

Epiphyllous liverworts (Marchantiophyta) from Batanta Island (Indonesia, West Papua) II

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ABSTRACT: The collection of epiphyllous liverworts was continued in 2020 at the low elevations of Batanta Island in the tropical rainforest belt by the entomologist Tibor Kovács and his colleagues, which were identified by Tamás Pócs. The collection resulted in 21 species of which 7 proved to be new to Batanta Island: *Cheilolejeunea intertexta*, *Cololejeunea amphibola*, *C. falcata*, *C. papillosa*, *Colura ari*, *C. tenuicornis* and *Lejeunea exilis*, along the species already known from the previous collections. One previous identification was corrected. The results of 4 years collecting activity resulting in 35 species known from Batanta Island is summarised.

Introduction

Our previous findings proved to be useful (Pócs & Kovács 2019). We had got an opportunity again to get to Batanta Island in 2020, we were able to continue collecting epiphyllous liverworts.

Material and methods

The collecting method was the same in Pócs & Kovács (2019). The material collected by Tibor Kovács with his colleagues and identified by Tamás Pócs are deposited in the Herbarium of Botany Department at Eszterházy Károly University in Eger (EGR).

The localities where all epiphyllous specimens were collected

The localities were similar to the previous collecting sites (Pócs & Kovács 2019) with the exception of localities 2020-9.b and 2020-12. Here we summarise all of them:

2017-6 (27.02.2017), **2019-9** (09.02.2019) and **2020-5**: Batanta Island, valley of Warmon Stream, between the lower and upper waterfall, S00°50'04.50", E130°42'54.01" and S00°50'23.25", E130°42'35.18", 12.02.2020, T. Kovács, R. Horváth, P. Juhász, E. Kondorosi.

2017-14 (27.02.2017), **2019-12** (12.02.2019) and **2020-10**: Batanta Island, valley of Tanjung Lampu River, between S00°54'18.6–24.3", E130°36'48.6" and S00°53'43.0", E130°36'38.5", 18.02.2020, T. Kovács, R. Horváth, P. Juhász, K. Sauyai, R. Sauyai.

2018-10: Batanta Island, Wailebet, stream, S00°52'47.10", E130°40'08.57", 20.02.2018, T. Kovács, R. Horváth, P. Juhász, K. Sauyai, R. Sauyai.

2019-14 (14.02.2019) and **2020-11**: Batanta Island, valley of Kalijakut River, between S00°54'20.59", E130°38'31.7" and S00°52'49.10", E130°38'4.9", 19.02.2020, T. Kovács, R. Horváth, P. Juhász, K. Sauyai, R. Sauyai.

2019-18 (17.02.2019) and **2020-3**: Batanta Island, valley of Waibin River, between S00°49'20.8", 130°45'56.9" and S00°50'01.9", E130°45'24.8", 10.02.2020, T. Kovács, R. Horváth, P. Juhász.

2019-21: Batanta Island, valley of Warai Stream, between S00°50'25.19", E130°34'59.19" and S00°50'59.3", E130°35'18.0", 22.02.2019, T. Kovács, R. Horváth, P. Juhász, E. Kondorosy.

2020-12: Batanta Island, valley of Warai Stream, between S00°50'51.0", E130°35'14.0" and S00°51'11.6", E130°35'20.0", the upper part along Warai Stream, above of the previous **2019-21**, 22.02.2020, T. Kovács, R. Horváth, P. Juhász.

2020-9.b: Batanta Island, valley of Wailebet Stream, between S00°53'37.74", E130°39'16.32" and S00°53'07.1", E130°38'59.5", 17.02.2020, T. Kovács, R. Horváth, P. Juhász, K. Sauyai, R. Sauyai.

Enumeration of the epiphylls collected in 2020 on Batanta Island

After the name of each taxon the number of collecting site, its New Guinean and finally its worldwide distribution is mentioned. These are followed by the distinguishing characters of the species. From the recently collected 21 species 7 were not known before on Batanta Island. These are marked with an asterisk. The other species were annotated in Pócs & Kovács (2019). One misidentification from the last collection is corrected. We mention synonyms only, which are widely used in Asian literature.

Caudalejeunea recurvistipula (Gottsche) Schiffn. – 2020-3, 2020-5, 2020-9.b, 2020-11, 2020-12.

