Urochloa trichopus (Hoch.) Stapf (Poaceae: Paniceae): An addition to the Flora of Karnataka, India

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Abstract

Urochloa trichopus (Hoch.) Stapf, a grass species native to Africa, the Arabian Peninsula, and Madagascar, is reported here for the first time from Karnataka (India). We provide a detailed taxonomic description with photographs and review its ecology.

Keywords

Angiosperms, Gramineae, non-native, new record, Bengaluru.

Introduction

Urochloa P.Beauv. (Family: Poaceae, Subfamily: Panicoideae, Tribe: Paniceae, Subtribe: Melinidinae) is a pantropical genus of over a hundred C4 grass species (Watson et al. 1992; Kellogg 2015). Of these, twenty-seven species and a further eight varieties are reported from India (Kellogg et al. 2020). The genus, *sensu lato*, is morphologically diverse, paraphyletic, and includes many species previously assigned to the genera *Brachiaria* (Trin.) Griseb., *Chaetium* Nees, *Scutachne* Hitchc. & Chase, *Megathyrsus* (Pilg.) B.K. Simon & S.W.L. Jacobs and *Eriochloa* Kunth (Kellogg 2015; Delfini et al. 2023; Masters et al. 2024). Many characters previously used to delimit the genus – mucronate upper lemma, abaxial spikelet orientation, transversely rugulose upper floret, racemose inflorescences – have subsequently been found to be of limited taxonomic value due to the occurrence of intermediate forms and high variability within the expanded genus (Bor 1960; Clayton and Renvoize 1986; Ashalatha and Nair 1993; Veldkamp 1996; Vorontsova 2022). As such, the genus is likely to undergo further revision (Vorontsova 2022). African *Urochloa* include several globally-important forage grasses such as *U. brizantha* (A.Rich.) R.D.Webster and *U. maxima* (Jacq.) R.D.Webster (≡ *Megathyrsus maximus* (Jacq.) B.K.Simon & S.W.L.Jacobs). Several African *Urochloa* are invasive in their introduced ranges and are known to negatively impact ecosystems (Pivello et al. 1999; Zenni and Ziller 2011; Rojas-Sandoval and Acevedo-Rodríguez 2022; Duque et al. 2022).

During routine grass collections for study, a small population (< 100 individuals) of *Urochloa* species was observed growing in an open-canopied, semi-wild habitat inside Gandhi Krishi Vigyan Kendra campus, Bengaluru (945 m ASL), amidst invasive plants such as *Parthenium hysterophorus* L. and *Calyptocarpus vialis* Less. and native plants such as *Setaria flavida* (Retz.) Veldkamp and *Sida spinosa* L. Examination of the literature indicated that the species was *U. trichopus* (Hochst.) Stapf, not previously reported from Karnataka (Sharma 1984; Karnataka Biodiversity Board 2019; Kellogg et al. 2020).

U. trichopus is a savanna woodland and grassland grass native to Africa, the Arabian Peninsula, and Madagascar. Morphologically and phylogenetically, it is closely allied to *U. mosambicensis* (Hack.) Dandy, which, together with *U. panicodies* P.Beauv. and *U. ramosa* (L.) T.Q.Nguyen form the Trichopus clade (Masters et al. 2024). Sosef (2016) noted that *U. trichopus* differs from *U. mosambicensis* largely by its annual, as opposed to perennial, habit.

Deeming the distinction taxonomically insufficient, he synonymized the latter with the former. The Trichopus clade as a whole has significance as livestock feed.

U. trichopus's ecology is not well-studied in its natural habitat. It appears to be prized by both wild and domesticated herbivores for its nutrient-rich tissues and is tolerant of intense herbivory (Van Oudtshoorn 1999; Treydte et al. 2013). A fast growing grass, it is considered an indicator of disturbed places and is associated with overgrazed and trampled areas and roadsides in southern Africa (Van Oudtshoorn 1999; Fish et al. 2015). The species grows well in light shade. In some regions, it dominates the herbaceous plant community after a fire (Heinl et al. 2007). A study in a southern African savanna found that, in contrast to other grass species, *U. trichopus* had greater mycorrhizal colonization in frequently burned, compared to unburned, areas (Hartnett et al. 2004). *U. trichopus* has been reported to be a highly-competitive invasive in Australia (Lawes and Grice 2010).

