

Rubus idaeus subsp. *strigosus* (Michx.) Focke, a new distribution record to the flora of India from Kashmir Himalaya

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Abstract: *Rubus idaeus* L. subsp. *strigosus* (Michx.) Focke, belonging to Rosaceae, is reported for the first time in India from Kashmir Himalaya. To validate this new distribution record for the country and to aid taxonomic identification, the paper provides a detailed taxonomic account, including description, photographic illustrations of diagnostic characters based on the plant material collected from the study region.

Key words: Kashmir Himalaya, Rosaceae, India, *Rubus*, distributional record, description.

Introduction

The genus *Rubus* L., belonging to the family Rosaceae, is globally one of the largest plant genera comprising of 1558 species (POWO, 2025). The genus has worldwide distribution, particularly common in temperate regions of northern hemisphere, and a few species extending into southern hemisphere (Lawrence *et al.*, 1983). The species delimitation in the genus is taxonomically challenging because of extensive hybridization, polyploidy, and the presence of numerous apomictic microspecies (Buczyński *et al.*, 2024; Chen *et al.*, 2024). The diagnostic characters used for species delimitation in the genus include: habit, stem, leaf, floral and fruit characters (Real & Madulid, 2019).

In India, 73 species of the genus have been reported to date (Mao & Dash, 2020). Among these, 9 species have been reported from Kashmir Himalaya – a

region located in the north-western extreme of the Indian Himalaya (Stewart, 1972; Malik *et al.*, 2010; Mughal *et al.*, 2017). During recent botanical exploration in Kashmir Himalaya, few unique plant specimens of *Rubus* were collected from Tragbal, Razdan top of district Bandipora. After detailed investigation of morphological characters of the collected specimens with all the previously known *Rubus* species from the Himalaya and neighbouring regions, the collected specimens were identified as *Rubus idaeus* L. subsp. *strigosus* (Michx.) Focke, which is hitherto unreported from India (Hooker, 1878; Dikshit & Panigrahi, 1998; FOP, 2024). To validate this plant distribution record for India and to aid its identification, the present study provides a detailed taxonomic account, including description, photographic illustrations of diagnostic characters based on the plant material collected from the study region.

Material and methods

The present study was conducted in Kashmir Himalaya (Fig.1), a region spread over an area of ~ 15,000 km² and lying between 32°20' to 34°50' N, 73°55' to 75°35' E (Dar & Khuroo, 2020). In fact, 64% of this region is mountainous and the elevation ranges from 1600 to 5420 m. asl (Khuroo *et al.*, 2007). The winter is extremely cold and receives heavy snowfall and lasts from December–February (Dar & Dar, 2021). The average daily temperature of the region ranges from maximum of 31°C to minimum of 15°C during summer, and maximum of 4°C to minimum of – 4°C during

winter (Islam *et al.*, 2023a, b, c). The region receives an average annual precipitation of ~ 1055 mm, mostly in the form of snow during winter. The plant specimens were collected from Tragbal, Razdan top (Bandipora district), Jammu and Kashmir, India. Standard taxonomic procedures for collection, drying and further processing of the herbarium specimens were followed (Bridson & Forman 1998). The specimen was collected and deposited in the University of Kashmir Herbarium (KASH) for future reference (herbarium acronyms follow Thiers, 2025, continuously updated). The identification of the collected specimens was achieved by perusing relevant taxonomic literature (Lawrence *et al.*, 1983; FOC, 2024). The collected plant specimens were compared with the protologue of *R. idaeus* L. subsp. *strigosus* (Michx.) Focke (<https://www.biodiversitylibrary.org/page/33698256>) and digital images of its specimens (B00000099789, B00000082273, B00000165684, B00000082323 and B00000082330) available at Botanic Garden and Botanical Museum Berlin

Dahlem, Germany. The field photographs were taken by mobile phone camera (Make: iPhone 15 Pro Max). The microphotography of the diagnostic characters was carried out at the Centre for Biodiversity & Taxonomy Laboratory, University of Kashmir under a stereozoom microscope (Make: Leica S9D, Germany) integrated with image processing software (LASX). The geo-coordinates were recorded with the help of a mobile phone-based Geographica app (<https://geographica-offline-gps-app.en.softonic.com/android>). The distribution map was prepared using ArcGIS (version 10.2; <https://www.arcgis.com/>).

