RESEARCH ARTICLE

Current Status of Rare and Interesting Genus *Mylia* Gray in India with an Account of *M. taylorii* (Hook.) Gray

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DOI: 10.18811/ijpen.v5i02.4

Abstract

Mylia taylorii (Hook.) Gray, a rare taxon has been collected from Singalila National Park, Darjeeling (West Bengal), in the subalpine region, on way to Phalut from Sandakphu (ca 3657 m). A detailed morpho-taxonomic and illustrated account of the Indian plants is provided.

Keywords: Eastern Himalaya, India, Liverwort, *Mylia*, Rare.

International Journal of Plant and Environment (2019)

Introduction

Genus *Mylia* Gray was established by Gray (Nat. Arr. Brit. Pl.1: 693, 1821) and various taxonomic treatments were given to the genus by workers from time to time at the level of order, suborder, family and subfamily. The genus was earlier placed as a member of Plagiochileae of Jungermanniaceae (Jorgensen, 1934) and under Plagiochilaceae (Műller, 1948, 1951-54; Inoue, 1958; Schuster, 1959). Later, Grolle (1963) proposed the sub-family Mylioideae under Jungermanniaceae to include the genus *Mylia*, which is distinctive from Plagiochilaceae due to presence of dense rhizoids on postical side of stem, presence of gemmae and uniseriate antheridial stalk. The placement was also accepted by Schuster (1968). Recently, Shaw *et al.* (2015) during a study on Phylogenetic relationships and morphological evolution based on molecular data, excluded family Myliaceae from the Jungermanniaceae. They formed a new suborder Myliineae and included the family Myliaceae Schljakov within it.

The placement of this genus based on morphological data seems very interesting as it is close to members of Jungermanniaceae on one hand as mentioned above, however it has a closer affinity to genus *Plagiochila* and family Plagiochilaceae on the other hand in possessing laterally compressed perianth, which is completely free from bracts. However, molecular analysis suggests that it should be placed in a different suborder Myliineae under family Myliaceae (Shaw *et al.*, 2015).

Genus *Mylia* is represented all over the world by 3 species and one subspecies viz. *M. anomala* (Hook.) Gray, *M. taylorii* (Hook.) Gray, *M. verrucosa* Lindb.,and *Mylia verrucosa* Lindb. subsp. *nuda* (H. Inoue & Yang) Potemk. & Kazanovsky (Schuster, 1968, see also Potemkin and Kazanovsky, 1993; Vana, 1996). As far as distributional record of this genus in India is concerned there are two listings provided by Parihar *et al.* (1991) and Singh *et al.* (2016) according to which there occur two species, *M. taylorii* and *M. verrucosa* in eastern Himalaya (India). However, there are only a few records of subsequent collections (Long and Grolle, 1990) of these taxa in India since their original description. An account of *M. taylorii* has recently been provided by Li *et al.* (2013) based on their collection from China.

During an investigation on Bryophytes of Singalila National Park (SNP), Darjeeling, eastern Himalaya some interesting plants of *Mylia* were identified closely approaching to *M. taylorii* (Hook.) S. Gray, it was described by Hookeras *Jungermannia taylorii* and subsequently transferred to genus *Mylia* by S. Gray in 1821. Inoue (1958) and Inoue and Yang (1966) provided an account of this taxon in European and North American Manuals. As far as reports of its occurrence in India is concerned it is listed by Parihar *et al.* (1991) and Singh *et al.* (2016) from eastern Himalaya, with little information provided about its specimens and collection in Indian region. The collection of this taxon from SNP, provides the authentic information about the occurrence of taxon in Indian region after a gap of about more than a Century. A detailed morphological account of the Indian plants of this taxon has been provided in the present contribution.

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How to cite this article: Asthana, A.K., Sahu, V. and Gupta, R. (2019). Current Status of Rare and Interesting Genus *Mylia* Gray in India with an Account of *M. taylorii* (Hook.) Gray. International Journal of Plant and Environment, 5(2): 92-95.

