

***Bromus diandrus* Roth (Poaceae): New Addition to the Flora of Jammu & Kashmir from Kashmir Himalaya**

Kuntal Saha^{1*}, Manoj Chandran², Ranjana Negi³, Saurabh Guleri¹ and Akhtar H. Malik⁴

¹Department of Botany, Shri Guru Ram Rai University, Patel Nagar, Dehradun (Uttarakhand) India.

²Indian Forest Service, Uttarakhand Forest Department, Dehradun (Uttarakhand) India.

³Systematic Botany Discipline, Forest Botany Division,
Forest Research Institute (FRI), Dehradun (Uttarakhand) India.

⁴Centre for Biodiversity & Taxonomy, Department of Botany,
University of Kashmir, Srinagar (Jammu & Kashmir), India.

(Corresponding author: Kuntal Saha*)

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ABSTRACT: *Bromus diandrus* Roth has been recorded for the first time in Jammu & Kashmir, India, where its distribution was previously known only in Himachal Pradesh and Tamil Nadu. This new finding raises the number of *Bromus* L. taxa in Jammu and Kashmir to seventeen. A detailed description, habitat, and illustrations of *B. diandrus* are provided, along with a geo-coordinate map showing the collection site.

Keywords: Bromaceae, India, New record, Pooideae, Srinagar, Western Himalayas.

INTRODUCTION

The Western Himalayas encompass unique ecosystems that support numerous endemic and uncommon plant species (Rana *et al.*, 2015). A prime example of this was observed during a field survey conducted across various parts of the Western Himalayas, especially within the temperate vegetation of the Kashmir Himalayas. In Srinagar, the summer capital of Jammu and Kashmir, we documented a roadside annual grass population, 30cm to 50cm tall exhibiting distinct characteristics. These include a very lax panicle inflorescence with several to many laterally compressed florets and cuneiform spikelets. Further microscopic examination of the spikelets reveals a long and straight awn inserted in the bi-lobed lemma, which is rounded on the backside, has a fleshy appendage above the style insertion, and is pubescent at its apex, remaining persistent in the caryopsis. Consultation of relevant taxonomic literature (Bor, 1960; Gill & Carstairs 1988; Saarela *et al.*, 2014) revealed that the grass was *Bromus diandrus* Roth.

Bromus L. is recognized as a large and taxonomically troublesome grass genus, comprising around 160 species (WCVP, 2024) distributed across temperate regions worldwide (Saarela *et al.*, 2014). It belongs to the tribe Bromaceae (Bor, 1960; Chen *et al.*, 2006; Clayton & Renvoize 1986) within the supertribe Triticoideae (Soreng *et al.*, 2017) of the subfamily Pooideae of the Poaceae family. Interestingly, out of the 22 taxa (Prasanna *et al.*, 2020) of *Bromus* L. found in India, 16 taxa (Kellogg *et al.*, 2020) were recorded in Jammu and Kashmir. This study marks first documented occurrence of this grass species in this region.

MATERIAL AND METHODS

This study was based on a field survey conducted in various parts of the Kashmir Himalayan region. A comprehensive description of the species, accompanied by a colour photograph of plant specimens in their natural habitat (Fig. 1) and illustrations (Fig. 2), has been included to facilitate identification. The mapping of collection locations (Fig. 3) was carried out using “QGIS Version 3.36.2.” The herbarium specimen has been deposited in the herbarium of the Forest Research Institute, Dehradun (DD).

RESULTS AND DISCUSSION

In our detailed examination of the distribution of *B. diandrus* Roth, we discovered that neither regional studies (Singh & Kachroo 1976; Sharma & Kachroo 1981; Dhar & Kachroo 1983; Kaul, 1986; Kapur & Sarin 1989; Navchoo & Kachroo 1995; Swami & Gupta 1998; Sharma & Jamwal, 1998; Dar *et al.*, 2014; Mehraj *et al.*, 2016; Dar & Khuroo 2020; Dar *et al.*, 2022) nor national floras (Prasanna *et al.*, 2020; Kellogg *et al.*, 2020) have documented its presence in Jammu and Kashmir. This reveals a gap in the recorded flora of the region and highlights the necessity for further research and documentation to accurately reflect the biodiversity in Jammu & Kashmir. This annual species is a widespread weed along the boundaries of agricultural fields.

