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## CHAPTER 19

# Expanding the Grass Diversity Atlas: 35 New Additions to the Grasses of Nizamabad District, Telangana

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**Abstract**

Thirty-five species are reported here as new additions to the grass flora of Nizamabad District, Telangana. Out of these thirty-five species, seven species are endemic to the country. The maximum number (five) of species belongs to the genus *Eragrostis*, followed by three species of *Tripogon*, and two species each of *Bothriochloa*, *Heteropogon*, and *Panicum*, with the remaining 22 genera represented by a single species each.

**Keywords:** Additions, Endemic, Fodder, Grasslands, Nizamabad, Poaceae, Telangana

## Introduction

Many speak of the enchanting fragrance and vibrant colours of the lotus, yet few acknowledge the sacrifices made by the mud that births this beautiful flower, as it breaks its heart in the process. Similarly, only a select few researchers appreciate the beauty of grasses and discern the divine presence within them. The authors have witnessed and been mesmerized by the beauty of the grasses and have been studying them for the past ten years for the development of grasslands.

Grasses are considered the most economically important plant group due to the fact that they produce our staple food and provide building and thatching materials for our shelter. They are also important sources of raw material for the biomass and bioenergy industries. Many grasses are well known for their rich fodder value, and a few have high ornamental potential. They are also ecologically very important and dominant, covering an estimated 40% of the Earth's land surface as grasslands or bamboo forests (Gibson, 2008). Grasses are highly successful winners in the evolution of angiosperms, having diversified throughout the Cenozoic to become the fifth most species-rich family of flowering plants in the world (Hodkinson, 2018), with about 11,506 species



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belonging to 768 genera (Soreng et al., 2017). In India, the grass family Poaceae is the largest angiosperm family, with 1,760 taxa belonging to 1586 species and 309 genera (Mao & Dash, 2020), contributing to about 12.6% of the world's species (Jalander et al., 2021). It is widely distributed in all of the world's climatic zones, except the polar regions.

Grasses occupy a significant portion of ground flora. The diversity of grasses determines the existence of herbivore populations in any ecosystem. Their habits, habitats, and associated species need to be studied extensively to improve wildlife in our habitats. Grasses play a major role in enhancing the productivity and carrying capacity of an ecosystem. Due to various anthropogenic activities, habitats of grasslands have degraded. To restore our degraded habitats, grasses need to be studied, and grasslands need to be developed based on the prey-predator relationships or affinities (Swamy et al., 2020). Hence, the authors have aimed to document the grass diversity of the region.

**Study Area**

Nizamabad, a popular princely district in Telangana, derived its name as Nizamabad (Nizam-a-abad) from the Nizam of Hyderabad Asaf Jahi VI, who ruled Deccan during the 18th century A.D. The latter term "Abad" means "Long Live." Nizamabad became a separate district in the year 1956. Originally, the district was called Indur, known to have originated from the name of King Indradatta who ruled this region during the 5th century A.D. (Pullaiah & Rao, 1995). The district lies between 18°05' and 19°00' of the Northern latitudes and 77°40' and 78°37' of the Eastern longitudes. It is bounded on the North by Nirmal district, on the East by Jagityal district, on the South by Kamareddy district, and on the West by Nanded district of Maharashtra State. The geographical area of this district is 4288 $km^2$ with three revenue divisions: Nizamabad, Armoor, and Bodhan, 29 mandals, and 452 villages. The district is situated in the tableland of the Deccan plateau. The region mostly consists of plains with isolated peaks, rocky clusters, undulating hills, and gentle slopes. The altitude ranges from 100-660 meters; the highest point in the district is Sirikonda Gandi with an altitude of 663 meters. The climate, topography, edaphic, rivers, and biotic conditions support the main forest type, which is "Tropical Dry Deciduous." The main forest type is further divided into Dry Teak, Dry Mixed Deciduous, and Dry Savannah types (Champion & Seth, 1968). The total forest area in the district is 853.21 $km^2$ (Jalander et al., 2021).

**Materials and Methods**

The present study is based on regular floristic investigations undertaken during the years 2014-2024. The collected specimens were processed according to the standard protocol described by Jain & Rao (1977). Every specimen was carefully studied by dissecting the floral parts of the duplicate specimens under dissection and compound microscopes. Detailed study of the dried specimens and their identification was carried out at the Botanical Survey of India, Deccan Regional Centre, Hyderabad, and the Department of Botany, Telangana University, Nizamabad district, Telangana with the help of various Indian floras such as "Grasses of Burma, Ceylon, India, and Pakistan" (Bor, 1960), "Flora of Tamil Nadu – Grasses" (Kabeer & Nair, 2009), "Grasses of Maharashtra" (Potdar et al., 2012), "Flora of Telangana" (Pullaiah, 2015; Reddy & Reddy, 2016), " Flora of Pocharam Wildlife Sanctuary, Telangana (Swamy et al., 2019), "Grasses of Adilabad (Erstwhile District)" (Swamy et al., 2020), and "Grasses of Nizamabad District" (Jalander et al., 2021). Further, detailed revisions and relevant taxonomic papers were consulted wherever required. The accepted plant names, basionyms, important synonyms, and families are as per the International Plant Name Index (IPNI, 2023) and Plants of the World online (POWO, 2023). A brief description with color photographs is provided to facilitate easy identification. Voucher specimens are deposited at the Department of Botany, Telangana University Herbarium (TUH), Dichpally, Nizamabad, Telangana.

**Results and Discussion**


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While working on the grass flora of Nizamabad District in Telangana state, the authors have collected and identified more than 190 species of grasses from various parts of the district. Among these, thirty-five species such as *Aristida stocksii* (Hook.f.) Domin, *Arthraxon santapuii* Bor, *Axonopus compressus* (Sw.) P.Beauv., *Bothriochloa glabra* (Roxb.) A. Camus, *B. insculpta* (Hochst. ex A. Rich.) A. Camus, *Chloris montana* Roxb., *Digitaria tomentosa* (J.Koenig ex Willd), *Diectomis fastigiata* (Sw.) Kunth, *Eragrostis barrelieri* Daveau, *E. maderaspatna* Bor, *E. papposa* (Roem. & Schult) Duf. ex Steud., *E. riparia* (Willd.) Nees, *E. zeylanica* Nees & Mey., *Eriochloa barbatus* (Trin.) S. Yadav & M.R., *Hemarthria compressa* R. Br., *Heteropogon fischerianus* Bor, *H. triticeus* (R. Br.) Stapf ex Craib, *Iseilema anthephoroides* Hack., *Leersia hexndra* Sw., *Leptochloa panicea* (Retz.) Ohwi, *Lopopogon tridentatus* (Roxb.) Hack., *Megathyrsus maximus* (Jacq.) B.K. Simon & S.W.L. Jacobs, *Panicum paludosum* Roxb., *P. sumatrense* Roth *ex* Roem. & Schult., *Pogonatherum paniceum* (Thunb.) Kunth, *Polypogon monspeliensis* (L.) Desf. var. *monspeliensis*, *Pseudoraphis spinescens* (R.Br.) Vickery, *Pseudosorghum fasciculare* (Roxb.) A. Camus, *Sarga purpureosericea* (Hochst. Ex A.Rich.) Spangler, *Schizachyrium brevifolium* (Sw.) Nees ex Buse, *Sporobolus spicata* (Vahl) Kunth, *Tripogon borii* Kabeer, V. J. Nair, G. V. S. Murthy, *T. bromoides* Roem. & Schult., *T. polyanthus* Naik & Patunkar,and *Urochloa deflexa* (Schumach) C.E.Hubb. & Robyns are reported here as new additions to the grass flora of Nizamabad District, Telangana. Out of these thirty-five species, seven species are endemic to the country. The maximum (five) species belong to the genus *Eragrostis*, followed by *Tripogon* (3 species), *Bothriochloa*, *Heteropogon*, and *Panicum* (2 species each), with the remaining 22 genera represented by single species.

**Enumeration of Species**

**1. Aristida stocksii** (Hook.f.) Domin, Biblioth. Bot. 85: 338. 1915; Bor, Grasses Burma, Ceylon, India & Pakistan 412. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 321. 2020. *Aristida funiculata* Trin. & Rupr. var. *stocksii* Hook.f., Fl. Brit. India 7: 227. 1896. (Fig. 1)

Annuals. Culms tufted, terete, geniculately ascending, up to 30 cm high. Leaf blade linear, hispid on upper side; ligule a rim of hairs; sheaths terete, glabrous. Panicles up to 15 cm long, branches spreading. Spikelets linear-lanceolate, arranged on filiform pedicels. Lower glume membranous, linear, minutely hairy all-over dorsal side, 1-nerved, 1-keeled, acuminate at apex with small staight awn. Upper glume membranous, narrowly ovate, 1-nerved, apex acuminate. Callus of floret pungent, hairy. Lemma coriaceous, linear, 3-nerved, awns 3, awns straight; column covered with long white hairs. Palea hyaline, narrowly ovate, 2-nerved, obtuse at apex. Caryopsis narrowly obovate, white.

**Flowering & Fruiting:** August-October.

**Habitat:** Rarely found in open grasslands. Endemic to Andhra Pradesh, Karnataka, Maharashtra and Telangana.

**Specimen examined:** Navipet Mandal, Frakrabad Village, *V. Jalander* 986 (TUH).

**2. Arthraxon santapauii** Borin Kew Bull.6: 446. (1951) 1952 & Grasses Burma, Ceylon, India & Pakistan 102. 1960. *Arthraxon hispidus* (Thunb.) Makino var. *santapauii* (Bor) Welzen in Blumea 27 (1): 280. 1981; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 322.2020. (Fig. 2)

Annuals, culms 20-40 cm high; nodes pubescent. Leaf blade flat elliptic-lanceolate, acute at apex, semiamplexicaul at base; ligule membranous hairy. Inflorescence composed of 2-3subdigitate racemes. Spikelets in paired. Sessile spikelet laterally compressed, ovate to lanceolate, acuminate or obtuse awned. Glumes dissimilar, exceeding apex of florets. Lower glume lanceolate, dorsally rounded, coriaceous, without keels, with scabrid spicules all over; margins flat. Upper glume lanceolate, acute to acuminate at apex, glabrous. Florets 2. Basal sterile florets barren. Lower lemma narrowly ovate, acute at apex, nerveless. Lower palea absent. Upper lemma narrowly ovate, acute to acuminate at apex, 1-nerved, awned, awn basifixed, Upper palea absent. Lodicules 2. Stamens 2. Ovary oblong-elliptic.


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**Flowering & Fruiting:** September-December.

**Habitat:** Common, growing in rock crevices and road sides.

**Specimen examined:** Indalwai Mandal, Chandrayanpally Village, *V. Jalander* and *J. Swamy*, VJ 856 (TUH).

**Note:** Jalander et al. (2021) were not reported in their Grasses of Nizamabad District and recently it has collected from Indalwai forest (Jalander et al. 2022).

**3. Axonopus compressus** (Sw.) P. Beauv., Ess. Agrostogr. 12. 1812; Bor, Grasses Burma, Ceylon, India & Pakistan 278. 1960; Prasanna & al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 326. 2020. *Milium compressum* Sw., Prodr. Veg. Ind. Occ. 24. 1788. (Fig.3)

Perennials. Culms creeping or stoloniferous10-30 cm; nodes bearded. Leaf blade linear-oblong to oblanceolate, obtuse to subacute at apex; ligule truncate, membranous, finely fimbriate at apex and back. Inflorescence terminal, solitary, at times 2. Spikelets subsessile, 2-rowed, alternate, oblong to ovate-lanceolate. Lower glume absent. Upper glume elliptic to ovate-lanceolate, 5-nerved, hairy on nerves. Florets 2, lower barren and upper bisexual. Lower lemma more or less similar to upper glume. Lower palea absent. Upper lemma elliptic-lanceolate, acute with tuft of long penicillate hairs at apex. Upper palea oblong to elliptic, obtuse 2-nerved. Stamens 3. Ovary oblong-elliptic. Caryopsis oblong to obovate.

