

Genus *Fimbristylis* Vahl. *nom. cons.* (Cyperaceae) in Uttar Pradesh, India

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Abstract

The paper provides a detailed taxonomic account of 29 spp. of the genus *Fimbristylis* Vahl. *nom. cons.* in Uttar Pradesh. Key to the species and uses are also provided.

The state of Uttar Pradesh (after recent reorganisation) is situated between 77⁰-3' & 84⁰-39' N and 23⁰-52' & 30⁰-25' E. The area falls under Gangetic Plain and covers forested area of Tarai & Bhabhar tract, cultivated areas of Purvanchal, Rohilkhand Duabs, Bundelkhand etc. But the flora of the region is not yet worked out. Present study deals with the floristic diversity of the genus *Fimbristylis* in the state. The study is based on the field observations, scrutiny of literature (Uniyal *et al* 1997, Duthie 1929, Hooker 1893-94, Singh & Srivastava 2002) and herbarium specimens housed in CAL, LWG, DD, BSA, BSIP, MU (Herbarium at Merrut University) GU, (Herbarium at Gorakhpur University) DUTHIE (Allahabad University) herbaria.

FIMBRISTYLIS Vahl. *nom. cons.*

Enum. Pl. 2 : 285. 1806 ('*Fimbristyles*', '*fimbristylis*' et '*Fimbristylis*', sphalm). *Abildgaardia* Vahl, *l.c.* 296 ('*Abildgardia*' et '*Abilgardia*', sphalm.). *Pogonostylis* Bertol. Fl. Ital. 1 : 312. 1833.

Type : *Fimbristylis dichotoma* (L.) Vahl ('*dichotomum*') (*Scirpus dichotomus* L.) (*typ. cons.*).

Annuals or perennials, usually tufted. Rhizomes, when present, woody, usually short, sometimes long, creeping. Stems 3-5-angled or compressed. Leaves clustered at the base, sometimes all or only the lower distichous or subdistichous, acropetally falling from the elongating rhachilla, lower 1-3, rarely more, empty. Flowers usually all bisexual, sometimes upper 1-3 male or barren; perianth absent; stamens 1-3, anterior; gynophore sometimes well developed; styles articulated with the ovary dilated at the base, usually fimbriate, ultimately deciduous; stigmas 2-3. Nuts few or all reduced to bladeless sheaths; ligules absent, or membranaceous, or a dense fringe of short-hairs. Inflorescence usually anthelate, sometimes capitate or reduced to a solitary spikelet; bracts foliaceous or glumaceous; spikelets solitary or in clusters, few-several-flowered; rhachilla persistent or rarely caducous along with the glumes, sometimes winged; glumes usually all spiral, some-sessile or stipitate, lenticular or trigonal, orbicular, obovoid, oblong or linear, smooth, verruculose or tuberculate, rarely glandular, sometimes vertically trabeculate due to transversely oblong surface cells being regularly superimposed in several vertical rows or reticulate due to rounded or polygonal surface cells.

A genus of *ca* 300 tropical and subtropical species; *ca* 50 species in India; 29 species in Uttar Pradesh (present study).

Notes : *Fimbristylis albicans*, *Fimbristylis ciliaris*, *Fimbristylis globulosa*, *Fimbristylis scaberima*, *Fimbristylis siberiana* (Allahabad) and *Fimbristylis tenuicula* are reported from the area but no specimen could be available, during present study, hence not included in this treatment and kept under *Taxa Dubia*.



Key to the species

- 1a. Nuts linear with almost parallel sides ...2
- 1b. Nuts obovoid or suborbicular; sides not parallel ...3
- 2a. Leaves present. Spikelets several, anthelate. Glumes aristate ...*F. dipsacea*
- 2b. Leaves absent. Spikelet solitary, terminal. Glumes obtuse ...*F. tetragona*
- 3a. Stigmas 2. Nuts lenticular ...4
- 3b. Stigmas 3. Nuts trigonal ...15
- 4a. Stems bearing 1-3 spikelets ...5
- 4b. Stems bearing 4-numerous spikelets ... 7
- 5a. Glumes *ca* 1 mm long; stamens 1 ...*F. argentea*
- 5b. Glumes 2.5-3 mm long; stamens 1-3 ...6
- 6a. Glumes narrowly oblong, obtuse, twice or more or long as broad ...*F. polytrichoides*
- 6b. Glumes suborbicular to broadly ovate, shortly apiculate, less than twice as long as broad ...*F. schoenoides*
- 7a. Glumes hoary at least in the upper part ...*F. ferruginea*
- 7b. Glumes entirely glabrous ...8
- 8a. Glumes aristate, the arista about as long as the main body; style-base with long pendent hairs ...*F. suqarrosa*
- 8b. Glumes acute or mucronate, or if aristate, the arista about one fourth as long as the main body; style-base glabrous or with short spreading hairs ...9
- 9a. Glumes 1.2-1.5 mm long; nuts 0.5-0.7 mm long ...10
- 9b. Glumes 2-5 mm long; nuts 0.7-1.5 mm long ...11
- 10a. Leaves with a ligule of fringe of short hairs; nuts trabeculate ...*F. bisumbellata*
- 10b. Leaves without a ligule; nuts not trabeculate ...*F. aestivalis*
- 11a. Spikelets almost all in clusters of 2-6, sometimes a few solitary, linear-lancolate, scarcely broader than their pedicels ...*F. hookeriana*
- 11b. Spikelets all solitary or sometimes only a few rather clustered, ellipsoid or ovoid-oblong, several times broader than their pedicels ...12
- 12a. Leaves ligulate ...13
- 12b. Leaves not ligulate ...*F. rigidula*
- 13a. Surface cells of the nut arranged in 5-10 vertical rows on each face ...*F. dichotoma*
- 13b. Surface cells of the nut arranged in 12-24 vertical rows on each face ...14
- 14a. Glumes *ca* 3.5 mm long ...*F. tomentosa*
- 14b. Glumes 1-2 mm long, ...*F. alboviridis*
- 15a. Glumes 1-1.2 mm long. Umbel compact. Style glabrous ...*F. cymosa*
- 15b. Glumes *ca* 2 mm long. Umbels lax. Style pubescent. Nuts with 15-20 vertical rows of cells ...*F. alboviridis*
- 16a. Glumes all spiral; spikelets throughout terete or angular ...17
- 16b. Glumes lower distichous or subdistichous, upper spiral; spikelets compressed below, terete or angular above ...21
- 17a. Spikelets in clusters of 2-5, or sometimes a few solitary ...*F. falcata*
- 17b. Spikelets all solitary ...18
- 18a. Cauline leaves all with well developed blades, ligulate ...19
- 18b. Cauline leaves, at least the upper ones, reduced to bladeless sheaths, eligulate, or leaves absent...20
- 19a. Stems strongly compressed ...*F. complanata*
- 19b. Stem 3-5 angled ...*F. thomsonii*
- 20a. Leaves equitant, laterally folded and compressed, the midrib thus appears to be on margins ...*F. littoralis*



- 20b. Leaves not equitant, not folded, dorso-ventrally flattened ...*F. miliacea*
21a. Inflorescence usually consisting of a solitary terminal spikelet, rarely of 2-3 spikelets; nuts 2-3 mm long, coarsely tuberculate ...*F. ovata*
21b. Inflorescence usually of several to numerous spikelets, rarely reduced to 1-2 spikelets; nuts ca 1 mm long, smooth or verruculose ...*F. tenera*

Fimbristylis aestivalis (Retz.) Vahl, Enum. Pl. 2 : 288. 1806; C.B. Clarke in Hook. *f.*, Fl. Brit. India 6 : 637. 1893, *p.p.* *Scirpus aestivalis* Retz., Obs. Bot. 4 : 12. 1786. *Fimbristylis bis-umbellata sensu* C.E.S. Fischer in Gamble, Fl. Pres. Madras : 1898, 1936 (3 : 1151. 1967 rep. ed.), *non* Bub. (1850).

Type : Ceylon, Koenig.

ssp. **aestivalis**

Small, erect, annual, caespitose herbs. Stems angular, filiform. Leaves linear, acute, hairy, often shorter than stems; sheaths stramineous or ferruginous; ligules absent. Umbels compound and decomposed, 1-7 cm long; bracts 4-6, filiform, foliaceous; spikelets many, solitary, oblong, sub-cylindric, angular, acute 3-8 mm long; rachilla narrowly, winged; glumes spiral, membranous, ovate, mucronulate, with sharp, green keel, ferruginous, 1-1.5 mm long; stamens 1-1.5 mm long; stamens 1, anther oblong; ovaries 1-celled; styles nearly as long as nuts, flat, dilated at base; stigmas 2. Nuts biconvex, elliptic or obovate, short-stipitate, smooth, obscurely reticulate, straw-coloured, 0.5-0.8 mm long.

Fl. & Fr. : Feb.-July.

Habitat : in moist sandy places along streams, banks of ponds, cultivated fields. Common.

Chrom. No. : 2n = 10.

Distribution : India, Sri Lanka, Malaysia, Australia.

