 30 cm long, slender, glabrous, hairy on lower nodes. Leaves 2.5 - 3.75 cm long, 3-5 mm wide, flat, spreading, linear-acuminate, often glabrous; sheaths lax, broad, keeled, much shorter; ligules hyaline, toothed. Panicles dense, congested, with minute spikelets; awns terminal. Spikelets 2.5-4 mm long, alternate, distant, lanceolate, glabrous or hirsute; pedicels short. Lower glume short, truncate, membranous, 3-veined; upper 3.5-4mm long, ovate, finely acuminate, with 7-9-veins; lower floret male or neuter; lemma 2.5-5 mm long, membranous, ovate-subacute; palea 2-veined; upper floret hermaphrodite; lemma 1.25mm
long, oblong- acute; palea ovate-oblong. Grain elliptic-lanceolate, grooved on one side, white.

Fls: May.

Ecology: Growing in aquatic habitat.

Distribution: India (Bihar, West Bengal, Assam, Orissa), Bangladesh, Burma, Tonkin.

Specimen examined: Puri Dist.: Sar Lake Cut, near Balukhand, 25 May 1948, Mooney 3031 (K, DD).

Note: Bor (l.c.) remarks that this is extremely pretty grass with dense panicles of small spikelets varying in colour from reddish-green to deep purplish red. Mooney (l.c.) mentions that it is an aquatic grass growing in water up to 22.5 cm deep in brackish water, this grass tends to grow in small gregarious patches.


Type: P. fasciculare (Roxb.) A. camus

Note: A monotypic genus distributed in India, Burma and Southeast Asia. It is difficult to separate Sorghum and Pseudosorghum as the characters separating them are weak, except the later superficially resembles Bathriochloa bladhii. Its status as link between these genera deserves cytogenetic investigations and until that these may be kept as distinct.


Andropogon fascicularis Roxb., Hort. Beng. 82, 1814, nom. nud./ Fl. Ind. 1: 269, 1820, (misapplied by Thwaites 1864).

Type locality: "Native of mountains".

A. gangeticus Hack. in DC., Monogr. Phan. 6: 539, 1889.

Syntype: "India Orient. ad Gangem fl. pr. Sahibgange
( Kuntze in h.prop. ); in provincia Centralti, divisions Tschanda
( Duthie in h.m.), pr. Manbhium ( Clarks 344208 ).

Sorghum fascicular ( Roxb.) Haines, Bot.; 1034.

Erect, slender annual with simple or branched stems, 60-150 cm high. Leaves linear, very slender, 5-50 cm in length, 7 cm in breadth, finely acuminate, with tubercle-based hairs near the base and on the margins of the sheaths; sheaths hardly compressed, hirsute or subglabrous, mouth bearded; ligule shortly ovate. Panicle 2.5-5 cm long, long-peduncled, usually narrow; joints and pedicels equal, compressed, villibus on margins, sessile spikelets dorsally flattened, 4-4.5 mm long, glabrous dorsally; callus rounded, bearded. Glumes thin; lower glume elliptic-oblong, ovate, lanceolate, flat margins involute, hispid on the keels above, truncate; upper glume equal or slightly longer; lower lemma lanceolate, hyaline, a little shorter, obtusely acuminate, ciliate; upper lemma 4 mm long, deeply 2-fid to below the middle. Ovary glabrous. Grain oblong-fusiform, 4 mm long. Pedicelled spikelets male, 3.7-4 mm long with 3-4 glumes, base obtuse; lower glume 9-11-veined; upper glume cymbiform with ciliate keels; lower lemma 4/5 of the lower glume, lanceolate; upper lemma, if present, over half of the lower glume, narrowly oblong, entire, ciliolate.

Ecology: Frequent in moist open forest floors.

Distribution: India, Burma, and S.E.Asia.

Specimens examined: Koraput Dist.: Malayagiri hills, 23 Dec. 1960, P.C. Nanda 2479; Ganjam Dist.: Rambha, Dec. 1889 Gamble 21628 (both CAL); Kalahandi Dist.: Madanpur-Rampur, 120 m, 14 Dec. 1939, Mooney 1176 (CAL, DD); Kalahandi, 14 Dec. 1939, Mooney 1181; Sambalpur Dist.: Kholgaon, 450 m, on Tablir hill, 27 Oct. 1947, Mooney 2939 (both DD); Bhatipathar, 1 Nov. 1959, Panigrahi 20709, Dhenkanal Dist.: Bulajhar, Talcher, 150 m, 6 Dec. 1940, Mooney 1631 (both CAL).

Fischer (l.c.) also recorded it from Ganjam, Mooney (l.c.) from Dhenkanal and Gangpur in Sundergarh District and Raju(l.c.) from banks of Sileru in Koraput District respectively.

Note: Stapf in considering the Roxburgh's Andropogon fascicularia to be an Amphilophis, named it Amphilophis fascicularis. Haines (l.c.) pointed out that neither Roxburgh's description nor his detailed drawing were consistent with Amphilophis and as the general habit resembled somewhat more like an Amphilophis and also very well resembled some specimens of Sorghum, he named, Sorghum fasciculare to the species.


**Type:** Cochin-China (BM).


**Type:** "In Indiis, Thunberg (LINN, holotype; microfiche-CAL !)."

Annual grass. Culms stout, terete, up to 180 cm high, erect, branched, standing on stiff still roots. Leaves flat, linear to linear-lanceolate, 25-40 X 0.8-2 cm, glabrous, hispid or glabrescent; sheaths terete, 6-14 cm long; ligule short, membranous, inflorescence a spiciform raceme. Spikes 5-10 cm long, terete, long peduncled; joints 5-6 mm long, concave, smooth, glabrous, broad at apex; callus glabrous. *Sessile spikelets* linear-lanceolate, 5-5.25 mm long, oblong, glabrous; lower glume nearly flat, 4-5.5 mm long, oblong-lanceolate to ovate-oblong, 2-keeled; keels hyaline, muticus upper glume broadly ovate, coriaceous or chartaceous, boat-shaped, 4.25-4.5 mm long; keel apically narrowly winged; lower lemma elliptic to oblong-lanceolate, 4-4.25 mm long, 2-keeled. Lodicules 2. Stamens 3, anthers 1.5 mm long, Upper lemma shorter, convex, ovate to broadly ovate-lanceolate, acute or acuminate, 3.5-
4 mm long, margins inrolled, muticous; palea linear-lanceolate, 3-3.5 mm long, hyaline, veinless. Lodicules 2. Stamens 3; anthers 1.5 mm long. Styles 2, distinct; stigmas plumose, laterally exerted. Grain broadly oblong or ellipsoid, 2.5-3 mm long. Pedicelled spikelets oblong-lanceolate, 3.5-4.5 mm long. Lower glume elliptic-lanceolate, 3.5-5 mm long; keels 2, winged towards the apex, with bifid apex; upper glume elliptic-lanceolate, 3-3.5 mm long, 3-veined, keels 2, with acute apex, chartaceous; lower lemma linear-lanceolate, 2.5-2.8 mm long, apex acute; palea hyaline, with male florets reduced; upper lemma linear-lanceolate, 2.2-2.5 mm long, acute, veinless, without palea.

Fls. and frts.: Aug. to Dec.

Ecology: Comparatively in dry localities.

Distribution: India, Pakistan, Sri Lanka, Burma, China, Old World tropics, Malaysia, Australia, Africa. Introduced to the Caribbean.


Haines (l.c.) recorded its occurrence from Puri, Mooney from Rairakhol in Sambalpur District and Saxena et al (l.c.), from Bhubaneswar.
Uses: An uncommon good fodder grass and used as an excellent hay in Africa.

Note: 1. Clayton (Taxon 29:691.1980) made a proposal to conserve Rottboellia L.f., Suppl. Pl.:114.1782 based on R. exaltata L.f. 1782, non (L.) L.f., Nov. Gram. Gen. 23:37.1779, and is typified with "Indiis, Thunberg., Linna 101.57 (LINN). And since R. exaltata L.f. (1782) is Stegosa cochinchnensis Lour. (Fl. Cochinch. 1:51.1790) (Type: Cochinchina (BM) ) = R. cochinchnensis (Lour.) W.D. Clayton. This proposal has been approved by the spermatophyta Committee by 11-01 votes (cf. Brumitt in Taxon 32 (4) :624.1983). R. exaltata (L.) L.f., 1779, for which R. corymbosa L.f., 1782 was proposed as a nom. nov. (Aegilops exaltata L. 1771, Type: "India, Koenig 10 (LINN) is now transferred to Ophiuros Gaertn., Fruct. 3:3.1805 Type:O. corymbosa (L.f.) Gaertn., and should be known as Ophiuros exaltatus (L.) Kuntze.

2. It has recently become a serious pest for cultivation and gaining importance in the tropics. It has been listed in 1977 as the 18th most troublesome weed in the world (Clayton et Renvoize, 1986).


Lectotype: S. officinarum Linn. ("Officinarum") (vide


Type: N. \textit{parphyrocoma} (Hance) Bor (Eriochoysis \textit{parphyrocoma} Hance), ( =Saccharum \textit{narenga} Wall. ex Hack. (in Alph. et A.C. de Candolle, Monogr. Phan. 6:119.1889).

\textit{Note}: Bor(1940) distinguishes \textit{Narenga} Bor from \textit{Saccharum} L. by its coriaceous glumes (slightly membranous at the tip in the case of the upper glumes); whereas in \textit{Saccharum} L. the membranous glumes, at most is slightly coriaceous at the base. This is "no more than the extreme expression of a trend found elsewhere in the genus". Therefore, Clayton \& Renvoize (l.c.) reduce it to a synonym of \textit{Saccharum} L.

\textbf{Akhu-Or.}

\textit{Sugarcane, Noble Cane-Eng.}

2. Several species like \textit{S. arundinaceum} Retz. and \textit{S. officinarum} L. are extensively cultivated in our area, the former used in making walls by the natives due to straight and strong culms and the latter extensively grown in larger areas for sugar, paper, and cordage. The young leaves and culms are eaten by cattle.

1a. Glumes membranous, almost slightly coriaceous at the base:

2a. Peduncles up to 40 cm long, not hairy; rachis less fragile; callus hairs less than 1 mm long, much shor-
ter than the spikelets; glumes villous on the lower two-third of the back; lemmas cuspidate... \textit{S. bengalense}

2b. Peduncles up to 60 cm long, hairy below the panicles; rachis very fragile; callus-hairs 1-2 mm long, at least twice as long as the spikelets, very white-silvery; glumes glabrous on the back; lemmas not cuspidate.................. \textit{S. spontaneum}

1b. Glumes coriaceous, slightly membranous at the tip of the upper glume:

3a. Lower glume charateous dorsally villous all over; tip of the upper glume spiculate or obtuse; lower lemma shorter than the glumes, oblong-lanceolate; stem rusty tomentose below the larger panicle; sessile spikelets 4-5 mm; the whole panicle golden or golden-brown in appearance. .................. \textit{S. longifolium}

3b. Lower glume coriaceous, glabrous or pubescent below, not villous; tip of the upper glume membranous; lower lemma equal to the glumes, elliptic; stem silky below the panicle; sessile spikelets 2.5-3.0 mm; the whole panicle purplish or greyish-purple in appearance........ \textit{S. narenga}

\textit{Saccharum bengalense} Retz., Obs. Bot. 5:16,1789; Bor, Grass.: 211; Panigrahi et al., BBSI 6:263.

\textbf{Type}: India; Bengal, Koenig.
Saccharum munja Roxb., Fl. Ind. 1:250.1920; Haines, Bot. 1013.

**Type locality:** "A native of the countries about Benares".

**Iconotype:** Roxb. Ic. No. 1522 (CAL: K).


**Type:** "Habitat Asia: Balaspar (Hugel: no. 877) Hb. Vindobon".

A very large tufted grass ca 3.5 m high. Culms not leafy above, glaucous, up to 1 m long, 1.5(-2) cm wide. Panicle rather contracted, yellowish-villous, up to 40 cm long, silvery or grey; glabrous; peduncle; rachis less fragile; joints of rachis and pedicels 2.5-3 mm long, yellowish-villous. Callus hairs less than 1 mm long. Sessile spikelets 4-6 mm long, longer than internode of rachis. Lower glume of the sessile spikelets villous, with 0.7-1.0 cm long hairs; upper glabrous. Lemmas cuspidate. Grain linear-oblong.

**Fls. and frts.:** Oct-Dec.

**Ecology:** Usually observed along the river beds.
2n = 60 (Bor, l.c.)

**Distribution**: Throughout India, Pakistan, Afghanistan, Persea.

**Specimens examined**: Sambalpur Dist.: Bhatipathar, 1 Nov. 1959, Panigrahi 20663; Saptadhar, 550 m, 7 Nov. 1959, Panigrahi 20933 (both CAL).

Fischer (l.c.) and Srinivasan et Rao (1961) recorded it from Parlakimedi in Ganjam District.

**Uses**: Juice cures mild gonorrhoea. Upper leaf-sheaths of the flowering culms provide a valuable fibre. Only young leaves are eaten by cattle.


_Type locality_: "East India".

_Saccharum fallex_ Balansa in _J. De Bot._ 4:80.1890, _nom. illeg._

_Type locality_: "Valleae et collines a Tuphap". L.'Indo-China francaise.

