

THE GENUS *HETEROPOGON* PERS. (POACEAE) IN INDIA

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ABSTRACT

Taxonomic revision of the grass genus *Heteropogon* Pers., in India is presented with keys to 5 species and a variety. Literature citations, synonymy, descriptions, types, phenology, distribution, specimens examined and chromosome numbers are presented. Two species and the variety are endemic to the Indian region.

HETEROPOGON Pers.

Syn. Pl. 2 : 533. 1807 ; Benth. & Hook. f. Gen. Pl. 3 : 1133. 1880 ; Bor, Grass, Burma, Ceylon, India & Pakistan 162. 1960. *Andropogon* L. subgenus *Heteropogon* Hack. in DC. Monogr. Phan. 6 : 583. 1889 ; Hook. f. Fl. Brit. India 7 : 199. 1896.

Annuals or perennials, 30-150 cm high, simple or branched. Leaf blades linear, linear-lanceolate, glabrous or with scattered tubercle-based hairs on both sides ; ligule small, ciliolate or a long scaly membrane. Inflorescence a solitary raceme terminating the culm or sometimes many together in the axils of the leaves. Spikelet pairs in the lower $1\frac{1}{4}$ (or sometimes upto $2/3$) length of the raceme male or neuter, homogamous, others, heterogamous. Sessile spikelets of the upper pairs bisexual or female ; pedicelled spikelets of all pairs male or neuter. Upper sessile spikelets terete or subterete, awned ; callus long, pointed, densely hairy upwards ; glumes coriaceous or chartaceous, more or less equal ; lower coriaceous, convex, sometimes grooved ; lemmas hyaline ; upper lemma a hyaline base passing into an awn ; palea absent ; floret female or bisexual ; lodicules 2 ; stamens 3 or rudimentary or 0. Lower sessile and all pedicelled spikelets

dorsally compressed ; glumes dissimilar, lower ones 2-keeled, winged upwards on one or both keels ; lemmas hyaline, reduced or suppressed ; stamens 3 or 0.

Distrib. : ca 12 species in the world ; 5 species and 1 variety in India of which 2 species & the variety are endemic.

Chr. No. : $x=10$ or 11 .

KEY TO THE SPECIES

- 1a. Pedicelled spikelets 6-9 mm long
 - 2a. Leaves distichous .. *H. fischerianus*
 - 2b. Leaves not distichous
 - 3a. Ligule 1 mm long, scarious, a shortly ciliate membrane .. *H. contortus*
 - 3b. Ligule 4-6 mm long, a brown membrane, sometimes splitted upto base into several segments .. *H. ritchiei*
- 1b. Pedicelled spikelets 10-22 mm long
 - 4a. Lower glume of pedicelled spikelets with a longitudinal median series of depressed glands .. *H. melanocarpus*
 - 4b. Lower glume of pedicelled spikelets not as above .. *H. triticeus*

Heteropogon contortus (L.) P. Beauv. ex Roem. et Schult. Syst. Veg. 2 : 836. 1817 ; Haines, Bot. Bihar & Orissa, V. 1049. 1924 (repr. ed. 3 : 1088. 1961) ; Fischer in Gamble, Fl. Pres. Madras 10 : 1743. 1934 (repr. ed. 3 : 1208. 1957) ; Bor in Kanjilal, Fl. Assam. 5 : 402. 1940 ; Raizada et Jain in Ind. For. Rec. 4 (7) : 247. 1957 (1961) ; Bor, Grass. Burma, Ceylon, India & Pakistan 163 : 1960. *Andropogon contortus* L. Sp. Pl. ed. 1 : 1045. 1753 ; Hook. f.

Fl. Brit. India 7 : 199. 1896 ; Cooke, Fl. Pres. Bombay 2 : 990. 1908 (repr. ed. 3 : 510. 1958). Kher, Kulia (Hind.) ; Kursali (Mar.) ; Kari vunugada hullu (Kan.) ; Ocsi pullu (Tam.) ; Eddi gaddi (Tel.) ; Sinkclo (Ur.).

Annuals or perennials, 30-150 cm high ; culms densely tufted, erect or decumbent. Leaf blades 5-30 cm $\times$ 2.5-5.0 mm, linear, acute, glabrous on both surfaces or sometimes with scattered bulbous based hairs ; ligule 1.0 mm long, a scarious membrane with short cilia. Inflorescence solitary, terminal or many together in the axil, spatheate. Racemes 3.0-4.0 cm long, hairy. Sessile spikelets 4.0-7.0 mm ; callus 2 mm long, pungent, hairy ; lower glume upto 5 mm linear, 2-nerved ; awn very long, upto 8 cm, golden brown, twisted, hairy. Pedicelled spikelets 6-8 mm long ; lower glume 5.0-6.0 $\times$ 1.25 mm, oblong-lanceolate, narrowly equally winged, hairy along the margins in the upper half, hairs with small bulbous bases.