Source of support: Nil

Conflict of interest: None

Submitted: 07/05/2018 **Accepted:** 30/04/2019 **Published:** 30/04/2019

Description

***Mylia taylorii* (Hook.) Gray, Nat. Arr. Brit. Pl.1: 693 (1821)** [as "Mylius and "Taylorii"] – *Jungermannia taylorii* Hook. Brit. Jungerm. Pl.57 (1816). – *Aplozia taylorii* Dum. Rec. d' Obs. 16 (1835). – *Leptoscyphus taylorii* Mitt. London Jour. Bot. 3: 358 (1851).- *Leioscyphus taylorii* Mitt. in Hooker Fl. Antarct. 2 (2): 134 (1855).- *Jungermannia reticulatopapillata* Steph. Mem. Soc. Nat. Cherbourg 29: 215 (1819).

Plants up to 50 mm long and 3-5 mm wide including leaves, yellowish to brownish green and reddish purple at apex. Stem branched, 0.4-0.5 mm thick; in cross section 9-11 cells wide, no differentiation in cortical and medullary cells, thick walled, cortical cells 40-48 µm long and 28-40 µm wide, while medullary cells 28-60 µm long and 20-40 µm wide, variable in size. Leaves closely imbricate, horizontally spreading, widely inserted with the line of insertion curved upwards ending at ½ of the stem width,ventrally not decurrent, orbicular-widely ovate, 1.8-2.5 mm long and 1.8-2 mm wide. Marginal cells of leaf 28-48 µm long and 28-48 µm wide, margin verrucose, rectangular to quadrate in shape, trigonous, median cells 48-60 µm long and 40-48 µm wide, polygonal and trigones conspicuously large, basal cells 60-100 µm long and 40-60

µm wide, trigones large. Numerous colourless rhizoids present on stem. Amphigastria linear- lanceolate, generally hidden among rhizoids, 0.72-0.80 mm long and 0.16 mm wide, 5-12 cells uniseriate at apex. Male plants not seen. Perianth oblong about 3 mm long, mouth truncate, laterally compressed in upper 1/3 inflated below, Many multicellular protuberances present on the surface of perianth, sometimes smooth also.