**Cheilejeunea intertexta* (Lindenb.) Steph. (Figs. 3–4) – 2020-5.

A Pantropical species not known from the Indonesian part, only from Papua New Guinea (Pócs et al. 2019). It is an autoicous species with oblong oval leaves with slightly arched keel, short lobules and evenly thin cell walls with small trigones.

**Cololejeunea amphibola* B.M.Thiers (Figs 7–8) – 2020-5.

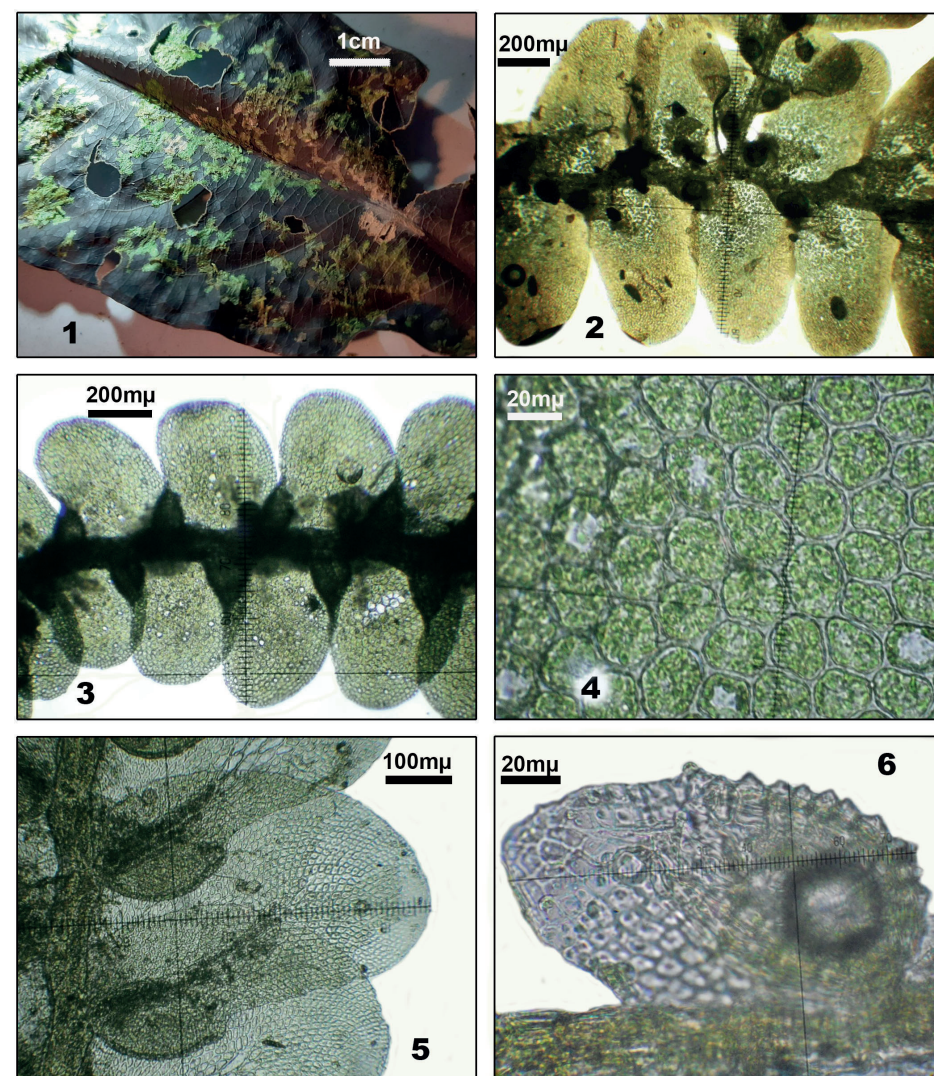
In New Guinea known only in its eastern part. A Malesian-Pacific species known from Sarawak, Sulawesi, Papua New Guinea, Australia and Fiji Islands (Pócs & Phippo 1999, Pócs et al. 2011). A tiny species of subgen. *Diaphanae* with very large, inflated lobule and acute, incurved lobe apex.

Cololejeunea equialbi Tixier – 2020-5, 2020-12.

**Cololejeunea falcata* (Horik.) Benedix (Fig. 5) – 2020-12.

A widespread, but uncommon Palaeotropic species known from Madagascar, Sri Lanka, S-China, S-Japan, Thailand, Vietnam, Cambodia, Malaysia, Borneo, Philippines, New Guinea, Australia, New Caledonia, Fiji and Mariana Islands (Thiers 1988, Zhu & So 2001, Pócs et al. 2011). A small species of subgenus *Taeniolejeunea* with falcate leaves possessing a short vitta.

