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A New *Calypogeia* Raddi from India

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ABSTRACT: *Calypogeia khasiana* sp. nov. is described here as a new species from Khasi Hills: Meghalaya in Eastern Himalayas. It is characterized by longer plants, larger leaves with narrowed apex, apex subacute to acute (very rarely emarginate); underleaves bisbifid, with non-divergent, acute-acuminate lobes.

KEY WORDS: Bryophytes, *Calypogeia khasiana,* new species, Meghalaya, eastern Himalayas.

INTRODUCTION

The genus *Calypogeia* belonging to family Calypogeiaceae is distributed world wide primarily in subtropical to tropical climates. The history to the study on this genus in India dates back to the time of Mitten (1861) when he described *C. aeruginosa* Mitt. from Sikkim, *C. imbricata* (Mitt.) Steph. under the name *Mastigobryum imbricatum* Mitt. from Himalaya, *C. lunata* Mitt. from Assam, Sikkim, Mussoorie and *C. marginella* Mitt. from Khasia mountains. In this connection Stephani (1908), Chopra (1938, 1938a, 1943), Parihar (1961-62), Parihar et al. (1994), Grolle (1964, 1964a, 1964b) and Bapna *et* Kachroo (2000) made contribution on the distribution of various species in India. Robinson (1964) during studies on the small collection of bryophytes from upper Assam (India) described *Calypogeia arguta* Mont. *et* Nees from Jorhat. The remarks on the taxonomic problem of Japanese and African *Calypogeia* of adjacent oceanic region of Indian subcontinent were made by Inoue (1966) and Bischler (1957, 1963, 1970) respectively, which made various Indian species critically distinct. Bonner (1963) in his voluminous work 'Index Hepaticarum' listed 117 species, 48 varieties, 32 forma and 1 subspecies of *Calypogeia.* During this treatment Bonner (*l.c.*) listed only 11 species from Himalayan region i.e. *C. aeruginosa* Mitt., *C. alternifolia* (Nees.) Steph., *C. birostris* Tayl., *C. gollanii* Steph., *C. hartlessiana* Steph., *C. imbricata* (Mitt.) Steph., *C. lunata* Mitt., *C. marginella* Mitt., *C. pusilla* Steph., *C. graveolens* (Schrader) Dumortier and *C. renistipula* Steph. After a long gap of three decades it was the contribution by Srivastava & Sharma (1987) and Sharma & Srivastava (1993) which critically emphasized the taxonomic treatment on Indian Lepidoziinae. According to their study genus *Calypogeia* is represented in India by six species viz. *C. marginella* Mitt., *C. fissa* (L.) Raddi and *C. aeruginosa* distributed in eastern Himalayas (Meghalaya, Sikkim and Darjeeling) while *C. azurea* Stotler *et* Crotz. and *C. lunata* Mitt. distributed in eastern and western Himalayas and *C. arguta* Nees *et* Mont. in eastern Himalayas, central India and south India. During the course of study on the hepatic flora of the north east hills, Meghalaya, eastern Himalayas specimens belonging to genus *Calypogeia* have been encountered which were quite different from hitherto known species of the genus, hence it is described here as *Calypogeia khasiana* sp. nov. which is new to the science. The genus *Calypogeia* is now represented in India by seven species due to the discovery of above species.

MATERIALS AND METHODS

The plants were collected from various localities of Meghalaya, between 773-1788 m altitude range, growing on soil or soil covered rocks adjacent to stream or under dripping water. The specimens were critically studied and the line drawing illustrations were made with the help of Camera Lucida (Olympus, Tokyo-203954). The voucher specimens have been deposited in the Bryophyte Herbarium NBRI (LWG).

TAXONOMIC TREATMENTS

Calypogeia khasiana *sp. nov.*

Fig. 1

Planta major, caulis 60 mm longus, cumfaliis 2.0 mm latus, folia caulina imbricata, dorso caulem 1.50-1.58 mm longa, 1.15-1.25 mm lata.