Ecology

Plants usually grow on soil covered rock with humus at an elevation

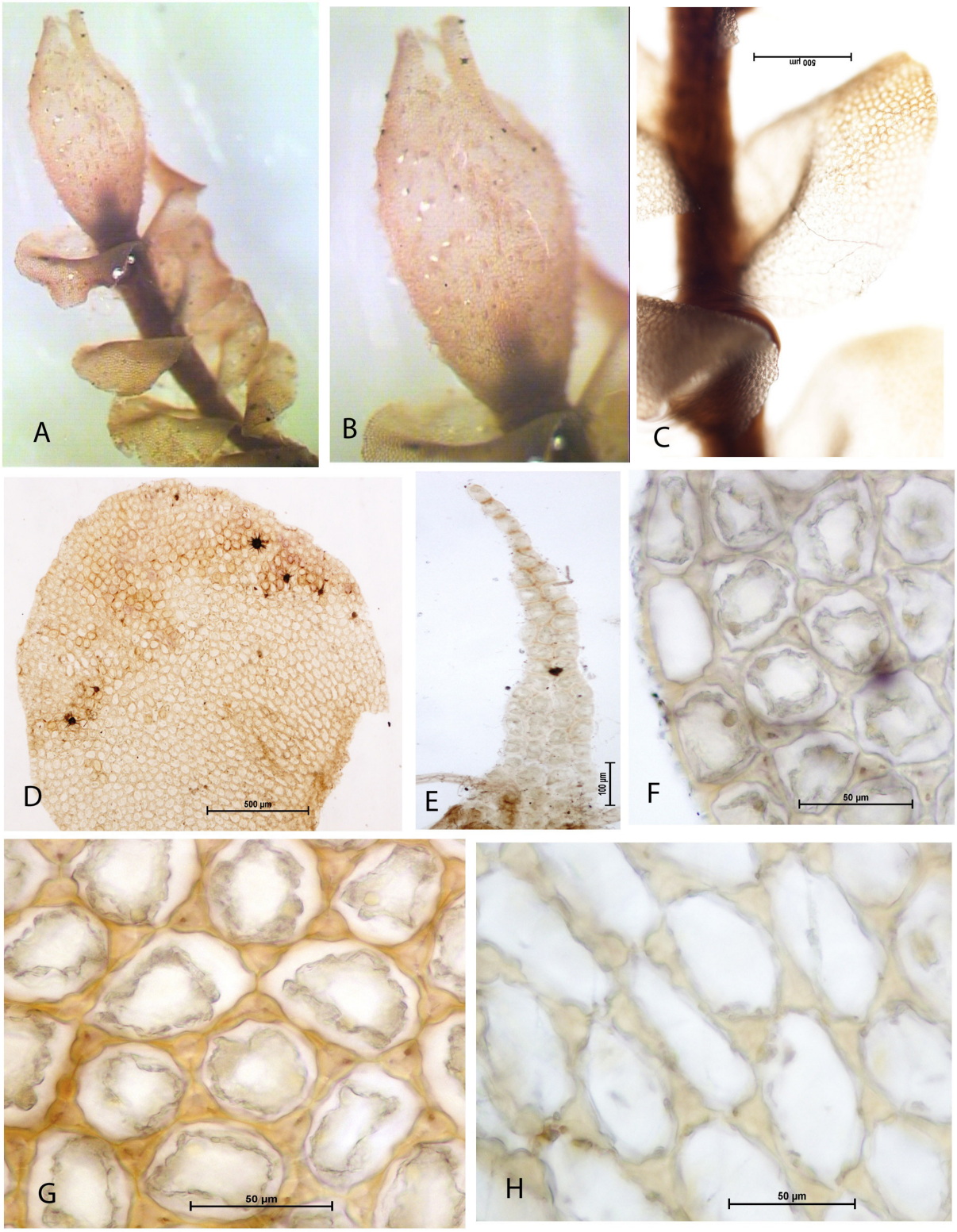

Fig. 1: *Mylia taylorii* (Hook.) Gray A. Plant with perianth,B. Perianth showing protuberances over surface, C. A portion of plant showing leaf attachment, D. Leaf, E. Underleaf, F. Marginal cells of Leaf, G. Median cells of Leaf, H. Basal cells of leaf. (Photographs from LWG 225378B).

of ca 3657m a.s.l. This species was found growing in association with *Solenostoma* sp., *Metacalypogeia alternifolia, Bazzania tricrenata, Herbertus dicranus, Scapnia* sp., *Dicranum lorifolium, Calycularia crispula, Lophocolea sikkimensis, Plagiochila semidecurrens, Riccardia sikkimensis, Entodon* sp., *Lepidozia reptans, Pogonatum urnigerum, Bazzania sikkimensis and Plagiothecium neckeroideum.*

Specimens Examined: India, eastern Himalaya, Darjeeling, on way to Phalut, Sandakphu, 6-11-2003, leg. A. K. Asthana and V. Sahu;