**Flowering & Fruiting:** June-November.

**Habitat:** Common lawn grass and often escaped from lawns, gardens and naturalised in moist areas adjoining to towns.

**Specimen examined:** Nizamabad, Tilak Garden, *V. Jalander* 857 (TUH).

**4. Bothriochloa glabra** (Roxb.) A. Camus, Ann. Soc. Linn. Lyon Ser. 2, 76: 164. 1931; Bor, Grasses Burma, Ceylon, India & Pakistan 107. 1960. *Andropogon glaber* Roxb., Fl. Ind. 1: 271. 1820. *Andropogon intermedius* R. Br., Prodr. Fl. Nov. Holland. 202. 1810. *Amphilophis glabra* (Roxb.) Stapf, Fl. Trop. Africa 9(1): 172. 1917. *Bothriochloa intermedia* (R. Br.) A. Camus, Ann. Soc. Linn. Lyon Ser. 2, 76: 164. 1931; Bor, Grasses Burma, Ceylon, India & Pakistan 108. 1960. *Dichanthium glabrum* (Roxb.) S.K. Jain & Deshp., Bull. Bot. Surv. India 20: 134. 1979 (Fig. 4).

Perennial. Culms erect 1-2 m tall, nodes with a ring of white hairs. Ligule membranous. Leaf blade glabrous, apex acuminate. Panicles dense, 10-14 cm long; joints with a translucent groove in the middle. Sessile spikelet narrowly ovate, awned. Lower glume coriaceous, narrowly ovate, glabrous, apex obtuse. Upper glume narrowly ovate, acuminate at apex. Lower lemma narrowly elliptic, apex acute. Palea absent. Upper lemma hyaline to a base of geniculate awn, linear, 1-nerved, awned. Palea hyaline, apex acute. Lodicules 2. Stamens 3. Pistil 2-2.5 mm long. Pedicelled spikelet narrowly ovate. Lower glume narrowly elliptic, glabrous, apex acute. Upper glume narrowly ovate, apex acute. Lower lemma hyaline, margins inflexed, nerveless, apex acute.

**Flowering & Fruiting:** September to January.

**Habitat:** Occasional along the streams.

**Specimen examined:** Near Badapahad, Kakaldas Thanda, *V. Jalander* and *J. Swamy* VJ 990 (TUH).

**5. Bothriochloa insculpta** (Hochst. ex A. Rich.) A. Camus, Ann. Soc. Linn. Lyon Ser. 2, 76: 165. 1931; Bor, Grasses Burma, Ceylon, India & Pakistan 107. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 327. 2020. *Andropogon insculptus* Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 458. 1851. *Andropogon pertusus* Willd. var. *insculptus* (Hochst. ex A. Rich.) Monogr. Phan. 6: 482. 1889; Hook. f., Fl. Brit. India 7: 174. 1896. *Amphilophis insculpta* (Hochst. ex A. Rich.) Stapf, Fl. Trop. Africa 9: 176. 1917. *Dichanthium insculptum* (Hochst. ex A. Rich.) Clayton, Kew Bull. 32: 3. 1977. (Fig. 5)


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Fig. 1. **Aristida stocksii** (Hook.f.) Domin





Fig. 2. **Arthraxon santapuii** Bor




**Fig. 3. Axonopus compressus** (Sw.) P.Beauv.






**Fig. 4. Bothriochloa glabra** (Roxb.) A. Camus

**Fig. 1.** A. Habit; B. Spikelet; C. Lower & upper glumes; D. Articulation & callus. **Fig. 2.** A. Inflorescence; B. Part of inflorescence; C-D. Spikelets; E-F. Lower glume. **Fig. 3.** A. Habit; B. Parts of inflorescence; C. Spikelets. **Fig. 4.** A. Inflorescence; B-C. Sessile & pedicelled spikelets; D. Sessile spikelet; E. Pedicelled spikelet.


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Perennials, up to 50 cm tall. Culms tufted, erect to decumbent. Leaf blade usually basal, linear-lanceolate, slightly aromatic when fresh; ligule membranous. Inflorescence of 2-6 digitate to subdigitate racemes, nodes hairy. Spikelets two together, one sessile and other pedicelled, joints and pedicels with median translucent furro. Sessile spikelet oblong to ovate-lanceolate, acuminate, awned. Lower glume oblong-lanceolate, 1-pitted or pit absent. Upper glume ovate-lanceolate, acuminate, Florets 2, both epaleate; lower barren and upper bisexual. Lower lemma oblong to lanceolate, acute to obtuse. Upper lemma reduced to hyaline base of awn. Stamens 3. Ovary oblong. Caryopsis oblong-elliptic to oblanceolate. Pedicelled spikelet ovate-lanceolate, acuminate, unawned. Lower glume oblong to elliptic-lanceolate, 1 or 2 or rarely up to 4-pitted. Upper glume ovate to oblong-lanceolate, acuminate. Florets 2; lower male, epaleate; upper obscure.

**Flowering & Fruiting:** July-March.

**Habitat:** Common in waste lands and road sides.

**Specimen examined:** Dichpally Mandal, Dichapally, *V. Jalander* 864 (TUH); Dichpally Mandal, Ghanpur Village, *V. Jalander* 902 (TUH).

**Note:** Swamy et al. (2021) reported from Kinnerasani Wildlife Sanctuary of Bhadradi Kothagudem district, Telangana.

**6. Chloris montana** Roxb., Fl. Ind. 1: 331. 1820; Bor, Grasses Burma, Ceylon, India & Pakistan 466. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 339. 2020. (Fig. 6)

Perennials. Culms geniculate, 20-50 cm high; nodes brownish black. Leaf blade lanceolate, acuminate; ligule membranous. Inflorescence of 4-6 digitate compact spikes, peduncle smooth, hairy just below spikes. Spikelets secund, subsessile, oblanceolate, truncate at apex, acute at base, greenish yellow. Glumes unequal. Lower glume lanceolate, acute with mucronate apex, 1-nerved, keeled. Upper glume lanceolate, acute, mucronate, chartaceous, prominently 1-nerved, keeled, scabrid. Florets 4, awned; lower one fertile, paleate, other 3 sterile, epaleate. Fertile lemma oblanceolate, obtuse to acute, awned, 3-nerved. Palea oblanceolate, acute, chartaceous, 2-nerved, 2-keeled. Lodicules 2. Stamens 3. Ovary oblong. Caryopsis narrowly oblong. Sterile lemmas more or less similar to fertile one, but smaller.

**Flowering & Fruiting:** Throughout the year.

**Habitat:** Rare on agriculture field bunds.

**Specimen examined:** Dichpally Mandal, Mentrajpally Village, *V. Jalander* 799 (TUH).

**7. Diectomis fastigiata** (Sw.) Kunth, Nov. Gen. Sp. 1: 193, t. 64. 1816; Bor, Grasses Burma, Ceylon, India & Pakistan 135. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 351. 2020. *Andropogon fastigiatus* Sw., Prodr. 26. 1788. (Fig. 7).

Annuals, up to 75 cm tall. Culms erect or geniculate, nodes glabrous. Ligule membranous. Leaf blades linear. Raceme single. Sessile spikelets coriaceous, linear-lanceolate. Lower glume linear-lanceolate, deeply grooved on the back, ciliate in the groove in upper half, apex 2-toothed. Upper glume awned, apex 2-toothed. Lower lemma ovate-lanceolate, deeply grooved on the back, apex obtuse, epaleate. Upper lemma apex 2-fid, awned. Palea oblong-elliptic, obtuse. Stamens 3. Ovary linear. Caryopsis elliptic-obovate. Pedicelled spikelet ovate-lanceolate. Lower glume ovate-lanceolate, 15-nerved, central nerve distinct, 2 toothed at apex, awned. Upper glume ovate-lanceolate, 5 nerved, slightly 2-toothed at apex, awned. Lemma membranous, ovate lanceolate, nerveless, acute, epaleate.

**Flowering & Fruiting:** September-November.

**Habitat:** Occasional in sandy soils.

**Specimen examined:** Dichpally Mandal, Nadipally Thanda, *V. Jalander* 954 (TUH).


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Fig. 5. **Bothriochloa insculpta** (Hochst. ex A. Rich.) A. Camus


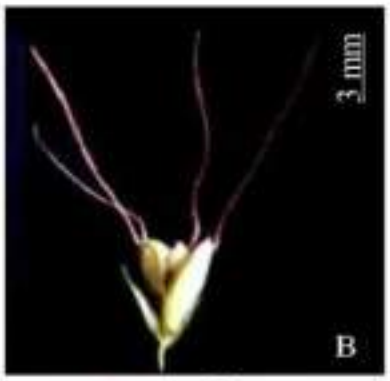




Fig. 6. **Chloris montana** Roxb.




Fig. 7. **Diectomis fastigiata** (Sw.) Kunth




Fig. 8. **Digitaria tomentosa** (J.Koenig ex Willd.) Henrard

**Fig. 5.** A. Part of inflorescence; B. Sessile & pedicelled spikelets; C-D. Sessile & Pedicelled spikelets. **Fig. 6.** A. Inflorescence; B. Spikelet; C. Fertile lemma; D. Palea. **Fig. 7.** A. Inflorescence; B. Sessile spikelet; C. Pedicelled spikelet. **Fig. 8.** A. Inflorescence; B-C. Spikelets ( both views).


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**8. Digitaria tomentosa** (J. Koenig ex Rottler) Henrard, Blumea 1: 100. 1934; Bor, Grasses Burma, Ceylon, India & Pakistan 306. 1960; Prasanna et al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 354. 2020. *Milium tomentosum* J. Koenig. ex Rottler, Neue Schriften Ges. Naturf. Freunde Beilin 4: 220. 1803. *Panicum subeglume* Trin., Mem. Acad. Imp. Sci. St.-Petersbourg, Ser. 6, Sci. Math., Seconde Pt. Sci. Nat. 3: 292. 1834. (Fig. 8).

Tufted perennials. Culms erect to stoloniferous, 40-70 cm high. Leaf blade linear-lanceolate, rounded to subcordate at base; ligule membranous. Panicle effuse, 8-25 × 6-12 cm. Spikelets solitary, with long pedicel, acute at both the ends, greenish, hairy on dorsal side. Lower glume absent. Upper glume oblong, acute at apex, nerveless. Florets 2; lower barren, epaleate; upper bisexual, paleate. Lower lemma ovate-lanceolate to elliptic, acute at apex, 7-nerved. Upper lemma elliptic, acute to apiculate at apex, black to brownish at maturity, 3-nerved. Upper palea ovate-lanceolate to elliptic, black to brownish at maturity, 2-nerved. Lodicules 2. Stamens 3. Ovary oblong; stigma plumose. Caryopsis oblong.

**Flowering & Fruiting:** August-February.

**Habitat:** Common in scrub jungles.

**Specimen examined:** Nizamabad Mandal, Malkapur Thanda, *V. Jalander* 906 (TUH).

**9. Eragrostis barrelieri** Daveau, J. Bot. (Morot) 8: 289.1894; Bor, Grasses Burma, Ceylon, India & Pakistan 503.1960; Jalander et al., *Nelumbo,* 64 (1): 94-96.2022. (Fig. 9)

Annuals or short-lived perennials. Culms 15-40 cm high, tufted, nodes without or with ring like glandular pits below the nodes. Leaf blade linear-lanceolate, eglandular along the margin; ligule a fringe of hairs. Panicle 8-20 × 6-7 cm. Spikelets solitary, linear, laterally compressed, greenish with purple tinge; pedicels with a glandular band. Glumes dissimilar, deciduous. Lower glume ovate-lanceolate, acute to acuminate at apex, chartaceous, 1-keeled, 1-nerved. Upper glume ovate-lanceolate, acute at apex, faintly 1-nerved,1-keeled. Florets 6-16, disarticulating from below upwards, closely arranged on rachilla. Lemma oblong, acute to obtuse at apex, 3-nerved, mid-nerve prominent, faintly keeled. Palea persistent, elliptic to oblanceolate, obtuse-acute at apex, 2-nerved, 2-keeled. Lodicules 2. Stamens 3. Ovary ovoid, stigma plumose. Caryopsis ellipsoid, oblong, prismatic, slightly laterally compressed, ± terete, brown, smooth.

