

## NEW SPECIES RECORDS OF SRI LANKAN MOSSES

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**ABSTRACT.** – Five new species records of Sri Lankan mosses are reported based on a small collection made in May of 2002 from the cliff forest of Hantane Ridge and the lower montane rain forest at Taylor’s Seat in Loolekondera Estate. They are: *Acroporium secundum* (Reinw. & Hornsch.) Flesich., *Gammiella koningsbergeri* (Fleisch.) B.C. Tan & Y. Jia, *Hageniella micans* (Mitt.) B.C. Tan & Y. Jia, *Pinnatella foreauana* Thér. & P. dela Varde, and *Sematophyllum phoeniceum* (Müll. Hal.) M. Fleisch. The taxonomy and phytogeographical significance of these newly discovered taxa are discussed. *Sematophyllum capilliferum* Thwaites & Mitt. is recollected 131 years after its first description made in 1873.

**KEY WORDS.** – Sri Lanka, mosses, phytogeography, Gondwana, Hantane Ridge, Taylor’s Seat.

### INTRODUCTION

Sri Lanka, with a total land area of 65,610 sq. km., is truly a unique tropical island in the Indian Ocean. The southern part is mountainous, and the north formed by a rolling plain. Today, its natural forested areas still constitute over 12% of the total area. Very recently, O’Shea (2002, 2003) reviewed and summarized the bryological history and phytogeography of the island’s moss flora, and estimates it to consist of 561 taxa.

Geo-historically, the island originated south of the equator from the supercontinent of Gondwana. This has made the study of the natural history of this island country intriguing. Owing to plate tectonics, the island broke away from Gondwana and drifted northward towards its present geographical position early in the Cretaceous, arriving in Asia in the Tertiary, about 40 million years ago (Ashton & Gunatilleke, 1987). Consequently, its flora, including the mosses, bears evidence of a long history of geological upheavals and geographical movement across the equator.

According to the phytogeographical analysis made by O’Shea (2003), 69% of the Sri Lankan moss flora is shared with that of India. In comparison, the island moss flora shares 58% of taxa with the moss flora of Indochina. It also shares 61% of its taxa with the Malesian moss flora, notwithstanding the great physical distance between the two regions. Furthermore, there are 63 endemic moss taxa in Sri Lanka representing about 11% of the moss flora (O’Shea, 2003).

The calculations cited above are based on literature rather than an examination of specimens, and a renewed study of past and present collections will doubtlessly alter the figures. Since collections of mosses made in the past are largely from accessible places in the central plateau, such as Horton Plains, Nuwara Eliya and the vicinity of Mt. Pedrutallagalla, surveys of moss diversity in less accessible places are also likely to yield new discoveries. This fact is borne out by a small collection of mosses made by the author in May of 2002 mainly from two little known mountain forests (cliff forest at Hantane Ridge and lower montane forest at Taylor’s Seat in Loolekondera Estate). The effort has yielded five new species records (\*), all with meaningful phytogeographical significance. For other species relevant taxonomic notes were added where appropriate. Voucher specimens are deposited at SING, with duplicates distributed to PDA, NY and MO.

### SPECIES LISTING

#### FAMILY BARTRAMIACEAE

*Philonotis hastata* (Duby) Wijk & Marg. – on shaded ground behind the PGIA guest house of University of Peradeniya, 9 May, *Tan 02-125c pp*; Taylor’s Seat, on road bank, shaded, near the tea plantation, *Tan 02-132b*.

#### FAMILY BRYACEAE

*Brachymenium exile* (Dozy & Molk.) Bosch & Sande Lac. – Taylor’s Seat, on road bank, shaded, near the tea plantation, *Tan 02-132a*.

FAMILY CALYMPERACEAE

*Syrrhopodon muelleri* (Dozy & Molk.) Sande Lac. – Sinharaja Forest Reserve, coll. N. Gunatilleke, s.n.

FAMILY DICRANACEAE

*Leucoloma molle* (Müll. Hal.) Mitt. – Hantane Ridge, on rock near forest margin, Tan 02-112.

FAMILY FISSIDENTACEAE

*Fissidens ceylonensis* Dozy & Molk. – Hantane Hill, on soil in grassland, 8 May, Tan 02-119; on shaded ground behind the PGIA guest house of University of Peredeniya, Tan 02-124.

*Fissidens crispulus* Brid. (syn. *F. zippelianus* Dozy & Molk.) – campus of University of Peredeniya, 9 May, Tan 02-126.

*Fissidens flaccidus* Mitt. (syn. *F. splachnobryoides* Broth.) – on shaded ground behind the PGIA guest house of University of Peredeniya, Tan 02-125a pp.

*Fissidens thwaitesii* Paris – Hantane Ridge, on soil inside cliff forest, Tan 02-117 pp.

This species has one sharp and strong papilla per leaf cell.

*Fissidens virens* Thwaites & Mitt. – Hantane Ridge, on soil inside cliff forest, Tan 02-117 pp.; on shaded ground, Peredeniya Botanical Gardens, Tan 02-116.

This species is probably conspecific with the much widespread *F. crenulatus* Mitt., not yet reported from Sri Lanka.

