Bull. Natl. Mus. Nat. Sci., Ser. B, 42(1), pp. 19–23, February 22, 2016

A New Locality of *Fossombronia mylioides* (Fossombroniaceae, Marchantiophyta)

Masanobu Higuchi

Department of Botany, National Museum of Nature and Science,
Amakubo 4–1–1, Tsukuba, Ibaraki 305–0005, Japan
E-mail: higuchi@kahaku.go.jp

(Received 30 November 2015; accepted 22 December 2015)

Abstract A new locality of *Fossombronia mylioides* is reported from Iriomote Island, southwest of Ryukyu Islands, Japan. *Fossombronia mylioides* has been only known from the type locality. Morphological characteristics of the plants from the new locality are compared with those of the former collections. Details of the spore dispersal of the species are described for the first time.

Key words: bryophytes, *Fossombronia mylioides*, Japan, new locality, spore dispersal.

Fossombronia mylioides (Fossombroniaceae, Marchantiophyta) was described by Inoue (1973) based on the specimen collected from Iriomote Island, southwest of Ryukyu Islands, Japan. This species has been known from the type locality along Urauchi River situated in the west of Iriomote Island. The other specimen of this species is a 1998 collection by T. Yamaguchi from the type locality distributed as no. 142 in Fasc. 6 of the exciccatae series "Bryophytes of Asia" edited by H. Deguchi and T. Yamaguchi (HIRO). A new locality of *Fossombronia mylioides* at Nakama River situated in the east of the island was found during performing research of the island in 2011. The plants with mature sporophytes enabled to observe the process of the spore dispersal which has never been known on the species.

Fossombronia mylioides Inoue, Journal of Hattori Botanical Laboratory 37: 296. 1973. (Figs. 1–21)

The following description is based on the plants from Nakama River in 2011.

Plants light green, medium to large for the genus, 4–10 mm long, 2–3 mm wide. Stems dorsally compressed to slightly concave, usually unbranched, rarely dichotomously branched. Leaves imbricate, horizontal to patent-divergent, obliquely inserted, succubous, broadly oblong rectangular to quadrate, 1.4–1.8 mm long × 1.6–2.5 mm wide, plane, but somewhat undulate at the apices, slightly lobed; margins entire or occasionally irregularly angulate. Median leaf cells isodiametric to elongate, thin-walled, without trigones, 60–90 μm long, 30–70 μm wide; marginal cells smaller than the median cells. Rhizoids dense, deep purple, along the ventral surface of the stem. Monoicous, antheridia and archegonia scattered along the dorsal surface of the stem. Archegonia surrounded small scale-like leaves on dorsal surface of the stem at apex. Caulocalices (= pseudoperianths) campanulate, often somewhat flaring at mouth, usually split almost to base on both sides.

Sporophytes matured in spring (March). Setae 2–3 mm long. Capsules spherical, deep brown, dehisce irregularly when matured. Spores spherical, 30–46 μm in diameter; distal surface subcristate to irregularly lamellate; proximal surface irregularly lamellate. Elaters 90–160 μm long, rarely branched, with 2 spiral thickening bands.

Figs. 1–4. Habitats of *Fossombronia mylioides* Inoue. 1, 2. Plants are growing on boulder covered with sandy soil on the riverside. 3, 4. Plants are associated with *Riccardia* sp. Photo by M. Higuchi on March 11, 2011.