**Flowering & Fruiting:** October-December.

**Habitat:** Occasionally grows along gravelly roadsides and agriculture fields.

**Specimen examined:** Nizamabad, along bypass road, *V. Jalander* 884 (TUH).

**Note:** Jalander et al. (2022a) reported from Nirmal district of Telangana.

**10. Eragrostis maderaspatana** Bor, Grasses Burma, Ceylon, India & Pakistan 509. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 366. 2020; Vivek et al. in Nelumbo 60 (1): 63. 2021; Jalander & Swamy, J. Exp. Agric. Int. 45 (12): 114.2023. *Eragrostis willdenowiana* Nees ex Stapf in Hook.f., Fl. Brit. India 7: 322. 1896 non Nees ex Hook. & Arn., 1838. (Fig. 10).

Tufted annuals. Culms geniculate, 10-50 cm high, with a glandular ring-like patch just below the node. Leaf blades linear to lanceolate, margins rarely with sparse tuberculate glands; ligule membranous fringe of cilia. Panicle 6-20 × 3-5 cm, peduncle with a glandular ring-like patch just below the panicle, pedicels with or without glandular patches. Spikelets narrowly ovate-lanceolate, acute, olive green to grey; florets closely arranged on rachilla. Glumes unequal; lower glume ovate-lanceolate, acute, 1-nerved; upper glume ovate, 1-nerved. Florets 9-22, closely imbricate on zigzag rachilla; disarticulating from below upwards. Lemma broadly elliptic, sub-acute, 3-nerved, 1-keeled. Palea elliptic to oblanceolate, obtuse, membranous, truncate at apex. Stamens 3. Ovary ovate to oblong-ellipsoid; stigma plumose. Caryopses 0.5-0.8 mm long, oblong to ellipsoid, truncate at both ends, ventrally flattened to slightly grooved, yellowish brown.


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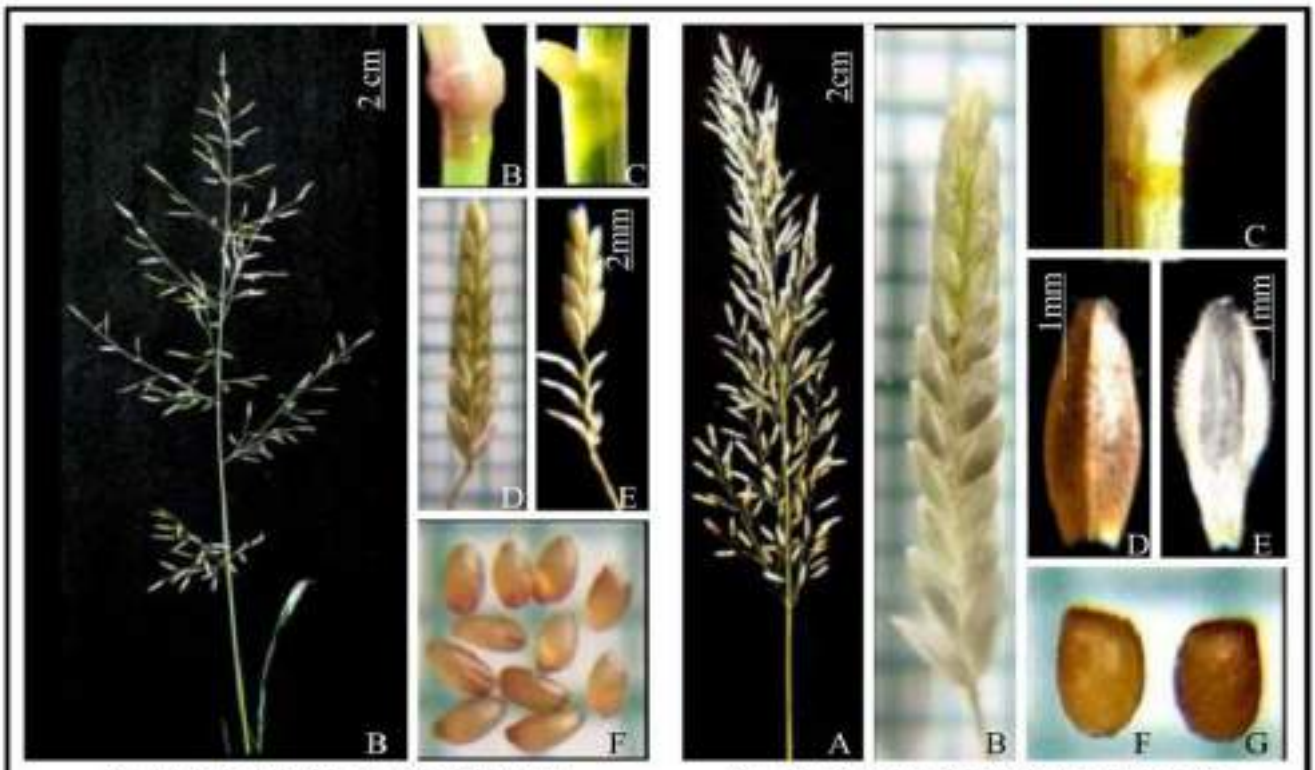


Fig. 9. **Eragrostis barrelieri** Daveau




Fig. 10. **Eragrostis maderaspatana** Bor

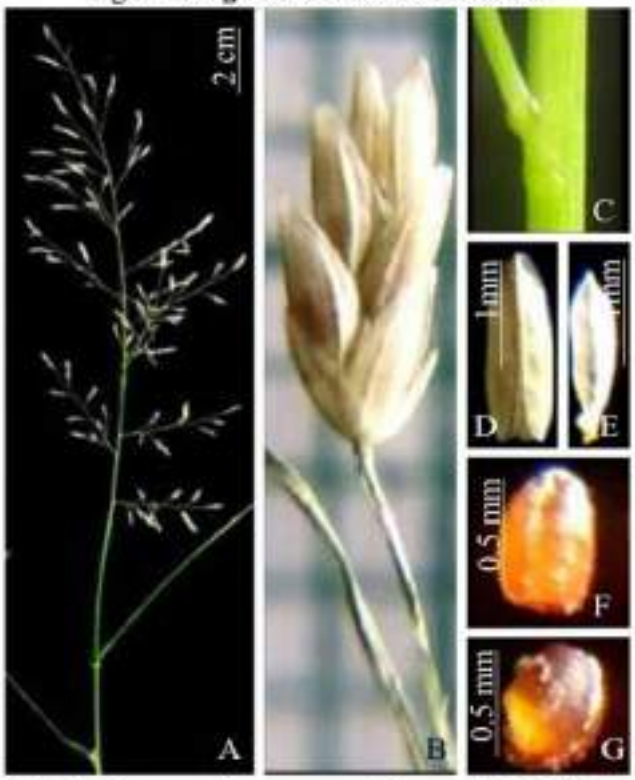


Fig. 11. **Eragrostis papposa** (Roem. & Schult.) Duf. ex Steud

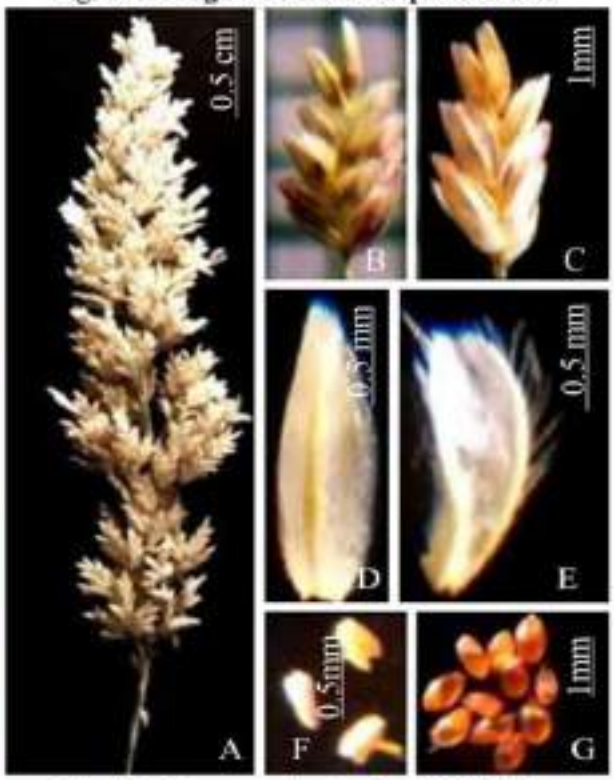


Fig. 12. **Eragrostis riparia** (Willd.) Nees

**Fig. 9.** A. Inflorescence; B-C. Glands on node & Below the inflorescence; D-E. Spikelets; F. Caryopses. **Fig. 10.** A. Inflorescence; B. Spikelet; C. Gland below the inflorescence; D. Lemma; E. Palea; F-G. Caryopses. **Fig. 11.** A. Inflorescence; B. Sessile spikelet; C. Gland below the inflorescence; D. Lemma; E. Palea; F-G. Caryopses. **Fig. 12.** A. Inflorescence; B-C. Spikelets; D. Lemma; E. Palea; F. Stamens; G. Caryopses.


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**Flowering and fruiting:** August-October.

**Habitat:** Common along the roadsides and wastelands.

**Specimens examined:** Dichpally (Mandal), *V. Jalander* 885 (TUH).

**Note:** Jalander et al. (2021) were not reported in their Grasses of Nizamabad District and recently it has collected from Dichpally (Jalander and Swamy, 2023).

**11. Eragrostis papposa** (Roem. & Schult.) Steud., Nomencl. Bot., ed. 2. 1. 564. 1840; Bor, Grasses Burma, Ceylon, India & Pakistan 511. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 367. 2020. *Megastachya papposa* Roem. & Schult., Syst. Veg., ed. 15 bis 2: 585. 1817. *Poa papposa* Dufour ex Roem. & Schult., Syst. Veg. ed. 15. 2: 585. (Fig. 11).

Annual or perennials. Culms erect, 15-22 cm high; nodes glabrous. Leaf blades linear to lanceolate; ligule with a fringe of cilia. Panicle open, ovate, 4-12 × 8-10 cm; peduncle and pedicels with or without glandular patches. Spikelets elliptic to lanceolate; florets closely arranged on rachilla. Glumes ovate-lanceolate, subequal. Lower glume acute, 1-nerved, 1- keeled. Upper glume acute, 1-nerved, 1-keeled. Florets up to 7, disarticulating from below upwards. Lemma ovate to elliptic, obtuse, 3-nerved, 1-keeled. Palea membranous. Obtuse at apex, persistent, 2-nerved, 2-keeled. Stamens 3. Ovary ovate to oblong-ellipsoid; stigma plumose. Caryopses 0.5-0.7 mm long, oblong to ellipsoid, truncate or rounded at the ends, ventrally flattened to grooved, yellowish to brown.

**Flowering and fruiting:** August-November.

**Habitat:** Common along the forest fringes and roadsides.

**Specimens examined:** Dichpally (Mandal), *V. Jalander* 863 (TUH).

**Note:** Jalander et al. (2021) were not reported in their Grasses of Nizamabad District and recently it has collected from Dichpally (Jalander and Swamy, 2023).

