

## THE FLORA OF BRYOPHYTES ON MT. KWANAK, WITH SOME NEW ADDITIONS TO THE KOREAN FLORA

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洪元植：未記錄種을 包含한 冠岳산의 蘚苔類

### ABSTRACTS

HONG, Won Shic(Catholic Medical College, Seoul, Korea) : *The Flora of Bryophytes on Mt. Kwanak with some new additions to the Korean flora*— Kor. Jour. Bot. 3 (2) 19—26, 1960

1. This study was made on the flora of bryophytes on Mt. Kwanak, which is situated (37°30' N, Lat, 127° 0' E, Long) to the south of Seoul area.

2. The bryophytic flora of this mountain consists of the following elements.

- 1) Holarctic elem, Musci.....16 species (25.0%), Hepaticae.....4 species (28.6%).
- 2) North Pacific elem. M.....1 species (1.56%), H.....O.
- 3) Cosmopolitan elem. M.....10 species (15.65%), H.....1 species (7.1%).
- 4) East-Asiatic elem. M.....16 species (25.0%), H.....4 species (28.6%).
- 5) Tropical elem. M.....3 species (4.68%), H.....3 species (21.4%).
- 6) Japanese-Korean elem. M.....17 species (26.56%), H.....2 species (14.3%).
- 7) Endemic elem. M.....1 species (1.56%), H.....O.

3. In the list of bryophytes of Mt. Kwanak, 62 species, 1 variety and 1 subspecies belonging to 47 genera for Musci and 12 species 2 subspecies belonging to 10 genera for Hepaticae were enumerated. Of these the following 5 species are new to Korean flora.

- 1) *Macromitrium japonicum* D.M.
- 2) *Entodon arenosus* Okam.
- 3) *E. okamurae* Broth.
- 4) *Gollania ruginosa* (Mitt.) Broth.
- 5) *Temnoma birmensis* (St.) Hatt.

### A short sketch of the Briophytic flora

Mt. Kwanak is famous for many temples, beautiful ravines and before long this mountain will be appointed a national park.

Mt. Kwanak, which consists of a group of small mountains, is situated at about 37°30' N. Lat and 127°0' E. Long. Youmzudai, the highest peak rising to an altitude of 629 m. s. m. and consisting of mostly gray granite. During recent years several reports have been published (1,2) on their vegetation, but in those reports the lowerplant's flora, especially the bryoflora has been untouched.

The author have visited the mountains several times since 1959 and collected about 1200 packets of many bryophytes. From the view point of geobotanical flora, the plants of these mountains belong to the middle zone

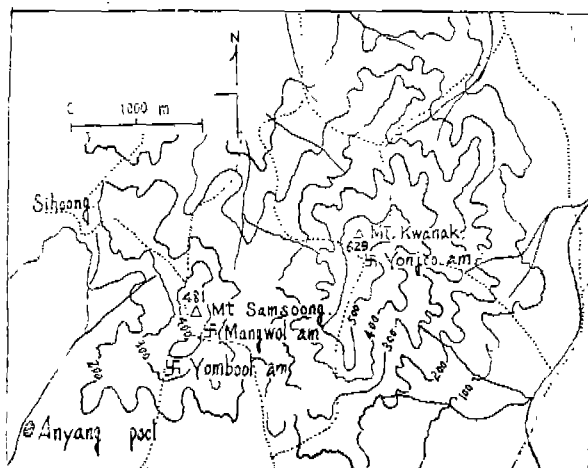


Fig. 1. Map showing the topography of investigated areas

of Korean flora, but the northern type such as *Pinus koraiensis*, *Abies holophylla* and the southern types such as *Pseudotsuga japonica* are mixed in these areas. Like another mountains, almost all the primeval forests (below 400 m. s. m.) have been destroyed, and the lower part of these mountains are occupied by sparse forest of *Pinus densiflora*. So in these areas, generally the moss flora is very poor, but rich mossy vegetation occurs in the upper part (above 400 m. s. m.) and along the valley. In these regions, the author found deciduous trees such as *Quercus serrata*, *Q. mongolica*, *Alnus sibirica*, *A. japonica*, *Rhus javanica*, and shrubs such as *Rhododendron Schlippenbachii*, *R. mucronulatum*, *Buxus koreana* var. *elongata*, *Weigela florida*, *Deutzia prunifolia*.