Distribution in Uttar Pradesh : Bahraich, Bulandshahar, Jaunpur, Ghazipur, Gorakhpur, Meerut, Sultanpur, Varanasi.

Representative specimens : **Bahraich** : Shoelwa, Chandra *et al.*, 12421 (LWG!). **Bulandshahar** : Charora, near Ahar, L.K. Sharma, 1566 (MU). **Ghazipur** : Nandganj, S.D. Singh, 12778 (GU). **Gorakhpur** : Along Turra Nala, A.K. Srivastava, 7056 (GU); Tilkonia forest, T.N. Srivastava, 170 (GU). **Jaunpur** : (cf. S.K. Singh & Dixit, 1969). **Meerut** : Hastinapur, Murty & Singh, 516 (MU). **Sultanpur** : Lumbhua, Om Prakash, 10628 (GU). **Varanasi** : Latipshah Dam, Kaul *et al.*, 47671 (LWG!).

Notes : This species is quite similar to *Fimbristylis squarrosa* Vahl, but can be distinguished by its floral glumes which are short-sub-mucronate or cuspidate at apex, whereas in *Fimbristylis squarrosa* Vahl, the glumes are long aristate, the awns being recurved and hooked and hence the spikelets become squarrose. However, this character sometimes varies and occasionally there are non-squarrose glumes in *Fimbristylis squarrosa* Vahl, then the spikelets look quite similar to *Fimbristylis aestivalis*. The difference therefore rests only on the characters of styles. The styles of *Fimbristylis aestivalis* are very minutely hairy at base or glabrous in contrast to those of *Fimbristylis squarrosa* with pendent, long silky hairs at the base.

Fimbristylis albovidis Clarke in Hook. *f.* Fl., Brit. India 6 : 638. 1893.

Annuals, 15-25 (-40) cm high. Stems compressed-trigonous, ca 1 mm thick. Leaves several, shorter than to equalling the stem, 1-2 mm broad; ligule a fringe of hairs. Anthela compound or decomposed, lax ca 2 x 4.5 cm across, bearing 5-27 spikelets; bracts foliaceous, spreading, lowest 3.5-8 cm long; rays 4-7, longest 12-25 mm long; spikelets solitary, ovoid, terete, 4-11 x 2-2.5 mm, subacute; glumes spiral, broadly ovate, 2-2.5 mm long, mucicous, greyish green or brown tinged, 3-nerved. Stamens 1-2; anthers ca 0.7 mm long, crest ovate; styles 1-1.5 mm long, fimbriate; stigmas 2, ca 1 mm long. Nuts shortly stipitate, obovoid, biconvex, 1-1.2 x 8 mm, stramineous, verruculose, trabeculate due to the surface cells being arranged in 12-16 rows on each face.

Fl. & Fr. : Sept.

Habitat : in wastelands. Scarce.

Distribution in Uttar Pradesh : Allahabad, Basti, Gorakhpur, Sultanpur.

Representative specimens : **Allahabad** : Garwa, R.P. Dube, 555 (DUTHIE!). **Gorakhpur** : Along Chilwa Nala, A.K. Srivastava, 6894 (GU). **Sultanpur** : Kadipur, Om Prakash, 10875 (GU).



Fimbristylis argentea (Rottb.) Vahl, Enum. Pl. 2 : 294. 1806; C.B. Clarke in Fl. Brit. India 6 : 640. 1893. *Scirpus argenteus* Rottb., Progr. 27. 1772.

Stems annual, tufted, trigonous, 10-20 cm high. Stems leafy at base. Leaves usually shorter than stem, narrow, glabrous. Spikelets 4-20 in the head. Spikelets linear-cylindric grey or whitish *ca* 10 x 2.6 mm, densely-flowered; bracts 2-4, much overtopping head; glumes ovate, scarcely acute, silver grey, keel green. Styles 2-fid, small, shorter than nut, nearly glabrous, deciduous with its base. Nuts very small, about 1/3 as long as glume, biconvex, almost margined; outer cells obscure, with transversely wavy lined or obovoid pale smooth.

Fl. & Fr. : Sept.-Oct.

Habitat : near marshy places.

Distribution : Bengal and Central India to Sri Lanka, Mauritius.

Distribution in Uttar Pradesh : Basti (*cf.* Saini, 1990)

Fimbristylis bis-umbellata (Forssk.) Bubani, Dodacanth. : 30. 1850; Koyama in Dassan., Rev. Handb. Fl. Ceylon 5 : 312. 1895. *Scirpus bis-umbellatus* Forssk., Fl. Aegypt.-Arab. 15. 1775. *Fimbristylis dichotoma auct., non* (L.) Vahl (1805); C.B. Clarke in Hook. *f.*, Fl. Brit. India 6 : 635. 1893.

Type : described from Egypt.

Erect, annual caespitose herbs; pubescent or puberulous. Leaves basal, usually shorter than stems, falcate-linear, acute, glabrous or hairy, 1-2 mm broad; sheaths membranous, stramineous or ferruginous; ligule a dense fringe of hairs. Umbels compound or decompound, 5-10 cm across; bracts 2-3, unequal, foliaceous, glabrous or hairy; spikelets many, solitary, oblong or ovoid, angular, acute, 5-8 mm long, elongating after fall of lower glumes; rachilla narrowly winged; glumes spiral, membranous, ovate, acute or mucronate, sharply keeled; margins hyaline, pale brown, 1-1.5 mm long, lowest empty; stamen 1, anthers oblong; ovaries 1-celled; styles flattened, base dilated, ciliate in upper part, stigmas 2. Nuts 5-9-striately ridged on each face, biconvex, broadly obovate, short-stipitate, straw-coloured.

Fl. & Fr. : July-Feb.

Habitat : in moist places, cultivated fields, near streams. Common.

Chrom No. : 2n = 10.

Note : It differs from *Fimbristylis dichotoma* (L.) Vahl, in having more densely tufted, strictly annual habit and slightly smaller spikelets, which are yellow-brownish and dull vs. dark brown, more or less shining spikelets in *Fimbristylis dichotoma*.

Distribution : India, Malaysia, Australia, Mediterranean region, Africa.

Distribution in Uttar Pradesh : Agra, Aligarh, Allahabad, Azamgarh, Bahraich, Banda, Bulandshahar, Fatehpur, Ghazipur, Gonda, Gorakhpur, Jalaon, Jaunpur, Lucknow, Mathura, Meerut, Saharanpur, Sitapur, Sultanpur, Varanasi.

Representative specimens : **Agra** : Poiyaghat, AKS, 98 (RBSCH). **Aligarh** : Ganga's Bank, A.K. Singh, 1303 (MU). **Allahabad** : Hanida, B.K. Mishra, 582 (DUTHIE!); Malaka, B.K. Mishra, 390 (DUTHIE!); Mahuli, G. Panigrahi, 11222 (BSA); Dihaghat, Kaul *et al.*, 47586 (LWG!). **Azamgarh** : Fatehpur, S.N. Srivastava, 14338 (GU); Pawai, Chandra, 5749 (GU). **Bahraich** : United Province, Sri Ram, 46447 (DD!). **Banda** : *s.l.*, B.K. Verma, 5037 (DUTHIE). **Bulandshahar** : Pahasu, L.K. Sharma, 3096 (MU). **Fatehpur** : *s.l.*, S.D. Malviya, 214749 (LWG!); Bhitaura, S.K. Dixit, 1924 (DUTHIE). **Ghazipur** : Bogna Tal, S.D. Singh, 12792 (LWG!). **Gorakhpur** : Along Turra nala, A.K. Srivastava, 7057 (GU). **Jaunpur** : Bank of Sai River, G. Saran *et al.*, 25063 (LWG!); (*cf.* S.K. Singh & Dixit 1969); Kuddupur Sai, J.N. Dwivedi, 102 (TDC!). **Lucknow** : Gomti riverside, J.G. Srivastava, 84960 (LWG!); Kukrail forest, Botanical Club I : 18944 (LWG!); Amethi, G. Saran *et al.*, 24911 (LWG!). **Mathura** : Satoha Tank, Maliya *et al.*, 218361 (LWG!). **Meerut** : Pilana, R.S. Saxena, 1618 (MU). **Saharanpur** : Mohand, A.K. Goel, 15 (MU). **Sitapur** : Ellassia Gaint forest, G. saran *et al.*, 26791 (LWG!); Gauria forest, G. Saran *et al.*, 26797 (LWG!). **Sultanpur** : Kurebhar, Om Prakash, 10172 (GU). **Varanasi** : *s.l.*, G. saran *et al.*, 25493 (LWG!).

Fimbristylis complanata Link, Hort. Bot. Berol. 1 : 292. 1827; Koyama in Dassan., Rev. Handb. Fl. Ceylon 5 : 284. 1985. *Scirpus complanatus* Retz., Obs. Bot. 5. 14 : 1788.

Type : Described from 'India orientalis'.

