



<https://doi.org/10.11646/bde.42.1.5>

Bryocrumia vivicolor, new localities in Japan and Taiwan

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Abstract

New localities of *Bryocrumia vivicolor* (Broth. & Dixon) W.R.Buck, a monotypic species, is first reported from Japan and Taiwan. Some old specimens of *B. vivicolor* were discovered at the herbarium of the Hattori Botanical Laboratory (NICH). These old specimens were from 4 regions in Japan, which are Oita, Miyazaki, Wakayama and Hyogo Prefecture, and 2 regions in Taiwan, which are Mt. Anma-shan and Mt. Li.

Keywords: *Bryocrumia*, *Glossadelphus*, Japan, Taiwan, new locality

Introduction

Bartram (1951) described *Glossadelphus andersonii* E.B.Bartram (1951: 81) for an American species, which was considered as a member of *Taxiphyllum* M.Fleisch. (1923: 1434-1435) by Crum (1980). However, Anderson (1980) argued that this species was distinguished by morphological characters, such as broad leaf tips, elliptic or oblong-ovate leaf shape and short leaf cells from *Taxiphyllum* or related genus *Isopterygium* Mitten (1869: 21). Therefore, he suggested the monotypic genus *Bryocrumia* L.E.Anderson (1980: 65-66) for this species. Meanwhile, Dixon (1914) described a new species *Taxithelium vivicolor* Broth. & Dixon (1914: 86-87) from India, which was combined with the genus *Glossadelphus* M.Fleisch. (1923: 1351-1352) by Brotherus (1925). Then, Buck (1987) judged that *Taxithelium vivicolor* (\equiv *G. vivicolor*) was a same species to *B. andersonii*. So that, he treated *B. andersonii* as a synonym of *Bryocrumia vivicolor*. Consequently, the distribution of *B. vivicolor* is known to South India, China, Vietnam, Thailand, North America, Uganda, Zaire, Kenya and Tanzania (Buck 1987; Crum & Anderson 1981; Kis 2002; Ma *et al.* 2016; Printarakul *et al.* 2013; O’Shea & Buck 2001; Redfearn *et al.* 1989, Redfearn *et al.* 1996). Fortunately, we discovered some old specimens at the herbarium of the Hattori Botanical Laboratory (NICH). The present study reports new localities of *B. vivicolor* in Japan and Taiwan.

Material and methods

Old specimens deposited in NICH, and some specimens collected in recent years are deposited in the National Institute of Biological Resources (KB) and Hiroshima University (HIRO). Specimens were examined under microscopes (Olympus BX-51 and Nikon SMZ-1500). Microscopic images were created by IMTcam3 camera (IMT i-Solution Inc.) and DS-Ri1 (Nikon).

Result and Discussion

***Bryocrumia vivicolor* (Broth. & Dixon) W.R.Buck** (Figs. 1–3)

Mem. New York Bot. Gard. 45: 522. 1987.

Basionym: *Taxithelium vivicolor* Broth. & Dixon, Rec. Bot. Surv. India 6: 86. 1914 \equiv *Glossadelphus vivicolor* (Broth. & Dixon) Broth. in Engler & Prantl, Nat. Pflanzenfam. ed. 2, 11: 444. 1925.

