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# Botanica Pacifica

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# Hepatics of Mt. Deogyu National Park, Republic of Korea

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## ABSTRACT

We investigated the hepatic flora of Mt. Deogyu National Park in the Republic of Korea. We assembled a checklist including 127 taxa belonging to 28 families, 57 genera, 120 species, 4 subspecies, and 3 varieties. Seven species in the list are new for the country. We provide a description of the study area, a history of hepatic exploration on the Korean Peninsula, and details of altitudinal distribution patterns in the park.

## Keywords

Hepaticae, liverworts, Marchantiophyta, Mt. Deogyu, South Korea

## РЕЗЮМЕ

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Печеночники национального парка Гора Деогу, Республика Корея

Изучена флора печеночников национального парка г. Дою (республика Корея). Составленный список включает 127 таксонов из 28 семейств, 57 родов, 120 видов, 4 подвидов и 3 разновидностей. Семь видов приводится впервые для республики Корея. Даны комментарии о высотном-поясном распределении печеночников, описаны район исследования и история исследования печеночников Корейского п-ова.

## Ключевые слова

Hepaticae, печеночники, Marchantiophyta, Южная Корея

## INTRODUCTION

Faurie (1847–1915) was the first to collect hepatics on the Korean Peninsula. In collaboration with Taquet, he sampled diverse hepatics and mosses while amassing a large collection of vascular plants. The collections were studied by Stephani (1909–1912, 1912–1917, 1917–1924, 1924) and listed in his well-known Species Hepaticarum. Six species from the collection were described by Stephani as new to science (Hong 1966). Since then, Korean Hepaticae have been studied mostly by Japanese botanists, including Nakai (1918), Reimers (1931), Horikawa (1932, 1934, 1955), Hattori (1943, 1947, 1952, 1956, 1978), Hattori et al. (1962a, 1962b), Ando (1955, 1960), Amakawa (1960), and Inoue (1958a, 1958b, 1959a, 1959b, 1962).

The first Korean botanist to study hepatics of the Republic of Korea was Hong (1960a, 1960b, 1960c, 1966, 1997, 2003). He reported 135 taxa in 41 genera and 18 families, based on a study of ca. 5,000 herbarium specimens (Hong 1966). Hong (1997) markedly expanded his list to include 259 taxa belonging to 76 genera in 37 families on the basis of personal collections and literature records for North Korean hepatics (Gao & Chang 1981, 1983a, 1983b, 1983c, Kim 1991, Kim et al. 1995). Hong also provided identification keys to 263 known or expected taxa on the Korean Peninsula (Hong 2003).

Following in the footsteps of Hong, Choe conducted comprehensive bryofloristic research studies in South Korea. He published a manual on Korean Hepaticae, which

included 201 taxa in 66 genera (Choe 1980). Later, in collaboration with the Japanese hepaticologist Yamada, 236 taxa of Hepaticae (Yamada & Choe 1997) were assembled in a special checklist providing information on species' distributions within administrative provinces of both nations on the Korean Peninsula. They also recorded two species of *Frullania* new to the Korean Peninsula (Yamada & Choe 2000).

More recently, Song & Yamada (2006, 2009a, 2009b) examined the hepatic flora of Jeju Island (2006), Mt. Jiri (Jirisan) (2009a) and Mt. Gaya (Gayasan) (2009b). Lim (2006) reported nine taxa from Dongbaekdongsan on Jeju Island, and Lai et al. (2007) newly reported *Lejeunea anisophylla* Mont. for the Korean Peninsula. Park & Choi (2007) published a list of bryophytes for the Korean Peninsula based on literature data. The list includes 281 taxa belonging in 81 genera. However, some species listed by Park & Choi (2007) were recorded mistakenly or on the curious assumption that a taxon might occur in Korea.

Mt. Deogyu National Park has been a focus of floristic studies for the past several decades. The vascular plant flora has been exhaustively studied (Yim et al. 1994, Sun & Park 1999, Yu 2007). Recently, Yoon (2009) investigated the moss flora of the park. He recorded 183 taxa (loc. cit.). Hong (1966) and Choe (1980) inventoried the hepatic flora on the mountain, but only 18 taxa were reported. Recently, Bakalin et al. (2008) reported *Tetralophozia filiformis* (Steph.) Urmi from the park; this was a first record for the Korean

Peninsula. Since the hepatic flora of Mt. Deogyu has never been examined systematically, and only fragmentary floristic data are available for mountain ranges on the Korean Peninsula, we aimed to describe the hepatics of the area in as much detail as possible, providing information on altitudinal distribution and species ecology, as part of a compilation of data on the hepatic flora of Korea.

## RESEARCH AREA

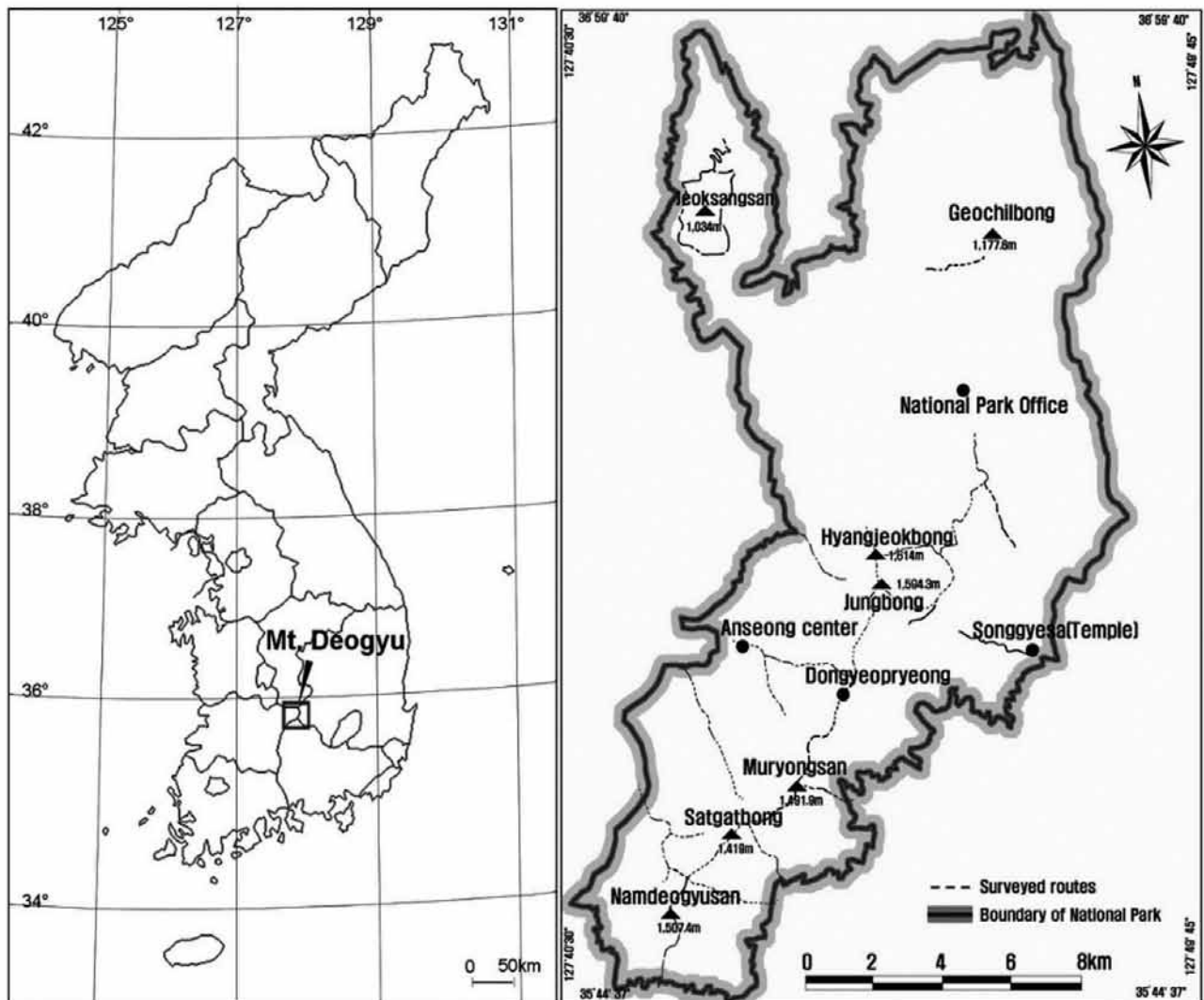
Mt. Deogyu National Park is located in the central part of the Korean Peninsula. It includes the northeastern region of Jellabuk-do Province and the northwestern region of Gyeongsangnam-do Province. The highest peaks are Hyangjeokbong (1,614 m a.s.l., central sector), Namdeogyusan (1,507 m a.s.l., southern sector), Jeoksangsan (1,034 m a.s.l., northwestern part), and Geochilbong (1,177 m a.s.l., northeastern sector). The park occupies 231.65 km<sup>2</sup> and lies within the following coordinates: 127°40'30"–127°49'45"E and 35°44'37"–36°59'40"N. The lowland area of the park is covered by broad-leaved deciduous forest that change to the forests of twisted conifers near the ridgelines. The mean annual temperature in the lowland area is 10.4°C, and annual precipitation is 1,422 mm. This mountainous