Perennial rhizomatous herbs, upto 6 cm long, 1-1.25 mm thick, clothed with brown scales and their fibrous remnants; stems tufted, angular below. Leaves basal, shorter or as long as stems, 3-5 mm broad; ligule a dense fringe of short hairs; sheaths compressed, keeled on back, lower one bladeless. Umbels compound/decompound, 6-12 cm across; bracts 2-4, broad, very obtuse, shorter than umbels, foliaceous; spikelets lanceolate to oblong, angled, acute, chestnut brown, 5-8 mm long; glumes spiral, membranous, ovate or oblong-ovate, keel 3-veined, excurrent as a fine point; stamens 3, anthers linear; ovaries 1-celled; styles triquetrous, longer than nuts, with a short conical base; stigmas 3. Nuts obovoid, obtuse, trigonous, faintly striate and tubercled, 2 mm long, white or pale.

Fl. & Fr. : May-Sept.

Habitat : found in moist places, near ponds, margins of rice fields, canals also in and around cultivated fields. Occasionally.

Distribution in Uttar Pradesh : Azamgarh, Bulandshahar.

Representative specimens : **Azamgarh** : Martinganj, Chandra, 5746 (GU). **Bulandshahar** : Jatvi, Anup Shahar, L.K. Sharma, (MU)

Fimbristylis dichotoma (L.) Vahl, Enum Pl. 2 : 287. 1806; Koyama in Dassan., Rev. Handb. Fl. Ceylon 5 : 306-311. 1985. *Scirpus dichotomus* L., Sp. Pl. 50. 1753. *Scirpus diphyllus* Retz., Obs. Bot. 5 : 15. 1788; T. : India orientalis (Tranquebar), Koenig. *Fimbristylis diphylla* (Retz.) Vahl, Enum. Pl. 2 : 289. 1806; C.B. Clarke in Hook. f., Fl. Brit. India 6 : 639. 1893, excl., var. *pluristriata*.

Type : Ceylon : *Herb. Hermann* 2, fol. 63 (BM).

Erect, annual or perennial herbs. Stems tufted, striated, 3-5-angled or compressed. Leaves basal, shorter than or as long as stems, falcate linear, obtuse or acute, glabrous or hairy, 2-3 mm broad; ligule a dense fringe of hairs. Corymbs simple or sub-compound, 5-15 cm across; bracts 4-5, foliaceous, 5-12 cm long; spikelets solitary, brown or chestnut brown, ovoid-oblong or ovoid-lanceolate, terete, acute, 5-10 mm long; rachilla narrowly winged; glumes spiral, chartaceous, ovate-rounded, obtuse, mucronulate, keel green, margin chestnut brown, closely imbricate, 2.5-3 mm long, lowest 1-3 empty; stamens 1-3, anthers oblong-linear; ovaries 1-celled, styles flattened, slightly dilated at base; stigmas 2. Nuts short-stipitate, 5-8 striate on each face with transversely oblong cells, biconvex, obovate, straw-coloured or whitish.

Fl. & Fr. : July-Feb.

Habitat : in waste places, forest clearings, along forest roads, on the bank of ponds, cultivated fields. Common.

Distribution : Tropics and subtropics.

Distribution in Uttar Pradesh : Agra, Aligarh, Allahabad, Azamgarh, Bahraich, Banda, Bijnor, Bulandshahar, Etawa, Fatehpur, Ghazipur, Gaziabad, Gonda, Gorakhpur, Jalaun, Kheri, Lucknow, Mainpuri, Meerut, Mirzapur, Moradabad, Muzaffarnagar, Pilibhit, Saharanpur, Sultanpur, Varanasi.

Representative Specimens : **Agra** : Agra College Campus, Sinha, 125710 (DD!). **Aligarh** : Rajghat road, Maliya, S.D., 218385 (LWG!); Jamuna bank, A.K. Singh, 4071 (MU). **Allahabad** : Hanumanganj, B.K. Mishra, 663 (DUTHIE!); Meja, B.K. Mishra, 670; Garwa, B.K. Mishra, 74, 419 (DUTHIE); B.K. Verma & R.P. Dube, 548 (DUTHIE). **Azamgarh** : Mirzapur, V. Chandra, 4697 (GU). **Bahraich** : Bayagpur, Chandra et al., 11840 (LWG!); Abdullaganj, O.P. Mishra, 6379 (BSA). **Banda** : s.l., B.K. Verma, 5134 (DUTHIE). **Bijnor** : Phanton, Chandra et al., 44163 (LWG!). **Bulandshahar** : Canalside, Delhi road, L.K. Sharma, 888 (MU). **Etawah** : s.l., Duthie, 6508 (DD!). **Fatehpur** : Lalauli, S.K. Dixit, 1961 (DUTHIE). **Gaziabad** : Hindan River, S.D. Maliya, 218319 (LWG!). **Ghazipur** : Renda Tal, S.D. Singh, 12179 (GU). **Gonda** : s.l., K.K. Khanna, 37243 (CAL!). **Gorakhpur** : s.l., Harsukh, 22873(a) (DD!); Along Jalwania Tal, A.K. Srivastava, 6896 (GU). **Jalaun** : Bohadpura, G. Shukla, 7112 (DUTHIE). **Kheri** : s.l., Inayat, 22873 (DD!). **Lucknow** : Nisatganj, Ravi Ahuja, 1381 (LWG!); Kukrail, S.L. Kapoor, 46956 (LWG!). **Mainpuri** : Tisauli, S.D. Maliya, 215432 (LWG!). **Meerut** : Parikshigarh, R.S. Saxena, 984 (MU). **Mirzapur** : Tanda, U.C. Bhatt., 13228 (BSD). **Moradabad** : s.l., Paliwal & Singh, 386 (Hindu College, Herb.). **Muzaffarnagar** : s.l., Tayal & Lalita, 269 (DAV College). **Pilibhit** : Mainakot, Inayat, 22877 (DD!). **Saharanpur** : Mohand, A.K. Goel, 791 (MU). **Sultanpur** : Lumbhua, Om Prakash, 10161 (GU). **Varanasi** : BHU, R. Mishra (LWG-1653).



Fimbristylis dispsacea (Rottb.) C.B. Clarke in Hook. f., Fl. Brit. India 6: 635. 1893; Koyama in Dassan., Rev. Handb. Fl. Ceylon 5 : 321. 1985. *Scirpus dipsaceus* Rottb., Descr. et. Icon. Pl. : 56. t. 12. f. 1. 1773.

Type : From 'India orientals', *Koenig*.

Small, erect, annual herbs. Stems caespitose, filiform. Leaves capillary, often as long as stems; sheaths obliquely truncate, brownish; ligule absent. Umbels simple or compound, 2-4 cm across; bracts 2-3, filiform, often overtopping umbels, 2.5 cm long; spikelets 1-many, subglobose or oblong terete, obtuse, squarrose, pale green, 3-5 mm long; glumes spiral, membranous, squarrose, narrowly elliptic, pale, hyaline, 1-2 mm long, with green keel excurrent into an awn as long as blade; stamen 1 or 2, anther oblong; ovaries 1-celled; styles glabrous, slender, stigmas 2. Nuts glabrous, smooth, pale brown, subterete, oblong-linear, cylindrical.

Fl. & Fr. : May-July.

Habitat : in moist sandy bed of streams, cultivated fields, bank of ponds. Occasionally.

Chrom. No. : 2n = 10.

Distribution : Paleotropics.

Distribution in Uttar pradesh : Banda.

Representative specimens : **Banda** : Manikpur, *B.K. Sinha*, 5622 (DUTHIE).

Fimbristylis falcata : (Vahl.) Kunth, Enum. 2 : 239. 1837; Koyama in Dassan., Rev. Handb. Fl. Ceylon 5 : 289. 1985. *Scirpus falcatus* Vahl, Enum. Pl. 2 : 275. 1806. *Trichelostylis junciformis* Nees in Wt., Contr. Bot. Ind. : 106. 1834. *Fimbristylis junciformis* (Nees) Kunth, Enum. Pl. 2 : 239. 1837; C.B. Clarke in Hook. f., Fl. Brit. India 6 : 647. 1893.

Type : Nepal ad ripus Irawaddi, *Wallich* 3520 except P(K).

Type : 'India orientals', *Koenig*.

var. **falcata**

Erect, perennial herbs. Rhizomes woody, short-creeping, covered with brown leaf-sheaths. Stems rigid, angular, sulcate. Leaves basal, shorter than stems, 1.5-3 mm broad, obtuse, hispidulous; ligule absent; sheaths ferruginous. Umbels compound or decompound, 2.5-7 cm across, each umbel with 15-25 clusters of spikelets; branches 2-4, shorter than rays, foliaceous; spikelets 2-5 in a cluster, brown or chestnut, ovoid-oblong, 3-6 mm long; rachilla broadly winged; glumes spiral, ovate, acute, with 3-veined keel, margins scarious, 2-3 mm long; stamens 3, anthers linear, bristly at top; ovaries 1-celled; styles triquetrous, longer than nuts, base pyramidal, style with style-base deciduous; stigmas 3, about as long as style. Nuts trigonous, obovoid, smooth or verrucose, pale straw-coloured, about 0.5 mm long.

Fl. & Fr. : May-Sept.

Habitat : in waste places, along forest-roads, forest clearing in grassy places. Common.

