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Lichens of Ozegahara Moor and its Adjacent Areas, Central Japan

By

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柏谷博之[1)]*・井上正鉄[2)]・文　光喜[3)]・佐々木弘次郎[4)]：尾瀬ヶ原及びその周辺地域の地衣類

Ozegahara is located in central Honshu covering 1400 square kilometers. The area contains marsh (elevation ca 1400 m) and lakes surrounded by mountains such as Mt. Hiuchi (2356 m) on the north, Mt. Shirao (2003 m) on the south, and Mt. Shibutsu (2228 m) on the west (Fig. 1). It has been preserved as part of the Nikko National Park.

The vegetation of the marsh was summarized by Miyawaki and Fujiwara (1970). The marsh is mostly composed of high- and low-moors; the high-moor which includes *Sphagnum* spp., *Andromeda plifolia*, *Carex limosa* and *Moliniopsis japonica*. The low-moor includes *Phragmites communis* and *Osmundastrum cinnamomeum* var *asiaticum*. Shrubs composed of *Alnus japonica*, *Fraxinus mandshurica*, *Malus sieboldii*, *Larix leptolepis* and *Sorbus commixta* are scattered in and around the marsh.

The mountains surrounding the marsh are covered with thick forests. At elevations between 1450–1700 m, broad-leaved deciduous forests dominated by *Fagus crenata*, *Viburnum furcatum*, *Betula ermanii*, *Carpinus* spp. and *Quercus mongolica* var. *grosseserrata*. At higher elevations at 1900–2100 m, coniferous forests dominated by *Abies mariesii* mixed with *Tsuga diversifolia* are developed. In addition, small-scale high-moors such as Hirosawatashiro, Kumasawatashiro, Kamitashiro etc., are scattered on the northern slope of Mt. Hiuchi.

Rocky outcrops are common on the summit areas of Mt. Hiuchi and Mt. Shibutsu have rocky outcrops and gravel areas are often covered with *Pinus pumila*, *Rhododendron brachycarpum* and *Vaccinium* spp. The outcrops of Mt. Hiuchi are mainly composed of igneous rocks, whereas those of Mt. Shibutsu of serpentine rocks.

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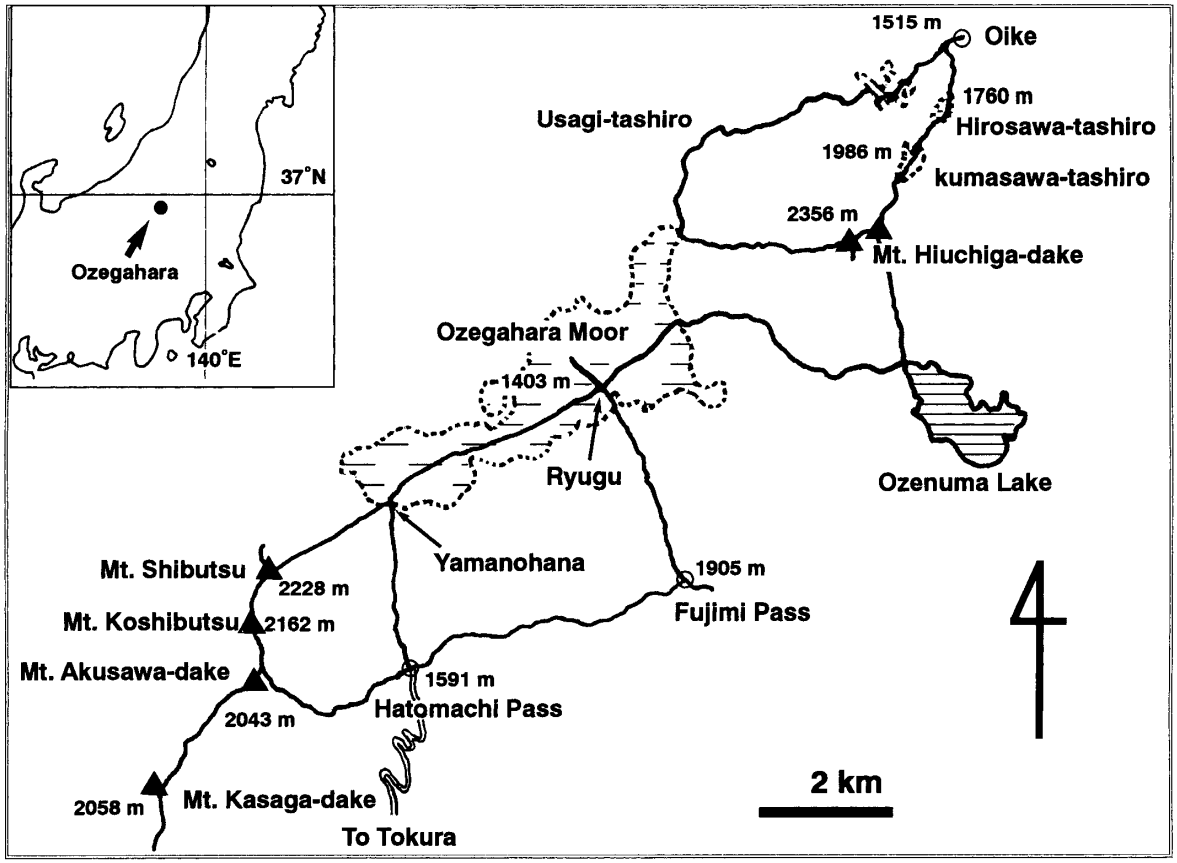

Fig.1. Ozegahara moor and its adjacent area showing routes of investigation (solid lines).

Lichens of the present area were first studied by Asahina (1952) who reported 75 taxa (51 species, 13 varieties and 11 forms), most of which were foliose and fructose lichens. Some of them, however, are required to be revised by the current taxonomic knowledge.

Materials and Methods

The authors carried out a field survey of lichens on the Ozegahara marsh and the adjacent areas including Mt. Hiuchi, Mt. Kasagatake and Mt. Shibutsu under the project of Natural History Researches of the Kanto plain, its northern mountains and their adjoining areas (II) organized by the National Science Museum, Tokyo. Collections of lichens were made in October 6–11, 2001 along mountain trails in this area as shown in Fig. 1. Through the survey, 1450 specimens of lichens were collected and the results of the taxonomic studies are presented in this paper. In addition to them, specimens collected from the present area and preserved in TNS are also used for this study. All the specimens examined are kept in the herbarium of the National Science Museum, Tokyo (TNS). Most specimens of *Arthonia*, *Buellia*, *Caloplaca*, *Lepraria*, *Rinodina* and *Verrucaria* are excluded from the present study, as further taxonomic revisions are required for them. Some of the following genera are retained undetermined with the same reason; they are *Bacidia*, *Collema*, *Lecanora*, *Parmeliella* and *Pyrenula*.

Chemistry of specimens was studied by means of thin layer chromatography (Culberson & Johnson, 1982) or microcrystal tests if necessary. Only the solvent B system was employed for TLC

tests. Sections of apothecia and thalli for anatomical studies were cut by hand-razor and mounted in GAW or lactophenol cotton-blue solutions. The ascus structure was examined using by Lugol's iodine solution (Purvis *et al.*, 1992).

List of Localities

The following abbreviations indicate the localities where fieldworks were carried out. They are listed below in alphabetical order.

1) Akusawa–Mt. Kasagadake... Prov. Kohzuke (Pref. Gunma): en route from Mt. Akusawadake to Mt. Kasagadake, Katashina-mura, Tone-gun. Trail along ridge partly covered with *Abies mariesii*, elevation 2040–2054 m, October 9 and 11, 2001.

2) Fujimi–Ryugu...Prov. Kohzuke (Pref. Gunma): en route from Fujimi Pass to Ryugu Lodge, Ozegahara, Katashina-mura, Tone-gun. *Fagus crenata* forest with *Quercus mongolica* var. *grosseserrata* and *Betula ermanii*, elevation 1900–1400 m, October 10, 2001.

3) Hatomachi–Mt. Akusawa... Prov. Kohzuke (Pref. Gunma): en route from Hatomachi Pass to Mt. Akusawa-dake, Katashina-mura, Tone-gun. *Fagus crenata* forest mixed with *Quercus mongolica* var. *grosseserrata*, *Betula ermanii* and *Abies mariesii*, elevation1600–1860 m, October 9, 2001.

4) Hatomachi–Fujimi... Prov. Kohzuke (Pref. Gunma): en route from Hatomachi Pass to Fujimitashiro, Katashina-mura, Tone-gun. *Fagus crenata* forest mixed with *Quercus mongolica* var. *grosseserrata* and *Betula ermanii*, elevation 1590–1900 m, October 10, 2001.

5) Hatomachi–Yamanohana... Prov. Kohzuke (Pref. Gunma): en route from Hatomachi Pass to Yamanohana, Katashina-mura, Tone-gun. *Fagus crenata* forest mixed with *Betula ermanii*, *Quercus mongolica* var. *grosseserrata*, *Larix leptolepis*, *Tsuga diversifolia* etc. elevation 1400–1600 m, October 10 and 11, 2001.

6) Hirosawa–Kumasawa... Prov. Iwashiro (Pref. Fukushima): en route from Hirosawatashiro to Kumasawatashiro, N slope of Mt. Hiuchi, Hinoemata-mura, Minamiaizu-gun. Open bog with scattered *Abies mariesii*, *Pinuspumila*, *Rhododendron*, *Tsuga* and *Thujopsis*, elevation 1740–1800 m, October 7, 2001.

7) Kumasawa–Mt. Hiuchi... Prov. Iwashiro (Pref. Fukushima): en route from Kumasawatashiro to the top of Mt. Hiuchi, Hinoemata-mura, Minamiaizu-gun. *Abies mariesii* forest mixed with *Sorbus commixta* and *Rhododendron*, elevation 1800–2200 m, October 7, 2001.