area has a southern inland climate. The dominant rocks are granitic gneiss. Quaternary deposits are mostly formed from these rocks (Yim et al. 1994).

## MATERIALS AND METHODS

Collections were concentrated in habitats where hepatics are typically common and diverse, such as wet stones near stream beds, more or less dry rocks, bark of forest trees, exposed rocks and shaded cliffs near selected mountains tops (Fig. 1). We conducted 26 field surveys in a period between Oct. 2007 and Oct. 2009 at various sites in the park (Table 1).

All specimens were packed in newspaper or acid-free paper and annotated in the field with collection date, geographical coordinates, field herbarium number, collector, preliminary species name, substratum, and habitat. The collected materials were air-dried in the laboratory, and some species were cultivated in the greenhouse. The specimens we studied are kept in Chonbuk National University Herbarium (JNU, coll. S. S. Choi) and the herbarium of the Botanical Garden-Institute in Vladivostok (VBGI, coll. V. A. Bakalin). Specimens were identified by S. S. Choi and V. A. Bakalin in the course of a special collaborative project.



**Figure 1** The position of Mt. Deogyu within Korean Peninsula and the surveyed routes of Mt. Deogyu in this study

**Table 1** Surveyed locals and dates of Mt. Deogyu

No.	Locality	Dates
1	Hyangjeokbong-Baegryeonsa area	24.10.2007
2	Songgyesa area	30.10.2007
3	Toyokdong stream	28.11.2007
4	Toyokdong stream	01.12.2007
5	Ansung-Chilyeon waterfall	12.12.2007
6	Uelsung stream	19.03.2008
7	Uelsung stream	02.04.2008
8	Guchendong stream	27.04.2008
9	Muryongsan area	28.04.2008
10	Chilyeon Waterfall	22.05.2008
11	Uelsung stream	31.05.2008
12	Meongchon stream	07.06.2008
13	Hyangjeokbong-Baekyeonsa area	24–26.06.2008
14	Chilyeon waterfall	27.06.2008
15	Satgatgoljae area	30.06.2008
16	Deokgok stream	01.07.2008
17	Deokgok stream	10.07.2008
18	Satgatgoljae area	18.09.2008
19	Mt. Namdeogyusan	30.10.2008
20	Guchendong stream	22.11.2008
21	Guchendong-Baekyeonsa area	15.12.2008
22	Mt. Jeoksangsan	14.03.2009
23	Baekyeonsa-Osujagul area	14.04.2009
24	Mt. Namdeogyusan	15.04.2009
25	Toyokdong-Uelsungchi area	14.05.2009
26	Geochilbong area	11.10.2009

## RESULTS AND DISCUSSION

### Flora

The checklist of hepatics on Mt. Deogyu includes 127 taxa from 28 families, 57 genera, 120 species, 4 subspecies, and 3 varieties. The list is based on critical study of 1538 herbarium specimens collected by S. S. Choi and V. A. Bakalin. The number of taxa corresponds to ca. 45% of the total hepatic taxonomic richness currently known for the Korean Peninsula. Among the taxa, seven species are new for the Republic of Korea. However, 3 species (*Jubula japonica*, *Porella gracillima*, *Schistochilopsis incisa*) among 18 taxa reported previously (Hong 1966, Choe 1980) were not found in the present study.

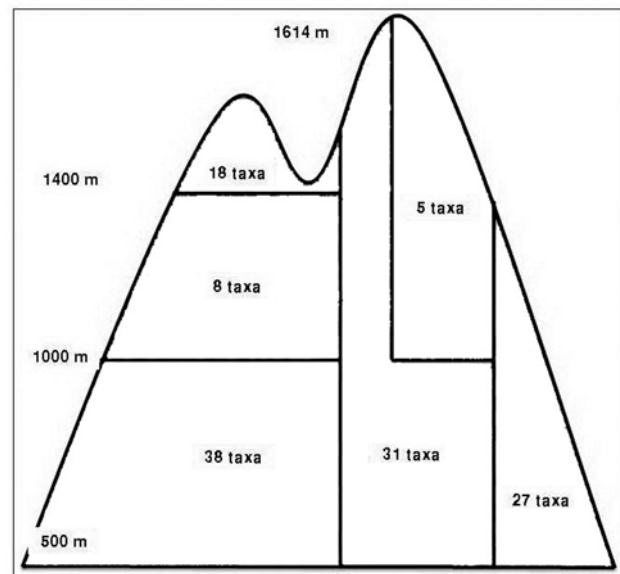
### Altitudinal distribution patterns

Three main altitudinal categories were defined (Fig. 2):

**1. Areas near the mountain top at elevations of 1400–1614 m a.s.l.** Only 18 species were found above 1400 m a.s.l., including epilithic Arcto-Alpine taxa, such as *Anastrophyllum assimile* and *Gymnomitrium commutatum*.

**2. Areas along ridges at elevations of 1000–1400 m a.s.l.** Only eight species were found along ridges between 1000 m and 1400 m a.s.l., including a range of boreal epixyloous taxa, such as *Aneura pinguis* and *Cephalozia lacunculata*.

**3. Areas near streams at elevations below 1000 m a.s.l.** Thirty-eight species were found below 1000 m a.s.l. The majority were restricted to wet habitats near streams,

**Figure 2** Altitudinal distributions of all taxa in Mt. Deogyu

valleys, and waterfalls; these included *Chiloscyphus polyanthus* and *Geocalyx lancistipulus*.

Three additional distribution categories were assigned to species occurring in at least two of three main altitudinal belts:

**4. Areas above 1000 m a.s.l.** Five species were found in the two categories above 1000 m a.s.l.; the most common were the boreal species *Bazzania tricrenata* and *Cephalozia lunulifolia*.

**5. Areas between 500 and 1614 m a.s.l.** Thirty-one species were found in each of the three main altitudinal categories.

**6. Areas between elevations of 500 m and 1400 m a.s.l.** Twenty-seven species occurred here.

### Taxa newly recorded for the Republic of Korea, but previously found on the Korean Peninsula in the Korean People's Democratic Republic

#### 1. *Cephalozia lacunculata* (J. B. Jack) Spruce

This species had been previously recorded from Mt. Myohyang and Mt. Geumgang (Kim 1991). We found it on decaying wood in a broad-leaved forest alongside the road from Jungbong to Baegryeonsa at an elevation of 1160 m a.s.l.

#### 2. *Cephalozia lunulifolia* (Dumort.) Dumort.

This species had been previously recorded from Chailbong (Bujeon), Seonggan, Nanglim Mountains, and Mt. Heulryeong (Kim 1991). We found it on wet cliffs in a broad-leaved forest with a coniferous admixture alongside the road from Jungbong to Baegryeonsa at an elevation of 1160–1245 m a.s.l.

