

Thysananthus ciliaris (Lejeuneaceae, Marchantiophyta): a new record of *Thysananthus* species for Thailand

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Abstract

Thysananthus ciliaris (Sande Lac.) Sukkharak, a rare species from Sumatra and Peninsular Malaysia, was newly discovered in lowland evergreen forest, southern Thailand. A detailed description and illustrations are here provided.

Introduction

Recent molecular analysis results and the lacking of diagnostic morphological features separating *Mastigolejeunea* (Spruce) Steph. from *Thysananthus* Lindenb. have led to the treatment of the former as a subgenus of the latter (Sukkharak and Gradstein 2017). *Thysananthus*, thus, is the second largest genus of Lejeuneaceae subfam. Ptychanthoideae, being inferior to *Lopholejeunea* (Spruce) Steph., with 30 species. The genus is mainly distributed in pantropical area and has only seven species ranging into warm temperate regions. In Thailand, 12 species including *Thysananthus auriculatus* (Wilson & Hook.) Sukkharak & Gradst., *T. comosus* Lindenb., *T. convolutus* Lindenb. var. *convolutus*, *T. fruticosus* (Lindenb. & Gottsche) Schiffn., *T. gottschei* (Jack & Steph.) Steph. var. *gottschei*, *T. humilis* (Gottsche) Sukkharak & Gradst., *T. indicus* (Steph.) Sukkharak & Gradst., *T. ligulatus* (Lehm. & Lindenb.) Sukkharak & Gradst., *T. repletus* (Taylor) Sukkharak & Gradst., *T. retusus* (Reinw. *et al.*) B.M.Thiers & Gradst. subsp. *retusus*, *T. spathulistipus* (Reinw. *et al.*) Lindenb., and *T. virens* Ångström have been reported (Lai *et al.* 2008, Sukkharak and Gradstein 2014, Sukkharak 2015). During our field trip to Songkhla province in the southern part of Thailand, a new record of *Thysananthus* species of Thailand, *T. ciliaris* (Sande Lac.) Sukkharak, was discovered.

Thysananthus ciliaris, a rare species of Peninsular Malaysia and Sumatra of Indonesia, is characterized by enlarged and thin-walled dorsal epidermal cells, elongate lobule teeth (4–6 cells long), and toothed female involucre and perianths. In the past, *T. ciliaris* was treated as a synonym of *Schiffneriolejeunea pulopenagensis* (Gottsche) Gradst. by Thiers and Gradstein (1989) and has been assigned to four different genera as summarized by Sukkharak (2015). In addition, the material of *T. ciliaris* was erroneously included under *T. comosus* in the molecular phylogenetic analysis of Lejeuneaceae by Wilson *et al.* (2007). The more recent molecular analysis of *Thysananthus* and a world-wide revision of the genus (Sukkharak *et al.* 2011, Sukkharak 2015) showed that *T. ciliaris* is a distinct species of *Thysananthus*. This is further supported by an additional molecular analysis indicating that *T. ciliaris* is a member of *Thysananthus* subsect. *Anguiformes* and strengthening the importance of

morphological characters in the taxonomy and evolution of *Thysananthus* and *Mastigolejeunea* (Sukkharak and Gradstein 2017). Based on the monograph of *Thysananthus* (Sukkharak 2015), *T. ciliaris* is a rare species and was reported only from Malaysia and Indonesia. In this paper, a new report of *T. ciliaris* from Thailand is presented.

Taxonomic discussion

Thysananthus ciliaris (Sande Lac.) Sukkharak in Sukkharak & Gradstein, *Nova Hedwigia* 99: 339 (2014).

Phragmicoma ciliaris Sande Lac., *Annales Musei Botanici Lugduno-Batavi* 1: 307 (1864).

Lopholejeunea ciliaris (Sande Lac.) Schiffn., *Conspectus Hepaticarum Archipelagi Indici* 291 (1898).

Ptychocoleus ciliaris (Sande Lac.) Steph., *Species Hepaticarum* 5: 39 (1912).

Mastigolejeunea ciliaris (Sande Lac.) Verd., *Annales Bryologici* 6: 79 (1933).

Type citation: *Banca*, ad truncos arborum cariosos in sylvis vici Baroe prope Batoe-roesak: Kurz.

Type: INDONESIA. Banca, Kurz s.n. (holotype: L!).

