

On the occurrence of *Eragrostis trichodes* (Poaceae: Chloridoideae) in India

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Abstract: The present paper re-affirms the occurrence of *Eragrostis trichodes* (Nutt.) Alph. Wood in Indian grass flora based on the collection from Meghalaya state, India. A brief description, taxonomic notes, photoplates along with the distribution map have been provided for easy identification of the species.

Keywords: Chloridoideae, *Eragrostis*, Khasi hills, Poaceae, Taxonomy.

Introduction

Eragrostis Wolf is the largest genus in the subfamily Chloridoideae (Poaceae) with about 421 species, worldwide (POWO, 2023) and categorized under the sub-tribe Eragrostidinae of tribe Eragrostideae (Soreng *et al.*, 2017). It is distributed across the tropics and temperate regions of the world and is found in open habitats and sometimes in forests from sea level to high altitudes (Lazarides, 1980; Clayton & Renvoize, 1986; Chaisongkaram *et al.*, 2013). In India, it is represented by c.51 taxa including 40 species and 11 varieties (Kellogg *et al.*, 2020). Several taxonomic works have been done in different parts of India in the last decades with the discovery of new species, *Eragrostis collinensis* Vivek, G.V.S.Murthy & V.J.Nair (Vivek *et al.*, 2013a), *E. jainii* Vivek, G.V.S.Murthy & V.J.Nair (Vivek *et al.*, 2013b), *E. nilgiriensis* Vivek, G.V.S.Murthy & V.J.Nair (Vivek *et al.*, 2013c), new records to Indian flora, *E. paniciformis* (A.Braun) Steud. (Veldkamp *et*

al., 2017), *E. nairii* Kalidass C. (Pavitra *et al.*, 2017), *E. barrelieri* Daveau (Jalander *et al.*, 2022) and the designation of the nomenclatural type of names *Eragrostis burmanica* Bor (Landge & Shinde 2021), *E. maderapatana* Bor (Vivek *et al.*, 2015), *E. rottleri* Stapf (Vivek *et al.*, 2013d), *E. coarctata* Stapf, *E. plana* Nees, and *E. superba* Peyr. (Jaiswal *et al.* 2023). Along with these, the genus *Eragrostis* in India was revised by by Vivek *et al.* (2021). Despite published revisionary work of *Eragrostis* from India, the confirmed occurrence of *Eragrostis trichodes* (Nutt.) Alph. Wood has not been resolved till now. The occurrence of this species in India was first recorded by Bor (1960), but he did not mention the specimen details. Later, Kellogg *et al.* (2020) and Vivek *et al.* (2021) included this species in Indian grass flora based on Bor (1960). Hitherto, the occurrence of *E. trichodes* in India was not confirmed with a specimen proof.

While exploring the grass flora of Khasi Hills, the second author collected a species near Mairang in upper Shillong. The identity of this species was confirmed through the consultation of the type specimens, protologue, and taxonomic literatures (e.g., Bor, 1960; Peterson *et al.*, 2003). Thus, the occurrence of this species in India is confirmed. The voucher specimen has been submitted to LWG. In addition to this, a brief description, taxonomic notes, and microscopic photo plates have been provided for the correct identification of the species, along with a distribution map.

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Material and Methods

The specimens for the present work were collected during fieldwork conducted in Khasi Hills, Meghalaya from September to October 2022. The studies, including identification, taxonomic treatment, distribution data, and notes on the habitat, were based on observations in the field and consultation of literature (Bor, 1960, Peterson *et al.*, 2003). For the critical study, specimens were dissected and observed using a Leica S8 APO stereozoom microscope equipped with MC 120 HD camera. Distribution map of the species has been prepared using QGIS program (QGIS Development Team, 2023).

Taxonomic Treatment

Eragrostis trichodes (Nutt.) Alph.Wood, Class-book Bot.: 796. 1861; Bor, Grass. Burma Ceylon India & Pakistan 521. 1960; Vivek, G.V.S. Murthy & V.J. Nair, Nelumbo 63(1): (33-101). 2021. *Poa trichodes* Nutt., Trans. Amer. Philos. Soc., n.s., 5: 146. 1835. Type: USA, **Arkansas**, Thomas Nuttall s.n. (holo NY[NY00431374 digital image!]). **Figs. 1 & 2**

