

# NEW DISTRIBUTIONAL RECORDS OF GRASSES TO THE STATE OF GOA

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## ABSTRACT

Grass flora of Goa is poorly documented. The present studies on grasses resulted in the addition of 20 species to the State. The paper reports these new records along with their nomenclature, description, field notes and specimens examined.

## INTRODUCTION

The family Poaceae occupies second position in dominance among the Angiosperms of the State of Goa (Rao, 1985). Though intensive studies on grass flora were carried out in the adjoining regions of Goa (Sreekumar & Nair, 1991; Salunkhe, 1995; Lakshminarasimhan, 1996; Bhat & Nagendran, 2001), much remains to be known from Goa on the systematics of this group. After the liberation of Goa from Portuguese, the botanising of the State got new impetus. Vartak (1966) reported 92 grass species for the broader area of Gomantak, encompassing areas from Karnataka and Maharashtra, of which only 15 were actually referred from Goa. Rao (1986) listed 62 species of grasses under 38 genera. To this list, 24 grass species were added by Rajkumar *et al.* (1999) and four by Vaishali & Janarthanam (2004).

Recently, two new species are added under the genus *Glyphochloa* by Janarthanam *et al.* (2000) and Fonseca & Janarthanam (in press). Present studies on the grasses of Goa are taken up to fill the gap existing in the taxonomic studies of this group from this region. The recent field investigations in Goa State resulted in addition of 20 species that were not reported in earlier works. With these additional distributional records, the total number of grasses within the State has increased to 116 species referable to 57 genera.

All the specimens are deposited in the herbarium, Department of Botany, Goa University. The taxonomic account of new records including their nomenclature, description, field notes and specimens examined are provided below.

## ENUMERATION

**Aristida setacea** Retz. Obs. Bot. 4: 22. 1786; Blatt. & McCann, Bombay Grass. 211. 1935; Cooke, Fl. Bombay 3: 529. 1958 (repr. ed.); Bor, Grass. Bur. Cey. Ind. Pak. 412. 1960; Sreekumar & Nair, Fl. Kerala Grass. 328. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 397. 1996; Bhat & Nagendran, Sedges and Grass. 116.t.33. 2001.

Perennial. Culms up to 150 cm high, tufted, erect. Inflorescence 10 - 35 cm long panicle. Spikelets linear-lanceolate, up to 15 mm long; pedicel 1-10 mm long, flattened. Lower glume aristate; lemma linear-lanceolate, awned; awn trifold, up to 35 mm long.

Found growing in dry open areas along roadsides and on lateritic plateaus.

*Specimen examined:* Verna, 16.10.2003, Harshala S. Gad 86.

**Bhidea burnsiiana** Bor in Kew Bull. 1948: 445. 1949 & Grass. Bur. Cey. Ind. Pak. 103. 1960; Sreekumar & Nair, Fl. Kerala Grass. 45. t. 5. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 413. 1996; Bhat & Nagendran, Sedges & Grass. 246. t.72. 2001.

Annual. Culms up to 40 cm high. Ligule membranous, fimbriate at apex. Racemes 2, up to 6 cm long, abscission of rhachis slightly oblique. Sessile spikelets lanceolate, ca 8 mm long, lower glume with unequal hyaline wings on margins.

Found growing on lateritic rocks in open area.

*Specimen examined:* Verna, 16.10.2003, Harshala S. Gad 89.

**Bhidea fischeri** Sreekumar & Shetty in Kew Bull. 42: 683. 1987; Sreekumar & Nair, Fl. Kerala Grass. 47. t. 6. 1991.

Annual. Culms up to 28 cm high, erect. Ligule membranous, truncate at apex. Racemes 2, up to 3.5 cm long, abscission of rhachis extremely oblique. Sessile spikelets lanceolate, ca 6 mm long. Lower glume with extremely unequal hyaline wings on both margins.

Found growing on lateritic rocks in open areas, in association with *Bhidea burnsiiana*.

*Specimen examined:* Goa University campus, 9.10.2003, Harshala S. Gad 82.

**Brachiaria miliiformis** (J.S. Presl ex C.B. Presl) A. Chase in Contrib. U.S. Nat. Herb. 22: 35. 1920; Bor, Grass. Bur. Cey. Ind. Pak. 283. 1960; Sreekumar & Nair, Fl. Kerala Grass. 220. t. 5. 1991; Bhat & Nagendran, Sedges and Grass. 185. t. 56. 2001. *Panicum miliiforme* J.S. Presl ex C.B. Presl, Rel. Haenk. 1: 300. 1830.

