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Note on the distribution of *Parahyparrhenia khannae* (Poaceae: Andropogoneae): a rare and endemic taxon from India

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Abstract

In the present paper, we report *Parahyparrhenia khannae*, a rare and endemic grass, as a new distributional record for the state of Maharashtra. This discovery represents both a new species and a new genus record for the state's flora. This finding is particularly significant as population studies for this species are currently underway. To facilitate field identification, we provide a detailed description, a photoplate of the species, alongside images of its natural habitat. Furthermore, we present a comprehensive map of the species' known distributional range within India.

Keywords: Biodiversity conservation, grasses, Maharashtra flora, new record, range extension, taxonomy.

Parahyparrhenia A.Camus, a rare, relatively small Afro-Eurasian genus (Landge & Shinde, 2021), is classified within the tribe Andropogoneae Dumortier. Globally, this genus is represented by seven species distributed across Africa, India, and Thailand (Soreng *et al.*, 2017; Landge & Shinde, 2021, 2022). In India, only two species are known, *viz.*, *P. bellariensis* (Hack.) Clayton and *P. khannae* A.P. Tiwari & Chorghé, both of which are considered endemic to the country (Landge & Shinde, 2021). Taxonomically, the genus is generally considered polyphyletic. Morphologically, it is characterised by the presence of a protruding, pungent callus on the sessile spikelet; a detailed description of its distinguishing characters is provided in Landge & Shinde (2022).

During a phylogenomic study focused on Asian Andropogoneae, correspondence with the second and third authors (TAK and MS) brought attention to an important collection of an interesting grass specimen. This specimen originated from the northern drier regions of Maharashtra, specifically the Jalgaon district. The specimens were subsequently sent to the Blatter Herbarium (BLAT) and identified by the first author (SNKBL) as *Parahyparrhenia khannae* using the key provided by Landge & Shinde (2021, 2022) (Figures 1 & 2).

Prior to this finding, *Parahyparrhenia khannae* was known only from a few isolated localities in the Indian states of Madhya Pradesh and Gujarat (Tiwari *et al.*, 2020; Landge & Shinde, 2022). In this publication, we report the occurrence of *P. khannae* from Charmali village, Jalgaon District, establishing not only a new distributional record but also a new genus record for the grass flora of the state of Maharashtra (Figure 3).

Recent field studies conducted from 2024 to 2026 in the Marathwada and Vidarbha regions of Maharashtra revealed habitat similarities—specifically regarding aridity—to Asirgarh, Sailana, and Ratlam, where *P. khannae* is known to occur (pers. obs.). Based on these ecological parallels, we hypothesise that the species may also be present in the semi-arid districts of Aurangabad and Nagpur. Furthermore, targeted field surveys in Rajasthan, Haryana, and Chhattisgarh are recommended to further delineate the distribution of *P. khannae*.

Morphological description

Caespitose, ephemeral grass, ca. 350 mm high, with shallow roots and geniculately-ascending culms. Culms slender, unbranched, distinctly bicoloured (internodes pale yellow and sheaths green) with definite brown or purplish nodes, glabrous. A single tuft comprising up to 25 culms. Basal sheaths glabrous, somewhat reddish in colour, ca. 8.0 mm long, middle and upper sheaths 35–75 mm long. Internodes are

longer than the sheaths, ribbed, prominently nerved, distinctly granulated between the nerves, and glabrous. The sheath mouth is constricted, leading to leaf blade abscission. Ligule membranous 0.9 mm, hairy on the dorsal surface, and the apex is ciliate. Blades linear, long-acuminate, apex acuminate; lamina initially flat, later convoluted; dorsal surface densely hairy, striated, slightly granulated between the nerves, glaucous; ventral surface of the blade is green, striated, prominently granulated with a distinct mid rib. The lowest blade is 8.0×0.5 mm, and the upper is 70×1.0 mm. Inflorescence terminal in a pedunculate fascicle (1–3 racemes each on a separate peduncle per fascicle) of racemes. Racemes 4.0 cm long (without awns) and 9.0 cm long (with awns), solitary, slender, possessing large awns. Spikelets disposed in a heteromorphic pair, lowest pair(s) homomorphic and sterile. Terminal spikelet pair constitutes a triad of one sessile and two pedicelled spikelets. Sessile spikelets, two flowered; lower floret epaleate, sterile; upper floret hermaphrodite, well-developed, and awned. Callus acicular, dorsally channelled, curved in the lower one-fourth, distinctly protruding, oblique at the base, profusely bearded, 2.0×0.2 mm, and honey-coloured. Sessile spikelet 7.0×0.7–1.0 mm, often farinaceous; lower glume coriaceous, dorsally convex, linear-elliptic, 5.0×0.8–1.0 mm, straw, green or greyish to leaden black in colour, setose in the upper half either side of the longitudinal median slit, 6–8-nerved, obscure, apex deeply notched (1.0 mm deep) with hyaline disintegrating membrane, both the margins rounded (except near the apex margins keeled, minutely winged and scabrid), evenly inflexed throughout the length, tightly and evenly clasping the edges of the upper glume. The ventral surface of the lower glume exhibits a median ridge throughout the length responsible for casting a longitudinal scar (channel) on the developed caryopsis. Upper glume coriaceous-membranous, linear-oblong, 4.8×1.0 mm



