

Colura calyptrifolia (Lejeuneaceae: Marchantiophyta) a rare leafy liverwort from the Western Ghats of India

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कोलुरा कैलिप्ट्रीफोलिया (लेज्यूनिऐसी : मार्केशियोफाइटा) भारत के पश्चिमी घाट से प्राप्त एक दुर्लभ पत्तीनुमा लिवरवर्ट

मुफिद, बी;चांदनी वी.के.;सी. एन. मंजू एवं के. पी. राजेश

सारांश

कोलुरा कैलिप्ट्रीफोलिया (हुक.) डुमोर्ट कुल लेज्यूनिऐसी की एक सूक्ष्म आकार की दुर्लभ किन्तु रोचक अधिपादपीय जाति है। इस जाति को प्रथम बार केरल राज्य के पश्चिमी घाट में अनामुदिशोला राष्ट्रीय उद्यान से अभिलेखित की गई है। प्रस्तुत शोध पत्र में इस जाति का विस्तृत वर्णन एवं सहज निर्धारण के लिए रेखांकन उपलब्ध करवाया गया है, जो इसके वर्तमान संग्रहण पर आधारित है। सुगठित सपाट लोब्यूल जो शीर्ष पर लम्बी चोंच सदृश आकृति के साथ विकृत कोष का निर्माण करता है, इस जाति के प्रमुख लक्षण हैं।

ABSTRACT

Colura calyptrifolia (Hook.) Dumort. a very small and rare interesting epiphytic species of the family Lejeuneaceae is reported for the first time from Anamudishola National Park in the Western Ghats of Kerala. The description and illustration based on the present collection are provided herewith. The species is characterized by strongly inflated lobules forming a fusiform sac with a narrow beak-like prolongation at the tip.

Keywords: Lejeuneaceae, Marchantiophyta, New record, Rare, Western Ghats

INTRODUCTION

Colura is a highly distinctive genus with long beaked sac like leaf lobule and presence of valve. About 80 species are reported worldwide (Hassel & al., 2014). Major contributions were done on the genus by Jovet-Ast (1953, 1954, 1956) and Pocs (1991, 2007, 2011, 2015). In India the genus is represented by seven species viz., *Colura acroloba* (Mont.) Jovet-Ast, *C. ari* Steph., *C. calyptrifolia* (Hook.) Dumort., *C. conica* (Sande Lac.) K.I. Goebel, *C. leratii* (Steph.) Steph., *C. tenuicornis* (A. Evans) Steph.

and *Colura pluridentata* Ast. (Lal, 1980, 2003; Asthana & Sukla, 2010; Dey & Singh, 2016). Among these only *Colura leratii* (Steph.) Steph. is reported from Western Ghats. *Colura calyptrifolia* (Hook.) Dumort. the type species of the genus *Colura* (Dumortier, B.C.J. 1835) is usually grow as as an epiphyte and has a very interesting and complicated leaf structure. During our present investigation in the Anamudi shola National Park in the Western Ghats of Kerala we could locate *C. calyptrifolia* in the shola forest. *C. calyptrifolia* has a very wide but somewhat scattered global distribution (Hassel & al.,

2014). Due to small size and indistinct morphology of the species, the species remain unnoticed. *C. calyptrifolia* is earlier reported from Arunachal Pradesh and Darjeeling district of West Bengal, Eastern Himalaya. The present communication the species is reported as a new record for Western Ghats. A briefly description the species along with an illustration, information on habitats and geographical distributions are also been provided.

TAXONOMIC DESCRIPTION

Colura calyptrifolia (Hook.) Dumort., Recueil Observ. Jungerm.: 12. 1835. (Figs. 1-3)

Type: JE Chile

Plants erect, small, 4-6 mm long, 1.3-1.5 mm wide including leaves, yellowish green when, fresh, brownish when dry, branching irregular. Stem 90-100 μ m in diameter, composed of seven cortical cells surrounding 3 medullary cells. Leaves 0.3-0.38 mm long and 0.2-0.24 mm wide, up to 1.25 mm long including lobular beak, diverging from stem at an angle of approximately 85°, contiguous, erect spreading, upper margin of dorsal lobe arched, entire, straight at point of dorsal attachment, not overlapping, ventral margin of dorsal lobe almost straight, pointed, ending with one cell, incurved at tip to the dorsal margin; cells of leaf lobes rectangular to hexagonal,



Fig. 1: Distributional map showing the distribution of *Colura calyptrifolia* (Hook.) Dumort in the world.