Chrom. No. : 2n = 44; 22 (*Fimbristylis junciformis* Kunth).

Distribution : Nepal, India, Sri Lanka, Malaysia.

Distribution in Uttar Pradesh : Agra, Allahabad, Bahraich, Banda, Bulandshahar, Fatehpur, Ghazipur, Gonda, Gorakhpur, Jalaun, Kheri, Lucknow, Mirzapur, Saharanpur, Sultanpur.

Representative specimens : **Agra** : Shahjahan, AKS, 754 (RBSCH). **Allahabad** : Hanida, *B.K. Mishra*, 579 (DUTHIE!); Ramnathpur, *B.K. Mishra*, 604 (DUTHIE!); Garwa, *B.K. Verma & R.P. Dube*, 530 (DUTHIE); Chaitham Lines, *R.P. Dube*, 502 (DUTHIE). **Bahraich** : Shoelwa, *Chandra et al.*, 12373 (LWG!); *s.l.*, *Harsukh*, 22876 (DD). **Banda** : Manikpur, *B.K. Sinha*, 6222 (DUTHIE). **Bulandshahar** : Dankaur, *L.K. Sharma*, 1555 (MU). **Fatehpur** : Naubasta, *S.K. Dixit*, 2284 (DUTHIE). **Ghazipur** : Renda Tal, *S.D. Singh*, 12185 (GU). **Gonda** : Koilabasa, *Chandra et al.*, (LWG-17950); *s.l.*, *K.K. Khanna*, 37283 (CAL!); Gurhni forest, *Sri Ram*, 46450 (DD). **Gorakhpur** : Tilkonia forest, *A.K. Srivastava*, 6966 (GU). **Jalaun** : Bohadpur, *G. Shukla*, 7132 (DUTHIE). **Jaunpur** : (cf. *S.K. Singh & Dixit*, 1969). **Lucknow** : Kurail forest, *Uma Shankar* (LWG-16647). **Moradabad** : *s.l.*, *Paliwal & Singh*, 513 (Hindu College Herb.). **Saharanpur** : Badshahibag, *A.K. Goel*, 228 (MU). **Sultanpur** : Kadu Nala forest, *Om Prakash*, 10919 (GU).

Uses : Roots are given in dysentery.



Fimbristylis ferruginea (L.) Vahl, Enum. Pl. 2 : 291. 1806; C.B. Clarke in Hook. *f.*, Fl. Brit. India 6 : 638. 1893; Srivastava, Flora Gorakhpurensis : 345. 1976.

Stems 20-70 cm high, tufted, base slightly thickened, often clothed by shining hard rusty scales. Leaves short, sometimes absent, glabrous or hairy, 10-15 cm long, very narrow. Umbel simple or compound contracted, usually of 5-10 spikelets, sometimes with 20 spikelets, rarely with 1-3 spikelets; bracts shorter than umbel, often very short. Spikelets 10.4 mm. Stamens 3 or 2, filamentous ligulate; anthers not crested. Styles 2-fid, longer than nut, flattened, villous below bifurcation. Glumes obtuse scarcely mucronate, brown, tip incurved, keel green. Nuts as long as 1/3-1/2 glume, shortly stalked, outermost cells small, in numerous longitudinal series, obovoid smooth pale finally-brownish.

Fl. & Fr. : June-Oct.

Habitat : along the bank of the canals, ponds along other moist places.

Distribution : All warmer regions, throughout India, abundant near the sea.

Distribution in Uttar Pradesh : Agra, Aligarh, Allahabad, Banda, Bulandshahar, Gorakhpur, Jalaun, Pilibhit, Saharanpur, Sultanpur.

Representative specimens : **Agra** : Kitham, AKS, 247 (RBSCH). **Aligarh** : Kishanpur-yamuna bank, A.K. Singh, 4185 (MU). **Allahabad** : Garwa, B.K. Verma & R.P. Dube, 399, 583 (DUTHIE!). **Banda** : s.l., B.K. Verma, 5177 (DUTHIE). **Bulandshahar** : Narora, L.K. Sharma, 884 (MU). **Gorakhpur** : Along Turra Nala, A.K. Srivastava, 6900 (GU); Domingarh, T.N. Srivastava, 1087 (GU). **Jalaun** : Bohadpur, G. Shukla, 7113 (DUTHIE). **Jaunpur** : (cf. S.K. Singh & Dixit 1969). **Pilibhit** : s.l., C.L. Malhotra, 50504 (CAL!). **Shahjahanpur** : Shakumbhari, A.K. Goel; 44 (MU). **Sultanpur** : Belhari, Om Prakash, 101616.

Fimbristylis hookeriana Boeck. in Linnaea 37 : 22. 1871; C.B. Clarke in Hook. *f.*, Fl. Brit. India 6 : 641. 1893.

Annuals, 5-45 cm high. Stems trigonous, 1-2 mm thick, slenderly ribbed. Leaves several, rather slightly exceeding the stem, 1.5-2.5 mm broad; ligule membranaceous. Anthela compound or decomposed, rarely simple in depauperated plants, 2-18 cm across, bearing 4-27 spikelets; rays 3-9, rigid, subcompressed, longest 2.5-17 cm long; bracts foliaceous, lowest 3-35 cm long; spikelets usually in clusters of 2-6 with a few solitary ones, sometimes all solitary on up to 10 cm long pedicels, linear-lanceolate, 5-12 x 1.5-2 mm, acute; glumes oblong, keeled 3.5-5 mm long, mucronate, rusty-green. Stamens 2; anthers ca 0.7 mm long, crest ovate; styles 2.7-3.3 mm long fimbriate throughout; stigmas 2, ca 0.8 mm long. Nuts shortly stipitate, obovoid, lenticular, 1.1-1.3 x 0.8-1 mm, yellowish brown, tubercled on shoulders, slenderly longitudinally ribbed due to arrangements of surface cells in 12-15 vertical rows.

Fl. & Fr. : Aug.-Sept.

Habitat : in dry to moist places among boulders; it is one of the pioneer species on sandstones.

Distribution in Uttar Pradesh : Basti. (cf. Saini 1990)

Fimbristylis littoralis Gaudich, in Frey. Voy. Bot. 413. 1826; Kern in Steenis, Fl. Males, ser. I. 7 : 551. 1974. *Fimbristylis miliacea* Vahl, Enum. Pl. 2 : 287. 1806, *excl. basion.*; Clarke in Hook. *f.*, Fl. Brit. India 6 : 644. 1893.

Annuals or perennials 10-45(-90) cm high. Rhizomes, if present, short, woody. Stems 4-5-angled, 1-1.7 mm thick. Leaves several, equitant, usually more or less distichous, laterally flattened, as long as the stem, 1-3 mm broad, frequently yellowish green, finely several striate but lacking a midrib; outer margin thin, inner thick, grooved; upper two cauline leaves reduced to bladeless sheaths. Anthela lax or rather dense, usually decomposed, rarely compound or supradecomposed, bearing (12-) 30-80 spikelets; bracts spreading, lowest 0.5-3 cm long; rays 7-15, longest (1-)4-5 cm long; spikelets solitary, terete, subglobose, 2-5 x 1.5-2.5 mm, obtuse, 8-21-flowered; glumes spiral, ovate-oblong, 1-1.5 mm long, mucous, 3-nerved. Stamens 1-2; anthers 0.3-0.5 mm long; style 0.6-0.8 mm long, sparsely fimbriate at tip; stigmas 3, ca 0.3 mm long. nuts shortly stipitate, narrowly obovoid, trigonous, 0.6-0.7 x 0.3-0.4 mm, stramineous, verruculose, transversely lineolate.

Notes : Easily distinguished by the equitant laterally flattened leaves and small **globose** spikelets.

Fl. & Fr. : June-Sept.

Habitat : in open, moist to swampy places, along roadside ditches, drains and streams; a common weed of paddy-fields. Common.

Distribution in Uttar Pradesh : Allahabad, Azamgarh, Bahraich, Banda, Barabanki, Bijnor, Fatehpur, Gorakhpur, Hardoi, Jalaun, Jaunpur (cf. Singh & Dixit, 1969), Lucknow, mainpuri, Mirzapur, Moradabad, Pilibhit, Saharanpur, Sultanpur.

