

NEW RECORDS OF SPECIES OF SPOROBOLUS (POACEAE: CHLORIDOIDEAE: CYNODONTAE: ZOYSIEAE) FROM BHANDARA DISTRICT OF MAHARASHTRA STATE, INDIA

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ABSTRACT: Four species of *Sporobolus* were recorded from Bhandara district of the Maharashtra State for the first time. These species are *S. diandrus*, *S. coromandelianus*, *S. tetragonus* and *S. fertilis*. The present work embodies a detail description, diagram and illustration of the species.

Keywords: Poaceae, Sporobolus species, Bhandara District.

INTRODUCTION:

The Poaceae is the fourth largest family of flowering plants, globally represented by 10,550 species under 715 genera (Mabberley 2008). India is known to comprise 261 genera including 1334 species of grasses (Karthikeyan 2005). Potdar (2006) reported that 373 species of grasses occur in Maharashtra, 124 are reported to be endemic to Peninsular India of which 34 are known to occur only in Maharashtra and there are 14 monotypic genera.

Sporobolus R. Brown., is a cosmopolitan genus, forming one of the main genera of sub-family Chloridoideae. Tribe Eragrostideae and sub-tribe Sporobolinae (Clayton and Renvoize 1992). The genus include 160 species distributed in the tropical and pan-tropical regions of the world (Clayton and Renvoize 1986). Baijans and Veldkamp (1961) reported species from Malesia. Peterson et al. 2004 briefly discussed relationship among all native species of *Sporobolus* in North Eastern Mexico. *S. coromandelianus* is a species pervasive from tropical Africa to India extending up to Australia (Phillips 1995). Simon and Jacobs (1999) revised the genus and reported twenty six species from Australia.

In India Hooker (1897) reported 14 species and Bor (1960) made extensive studies on Grasses of Burma, Ceylon, India and Pakistan reported twenty one species and Karthikeyan (2005) reported nineteen species of *Sporobolus* from India. Patunkar (1980) recorded three species, Mahabale (1987) reported two species; Ugemuge (1985) reported three species. Cope (1998) recorded two new species viz., *S. mopane* and *S. fibrosus*. Shukla (1996) enumerated three species. Saldhana and Nicolson (1976) reported four species. Pathak and Singh 2013 recorded *S. coromandelianus* as a new species from NE India. The Indian biodiversity portal reveals nineteen species *S. indicus*, *S. tourneuxi*, *S. diandrus*, *S. pallidus*, *S. fertilis*, *S. piliferus*, *S. virginicus*, *S. coromandelianus*, *S. wallichii*, *S. tremulus*, *S. violascens*, *S. orientalis*, *S. capillaris*, *S. junceus*, *S. nervosus*, *S. tenuissimum*, *S. maderaspatanus*, *S. glaucifolius*, *S. mangaloricus*.

The present work on the investigation of grasses have been undertaken as there are no earlier reports.

AREA UNDER STUDY:

Bhandara district lies between 20°38' to 21°36' NL and 79°27' to 80°06' EL. This district is situated on NE side of Maharashtra State. The adjoining districts are Gondia on the eastern side, on the northern side Balaghat district of Madhya Pradesh and on Western side Nagpur district and to the south is Chandrapur district. The district is known as Lake District of Maharashtra. It covers an area of about 3717 sq.km. of which rice is cultivated in 1718.63 sq.km. It is inhabited by 1254 lakes. The farmers cultivate two crops of paddy. The total forest area of the district is 645.58 sq.km. The district lies in the basin of Wainganga River with its tributaries like Bawanthadi, Chulband, Sur, Godra rivers. The average rainfall is 1250-1500 mm/year. The mean minimum temperature is 6°C and mean maximum temperature is 45°C. It has an average elevation of 357 meters.

