

A Collection of Hepatics from the Tottori Prefecture, Japan

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Abstract Basing on the collection of hepatics gathered in the middle of March, 2013, in Tottori Prefecture, Japan, 56 species of liverwort and one hornwort species are recorded. Compiled checklist provides the information on generative structures and vegetative propagules presence, altitudinal diapason of collected specimens, habitat description and accompanying taxa list for each recorded species. Nine species (*Aneura maxima*, *Conocephalum salebrosum*, *Lejeunea aquatica*, *Megaceros flagellaris*, *Plectocolea horikowana*, *Plectocolea ovalifolia*, *Riccardia kodamae*, *Riccardia latifrons* and *Riccardia tamariscina*) are new for Tottori Prefecture.

Key words : bryophytes, hornworts, Japan, liverworts, Tottori Prefecture.

Tottori Prefecture is located in South–West part of Honshu, Japan, and covers over than 3500 km². It stretches out long and thin from east to west (approximately 120 km east–west and maximum 50 km north–south). It faces the Sea of Japan in the north, and it is bordered southward with a ridgeline of Chugoku Mountains including Mt. Daisen (1,729 m alt.), the highest peak in a Western part of Honshu. The vegetation of the lower part under 300 m alt. was originally represented by warm-temperate, evergreen broad-leaved forests (e.g. laurel forest), and that of the higher part over 600 m alt. was by deciduous broad-leaved forest (e.g. beech forest). The part between 300 and 600 m alt. is an ecotone. Most of these forests, however, are now replaced by secondary forests dominated by *Pinus densiflora* and the plantation of *Cryptomeria japonica*. Tottori Prefecture is the least populous prefecture in Japan (ca. 590,000), because of the mountainous topography. In spite of the low latitude, heavy snowfalls are sometimes occurred in winter

owing to the Sea of Japan.

The prefecture has a long history of bryological exploration that was summarized by Arikawa *et al.* (2011) provided checklist of bryophytes of the prefecture. The list counts 312 species of mosses, 124 species of liverworts and 3 species of hornworts recorded in literature. Later Arikawa *et al.* (2012) published floristic results of field survey for Tottori red list species recognizing. That list is based on field researches carried in 2010. Arikawa *et al.* (2012) provide data on distribution of 183 species of mosses and 93 species of hepatics, respectively with 30 and 14 species of bryophytes new for Tottori Prefecture. Recently Kobayashi (2012a, 2012b) also reported 2 species of hepatics as new record for Tottori Prefecture.

Our researches were conducted in three days at March of 2013 as the part of collaboration project for studies of biota diversity and development around Sea of Japan, concluded between National Museum of Nature and Science, Tokyo,