A very tall perennial grass with culms 2.8-5 mm high, nodes with erectopatent silky hairs rendering rusty appearance; root-stock horizontal. Lower leaves 60-180 X 2.5 cm
glabrous or hirsute, dark-green with white midrib, leaves below the panicle often reduced to brown bristles; sheaths with bulbous-based hairs; ligules short, 2-fid, panicles 30-60 cm long, strict, lanceolate or oblong; rachis fragile, angular, pubescent, golden or golden-brown. Sessile spikelets 4-5 mm long, linear-oblong. Lower glume narrowly truncate chartaceous, dorsally flat, 2-keeled; upper glume similar, 1-keeled, apiculate or obtuse, margins ciliate above. Lower lemma short, oblong-lanceolate, hyaline, ciliate; upper lemma smaller, 2-fid, 1-veined, fimbriate or ciliate; palea minute, broad, truncate, ciliate.

Ecology: In damp forest floors.

2n = 30 (Bor, l.c.)

Distribution: India (Bihar, West Bengal, Assam, Nagaland, Orissa), Burma, S-E Asia to Malaysia.

Specimen examined: Nil.

Saxene et al. (l.c.) reported its occurrence from Orissa without specifying the locality.

Use: Arrows, mats and ceilings are prepared from this plant.
Saccharum narenga (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6:119.1889; Haines, Bot. : 1013.


Eriochrysis porphyrocoma Hance ex Trin. in J. Bot. 16: 294.1876.

Type: "China- in provincia cantonensi, secus ammem Lien Chau"October,1875, invenit domina Galbraith 9285(K).

Note: Several botanist followed Boe for his new combination as S. porphyrocoma (Hance ex Trin.) Hack. in DC., Monogr. Phan. 6:120.1889.

A very tall grass, 3-4 m high with a stout horizontal rhizome. Stems slender, pubescent above, nodes bearded with a ring of erect stellate hairs. Lower leaves up to 180 X 2.5 cm, linear, long, acuminate, narrowed at the base, margins scabrid above, upper-most subulate; sheaths with bulbous-based hairs; ligule rounded, very coriaceous, 2-fid; panicle 30-60 cm long, lanceolate or oblong; rachis scaberulous, bearded at the nodes, branchlets covered with purple hairs. Sessile spikelets 2.5-3 mm long. Lower glume coriaceous, 2-keeled, ciliate, brown, shining, tip narrowly
 truncate; upper glume similar, but 1-keeled, oblong, coriaceous, tip membranous; lower lemma equal, elliptic, hyaline, much ciliated; upper lemma smaller, linear-oblong, 1-veined above, fimbriate or ciliate. Lodicules 2. Stamens 3. Styles exserted.

**Fls. and frts.:** Aug.-Nov.

**Ecology:** Grows in damper forests of the valleys.

2n = 30 (Bor, l.c.).

**Distribution:** India, tropical South-East Asia.

**Specimens examined:** Nil.

Mooney (l.c.) collected it from the grassy summit of Siji Mali (1300 m) of Kalahandi district. He points out that this species is not common in the southern tract and abundantly found over 700 m.

**Uses:** This plant is used in making mats, ceilings and arrows etc. It is also a good soil binder.

**Note:** Several botanists followed Bor for his new combination as *Narenga porphyrocoma* (Hance ex Trin.) Bor, Ind. For. 66: 267.1940; Mooney, Suppl.:133; Bor, Grass.:198.


**Type:** India: Malabar, Koenig (LINN).

Kishi (Or.)
Tall erect grass up to 7 m high. Culms erect, solid, smooth, polished, silky beneath the panicle. Leaves up to 1.2 m long, 0.4 - 1.2 cm broad, narrowly linear, finely acuminate, glabrous, often with convolute margins; sheaths smooth; ligule membranous. Panicles up to 60 cm long, contracted; peduncle hairy; rachis fragile. Callus hairs up to 2 cm long. Lower glume glabrous; upper obscurely keeled. Palea small, ciliate, hyaline.

Figs. and frts.: Aug. - Feb.

Ecology: Common along rivers, ponds, swampy places and rice fields.

2n = 48 to 128 (Bor, l.c.).

Distribution: India, widely distributed in the warmer regions of the old world.


Raju (l.c.) recorded its occurrence from Balimela in Koraput District; Panigrahi et al. (l.c.), from Lulung in Mayurbhanj and Choudhury et Patnaik (l.c.), from Patia, Bhubaneswar.

Uses: It is an excellent soil binder. Used for thatching and brooms. Kols use the panicles for decorating the hair in darces.
SACCIOLEPIS Nash in N.L. Britton, Man. Fl. North
Stat. Canad. Canada: 89. 1901; Haines, Bot.: 990; 1924;
Fischer in Gamble, Fl. Madras: 1787 (1238). 1934; Bor,

Type: S. gibba (S. Elliott) Nash (Panicum gibbum S. Elliott).

Note: This genus is recognised by its spiciform inflorescence.
It is sometimes mistaken for Panicum due to open panicle, but
has the gibbous ribbed spikelets, characteristic of Sacciolepis

1a. Leaves up to 40 cm long; spikelets 1.5-2 mm,
globose, blunt. S. mysuroides.

1b. Leaves up to 30 cm long; spikelets 2.5-5 mm
tips acute.

2a. Culms robust, usually spongy below; lower glume
ovate, less than half the length of spikelets,
3-6-veined; spikelets 4-5 mm long, lanceolate,
usually in interrupted crowded fascicles,
glabrous. S. interrupts

2b. Culms slender; glumes spongy; lower glume
lanceolate, half as long as the spikelets, 3-veined;
spikelets 2.5-3.5 mm long, lanceolate-ovoid, in
continuous pseudospikes, often hairy. S. indica.

21: 8. 1908; Haines, Bot.: 990; Mooney, Suppl.: 172;
Bor, Grass.: 357; Panigrahi et al., BBSI 6: 263; Raju,
BBSI 6: 294.

Aira indica L., Sp. Pl. 2: 63. 1753 (in 'errata') as
A. spicata L., Sp. Pl.: 63. 1753, non A. spicata L. P; 64. 1753.

Type locality: "Habitat in India."
**Panicum indicum** (L.) L., Mant. Alt. Pl. 2: 184, 1771, non Mill., 1768.

A much variable tufted grass, with slender culms, 10-60 cm high. Leaves 3-14 cm long, 1-5-5 mm broad, glabrous. Inflorescence a spiciform cylindrical dense, panicle; pedicels shorter than the spikelets. Spikelets 2.5-3.5 mm long, in continuous pseudospikes, ovoid, usually curved, 2-3.2 mm long, glabrous or densely hispid. Lower glume half as long as the spikelet, lanceolate from a broad base, 3-veined, acute; upper glume curved, obtuse, 7-11-veined, often hairy. Grain elliptic, dorsally compressed.

**Fls. and frts.**: Aug.-Dec.

**Ecology**: Common in open grasslands and is often gregarious in swampy places.

**Distribution**: Throughout tropical and sub-tropical India, tropical Asia, Polynesia to Australia. Introduced into Africa and America.

**Specimens examined**: Koraput Dist.: Nuanai, 14th Dec. 1960, P.C. Manda 2362 (CAL); Sambalpur Dist.: Lamtidadar, Rairakhol, 30 Oct. 1948, Mooney 3137 (DD); Padampur, 29 Oct. 1959, Panigrahi 20536; Puri Dist.: Balukhand Reserve Forest, 21 Apr. 1965, V. Abraham 69 (both CAL); Cuttack Dist.: Sikharpur, Cuttack, 1 Nov. 1930, sine lect 141 (Rav. Coll. Herb.); Keonjhar Dist.: near Sirkagutu, 2 Oct. 1946, Mooney 2777, Keonjhar, 3 Oct. 1946, Mooney 2792 (both DD).

Haines (l.c.) also recorded it from Sambalpur; Fischer (l.c.), from Ganjam; Mooney (l.c.), from Bhadodih, 100 m, in Keonjhar District and Raju (l.c.), from Balimela in Koraput District.

**Sacciolepis interrupta** (Willd.) Stapf in Drain, Fl. Trop. Africa
Aquatic or semi-aquatic grass, with culms robust and spongy below, up to 2 m high. Leaves 15-30 (37) cm long, 0.5-1.25 cm wide, linear, tapering. Panicle dense, cylindrical, spiciform with short pedicels, 15-25 cm long. Spikelets 4-5 mm long, usually in uninterupted crowded fascicles, obliquely lanceolate in outline, often hairy; tips acute. Lower glume less than half the length of the spikelets, broadly ovate, acute or obtuse, 3-6-veined; upper glume elliptic-lanceolate, strongly 7-9-veined; lower lemma with a small palea, which is hardened white in compressed fruit.


Ecology: In swamps, in imundated soil.

Distribution: India (probably throughout), Tropics of South-east Asia.

Specimens examined: Koraput Dist.; Korandi River valley, 9 Dec. 1962, G.V.S. Rao 30145; Puri Dist.; Khurda, 1889, Walsh 11 (both CAL); Keonjhar Dist.: Dhubna, 1 Oct. 1946, Mooney 2751; Mayurbhanj Dist.: Suliapada, 26 Nov. 1940, sine lect 984 (both DD); Dukura to Udala, 12 Feb. 1958, Panigrahi 12246 (CAL).

Haines (l.c.) recorded its occurrence from Puri; Fischer (l.c.), from Ganjam and Saxena et al., (1982), from Bhubaneswar.
Uses: Spongy stems are readily eaten by cattle.

*Sacciolepis mysuroides* (R.Br.) A. camus in Lecomte, Fl. Gen. de L'Indo-Chine 7: 460. 1922; Haines, Bot.: 990; Fischer in Gamble, Fl. Madras: 1787 (1238). 1934; Mooney, Suppl.: 172; Bor, Grass.: 358; Panigrahi et al., BBSI, 6: 263.

*Panicum mysuroides* R.Br., Prodr.: 189. 1810.

Type: 'T' - *Littorea novae Hollandiae (Australia) intratropicum*, Banks.

*Hyphenachne myuroides* (R.Br.) Balansa in Morbt, J. de Bot. 4: 143. 1890.

Very slender glabrous perennial with culms 15-100 cm high. Leaves 10-40 cm long, 1.25 - 5 mm wide, narrowly linear, finely acuminate, margins smooth. Spiciform panicles 5-22.5 cm long, dense, cylindrical; pseudo-spikes 3.3-2.5 cm long, continuous, rarely interrupted. Pedicels shorter than the spikelets. Spikelets 1.5-2 mm long, subglobose, blunt, lanceolate, ovate, acute, 3-veined; upper ovate, obtuse, 5-9-veined. Lower lemma paleate, empty; upper lemma with palea as long as the glume.

Fls. and frts.: Sep. - Dec.

Ecology: Along the margins of tanks and other damp places.

Distribution: Throughout the hotter parts of India, Tropical Asia, Australia and Trop. and South Africa.

Specimens Examined: Koraput Dist.: Junapani, 720 m, in Sonabera Plateau, 3 Sep. 1949, Mooney 3665 (DD); Ganjam Dist.: Chatrapur, Dec. 1889, Gamble 21697 (CAL); Sambalpur, Griffith s.n. (Accn. No. 520585 - CAL); Malda, 1 Nov. 1959, Panigrahi 20618; Laupada, 22 Dec. 1960, C.R. Rao 2462 (both CAL); Keonjhar Dist.: Sirkagutu, 975 m, 3 Oct. 1946, Mooney.
2793 (DD); Orissa: sine loc. 1888, Walsh s.n. (Accn. No. 520605 CAL).

**Schizachyrium** C.G.D. Nees, Agrost. Bras.: 331.

Mar.-Jun. 1829; Haines, Bot.: 1042; 1924; Bor, Grass:


1a. Plant very slender, delicate, divergently branched; leaves linear rounded at the apex to an obtuse tip; joints of the raceme 2-3 mm long.......................... *S. brevifolium*

1b. Plant robust, fastigially branched; leaves tapering to an acuminate tip; joints of the raceme 4-6 mm long; spikes pubescent and villous .................................................. *S. exile*

*Schizachyrium brevifolium* (Swartz) Nees ex Euse in Mig.


Type: Jamaica, Swartz (M: Type fragment US, Photo-K).

Type: Puerto Rico, Lendru (Isotype, U.S.).

A delicate annual, with slender, divergently much-branched from the nodes, straggling but ascending stem, 5-100 cm long, glabrous, leafy throughout. Leaves divericate, linear-obtuse,
1.5- 7.5 mm × 1.3- 5 mm, margins and nerves beneath scabrid: 
spathes 1. -2.5 cm long; peduncles filiform; joints 2-2.7 mm 
long, glabrous with a tuft of hairs at the base; pedicels 
glabrous or sparsely hairy. Spikes numerous, glabrous, or 
sparsely hairy. Spikelets 3-4.25 mm long. Sessile spikelets 
3.25 mm long, linear- oblong. Lower glume 2.5- 3 mm long, 
coriaceous, minutely puberulous, with a 2-fid tip; upper glume 
acuminate or cuspidate; upper lemma deeply 2-fid, callus 
a tuft of hairs; awn 0.75 - 1.25 cm long. Pedicelled spikelets 
reduced to a long awned glume.


Ecology: Abundant in rice - fields and waste drier parts of 
the forests.

Distribution: Throughout India, to Tropics of Old World.

Specimens examined: Orissa: sine loc. 1889, D. Walsh 
s.n. ( Accn. No. 530166 - CAL ); Koraput Dist.: Malakotta 
Parbat, near potangi, 1200 Oct. 1950, Mooney 4038; Kalahandi 
Dist.: Purnagumma, 600 m, 19 Dec. 1948, Mooney 3176; Sambalpur 
Dist.: Kholgaon, 26 Oct. 1947, Mooney 2923; Keonjhar Dist.: 
Sirkagutu, 1000 m, 3 Oct. 1948. Mooney 2791 ( all DD ).

