



# A study of genus *Fimbristylis* Vhal. from Sudhakarnagar Hill, Aurangabad District of Maharashtra

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## Abstract

The paper gives an account of sedges of the Sudhakarnagar hill, Aurangabad district. A total of 10 species under *Fimbristylis* were collected and identified during the year 2020 for the first time. Species were distributed widely in marshy places, pond and in wetlands. Plant species of family Cyperaceae from Sudhakarnagar area, have been listed systematically, these plant species grown mostly as wild, and known as weed plants.

**Keywords:** - *Fimbristylis*, Cyperaceae, Sudhakarnagar Hill, Aurangabad.

## Introduction

Annual temperatures in Aurangabad is range from 17 to 33 °C. The Cyperaceae is the third largest monocot family, globally it consisting of a valued 5000 species in 104 genera. They have a worldwide distribution, especially in the tropics. The biggest genera (approximate numbers of species) of *Fimbristylis*, 300 spp. The family has significant economic importance; many members are considerate agricultural weeds, whereas others provide animal food, and medicines. Nearly 10% of the family is place to use by humans with the focus of use in the tropics. Cyperaceae also have protection and environmental importance. They are major or even main components of marshland habitats.

## KEY TO THE SPECIES AND SUBSPECIES OF FIMBRISTYLIS IN SUDHAKARNAGAR, AURANGABAD.

- 1a Styles 2-fid; nuts biconvex ..... 2
- 1b Styles 3-fids'; nuts trigonous or triquetrous. .... 8
- 2a Leaves eligulate ..... **F. cymosa** subsp. **spathacea**
- 2b Leaves ligulate. .... 3
- 3a Glumes wholly or partly (in upper half) densely brown or greyish tomentose on the back: nuts usually smoother or finely striated ..... 4
- 35b Glumes glabrous, rarely minutely ciliolate on apex margins; nuts trabeculate or reticulate. .... 5
- 4a Leaves shorter up to 10 cm long; involucre bracts shorter than inflorescence; nuts obovate, 0.7-1 x 0.3-0.6 mm, slightly depressed at apex; styles 2.5-2.8 mm long..... **F. ferruginea**
- 4b Leaves up to 30 cm long; involucre bracts longer than inflorescence; nuts suborbicular, 1.5-1.6 x ca 1 mm, styles 2-2.2 mm long. .... **F. sieberiana**

- 5a Nuts copiously tuberculate or verruculose ..... **F. alboviridis**
- 5b Nuts etuberculate ..... **6**
- 6a Nuts smoothly trabeculate, 0.4-0.6 mm long with 4-6 vertical ridges, in between very small, fine epidermal cells on each face; styles very narrow, almost narrower than staminal filaments; stamen 1, spikelets 1.5-2.2 mm broad. .... **F. bisumbellata**
- 6b Nuts coarsely trabeculate 0.8-1.1 mm long with 7-9 (10) vertical ridges in between rather larger epidermal cells on each face; styles often flat, almost as wide as to wider than staminal filaments, stamens 1-2; spikelets 2-3.5(4) mm broad. .... **7**
- 7a Inflorescence simple to compound; styles narrow, slender, as wide as staminal filaments, or if wider than staminal filaments then conspicuously longer than nuts, often 1.5-2.8 mm long; glumes as long as or slightly to conspicuously longer than broad.....**F. dichotoma** subsp. **dichotoma**
- 7b Inflorescence compound or subcompound; styles much wider, sometimes twice wider than staminal filaments, shorter to as long as nuts, often 1-1.2 mm long; glumes almost as long as broad. .... **F. dichotoma** subsp. **depauperata**
- 8a Spikelets sessile, all clustered. .... **F. cymosa** subsp. **spathacea**
- 8b Spikelets all solitary, none clustered. .... **9**
- 9a Stems strongly compressed, ancipitus or 2-sided. .... **10**
- 9b Stems not compressed, terete or angular, sometimes compressed trigonous (dipterous). .... **F. miliacea**
- 10a Annual; stems 1-1.7 mm wide, scabrid below the inflorescence, spikelets ovoid, 2-4 x 1-1.5 mm ; glumes ca 1 x 1 mm ; styles 0.5 mm long, nuts 0.5-0.6 mm long. .... **F. microcarya**
- 10b Perennials with stout rhizome; stems 3-4 mm wide, scabrid in lower greater part or below inflorescence; spikelets ovate lanceolate, 4-9 mm long, glumes 2.5-3 x ca 2 mm; nuts 0.7-1.4 x 0.7 mm; styles 1-2.3 mm long. .... **F. complanata**