Representative specimens : **Allahabad** : Hanumanganj, B.K. Mishra, 628 (DUTHIE!); Garwa, B.K. Mishra, 83 (DUTHIE); B.K. Verma & R.P. Dube, 441 (DUTHIE!); Soraon, Srivastava & Singh, s.n. (BSA). **Azamgarh** : Fatehpur, S.N. Srivastava, 13396 (GU); Pawai, Chandra, 4676 (GU). **Bahraich** : s.l., Hiralal, 16530 (LWG!). **Banda** : Manikpur, B.K. Sinha, 6034 (DUTHIE). **Barabanki** : s.l., Deo & Mishra, 7244 (LWG!). **Bijnor** : Badhapur forest, Chandra et al., 43985 (LWG!). **Fatehpur** : Naubasta, S.K. Dixit, 2285 (DUTHIE). **Gorakhpur** : Lucchipur, A.K. Srivastava, 7095 (GU); Ambazar, T.N. Srivastava, 482 (GU). **Hardoi** : Haridaspur, T. Hussain & B. Dutt, 21290 (LWG!). **Jalaun** : Orai, G. Shukla, 7561 (DUTHIE). **Jaunpur** : Goojartal, J.N. Dwivedi, 761 (T.D.C.); Ramdayalganj, J.N. Dwivedi, 217 (TDC!). **Lucknow** : Malihabad, U.S. Mishra, 4695 (LWG!); Kakrail forest, Umashankar, 13957 (LWG!); Gomti side, J.G. Srivastava, 56165 (LWG!). **Mainpuri** : s.l., Maliya Lal, 215597 (LWG!). **Mirzapur** : s.l., J.G. Srivastava (LWG-21597). **Moradabad** : s.l., T. Thomson, 281 (DD!). **Pilibhit** : United Province, Sri Ram, 46447 (DD!). **Saharanpur** : Ramnagar, Chandra et al., 42766 (LWG!). **Sultanpur** : Akhand Nagar, Om Prakash, 10674 (GU).

Fimbristylis miliacea (L.) Vahl, Enum. Pl. 2 : 287. 1806; Kern in Steenis, Fl. Males. ser. 1.7 : 552. 1974. *Scirpus miliaceus* L. Syst. Veg. ed. 10. 868. 1759. *S. quinquangularis* Vahl, l.c. 279. 1837; Clarke in Hook. f., Fl. Brit. India 6 : 644. 1893.

Annuals or Perennials, 20-90 cm high, with many flowering shoots and a few sterile leafy shoots. Rhizomes short, woody. Flowering stems leafless or with a solitary basal leaf, acutely 5-angled, 1.5-2.5 mm thick, deeply grooved. Leaves of sterile shoots several, 2-3 mm broad, margins cartilaginous; sheaths of the flowering stems inflated, with a short acute tip. Anthela lax, decompound or superadecompound, rarely compound, 2-9 cm broad, usually bearing about 100-300, sometimes only 10-15 spikelets; bracts usually short, setaceous, sometimes longer, foliaceous, lowest 2-5 cm long; rays few to many, longest 2-10 cm; spikelets all or nearly all solitary, ovoid or ovoid-oblong, subterete or angular, 2-5 x 1.2-2 mm, acutish, 6-16 flowered; rhachilla winged; glumes spiral, ovate, 1-2; anthers 0.4-0.8 mm long. Nuts shortly stipitate, obovoid or suborbicular, trigonous, 0.4-0.8 x 0.3-0.5 mm, densely verruculose, stramineous to pale brown, faintly transversely lineolate with the surface cells being transversely linear in 4-6 vertical rows on each face.

Fl. & Fr. : July.-Dec.

Habitat : in moist cultivated fields, ditches, muddy bank of ponds. Common.

Chrom. No. : 2n = 10.

Distribution : Pantropical.

Distribution in Uttar Pradesh : Agra, Aligarh, Allahabad, Azamgarh, Bahraich, Banda, Bijnor, Bulandshahar, Deoria, Faizabad, Fatehpur, Ghazipur, Gorakhpur, Jalaun, Kanpur, Lucknow, Meerut, Mirzapur, Muzaffarnagar, Saharanpur, Sultanpur.

Representative specimens : **Agra** : Ketham, Kaul et al., 24771 (LWG!); Salempur, AKS, 477 (RBSCH). **Aligarh** : Gonda Iglas, A.K. Singh, 3009 (MU); Etah road, A.K. Singh, 5154 (MU). **Allahabad** : Hanumanganj, B.K. Mishra, 627 (DUTHIE!); Garwa, B.K. Mishra, 79 (DUTHIE!); B.K. Verma & R.P. Dube, 510 (DUTHIE); Daraganj, T. Rajgopal, 6128 (BSA); Soraon, Srivastava & Singh, s.n. (BSA); University Campus, B.K. Verma, 36 (DUTHIE). **Azamgarh** : Amla, S.N. Srivastava, 14637; Phoolpur, Chandra, 5596 (GU). **Bagpat** : s.l., R.S. Saxena, 1033 (MU). **Banda** : s.l., B.K. Verma, 5143 (DUTHIE). **Bahraich** : Nishangarh, O.P. Mishra, 6598 (BSA). **Bijnor** : Phanton, Chandra et al., 44162 (LWG!). **Bulandshahar** : Agriculture College, L.K. Sharma, 581 (MU); Agriculture College, L.K. Sharma, 822 (MU). **Fatehpur** : Kishanpur, S.K. Dixit, 2366 (DUTHIE). **Ghazipur** : Jangipur, S.D. Singh, 12485 (GU). **Gorakhpur** : Mirzapur, T.N. Srivastava, 586 (GU). **Jalaun** : Bahadurpur, G. Shukla, 7133 (DUTHIE). **Jaunpur** : (cf. S.K. & Dixit, 1969). **Kanpur** : s.l., Shyamcharan Verma, 69 (LWG!). **Lucknow** : Aurawan, Ravi Ahuja, 1147 (LWG!); Amlibadhanvan, Chunnoo, 3524 (LWG!); NBG, Shyam L. Kapoor, 24090



(LWG!). **Mirzapur** : Yisuhi, *P.L. Chaturvedi* (LWG-48213); Mirzapur city, *U.G. Bhatt*, 17516 (BSD). **Moradabad** : *s.l., R.C. Bhardwaj* (LWG-12618). **Muzaffernagar** : Sukh Tal, *R.C. Bhardwaj* (LWG-8445). **Saharanpur** : Manglore, *A.K. Goel*, 1866 (MU); Ramnagar, *Chandra et al.*, 42760 (LWG!); *s.l., Duthie*, 5009 (DD!); Pathri, *A.K. Goel*, 399 (MU). **Sultanpur** : Kadu Nala, *Om Prakash*, 10684 (GU).

Uses : used for making mats.

Notes : Linn. Herb. No. 71.40 labelled “*miliaceus*” in Linnaeus’s own hand, is indeed *Fimbristylis quinquangularis* Kunth. Therefore, the maintain the current usage, Kern (1954) selected the other syntype 71.41 as the lectotype and he is supported by Koyama (1985).

Fimbristylis ovata (N. Burm.) Kern in Blumea 15 : 126. 196. 1967; Koyama in Dassan., Rev. Handb. Fl. Ceylon 5 : 273. 1985. *Carex ovata* N. Burm., Fl. Ind. : 194. 1768. *Cyperus monostachyos* L., Mant. Pl. 2 : 180. 1771. *Type* : Ind. or., *Fimbristylis nonostachyos* (L.) Hassk., Pl. Jav. Rar. : 61. 1848 (‘*monostachya*’); Haines, Botany 3 : 961.

Type : Described from Java.

Erect perennial herbs. Rhizomes short. Stems caespitose, slender, angular striate, somewhat thickened at base. Leaves basal, filiform, half as long as stems; ligule absent. Spikelets solitary, terminal, rarely 2-or 3, ovate or ovate-lanceolate, compressed, acute, shining stramineous or yellowish, 8-15 mm long; rachilla broadly winged; bracts 2-3, glumaceous; lower glumes distichous, sub-coriaceous, broadly ovate, acute, back rounded, 3-vained, keel green, sides yellow or straw-coloured, middle 5-6 male, upper tabescent; all 4-5 mm long; stamens 2-3, anthers linear; ovaries 1-celled; styles triquetrous, style-base pyramidal, style with style-base deciduous; stigmas 3, much shorter than style. Nuts obovoid or globose, obtusely trigonous, base attenuate, minutely verrucose, straw-coloured, 2-3 mm long.

Fl. & Fr. : July-Sept.

Habitat : moist places, cultivated fields, along canals, and on moist grass patches. Common.

Chrom. No. : 2n = 10, 20.

Distribution : Pantropical.

Distribution in Uttar Pradesh : Agra, Allahabad, Azamgarh, Bahraich, Banda, Bulandshahar, Farukhabad, Ghazipur, Gonda, Gorakhpur, Jalaun, Jaunpur, Kanpur, Kheri, Lucknow, Meerut, Saharanpur, Sultanpur.

Representative specimens : **Agra** : Shahjahan garden, AKS, 744 (RBSCH), **Allahabad** : Handia, *B.K. Mishra*, 576 (DUTHIE); Ramnathpur, 600 (DUTHIE); Garwa, *B.K. Mishra*, 728 (DUTHIE!); Mau Aima, *B.K. Verma & R.P. Dube*, 337 (DUTHIE). **Azamgarh** : Dubari, *S.N. Srivastava*, 14332 (GU); Sidhari, *Chandra*, 4699 (GU). **Bahraich** : Kakarderi, *Chandra et al.*, 12141 (LWG!); Neshangara, *Sri Ram*, 46449 (DD!); Nishangarha, *O.P. Mishra*, 6440 (BSA). **Banda** : *s.l., B.K. Verma*, 5105 (DUTHIE). **Bulandshahar** : Khurja, *L.K. Sharma*, 588 (MU). **Farukhabad** : Mahmoodpur Sindauda, *Ram Dayal*, 874 (DD!). **Ghazipur** : Birano, *S.D. Singh*, 12397 (GU). **Gonda** : *s.l., K.K. Khanna*, 37236 (CAL!). **Gorakhpur** : Near Chilwalake, *A.K. Srivastava*, 6895 (GU); Tilkonia forest, *T.N. Srivastava*, 244 (GU). **Jalaun** : Bohadpura, *G. Shukla*, 7457 (DUTHIE). **Jaunpur** : Goojar Tal, *J.N. Dwivedi*, 760 (TDC!). **Kanpur** : Agriculture University, *Janki Prasad*, 2713 (LWG!). **Lucknow** : Kursi road, Gago forest, *Chunnoo*, 3540 (LWG!). **Meerut** : Machhra, *R.S. Saxena*, 1167 (MU). **Saharanpur** : Roorkee road, *A.K. Goel*, 611 (MU). **Sultanpur** : Belahari, *Om Prakash*, 10186 (GU).