**12. Eragrostis riparia** (Willd.) Nees, Agrost. Bras. 2: 512. 1829; Bor, Grasses Burma, Ceylon, India & Pakistan 513. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 367. 2020. *Poa riparia* Willd., Neue Schriften Ges. Natur. Freunde Berlin 4: 185. 1803. *Eragrostis tenella* (L.) P. Beauv. ex Roem. & Schult. var. *riparia* (Willd.) Stapf in Hook.f., Fl. Brit. India 7: 315. 1896. (Fig. 12).

Tufted perennials. Culms up to 40 cm high, geniculate. Leaf blade mostly basal, lanceolate; ligule membranous with a row of hairs. Panicle spiciform, glandular on axis and raceme base, but not viscous. Spikelets ovate to oblong, acute, purple to yellowish green. Lower glume ovate to lanceolate, acute, 1-nerved, keeled. Upper glume ovate-lanceolate, acute, 1-nerved, keeled. Florets 5-10; similar; disarticulating from above downwards. Lemma ovate-lanceolate, acute, 3-nerved, 1-keeled. Palea obovate to elliptic, obtuse to retuse, 2-nerved, 2-keeled, long ciliate on keels. Lodicules 2, Stamens 3. Ovary ovate to narrowly elliptic; stigma plumose. Caryopsis 0.4-0.5 × 0.2-0.3 mm, ellipsoid to ovoid, light brown.

**Flowering and fruiting:** Almost throughout the year.

**Habitat:** Grows in red sandy soils, in drier areas.

**Specimens examined:** Dichpally (Mandal), *V. Jalander* 452 (TUH).

**Note:** Jalander et al. (2021) were not reported in their Grasses of Nizamabad District and recently it has collected from Dichpally (Jalander and Swamy, 2023).

**13. Eragrostis zeylanica** Nees & Mey., Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19(Suppl. 1): 204. 1843; Prasanna et al., Poaceae in A.A. Mao &S.S. Dash (eds.), Fl. Pl. India Annot.Checkl.Monocot.3: 368. 2020; Vivek et al., Nelumbo 60 (1): 95. 2021; Jalander & Swamy, J. Exp. Agric. Int. 45 (12): 138.2023. *Eragrostis elongata*sensu Stapf in Hook. f., Fl. Brit. India. 7: 319. 1896, non Jacq., 1813. (Fig. 13).


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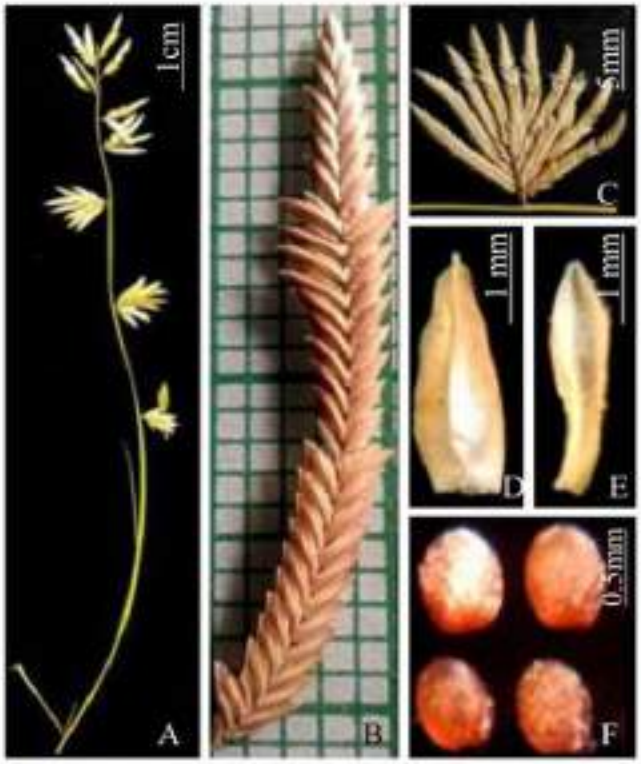


Fig. 13. **Eragrostis zeylanica** Nees & Mey.


Fig. 14. **Eriochloa barbatus** (Trin.) S.Yadav & M.R.Almeida

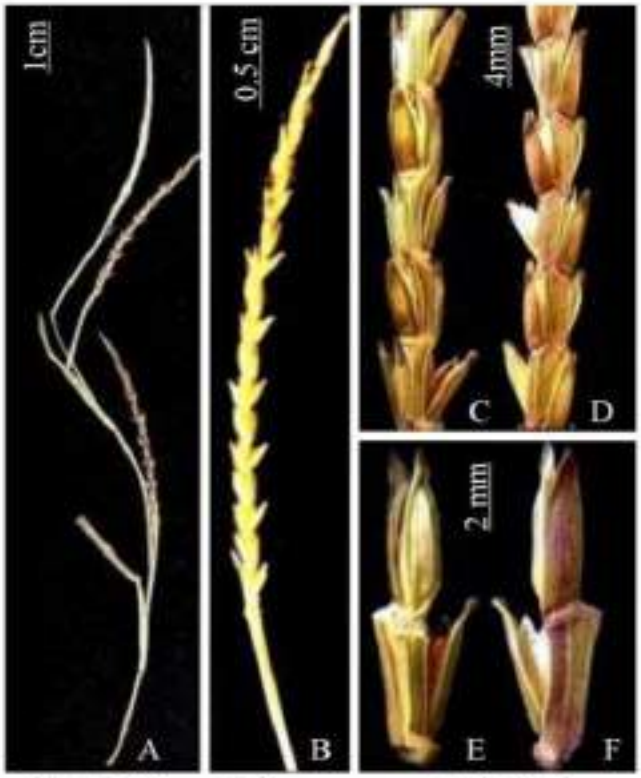


**Fig. 15. Hemarthria compressa** (L.f.) R. Br.


Fig. 16. **Heteropogon fischerianus** Bor

**Fig. 13.** A. Inflorescence; B. Spikelet; C. Fascicled spikelets; D. Lemma; E. Palea; F. Caryopses. **Fig. 14.** A. Inflorescence; B. Part of raceme; C. Spikelets in pair; D. Single spikelet. **Fig. 15.** A. Inflorescence; B. Raceme; C-D. Parts of raceme; E-F. Sessile & pedicelled spikelets. **Fig. 16.** A. Habit; B-C. Sessile & pedicelled spikelets.


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Annual or short-lived perennial. Culms 15-45 cm high, erect or decumbent, geniculate; nodes brownish. Ligule a fringe of hairs. Leaf blades linier to lanceolate. Panicles 3-18 × 1.5-3.5 cm, open, with spikelets fascicled and grouped in branches. Spikelets 5-65-flowered, lanceolate to oblong, sharply acute at apex; florets firmly arranged on rachilla, rachilla narrowly zigzag, disarticulating from below upwards. Glumes linear to lanceolate, chartaceous or sub-coriaceous, 1-nerved, 1-keeled, scabrid along keel, apex acute to acuminate; Lemmas ovate to lanceolate, sub-coriaceous, 3-nerved, 1-keeled, apex acute. Paleas persistent, elliptic slightly curved, 2-nerved, 2-keeled, ciliolate along keels above middle, apex acute to obtuse. Stamens 3. Caryopses ovate to sub-globose or orbicular, laterally compressed, light brownish.

**Flowering and fruiting:** August-October.

**Habitat**: Occasional on road sides banks of streams and backwaters.

**Specimens examined:** Dichpally (Mandal), Near CMC, *V. Jalander* 454 (TUH).

**Note:** Jalander et al. (2021) were not reported in their Grasses of Nizamabad District and recently it has collected from Dichpally (Jalander and Swamy, 2023).

**14. Eriochloa barbatus** (Trin.) S. Yadav & M.R. Almeida, Fl. Maharashtra VIA: 145. 2014; Jalander et al., Int. J. Curr. Res. Biosci. Plant Biol. 9(7). 8-11.2022. *Helopus barbatus* Trin. in Spreng., Neue Entdeck. ii. 49. 1821. *Eriochloa fatmensis* (Hochst. & Steud.) Clayton, Kew Bull. 30(1): 108. 1975; Prasanna et al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 370. 2020. *Panicum fatmense* Hochst. & Steud., UnioItin. Schimper 806. 1837. *Helopus nubicus* Steud., Syn. Pl. Glumac. 1(2): 100. 1854. *Eriochloa nubica* (Steud.) Hack. & Stapf ex Thell., Vierteljahrsschr. Naturf. Ges. Zurich 64: 697. 1919; Bor, Grasses Burma, Ceylon, India & Pakistan 312. 1960. (Fig. 14).

Annuals 30-110 cm high. Culms erect or decumbent; nodes glabrous; ligule with a fringe of hairs; leaf blades linear, flat to involute. Panicles 6-15 × 0.6-3 cm. Spikelets solitary or in unequally pedicellate pairs at the middle of the branches; pedicels consist up to 10 long hairs at the apices of pedicel. Spikelets lanceolate. Lower glume reduced to a pink-coloured ring at the base of spikelet. Upper glume ovate-lanceolate, margins folded, hairy, shortly awned at apex. Florets 2; lower barren, epaleate, upper bisexual paleate. Lower lemma, elliptic, setose, acuminate, mucronate at apex. Lower paleas absent. Upper lemma elliptic, granulose, rounded with mucronate at apex. Upper palea indurate, finely rugose, obtuse-rounded at apex. Stamens 3. Ovary elliptic; stigma plumose. Caryopsis ellipsoid, glabrous.

**Flowering and Fruiting:** August-February.

**Habitat:** Occasional in marshy habitats.

**Specimens examined:** Dichpally (Mandal), *V. Jalander* & *J. Swamy* VJ 489 (TUH).

**Note:** Jalander et al. (2021) were not reported in their Grasses of Nizamabad District and recently it has collected from Dichpally (Jalander et al. 2022b).

**15. Hemarthria compressa** (L.f.) R.Br., Prodr. Fl. Nov. Holland. 207. 1810; Bor, Grasses Burma, Ceylon, India & Pakistan 161. 1960; Prasanna et al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 379. 2020. *Rottboellia compressa* L.f., Suppl. Pl. 114. 1782; Hook.f., Fl. Brit. India 7: 153. 1896. (Fig. 15).

Perennials. Culms up to 1 m high. Leaf blade linear, acute at apex; ligule membranous rim with long ciliate hairs. Inflorescence solitary, spiciform, terminal or arising from upper axils. Spikelets paired, one sessile, other pedicelled, both more or less similar. Sessile spikelet narrowly oblong-elliptic, sunk in cavity of joints. Lower glume oblong-elliptic, convex dorsally, 5-nerved, 2 keeled towards apex, keels winged. Upper glume oblong-elliptic, acute to acuminate at apex, 5-nerved, 1-keeled. Florets 2; lower barren, epaleate; upper bisexual, paleate. Lower lemma oblong, flat, acute at apex, 2-nerved. Upper lemma oblong-elliptic, acute at apex, 1-nerved. Upper palea narrowly oblong, flat, acute at apex, nerveless. Stamens 3. Ovary ovate-lanceolate. Pedicelled spikelet 4.2-


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4.3 mm long. Glumes shape and sizes vary, slightly spreading from rachis, otherwise more or less similar to sessile spikelet. Lower glume oblong-elliptic, acute to acuminate at apex, narrowly winged on one side of keel. Upper glume apex slightly apiculate, 2-keeled, keels narrowly winged towards apex. Lower and upper florets as in sessile spikelet.