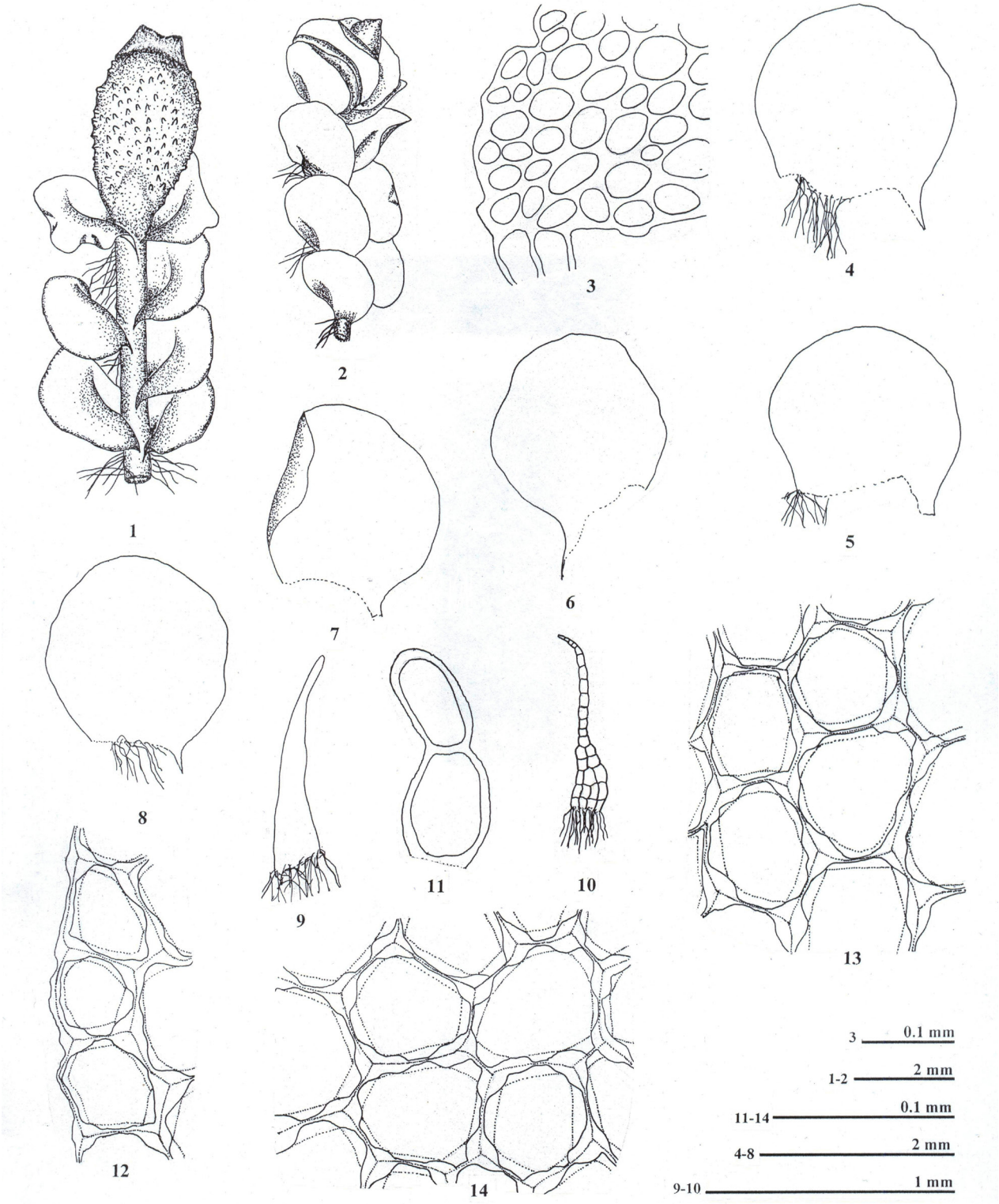

Fig. 2: *Mylia taylorii* (Hook.) Gray 1. Plant with perianth. 2. A portion of plant, 3. Cross section of stem (a portion), 4-8. Leaves, 9, 10. Underleaves, 11. Protuberance of perianth,12. Marginal cells of leaf, 13. Median cells of leaf, 14. Basal cells of leaf. (diagrams drawn from LWG 225378B).

225378B, 225394A, 225379C, 225395E, 225396B (LWG).

Range of Distribution:

Europe, N. America, India, China, Japan, Bhutan, Nepal, Taiwan, Russia (Singh *et al*., 2016).

Discussion

Mylia taylori closely approaches *Mylia verrucosa* in perianth shape, leaf insertion and leaf cell trigones, while latter can be clearly recognized from the former in having rectangular leaves with strongly reflexed dorsal margin and perianth always with numerous prominent protuberances (Potemkin and Kazanovsky, 1993).

Similarly plants of *M. nuda* also resemble with *M. taylorii* in sterile condition except leaves which are oblong – lingulate-falcate in former, however, fertile plants are clearly distinguishable from latter as former always possesses smooth perianth, cilia (2-6 cells long) at mouth of perianth, antheridia 4-7 (6) per bract. Another species of the genus, *M. anomala* is also distinctly different from *M. taylorii* in having smooth walled perianth and leaves which are elongate, lanceolate and pointed at apex (Potemkin and Kazanovsky, 1993).