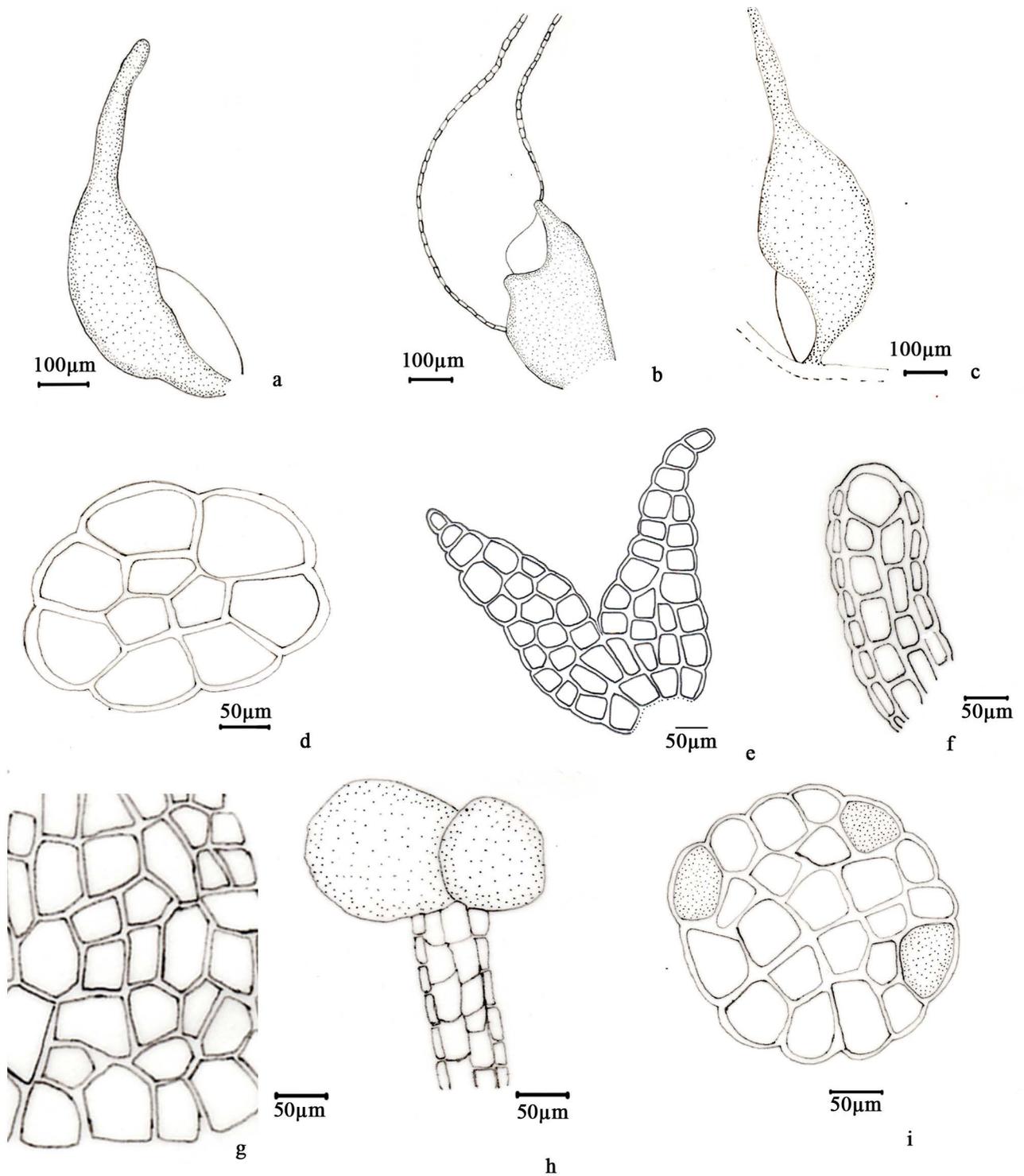


Fig. 2: *Colura calyptrifolia* (Hook.) Dumort. **a.** Leaf lobe dorsal (showing lobule), **b.** Leaf lobe ventral, **c.** Leaf lobe attachment on stem, **d.** C. S. of stem, **e.** An underleaf, **f.** Lobule tip, **g.** Lobule cells, **h.** Lobule tip with gemmae, **i.** A gemma.

