Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 17 (1): 227–231
https://doi.org/10.15560/17.1.227

PENSOFT

Chaetomitrium vrieseanum Bosch & Sande Lac. (Symphyodontaceae), a noteworthy record of a moss from Borneo

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Abstract

Chaetomitrium vrieseanum Bosch & Sande Lac. is reported as new to Borneo based on specimens collected from Maliau Basin Conservation Area in Sabah, East Malaysia. It is the first species of the genus with orbicular branch leaves reported from this island.

Keywords

Malaysian Borneo, Maliau Basin Conservation Area, new record, Sabah

Academic editor: Juçara Bordin | Received 22 September 2020 | Accepted 24 January 2021 | Published 10 February 2021

Citation: Suleiman M, Anwar I (2021) *Chaetomitrium vrieseanum* Bosch & Sande Lac. (Symphyodontaceae), a noteworthy record of a moss from Borneo. Check List 17 (1) 227–231. https://doi.org/10.15560/17.1.227

Introduction

Chaetomitrium Dozy & Molk. is a moss genus of the family Symphyodontaceae with 39 accepted species in the Malesian region (Suleiman and Akiyama 2014). Borneo is one of the centres of diversity of this genus, and 17 species are reported thus far (Akiyama and Suleiman 2001; Suleiman et al. 2006, 2017). Generally, species of this genus have unbordered leaves, toothed margins, short double costae, prorate to spinose leaf cells, large perichaetia, papillose to setulose setae, hispid calyptrae, and long rostrate lids. Members of *Chaetomitrium* can be divided into two groups depending on their branch leaf shape: orbicular to suborbicular and ovate-lanceolate to ovate-oblong. In the Malesian region, only six species of this genus (ca. 15%) have the orbicular leaf type, namely *Chaetomitrium acanthocarpum* Bosch & Sande Lac., *C. brassii* E.B. Bartram, *C. laevisetum* Dixon, *C. robbinsii* E.B. Bartram, *C. roemeri* M. Fleisch., and *C. vrieseanum* Bosch & Sande Lac. Interestingly, all of these species are restricted to New Guinea and Maluku Islands. However, *C. acanthocarpum* was also reported by Ariyanti et al. (2009) from Sulawesi. This paper contributes to the knowledge of the species richness of *Chaetomitrium* in Borneo.

Methods

Chaetomitrium vrieseanum was collected during a study on the moss flora of the Maliau Basin Conservation Area (MBCA), in Sabah, Malaysian Borneo. Fieldwork was carried out in September 2016 and July 2017, with

research and access permission granted from the Maliau Basin Management Committee (ref. YS/MBMC/2 016/217) and the Sabah Forestry Department (ref. JPHTN/TP(FSP) 100-14/18/2/JLD.33(53)). Specimens of mosses were collected from along all existing trails in the southern part of the conservation area. The specimens were processed at the Institute for Tropical Biology and Conservation (ITBC), Universiti Malaysia Sabah, Malaysia. Specimens of *Chaetomitrium* were identified using keys from Akiyama and Suleiman (2001) and Suleiman and Akiyama (2014). Photographs were taken using an Olympus Digital Camera DP72 at the Phytochemistry Laboratory of Forest Research Centre, Sabah Forestry Department, Malaysia. Voucher specimens were deposited at the BORNEENSIS Herbarium (BORH) of ITBC.

The geographic distribution (Fig. 1) of the species was based on Akiyama (1997) and Suleiman and Akiyama (2014), as well as data from Global Biodiversity and Information Facility (GBIF 2020). The map was prepared using QGIS v. 3.8 and Google Earth.

Results

***Chaetomitrium vrieseanum* Bosch & Sande Lac.**
Figures 2, 3

New record. BORNEO • Sabah, Tawau District, Maliau Basin Conservation Area; trail from Ginseng Camp to Maliau Falls; 04°46.2′N, 116°55.1′E; 780 m a.s.l.; 09.VII.2017; A Irmah 114, 117 leg.; growing on lianas, in partially shaded area; BORH 100803, 100806.