FAMILY HYOPTERYGIACEAE

*Hypopterygium tamarisci* (Sw.) Brid. ex Müll. Hal. – Hantane Ridge, on log with humus inside cliff forest, Tan 02-110.

FAMILY LEUCOBRYACEAE

*Leucobryum humillimum* Cardot – Hantane Ridge, on rock at forest margin, Tan 02-111.

This is a widespread species in Asia, ranging from Japan, Korea, China to Himalayas, India and Sri Lanka (Yamaguchi, 1993). The species is easily distinguished by its *Schistomitrium*-like appearance. The leaves have a distinct cucullate apex with a mucro.

FAMILY MYURACEAE

*Myurium rufescens* (Reinw. & Hornsch.) M. Fleisch. – Taylor's Seat, on tree trunk, in lower montane rain forest, 7 May, Tan 02-101.

The plant forms many long creeping stems and branches, some of them are microphyllous in habit.

FAMILY NECKERACEAE

*Homaliodendron exiguum* (Bosch & Sande Lac.) M. Fleisch. – Taylor's Seat, on boulder in shade, Tan 02-129.

*Homaliodendron flabellatum* (Sm.) M. Fleisch. – Hantane Ridge, on boulder, inside cliff forest, Tan 02-130.

\* *Pinnatella foreauana* Thér. & P. dela Varde – Hantane Ridge, on boulder, inside a cliff forest, 8 May, Tan 02-120.

This is a fairly large member of the genus that is best identified by its oblong to ovate-lanceolate, somewhat concave leaves. The leaves are rugose, broadly obtuse and mucronate. The stem is without a central strand. The frondose plant produces

many microphyllous branches probably functioning as vegetative propagules.

The species is known from many localities in India, SW China (Yunnan) and Indochina (Enroth, 1994). Its presence in south central Sri Lanka is evidence of the Indian influence on the island flora.

FAMILY ORTHOTRICHACEAE

*Macromitrium fasciculare* Mitt. – Taylor's Seat, on tree trunk, in lower montane rain forest near tea plantation, Tan 02-107.

*Macromitrium japonicum* Dozy & Molk. – Taylor's Seat, in lower montane rain forest, on tree trunk, Tan 02-105.

This widespread East Asiatic species is quite distinctive with its yellowish, pilose calyptrae. The leaves are oblong-lanceolate and possess round to quadrate, mammillose to multipapillose cells. These occupy more than 2/3 of the distal leaf blade, and in some leaves may reach the leaf base. In the leaf base, the cells are shortly rectangular to oblong, and smooth. Its subacute to obtuse and cucullate leaf apices are most distinctive. To a great extent, the cucullate and inrolled leaves of *M. japonicum* are similar to *M. falcatulum* Müll. Hal., a common and widespread species in Malesia. As the leaf cells of both species are variable in papillosity (Eddy, 1996; Noguchi, 1989), the taxonomic distinction between these two species needs clarification.

*Schlotheimia cf. grevilleana* Mitt. – Taylor's Seat, in lower montane rain forest, ca. 1000 m, on tree trunk, 7 May, Tan 02-128.

This specimen is like *S. grevilleana*, but bigger in size, and frequently has basal cells in the leaves that are strongly papillose. The basal leaf cells are smooth in typical plants of *S. grevilleana*. Perhaps this Sri Lankan specimen deserves a separate taxonomic recognition.

FAMILY POTTIACEAE

*Barbula indica* (Hook.) Spreng. – On shaded ground behind the PGIA guest house of University of Peredeniya, Tan 02-125b pp.

*Pseudosymblypharis angustata* (Mitt.) Chen [syn. *P. subduriuscula* (Müll. Hal.) Chen] – Taylor Seat, Tan 02-103, 02-102 (*P. angustata* form); ibid, Tan 02-104 (*P. subduriuscula* form]

This is a polymorphic species with two distinct forms represented by the two synonymous names listed above: one has linear-lanceolate leaves with very long acuminate and sometimes, broken, leaf apices (the *P. subduriuscula* form), and the other has narrowly lanceolate leaves with acuminate apices (the *P. angustata* form). There are, however, intermediate forms reported from many parts of Malesia (Eddy, 1990). Both forms are found growing in Taylor's Seat with no intermediate populations observed *in situ*. Recently, the taxon has been synonymized further with another taxon, *P. bombayensis* (Müll. Hal.) Sollman, from India (Sollman, 2000). Perhaps a biosystematic study of this species complex using molecular data is needed to clarify the situation.

## FAMILY PTEROBRYACEAE

*Symphysodontella involuta* (Thwaites & Mitt.) M. Fleisch. – Taylor's Seat, on tree trunk, ca. 1000 m, in lower montane rain forest, *Tan 02-127*; Hantane Ridge, on boulder, in cliff forest, *Tan 02-118*.

This is an Indian and Sri Lankan endemic, and also the only species of the genus to occur in Sri Lanka. The type specimen came from Central Province of Sri Lanka. The species is identified by strongly concave, oblong leaves with a nearly percurrent costa.