8) Miike–Hirosawa... Prov. Iwashiro (Pref. Fukushima): en route from Miike to Hirosawatashiro, N slope of Mt. Hiuchi, Hinoemata-mura, Minamiaizu-gun. Mixed forest mixed with *Abies*, *Fagus*, *Larix*, *Tsuga* and *Thujopsis*, elevation 1500–1720 m, October 7, 2001.

9) Miike–Usagi... Prov. Iwashiro (Pref. Fukushima): en route from Miike to Usagitashiro along the Hiuchiura trail, Mt. Hiuchi, Hinoemata-mura, Minamiaizu-gun. Open gentle slope with scattered *Larix kaempferi* and *Quercus mongolica* var. *grosseserrata*, elevation 1450–1500 m, October 7, 2001.

10) Mt. Hiuchi summit... Prov. Iwashiro (Pref. Fukushima): around the top of Mt. Hiuchi, Hinoemata-mura, Minamiaizu-gun. Open crag with scattered *Pinus pumila*, *Rhododendron*, stunted *Abies*, *Acer* and *Sorbus*, elevation 2300–2346 m, October 7, 2001.

11) Mt. Kasagatake summit... Prov. Kohzuke (Pref. Gunma): around the top of Mt. Kasagatake, Katashina-mura, Tone-gun. Rocky slope with *Pinus pumila* and stunted *Abies*, elevation 2000–2050 m, October 11, 2001.

12) Mt. Koshibutsu summit... Prov. Kohzuke (Pref. Gunma): around the top of Mt. Koshibutsu,

Katashina-mura, Tone-gun. Rocky slope of serpentine rocks along ridge, elevation 2000–2200 m, October 11, 2001.

13) Mt. Shibutsu–Yamanohana... Prov. Kohzuke (Pref. Gunma): en route from Mt. Shibutsu to Yamanohana Lodge, Ozegahara, Katashina-mura, Tone-gun. Rocky slope of serpentine rocks along ridge, elevation 2200–1900 m, October 9, 2001

14) Oyama–Kasagatake... Prov. Kohzuke (Pref. Gunma): en route from Oyamasawa–tashiro to Mt. Kasagatake via Mt. Akusawa, Katashina-mura, Tone-gun. *Abies mariesii* forest, elevation 2000–2050 m, October 11, 2001.

15) Oyama–Mt. Koshibutsu... Prov. Kohzuke (Pref. Gunma): en route from Oyamatashiro to Mt. Koshibutu, Katashina-mura, Tone-gun. Open rocky slope with *Pinus pumila*, *Abies*, *Acer* and *Sorbus*, elevation about 2100 m, October 9, 2001

16) Ryugu–Yamanohana... Prov. Kohzuke (Pref. Gunma): along the trail from Ryugu Lodge to Yamanohana Lodge, Ozegahara, Katashina-mura, Tone-gun. Open trail in the Ozegahara moor, with scattered grove of *Laris*, *Quercus* and *Malus*, elevation about 1400 m, October 10, 2001.

17) S of Hatomachi... Prov. Kohzuke (Pref. Gunma): ca 4 km S of Hatomachi Pass along Tsunakizawa valley, Katashina-mura, Tone-gun. S facing slope along road, secondary forest mixed with *Betula*, *Salix* and *Quercus*, elevation about 1300 m, October 11, 2001

Enumeration of the Species

In the following systematic account, genera and species are arranged alphabetically. In order to save space, localities are shown by abbreviations listed above. The collectors are abbreviated as follows; M. Inoue = MI, H. Kashiwadani = HK, and K. H. Moon = KM. In case of common species, only representative specimens are cited.

Adelolecia pilati (Hepp) Hertel & Hafellner. Rare, found on exposed rocks. This species was previously known from Europe, Svalbard and North America. However, the range now includes Japan. It is distinctive in having the well-developed exciple (K + violet or purple red), the epithecium containing "*Lecidea* green"(K + purple red) and the colorless hypothecium. Mt. Hiuchi summit, MI 30236.

Agonimia pacifica (H.Harada) Diederich. Common over mosses on bark. Hatomachi–Yamanohana, HK 44376.

Alectoria lata (Taylor) Linds. Common on twigs of coniferous trees at elevation higher than 1750 m. Hirosawa–Kumasawa, HK 44202; Kumasawa–Mt. Hiuchi, HK 44237; Miike–Usagi, KM 6234; Mt. Hiuchi summit, MI 30147; Oyama–Mt. Koshibutsu, MI 30305 & HK 44314.

Alectoria ochroleuca (Hoffm.) A.Massal. Rare, restricted to exposed rocks in the summit area of Mt. Shibutsu. Mt. Shibutsu summit, MI 30280 & 30349; Kasagatake summit, MI 30565 & 30577; Koshibutsu, MI 30601.

Amygdalaria aeolotera (Vain.) Brodo & Hertel. Rare, found on exposed rocks at the summit of Mt. Hiuchi. Mt. Hiuchi summit, MI 30189& 30227.

Anaptychia isidiza (Zahlbr.) Kurok. Although this is one of the most common species throughout Japan, it is very rare in the present area where it was collected only at one locality. Hatomachi–Yamanohana, HK 44455.

Anaptychia palmulata (Michx.) Vain. Common on bark of *Fagus* or on rock. Hatomachi–

Yamanohana, HK 44344 & 44373; Mt. Koshibutsu, MI 30580; Oyama–Mt. Koshibutsu, KM 6181.

Anzia japonica (Tuck.) Müll.Arg. Occasional, on bark. Hatomachi–Yamanohana, HK 44441; Oyama–Mt. Koshibutsu, KM6167.

Anzia opuntiella Müll.Arg. Common on bark of *Fagus crenata* at elevation 1400–1550 m. Hatomachi–Mt. Akusawa, HK 44343, KM 6103 & 6108; Miike–Hirosawa, HK 44173; Miike–Usagi, KM 6070; Oyama–Mt. Koshibutsu, KM 6160.

Anzia stenophylla Asahina. Rare, collected on bark of *Fagus crenata* at only one locality. Hatomachi–Yamanohana, HK 44440.

Arthrorhaphis citrinella (Ach.) Poelt. Rare, found on exposed ground in the summit area. Mt. Hiuchi summit, MI 30223; Mt. Shibutsu summit, MI 30337.

Bacidia baculifera (Nyl.) Zahlbr. Since Nylander (1890) first reported this species from Mt. Fuji (Ichigome) as *Lecidea baculifera* Nyl., it has never been reported from Japan. This is a second report for the species. In the present area, however, it is common on bark of *Abies mariesii* or *Fagus crenata*. Fujimi–Ryugu, MI 30459; Hatomachi–Fujimi MI 30389 & 30409; Mt. Akusawa–Mt. Kasagadake, MI 30525; Mt. Shibutsu summit, MI 30346.

Baeomyces absolutus Tuck. Rare, collected at only one locality on Mt. Hiuchi where it grows on exposed rock along trail. Hirosawa–Kumasawa, HK 44189.

Baeomyces placophyllus (Lam.) Ach. Occasional, on rock in shaded condition. Miike–Hirosawa, HK 44107; Mt. Hiuchi summit, MI 30175 & 30194; Mt. Shibutsu summit, MI 30334; Oyama–Mt. Koshibutsu, KM 6176.

Biatora vernalis (L.) Fr. Occasional, over mosses on trunks of *Abies mariesii*. Hatomachi–Fujimi MI 30392& 30399; Hatomachi–Mt. Akusawa, MI 30272.

Brigantiaea ferruginea (Müll.Arg.) Kashiw. & Kurok. Common on bark with mosses of *Fagus* and *Acer*. Fujimi–Ryugu, MI 30460; Hatomachi–Fujimi, MI 30414; Hatomachi–Yamanohana, HK 44368, 44450 & MI 30512; Kumasawa–Mt. Hiuchi, HK 44239; Miike–Hirosawa, HK 44135.

Brigantiaea nipponica (M.Sato) R.Sant. & Hafellner. Occasional, on bark of *Abies* and *Camaecyparis* at elevation between 1650 to 1700 m. Miike–Hirosawa, HK44106 & 44185.

Brigantiaea sorediata Kashiw., M.Inoue & K.H.Moon, sp. nov. (Fig. 2)

Thallus similis *Brigantiaea lobulata* sed thalli sorediis granularibus et zeorinum continentibus differt.

Type collection: JAPAN. Honshu. Prov. Iwashiro (Pref. Fukushima): en route from Miike to Hirosawatashiro, N slope of Mt. Hiuchi, Hinoemata-mura, Minamiaizu-gun. On bark of *Thujopsis dolabrata*, elevation about 1650 m, October 7, 2001, H. Kashiwadani 44106–holotype in TNS.

Thallus corticolous, whitish grey to greenish grey, thick (to 1 mm thick), sorediate with granular soralia (Figs. 2a & 2b); medulla white, containing crystals of calcium oxalate. Apothecia stipitate, constricted at the base, semi-buriedin soredia, 0.7–1.2 mm in diameter; margin entire; disc flat, with reddish brown pruina; epithecium reddish brown or rusty red (K + purple); hymenium 130–150 μm thick; hypothecium straw-yellow, 30–50 μm thick; exciple cartilaginous, 50–70 μm thick; asci 1-spored; spores muriform, pale brown, 90–120 × 25–35 μm.

Chemical substance: atranorin and zeorin.

