



Themeda palakkadensis (Poaceae: Panicoideae), a new species from Kerala State, India

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ABSTRACT: *Themeda palakkadensis*, a new grass species from Kerala, India, is described and illustrated. The new species is similar to *T. laxa* in having pair of involucre spikelets arranged at same level and in inflorescence pattern but, differs in having densely rufous hairy sessile spikelets, lower lemma of sessile spikelet sparsely rufous hairy, lower glumes of pedicelled spikelets winged on keels, longer anthers and shorter caryopsis length.

KEY WORDS: Andropogoneae, Anthistirineae, Panicoideae, Poaceae, *Themeda palakkadensis*, Western Ghats.

INTRODUCTION

The genus *Themeda* Forssk. (1775) belongs to the tribe Andropogoneae, subfamily Panicoideae in the family Poaceae (Soreng *et al.*, 2015). The genus is characterized in having a compound panicle, racemes with 2 involucre homogamous pairs at base and 1 or more sessile spikelets accompanied by 2 or more pedicelled spikelet (Clayton and Renvoize, 1986; Veldkamp, 2016). It comprises 30 species in the tropics and subtropics of the Old World, mainly in Asia (Kellogg, 2015; Veldkamp, 2016). There are 17 species and 3 varieties in India including newly discovered *Themeda odishae* Chorghe *et al.* (Bor, 1960; Karthikeyan *et al.*, 1989; Chorghe *et al.*, 2016). With maximum number of species distributed, Northern India and Yunnan of China is considered as distribution and diversification centers of genus *Themeda* (Zhang and Qing, 2012).

While exploring Elivali Malai in Palakkad district of Kerala state one of the author (KP) collected several specimens of *Themeda*, an erect grass growing on rocky crevices. After critical study of the material, consultation of relevant literature and herbarium, the authors arrived at the conclusion that this is an undescribed species of *Themeda*. The novelty is described, illustrated and compared with the allied *T. laxa* (Andersson) A. Camus (1920), which is known to be distributed in Bhutan, India and Nepal. In addition to present collections, few specimens collected from different location of Palakkad district present in CAL and MH were also studied which shows characters same as *T. palakkadensis*.

TAXONOMIC TREATMENT

Themeda palakkadensis Chorghe, K. Prasad & Lakshmin., *sp. nov.* **Fig. 1**

Type: INDIA, Kerala, Palakkad District, Elivai Malai 10°56'06.34"N, 76°38'20.76"E, at 1858 m a. s. l., 12 Nov. 2016, K. Prasad 8485 (holotype CAL, isotype: BSI).

Etymology: The new species is named after Palakkad District of Kerala state.

Diagnosis: *Themeda palakkadensis* is similar to *T. laxa* in having involucre spikelets arranged at same level and spathe having 1–3 racemes arranged, but differs from it in having both the glumes of sessile spikelet densely rufous hairy (vs glabrous), lower lemma of sessile spikelet sparsely rufous hairy at apex (vs glabrous); anthers 4–5 mm long (vs 2–3 mm); caryopsis 2.5–3 mm long (vs 3.5–4 mm long) and lower glumes of pedicelled spikelet winged on both the keels (vs wingless).

Tufted perennial. Culms 30–60 cm long, erect; nodes glabrous. Leaf blades linear, 2–15 × 0.2–0.5 cm, attenuate at apex, surface glabrous with sparsely tuberculate hairy on basal margins; ligules membranous, hyaline c. 2 mm long; leaf sheath 1–5 cm long, glabrous, keeled. Panicle 5–20 cm long, with spathaceous racemes of 1–3 from each sheath, 1–4 clusters from each node; peduncle slender; spathe infolded boat shaped, 2–5 × 0.3–0.6 cm, attenuate at apex, densely tuberculate hairy; raceme consist of 4 sessile homogamous involucre male spikelets, 1 sessile awned bisexual spikelet and 2 pedicelled male spikelets. Involucre spikelet oblong-lanceolate, 8–10 × 1.5–2 mm, obtuse at apex, 1-flowered, male, epaleate, arranged at same level. Lower glumes oblong-lanceolate 8–10 × 1.5–2 mm, obtuse at apex, chartaceous, 9–13-nerved, 2-keeled, keels broadly winged, wings c. 0.5 mm wide, sparsely tuberculate based hairy, hairs 2–3 mm long. Upper glume elliptic-lanceolate, 8–9 × 1–1.5 mm, acute at apex, membranous, 3-nerved, margins infolded with ciliate hairs. Lemma 8–8.5 × c. 1 mm, obtuse at apex, membranous, hyaline, 3-nerved, margins infolded, ciliate. Stamens 3; anther 4–5