**Flowering and fruiting:** July-February.

**Habitat:** Rare, along riverbanks and marshy places.

**Specimens examined:** Indalwai Mandal, Chandrayanpally Village, *V. Jalander* 963 (TUH).

**16. Heteropogon fischerianus** Bor, Kew Bull. 6: 170. 1951 & Grasses Burma, Ceylon, India & Pakistan 165. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 379. 2020. *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. var. *distichus* C.E.C. Fisch. in Gamble, Fl. Madras 1743. 1934. (Fig. 16)

Perennials. Culms up to 40 cm high. Leaves distichous, crowded together in the middle one third portion. Leaf blade linear, flat, rigid, falcate; ligule densely ciliate. Racemes up to 5 cm long, terminal, solitary. Spikelets in pairs; lower 4-6 pairs homogamous, male or neuter, unawned; upper sessile spikelets female, awned. Homogamous pairs: Sessile and pedicelled spikelets similar, except the margin of lower glume, broadly winged in pedicelled spikelets. Lower glume lanceolate, acute, two keeled, margins in turned. Upper glume elliptic-acute, 8-nerved, margins ciliate at upper portion. Lower lemma elliptic, hyaline, margins ciliate. Upper lemma lanceolate, hyaline. Heterogamous spikelets: Sessile spikelets bisexual. Lower glume apex laterally rounded, truncate, brown turning to dark brown, shortly pilose, 2-grooved. Upper glume equal to lower glume, 3-nerved. Lower lemma shorter, lanceolate. Upper lemma reduced to a base of an awn; awn up to 50 mm long, robust, villous. Pedicelled spikelet similar to sessile spikelet of the homogamous pair or longer.

**Flowering and Fruiting:** July-October.

**Habitat:** Rare in rock crevices and wastelands.

**Specimens examined:** Jakranpally Mandal, Puppalapally Village, *V. Jalander* 854 (TUH).

**17. Heteropogon triticeus** (R. Br.) Stapf ex Craib, Bull. Misc. Inform. Kew 1912: 432. 1912; Bor, Grasses Burma, Ceylon, India & Pakistan 165. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 380. 2020. *Andropogon triticeus* R. Br., Prodr. Fl. Nov. Holland. 201. 1810; Hook.f., Fl. Brit. India 7: 200. 1896. (Fig. 17).

Perennial. Culms up to 2 m tall, tufted, terete, erect, simple, glabrous; nodes glabrous. Leaf blade flat, linear-ovate, apex acuminate; ligule membranous; Raceme solitary, terminating the culms and its branches, with lower homogamous awnless and upper awned heterogamous spikelets. Sessile spikelets hermaphrodite, narrowly ovate-elliptic. Lower glume narrowly ovate, 7-9-nerved, glabrous, apex truncate. Upper glume narrowly ovate-oblong, 3-5-nerved, apex obtuse. Lower lemma narrowly ovate, apex acuminate. Palea absent. Upper lemma passing into a 8-12 cm long geniculate awn, hairy. Palea hyaline, ovate-oblong, apex ciliate hairy. Pedicelled spikelets narrowly ovate, unawned. Lower glume narrowly ovate, chartaceous, glabrous, 2-keeled, acuminate at apex. Florets 2; lower floret barren; upper floret staminate.

**Flowering and Fruiting:** August-December.

**Habitat:** Rare in rock crevices. Endemic to Chhattisgarh, Gujarat, Karnataka, Maharashtra and Telangana.

**Specimens examined:** Nizamabad, Sarangapur Campus, Telangana University, *V. Jalander* 854 (TUH).

**18. Iseilema anthephoroides** Hack. in A. DC. & C. DC., Monogr. Phan. 6: 683. 1889; Hook. f., Fl. Brit. India 7: 219. 1896; Bor, Grasses Burma, Ceylon, India & Pakistan 187. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 390. 2020. (Fig. 18).


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Perennials. Culms up to 60 cm long. Leaf-blades oblong-lanceolate, obtuse at apex, sparsely tuberculate hairy along margins; ligule membranous, ciliate at apex. Inflorescence a linear, spatheate compound panicle. Racemes consist of 4 basal male involucral spikelets, 1 sessile bisexual spikelet and 2 pedicelled male spikelets. Involucral spikelets pedicelled, oblong-lanceolate, acute at apex, pedicels of involucral spikelets as broad as long. Lower glume oblong-lanceolate, acute at apex, 5–9-nerved, 2-keeled. Upper glume elliptic-lanceolate, acute at apex, 3-nerved. Lemma oblong, acute at apex. Stamens 3. Sessile spikelet oblong-elliptic, awned. Lower glume oblong-elliptic, long beaked towards apex, 2-toothed at apex, 5-nerved, 2-keeled. Upper glume oblong-elliptic, beaked at apex, acuminate at apex. Florets 2, both epaleate; lower barren, upper bisexual. Lower lemma oblong-lanceolate, acute at apex. Upper lemma reduced to hyaline base of awn, 1. Caryopsis oblong. Pedicelled spikelets oblong-lanceolate, acute at apex. Lower glume oblong-lanceolate, acute at apex, 7-nerved. Upper glume elliptic-lanceolate, acuminate at apex, 3-nerved.

**Flowering and Fruiting:** November-March.

**Habitat:** Common in open grasslands and along the paddy field bunds.

**Specimens examined:** Navipet Mandal, Fakrabad Village, *V. Jalander* 987 (TUH).

**19. Leersia hexandra** Sw., Prodr. 21. 1788; Hook.f., Fl. Brit. India 7: 94. 1896; Bor, Grasses Burma, Ceylon, India & Pakistan 599. 1960; Prasanna & al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 391. 2020. (Fig. 19).

Perennials, up to 70 cm tall. Culms geniculately ascending. Ligule acute to truncate, membranous; leaf blade linear-lanceolate, acuminate at apex. Panicle 6-13×1.5-2 cm. Racemes alternate. Spikelets imbricate, oblong. Lower glume reduced to a rim or absent. Upper glume absent. Floret 1, bisexual. Lemma broadly oblong, planoconvex, beaked, acute at ends, subcoriaceous, 5-6 -nerved, scabrid to spinulose on keel. Palea oblong, acute to truncate at apex, narrowly acute at base, 3-nerved, midnerve prominently keeled, clearly scabrid to spinulose on keel. Stamens 6. Ovary ovate to elliptic. Caryopsis oblong.

**Flowering & Fruiting:** August-January.

**Habitat:** Occasional in moist habitats.

**Specimens examined:** Dichpally Mandal, Dichpally Village, *V. Jalander* 972 (TUH).

**20. Leptochloa panicea** (Retz.) Ohwi, Bot. Mag., Tokyo 55: 311. 1941; Bor, Grasses Burma, Ceylon, India & Pakistan 517. 1960; Prasanna & al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 392. 2020. *Poa panicea* Retz., Observ. Bot. 3: 11. 1783. *Dinebra panicea* (Retz.) P.M. Peterson & N. Snow, Ann. Bot. (Oxford) 109: 1326. 2012. *Leptochloa filiformis* sensu Hook. f., Fl. Brit. India 7: 298. 1896 non P. Beauv., 1812.(Fig. 20).

Annual. Culms geniculate, up to 60 cm high. Leaf blade linear-lanceolate, sparsely ciliate on lower surface, acuminate at apex; ligule membranous. Panicle open. Spikelets alternate, oblong; florets 2-3, at times 3$^{rd}$ floret represented by only elongated rhachilla. Glumes lanceolate, acute to acuminate at apex. Lemmas oblong-elliptic to lanceolate, acute or obtuse with a single notch at apex. Paleas oblong-elliptic, acute to obtuse at apex.

**Flowering & Fruiting:** January-September.

**Habitat:** Common in moist habitats.

**Specimens examined:** Dichpally Mandal, *V. Jalander* & *P.V. Ramana* 274 (TUH); Old Collectorate, Nizamabad, *V. Jalander* 979 (TUH).

**Note:** Jalander et al. (2021) were not reported in their Grasses of Nizamabad District and recently it has collected from Dichpally (Jalander and Swamy, 2021).


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Fig. 17. **Heteropogon triticeus** (R. Br.) Stapf ex Craib

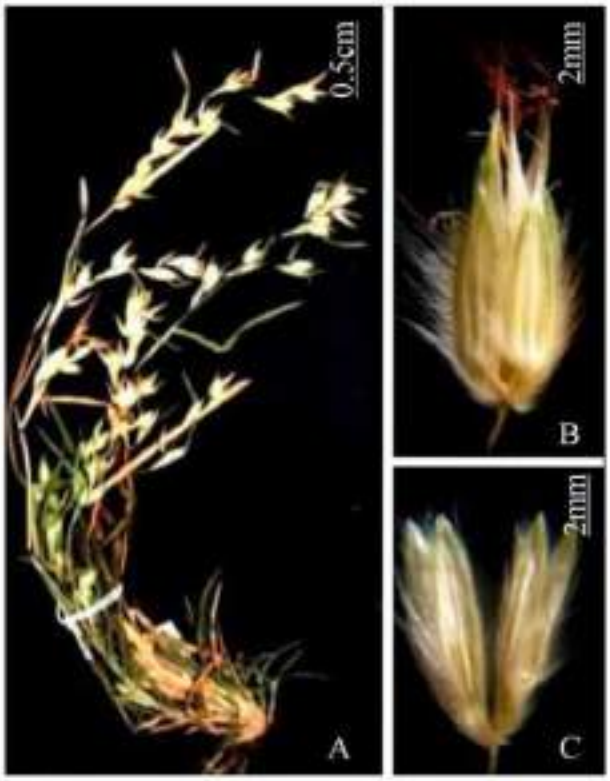


Fig. 18. **Iseilema anthephoroides** Hack.

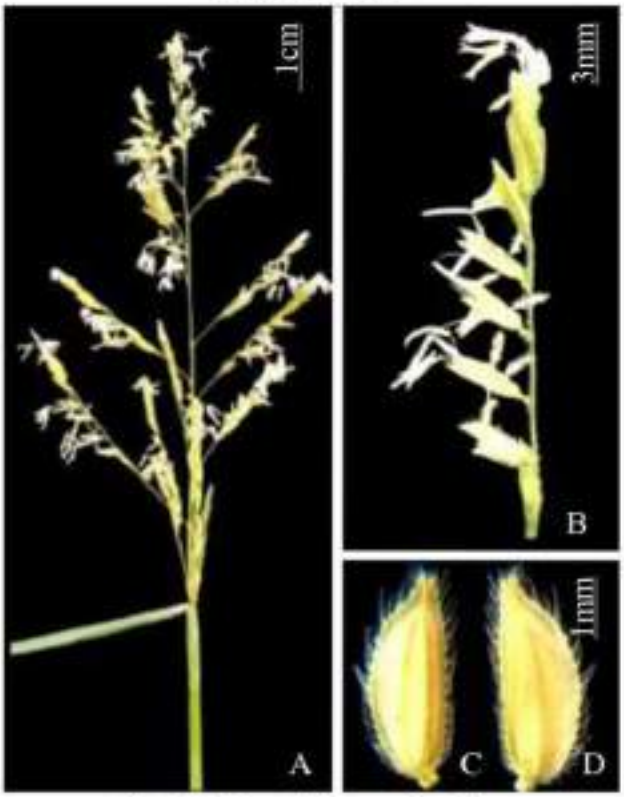


Fig. 19. **Leersia hexandra** Sw.