This species is unique in having thick thallus totally covered with soredia. It might be confused with *B. lobulata* F.J.Walker & Hafellner, a species reported from New Zealand by Hafellner (1983). However, it can be easily distinguished from the latter by the presence of soredia and by the production

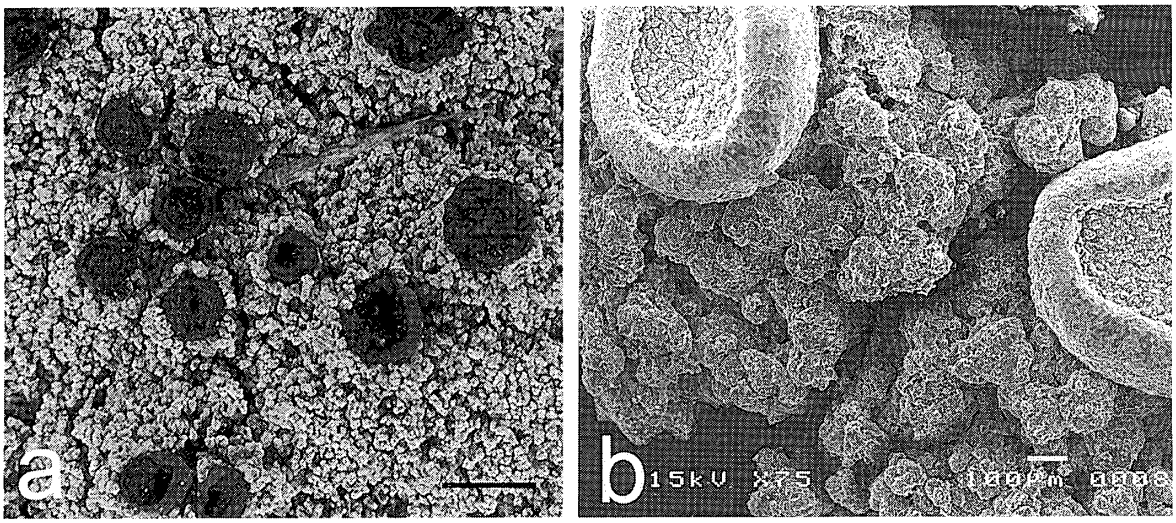

Fig.2. *Brigantiaea sorediata* Kashiw., Mas.Inoue. & K.M.Moon, holotype (TNS). a: general view of a part of thalli with apothecia and granular soralia (scale bar = 1 mm), b: granular soredia (magnified, scale bar = 100 μm).

of zeorin; *B. lobulata* has lobules and does not contain zeorin. It can be separated from all Japanese species of *Brigantiaea* by the presence of soredia. Known only from the type locality but locally abundant on bark of *Thujopsis dolabrata*.

Bryocaulon pseudosatoanum (Asahina) Kärnefelt. Locally abundant on bark of *Tsuga* and *Abies* at elevation between 1450 to 1700 m. Hirosawa–Kumasawa, HK 44213; Miike–Usagi, KM 6232; Oyama–Mt. Koshibutsu, KM6192.

Bryoria asiatica (Du Rietz) Brodo & D.Hawksw. Occasional, on bark. Miike–Hirosawa, HK 44123.

Bryoria bicolor (Ehrh.) Brodo & D.Hawksw. Locally abundant, on twigs at the summit area of Mt. Hiuchi. Mt. Hiuchi summit, MI30163 & 30248; Kumasawa–Mt. Hiuchi, MI 30142b.

Bryoria furcellata (Fr.) Brodo & D.Hawksw. Common on bark of *Larix campferii*. Miike–Usagi, KM 6259; Ryugu–Yamanohana, MI 30486.

Bryoria trichodes ssp. americana (Mont.) Brodo & D.Hawksw. Common on bark. Hirosawa–Kumasawa, HK 44203.

Bundophoron melanocarpum (DC.) Wedin. Occasional, on bark of coniferous trees. Hatomachi–Yamanohana, HK 44384.

Calicium adspersum Pers. Rare, probably having been overlooked. Hatomachi–Mt. Akusawa, KM 6082.

Caloplaca flavorubescens (Huds.) J.R.Laundon. Common on bark, especially on *Fagus crenata*. Kumasawa–Mt. Hiuchi, HK 44252; Miike–Hirosawa, HK 44163; Fujimi–Ryugu, MI 30444.

Candelaria concolor (Dicks.) Stein. Occasional, on bark and on rock. Hatomachi–Yamanohana, HK 44512; Oyama–Mt. Koshibutsu, HK 44328.

Carbonea vorticosa (Flörke) Hertel. Occasional, on exposed rocks around the summit of Mt. Hiuchi and Mt. Shibutsu. Mt. Hiuchi summit, MI 30195 & 30238; Mt. Shibutsu summit, MI 30355.

Cetraria islandica subsp. orientalis (Asahina) Kärnefelt. Rare, restricted around the summit of Mt. Koshibutsu. Oyama–Mt. Koshibutsu, KM 6155.

Cetraria laevigata Rass. Locally abundant around the summits of Mt. Hiuchi, Mt. Koshibutsu and Mt. Kasagatake. Kasagatake summit, MI 30245; Mt. Hiuchi summit, MI 30166 & 30166; Oyama–Mt. Koshibutsu, MI 30302 & 30307.

Cetrelia braunsiana (Müll.Arg.) W.L.Culb. & C.F.Culb. Rare, collected at only one locality where it grows on bark of *Salix* sp. at elevation about 1500 m. Hatomachi–Yamanohana, HK 44473.

Cetrelia chicitae (W.L.Culb.) W.L.Culb. & C.F.Culb. Occasional, on bark. Oyama–Mt. Koshibutsu, KM 6159.

Cetrelia japonica (Zahlbr.) W.L.Culb. & C.F.Culb. Scattered on bark of *Tsuga* and *Fagus*. Oyama–Mt. Koshibutsu, KM 6178.

Cetrelia olivetorum (Nyl.) W.L.Culb. & C.F.Culb. Scattered, on bark. Hatomachi–Yamanohana, HK 44449 & 44464.

Chaenotheca brunneola (Ach.) Müll.Arg. Occasional, on weathered bark. Miike–Hirosawa, HK 44095.

Chaenotheca chrysocephala (Ach.) Th.Fr. Occasional, on weathered bark. Kumasawa–Mt. Hiuchi, HK 44273.

Cladia aggregata (Sw.) Nyl. Rare, collected only at one locality at the summit of Mt. Kasagadake. Mt. Kasagatake summit, MI 30568.

Cladonia alpina (Asahina) Yoshim. Rare, only at one locality around the summit of Mt. Hiuchi where it grows mixed with. *C. cyanipes* and *C. crispata*. Mt. Hiuchi summit, MI 30199 (pr.p.)

Cladonia arbuscula (Wallr.) Flot. Locally abundant around the top of Mt. Shibutsu and Mt. Hiuchi. Mt. Shibutsu, July 16, 1950, Asahina 5002a; Ozegahara, elevation about 1400 m, October 17, 1996 Taira 9744.

Cladonia amaurocracea (Flörke) Schaer. Locally abundant around the summits of Mt. Hiuchi, Mt. Kasagatake and Mt. Shibutsu. Mt. Hiuchi summit, MI 30214; Mt. Kasagatake summit, MI 30527; Mt. Shibutsu summit, MI 30328; Oyama–Mt. Koshibutsu, HK 44300, 44310 & KM 6148.

Cladonia carassensis Vain. Common on soil with humus. Hatomachi–Yamanohana, HK 44413; Hirosawa–Kumasawa, HK 44226; Miike–Usagi, KM 6226; Mt. Hiuchi summit, MI 30217; Mt. Shibutsu summit, MI 30331.

Cladonia cenotea (Ach.) Schaer. Rare, collected at only one locality. Hirosawa–Kumasawa, HK 44191.

Cladonia chlorophaea (Flörke ex Sommerf.) Spreng. Common on rocks or on ground with humus. Hatomachi–Yamanohana, HK 44400.

Cladonia coniocraea (Flörke) Spreng. Common on trunk base. Hatomachi–Mt. Akusawa, KM 6091; Miike–Hirosawa, HK 44111 & 44168.

Cladonia cornuta (L.) Hoffm. Common on trunk base of *Abies* or on decayed wood at elevations higher than 1600 m. Kumasawa–Mt. Hiuchi, HK 44235; Miike–Hirosawa, HK 44149.

Cladonia crispata (Ach.) Flot. Common on ground at hillside bogs such as Hirosawatashiro and Kumasawatashiro but very rare in the Ozegahara marsh. Hirosawa–Kumasawa, HK 44215; Kumasawa–Mt. Hiuchi, HK 44271; Miike–Usagi, KM 6264.

Cladonia cyanipes (Sommerf.) Nyl. Occasional, on ground with humus at the summit areas of Mt. Hiuchi and Mt. Koshibutsu. Mt. Hiuchi summit, MI 30199; Oyama–Mt. Koshibutsu, KM 6134.

Cladonia digitata (L.) Hoffm. Common on ground with humus. Hatomachi–Mt. Akusawa, MI 30269; Kumasawa–Mt. Hiuchi, HK 44268; Mt. Hiuchi summit, MI 30204.

Cladonia furcata (Huds.) Schrad. Common on ground with humus or mosses in exposed condition. Hatomachi–Mt. Akusawa, KM 6126; Hirosawa–Kumasawa, HK 44194 & 44209; Miike–Hirosawa, HK 44113; Miike–Usagi, KM 6263; Mt. Shibutsu–Yamanohana, MI 30375.

Cladonia glauca Flörke. Rare, collected at only one locality, where it grows on humus. Hirosawa–Kumasawa, HK 44190.

Cladonia gracilis ssp. turbinata (Ach.) Ahti. Common on decayed wood or on tree trunks in *Fagus* or *Abies* forests. Hatomachi–Yamanohana, HK 44361; Hirosawa–Kumasawa, HK 44204; Miike–Usagi, KM 6059 & 6219.

Cladonia granulans Vain. Locally abundant on ground with humus at the summit area of Mt. Hiuchi. Mt. Hiuchi summit, MI 30184 & 30211.