- 1a. Racemes solitary, terminal var. *contortus*
1b. Racemes many together, axillary var. *polystachyos*

var. **contortus**

Type : India : Ill. Plunk, alm. 173. t. 191. f. 5. 1692.

Fls. & Frs. : Aug.-Mar.

Distrib. : INDIA : Widely distributed : Jammu & Kashmir, Punjab, Haryana, Delhi, Himachal Pradesh, Uttar Pradesh, Bihar, W. Bengal, Sikkim, Nagaland, Arunachal Pradesh, Rajasthan, Madhya Pradesh, Orissa, Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Tamilnadu, Kerala, Goa, Daman & Dadra, Laccadive Islands, Andaman & Nicobar Islands ; NEPAL ; BURMA ; PAKISTAN ; SRI LANKA ; THAILAND ; SUMATRA ; JAVA ; AFRICA ; S. AFRICA ; AFGHANISTAN ; EUROPE ; S. AMERICA ; generally in all tropical and warm temperate regions.

Specimens examined : Punjab, Gurdaspur U. C. Bhattacharya 99395 (BSD) ;

Himachal Pradesh, Neerath N. C. Nair 28866 (BSD) ; Nagaland, Naga hills N. L. Bor 21362 (ASSAM) ; Rajasthan, Barmer B. V. Shetty 2232 (BSJO) ; Orissa, Malda G. Panigrahi 20625 (BSA) ; Maharashtra, Osmanabad R. S. Rao 90674 (BSI) ; Andaman & Nicobar Islands, N. Nicobar N. C. Nair 4538 (PBL).

Chr. No. : $2n=20$ (Janaki Ammal, E.K. in Darlington's *Chromosome Atlas* ed. 1 : 1945) ; $2n=44$ (Maffett, A. A. & R. Hurcombe in *Heredity* 3 : 369. 1949) ; $2n=40$ (Tateoka, T. in *Am. J. Bot.* 52 : 864-869. 1965) ; $2n=60$ (Gould, F. W. in *Canad. J. Bot.* 46 : 1315-1325. 1968).

var. **polystachyos** (Roxb.) Deshpande stat. et comb. nov.

Andropogon polystachyos Roxb. Fl. Ind. 1 : 261. 1832 ; Hook. f. Fl. Brit. India 7 : 202. 1896 ; Cooke, Fl. Pres. Bombay 2 : 989. 1908 (repr. ed. 3 : 508. 1958). *Heteropogon polystachyos* (Roxb.) Schult. Syst. Veg. 2, Mant. 460. 1824 ; Fischer in Gamble, Fl. Pres. Madras 10 : 1743. 1934 (repr. ed. 3 : 1208. 1957) ; Bor, Grass. Burma, Ceylon, India & Pakistan 163. 1960.

Type : India : Roxburgh Ic. 2020 (CAL !).

Fls. & Frs. : Oct.-Dec.

Distrib. : INDIA : Gujarat, Maharashtra, Andhra Pradesh, Endemic, rare.

Specimens examined : Andhra Pradesh, Gabonapalam K. Subramanyam 51460 (MH), Cuddapah 15366 (MH).

Notes : This taxon very closely resembles the variety proper and differs only in the nature of its inflorescence ; hence reduced to a varietal level.

Heteropogon fischerianus Bor in Kew Bull.

1951 : 170. 1951 et Grass. Burma, Ceylon, India & Pakistan 165. 1960. *H. contortus* (L.) P. Beauv. var. *distichous* Fischer in Gamble, Fl. Pres. Madras 10 : 1793. 1934 (repr. ed. 3 : 1208. 1957).