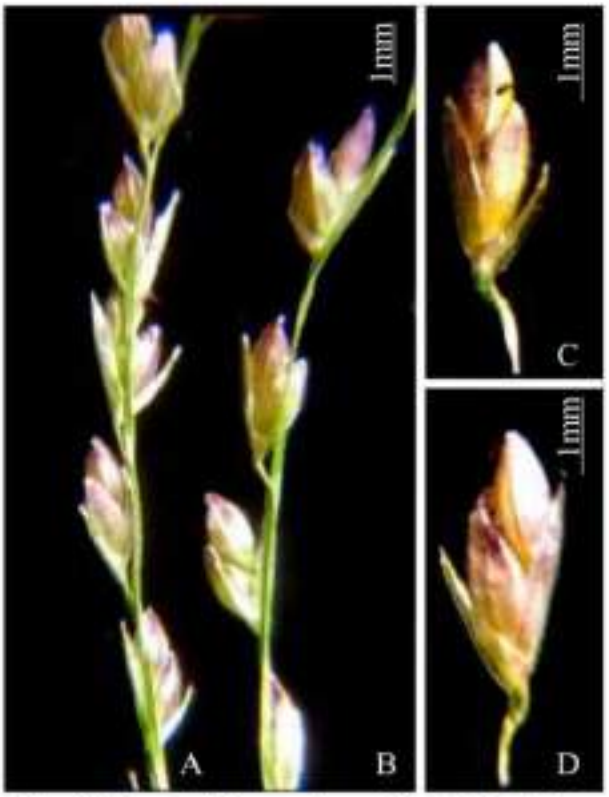


Fig. 20. **Leptochloa panicea** (Retz.) Ohwiin

**Fig. 17.** A. Raceme; B. Part of raceme; C-D. Sessile & pedicelled spikelets. **Fig. 18.** A. Habit; B. Raceme; C. Involucral spikelets. **Fig. 19.** A. Inflorescence; B. Part of inflorescence; C-D. spikelets. **Fig. 20.** A-B. Parts of raceme; C-D. Spikelets.


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**21. Lophopogon tridentatus** (Roxb.) Hack., Monogr. Phan. 6: 254. 1889; Hook.f., Fl. Brit. India 7: 149. 1896; Bor, Grasses Burma, Ceylon, India & Pakistan 190. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 394. 2020. *Andropogon tridentatus* Roxb., Fl. Ind. 1: 261. 1820. (Fig. 21).

Short-lived annual or perennial. Culms up to 45 cm long, erect, slender, terete, glabrous. Leaf blades linear, flat, conduplicate or involute; ligule short, hyaline, truncate, ciliate. Inflorescence composed of racemes. Racemes 2, appressed back to back, oblong. Spikelets in paired, sessile and pedicelled, lanceolate, laterally compressed. Glumes dissimilar, firmer than lemma. Lower glume cuneate, equal to spikelet in length, 5-7-nerved, surface with transverse tufts of hairs, apex dentate, 3-fid, truncate. Upper glume elliptic, membranous, 3-nerved, ciliate on margins and near tip, acute, awned. Lower floret male, epaleate, upper floret hermaphrodite. Lower lemma elliptic, hyaline, 1-nerved, sub-acute. Upper lemma elliptic-lanceolate, 3-nerved, 2 lobed, not awned. Palea hyaline. Stamens 2. Pedicelled spikelets short pedicelled, Lower glume with hairs at the middle and lower sides, 3 toothed, multi-nerved, truncate. Lemma awned, 2 mm long, geniculate.

**Flowering & Fruiting:** September-December.

**Habitat:** In rocky areas.

**Specimens examined:** Dharpally Mandal, Ramadugu Project, *V. Jalander* 956 (TUH).

**22. Megathyrsus maximus** (Jacq.) B.K. Simon & S.W.L. Jacobs, Collectanea 1: 76. 1787 (1786). *Panicum maximum* Jacq., Icon. Pl. Rar. 1: t. 13. 1781-86 & Collecteana 1: 76. 1786; Hook.f., Fl. Brit. India 7: 49. 1896; Bor, Grasses Burma, Ceylon, India & Pakistan 327. 1960; Prasanna et al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 402. 2020. *Panicum maximum* Jacq. subsp. *pubescens* M. Sharma, J. Econ. Taxon. Bot. 7: 106, f. 1. 1985. (Fig. 22).

Perennial. Culms up to 1 m high, erect or decumbent. Leaf blades linear-lanceolate. ligule an eciliate membrane. Inflorescence a panicle, open, ovate. Spikelets solitary, oblong, dorsally compressed, acute at apex. Florets 2; lower male, upper bisexual. Lower lemma ovate-lanceolate, 5-nerved, glabrous to ciliate or tuberculate hairy. Lower palea oblong-lanceolate, acute to obtuse, 2-nerved, 2-keeled. Upper lemma elliptic-oblong, acute, transversely rugulose, 5-nerved, ciliate at apex, minutely stipitate. Upper palea elliptic, acute, 2-nerved, rugulose. Stamens 3. Ovary ovate-oblong to elliptic, obtuse. Caryopsis obovate, flat, acute to obtuse at apex.

**Flowering & Fruiting:** June-April.

**Habitat:** In moist places; foothills to 1200 m; introduced and naturalized.

**Specimens examined:** Dichpally Mandal, Near CMC, *V. Jalander* 899 (TUH).

**23. Panicum paludosum** Roxb., Fl. Ind. 1: 310. 1820; Bor, Grasses Burma, Ceylon, India & Pakistan 329. 1960; Prasanna et al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 402. 2020. *Panicum proliferum* sensu Hook. f., Fl. Brit. India 7: 50. 1896 non Lam., 1798.(Fig. 23).

Perennials. Culms up to 70 cm high, erect or ascending, slender. Leaf blades flat, attenuate at apex; ligule an eciliate membrane. Panicle effuse. Spikelets gaping at maturity and upper floret seen, paired with long and short pedicels, oblong-lanceolate to elliptic, acute to acuminate at apex. Lower glume ovate, cup like, acuteat apex, rounded at base, 3-5-nerved, rarely faintly 9-nerved. Upper glume broadly ovate to elliptic-lanceolate, acute to acuminate, 11-nerved. Florets 2; lower male or barren, upper bisexual. Lower lemma oblong-lanceolate to elliptic, acute, 9-nerved. Lower palea elliptic, obtuse, 2-nerved, 2-keeled. Upper lemma elliptic, acute, subcoriaceous, smooth to shiny, faintly 5-nerved. Upper palea elliptic, acute, smooth, shiny, 2-nerved. Stamens 3. Ovary oblong. Caryopsis turgid, oblong to elliptic.

**Flowering & Fruiting:** August-December.

**Habitat:** Common in fringe areas of lakes and water bodies.


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**Specimens examined:** Navipet Mandal, Fakrabad Village, *V. Jalander* 987 (TUH).

**24. Panicum sumatrense** Roth ex Roem. & Schult., Syst. Veg., ed. 15 bis 2: 434. 1817; Bor, Grasses Burma, Ceylon, India & Pakistan 701. 1960; Prasanna et al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 403. 2020. *Panicum miliare* Lam., Tabl. Encycl. 1: 173. 1791. *Panicum sumatrense* Roth subsp. *psilopodium* (Trin.) de Wet, J. Agric. Tradit. Bot. Appl. 30: 159. 1983. *Panicum psilopodium* Trin., Gram. Panic. 217. 1826. *Panicum psilopodium* Trin. var. *coloratum* Hook.f., Fl. Brit. India 7: 47. 1896. (Fig. 24).

Perennials, up to 1 m tall. Culms slender. Leaves disthicous; ligules membranous; leaf-blades linear-lanceolate, acuminate at apex. Panicle 15-25 × 2.510 cm. Spikelets paired with long and short pedicels, oblong-lanceolate, elliptic when mature, acute at apex. Lower glume broadly ovate, orbicular, 1/3 of spikelet, acute, cup like at base. Upper glume ovate-lanceolate, acute to acuminate. Florets 2; lower male and reduced, upper bisexual. Stamens 3. Stigma plumose. Caryopsis oblong to elliptic, obtuse, greenish-white.

**Flowering & Fruiting:** September-January.

**Habitat:** Common in moist habitats and plains.

**Specimens examined:** Nizamabad, G.G. College Campus, *V. Jalander* 911 (TUH).

**25. Pogonatherum crinitum** (Thunb.) Kunth, Enum. Pl. 1: 478. 1833; Hook.f., Fl. Brit. India 7: 141. 1896; Bor, Grasses Burma, Ceylon, India & Pakistan 200. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 412. 2020. *Andropogon crinitus* Thunb., Fl. Jap. 40. t. 7. 1784. (Fig. 25).

Tufted annuals or perennials, up to 60 cm tall. Culms erect to geniculate, nodes bearded. Leaf blade linear-lanceolate, acuminate; ligule membranous brown. Raceme terminal, 2-4 cm long. Spikelets binate. Sessile spikelets ovate-lanceolate, acute, long awned. Lower glume oblong-lanceolate, acute. Upper glume ovate to oblong-lanceolate, acute, slightly 2-lobed, awned. Florets 2; lower barren; upper bisexual. Lower lemma linear, acute at apex. Upper lemma oblong-lanceolate, 2-lobed, awned. Palea broadly ovate, ciliate at apex. Stamen 1. Ovary narrowly elliptic. Caryopsis narrowly elliptic-oblong, wrinkled on surface. Pedicelled spikelets similar to sessile spikelets.

**Flowering & Fruiting:** May-March.

**Habitat:** Occasional along streams and shaded rivulets.

**Specimens examined:** Dichpally, Telangana University Campus, *V. Jalander* 908 (TUH).

**26. Polypogon monspeliensis** (L.) Desf., Fl. Atlant. l: 67. 1798; Hook.f., Fl. Brit. India 7: 245. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 403. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 412. 2020. *Alopecurus monspeliensis* L., Sp. Pl. 1: 61. 1753. (Fig. 26).

Annuals. Culms solitary or caespitose, geniculately ascending from base, slender, up to 40 cm high; nodes glabrous; ligule an eciliate membrane; leaf blade linear, rounded at base, acute at apex. Inflorescence a panicle; panicle dense, spiciform, narrowly oblong, or ovate, lobed, branched. Spikelets crowded, laterally compressed, narrowly oblong, awned. Glumes subequal, similar, exceeding the apex of florets. Lower glume oblong, obscurely 1-nerved, shortly notched at apex with 2-5 mm long, scaberulous awn. Upper glume similar, little longer. Lemma oblong, obscurely nerved, dentate, 2-4-fid at apex, awned. Palea hyaline, ovate, acute at apex. Stamens 3. Caryopsis obovoid

**Flowering & Fruiting:** January - June.

**Habitat:** Occasional along the streams and water bodies.

**Specimen examined:** Dichpally Mandal, Nakathanda, *V. Jalander* 890 (TUH).

**Note:** Jalander et al. (2022c) reported from Nirmal District of Telangana.


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Fig. 21. **Lophopogon tridentatus** (Roxb.) Hack.


Fig. 22. **Megathyrsus maximus** (Jacq.) B.K. Simon & S.W.L. Jacobs


**Fig. 23. Panicum paludosum** Roxb.

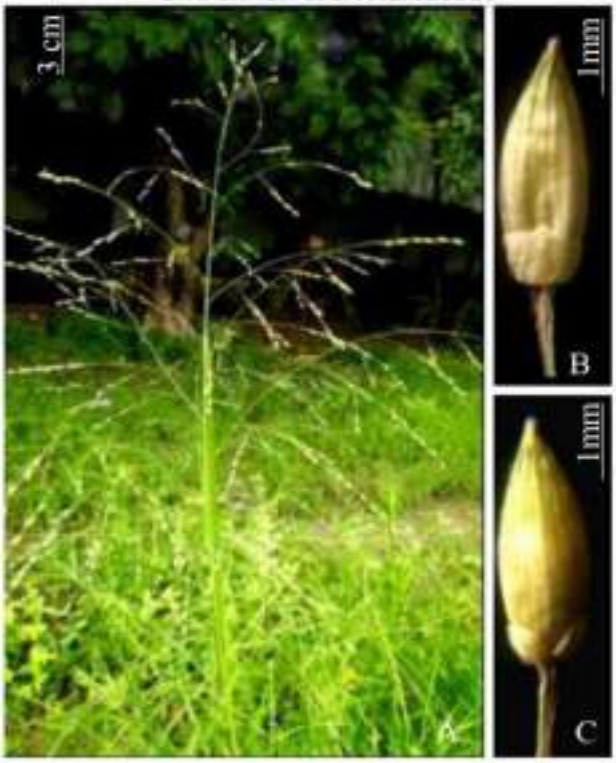


**Fig. 24. Panicum sumatrense** Roth *ex* Roem. & Schult.

**Fig. 21.** A. Inflorescence; B-C. Sessile & pedicelled spikelets; D. Sessile spikelet; E. Lower glume; F. Pedicelled spikelet; G. Lower glume. **Fig. 22.** A. Part of raceme; B. Inflorescence; C-D. Spikelets. **Fig. 23.** A. Inflorescence; B. Part of raceme; C-D. Spikelets. **Fig. 24.** A. Inflorescence; B-C. Spikelets both views.