Cladonia kanewskii Oxsner. Rare, collected on ground at only two localities. Kasagatake summit, MI 30531 & 30532; Oyama–Mt. Koshibutsu, KM 6149.

Cladonia kurokawae Ahti & S.Steenroos. Rare, collected at only one locality. As discussed by Ahti *et al.* (1995–1996), this species is distinguished from. *C. humils* by corticated podetia with schizidia up to the top of the margins. The specimens reported as *C. conistea* Asahina from the present area (Asahina 1952) are now identified with this species. Hatomachi–Mt. Akusawa, MI 30281. In the forest zone of Mt. Shibutsu, Oze, Y. Asahina 5023A & 5023B (TNS).

Cladonia macilenta Hoffm. Common on bark or on humus. Fujimi–Ryugu, MI 30431; Hatomachi–Yamanohana, HK 44387; Oyama–Mt. Koshibutsu, KM 6153; Ryugu–Yamanohana, MI 30495.

Cladonia macrophylla (Schaer.) Stenh. Rare, collected at only one locality. Mt. Hiuchi summit, MI 30203.

Cladonia macroptera Räsänen. Rare, collected at only one locality. Mt. Hiuchi summit, MI 30153.

Cladonia maxima (Asahina) Ahti. Occasional, on ground with mosses. Mt. Shibutsu summit, MI 30339; Oyama–Mt. Koshibutsu, KM 6130 & 6135.

Cladonia merochlorophaea Asahina. Common on ground with humus. Hatomachi–Mt. Akusawa, KM 6092; Hirosawa–Kumasawa, HK 44217; Miike–Usagi, KM 6216 & 6251.

Cladonia metacorallifera Asahina. Locally abundant on ground with humus at the summit range between Mt. Koshibutsu to Mt. Kasagatake. Mt. Kasagatake summit, MI 30571; Oyama–Mt. Koshibutsu, HK 44305 & 44306.

Cladonia mitis Sandst. Common on ground at high-moor such as Hirosawatashiro and Kumasawatashiro. Hatomachi–Yamanohana, HK 44416; Hirosawa–Kumasawa, HK 44218; Mt. Kasagatake summit, MI 30557: Oyama–Mt. Koshibutsu, HK 44326.

Cladonia nipponica Asahina. Rare, collected at only one locality on the summit area of Mt. Koshibutsu. Oyama–Mt. Koshibutsu, MI 30301.

Cladonia pleurota (Flörke) Schaer. Common on ground or on rocks. Hatomachi–Yamanohana, HK 44360; Mt. Hiuchi summit, MI 30201.

Cladonia pseudoevansii Asahina. Asahina (1952) once reported this species from the present area, but not found during our fieldwork. Shobudaira, Oze, elevation about 1900 m, July 14, 1950, Y. Asahinas.n. (TNS).

Cladonia pseudohondoensis Asahina. Not found during our fieldwork, but two specimens were collected at Mt. Shibutsu and Mt. Hiuchi. On the top of Mt. Shibutsu, Oze, July 16, 1950, Y. Asahina

5018a (TNS); Mt. Hiuchi-dake, July 20, 1950, Y. Ikoma 5331 (TNS).

Cladonia pseudostellata Asahina. Rare, collected at only one locality on the summit area of Mt. Shibutsu. Mt. Shibutsu summit, MI 30343

Cladonia rangiferina (L.) Weber ex F.H.Wigg. Common on ground at at the summit areas of Mt. Kasagatake and Mt. Shibutsu, also common along trail in high-moors. Mt. Shibutsu summit, MI 30317; Oyama–Mt. Koshibutsu, HK 44330 & KM 6137; Ryugu–Yamanohana, MI 30484; Miike–Hirosawa, HK 44116; Mt. Kasagatake summit, MI 30551.

Cladonia scabriuscula (Delise in Duby) Nyl. Common on ground and on rocks. Hatomachi–Yamanohana, HK 44422 & KM 6202; Miike–Usagi, KM 6074.

Cladonia squamosa Hoffm. Common on barks or on ground with humus. Hatomachi–Yamanohana, HK 44452; Hirosawa–Kumasawa, HK 44205; Kumasawa–Mt. Hiuchi, HK 44230 & 44290; Miike–Hirosawa, HK 44159; Miike–Usagi, KM 6225; Mt. Hiuchi summit, MI 30257; Oyama–Mt. Koshibutsu, HK 44304.

Cladonia squamosa var. subsquamosa (Nyl. ex Leight.) Vain. Rare, collected at only one locality where it grows on decayed wood of *Abies*. Hatomachi–Yamanohana, HK 44414.

Cladonia stellaris (Opiz) Pouzar & Vězda. Locally abundant at the summit areas of Mt. Shibutsu and Mt. Koshibutsu. Mt. Shibutsu summit, MI 30332; Oyama–Mt. Koshibutsu, HK 44311 & KM 6131.

Cladonia submitis A.Evans. Common on ground at hillside bogs such as Hirosawatashiro and Kumasawatashiro but very rare in the Ozegahara moor. Mt. Shibutsu–Yamanohana, MI 30373.

Cladonia turgida Hoffm. Rare, collected at only one locality where it grows among mosses on

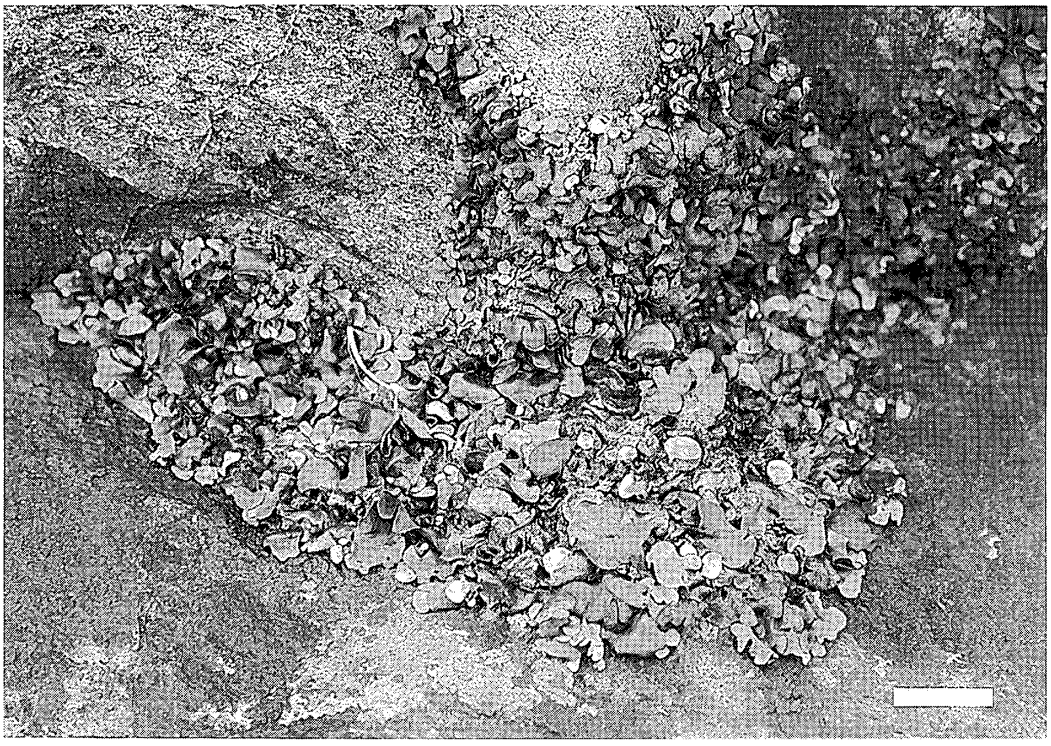

Fig. 3. Colonies of *Dermatocarpon tuzibei* M.Sato on serpentine rock, H. Kashiwadani 44301 (TNS). Scale bar = 1 cm.

ground. Mt. Shibutsu summit, MI 30333.

Coccocarpia palmicola (Spreng.) Arv. & D.J.Galloway. Rare, collected at only one locality. Miike–Usagi, KM 6063.

Collema japonicum (Müll.Arg.) Hue. Previously reported by Asahina (1952). Not found during our fieldwork.

Collema leptaleum Tuck. Not found during our fieldwork. However, it was collected in the present areas by Asahina. Ozegahara Forest, Prov. Kohzuke, July 15, 1950, Y. Asahina (TNS).

Collema leptaleum var. biliosum (Mont.) Degel. Rare, collected at only one locality where it grows on trunks of *Salix* sp. Hatomachi–Yamanohana, HK 44500.

Collema subflaccidum Degel. Occasional, on rocks. Kumasawa–Mt. Hiuchi, HK 44296.

Collema tenax (Sw.) Ach. Rare, collected at only one locality around the summit of Mt. Kasagatake. Mt. Kasagatake summit, MI 30549.

Dermatocarpon miniatum (L.) W.Mann. Previously reported along the stream near Toden-goya lodge by Asahina (1952). Not found during our fieldwork. In the forest zone of Oze, Prov. Iwashiro, July 15, 1950, Y. Asahina 5043 (TNS).

Dermatocarpon tuzibei M.Sato. Locally abundant, forming big colonies on serpentine rocks along ridge between Mt. Koshibutsu to Mt. Shibutsu at elevations between 2000 to 2100 m (Fig. 3). *D. tuzibei* is an endangered species of lichens in Japan having been reported from only two localities, Mt. Hayachine in Iwate Pref. and Mt. Tanigawa in Gunma Pref. (Harada 1993). This is the third locality for the species. Mt. Shibutsu summit, MI 30340; Oyama–Mt. Koshibutsu, HK 44301 & 44303.