Figure 1. Habit and habitats of *Parahyparrhenia khannae* near Charmalli, Jalgaon, Maharashtra, India. A. Closeup of the grass in the habitat. B. Tuft of a single specimen. C. Slope with intermittent basalt rocks. (Based on TAK 3168 at the Blatter Herbarium (BLAT)) (© Dr. Tanveer A. Khan)

(unopened), 3-nerved (mid nerve scabrid on the keel), apex tridentate (mid nerve excurrent as an arista); dorsally convex and upper portion flattened, margins evenly inflexed, upper margins slightly broader, glabrous, sometimes granulated. Lower floret, sterile and epaleate; lower lemma elliptic-lanceolate, 2.8×0.5–0.6 mm, hyaline-membranous, extremely fragile, nerves barely visible, apex obtuse or erose, puberulous or glabrescent, margins close to the apex puberulous, dorsally longitudinally depressed, closely appressed to the caryopses (in the mature fruiting specimens). Upper floret: hermaphrodite, epaleate: upper lemma with a geniculate awn, lemma body linear-stipitate, 4.0×0.3 mm, lower half hyaline-membranous, rupturable, prominently 3-nerved, glabrous, upper half tough, coriaceous, nerves not visible, husky-brown, bifid, lobes minute, linear (not persistent in fruiting specimens), caducous after anthesis; awn bigeniculate, first column 1.6 cm, second column 1.1 cm, bristle 3.6–4.0 cm; column hirtellus, hair 0.5–1.2 mm long, biserially disposed on each margin of the twisted column. Stamens three, anthers ca. 0.8 mm, whitish. Lodicules two, scarious-membranous (in fruiting), subclavate-oblong, ciliate (only two on each lodicule), 0.8×0.3 mm, with two prominent cilia, 0.1–0.2 mm. Caryopsis deep purplish, linear-elliptic, 2.8–3.4×0.7–0.8 mm, longitudinally sulcate on the front side and bulged on the lower back because of the embryo; embryo more than half, almost two-thirds of the length, of the caryopsis. Rhachis internode yellowish, 2.1 mm long (before merging in the callus), laterally compressed, densely ciliate (hair white) on the margins, lower hair short ca. 0.5 mm and

