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Research Paper

FOUR SPECIES AND ONE SUBSPECIES OF FIMBRISTYLIS VAHL AS NEW DISTRIBUTIONAL RECORDS FOR KHANDESH REGION OF MAHARASHTRA

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Abstract

The present paper deals with addition to four species and one subspecies of *Fimbristylis* Vahl reported for the first time for Khandesh region from different parts of the Satpuda ranges. The herbarium specimens have been lodged in the herbarium of Department of Botany, H. J. Thim College Jalgaon. Detailed description and images are provided.

Key words: *Fimbristylis* Vahl., New records, Khandesh region.

INTRODUCTION

The genus *Fimbristylis* (from Latin Fimbria-fringe; stylus-style, referring to fringed or hairy styles of certain species) was erect by Vahl, M. (1806) and is distinguished from closely allied genus *Scirpus* L. (1753) s.l. by articulate flat and hairy styles of its members. Majority of the species often from dominant components of wet situations of plains. Very few species such as *Fimbristylis falcata* Vahl, *Fimbristylis dichotoma* (L.) Vahl, *Fimbristylis alboviridis* Clarke appear to be hill forest dwellers but they are also found in plains. Abundant in Indo-Malesia and Australia. Mostly in plains of eastern central and souther India. Some occurs widely throughout India. The genus represented by about 300 species in the world and over 110 species (Karthikeyen, 1989) in India. While in Maharashtra over 32 species (Karthikeyan *et al.* 2002) and in study region 26 species (only enumeration was done by Tanveer *et al*. 2010). *Fimbristylis cinnamometorum* (Vahl) Kunth, *Fimbristylis dichotoma* (L.) Vahl subsp. *depauperata* (R. Br.) Kern, *Fimbristylis littoralis* Gaudich., *Fimbristylis tetragona* R. Br., *Fimbristylis woodrowii* Clarke are new distributional records for Khandesh region.

Khandesh region consist of three district Jalgaon, Dhule and Nandurbar, total area of Khandesh is 10431 sq miles. Khandesh region lies between 20^0 8' and 22^0 7' North latitude and 73^0 42' and 76^0 28' East longitude. The forest of the Khandesh region is of dry deciduous type. Khandesh region though botanically rich in biodiversity have not been explored extensively except a few sporadic reports on floristic of Karnik 1959; Salunkhe 1995; Mathew 1988; Garud 1999; Yadav 2003; Kshirsagar 2008; Patil 2003.

During botanical explorations of Khandesh region, 05 interesting specimens belonging to Cyperaceae were collected from wet situations of plains and margins of water courses. Close examination with the help of literature and herbarium specimens revealed that they were not recorded earlier from Khandesh region. All of them have been identified as *Fimbristylis*

cinnamometorum (Vahl) Kunth, *Fimbristylis dichotoma* (L.) Vahl subsp. *depauperata* (R. Br.) Kern, *Fimbristylis littoralis* Gaudich., *Fimbristylis tetragona* R. Br., *Fimbristylis woodrowii* Clarke.

This proved to be new records for Khandesh region. Identification of all these taxa is confirmed by Dr. M.A. Wadood Khan, who confirmed the identity of the species and also comparing the specimens with those of by BSI western circle, Pune. Detailed descriptions are given below:

Fimbristylis cinnamometorum (Vahl) Kunth, Enum. Pl. 2 : 229. 1837; Kern in Van Steenis, Fl. Malesiana 1, 7(3): 565. 1974; Lakshmin. in Sharma *et al.*, Fl. Maharashtra State, Monocot. 306. 1996. *Scirpus cinnamometorum* Vahl, Enum. Pl. 2: 278. 1806. *Fimbristylis cyperoides* R. Br. var. *cinnamometorum* (Vahl) Clarke in Hook. f., Fl. Brit. India 6: 650. 1893. **(Plate-I)**