Mooney ( l.c. ) also recorded it from Gangpur and Bonai 
in Sundargarh District, Bamra, Redhakhol and Sambalpur and 
Panigrahi et al., ( l.c. ) recorded it from Patna ( Panigrahi 
20976 a ) in Bolangir District respectively.

Note: The leaves and sheaths turn rosy red when the plant 
matures.


Type: Africa, Aethiopica in the eastern mountains, Kotschy 370.

An erect, slender annual, with stems tufted 5-55 cm high. Leaves 2.5-10 cm long, very narrow with acuminate tip, erect. Spathe 2-4.25 cm long, narrowly lanceolate, slender, often becoming bright red; upper spathe often aristulate; peduncles 1.25-2.5 cm long, compressed. Spikes 2.5-3.75 cm long, joints pubescent, often concealed among the leaves, 0.75 cm long, pubescent and densely silky villous towards the tip; pedicels thickened upwards, with lunate tips. Sessile spikelets 3.5-4.5 (to 6.25) mm long, subulate-lanceolate. Lower glume 5-5.5 mm long, coriaceous, densely villous, tip very slender, bifid; upper glume linear-lanceolate, 1-veined, cuspidate or with a short awn; upper lemma bifid, with awn 7.5-17.5 mm long, very slender. Pedicelled subulate, silky. Lower glume shortly awned.

Fls. and frts.: Oct-Dec.

Ecology: In moist locality under partial shade.

Distribution: India, Tropics of the Old World.

Specimens examined: Koraput Dist.: Borara, 800 m, in Sonabera, 1 Oct. 1949, Mooney 3680; Sambalpur Dist.: Motijharan, 21 Oct. 1947, Mooney 2919; Charmal, in Rairakhol, 28 Oct. 1948, Mooney 3835 (all DD); Cuttack Dist.: Cuttack, criminal court area, 2 Oct. 1934, D. Mukherjee 442 (Rav.Coll. Herb.). Mooney (l.c.) also recorded it from Gangpur 240-450 m, in Sundargarh District, Redhakhol and Kholgaon, 210 m, in Sambalpur Dist. and also from Sonabera, 700 m in koraput Dist.

Type: S. blumei Nees.


Note: Clayton and Renvoize (l.c.) reduced Gephalostachyum Munro, Teinostachyum Munro (Type: T. griffithii Munro), Nechouzere A. Camus (Type: T. mekongensis A. Camus) and Dendrochos Parkinson (Type: D. distans Parkinson) as congeneric synonyms of Schizostachyum Nees.

Gamble in J.D. Hooker, Flora of British India (1895) described Cephalostachyum pergracilis Munro, from Burma as a species of Cephalostachyum Munro and Melocanna gracilis Munro with type from Singapore as a synonym of Schizostachyum chilianthum Kurz (1870). Holttum transferred the latter to the Schizostachyum Nees as S. gracile (Munro) Holttum. Therefore, Cephalostachyum pergracilis reported by Haines from Bihar needs to be transferred to Schizostachyum Munro and would justify the new combination proposed.

Schizostachyum per-gracilis (Munro) comb. nov.

Cephalostachyum pergracilis Munro in Trans. Linn. Soc. 26: 141. 1863, Haines, Bot.: 946.

Syntype: "Hab. in Ind. or Tenasserim, Rangooa"!

Mc Clelland;
A deciduous, tufted, arborescent bamboo. Culms 10 - 13 m tall, 5 - 7.5 cm in diam., glaucous-green and whitish-puberulous below the scarcely thickened nodes. Leaves variable, linear-lanceolate, 15 - 35 x 2.5 - 3.25 (-6.25) cm, thin rounded or cuneate at the base into a short petiole, glabrescent beneath; ligule very narrow, entire. Inflorescence or large panicle with filiform, drooping spikes, bearing distant broad heads of spikelets, subtended by chaffy sheathing bracts; rhachis very slender, wiry. Spikelets in bracteate clusters, 1.2 - 1.8 cm long, without glumes; 1-2 sterile florets, followed by a fertile floret, ending in a produced rhachilla; lemma 1.25 - 1.75 cm long, ovate-lanceolate, many-veined, densely pale - hairy, long - mucronate; palea as long, 2-keeled, the keels close together, ciliate, apex bipartite, mucronate. Lodicules 2, narrow, lanceolate. Stamens 6, free; anthers long, obtuse, purple. Ovary smooth, subglobular; style 3-cornered; stigmas 2-3, stout, recurved, plumose. Grain obovate-oblong, shining, 1.25 cm long, furrowed on one side, ending in a beak.

Ecology: Growing in deep ravines and valleys.

Distribution: India (Uttar Pradesh, Bihar, West Bengal, Assam, Madhya Pradesh, Andhra Pradesh), Bastar.

Specimens examined & Dhenkanal Dist.: Latangi to Tulka, 750 m, in Angul, 9 Dec. 1902, J. H. Lace 2568 (CAL).

Bahadur and Naithani (1976) record the species doubtfully from Govindapur Dist. (June 1959, Das s.n. (Cult. or Wild).
Uses: When young relished by cattle and becomes unpalatable at maturity.

Note: The plant turns rusty red in dry season.

**SEHIMA** Forsk., Fl. Aeg. - Arab.: 178. 1775;


**Type:** *S. ischaemiides* Forskål.

Note: Characterised by shape and nervation of pedicelled spikelet.


**Type:** India, Rottler (K).

Tufted (often gregarious) perennial, with a rhizomatous base from which leafy glabrous stems of ca 1.3m high arise. Leaves 7.5-50 cm long, 2.5-7.5 mm wide. Spikes 7.5-12.5 cm long, fragile, with pedicels 3.5-4.5 mm long, ciliate on both edges; joints of rachis also ciliate on both edges. Sessile spikelets 8-9 mm long; awn very minutely ciliate along the spiral. Lower glume of pedicelled spikelet lanceolate-acuminate, slightly 2-toothed. Lower glume of the sessile spikelets 6.25-7 mm long, without a slit but deeply grooved, strongly 4-veined; callus -1-1.25 mm long, entire; keel narrowly winged at the apex, with a setaceous arista, 1-1.5 mm long; awns 3-4 cm long.

Rare! Fls. and frts.: Sept. - Nov.
Ecology: Frequently found in sandy rocky terrain and hilly forests.

2n = 34, (Bor., l.c.)

Distribution: Widespread in India, Pakistan, China, Australia, Arabia, Trop. Africa.


Haines (l.c.) also recorded its occurrence from Angul forests in Dhenkanal District.

Use: An excellent fodder grass relished by cattle even after the fall of the spikes.


Type: *S. viridis* (L.) P. Beauv. (*Panicum virides* L.) (typ. cons.)

Fungi: Lich._7

Type: *S. trichodes* A. Michx.

Note: *S. italica* (L.) P. Beauv. (*Kongo, kongu, Tangan- Or.*; The Italian Millet - Eng), is often grown in our area for grains.

1a. Inflorescence a cylindric and dense or sometimes lobed spiciform panicle blades folded or flat:

2a. Bristles retrosely barbed......................*E. verticillata*

2b. Bristles antrosely barbed;

3a. Inflorescence a narrow-panicle, sometimes loosely lobed below and tapering upwards...............*S. intermedia*. 111
3b. Inflorescence a cylindric false spike;

4a. Spikelets 3 mm long; upper leaf coarsely rugose, boat-shaped and slightly keeled upwards, broad and dorsally strongly earned in profile..................S. glauca

4b. Spikelets 2.35 mm long; upper lemma usually finely rugose, narrow and dorsally gently curved, not at all keeled.......................S. pumila

1b. Inflorescence a dense or rather loose, narrow or widely spreading panicle; leaves lobed, fan-fashioned between the longitudinal veins:

5a. Short slender grass, the culms radiating or geniculate ascending to form a leafy clump; 0.5 - 1 in high with amargent floating culms up to 1.5 m; leaf-blades 0.5 - 3 cm wide; panicle not more than 25 cm long and 5 cm wide; linear to narrowly lanceolate with short appressed or ascending lateral branches, apiculate at the base; spikelet 3.5- 4 mm long; upper lemma finely but distinctly rugose, longer than the lower lemma...S. plicata

5b. Robust grass 1-2 m high; leaf-blades 1.5- 8 cm wide; panicle, up to 50 cm long and 20 cm wide, ovate, lax, with long flexuous branches; spikelets 2.5- 3.5 mm long, acute; upper lemma smooth or punctate, equal to or shorter than the lower lemma..................S. palmifolia

Setaria glauca (L.) Beauv., Egs. Agrost. 51 : 169, 178, 1812;
Haines, Bot. : 988; Bor, Grass.: 360; Panigrahi et al., BBSI 6 : 263; Terrel, Taxon, 25 : 303. 1976.

Lectotype: "Habitat in Indiis," Clayton - 579, Cf.80.10 and 80.11 (LINN).

(Terrel states, "Specimen of Clayton - 579 of Panicum glaucum in BM, is type for var., Yellow foxtail").

Annual with stem 30-110 cm high, erect or ascending, nodes glabrous. Leaves 10-30 cm long, 5-7.5 mm wide, folded or flat, linear, finely acuminate, sparsely hairy; sheaths smooth; ligule a ridge of hairs. Inflorescence a cylindric false spike. Spikelets 3 mm long, solitary in involucre; if several together than the inflorescence not plicate with yellowish or rufous entrosely barbed bristles. Lower glume less than half the length of the spikelets, broadly ovate, often shortly apiculate, 3-veined; upper glume shorter than the upper lemma, rugose; upper lemma coarsely rugose; boat-shaped and slightly keeled upwards, broad and dorsally curved in profile. Grain pale yellow.

Fls. and frts.: Sep. - Nov.

Ecology: Common in cultivated fields and grassy lands.

Sometimes cultivated.

2n = 18, 36 (Bor, l.c.)

Distribution: India, Sri Lanka, temperate and tropical regions of the world. Native of warm temperate zone of the Old World, introduced into America, Australia and other countries.

Specimens examined: Ganjam Dist.: Parlakimedi, rocky hillside, Sep. 1903, Grant, Candler et Burkill 20489 (ESIS); Puri Dist.: Salia forest, Nayagarh; 16 Oct. 1946, Mooney 2693; Mayurbhanj Dist.: Near Burhi Khamar, 28 Jun. 1940; sine lect 861 (both DD). Haines (l.c.) however, recorded
its occurrence from Orissa, without citing any specific locality and Panigrahi et al. (l.c.), from Bhatipathar in Sambalpur respectively.

Setaria intermedia Roem. et Schult., Syst. Veg. 2:489.1817; Haines, Bot.: 989; Raju, BBSI 6:294.

Type: "In India, Orientali", Heyne.

Panicum tomentosum Roxb., Fl. Ind. 1:303.1820.

Type locality: "Growing in tufts on dry pasture ground over various parts of India".

P.intermedium (Roem. et Schult.) Roth, Nov. Pl. Sp.:47. 1821, non Hornem., 1813.

Setaria tomentosa (Roxb.) Kunth, Rev. Gram. 1:47.1829; Bor, Grass.: 365.

Annual, Culms slender, up to 1 m high. Leaves flaccid, lanceolate, 5-30 cm long, 2.5-1.8 mm broad. Panicles very much wider, open, lobed. Spikelets up to 2 mm long, crowded or loosely scattered. Bristles 3-4, antrosely barbed. Lower glume suborbicular, hyaline, 7-1 mm, 3-veined; upper orbicular, 1 mm long, 5-veined. Grains ellipsoid or oblong.


Ecology: On damp grassy places especially in shades.

Distribution: India, Pakistan, Nepal, Bhutan, Bangladesh, Burma, Sri Lanka, extending to Malaysia and Polynesia and introduced to Tropical Africa.

Specimens Examined: Koraput Dist.: Medeng Gandi, 1000-1300 m, near Gottangi, 9 Oct. 1950, Mooney on 4048 (DD); Ganjam Dist.: Chatrapur, Aug. 1904, C.E.C. Fischer 27; Kalahandi Dist.: Sambodola, 22 Sept. 1956, S.K. Mukherjee 2437 (both CAL); Dhenkanal Dist.: Kapilas Hills, 600 m, 30 Aug. 1946, Mooney 2728

Panicum palmifolium 'Palmaefolium' Koenig, Naturf. 23: 208. 1788.

Type locality: Thailand (Whereabouts not known).

P. plicatum Willd., Enum. Pl.: 1033. 1809, non Lam. 1791.

Holotype: India: Calcutta, Roxburgh (B).

A perennial plant, 1-2 m high with plicately-veined leaves, 1.5-8 cm wide. Panicles ovate, open, very lax, long, flexuous. Spikelets narrowly ovate to elliptic, 2.5-3.5 mm long, acute. Bristles ± twice as long as the spikelet. Upper lemma usually punctate, equal to or shorter than the lower lemma. Palea ovate or acute. Grain free within hardened lemma and palea.

Fls. and Frts.: Sep.-Dec.

Ecology: Often located in dense shady ravine.

2n = 36, 54, (Bor, l.c.)

Distribution: India, Tropical Asia, Central America and West Africa.

A native of India.

Specimen examined: Nil.

Mooney (l.c.) recorded it from Kalahandi hills, 1000-1200 m.

Uses: It is sometimes grown as ornamental in our gardens.

Note: This species is easily recognised in the field by...
its plicately folded leaves, very lax open panicle of long loose flexuous branches and often punctate surface of the upper lemma.


_Panicum plicatum_ Lam. _Encycl._ Meth. _Bot._ 4: 436. 1797.

_Holotype_ : Cult. Paris; Origin uncertain (P-LA).