Perennial. Culms 45–80 cm long, non-glandular. Leaf sheaths 11–18 cm long, hairy on apices. Ligule membranous, apex lacerate, ciliate with cilia 0.3–0.7 mm long. Leaf blades 25–47 cm long, flat to involute, adaxial surface scabrid. Panicles 30–45 (–70) cm long, open. branches alternate to sub-whorled, capillary, axils ciliate. Pedicels up to 2.5 cm long, capillary. Spikelets ovate to lanceolate or oblong, 5.0–7.7 mm long, disarticulating from below upwards, 5–8-flowered. Lower glumes 1.8–3.0 mm long, apex acuminate. Upper glume 2.0–3.5 mm, apex acuminate. Lemmas 2.5–3.0 mm long, broadly ovate to lanceolate, membranous, keel prominent, scabrous along keel towards apex, apex obtuse to acute. Paleas 1.5–2.5 mm long, scaberulous along keels above middle, apex acute. Stamens 3, anthers 1–1.5 mm long, purplish. Caryopses 0.7–1.3 mm long, oblong, prismatic, ventrally grooved, truncate at ends, dark reddish.

Flowering and fruiting: From September to October.

Habitat and distribution: *Eragrostis trichodes* (Nutt.) Alph.Wood (\equiv *trichodes* Nutt.) was discovered from Arkansas, North America (Nuttall, 1835). The native range of this species is the Central and East United States of America (Peterson *et al.*, 2003). It is a warm-season, short-lived, perennial grass which grows on sandy soils, open sandy woods, rocky slopes, and roadsides, at 100–2150 m a.s.l. in their native range. It is also found in France, Germany, Japan, Maryland, and Saudi Arabia as an introduced species (POWO, 2023). However, in India, it was first reported by Bor (1960) as an introduced species without any comments on its distributional range and citation of specimens made in the country. During a field trip in Khasi Hills, was been collected near Mairang, Upper Shillong, which confirms its occurrence in India. It is an alien grass species and found to grow on degraded land, secondary cliffs, near the forest margin; at 1700–1750 m a.s.l. (Fig. 3).

Specimens examined: INDIA, **Meghalaya**, upper Shillong, on way to Mairang, N 25° 31' 25.68" , E 91° 41' 27.96", 12.10.2022, 1750 m, D. Prasad 350004 (LWG).

Taxonomic notes: According to Peterson *et al.* (2003), the spikelets of *E. trichodes* are disarticulated from below upwards. However, in the taxonomic keys, Bor (1960) noted that the spikelets are disarticulated from above downwards as found in *E. aspera* Nees. We examined the disarticulation patterns of spikelet and found that the lemmas have fallen from below upward, while the paleas are persistent on the rachilla as same has been described by Vivek *et al.* (2021) (Fig. 2). However, the description, provided by Vivek *et al.* (2021), is based on the specimens deposited at CAL herbarium, collected from USA. *Eragrostis trichodes* shares similarity with *E. aspera* in having very broadly oblong open to loose panicle with numerous capillary branches bearing long or short pedicelled spikelets but differs from the latter by panicle longer than half the length of culm (*vs.* shorter than half the length of culm), spikelets are disarticulated from below upward (*vs.* from above downward), lower glumes 1.8–3.0 mm long,