Densely tufted perennials, culms 30-40 cm high, nodes many, sheathed below. Leaf sheath strongly compressed, *ca* 2.5 cm long, keeled, striate, distichous; leaves numerous, distichous, crowded together in the middle one third portion, linear, flat, rigid, 2.5-7.0 cm long, complicate, falcate, pilose at base, margins scabrous towards apex, cartilaginous median vein distinct; ligule 1.0 mm long, densely ciliate. Racemes terminal, solitary 4-5 cm long. Lower 4-6 pairs homogamous, male or neuter, unawned; upper sessile spikelets female, awned. Homogamous pairs: joint 3 mm long, thickened at the apex, minutely scabrous; sessile and pedicelled spikelets similar except the margin of the which is lower glume of pedicelled spikelets which is broadly winged; lower glume 7 × 2 mm lanceolate, acute, two keeled, keels narrowly winged, margins inturned; upper glume 6 × 1 mm, elliptic-acute, 8 nerved, margins ciliate in the upper portion; lower lemma 5.5 mm long, elliptic, hyaline, margins ciliate; upper lemma 4.5 mm long, lanceolate, hyaline; stamens 3, anthers upto 2.5 mm long. Heterogamous spikelets: sessile spikelets: callus 2.5 mm long, terete, dark brown, curved, covered with reddish-brown hairs, sharply pointed; lower glume 6.0-6.5 mm long, apex truncate, laterally rounded, brown turning to dark brown, shortly pilose, 2-grooved; upper glume equal to lower glume, margins hyaline, 3-nerved, brown, scabrous; lower lemma shorter, hyaline, lanceolate; upper lemma reduced to a base of an awn; awn robust, *ca* 6 cm long, villous; styles 2; stigma long, purple. Pedicelled spikelet similar to sessile spikelet of the homogamous pair or longer.

Type: India: Kodaikanal, Pulneys, Jesmond hill Bourne 2025, July 1, 1901 (K), (Isotype, CAL!); Kodaikanal, Pulneys Bourne 2026 July 1, 1901 (Paratype CAL! Photo. MH!); Poonachi, Annamalais C. A. Barber Oct. 10, 1901 (Paratype, MH Photo!).

Fls. & Frs.: July-Oct.

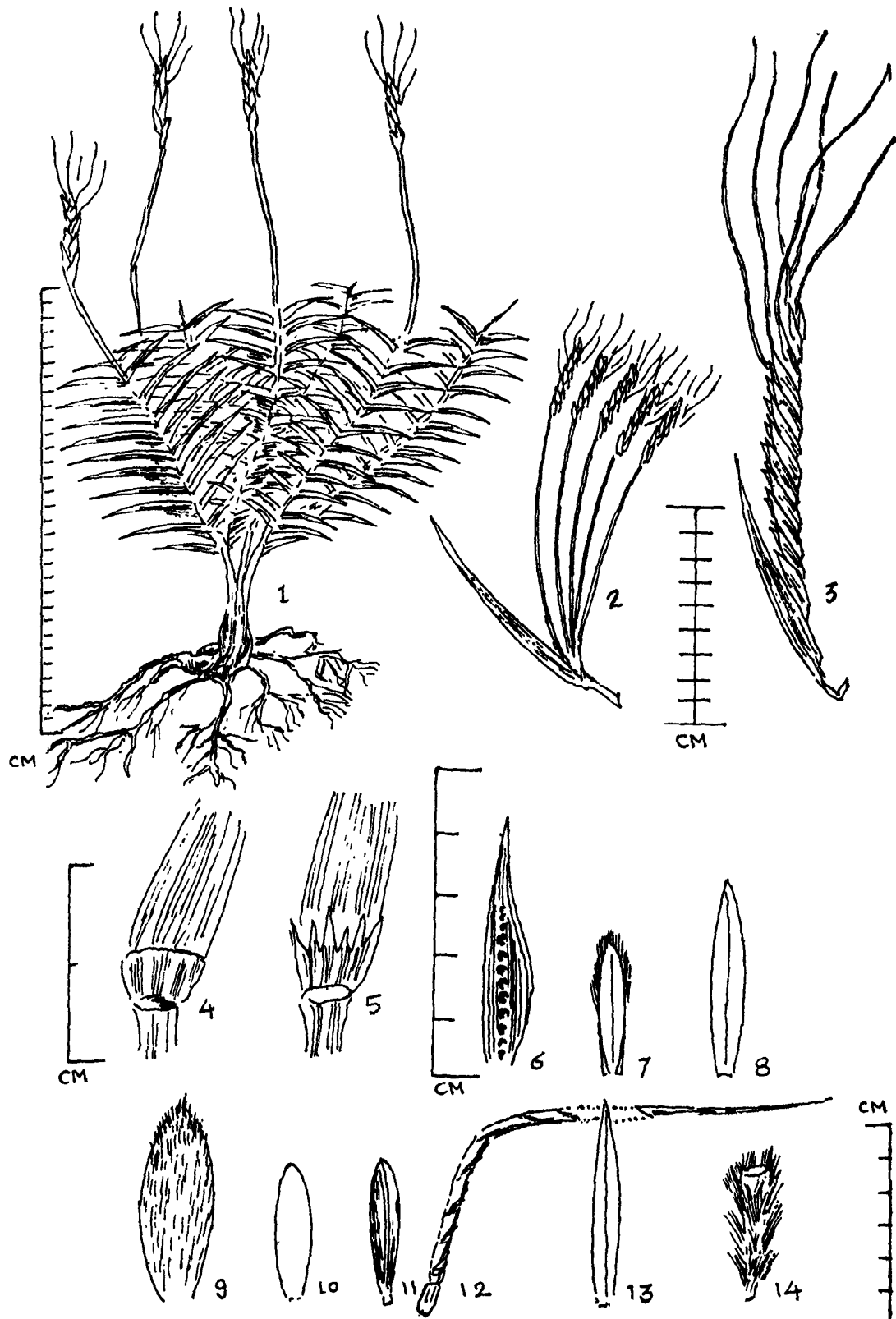
Distrib.: INDIA: Tamilnadu. Endemic, rare.