Perennial, with creeping, woody, 1-1.4 mm wide, thick rhizome. Stem solitary, slender, compressed-angular, 20-40 x 0.5-1 cm, smooth. Leaves: ligule absent ; blades at least half as long as the stem, erect, setaceous, rigid, 0.3-0.4 mm wide, acute at apex, antrorsely scabrid at top. Inflorescence compound or decompound, loose, with many spikelets, 3-6 cm long; involucral bracts 1-2, erect, much shorter to slightly longer than inflorescence, lowermost upto 4 cm long; primary rays 5-8 filiform, erect, smooth. Spikelets solitary, oblong or linear-oblong, strongly compressed, 4-5 x 1-1.2 mm, few flowered, acute at apex; rhachilla winged. Glumes distichous, membranous, ovate-lanceolate, 2.8-4 x 1.5-2 mm, muticous or apiculate at apex, sharply keeled; keel 3-nerved; densely reddish gland-dotted sides. Stamens 3; anthers linear, upto 2 mm long. Nuts trigonus, obovoid or verruculose, finely transversely lineolate on the faces by the linear-oblong epidermal cells.

Flowering and Fruiting: September to November

Distribution : In Nandurbar district.

Habitat : Rare. Along the hill slopes and near water courses at high elevations.

Specimens examined: Nandurbar Dist., Akkrani, *TAK* 1520; Kanjala ghat, *TAK* 1527.

Note : According to Blake (Journ. Arn. Arb. 35: 220. 1954) the Australian *F. cyperoides* R. Br. and the Asian *F. cinnamometorum* are one and the same, though Clarke (l.c.) distinguished these two on the basis of annual habit of the latter and the perennial habit of the former. It is observed that these plants become annual especially on unstable sandy ground, where the water level fluctuates remarkably (Koyama, l.c.).

Fimbristylis dichotoma (L.) Vahl subsp. **depauperata** (R. Br.) Kern in van Steenis, Fl. Malesiana Ser. 1, 7(3): 576. 1976; 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 loc. cit. *F. annua* Clarke loc. cit., non Roem. & Schult. **(Plate-I)**

Much similar to subsp. *dichotoma* almost in many respects except stems, leaves, bracts and rays of the inflorescence often softly hairy. Inflorescence simple or compound with few to several spikelets; spikelets pale brown, turgid. Glumes very broadly ovate, broader than long, often minutely ciliolate at the upper edges; cells in the upper part of the glume nearly square. Anthers oblong, upto 0.7 mm long. Nuts 1.3-1.5 mm broad, obpyriform; glumes inflated in the centre on the back with spreading scarious margins. Style short and broad, more than twice broader than the staminal filament, as long as to slightly shorter than the nuts.

Flowering and Fruiting: September to November.

Distribution : Nandurbar district.

Habitat : Along the banks of streams, in marshes of open grasslands, in ditches along the road sides.

Specimens examined: Nandurbar Dist., Sita khai, *TAK* 656; Yashwant lake, *TAK* 1168; Legapani, *TAK* 2700. Jalgaon Dist., Waghur dam, *TAK* 1492; Hatnur dam, *TAK* 1584.

Note : Very variable like subsp. *dichotoma*, in respects of pubescence, nature of inflorescence and number of spikelets.

Fimbristylis littoralis Gaudich. in Freyc. Voy. Bot. 413. 1826; Lakshmin. in sharma *et al.*, Fl. Maharashtra State, Monocot. 313. 1996; Prasad and Singh, Sedges of Karnataka 186. 2002. *F.*

miliacea sensu Vahl, Enum. Pl. 2: 287. 1806 (non *Scirpus miliaceus* L.); Clarke in Hook. f., Fl. Brit. India 6: 644. 1894.**(Plate-I)**