METHODOLOGY

The field visits were conducted in the in the various localities in various seasons. The herbarium specimens were collected, identified and deposited in the herbarium of Department of Botany, J M Patel College, Bhandara. Mostly the species were collected from paddy fields and its adjoining areas. Field data as well as other scientific information is noted in the field book. Beside the local flora, monographs of the genus is referred for identification. The material is dissected under the microscope and hand line diagram is prepared. Taxonomic key is prepared to identify the species. The description of plant is taken from web of Grass Base (Clayton et.al. 2006)

RESULT:**Description of Genus:-*****Sporobolus* R.Brown.,**

Annuals or perennials, tufted or sometimes with creeping rhizomes or stolons. Leaf blades flat or rolled, linear to narrowly lanceolate; ligule a line of hairs. Inflorescence an open or contracted panicle, rarely spike-like. Spikelets with 1 floret, subterete, not compressed or keeled, glabrous; rachilla disarticulating above glumes; glumes usually shorter than lemma, unequal, membranous, deciduous or persistent, 1-veined or veinless, apex obtuse, acute or acuminate; lemma elliptic to narrowly ovate, thinly membranous, 1–3-veined, glabrous, rounded on back, awnless; palea equaling or shorter than lemma, depressed between veins and often splitting lengthways as grain grows. Stamens 2–3. Grain globose to ellipsoid, rounded or truncate, pericarp free, commonly swelling when wet and expelling the grain, which often adheres to spikelet apex.

TAXONOMIC KEY

(1a) Perennial.....	2
(1b) Annual.....	3
(2a) Stamens 2	<i>S.diandrus</i>
(2b) Stamens 3	<i>S.fertilis</i>
(3a) Grains obovate	<i>S.coromandelianus</i>
(3b) Grains quadrangular	<i>S.tetragonus</i>

Description of Species:

1. *Sporobolus coromandelianus* (Retzius) Kunth, Révis. Gramin. 1: 68. 1829; Gamble, Fl. Madras 3: (1258). 1934; Bor, Grasses of Burma, Ceylon, India, Pakistan: 627. 1960 *Agrostis coromandeliana* Retzius, Observ. Bot. 4:19. 1786.

Tufted, rosette forming, annual. Culms caespitose, erect or geniculately ascending at base, 8–22 cm, surface glabrous-ribbed, furrowed at the middle, greenish; nodes round, slightly depressed, glabrous. Leaf blades lanceolate to linear lanceolate, acuminate, base narrow, truncate, 2–7.5 × 0.3–0.5 cm, adaxial surface scabrid to rugose, tuberculate white, hairs present at base, ca 0.5–0.6 mm, abaxial surface rough, glabrous, margins glabrous, rarely ciliate at base, margins serrulate, cartilaginous, hirsute at apex, mid-rib prominent, raised abaxially, lateral veins many; ligule 0.5–0.6 mm, a fringe of white, villous hairy; sheath keeled, terete, mouth ciliate, outer margins cartilaginous, 1.5–1.8 cm. Inflorescence an effuse, pyramidal, panicle, 2–8 × 1.5–5 cm, branches whorled, spreading, 3–7 noded, having 5–8 racemes per node; peduncle 4–8.5 cm, ribbed. Racemes 1–4.8 cm, hairy when young, rachis scabrid, with purplish glands near nodes. Spikelets paired towards base, with long 0.5 mm, to short 0.2–0.3 mm pedicels and solitary towards apex. Spikelets lanceolate acuminate at apex, truncate at base, 1–1.5 × 0.4 mm, glabrous, subterete, greenish yellow, breaking up at maturity. Glumes deciduous, dissimilar, reaching apex of florets. Lower glume minute, ovate to oblong, obtuse at apex, 0.3–0.4 × 0.1–0.2 mm, hyaline, membranous, nerveless. Upper glume oblong to lanceolate, apex acute, 0.8–1.5 × 0.4–0.5 mm, membranous, surface smooth, glabrous, 1-nerved, grayish green. Lemma oblong to lanceolate, apex acute, 1.5 × 0.4 mm, chartaceous, surface smooth, glabrous, 1-nerved, grayish green. Palea oblong, 0.7–1 × 0.4 mm, 2-nerved, not keeled, hyaline. Stamens 3, rarely 2, anthers purplish, 0.2–0.3 mm, stamens 0.4 mm long. Pistil 0.8–1 mm, ovary globose, white, style 2, stigma plumose, dark brown. Lodicules 2, hyaline, truncate, 0.2–0.3 mm. Caryopsis ovate, 0.8–1 × 0.6 mm, 0.7–0.8 mm, dark brown. **Figure 1.**