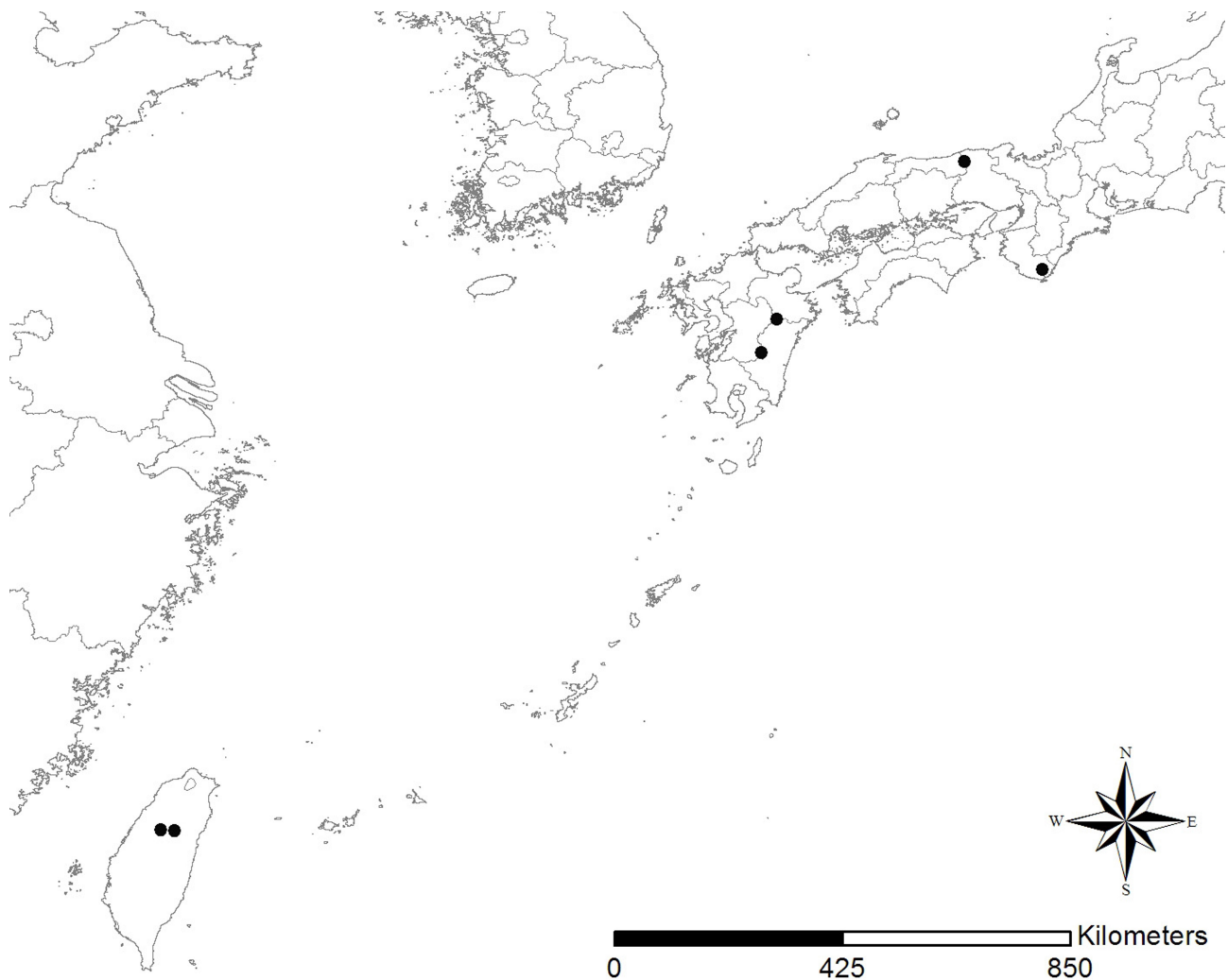


FIGURE 1. New localities of *B. vivicolor* in Japan and Taiwan.