Perennials, 20-80 cm tall, with spongy, thickened base. Stems tufted, flat, 4 sided, with 2 sharp edges, 1-2 mm wide, smooth, glabrous, striate. Leaves: sheaths glabrous, 8-12 cm long, reticulate; ligule absent; blades of the stem reduced to sheaths; those of the sterile shoots, well developed, flat, 3-4.5 mm wide, laterally compressed, equitant, without prominent mid-rib, much shorter or as long as stem, scabrid in the upper half, acute at apex. Inflorescence compound or decompound, diffuse or more or less contracted; involucral bracts 3-5, setaceous or narrowly foliaceous, much shorter than the inflorescence; primary rays 5-10, the longest ones 4-5 cm long, rigid, erect, with many spikelets. Spikelets solitary, globose or ovoid-globose, 2-3 mm across, rusty brown, densely many flowered; rhachilla wingless. Glumes spiral, membranous, boat-shaped, broadly ovate, 1-1.7 x 0.8-1.3 mm, reddish-brown; keel 3-nerved, with a lateral brown streak on either side close to the mid nerve; sides nerveless, narrowly hyaline on margins, almost rounded at apex, muticous. Stamens 2; anthers oblong, upto 0.5 mm long. Nuts trigonous, obovoid, 0.7-1 x 0.3-0.4 mm, densely verruculose in between transversely oblong faint cells, shortly stipitate. Style 3-fid, upto 0.6 mm long, hairy.

Flowering and Fruiting: September to January.

Distribution : Jalgaon and Dhule districts.

Habitat : Common. Along the margins of ponds, streams and canals,common weed in rice fields, road sides, ditches, other moist and swampy areas.

Specimens examined: Jalgaon Dist., Manudevi forest, *TAK* 317; Patnadevi forest, *TAK* 1502; Hatnur dam, *TAK* 1609; Waghur dam *TAK* 2792. Dhule Dist., Nakana talav, *TAK* 2071; Panjara river, *TAK* 1580; Charanmal, *TAK* 1768.

Note : It is distinguished from *F. miliacea* by laterally compressed leaves and equitant without prominent mid-rib, and the small globose spikelets. There is much confusion regarding the nomenclature of this species and much can be written about it. But in many floras this species is described as *F. miliacea* (L.) Vahl based on *Scirpus miliaceus* L. But this Linnean specimen was found to be *F. quinquanqularis* (Vahl) Kunth (Clarke in J. Linn. Soc. Bot. 30: 312. 1894). Consequently S. T. Blake (in J. Arn. Arb. 35: 217.1954) accepted *F. littoralis* Gaudich. as the correct name for this species and the same was followed by many subsequent authors including Kern. l. c. Same has been followed in the present study.

Fimbristylis tetragona R. Br., Prodr. 226. 1810; Clarke in Hook. f., Fl. Brit. India 6: 631. 1893; Lakshmin. in Sharma *et al*., Fl. Maharashtra State, Monocot. 319. 1996; Yadav & Sardesai, Flora of Kolhapur Dist. 544. 2002. **(Plate-I)**

Annual or perennial, 10-40 cm tall, with short rhizome. Stems densely tufted, angular, 0.7-1 mm wide, slender, smooth, striate. Leaves: sheaths glabrous, membranous, yellowish to brown; blades reduced, those on the sterile shoots often 1-3, with involute margins, much shorter than the stem, glabrous, acute-acuminate at apex. Inflorescence a single terminal spikelet, ovoid to spherical, 5-10 x 4-7 mm, densely many flowered, yellowish to dark brown, obtuse or subacute; rhachilla narrowly winged; involucral bracts absent or of 2-4 empty glumes. Glumes spiral, closely imbricate, membranous, oblong-ovate to oblong, 3-4 x 1.4-1.8 mm, glabrous, yellowish to pale brown, with 3-nerved, smooth keel, sides nerveless, with incurved margins, rounded at apex, obtuse at base. Stamens 2; anthers linear, upto 1.2 mm long, apiculate. Nuts biconvex, oblong-cylidrical, 1.7-2 x 0.4-0.5 mm, obtuse at apex, gradually narrowed below, subcuneate, short stipitate at base, maturing cream-coloured, each side, with 5 to 8 rows of transversely oblong-hexagonal cells, smooth gynophore, beaked by the persistent style base. Style 2-fid or 3-fid, linear, sparsely ciliate, dilated at base, often long persistent on the nut.

