

Notes on *Isachne veldkampii* (Poaceae) and reduction of *I. bhatii* as conspecific

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Abstract: The recently described species *Isachne bhatii* P.Biju, Josekutty & Augustine is treated as conspecific to *I. veldkampii* K.G.Bhat & Nagendran. A detailed description, notes on habitat, distribution, conservation status, and photographs are provided. Although the species was previously considered Critically Endangered, the present study reveals a broader distribution than was previously documented.

Keywords: Endemism, Grass, Micrairoideae, South India, Synonym, Variations

Introduction

Isachne R.Br. is the largest genus in the subfamily Micrairoideae (Poaceae), comprising approximately 105 species distributed worldwide (Soreng *et al.*, 2022). It is primarily distributed across tropical and subtropical regions of both hemispheres (Prakash & Jain, 1987). Recently, Kellogg *et al.* (2020) in their Checklist of Indian Grasses documented 37 species of the genus from India. Members of the genus are typically annual or perennial hygrophilous grasses. The inflorescence is usually an open panicle, occasionally racemose; spikelets sub-globose to obovoid, two-flowered, awnless, and borne on a short rachilla. The glumes are equal or subequal in length, and they disarticulate above the glumes (Prakash & Jain, 1984).

During the revisionary studies on the subfamily Micrairoideae in India, extensive field explorations were conducted between 2022 and 2025, resulting

in the collection of many *Isachne* specimens from low-altitude lateritic plateaus of northern Kerala, South India. After carefully examining the collected materials and also herbarium specimens available in Indian herbaria (CAL, CALI, MH) in comparison with type materials and protologues of all the *Isachne* species present in India, it was understood that these specimens exhibited significant morphological variations, leading to ambiguity in species identification. Detailed examination revealed that *Isachne bhatii* P.Biju, Josekutty & Augustine does not stand out from *Isachne veldkampii* K.G.Bhat & Nagendran, hence, treated as conspecific.

Isachne veldkampii is a critically endangered species (Kumar, 2011) growing in marshy lands on the Manipal district, South Kanara, Karnataka (Bhat & Nagendran, 1983). Recently, the extended distribution of this species has been reported from the lateritic plateaus of Kannur district, Kerala (Pramod & Pradeep, 2012). Subsequently, *Isachne bhatii* was described by Biju *et al.* (2016) from the Kalliad lateritic plateau in the Kannur district of Kerala. Incidentally, the authors of the species have not compared the new taxon with *I. veldkampii*, instead with an Eastern Himalayan species, *I. clarkei* Hook.f., which is distantly related, and grows primarily in a seasonally dry tropical biome (POWO, 2025). The present study investigates the taxonomic identity of *I. bhatii* based on new collections and comparative analysis.

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Materials and Methods

This study is primarily based on live materials collected during botanical field expeditions from 2022 to 2025. Detailed morphological descriptions were prepared using both live specimens and herbarium specimens housed in CAL, CALI, and MH. Digital images of specimens from PND (Thiers, 2025) and Global Biodiversity Information Facility (GBIF, 2025) were also examined.

To assess morphological variations, multiple populations were studied using a M80 stereo microscope (Leica, Germany) equipped with a digital imaging system. Field photographs were captured with a D750 camera (Nikon, Japan). Updated descriptions were compared with the diagnostic characters and original illustrations provided in the protologues of *I. bhatii* and *I. veldkampii*. A distribution map was generated using QGIS software version 3.38.3 (QGIS, 2022).

An assessment of the conservation status of the species was carried out using the IUCN criteria and guidelines version 16 (IUCN, 2024). The conservation status of these species was assessed using the Extent of Occurrence (EOO) and Area of Occupancy (AOO), both of which were calculated in GeoCAT (Bachman *et al.*, 2011) using the required 2×2 km grid.

Taxonomic Treatment

Isachne veldkampii K.G.Bhat & Nagendran, Curr. Sci. 52: 258. 1983; V.Prakash & S.K.Jain, Fasc. Fl. Ind. 14: 36. 1984; K.G.Bhat, Fl. Uduppi 815. 2003; Pramod & Pradeep, J. Econ. Tax. Bot. 36(1): 59. 2012; Hillock Biodivers. Ecol. Fl. Madayippara 243. 2020. *Type*: INDIA, **Karnataka**, South Kanara district, Manipal, 150 m, 29.10.1977, K.G.Bhat 468A (CAL [CAL0000002118!]).