Identification. *Chaetomitrium vrieseanum* is a small epiphytic moss. Plants are regularly and densely branched. The stem leaves are erect-spreading, suborbicular, 0.7–1.0 mm long, and 0.6–0.7 mm wide; the apices are obtuse and short-acuminate. The leaf margins are undulate, closely denticulate in upper half, sparsely below, and the teeth are germinate. As in many other species of the genus, the costa of this species is short and faint. The median laminal cells are thick-walled, linear-elongated, 37–62 µm long, 3.0–5.0 µm wide, strongly prorate to the base, and spiculose-prorate above mid-leaf. The branch leaves are squarrose, orbicular, the margin strongly undulate above, and the apices are rounded with sharp apiculus; the lamina cells are as in the stem leaves but shorter at acumen, irregularly oval to short-rhomboidal, 10–15 µm long, and 5–10 µm wide. The inner perichaetial leaves are 2.48 mm × 0.9 mm, plicate, and ovate-lanceolate; the apices are long-acuminate, laciniate below the acumen, margins are strongly spinose-serrate to the base, and teeth are up to 74 µm and geminate. Setae are up to 6 mm long; papillose to the base, and papillae are up to 37 µm. Calyptra are mitriform, 2.48 mm × 0.87 mm, and hispid with long cilia at the base; the cilia are up to 1.35 mm long. Capsules are erect and smooth, 1.9 mm long, and 0.9 mm wide.