It is quite encouraging to see large populations of this species in both the wet lower montane rain forest at Taylor's Seat and the dry cliff forest at Hantane Ridge. Additional published localities of this species in Sri Lanka include Matale and Kandy Districts (Magill, 1980).

## FAMILY SEMATOPHYLLACEAE

\* *Acroporium secundum* (Reinw. & Hornsch.) M. Fleisch. – Taylor's Seat, on tree trunk, in mossy lower montane rain forest, 7 May, *Tan 02-123*.

This is a widespread tropical Asiatic species known from southern Japan, China (Taiwan, Hainan), Malesia to Indochina and India. The plants are small, with concave, ovate to ovate-lanceolate leaves, measuring less than 1.25 mm long. In many ways, the species looks like a small version of *Acroporium stramineum* (Reinw. & Hornsch.) M. Fleisch. (Tan & Jia, 1999). The latter species has been reported many times from Sri Lanka (O'Shea, 2002).

\* *Gammiella koningsbergeri* (M. Fleisch.) B.C. Tan & Y. Jia – Taylor's Seat, on tree trunk and branches, in humid mossy lower montane forest, ca. 1000 m, *Tan 02-108*.

With its long creeping stems and somewhat pendent branches, this large species of *Gammiella* looks like a member of Meteoriaceae. The leaves have quadrate to short rectangular, coloured alar cells that have thick walls. These are diagnostic for the genus in the subfamily Heterophyllioideae of Sematophyllaceae. A good illustration of this species, as *Barbella koningsbergeri* M. Fleisch., can be found in Fleischer (1923).

Unlike its other congeners, *Gammiella koningsbergeri* does not produce slender and mat forming branches. Instead, the branches are complanate with pseudo-distichous leaves.

This species has previously been recorded from Java, and there is a doubtful collection from Hainan of China (see Tan & Jia, 1999). Its present discovery in Sri Lanka shows a disjunctive range in tropical Asia, and highlights the Asiatic connection of Sri Lankan flora.

\* *Hageniella micans* (Mitt.) B.C. Tan & Y. Jia – Taylor's Seat, on tree trunk, in lower montane rain forest, *Tan 02-109*.

It was a surprise to collect this species from a mountain in Sri Lanka, which represents a significant southward extension of range in the Indian region. The species is known from North America, Europe, Russian Siberia, China, Himalayas, India, the Philippines and North Borneo (Tan & Jia, 1999). The small plants produce distinct spoon-shaped leaves with a constricted base where the few enlarged and thin-walled alar cells are found.

*Sematophyllum capilliferum* Thwaites & Mitt. – Sinharaja Forest, ca. 460 m, *N. Gunatilleke, s.n.*

*Sematophyllum capilliferum* was first collected in Sri Lanka from an unspecified locality (Mitten, 1873). Notably, after more than a century, the present collection from Sinharaja forest reserve is the second report of this species.

The species is distinctive among its congeners in the region in having narrowly oblong-lanceolate and somewhat concave leaves, 1–2 mm long, including the subulate and sharply pointed leaf apex. The leaf margin is entire except near the apex where it is serrulate. The elongate to linear cells of the leaves are (65–) 77–90 × 3–5  $\mu$ m, with incrassate, sometimes pitted walls. The alar cells are much enlarged, thin-walled and coloured. The perichaetial leaves are small, less than half the length of the vegetative leaves, ovate-lanceolate to lanceolate, acuminate, and serrulate. The short setae are papillose distally. Capsules are ovoid. My examination of the present collection confirms the sexuality to be autoicous.

On the basis of leaf concavity, incrassate leaf cells, and the much enlarged and coloured alar cells, the species is more appropriately placed in *Acroporium* Mitt. But the confirmation will require a revision of the family Sematophyllaceae in Sri Lanka. *Sematophyllum capilliferum* is a Sri Lankan endemic.

\* *Sematophyllum phoeniceum* (Müll. Hal.) M. Fleisch. – Hatane Ridge, on forest floor, semi-shaded, *Tan 02-121*.

This is a widespread species in Asia, especially in the Indian subcontinent. Its morphological differences from the related *S. subhumile* (Müll. Hal.) M. Fleisch. and *S. subpinnatum* (Brid.) Britt. are outlined in Tan & Jia (1999). The species can be identified by its long acuminate and somewhat pointed leaf apex with elongate leaf cells.

*Sematophyllum subpinnatum* (Brid.) Britt. – Taylor's Seat, on tree trunk, ca. 1000 m, in lower montane rain forest, *Tan 02-106*.

*Trichosteleum ruficaule* (Thwaites & Mitt.) B.C. Tan – Sinharaja Forest, ca. 460 m, on *Mesua* tree trunk, 18 Apr. 2002, *N. Gunatilleke, s.n.* (two packets).

This seems to be a common epiphyte in the lowland rain forest in Sinharaja forest reserve. Specimens produce abundant axillary gemmae, a feature uncommon in the genus.

## FAMILY TRACHYPODACEAE

*Trachypus humilis* Lindb. – Taylor's Seat, on tree trunk, in lower montane rain forest, ca. 1000 m, *Tan 02-100*.

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