Fimbristylis polytrichoides (Retz.) R. Br., Prodr. 226. 1810; C.B. Clarke in Hook. f., Fl. Brit. India 6 : 632. 1893. *Scirpus polytrichoides* Retz., Obs. Bot. 4 : 11. 1786.

Plants slender, glabrous. Stems upto 20 cm high. Leaves about half as long as stem; sheaths glabrous or obscurely puberulous, 1(2-3) ellipsoid-oblong obtuse. Spikelets ca 8.6 x 3.2 mm. Glumes many ovate, obtuse, densely imbricate on all sides, fuscous brown; 2-3 lowest empty, often like the others, but lowest sometimes 2.5 cm, as though a continuous of stem. Stamens 3-1. Styles 2-fid, rather shorter than nut, glabrous, base little diated. Nuts as long as ½ glume, obovoid, biconvex; outer most cells in about 30 rows on each face, ultimately marcescent scarious, smooth brown-black often slightly white-scaly on shoulders.

Fl. & Fr. : Aug.-Oct.

Habitat : in wetlands.

Distribution : Tropics of Old World. From Bengal to Sri Lanka and Malacca.

Distribution in Uttar Pradesh : Basti. (cf. Saini 1990)

Fimbristylis rigidula Nees in Wt. in Contr. Bot. Ind. 99. 1834.

Perennials, 10-55 cm high. Rhizomes short, creeping. Stems closely uniseriate, 1-1.5 mm thick, swollen at the base. Leaves one-third to two-third as long as the stem, 1.5-2.5 mm broad, glabrous or pubescent. Anthela simple or compound, lax, 2-13 cm across, bearing 5-20 spikelets; bracts short, lowest scarcely 1-2 cm long; rays 5-9, longest 1.5-5 cm long; spikelets all solitary or a few in pairs, ovoid-ellipsoid, terete, 5-12 x 3-5 mm, obtuse; glumes spiral, ovate-oblong, 3.5-4 mm long, acute, chestnut, 3-nerved. Stamens 3; anthers 1.3 mm long; style 2-3 mm long, fimbriate; stigmas 2, 1.7 mm long. Nuts stipitate, obovoid, lenticular, 1.3-1.5 x 1.2 mm, stramineous faintly trabeculate with surface cells arranged in 20-30 vertical rows on each face.

Fl. & Fr. : June-Aug.

Habitat : in marshy lands.

Distribution in Uttar Pradesh : Bijnor, Kheri.

Representative specimens : **Bijnor** : Nagina, Chandra et al., 2356 (LWG!). **Kheri** : Kishanpur, Inayat, 22880 (DD!).

Fimbristylis schoenoides (Retz.) Vahl, Enum. Pl. 2 : 286. 1806; Koyama in Dassan., Rev. Handb. Fl. Ceylon. 5 : 315. 1985; *Scirpus schoenoides* Retz., Obs. Bot. 5 : 14. 1788.

Type : 'India orientalis', Koenig.

Erect, annual or perennial herbs. Stems slender, caespitose, compressed, sulcate, striate, often thickened below. Leaves basal, linear, filiform, shorter or as long as stems; lower sheaths stramineous or ferruginous; ligule a dense fringe of hairs. Inflorescence consisting of a single, terminal spikelet or 1-2 lateral, peduncled spikelets; spikelets globose-ovoid, terete, pale or brown, dense flowered, 5-10 mm long, supported at base sometimes by 1 or 2 rigid, glumaceous bracts; rachilla narrowly winged; glumes spiral, subchartaceous, appressed, ovate-rounded, obtuse or sub-orbicular concave, scarcely keeled, short-mucronate, many-striate, 3.5 mm long; stamens 2-3, anthers oblong-linear; ovaries 1-celled; styles flattened, dilated at base, ciliate in upper half; stigmas 2, shorter than styles. Nuts obovoid, short-stipitate, smooth, pale straw or whitish-coloured.

Fl. & Fr. : July-Oct.

Habitat : in muddy near stamens, on the margins of rice-fields.

Chrom No. : $2n = 10$.

Distribution : Nepal, India, Thailand to Vietnam, Malaysia, N. Australia.

Distribution in Uttar Pradesh : Agra, Aligarh, Allahabad, Azamgarh, Banda, Bulandshahar, Chitrakoot, Deoria, Fatehpur, Ghazipur, Gorakhpur, Jalaun, Lucknow, Mahrajganj, Mainpuri, Mirzapur, Pilibhit, Saharanpur, Sultanpur.

Representative specimens : **Agra** : Tantpur, AKS, 907 (RBSCH). **Aligarh** : Nanau, A.K. Singh, 5241 (MU). **Allahabad** : Meja, B.K. Mishra, 666 (DUTHIE!); Garwa, B.K. Mishra, 71, 722 (DUTHIE!); Garwa, R.P. Pandey, 4056 (DUTHIE). **Azamgarh** : Bankat, S.N. Srivastava, 14642 (GU); Bada Pul, Chandra, 4727 (GU). **Banda** : s.l., B.K. Verma, 5175 (DUTHIE). **Bulandshahar** : Civil Line, L.K. Sharma, 808 (MU). **Chitrakoot** : s.l., Kaul et al., 42503 (LWG!). **Deoria** : Siswa Bazar, A.K. Singh et al., 63695 (LWG!). **Fatehpur** : Dhata, S.K. Dixit, 2324 (DUTHIE). **Ghazipur** : Garagaon Tal, S.D. Singh, 12484 (GU). **Gorakhpur** : Madhulia forest, A.K. Srivastava, 7230 (GU); Domingarh, T.N. Srivastava, 1047 (GU). **Jalaun** : Bohadpura, G. Shukla, 7458 (DUTHIE). **Lucknow** : NBG, J.G. Srivastava, 17362 (LWG!); Banthra, Chandra (LWG-42959). **Mainpuri** : Jain Inter College, S.D. Maliya, 2719 (LWG!). **Mirzapur** : s.l., J.G. Srivastava, 21594 (LWG!); Tanda, U.C. Bhatt, 17647 (BSD). **Pilibhit** : s.l., C.L. Malhotra, 42503 (CAL!); United Provinces, Sri Ram, 46448 (DD!). **Saharanpur** : s.l., R.N. Parker, 44862 (DD!); Balawali, A.K. Goel, 947 (MU). **Sultanpur** : s.l., Maliya et al., 214816 (LWG!); Karahawa Tal, Om Prakash, 10690 (GU).



Fimbristylis cymosa R.Br., Prodr. 228. 1810. Fl. Agra Dt. 28: 2. 1995. Sharma & Dhakre. *Fimbristylis spathacea*, Rottb. Nov. Pl. Sp. 24. 1821.

Stems 10-40 cm, tufted, rigid. Leaves as long as 1/3 stem (often much shorter), narrow, glabrous, margins incurved. Umbel compound with solitary spikelets often contracted sometimes subcapitate, 5 cm in diameter in well developed examples, usually somewhat dense with solitary but closely approximated spikelets; in less developed examples the spikelets are nearly or quite clustered, sometimes virtually in a single head; bracts short, broad. Spikelets 4.3-6.5 x 2.6 mm, cylindrical or ellipsoid, upto 60 in an umbel. Style 2-fid. Glumes ovate, obtuse often notched. Concave, incurved, margins scarious. Stamens usually 2. Style somewhat shorter than nut, often glabrous. Nut as long as 2/5 glume, biconvex, shortly stalked, obovoid smooth or somewhat tubercled dusky.

Fl. & Fr. : Aug.-Oct.

Habitat : at river bank.

Distribution : Warm regions. From Sind and Orissa (India), to Sri Lanka and Singapore.

Distribution in Uttar Pradesh : Aligarh.

Representative specimens : **Aligarh** : Sankra, A.K. Singh, 1264 (MU).

Fimbristylis squarrosa Vahl, Enum. Pl. 2 : 289. 1806. *Fimbristylis aestivalis* var. *aestivalis* var. *squarrosa* Koyama in Jour. Fac. Sci. Univ. Tokyo Ill. 8 : 116. 1962.