Perennial slender grass, upto 2.4 m long. Leaves up to 3 mm wide, linear-lanceolate, finely acuminate, folded fan-fashioned between longitudinal veins. Panicle very lax, not more than 25x5 cm; lateral branches not more than 8 cm long, apiculate at base. Spikelets 3.5-4 mm long. Lower glume broadly ovate, obtuse, 5-veined; upper ovate-obtuse, 7-veined. Lower lemma longer than the upper, ovate, shortly apiculate, 5-veined; upper ovate-oblong. Palea ovate, acute. Grain oblong or ellipsoid.


_Ecology_ : Moister parts of hill forests.

2n = 36 ( _Bor, l.c._)


_Specimen examined_ : Nil.

Haines (l.c.) recorded its occurrence only from the Mayurthanj Hill, above 1000 m.

_Use_ : Sometimes planted in gardens as ornamental species.

_Note_ : Lamarck (l.c.) states, "Cette espece est cultivees an Jardin du Museum. On la dit originaire de l'Isle- de France; d'autres pensent qu'elle envoyee de Saint-Domingue".

Clayton (l.c.) however, treats it as a local species, a depauperate from of _S. palmifolia_.


_Type:_ "Jignore le lieu natal de cette plantée", v.s.

Desfontaines (P).
_Type:_ "Guinea, Africa (Thonning and other Danish botanists from title).


Setaria pallide-fusca (Schum.) Stapf ex C.E. Hubb., Kew Bull.: 259. 1930; Bor, Grass.: 363; Panigrahi et al., BBSI 6: 263; Saxena et al., Ind. J. For.: 5 (2): 103. 1982.

Sial Langudo (Or.)

Annual grass with culms 1.3 m high. Leaves 6.25-32.5 x 0.35-1 cm, flat. Inflorescence a false spike or cylindrical panicle, 7-16.5 cm long, contorted, continuous. Bristles usually 8, antrosely bearded. Spikelets up to 2.25 mm long, deciduous, ovate to elliptic-oblong. Upper glume shorter than the upper lemma. Upper lemma coarsely rugose, boat-shaped or slightly keeled upwards. Palea bisexual.

_Fls. and frts:_ Jun.- Apr.

Ecology: A way side weed commonly found in depressions during rainy season.

2n = 18, 36 (Bor, l.c.)
Distribution: India, tropical and warm temperate regions of the Old World, N. America, Afghanistan, tropical Africa and Australia.

May have been introduced into America.


Choudhury et Patnaik (l.c.) also recorded the species from Sisupalgarh and Behera et al. (l.c.) and Saxena et al. (l.c.) from Bhubaneswar.

Use: It is regarded a good fodder grass.

Note: Clayton (1979) pointed out that annuals from India, Southeast Asia and Australia (excepting the Australian endemic species), differ from African population in that the standard deviations of spikelet length is twice as great. This scarcely constitutes a practical taxonomic character, and it is apparent that these populations must be included in *S. pallide-fusca*. Further more, the range overlaps that of the Mediterranean population in such a way that the two elements cannot be separated. Evidently, the annual populations must all be treated as conspecific under the name *S. humila* and we follow Clayton in the treatment of the species.
There is a controversy about the type of this taxa. Thonning and other Danish botanists cited the type from "Guinea, Africa" basing upon the title of the publication, whereas Bor (1970) mentions it as "sine loco designato, Schumacher".

*Setaria verticillata* (L.) P. Beauv., Essai Agrost.: 51; 178. 1812; Hook. f., FH 7: 80. 1896; Haines, Bot.: 989; Mooney, Suppl.: 177; Bor, Grass.: 365; Panigrahi et al., EBSI 6: 263.


**Type**: Habitat in Europa Australis and Oriente (LINN 87. 7, microfiche CAL 1)

Annual. Culms, slender, erect or ascending, 30-120 cm long, stout. Leaves 8.75 - 35.3 x 0.5 - 2.5 cm, flat, linear-lanceolate, acute, with a narrow base. Sheaths smooth. Ligule a fringe of hairs. Panicle cylindrical, 1.25 - 20 cm long. Bristles 1-4, retrorsely barbed with descending teeth. Spikelets 1.7 - 2 mm long, ellipsoid, glabrous. Lower glume ovate, hyaline, 3-veined; upper, thinly membranous, 5-veined. Lower lemma paleate or not; upper lemma elliptic-oblong, palea faintly striatulate. Grain elliptic or ellipsoid.

Fls. and frts.: probably throughout the year.

2n = 36, 78 (Bor, l.c.)

**Distribution**: India, tropical and warm temperate regions of the Old World. Introduced into America.

**Specimen examined**: Orissa: sine loc., Walsh s.n. (Accn. No. 524295 - CAL); Koraput Dist.: Gupteswar, 496 m, 20 Dec. 1962, G.V.S. Rao 30418; Ganjam District: Gurangi, 19 Aug. 1931, Narayanaswami on 5798 (MH); Ganjam, Dec.
1949, W.Wight 3046; Sambalpur Dist.: Rayagarha, 14 Aug.
1946, S.K. Mukherjee 4419; Sambalpur Dist.: Rayagarha, 14 Aug. 1946, H.F. Mooney 2693; Mahadeoghora, Pantgrahl 20845, 20846; Cuttack Dist.: Chammundia, Mahanadi delta.
20 Mar. 1943, Biswas - 6251 (all CAL.)

Uses: Grains are eaten by poor at the time of scarcity. Cattle eat this grass before flowering. The seeds are widely distributed, when fruiting panicles attach on the body of the grazing animals. Millet and maize are effectively protected, from the rats by a layer of dry dried panicles over the grain.

**SORGHUM** Moench., Meth. Bot.: 207.1794.

Type: *S. bicolor* (L.) Moench. (*Holcus bicolor* L.).

**Sorghum bicolor** (L.) Moench. (Gangi - Or.; Great Millet-Eng.);

*S. cernuum* Host. var. *globosum*; var. *Orientale* Snowden,
*S. conspicuum* var. *usaramense* (Busse et Pilger) Snowden,
*S. milliforme* (Hack.) Snowden var. *milliforme*; *S. miliiforme* var. *rotundulum*; *S. nervosum* Busse ex Schult., *S. roxburghii* Stapf var. *fulvum* (Hack.) Snowden and *S. roxburghii* var. *nanum* Snowden often cultivated in our area.

1a. Sheath-nodes densely bearded; panicle up to 25 cm long; primary branches simple. . . . . *S. nitidum*

1b. Sheath-Nodes glabrous or finely pubescent, not bearded; panicle more than 25 cm long:

2a. Sessile spikelets up to 6.2 mm long, acute.
to acuminate; glumes subcoriaceous with some-what papery tips; lower glume with the keels ending without or with only obscure teeth. \textit{S. controversum}

2b. Sessile spikelets up to 5.5 mm long, more or less obtuse, elliptic to subelliptic-lanceolate; glumes coriaceous; lower glume with the keels ending in a distinct minute teeth, forming with the subhyaline apex a more or less distinct 3-toothed tips.

3a. Culms slender, 0.5 - 1.5 mm high, up to 5 mm wide; leaf-blades 0.5 - 2 cm wide (rarely more) panicles small, often somewhat contracted after flowering, up to 25 cm long and 5 cm wide, with the lower branches about 5 - 8 cm long. \textit{P. halepense}

3b. Culms slender to robust, usually 2-3 m high and 1 cm wide; leaf-blades somewhat broad, mostly 2-4 cm wide when mature; panicle large, loose and spreading, generally 25-55 cm long, 10-25 cm wide, with the lower branches 10-25 cm long. \textit{S. miliaceum}


\textbf{Type}: Northeast India: Bengal, Botanical Garden, Calcutta, Wallich 8778 H (Roxb., Icon. 894-K).

\textbf{Lectotype}: Tapeswarani, Godavari District E in Andhra-Pradesh, Dec. 1907, Bourne 3270 (K).
Perennial grass with long creeping rhizomes. Culms 0.5-2 m; 0.3-1 cm. Leaf-blades 0.5-2 cm wide, narrow. Panicle small, 15-30 cm long, lower branches 5-15 cm long. Sessile spikelets 5-6.2 mm long, acuminate to acute, often awned. Glumes subcoriaceous with somewhat papery tips; lower glume with the keels ending with or without a small tooth. Pedicelled spikelets 3.8-6.2 mm long, deciduous when mature.

Fls. and frts.: Sept.-Jan.

Ecology: It is wildly growing in open most soil.

2n = 40 (Bor, l.c.)

Distribution: India (W. Bengal, Bihar, Orissa, Andhra Pradesh, Tamil Nadu, Maharashtra), Burma, Sri Lanka.

Specimen examined: Nil.

Snowden (l.c.) recorded its occurrence from Orissa without citing the precise locality (Haines 706 at K); and from Karlapat and Langigarh in Kalahandi District (Mooney 1189, 1736 at K) respectively.

Syntype: Syria and Mauritania (LINN.,) Andropgon halepensis (L.) Brotn., Fl. Lusit. 1: 89. 1804.

Johnson Grass (Eng.)

Erect, sometimes gregarious perennial grass with solitary, stout, often woody culms, 1-5 m high. Leaves 12.5-82.5 x 0.7-5.5 cm, broadly linear, acuminate, margins scabridly serrulate with stout midrib; sheaths glabrous; ligule short, membranous, ciliate. Panicle 12.5 (-25)-45 cm long, decompound. Sessile spikelets 4.5-5 mm long, ovoid.
lanceolate, dorsally compressed, with small shortly bearded callus. Glumes more or less hairy at the back; lower glume lanceolate, acuminate; upper elliptic-oblong, hyaline. Lower lemma oblong, obtuse; upper reduced to a bristle or suppressed. Pedicelled spikelets, herbaceous keels ciliate. Upper lemma linear-oblong, hyaline.

Fls. and frts.: May-Oct.

Ecology: Common in places with sufficient water.

2n = 40 (Bor, l.c.)

Distribution: India, Sri Lanka, Mediterranean, Portugal, Iran, Turkman, Afghanistan, Western Pakistan, United States.

It has been introduced into India at some early period and therefore, it can not be believed to be an indigenous to India.

Specimens examined: Kalahandi Dist.: Karlapat, 450 m, 24 Dec. 1939, Mooney 1189; Lanjigarh, 450 m, 2 May 1941, Mooney 1736 (both K,KD).

Haines (l.c.) did not record it from Orissa.

Uses: A good fodder and hay grass at maturity. Since the young plant contains hydrocyanic acid, it is injurious to animals. Grains are eaten.

Note: It is very difficult to eradicate this grass from cultivated land. It is cultivated in States under the name "Johnson Grass".

Sorghum miliaceum (Roxb.) Snowden, J. Linn. Soc. (Bot.) 55: 205, 207. 1955; Bor Grass.: 223.

Andropogon miliaceus Roxb., Fl. Ind. 1: 276. 1820.

Lectotype: India: mountains of Oudh. Wallich 8778 B (Roxburgh, Icon. 1717 K, CAL) (Selected by Snowden, l.c. 207).

A. milliformis Schult., Syst. Veg. 2, Mant. 1448. 1824.
Type: Same as for Andropgon miliaceus Roxb.

var. miliaceum

Perennials with well-developed more or less extensively long creeping rhizomes, 2-3 m high, up to 1 cm wide, slender to robust. Leaves ca 2-4 cm wide when mature, somewhat broad. Panicles large, 25-55 X 10-25 cm, loose and spreading, with lower branches 10-25 cm long. Sessile spikelets 4-5.5 mm long, obtuse, elliptic to elliptic-lanceolate. Glumes coriaceous; lower glume with the keels ending in distinct minute teeth, forming with the subhyaline apex, more or less distinct 3-toothed tip. Pedicelled spikelets 3.8-6.2 mm long, deciduous when mature.

Fig. and frts.: May - Oct.

Ecology: Mostly found in cultivated land.

2n = 40 (Bor, l.c.)

Distribution: India, Pakistan, Europe.

Specimen examined: Xmasix Phulbani Dist.: Baud State, near Tikrapara, Mooney 634 (DD,K).


Type locality: "India Orientali".

A tall tufted perennial grass, 1-2.8 m high, with solitary stout culms, nodes silky, leaf-sheaths silky hairy on one side. Leaves 20-52.5 cm long, 3.75-7.5 mm wide, with narrow long hairy base. Panicle 10-25 cm long, effuse. Sessile spikelets 4-5.5 X 1.1-1.5 mm, elliptic-oblanceolate-oblong, sparingly strigose, at length light to dark-brown and glissy
on the exposed parts, awned or awnless. Lower glume black and polished when ripe; upper lemma 8 mm long, truncate or bifid, muticous. Pedicelled spikelets similar to or much smaller than the sessile spikelets, usually linear-lanceolate.

Fls. and frts.: Sep. - Dec.

Ecology: Found chiefly in moist hill forests.

2n = 20 (Bor, l.c.)

Distribution: India, Burma, Pakistan, Sri Lanka, to China and Australia.

Specimens examined: Kalahandi Dist.: Saptadhar, 7 Nov. 1959, Panigrahi 20930 (CAL); Kalahandi Dist.: Madanpur- Rampur, 120 m, Dec. 1939, Mooney 1177 (DD).

Haines (l.c.) reported it from Bihar only.

Note: Both awned and unawned forms are found in our area.


Type: S. squarrosus L.


Stipa littorea Burm. f., Fl. Ind.: 29, 1768.

Type locality: "East Indies".

Spinifex squarrosus L., Mant. 2: 300, 1771; Haines, Bot.: 1010.