#### 3. *Odontoschisma denudatum* (Nees) Dumort.

This species had been previously recorded for Mt. Myohyang and Mt. Geumgang (Kim, 1991). On Mt. Deogyu, we found it on decaying wood in broad-leaved forests near the Chilyeon waterfall and in the Hyangjeokbong area at elevation of 680–1500 m a.s.l.

4. *Plicanthus hirtellus* (F. Weber) R. M. Schust.

This species had been previously recorded from Mt. Maengbu (Kim, 1991). We found it on cliffs along Meongchon stream in a broad-leaved forest at an elevation of 689 m a.s.l.

5. *Geocalyx lancistipulus* (Steph.) S. Hatt.

This species had been previously recorded from Mt. Oga (Kim 1991). We found it on shaded rocks along Toyokdong streams in broad-leaved forests at an elevation of 820 m a.s.l.

6. *Hattorianthus erimonus* (Steph.) R. M. Schust. & H. Inoue

This species had been previously recorded from Mt. Chilbo, Yangdok and Sambang (Kim 1991). We found it on the wet soil near Uelsung and Guchendong streams in broad-leaved forests.

7. *Riccardia multifida* var. *decrescens* (Steph.) Furuki

This variety had been previously recorded from Mt. Baekdu, Mt. Chilbo, Yangdok, Mt. Myohang, and in Seonggan and Chanseong provinces (Kim, 1991). We found it on wet cliffs alongside the road from Baegryeonsa to Osujagul Cave at 1446 m a.s.l.

## LIST OF SPECIES

Taxa are arranged alphabetically. Nomenclature for taxa in the list follows Konstantinova et al. (2009); when taxa were absent from Konstantinova et al. (2009), we followed Yamada & Iwatsuki (2006). Each species is annotated as follows: 1) sexual and asexual reproduction organs present: spor. – sporogonia; arch. – archegonia; ant. – antheridia; per. – perianthia; gemm. – gemmae; 2) habitats; 3) altitudinal range in the area studied; 4) accompanying taxa; 5) selected voucher specimen number (S. S. Choi's collections are prefixed by SC, V. A. Bakalin's collections are prefixed by VB); 6) data on oil bodies in mid-leaf cells are included for some species; variation in this parameter is poorly understood for many East Asian species.

*Anastrophyllum assimile* (Mitt.) Steph. – shaded cliffs and rocks in *Quercus* forest; 1446 m a.s.l.; 15.04.2009, SC 13492 (JNU), 15.04.2009, SC 13496 (JNU).

*Aneura pinguis* (L.) Dumort. – wet cliffs along stream in broad-leaved forest mixed with conifers; 1200 m a.s.l.; 02 Apr. 2008, SC 10303 (JNU), 22 May 2008, SC 10572 (JNU), 26 Jun. 2008, VB Kor-11-10-08 (VBGI).

*Apometzgeria pubescens* (Schrank) Kuwah. – wet cliffs along stream in broad-leaved forest mixed with conifers; with *Porella fauriei*, *Porella grandiloba*; 600–1160 m a.s.l.; 28 Nov. 2007, SC 10078 (JNU), 28.11.2007, SC 10780 (JNU), 26 Jun. 2008, VB Kor-11-27-08 (VBGI).

*Asterella cruciata* (Steph.) Horik. – spor.; rocks along stream in broad-leaved forest; 810 m a.s.l.; 30.06.2008, SC 10879 (JNU), 30 Jun. 2008, SC 10880 (JNU), 30 Jun. 2008, VB Kor-16-3-08 (VBGI).

*Bazzania bidentula* (Steph.) Steph. ex Yasuda – shaded rocks in *Alnus* thickets; 880–1580 m a.s.l.; 25 Jun. 2008, SC 10707 (JNU), 25 Jun. 2008, SC 10721 (JNU), 25 Jun. 2008, VB Kor-9-20-08 (VBGI).

*Bazzania denudata* (Torr. ex Lindenb.) Trevis. – decaying wood, shaded rocks and cliffs in broad-leaved forests, fine-grained soil along roadside; in pure mats or with *Blepharostoma minus*, *Cephalozia lunulifolia*, *Diplophyllum*

*taxifolium*, *Lophocolea minor*, *Marsupella tubulosa* var. *patens*, *Metzgeria furcata* var. *uhvula*; 549–1400 m a.s.l.; 01 Dec. 2007, SC 10145 (JNU), 27 Jun. 2008, SC 10836 (JNU), 24 Jun. 2008, VB Kor-7-2-08 (VBGI), 27 Jun. 2008, VB Kor-14-19-08 (VBGI).

*Bazzania japonica* (Sande Lac.) Lindb. – decaying wood in broad-leaved forest; 1400 m a.s.l.; 24 Jun. 2008, SC 10632 (JNU), 30 Oct. 2008, SC 11124 (JNU), 24 Jun. 2008, VB Kor-7-1-08 (VBGI).

*Bazzania tricrenata* (Wahlenb.) Trevis. – shaded rocks and wet cliffs along streams in broad-leaved forests; in pure mats or with *Plagiocbila sciophila*, *Scapania ciliata*, *S. integerrima*; 1160–1584 m a.s.l.; 24 Jun. 2008, SC 10630 (JNU), 25 Jun. 2008, SC 10695 (JNU), 24 Jun. 2008, VB Kor-9-3-08 (VBGI), 26 Jun. 2008, VB Kor-11-28a-08 (VAL).

*Blepharostoma minus* Horik. – cliffs along streams in broad-leaved forest; in pure mats or with *Bazzania denudata*, *Herbertus* sp. *Tetralophozia filiformis*; 549–1444 m a.s.l.; 12 Dec. 2007, SC 10117 (JNU), 19 Mar. 2008, SC 10235 (JNU), 27 Jun. 2008, VB Kor-14-19-08 (VBGI), 1 Jul. 2008, VB Kor-17-35-08 (VBGI).

*Blepharostoma trichophyllum* (L.) Dumort. – wet cliffs along stream in broad-leaved forest mixed with conifers; in pure mats or with *Plagiocbila trabeculata*, *Radula japonica*; 600–1444 m a.s.l.; 22 May 2008, SC 10565 (JNU), 24 Jun. 2008, SC 10669 (JNU), 26 Jun. 2008, VB Kor-11-5-08 (VBGI).

*Calycularia crispula* Mitt. – arch.; wet shade rocks and cliffs along streams in broad-leaved forests; 809–1446 m a.s.l.; 24 Oct. 2007, SC 10007 (JNU), 25 Jun. 2008, SC 10730 (JNU), 25 Jun. 2008, VB Kor-10-20-08 (VBGI), 30 Jun. 2008, VB Kor-16-18-08 (VBGI).

*Calyptogeia arguta* Nees et Mont. – gemm.; wet cliffs along streams and fine-grained soil along roadside in broad-leaved forests; 518–1234 m a.s.l.; 28 Nov. 2007, SC 10086 (JNU), 01 Dec. 2007, SC 10157 (JNU), 26 Jun. 2008, VB Kor-11-34-08 (VBGI), 27 Jun. 2008, VB Kor-13-14-08 (VBGI).

*Calyptogeia azurea* Stotler et Crotz. – wet cliffs along stream in broad-leaved forest; with *Jungermannia subulata*; 1200 m a.s.l.; 26 Jun. 2008, VB Kor-11-35a-08 (VBGI).

*Calyptogeia tosana* (Steph.) Steph. – cliffs and rocks along streams, fine-grained soil along roadside in broad-leaved forests; in pure mats or with *Cephalozia lunulifolia*; 600–1458 m a.s.l.; 27 Apr. 2008, SC 10393 (JNU), 22 May 2008, SC 10524 (JNU), 24 Jun. 2008, VB Kor-8-2-08 (VBGI), 30 Jun. 2008, VB Kor-16-6-08 (VBGI).

*Cephalozia* cf. *catenulata* (Huebener) Lindb. ssp. *nipponica* (S. Hatt.) H. Inoue – rocks along stream in broad-leaved forest; 1200 m a.s.l.; 30 Jun. 2008, VB Kor-16-7-08 (VBGI).