**Fimbristylis alboviridis** Clarke in Hook f. Fl. Brit India 6:638.1893; Kern in Steenis Fl. Malesiana 1(7)3:580.1974; W. Khan in Marathwada Univ. J. Sc. 22(15):8.1983 et in Naik, Fl. Marathwada 2:947;1998.(excl. descr.); Karthik. et. al Fl. Indic. En. Monocot. 50.1989.

Slender annual, 15-30 cm tall; stems angular, 1-1.5 mm wide, hispid at least below the umbels. Leaves: basal, sheaths densely hispid, ligulate, blades linear 1-2 mm, wide, slightly falcate, shorter than the stems. Inflorescence: simple or subcompound; involucre bracts 3-4. Spikelets solitary, ovoid or ovoid-oblong, terete, stramineous or greenish-white, variegated with brown, on short rigid peduncles, obtuse; rhachilla winged. Glumes broadly ovate, 2.2-2.5 x 1.5 mm, with 3-nerved keel; sides nerveless, pale brown, hyaline on margins near the obtuse apex, mucous. Stamens 2; anthers-oblong, apiculate. Nuts biconvex, oblong-obovoid, 1.2-1.4 x 1.1 mm, longer than broad, trabeculate with transversely oblong cells in between 16-20 vertical, strong ridges, tuberculate, especially in the upper half, shortly stipitate. Styles 2-fid, very slender, glabrous, much-dilated at base.

Very common, in marshes of open grass-lands, pastures along banks of water courses.

**Fls. & Frts.:** - September & November.

**Specimens examined:** - Maharashtra State, Aurangabad District, Sudhakarnagar near hill, Solanke S. N. 1250.

**Fimbristylis bisumbellata** (Forsk.) Bub. Dodec. 30.1860. Kern in Steenis Fl. Malesiana 1.7(3):579.1974; Fischer in Kew Bull. 149. 1935 et in Gamble Fl. Pres. Madras (1931) 3:1650. (repr.ed.) 1994; in corrig. P. 1898 *F. dichotoma* (non Vahl). Koyama in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 5:312.1985.

Densely tufted annual, 5-20 cm tall; stem acutely angular, 1-1.5 mm wide. Leaves: ligulate sheaths pubescent, ferruginous or stramineous; blades linear 1-2 mm wide, basal, shorter than or equalling the stems, pubescent beneath. Inflorescence: compound or subcompound, sometimes contracted; involucre bracts 2-4 foliaceous, the longest much exceeding the inflorescence; rays 2-4, 2-3 cm long with several to many spikelets. Spikelets solitary, ovoid or oblong ovoid, 3-6 x 1-1.5 mm, angular subacute, rhachilla narrowly winged. Glumes ovate, 1.2-1.3 x 1 mm, membranous, white-hyaline margined with 3- nerved keel, sides nerveless, often brown involucre near margins, acute, mucronate. Stamens 1; anthers oblong *ca* 0.5 mm long, muticous. Styles 2-fid, flat, very slender, much dilated at base, hairy on stigma. Nuts biconvex, obovoid, *ca* 0.5 x 0.3 mm, trabeculate with transversely oblong cells in between 5-7 vertical ridges, shortly stipulate and discoid at base, umbonulate, apiculate.

Occasional, in moist sandy soils in open fields, along road side.

**Fls. & Frts:** - November to July.

**Specimens examined:** - Maharashtra State, Aurangabad District, Sudhakarnagar near hill, Solanke S. N. 1208.

***Fimbristylis complanata*** (Retz.) Link, Hort. Bot. Berol. 1:292.1827; Clarke in Hook. f. Fl. Brit. India. 6:646.1893; T. Cooke, Fl. Pres. Bombay 3:400. (1908)1958 (Repr.ed.); Fischer in Gamble Fl. Pres. Madras (1931) 3:1654. (repr. ed.) 1994; Kern in Steenis Fl. Malesiana 1.7(3):548.1974; W. Khan in Marathwada Univ. J. Sc. 22(15):9.1983; et.in Naik Fl. Marathwada: 2.948.1998.