Taxonomic treatment: *Bromus diandrus* Roth, Bot. Abh. Beobacht. 44 (1787); Bor, Gras. Burma, Ceyl., Ind. & Pak. 454.1960; Karthikeyan *et al.* (1989) Florae. Indicae. Enumeratio. Mcot. 192.

Annual, herb. Culms 25 – 100 cm, erect or decumbent, weakly pubescent below the inflorescences; 2-4 nodes,

glabrous. Leaf Sheaths 1.5 – 2.75 mm, pubescent, margin ciliate; ligules 2.5 – 3.5 mm, glabrous, obtuse, erose-lacerate. Leaf-blades 2.5 – 15 cm × 0.2 – 0.75 cm, flat, pilose, margins pubescent. Panicles 7.5 – 25 cm × 2 – 15 cm, very lax and nodding, erect or spreading; branches 1 – 7.5 cm, erect to ascending, spreading, slender, scabrid, tipped by 1–3 spikelets. Spikelets 3 – 6.5 cm, 5–9-flowered, oblong-lanceolate, laterally compressed, at maturity with visible rachillas. Lower glume 10 – 25 mm, narrowly lanceolate to lanceolate, 1–3-nerved, scabrous, midnerves glabrous, apex acute, margin hyaline. Upper glume 15 – 30 mm, lanceolate, 3–5-veined, scabrous, apex acuminate, translucent between nerves, margin hyaline. Lemma 23 – 35 mm × 1.5 – 2 mm, linear-lanceolate, rounded over the backs, scabrous, 7-nerved, margins hyaline, apex 2-lobed, acuminate, keels scabrous, lobe 2.5 – 5 mm; awns 30 – 55 mm, straight, arising 2 – 6 mm below lemma apex. Palea 12 – 15 mm, back glabrous, keels

sparsely ciliate. Stamens 2; anther 0.8 – 1 mm. Caryopsis 11 – 12.5 mm, elliptical-lanceolate.

Flowering & fruiting: April – July.

Habitat: In open, sunny areas along the roadsides.

Distribution: INDIA: Tamil Nadu, Himachal Pradesh, Jammu and Kashmir (present report).

Etymology: *Bromus* is derived from the Greek word “bromos,” meaning “oats” or “bromos,” which is thought to refer to the plant's resemblance to oats plant. *Diandrus* comes from the Latin words “di,” meaning “two,” and “andrus,” meaning “male,” likely referring to the two stamens.

Specimens examined: India, Jammu and Kashmir, Srinagar District, Srinagar, Near the J&K ATM and along the path of Sheikh Hamza Makhdoom guest house (34°08'06"N, 74°50'14"E), 1618 m a.s.l., 15.03.2024, K. Saha & Ishfaq Hussain, K. Saha 212 (DD).



Fig. 1. *Bromus diandrus* Roth; A- Life form; B- Close-up of inflorescence.