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**27. Pseudoraphis spinescens** (R. Br.) Vickery, Proc. Roy. Soc. Queensland 62: 69. 1952; Bor, Grasses Burma, Ceylon, India & Pakistan 353. 1960; Prasanna et al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 414. 2020. *Panicum spinescens* R. Br., Prodr. 193. 1810. *Chamaeraphis spinescens* (R. Br.) Poir., Encycl. 2: 189. 1811; Hook.f., Fl. Brit. India 7: 62. 1896. (Fig. 27).

Aquatic annuals, up to 70 cm tall. Culms trailing, nodes hairy. Ligules a rim of hairs; leaf blades linear-lanceolate, sparsely tubercle based hairy above. Panicle 5-9 × 2-4 cm, peduncle enclosed by sheath. Racemes up to 4 cm long. Spikelets linear to narrowly elliptic-lanceolate, mm, acuminate at apex. Lower glume oblong, truncate, granulate. Upper glume narrowly elliptic-lanceolate, acuminate. Florets 2; lower male, upper bisexual or male. Stamens 3. Ovary narrowly oblong. Caryopsis linear-oblong.

**Flowering & Fruiting:** August-December.

**Habitat:** Occasional in marshy habitats and water bodies.

**Specimen examined:** Yedaplly Mandal, Janakampet Village, *V. Jalnder* 912 (TUH).

**28. Pseudosorghum fasciculare** (Roxb.) A. Camus, Bull. Mus. Natl. Hist. Nat. 26: 662. 1920; Bor, Grasses Burma, Ceylon, India & Pakistan 205. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 414. 2020. *Andropogon fascicularis* Roxb., Fl. Ind. 1: 269. 1820; Hook.f., Fl. Brit. India 7: 177. 1896. *Sorghum fasciculare* (Roxb.) Haines, Bot. Bihar Orissa 1034. 1924. *Sorghum gangeticum* (Hack.) Stapf ex Haines, Bot. Bihar Orissa 1034. 1924. (Fig. 28).

Perennials, up to 1m tall. Culms erect, nodes glabrous or sparsely hairy. Ligules membranous; leaf blades linear-lanceolate, acuminate or caudate. Panicle up to 14 cm long. Racemes few to many, alternate, compact, 5-6 cm long. Spikelets paired. Sessile spikelets ovate-lanceolate, acute to acuminate at apex, awned. Stamens 3. Ovary narrowly oblong-elliptic; stigma plumose. Caryopsis elliptic-lanceolate, acute at ends, turgid, flat on dorsal surface, brownish. Pedicelled spikelet lanceolate, acuminate.

**Flowering & Fruiting:** October-December.

**Habitat:** Rare on the moist habitats and margins of the forest.

**Specimen examined:** Indalwai Mandal, *V. Jalander* 964 (TUH).

**29. Sarga purpureosericea** (Hochst. ex A.Rich.) Spangler in Austral. Syst.Bot. 16(3): 291. 2003. *Sorghum purpureosericeum* (Hochst. ex A.Rich.) Asch. & Schweinf. in Schweinf., Beitr. Fl. Aethiop.: 310. 1867; Bor, Grasses Burma, Ceylon, India & Pakistan 246. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 425. 2020. *Andropogon purpureo-sericeus* Hochst. ex A.Rich., Tent. Fl. Abyss. 2: 469. 1851(1850); Hook.f., Fl. Brit. India 7: 185. 1896. *Sorghum deccanense* Stapf ex Raizada, Indian Forester 80: 43. 1954. (Fig. 29).

Tufted annuals. Culms erect, up to 1.5 m high; nodes densely bearded with long silky hairs. Leaf blades linear-lanceolate, hairy dorsally; ligule membranous, ciliate at apex. Panicle oblong, contracted. Raceme branches whorled at most nodes bearing 3-5 fertile spikelets. Spikelets paired, sessile and pedicelled. Sessile spikelet up to elliptic-lanceolate, dorsally compressed, awned, densely golden brown hairy to glabrous. Glumes ovate, acute to 2-dentate at apex, 5–7-nerved, at times keeled, keel ends with beak like tip, spinulously ciliate, dark brown or black, hairy to glabrous, margins involute. Florets 2; lower barren, upper bisexual. Lower lemma elliptic, 2-nerved, margins ciliolate. Lower palea absent. Upper lemma oblong, 2-fid at apex, awned from sinus, 1-nerved. Upper palea absent or minute. Stamens 3. Caryopsis ellipsoid. Pedicelled spikelet linear to lanceolate, male, slightly shorter than sessile. Glumes chartaceous, muticous. Lemmas enclosed by glumes.

**Flowering & Fruiting:** August-December.

**Habitat:** Occasional in the grasslands of plateaus.


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Fig. 25. **Pogonatherum crinitum** (Thunb.)Kunth




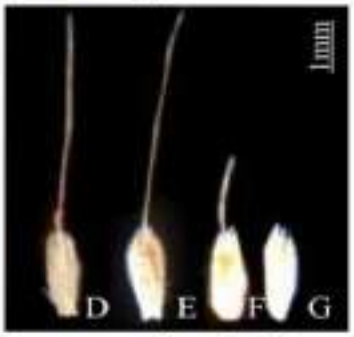


Fig. 26. **Polypogon monspeliensis** (L.) Desf. var. **monspeliensis**




Fig. 27. **Pseudoraphis spinescens** (R.Br.) Vickery






Fig. 28. **Pseudosorghum fasciculare** (Roxb.) A. Camus

**Fig. 25.** A. Habit; B Inflorescence; C. Sessile & pedicelled spikelets; D. Sessile spikelet; E. Pedicelled spikelet. **Fig. 26.** A. Inflorescence; B-C. Spikelets; D. Lower glume; E. Upper glume; F. Lemma; G. Palea. **Fig. 27.** A. Inflorescence; B. Part of raceme; C-D. Spikelets. **Fig. 28.** A. Inflorescence; B. Raceme; C. Sessile and pedicelled spikelets; E. Sessile spikelet; F. Pedicelled spikelet.


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**Specimen examined:** Dichpally Mandal, Mullangi Village, *V. Jalander* 953 (TUH).

**30. Schizachyrium brevifolium** (Sw.) Nees ex Buse in Miq., Pl. Jungh. 359. 1854; Bor, Grasses Burma, Ceylon, India & Pakistan 216. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 418. 2020. *Andropogon brevifolius* Sw., Prodr. 1788; Hook.f., Fl. Brit. India 7: 165. 1896.

Annuals, up to 20 cm tall. Culms erect or ascending. Ligules membranous, fimbriate; leaf blades oblong-lanceolate. Inflorescence a series of axillary, spatheate solitary racemes, in false panicle; spatheole oblanceolate, acuminate at apex. Raceme up to 2 cm long; rachis fragile, linear to clavate; joints triquetrous with bidentate apex. Spikelets paired, dissimilar. Sessile spikelet oblong-linear, acute at apex, brownish, awned. Caryopsis narrowly oblong - linear, acute at ends, brownish. Pedicelled spikelet reduced to awned glumes.

**Flowering & Fruiting:** August-December.

**Habitat:** Occasional in the hills and in grassy patches.

**Specimen examined:** Nizamabad Mandal, Malkapurthanda, *V. Jalander* 907 (TUH).

**Note:** Swamy (2018) reported it from Kinnerasani Wildlife Sanctuary of Bhadradri Kothagudem district.

**31. Sporobolus spicatus** (Vahl) Kunth, Revis. Gramin. 1: 67. 1829; Hook.f., Fl. Brit. India 7: 250. 1896; Bor, Grasses Burma, Ceylon, India & Pakistan 632. 1960; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 429. 2020. *Agrostis spicata* Vahl, Symb. Bot. 9. 1790. (Fig. 31).

Tufted, stoloniferous annuals or perennials, up to 10-40 cm tall. Culms creeping, tufted, node a glabrous brown ring. Leaf blade linear-lanceolate. Ligule a rim of ciliate. Inflorescence a panicle, spicate, branches compactly arranged on central axis. Spikelets lanceolate-elliptic, apex acuminate. Glumes unequal, persistent, later falling down. Lower glume, ovate-oblong, apex obtuse to acute. Upper glume lanceolate-oblong, apex acute to minutely lobed. Lemma elliptic to oblong-lanceolate or boat shaped, apex acute, as long as spikelet. Palea oblong-lanceolate, apex acute to obtuse. Stamens 3. Ovary lanceolate-oblong. Caryopsis oblong to ovate, apex truncate.

**Flowering & Fruiting:** Throughout the year.

**Habitat:** In marshy areas.

**Specimen examined:** Dichpally Mandal, Nadipallythanda, *V. Jalander* 860 (TUH).

**32. Tripogon borii** Kabeer, V.J.Nair, G.V.S.Murthy, Bull. Bot. Surv. India 50(1–4): 115. 2009; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 436. 2020. (Fig. 32).

Caespitose perennials. Culms up to 60 cm high, terete; nodes glabrous. Ligule membranous; leaf blades linear, flat-involute, attenuate at apex. Racemes 15-25 cm long, straight to curved, spikelets appressed to concavities in rachis. Spikelets ovate lanceolate, linear, creamy, 6-12 flowered. Lower glumes oblong, deeply lobed below middle along one side, lobes acute to acuminate, 1-nerved, 1-keeled. Upper glumes elliptic-oblong, 1-keeled, 1-nerved, apex bi-lobed, aristate, arista at sinus. Lemmas oblong-lanceolate, 6-lobed, 3-nerved, 3-awned, median awns 2.5-3 mm long; lobes on either side of median awns acute to acuminate, lateral awns 1.5–2 mm long, lateral lobes on either side conspicuous, slightly keeled. Paleas oblong-elliptic, hyaline, 2-nerved, sub-acute at apex. Stamens 3. Ovary oblong-elliptic. Caryopses narrowly oblong-lanceolate, light brown.

**Flowering & fruiting:** September-December.

**Habitat:** This species prefers to grow in rock crevices.

**Specimens examined:** Jakranpally Mandal, Puppalapally Village, *V. Jalander* 853 (TUH).

**Note:** Jalander et al. (2021) were not reported in their Grasses of Nizamabad District and recently it has collected from Jakranpally Mandal (Jalander and Swamy, 2023a).