Perennials, 30-80 cm tall; rhizome short; stems strongly flattened. Leaves : shorter than stem, flat, 2-4 mm wide striate; margins thickened, sheaths compressed, flattened keeled along mid-rib on the back 3-16 cm long, ligulate; lower leaves reduced to bladeless sheaths. Inflorescence: compound; involucre bracts 3-4, shorter than inflorescence, as broad as the stems; lowest 2-6.5 cm long; primary rays few, unequal compressed up to 6 cm long. Spikelets solitary, lanceolate or ovoid-lanceolate, angled, acute at apex; glumes spirally arranged, membranous, ovate or oblong-ovate, acute and mucronulate, keeled, hyaline margined. Stamens 3; anthers linear oblong apiculate *ca* 1.3 mm long. Nuts trigonous broadly obovoid, shortly stipulate, smooth or verruculose creamy-white; epidermal cells very minute in many rows. Common in moist soils, swampy grass fields.

**Fls. & Frts.:** - August to April

**Specimens examined:** - Maharashtra State, Aurangabad District, Sudhakarnagar near hill, Solanke S.N 1283.

***Fimbristylis cymosa*** R. Br. Prodr. 228. 1810. Kern in Steenis Fl. Malesiana 1.7(3): 557. 1974; Cook, CDK. Aq. & wetl. Pl. India: 140. 1996; *F. spathacea* Roth Nov. Sp. Pl. 24. 1821; Clarke in Hook. f. Fl. Brit. India. 6:640.1893. *F. cymosa* R. Br. subsp. *spathacea* (Roth.) Koyama in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 5:301.1985; W. Khan in Naik Fl. Marathwada 2:949.1998; Prasad & Singh Sedg. Karnataka (Fam. Cypr.): 171.2002.

subsp. ***spathacea***

Perennial, 10-60 cm tall, rhizome thick, stout, often blackish, not creeping; stems, smooth. Leaves: eligulate, basal sheaths glabrous, much shorter than the stems. Inflorescence: compound or subcompound loose; involucre bracts 4-5, dilated at base, almost spathaceous with short 0.5-10 mm long, setaceous scabrid blades, equalling or shorter than the rays; primary rays 3-8, very unequal, the longest up to 3 cm long, secondary ones, if present very short but distinct, up to 5 mm long, with few to several spikelets. Spikelets solitary, ovoid or oblong, greenish or stramineous, variegated with pale brown, obtuse or subacute; a few of them sessile, clustered rhachilla distinctly winged. Glumes ovate, almost deltoid, broadly hyaline margined thinly membranous; keel 3-nerved. Stamens 3; anthers linear *ca* 0.5 mm long with shortly appendiculate tips. Styles 2-fid or 3 fid, very slender, narrowly dilated at base. Nuts biconvex, obovoid 1-1.2 x 0.5-0.7 mm, obscurely smooth, with rib on either the edges, dark or chest-nut brown, sessile, muticous.

Occasional, in rice-fields, in pastures along road sides.

**Fls & Frts:** - September to December.

Specimens examined: - Maharashtra State, Aurangabad District, Sudhakarnagar near hill, Solanke S.N 1222.

**Fimbristylis dichotoma** (L.) Vahl, Enum. 2: 287.1806. Kern in Steenis Fl. Malesiana 1(7).3:575.1974; Koyama in contr. de Inst. Bot. Univ. Montreal 70: 39.1957; *Scirpus dichotomus* L. Sp. Pl. 50.1753. *Fimbristylis diphylla* Vahl l. c. 289 Clarke in Hook. Fl. Brit. India. 6:637.1893. L'narsimhn in Sharma et al Fl. Maharashtra (Monocots) 2:307.1996; W. Khan in Naik Fl. Marathwada 2:950. 1998.

subsp. **dichotoma**

Densely tufted annuals 10-80 cm tall. Stems trigonous, 2.5-3 mm wide, smoothly glabrous. Leaves sheaths glabrous, or sparsely pubescent, blade linear, 0.5-1.5 mm wide, flat, brown dotted on the both surface, shorter than the stems, scabrid in upper half, acute. Umbels compound or decomposed, involucre bracts 3-4, longer than the umbels, the lowest often erect, rays 4-6, very unequal, 2-6 mm long, with few to many spikelets, glabrous or hairy. Spikelets solitary ovoid or oblong, 2-6 x 1.5-2 mm long peduncled, rarely sessile or even sessile, ferruginous, rhachilla distinctly winged. Glumes broadly ovate or ovate - oblong, sides nerveless, brownish with narrow hyaline margins, obtuse at apex, apiculate. Stamens 1 or 2, anther linear, apiculate. Style 2-fid, flat, linear with distinctly hairy - hyaline margins. Nut biconvex, obovoid or suborbicular, trabeculate with transversely oblong cells in between 8-12 vertical ridges, brownish.