U. trichopus was introduced into India as a fodder crop (Bor 1960). It has been reported from Uttar Pradesh (Kellogg et al. 2020) and Telangana (Siddabathula and Yadav 2021) and, as *U. mosambicensis*, from Rajasthan and Tamil Nadu (Kabeer and Nair 2009; Kellogg et al. 2020). Given that many *Urochloa* fodder species are capable of being strongly competitive, producing allelopathic compounds, and altering fire regimes (Gorgone-Barbosa et al. 2015; Masters et al. 2024), *U. trichopus* merits careful evaluation of its potential as an invasive in India. Given the pronounced dormancy of *U. trichopus* seeds (McIvor and Howden 2000), their inadvertent transport with soil presents a plausible dispersal pathway.

Methods

Specimens were processed by standard herbarium techniques and deposited at the National Centre for Biological Sciences. Micro-morphological characters were photographed using a Leica M125 C encoded stereo microscope (Leica Microsystems GmbH, Germany) and measured in Fiji (Schindelin et al. 2012).

Taxonomic treatment

Urochloa trichopus (Hochst.) Stapf in Oliv., Fl. Trop. Afr. 9: 589 (1920). ≡ *Panicum trichopus* Hochst. in Flora 27: 254 (1844). ≡ *Eriochloa trichopus* (Hochst.) Benth. in J. Linn. Soc., Bot. 19: 89 (1881). ≡ *Helopus trichopus* (Hochst.) Steud. in Syn. Pl. Glumac. 1: 100 (1854). = *Urochloa mosambicensis* (Hack.) Dandy in J. Bot. 69: 54 (1931). = *Panicum mosambicense* Hack., Bol. Soc. Brot. 6: 140 (1888). = *Echinochloa notabilis* (Hook. f.) Rhind, Grasses of Burma 50 (1945; as "notabile"). = *Panicum notabile* Hook. f., Fl. Brit. India (J.D. Hooker). 7(21): 32 (1896). = *Urochloa pullulans* Stapf, Fl. Trop. Afr. 9 (1920) 590, nom. superfl. = *Urochloa pullulans* Stapf var. *mosambicensis* Stapf, Fl. Trop. Afr. 9 (1920) 590, comb, incorr.

Caespitose perennials. Culms stoloniferous, geniculately ascending, 50—100 cm tall, nodes terete, bearded, lower nodes rooting; internodes 9.5—16.2 cm long. Leaves basal and cauline. Leaf sheath 6.1—13.0 × 0.2—1.3 cm, with longitudinal grooves, glabrous below, pubescent above, margins ciliate. Leaf blade 2.1—16.4 cm × 0.3—1.2 cm, chartaceous, lanceolate, base cordate to amplexicaul, apex acuminate, midrib prominent, margins tuberculate ciliate to glabrous, cilia ca. 2 mm. Ligule a fringe of hairs, 0.1—0.25 cm long. Inflorescence terminal or axillary, made up of racemes along a central axis, 7—35 cm long. Raceme axis 10.5—20.2 cm long, pubescent. Racemes 4—5(7), 3.3—6.2 × 0.2—0.4 cm, alternate, secund, spikelets imbricate, densely packed in two rows, disarticulating below glumes. Rachis 0.5 mm wide,