*Cephalozia lacunculata* (J. B. Jack ex Gottsche & Rabenh.) Spruce – decaying wood in broad-leaved forest; 1160 m a.s.l.; 26 Jun. 2008, SC 10777 (JNU), 27 Jun. 2008, SC 10846 (JNU).

*Cephalozia lunulifolia* (Dumort.) Dumort. – wet cliffs along stream in broad-leaved forest mixed with conifers, fine-grained soil along roadside in broad-leaved forest; in pure mats or with *Bazzania denudata*, *Calyptogeia tosana*, *Diplophyllum taxifolium*; 1160–1458 m a.s.l.; 27 Apr. 2008, SC 10396 (JNU), 24 Jun. 2008, SC 10668 (JNU), 24 Jun. 2008, VB Kor-8-4-08 (VBGI), 26 Jun. 2008, VB Kor-11-15-08 (VBGI).

*Cephalozia otaruensis* Steph. – per., spor.; wet cliffs along stream in broad-leaved forest, decaying wood in broad-leaved forest mixed with conifers; in pure mats or with *Jungermannia subulata*; 549–1444 m a.s.l.; 1 Dec. 2007, SC

- 10155 (JNU), 19 Mar. 2008, SC 10246 (JNU), 26 Jun. 2008, VB Kor-11-32-08 (VBGI), 27 Jun. 2008, VB Kor-14-2-08 (VBGI).
- Cephaloziella divaricata* (Sm.) Warnst. – ant.; rocks crevices shaded by *Alnus*; 1576 m; 25 Jun. 2008, SC 10709 (JNU), 24 Jun. 2008, VB Kor-9-19-08 (VBGI).
- Cephaloziella hampeana* (Nees) Schiffner ex Loeske – shaded cliffs and rocks in *Quercus* forest; 1421 m a.s.l.; 27 Jun. 2008, SC 10801 (JNU), 30 Jun. 2008, SC 10867 (JNU).
- Cephaloziella microphylla* (Steph.) Douin – fine-grained soil along roadside in broad-leaved forest; 580–1446 m a.s.l.; 02 Apr. 2008, SC 10585 (JNU), 15 Apr. 2009, SC 13489 (JNU).
- Cephaloziella spinicaulis* Douin – shade stones, rocks, cliffs along stream in broad-leaved and mixed forests; in pure mats or with *Macvicaria ulophylla*; 625–1437 m a.s.l.; 02 Apr. 2008, SC 10341 (JNU), 24 Jun. 2008, SC 10641 (JNU), 24 Jun. 2008, VB Kor-7-7-08 (VBGI), 1 Jul. 2008, VB Kor-17-9-08 (VBGI).
- Cephaloziella spinigera* (Lindb.) Jørg. – shaded cliffs and rocks in *Quercus* spp. forest; 1421 m a.s.l.; 30 Oct. 2008, SC 11107 (JNU).
- Cheilolejeunea obtusifolia* (Steph.) S. Hatt. – shaded cliffs and rocks (mainly along streams) in broad-leaved forests; 549–1576 m a.s.l.; 01 Dec. 2007, SC 10104 (JNU), 27 Apr. 2008, SC 10379 (JNU), 24 Jun. 2008, VB Kor-8-11-08 (VBGI), 1 Jul. 2008, VB Kor-17-14-08 (VBGI); oil-bodies 2–3 per cells, fusiform, 10–12 × 4 µm.
- Chiloscyphus polyanthus* (L.) Corda. – wet cliffs along streams in broad-leaved and mixed forests; in pure mats or with *Lejeunea japonica*, *Xenochila integrifolia*; 690–840 m a.s.l.; 30 Oct. 2007, SC 10017 (JNU), 1 Dec. 2007, SC 10103 (JNU), 26 Jun. 2008, VB Kor-11-11-08, 1 Jul. 2008, VB Kor-17-10-08 (VBGI).
- Cololejeunea longifolia* (Mitt.) Benedix – cliffs along stream in broad-leaved forest; 549–880 m a.s.l.; 1 Dec. 2007, SC 10121 (JNU), 19 Mar. 2008, SC 10223 (JNU), 1 Jul. 2008, VB Kor-17-2-08 (VBGI).
- Cololejeunea macounii* (Spruce ex Underw.) A. Evans – per.; shaded stones and cliffs along streams in broad-leaved forests; in pure mats or with *Frullania tamarisci* ssp. *obscura*; 625–880 m a.s.l.; 1 Jul. 2008, SC 10921 (JNU), 10 Jul. 2008, SC 10992 (JNU), 24 Jun. 2008, VB Kor-7-11-08 (VBGI), 1 Jul. 2008, VB Kor-17-6-08 (VBGI).
- Cololejeunea ornata* A. Evans – bark of broad-leaved trees in broad-leaved forest; 880 m a.s.l.; 15 Dec. 2008, SC 11205 (JNU).
- Conocephalum conicum* (L.) Underw. – wet cliffs and humic soil along streams in broad-leaved forests, very wet and shady rocky wall in small grotto; in pure mats and with *Jungermannia subulata*, *Pellia endiviifolia*; 518–1245 m a.s.l.; 24 Oct. 2007, SC 10001 (JNU), 14 Mar. 2009, SC 13405 (JNU), 26 Jun. 2008, VB Kor-11-17-08 (VBGI), 30 Jun. 2008, VB Kor-15-1-08 (VBGI).
- Conocephalum japonicum* (Thunb.) Grolle – very wet and shaded rocky wall in small grotto, cliffs along stream in broad-leaved forest; in pure mats or with *Radula japonica*; 723–1155 m a.s.l.; 24 Oct. 2007, SC 10013 (JNU), 27 Jun. 2008, SC 10793 (JNU), 27 Jun. 2008, VB Kor-12-1-08 (VBGI), 27 Jun. 2008, VB Kor-14-41-08 (VBGI).