Habitat: Grows in patches in dry, waste lands and sometimes along forest edges. Also seen to grow in disturbed landslide zones

Flowering & Fruiting: September to March.

Locality: Purkabodi

Specimen Examined: 537

Distribution: Afghanistan, Java, Myanmar, New Guinea, Pakistan, South Africa, Sri Lanka, Thailand. INDIA: Andhra Pradesh, Bihar, Daman & Diu, Gujarat, Karnataka, Maharashtra, Mizoram, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh

2. *Sporobolus diandrus* (Retz.) P.Beauv., Ess. Agrostogr 26: 147, 178, 1812; Gamble, Fl. Madras 1817(1258). 1934; Bor, Grasses India 629. 1960 *Agrostis diandra* Retz., Obs. Bot. 5:19. 1789

Perennial; caespitose. Butt sheaths herbaceous. Culms erect; 30–90 cm long. Ligule a fringe of hairs. Leaf-blades flat, or convolute; 10–25 cm long; 2–4 mm wide. Leaf-blade apex attenuate. Inflorescence a panicle. Panicle open; lanceolate; 10–15 cm long; 2–4 cm wide; contracted about primary branches. Primary panicle branches spreading; bearing spikelets almost to the base. Panicle branches glabrous in axils. Spikelets solitary. Fertile spikelets pedicelled. Pedicels linear. Spikelets comprising 1 fertile florets; without rhachilla extension. Spikelets lanceolate; subterete; 1.2–1.6 mm long; breaking up at maturity; disarticulating below each fertile floret. Glumes deciduous; similar; shorter than spikelet; thinner than fertile lemma. Lower glume oblong; 0.5–0.6 length of upper glume; without keels; 0-veined. Lower glume lateral veins absent. Lower glume apex obtuse. Upper glume oblong; 0.5–0.66 length of adjacent fertile lemma; hyaline; without keels; 1-veined. Upper glume lateral veins absent. Upper glume apex obtuse, or acute. Fertile lemma ovate; 1.5–1.8 mm long; membranous; without keel;

1 -veined. Lemma apex acute. Palea 1 length of lemma; 2 -veined. Palea keels approximate. Anthers 2; 0.4 mm long. Caryopsis with free soft pericarp; oblong, or obovoid; 0.8–1 mm long. See Figure 2.

Habitat: Dry hill slopes, grassy fields, roadsides

Flowering and Fruiting: July – September

Locality: Korambi

Specimen examined: VJT-707

Distribution: Africa, Macaronesia, northeast tropical, and western Indian Ocean. Asia-temperate: Arabia, China, and eastern Asia. Asia-tropical: India, Indo-China, Malesia, and Papuasias. Pacific: southwestern, south-central, northwestern, and north-central. South America: Mesoamericana.

3. *Sporobolus tetragonus* Bor. In Kew Bull.1949, 251 (1949)., *S.pulchellus* of Fl.Brit.Ind.7,252 (1896)non R.Br.(1810)