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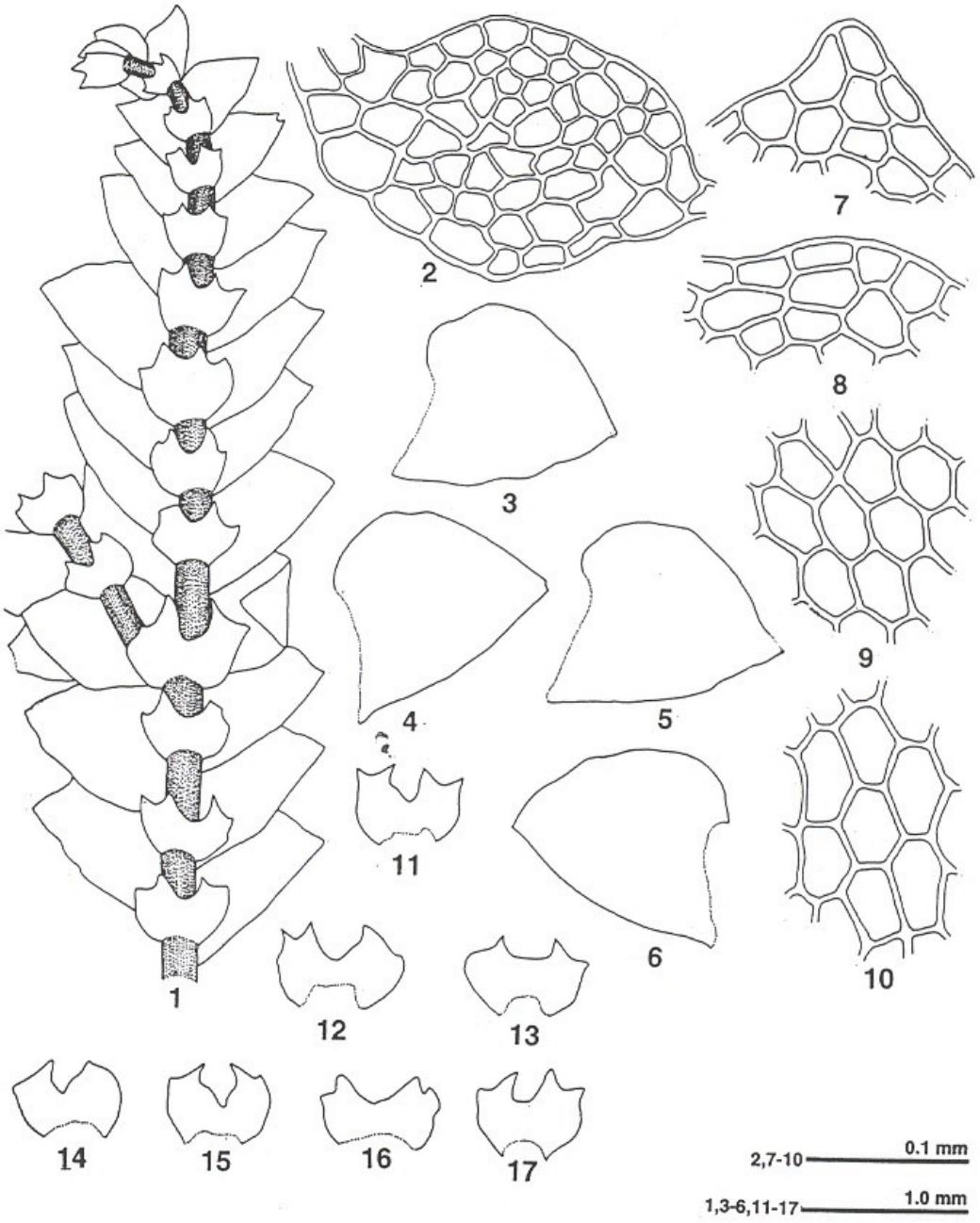


Fig. 1. *Calypogeia khasiana* sp. nov. 1: Ventral view of plant. 2: Cross section of stem. 3-6: Leaves. 7: Leaf apical cells. 8: Leaf marginal cells. 9: Leaf median cells. 10: Leaf basal cells. 11-17: Underleaves.