- Crossogyna autumnalis* (DC.) Schljakov – per.; shaded rocks and wet cliffs along streams in broad-leaved and mixed forests; in pure mats or with *Lejeunea compacta*, *Pedinophyllum truncatum*, *Scapania undulata*, *Trichocoleopsis sacculata*; 690–1580 m a.s.l.; 30 Oct. 2007, SC 10016 (JNU), 15 Apr. 2009, SC 13483 (JNU), 24 Jun. 2008, VB Kor-9-1-08 (VBGI), 01 Jul. 2008, VB Kor-17-31-08 (VBGI).
- Cylindrocolea recurvifolia* (Steph.) H. Inoue – shaded stones, rocks, cliffs along stream in broad-leaved and mixed forests; 667–1234 m a.s.l.; 27 Jun. 2008, SC 10807 (JNU), 30 Jun. 2008, SC 10868 (JNU).
- Dicranolejeunea yoshinagana* (S. Hatt.) Mizut. – very wet rocks along stream in broad-leaved forest; 576–629 m a.s.l.; 19 Mar. 2008, SC 10236 (JNU), 7 Jun. 2008, SC 10584 (JNU).
- Diplophyllum albicans* (L.) Dumort. – cliffs and rocks along streams in broad-leaved and mixed forests; 580–1446 m a.s.l.; 07 Jun. 2008, SC 10619 (JNU), 26 Jun. 2008, SC 10771 (JNU), 26 Jun. 2008, VB Kor-11-39-08 (VBGI), 30 Jun. 2008, VB Kor-16-17-08 (VBGI).
- Diplophyllum serrulatum* (Müll. Frib.) Steph. – ant., per., gemm.; cliffs along streams in broad-leaved forests; 580–760 m a.s.l.; 7 Jun. 2008, SC 10595 (JNU), 27 Jun. 2008, SC 10806 (JNU), 27 Jun. 2008, VB Kor-13-2-08 (VBGI), 1 Jul. 2008, VB Kor-17-4-08 (VBGI).
- Diplophyllum taxifolium* (Wahlenb.) Dumort. – cliffs and rocks along streams in broad-leaved and mixed forests; 680–1160 m a.s.l.; 26 Jun. 2008, SC 10783 (JNU), 27 Jun. 2008, SC 10813 (JNU).
- Frullania appendiculata* Steph. – ant.; cliffs and rocks along streams, stones and bark of *Quercus mongolica* in broad-leaved forests; in pure mats or with *Cololejeunea macounii*, *Frullania davurica*, *Plicanthus birmensis*; 690–1580 m a.s.l.; 28 Nov. 2007, SC 10091 (JNU), 15 Dec. 2008, SC 11178 (JNU), 24 Jun. 2008, VB Kor-7-10-08 (VBGI), 1 Jul. 2008, VB Kor-17-20-08 (VBGI).
- Frullania davurica* Hampe. – shaded cliffs and rocks in broad-leaved and mixed forests; in pure mats or with *Frullania tamarisci* ssp. *obscura*, *Lejeunea japonica*; 518–1437 m a.s.l.; 28 Nov. 2007, SC 10052 (JNU), 1 Dec. 2007, SC 10109 (JNU), 24 Jun. 2008, VB Kor-9-3a-08, 1 Jul. 2008, VB Kor-17-17-08 (VBGI).
- Frullania diversitexta* Steph. – bark of broad-leaved trees (*Quercus mongolica*) in broad-leaved forest; 723–1584 m a.s.l.; 25 Jun. 2008, SC 10680 (JNU), 10 Jul. 2008, SC 11016 (JNU).
- Frullania inflata* Gottsche – shaded cliffs along stream in broad-leaved forest; 625 m a.s.l.; 1 Jul. 2008, SC 10937 (JNU).
- Frullania kagoshimensis* Steph. – shaded cliffs along stream in broad-leaved forest; 625 m a.s.l.; 1 Jul. 2008, SC 10903 (JNU).
- Frullania muscicola* Steph. – arch.; shaded rocks, cliffs along stream, bark of trees in broad-leaved forests and *Alnus* thickets; 625–1580 m a.s.l.; 24 Jun. 2008, SC 10654 (JNU), 14 Mar. 2009, SC 13411 (JNU), 24 Jun. 2008, VB Kor-7-18-08 (VBGI), 1 Jul. 2008, VB Kor-17-34-08 (VBGI).
- Frullania polyptera* Tayl. – per.; bark of broad-leaved trees in broad-leaved forest; 720 m a.s.l.; 27 Jun. 2008, SC 10837 (JNU), 27 Jun. 2008, VB Kor-14-3-08 (VBGI).
- Frullania taradakensis* Steph. – per., spor.; bark of broad-leaved trees and *Abies koreana*, cliffs along streams in broad-leaved and mixed forests; 690–1580 m a.s.l.; 28 Nov. 2007, SC 10033 (JNU), 22 Nov. 2008, SC 11151 (JNU), 24 Jun. 2008, VB Kor-7-17-08 (VBGI), 1 Jul. 2008, VB Kor-17-22-08 (VBGI).
- Frullania usamiensis* Steph. – bark of broad-leaved trees in broad-leaved forest; with *Frullania taradakensis*; 234–1584 m a.s.l.; 25 Jun. 2008, SC 10679 (JNU), 18 Sep. 2008, SC 11043 (JNU).
- Geocalyx* cf. *lancistipulus* (Steph.) S. Hatt. – shaded rocks