Annual. Culms 25–55 cm long. Ligule a fringe of hairs. Leaf-blades linear, or lanceolate; 5–15 cm long; 4–9 mm wide; flaccid. Leaf-blade surface scabrous; rough on both sides. Leaf-blade margins scabrous; tuberculate-ciliate; hairy at base. Inflorescence a panicle. Panicle open; elliptic; effuse; 10–25 cm long; 4–8 cm wide. Primary panicle branches whorled at most nodes; rebranched above middle; 2–5 cm long. Panicle branches smooth, or scaberulous. Spikelets solitary. Fertile spikelets pedicelled. Pedicels 1–1.5 mm long; scaberulous. Spikelets comprising 1 fertile florets; without rhachilla extension. Spikelets lanceolate; subterete; 1.75 mm long; breaking up at maturity; disarticulating below each fertile floret. Glumes deciduous; dissimilar; reaching apex of florets. Lower glume lanceolate; 1 mm long; 0.5–0.66 length of upper glume; hyaline; without keels; 0 -veined. Lower glume lateral veins absent. Lower glume surface scabrous; rough above. Lower glume apex acute. Upper glume elliptic; 1.75 mm long; 1 length of adjacent fertile lemma; membranous; without keels; 1 -veined. Upper glume lateral veins absent. Upper glume surface scabrous; rough above. Upper glume apex acute. Fertile lemma elliptic; 1.75 mm long; membranous; without keel; 1 -veined. Lemma apex obtuse. Palea 1–1.5 mm long; 2 -veined. Palea keels approximate.

Anthers 3. Caryopsis with free soft pericarp; ellipsoid; quadrangular; 0.6 mm long.

Figure 3

Habitat- Dry hill slopes, grassy fields, roadsides,

Flowering and Fruiting- July - November

Specimen Examined -VJT-860

Locality: Tumsar

Distribution -Bihar, Burma, Madhya Pradesh in India, China. Asia-tropical: India and Indo-China

4. *Sporobolus fertilis* (Steudel)W D Clayton, Kew Bulletin 19:291, 1965 *Agrostis fertilis* Steudel, Syn PI Glum.1:170 1854 *Sporobolus indicus* auct.non(L.)R.Br:Gamble, Fl Madras 1817 (1258):1934

Perennial; caespitose. Butt sheaths scarious. Culms erect; 90–160 cm long; 2–5 mm diam. Ligule a fringe of hairs. Leaf-blades flat, or convolute; 25–50 cm long; 3–5 mm wide. Leaf-blade apex attenuate.

Inflorescence a panicle. Panicle open; linear; 15–35 cm long; 1–2 cm wide; contracted about primary branches. Primary panicle branches appressed, or ascending; 2–4 cm long; bearing spikelets almost to the base. Panicle branches stiff; glabrous in axils. Spikelets solitary. Fertile spikelets pedicelled. Pedicels linear. Spikelets comprising 1 fertile florets; without rhachilla extension. Spikelets lanceolate; subterete; 1.7–2 mm long; breaking up at maturity; disarticulating below each fertile floret. Glumes deciduous; similar; shorter than spikelet; thinner than fertile lemma. Lower glume oblong; 0.4 mm long; 0.5 length of upper glume; without keels; 0 -veined. Lower glume lateral veins absent. Lower glume apex truncate. Upper glume oblong; 1 mm long; 0.5 length of adjacent fertile lemma; hyaline; without keels; 1 -veined. Upper glume lateral veins absent. Upper glume apex obtuse, or acute. Fertile lemma ovate; 1.7–2 mm long; membranous; without keel; 1 -veined. Lemma apex acute. Palea 1 length of

lemma; 2 -veined. Palea keels approximate. Anthers 3; 0.7 mm long. Caryopsis with free soft pericarp; obovoid; exposed between gaping lemma and palea at maturity; 0.8–1 mm long; truncate. See Figure 4.

Habitat- Dry hill slopes, grassy fields, roadsides,

Flowering and Fruiting: July – August

Locality: Sakoli

Specimen Examined- VJT –1020

Distribution: India, Malaysia Asia-temperate: Caucasus, China, and eastern Asia. Asia-tropical: India, Indo-China, Malesia, and Papuasias. Australasia: Australia. Pacific: southwestern, south-central, and northwestern.

DISCUSSION AND CONCLUSION

These four species of *Sporobolus* is reported for the first time from Bhandara district of Maharashtra State. It is a valuable fodder grass. Further extensive and intensive floristic investigations are needed to record different species of this genus in India.

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