Morphological characteristics

Plants are small, slender, thin, and stems are creeping and irregularly branched (Bartram 1951, Anderson 1980, Crum and Anderson 1981, Buck 2014). Bartram (1951) and Crum (1965) mentioned that the branches were sometimes attenuate at the tips. We could observe this branch feature from the Japanese plants (Fig. 2 B). This species has various leaf forms, and it is well shown on the illustration from Crum and Anderson (1981). The present study also confirmed such as various leaf features (Fig. 3). American plants are known that the costa of leaves is absent. However, Dixon (1914) and Buck (2014) described that this plant has ecostae or short and weak two costa. Old specimens are mostly ecostate, or with very indistinct forked costae. Then, the old specimens collected from Japan and Taiwan were usually misidentified as *Filibryum ogatae* (Broth. & Yasuda 1926: 4) W.Kim & T.Yamag. (2017: 157) (\equiv *Glossadelphus ogatae* Broth. & Yasuda). These species are similar in the feature of leaf alar region cells, which are flat and usually short rectangular or subquadrate. However, *Bryocrumia* differs from *Filibryum* by the leaf form and size of median leaf cells. *Bryocrumia* has round or broadly obtuse leaf apices, and its median leaf cells are 10–30 μm long. However, *F. ogatae* has acute or obtuse leaf apices, and its leaf median cells are 70–85 μm long. Sometimes, this species is also confused as other species of *Phyllocladon* Schimp. (1851: 60–63), such as *P. glossoides* (Bosch & Sande Lac.) P.E.A.S.Câmara (2010: 140) and *P. similans* (Bosch & Sande Lac.) S.He (2012: 59). However, they are different from the basal cell areolation and cells at the leaf apex. *P. glossoides* and *P. similans* have bifid leaf apex cells. Additionally, this species is also resembled to the genus *Homalia* Bridel (1827: 807, 812), especially very similar to *H. pennatula* (Mitt.

ex Dixon 1914: 66) S.He & Enroth (1995: 334) based on the cells at the leaf apex, the leaf arrangement of secondary stems, and cells at the alar region. However, *H. pennatula* differs in the truncate and culti-spathulate leaf shape.

