

# *Plagiochila ghatiensis* Stephani: A rare liverwort New to Himalaya

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## ABSTRACT

During investigation on the bryoflora of Govind Wild Life Sanctuary, Uttarakhand, India, a rare liverwort, *Plagiochila ghatiensis* Stephani (Plagiochilaceae), with known restricted occurrence within south India, has been identified amongst the bryoflora of Himalaya, north India. The taxon is characterized by filiform, flagilleferous, microphyllous, lateral-intercalary branches; leaves obliquely inserted, symmetrically bilobed upto 1/7 to 1/4 of the leaf length, sinus ranging from lunate to deep V-shaped; ventral margin arched, short to moderately decurrent, dorsal margin arched, and long decurrent.

**Key-words:** Bryoflora, Govind Wild Life Sanctuary, Liverworts, *Plagiochila ghatiensis*, Uttarakhand.

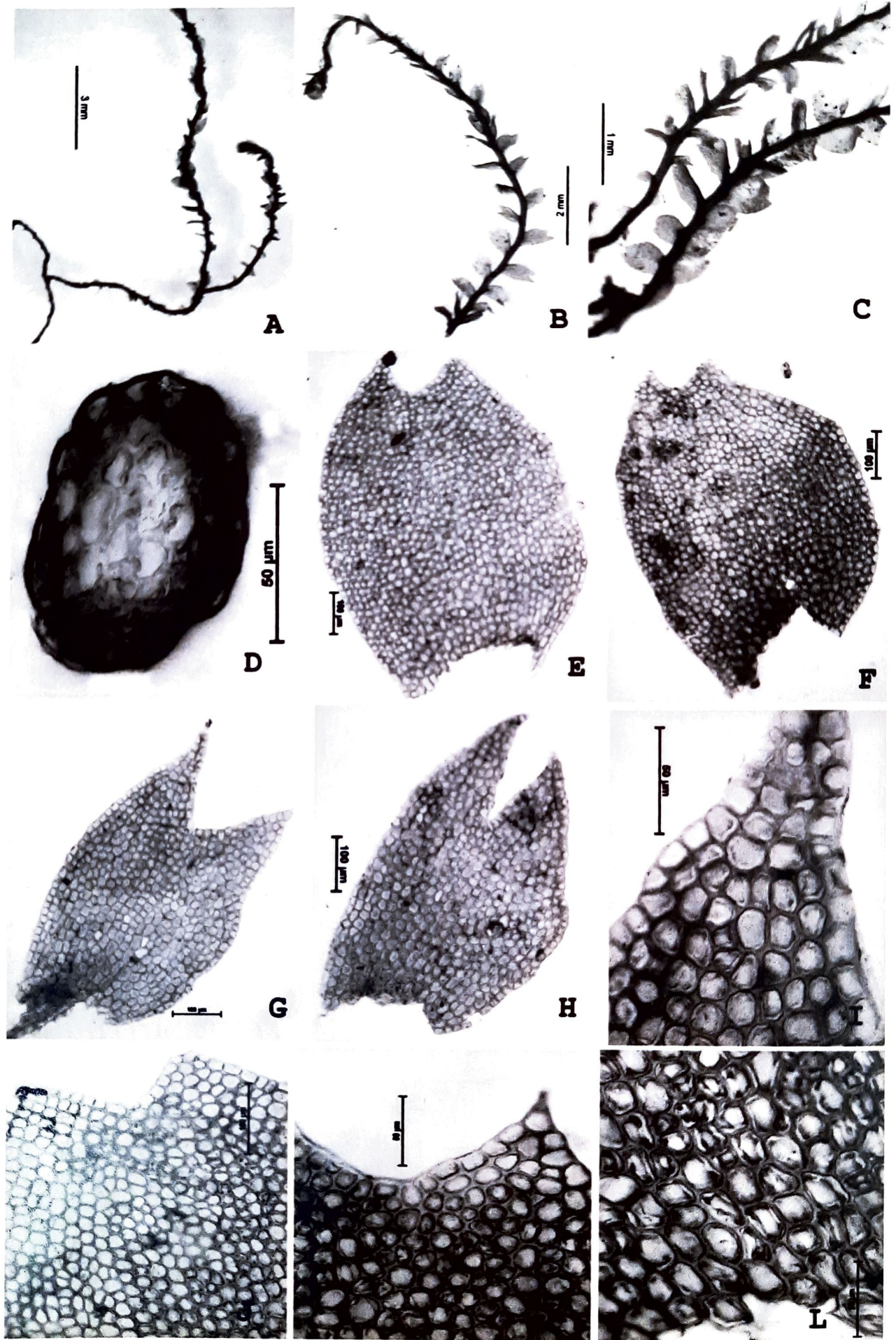
## INTRODUCTION

Genus *Plagiochila* (Dumort.) Dumort. belongs to the family Plagiochilaceae with about 1600 species reported throughout the globe (Geissler & Bischler 1989). So & Grolle (2000) listed a total number of 480 taxa from Asia after critical evaluation of several types and authentic specimens of various species. Within India, various workers have previously attempted to assess the status of the genus *Plagiochila* (Parihar et al. 1994, Deo & Singh 2014, Manju et al. 2005, Majumdar & Singh 2015, Srivastava & Dixit 1993, 1994, 1996, Srivastava et al. 2000, 2006, 2007, Rawat & Srivastava 2007, Singh & Singh 2011, Singh & Singh 2006, 2007, Verma & Srivastava 2008, Verma & Rawat 2014, Verma et al. 2013, 2014, 2015, Daniels & Mabel 2010). There are still debates on the exact number of taxa belonging to genus *Plagiochila* present within India (Rawat & Srivastava 2007 and references therein). However, recently, Singh et al. (2016) have listed about 82 taxa of *Plagiochila* in India. Interestingly, all the previous occurrences of the taxon