Dibaeis absoluta (Tuck.) Kalb & Gierl. Occasional, on exposed rocks or on soil. Hatomachi –Fujimi MI 30391; Hirosawa–Kumasawa, HK 44189.

Dimerella pineti (Ach.) Vězda. Occasional, on bark. Hatomachi–Yamanohana, HK 44366.

Evernia esorediosa (Müll.Arg.) Du Rietz. Common on bark of *Larix* and *Abies*. Miike–Usagi, KM 6233 & 6262; Oyama–Mt. Koshibutsu, KM 6172.

Farnoldia jurana (Schaer.) Hertel. Found on exposed rocks. This species was previously known from Europe, Svalbard and North America. However, the range now includes Asia. *F. jurana* is distinctive by the highly carbonaceous and well developed excipulum and the production of confluentic acid as chemical ingredient. Mt. Akusawa–Mt. Koshibutsu, MI 30277 & 30311; Mt. Hiuchi summit, MI 30208.

Flavoparmelia caperata (L.) Hale. Occasional, on bark. Hatomachi–Yamanohana, HK 44424; Mt. Shibutsu–Yamanohana, MI 30367.

Fuscidea circumflexa (Nyl.) V.Wirth & Vězda. Common on exposed rocks in the summit areas of Mt. Hiuchi and Mt. Shibutsu. Mt. Akusawa–Mt. Koshibutsu, MI 30285 & 30310; Mt. Hiuchi summit, MI 30170, 30253 & 30362; Mt. Koshibutsu summit, MI 30587, 30589 & 30593; Mt. Shibutsu summit, MI 30316 & 30353.

Fuscidea intercincta (Nyl.) Poelt. Found on exposed rocks in the summit areas of Mt. Shibutsu. The occurrence of this species in Japan was reported from Shirakami Mts. in northern Honshu by Inoue and Moon (1998). This is the second report for the species in Japan. Mt. Koshibutsu summit, MI 30583; Mt. Shibutsu summit, MI 30348.

Fuscidea mollis (Wahlenb.) V.Wirth & Vězda. Found on exposed rocks in the summit areas of Mt. Shibutsu. Mt. Akusawa–Mt. Koshibutsu HK 44320; Mt. Shibutsu summit, MI 30354.

Fuscidea submollis Mas.Inoue. Rare, found on exposed rocks around the top of Mt. Hiuchi.

Fuscidea submollis can be distinguished from *F. mollis* by the adnate apothecia and amyloid medulla. Mt. Hiuchi summit, MI 30190.

Fuscidea verruciformis Mas.Inoue. Common, on twigs or trunks of trees. Kumasawa–Mt. Hiuchi, HK 44231; Mt. Akusawa–Mt. Koshibutsu HK 44332 & MI 30306; Mt. Koshibutsu summit, MI 30596.

Fuscopannaria incisa (Müll.Arg.) P.M.Jørg. Occasional, on bark. Hatomachi–Yamanohana, HK 44405; Kumasawa–Mt. Hiuchi, HK 44240; Miike–Hirosawa, HK 44104.

Fuscopannaria leucosticta (Tuck.) P.M.Jørg. Rare, collected at only one locality where it grows on bark of *Salix* sp. Hatomachi–Yamanohana, HK 44480.

Fuscopannaria protensa (Hue) P.M.Jørg. Rare, collected at only one locality. Ryugu–Yamanohana, MI 30467 & 30478.

Fuscopannaria sorediosa P.M.Jørg. Although this species is widely distributed in mountain regions from Kyushu to Shikoku in Japan (Jørgensen, 2000), it is very rare in the present area being collected at only one locality near the Ryugu lodge where it grows on bark of *Fraxinus mandshurica* var. *japonica*. Kumasawa–Mt. Hiuchi, HK 44259.

Fuscopannaria subincisa (Zahlbr.) P.M.Jørg. Occasional, on bark. Miike–Usagi, KM 6064.

Glossodium japonicum Zahlbr. Previously reported by Asahina (1952). Not found during our fieldwork.

Graphis scripta (L.) Ach. Abundant, one of the most common crustose lichen on barks of branches. Hatomachi–Mt. Akusawa, KM 6111; Hatomachi–Yamanohana, HK 44358; Hirosawa–Kumasawa, HK 44219; Kumasawa–Mt. Hiuchi, HK 44248; Miike–Hirosawa, HK 44145; Miike–Usagi, HK 44186 & KM6217.

Haematomma ochrophaeum (Tuck.) A.Massal. Occasional on bark. Hatomachi–Yamanohana, HK 44346; Miike–Usagi, KM 6228.

Heteroderemia diademata (Taylor) D.D.Awasthi. Occasional, on bark of *Fagus* and *Fraxinus*. Hatomachi–Fujimi MI 30435; Ryugu–Yamanohana, MI 30488.

Heterodermia hypochraea (Vain.) Swinscow & Krog. Previously reported by Asahina (1952) under *Anaptychia*. Not found during our fieldwork.

Heterodermia hypoleuca (Muhl.) Trevis. Common on bark of deciduous broad leaved trees such as *Fraxinus* and *Salix*. Hatomachi–Mt. Akusawa, HK 44468 & KM 6099; Hatomachi–Yamanohana, HK 44487; Oyama–Mt. Koshibutsu,KM 6168.

Heterodermia,microphylla (Kurok.) Skorepa. Rare, collected at only one locality. Hatomachi–Yamanohana, HK 44471.

Heterodermia pseudospeciosa (Kurok.) W.L.Culb. Common on bark of *Fagus* and *Tsuga*. Hatomachi–Yamanohana, HK 44399 & 44418.

Hypocenomyce friesii (Ach.) P.James & Gotth.Schneid. Rare, collected at only one locality where it grows on bark of *Larix leptolepis*. Hatomachi–Yamanohana, HK 44390.

Hypogymnia hypotrypa (Nyl.) Rass. Occasional, on bark of *Abies*. Hirosawa–Kumasawa, HK 44201; Kumasawa–Mt. Hiuchi, HK 44256; Mt. Hiuchi summit, MI 30246.

Hypogymnia physodes (L.) Nyl. Occasional, on bark. Hatomachi–Yamanohana, HK 44389.

Hypogymnia pseudophysodes (Asahina) Rass. Common on bark of *Pinus pumila* and *Abies mariesii*. Hirosawa–Kumasawa, HK 44200; Kumasawa–Mt. Hiuchi, HK 44260; Oyama–Mt. Koshibutsu, HK 44313.

Hypogymnia pulverata (Nyl.) Elix. Common on bark of trees such as *Abies*, *Alnus*, *Fagus* and *Tsuga*. Hatomachi–Yamanohana, HK 44359; Hirosawa–Kumasawa, HK 44211; Miike–Hirosawa, HK 44160; Miike–Usagi, KM 6238 & 6245; Oyama–Mt. Koshibutsu, KM 6173.

Hypogymnia submundata (Oksner) Rass. Rare, collected at only one locality where it grows on bark of *Pinus pumila*. Oyama–Mt. Koshibutsu, KM 6150.

Hypogymnia vittata (Ach.) Gasp. Common on bark of coniferous trees or on rocks at elevations higher than 1550 m. Hatomachi–Yamanohana, KM 6193; Hirosawa–Kumasawa HK 44210; Kumasawa–Mt. Hiuchi, HK 44210 & 44261; Mt. Hiuchi summit, MI 30246; Mt. Shibutsu summit, MI 30333; Oyama–Mt. Koshibutsu, KM 6151.

Icmadophila ericetorum (L.) Zahlbr. Common on rotten wood. Hatomachi–Yamanohana, HK 44348; Miike–Hirosawa, HK 44184; Miike–Usagi, KM 6218.

Imshaugia aleurites (Ach.) S.L.F.Mey. Common on bark of coniferous trees such as *Abies*, *Laris* and *Tsuga*. Hirosawa–Kumasawa, HK 44192 & 44196; Miike–Hirosawa, HK 44174; Mt. Hiuchi summit, MI 30157; Mt. Kasagatake summit, MI 30563; Oyama–Mt. Koshibutsu, HK 44325 & KM 6141; Ryugu–Yamanohana, MI 30485.

Lecanora cinereofusca H.Magn. One of the most common crustose lichens on bark in the present area. Fujimi–Ryugu, MI 30451; Hatomachi–Fujimi MI 30386; Hatomachi–Mt. Akusawa, KM 6078; Hatomachi–Yamanohana, HK 44357; Miike–Usagi, KM 6256.

Lecanora hemiphracta Hue. Rare, collected at only one locality where it grows on bark of *Acer*. Fujimi–Ryugu, MI 30500.

Lecanora lecanactina Zahlbr. Common on barks of *Aesculus*, *Betula* and *Fagus*. Hatomachi–Mt. Akusawa, KM 6077 & 6121; Hatomachi–Yamanohana, HK 44445; Kumasawa–Mt. Hiuchi, HK 44249; Miike–Hirosawa, HK 44144; Miike–Usagi, KM 6223.

Lecanora megalocheila (Hue) H.Miyawaki. Occasional, on bark, especially on barks of *Populus* and *Salix* in the present area. Hatomachi–Yamanohana, HK 44354 & 44493.

Lecanora pulicaris (Pers.) Ach. Locally abundant on twigs of *Abies mariesii* and *Pinus pumila* at elevations higher than 1700 m. Hirosawa-Kumasawa, HK 44198 & 44224.

Lecanora yasudae Räsänen. Common on bark of deciduous broad-leaved trees. Hatomachi–Fujimi MI 30456; Hatomachi–Yamanohana, HK 44421; Kumasawa–Mt. Hiuchi, HK 44267.

Lecidea auriculata Th.Fr. Common on exposed rocks in the summit area of Mt. Hiuchi. Mt. Hiuchi summit, MI 30155, 30176, 30216 & 30235.