Flowering and Fruiting: August to December.

Distribution : Jalgaon & Nandurbar districts.

Habitat : Occasional. Along the margins of rice fields, streams, pastures.

Specimens examined: Jalgaon Dist., Langdha Amba, *TAK* 1444; Hatnur dam, *TAK* 1973; Waghur dam *TAK* 3187. Nandurbar Dist., Toranmal, *TAK* 1522; Kanjala, *TAK* 1819; Bilgaon, *TAK* 2852.

Note: The plants are mostly leafless due to cauline leaves reduced to sheaths. However, some stems bear well-developed long bladed leaves but there are no exception to the spikelets and the floral structures.

Fimbristylis woodrowii Clarke in Bull. Misc. Inf. 227. 1898. et in J. Linn. Soc. Bot. 34: 68. 1898; Lakshmin. in Sharma *et al*., Fl. Maharashtra State, Monocot. 323. 1996; C.D. K. Cook, Aquatic and wetland plants of India. 151:1996. **(Plate-I)**

Annual, with fibrous roots 7-18 cm tall. Stems tufted, slender, compressed below the the inflorescence, 0.2-0.8 mm wide. Leaves: sheaths striate, upto 2.5 cm long; ligule a fringe of minute hairs; blades shorter than the stem, flat, 2-10 x 0.5-1.5 mm, margins slightly thickened on the upper surface, acuminate at apex. Inflorescence simple or compound umbel, with few to many spikelets; involucral bracts 1-3, lowest smaller than to overtopping the inflorescence; primary rays 2-7 angular, compressed. Spikelets paired or in clusters of 3, of which one sessile and the other two short-peduncled, at times solitary, ovoid-lanceolate, 2-6 x 1-2 mm, few-flowered, acute at apex, faintly angled; rhachilla winged. Glumes spiral, membranous, broadly triangular-ovate, 1.2-1.8 x 1-1.3 mm, hyaline towards margins, keeled; keel 3-nerved, acute and mucronate at apex. Stamen 1; anthers oblong, upto 0.5 mm long, minutely apiculate at apex. Nuts trigonous, with prominent angles, obovoid, umbonulate, shortly stipitate, 0.7-0.8 x 0.4-0.7 mm, smooth, at times sparsely verruculose, creamish; epidermal cells transversely linear-oblong. Style 3-fid.

Flowering and Fruiting: August to November.

Distribution : Jalgaon district.

Habitat : Frequent. Along the margins of river, banks of water courses, moist open grasslands, marshy areas in the forest.

Specimens examined: Jalgaon Dist., Girna river, *TAK* 1484; Tapi river, *TAK* 1638; Chopda forest, *TAK* 1804; Hatnur dam, *TAK* 3476; Waghur dam *TAK* 3851.

MATERIALS AND METHODS

While working on Sedges of Khandesh region of Maharashtra State, we undertook frequent collection tours in every season to collect plants. The outcome of the collection tour was the 04 species and 1 subspecies of *Fimbristylis* Vahl. All taxa have been identified with the help of available literature. The voucher specimens are deposited at the herbarium of Department of Botany, H. J. Thim College, Jalgaon, Maharashtra. The plants have been described with their Latin names, followed by authors citations. Detailed descriptions of the taxa, flowering and fruiting period and distributions, precise locations and exsiccate numbers are appended at the end.

RESULT AND DISCUSSION

During the survey of pertinent literature (Clarke, 1893; Rao and Verma, 1982; Shah, 1978; Singh, 2001; Wadood Khan, 1998; Lakshminarsimhan, 1996; Cook, 1996; Yadav and Sardesai 2002; Prasad 2002; Patil, 2003; Kshirsagar, 2008) and by consulting the BSI Herbarium Pune. We found that, these species were not reported in any of the Khandesh floras. This clearly reveals that, these species are rare to flora of Maharashtra State, even India as a whole. Thus, the described species are new record to the flora of Khandesh region of Maharashtra State. The voucher specimens have been deposited in the herbarium of Department of Botany, H. J. Thim College of Arts and Science Mehrun, Jalgaon.