Type locality: "Indiae orientalis arenosis maritimis"

Gudukinko, Burkonko,
Gudukanko, Rabana, Pabana (Or.)
A large pale grey or glaucous, fruticose, gregarious bush, several feet high forming an impenetrable thicket. Stems smooth, solid. Leaves 10–35 cm long, squarrose, recurved, pungent, concavo-convex, smooth, tapering from the base to the tip, margins scaberulous, very rigid, spiny; sheaths 1–2–2.5 cm long, smooth with naked margins; ligule very short, hirsute. **Male spikelets** 15–20 cm in diam., bracts shorter than the spikes, lanceolate, aristately pungent, flat, chartaceous, with a midrib very prominent beneath. Lower glumes usually shorter than the upper, ca 5–6.5 mm long, ovate, acute, pungent, 7–9-veined, upper similar but larger, glabrous, subequal, oblong-lanceolate, lemmas longer than the glumes, subequal, 5–7-veined, subaristate or conspicuously acuminate; keels ciliate. **Female spikelets** up to 32.5 cm in diam.; bracts similar but smaller than in the male; peduncle thickened towards the base; Glumes glabrous; lower glume oblong-lanceolate, acuminate, multi-veined, scaberulous; upper rather shorter, 7-veined; lower lemma empty, the palea imperfect or O; upper lemma ovate-lanceolate, 5-veined; palea shorter but broader than the glume, acute, 2-veined; keels smooth. Style very long, branches slender, with stigmas 1.7 cm long.

**Flora:**

Fls. and frts.: Sep.–May.

**Ecology:** Common on sandy shores of all coastal districts.

2n = 18 (Bor, l.c.)

**Distribution:** India, Pakistan, Bangladesh, Burma, Sri Lanka, Eastern Asia, Malaya, Thailand, Java, Australia, Pacific Islands.

**Specimens examined:** Ganjam Dist.: Ganjam, Dec. 1949, W. Wight 3044, 3045; Puri, 1889, Dr. Walsh 8; May 1874, C.B. Clarke 2733 D (all CAL); 1 May 1899, G. Watt 12633 (BSIS, CAL);
H.C. Lewinge 9222 (CAL); Puri Coast, L.K. Banerjee s.n.
( Accn. No. 4857 - CAL); Balukhand Reserve Forest, 21 Apr.
1965. V. Abraham 41; 2 Dec. 1965, T.A. Rao 5689; Konark
coast, 4 Dec. 1965, T.A. Rao 5938; Cuttack Dist.; Paradeep,
21 May 1966, M.K. Ghosh 180; Hetamundra, 2 Sept. 1968 =
L.K. Banerjee 519; Hukitola, 1 Feb. 1961, Panigrahi 23621;
(all CAL).

Haines also recorded it from Balasore coast, and Rao et
Mukherjee (l.c.), from Backshore of Konark to Chilka Lake.

Uses: An excellent sand binder. Haines pointed out that
the long stolons run for a considerable distance and then give
rise to a further clump, they serve to fix the sands.

Bor (l.c.) points out that the spine-like leaves though
not attractive to grazing, but sometimes eaten by goats.

**SPOROBOLUS** R. Brown, Prod. Fl. Nov. Holl.:
169. 1910; Haines, Bot.: 973. 1924; Mooney, Suppl.: 163. 1950;
Bor, Grass.: 629. 1960; Clayton et Renvoise, Kew Bull. Addl.

**Lectotype:** sp. sp.<br><br>R. Br. ( *Agrostis indica* L. L Ovide Nash in N. L. Britton et A. Brown,

1a. Upper glume distinctly shorter than the lemma; lowest
branches not truly, whroled:

2a. Panicle contracted...................... **S. fertilis**

3a. Slender growth, leaves up to 30 cm long;
ligule a ridge of minute hairs; panicles up
20 cm long, 4-5 cm wide; spikelets up to 2 mm
long, rather crowded, statey-grey in colour; lower
glume 2.5 - 5 mm long, truncate; upper 5-10 mm long, often acute; lemma 1.5 mm long, stamens 2. ........... S. diander

3b. Tall grass with leaves up to 60 cm long; ligule 0; panicles up to 45 cm long and 20 cm wide; spikelets hardly 1.75 mm long, rather scattered; lower glume 5-7.5 mm long, very short, obtuse; upper 1-1.5 mm long; truncate, acuminate; lemma 1.75 - 2 mm long; stamens 3. ... S. wallichii

1b. Upper glume as long, nearly as long as or longer than the lemma; lowest branches whorled or not;

4a. Fringed Panicle effuse, spreading at least at maturity; lower branches truly whorled. ............... S. coromandelianus

4b. Panicle contracted; lower branches not truly whorled.

5a. Perennials; culms up to 42.5 cm long; leaves shorter up to 6.25 cm; spikelets 1.5 - 1.75 mm long; stamens 2. ...

.......................... S. tremulus

5b. Annuals; culms up to 30 cm long; leaves longer, up to 13.75 cm; spikelets 1.25 cm long; stamens 2. ........... S. piliferus


Type locality "Coasts of coromandel".

A densely tufted annual, with spreading culms 5-50 cm high, copiously leafy at the base. Leaves 1-16.5 cm long, 3.7-6.5 mm wide, ovate-lanceolate, acuminate; lower sheaths short, terete or compressed; upper long, hairy at mouth; ligule membranous fringed with long hairs. Panicles 6.5 cm long, effuse; rachis and branches smooth. Spikelets 1-1.25 mm long, crowded on the distal end of the branch. Lower glume very minute, sub- orbicular, veinless; upper
equal to the length of the lemma, 1-veined; lemma oblong, obtuse, 1-3-veined. Palea as long as the glume. Stamens 3; anthers very small. Grains obovate in outline, 0.75X0.5mm, smooth.

**Fls. and frts.** Sep.-Jan.

**Ecology:** Occasionally found in plains on hard soil.

**Distribution:** India, Pakistan, Burma, Sri Lanka, Afghanistan and South Africa. Probably introduced into Texas and Mexico.

**Specimens examined:** Nil.

While Cooke (l.c.) reported its occurrence from Orissa, without citing the specific locality, Haines (l.c.) did not find the specimens from Orissa except Roxburgh's collection from Madras (South India).

**Use:** This grass is regarded as a poor fodder and is taken by the stock at the time of scarcity.


**Type:** India, Madras, Koenig s.n. (LD).

Tufted slender perennial, with culms up to 1 m high, smooth, glabrous. Leaves 10-30 cm long, 1.25 - 5 mm wide, very narrow, convolute; sheaths smooth, ribbed, lower short, upper very long; ligule a ridge of minute hairs. Panicles 20 X 4-5 cm, contracted, gradually becoming affuse at maturity. Spikelets up to 2 mm long, branches apiculate to the base. Lower glume distinctly shorter than the lemma,
2.5-5 mm long, truncate; upper 5-10 mm long, often acute, 1-veined; lemma 1.5 mm long, broadly ovate-obleng, acute, 1-veined; palea plicate. Stamens 2. Styles 2, distinct. Grain obovoid, truncate above, red brown.


Ecology: Along roads in plains and hills up to 1080 m.

2n = 36 (Bor, l.c.)

Distribution: India, Pakistan, Bangladesh, Burma, Sri Lanka, Malaysia, and Australia.


Haines (l.c.) recorded its (form A) occurrence from Puri; Saxena et al. (l.c.), from Bhubaneswar and Singh et Verma (l.c.), from Angul in Dhenkanal District.

Use: A good fodder readily eaten by cattle.

Note: Haines (l.c.) distinguished 3 forms of which form B is actually S. diander, which has been recorded from Puri.


Type locality: "Ex Herbo. Mus 1 Ludg. Bot. Japonia."

A densely tufted perennial, with culms up to 1 m high, internodes long, nodes glabrous. Leaves up to 60 cm long, rarely 3.7 mm diam., broad, usually convolute, crowded, at the base, with filiform tips, smooth; sheaths very broad, ribbed; ligule of minute hairs. Panicles 10-35 cm long, up to 2.5 cm wide, contracted, subspiciform, often interrupted, branches spicate to the base. Spikelets usually under 2 mm (rarely 2.1 mm) long. Lower glumes 5-6.5 mm long, much shorter than the lemma; upper 10-12.5 mm long, distinctly shorter than the lemma. Lemma 15-20 mm long, 1-3-veined. Stamens 3. Grains 1.1 - 1.25 X 0.5 - 0.6 mm, oblong or elliptic-oblong, truncate above, wedge-shaped or compressed in section.

Fls. and frts.: Jul.-Feb.

Ecology: Common in cultivated and waste lands.

Distribution: India, Pakistan, Bhutan, Bangladesh, Burma, Sri Lanka, China, Japan, Malaysia, Indo-China, Philippines.


Behera et al. (l.c.) and Choudhury et Patnaik (l.c.) recorded it from Bhubaneswar, Khandagiri-Udayagiri and Utkal University Campus, Vanivihar.

Haines (l.c.) and Mooney (l.c.) recorded this species from Bihar and Bengal only.


**Type**: Nepal (LE).

Tufted annuals, 2.5–30 cm high, erect. Leaves 1.5–13.75 cm long, 1.25–2.5 mm wide, chiefly radical, flat or convolute, softly pilose, margins serrulate; sheaths hairy at mouth; ligule a minute narrow line. Panicles 1.5–3.75 cm long, linear, dense-flowered, contracted, subspiciform. Spikelets 1.25–1.5 mm long, pale brown; pedicels short. Lower glume 1–1.5 mm long, shorter than the lemma, ovate-lanceolate, hyaline, veinless; upper glume 1.5–2 mm long, as long as or longer than the lemma, oblong-lanceolate, 1-veined. Lemma 1.75 mm long, oblong, 1-veined; palea oblong. Stamens 2. Grains elliptic, compressed, reddish-brown.

**Fls. and frts.**: Jul. – Oct.

**Ecology**: Apparently a high level hilly grass of temperate regions.

**Distribution**: India, Nepal, Pakistan, Sri Lanka, Malacca, East Africa.

**Specimens examined**: Koraput Dist.: Pottangi, 1200 m, near Malabotta parbat, 8 Oct. 1950, Mooney 4037; Sonabera, 700 m, 30 Sep. 1949, Mooney 3667; Turiakonda, 12–1500 m, 10 Oct. 1950, Mooney 4069; Sambalpur Dist.: Gandhamardan hill, 1000 m, above Nrusinghnath, 8 Oct. 1949, Mooney 3708; Keonjhar Dist.: Sirkaguda, 900 m, 3 Oct. 1946, Mooney 2795 (all DD).

Haines (l.c.) did not record this species.

**Use**: It is often eaten by cattle.

**Sporobolus tremulus** (Willd.) Kunth, Rev. Gram. 1: 67. 1829; Hook. f., FH 7: 250. 1896; Haines, Bot.: 974; Mooney, Suppl.: 163; Bor, Grass.: 633.

**Type**: "Habitat in Indiae lucis (V.S.)", Klein (B).


**Type locality**: "Madras".

**Sporobolus geniculatus** (Nees ex Steud.) Aitch., Cat.Punjab Pl. : 165 . 1869.

Stoloniferous perennials, with culms up to 42.5 cm high.

Leaves 0.75 - 6.25 cm long, 1.75 - 3.5 mm wide, rigid, flat or convolute, margins smooth, pungent; ligule a rim of hairs.

Panicles 7.5 - 11.25 mm long, sub-spiciform, contracted with a few lower branches spreading, not woody, sometimes interrupted and flexuous. Spikelets 1.25 - 1.75 mm long, crowded, articulate on a very short pedicel; rachilla disarticulate above the lowest glume. Glumes all 1-veined. Lower glume ca 1 mm long, lanceolate, shorter than the lemma; upper glume up to 2 mm long. Lemma up to 2.5 mm long. Grain 0.8 - 0.4 mm, with loose pericarp.

Fls. and frts.: May - Dec.

**Ecology**: Common in plains above the level of water and on moist sandy soil near sea.

2n = 20 (Bor, l.c.)

**Distribution**: In plains of India, Pakistan, Bangladesh, Burma, Sri Lanka, Indochina.

**Specimens examined**: Ganjam Dist.: Gopalpur Road, 20 Oct. 1930, Narayanawadi 4700 (MH); Kalahandi Dist.: Junagarh, 210 m, 22 Jul. 1949, Mooney 3553; Puri Dist.: Barkul, in Chilka Lake, 1 Jun. 1948, Mooney 3071; Cuttack Dist.: Narasinspur, 75 m, 12 Jul. 1943, Mooney 3251 (all DD).

Haines (l.c.) recorded it from Bihar and Bengal only.
Uses: A good soil binder and a variable pasture grass. It is also regarded as a valuable fodder for cattle.


Syntype: Ceylon: Somewhere between Trincomalie and Kontalai, 1886, _Ferguson s.n._ (K): Bihar; Rajinahal Hills, Wallich Number, List. No. 3769 A (K-W).

A very tall erect perennial, with culms up to 1 m high, sparingly leafy. Leaves up to 60 cm long, 5-7.5 mm wide, quite smooth; upper sheaths very long; ligule 0. Panicles up to 45 x 20 cm, effuse. Spikelets hardly 1.75 mm long, very rarely 2 mm long, rather scattered. Lower glume 5-7.5 mm, truncate, obtuse, shorter than the lemma; upper 1-1.5 mm long; Lemma 1.75 mm long. Stamens 3. Grains 1.0 x 0.7 mm, compressed, flat on the surface, rather coarsely pitted on the surface; pericarp adherent.


Ecology: In wet places of plains and hills.

2n = 24 (Bor., l.c.)

Distribution: India (Bihar, Orissa, Andhra Pradesh), Burma, Sri Lanka.