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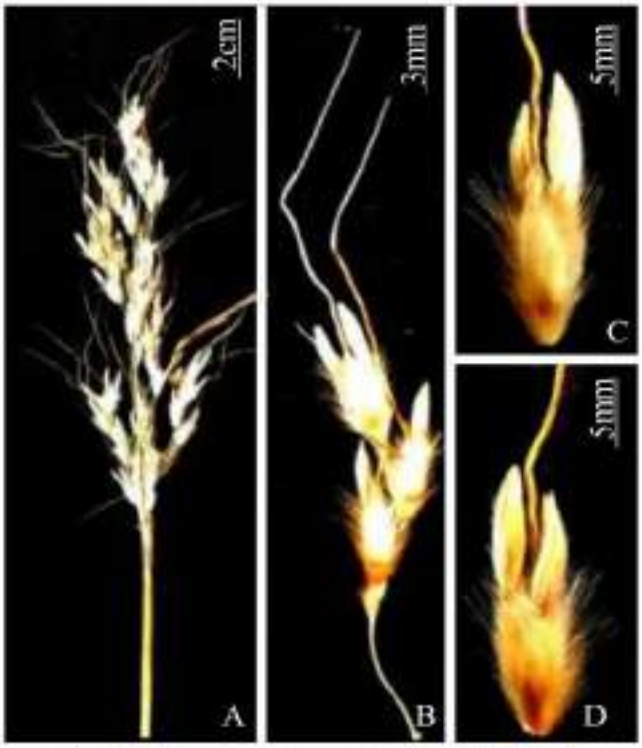


Fig. 29. **Sarga purpureosericea** (Hochst. ex A.Rich. ) Spangler

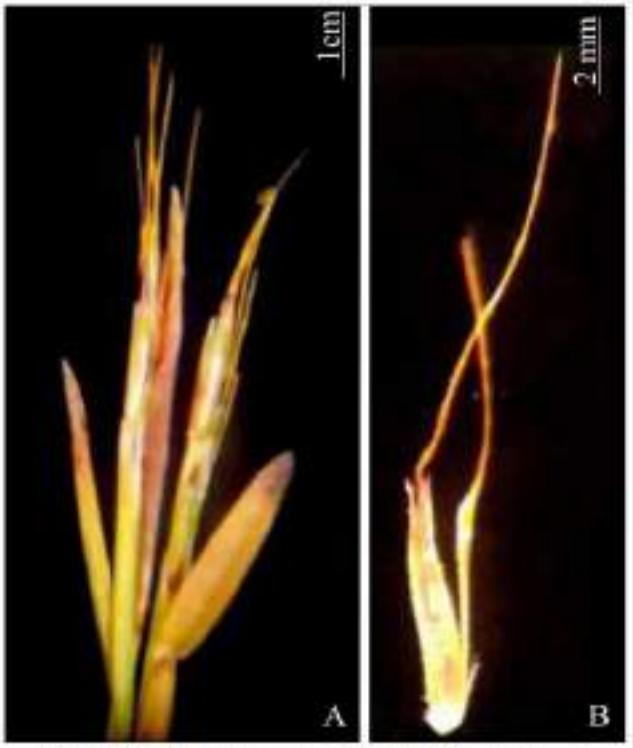


Fig. 30. **Schizachyrium brevifolium** (Sw.) Nees ex Buse

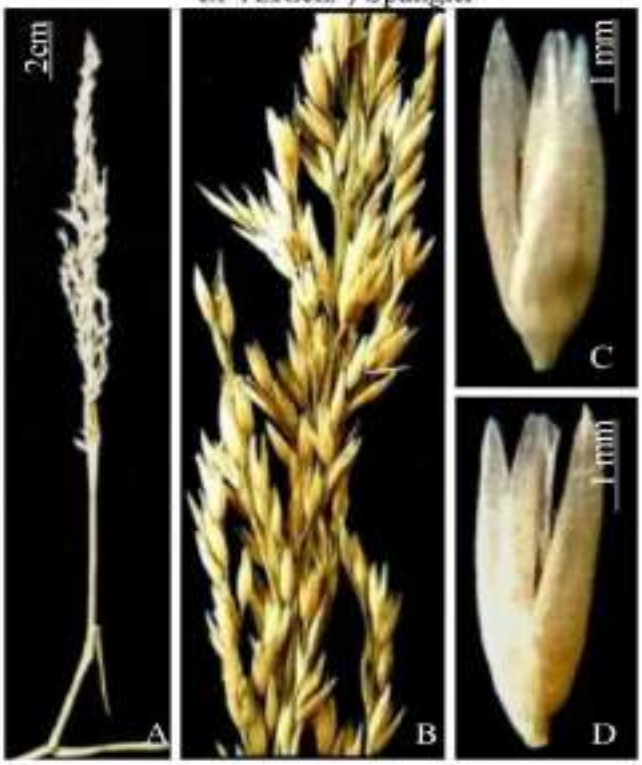


Fig. 31. **Sporobolus spicatus** (Vahl) Kunth

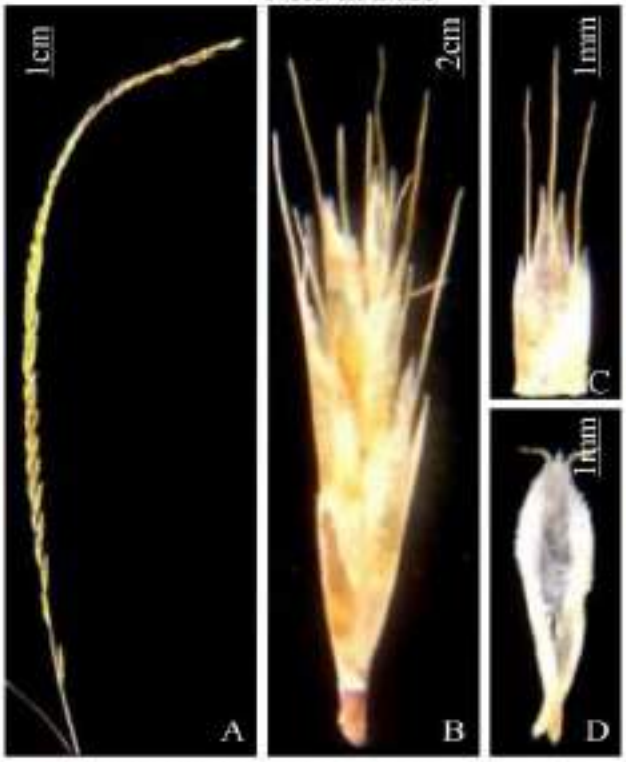


Fig. 32. **Tripogon borii** Kabeer, V.J.Nair, G.V.S.Murthy

**Fig. 29.** A. Inflorescence; B. Raceme; C-D. Sessile & pedicelled spikelets. **Fig. 30.** A. Inflorescence; B. Sessile & pedicelled spikelets. **Fig. 31.** A. Inflorescence; B. Part of inflorescence; C-D. Spikelets. **Fig. 32.** A. Inflorescence; B. Spikelet; C. Lemma; D. Palea.


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**33. Tripogon bromoides** Roth ex Roem. & Schult., Syst. Veg. (ed.15) 2: 600. 1817; Hook.f., Fl. Brit. India 7: 287. 1896; Bor, Grasses Burma, Ceylon, India & Pakistan 521. 1960; Prasanna & al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 436. 2020.

Perennial. Culms tufted, terete, up to 20 cm tall, erect, slender, glabrous, nodes glabrous. Leaf blade convolute, linear, apex acuminate; ligule membranous. Racemes spiciform, 5-20 cm long. Spikelet narrowly ovate, 4-10 flowered. Lower glume oblong-ovate, glabrous, asymmetrical, 1-keeled, keel scabrous, 1-nerved, apex notched. Upper glume, narrowly ovate, glabrous, 1-keeled, keel scaberulous, 1-nerved, 2-toothed at apex, awned from sinus. Lemma narrowly ovate-elliptic, glabrous, 1-keeled, 3-nerved, apex 4 lobed, inner lobes membranous, obtuse, outer lobes with bristle like arista, median awn 2-4 mm long, shorter or as long as lemma. Palea hyaline, narrowly obovate, 2-keeled, keels ciliate, apex obtuse. Stamens 3. Grain oblong elliptic.

**Flowering & fruiting:** August to November.

**Habitat:** This species prefers to grow in rock crevices and on seasonally wet bare rocks in high elevation grasslands.

**Specimens examined:** Jakranpally Mandal, Puppalapally Village, *V. Jalander* 800 (TUH); Yedapally mandal, Near Janakampet Railway Station, *V. Jalander* 968 (TUH).

**34. Tripogon polyanthus** Naik & Patunkar, Bull. Bot. Surv. India 15: 159. 1973; Prasanna et al., Poaceae in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 437. 2020. *Tripogon jacquemontii* var. *polyanthus* (Naik and Patunkar) Sang. Dey and Prasanna in J. Econ.Taxon. Bot. 43(1–4): 7. 2020.

Perennial. Culms tufted, erect, up to 50 cm high; nodes glabrous. Leaf blade linear, convolute, filiform, acute to acuminate at apex; leaf sheaths glabrous, ribbed, basal sheaths fibrous, persistent; ligule very minutely ciliate. Spikes (racemes) up to 20 cm long. Spikelets oblong to linear-lanceolate, alternate on opposite rows. Sessile spikelets , purple tinged, acute at apex. Lower glumes asymmetrical, 1-nerved, 1-keeled, mucronate at apex. Upper glumes lanceolate, 1-nerved, 1-keeled, acute at apex. Fertile florets 25-35. Lemmas ovate-lanceolate, 3-nerved, acute and 2-lobed at apex, awned from sinus, lobes acute to acuminate, unawned, median awn 1-1.35 mm long. Paleas oblong-lanceolate, narrowly winged, hyaline, 2-keeled, keels ciliate, acute to emarginate at apex. Stamens 3. Ovary obovate. Caryopses narrowly oblong-lanceolate, light brown.

**Flowering and Fruiting:** August-November.

**Habitat:** Rare along streams and fringe areas of the lakes and tanks.

**Specimen examined:** Dichpally Mandal, *V. Jalander* and *J. Swamy* VJ 399 (TUH).

**Note:** Jalander et al. (2021) were not reported in their Grasses of Nizamabad District and recently it has collected from Jakranpally Mandal (Jalander and Swamy, 2023b).

**35. Urochloa deflexa** (Schumach.) H. Scholz, Bull. Mus. Natl. Hist. Nat., B, Adansonia Sér. 4, 11(4): 443. 1990. *Panicum deflexum* Schumach., Beskr. Guin. Pl. 63. 1827. *Brachiaria deflexa* (Schumach.) C.E. Hubb. ex Robyns, Bull. Jard. Bot. Etat Bruxelles 9: 181. 1932; Bor, Grasses Burma, Ceylon, India & Pakistan 281. 1960; Prasanna et al. in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. 3: 329. 2020. *Pseudobrachiaria deflexa* (Schumach.) Launert, Mitt. Bot. Staatssamml. Munchen 8: 158. 1970.

Annual. Culms up to 60 cm high, ascending or prostrate. Leaf blades linear-lanceolate, acute at apex; ligule a fringe of hairs. Raceme, up to 12 cm long, digitate, unilateral. Spikelets elliptic, in pairs, densely hairy, dorsally compressed, acute at apex. Glumes unequal. Lower glume ovate, half the length of spikelets, 5-7-nerved, acute at apex. Upper glume ovate, as long as spikelets, 5-7-nerved, acute at apex. Lower lemma ovate, as long as spikelets, 3-5-nerved, acute at apex. Upper lemma ovate, margin involute, acute at apex. Caryopsis ellipsoid.

**Flowering and Fruiting:** August-September.


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Fig. 33. **Tripogon bromoides** Roem. & Schult.





Fig. 34. **Tripogon polyanthus** Naik and Patunkar





**Fig. 35. Sporobolus spicatus** (Vahl) Kunth

**Fig. 33.** A. Part of inflorescence; B. Spikelet; C. Lemma; D. Palea. **Fig. 34.** A. Inflorescence; B. Spikelet; C. Lemma; D. Palea. **Fig. 35.** A. Habit; B. Inflorescence; C. Spikelets; D-E. Both views of spikelet.


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**Habitat:** Prefers dry situations.

**Specimens examined:** Nizamabad District, Dichpally Mandal, *V. Jalander* 830 (TUH).

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