1) **Along the valley from the Anyang pool to Mt. Samsung;** The main constituent plants of this route are *Buxus koreana* var. *elongata*, *Pinus densiflora*, *Alnus sibirica*, *Quercus serrata*, *Q. acutissima*, *Rhododendron Schlippenbachii*, *R. mucronulatum*. Under the canopy of these trees, especially along the streams, the following species can be observed, *Bryum pseudotriquetrum*, *Mnium cuspidatum*, *M. microphyllum*, *Bartramia pomiformis*, *Philonotis lancifolia*, *Thamnum plicatum*, *Brachythecium buchanani*, *B. rivulare*, *Eurhynchium riparioides*, *Entodon challengerii*, and *E. okamurae*, *Scapania undulata*, *Marsipella parviterata*, *Frullania moniliata* subsp. *obscur*.

2) **Near the Sammak temple;** In this area, good primeval forests consist of such trees as *Populus Maximowiczii*, *P. davidiana*, *Salix babylonica*, *Alnus japonica*, *Quercus acutissima*, *Q. mongolica*, *Zelkova serrata*. Under the canopy of these forests, especially on the shady and moist rocks, the following species can be observed, *Fissidens cristatus*, *Campylopus japonicus*, *Dicranum scoparium*, *Mnium microphyllum*, *Bartramia pomiformis*, *Thamnum plicatum*, *T. sandei* var. *coreense*, *Okamurae hakoniensis*, *Thuidium toyamae*, *Brachythecium rivulare*, *Entodon griffithii*, *Gollania ruginosa*, and *Pogonatum spinulosum*.

3) **Along the route from Kwachon valley to Yonmzu temple;** On this route the author also found deciduous forest consisting of such trees as *Acer mono*, *A. pseudo-Sieboldianum* var. *koreanum*, *Quercus aliena*, *Q. mongolica*, *Alnus sibirica*, and *Populus Maximowiczii*. Especially along the streams, large pure community of *Impatiens textori* are occur. The author collected many specimens of moist moss in that area such as *Eurhynchium riparioides*, *Philonotis lancifolia*, *Brachythecium rivulare*, *B. flagellare*, *Entodon okamurae*, *Mnium cuspidatum*. A large mass of *Eurhynchium riparioides* grows well in the water in that area.

4) **Along Sihung route;** Good forests are located near Sihungri, and these forests have been protected by private owners for many years. So in this area, the moss vegetation is rich. Many species of moss and hepaticae

are found; for example, *Polytrichum formosum*, *Atrichum undulatum*, *Dolichotheca perrobusta*, *Plagiothecium silvaticum*, *Entodon griffithii*, *Haplodadium microphyllum*, *Cladopodium subpiliiferum*, *Anomodon rugelii*, *Okamurae hakoniensis*, *Furiella tenuis*, *Macromitrium gymnostomum*, *M. japonicum*, *Lophocolea minor*, *Temnoma birmensis*, *Scapania undulata*, *Porella gracilima*, *P. ulophylla*, *P. vernicosa* ssp. *vernicosa*, *Frullania japonica*, *F. moniliata* ssp. *obscur*, and *Metzgeria conjugata*.