Specimens examined: Koraput Dist.: Kuthada hills, 19Aug. 1931, _Narayanaswami_ 5909, 5924 (both MH).

New Record for Orissa.

_THEMEDA_ Forssk., _Fl. Aegypt._ - Arab.: 178.

Type: *I. triandra* Forsskal.

1a. Pairs of involucral spikelets inserted at different levels:

2a. Involucral spikelets entirely glabrous or puberulous but without tubercle-based hairs:

3a. Leaves small, ca 6 cm long; involucral spikelets entirely glabrous.................... *T. saxicola*

3b. Leaves large 30 cm to 150 cm long; involucral spikelets puberulous with very short hairs on the lower glumes;

4a. Culms up to 3.2 m high; leaves less than a metre long; sessile spikelets 6.25 mm long; fertile spikelets with an imperfect awn or awnless.................... *T. villosa*

4b. Culms up to 7 m high; leaves 1 m or more long; sessile spikelets 1 mm long; fertile spikelets with weak-developed awn........... *T. caudata*

2b. Involucral spikelets covered on the lower glumes with numerous or sparse tubercle-based bristles:

5a. Sessile spikelets not awned .................... *T. intermedia*

5b. Sessile spikelets awned:

6a. Racemes less than 1.5 cm long.................. *T. triandra*

6b. Racemes more than 1.5 cm long:

7a. Tall robust grass 3-7 m high; leaves 1-3 m long, 1.5-3.75 mm wide; with nodding panicles and tubercle-based golden hairs on the lower glumes of the involucral spikelets; awns stout................................. *T. arundinacea*
Weak but not wiry, bushy grasses ca 40 cm high; leaves ca 30 cm long, 4 mm wide, or if robust, the hairs on the lower glumes of the involucral spikelet always grey; awns slender. 

Pairs of involucral spikelets inserted at the same level:

Ligule absent; panicle very loose, leafy; awn ca 3.5 cm long. 

Ligule present; panicle more or less densely congested, not leafy; awn more than 4 mm long.

Lower glumes of the involucral & spikelets very densely strigose all over; lower glumes of the bisexual spikelets hispidous above.

Lower glumes of the involucral spikelets not densely strigose but with tubercle-based hairs mostly towards the tip; lower glume of the bisexual spikelets glabrous.

**Themeda arundinacea** (Roxb.) Ridl., Trans. Linn. Soc. Bot. B ser. 2, 3: 401. 1893; Haines, Bot.: 1052. 1924; Mooney, Suppl. Bot.: 191; Bor, Grass.: 250; Panigrahi et al., BBSI 6: 263.


**Type:** "A native of Bengal"; Roxb. Icon. 1718 (CAL, K).

Tall, robust grass, 3-7 m high, with culms ca 1.5 cm diam., polished yellowish, glabrous, simple below, branching above. Leaves 1-3 m long, 1.5 - 3.75 mm wide (often 2.5 cm), linear, setaceously acuminate, scabrous above and glabrous below. Panicles nodding. Involucral spikelets 10-20 mm long, inserted at different levels, densely clothed with tubercle-based...
bristles. Sessile spikelets awned, awns with a column 3.75-7 cm long. Lower glume spinulosely acuminate with tubercle-based golden hairs. Pedicelled spikelets 1-1.5 cm long yellow bristles. Grains beaked, acuminate, with a sharp callus. Rate: FIs, and frts.: Sep. - Feb.

Ecology: On marshy lands, on the bank of stream.

Distribution: India (Uttar pradesh, Bihar, West Bengal, Orissa, Assam, Nagaland), Burma and South-east Asia.

Specimen examined: Nil.

Panigrahi et al. (l.c.) recorded it from Nigirda in Mayurbhanj District.

Use: The stout stems are used for wattle wall.

Note: The false fruits with sharp callus pierce the skin.

**Themeda caudata** (Nees) A.Camus in Lecomte, Pl. Gen. Indo-Chine 7: 364. 1922; Haines, Bot.: 1052; Bal, RBSI 6 (10): 119; Mooney, Suppl.: 191; Bor, Grass.: 250; Panigrahi et al., BBSI 6: 263.


**Type**: "N. ab E. in Herb. Lindl. Hab. prope Macao et in vicinis; G.H. Vachell, n. 46 (ex parte)."

A very large caespitose grass from a stout rhizome, with flattened stems, 3-7 m high. Leaves up to 1.5 m long, 7.5-18 mm wide, with scabrid margins. Panicle lax-flowered, branches and branchlets glabrous; spikelets often divergent. Involute spikelets in pairs inserted at different levels, 1-1.5 cm long, glabrous or hairy, not with tubercle-based hairs; keel scabrid, glabrous; awn 4.25 cm long, dark brown, scaberulous. Lower glume subulate-aristulate, scabrid,
9-veined; upper glume 3-veined; lemmas ciliate hyaline. Sessile spikelets 2 in each raceme, 1 cm long, densely hirsute; awned. Fertile spikelets with a well-developed awn. Lower glume densely hairy. Lodicules large, oblong-lanceolate, bicuspidate. Grains 3.5 mm long, oblong, free, brown.

Fls. and frts.: Sep. - Feb.

Ecology: Frequently found near the streams under shade, especially in the hills between 600-2000m.

Distribution: India, Bhutan, Burma.

Specimens examined: Kalahandi Dist.: Upper Ampodar, 900m, 23 Dec. 1948, Mooney 3210 (DD); Mayurbhanj Dist.: Jenabil, 16 Feb. 1958, Panigrahi 12500; Burhabalanga, 100 m, 19 Feb. 1958, Panigrahi 12613 (both CAL).

Note: Due to ripe pungent glumes this grass becomes a pest.

*Themeda intermedia* (Hack.) Bor, Ind. For. Rec. (Bot.) 1, 3: 95. 1938, et Grasses...: 251.


Type: *"In montium Khasia, Hooker, f. et Thomson.*

Robust tall grass, ca. 5 m high, with culms erect, terete, glabrous. Leaves ca 2.5 m long, 2.5 cm wide, linear, setaceous acuminately ligule short, membranous. Panicle large, decomposed, branches glabrous or scaberulous. Pairs of involucral spikelets inserted at different levels, 10-12 mm long, covered on the lower glume with numerous or sparse tubercle-based bristles, not awned. Sessile spikelets ca 8 mm long, dark brown, Fertile spikelets up to 5 mm long with an imperfect awn or awnless. Lodicules large. Stamens 3, Styles 2. Grains oblong, free.

Ecology : In slightly moist shady regions of the hills.

Distribution : India ( Assam, Orissa ), Burma.

Specimen examined : Mayurbhanj Dist.; Nigirda, 900m, 18 Feb. 1958, Panigrahi 12578 ( CAL ).

New Records for Orissa.

Note : Bor ( l.c.) considers it to be a putative hybrid between

T. arundinacea ( Roxb.) Ridley and T. villosa ( Roxb.) A. Camus,

characterised by the absence of awn.


119. 1942 ; Mooney, Suppl. : 191 ; Bor, Grass. : 251 . 1960;

Panigrahi et al., BBSI 6 : 263 .


243. 1856.

Type : "Habitat in Nepalia ", Wallich, Num. list No.8775(K-W)

Tufted slender perennial with diffuse branches, 60-120cm

high. Leaves on the culms up to 35 cm long, 7.5 mm wide, upper

leaves 7.5-10 cm long, with filiform tip, soft white hairs

at base; sheaths compressed, keeled; ligule 0. Panicles

1.25 cm diam., very loose, leafy. Pairs of involucral spikelets

inserted at the same level, less than 6 mm long, awn ca 3.5mm

long, Lower glumes 6-6.5 mm long, a few bristles at tip, glabrous

below, 9-11 - veined. Lower glumes of bisexual spikelets 4.5cm

long, glabrous, shining below, hispidulous at apex; awns

2.5-4 cm long. Lodicules 0.7 - 1.0 mm long, oblong- obovate.

Ovary linear- oblong. Pedicelled spikelets linear, acute.

Lower glume many - veined.

Plate 14

*Themeda mooneyi* Bor.

TYPE
Ecology: Abundantly growing gregarious in moist lands.

Distribution: India.

Specimens examined: Ganjam Dist.: Karaka, May 1900, Barber 1702 (MH); Kalahandi, Mooney 655; Bolangir Dist.: Patna, 8 Nov. 1959, Panigrahi 20997; Mayurbhanj Dist.: Bhanjabasa, 793 m, 13 Feb. 1958, Panigrahi 12266 (all CAL); Puri Dist.: Jatia, in Chilka, 1 Oct. 1938, P. Parija 726 (Rev. Coll. Herb.); Mayurbhanj Dist.: Chahala, 960 m, 7 May 1940, sine lect 619 (DD, BSIS); Gurguria, near Baripada, Nov. 1957 S.K. Seth s.n. (Accn. No. 1123258-DD).

Haines (l.c.) reported it from Sambalpur and Mooney(l.c.) also from Khariar in Sambalpur District.

Use: A poor fodder for cattle and is taken at the time of scarcity.


Type: Orissa, near Pottangi, Koraput District, 1300m, 10 Oct. 1950, H.F. Mooney 4064 (holotype -K, isotype - DD).

A weak erect perennial, with culms 40 cm. Leaves Ca 30 cm long, 4 mm wide, linear, lower leaves glabrous, upper pilose; sheaths compressed; ligule 1.5 mm long, membranous, white, lacerate. Inflorescence a suberect, simple raceme. Involucral spikelets grey, with slender awn. Lower glume 11 X 2 mm, elliptic, acute, many - veined; upper glume 7.5 mm long, oblong elliptic, acute, hyaline. Palea oblong-obtuse. Lodicules 2, oblong - truncate. Sessile spikelet 3-3.5 mm long. Lower glume 5 X 2 mm, oblong - truncate, lemma 1.5-2.5 mm long, palea absent. Stamens 3 (Plate 14, Photo 15).
Rare in Fls. and frts. : Sept. - Nov.

Ecology : It grows gregariously at hill tops.

Distribution : India (Orissa). Endemic in Orissa, near Pottangi, Koraput District.

Specimens examined : Koraput Dist.: Turiaikonda, above 1200-1560 m, 10 Oct. 1950, Mooney 4064; Above Nelpada village, near Pottangi, 1200-1300 m, 8 Oct. 1950, Mooney 4034 (K, DD).

Themeda quadrivalvis (L.) O.Kuntze, Rev. Gen. Pl. 2: 794. 1891; Haines, Bot.: 1050; Fischer in Gamble, Fl. Madras: 1746 (1210). 1934; Bor, Grass.: 252; Panigrahi et al., BSBI 6: 263.


Type: India (LINN: 1211.485; microfiche- CAL 1)

A. nutans L., Mant. : 303. 1771, non L., 1753.

"Linn. (1774) observed. Andropogon quadrivalvis L. for "Perperam A. nutans in Mantissa 303, errore typographi")7"

var. quadrivalvis

Robust usually gregarious annuals with culms up to 2mm long, 3.7 - 5 mm diam., usually terete. Leaves up to 30 cm long, 6.25 mm wide, some leaves with tubercle-based bristles, glaucous beneath; lower sheaths lax and open, upper keeled; ligule lacerate, 1.25 - 2.5 mm long. Panicles densely congested.
Erect or suberect spikelets in usually narrow small clusters.

Involucral spikelets inserted at the same level, 5 mm long; awns shorter. Lower glume of the involucral spikelets 4.5-5 mm long, not densely strigose, but with tubercle-based hairs mostly towards the tip; lower glume of the bisexual spikelet 4-4.5 mm long, glabrous along the middle line; awns 3.2-3.75 mm long; callus barbed with long brown hairs. Pedicelled spikelets with lower glume linear, flat. Stamens 3. Grains linear-obovate.


Ecology: Widespread in dry localities.

2n = c. 40 (Bor, l.c.)

Distribution: India (Widespread), Pakistan, Nepal, Bhutan, Burma, Sri Lanka, Iran. Introduced into Iraq.


Haines (l.c.) reports its occurrence from Angul to Sambalpur; Fischer (l.c.), from Ganjam and Panigrahi et al. (l.c.), from Baitaranit source in Keonjhar District respectively.

Use: It is often eaten by buffaloes.


Type: Indian Or.: Orissa, Raisili village, Koraput Dist., 1000m, 25 Oct. 1950, H.F.Mooney 4241 (K, holotype).

Perennial grass with culms 35 cm long, weak, terete. Leaves 6 cm long, 2.5-3 mm wide, linear, acuminata, sheaths glabrous;
ligule 1 mm long, membranous, margins ciliate. Racemes 1.3-1.8 mm long, solitary, compound terminating the tip of an unbranched culm. Pairs of involucral spikelets inserted at different levels, glabrous. Lower glume 1.1-1.5 mm, elliptic, acute, 2-carinate, hyaline, 3-veined. Palea oblong-obtuse. Stamens 3; anthers 3.4-4 mm long. Sessile spikelets 2 mm long. Lower glume oblong-truncate; palea absent.

Rare. Fls. and frts.: Sep.-Nov.

Ecology: Usually growing moist shallow soil overlying granite-gneiss.

Distribution: (India (Orissa)). Endemic in Koraput District.

Specimen examined: Koraput Dist.: Raisili village, 1000m, 25 Oct. 1950, Mooney 4241 (K, DD).


Anthistiria strigosa Buch.-Ham. ex Hook.f., FBI 7:214.1896.

Syntype: "Lower Assam, Hamilton, Bihar: Monghyr.