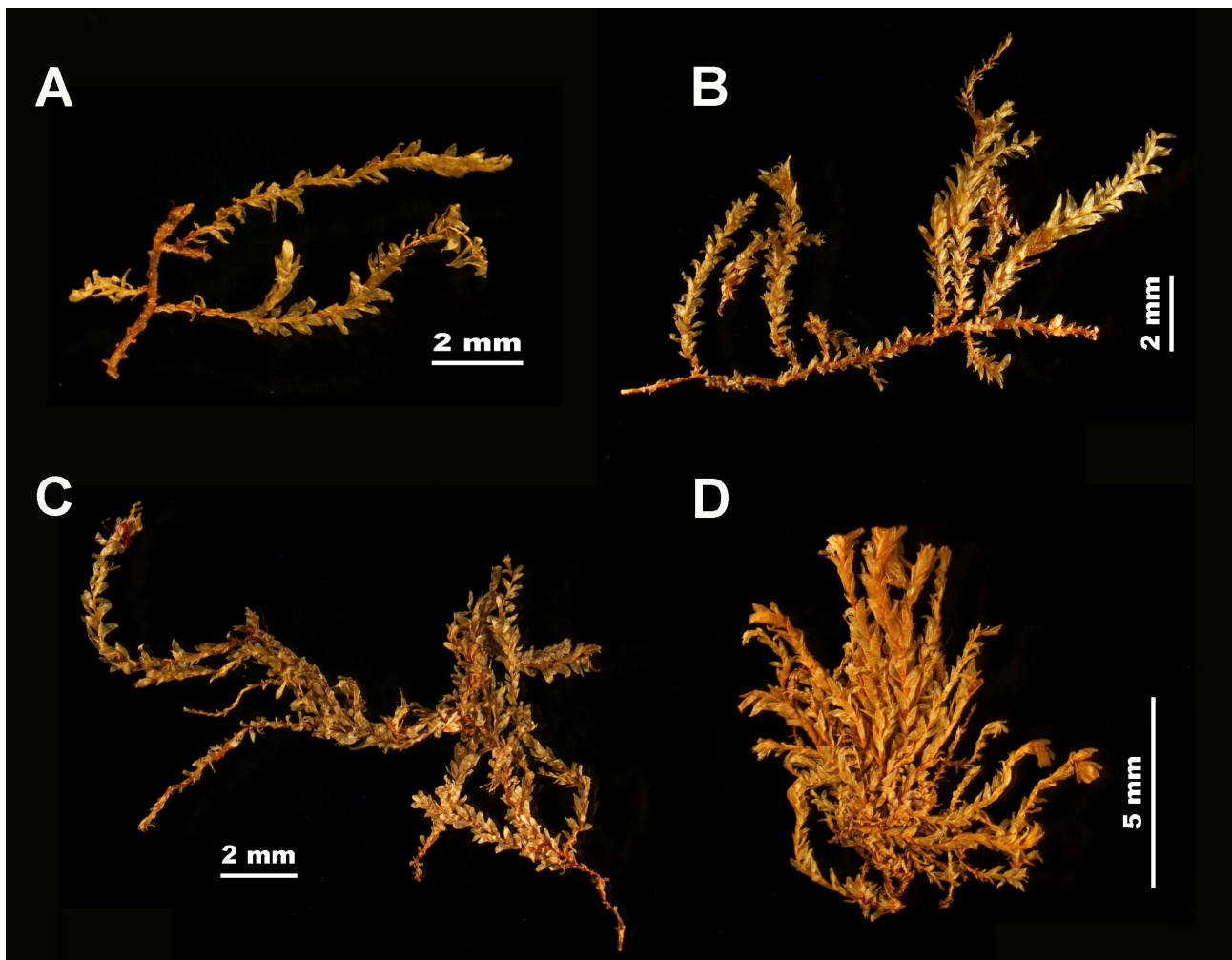


FIGURE 2. Plants of *Bryocrumia vivicolor*. A. Hyogo, Japan (NICH 187582), B. Oita, Japan (NICH 111229), C. Mt. Li, Taiwan (NICH 245211), D. Hsueh Shan, Taiwan (NICH 232064).

Habitat

Labels for Japanese older specimens were well documented about habitat attributes. They were usually reported as growing on wet rocks in or along a stream. In the case of Taiwan's collections which were obtained from Mt. Li and Anma-shan, 1,900–2,100 m above sea level, there is no mention about the environmental conditions on the labels. However, it is possible to assume that the habitat in Taiwan is rather foggy sites, because the Li-shan and Anma-Shan are well known as tea cultivation regions. Consequently, it is considered that *B. vivicolor* usually grows on rocks in aquatic or high humidity environments.

Specimens examined: JAPAN: Oita Pref., Mt. Sobo, ca. 1,200 m alt., on rock submerged in stream, 23 July 1951, *Y.Kuwahara 1237* (NICH 111229); Miyazaki Pref., Kitago-cho, along a stream, Yokotani Valley north of Itaya, ca. 450 m alt., on rock, 16 Nov. 1972, *Z.Iwatsuki & W.B.Schofield 3542* (NICH-135459); Hyogo Pref., Mt. Ogino-sen, ca. 500 m alt., on rock in stream side, 7 Aug. 1964, *T.Kodama 24953* (NICH 187582); Wakayama Pref., Higashimuro-gun, Kozagawa-cho, Komorigawa, ca. 250 m alt., 29 July 1960, *T. Nakazima no.* (NICH 122423). TAIWAN: Hsueh Shan, hardwood forests just below Anma-shan, 2,100 m alt., on rock, 22 March 1965, *Z.Iwatsuki, A.J.Sharp & E.Sharp 3216* (NICH 245211); Mt. Li, Cho-chi Haiong, Hwaiien, 1,900 m alt., on rock in spruce, hemlock, cypress and hardwood mixed forest, 20 July 1962, *C.K.Wang 1827* (NICH 231937), 21 July 1962, *C.K.Wang 1885* (NICH 2452114).