Isachne bhatii P.Biju, Josekutty & Augustine, Int. J. Pl. Anim. Environm. Sci. 6(3): 135. 2016, **syn. nov.** *Type*: INDIA, **Kerala**, Kannur district, Kalliad lateritic plateau, N $12^{\circ}16'28.5''$, E $075^{\circ}14'05.6''$ 82 m, 23.08.2014, P. Biju & Augustine 2491 (CAL, *n.v.*).

Figs. 1–4

Glabrous annual hygrophilous herbs, tufted or non-tufted, erect or creeping with ascending branches, 3–32 cm long; rooting from the basal nodes, 4–12 cm long. Culms canaliculate; nodes and internodes ribbed, glabrous; nodes 0.5–5 cm long, not fully covered by leaf sheaths; leaf blades ovate or elliptical or lanceolate, $0.8\text{--}7 \times 0.3\text{--}1.5$ cm, 10–20-nerved, mid-nerve obscure, base obtuse, margins serrulate, apex acuminate, thick, glabrous on both surfaces, marginal hairs longer towards the base; sheath 0.5–1.5 cm long, canaliculate, margins hyaline, glabrous; ligule absent in normal leaves, present in flag leaves represented by fringes of hairs. Flag leaves ovate-lanceolate, $0.2\text{--}4 \times 0.1\text{--}0.25$ cm, glabrous on both surfaces, base obtuse, margins serrulate, marginal hairs longer towards the base; sheath 1–2.5 cm long, loose, margins hyaline, glabrous. Panicle 3–16 cm long, peduncle slightly canaliculate, glabrous, 4–16 branches arising from the peduncle; each branch with 1–7 spikelets, base bulbous; 1–4 glandular bands on the branches, $0.1\text{--}0.2 \times c. 0.14$ mm; pedicles 0.3–0.5 mm long, glabrous, eglandular; spikelet ovoid-elliptical, $1\text{--}1.5 \times 1\text{--}1.3$ mm, pale green to purplish. Glumes 2, shorter than lemmas, disarticulated above the glumes, minute hairs on the upper side; lower glumes elliptical, $0.8\text{--}1.2 \times 0.6\text{--}1$ mm, glabrous, faintly 3-nerved, margins hyaline, pale green or purple; upper glumes ovate, $1.2\text{--}1.5 \times c. 1$ mm, sparingly hairy, faintly 5-nerved, margins hyaline, folded, pale green or purple. Florets 2 per spikelet, similar, bisexual, ovate to



Fig. 1. Distribution of *Isachne veldkampii* K.G.Bhat & Nagendran in the Western Ghats (prepared using QGIS software version 3.38.3).



Fig. 2. *Isachne veldkampii* K.G.Bhat & Nagendran: **a.** Habitat; **b.** Microhabitat (Photos Haritha P. Bharathan).

obovate, $1.3\text{--}1.5 \times 0.8\text{--}1$ mm, pale green to slightly purple; lemma similar, elliptic, $1\text{--}1.5 \times 0.7\text{--}1$ mm, sub-equal, margins folded, indistinctly nerved, coriaceous, outer surface puberulous, with woolly hairs at the base; paleas similar, elliptical, $0.8\text{--}1.2 \times 0.5\text{--}0.8$ mm, flat, with involuted margins, tuft of woolly hairs at the base, scabrous hairs on the upper side. Lodicules 2, cuneate. Stamens 3, anthers oblong, $0.6\text{--}1 \times 0.3$ mm, opening through longitudinal slit, pale yellow or purplish; filaments c. 0.5 mm long; pistils c. 0.8 mm long; ovary ovoid c. 0.3×0.3 mm; style 2, $0.2\text{--}0.4$ mm long; stigma plumose, c. 0.5 mm long, purple or purplish red. Grains ovoid, $0.8\text{--}1 \times c. 0.7$ mm, brownish.

Flowering & fruiting: Flowering from August to October and fruiting from mid-August to October.