Notes: Besides the above mentioned specimens there is one more specimen of this species at Kew which is also collected from Kodaikanal, Pulney Hills by Bourne (Fairy Falls, Bourne 1207, Apr. 27, 1898) and cited by Bor (*l.c.*). These are the only specimens available for this species.

Heteropogon melanocarpus (Ell.) Benth. in J. Linn. Soc. 19: 71. 1881; Raizada & Jain in Ind. For. Rec. 4(7): 248. 1957; Bor, Grass. Burma, Ceylon, India & Pakistan 165. 1960. *Andropogon melanocarpus* Ell. Sketch. Bot. S. Carolin 1: 146. 1816; Hook. f. Fl. Brit. India 7: 200. 1896.

Erect annuals, upto 2 m high. Culms stout with stilt roots from the lower nodes, glabrous. Leafsheaths compressed, keeled, keels with impressed glands; leaf-blades 15-60 × 0.6-1.8 cm, linear, long tapering to a fine point; ligule short, scarious. Inflorescence spatheate with few to many racemes. Racemes 2.5-5.0 cm long (rarely upto 30 cm long). Upper sessile spikelets 8-15 mm long, linear-oblong; lower glume 8-15 mm long, linear-oblong, minutely fulvous hairy; upper glume narrower, nearly equal to lower glume; lower lemma long, hyaline 4-5 mm long; upper lemma very narrow passing into an awn; awn 6-14 cm long. Lower sessile spikelets of the homogamous pairs male or neuter, upto 15 mm long. Pedicelled spikelets of all pairs male, 13-22 mm long, lanceolate, subulate, acuminate; lower glume 13-22 mm long, herbaceous, keeled on one side, keel serrulate with an inflexed flap while the other side involute; upper glume lanceolate acute; lower lemma oblong-ovate, 1-nerved, ciliate; upper lemma linear, very narrow.

Type: U.S.A.: Georgia, in the pine barrens between Fort Barrington on the Altamaha and Jefferson on the Satilla R. habersham (CHARL?, PH?).



Figs. 1-14 : 1. *Heteropogon fischerianus* Bor.—Habit. 2. *H. contortus* (L.) P. Beauv. ex Roem. et Schult. var. *polystochyos* (Roxb.) Deshpande.—Inflorescence. 3. *H. triticeus* (R. Br.) Stapf ex Craib.—Inflorescence. 4. *H. contortus* (L.) P. Beauv. ex Roem. et Schult.—Ligule. 5. *H. ritchie* (Hook. f.) Blatt. et McCann.—Ligule. 6-14. *H. melanocarpus* (Ell.) Benth. 6-8. Pedicelled spikelet ; 6. Lower glume. 7. Lower lemma. 8. Upper glume. 9-14. Sessile spikelet ; 9. Lower glumes. 10. Lower lemma. 11. Nut. 12. Upper lemma with awn. 13. Upper glume. 14. Callus.

Fls. & Frs. : Sept.-Dec. (rarely up to Mar.)

Distrib. : INDIA : Uttar Pradesh, Bihar, NEPAL; S. AFRICA; S. AMERICA.; Distributed in the tropical and subtropical regions.

Specimens examined : Uttar Pradesh, Garhwal M. A. Rau 6400 (BSD); Kumaon D. D. Awasthi 1615 (DD); Bihar, H. S. Mooney 1183 (DD).

Chr. No. : $2n=22$ (Moffett A. A. & R. Hurcombe, *Heredity* 3 : 369. 1949).

Heteropogon ritchiei (Hook. f.) Blatt. et McC. in J. Bombay nat. Hist. Soc. 32 : 623. 1928; Bor, Grass. Burma, Ceylon, India & Pakistan 165. 1960. *Andropogon ritchiei* Hook. f. Fl. Brit. India 7 : 201. 1896; Cooke, Fl. Press. Bombay 2 : 990. 1908 (repr. ed. 3 : 509. 1958).