Lecidea plana (J.Lahm) Nyl. Rare, on exposed rocks in the summit area of Mt. Hiuchi. Mt. Hiuchi summit, MI 30191 & 30231.

Lecidea subleucothallina Mas.Inoue. Occasional, on exposed rocks. Mt. Akusawa–Mt. Koshibutsu, MI 30299 & 30308.

Lecidea albofuscescens Nyl. Very common on bark of *Abies mariesii*. Hatomachi–Fujimi MI 30394, 30413 & 30381; Hatomachi–Mt. Akusawa, MI 30261 & 30270; Kumasawa–Mt. Hiuchi, HK 44275, 44276 & MI 30260; Miike–Hirosawa, HK 44172 & 44178; Mt. Akusawa–Mt. Kasagadake, MI 30524; Mt. Kasagadake, MI 30535 & 30536.

Lecidea ocelliformis Nyl. Occasional, found on barks of deciduous broad-leaved trees. Hatomachi–Fujimi MI 30382 & 30424; Hatomachi–Yamanohana, HK 44365.

Lecidella bullata Körb. Occasional, restricted on exposed rocks at the summit area of Mt. Hiuchi. Mt. Hiuchi summit, MI 30244.

Lecidella carpathica Körb. Very common on exposed rocks around the summit area of Mt. Shibutsu. Mt. Akusawa–Mt. Koshibutsu HK 44329, MI 30275, 30279 & 30286; Mt. Kasagadake summit, MI 30530, 30533, 30541, 30552, 30560, 30561 & 30575; Mt. Koshibutsu summit, MI 30585 & 30595; Mt. Shibutsu summit, MI 30363; Mt. Shibutsu–Yamanohana, MI 30370 & 30374.

Lecidella elaeochroma var. caesitia (Vain.) Mas.Inoue. Occasional, on bark. Ryugu–Yamanohana, MI 30470 & 30491.

Leptogium azureum (Sw.) Mont. Common on trunk base of trees or on rocks in shaded condition. Hatomachi–Yamanohana, HK 44363 & 44454; Kumasawa–Mt. Hiuchi, HK 44238; Miike–Usagi, KM 6065; Oyama–Mt. Koshibutsu, KM 6166; Hatomachi–Yamanohana, HK 44431.

Leptogium asiaticum P.M.Jørg. Locally abundant on bark of *Fagus* and *Salix*. Hatomachi–Yamanohana, HK 44476.

Leptogium cyanescens (Ach.) Körb. Occasional, on bark. Miike–Hirosawa, HK 44101.

Leptogium moluccanum var. myriophyllinum (Müll.Arg.) Asahina. Occasional, on bark or on rocks. Kumasawa–Mt. Hiuchi, HK 44285.

Leptogium rugosum Sierk. Not found during our fieldwork. However, one collection was made in the present areas. Oze Pass, Prov. Kozuke, July 27, 1926, E. Uematsu 26727.

Leptogium subtile (Schrad.) Torss. This species is widely distributed in the Northern Hemisphere, but it has not been reported from Japan before. In the present study we found a well developed colony of this species around the top of Mt. Kasagatake where it grows on plant debris on the ground together with *Peltigera* sp. Although the Japanese specimens are sterile, they have characteristic thalli composed of deeply divided squamules (0.1–0.3 mm wide) and are readily identified with *L. subtile*. Mt. Kasagatake summit, MI 30569 & 30570.

Lobaria adscripturiens (Nyl.) Hue. Common on bark. Hatomachi–Yamanohana, HK 44351; Oyama–Mt. Koshibutsu, KM 6184; Ryugu–Yamanohana, MI 30466.

Lobaria fuscotomentosa Yoshim. Common on bark. Hatomachi–Yamanohana, HK 44345 & 44506; Oyama–Mt. Koshibutsu, KM 6200.

Lobaria japonica (Zahlbr.) Asahina. Common on bark. Hatomachi–Yamanohana, HK 44443 & KM 6207.

Lobaria kazawaensis (Asahina) Yoshim. Occasional, on bark. Miike–Hirosawa, HK 44140; Oyama–Mt. Koshibutsu, KM 6171.

Lobaria linita (Ach.) Rabenh. Common on bark of *Abies* at elevations higher than 1600 m. Hatomachi–Mt. Akusawa, KM 6081 & MI 30266; Miike–Hirosawa, HK 44118; Miike–Usagi, KM 6058.

Lobaria orientalis (Asahina) Yoshim. Not found during our fieldwork. Mt. Hiuchi–dake, Ozegahara, August, 1955, S. Watari s.n. (TNS).

Lobaria retigera (Bory) Trevis. Occasional, on bark. Hatomachi–Yamanohana, MI 30505 & HK 44380; Oyama–Mt. Koshibutsu, KM 6183.

Lobaria spathulata (Inumaru) Yoshim. Occasional, on bark. Hatomachi–Yamanohana, HK 44479; Oyama–Mt. Koshibutsu, KM 6157.

Lobaria yoshimurae Kurok. & Kashiw. Occasional, on bark. Hatomachi–Yamanohana, KM 6203.

Lopadium disciforme (Flot.) Kullh. Rare, collected at only one locality where it grows on bark of *Tsuga diversifolia*. Hatomachi–Yamanohana, HK 44347.

Loxospora ochrophaea (Tuck.) R.C.Harris. Not found during our fieldwork, but one specimen collected by Asahina is now identified with this species. Ozegahara, July 15, 1950, Y. Asahina 5045 (TNS).

Megalospora tuberculosa (Fée) Sipman. Occasional, on bark. Hatomachi–Yamanohana, HK 44393.

Melanelia olivacea (L.) Essl. Common on bark. Mt. Hiuchi summit, MI 30140 & 30255; Ryugu–Yamanohana, MI 30476.

Melanelia stygia (L.) Essl. Rare, restricted on rocks around the summit of Mt. Hiuchi. Mt. Hiuchi summit, MI 30141.

Menegazzia terebrata (Hoffm.) A.Massal. Common on bark. Fujimi–Ryugu, MI 30454; Hatomachi–Fujimi MI 30401; Hatomachi–Mt. Akusawa, KM 6083; Hatomachi–Yamanohana, HK 44342; Miike–Hirosawa, HK 44130; Miike–Usagi, KM 6062; Oyama–Mt. Koshibutsu, KM 6187.

Mycobilimbia berengeriana (A.Massal.) Hafellner & V.Wirth. Occasional, on bark of *Quercus serrata*. Hatomachi–Yamanohana, HK 44394 & MI 30503.

Mycoblastus alpinus (Fr.) Th.Fr. ex Hellb. Rare, restricted on the summit areas of Mt. Hiuchi and Mt. Koshibutsu. Mt. Koshibutsu summit, MI 30591; Mt. Hiuchi summit, MI 30241.

Mycoblastus sanguinarius (L.) Norman. Occasional, on bark. Fujimi–Ryugu, MI 30455 & 30461; Hatomachi–Yamanohana, HK 44378; Hirosawa–Kumasawa, HK 44193 & 44227; Mt. Hiuchi summit, MI 30150.

Mycocalicium subtile (Pers.) Sandst. Previously reported by Asahina (1952) as *Calicium parietinum* Ach. Not found during our fieldwork, probably overlooked.

Myelochroa entotheiochroa (Hue) Elix & Hale. Common on bark. Hatomachi–Mt. Akusawa, KM 6100.

Myelochroa galbina (Ach.) Elix & Hale. One specimen from the present area in TNS is identified with this species. Not found during our fieldwork. Ozegahara, July 15, 1950, Y. Asahina 5060 (TNS).

Myelochroa irrugans (Nyl.) Elix & Hale. Common on bark. Hatomachi–Yamanohana, HK 44460.

Myelochroa leucotyliza (Nyl.) Elix & Hale. Common on bark. Miike–Hirosawa, HK 44142 & 44143; Oyama–Mt. Koshibutsu, KM 6163.

Nephroma helveticum Ach. Common on bark in more or less shaded condition. Hatomachi–Mt. Akusawa, KM 6080; Hatomachi–Yamanohana, HK 44482; Kumasawa–Mt. Hiuchi, HK 44283; Miike–Hirosawa, HK 44102; Ryugu–Yamanohana, MI 30496.

Nephroma resupinatum (L.) Ach. Occasional, on bark with mosses. Miike–Hirosawa, HK 44103 & 44124.

Nephroma squamigerum Inumaru. Previously reported by Asahina (1952) as *N. laevigatum* f. *squamigerum* (Inumaru) Asahina. Not found during our fieldwork. Ozegahara, July 15, 1950, Y. Asahina 5054 (TNS).

Nephromopsis endocrocea Asahina. Common on bark. Hatomachi–Mt. Akusawa, KM 6084; Hatomachi–Yamanohana, HK 44404; Miike–Usagi, KM 6227; Oyama–Mt. Koshibutsu, KM 6199.

Nephromopsis ornata (Müll.Arg.) Hue. Occasional, on bark. Hatomachi–Yamanohana, HK 44429; Miike–Usagi, KM 6258.

Nephromopsis rugosa Asahina. Previously reported as *Cetraria rugosa* (Asahina) Sato by

Asahina (1952). Not found during our fieldwork.

Ochrolechia submarginata (Nyl.) Oshio. Rare, found only on rocks around the summit of Mt. Hiuchi. Kumasawa–Mt. Hiuchi, HK 44287.

Ochrolechia tartarea (L.) A.Massal. Occasional, on bark. Hatomachi–Yamanohana, HK 44432.

Ochrolechia trochophora (Vain.) Oshio. Common on bark. Hatomachi–Yamanohana, HK 44436.

Ochrolechia yasudae Vain. Occasional over mosses on bark. Hatomachi–Mt. Akusawa, KM 6085.