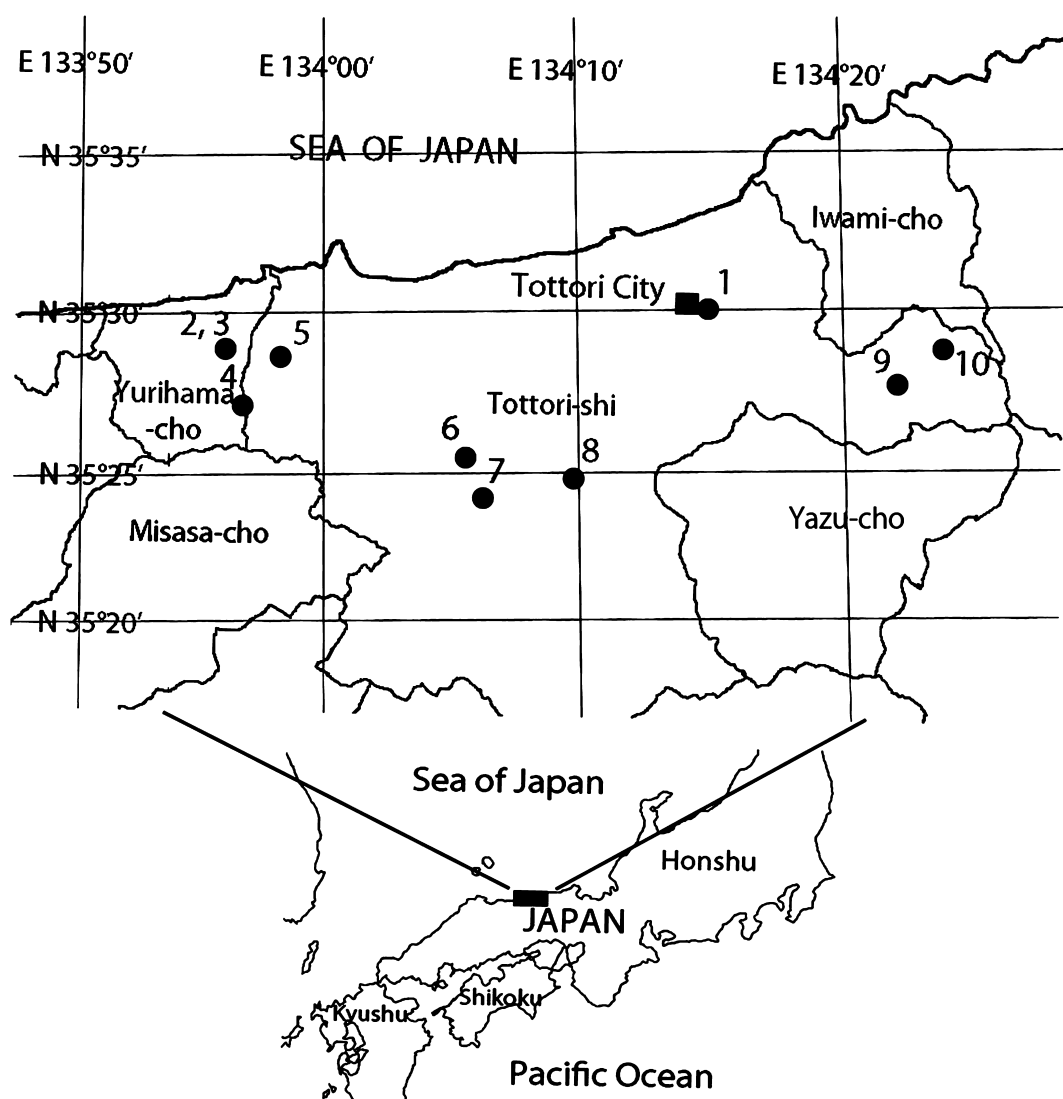


Fig. 1. Map of collecting localities in Tottori Prefecture.

and three institutes of the Far East Division of the Russian Academy of Sciences (Botanical Garden-Institute, Institute of Biology and Soil Sciences and Institute of Geology). Due to springtime we conducted field researches in low altitudes in Tottori Prefecture (see Fig. 1 and Table 1), when over than 200 specimens of hepatics were collected. All specimens were studied for oil-bodies features within one week after the collection, when the plants were in living condition. Despite the time for collecting was

very limited we have found 57 species of hepatics (56 liverworts and 1 hornwort), 9 of them are new for the prefecture. Due to the latter fact, as well as we found in additional localities some rare in Tottori Prefecture taxa we provide the list of our collection below.

Enumeration of Species

The conspectus lists taxa in alphabetical order. Taxa new for the prefecture are marked with