On close examination of herbarium specimens and detailed scrutiny of literature published till today on these taxa, it can be claimed that these are new distributional records for Khandesh region from Maharashtra.

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Fimbristylis cinnamometorum (Vahl) Kunth

Fimbristylis dichotoma (L.) Vahl subsp. *depauperata* (R.Br.) Kern

Fimbristylis littoralis Gaudich.

Fimbristylis tetragona R. Br. *Fimbristylis woodrowii* Clarke

Plate-I

REFERENCES

1. Clarke, C. B. (1893 and 1894). Cyperaceae In: J. D. Hooker, *Flora of British India*. 6: 585. et. 6: 673, London.
2. Cook, C. D. K. (1996). "Cyperaceae" In: *Aquatic and Wetland Plants of India*. Oxford University Press London. 125-181.
3. Garud, B. D. (1998). Studies on the Flora of Toranmal, Dhule District in Maharashtra Statre. Ph. D. Thesis, North Maharashtra University, Jalgaon: 374-507.
4. Karnik, C. R. (1959). Studies on the flora and vegetation of Satpuras Bombay State.
5. (India), With a note on the Satpuda hypothesis, Ph.D. Thesis, University of Poona, Pune,14-108.

6. Karthikeyan S. K., Jain, S. K., Nayer, M. P. and Sanjappa, M. (1989). Cyperaceae in Florae Indicae Enumerato: Monocotyledonae, BSI. Kolkata. 71-73.
7. Kshirsagar, S. R. and Patil, D. A. (2008). *Flora of Jalgaon District, Maharashtra*. Bishen Singh Mahendra Pal Singh, Dehradun. 231-376.
8. Lakshminarasimhan, P. (1996). "Cyperaceae" In: Sharma B. D., S. Karthikeyan and N. P. Singh. *Flora of Maharashtra State. (Monocotyledons)*. Botanical survey of India, Kolkata. 270-377.
9. Mathew, V. (1988). Forest flora of Dhule District, Ph.D. Thesis, Sardar Patel University,V. V. Nagar, 607-611.
10. Patil, D. A. (2003). *Flora of Dhule and Nandurbar Districts Maharashtra*. Bishen Singh Mahendra Pal Singh, Dehradun. 628-649.
11. Prasad, V. P. and Singh, N. P. (2002). *Sedges of Karnataka (India)family Cyperaceae* . Scientific publishers (India), Jodhpur. 44-324.
12. Rao, R. S. and Verma, D. M. (1982). *Cyperaceae of North East India*. Botanical Survey of India, Kolkata, 41-47.
13. Salunkhe, I. B. (1995). Contribution to the flora and vegetation studies of southern.
14. Satpuda ranges with reference to Yawal wild life sanctuary, Ph.D.Thesis, University of Poona, Pune, 28-138.
15. Shah, G. L. (1978). *Flora of Gujrat State*. University press, Sardar Patel University, Vallabh Vidyanagar. Vol. 2. 720-882.
16. Singh, N. P, Khanna, K. K., Mudgal, V. and Dixit, R. D. (2001). *Flora of Madhya Pradesh*. Botanical Survey of India, Kolkata,Vol.3: 236-546.
17. Tanveer A. Khan, Pooja O. Pandey and G. S. Chaudhari 2010. The genus *Fimbristylis* Vahl.in Khandesh (Maharashtra) in *J. Bioinfolet* 7 (3): 201-208.
18. Wadood Khan, M. A. (1998). Cyperaceae In: Naik V. N. *Flora of Marathwada*. Amruth Publ. Aurangabad (M.S.) 2: 695-730.
19. Yadav, S. R. and Sardesai, M. M. (2002). *Flora of Kolhapur District*. Shivaji University, Kolhapur (India) 535-611.
20. Yadav, S.S., V.S. Patil and V. Mathew (2003). Seven new flowering plant records from Khandesh Satpuda, Maharashtra State. *Plant Archives*, 3(1):129-131.