5) **Along the valley from the pool to Mangwol Temple;** *Rhus javanica*, *Rhododendron schlippenbachii*, *R. mucronulatum*, *Lespedeza maximowiczii* are main constituent plants of this route. Near the

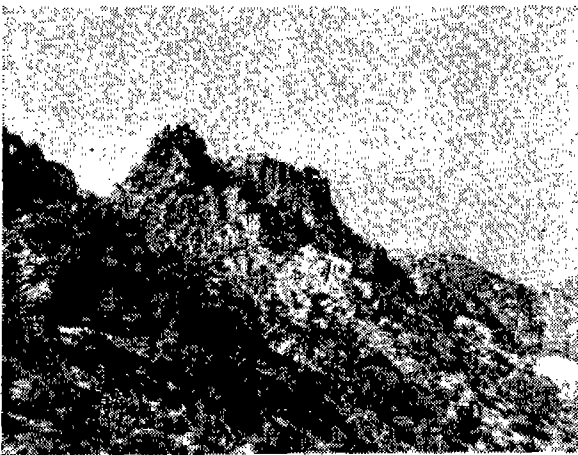


Fig. 2. The highest peak of Mt. Anwanak

temple occurs a large community of *Mnium microphyllum*, *M. cuspidatum*, *Bartramia pomiformis*, and *Dicranum scoparium*.

6) **Along the valley from pool to the highest peak;** Along the streams, the author found many huge trees such as *Quercus aliena*, *Q. acutissima*, *Q. serrata*, *Pinus densiflora*, *P. koraiensis*, and near the streams occurred a large pure community of *Impatiens textori*, *Mukdenia rossi* var. *typica*. Some epiphytic bryophytes occurred on the trunks of these trees, *Grimmia pilifera*, *Hedwiga ciliata*, *Anomodon giraldii*, *A. minor*, *A. rugelii*, *Herpetineuron tocosa* occurred on the exposed rocks near the highest peak.

A total of 57 genera and 78 species were identified from among the collections. The following table summarizes the phytogeographical considerations.

Geographical distribution	Musci	Hepaticae
Holarctic elem.	16 species (25.0%)	4 species (28.6%)
North Pacific elem.	1 species (1.56%)	0
Cosmopolitan elem.	10 species (15.65%)	1 species (7.1%)
East Asiatic elem.	16 species (25.0%)	4 species (28.6%)
Tropical elem.	3 species (4.68%)	3 species (21.4%)
Japane-Korean elem.	17 species (26.56%)	2 species (14.3%)
Endemic elem.	1 species (1.56%)	0
Species in Total.	64 (100%)	14 (100%)

The above list is based mainly on his collections. As shown in the above list, the flora mainly consists of Japan-Korean element, Holarctic element and East Asiatic element. T. Osada formerly reported that *Thuidium recognitum* is the most common genus *Thuidium* in North Korea, while *T. toyamae* is the most common species in Japan. But in this area the author could not collect *T. recognitum*.

In this area, Japanese-Korean elements such as *Onchophorus crispifolius*, *Leucobryum glaucum*, *Racomitrium carinatum*, *Philonotis lancifolia*, *Fauriella tenuis*, *Schwetckheopsis denticulata*, *Rhynchostegium pallidifolium*, *Entodon arenosus*, and *E. okamurae* are widely distributed.

In this area the author could not find species of Funariaceae, Aulacomniaceae, Ptychomitriaceae, Climaceae, Cryphaeaceae, Hylacomniaceae, but these species occur in Mt. Soyo (3) and Dobong to north of Seoul City.

The species preceded by an asterisk are new additions to the Korean flora. The author wishes to express his thanks to Prof. H. Ando (Musci & Hepaticae), Prof. H. Inoue (Hepaticae), Dr. A. Noguchi (Musci) and Dr. S. Hattori (Hepaticae) for the identification of many specimens.