wavy, pilose, margins winged, scabrid. Pedicel 0.3—0.7 mm long with 1-4 setae, 2.3—4.4 mm long. Spikelets 3.5—4.8 × 1.5—2.0 mm, abaxial, elliptic-ovate. Lower glumes 1.0—3.2 × 0.3—1.0 mm (2/3—3/4 length of spikelet), turned away from rachis, pubescent below, glabrous above, elliptic, apex rounded, 3-nerved, with 1—2 bristles on the mid-nerve inserted 2/3 from the base; bristles 1.0—2.0 mm long, geniculate, translucent white or purple. Upper glume 3.3—4.3 × 1.4—1.9 mm, pubescent, elliptic-ovate, apex attenuate-acuminate, 3—5-nerved, 3—5-keeled. Florets 2; lower male, upper bisexual. Lower lemma 3.1—4 × 1.4—1.7 mm, hyaline, elliptic-ovate, apex acuminate, margins involute, fringed with purple bristles, 3—5-nerved, 3-keeled. Lower palea similar to lower lemma, 2.5—3.6 × 1.4—1.6 mm, hyaline, 2-nerved, without keels. Stamens 3, anthers 1.3—2.0 × 0.2—0.4 mm. Lodicules fringed, 0.2—0.3 mm long. Upper lemma 1.6—2.6 × 1.3—1.6 mm, elliptic, 3—5-nerved, without keels, transversely rugulose, apex mucronate, mucro 0.5—0.8 mm long, puberulent. Upper palea 1.5—2.8 × 1.2—1.6 mm, hyaline, 3-nerved, apex obtuse, without keels, involute, winged, wings hyaline. Lodicules 0.2—0.3 mm long, cuneate, hyaline. Stamens 3. Ovary 0.5—1.2 × 0.2—0.9 mm. Stigmas 2, 1.2—1.8 × 0.2—0.5 mm, plumose, purple at maturity. Caryopsis 1.0—2.4 × 0.5—1.5 mm, ovoid.

Notes: *U. trichopus* is distinguished from *U. panicoides*, with which it shares abaxial spikelet orientation, by the lower glume being 2/3—3/4 the length of the spikelet (versus 1/4—1/3 in *U. panicoides*) and the lower lemma having a prominent fringe of bristles (versus not).

Flowering & fruiting: June—October.

India distribution: Rajasthan, Uttar Pradesh, Tamil Nadu, Telangana, Karnataka.

Global distribution: Native to sub-Saharan Africa, Madagascar, Saudi Arabia, Yemen; introduced into India, Myanmar, Australia, Brazil, Argentina, Mexico, U.S.A.

Specimens examined: India, Karnataka, Bengaluru, 13.08533 N 77.578289 E, 945 m ASL, 13-08-2025, *S. Pulla* 2 (JCB [HJCB 2000]) and 23-06-2025, *S. Pulla* 23VI25A (NCBS Research Collections [NRC-P-AA-0470], NCBS, Bengaluru).

Acknowledgements

We are grateful to Dr. Navendu Page; Dr. Pritha Dey and Tarun Karmakar at NCBS Research Collections Facility; and Prof. Sankara Rao at Herbarium JCB for their support.

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Figures

Figure 1. *Urochloa trichopus* (Hochst.) Stapf. (A) Inflorescences. (B) Raceme. (C) Herbarium specimen.

Figure 2. *Urochloa trichopus* (Hochst.) Stapf. (A) Spikelet abaxial view. (B) Spikelet adaxial view. (C) Lower glume. (D) Upper glume. (E) Lower lemma. (F) Lower palea. (G) Upper anthecium adaxial view showing germination flap in the lower-third. (H) Upper lemma abaxial view. (I) Upper palea with gynoecium. (J) Upper palea with caryopsis. (K) Gynoecium. (L) Anthers. All scale bars 1 mm.

Figure 1.

(A)

(B)

(C)

HERBARIUM JCB
HJCB 2000
Herbarium
IISc, Bangalore
No HJCB 2000
Dat 13-8-2025
Family Poaceae
Genus Urochloa
Species trichopus (Hoch.) Stapf.
Locality University of Agricultural Sciences, GKVK Campus
Remarks
Caespitose grass, geniculately ascending; racemes along central axis; spikelet with one-two bristles on the midnerve
Collector(s) Sandeep Pulla

Figure 2.