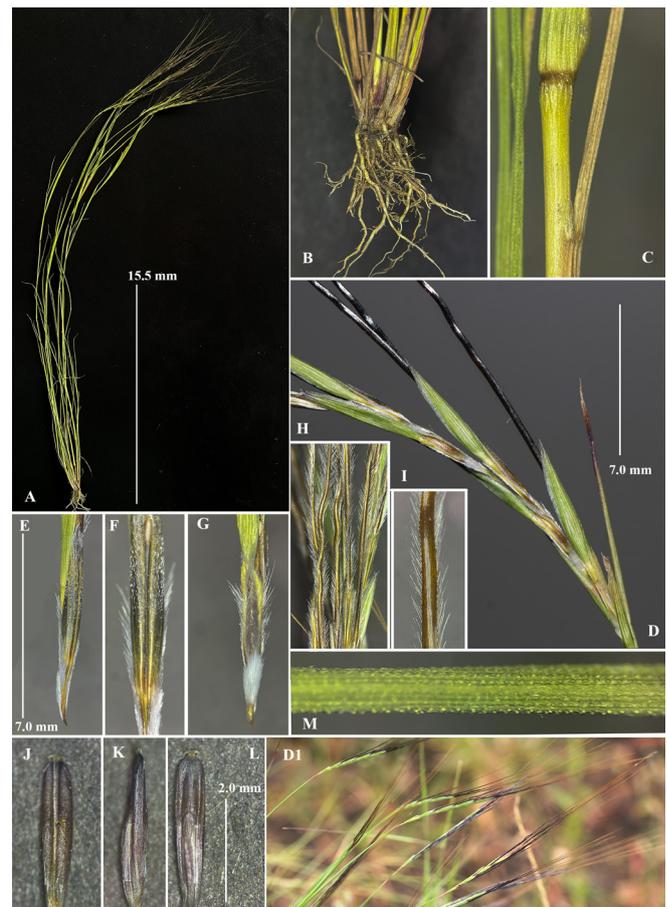


Figure 2. Morphological characteristics of *Parahyparrhenia khannae* from Jalgaon, Maharashtra. A. Habit. B. Basal portion of the grass specimen. C. Leaf base, culm, and glabrous node. D–D1: Inflorescence. D. Raceme closeup. D1. Racemes in field showing all geniculate awns on one side. E–G: Sessile spikelet. E. Lateral view. F. Front view. G. Back side view. H & I: Geniculate awn closeup. J–L: Caryopsis. J. Front view (showing a median longitudinal groove/slit). K. Lateral view. L. Back side view. M. Leaf blade surface granulated. (Based on TAK 3168 at the Blatter Herbarium (BLAT)) (© Shahid Nawaz Khwaja Bhai Landge).



Figure 3. Distribution map of *Parahyparrhenia khannae* A.P. Tiwari & Chorghe in India, prepared using ArcGIS PRO 3.6.1 (Legends: White dot=Type locality; Black dots=Already known localities; Green dot=recent collection locality).

upper hair 1.1 mm long, apex sharply oblique. Pedicel yellowish, shorter than the rhachis internode, 1.8 mm (before merging in the callus), laterally compressed except being angular towards the apex, densely ciliate on the margins, joint between pedicelled spikelet and pedicel scarcely visible. Pedicelled spikelet sterile without florets, equal or subequal to the sessile spikelet, often farinaceous, callus long, indistinct, 0.8–1.0 mm; lower glume elliptic-lanceolate, 7.0×1.0 mm, 7–8-nerved (of unequal lengths,

four nerves reach to the apex and are somewhat excurrent), apex broadly bifid, submarginal nerves somewhat keeled and moderately winged all along the length except lower 2.0 mm, wings tend to curl inward, edges of the wing scabridulous, especially towards the apex becoming scabrid bearing processes; dorsal surface granulated on and between the nerves. Upper glume elliptic, 5.5×0.8 mm, subhyaline-membranous, 5-nerved, apex acute, margins hyaline, hairy in the lower two-thirds.

Parahyparrhenia khannae can be distinguished from another species of *Parahyparrhenia* found in India, *P. bellariensis*, based

on morphological differences such as ligule, leaf blade size, anther length, etc. (Table 1).

Table 1. Morphological comparison of the key characters of two species of *Parahyparrhenia* from India.

Morphological characters	<i>Parahyparrhenia khannae</i>	<i>Parahyparrhenia bellariensis</i>
Habit	Ephemeral, 10–35 cm high.	Perennial, 50–65 (–90) cm high.
Basal leaf sheaths	Glabrous.	Appressed hairy indumentum.
Ligule	Membranous (only the apex is ciliate).	Ciliate (biserially ciliate).
Surface of the blades and sheaths	Granulated.	Non-granulated.
Leaf blade size	2.5–7.0 × 0.5–1.5 cm.	(5.0–) 10–45 × 0.1–0.4 cm.
Anther length	0.5–0.8 mm long.	2.8–3.1 cm long.
Geniculate awn length	4.5–6.7 cm long.	3.2 cm long.

Distribution: Gujarat state (Rajkot University Campus), Madhya Pradesh (Sailana Bird Sanctuary (also known as Sailana Lesser Florican Sanctuary) and Asirgarh fort hill) and Maharashtra (Jalgaon district) (Figure 3). Endemic to Peninsular India (Tiwarei *et al.* 2020; Landge & Shinde, 2021, 2022).

Habitats: In Maharashtra, the species was observed growing on a slope among intermittent basalt rocks adjacent to a freshwater stream (Figure 1).

Specimens Examined: INDIA. Maharashtra state, Jalgaon District, 3 km away from Charmali village, 21.2993744, 75.8049824, 14 Sept. 2025, TAK 3168 (BLAT) 8 Preparations.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY

All the information available to authors, have been provided.

AUTHOR CONTRIBUTIONS

The first author (SNKBL) conceptualised, designed, and prepared the manuscript; second (TAK) and third (MS) collected the specimens and provided the material for research work, reviewed the manuscript, and arranged the funding for the research work.

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