Collecting bryophytes in Taiwan

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During two international museum conferences at the National Taiwan Museum one of the authors (GW) had the chance to visit Yangmingshan National Park (2008) and Dasyueshan National Forest Recreational Area (2015). He was so fascinated by the bryophyte flora that the desire arose to come back for detailed investigations.

Finally October 2016 the two authors, bryologists from Germany, had the unique chance to visit Taiwan. They were invited and sponsored by the generosity of the Director of the National Taiwan Museum in Taipei (Chi-Ming Chen) to do research at different locations for two weeks, and one of them (ASV) could add another week on invitation by the Taiwan Endemic Species Research Institute in Jiji [see separate report].

Although there was heavy rain during the first two weeks, the field work in Xitou Forest Recreational Area, Dasyueshan National Forest Recreational Area, Manyueyuan National Forest Recreation Area, Yangmingshan National Park and around Taipei was a great success. About 510 specimens were collected. Only epiphyllous liverworts may be underrepresented due to these wet collecting conditions.

The two week trip was perfectly organized by Liang-Chi Wang, Yu-Chwen Hsu and Chao-Ling Kuo, who made all reservations for the accommodations, transpotation to the different locations, organized all permits and cordially looked after us throughout the entire stay. Furthermore, Kan-Yu Fan joined our trip, an excellent photographer who made pictures of most samples collected in situ.

Fig. 1. *Conocephalum conicum* (Photo: Kan-Yu Fan)

Fig. 2. Left: Alfons Schäfer-Verwimp at Xitou (Photo: G. Winter)
Right: *Leptolejeunea apiculata* (Photo: Kan-Yu Fan)

Schäfer-Verwimp focused mainly on liverworts, especially Lejeuneaceae, however, without neglecting mosses. Representatives of most genera of Lejeuneaceae known from Taiwan were collected, including *Acrolejeunea*, *Cheilolejeunea, Cololejeunea, Drepanolejeunea, Lejeunea, Microlejeunea, Leptolejeunea, Lopholejeunea, Nipponolejeunea*, and *Spruceanthus*. Although a very high number of bryophytes, about 900 taxa of mosses (Redfearn *et al*. 1996; Chiang *et al*. 2001) and 531 taxa of liverworts and hornworts (Wang *et al*. 2011) are known from Taiwan, a few species new to Taiwan came to light which will be published elsewhere.

Fig. 3. *Drepanolejeunea foliicola* (Photo: Kan-Yu Fan)

Fig. 4. Left: *Frullania moniliata* from Dasyueshan (Photo: G. Winter)
Right: Yu-Chwen Hsu & Gerhard Winter at the National Taiwan University, Taipei (Photo: A. Schäfer-Verwimp)

Winter was mostly interested in genus *Frullania*. Among the 510 specimens collected during the first two weeks, about 120 belong to the genus *Frullania*. From the known species of Taiwan (49 species in checklist, Wang, Lai & Zhu 2011) about 28 % could be identified: *Frullania acutiloba, F. caduca, F. densiloba, F. ericoides, F. hypoleuca, F. inouei, F. kagoshimensis, F. meyeniana, F. moniliata, F. motoyana, F. nepalensis, F. parvistipula, F. schensiana* and F. *yuennanensis*. A great help for the identification were the illustrations and the key in the excellent "The Liverwort flora of Taiwan" published by Shan-Hsiung Lin in 2000.

Twenty specimens are still under review and some collections may represent species new to Taiwan. Definitely there are specimens belonging to two new species of *Frullania* which will be published elsewhere.

During our stay we had the opportunity to use the laboratories at the Taiwan National Museum to observe and record the number, color and size oil bodies which dissolve soon after specimens are dried and they are important for the determination of some liverwort species.

Fig. 5. At the laboratory of National Taiwan Museum
From left: Kan-Yu Fan, Gerhard Winter, Yu-Chwen Hsu, (Photo: A. Schäfer-Verwimp)

During our stay we had also the chance to visit the Taiwan Endemic Species Research Institute on invitation of Jia-Dong Yang, now director of TESRI.

Fig. 6. From left: 1 Chao-Ling Kuo, 2 Ka-Po Cheng, 3 Kuei-Chu Chen, 4 Gerhard Winter, 5 Jia-Dong Yang, 6 Alfons Schäfer-Verwimp, 7 Kuei-Yu Yao, 8 Yu-Chwen Hsu, 9 Liang-Chi Wang at TESRI. (Photo: Kan-Yu Fan)

Meanwhile most of the specimens were identified and duplicates of these sent to the herbaria of the National Taiwan Museum (hb TAIM) and the Taiwan Endemic Species Research Institute (hb TAIE). Still there are some specimens under discussion and require further research.
Since all of the collections were obtained by the appropriate permits, as applicable, the specimens can now be used for genetic research under the Nagoya protocol.
This was the first collecting trip of both authors to learn about the bryophyte flora of Taiwan and maybe there is a chance to come back and continue research in cooperation with both institutions in the future.

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臺灣苔蘚採集紀要

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