## EAUMERATION OF SPECIES

### Musci

#### Fissidentaceae

*Fissidens cristatus* Wils. 220 m, on moist rocks (+ *Metzgeria conjugata*) (10184), 430 m, on moist rocks (+ *Ctenidium capillifolium*, + *Porella grandiloba*, + *Metzgeria conjugata*), (10112), 520 m, on rocks (10223) 600 m, on rocks (+ *Ctenidium capillifolium*, + *Brachythecium populeum*), (10230),

### Ditrichaceae

*Ditrichum pallidum* (Hedw.) Hampe. 80m, on soil, (+ *Hypnum plumaeforme*) (10086), 90 m, on soil, (+ *Hypnum plumaeforme*), (10175).

### Dicranaceae

*Dicranella heteromalla* (Hedw.) Schimp. 250 m, on soil, (1472), 430 m, on rocks (1487).

*Campylopus japonicus* Broth. 90 m, on soil (10375) (10378), 110 m, on moist rocks, (+ *Hypnum plu-*

*maeforme*, + *Philonotis lancifolia*) (10261), 330m, on rocks, (+ *Thuidium toyamae*), (10416), 450m, on rocks, (1505),

*Onchophorus crispifolius* (Mitt.) Lindb. 430 m, on rocks, (+ *Isopterygium* sp.) (1493).

*Dicranum scoparium* Hedw. 430m, on moist rocks, (+ *Atrichum undulatum*, + *Hypnum plumaeforme*), (10340), 380m, on rocks, (10056), (10073-75) 450m, on rocks, (+ *Hypnum plumaeforme*), (10323),

#### Leucobryaceae

*Leucobryum glaucum* (L.) Schimp. 90 m, on soil, (+ *Hypnum plumaeforme*), (10365), 420 m, on logs (1561).

#### Pottiaceae

*Weissia controversa* Hedw. 100m, on rocks (10282), 200 m, on rocks (10245), 230 m, on rocks (10245), 230m, on rocks (10333), 260 m, on soil (+ *Thuidium toyamae*), 300 m, on rocks (10227), 310 m, on rocks (10155), 420 m, on rocks, (10246).

#### Grimmiaceae

*Grimmia pilifera* P. Beauv. 180 m, on rocks (10191), 200 m, on rocks (10243), 310 m, on rocks, (+ *Brachiolejeunia sandvicensis*, + *Frullania moniliata*), (10171), on rocks, (+ *Haplohymenium triste*, + *Frullania moniliata*), (10088), 440 m, on rocks, (+ *Frullania moniliata*). (10136). 550m, on rocks, (+ *Hedwigia ciliata* + *Cladonia* sp.), (10114),

*Rhacomitrium anomodontoides* Card. 390 m, on wet rocks (1531).

*Rh. canescens* (Hedw.) Brid. 100 m, on soil, (10229), 200 m, on rocks, (1324).

*Rh. carinatum* Card. 220 m, on rocks (1558) 420 m, on rocks (1546).

*Rh. heterostichum* (Hedw.) Brid. 450 m, on rocks, (1485).

#### Bryaceae

*Bryum pseudotriquetrum* (Hedw.) Schwaegr. 200 m, on wet rocks, (1474).

#### Mniaceae

*Mnium cuspidatum* Hedw. 100m, on soil, (10237), 430 m, on rocks, (+ *Metzgeria conjugata*). (10290), on logs, (+ *Cladopodium subpiliferum*, + *Ctenidium catbillifolium*) (1520).

*M. microphyllum* Doz. et Mok. 260 m, on rocks (10308), 310m, on wet rocks, (10284), 340m, on wet rocks, (+ *Atrichum undulatum*), (10343), 410 m, on wet rocks, (+ *Atrichum undulatum*). (10307). 430 m, on rocks, (+ *Atrichum undulatum*). (10276), on logs, (+ *Bartramia pomiformis*, + *Myuroclada concinna*), (10309), 450 m, on rocks, (10324),

#### Bartramiaceae

*Bartramia pomiformis* Hedw. 350 m, on rocks, (+ *Mnium microphyllum*, + *Atrichum undulatum*, + *Thuidium toyamae*), (10320), 450m, on rocks (1548). 430 m, on soil, (+ *Thuidium toyamae*, + *Atrichum undulatum*), (10376), on rocks, (+ *Mnium microphyllum*, + *Atrichum undulatum*) (10315), 410 m, on soil, (+ *Mnium microphyllum*), (10353), 450 m, on rocks, (+ *Thuidium toyamae*, + *Mnium microphyllum*) (10300).