Habitat: *Isachne veldkampii* is usually found growing along low-altitude marshy lands and near temporary pools of lateritic plateaus, associated with species such as *Coelachne madayensis* Pramod & Pradeep

(Poaceae), *Drosera indica* L. (Droseraceae), *Eriocaulon cuspidatum* Dalzell, *E. eurypeplon* Körn. (Eriocaulaceae), *Geissaspis cristata* Wight & Arn. (Fabaceae), *Murdannia semiteres* (Dalzell) Santapau (Commelinaceae), *Rhaphicarpa longiflora* (Arn.) Benth. (Orobanchaceae), *Rotala malabarica* Pradeep, K.T.Joseph & Sivar., *R. malampuzhensis* R.V.Nair ex C.D.K.Cook (Lythraceae), and several species of *Fimbristylis* Vahl (Cyperaceae) and *Utricularia* L. (Lentibulariaceae).

Distribution: Endemic to South India.

Conservation status: *Isachne veldkampii* exhibits a narrow distribution, based on the values Extent of Occurrence (EOO) of 218.059 sq. km and an Area of Occupancy (AOO) of c. 44 sq. km. According to the IUCN Red List Categories and Criteria (IUCN, 2024), these metrics place the species under the Endangered (EN) category. Although it was previously assessed as Critically Endangered, recent field data indicate a marginally broader