*Plagiochila ghatiensis* were restricted to south India. It should be noted here that *P. ghatiensis*, has been previously reported as *Tylimanthus indicus* and also as *P. acutiloba* from the Cinchona plantations in Western Ghats (Srivastava & Verma 2004) (also refer section "Discussion", present article). Further, we hold the view that the present study extends the geographic record of *P. ghatiensis* within the Himalaya, north India.

## MATERIALS AND METHODS

Plant specimens were collected from Har Ki Dun-Osla area of Govind Wild Life Sanctuary, District Uttarkashi, Uttarkhand, India. For morphological and anatomical study, the plant samples were initially soaked and washed under tap water. Later, the plant specimens were mounted on a slide using 30% glycerine for further investigation under a microscope. All the plant specimens studied in the present investigation are housed in the Bryophyte Herbarium, CSIR-National Botanical Research Institute (NBRI), Lucknow, India.



## PLATE 1

*Plagiochila ghatiensis* Steph. A-C. Plants habit; D. Cross section of stem; E-H. Leaves; I-K. Leaf apical cells; L. Basal leaf cells.

## TAXONOMIC ENUMERATION

*Plagiochila ghatiensis* Stephani Spec. Hepat. 6: 159 1918.

Type: India. Tamil Nadu: India orientalis, Ghates meridionales, Kodaikanal, 1908, *s.n.* (holotype: G0110011).

### Plate 1A-L

Synonyms:

*Tylimanthus indicus* Stephani Spec. Hepat. 6: 248 (1924)

*P. acutiloba* Inoue, *Bull. Natl. Sci. Mus.*, Tokyo 8: 390 (1965)

**Description:** Plants yellowish brown in herbarium specimen, 10-25 mm long and 1-1.2 mm wide including leaves; branching lateral intercalary, arising at 90°, branches filiform, flagelleferous and microphyllous. Stem in cross section ovoid, 92-100 µm long and 68-72 µm wide, 8-9 celled across diameter, differentiated; cortical cells in 2 layers, quadrate to subquadrate, 8-10 µm long and 8-10 µm wide, thick walled; medullary cells polygonal, 10-16 µm long and 8-10 µm wide, thin walled. Leaves distant to contiguous, obliquely inserted, elliptical-ovate, 0.80-0.88 mm long and 0.48-0.64 mm wide, length-width ratio 1.46; symmetrically bilobed to 1/4 - 1/7 of the leaf length, sinus ranging from lunate to deep V-shaped; ventral margin arched, short to moderately decurrent; dorsal margin arched, long decurrent; marginal cells 16-20 µm long and 12-16 µm wide, rectangular to polygonal, trigonous; basal cells 16-44 µm long and 16-24 µm wide, trigonous, polygonal. Rhizoids scattered, irregular. Only vegetative plants found.

**Habitat:** Growing on soil mixed with *Metzgeria pubescens* (Schrak.) Raddi, *Plagiomnium cuspidatum* (Hedw.) T. J. Kop., *Leucodon secundus* (Harv.) Mitt., *Brachythecium* sp. and *Isopterygium* sp.

**Specimens examined:** Leg. V. Nath, 204950C (LWG), 23/06/1989.

**Locality:** Uttarkhand, Uttarkashi, Govind Wild Life Sanctuary, Har Ki Dun-Osla, alt. ca. 3000 m.

**Distribution Range:** India (Tamil Nadu: Kodaikanal; Uttarakhand: Uttarkashi), Sri Lanka and China (So 2001).

## DISCUSSION

According to So (2001), in *P. ghatiensis* the plant apex is freely caducous to almost denuded; leaves remote to contiguous, oblong ovate, trigones absent to small thin. So (2001) further discussed the differences between *P. ghatiensis* and *P. gracilis* Lindenb. and Gott. He observed that *P. gracilis* differs from *P. ghatiensis* in having large trigones and persistent leaves while *P. ghatiensis* shows medium to large sized and sometimes even confluent trigones (refer figs. 30e and 30f in So 2001). Observations by one of us (KKR) on the type specimen of *P. ghatiensis* suggests that the leaves are rectangulate, distantly arranged with insertion line more or less vertical and almost all of the leaves were strictly bilobed without any extra teeth. The extra tooth on ventral margin was extremely rare. However, So's observations "with 1(-2) broad teeth in the middle" on and illustrations (refer Figs. 30a, 30b and 30c in So 2001) of the chinese specimen suggested that the presence of a third tooth is very common. Thus, we hold the opinion that the Chinese specimen(s) identified as *P. ghatiensis* may possibly belong to *P. gracilis* or *P. exigua* (Taylor) Taylor. Considering these observations, we here also doubt the records of *Tylimanthus indicus* and *P. acutiloba* from the Cinchona plantations, Tamil Nadu, south India by Srivastava & Verma (2004). In addition, the present study certainly provides evidence for the presence of *P. ghatiensis* in the Himalayan region, north India.

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