Taxonomic treatment

Rubus idaeus* L.**, Sp. Pl. 1: 492. 1753. subsp. ***strigosus (Michx.) Focke, Abh. Naturwiss. Vereins Bremen 13(3): 473. 1896; Alice *et al.* in Fl. N. Amer. 9: 43. 1983; Widrl., *Castanea* 63(4): 415-465. 1998. *Rubus strigosus* Michx., Fl. Bor.-Amer. 1: 297. 1803. *Lectotype* designated by Uttal, *Rhodora* 86:38. 1984: CANADA, Haute montagnes

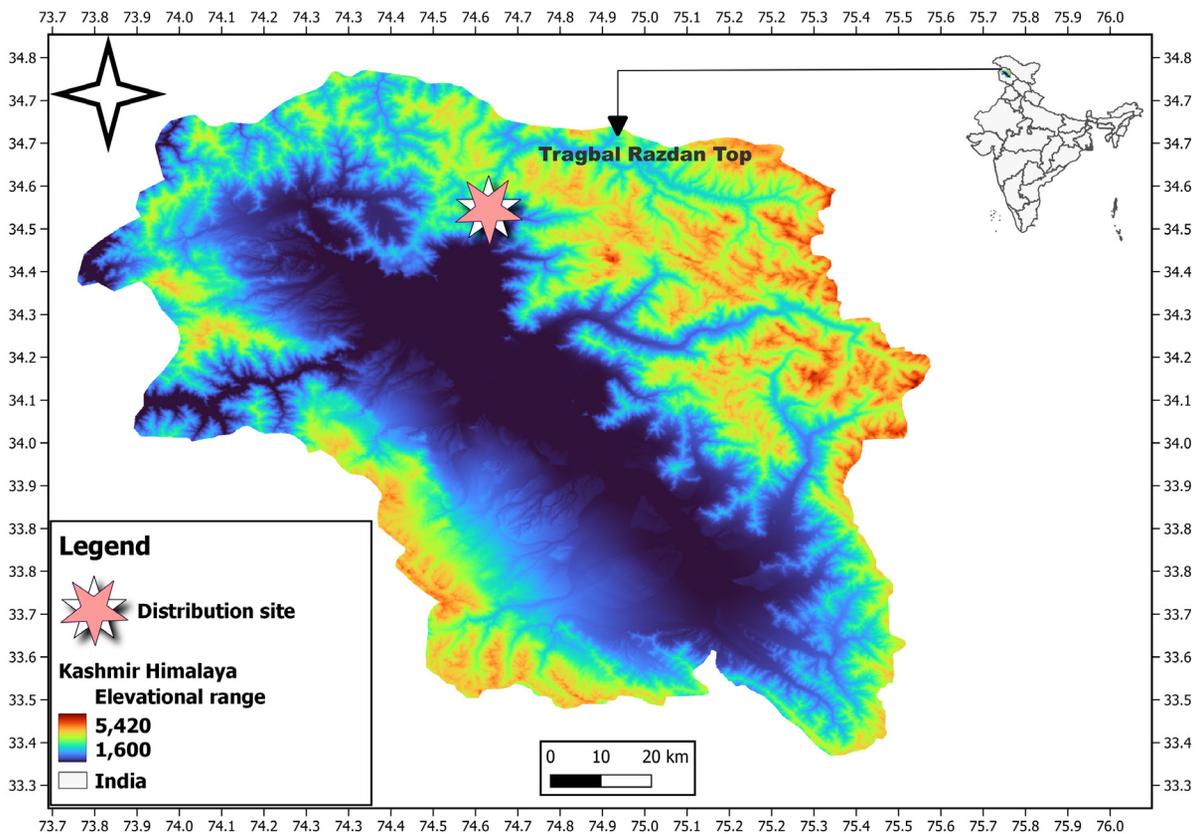


Fig. 1. Map showing the distribution site of *Rubus idaeus* subsp. *strigosus* in Kashmir Himalaya, India.

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Figs.2

Gregarious shrubs, 60–80 cm tall. Stems with
sparsely-spaced spines, straight, stipitate-
glandular, bark light brown, usually peeling



Fig. 2. *Rubus idaeus* L. subsp. *strigosus* (Michx.) Focke: **a.** Habit and habitat; **b&c.** Leaf (adaxial and abaxial sides respectively); **d.** Stem showing spines; **e.** Old stem; **f.** Flower; **g.** Stipules; **h.** Sepals; **i.** Petals; **j.** Stamens; **k.** Carpels showing hairs; **l.** Drupeccetum.