- along streams in broad-leaved forests; 820 m a.s.l.; 1 Dec. 2007, SC 10156 (JNU), 1 Dec. 2007, SC 10159 (JNU).
- Gymnomitrium alpinum* (Gottsche ex Husn.) Schiffn. – shaded cliffs and rocks in *Quercus* forest; 1421 m a.s.l.; 30 Oct. 2008, SC 11097 (JNU).
- Gymnomitrium commutatum* (Limpr.) Schiffn. – shaded cliffs and rocks in *Quercus* forest; 1421 m a.s.l.; 30 Oct. 2008, SC 11105 (JNU), 30 Oct. 2008, SC 11106 (JNU).
- Hattorianthus erimonus* (Steph.) R. M. Schust. & H. Inoue – humic soil along stream in broad-leaved forest; with *Conocephalum conicum*; 650 m a.s.l.; 19 Mar. 2008, SC 10272 (JNU), 30 Jun. 2008, VB Kor-15-1-08 (VBGI).
- Herbertus aduncus* (Dicks.) Gray – shaded cliffs along stream in broad-leaved forest with admixture of conifers; 723–1234 m a.s.l.; 10 Jul. 2008, SC 10982 (JNU), 18 Aug. 2008, SC 11056 (JNU).
- Herbertus buchii* Juslén – rock outcrops in full sun, broad-leaved forest mixed with conifers and shrubs; 1437–1584 m a.s.l.; 05 Jun. 2008, SC 10682 (JNU), 30 Oct. 2008, SC 11096 (JNU). Although we accept here this taxon at species level, its rank requires further study. Most probably it represents only depauperate form of *H. dicranus*. We studied the isotype of the species (VBGI) and found material very diverse with the most developed plants indistinguishable from typical *H. dicranus*.
- Herbertus dicranus* (Taylor) Trevis. – shaded cliffs in broad-leaved forest mixed with conifers and shrubs, rock outcrops in full sun; in pure mats or with *Plicanthus birmensis*; 690–1580 m a.s.l.; 25 Jun. 2008, SC 10691 (JNU), 10 Jul. 2008, SC 11031 (JNU), 24 Jun. 2008, VB Kor-9-12-08 (VBGI), 1 Jul. 2008, VB Kor-17-43-08 (VBGI).
- Heteroscyphus planus* (Mitt.) Schiffn. – cliffs along stream in broad-leaved forest; 690 m a.s.l.; 1 Jul. 2008, VB Kor-17-3-08 (VBGI); oil-bodies 9–12 per cells, spherical, filling lumen.
- Jubula hutchinsiae* (Hook.) Dumort. ssp. *javanica* (Steph.) Verd – very wet and shaded rocky wall in small grotto; 640 m a.s.l.; 19 Mar. 2008, SC 10277 (JNU), 27 Jun. 2008, SC 10797 (JNU), 27 Jun. 2008, VB Kor-12-6-08 (VBGI).
- Jubula japonica* Steph. – only literature record (Hong 1966).
- Jungermannia atrovirens* Dumort. – wet cliffs and rocks along stream in broad-leaved forest; 600–1245 m a.s.l.; 19 Mar. 2008, SC 10283 (JNU), 14 Apr. 2009, SC 13430 (JNU).
- Jungermannia exsertifolia* Steph. – ant.; cliffs along stream in broad-leaved forest; 720 m a.s.l.; 27 Jun. 2008, VB Kor-14-14-08 (VBGI).
- Kurzia makinoana* (Steph.) Grolle. – per.; cliffs along stream in broad-leaved forest; 580–1446 m a.s.l.; 7 Jun. 2008, SC 10620 (JNU), 15 Apr. 2009, SC 13482 (JNU), 27 Jun. 2008, VB Kor-14-20-08 (VBGI).
- Lejeunea compacta* (Steph.) Steph. – shaded cliffs in broad-leaved forest mixed with conifers and shrubs; in pure mats or with *Jamesoniella autumnalis*; 880–1330 m a.s.l.; 30 Oct. 2008, SC 11126 (JNU), 15 Dec. 2008, SC 11182 (JNU), 25 Jun. 2008, VB Kor-10-10-08 (VBGI).
- Lejeunea japonica* Mitt. – per.; cliffs along streams, very wet and shaded rocky wall in small grotto, fine-grained soil along streams in broad-leaved and mixed forests; in pure mats or with *Chiloscyphus polyanthos*, *Frullania davurica*, *Metzgeria conjugata*, *Xenobla integrifolia*; 640–1446 m a.s.l.; 28 Nov. 2007, SC 10032 (JNU), 15 Apr. 2009, SC 13484 (JNU), 26 Jun. 2008, VB Kor-11-8-08 (VBGI), 1 Jul. 2008, VB Kor-17-10-08 (VBGI).
- Lejeunea parva* (S. Hatt.) Mizut. – very wet and shaded rocky wall in small grotto, cliffs along stream in broad-leaved forest; 662–1444 m a.s.l.; 19 Mar. 2008, SC 10293 (JNU), 30 Oct. 2008, SC 11123 (JNU), 27 Jun. 2008, VB Kor-12-3-08 (VBGI), 27 Jun. 2008, VB Kor-14-18-08 (VBGI); oil-bodies 2–5(6) per cell.
- Lejeunea ulicina* (Taylor) Gottsche – shaded cliffs and rocks in *Quercus* forest; with *Radula cavifolia*, *Cephalozia spinigera*; 1421 m a.s.l.; 30 Oct. 2008, SC 11107 (JNU).
- Lepidozia reptans* (L.) Dumort. – decaying wood in mixed forest; 1576 m a.s.l.; 25 Jun. 2008, SC 10699 (JNU), 25 Jun. 2008, SC 10700 (JNU), 24 Jun. 2008, VB Kor-9-27-08 (VBGI).
- Lioblaena subulata* (A. Evans) Schljakov – per., gemm.; wet cliffs and humic soil in broad-leaved and mixed forests, very wet and shady rocky wall in small grotto; in pure mats or with *Calyptogeia azurea*, *Cephalozia otaruensis*, *Conocephalum conicum*; 580–1160 m a.s.l.; 27 Apr. 2008, SC 10363 (JNU), 15 Dec. 2008, SC 11214 (JNU), 26 Jun. 2008, VB Kor-11-35-08 (VBGI), 1 Jul. 2008, VB Kor-17-18-08 (VBGI).
- Lophocolea bidentata* (Nees) Fulford – wet cliffs and rocks along stream in broad-leaved forest; 723 m a.s.l.; 10 Jul. 2008, SC 10994 (JNU), 10 Jul. 2008, SC 11003 (JNU).
- Lophocolea heterophylla* (Schr.) Dumort. – wet cliffs along stream in broad-leaved forest mixed with conifers; 576–1245 m a.s.l.; 19 Mar. 2008, SC 10242 (JNU), 10 Jul. 2008, SC 10975 (JNU).
- Lophocolea horikowana* S. Hatt. mod. *minuta* – cliffs along stream in broad-leaved forest; 720 m a.s.l.; 27 Jun. 2008, VB Kor-14-10-08 (VBGI).
- Lophocolea itoana* Inoue – decaying wood in broad-leaved forest; 680 m a.s.l.; 1 Dec. 2007, SC 10112 (JNU), 15 Dec. 2008, SC 11187 (JNU).
- Lophocolea minor* Nees. – gemm.; shaded stone in broad-leaved forest; in pure mats or with *Bazzania denudata*, *Marsupella emarginata* var. *tubulosa*; 518–1505 m a.s.l.; 28 Nov. 2007, SC 10041 (JNU), 22 Nov. 2008, SC 11146 (JNU), 24 Jun. 2008, VB Kor-7-3-08 (VBGI).
- Makinoa crispata* (Steph.) Miyake – shaded rocks along stream in broad-leaved forest; 680 m a.s.l.; 02 Apr. 2008, SC 10306 (JNU), 2 Apr. 2008, SC 10307 (JNU).
- Marchantia polymorpha* ssp. *montivagans* Bischl. & Boiselier-Dubayle – fine-grained soil along roadside in broad-leaved forest; 950 m a.s.l.; 24 Jun. 2008, SC 10656 (JNU), 24 Jun. 2008, SC 10671 (JNU), 24 Jun. 2008, VB Kor-8-1-08 (VBGI).
- Marchantia polymorpha* L. ssp. *polymorpha* – wet fine-grained soil along roadside in broad-leaved forest; 580 m a.s.l.; 28 Nov. 2007, SC 10030 (JNU), 22 May 2008, SC 10574 (JNU).
- Marsupella emarginata* (Ehrh.) Dumort. subsp. *tubulosa* (Steph.) N. Kitag. – ant., per.; Shaded stones, rocks, cliffs in broad-leaved and mixed forests; in pure mats or with *Bazzania denudata*, *Lophocolea minor*, *Scapania integerrima*; 640–1580 m a.s.l.; 19 Mar. 2008, SC 10294 (JNU), 15 Dec. 2008, SC 11215 (JNU), 24 Jun. 2008, VB Kor-7-3-08 (VBGI), 27 Jun. 2008, VB Kor-13-4-08 (VBGI).
- Marsupella pseudofunckii* S. Hatt. – per.; cliffs along streams, fine-grained soil along roadside in broad-leaved forests; in pure mats or with *Scapania undulata*; 625–1584 m a.s.l.; 22 May 2008, SC 10509 (JNU), 14 Apr. 2009, SC 13459 (JNU), 24 Jun. 2008, VB Kor-8-3-08 (VBGI), 1 Jul. 2008, VB Kor-17-15-08 (VBGI).
- Marsupella yakushimensis* (Horik.) S. Hatt. – wet cliffs along stream in broad-leaved forest mixed with conifers; 880–1501 m a.s.l.; 24 Jun. 2008, SC 10653 (JNU), 15 Dec. 2008, SC 11209 (JNU), 26 Jun. 2008, VB Kor-11-41-08 (VBGI).