Cololejeunea floccosa (Lehm. & Lindenb.) Schiffn. var. *aurita* Benedix – 2020-12.



Figs 1–2. *Radula protensa* Lindenb. 1 = coverage on a leaf; 2 = habit, ventral view **Figs 3–4.** *Cheilejeunea intertexta* (Lindenb.) Steph. 3 = habit, ventral view; 4 = lobe median cells **Fig. 5.** *Cololejeunea falcata* (Horik.) Benedix. leaf, ventral view. **Fig. 6.** *Cololejeunea papillosa* (K.I.Goebel) Mizut. leaf, ventral view

Cololejeunea hirta (Steph.) Benedix – 2017-6, 2019-14, 2020-3, 2020-5.

It was published in our previous paper (Pócs & Kovács 2019: p. 9, 10, Figs 12–13) as *Cololejeunea haskarliana* (Lehm. & Lindenb.) Schiffn. by mistake. Now, having adequate material, it turned out to be *Cololejeunea hirta*, a species widespread in tropical Asia and Melanesia to the Solomon Islands including western and Papua New Guinea. It differs from *C. haskarliana* by its shorter and more sparse dentition of the lobe margin.

Cololejeunea lanciloba Steph. – 2020-5.

**Cololejeunea papillosa* (K.I.Goebel) Mizut. (Fig. 6) – 2020-12.

Syn.: *Aphanolejeunea borneensis* (Herzog) Pócs.

An amphipacific species known in Papua New Guinea, Sarawak and in tropical America (GRADSTEIN 2020). Member of subgenus *Aphanolejeunea*, having urn shaped and reduced leaves. The fully developed leaves are papillose with lobule almost equal to the lobe, with a straight or falcate lobule tooth.

**Colura ari* Steph. (Fig. 9) – 2020-3, 2020-12.

A species widespread in the Indomalayan-Pacific region from Sri Lanka, including both parts of New Guinea, to Fiji and Samoa (Pócs 2013). It is distinguished from the other members of section *Harmophyllum* by its small, laterally recurved, triangular lobular sac.

Colura conica (Sande Lac.) K.I.Goebel – 2020-12.

Colura imperfecta Steph. (Figs 10–11) – 2020-3.

**Colura tenuicornis* (A.Evans) Steph. (Fig. 12) – 2020-3.

Widespread Pantropical species known also from Papua New Guinea from several localities (Pócs 2013). Member of section *Colura* with two triangular cells at the base of valve. It is easy to distinguish from other members by its very prolonged, acute lanceolate lobule sac equalling or exceeding the lobe length.

Drepanolejeunea levicornua Steph. – 2020-12.

Drepanolejeunea longicuris (Steph.) Grolle & R.L. Zhu – 2020-11.

Drepanolejeunea pentadactyla (Mont.) Steph. – 2020-12.

Lejeunea adpressa Nees – 2020-5, 2020-12.

**Lejeunea exilis* (Reinw., Blume et Nees) Grolle var. *exilis* – 2020-12.

Palaeotropical species. known from Madagascar and Réunion throughout tropical Asia (including New Guinea, Pócs et al. 1994) and Australasia to the Society islands (Pócs et al. 2011, LEE 2013). It seems to be rare but surely overlooked due to its very small size. Easy to recognise it from the very distant, small leaves, often producing ribbon-like gemmae and the minute, often unilobed underleaves.