Inoue (1958) and Schuster (1968) described the plants of *M. taylorii* with smooth perianths occurring in the areas outside of the Himalayan region. However, Li *et al.* (2013) examined a number of specimens of this species and found that presence of protuberances on perianth cell surface is not a constant feature in *M. taylorii* and it may be present in the plants of Himalayan region. *Mylia taylorii* may be confused with *M. verrucosa* by protuberance occurring on perianth surface, but protuberance of former can be recognized as coarse plates on cell walls but in latter these are a line containing two or three cells (Li *et al*., 2013). In Himalayan plants collected on way to Phalut from Sandakphu (Darjeeling, West Bengal) protuberances on perianth surface are like projections of 1-2 cells (Fig. 1.B, Fig. 2. 1,11).

Acknowledgements

The authors are thankful to the Director National Botanical Research Institute, Lucknow for encouragement and providing facilities. One of the authors (RG) is grateful to Science & Engineering Research Board, New Delhi for Young Scientist Scheme. Authors acknowledge with thanks Prof. Jiri Vana, Deptt. ofBotany, Charles University, Czech Republic, for his valuable suggestions duringpreparation ofthe manuscript. Thanks are also due to Dr. S. K. Singh, Scientist, Botanical Survey of India, Shillong for providing the relevant literature.

References

Gray, S.F. 1821. A natural arrangement of British plants. Vol. I, Baldwin, Cradock and Joy, London, pp. 1-824.

Grolle, R. 1963. Monographie der Lebermoosgattung *Leptoscyphus* Mitt. *Nova Acta Leopoldina N.F.* **25**: 1-143, pl. 1-25.

Inoue, H. and Yang, B.Y. 1966. Genus *Mylia* Gray in Taiwan. *Taiwania* **12**: 35-37.

Inoue, H., 1958. The family Plagiochilaceae of Japan and Formosa I. *The Journal of the Hattori Botanical Laboratory* **19**: 25-59.

Jorgensen, E. 1934. Norges Lebermooser Bergens Mus. *Skrif.* **16**: 1-343, pl. 1-25.

Li, W., Váňa, J. and Gao, C. 2013. The genus *Horikawaella S.* Hatt. & Amakawa in China. *Nova Hedwigia* **96**(3-4): 525-531.

Long, R. and Grolle, R. 1990. Hepaticae of Bhutan II. *The Journal of the Hattori Botanical Laboratory* **68**: 381-440.

Műller, K. 1948. Morphologische und anatomische untersuchungen an Antheridien beblatterter Jungermannien. *Botaniska Notiser* **1948**(4): 71-80.

Műller, K. 1951-54.Die Lebermoose Europas, In Rabenhorst's Kryptogamen-flora, 3, **6**(1): 1-756.

Parihar, M.S., Lal, B. and Katiyar, N. 1991. Hepatics and Anthocerotes of India-A new annotated checklist. Central Book Depot, Allahabad, pp. 1-106.

Potemkin, A.D. and Kazanovsky S.G. 1993. On the genus *Mylia* S. Gray (Hepaticae, Jungermanniaceae, Mylioideae). *Arctoa* **2:** 1-11.

Schuster, R.M. 1959. A monograph of the nearctic Plagiochilaceae I. *The American Midland Naturalist* **62**: 1-166.

Schuster, R.M. 1968. The Hepaticae and Anthocerotae of North America II. Columbia University Press, New York, pp. 1034-1049.

Shaw, B., Crandall-Stotler, B., Vana, J., Stotler, R.E., Von Konrat, M., Engel, J.J., Davis, C., Long, D.G., Sova P., and Shaw, A.J. 2015. Phylogenetic relationships and morphological evolution in a major clade of leafy liverworts (Phylum Marchantiophyta, Order Jungermanniales): Suborder Jungermanniineae. *Systematic Botany* **40**(1): 27-45.

Singh, D.K., Singh, S.K and Singh, D. 2016. Liverworts and Hornworts of India: an Annotated Checklist. Botanical Survey of India, pp. 202-203.

Váňa J., 1996. Notes on the Jungermanninae of the world. *Annal. Inst. Biol. Univ. Nac. Auton. Mexico, Ser. Bot.* **67**(1): 99-107.