Fig. 1. *Themeda palakkadensis* Chorghe, K. Prasad & Lakshmin. sp. nov. **A.** Habit, **B.** Raceme, **C.** Sessile spikelet and pedicelled spikelet; **D–F.** Involucral spikelet: **D.** Lower glume, **E.** Upper glume, **F.** Lemma, **G.** Stamens; **H–N.** Sessile spikelet: **H.** Spikelet, **I.** Lower glume, **J.** Upper glume, **K.** Lower lemma, **L. & M.** Upper lemma, **N.** Caryopsis; **O–R.** Pedicelled spikelet: **O.** Spikelet, **P.** Lower glume, **Q.** Upper glume, **R.** Lemma.



mm long. Sessile spikelet oblong, 5–6 × 1.5–2 mm, obtuse at apex, truncate to round at base, awned, callus *c.* 2 mm, pointed, bearded with rufous hairs. Lower glume oblong, 5–6 × 1.5–2 mm, obtuse at apex, narrow at base, subcoriaceous, 9-nerved, densely rufous hairy throughout, margin inrolled. Upper glume linear-lanceolate, 4.5–5.5 × *c.* 1 mm, obtuse at apex, chartaceous, 3-nerved, inwardly thickened in between middle and lateral nerves, 3 sublobed, densely rufous hairy throughout. Floret 2, lower barren, epaleate; upper perfect, epaleate. Lower lemma broadly oblong, 4–4.5 × 0.8–1 mm, obtuse at apex, membranous, hyaline, 3-nerved, sparsely rufous hairy at apex. Upper lemma 1.5–2.5 × 0.25–0.3 mm; awn 2.5–3.5 cm long, stiff, geniculate, column twisted toward apex, hairy. Caryopsis 2.5–3 × *c.* 0.5 mm, oblong-lanceolate, obtuse at apex, narrow at base. Pedicelled spikelet lanceolate, 7–8 × 1–1.5 mm, acute at apex; pedicels 1–1.2 mm long. Lower glume lanceolate, 7–8 × 1–1.5 mm, acuminate at apex, chartaceous, 9–13 nerved, margins keeled, keels winged; wings *c.* 0.5 mm wide. Upper glume linear-lanceolate, 7–7.5 × 1–1.5 mm, acuminate at apex, membranous, 2-nerved, margins infolded towards apex, ciliate. Floret 1, male, epaleate. Lemma linear-lanceolate, 6.5–7 × *c.* 1 mm, acute at apex, membranous, hyaline, 1-nerved, margins infolded.

Flowering & Fruiting: September–December.

Distribution & Ecology: It grows on rocks at an elevation from 1600 to 1900 m a. s. l., in association with *Tripogon bromoides* Roth, *Crotalaria fysonii* Dunn, *Habenaria longicorniculata* Graham. *Themeda palakkadensis* is currently known from the Palakkad District of Kerala state.

Additional specimens examined: INDIA. Kerala, Palakkad District: Elivai Malai, 12th November 2016, K. Prasad 8463, 8465, 8479, 8480, 8482 (CAL, MH, BSID); Walayar, J. Joseph 17897 (CAL & MH) & Anamooly, P. Bhargavan 65769 (CAL & MH); Mukkali, E. Vajravelu 26263 (MH).