- Metacalyptogeia cordifolia* (Steph.) H. Inoue – wet cliffs along stream in broad-leaved forest with admixture of conifers; 1200 m a.s.l.; 30 Oct. 2007, SC 10018 (JNU), 27 Jun. 2008, SC 10803 (JNU), 26 Jun. 2008, VB Kor-11-40-08 (VBGI).
- Metzgeria lindbergii* Schiffn. – shaded stone, wet cliffs along stream in broad-leaved forests, very wet and shaded rocky walls in small grotto; in pure mats or with *Lejeunea japonica*; 640–1400 m a.s.l.; 28 Nov. 2007, SC 10079 (JNU), 14 Mar. 2009, SC 13410 (JNU), 24 Jun. 2008, VB Kor-7-6-08 (VBGI), 27 Jun. 2008, VB Kor-12-2-08 (VBGI).
- Metzgeria furcata* (L.) Corda – shaded stone in broad-leaved forest on a slope; 1400 m a.s.l.; 24 Jun. 2008, SC 10635 (JNU), 24 Jun. 2008, SC 10651 (JNU), 24 Jun. 2008, VB Kor-7-14-08 (VBGI).
- Metzgeria temperata* Kuwah. – wet cliffs along stream in broad-leaved forest mixed with conifers; 1200 m a.s.l.; 15 Dec. 2008, SC 11190 (JNU), 26 Jun. 2008, VB Kor-11-28-08 (VBGI).
- Nardia assamica* (Mitt.) Amak. – fine-grained soil along roadside in broad-leaved forest; 1234–1458 m a.s.l.; 24 Jun. 2008, SC 10673 (JNU), 18 Sep. 2008, SC 11051 (JNU), 24 Jun. 2008, VB Kor-8-5-08 (VBGI); 1 large oil-body per 15 % midleaf cells, 7.5–10 × 5–7.5 µm.
- Nipponolejeunea pilifera* (Steph.) S. Hatt. – shaded rocks and cliffs in broad-leaved forest mixed with conifers and shrubs and in *Alnus* thicket; 1437–1584 m a.s.l.; 24 Jun. 2008, SC 10636 (JNU), 30 Oct. 2008, SC 11113 (JNU), 24 Jun. 2008, VB Kor-9-5-08 (VBGI), 25 Jun. 2008, VB Kor-10-6-08 (VBGI).
- Odontoschisma denudatum* (Nees) Dumort. – decaying wood in broad-leaved forest; 600–1498 m a.s.l.; 22 May 2008, SC 10563 (JNU), 27 Jun. 2008, SC 10847 (JNU), 27 Jun. 2008, VB Kor-14-1-08 (VBGI).
- Pedinophyllum interruptum* (Nees) Kaal. – shaded rocks in broad-leaved forest; 950 m a.s.l.; 27 Jun. 2008, SC 10858 (JNU), 24 Jun. 2008, VB Kor-8-10-08 (VBGI); oil-bodies 3–7 per midleaf cell.
- Pedinophyllum truncatum* (Steph.) H. Inoue. – per.; cliffs along stream in broad-leaved and mixed forests; in pure mats or with *Jamesoniella autumnalis*, *Trichocoleopsis sacculata*; 690–1200 m a.s.l.; 2 Apr. 2008, SC 10305 (JNU), 10 Jul. 2008, SC 11000 (JNU), 26 Jun. 2008, VB Kor-11-25-08 (VBGI), 1 Jul. 2008, VB Kor-17-12-08 (VBGI); oil-bodies 8–15 per midleaf cell.
- Pellia endiviifolia* (Dicks.) Dumort. – ant.; crevices of shaded rocks in *Alnus* thicket, very wet and shaded rocky wall in small grotto; in pure mats or with *Conocephalum conicum*; 640–1580 m a.s.l.; 28 Nov. 2007, SC 10029 (JNU), 14 May 2009, SC 13586 (JNU), 24 Jun. 2008, VB Kor-9-21-08, 27 Jun. 2008, VB Kor-12-8-08 (VBGI).
- Pellia neesiana* (Gottsche) Limpr. – cliffs in the broad-leaved forest; 998 m a.s.l.; 19 Mar. 2008, SC 10228, 14 Apr. 2009, SC 13461 (JNU), 27 Jun. 2008, VB Kor-13-1-08 (VBGI).
- Plagiochila hakkodensis* Steph. – wet cliffs along stream in broad-leaved forest mixed with conifers; with *Trichocoleopsis sacculata*; 1200 m a.s.l.; 26 Jun. 2008, VB Kor-11-13-08 (VBGI).
- Plagiochila ovalifolia* Mitt. – shaded cliffs and rocks, mainly along stream in broad-leaved and mixed forests; in pure mats or with *Kurzia makinoana*, *Porella fauriei*, *Porella vernicosa*, *Radula japonica*; 720–1580 m a.s.l.; 19 Mar. 2008, SC 10220 (JNU), 19 Mar. 2008, SC 10234 (JNU), 24 Jun. 2008, VB Kor-9-7-08 (VBGI), 30 Jun. 2008, VB Kor-16-19a-08 (VBGI).
- Plagiochila porelloides* (Torrey in Nees.) Lindenb. – wet cliffs and rocks along streams in broad-leaved and mixed forests; 1576 m a.s.l.; 25 Jun. 2008, SC 10703 (JNU).
- Plagiochila sciophila* Nees ex Lindenb. – wet cliffs and rocks along streams in broad-leaved and mixed forests; in pure mats or with *Bazzania tricrenata*; 810–1200 m a.s.l.; 28 Nov. 2007, SC 10069 (JNU), 14 Apr. 2009, SC 13455 (JNU), 26 Jun. 2008, VB Kor-11-20-08 (VBGI), 30 Jun. 2008, VB Kor-16-3a-08 (VAL); oil-bodies 4–7 per midleaf cell, elliptic.
- Plagiochila semidecurrrens* Lehm. et Lindenb. – shaded rocks in *Alnus* thicket; 1580 m a.s.l.; 24 Jun. 2008, VB Kor-9-9-08 (VBGI).
- Plagiochila trabeculata* Steph. – shaded stones, rocks, cliffs, mainly near springs in broad-leaved and mixed forests; in pure mats or with *Blepharostoma trichophyllum*, *Radula japonica*; 950–1400 m a.s.l.; 24 Jun. 2008, SC 10649 (JNU), 25 Jun. 2008, SC 10678 (JNU), 24 Jun. 2008, VB Kor-7-12-08 (VBGI), 26 Jun. 2008, VB Kor-11-4-08 (VBGI).
- Plectocolea erecta* Amakawa – wet cliffs in *Quercus* forest; 1444 m a.s.l.; 15 Apr. 2009, SC 13499 (JNU).
- Plectocolea hyalina* (Lydell) Mitt. – wet fine-grained soil along roadside; 1481 m a.s.l.; 24 Jun. 2008, SC 10633 (JNU), 24 Jun. 2008, SC 10639 (JNU).
- Plectocolea infusca* Mitt. var. *infusca* – ant., arch.; cliffs and rocks mainly near stream in broad-leaved forests; 640–809 m a.s.l.; 27 Apr. 2008, SC 10368 (JNU), 10 Jul. 2008, SC 10996 (JNU), 27 Jun. 2008, VB Kor-13-7-08 (VBGI), 30 Jun. 2008, VB Kor-15-2-08 (VBGI); oil-bodies 3–6 per cell, filling cell lumen.
- Plectocolea infusca* var. *ovicalyx* (Steph.) Bakalin – wet cliffs along stream in broad-leaved forest mixed with conifers; 667–1437 m a.s.l.; 22 May 2008, SC 10549 (JNU), 30 Jun. 2008, SC 10878 (JNU).
- Plectocolea rosulans* (Steph.) S. Hatt. – ant.; wet cliffs and rocks along stream in broad-leaved and mixed forests; 625–998 m a.s.l.; 7 Jun. 2008, SC 10596 (JNU), 14 Apr. 2009, SC 13434 (JNU), 27 Jun. 2008, VB Kor-14-27-08 (VBGI), 30 Jun. 2008, VB Kor-16-20-08 (VBGI); oil-bodies 3–6 per midleaf cell, ovate.
- Plectocolea virgata* Mitt. – ant.; rocks along stream in broad-leaved forest; 591–1584 m a.s.l.; 30 Oct. 2007, SC 10019 (JNU), 14 Apr. 2009, SC 13436 (JNU), 30 Jun. 2008, VB Kor-16-5-08 (VBGI); oil-bodies 2–6 per cell, granulate, mostly spherical, 7.5–10 × 5–7.5 µm.
- Plicanthus birmensis* (Steph.) R. M. Schust – shaded cliffs in broad-leaved forest mixed with conifers and shrubs, rock outcrops in full sun; in pure mats or with *Frullania tamarisci* ssp. *obscura*, *Herbertus dicranus*; 1330–1580 m a.s.l.; 25 Jun. 2008, SC 10688 (JNU), 25 Jun. 2008, SC 10701 (JNU), 24 Jun. 2008, VB Kor-9-12-08 (VBGI), 25 Jun. 2008, VB Kor-10-8-08 (VBGI).
- Plicanthus birtellus* (F. Weber) R.M. Schust. – cliffs along stream in broad-leaved forest; 689 m a.s.l.; 1 Jul. 2008, SC 10962 (JNU).
- Porella caespitans* (Steph.) S. Hatt. – cliffs and rocks along stream in broad-leaved forest; 690–810 m a.s.l.; 30 Oct. 2007, SC 10022 (JNU), 14 Mar. 2009, SC 13407 (JNU), 30 Jun. 2008, VB Kor-16-1-08 (VBGI), 1 Jul. 2008, VB Kor-17-42-08 (VBGI).
- Porella fauriei* (Steph.) S. Hatt. – shaded stones and cliffs in broad-leaved and mixed forests; in pure mats or with *Apometzgeria pubescens*, *Metzgeria furcata*, *Plagiochila ovalifolia*; 810–1400 m a.s.l.; 2 Apr. 2008, SC 10327 (JNU), 14 Apr. 2009, SC 13450 (JNU), 24 Jun. 2008, VB Kor-7-5-08 (VBGI), 30 Jun. 2008, VB Kor-16-16-08 (VBGI).
- Porella gracillima* Mitt. – only literature record (Hong 1966).