Annuals. Culms 3.4 m high, leafy. Leaves 2.5-4.25 mm wide, margins scabrid; ligule up to 1.25 mm long. Panicle densely congested, compound, not leafy; branches long, slender. Pairs of involucral spikelets inserted at the same level, ca 4.25 mm long. Lower glume oblong-lanceolate, densely strigose all over, many-veined. Bisexual spikelets usually 2, callus with pale hairs. Lower glume hispidous above; upper slender, with awn 7.5-12.5 mm long. Lower glume of the pedicelled spikelets lanceolate; keel covered with long tubercle-based bristles.

Rare. Fls. and frts.: Jul.-Dec.

Ecology: on the bank of the river.
**Distribution**: India (Assam, West Bengal, Bihar, Orissa, Maharashtra). Endemic.

**Specimen examined**: Keonjhar Dist.: Baitarani source, 7 Jul. 1957, Panigrahi 8716 (CAL.).

New Record for Orissa.

**Use**: A good fodder grass relished by cattle.


**Type locality**: Hadie, Arab.


**Type**: "Gramen hoc Capite B. Spei allatum communicavit Cl. Poet. Acharius" (Cape Good Hope).


An erect unbranched perennial. Culms up to 3 m high, tufted, robust, glabrous, polished. Leaves 7.5-50 mm long, 2.5-13.5 mm wide, linear, acuminate, coriaceous, flat, with scabrid margins; sheaths keeled; ligule a ciliolate membrane. Racemes ca 1.5 cm long. Involutcal spikelets inserted at different levels, 9 mm long, sessile, lanceolate, acuminate. Bisexual spikelets usually 1, ca 6 mm long; callus pungent, bearded with coloured hairs. Lower involucral glume with tubercle-based bristles, 7-9-veined; upper glabrous; Lower lemma shorter than the involucral glume, glabrous; upper with awn, 3.75-6.5 cm long. Anthers ca 2 mm long. Grain 2.5 mm long, oblong, with a ventral groove. Pedicelled spikelets 3-7 mm long, very unequal, linear, acuminate, glabrous; keels ciliolate.
Fls. and frts.: Jul.-Dec.

Ecology: It grows in waste places of the hills and plains.

2n = 20, 40, 60, 70, 80 (Bor, l.c.)

Distribution: India (throughout), warm and temperate regions of the Old World.


Raju (l.c.) recorded it from Chitrakonda forest in Koraput District and Saxena et Brahnam (l.c.) from Mahendragiri Hills in Ganjam District respectively.

Haines (l.c.) though described the species but not recorded its occurrence from Bihar and Orissa.

Uses: It is used as a hay, a good roofing materials for huts and a good fodder grass before flowering.

Themeda villosa (Poir.) A. Camus in Lecomte, Fl. Gen. de l'Indo-Chine 7: 364. 1922; Mooney, Suppl.: 265; Bor, Grass.: 254.


Type: "Java". Commerson (V.S. In Herb. Lam. et Desfert.)

A large caespitose perennial grass from a smooth, solid rhizome. Culms 2-3, 2 m high. Leaves 30-60 cm long, linear-lanceolate, glabrous, scaberulous; sheaths auricled at the mouth, keeled below; ligule 2.5 mm long, membranous. Panicles large, decomposed; branches and branchlets, scabrous or scaberulous. Spathecoles boat-shaped. Spikes erect or divaricate.
Pairs of involucral spikelets insorted at different levels, up to 1.25 cm long, puberulous, male. Lower glume 2.5-3.75 mm long, many-veined, sparsely hairy; upper glume hyaline, 3-veined; lemma 3.75 mm long, lanceolate, palea narrow, ciliate. Stamens 3; anthers 5 mm long. Sessile spikelets 6.25 mm long, callus densely hispidous. Lower glume 6.25 mm long, lanceolate-oblong, truncate, keeled, 7-8-veined; upper similar, narrowly lanceolate, 3-veined, awned; upper lemma bisexual, with a stout awn, or awnless. Pedicelled spikelets male. Lower glume 1-1.5 cm long, lanceolate, acuminate, 13-veined; upper 5-veined. Lemma up to 3.7 mm long, hyaline; palea hyaline, obtuse. Stamens 3; anthers up to 5 mm long.

Fls. and frts.: Sept.-Dec.

Ecology: Gregariously growing along the bank of pond.

Distribution: India (Uttar pradesh, Bihar, West Bengal, Assam, Manipur, Orissa), South-east Asia.


Uses: This plant is liked by an animal for considerable amount of sugar in it. It is also used in paper industry.


Type: *T. agrostis* Nees, nom. illeg. (*Agrostis maxima* Roxburgh, *T. maxima* (Roxb.) O.Kuntze.).

Probably mono-typic, distributed in Tropical Asia to New Guinea, India and also common in Orissa State.

Use: The inflorescences used for brooms.
Thysanolaena maxima (Roxb.) O.Kuntz; Rev. Gen. Pl. 2:794, 1891; Haines, Bot.: 982; Bal, RBSI 6 (10):91.1942; Bor.

Grass: 650.

Agrostis maxima Roxb., Fl. Ind. 1:319, 1820.

Type locality: India: "A native of hedges, & C. amongst the mountains".


Type: Same as for A. maxima Roxb.

Phulbandhuni, Phula

Chhanchuni (Or.)

Tiger grass (Eng.)

A large, very elegant species, 1.5-4 m high. Stems glabrous, polished, 1.25 cm diam. Leaves large, 30-60 x 5-10 cm, coriaceous, linear-lanceolate to oblong-lanceolate, tapering to fine point, usually broadest above the rounded or cordate base, punctualte, margins, nearly smooth; sheaths glabrous, striate, hairy at the mouths; ligule truncate, nearly obsolete, small, ciliate. Panicle large, up to 90 cm long and 60 cm across, soft, glabrous; branches very numerous, suberect, filiform, with many short branchlets carrying small spikelets. Spikelets 2.0-0.25 mm long, ovoid-lanceolate, acuminate; rhachilla produced into a linear-lanceolate point. Glumes subequal, Lower glume 0.5-8.5 mm long; Upper 1 mm long; lemma lanceolate, boat-shaped, acuminate, 1.5-1.8 mm long; lower lemma longer than the upper, membranous, lanceolate, acuminate, glabrous, epaleate, empty, 1-veined; upper lemma shorter, ovate-lanceolate, ciliate with long erect white hairs.
Ecology: On shady slopes in the forests and also on sandy banks.

Distribution: India (Very common throughout India), South-east Asia, New Guinea.

Specimens examined: Koraput Dist.: Balimela, Bandamamidi, 200-490 m, 24 May, 1959; Panigrahi 18539; Chitrakonda, D.C.S.Raju 806; Marunikonda, Lakhmipura, 17 Dec, 1960; P.C. Nanda 2392 (all CAL); Phulbani Dist.: Digi, 29 Jan, 1900; Barber 1325; Ganjam Dist.: Mahendragiri, 1200 m, March 1884; Gamble 13906; Boragharo, 20 Aug, 1931; V. Narayanaswami 5935 (all MH); Kalahandi Dist.: Niyamgiri, 30 Apr, 1956; S.K. Mukherjee 4164; Annigarh, 20 Mar, 1943; Biswas 6197; Dhenkanal Dist.: Angul, near Rayagada, 740 m, 7 Dec, 1902; J.H. Lace 2555; Malyagiri Hills, 23 Dec, 1960; P.C. Nanda 2474 (all MH); Kapilas Hills, 700 m, 10 Jan, 1954; D.K. Ray 590; Cuttack Dist.: Ravenshaw College Botanical Garden, Cuttack, 10 Apr, 1927; D. Mukherjee 649 (both Rav. Coll, Herb.) Mayurbhanj Dist.: Burhabalanga nullah, 750 m, 15 Apr, 1939; Sine lect 173 (BSIS); Similipal, 13 Feb, 1958; Panigrahi 12324; Bhanjabasa, 13 Feb, 1958; Panigrahi 12324 (both CAL).

Haines (l.c.) also recorded its occurrence from Sambalpur, Bal (l.c.) from Bhanja Forest in Mayurbhanj District, Fischer (1931), from Ganjam and Saxena et al. (1782) from Bhubaneswar.

Uses: Inflorescences are used for brooms.

Type: *T. mucronata* Persoon, nom. illegit., (Cenchrus muricatus L. (Sphalm* mueronatus') *T. muricata* (L.) Trinius.

A monotypic species distributed in India, Burma and Sri Lanka.

**Trachys muricata** L., Mant. 2: 302. 1771.

**Type:** "Habitat in India Orientali ", Koenig.

**Trachys mucronata** Pers., Syn. pl. 1: 85. 1805, nom. illegit. superfl.

**Type:** Same as for *Cenchrus muricatus* L. (Sphalm 'mucronatus')

A diffused annual grass. Culms rooting below, up to 60 cm high, glabrous, with villous nodas. Leaves 2.5-16.25 cm x 0.25-1.25 cm ovate-lanceolate, acuminate, more or less softly villous, margins crisped; sheaths glabrous or hairy; ligule membranous. Racemes 1.25-6.25 cm long, glabrous; rachis 3-4.25 mm wide, with a broad flat stout midrib. Spikelets 1-6 in a cluster, 6.25 mm diam. Lower involucral glume 1.75-2.8 mm long, lanceolate, acute; upper involucral glume 2.25-3.5 mm long, linear-lanceolate, 3-veined, lower lemma 5.25-6 mm long, obovate, cuspidately acuminate, 9-13-veined; upper lemma 3.75-4 mm long, ovate, acute. Lodices very small or 0. Stamens 3; anthers linear. Styles very long; stigmas slender. Grains oblong, compressed, free.

**Fls. and frts.:** Aug.-Dec.

**Ecology:** Common on wet coastal sands.

**Distribution:** India, Bangladesh, Burma, and Sri Lanka.


**Use:** It is used as a fodder before flowering.
**Note** : Persoon (1805) cited for *Trachys mucronata* Pers.

"Cenchrus mucronatus* L., *Panicum squarrosum* Retz. etc. as
obligate synonyms. But Linnaeus (1771) described *Cenchrus
musricatus* L. and not *C. mucronatus* L. Therefore, *T. mucronata*
Pers. is an illegitimate superfluous name for *Cenchrus
muscricatus* L. (= *Trachys mucricatus* L.)

1768, nom. cons.: Haines, Bot.: 978. 1924; Bor., Grass.: 682.

**Type** : *T. racemosus* (L.) Allioni (Fl. Pedem. 2: 241. 1785)
(Cenchrus racemosus L.)

*Tragus roxburghii* Panigrahi, Kew Bull. 29: 495. 1974; Anton,

**Type** : India, Madras: Velacherry, Jul. 1845, Thomson s.n.
(K, holotype), Labelled "Lappago biflora".

*Lappago biflora* sensu Roxb. (Hort. Beng.: 82. 1814, non
nud.), Fl. Ind. 1: 284. 1920, quod descript., excl. typo.

Iconotype : Roxburgh, Icon. No. 78 (K, CAL).

*Tragus biflorus* Sensu Schult., Syst. Veg. Mant. 2: 205. 1824;
Mooney, Suppl.: 166; Bor., Grass.: 682, quod descript., excl.
typo.

non (L.) Scope, 1777.

Tufted perennial grass, 8-12 (-15) cm high, readily spreading.
Culms strongly branched, leafy below, with long and short
internodes alternating in typical form, often rooting at the
nodes; nodes glabrous. Leaves variable, 1-5 cm long, 2-3.5 mm
wide, linear-lanceolate, acuminate, rigid, glaucous, glabrous,
with ciliate margins. Racemes 3-5 (-10) cm long, clusters subsessile, the peduncle 0.2 - 0.5 ( -0.7 ) mm long, densely hairy. Spikelets inserted almost at the same level with or without a short internode ( 0.2 mm long ) between them. Spikelets of the upper glume slightly slender. Lower glume ca 1 mm long, hyaline, often suppressed; upper glumes 4.5 mm long, involute, with rows of stout hooked spines along the ribs; lemma 2.5 - 2.7 mm long, oblong-lanceolate, shortly apiculate, puberulous. Lodicles 2, broad. Stamens 3. Styles longer; stigmas penicillate. Grains oblong, compressed, free within.

Rare ! Fls. and frts.: Jul.- Sep.

Ecology: Growing in dry plains.

Distribution: India, South-East Asia and East Africa.

Specimens examined: Keonjhar Dist.: Champua, 390 m, 18 Sep. 1946, Mooney 2744; 22 Sep. 1946, Mooney 2738 (both DD).

Mooney (l.c.) also collected from much further south at Nilgiri, 50 m, in Balasore District and expected it in Sambalpur, Patna (Bolangir Dist.) and Kalahandi, but so far not been collected from these localities.

Use: A nutritive fodder for cattle during rains.
1b. Lemmas cleft at the apex into 2 lobes, awned in the cleft; lobes awned or not:

2a. Culms up to 2.45 cm high, ligule reduced to a ridge, upper median awn as long as or longer than the lemma. ........... T. capillatus

2b. Culms up to 60 cm high; ligule short, ciliate

upper glume 3.75 mm long, median awn shorter than the lemma, occasionally almost absent. .... T. jacquemontii

Tripogon bromoides Roem. et Schult., Syst. Veg. 2: 600. 1817;
Raizada, JENHS 48: 680. 1949; Mooney, Suppl.: 162; Bor, Grass.: 521.

Type: Mysore, Hb. Heyne.

A stout tufted perennial, with culms 10-60 cm high. Leaves 7.5-37.5 cm long, filiform, convolute. Spikes 5-27.5 cm long; rachis scabrid on the margins. Spikelets 1 cm long, usually close, variable, several-flowered. Lower glume ovate to lanceolate, notched on one side, membranous with stout veins; upper glume 4-5.75 mm long, oblanceolate, 2-fid at the tip, lobes acute, with a short arista from the centre; lemmas 2-3.8 mm long, cleft at the apex into 4 lobes or with a definite lobe between each lateral awn and median; outer lobes if present, awned or not; inner membranous; median awn shorter than or nearly equal to the lemma; lowest lemma similar to others in sex and shape, hairy on the callus. Paleas not winged, scabrous on the keels; margins infolded. Grains narrowly oblong, free.