*Philonotis lancifolia* Mitt. 110 m, on rocks, (+ *Polytrichum formosum*), (10201), 200m, on wet rocks, (10313), 250m, on wet rocks, (10313), 250m, on wet rocks (10154), (10219), 330 m, on wet rocks (10055), 360 m, on wet rocks, (10200), 390 m, on wet rocks, (10150).

#### Orthotrichaceae

*Macromitrium clastophyllum* Card. 430m, on rocks, (+ *Frullania moniliata* ssp. *obscura*, + *Haplohymenium triste*, + *Grimmia pilifera*), (1498),

*M. gymnostomum* Sull. et Lesq. 400 m, on rocks (1563).

*M. japonicum* D.M. 200 m, on rocks, (+ *Brachiolejeunia sandvicensis*). (10821), 210 m, on rocks, (+ *Frullania moniliata*, + *Brachiolejeunia sandvicensis*) (10159). 370 m. on rocks, (+ *Frullania moniliata*, + *Brachiolejeunia sandvicensis*), (10070), 520 m, on rocks, (+ *Frullania moniliata*, + *Haplohymenium triste*, + *Brachythecium populium*), (10180).

#### Hedwigiaceae

*Hedwigia ciliata* (Hedw.) P. Beauv. 310m, on rocks, (+ *Grimmia pilifera*), (10241), 380 m, on rocks, (10069), 410m, on rocks, (10291), 450m, on rocks, (10337), 460 m, on rocks, (10067), 550 m, on rocks, (+ *Grimmia pilifera*), (10114), 600m, on rocks (10096).

#### Leucodontaceae

*Leucodon coreensis* Card. 450m, on rocks, (+ *Oka-*

*murae hakoniensis*, (= *Hypnum plumaeforme*), (10387), on rocks, (= *Thuidium toyamae*, + *Hypnum plumaeforme*) (10257).

## Neckeraceae

*Homalia trichomanoides* (Hedw.) B.S.G. 530m, on rocks, (1526).

*Thamnum plicatulum* Lac. 430 m, on rocks, (+ *Haplohymenium triste*, + *Porella vernicosa*), (10093), 450m, on rocks, (= *Thuidium toyamae*, + *Porella vernicosa*), (10272).

*T. sandei* Besch var. *coreense* Card. 330 m, on rocks (1557).

## Theliaceae

*Fauriella tenuis* (Mitt.) Card. 430 m, on rocks. (10314).

## Fabroniaceae

*Schwetschkeopsis denticulata* ssp. *japonica* (Besch.) Iwatsuki. 310m, at basal parts of trees, (+ *Okamurae hakoniensis*, + *Frullania japonica*), (10083), 380m, on rocks, (10197), 430 m, on rocks, (1494), 450 m, on logs, (+ *Lejeunea* sp.) (10400).

## Leskeaceae

*Okamurae brachydictyon* (Card.) Nog. 320 m, on logs (1552).

*O. hakoniensis* (Mitt.) Broth. 100m, on rocks, (10249), 220 m. on rocks, (+ *Metzgeria conjugata*), (10224), 310m, at basal parts of trees, (+ *Schwetschkeopsis denticulata*, + *Frullania japonica*), (10083). 420 m, on rocks. (+ *Haplohymenium triste*, + *Thuidium toyamae*, + *Peltigera* sp.). (10089), 450 m, on rocks, (= *Thuidium toyamae*), (10258). 530m, on rocks, (= *Hypnum plumaeforme*). (10102).