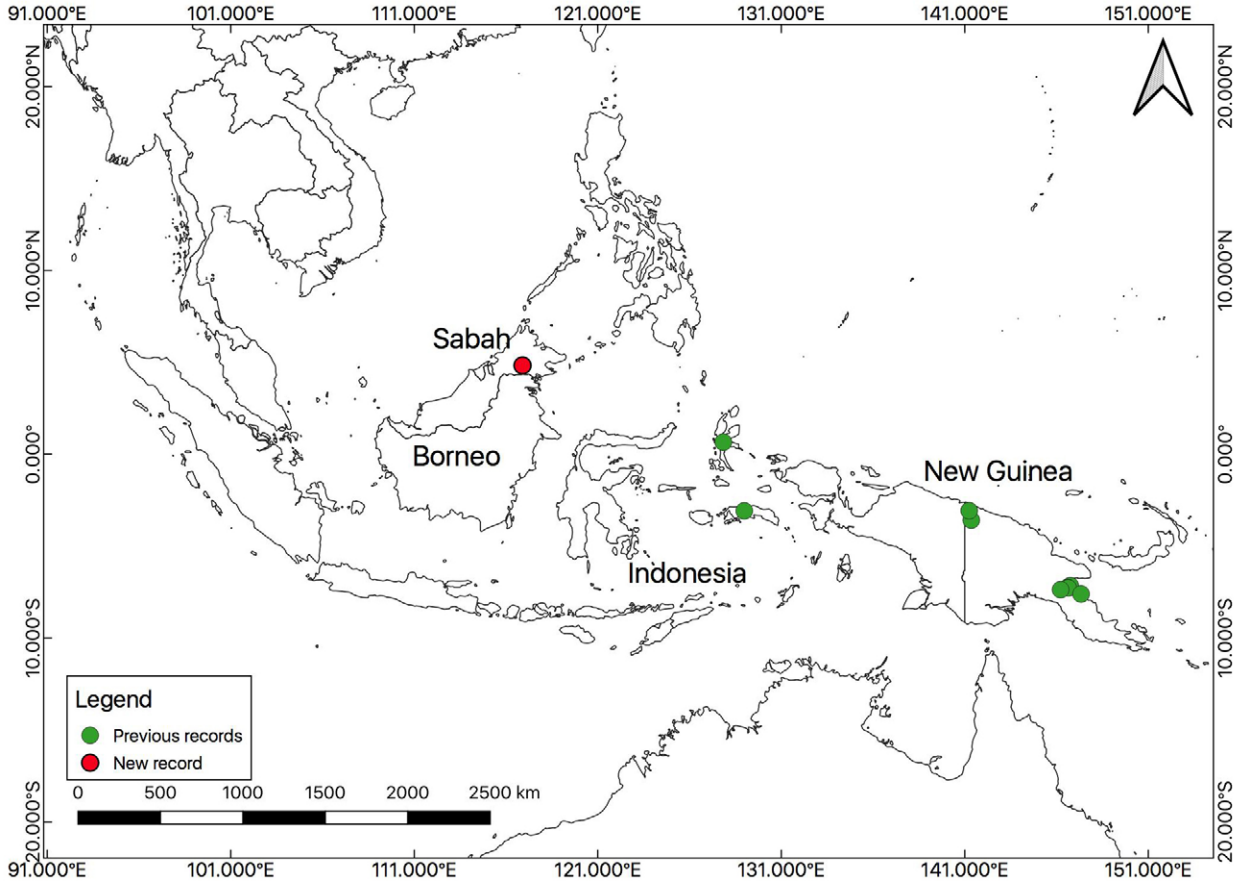

Figure 1. Geographic distribution map of *Chaetomitrium vrieseanum*.

Figure 2. *Chaetomitrium vrieseanum* growing on liana (based on *A. Irmah 114*).

Discussion

This is the first record of an orbicular leaf type of *Chaetomitrium* in Borneo. We collected only two specimens of *C. vrieseanum* during our study, both from the same locality, which suggests that this species is not common in the MBCA. We examined a large number of herbarium specimens collected since 1996 in this conservation area but no specimens from prior collections were found.

Chaetomitrium vrieseanum was previously only recorded in New Guinea and Maluku Islands of Indonesia (Fig. 1). The type specimen was collected from Seram Island, the largest of the Maluku Islands, while two synonyms, *C. papuanum* E.B. Bartram and *C. rigidulum* Broth., were both collected from New Guinea (Akiyama 1997). The presence of *C. vrieseanum* in Borneo extends its geographical distribution to the Malesian region. With this new record, Borneo now has 18 species of *Chaetomitrium* which is approximately 46% of the total number of species reported in this region.

Apart from *C. vrieseanum*, there are six other species of this genus reported in the MBCA (Suleiman and Akiyama 2007; Mohamed et al. 2010). This includes a Bornean endemic species, *Chaetomitrium maryatii* H.Akiy. & M.Suleiman, described from this conservation area (Akiyama and Suleiman 2001). The MBCA contains one of the last remaining pristine forests in Borneo, and about 80% of its core area is yet to be explored botanically due to its inaccessibility. Once dubbed as the "the lost world of Sabah", this basin-like conservation area is likely home to other undescribed species of bryophytes, including *Chaetomitrium*.

Acknowledgements

We thank Maliau Basin Management Committee (MBCA) and Sabah Forestry Department for research access