Table 1. Collecting localities in Tottori Prefecture

Locality number	Coordinates	Geographic description	Altitude, m alt.	Date
1	35°30'04.7"N 134°14'59.7"E	Tottori-shi, Ue-machi, Ouchi-dani Park	60	10 March 2013
2	35°28'55.1"N 133°56'09.3"E	Tohaku-gun, Yurihama-cho, Urushibara, Fudo Waterfall	40	11 March 2013
3	35°28'54.0"N 133°56'07.3"E	Tohaku-gun, Yurihama-cho, Urushibara	40	11 March 2013
4	35°27'13.8"N 133°56'50.8"E	Tohaku-gun, Yurihama-cho, Kawakami, around the summit of Mt. Hachibuse	500	11 March 2013
5	35°28'41.3"N 133°58'20.7"E	Tottori-shi, Aoya-cho, Tawaradani, Fudo Waterfall	115	11 March 2013
6	35°25'17.3"N 134°05'28.0"E	Tottori-shi, Kouchi, Kouchi Shrine	170	12 March 2013
7	35°24'09.6"N 134°06'09.4"E	Tottori-shi, Iwatsubo, Iwatsubo Shrine	240	12 March 2013
8	35°24'48.3"N 134°09'42.6"E	Tottori-shi, Naka-sunami	210	12 March 2013
9	35°27'40.8"N 134°22'18.2"E	Tottori-shi, Kokufu-cho, Sugano, Sugano Marsh	400	12 March 2013
10	35°28'42.5"N 134°24'04.0"E	Tottori-shi, Kokufu-cho, Amedaki, Amedaki Waterfall	390	12 March 2013

asterisk. The nomenclature mostly followed to the accepted in the "Catalog of the hepatics of Japan" (Yamada and Iwatsuki, 2006) with the exception in recognizing of *Plectocolea* and *Solenostoma* as the genera different from, *Jungermannia* s. str. (cf. Bakalin and Vilnet, 2012). Each species is annotated by the followings.

(1) Locality number.

(2) Presence of generative structures and vegetative propagules (if present) in the following abbreviations: per. (perianths including fleshy calyptrae and pseudoperianths of metzgerioid hepatics), ant. (antheridia), arch. (archegonia), spor. (sporangia), gemm. (gemmae).

(3) Altitudinal diapason where the species was collected.

(4) Habitat description.

(5) Accompanying species (if present).

(6) Selected specimens examined herbarium number (one per each locality, according to the Fig. 1 and Table 1).

(7) In some cases some taxonomical or other notes are added.

The specimens cited here were mainly collected by Bakalin, and they are deposited in the herbarium of the Botanical Garden-Institute, Far Eastern Branch of the Russian Academy of Sciences (VBGI) and some duplicates in the herbarium of the Department of Botany, National

Museum of Nature and Science (TNS).

***Aneura maxima** (Schiffn.) Steph. L10, 390 m. Wet cliff in open place in the spray zone of waterfall. Only one collection. With *Conocephalum salebrosum*, *Heteroscyphus coalitus*, *Pallavicinia subciliata*, *Pellia neesiana* and *Riccardia chamaedryfolia*. J-10-9-13.

Bazzania tridens (Reinw., Blume & Nees) Trevis. L1, 60 m. Wet clay road cuts and tree trunks in part shade in broadleaved-coniferous forest. In pure mats or with *Blepharostoma minus* and *Kurzia makinoana*. J-1-45-13.

Blepharostoma minus Horik. L1, 60 m. Wet clay road cuts and stone walls in the valley in part shade in the secondary forests. In pure mats or with *Bazzania tridens*, *Diplophyllum taxifolium*, *Kurzia makinoana* and *Scapania parvixtexta*. J-1-44-13.

Calypogeia japonica Steph. L1, 60 m. Wet stone walls in the valley in the secondary forests. In pure mats or with *Conocephalum salebrosum*, *Pallavicinia subciliata* and *Riccardia tamariscina*. J-1-15-13.

Calypogeia tosana (Steph.) Steph. L1, 2, 7, 40–240 m. Wet sandy and clayish road cuts in part shade, clay on slope to stream, moist cliffs along stream in the secondary forests. In pure mats or with *Lejeunea japonica*, *Pallavicinia subciliata*, *Plagiochila ovalifolia* and *Plectocolea truncata*. J-1-26-13, J-2-9-13, J-7-18-13.

Cavicularia densa Steph. L7, 240 m. Very wet cliff along stream in the secondary forest. Only one collection. With *Conocephalum salebrosum* and *Plectocolea unispiris*. J-7-13-13.