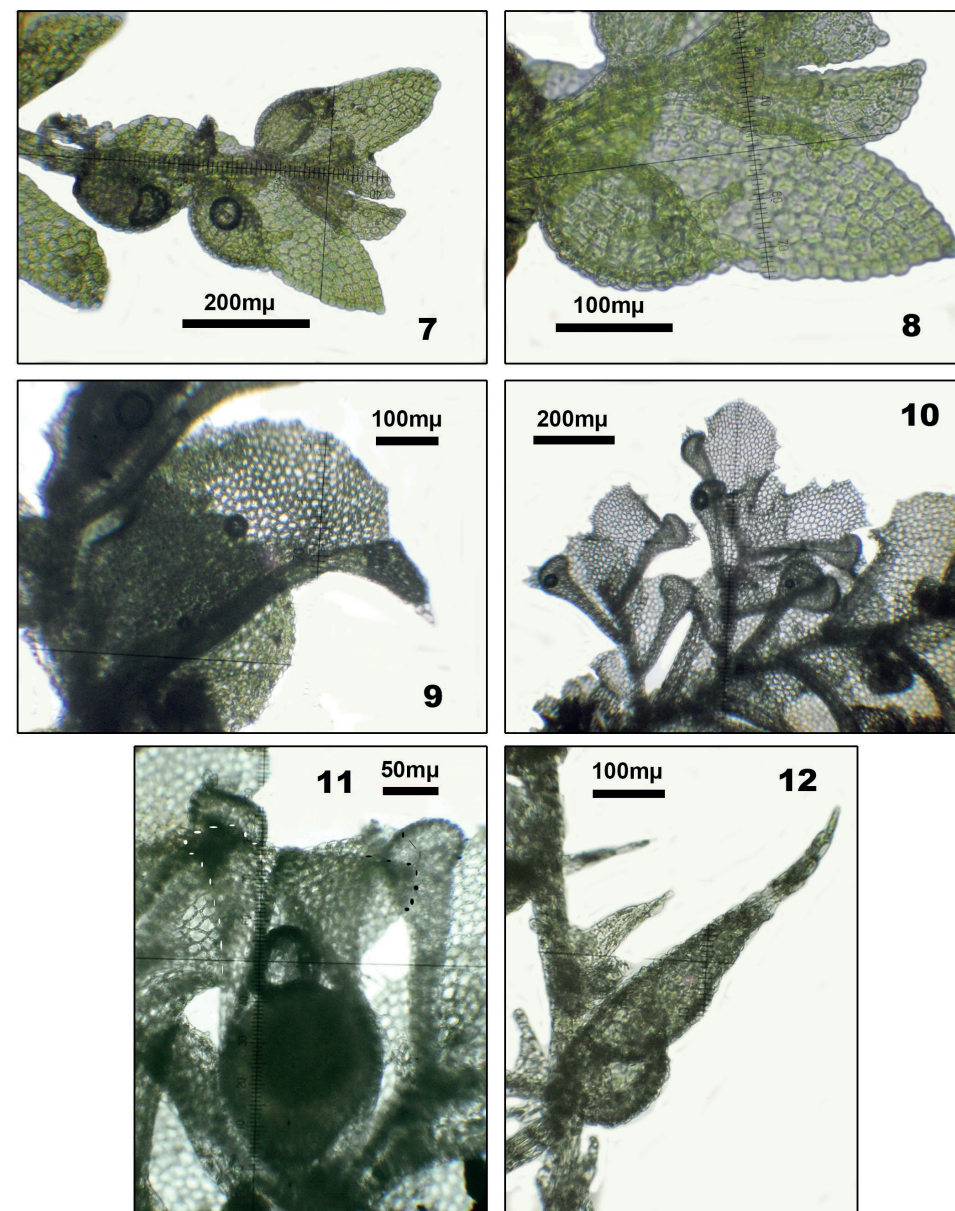
Leptolejeunea epiphylla (Mitt.) Steph. – 2020-3, 2020-5, 2020-10.

Leptolejeunea tripuncta (Mitt.) Steph. – 2020-5, 2020-12.

The previously used locality number „2019-10” (Pócs & Kovács 2019: p. 13) is misspelling, correctly „2018-10”.

Radula nymanii Steph. – 2020-5, 2020-10, 2020-11.

Radula protensa Lindenb. (Figs 1–2) – 2020-5, 2020-11, 2020-12.



Figs 7–8. *Cololejeunea amphibola* B.M. Thiers, 7 = habit, ventral view; 8 = leaf, ventral view **Fig. 9.** *Colura ari* Steph. leaf, ventral view **Figs 10–11.** *Colura imperfecta* Steph. 10 = habit, ventral view; 11 = perianth, ventral view **Fig. 12.** *Colura tenuicornis* (A.Evans) Steph. habit, ventral view

The following table (Table 1) gives an overview of all epiphyllous liverworts collected by the second author during 2017-2020 in the low region (below 400 m elevation) rainforests of Batanta Island. It is based on 106 specimens belonging to 35 species. For a smaller lowland tropical area in the Australasian realm, this is a good average number for epiphyllous species.