Table 1. Comparison of diagnostic characters between *Rubus idaeus* subsp. *idaeus* and *R. idaeus* subsp. *strigosus*.

Character	<i>Rubus idaeus</i> L. subsp. <i>idaeus</i>	<i>Rubus idaeus</i> L. subsp. <i>strigosus</i> (Michx.) Focke
Stem	Eglandular	Stipitate glandular
Bark	Usually not peeling with age	Usually peeling with age
Terminal leaflets	Broadly ovate to oblong	Ovate to lanceolate
Leaf apex	Acute to acuminate	Acuminate to attenuate

with age. Leaves 3–5-foliolate, leaflets unlobed, green adaxially, white tomentose abaxially, ovate to lanceolate, base rounded to cordate, margin serrate, apex acute to attenuate, petiole stipitate-glandular, 1.3–2.7 cm long; lateral leaflets 1–2 cm wide × 2–4 cm long; stipules 2, curved when dry, terminal leaflet 1.5–2 cm wide × 4–6 cm long. Inflorescence terminal, short racemes, rarely several flowers in clusters of leaf axils. Flowers pedicellate; pedicels 0.8–1.3 cm long. Sepals deltoid, base truncate, margins entire, apex acuminate, stipitate-glandular. Petals obovate, white, margin entire, apex round. Stamens many, up to 6 mm long, shorter than petals; filaments broadened and flattened; anthers up to 0.5 mm wide, dorsifixed, oblong with acute tips. Carpels 10–60, shorter than stamens, up to 4 mm long; ovary and base of style densely grey tomentose. Fruit drupeletum of 10–60 drupelets, red in colour at maturity.

Flowering & fruiting: Flowering from June to July and fruiting from July to August.

Habitat: Growing on the mountain slopes in forest gaps.

Distribution: North America, Europe, northern and eastern Asia, and now in south Asia (from Kashmir, India).

Specimen examined: INDIA, **Jammu and Kashmir**, Bandipora, Razdan Top, Tragbal, 34.5097° N, 74.6379° E; 3248 m asl, 27 July 2024, Sameer A. Sofi, Anzar A. Khuroo, Tajamul Islam, Shabir A. Zargar, KASH-45719

Taxonomic notes: *Rubus idaeus* L. subsp. *strigosus* (Michx.) Focke. was previously considered as a distinct species as *Rubus strigosus* Michx. (Michaux, 1803) which was subsequently reduced as a subspecies by Breman (1896). The subsp. *strigosus* differs from subsp. *idaeus* in having stipitate glands and stiff bristles on stems and branches (Wildrlechner, 1998). The comparison of diagnostic characters of the two subspecies is provided in table 1.

Discussion

The genus *Rubus* is a rich bioresource of wild edible fruit plants. The genus holds promise as a valuable source of polyphenols and bioactive compounds, and have shown antioxidative anticarcinogenic, and antimutagenic properties (Gao *et al.*, 2024; Singh *et al.*, 2022). Therefore, the present distribution record adds to the *Rubus* germplasm in India. In fact, addition of novel distributional records is one of pressing research requirements to overcome the Wallacean biodiversity shortfall (Lomolino & Heaney, 2004; Gulzar *et al.*, 2021; Wani *et al.*, 2024). The present work is the first record of this taxon for the flora of India. Previously, *R. idaeus* L. subsp. *idaeus* has been reported to grow as a cultivated shrub in Nilgiri, Tamil Nadu (Henry, 1983; Dash, 2020).

During the present study, this taxon has been collected from the natural population in Kashmir Himalaya. Further surveys in future are required to locate more populations of this taxon in the study region and neighbouring Indian Himalayan regions. Currently, the road widening and

subsequent landslides pose a potential threat to the survival of its natural populations. Therefore, the seeds of this taxon may be collected and cultivated for *ex-situ* conservation strategy.

Acknowledgements

The authors are thankful to the Head, Department Botany, University of Kashmir. We are grateful to the research scholars and supporting staff of BIOTA Laboratory, Centre for Biodiversity and Taxonomy, Department of Botany, University of Kashmir, for their kind assistance and support during the present study. The Department of Science & Technology, Government of India, New Delhi is also acknowledged for funding under FIST Scheme vide File No. SR/FST/LS-II/2017/103(C), dated: 05-02-2019. Sameer A. Sofi and Tajamul Islam acknowledge the UGC-India for providing junior research fellowship under 211610052730 and 924/ (CSIRNET JUNE-2019) respectively.

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