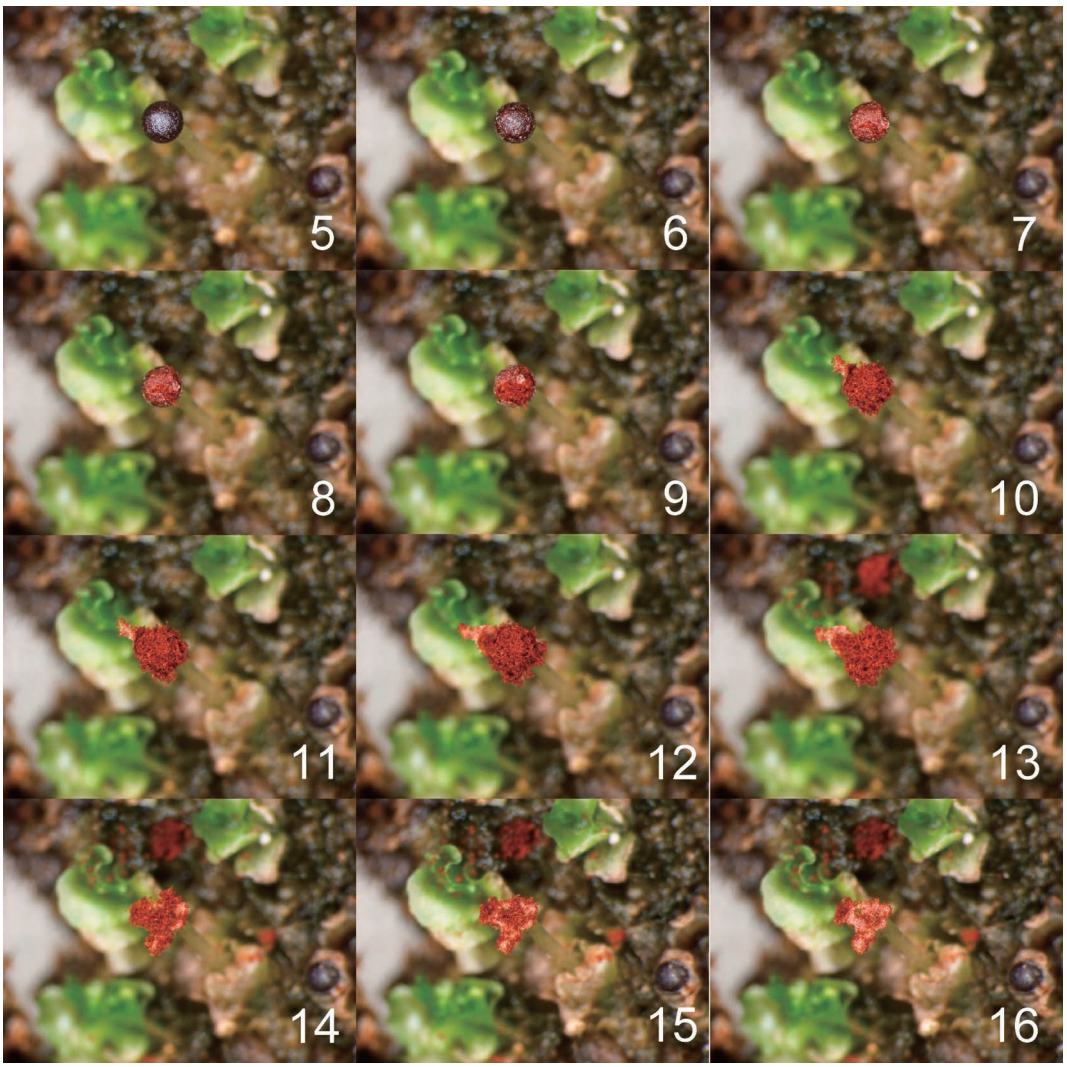
Specimens examined. Japan. Ryukyu Islands, Iriomote Island, Okinawa Pref., Yaeyama-gun, Taketomi-cho, upper stream of Nakama River, southeast of Island, south of Mt. Gozadake, 24°17′47N, 123°49′43E, 30 m alt., March 11, 2011, coll. *M. Higuchi 53855, 53856* (TNS); Urauchi River, January 14, 1973, coll. *H. Inoue 21055* (type in TNS); March 18, 1998, coll. T. Yamaguchi, no. 142 in Fasc. 6 of the exciccatae series "Bryophytes of Asia" (TNS).

Distribution. Endemic to Japan (Iriomote Island).

As the epithet "*mylioides*" indicates, *Fossombronia mylioides* is much like the species of *Mylia* or *Jungermannia* in appearance (Fig. 4). Four species of *Fossombronia*, *F. alaskana*, *F. japonica*, *F. mylioides* and *F. pusilla*, are distributed in Japan (Krayesky *et al.*, 2005; Katagiri and Furuki, 2012). *F. mylioides* is distinguished from other species of *Fossombronia* by having leaves horizontal to patent-divergent and usually undulate with entire margins (Fig. 17), spores with distal surface subcristate to irregularly lamellate (Fig. 19), elaters with 2 spiral thickenings (Fig. 20) and monoicous sexuality.

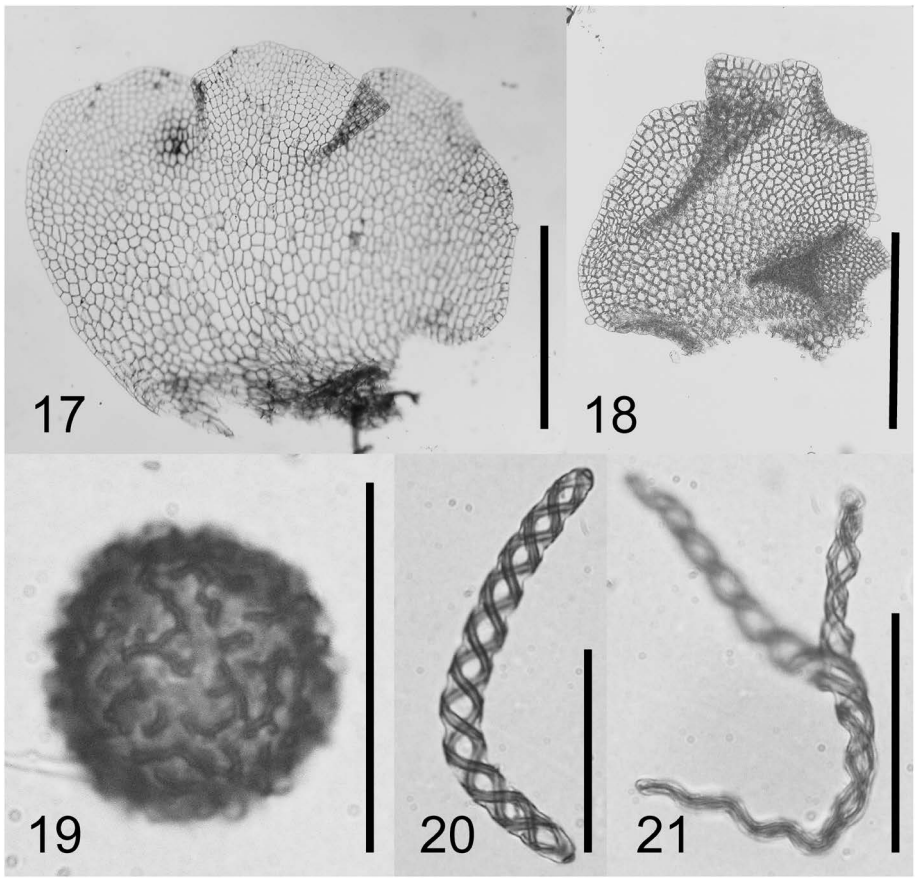
Inoue (1973) described the habitat of *F. mylioides*, "*F. mylioides* always occurs on moist rocks or stones in river-beds; occasionally it may be submerged during high water." The habitat of the new locality is similar to that of the type locality. It grows on open boulder covered with sandy soil on the riverside, mixed with *Riccardia* sp., where flooding may occur (Figs. 1, 2). In addition, the plants are tightly attached to substrate by rhizoids.