- Porella grandiloba* Lindb. – shaded stone, wet cliffs and rocks along stream in broad-leaved and mixed forests; in pure mats or with *Apometzgeria pubescens*, *Metzgeria conjugata*; 690–1400 m a.s.l.; 28 Nov. 2007, SC 10049 (JNU), 14 Apr. 2009, SC 13454 (JNU), 24 Jun. 2008, VB Kor-7-15-08 (VBGI), 1 Jul. 2008, VB Kor-17-50-08 (VBGI).
- Porella japonica* (Sande Lac.) Mitt. – shaded rocks along stream in broad-leaved forest; 680 m a.s.l.; 2 Apr. 2008, SC 10320 (JNU).
- Porella oblongifolia* S. Hatt. – cliffs along stream in broad-leaved forest; 720 m a.s.l.; 27 Jun. 2008, SC 10843 (JNU), 27 Jun. 2008, VB Kor-14-22-08 (VBGI).
- Porella ulophylla* (Steph.) S. Hatt. – ant., per., spor.; cliffs along stream in broad-leaved forest; in pure mats or with *Cephalozia spinicaulis*; 518–880 m a.s.l.; 28 Nov. 2007, SC 10043 (JNU), 5 Dec. 2008, SC 11208 (JNU), 1 Jul. 2008, VB Kor-17-25-08 (VBGI).
- Porella vernicosa* Lindb. – wet cliffs along streams in broad-leaved and mixed forests; 690–1245 m a.s.l.; 28 Nov. 2007, SC 10054 (JNU), 14 Mar. 2009, SC 13404 (JNU), 26 Jun. 2008, VB Kor-11-7-08 (VBGI), 1 Jul. 2008, VB Kor-17-46-08 (VBGI).
- Radula auriculata* Steph. – wet cliffs along stream in broad-leaved mixed forests; 720–1200 m a.s.l.; 26 Jun. 2008, SC 10744 (JNU), 30 Jun. 2008, SC 10875 (JNU), 26 Jun. 2008, VB Kor-11-14-08 (VBGI), 27 Jun. 2008, VB Kor-14-16-08 (VBGI).
- Radula cavifolia* Hampe – shaded cliffs and rocks in *Quercus* forest; with *Lejeunea ulicina*, *Cephalozia spinigera*; 1421 m a.s.l.; 30 Oct. 2008, SC11107 (JNU), 15 Apr. 2009, SC 13486 (JNU)
- Radula constricta* Steph. – shaded cliffs along stream and bark of trees in broad-leaved mixed forests; 576–1421 m a.s.l.; 12 Dec. 2007, SC 10192 (JNU), 15 Dec. 2008, SC 11191 (JNU).
- Radula japonica* Gott. ex Steph. – wet cliffs along stream in broad-leaved forest mixed with conifers, very wet and shady rocky wall in small grotto; in pure mats or with *Blepharostoma trichophyllum*, *Conocephalum japonicum*, *Plagiobhila trabeculata*; 640–1200 m a.s.l.; 1 Dec. 2007, SC 10164 (JNU), 25 Jun. 2008, SC 10733 (JNU), 26 Jun. 2008, VB Kor-11-4-08 (VBGI), 27 Jun. 2008, VB Kor-12-1-08 (VBGI).
- Radula obtusiloba* Steph. – shaded cliffs in broad-leaved forest mixed with conifers and shrubs; 590–880 m a.s.l.; 30 Oct. 2007, SC 10020 (JNU), 15 Dec. 2008, SC 11199 (JNU), 25 Jun. 2008, VB Kor-10-31-08 (VBGI).
- Radula tokiensis* Steph. – wet cliffs in broad-leaved forest; 828 m a.s.l.; 27 Apr. 2008, SC 10386 (JNU).
- Reboulia hemisphaerica* (L.) Raddi subsp. *bemisphaerica* – spor.; cliffs along stream in broad-leaved forest; 518–690 m a.s.l.; 28 Nov. 2007, SC 10045 (JNU), 1 Jul. 2008, SC 10947 (JNU), 1 Jul. 2008, VB Kor-17-44-08 (VBGI).
- Riccardia multifida* (L.) Gray var. *decrescens* (Steph.) Furuki – wet cliffs along stream in broad-leaved forest; 1446 m a.s.l.; 14 Apr. 2009, SC 13448 (JNU).
- Riccia huebeneriana* Lindenb. – wet soil in cultivated field; 660 m a.s.l.; 22 Nov. 2008, SC 11169 (JNU), 22 Nov. 2008, SC 11176 (JNU).
- Scapania ampliata* Steph. – wet cliffs along streams in broad-leaved and mixed forests; 1234–1444 m a.s.l.; 18 Sep. 2008, SC 11060 (JNU), 30 Oct. 2008, SC 11084 (JNU).
- Scapania ciliata* Lac. – per.; shaded cliffs along streams in broad-leaved and mixed forests; in pure mat or with *Bazzania trirenata*, *Cephalozia* sp.; 640–1330 m a.s.l.; 22 May 2008, SC 10494 (JNU), 14 Apr. 2009, SC 13466 (JNU), 25 Jun. 2008, VB Kor-10-12-08 (VBGI), 27 Jun. 2008, VB Kor-14-26-08 (VBGI).
- Scapania integerrima* Steph. – gemm.; shaded rocks and cliffs along streams in broad-leaved, mixed forests, and *Alnus* thickets; in pure mats or with *Bazzania trirenata*, *Marsupella emarginata* var. *tubulosa*; 640–1330 m a.s.l.; 15 Apr. 2009, SC 13497 (JNU), 24 Jun. 2008, VB Kor-9-3-08 (VBGI), 1 Jul. 2008, VB Kor-17-16-08 (VBGI).
- Scapania parvitexta* Steph. – wet rocks along streams in broad-leaved forest; 625 m a.s.l.; 1 Jul. 2008, SC 10911 (JNU).
- Scapania undulata* (L.) Dumort. – arch.; wet cliffs along streams in broad-leaved and mixed forests; in pure mats or with *Jamesoniella autumnalis*, *Marsupella pseudofunckii*, *Trichocoleopsis sacculata*; 690–1200 m a.s.l.; 2 Apr. 2008, SC 10336 (JNU), 14 Apr. 2009, SC 13453 (JNU), 26 Jun. 2008, VB Kor-11-26-08 (VBGI), 1 Jul. 2008, VB Kor-17-38-08 (VBGI).
- Schistochilopsis incisa* (Schrad.) Konstant. – only literature record (Choe 1980).
- Solenostoma emarginatum* (Amakawa) Váňa, Hentschel & J. Heinrichs – wet cliffs along stream in broad-leaved forest; 1060 m a.s.l.; 14 May 2009, SC 13593 (JNU).
- Solenostoma pyriformum* Steph. – fine-grained soil along cliffs in *Quercus* forest; 1446 m a.s.l.; 5 Apr. 2009, SC 13477 (JNU), 5 Apr. 2009, SC 13481 (JNU).
- Tetralopbozia filiformis* (Steph.) Urmi – cliffs along stream in broad-leaved forest; in pure mats or with *Blepharostoma minus*, *Herbertus aduncus*; 690 m a.s.l.; 1 Jul. 2008, SC 10958 (JNU), 1 Jul. 2008, SC 10981 (JNU), 1 Jul. 2008, VB Kor-17-35-08 (VBGI).
- Trichocolea tomentella* (Ehrh.) Dumort. – wet cliffs along streams in broad-leaved forests; 662 m a.s.l.; 27 Apr. 2008, SC 10420 (JNU).
- Trichocoleopsis sacculata* (Mitt.) S. Okamura – wet cliffs along streams in broad-leaved forests; in pure mats or with *Jamesoniella autumnalis*, *Pedinophyllum truncatum*, *Plagiobhila hakkodensis*, *Scapania undulata*; 690–1200 m a.s.l.; 19 Mar. 2008, SC 10257 (JNU), 14 May 2009, SC 13589 (JNU), 26 Jun. 2008, VB Kor-11-13-08 (VBGI), 1 Jul. 2008, VB Kor-17-38-08 (VBGI).
- Trocholejeunea sandvicensis* Mizut. – per., ant., spor.; cliffs along stream in broad-leaved forest; 518–760 m a.s.l.; 28 Nov. 2007, SC 10092 (JNU), 22 Nov. 2008, SC 11136 (JNU), 1 Jul. 2008, VB Kor-17-29-08 (VBGI).
- Xenochila integrifolia* Inoue – shaded rocks and wet cliffs along streams in broad-leaved and mixed forests; in pure mats or with *Jamesoniella autumnalis*; 662–1245 m a.s.l.; 2 Apr. 2008, SC 10302 (JNU), 14 Apr. 2009, SC 13438 (JNU).

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