Annuals, 5-10(-33) cm high. Stems trigonous, 0.3-0.5 mm thick. Leaves shorter than to equalling the stem, 0.5-1 mm broad, acute, glabrous or hairy; sheaths usually white ciliate, sometimes glabrous. Anthela compound, rather dense, 2-6 cm across, bearing 11-19 (-53) spikelets; bracts 3-4 foliaceous, subequalling the anthela; rays 7-11, slender, spreading, longest 15-35 mm long; spikelets solitary, linear-oblong, polygonal, squarrose, 3-7 (-13) x 2 mm; rhachilla narrowly winged; glumes spiral, ovate-oblong, keeled, aristate, 2-2.5 mm long including *ca* 1 mm long arista, pale brown, lower sometimes hairy, 3-nerved. Stamen 1; anthers 0.3-0.5 mm long, apiculate; style 1-1.2 mm long with long white pendent hairs from the base covering the upper half of the nut; stigmas 2, *ca* 0.2 mm long. nuts shortly stipitate, obovoid, biconvex, 0.6-0.8 x 0.5 mm, stimineous, smooth.

Fl. & Fr. : May-June.

Habitat : In open marshy places, near streams and ditches.

Distribution in Uttar Pradesh : Allahabad, Banda, Sultanpur.

Representative specimens : **Allahabad** : Garwa, B.K. Mishra, 1192 (DUTHIE!). **Banda** : Manikpur, B.K. Sinha, 6022 (DUTHIE). **Sultanpur** : Akelawa, Om Prakash, 10&19 (GU).

Fimbristylis tenera Roem. & Schult., Mant. Syst. 2 : 57. 1824; Fl. Brit. india 6 : 642. 1893. Duthie, Fl. Upper Gangetic Plains. 3 : 355. 1929.

var. **tenera**

Tufted, annual herbs. Stems 15-30 cm tall. Leaves half as long as the stem. Spikelets ovoid-subcylindrical. Glumes broadly ovate, acuminate, with an auricle on either side, somewhat boat-shaped, mucronate, with a prominent keel, scarious-margined. nut obovoid, dirty white, minutely verrucose.

Fl. & Fr. : July-Nov.

Habitat : in wet places.

Distribution in Uttar Pradesh : Mahrajganj, Ghazipur, Saharanpur.

Representative specimens : **Ghazipur** : Bogana Tal, S.D. Singh, 12397 (GU). **Mahrajganj** : Madhulia forest, A.K. Srivastava, 7058 (GU). **Saharanpur** : Hardwar road, A.K. Goel, 783 (MU).

Fimbristylis tenera Schult. (Steud.) Clarke in Hook. f. Fl. Brit. India 6 : 642. 1893. *Fimbristylis oxylepis* Steud., Syn. Cyper. 110. 1855. *Fimbristylis tenera* var. *verrucaenum* Clarke ex Haines, Bot Bihar & Orissa 1924 (repr. ed. 3 : 961. 1961).

var. **oxylepis**

Annual, tufted herbs, 15-30 cm high. Stems slender, 4-5 angled. Leaves *ca* half as long as the stem, flat, narrow. Anthela subcompound, bearing 7-9 spikelets; bracts setaceous, up to 2.5 cm long; spikelets solitary, linear-lanceolate, 3-6 mm long, pale brown; glumes ovate, *ca* 1.3 mm long, mucronate,



glabrous, 3-nerved. Style long, glabrous, base pyramidal; stigmas 3. Nuts obovoid, trigonous, yellowish brown, varrucose.

Fl. & Fr. : July-Oct.

Habitat : along canal, ponds and sandy fields. Common.

Distribution in Uttar Pradesh : Aligarh, Allahabad, Azamgarh, Banda, Bulandshahar, Gorakhpur, Meerut, Pilibhit, Sultanpur.

Representative specimens : **Aligarh** : Sathini road, A.K. Singh, 3074 (MU). **Allahabad** : Handia, B.K. Mishra, 581 (DUTHIE!); Garwa, B.K. Verma & R.P. Dube, 591 (DUTHIE!). **Azamgarh** : Bankat, S.N. Srivastava, 14355 (GU). **Banda** : s.l., B.K. Verma, 5004 (DUTHIE). **Bulandshahar** : Khurja Road, L.K. Sharma, 815 (MU). **Gorakhpur** : Bohadpura, G. Shukla, 7215 (DUTHIE). **Meerut** : Rajpura, R.S. Saxena, 1524 (MU). **Pilibhit** : s.l. C.L. Malhotra, 50875 (CAL!). **Sultanpur** : Kadu Nala forest, Om Prakash, 10722 (GU).

Fimbristylis tenuicula Boeck. in Linnaea, 38. 385.

Stems 10-20 cm, bristle like, sheath hairy, Spikelet 8.5 x 2.6 mm, Cylindric-lanceolate. Glumes suberect, ovate obtuse minutely mucronate, dirty straw colour, keel green, lowest like the other or if bracteiform shorter than spikelet. Stamens 1-2. Style 2-fid, below bifurcation glabrous or sparsely hairy. Nut less obtuse, outermost cells larger, in about 15 longitudinal rows on each face of nut. Nut smooth brown obscurely white scaly on shoulders.

Fl. & Fr. : Aug.-Sept.

Habitat : Near wetlands.

Distribution : Bangladesh, Myanmar, India.

Distribution in Uttar Pradesh : Basti (cf. Saini, 1990).

Fimbristylis tetragona R. Br. Prodr. Fl. Nov. Holl. : 226. 1810; Koyama in Dassan., Rev. Handb. Fl. Ceylon 5 : 323. 1985.

Type : Described from Australia.

Erect, annual or perennial herbs; rhizomes short; stems caespitose, quadrangular. leaves of flowering stems reduced to 2-3, obliquely truncate, sheaths 3-6 cm long, in sterile stems leaves basal, filiform. Spikelets solitary, terminal, ebracteate, globose, ovoid or oblong-ovoid, terete, dull brown, dense-flowered, 6-10 mm long; glumes spiral, membranous, oblong-ovate, obtuse, truncate, scarcely mucronate, closely imbricate with rounded backs, margins hyaline, 3-5 mm long, lowest 2 or 3 empty; stamens 2 or 3, anthers linear; ovaries 1-celled; styles flattened, brown, short-stipitate, base nearly as wide as nuts, deciduous with glumes; stigmas 2. Nuts plano-convex or subterete, linear-oblong, cylindrical, stipitate, reticulate, straw-coloured, 1.5-2 mm long.

Fl. & Fr. : July-Dec.

Habitat : in moist cultivated fields, bank of ponds, in marshy places in open deciduous forests. Common.

Chrom. No. : $2n = 10, 20$

Distribution : India to tropical Australia.

Distribution in Uttar Pradesh : Banda, Gorakhpur, Mirzapur, Saharanpur.

Representative specimens : **Banda** : Manikpur, B.K. Sinha, 6438 (DUTHIE). **Gorakhpur** : Along Turra nala, A.K. Srivastava, 7231 (GU); Ambazar, T.N. Srivastava, 1041 (GU). **Mirzapur** : s.l., G. Panigrahi, 12245 (CAL!); Tanda, U.C. Bhatt, 13245 (BSD). **Saharanpur** : Ramnagar, Chandra et al., 42759 (LWG!).

Fimbristylis thomsonii Boeck. in Linnaea 37 : 37. 1871; Clarke in Hook. f., Fl. Brit. India 6 : 646. 1893.

Annuals or perennials, 15-80 cm high. Stems obtusely 3-5 angled, 0.5-1.2 mm thick. Leaves half as long as or longer than the stem, 2-5.5 mm broad, abruptly narrowed to a triangular tip; ligule a fringe of hairs. Anthela compound to supraderm compound, 3-10 cm broad, usually bearing 20-50, sometimes up to 80 spikelets; bracts 2-5 foliaceous, lowest 2-10 cm long; rays 5-9, suberect or obliquely spreading, longest 2-10 cm; spikelets all or nearly all solitary, ellipsoid, 5-10 x 2-2.5 mm acute; glumes spiral, ovate-oblong, 3-4



mm long, acute or mucronulate, castaneous, 5-9-nerved, stamens 3; anthers 1.5 mm long; styles 1.5-2.5 mm long, thickened at the base, glabrous; stigmas 3, 1.8-3 mm long. nuts sessile, obovoid, trigonous, 1-1.2 mm long, stramineous or brownish, verrucose.

Fl. & Fr. : Feb.-June.

Habitat : in wastelands and plantations.

Distribution in Uttar Pradesh : Basti.

Fimbristylis tomentosa Vahl, Enum. Pl. 2 : 290. 1806; Kern in Fl. Males. Ser. I. 7 : 576. 1974. *Fimbristylis podocarpa* Nees & Meyen ex Nees in Wight, Contr. Bot. Ind. 98. 1834, *pro part.* includo typ.; C.B. Clarke in Hook. f., Fl. Brit. India 6 : 638. 1893. *Fimbristylis dichotoma* (L.) Vahl, subsp. *podocarpa* (Nees & Meyen ex Nees); Koyama in Micronesica 1 : 87. 1964, *et in* Hara *et al.*, Enum. 1 : 111. 1978.