Cephalozia otaruensis Steph. L1,5, per. 60–110 m. Moist rotten log in part shade in the secondary forests. In pure mats or with *Heteroscyphus coalitus*, *Odontoschisma denudatum* and *Riccardia latifrons* var. *miyakeana*. J-1-4-13, J-5-30-13.

Chiloscyphus polyanthos (L.) Corda L2, 5, 7, ant., per., spor. 40–240 m. Very wet cliffs in spray zone of waterfall in part shade, wet boulders and cliffs in the stream valley in open place or in part shade in the secondary forests. In pure mats or with *Conocephalum salebrosum*. J-2-15-13, J-5-12-13, J-7-16-13.

Cololejeunea japonica (Schiffn.) S.Hatt. ex Mizut. gemm. L1, 60 m. Tree trunk in the secondary forest. Only one collection. With *Radula constricta*. J-1-19-13.

Cololejeunea longifolia (Mitt.) Benedix in Mizut. L6, 170 m. Boulders in part shade in the secondary forests. Only one collection. In pure mats. J-6-16-13.

Conocephalum japonicum (Thunb.) Grolle L5, 110 m. Clay covering rocks in slope to stream in mesic conditions in part shade in the secondary forests. Only one collection. With *Dumortiera hirsuta* and *Plectocolea horikawana*. J-5-2-13.

***Conocephalum salebrosum** Szweyk., Buczkowska & Odrzykoski spor. L1, 5, 7, 10, 60–390 m. Wet clay and sandy road cuts, moist rotten log, wet cliffs along stream and in the spray zone of waterfall, clay covering rocks in slope to stream in mesic conditions, in part shade to open places mostly in the secondary forests. Very common species in pure mats or with *Aneura maxima*, *Calypogeia japonica*, *Cavicularia densa*, *Chiloscyphus polyanthos*, *Dumortiera hirsuta*, *Heteroscyphus coalitus*, *H. planus*, *Makinoia crispata*, *Pallavicinia subciliata*, *Pellia neesiana*, *Plectocolea unispiris*, *Radula kojana*, *Riccardia chamaedryfolia*, *R. tamariscina*, *Trichocolea tomentella* and *Wiesnerella denu-*

data. J-1-38-13, J-5-28-13, J-7-17-13, J-10-12-13.

This species was recorded for Japan (Kyushu, Miyazaki-ken) relatively recently (Szweykovsky *et al.*, 2005). In the same paper (l.c.) it was shown that the distribution of *C. conicum* (L.) Underw. mainly restricted to Europe, with the westernmost known locality in Turkey. Further researches by Borovichev *et al.* (2009) showed the similar tendency (the westernmost locality of *C. conicum* in Eurasia is in Altai Mts.). In our researches we did not recognize this species in the Russian Far East, Korean Peninsula and China (unpublished), where all population of the species previously named as *C. conicum* are really belonging to *C. salebrosum*. Akiyama (2006) suggested that *Conocephalum conicum* doesn't occur in Japan. The present research rather confirms this point of view.

Diplophyllum taxifolium (Wahlenb.) Dumort. L1, 7, ant., per. 60–240 m. Moist to wet cliffs along streams and wet stone walls in the valley in the secondary forests. In pure mats or with *Blepharostoma minus* and *Scapania parvixeta*. J-1-10-13, J-7-14-13.

Dumortiera hirsuta (Sw.) Nees in Reinw. L1, 2, 5, 7, 10, arch. 40–390 m. Moist to wet clayish road cuts, cliffs along stream, boulders and clay covering rocks on slopes to valleys, cliff in spray zone of waterfall, mostly in part shade in the secondary forests. Very common species growing in pure mats or with *Conocephalum japonicum*, *C. salebrosum*, *Heteroscyphus coalitus*, *Jubula hutchinsiae*, *Pallavicinia subciliata*, *Pellia neesiana*, *Plectocolea* sp. and *Wiesnerella denudata*. J-1-41-13, J-2-10-13, J-5-2-13, J-7-21-13, J-10-4-13.