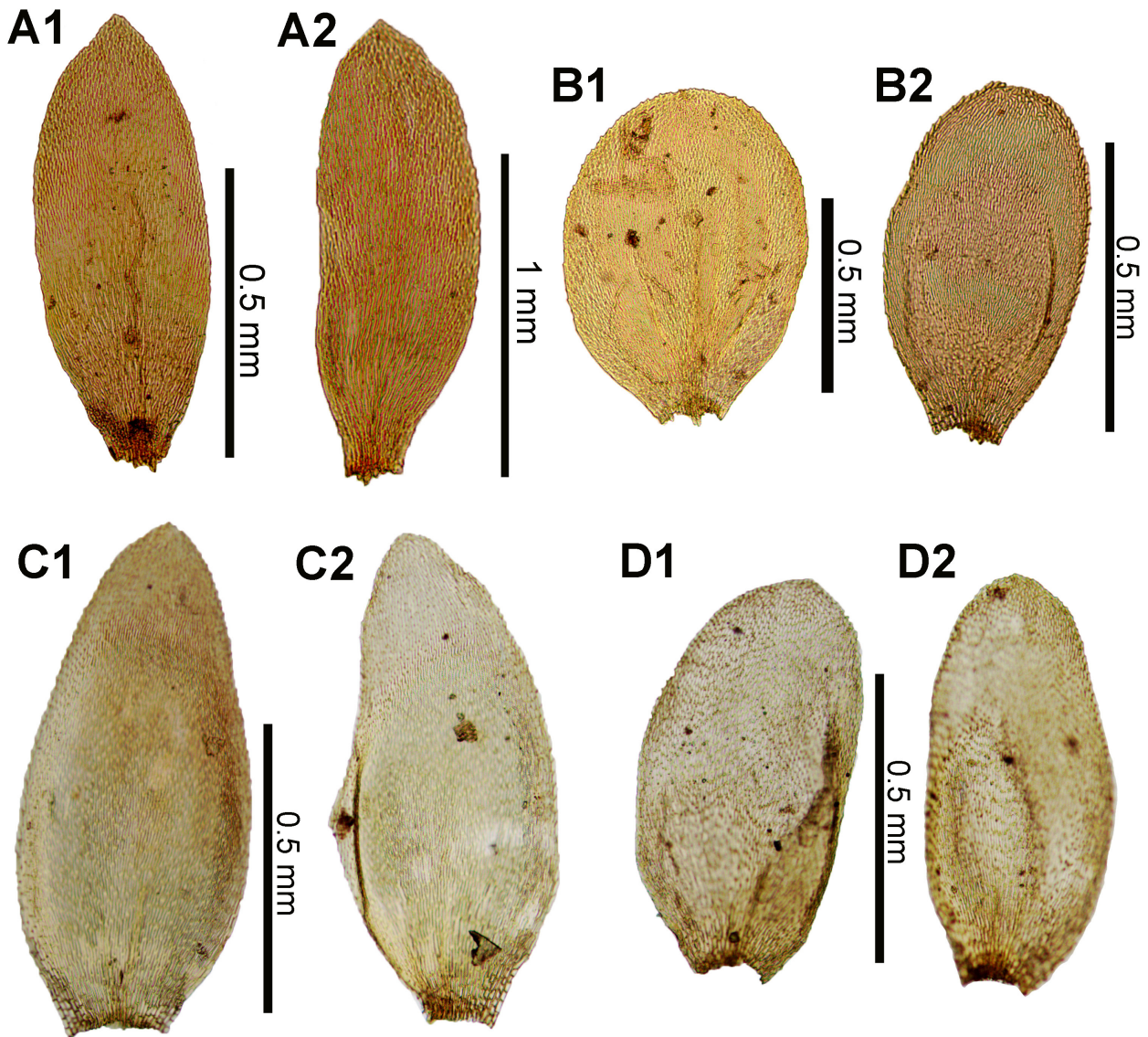


FIGURE 3. Leaf variations of *Bryocrumia vivicolor*. A. Miyazaki, Japan (NICH 135349), B. Hyogo, Japan (NICH 1857582), C. Mt. Li, Taiwan (NICH 231937), D. Hsueh Shan, Taiwan (NICH 245211).

Acknowledgement

We are grateful to the curator of the Hattori Botanical Laboratory (NICH). This work was supported by a grant from the National Institute of Biological Resources (NIBR), funded by the Ministry of Environment (MOE) of the Republic of Korea (NIBR201804102).

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