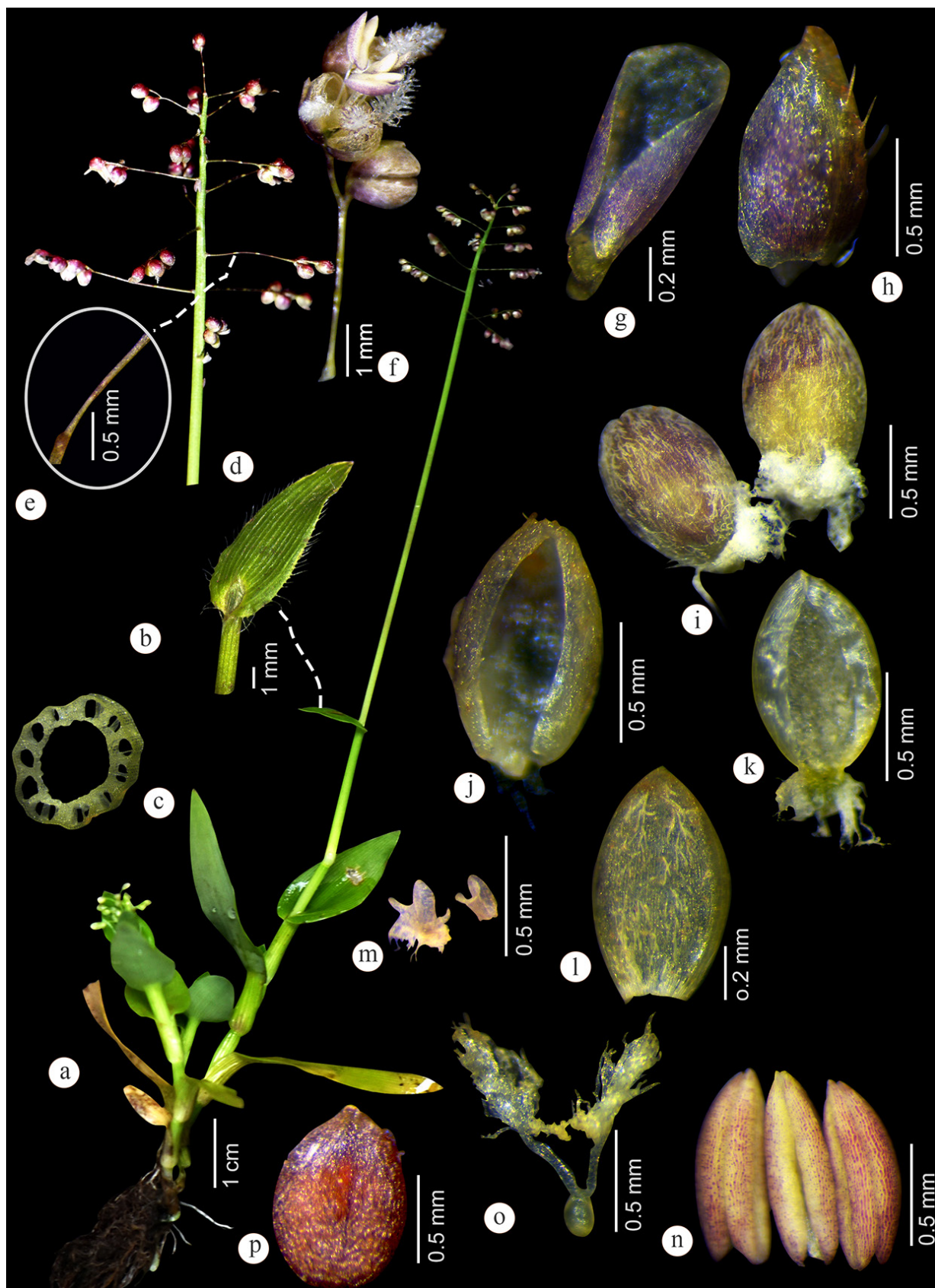


Fig. 3. *Isachne veldkampii* K.G.Bhat & Nagendran: **a.** Habit; **b.** Flag leaf; **c.** Cross-section of culm; **d.** Panicle; **e.** Enlarged view of glandular band; **f.** Panicle branch; **g.** Lower glume; **h.** Upper glume; **i.** Lower and upper florets; **j.** Lemma; **k.** Palea-abaxial view; **l.** Palea-adaxial view; **m.** Lodicules; **n.** Anthers; **o.** Pistil; **p.** Caryopsis (Photos Haritha P. Bharathan).



Fig. 4. Variations in the growth form of *Isachne veldkampii* K.G.Bhat & Nagendran (Photos Haritha P. Bharathan).

range than earlier records. However, the species continues to face serious threats, primarily due to unregulated laterite brick mining, which is widespread in its habitat.

Specimens examined: INDIA, **Kerala**, Kannur, district, Blathur, 26.08.2023, Haritha P. Bharathan 199974 (CALI); Kalliad, 16.07.2024, Haritha P. Bharathan 197267 (CALI); Korom, near Alakkad, N 12°40'01.7", E 75°00'51.4", 80 m, 19.08.2024, Haritha P. Bharathan 197276 (CALI); Madayippara, 46 m, 06.08.2023, Haritha P. Bharathan 199935, 199936, 199937; *Ibid.*, 15.07.2024, Haritha P. Bharathan 197266 (CALI); Madayippara near Vadukunda Shiva Temple, 20.08.2010, C. Pramod 126538 (CALI [CALI129093]); *Ibid.*, 25.07.2011, C. Pramod 126699 (CALI [CALI129092]); *Ibid.*, N 12°01'54.1", E 75°15'26.2", 09.08.2011, C. Pramod 126703 (CALI [CALI129090]); *Ibid.*, 11.09.2011, C. Pramod 126777 (CALI [CALI129088]); *Ibid.*, 24.09.2011, C. Pramod 133681 (CALI [CALI129096]); *Ibid.*, 28.07.2011, C. Pramod 133271 (CALI [CALI129095]); Kasargod district, Way to Bedrampalla, 12°38'20.6"N, 75°05'09.8"E,

170 m, 21.08.2024, Haritha P. Bharathan 197287 (CALI); Karindalam, 100 m, 15.08.2023, Haritha P. Bharathan 199953, 199954, 199955 (CALI); Periye, 102 m, 09.09.2011, K.V.C. Gosavi 753 (SUK); Near Permuda, N 12°40'01.7", E 75°00'51.4", 215 m, 21.08.2024, Haritha P. Bharathan 197286 (CALI).

Notes: While describing *Isachne bhatii*, the authors appear to have overlooked *I. veldkampii*, a morphologically diverse species that usually inhabits wet areas near seasonal pools of lateritic hillocks in southern India. The authors of *I. bhatii* compared their new taxon with *I. clarkei* Hook.f., which occurs in the northeastern states of India, China, Myanmar, Taiwan and New Guinea (Kellogg *et al.*, 2020; POWO, 2025). However, *I. veldkampii* exhibits considerable variation, particularly in foliar morphology and plant size (3–32 cm long), which encompasses the diagnostic features of *I. bhatii*. The type specimens of *I. bhatii* could not be traced from CAL and MH. The specimens provided by the first author of the species from his personal collection was also critically examined. The

studies, along with a thorough examination of the protologues, herbarium specimens, and field data, revealed the characters attributed to *I. bhatii* fall well within the variation range of *I. veldkampii*. Hence, *I. bhatii* P.Biju, Josekutty & Augustine is reduced into the synonymy of *I. veldkampii* K.G.Bhat & Nagendran.

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