Frullania appendiculata Steph. L1, 60 m. Tree trunks in the secondary forest. In pure mats. J-1-22-13.

Frullania appendiculata Steph. was considered by Hattori (1972) as one of synonyms of *F. tamarisci* subsp. *obscura*. Recent molecular researches, however, confirmed the species rank for *F. appendiculata* (cf. Heinrichs *et al.*, 2010).

Frullania davurica Hampe L1, 60 m. Tree

trunks in the secondary forests. In pure mats. *J-1-20-13*.

Frullania muscicola Steph. L1, 3, per., spor. 40–60 m. Tree trunk in open places near the roads or trunk in the secondary forests in part shade. In pure mats. *J-1-23a-13, J-3-4-13*.

Haplomitrium mnioides (Lindb.) R.M. Schust. L1, 7, ant., per. 60–240 m. Moist to wet cliffs along streams and wet sandy to clayish road cuts in part shade in the secondary forests. In pure mats. *J-1-27-13, J-7-30-13*.

Heteroscyphus coalitus (Hook.) Schiffn. L1, 2, 5, 7, 10, 40–390 m. Moist to wet clay to sandy road cuts in part shade, moist to wet cliffs along streams, near waterfalls, mostly in part to full shade in the secondary forests. Very common species. In pure mats or with *Aneura maxima*, *Cephalozia otaruensis*, *Conocephalum salebrosum*, *Dumortiera hirsuta*, *Heteroscyphus planus*, *Makinoa crispata*, *Pallavicinia subciliata*, *Plagiochila ovalifolia*, *P. sciophila*, *Radula kojana*, *Riccardia chamaedryfolia*, *Pellia neesiana*, *Trichocolea tomentella* and *Wiesnerella denu-data*. *J-1-57-13, J-2-22-13, J-5-22-13, J-7-23-13, J-10-12-13*.

Heteroscyphus planus (Mitt.) Schiffn. L1, 5, 6, 7, 60–240 m. Moist to wet clay to sandy road cuts in part shade, moist cliffs and tree trunks in part shade in stream valleys in the secondary forests. In pure mats or with *Conocephalum salebrosum*, *Heteroscyphus coalitus*, *Plagiochila sciophila* and *Trichocolea tomentella*. *J-1-39-13, J-5-19-13, J-6-4-13, J-7-25-13*.

Jubula hutchinsiae (Hook.) Dumort. ssp. **javanica** (Steph.) Verd. L2, 5, 6, 7, 10, ant., arch., per. 40–390 m. Moist boulders and humus on slopes to and along of the streams in part to full shade in the secondary forests. In pure mats or with *Dumortiera hirsuta*, *Megaceros flagellaris*, *Makinoa crispata*, *Plagiochila ovalifolia*, *Riccardia chamaedryfolia* and *Wiesnerella denu-data*. *J-2-5-13, J-5-33-13, J-6-13-13, J-7-1-13, J-10-5-13*.

Kurzia makinoana (Steph.) Grolle L1, per. 60 m. Rotten logs and wet clay road cuts in part shade in the secondary forests. In pure mats or

with *Bazzania tridens*, *Blepharostoma minus*, *Plagiochila ovalifolia* and *Plectocolea ovalifolia*. *J-1-2-13*.

***Lejeunea aquatica** Horik. L2, 5, 40–110 m. Very wet to moist cliffs in spray zone of waterfall or along steam valley, in part shade in the secondary forests. In pure mats or with *Riccardia chamaedryfolia*. *J-2-18-13, J-5-21-13*.

Lejeunea japonica Mitt. L5, 7, ant., per. 110–240 m. Wet to moist stone walls and cliffs, moist humus slope to valleys and along streams, tree trunks in part shade in the secondary forests. In pure mats or with *Calypogeia tosana*, *Plagiochila ovalifolia*, *P. sciophila* and *Wiesnerella denu-data*. *J-5-15-13, J-7-18-13*.

