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What is *Clastobryella tenella* M.Fleisch.?

Benito C Tan[1,†] and James R Shevock[2,*]

[1]*University Herbarium, 1001 Valley Life Sciences Building, University of California, Berkeley, California USA 94720 (†deceased December 23, 2016)*
[2]*Department of Botany, California Academy of Sciences, 55 Music Concourse Drive, Golden Gate Park, San Francisco, California USA 94118*
[*]*Author for correspondence:* jshevock@calacademy.org

Abstract

The moss *Clastobryella tenella* M.Fleisch. based on a collection from Java has remained poorly understood since its original description. Microscopic examination of the type material in the Fleischer Herbarium within the Farlow Herbarium of Harvard University, led us to conclude that the exceedingly fragmentary type material best represents juvenile plants of *Gammiella tonkinensis* (Broth. & Par.) B.C.Tan.

Introduction

Among the many species of Sematophyllaceae *sensu lato* described from East and South East Asia, *Clastobryella tenella* is one of the least known taxa. The type consists of very small pieces of Javan moss material that was separated from a mixed Junghuhn collection (see Fleischer 1900–1923). Figure 1 was prepared from the type material.

In Japan, this species was reported first by Iwatsuki and Sharp (1967) from Yakushima Island, and also by Noguchi (1994) from Kyushu. In 2004, Iwatsuki (2004) dismissed all reports of this species from Japan and corrected them to *Gammiella ceylonensis* (Broth.) B.C.Tan & W.R.Buck.

In a recent publication, Suzuki et al. (2014) reinstated the species for the Japanese moss flora based on a molecular study of *rbc*L gene sequences. In the molecular tree topology showing the clade leading to *Gammiella ceylonensis* (see Fig. 1, Suzuki et al. 2014), two specimens code-named *Clastobryella tenella* formed a separate branch with 13 base pair differences out of a total of 1428 bps. This led the authors to accept these two specimens (AB970711 and AB970712) to represent *C. tenella* apart from *G. ceylonensis*.

Unfortunately, neither of the two specimens code-named as *Clastobryella tenella* used in Suzuki et al. (2014)'s study were illustrated to show their diagnostic, taxonomical characters. Instead, other plant collections identified by these authors as *C. tenella* were illustrated in three full photo plates (see Figs 2–4 in Suzuki et al. 2014). Examining the photo plates named *C. tenella* and *Gammiella ceylonensis* (Fig. 5 in Suzuki et al. 2014), we cannot see any significant differences in the morphology of their plants' habit, leaf shape and margin, leaf areolation including the alar cells, and the filamentous propagules, except for a less differentiated alar structure

shown in Fig. 3e (Suzuki et al. 2014), which we interpret as a case of under-development of the alar region. *Gammiella ceylonensis* had been described and illustrated by Tan and Buck (1989) to be a relatively variable species with several synonyms. The variation of leaf morphology including the alar region seen in Asian plant specimens was well illustrated (see Figs. 23–33 in Tan and Buck 1989).

What is critically noticeable in the publication of Suzuki et al. (2014) is that none of the three plates of illustrations of *C. tenella* match the type specimen of this species that we borrowed for a study from the Fleischer Herbarium kept at the Farlow Herbarium of Harvard University (FH). The two type packets of *C. tenella* have the same label information, representing duplicates of the same Junghuhn collection obtained or created by Fleischer. Both type packets contain somewhat complanate plants with lanceolate to narrowly lanceolate leaves that have a gradually acuminate apex, markedly serrulate margin from apex to base, a non-decurrent base and prorulate laminal cells. The leaf alar region consists of few mostly quadrate cells, along with a few short rectangular, thin-walled cells (Fig. 1). Propagules, gametangia and capsules were not observed in the two type packets. In the protologue, Fleischer (1900–1923) reported the plant as dioicous, but described only the perichaetium. On the basis of plant habit and leaf morphology, the type specimens resemble juvenile plants of *Gammiella tonkinensis*. Indeed, the type material of *Clastobryella tenella* matches the illustration of leaves of *G. tonkinensis* published in Mohamed et al. (2004, Figs. 1, a–d), and also that in Suzuki et al. (2013, Fig. 2 as *Aptychella tonkinensis* (Broth. & Paris) Broth.). Like *G. ceylonensis*, *G. tonkinensis* is also a widespread species in East and South East Asia reaching Peninsular Malaysia, the Philippines and Indonesia (Tan and Jia 1999).

In view of very small size of the type material which represents probably juvenile plants that lack sporophytic and sexual/asexual characters to confirm the species identity, it is best to consider the binomial, *Clastobryella tenella*, as a *nomen dubium* or uncertain name, with no further taxonomical consideration.

What should then be the systematic position of the two Japanese specimens (AB970711 and AB970712) reported in Suzuki et al. (2014) that revealed several base pair differences from the representative specimens of *Gammiella ceylonensis*? We suggest that they could be given a new varietal recognition, if differences in morphological characters can be found between them and typical populations of *G. ceylonensis*. The result will preserve the homophyly of the clade defining the species of *G. ceylonensis*. However, studies of more gene sequences, in addition to *rbc*L, should be sought to assess further the biosystematic values of their reported base pair differences.