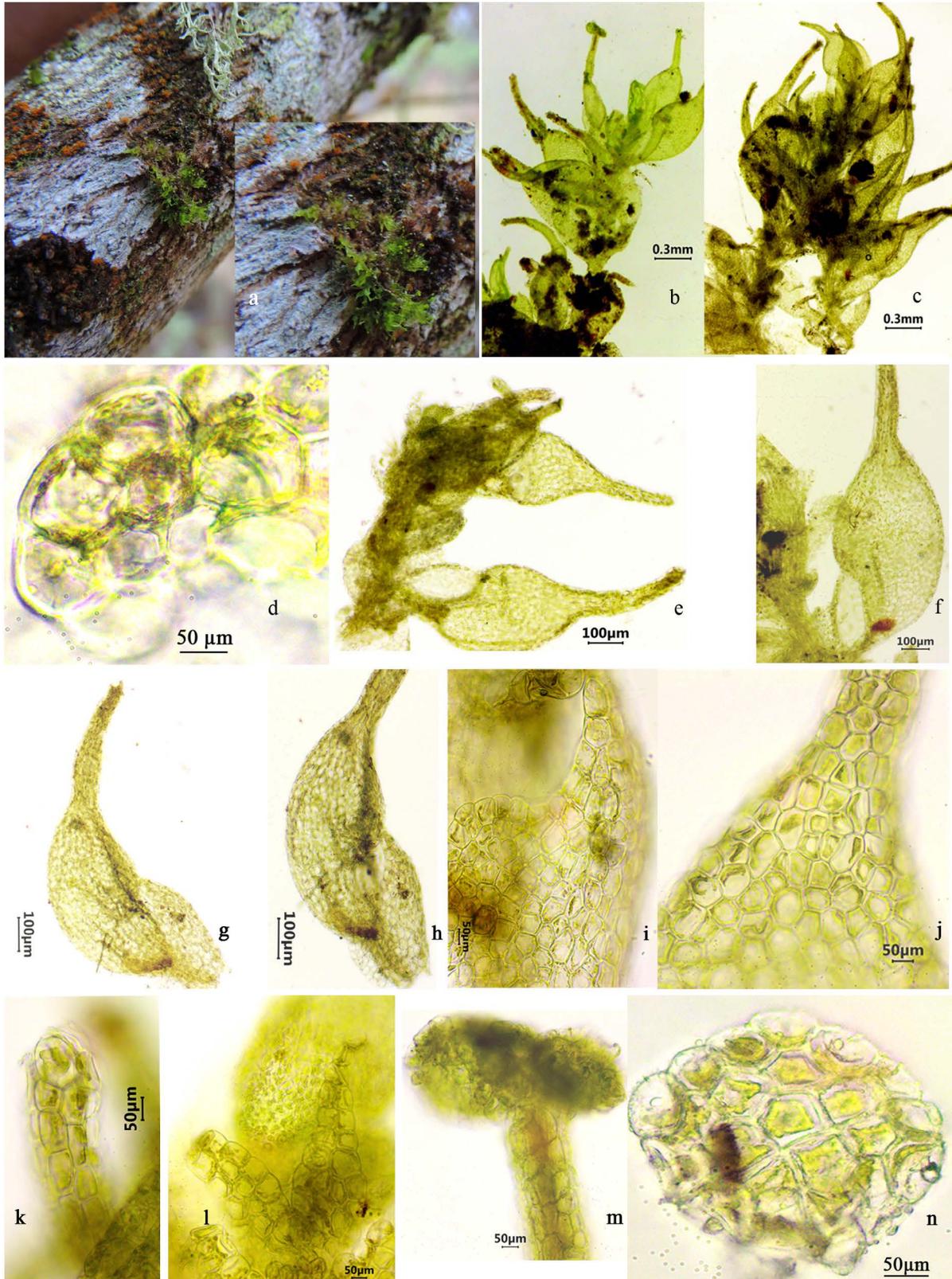


Fig. 3: *Colura calyptrifolia* (Hook.) Dumort. **a.** Plant attached to bark, **b, c.** Habit under light microscope, **d.** C. S. of stem, **e.** Leaf attachment to stem, **f-h.** Leaf with lobule, **i.** A leaf, **j.** Cells of lobule, **k.** Lobule tip, **l.** An underleaf, **m.** Gemmae at lobule tip, **n.** A gemma.

thin-walled without trigons and intermediate thickening, median cells $14.2-36.4 \times 9.4-23.4 \mu\text{m}$, basal cells larger, $31-70 \times 20-40 \mu\text{m}$, lobules $0.9-1.25 \text{ mm}$ long, twice as lobe length, strongly inflated forming a fusiform sac with a narrow beak-like prolongation at the tip, free margin involute strongly valve at the mouth of the sac, ovate to short-ligulate, composed of rectangular thin-walled cells $16-25.2 \times 10-30 \mu\text{m}$, border cells hyaline. Underleaves deeply bilobed with divergent lobes, lobes $0.16-0.22 \text{ mm}$ long, apex terminating in a single cell, lobes 3-4 cells broad at base, cells of underleaves $16.2-28.78 \mu\text{m}$ in size, trigones and intermediate thickenings absent; gemmae present on the beak like prolongation of the lobule, 1-3 in number, discoid, $65-85 \mu\text{m}$ in diameter, 23-24 celled. Fertile plants not seen.