Type : 'India orientalis'

Erect, annual herbs. Stems caespitose, angular, compressed below inflorescence. Leaves basal, as long as or shorter than stems, abruptly acuminate, ciliate, or hispid on margins, 1.5-2 mm broad; sheaths, often hairy; ligule a fringe of hairs. Umbels simple or compound, loose; bracts 4-5, hairy at base, scabrid on edges above, foliaceous, one often longer than umbel; spikelets brown, ovoid, terete, acute, 5-10 mm long; rachilla narrowly winged; glumes spiral, chataceous, appressed, concave-ovate or cymbiform, keeled, scarious margined, 2-3 mm long; stamens 2, anthers oblong-linear; ovaries 1-celled; styles flattened, ciliate in upper part; stigmas 2. Nuts pale yellow or white, biconvex, elliptic to orbicular, stipitate, 1.5-2 mm long.

Fl. & Fr. : July-Nov.

Habitat : found in moist places, cultivated fields, grassy places, forest clearings. Occasional.

Chrom No. : $2n = 20, 30$ (*Fimbristylis podocarpa*).

Distribution : Tropical Africa, India and Malaysia.

Distribution in Uttar Pradesh : Azamgarh, Gonda, Sultanpur.

Representative specimens : **Azamgarh** : Mahrajganj, S.N. Srivastava, 14342 (GU). **Gonda** : Deopur, J.K. Maheshwari, 81569 (LWG).

TAXA DUBIA

Fimbristylis albicans Nees in Wight, Contrib. 100. 1834; Clarke in Hook. f., Fl. Brit. India 6 : 641. 1893.

Plants almost glabrous. Stem 20-35 cm high, slender. Leafy at base. Leaves narrowly ligulate, tip suddenly narrowed, acute. Spikelets ellipsoid, rusty grey, 4-15 in the head, 6.5-4.3 mm; glumes scarcely acute, styles 2-fid. Stamens often 2. Styles longer than nut, slender, glabrous with long linear branches. Nuts obovoid, straw coloured, small, shining; outermost cells conspicuous, transversely oblong, not accurately superimposed in vertical series, smooth, transversely, minutely trabeculate.

Fl. & Fr. : July-Oct.

Habitat : in wetlands.

Distribution : Deccan Peninsula.

Distribution in Uttar Pradesh : Basti (*cf. Saini, 1990*).

Fimbristylis ciliaris (L.) Roxb. Fl. Ind. 1 : 184. 1820; *non* Nees, 1834. *Scirpus ciliaris* L., Mant. 182. 1771. *Fimbristylis glomerata* Lamk., Illustr. 1 : 150. 1791.

Glumes, spirally imbricating, membranaceous, oblong-lanceolate, 2.5-3 mm long, keeled, acute or mucronulate, lowest empty. Perianth of 6 segments divided almost to the base into numerous white hairs, elongating in fruits to 7-11 mm; stamen 1, anthers *ca* 1 mm long, crest lanceolate, *ca* 0.5 mm long, reddish, hirsute; styles continuous with the ovary, uniformly slender, caducous, 1.5-2 mm long; stigmas 3, *ca* 1.3 mm long. Nuts sessile, ellipsoid, compressed trigonous, smooth, 2.6-2.8 mm long, glossy, dusty black, beaked.

Fl. & Fr. : April-Nov.

Habitat : in rock-crevices near streams.

Notes : due to the presence of numerous long hair-like perianth segments this species is popularly known as the cotton-grass, and is sometimes used for making ropes.



Distribution in Uttar Pradesh : Banda (cf. *Sinha & Verma*, 1987).

Fimbristylis globulosa (Retz.) Kunth, Enum. Pl. 2 : 231. 1837. *Scirpus globulosus* Retz., Obs.. 6 : 19. 1791. *Fimbristylis assamica* Clarke ex Guha Bakshi in Bull. Bot. Soc. Beng. 24 : 111. 1970. *Fimbristylis umbellaris* (GU).

Perennials, 15-60 (-120) cm high. Stems rather stout, obtusely 4-5-angled, 1.5-3 mm thick, smooth or scaberulous at the tip. Cauline leave reduced to sheaths; sheaths 3-5, innermost 2.5-15 cm long, acute. Leaves of the sterile shoots flat or canaliculate, *ca* 1.5 mm broad; ligule absent. Anthela simple or compound, lax, bearing (1-)2-15 (-many) spikelets; bracts very short, lowest 4-8 mm long; rays 1-8, ascending, longest 8-25 mm; spikelets solitary, subglobose, terete, 4-6(-8) mm long, obtuse, numerous-flowered; rhachilla winged; glumes spiral, ovate, 2-2.5 mm long, muticous, brown, 3-nerved, midrib ending slightly below the tip; margins broadly scarious; sometimes upper glumes sterile and much elongated. Stamens 3, sometimes 2; anthers 0.6 mm long; styles 0.8-1 mm long, glabrous; stigmas 3, or sometimes 2, *ca* 0.8 mm long. Nuts sessile, obovoid, trigonous, or sometimes lenticular, 0.7-1 x 0.7 mm, verruculose, apiculate, stramineous; surface cells in 12-15 vertical rows on each face.

Notes : The leafless clumps bearing large globular spikelets are quite characteristic.

Fl. & Fr. : June-Sept.

Habitat : in marshy places, sometimes colonising.

Distribution in Uttar Pradesh : Sultanpur.

Representative Specimens : **Sultanpur** : Kadipur, *Om Prakash* (GU).

Uses : in Java the stems of a stout cultivated form are being used for making mats and baskets etc.

Fimbristylis scaberrima Nees in Wight Contrib. 102; Boeck. in *Linnaea*, 38. 409 (not 37. 13). Wall. Cat. 3507.

Plants glabrous. Roots fibrous, stout. Stems compressed 30-50 cm high, scabrous on edges at top. Leaves and bracts long. Umbel compound and decomposed. Bracts 3-4, two lower often 10-12.5 cm, very scabrous on margins. Spikelets many, *ca* 5.2 x 2.6 mm, 5-8-flowered, acute, chestnut brown. Glumes ovate, acute adpressed-incurved. Stamens 3. Style 2-fid, long, scarcely compressed, nearly glabrous; branches 3. Style 2-fid, long, scarcely compressed nearly glabrous; branches long. Nuts as long as 2/5 glume, biconvex, scarcely stalked; outermost cells very small in 20-24 vertical series on each face.

Fl. & Fr. : May-Aug.

Habitat : in wetlands.

Distribution : Bangladesh (Sylhet).

Distribution in Uttar Pradesh : Lucknow.

Representative specimens : **Lucknow** : NBG, *S.L. Kapoor*, 20437 (LWG!).

Fimbristylis sieberiana Kunth, En. 2 : 237. 1837; Steud. Syn. 2 : 118, 1855; Kern *Blumea* 8(1) : 131, 1955 et *Fl. Males.* (Ser. 1) 7(3) : 572-573, 1974; Naithani & Raizada in *Ind. For.*; *Fimbristylis ferruginea* (non Vahl) Decne, *Nouv. Ann. Mus. hist. Nat. Paris* 3 : 352, 1834; *Fimbristylis ferruginea* var. *sieberiana* Boeck. *Linnaea* 37 : 17, 1871.

In *Fimbristylis sieberiana* cauline leaves well developed, less stiff, flat, up to 35 cm by 1.5-2 mm; lower sheaths herbaceous; laminiferous, stramineous or ferrugineous; sheaths of cauline leaves pilose, especially towards the top, finally more or less glabrescent. Lower involucral bracts as long as or usually distinctly over-topping the inflorescence up to 10 cm; spikelets obtuse, glumes very broadly ovate, usually dark castaneous, densely tomentose on the apical part, 3-4.5 mm long and wide. Style broader, about 0.4 mm wide. Nut broadly ovate or orbicular, distinctly stipitate, umbonulate, larger 1.25-1.5. While in *Fimbristylis ferruginea* : lower sheaths bladeless, coriaceous, shining brown to castaneous, upper ones ferrugineous-membranous in front, ciliolate at the mouth. Involucral bracts 2-3, shorter than the inflorescence, scarious-margined at the dilated base. Spikelets solitary terete, acute, glumes ovate to oblong, obtuse, scarcely keeled, puberulous in the apical part, ferrugineous, 3-4 by 2.5-3 mm; style 0.25 mm wide. Nut ovate or oblong-obovate, shortly stipitate 1-1.25 by 0.75-1 mm.

Fl. & Fr. : Aug.-Oct.

Habitat : at marshy places.



Distribution : India : Gujrat, Rajasthan, Uttar Pradesh, Tamilnadu, Maharashtra. S. Africa, Madagascar, Arabia, Persia, tropical Australia, Malesia.

Distribution in Uttar Pradesh : Muzaffarnagar.

Representative specimens : **Muzaffarnagar** : s.l., R.C. Bhardwaj (LWG-12618).

Note : Clarke (Fl. Cap. 7 : 201, 1898) referred *Fimbristylis sieberiana* to the synonym of *Fimbristylis ferruginea* (L.) Vahl, from which according to Kern (l.c.) it is specifically distinct.

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