## Thuidiaceae

*Miyabea rotundifolia* Card. 320m, on rocks (1554).

*Haplohymenium triste* (Cesati) kindb. 200 m, on rocks, (+ *Grimmia pilifera*, + *Brachiolejeunia sandvicensis*), (10158), 320m, on rocks, (+ *Frullania moniliata*), (10414), 410m, on rocks, (+ *Hedwigia ciliata*, + *Grimmia pilifera*), (10330).

*Anomodon giraldii* C. Muell. 400 m, on rocks, (+ *Frullania moniliata*), (10287), 420 m, on rocks (1518), 430 m, at basal parts of trees, (+ *Entodon* sp.).

*A. rugelii* (C. Muell.) Keissl. 420 m, on rocks,

(1519), on rocks, (= *Porella grandiloba*), (1534),

*Herpetineuron toccoa* (Sull. et Lesq.) Card. 220m, on rocks (10174), 310m, on rocks (10169), 420m, on rocks (= *Haplohymenium triste*, + *Cladonia* sp.), (10097), 530m, on rocks, (+ *Fissidens cristatus* + *Cladonia* sp.) (10125).

*Cladopodium subpiliiferum* (Lindb. et Arn.) Broth. 90 m, on soil, (1482).

*Hypocladium microphyllum* (Schwaegr.) Broth. 90 m. on soil. (+ *Atrichum undulatum*, + *Hypnum plumaeforme*, + *Cladonia* sp.), (10372), 360m, on logs, (+ *Brachythecium populeum*). (10391), 430m, (+ *Hypnum plumaeforme*, + *Pogonatum inflexum*), (10402).

*Thuidium toyamae* Nog. 420m, on rocks, (+ *Okamurae hakoniensis*, + *Haplohymenium triste*, + *Peltigera* sp.) (10089), 430m, on soil, (+ *Bartramia pomiformis*, + *Atrichum undulatum*) (10273); 520 m, on rocks, (= *Porella grandiloba*, + *Metzgeria conjugata*), (10235).

## Amblystegiaceae

*Campylium chrysophyllum* (Brid.) Bryhn. 90m, on rocks, (1514), 260m, on logs, (10370). 430m, on rocks, (+ *Metzgeria conjugata*), (1541),

## Brachytheciaceae

*Brachythecium buchanani* (Hook.) Jaeg. 520m, on logs (= *Entodon challengerii*) (122).

*B. flagellare* (Hedw.) Jenn. 430 m, on rocks, (10090), 450m, on rocks (+ *Thuidium toyamae*), (10280),

*B. populeum* (Hedw.) B.S.G. 100m, on logs, (10266), 310m, on rocks, (+ *Grimmia pilifera*), (10188), 430 m, on rocks, (+ *Thuidium toyamae*, + *Anomodon giraldii*, + *Frullania moniliata*), (10115), 530 m, on rocks, (+ *Brachiolejeunia sandvicensis*) (10189),

*B. rivulare* (Bruch.) B.S.G. 260 m, on wet rocks (1477), 340 m, on wet rocks, (1484).

*Myuroclada maximowiczii* (Borosz.) Steere et Schofield. 430 m, on rocks, (+ *Mnium microphyllum*). (10270).

*Rhyncostegium pallidifolium* (Mitt.) Jaeg. 310m, on rocks covered with humus, (10077), 410m, on rocks, (+ *Metzgeria conjugata*), (10327).

*Eurhynchium riparioides* (Hedw.) Rich, 260m, on wet rocks (1455).

## Entodontaceae

\* *Entodon crenosus* Okam. 340m, on rocks (1506).

*E. challengerii* (Par.) Card. 200m, on rocks, (1036 1), 520m, on logs, (+ *Brachythecium buchananii*), (15 22), 550m, at basal parts of trees, (1536) (10113).