Ecology: Frequently found on old walls, rocks and shallow dry soil.
Distribution: India, Sri Lanka.

Specimens examined: Koraput Dist.: Sonabera 750 m, 15 Apr. 1949, Mooney 3297; Godma, in Sonabera, 700 m, 28 Sep. 1949, Mooney 3644; hills around Pottangi, 1200 - 1570 m, in Turiakonda, 10 Jul. 1950, Mooney 3839; 15 Jul. 1950, Mooney 3947; Sonabera, 700 m, near Aurar village, 3 Oct. 1949, Mooney 3695; Sonabera plateau, Khariar, 15 Apr. 1949, Mooney 3299 (all DD); Ganjam Dist.: Mahendragiri, 22 Aug. 1932, Narayanaswami 6063 (MH); Kalahandi Dist.: Bhawanipatna, 260 m, 3 Aug. 1949, Mooney 3565; 19 Jul. 1950, Mooney 3956 (both DD).

Mooney (l.c.) also recorded its occurrence from Sinang forest in Kalahandi District and Barapahar hills, 300-600 m, in Sambalpur District respectively.

Haines (l.c.) did not record this species from Bihar and Orissa.

Note: An extremely variable grass for which several varieties have been described. Since the characters intermingle, it is difficult to keep up as varieties.

Tripogon capillatus Jaub. et Spach, Ill.Fl. Orient. 4:47, t. 332. 1851; Haines, Bot.: 966; Mooney, Suppl.: 161; Bor, Grass.: 521.

Type: "Peninsular Indiae, circa urbem Poonah,............. Legit Jacquemont Sep. 1832 (P).

Densely tufted perennials, with culms, 3.75 - 17.5 (-45) cm high, slender, smooth, base clothed with leaf-sheaths. Leaves 3.75 - 25 cm long, filiform, blade convolute, rigid, sheaths glabrous, striate; ligule reduced to a ridge. Spikes 4-30 cm long, filiform, flexuous. Spikelets remote, few-flowered, with slender long awns. Lower glume 2.5 mm long, acuminate; upper 5 mm long with a short awn; Lemma ca 2.3-3.8 mm long.
ovate-lanceolate, 2-lobed at apex, awned in the cleft; paleas 2-veined, not winged. Anthers 1.5 mm long. Grain 1.25 - 1.75 mm long, narrowly terete, brown.

Fls. and frts.: Jul. - Dec.

Ecology: Common on trees and rocks.

Distribution: India, Endemic.

Specimens examined: Kalahandi Dist.: Upar Ampodar, 900 m, 23 Dec. 1948, Mooney 3212; Sambalpur Dist.: Gandhamardan hill, above Nrisinghnath, 5 Oct. 1949, Mooney 3710 (both DD); Keonjhar Dist.: Khandadhar hill, 4 Oct. 1946, Mooney 2808 (CAL).

Mooney (l.c.) also recorded it from Bhatadih, 1070 m, in Keonjhar District.


Type: "Hab. India ..................... Poona, Jacquemont, 320 bis."

A perennial grass with wiry, root forming tufts. Culms 30-60 cm high, glaucous. Leaves 5-20 cm long, filiform, involute, glaucous, glabrous; sheaths loose, papery; ligule short, ciliate. Spikes 5-20 cm long, terminal, solitary, slender. Spikelets 10-20-flowered, up to 2 cm long with awns x ca 2.5 mm long. Lower glume 2.5 mm long, lanceolate, membranous, 1-veined, lobed on one side; upper glume 3.75 mm long ovate-lanceolate or oblong-lanceolate, acute, membranous, 1-veined; lemmas 3.75 mm long, shortly beard at the base, broadly ovate, 3-veined, shortly 2-lobed, with a median awn ca 1 mm long; palea broad, truncate, keels scaberulous. Grain narrowly oblong, terete, glabrous.
Fls. and frts. : May - Oct.

Ecology : Growing on Old walls, rocks and shallow soils.

Distribution : India. Endemic.

Specimens examined : Koraput Dist.: Gunupur, 720m, 14 Jul. 1949, Mooney 3498; Kalahandi Dist.: Basang Mali, 1600 m, in Mandibisi, 30 May 1944, Mooney 2518 (both DD)

Haines (l.c.) did not record it from our locality.


Type: "Origin areo dell 'Asia min. e Mesopotamia ", Fiori et Paolettii


Type locality: France (Cf. Chase et Miles).
Culms with spikes articulate at maturity; spikelets with glumes having an indistinct keel that often disappears towards base of the glume; florets in spikelets more than 2, 2 or more florets being fertile; palea remaining entire at maturity.

Ecology: Cultivated in our area, which grows luxuriantly in fertile manured soil.

$2n = 28$ (Bor, l.c.)

Distribution: India; cultivated.

Widely cultivated throughout the world for its grain, but not extensively.

Specimen examined: Sambalpur, 13 April, sine lect s.n. (Acon. No. 40390, 40391-(BSIS)); Mayurbhanj: Dudruchampa, 23 January 1940, sine lect = 455 (DD, BSIS).

Several varieties are grown in our state.

Uses: The grains are used for preparation of bread, cakes, loafs etc. and the wheat-straw used in the manufacture of paper and for construction of thatched houses.
Urochloa panicoldes P. Beauvois.

Type: U. panicoldes P. Beauvois.

Urochloa panicoldes P. Beauv., Essai Agrost. 53, t. 11, f. 1, 1812; Mooney, Suppl.: 176; Bor, Grass.: 372;

Type: Mauritius "Ile de France", de Jussieu (P-JU).


1816; Hook. f., FBI 7: 35. 1896.

Panicum helopus Trin. in Spreng., Neue Endec. 2: 84. 1821.

Type locality: "Mascarenicis".

U. helopus (Trin.) Stapf in Prain, Fl. Trop. Africa 9:

595. 1920; Haines, Bot.: 1003.

Var. panicoldes

Annual grass 30 - 60 cm long. Culms decumbent and rooting below, nodes pubescent. Leaves 2.5 - 15.75 x 0.5 - 1.75 cm, subcordate, clasping stem, hairy or rarely nearly glabrous; sheaths loose with mouth villous; ligule of stiff hairs.

Panicles erect, distant branches 6 - 12; rachis compressed, glabrous. Spikelets 3.25 - 4 mm long, ovate to elliptic -
oblong, acute. Lower glume 1-1.5 mm long, less than one half the length of the spikelet, clasping the base of the spikelet, 3-veined; upper glume about the size and shape of the spikelet, ovate, acute 7-9-veined; lower lemma about the size and shape of the spikelet, without a fringe of bristles, glabrous or shortly velvety-pubescent, 5-veined, empty or male, with a membranous palea; upper lemma ovate-oblung, with a cusp, 0.8-mm long. Grain tightly enclosed within lemma and palea.

Fls. and frts.: Apr.-Sept.

Ecology: A weed of drier parts of heavily grazed ground.

Distribution: India, Pakistan, Sudan, Yemen to South Africa. Introduced into Australia.

Specimen examined: Kalahadidi Dist.: Junagarh, 210 m, 28 Aug. 1949, Mooney 3561; Dhenkanal Dist.: Gatipiri, 6 Apr. 1942, Mooney 2060; Sankarpur, 60 m, 2 Sep. 1942, Mooney 2050; Keonjhar District. Champua, 390 m, 30 Aug. 1942, Mooney 2040 (all DD).

Uses: An excellent fodder for cattle & horses. Grains are eaten by poor.


Type: **V. odoratissima** Bory de St. Vincent, nom. Illegit. (Andropogon squarrosum (L.).

Vetiveria zizanoides (L.) Nash
Bor Grass.: 258 ; Behera et al., JBNHS (Suppl.) 74 : 652, 1979;
Saxena et al., Ind. J. For. 5 (2) : 103, 1982 ; Choudhry et patnaik,

Phalaris zizanoides L., Mant. Pl. 2 : 183, 1771.

Type: "India Orientalis", Koenig.

Bena (Ori.)
The Khuskhus or
Kuskus (Eng.)

Coarse *perennis*, tufted perennial, often gregarious rigid,
with spongy aromatic roots from root-stock. Culms up to 2m
high or more. Leaves 30-60 cm long, radical leaves much longer,
ca 7.5 mm wide, margins setaceously scabrid, distichous at
base, coriaceous, conduplicate at least towards the base,
glabrous, 6-8 veins on either side of the midrib; ligule a
mere rim. Panicles 15-40 cm long, oblong or pyramidal, joints
and pedicels glabrous. Spikelets with glabrous callus, linear
to linear-lanceolate; sessile spikelets 3.25-4.25 mm; pedicelled
shorter. Lower glume muriculate; upper muriculate on the
keel; upper lemma entire, muticous or mucromilate. Stamens 3.
Grains oblong, compressed (Pl. 15, Fig. 16).


Ecology: Common on damp sandy places and forest glades.

2n = 20 (Bor, l.c.)

Distribution: India, South-east Asia and tropical Australia.
Introduced to the west Indies.

Specimens examined: Ganjam Dist. Kaliamba, Dec. 1889,
Gamble 21632 (DD).
Haines (l.c.) recorded it from Puri, Angul (Dhenkali District) and Sambalpur; Choudhury et al., Patnaik (l.c.), Behera et al. (l.c.) and Saxena, et al. (l.c.), from Sisupalgarh and Bhubaneswar.

Uses: A good fodder for cattle when young. Khas-Khas mats are prepared from aromatic root for colling dwellings and fans. Sweet scented aromatic and medicinal oil is also extracted from the roots, which is often used in perfumery.
Type: *Z. mays* Linnaeus

Probably monotypic cultivated throughout the world.

Low or tall plant 1-4 m high; stems robust, suckering at the base but otherwise usually unbranched, with brace roots arising from the lower joints; leaves up to 1 m long and ca 10.0 cm wide 1 at each joint of the node, long, linear-lanceolate or sword-shaped, acuminate-pointed, curving with prominent rib.

Male spikelets: 2-nate at each in the panicle or tassel, one sessile or nearly so and one pedicelled; each spikelet 2-flowered, 6-12 mm long with empty ciliate glumes, thin paleas and lemmas; stamens 3. Female spikelets in 8-24 rows on the rachis; the
floral envelopes consisting of 2 glumes; 2 paleas; 3 lemmas, which left as chaff on the cob; style several centimetre long and constituting the silk; fruit a flattened grain with convex or indented top and more or less pointed base.

Yellow, white and red varieties are cultivated; usually reaped at the end of the rainy season.

Ecology: Cultivated in plains and hills of many parts of the world.

Distribution: India (Cultivated throughout the country), Paleo-topic.

Native of South America.


Saxena et al. and Choudhury et Patnaik (l.c.) recorded its cultivation from Bhubaneswar in Puri District. As such this is much cultivated throughout the state.

Uses: Corn is eaten; foliaceous bracts are used as a wrapping for cigarettes in India, cheroots in Burma, and the stems and leaves are used as good fodder for cattle. Several races are widely cultivated in our country.
ZOYSIA Willdenow, Ges. Naturf. Freunde

Type: Z. pungens Willdenow (Z. matrella (L.) Merr.)


Type: O. matrella Cl. 70.Ktze (=Z. matrella (L.) Merr.)

Zoydia Persoon, Syn. Pl. 1:73(1805), (Orth. Var.)


Agrostis matrella L., Mant. Pl. 2:185.1771.

Type: "Habitat in Malabaricae arenosis". Koenig 56 in Hb. Linne. (LINN, No. 84.11, microfiche CALI), iso in L. (No. 909.67-176).


Type: Klein s.n. in Hb. Willdenow (B; No. 01514, n.v.; IDC 7440).


Type: Griffith s.n. ("Serampore") (B; iso in K, n.v.).

**var. matrella**

A perennial herb with rigid, wiry stolons, to 45(-60) cm long with cataphyllus in pairs, to 1.3 cm long. Culms 2.5-25 cm high. Leaves linear, coriaceous, blades erecto-patent to patent, to 8 cm X 1.5-2.8 mm when expanded, cordate; sheaths short, throat of the sheath with up to 5 mm long hairs; ligule a narrow ciliate membrane. Racemes exerted above the foliage at anthesis, 1.5-4.2 cm long, stiff, erect; rhachis somewhat wavy; pedicels occasionally absent, up to 3.2 mm long, broadened under the spikelet. Spikelets 2-3.8 X ca 1 mm, erect, pedicels usually long. Lower glume present or absent, if present up to 1 mm long, membranous; upper glume has revolute margins, with the midrib sometimes rough towards the apex, the outer 4 veins faint, awn absent or apical or sub-apical, straight to geniculate, up to 1.3 mm long; palea linear-oblong, veinless. Styles apical. Base of the caryopsis truncate.

**Ecology:** Sandy beaches and salt-marsh places.


**Distribution:** Coast of the Indian Oceans, Chinese Sea to Ryukyu Islands, Malesia, introduced into America.
Specimens examined: Puri beach, 20 Jun. 1936. sine lect s.n. (Rav. Coll. Herb.). Mooney (l.c.) recorded its occurrence from Sandy fore shore at Jambu Mahanadi delta in Cuttack District.

Uses: A common sand binder in sea-shore associated with Ipomoea pescaprae formation. It is commonly known as Manila grass. Of little use as fodder.