Taxon/Locality	Warai	Warmon	Waibin	Tanjung Lampu	Kalijakut	stream (Wailebet)	Wailebet Stream	Frequency in localities
<i>Caudalejeunea recurvistipula</i>	x	x	x	x	x	.	x	6
* <i>Cheilolejeunea intertexta</i>	.	x	.	.	.	.	.	1
* <i>Cololejeunea amphibola</i>	.	x	.	.	.	.	.	1
<i>Cololejeunea angustiflora</i>	.	x	.	.	.	.	.	1
<i>Cololejeunea appressa</i>	.	.	.	x	.	.	.	1
<i>Cololejeunea trichomanis</i> ssp. <i>cordiflora</i>	.	.	.	.	x	.	.	1
<i>Cololejeunea equalbi</i>	x	x	.	x	x	.	.	4
* <i>Cololejeunea falcata</i>	x	.	.	.	.	.	.	1
<i>Cololejeunea floccosa</i> var. <i>aurita</i>	x	.	.	x	.	.	.	2
<i>Cololejeunea hirta</i>	.	x	x	.	x	.	.	3
<i>Cololejeunea lanciloba</i>	.	x	.	.	.	.	.	1
<i>Cololejeunea obliqua</i>	.	.	.	x	.	.	.	1
* <i>Cololejeunea papillosa</i>	x	.	.	.	.	.	.	1
<i>Cololejeunea planissima</i>	.	.	.	x	.	.	.	1
<i>Cololejeunea streimannii</i>	x	.	.	.	x	x	.	3
<i>Cololejeunea</i> aff. <i>equalbi</i> (? <i>touwii</i>)	.	x	x	.	.	.	.	2
* <i>Colura ari</i>	x	.	x	.	.	.	.	2
<i>Colura conica</i>	x	.	.	.	x	.	.	2
<i>Colura imperfecta</i>	.	.	x	x	.	.	.	2
* <i>Colura tenuicornis</i>	.	.	x	.	.	.	.	1
<i>Dendroceros javanicus</i>	.	.	.	x	.	.	.	1
<i>Drepanolejeunea levicornua</i>	x	.	.	.	.	.	.	1
<i>Drepanolejeunea longicuris</i>	.	.	.	.	x	.	.	1
<i>Drepanolejeunea pentadactyla</i>	x	.	.	x	x	.	.	3
<i>Lejeunea adpressa</i>	x	x	.	.	.	.	.	2
* <i>Lejeunea exilis</i>	x	.	.	.	.	.	.	1
<i>Lejeunea micholitzii</i>	.	.	.	.	x	.	.	1
<i>Leptolejeunea elliptica</i>	.	x	.	x	.	.	.	2
<i>Leptolejeunea epiphylla</i>	x	x	x	x	.	.	.	4
<i>Leptolejeunea tripuncta</i>	x	x	.	x	x	x	.	5
<i>Metalejeunea cucullata</i>	.	.	.	x	.	.	.	1
<i>Radula acuminata</i>	.	.	x	x	.	.	.	2
<i>Radula nymanii</i>	x	x	.	x	x	.	.	4
<i>Radula protensa</i>	x	x	x	x	x	.	.	5
<i>Radula tjibodensis</i>	x	.	.	.	.	.	.	1
Number of taxon	17	14	9	16	12	2	1	

Table 1. Distribution of taxa by localities. Taxa new to Batanta Island are marked with an asterisk

As you can see, the greater part of localities was visited more than once and therefore, it is hoped that their entire epiphyllous flora may become known. The richest habitats are the ones started with valley of Warai Stream with 17, valley of Tanjung Lampu River with 16, valley of Warmon Stream with 14, valley of Kalijakut River with 12, valley of Waibin River with 9 species. The most frequent liverwort was *Caudalejeunea recurvistipula* occurring in 6 and *Leptolejeunea tripuncta*, *Radula protensa*, each occurring in 5 localities. Even the New Guinean endemic *Cololejeunea streimannii* var. *streimannii* occurs in 3 habitats out of the 7, giving a special local character for the epiphyllous flora.

As it was mentioned in our previous publication from the Batanta liverworts (Pócs & Kovács 2019), the floristic composition is typical for lowland New Guinea with the dominancy of widely distributed Indomalaysian-Pacific species. We hope to make acquaintance in the future with the epiphylls of the higher elevation of the island with a higher number of endemic, maybe even of new species.

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