Ophioparma lapponica (Räsänen) Hafellner & R.W.Rogers. Rare, found only on rock near the summit of Mt. Hiuchi. Mt. Hiuchi summit, MI 30169.

Oropogon asiaticus Asahina. Occasional, on bark. Hatomachi–Yamanohana, HK 44355; Kumasawa–Mt. Hiuchi, HK 44292.

Orphniospora moriopsis (A.Massal.) D.Hawksw. Found on exposed rocks. This species was previously known from Europe, Svalbard, North America, Australia, New Guinea and Kinabalu. However, the range now includes eastern Asia. *O. moriopsis* is a distinctive species easily identified by the areolate thallus which is polished and dark brown, the iodine-positive reaction in the medulla and by the brown spores. Mt. Hiuchi summit, MI 30162 & 30218.

Pannaria asahinae P.M.Jørg. Rare, collected at only one locality where it grows on bark of *Fraxinus*. Ryugu–Yamanohana, MI 30477.

Parmelia fertilis Müll.Arg. One of the most common foliose lichens on bark. Hatomachi–Mt. Akusawa KM 6096; Hatomachi–Yamanohana, HK 44461; Miike–Usagi, KM 6061; Mt. Hiuchi summit, MI 30154; Oyama–Mt. Koshibutsu, MI 30309; Ryugu–Yamanohana, MI 30476.

Parmelia laevior Nyl. Common on bark. Fujimi–Ryugu, MI 30434; Hatomachi–Mt. Akusawa, KM 6110; Miike–Hirosawa, HK 44171; Oyama–Mt. Koshibutsu, KM 6162.

Parmelia praesquarrosa Kurok. Locally abundant on bark between Oyamatashiro to Mt. Koshibutsu. Oyama–Mt. Koshibutsu, KM 6164 & 6196.

Parmelia pseudolaevior Asahina. Occasional, on bark. Hatomachi–Yamanohana, HK 44407; Miike–Hirosawa, HK 44133.

Parmelia pseudoshinanoana Asahina. Rare, collected at only one locality. Miike–Usagi, KM 6241.

Parmelia saxatilis (L.) Ach. Rare, collected at only one locality. Oyama–Mt. Koshibutsu, KM 6182.

Parmelia squarrosa Hale. Common on bark or on rocks. Hatomachi–Mt. Akusawa, KM 6090; Hirosawa–Kumasawa, HK 44222; Miike–Hirosawa, HK 44151; Miike–Usagi, KM 6243; Mt. Hiuchi summit, MI 30142 & 30243b; Oyama–Mt. Koshibutsu, HK 44333.

Parmeliopsis ambigua (Wulfen in Jacq.) Nyl. Common on bark of coniferous trees such as *Abies*, *Larix* and *Tsuga*. Fujimi–Ryugu, MI 30428; Hirosawa–Kumasawa, HK 44206; Kumasawa–Mt. Hiuchi, HK 44258; Miike–Hirosawa, HK 44112; Miike–Usagi, KM 6214.

Parmeliopsis hyperopta (Ach.) Arnold. Common on bark or on twigs of trees at elevations higher than 2100 m. Kumasawa–Mt. Hiuchi, HK 44255; Miike–Hirosawa, HK 44152; Mt. Hiuchi summit, MI 30226; Oyama–Mt. Koshibutsu, HK 44337 & 44338.

Peltigera collina (Ach.) Schrad. Common on bark. Hatomachi–Fujimi, MI 30412; Miike–Usagi, KM 6250; Hatomachi–Yamanohana, HK 44392; Miike–Hirosawa, HK 44100.

Peltigera degenii Gyeln. Occasional, on bark. Hatomachi–Yamanohana, HK 44481; Miike–Usagi, KM 6236.

Peltigera dolichorrhiza (Nyl.) Nyl. Common on decayed wood or on rocks with mosses. Hatomachi–Mt. Akusawa, KM 6089; Miike–Hirosawa, HK 44136; Miike–Usagi, KM 6069.

Peltigera leucophlebia (Nyl.) Gyeln. Not found during our fieldwork. However, one specimen was collected in the present areas. Ozegahara, Prov. Kozuke, July 26, 1930, R. Gomi (Y. Asahina 3194, TNS).

Peltigera polydactyla (Neck.) Hoffm. Occasional, on decayed wood. Kumasawa–Mt. Hiuchi, HK 44272; Miike–Hirosawa, HK 44162.

Peltigera praetextata (Flörke) Vain. Common on decayed wood or on rocks with mosses. Hatomachi–Yamanohana, KM 6206; Kumasawa–Mt. Hiuchi, HK 44244.

Peltigera pruinosa (Inumaru) Gyeln. Rare, collected at only one locality where it grows on bark of *Fagus crenata*. Kumasawa–Mt. Hiuchi, HK 44247.

Pertusaria alpina Hepp ex Ahles. This species is characterized by the hemiglobose apothecia with pale ostioles, the 8-spored asci and the presence of stictic acid and 4-5-dichlorolichexanthone as chemical ingredients. Occasional, on bark. Fujimi–Ryugu, MI 30457; Hatomachi–Mt. Akusawa, KM 6122; Miike–Hirosawa, HK 44147 & 44157.

Pertusaria composita Zahlbr. Specimens from the present area contain fumarprotocetraric acid and succinprotocetraric acid. Common, on bark. Fujimi–Ryugu IM 30452; Hatomachi–Yamanohana, HK 44475 & HK 44478.

Pertusaria laeviganda Nyl. Common on bark. Hatomachi–Mt. Akusawa, KM 6079, 6093 & 6106; Hatomachi–Yamanohana, HK 44446 & KM 6204.

Pertusaria multipuncta (Turner) Nyl. Common on bark. Hatomachi–Mt. Akusawa, KM 6107 & KM 6114; Kumasawa–Mt. Hiuchi, HK 44294.

Pertusaria obsolescens Nyl. This species is characterized by the hemiglobose apothecia with black ostioles, the 8-spored asci with thick-walled spores and by the presence of stictic acid and lichexanthone as chemical ingredients. It resembles *P. alpina* but can be distinguished by the thick and double walled spores and by the black ostioles. Rare, collected at only one locality where it grows on twigs of *Quercus mongolica*. This is the northern most locality for this species. Oyama–Mt. Koshibutsu, KM 6170.

Pertusaria pertusa (L.) Tuck. Common on bark. Hatomachi–Yamanohana, HK 44501 & MI 30506; Miike–Hirosawa, HK 44154.

Pertusaria quartans Nyl. Rare, collected at only one locality where it grows over mosses on rock among *Pinus pumila* scrub. Although, *P. quartans* usually produces stictic acid and 4-5-dichlorolichexanthone but the specimen from the present area lacks the former substance. The specimen is regarded as stictic acid deficient race of the species. Oyama–Mt. Koshibutsu, HK 44336.

Pertusaria stenostoma Vain. This species is characterized by the small hemiglobose apothecia (less than 1 mm in diameter) with irregular cracks around the black ostioles, the 8-spored asci, the thick-walled ascospores of 80–90 (–110) μm long and the presence of stictic acid and 4-5-dichlorolichexanthone as chemical ingredients. When he reported the present species from Japan, Oshio (1968) mentioned the color reaction is negative with P– for this species. However, this species always contains stictic acid and shows P + brick red reaction in the medulla as in the case of type specimen (Japan, Honshu, Prov. Hoki: Mt. Daisen, A. Yasuda 173–holotype in TUR and isotype in

TNS). Rare, collected on bark at only three localities in the present survey. Hatomachi–Mt. Akusawa, KM 6113; Miike–Hirosawa, HK 44139; Ryugu–Yamanohana, MI 30468.

Pertusaria subfallens Vain. Kashiwadani and Inoue (1993) reported the presence of fumarprotocetraric acid and thamnolic acid in this species. However, the specimens from the present area always contain fumarprotocetraric acid and protocetraric acid. Common on bark, rarely on rocks. Fujimi–Ryugu, MI 30440 & 30465; Hatomachi–Fujimi MI 30426; Hatomachi–Yamanohana, HK 44408, 44467 & 44474; Miike–Hirosawa, HK 44131; Miike–Usagi, KM 6055 & 6231; Mt. Hiuchi summit, MI 30254.

Pertusaria subobductans Nyl. Eight of nine specimens collected in the present area contain norstictic acid and perlatolic acid. However, one specimen (Inoue 30494) contains only norstictic acid. No morphological difference is observed in specimens with and without perlatolic acid. Common on bark. Hatomachi–Mt. Akusawa, KM 6105 & 6117; Hatomachi–Yamanohana, HK 44375, 44437, 44442 & KM 6212; Kumasawa–Mt. Hiuchi, HK 44291 & 44295; Miike–Usagi, KM 6254 & 6255; Oyama–Mt. Koshibutsu, HK 44297; Ryugu–Yamanohana, MI 30494.

Pertusaria violacea Oshio. Common on bark. Hatomachi–Yamanohana, HK 44379; Hirosawa–Kumasawa, HK 44195; Miike–Hirosawa, HK 44132; Miike–Usagi, KM 6056 & 6057; Mt. Kasagatake summit, MI 30553.

Phaeophyscia hirtuosa (Kremp.) Essl. Rare, collected at only one locality. Ryugu–Yamanohana, MI 30469.

Phaeophyscia hispidula (Ach.) Moberg. Common on bark. Hatomachi–Fujimi, MI 30380; Hatomachi–Yamanohana, HK 44495; Kumasawa–Mt. Hiuchi, HK 44243; Miike–Usagi, KM 6257.

Phaeophyscia imbricata (Vain.) Essl. Rare, collected at only one locality. Hatomachi–Fujimi MI 30393 & 30420.

Phaeophyscia sciastra (Ach.) Moberg. Rare, collected at only one locality. Mt. Koshibutsu summit, MI 30590.