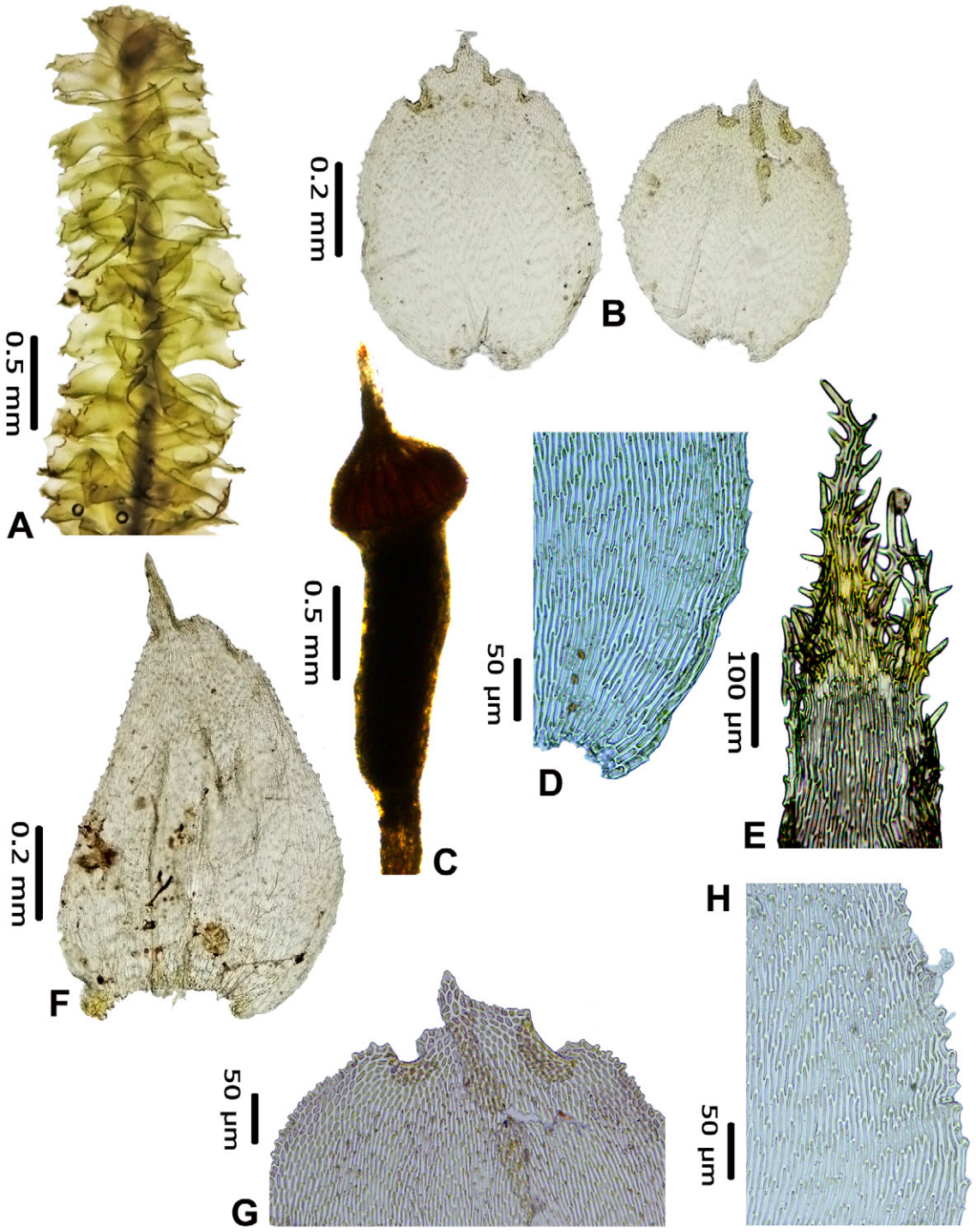

Figure 3. Morphological characters of *Chaetomitrium vrieseanum*. **A.** Plants. **B.** Branch leaves. **C.** Capsule. **D.** Alar region. **E.** Apex of perichaetial leaf. **F.** Stem leaf. **G.** Leaf apex of branch leaves. **H.** Margins of branch leaves. All photographs were based on *A. Irmah 114*.

permission. We appreciate the assistance given by staff of Yayasan Sabah at the MBCA during our fieldwork. We are grateful to Dr. Noreen Majalap for permission to use the microscopy camera at Phytochemistry Laboratory of Forest Research Centre, Sabah Forestry Department. We appreciate the technical assistance from Azrie Alliamat, GIS Laboratory, ITBC. We are also grateful to Noah Charles Mosios for the linguistic revision of the text. We appreciate the anonymous reviewers and the subject editor, Jucara Bordin, for their helpful comments and suggestions to improve the manuscript. This study was funded by Universiti Malaysia Sabah research grant GUG0064-STWN-2/2016.

Authors' Contributions

Both MS and IA collected and identified the specimens. MS photographed the specimens, and while IA illustrated them. Both authors discussed the results and wrote the manuscript.

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