Lophocolea minor Nees L1, 4, 5, 6, gemm., per. 60–500 m. Tree trunks in open places and moist rotten log in part shade in the secondary forests. In pure mats or with *Metzgeria lindbergii*. *J-1-1-13, J-4-1-13, J-5-8-13, J-6-3-13*.

This species is listed as *Chiloscyphus minor* (Nees) J.J.Engel & R.M.Schuster in Katagiri and Furuki (2012).

Macvicaria ulophylla (Steph.) S.Hatt L3, 40 m. Tree trunk in open place near the road across rice fields. In pure mats or with *Radula constricta*. *J-3-2-13*.

Makinoa crispata (Steph.) Miyake L1, 5, 6, 60–170 m. Wet stone walls, boulders and moist cliffs in part shade along streams in the secondary forests. In pure mats or with *Conocephalum salebrosum*, *Heteroscyphus coalitus*, *Jubula hutchinsiae*, *Megaceros flagellaris* and *Riccardia chamaedryfolia*. *J-1-12-13, J-5-22-13, J-6-11-13; Higuchi 51330*.

***Megaceros flagellaris** (Mitt.) Steph. L2, 6, 7, spor. 40–240 m. Very wet cliffs in spray zone of waterfalls, wet to moist boulders in the stream valleys in part shade in the secondary forests. In pure mats or with *Jubula hutchinsiae*, *Makinoa crispata* and *Riccardia chamaedryfolia*. *J-2-21-13, J-6-11-13, J-7-1-13; Higuchi 51349*.

Metzgeria furcata (L.) Dumort. L6, 170 m. Moist boulders along stream in part shade in the secondary forests. Only one collection. In pure mat. *J-6-10-13*.

Metzgeria lindbergii Schiffn. L5, ant., arch. 110 m. Tree trunk in open place in the secondary forests. Only one collection. With *Lophocolea minor*. J-5-7-13.

Nardia assamica (Mitt.) Amakawa L3, 6, per., spor. 40–170 m. Clayish roadside in mesic condition in open to partly shaded places along road across rice fields or in the secondary forests. In pure mats or with *Plectocolea infusca* var. *ovicalyx*. J-3-1-13, J-6-5-13.

Odontoschisma denudatum (Mart.) Dumort. L1, gemm. 60 m. Rotten log in part shade in the secondary forests. In pure mats or with *Cephalozia otaruensis* and *Riccardia latifrons* var. *miyakeana*. J-1-5-13.

Pallavicinia subciliata (Austin) Stephani L1, 5, 6, 7, 10, ant., arch., per., spor. 60–390 m. Wet to moist clay, humus, stones on slopes to and along streams, near waterfalls, along roads or in forest floor, mostly in part shade in the secondary forests. Very common species. In pure mats or with *Aneura maxima*, *Calypogeia japonica*, *C. tosana*, *Conocephalum salebrosum*, *Dumortiera hirsuta*, *Heteroscyphus coalitus*, *Pellia neesiana*, *Plectocolea truncata*, *Radula kojana*, *Riccardia chamaedryfolia* and *Trichocolea tomentella*. J-1-17-13, J-5-25-13, J-6-6-13, J-7-31-13, J-10-12-13; Higuchi 51313.

Pellia neesiana (Gott.) Limpr. L1, 7, 10, arch., spor. 60–390 m. Wet clay road cuts, wet to moist cliffs along streams or in the spray zone of waterfalls in part shade in the secondary forests. In pure mats or with *Aneura maxima*, *Conocephalum salebrosum*, *Dumortiera hirsuta*, *Heteroscyphus coalitus*, *Pallavicinia subciliata* and *Riccardia chamaedryfolia*. J-1-37-13, J-7-31-13, J-10-9-13.