Habitat: Corticolous growing on the bark of trees in the moist shady areas of montane wet temperate forest locally known as shola forest along with *Leucolejeunea xanthocarpa* (Lehm. & Lindenb.) A. Evans, *Frullania* sp. and *Parmelia* genus of lichens..

Distribution: India, Tiger hills of Darjeeling (Lal, 1977); Arunachal Pradesh (Singh, 1996)], Sri Lanka (Long & Rubasinghe, 2014), Chile, Taiwan, Ireland, Europe (Britain, France, Islands of Reunion and St. Helena) (Hassel & al., 2014); Central & South Africa (Dualien county, Dominica, Venezuela, Tanzania, Uganda and Malawi Island (Porley, 1997; Yang, 2013).

Specimens examined: INDIA, Kerala, Idukki district, Anamuishola National Park, 08.11.2017, Idivara Shola, 2300 m, Mufeed 7462 (ZGC); 06.02.2018, Mufeed 9867b (ZGC); 22.09.2018 Mufeed 9987 (ZGC).

Most of the species of *Colura* is reported as epiphyllous but the present collection of *Colura calyptrifolia* is from bark of shola trees. It is characterized by its very small size with lobules strongly inflated forming a fusiform sac, with a narrow beak-like prolongation at the tip. *Colura calyptrifolia* is similar to *C. tenuicornis* in its leaf lobe without intermediate thickening and trigones, sac like lobules with narrow prolongation at tip. *C. calyptrifolia* differ from *C. tenuicornis* by the closely arranged leaf lobe, leaf length, lobule sac, fusiform with lobular beak $1/3-1/4$ of total leaf length and lobule beak multiseriolate ending in a single large cell with supporting two small cells. While in *C. tenuicornis* the leaves are distant, lobule sac lanceolate with lobular beak $1/2$ of

total leaf length and lobule beak uniseriate ending with single cell. Porley (1997) also commented that the main differences between *C. calyptrifolia* and *C. tenuicornis* is beak $1/4-1/3$ of total leaf length and apex of perianth with five short spreading horns in the former and beak $1/2$ or more of total leaf length and apex of perianth with five very long sub-cylindric horns. During our present collection in three consecutive seasons we could not locate the reproductive structures, but collected with gemmae. As commented by Dr. Tamas Pocs, an expert in the genus (pers. comm.), majority of the species produce gemmae in large amounts and the occurrence of reproductive structure may be infrequent. The discovery of *C. calyptrifolia* from Anamudishola reports the occurrence of *Colura* in Kerala. This species was reported from Asia by Lal (1977) from Tiger hills of Darjeeling, Eastern Himalaya and Arunachal Pradesh (Singh, 1996). After this collection there is no report of this species from India. It prefers to grow in wide variety of habitats such as on rock, bark, etc. in natural habitat in addition to this, they grow on artificial substratum like Glass bottle (Averis, 2009). It's altitudinal distribution is also shows a wide range from sea level to high altitudes more than 1500 m above, but majority of the collections are restricted to the altitudinal range above 2000 m. Occurrence of the genus *Colura* give strength to the unique vegetation of the Shola forest of Kerala. The species produce profuse number of gemmae and there is no report of occurrence of reproductive structures. The present collections also support this.

KEY TO THE SPECIES OF COLURA IN INDIA

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|--|-----------------------|
| 1a. Under leaf lobes 2-cells wide at base | 2 |
| 1b. Under leaf lobes more than 2-cells wide at base | 5 |
| 2a. Leaf lobe with denticulate margin | <i>C. leratii</i> |
| 2b. Leaf lobe without denticulate margin | 3 |
| 3a. Cells of lobes without trigones and intermediate thickenings, lobule | 4 |
| 3b. Cells of lobes with trigones and intermediate thickenings, lobule sac | <i>C. acroloba</i> |
| 4a. Leaves distant, lobule sac lanceolate with lobular beak $1/2$ of total leaf length | <i>C. tenuicornis</i> |

4b. Leaves closely arranged, lobule sac fusiform with lobular beak 1/3-1/4 of total leaf length

C. calyptrifolia

5a. Leaf lobes obovate, lobule sac with acute to apiculate apices

C. pluridentata

5b. Leaf lobes ovate, lobule sac with rounded to obtuse apices 6

6a. Lobule sac small, less than 1/6 of lobe length, sharply turns away from the lobe

C. ari

6b. Lobule sac larger, upto 1/3 of lobe length in the direction of leaf axis

C. conica

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