Annual. Culms up to 40 cm high, decumbent, pubescent. Leaves lanceolate, up to 6 x 0.9 cm. Racemes 3 - 6 in number, up to 4.5 cm long, alternate, angular. Rachis triquetrous or filiform. Spikelets broadly elliptic, tapering at base. Pedicel angular, ca 1mm long; abscission discoid. Lower floret epaleate.

Found in moist shady areas.

*Specimen examined:* St. Cruz, 23.6.2004, Harshala S. Gad 116.

**Brachiaria ramosa** (L.) Stapf in Prain, Fl. Trop. Afr. 9:542.1919; Blatt & McCann, Bombay Grass. 134.1935; Bor, Grass. Bur. Cey. Ind. Pak. 284. 1960; Sreekumar & Nair, Fl. Kerala Grass. 223. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 417. 1996; Bhat & Nagendran, Sedges and Grass. 185. 2001. *Panicum ramosum* L. Mant. 1: 29. 1767; Cooke, Fl. Bombay 3:449.1958 (repr.ed.)

Annual. Culms up to 74 cm long, erect or decumbent. Leaves lanceolate - linear or lanceolate, 2 - 10 x 0.6 - 1.7 cm. Ligule a row of hairs. Panicle up to 16 cm long, lax. Racemes 4- 9, alternate, 2- 5 cm long. Rachis angular. Spikelets ovate - elliptic, ca 2 mm long, softly hairy.

Found in moist open areas of lateritic plateau.

*Specimen examined:* Goa University campus, 28.7.2003, Harshala S. Gad 13.

**Chloris barbata** Swartz, Fl. Ind. Occ. 1: 200. 1797; Blatt & McCann, Bombay Grass. 256. t.

171. 1935; Cooke, Fl. Bombay 3: 557. 1958 (repr. ed.); Sreekumar & Nair, Fl. Kerala Grass. 357. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 425. 1996; Bhat & Nagendran, Sedges and Grass. 246. t. 72. 2001.

Annual. Culms erect, up to 54 cm high. Ligule a membranous rim, fimbriate at apex. Inflorescence of 4-8 digitate spikes, each up to 5 cm long. Spikelets sessile, 2 - seriate, obovate, ca 2 mm long, 2 - flowered. Fertile lemmas ovate, ca 2 x 1 mm, awned, coriaceous, dorsally villous, 3 - nerved, with fringes of white hairs on margins.

Found along roadsides in open moist areas.

*Specimen examined:* Guirim along NH 17, 5.8.2003, Harshala S. Gad 24.

**Cyrtococcum patens** (L.) A. Camus in Bull. Mus. Hist. Nat. Paris 27: 118. 1921; Blatt. & McCann, Bombay Grass. 170. 1935; Bor, Grass. Bur. Cey. Ind. Pak. 292. 1960; Sreekumar & Nair, Fl. Kerala Grass. 231. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 444. 1996; Bhat & Nagendran, Sedges and Grass. 127. 2001. *Panicum patens* L. Sp. Pl. 58. 1753; Cooke, Fl. Bombay 3: 455. 1958 (repr. ed.).

Annual. Culms up to 60 cm long, creeping or trailing, rooting at nodes. Leaves lanceolate, up to 7 x 1.3 cm, acuminate, undulated along one margin. Inflorescence a panicle, up to 25 cm long. Spikelets ovate, ca 2 x 1 mm, villous. Upper lemma deltoid.

Found in moist shady areas.

*Specimen examined:* Goa University campus, 11.9.2003, Harshala S. Gad 44.

**Digitaria abludens** (Roem. & Schult.) Veldk. in Blumea 21: 53.1973; Sreekumar & Nair, Fl. Kerala Grass. 235. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 461. 1996. *Panicum abludens* Roem. & Schult. Syst. Veg. 2: 457. 1817. *Paspalum granulare* Trin. ex. Spreng. Neue Entdeck 2: 47. 1821. *P. pedicellare* Trin. ex Hook. f. Fl. Brit. India 7:

19. 1896. *Digitaria pedicellaris* (Trin. ex Hook. f.) Prain, Bengal Pl. 1181. 1903 (2: 890.1963, repr.ed.); Cooke, Fl. Bombay 3: 458.1958 (repr.ed.); Blatt. & McCann, Bombay Grass. 126.t.80.1935. *Digitaria granularis* (Trin. ex. Spreng.) Henr. Monogr. Gen. Digitaria 302. 1950; Bor, Grass. Bur. Cey. Ind. Pak. 301. 1960.