Plants large, brown to dark brown or yellowish brown, up to 60 mm long and 2.0 mm wide including leaves, fragile, prostrate or ascending, sparingly branched. Rhizoids long, colourless, numerous from the base of underleaves in fascicles. Stem reddish brown, cylindrical to slightly flattened, 0.16-0.18 x 0.24-0.27 mm in diameter and 8 cells across; cortical cells thin walled, 15-25 x 20-42.5 µm, non pigmented; medullary cells thin walled, non pigmented, 17.5-25 x 30-37.5 µm, whitish brown. Leaves of nearly equal size throughout, patent, imbricate, slightly oblique to horizontal, ovate-oblong, broadly cordate, 1.50-1.58 mm long and 1.15-1.25 mm wide, convex, apex narrowed, acute to subacute-emarginate or truncate, apex 1 (rarely 2 celled) long; apical cells 22.5-30 x 32.5-35 µm, slightly thick walled, less trigonous; marginal cells 25-30 x 30-32.5 µm, thick walled, minute

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trigonous; median cells 27.5-32.5 x 37.5-60 μm, minute trigonous, thick walled; basal cells 35-40 x 55-62.5 μm, minute trigonous, thick walled. Underleaves distant, sinuately attached, 2 times wider than stem, 0.50-0.63 mm long and 0.73-0.78 mm wide, orbicular, 1/2 or more bilobed, bisbifid, sinus lunate or obtuse to subobtuse or U shaped, 0.23-0.25 mm deep, lobes acute-acuminate, lobes not divergent, both margins usually with one acute-subacute tooth.

Distribution and ecology: Eastern Himalayas: Meghalaya: East Khasi Hills: Langkyrdum-Dawki Road.

Plants grow on soil covered rocks under dripping water in association with *Jungermannia* sp. and *Cephalozia* sp. at 1515 m altitude.

Range: India

Specimens examined: India: Meghalaya: East Khasi Hills: Langkyrdum-Dawki Road, 07.11.1998, V. Nath and party, 206109-A (LWG) HOLOTYPE. Det. V. Nath & A.P. Singh.

Other specimens examined: *Calypogeia tosana* Steph., Loc. Kiushiu, Miyazaki, Obi ca 100 Mt, ad truncos putridos, 1946, S. Hattori, Series I (6) 1946, Hepaticae Japonicae Exsicatte. Det. S. Hattori. *C. integristipula* Steph., Loc. North slope of Mt. Kuju, ca 1400 Mt alt., Oita County, August 1952, Leg., T. Ono, Series 5 (1952), Hepaticae Japonicae Exsicatte, Det. S. Hattori. *C. grandistipula* Steph., Loc. Mt. Daisetsu, Hokkaido, ca 1900 Mt, on wet soil, 7 July 1956, Leg., Y. Kuwahara, Series 8 (1956). Hepaticae Japonicae Exsicatte Det. S. Hattori. *Calypogeia marginella* Mitt.: India: Meghalaya: East Khasi Hills: Langkyrdum-Dawki Road, 07.11.1998, V. Nath and party, 206106-B (LWG); Experimental Garden, B.S.I. Barapani, 12.11.1998, V. Nath and party, 207998-B (LWG); West Khasi Hills: Mawsiangdur forest-Nongstoin, 15.09.2000, A.P. Singh, 208587-A (LWG); Domktung forest-Mairang, 18.09.2000, A.P. Singh, 208684-A (LWG). Det. V. Nath & A.P. Singh. *Calypogeia azurea* Stotler *et* Crotz.: India: Meghalaya: East Khasi Hills: Mawphlong forest, 05.11.1998, Leg., V. Nath and party, 205924-E, 205925-A, 205935-B, 205937-D, 205946-D, 205947-D, 205948-C, 205953-B, 205957-B, 205961-E, 205964-G, 205965-H (LWG); Elephant falls, 08.04.1965, S. Chandra, 201204-C, 201225-A, (LWG); 05.11.1998, V. Nath and party, 205989-C, 205999-A, 206003-E, 206004-H (LWG); 11.11.1998, V. Nath and party, 207961-B (LWG); Langkyrdum-Dawki Road, 07.11.1998, V. Nath and party, 206104-D, 206105-B, 206115-B, 206126-A (LWG). Det. V. Nath & A.P. Singh. *Calypogeia fissa* (L.) Raddi : India: Meghalaya: East Khasi Hills: Mawsun-Dawki Road, 07.11.1998, V. Nath and party, 206036-A (LWG); Langkyrdum-Dawki Road, 07.11.1998, V. Nath and party, 206083-A, 206107-E, 206108-A, 206109-A, 206110-C (LWG); West Khasi Hills: Mawsiangdur forest, 15.09.2000, A.P. Singh, 208588-B (LWG); Mawtmian forest-Mairang, 18.09.2000, A.P. Singh, 208679-B (LWG). Det. V. Nath & A.P. Singh. *Calypogeia lunata* Mitt.: India: Meghalaya: East Khasi Hills: On way to Jarain, 10.11.1998, V. Nath and party, 207912-A, 207946-A, 207950-A (LWG); Experimental Garden Barapani, 12.11.1998, V. Nath and party, 208023-A, 208025-A, 208030-A, 208033-A (LWG); West Khasi Hills: Mawsiangdur forest: Nongstoin, 15.09.2000, A.P. Singh, 208593-A, 208595-A, 208596-A, 208596-B (LWG); Thipringsong forest Nongstoin, 15.09.2000, A.P. Singh, 208615 -A (LWG); Mawtmian forest Mairang, 18.09.2000, A.P. Singh, 208697-B (LWG). Det. V. Nath & A.P. Singh.