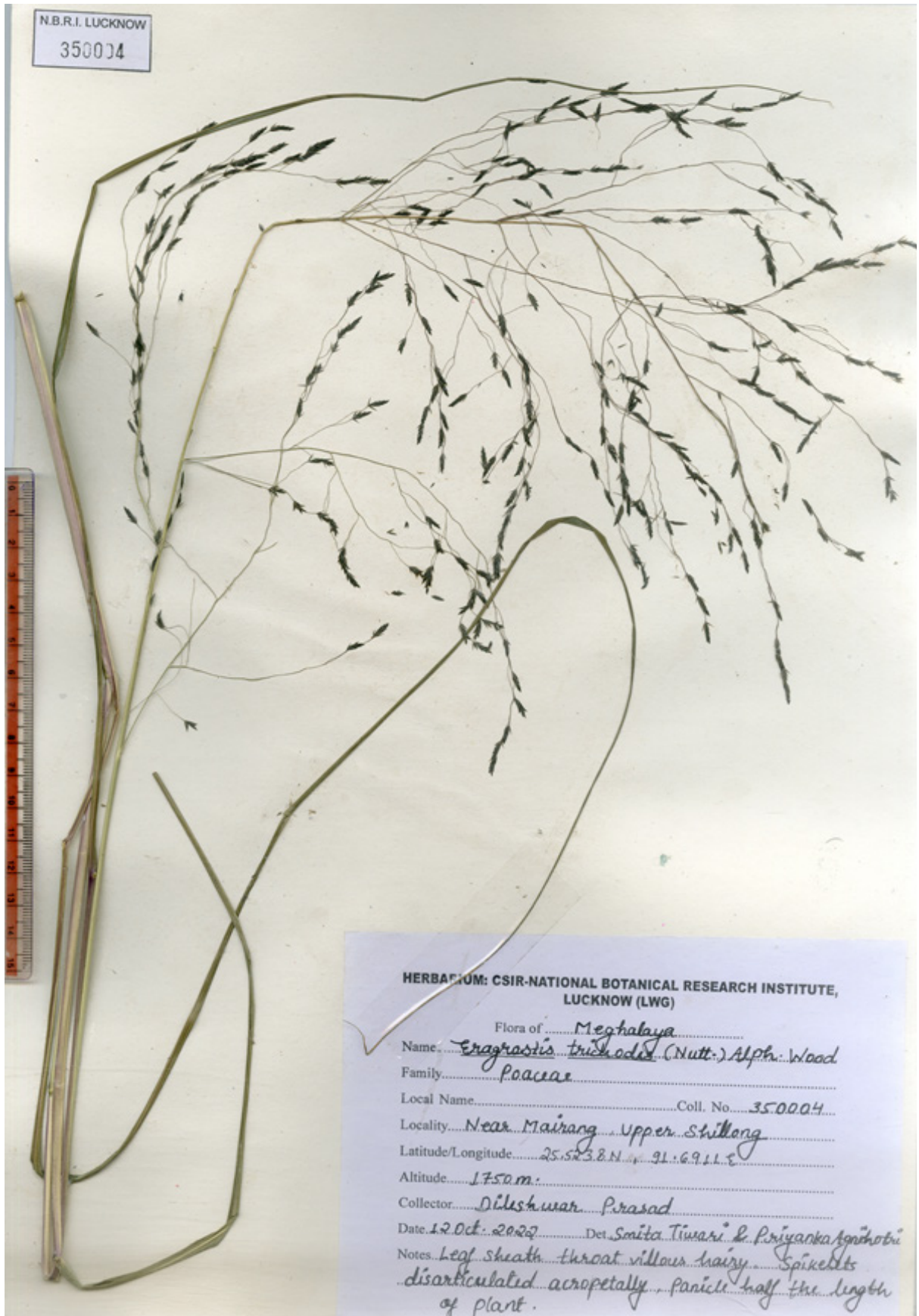


Fig 1. Representative specimen of *Eragrostis trichodes* from India.

lanceolate-acuminate (*vs.* 1.0–1.3 mm long, elliptic-acute), and lemmas 2.5–3.0 mm long ovate to lanceolate, apex acute (*vs.* 1.2–1.7 mm long, ovate to

elliptic, apex truncate). *E. trichodes* is also allied to *E. nigra* Steud., with glumes lanceolate-acuminate and a similar length of the lemma, but has lower glume



Fig. 2. *Eragrostis trichodes* (Nutt.) Alph.Wood: **a.** Axil of panicle; **b.** Junction of leaf sheath and blade—adaxial view; **c.** Leaf blade—adaxial view; **d.** Leaf blade—abaxial view; **e-g.** Spikelets; **h.** Removed glumes—lateral view; **i.** Lemma—lateral view; **j.** Palea—lateral view; **k.** Palea—dorsal view; **l.** Upper half of palea; **m.** Ovary with feathery stigma; **n.** Anthers; **o.** Caryopsis—lateral view; **p.** Caryopsis—adaxial view (from *D. Prasad* 350004).

1.8–3.0 mm long and lemma apex acute, however, the latter species has lower glume 1.5–2.5 mm long and lemma apex acuminate. In their native range, *E. trichodes* shows similarity with *E. palmeri* S. Watson by the obvious characters: fringe of hairs at leaf

sheath throat, upper glume exceeding the lower lemmas, palea apex truncate and reddish brown caryopsis with groove adaxially, but differs from *E. palmeri* in having spikelet 3–15 mm long, 1.5–3.6 mm wide (*vs.* spikelets 4–6 mm long, 1–2 mm