Annual. Culms up to 30 cm high, erect or geniculate. Ligule membranous, lacerate at apex. Racemes 2 - 3 in number, up to 5 cm long. Rachis triquetrous, up to 0.2 mm wide. Spikelets broadly elliptic to obovate, softly hairy. Pedicels 1-5 mm long, triquetrous, abscission discoid. Lower glume absent. Upper glume as long as spikelet, obovate, ca 2 x 1 mm, softly hairy, hairs adpressed to the surface.

Found in moist open areas of lateritic plateau.

*Specimen examined:* Goa University campus, 16.6.2004, Harshala S. Gad 113.

**Digitaria longiflora** (Retz.) Pers. Syn. Pl. 1: 85. 1805; Blatt & McCann, Bombay Grass. 127. t. 81. 1935; Cooke, Fl. Bombay 3: 458. 1958 (repr.ed.); Bor, Grass. Bur. Cey. Ind. Pak. 302. 1960; Sreekumar & Nair, Fl. Kerala Grass. 239.1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 463. 1996. *Paspalum longiflora* Retz. Obs. Bot. 4:15.1786

Annual or perennial. Culms up to 55 cm long, creeping, rooting at lower nodes. Leaves lanceolate; ligule ovate, membranous. Racemes 2-3, digitate, up to 8 cm long. Rachis flat, narrowly winged. Spikelets ovate - elliptic, solitary or in clusters of 3, softly hairy, greenish yellow in colour.

Found commonly growing in moist open areas, waste places and field bunds.

*Specimen examined:* Camurlim (Bardez), 7.9.2003, Harshala S. Gad 41.

**Digitaria setigera** Roth ex Roem. & Schult. Syst. Veg. 2: 474. 1817; Bor, Grass. Bur. Cey. Ind. Pak. 305. 1960; Sreekumar & Nair, Fl. Kerala Grass. 241. 1991; Lakshminarasimhan

in Sharma *et al.* Fl. Maharashtra Monocot. 463. 1996.

Annual. Culms up to 25 cm high, erect or geniculate. Ligule membranous; lacerate, bearded at mouth. Racemes 2 - 4, up to 5 cm long. Rachis triquetrous, narrowly winged, *ca* 0.3 mm wide. Spikelets broadly elliptic - obovate, softly hairy. Pedicels 0.5 - 2.5 mm long, flattened. Lower glume absent. Upper glume varies in length or minute scale-like or completely absent.

Found in moist open area of lateritic plateau.

*Specimen examined:* Goa University campus, 16.6.2004, *Harshala S. Gad* 114.

***Diplachne fusca*** (L.) P. Beauv. ex Roem. & Schult. Syst. Veg. 2: 615. 1817; Blatt. & McCann, Bombay Grass. 246. t. 163. 1935; Cooke, Fl. Bombay 3: 552. 1958 (repr.ed.); Sreekumar & Nair, Fl. Kerala Grass. 368. t. 75. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 471. 1996.

A tufted perennial. Culms up to 160 cm high, erect, rooting at lower nodes. Leaves linear, up to 36 x 0.3 cm, acuminate at apex, glaucous on either surface; leaf sheath with siliceous deposition on both surfaces. Inflorescence a panicle, up to 30 cm long. Spikelets linear - oblong, 5-9 x 1.5 mm, 8 - flowered. Lemma 3 - lobed at apex, chartaceous, 3 - nerved, dorsally villous along nerves in lower region.

Found growing in salt marshes.

*Specimen examined:* Loutolim, 9.8.2003, *Harshala S. Gad* 26.

***Eragrostis atrovirens*** (Desf.) Trin. ex Steud. Nom. Bot. ed. 2. 1: 562.1840; Bor, Grass. Bur. Cey. Ind. Pak. 503. 1960; Sreekumar & Nair, Fl. Kerala Grass. 377. t. 77. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 481. 1996; Bhat & Nagendran, Sedges and Grass. 136. t. 40. 2001. *Poa atrovirens* Desf. Fl. Atlant. 1: 73. t. 14 1798.

A tufted perennial. Culms up to 110 cm high, erect. Ligule short, fimbriate. Panicle ovate

- pyramidal, up to 22 cm long. Spikelets oblong lanceolate, up to 5 x 1.5 mm, 4 - 10 florets in each spikelet, purplish green in colour.