Plagiochila ovalifolia Mitt. L1, 2, 7, 10, 40–390 m. Wet to moist sandy road cuts, boulders along streams, cliffs in the spray zone of waterfalls, mostly in part shade in the secondary forests. In pure mats or with *Heteroscyphus coalitus*, *Kurzia makinoana*, *Plagiochila sciophila* and *Wiesnerella denudata*. J-1-31-13, J-2-22-13, J-7-2-13, J-10-6-13.

Plagiochila sciophila Neew in Lindenb. L5, 7,

10, ant., arch. 110–390 m. Cliffs, tree trunks and branches mostly in mesic, but rarely in wet conditions, in part shade in the secondary forests. In pure mats or with *Heteroscyphus coalitus*, *H. planus*, *Lejeunea japonica*, *Plagiochila ovalifolia*, *Radula kojana* and *Wiesnerella denudata*. J-5-18-13, J-7-7-13, J-10-1-13; Higuchi 51343.

* **Plectocolea horikawana** Amakawa L5, ant., per., spor. 110 m. Clay covering rocks in slope to stream in mesic conditions in part shade in the secondary forests. In pure mats or with *Conocephalum japonicum*. J-5-1-13.

This species is listed as *Solenostoma horikawanum* (Amakawa) Váňa, Hentschel & J. Heinrichs in Katagiri and Furuki (2012).

Plectocolea infusca var. **ovicalyx** (Steph.) Bakalin L1, 40 m. Clayish road cut along road across rice fields in open place. Only one collection. With *Nardia assamica*. J-3-1-13.

This variety is listed as *Solenostoma infusum* (Mitt.) J. Hentschel var. *ovicalyx* (Steph.) Potemkin & Sofronova in Katagiri and Furuki (2012).

* **Plectocolea ovalifolia** (Amakawa) Bakalin & Vilnet L1, per., spor. 60 m. Wet clay road cut in part shade in the secondary forest. Only one collection. With *Diplophyllum taxifolium*, *Kurzia makinoana*. J-1-56-13.

This species is listed as *Solenostoma infusum* (Mitt.) J. Hentschel var. *ovalifolium* (Amakawa) Potemkin & Sofronova in Katagiri and Furuki (2012).

Plectocolea truncata (Nees) Bakalin L1, 5, ant., per., spor. 60–110 m. Mesic to wet clay on slope to stream or along road cuts in part shade in the secondary forests. In pure mats or with *Calypogeia tosana* and *Pallavicinia subciliata*. J-1-50-13, J-5-10-13.

This species is listed as *Solenostoma truncatum* (Nees) R.M. Schust. ex Váňa & D.G. Long in Katagiri and Furuki (2012).

Plectocolea unispiris Amakawa L5, 7, ant., per., spor. 110–240 m. Moist to wet cliffs and boulders on slopes and along streams, in part shade to open places in the secondary forests. In pure mats or with *Cavicularia densa* and *Conocephalum salebrosum*. J-5-23-13, J-7-11-13.

This species is listed as *Solenostoma unispire* (Amakawa) Váňa, Hentschel & J. Heinrichs in Katagiri and Furuki (2012).

Porella densifolia (Steph.) S.Hatt. L1, 7, 60–240 m. Tree trunks on slope to valleys, in part shade in the secondary forests. In pure mats. J-1-21-13, J-7-8-13.

Porella japonica (Sande Lac.) Mitt. L7, per., spor. 240 m. Tree trunks on slope to valley, in part shade in the secondary forests. In pure mats. J-7-5-13.

Porella perrottetiana (Mont.) Trevis. L7, arch. 240 m. Tree trunks on slope to valley, in part shade in the secondary forests. In pure mats. J-7-3-13.

Porella vernicosa Lindb. L6, arch. 170 m. Tree trunks on slope to valley, in part shade in the secondary forests. Only one collection. In pure mat. J-6-2-13.

Radula constricta Steph. L1, 3, gemm. 40–60 m. Tree trunks in open place near road across rice fields and in part shade in the secondary forests. In pure mats or with *Cololejeunea japonica* and *Macvicaria ulophylla*. J-1-24-13, J-3-2-13.