*E. griffithii* (Mitt.) Jaeg. 80m, on rocks (1509), 380m, on rocks, (10389),

\* *E. okamurce* Broth. 210m, on rocks (1488) 430 m, on wet rocks (1513).

## Plagiotheciaceae

*Plagiothecium silvaticum* (Brid.) B.S.G. 310 m, on rocks, (1520).

## Sematophyllaceae

*Clastobryella tsunodae* (Broth. et Yasuda) Broth. 220m, on logs, (10225), 380m, on logs (10196),

*Brotherella yokohamae* (Broth.) Broth. 400m, at basal parts of trees, (+ *Brachythecium populeum*), (10327). 480m, at basal parts of trees, (10193). 500 m, at basal parts of trees, (+ *Hypnum plumaeforme*), (10095), 600m, on logs, (10209).

## Hypnaceae

*Homomallium leptothallum* (C. Mell) Nog. 460m, on rocks, (1539).

*Hypnum oldhamii* (Mitt.) Lindb. 90m, on soil, (+ *Polytrichum formosum*), (10079), 230m, on rocks (1 547).

*H. plumaeforme* Wils. 80m, on soil, (+ *Ditrichum pallidum*), (10053), 250m, on soil (+ *Pogonatum inflexum*), (10351), 370m, on rocks, (10164), 430m, on rocks, (+ *Okamurae hakoniensis*, + *Peltigera* sp.) (1 0274).

*Dolichotheca perrobusta* (Broth.) Broth. 200m, on logs (10409), 390m, on rocks, (+ *Frullania moniliata*) (10152).

*Taxiphyllum taxirameum* (Mitt.) Fl. 400m, on rocks (1544).

*Ctenidium capillifolium* (Witt.) Broth. 90m, on rocks, (+ *Campylium chrysophyllum*), (1514), 100m, on rocks, (10364), 200m, on logs, (10338), 380m, on rocks, (10277), 450m, on rocks, (+ *Anomodon giraldii*), (10396).

## Rhytidiaceae

*Gollania ruginosa* (Mitt.) Broth. 420m, on rocks,

(1537).

## Polytrichaceae

*Atrichum undulatum* (Hedw.) P. Beauv. 90m, on soil (10254), 200m, on soil, (1503), 310m, on rocks, (+ *Thuidium toyamae*, + *Hypnum plumaeforme*), (10 281). 350m, on rocks, (+ *Mainium microphyllum*, + *Thuidium toyamae*), (10320), 430m, on rocks, (+ *Clenidium capillifolium*, + *Porella vernicosa*), 430m, on soil, (+ *Bartramia pomiformis*, + *Thuidium toyamae*), (10273), 500m, on logs, (10222)

*Pogonatum inflexum* (Lindb.) Par. 250m. on soil, (1501), 420m, on rocks, (10240), 460m, on soil (102 10).

*P. spinulosum* Mitt. 90m, on soil (+ *Hypnum plumaeforme*), (10359), 310m, on soil, (+ *Atrichum undulatum*), (10352), 370m, on rocks, (10286). 410m, on rocks, (10279), 430m, on soil (10331).

*Polytrichum formosum* Hedw. 90m, on soil, (+ *Hypnum oldhamii*), (10030), 420m, on rocks (1565).

## Hepaticae

## Cephaloziaceae

*Cephaloziella jishibae* (St.) Hatt. 390m, on wet rocks (1630).

## Harpanthaceae

*Lophocolea minor* Nees. 90m, on rocks, (+ *Haplodadium* sp.) (1515), 410m, on rocks covered with humus, (1476), 430m, on logs, (1490). 450m, at basal parts of trees, (1504).

## Lophoziaceae

\* *Temnoma birmensis* (St.) Hatt. 220m, on rocks, (1473), 450 m, on rocks, (1475).

## Scapaniaceae

*Scapania undulata* (L.) Dum. 260 m, on wet rocks, (1512).