Plants blackish to dark brown when dry, turning upwards and becoming ascending to erect, up to 3 cm long, 0.8–1.2 mm wide; irregularly pinnately branched, branching of *Lejeunea*-type. *Stems* rigid; in cross section 130–180 µm in diameter, orbicular-subelliptic, composed of 20–35 epidermal cells surrounding 30–85 medullary cells, dorsal epidermal cells larger and thinner-walled than medullary and ventral epidermal cells; ventral merophyte 8–9 cell rows wide. *Rhizoids* fasciculate at base of underleaves. *Leaves* imbricate, when dry suberect and convolute, when moist strongly convex, apical part turned to the ventral side, recurved; dorsal lobes asymmetrically ovate, 0.6–0.7 × 0.5–0.6 mm, apex apiculate, margin entire, dorsal base auriculate, ventral margin incurved c. 1/2 of leaf length. Lobe cells elongate-hexagonal with acute ends, marginal cells 12–17 × 10–12 µm, median cells 20–25 × 7–12 µm, basal cells 30–37 × 15–22 µm, trigones cordate, often coalesced, intermediate thickenings 0–1(–2) per cell. Vitta and ocelli absent. Oil bodies not seen. *Lobules* rectangular to oblong-rectangular, c. 1/3 as long as lobe length; appendage on surface of lobule base not developed; keel without appendage; free lateral margin plane or incurved; apex oblique with one linear tooth, the tooth consisting of 6–9 cells, being 2–3 cells wide at base and ending in a row of 4–6 cells. *Underleaves* imbricate, slightly squarrose, broadly spatulate, 0.4–0.5 × 0.5–0.6 mm, 3–4 times as wide as stem, apex broadly rounded to truncate, plane, margins entire, bases cuneate, underleaf bases free or adnate with leaves on one side, on left-hand side for right branches and right-hand side for left branches. *Asexual reproductive structures* not seen. *Dioicous*. *Androecia* terminal or intercalary on lateral branches, bracts in 8–14 pairs, bracts hypostatic, 0.4–0.6 × 0.3–0.4 mm, apex acute, margins entire or dentate near the apex; antheridia 2 per bract. *Gynoecia* with 1–2 lejeuneoid innovations forming a dichasial pattern; bract lobe ovate, 0.9–1 × 0.6–0.8 mm, apex apiculate, margins in upper 2/3 with lacinate teeth; lobules broadly ovate, ca 2/3 of lobe length, apex apiculate, margins with lacinate teeth; bracteoles spatulate, 0.9–1 × 0.7–0.8 mm, apex emarginate with lacinate teeth, margins slightly recurved. *Perianths* oblong to oblong-ovate, 0.9–1 × 0.6–0.7 mm, with 3 keels; keels with numerous lacinate teeth. *Sporophytes* not seen. **Fig 1.**

Distribution: Malaysia (Perak), Indonesia (Sumatra), new to Thailand.

Ecology: In Thailand, *Thysananthus ciliaris* was found growing on a tree trunk in lowland dry evergreen forest at altitudes between 140 and 370 m.

Specimens examined: Thailand: Songkhla Province, Ton Nga Chang Wildlife Sanctuary, near Ton Nga Chang waterfall, 06°56'52"N, 100°14'01"E, 140–370 m, 9 Mar 2016, S. He & P. Sukkharak 47401 (Hb. Burapha Univ., MO, PSU).

Notes: The new record in Thailand represents the northernmost locality of *Thysananthus ciliaris* outside its original region in Sumatra and Peninsular Malaysia. The species might easily be overlooked in field by botanical explorations because of its small size. In Thailand it is presently known only from one locality at Ton Nga waterfall, but it might have a wider distribution and may also occur in other areas of southern Thailand. Together with the recent discovery of a new species and new records of bryophytes from southern Thailand (e.g. Chantanaorrapint *et al.* 2014; Inuthai *et al.* 2014, 2015; Lee *et al.* 2014; Pócs and Podani 2015; Promma and Chantanaorrapint 2015; Suwanmala and Chantanaorrapint 2016; Promma *et al.* 2017; Sangrattanaprasert *et al.* 2017; Sukkharak 2018) it is clear that southern Thailand is an important region for bryophyte discovery and that further new species records can be expected from many unexplored areas in this part of the country, especially in the Bantad mountain range.