Found growing in moist open areas near puddles.

*Specimen examined:* Sirlim (Salcete), 17.7.2004, *Harshala S. Gad* 120.

***Eragrostis viscosa*** (Retz.) Trin. in. Mem. Acad. Sci. Petersb. Ser. 6. 1: 397. 1830; Blatt & McCann, Bombay Grass. 233. 1935; Bor, Grass. Bur. Cey. Ind. Pak. 515. 1960; Rao, Fl. Goa, Diu, Daman, Dadra & Nagarhaveli 2: 501. 1986; Sreekumar & Nair, Fl. Kerala Grass. 393. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 493. 1996; Bhat & Nagendran, Sedges and Grass. 140. 2001. *Poa viscosa* Retz. Obs. Bot. 4: 20. 1786. *Eragrostis tenella* (L.) P. Beauv. ex R. & S. var. *viscosa* (Retz.) Stapf in Hook. f. Fl. Brit. India 7: 315. 1896; Cooke, Fl. Bombay 3: 546. 1958 (repr. ed.).

Annual. Culms up to 30 cm high, erect, with glandular hairs. Leaves linear - lanceolate, up to 8 x 0.3 cm, rounded at base, acuminate at apex. Inflorescence a pyramidal panicle, up to 10 x 5 cm, viscous; branches angular, alternate or whorled. Spikelets lanceolate, *ca* 2 mm long, 0.5 - 0.8 mm wide, bearing 5-7 florets.

Found growing on sandy soil and dry areas along roadsides. Recorded by Rao (*l.c.*) only from Daman and Nagarhaveli and not from Goa.

*Specimen examined:* Dona Paula, 15.8.2003, *Harshala S. Gad* 29.

***Paspalum conjugatum*** Berg. in. Act. Helv. Phy. Math. 7: 129. t. 8. 1772; Bor, Grass. Bur. Cey. Ind. Pak. 336. 1960; Sreekumar & Nair, Fl. Kerala Grass. 285. 1991; Bhat & Nagendran, Sedges and Grass. 216. t. 63. 2001.

Perennial. Culms up to 40 cm long, creeping, compressed, rooting at nodes. Racemes 2, conjugate, up to 9 cm long. Spikelets broadly elliptic or ovate, *ca* 1.5 x 1 mm, greenish yellow. Lower glumes absent.

Found as an under growth in rubber plantations and in moist shady places.

*Specimen examined:* Bramha-Karmali (Valpoi), 25.04.2004, *Harshala S. Gad* 104.

**Pennisetum pedicellatum** Trin. in Mem. Acad. Sci. Petersb. Ser. 6. 3: 184. 1834; Blatt & McCann, Bombay Grass. 180. t. 115. 1935; Cooke, Fl. Bombay 3: 346. 1958 (repr. ed.); Bor, Grass. Bur. Cey. Ind. Pak. 346. 1960; Sreekumar & Nair, Fl. Kerala Grass. 290. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 564. 1996; Bhat & Nagendran, Sedges and Grass. 219. t. 64. 2001.

Annual. Culms up to 140 cm high, tufted, erect. Inflorescence a spiciform panicle, up to 18 cm long. Spikelets subtended by involucre of bristles, fluffy- white or purplish. Rachis puberulous. Involucre enclosing 1- 2 spikelets. Pedicels up to 2 mm long, villous; bristles densely woolly, up to 15 mm long. Spikelets lanceolate, ca 4 x 1 mm. Lower lemma 3-lobed at apex.

Found in open areas along roadsides.

*Specimen examined:* Goa University campus, 11.11.2003, *Harshala S. Gad* 98.

**Phragmites vallisneria** (Pluk. ex L.) Veldk. in Blumea 37: 233. 1992; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 569. 1996. *Arundo vallisneria* Pluk. ex L. Herb. Amb. 15. 1754. *Arundo karka* Retz. Obs. Bot. 4: 21. 1786. *Phragmites karka* (Retz.) Trin. ex Steud. Nom. Bot. ed. 2. 2: 324. 1841; Bor, Grass. Bur. Cey. Ind. Pak. 416. 1960; Sreekumar & Nair, Fl. Kerala Grass. 331. 1991.

Perennial. Culms reed-like, up to 160 cm high, densely tufted, erect. Leaves linear-lanceolate, up to 50 cm long. Ligule a narrow rim of hairs. Panicles pyramidal, up to 40 cm long, purplish white. Rachilla densely silky villous, hairs up to 10 mm long.