## Marsupellaceae

*Marsupella parvitexta* Steph. 350m, on rocks, (14 81).

## Porellaceae

*porella gracilima* Mitt. 430m, on rocks, (+ *Homalia trichomitria*), (1523).

*P. grandiloba* Lindb. 220m, on rocks, (10183), 520 m, on logs, (1533).

*P. Ulophylla* (Steph.) Hatt. 400m, on rocks

*Frullania* so.) (1486).

*P. vernicosa* Lindb. ssp. *vernicosa* 420m, on logs (+ *Haplohymenium triste*), (10100), 430m, on rocks covered with humus, (+ *Thamnum plicatulum*, + *Haplohymenium triste*), (10093).

Frullaniaceae

*Frullania japonica* Sde, Lac. 310m, at basal parts of trees, (+ *Okamurae hakoniensis*, + *Schwetschkeopsis japonica*). (10083). 400m, on rocks, (+ *Anomodon giraldii*, + *Haplohymenium triste*), (10317).

*F. moniliata* ssp. *obscura* Verd. 210m, on rocks, (- *Macromitrium japonicum*), (10101), 320m, on rocks, (+ *Brachythecium* sp.). (10271), 370m, on rocks, (+ *Macromitrium japonicum*, + *Brachiolejeunia sandvicensis*), (10071), 400m, on rocks, (+ *Anomodon giraldii*, - *Haplohymenium triste*), (10317). 430m, on rocks, (- *Haplohymenium triste*), (10116), on rocks, (+ *Lejeunea* sp.) (1480).

Lejeuneaceae

*Brachiolejeunea sandvicensis* (Gott.) Evans, 200m, on rocks, (- *Frullania moniliata* ssp. *obscura*), (1542). 300m, on rocks, (- *Macromitrium japonicum*, + *Ptychomitrium sinense*), (10217), 310m, on rocks, (+ *Frullania moniliata*, - *Grimmia pilifera*), (10211). 370 m, on rocks, (- *Frullania moniliata*, + *Macromitrium japonicum*), (10072), 430m, on rocks (+ *Haplohymenium triste*, - *Okamurae hakoniensis*). (10305).

Metzgeriaceae

*Metzgeria conjugata* Lindb. 220m, on rocks, (+ *Fissidens cristatus*). (10184). 410m, at basal parts of trees, (10225). 430m, on rocks, (+ *Ctenidium capillifolium*), (10133)

Rebouliaaceae

*Reboulia hemisphaerica* (L.) Raddi, 90m, on wet rocks, (1517).

要 約

冠岳山一帶의 蘚苔類를 1959년부터 60년까지 주로 日曜日과 放學等を 利用해 (1) 安養~三幕寺 (2) 泉川~戀主庵 (3) 安養~望月庵 (4) 始興~三聖山 (5) 安養~戀主庵의 코오스를 주로 溪谷을 따라가면서 約 1200包를 採集했는데 그 中 蘚類는 62種, 1變種, 1亞種, 47屬에 達했고 苔類는 12種, 2亞種, 10屬에 達했다.

한편 地理的 分布概觀을 보면 다음과 같다.

	北周極要素	北太平洋要素	全世界要素	東亞要素	熱帶要素	日本-韓國要素	固有要素	總種數
蘚類	16(25.0%)	1(1.56%)	10(15.63%)	16(25.0%)	3(4.68%)	17(26.65%)	1(1.56%)	64
苔類	4(28.6%)	0	1(7.1%)	4(28.6%)	3(21.4%)	2(14.3%)	0	14

그리고 다음의 蘚類 四種과 苔類 1種은 韓國未記錄種이다.

蘚類

- *Macromitrium japonicum* D. M.
- *Entodon arenosus* Okam.
- *E. okamurae* Broth.
- *Gollania ruginosa*(Mitt.) Broth.

苔類

- *Temnoma birmensis* (St.) Hatt.

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