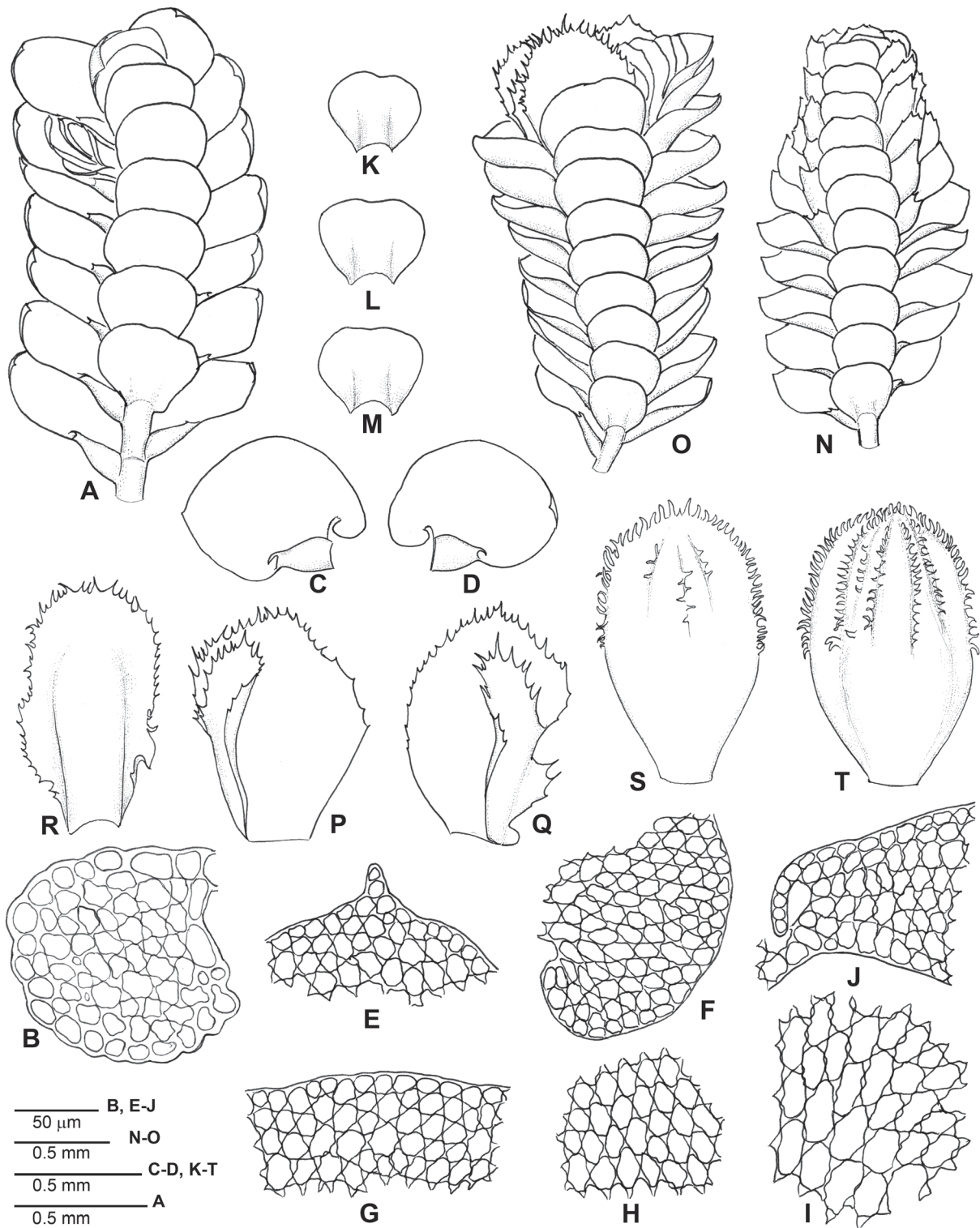


Fig. 1. *Thysananthus ciliaris* (Sande Lac.) Sukkharak. **A.** Vegetative shoot, ventral view. **B.** Cross section of stem. **C–D.** Lateral leaves, ventral view. **E.** Leaf apex. **F.** Auricle of leaf lobe. **G.** Marginal cells of leaf lobe. **H.** Median cells of leaf lobe. **I.** Basal cells of leaf lobe. **J.** Leaf lobule apex. **K–M.** Underleaves. **N.** Androecium, ventral view. **O.** Gynoecium, ventral view. **P–Q.** Female bracts. **R.** Female bracteole. **S.** Perianth, dorsal view. **T.** Perianth, ventral view. [All from *He & Sukkharak 47401* (PSU)].

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