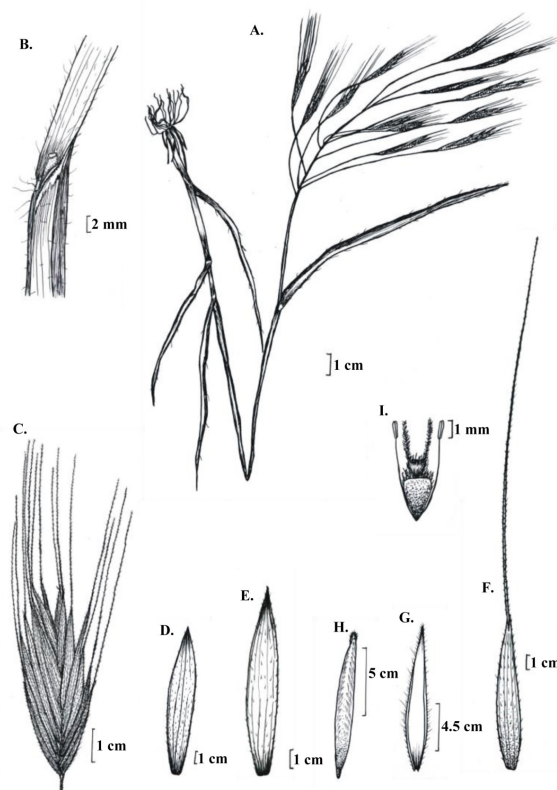


Fig. 2. A – I: Illustration of *Bromus diandrus* Roth; A. Habit; B. Portion showing ligule; C. Spikelet; D. Lower glume; E. Outer glume; F. Lemma with awn; G. Palea; H. Caryopsis; I. Pistil.

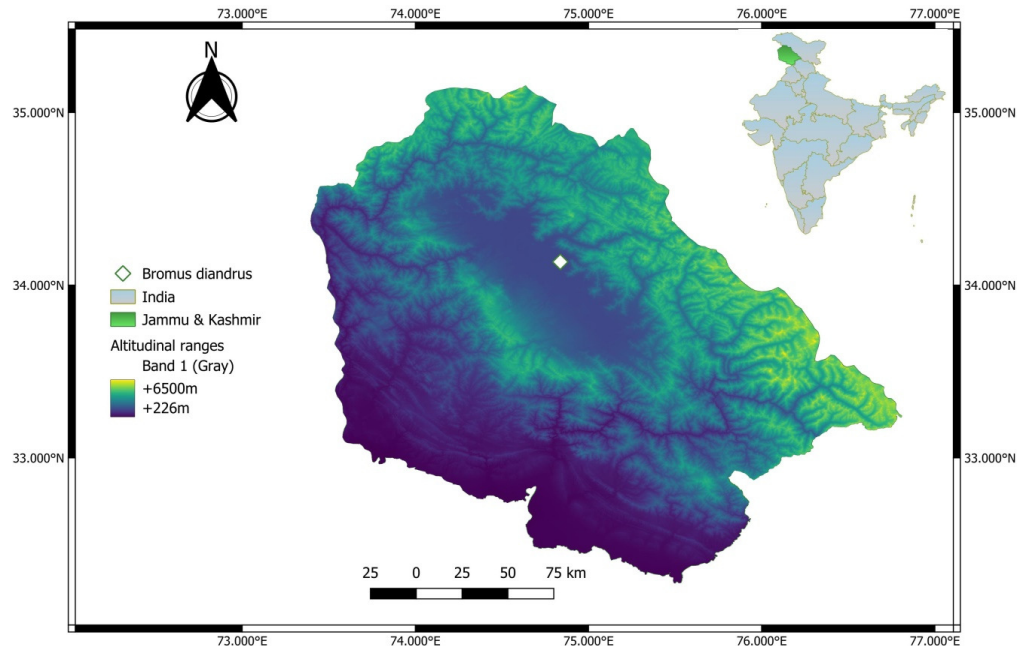


Fig. 3. Place of collection of *Bromus diandrus* Roth in Jammu & Kashmir.

CONCLUSIONS

This study offers a comprehensive overview of the distribution of *Bromus diandrus* in the Western Himalayas, specifically in Jammu and Kashmir. Although *B. diandrus* is native to the Mediterranean region and South and Central Western Europe, it has been widely introduced and naturalized in numerous other countries (Malik & Mohammad, 2015).

FUTURE SCOPE

B. diandrus has become naturalized in the hill states of northern India, at elevations ranging from 1400 m to 2100 m. In this region, it is utilized as fodder.

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