Krayesky *et al.* (2005) pointed out that the sporophytes mature in March based on Yama-



Figs. 5–16. Spore dispersal of *Fossombronia mylioides* Inoue. 5. Capsule with moist capsule wall. 6. Capsule with dry capsule wall. 7–9. Capsule dehisces irregularly. 10–16. Spores and elaters are released. A fallen spores and elaters is seen in Figs. 13–16.

guchi collection collected on March 18, 1998, although Inoue (1973) stated that in February. The plants at Nakama River have not only immature sporophytes but also matured ones, which supports that the sporophytes of *F. mylioides* mature in March. The spore size of 23–32 μm in diameter by Inoue (1973) is rather smaller than 30–46 μm in the present study. Krayesky *et al.* (2005) reported the spore size of 36–42 μm in diameter based on Yamaguchi collection, and suggested that the capsules of the type collection were still not totally mature. Although Krayesky *et al.* (2005) noted "Inoue (1973: 296) described spores as having "very distinct reticulations," which is what he perceived viewing the still immature spores with an optical microscope," Inoue (1973) did not describe spores as having very distinct reticulations. In the original description, Inoue (1973) described "spores 23–32 μm in diam., often with narrow wing, with rather indistinct reticulation." Probably Krayesky *et al.* (2005) misunderstood with the description of *F.*



Figs. 17–21. *Fossombronia mylioides* Inoue (*Higuchi 53855*). 17. Leaf. Scale bar = 1 mm. 18. Scale-like leaf surrounding archegonia on dorsal stem at apex. Scale bar = 0.5 mm. 19. Spore. Scale bar = 50 μm. 20, 21. Elaters. Scale bar = 50 μm.

foveolata Lindb. in Inoue (1973) such as "However, in *F. foveolata* Lindb. the spores are large (35–50 μm in diam.), with very distinct reticulations." The leaf size and cell size of the plants from Nakama River are a little larger than those of the type collection and Yamaguchi collection and the shape of the caulocalyx is somewhat different among them, which may be included in the variation. Inoue (1973) and Krayesky *et al.* (2005) described that this species has small and triangular perigonial leaves, which were not observed on the plants from Nakama River, that is, antheridia are naked and scattered along the dorsal surface of the stem.

One of the diagnostic characters of *Fossombronia* is the way of the spore dispersal, that is, the capsules dehisce irregularly when they release spores. The details of the spore dispersal, however, have never known in *F. mylioides*. I observed the process of the spore dispersal in the laboratory in April 4, 2011 (Figs. 5–16). After the matured capsules dry, they dehisce irregularly from apex downwards (Figs. 5–7). The capsules lack vertical lines of dehiscence. The capsule walls break into irregular fragments by irregular splitting (Figs. 8–12). Spores and elaters are released with a tendency to fall as a group (Figs. 13–16). In this case, it took about 22 minutes until the spore dispersal ends (Fig. 16) after the capsule begins to dehisce (Fig. 7).

Acknowledgments

I wish to express my sincere thanks to Dr. T. Yamaguchi of Hiroshima University for his kind help in the field research in 2011.

References

Inoue, H. 1973. The genus *Fossombronia* Raddi in Japan. Journal of Hattori Botanical Laboratory 37: 293–297.

Katagiri, T. and Furuki, T. 2012. Checklist of Japanese liverworts and hornworts, 2012. Bryological Research 10: 193–210 (in Japanese).

Krayesky, D. M., Crandall-Stotler, B. and Stotler, R. E. 2005. A revision of the genus *Fossombronia* Raddi in East Asia and Oceania. Journal of Hattori Botanical Laboratory 98: 1–45.