DISCUSSION

During present study plant specimens of *Calypogeia* (designated as *C. khasiana* sp. nov.) have been collected from Langkyrdum-Dawki Road, East Khasi Hills: Meghalaya. A critical study on these plants exhibited stable features among all the individuals of the growing population. These plants show resemblance with *Calypogeia azurea* Stotler *et* Crotz., *C. lunata* Mitt., and *C. fissa* (L.) Raddi but *Calypogeia azurea* is distinct from *C. khasiana* in smaller plant size (20-30 mm long), greenish brown-yellowish brown colour, smaller leaves (0.63-0.80 mm long x 0.63-0.75 mm wide), obliquely inserted, narrowed subacute-obtuse, apiculate (rarely bidentate) apex, sinus subacute, lobes 3-4 celled long, underleaves bifid, lobes acute to obtuse at apex, outer margin of the lobes usually rounded. Moreover, *C. lunata* Mitt. differs with *C. khasiana* in having yellow brown colour, stem 9-10 cells across and 0.25-0.26 x 0.36-0.38 mm in diameter, leaves obliquely ovate, apex narrowed, obtuse to subacute, bidentate, sinus less broad, acute to obtuse, lobes 2 cells long, underleaves bisbifid, lobes divergent, shallowly and irregularly notched, forming acute-obtuse dentitions. Besides, *C. fissa* also differs from *C. khasiana* in smaller length of plants (40 mm long), bluish yellow brown to green brown colour, broadly ovate leaves, apex frequently decurved, narrowed and bidentate, sinus narrow, obtuse or subacute, lobes 2-3 cells long, underleaves bisbifid, lobes narrowly rounded at apex, outer margin with an obtuse-subacute angulation on one or both side. A critical and comparative study of these plants with other known species of the genus *Calypogeia* has revealed that plants collected from Langkyrdum - Dawki road are clearly distinct and described here as *Calypogeia khasiana* sp. nov.

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印度護苔屬的蘚苔新種

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摘　　要

本文描述一種東喜馬拉雅山區護苔科護苔屬的蘚苔新種。其最主要的辨識特徵是植株較大、葉子較長，但先端窄縮、葉前端銳尖、基部葉兩叉且伴隨著缺刻。

關鍵詞：蘚苔、*Calypogeia khasiana*、新種、護苔屬、東喜馬拉雅。

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