Culms 90-120 cm high. Leafsheaths glabrous; blades $15.45 \times 0.8-1.0$ cm linear, acuminate, hairy on both surfaces, margins serrulate, ligule 4-6 mm long, a brown membrane, divided upto base into numerous narrow acute segments. Racemes 2.5-5.0 cm long, hispid, lower 1-2 pairs of spikelets homogamous. Upper sessile spikelets 4.5-6.0 mm long, oblong; lower glume oblong, 4.5-6.0 mm long, bluntly acuminate-truncate, hairy on the back; upper glume linear-oblong, 3-nerved; lower lemma hyaline, nerveless; awn 3-4 cm long. Pedicelled spikelets 10-13 mm long; pedicels short, glabrous; lower glume 9-11 mm, lanceolate, keeled, keels with a row of long, tubercle-based golden-yellow bristles; upper glume 10-13 mm long, lanceolate; lower lemma 8-10 mm long, oblanceolate, hyaline; upper lemma 7-9 mm long, narrowly linear, acute; stamens 3, 3.5-4.0 mm long.

Type : India : Belgaum Ritchie 884 (BM, Microfisch !); Belgaum Ritchie 884 (Isotype, CAL !).

Fls. & Frs. : Sept.-Dec.

Distrib. : INDIA : Maharashtra, Madhya Pradesh, Karnataka, Nagarhaveli. Endemic.

Specimens examined : Maharashtra, Mahabaleshwar Bole 474 (BLAT); Pune, Katraj ghat Gammie s.n. (BSI); Madhya Pradesh, Melghat Division W. R. Officer s.n. (DD); Nagarhaveli, Dolara Ansari 94126 (BSI).

Notes : J. D. Hooker (l.c.) described ligule with uncertainty in three different ways, viz. 'ligule a row of stiff bristles', 'ligule membranous', 'ligule imperfect'. On the type sheet also there is a remark stating: 'ligule of stiff bristles, connate below'. But on critical examination of several specimens it is found as distinct, 4-6 mm long brownish membrane, sometimes split upto base into a number of segments. Lower glume of sessile spikelet is also channelled but channel remains always covered with hairs. It is visible only when hairs falls off.

Heteropogon triticeus (R. Br.) Stapf ex Craib in Kew Bull. 1912 : 432. 1912; Bor, Grass. Burma, Ceylon, India & Pakistan 165. 1960. *Andropogon triticeus* R. Br. Prodr. 291. 1819; Hook. f. Fl. Brit. India 7 : 200. 1896; Cooke, Fl. Pres. Bombay 2 : 989. 1958 (repr. ed. 3 : 509. 1958). 'Kali Kusal' (Mar.).

Perennials with roots of stout fibres. Culms reed-like, 1.0-2.5 m high. Leafsheaths compressed-keeled; blades 30-60 cm long, linear, acuminate, sparsely hairy; ligule 2.0-4.0 mm long, a rounded membrane, shortly ciliolate. Racemes (2-) 5-15 cm long, glabrous. Spikelets many, except a few terminal spikelets all are awnless, male or neuter. Terminal few sessile spikelets long awned, bisexual. Sessile spikelets 7-8 mm long; callus 5-6 mm long, pointed, densely hairy; lower glume 7-8 mm long, linear-oblong, tip obtuse rounded, ciliolate, dorsally deeply grooved; upper glume as long as or slightly longer than the lower lemma, linear; lower lemma 3-4 mm long, hyaline, acuminate; upper lemma hyaline base of an awn, awn stout 5-10 cm long.

Upper pedicelled and lower spikelets 12-25 mm long, male or neuter than the lower one, linear-lanceolate, 3-nerved; lower lemma lanceolate, acuminate, ciliate; upper lemma narrow oblanceolate, 1-nerved, ciliate.

Type : W. coast, Australia, *R. Brown* s.n. 1801-1805 (BM !)

Fls. & Frs. : Sept.-Dec.

Distrib. : INDIA : Gujarat, Maharashtra,

Madhya Pradesh, Karnataka; BURMA; SRI LANKA; MALAYA; AUSTRALIA.

Specimens examined : Gujarat, Bhavnagar *M. P. Guha* 79 (DD); Maharashtra, Khandala *Santapau* 19782 (BLAT); Karnataka, Gulbarga *Ramesh & Manohar* KFP 10092 (CAL).

Chr. No. : $2n=60$ (Pritchard, A. J. & K. F. Gould, *Trop. Pastures Tech. Pap.* 2 (C.S.I.R.O., Australia : 18. 1964).