Key to species of Genus *Themeda* in India

- 1a. Lower glumes of involucre spikelets inconspicuous, small hidden among the spatheoles, membranous, 5- or 7-nerved *T. arguens*
- 1b. Lower glumes of involucre spikelets well developed, conspicuous, herbaceous, 9- or 11-nerved 2
- 2a. Pair of involucre spikelets inserted at different level 3
- 2b. Pair of involucre spikelets inserted at same level 15
- 3a. Involucre spikelets entirely glabrous or puberulous but without tubercle-based hairs 4
- 3b. Involucre spikelets covered on the lower glume with numerous or sparse tubercle-based bristles 8
- 4a. Involucre spikelets puberulous with very short hairs on the lower glumes 5
- 4b. Involucre spikelets entirely glabrous 6
- 5a. Awn well-developed, perfect, 23 – 60 mm long, column twisted, 12 – 37 mm long *T. villosa* var. *caudata*
- 5b. Awn absent or very short, 0(– 32) mm long, column more or less straight, 0 – 14 mm long *T. villosa* var. *villosa*
- 6a. Inflorescence of solitary compound raceme terminating unbranched culms *T. saxicola*

- 6b. Inflorescence of few to numerous compound raceme 7
- 7a. Inflorescence usually very large; involucre spikelets 4–6 mm long *T. cymbaria*
- 7b. Inflorescence simple, of few racemes; involucre spikelets 13–19 mm long *T. hookeri*
- 8a. Sessile spikelets not awned 9
- 8b. Sessile spikelets awned 10
- 9a. Robust tall grass; involucre spikelets 10–12 mm long, covered with golden hairs; sessile spikelets dark brown, 8 mm long *T. villosa* var. *polyantha*
- 9b. Weak erect grass with small spikelets; involucre spikelets 4.5–8 mm long, covered with grey hairs; sessile spikelets pale, 5 mm long *T. anathera*
- 10a. Tall robust grasses with nodding panicles and tubercle-based golden hairs on the lower glumes of the involucre spikelets; awn stout *T. arundinacea*
- 10b. Weak, wiry, bushy grasses or if robust the hairs on the lower glumes always grey; awns slender 11
- 11a. Racemes more or less glomerate; lower glume of sessile spikelet dorsally channelled 12
- 11b. Raceme solitary; lower glume of sessile spikelet not channelled 13
- 12a. Sessile spikelets covered with sparse, brown hairs *T. tremula*
- 12b. Sessile spikelets covered with dense, rusty brown stiff hairs *T. pseudotremula*
- 13a. Inflorescence leafy and branched *T. huttonensis*
- 13b. Inflorescence not branched and not leafy 14
- 14a. Keels of lower glume of involucre spikelet not winged, lower glume of sessile spikelet hairy *T. mooneyi*
- 14b. Keels of lower glume of involucre spikelet winged, lower glume of sessile spikelet glabrous *T. odishae*
- 15a. Awn of sessile spikelets up to 2.5 mm long 16
- 15b. Awn of sessile spikelets more than 3 mm long 17
- 16a. Lower glumes of involucre spikelets densely strigose all over, sessile spikelets up to 3.5 mm long *T. strigosa*
- 16b. Lower glumes of involucre spikelets glabrous or sparsely hairy towards apex, sessile spikelets 5–6 mm long *T. sabarimalayana*
- 17a. Involucre spikelets 4–6.5 mm long 18
- 17b. Involucre spikelets 7 – 12 mm long 19
- 18a. Robust plants, lower glume of the sessile spikelets glabrous along middle line *T. quadrivalvis* var. *quadrivalvis*
- 18b. Dwarf plants 30–45 cm tall; lower glumes of the sessile spikelets strigulose on the back *T. quadrivalvis* var. *helferi*
- 19a. Spathe with 6–8 racemes from each node; involucre spikelets 7–12 mm long; awn of sessile spikelet 5.5–7 cm long; anthers up to 5 mm long *T. triandra*
- 19b. Spathe with 1–3 racemes only; involucre spikelets up to 10 mm long; awn of sessile spikelets up to 3.5 mm long; anthers up to 4 mm long 20
- 20a. Lower glume of sessile spikelets smooth to shiny below, scabrid at apex and glabrous in middle; lower lemma of sessile spikelet glabrous; anthers of involucre spikelets 2–3 mm long; caryopsis 3.5–4 mm long; lower glume of pedicelled spikelets not winged . *T. laxa*
- 20b. Lower glume of sessile spikelets densely rufous hairy throughout; lower lemma sparsely rufous hairy at apex; anthers of involucre spikelets 4–5 mm long; caryopsis 2.5–3 mm long; lower glume of pedicelled spikelets winged on both the keels *T. palakkadensis*

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