Incidentally, in their publication Suzuki et al. (2014) mixed up the nomenclatural and taxonomical status of the three genera, namely, *Clastobryopsis* M. Fleisch. (1923:1179), *Aptychella* (Broth.) Herzog (1916:157) and *Gammiella* Broth. (1908:1067). Today, *Clastobryopsis* and *Aptychella* are considered congeneric with strong morphological and molecular evidence (see Akiyama et al. 2015). The differences between the generic concepts of *Aptychella* (syn. *Clastobryopsis*) and *Gammiella* were discussed by Tixier (1977) and Tan and Jia (1999). Accordingly, *Gammiella tonkinensis* should not be placed in the genus *Aptychella*.

Specimens of *Clastobryella tenella* examined: INDONESIA: Java: as *Pylaisia tenella* Wils. and *Stereodon tenuirameum*, leg. *Junghuhn* (Herb. Fleischer), FH (type, two packets 00458088 and 00458089).

Supplemental note: This manuscript was ready to submit shortly before the first author became ill and subsequently hospitalized in September 2016. Benito never recovered. As the second author, the disposition of the manuscript remained unknown while on expedition and it was not until access to computer files in early 2017 determined that this manuscript had not yet been submitted. This is likely the last manuscript Benito had ready for publication before his untimely death.

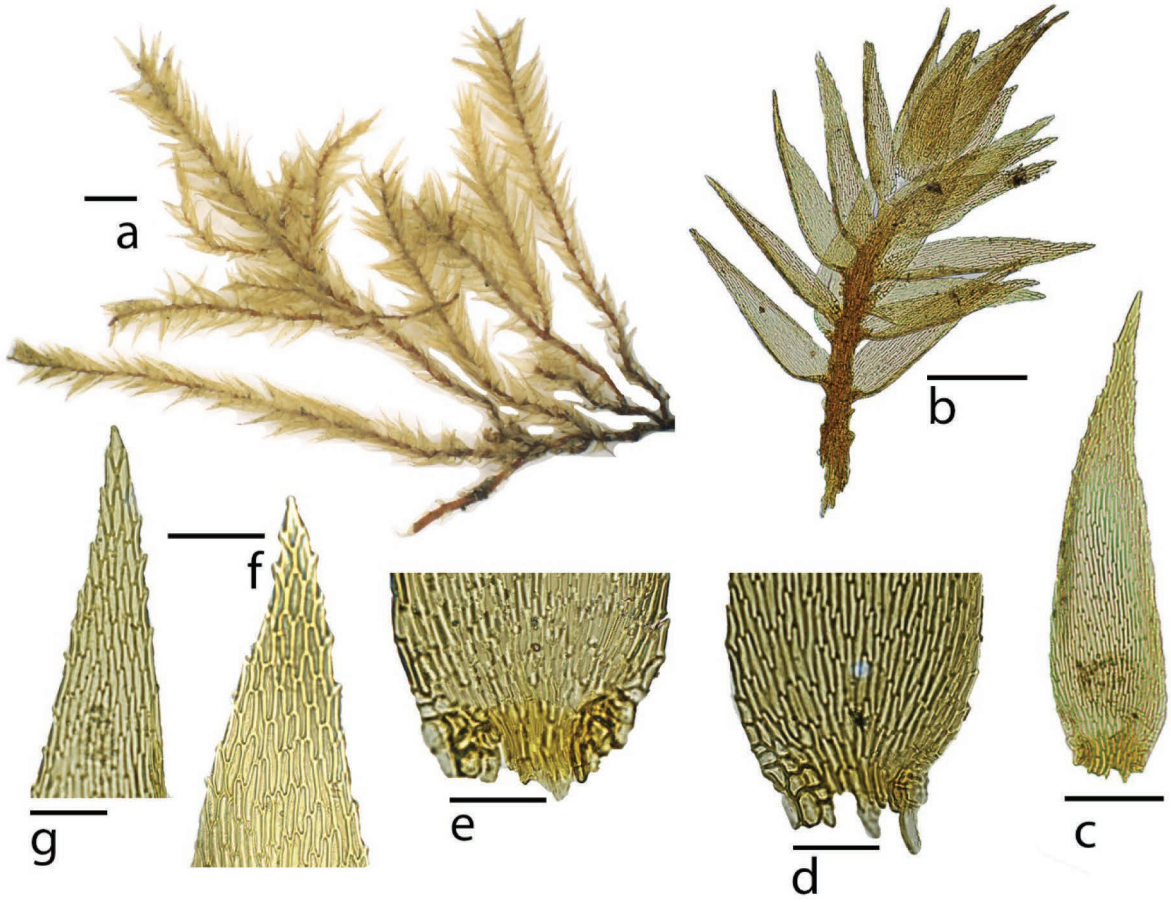

Fig. 1. *Clastobryella tenella*. Type (FH): **A**, plant habit; **B**, leaf arrangement on stem; **C**, mature leaf; **D–E**, alar region; **F**, young leaf apex; **G**, mature leaf apex. Scale bars: **A** = 0.05 mm, **B** = 0.2 mm, **C** = 0.1 mm, **D–G** = 50 µm

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