**Fls. & Frts:** - September to November.

**Specimens examined. :** - Maharashtra State, Aurangabad District, Sudhakarnagar near hill, Solanke S. N. 1248.

**Fimbristylis dichotoma** (L.) Vahl. subsp. **depauperata** (R.Br.) Kern in Steenis Fl. Malesiana 1(3).7:576.1974; W. Khan in Naik Fl. Marathwada 2:950. 1998; *F. diphylla* Vahl. Var. *depauperata* Clarke in Hook. f. Fl. Brit. India 6:637. 1893. incl. var. *spirostachya* Clarke l. c. *F. annua* sensu Clarke l. c. non Roem. & Schult.

Tufted annuals, 30 cm tall. Stems trigonous. Leaves as long as the stems, blade, erect, linear, Umbel compound or simple, whitish green in upper surface, with few to several spikelets, spikelets pale brown, turgid, involucre bracts 4 - 6, rays 3-5, unequal, 2-3 cm long. Spikelets pale brown, terete, densely many flowered. Glumes broadly ovate, broader than long, ciliolate at upper edges. Stamens 1 or 2, anther linear, 0.6-1 mm long, apiculate. Style short and very broad, as long as to slightly shorter than the nuts. Nuts obovate, biconvex, 1.2- 1.8 mm broad, excluding the gynophore, rounded - truncate at mucronate at apex with transversely oblong cells.

**Fls. & Frts:** - September to November.

**Specimens examined:** - Maharashtra State, Aurangabad District, Sudhakarnagar near hill, Solanke S. N. 1228;

**Fimbristylis ferruginea** (L.) Vahl. Enum. 2:291.1806; Clarke in Hook. Fl. Brit. India 6:638. 1893; Cook Fl. Pres. Bombay 3:396.1958; W. Khan in Marathwada Univ. J. Sc. 22(15): 9.1983. Fischer in Gamble Fl. Pres. Madras (1931) 3:165. (repr. ed.) 1994; Kern in Steenis Fl. Malesiana 1.7(3):572.1974; L'narsimhn in Sharma et al Fl. Maharashtra (Monocots) 2:309.1996.

Densely tufted perennials, robust, 20-90 cm tall. Rhizome woody, smooth. Stem angular, 1-1.5 mm wide, rigid, sometimes, ligulate, scabrid, apex acuminate, blade linear 0.5-1.5 mm wide, basal, shorter than the stems. Umbels simple of few spikelets, contracted, involucre bract 2-3, rays 2-5, 1-1.5cm long. Spikelets solitary, ovoid or ovoid-oblong, 4-10 x 3-4 mm, terete, brown, sometimes sessile added to solitary spikelets, rhachilla winged. Glumes ovate, 3.5-4 x 2.5-3 mm, sides nerveless, ferruginous, sometimes ciliate o margins near apex, obtuse, mucronate at apex. Stamens 3, anther oblong, 0.5 mm long, mucicous. Styles 2-fid, flat, hairy, longer than the stigmas. Nut biconvex, obovate, 1.6 x 1.7 mm, smooth, reticulate, shortly stipulate.

**Fls. & Frts.:** - September to December.

**Specimen examined:** - Maharashtra State, Aurangabad District, Sudhakarnagar near hill, Solanke S. N. 273;



**Fimbristylis microcarya** F. V. Muell. Fragm 1: 200. 1859; Kern in Baker & Bakh. Fl. Java 3: 464. 1968. et in Steenis Fl. Malesiana 1.7(3): 550. 1974. L'narsimhn in Sharma et al Fl. Maharashtra (Monocots) 2:315.1996. W. Khan in Naik Fl. Marathwada 2:952.1998.