Radula japonica Gottsche ex Steph. L2, per. 40 m. Tree trunk in part shade in the secondary forests. In pure mat. J-2-6-13.

Radula kojana Steph. L2, 5, 7, 40–240 m. Moist to wet cliffs in part shade along streams in the secondary forests. In pure mats or with *Conocephalum salebrosum*, *Heteroscyphus coalitus*, *Plagiochila sciophila*, *Pallavicinia* cf. *subciliata* and *Wiesnerella denudata*. J-2-11-13, J-5-20-13, J-7-26-13.

Reboulia hemisphaerica (L.) Raddi ssp. **orientalis** R.M.Schust. L5, 6, 7, 10, ant., arch., spor. 110–390 m. Moist to wet and mesic stones and cliffs in part shade to in open places along streams, on slopes to valleys and in the spray zone of waterfalls in the secondary forests. In pure mats or with *Wiesnerella denudata*. J-5-4-13, J-6-15-13, J-7-20-13, J-10-13-13.

Riccardia chamedryfolia (With.) Grolle L2, 6, 10, gemm. 40–390 m. Moist to wet boulders and cliffs along streams, in the spray zone of waterfall, clayish road cuts in mesic conditions,

in part shade in the secondary forests. In pure mats, but mostly mixed with other hepatics, such as *Aneura maxima*, *Conocephalum salebrosum*, *Heteroscyphus coalitus*, *Jubula hutchinsiae*, *Lejeunea aquatica*, *Makinoa crispata*, *Megaceiros flagellaris*, *Pallavicinia subciliata*, *Pellia neesiana* and *Wiesnerella denudata*. J-2-7-13, J-6-14-13, J-10-11-13.

***Riccardia kodamae** Mizut. & S.Hatt. L2, per. spor. 40 m. Clayish road cut in mesic conditions in part shade in the secondary. Only one collection. In pure mat. J-2-8-13.

***Riccardia latifrons** (Lindb.) Lindb. var. **miyakeana** (Schiffn.) Furuki L1, arch. 60 m. Rotten log in part shade in the secondary forests. Mixed with *Cephalozia otaruensis* and *Odontoschisma denudatum*. J-1-3-13.

***Riccardia tamariscina** (Steph.) Schiffn. L1, 60 m. Wet stone wall in the valley. Wet clay road cuts and stone walls along streams, in part shade in the secondary forests. In pure mats or with *Calypogeia japonica* and *Conocephalum salebrosum*. J-1-40-13.

Scapania parvitexta Steph. L1, 2, ant., per. 40–60 m. Wet clay road cuts, boulders in the stream beds, stone walls along streams, in part shade in the secondary forests. In pure mats or with *Blepharostoma minus* and *Diplophyllum taxifolium*. J-1-48-13, J-2-1-13.

Trichocolea tomentella (Ehrh.) Dumort. L7, 240 m. Moist to wet cliffs along stream in part shade in the secondary forests. In pure mats or with *Conocephalum salebrosum*, *Heteroscyphus coalitus*, *H. planus* and *Pallavicinia subciliata*. J-7-25-13.

Trocholejeunea sandvicensis (Gottsche) Mizutani L2, per. 40 m. Tree branch in open place in the secondary forest. Only one collection. In pure mat. J-2-3-13.

Wiesnerella denudata (Mitt.) Steph. L2, 5, 10, ant., arch. 40–390 m. Moist to wet cliffs, boulders (including clay covered) and humus along streams, on slopes, in the spray zone of waterfalls, mostly in part shade in the secondary forests. In pure mats or with *Conocephalum salebrosum*, *Dumortiera hirsuta*, *Heteroscyphus*

coalitus, *Jubula hutchinsiae*, *Lejeunea japonica*, *Plagiochila ovalifolia*, *P. sciophila*, *Radula kojana*, *Reboulia hemisphaerica* ssp. *orientalis* and *Riccardia chamaedryfolia*. J-2-19-13, J-5-5-13, J-10-7-13; Higuchi 51320.

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