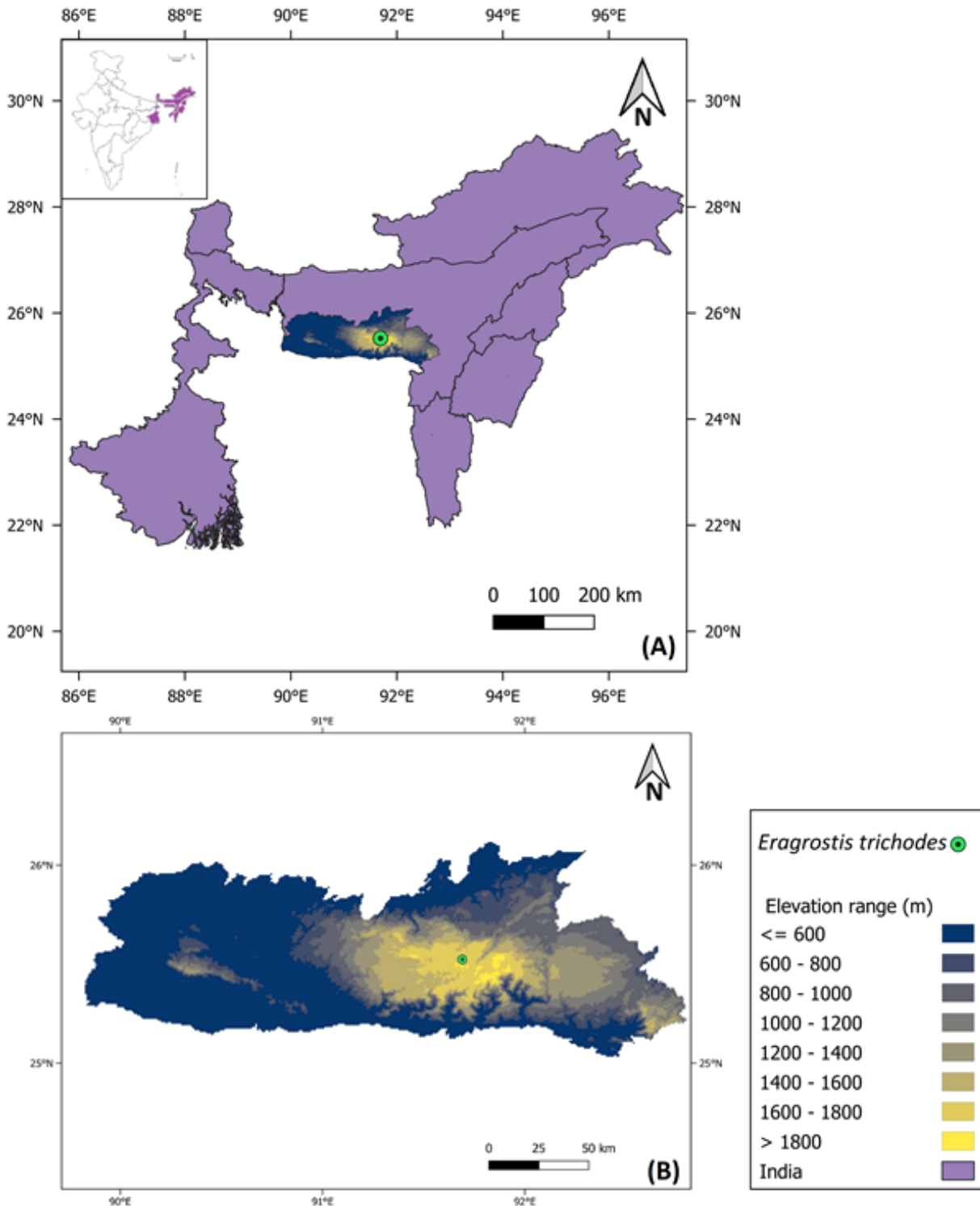


Fig. 3. Distribution map of *Eragrostis trichodes*. a. North-Eastern part of India; b. Meghalaya (prepared by using QGIS Development Team, 2023).

Table 1. Morphological comparison of *Eragrostis trichodes*, *E. aspera*, *E. nigra* and *E. palmeri*.

Characters	<i>E. trichodes</i> (Nutt.) Alph. Wood	<i>E. aspera</i> Nees	<i>E. nigra</i> Steud.	<i>E. palmeri</i> S. Watson
Height	30–120 (–160) cm	40–110 cm	3–90 cm	15–90 cm
Panicle length	30–80 cm	20–70	10–24	12–20
Spikelet length	3.0–15 mm	4.0–10 mm	3.0–6.0 mm	4.0–6.0 mm
Disarticulation pattern	From below upwards	From above downwards	From below upwards	From below upwards
Lower glume length	1.8–3.0 mm	1.0–1.3 mm	1.5–2.5 mm	1.1–1.8 mm
Upper glume length	2.0–4.0 mm	1.1–1.3 mm	1.8–2.5 mm	1.2–2.2 mm
Lemma length	2.2–3.5 mm	1.2–1.7 mm	2.0–2.5 mm	2.0–2.6 mm
Lemma apex	Acute to obtuse	truncate	Acuminate	Acute

wide), 2–22 cm long pedicelled (1–4 mm (14 mm) long), glumes 1.8–4 mm long (*vs.* 1.1–1.2 mm long) lemma 2.2–3.5 mm long (*vs.* 2–2.6 mm long), and caryopsis 0.8–1.3 mm (*vs.* 0.6–0.8 mm) (Peterson *et al.*, 2003) (Table 1).

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