Densely tufted annuals, 15-35 cm tall. Stems compressed, 1-1.5 mm wide, slender, glabrous, smooth. Leaves sheaths glabrous, ligulate blade linear, closely distichous, shorter than the stems, 1.5-2 mm wide, flat, scabrid in upper half, acuminate. Umbels compound or decompound, involucre bract 2-4, erect, equalling the umbels. Spikelets solitary ovoid or ovoid - oblong, 3-4 x 1 mm long, green, many spikelets, acute, rhachilla winged. Glumes ovate or ovate - lanceolate, 1 - 1.3 x 1 mm, 3 nerved keel, glabrous, brownish acute, mucronate at apex. Stamens 1, anther elliptic, muticous. Style 3-fid, glabrous, shorter than the stigmas. Nuts trigonous obovoid, 0.6 - 1 mm long, verruculose on angle, smooth on faces, marble white to brownish, apiculate.

**Fls. & Frts:** - September to December.

**Specimens examined:** - Maharashtra State, Aurangabad District, Sudhakarnagar near hill, *Solanke S. N.* 1259.

**Fimbristylis miliacea** (L.) Vahl En. Pl. 2: 287. 1806. Clarke in Hook. Fl. Brit. India 6:644.1893; Fischer in Gamble Fl. Pres. Madras (1931) 3:1655. (repr.ed.) 1994; Koyama in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 5:296.1985.

Densely tufted perennials, 10-25 cm flattened, smooth, 4 angled below, triquetrous above. Leaves shorter than the stems, laterally compressed, apex acuminate, scabrid on upper margins, eligulate, blade of the stems reduced to sheaths, those of the sterile shoots well - developed, linear, 1.5 x 2 - 2.5 mm wide, scabrid in upper half, acute. Umbels compound or decompound, involucre bract setaceous, much shorter than the umbels acuminate, scabrid, rays 8-12, the longest one 3-4 cm long, rigid, erect, few to many spikelets. Spikelets solitary, ovoid 1.5-2 mm wide, with dark brown, rhachilla wingless, involucre bract, filiform, 2-3. Glumes ovate, 1.5 x 1 mm, boat shaped, narrowly hyaline on margins, muticous. Stamens 2, anthers oblong ca 0.5 mm long, muticous. Style 3 field, trigonous, hairy on the stigma only.

**Fls. & Frts.:** - Almost throughout the year.

**Specimens examined:** - Maharashtra State, Aurangabad District, Sudhakarnagar near hill,, *Solanke S. N.* 1267.

**Fimbristylis sieberiana** Kunth En. Pl. 2: 237.1837; Kern in Steenis Fl. Malesiana 1.7(3): 572.1974; Karthik et al Fl. Indic. En. Monocots: 55.1989; L'narsimhn in Sharma et al Fl. Maharashtra (Monocots) 2:317.1996.

Perennial 25-60 cm tall with short woody rhizome; stems usually tufted, rather stiff, glabrous, 1-1.5 mm thick. Leaves: ligulate, shorter than stems, up to 40 cm long, 1.5-2 mm wide; basal sheaths membranous brown. Inflorescence: simple to compound, rarely decompound, involucre bracts 3. Spikelets few, terete, ovoid, acute 5-10 x 2.5-4 mm, densely many-flowered, ferruginous to reddish, pale to bright, brown. Glumes spiral, broadly oblong-ovate, obtuse and apiculate at apex, 3-3.5 x ca 3 mm, almost as broad as long, keeled, densely tomentose on the back towards apex. Stamens 3, anthers linear-oblong, ca 1 mm long. Styles 2-fid, flat, ca 2 mm long, densely fimbriate, dilated at base. Nut biconvex, broadly oblong-obovate, ca 1.5 x 1 mm, smooth, whitish, distinctly stipulate; stipe ca 0.25 mm long.

Occasional in most open grassland.

**Fls. & Frts.:** - June to March.

**Specimens examined.** : - Maharashtra State, Aurangabad District, Sudhakarnagar near hill,, *Solanke S. N.* 1353.

## MATERIAL AND METHODS

The study of genus *Fimbristylis* of monocot angiosperms from the Sudhakarnagar Hill is based on the spacious field survey of the vegetation of an area. Field survey was carried out for observation and collection of plants in various seasons. Field study visit made three (2018-2020) years after long back completed after research work and recollect the data of plants. The list of plant species with their scientific name, and Habit present in description.

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