Found on sandy soil along beaches.

*Specimen examined:* Miramar beach, 12.5.2004, *Harshala S. Gad* 108.

**Saccharum spontaneum** L. Mant. Pl. 2 : 183. 1771; Blatt & McCann, Bombay Grass. 45. t. 31. 1935; Cooke, Fl. Bombay 3: 465. 1958 (repr. ed.); Bor, Grass. Bur. Cey. Ind. Pak. 214. 1960; Sreekumar & Nair, Fl. Kerala Grass. 185. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 583. 1996; Bhat & Nagendran, Sedges and Grass. 316. t. 97. 2001.

Perennial. Culms up to 200 cm or more high, erect, rhizomatous, tufted. Panicle up to 25 cm long, densely silky villous. Peduncle softly hairy below. Joints dilated at apex, densely villous. Spikelets paired, one sessile the other pedicelled, lanceolate, ca 3.5 mm long, reddish brown.

Found on sandy soil along beaches.

*Specimen examined:* Miramar beach, 8.2.2003, *Harshala S. Gad* 96.

**Sorghum halepense** (L.) Pers. Syn. Pl. 1: 101. 1805; Blatt & McCann, Bombay Grass. 55. t. 37. 1935; Bor, Grass. Bur. Cey. Ind. Pak. 222. 1960; Sreekumar & Nair, Fl. Kerala Grass. 191. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 598. 1996. *Holcus halepensis* L. Sp. Pl. 1047.1753. *Andropogon halepensis* (L.) Brot. Fl. Lusit. 1: 89. 1804; Cooke, Fl. Bombay 3: 502.1958 (repr.ed.)

Perennial. Culms up to 200 cm high or more, rhizomatous. Leaves lanceolate, up to 55 x 3.5 cm, rounded at base; ligule fimbriate, membranous. Inflorescence a panicle, pyramidal, up to 40 cm or more long, up to 8 cm wide, lax. Spikelets elliptic, ca 5 mm long, awned, purplish - brown in colour.

Found growing in open areas as weed.

*Specimen examined:* Dona Paula, NIO Colony, 29.9.2003, *Harshala S. Gad* 79.

**Urochloa panicoides** P. Beauv. Ess. Agrost. 53. t. 11. f. 1. 1812; Bor, Grass. Bur. Cey. Ind. Pak. 372. 1960; Sreekumar & Nair, Fl. Kerala Grass. 316. t. 63. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot.

630. 1996. *Panicum javanicum* Poir. in Lam. Encycl. 4: 274. 1816; Cooke, Fl. Bombay 3: 350. 1958 (repr. ed.).

Annual. Culms tufted, up to 25 cm high, erect or creeping and decumbent, rooting at lower nodes. Ligule a row of hairs. Inflorescence of 2-5 racemes, each up to 4.4 cm long; rachis flat, narrowly winged. Spikelets solitary, arranged distichously, broadly elliptic, ca 3.8 x 1.5 mm, densely pubescent. Upper lemma mucronate.

Found in moist open areas of lateritic plateaus.

*Specimen examined:* Goa University campus, 26.6.2004, *Harshala S. Gad* 118.

**Vetiveria zizanioides** (L.) Nash in Small, Fl. S.E. U.S. 67. 1903; Blatt & McCann, Bombay Garss. 65. t. 40. 1935; Bor, Grass. Bur. Cey. Ind. Pak. 258. 1960; Sreekumar & Nair, Fl. Kerala Grass. 203. 1991; Lakshminarasimhan in Sharma *et al.* Fl. Maharashtra Monocot. 632. 1996; Bhat & Nagendran, Sedges and Grass. 324. 2001. *Phalaris zizanioides* L. Mant. Pl. 2: 183. 1771. *Andropogon squarrosus* L.f. Suppl. Pl. 433. 1781 (*nomen confusum*); Cooke, Fl. Bombay 3: 511. 1958 (repr. ed.).

Perennial. Culms up to 130 cm high or more, densely tufted, erect, with aromatic roots. Ligules fimbriate. Inflorescence a panicle, elliptic-pyramidal, contracted, up to 30 cm long; branches up to 7 cm long, whorled, rachis filiform. Joints ca 5 mm long. Spikelets awnless, spinulate or muricate; spines up to 0.8 mm long, yellowish-purplish in colour.

Found in open moist areas and field bunds.

*Specimen examined:* Sirlim (Salcete), 17.7.2004, *Harshala S. Gad* 121.

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