Physcia caesia (Hoffm.) Hampe. Occasional, on rock. Mt. Kasagatake summit, MI 30540; Oyama–Mt. Koshibutsu, HK 44299 & MI 30276.

Physconia grumosa Kashiw. & Poelt. Common on bark of *Fagus* and *Quercus*. Hatomachi–Yamanohana, HK 44504; Kumasawa–Mt. Hiuchi, HK 44265 & 44242.

Pilophorus clavatus Th.Fr. Occasional, on rock in shaded condition. Miike–Usagi, KM 6068; Mt. Hiuchi summit, MI 30198.

Pilophorus curtulus (Kurok. & Shibuichi) Jahns. Rare, collected at only one locality. Miike–Hirosawa, HK 44099.

Placynthiella uliginosa (Schrad.) Coppins & P.James. Found on humus. Mt. Hiuchi summit, MI 30240.

Platismatia interrupta W.L.Culb. & C.F.Culb. Common on bark. Hatomachi–Yamanohana, HK 44465; Kumasawa–Mt. Hiuchi, HK 44257; Miike–Usagi, KM 6261.

Porpidia albocaerulescens (Wulfen) Hertel & Knoph. Although this species is one of the most common saxicolous lichens in Japan, it is apparently very rare in the present area being collected at only one locality. Miike–Hirosawa, HK 44119.

Porpidia flavicunda (Ach.) Gowan. Common on exposed rocks in the summit area. Mt. Hiuchi summit, MI 30171 & 30251; Mt. Shibutsu summit, MI 30321 & 30360.

Porpidia macrocarpa (DC.) Hertel. Common on rocks both in exposed and shaded condition.

Fujimi–Ryugu, MI 30458; Hatomachi–Mt. Akusawa, MI 30273; Mt. Akusawa–Mt. Koshibutsu, MI 30283 & 30298; Mt. Kasagadake summit, MI 30528 & 30548.

Porpidia musiva (Körb.) Hertel & Knoph. Common on exposed rocks. Fujimi–Ryugu, MI 30498; Mt. Akusawa–Mt. Koshibutsu, MI 30296 & 30304; Mt. Hiuchi summit, MI 30202.

Pseudephebe pubescens (L.) M.Choisy. Rare, but locally abundant around the summit area of Mt. Hiuchi. Mt. Hiuchi summit, MI 30146b.

Pseudocyphellaria crocata (L.) Vain. Rare, collected at only one locality. Ryugu–Yamanohana, MI 30482.

Pseudopyrenula cinereoglaucescens Vain. Occasional, on bark. Kumasawa–Mt. Hiuchi, HK 44293; Miike–Hirosawa, HK 44134; Miike–Usagi, HK 6066.

Pyrenopsis conturbatula Nyl. This species was once reported from Kyushu (Takashima) by Nylader (1890). This is the second report for the species in Japan. In the present survey, it was found on exposed rock along trail at elevation about 1800 m. The specimen (Fig. 4) has following diagnostic characters; thallus minutely squamulose, tightly attached to the substrata, blackish with reddish tinge, gelatinous when moist; cortex not differentiated, medullary hyphae paraplectenchymatous; photobiont *Gloeocapsa*; apothecia perithecia-like; disc pored to urceolate; thalloid exciple distinct; asci with 8-spored; spores colorless, simple with additional septa, 10–11 × 4–5 μm. Although type specimen of *P. controbatula* was not studied by the authors, these characters described above coincide well with the specimens preserved in TNS. Kumasawa–Mt. Hiuchi, HK 44264. Other specimens examined. Japan. Honshu. Prov. Settsu: Takedao, November 12, 1933, Y. Asahina 3315 (TNS). Prov. Kii: Kinomoto, December 30, 1932, F. Fujikawa (hb. Y. Asahina 32123, TNS).

Pyrenula japonica Kurok. Common on bark. Miike–Hirosawa, HK 44137.

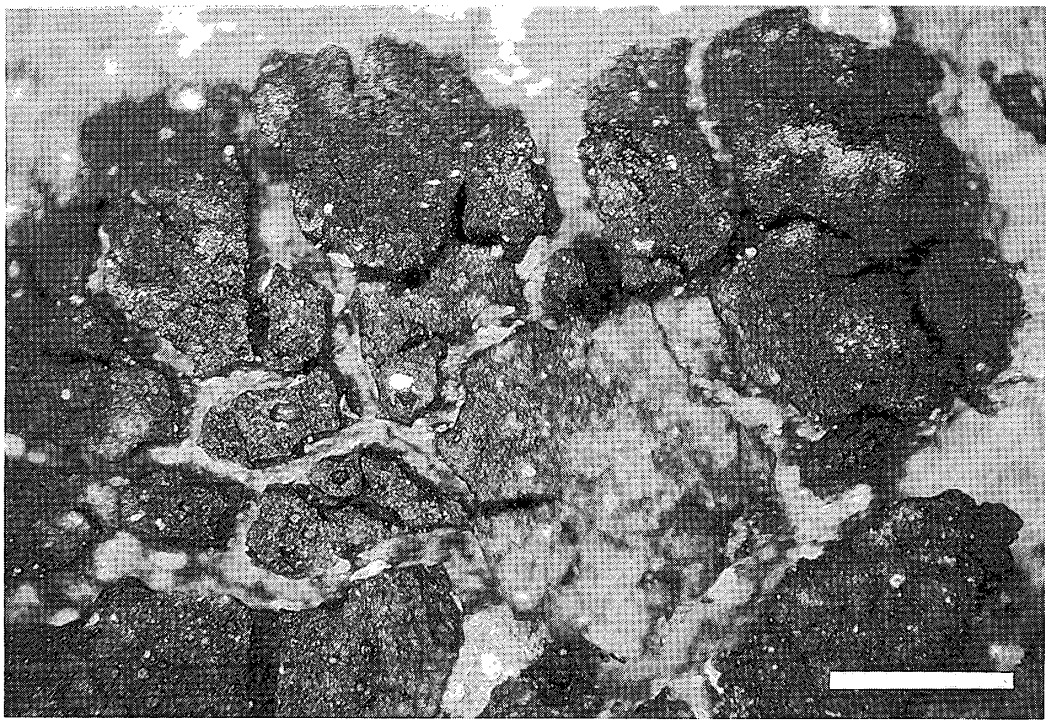

Fig.4. *Pyrenopsis conturbatula* Nyl., H. Kashiwadani 44264 (TNS). Scale bar = 1 mm.

Pyxine limbulata Müll.Arg. Occasional, on bark. Hatomachi–Yamanohana, HK 44498.

Pyxine sorediata (Ach.) Mont. Occasional, on bark. Hatomachi–Fujimi MI 30423; Hatomachi–Yamanohana, HK 44488.

Ramalina conduplicans Vain. Occasional, on bark. Fujimi–Ryugu, MI 30429; Hatomachi–Mt. Akusawa, KM 6098; Hatomachi–Yamanohana, HK 44457; Oyama–Mt. Koshibutsu, KM 6177.

Ramalina dilacerate (Hoffm.) Hoffm. Occasional, on bark. Hatomachi–Yamanohana, HK 44458; Miike–Hirosawa, HK 44128.

Ramalina roesleri (Hochst.) Nyl. Not found during our fieldwork, but one specimen from the present area can be identified with *R. roesleri*. Ozegahara, July 15, 1950, Y. Asahina 5071 (TNS).

Ramalina shinanoana Kashiw. Rare, collected at only one locality. Ryugu–Yamanohana, MI 30472.

Ramalina sinensis Jatta. Occasional, on bark. Hatomachi–Yamanohana, HK 44463 & 44486.

Ramalina yasudae Räsänen. Common on acid rocks around the summit of Mt. Shibutsu and Mt. Koshibutsu. Mt. Shibutsu summit, MI 30361; Oyama–Mt. Koshibutsu, HK 44322 & KM 6145.

Rhizocarpon eupetraeoides (Nyl.) Blomb. & Forssell. Common on exposed rock. Mt. Hiuchi summit, MI 30187 & 30237; Oyama–Mt. Koshibutsu, HK 44321.

Rhizocarpon fujiyamae Räsänen. Rare, found on exposed rocks. Since Räsänen (1944) reported this species from Mt. Fuji it has never been reported from Japan. This is a the second locality for this species in Japan. Mt. Akusawa–Mt. Koshibutsu, MI 30293.

Rhizocarpon geographicum (L.) DC. Common on exposed rocks in the summit area. Mt. Akusawa–Koshibutsu, MI 30295; Mt. Hiuchi summit, MI 30158, 30247 & 30258; Mt. Koshibutsu summit, MI 30578 & 30600; Mt. Shibutsu summit, MI 30318, 30320 & 30329.

Rhizocarpon oederi (Weber) Körb. Rare, found on exposed rocks. Diagnostic characteristics for this species are: the cracked-areolate thallus which is rusty orange, the subimmersed to appressed-adnate apothecia and the colorless 3-septated spores. Mt. Shibutsu summit, MI 30323.

Sphaerophoron formosanum (Zahlbr.) Wedin. Occasional, on bark or decayed wood. Fujimi–Ryugu, MI 30439; Hatomachi–Yamanohana, HK 44350 & MI 30509; Miike–Usagi, KM 6240.

Sphaerophoron meiophorum (Nyl.) Wedin. Occasional, on bark. Miike–Hirosawa, HK 44110.

Sphaerophoron fragilis (L.) Pers. Rare, restricted around the summit area of Mt. Hiuchi. Mt. Hiuchi summit, MI 30142c & 30152.

Stereocaulon depreaultii Delise ex Nyl. Rare, restricted on rock in exposed condition. Miike–Hirosawa, HK 44097.

Stereocaulon exutum Nyl. Occasional, on rock. Hatomachi–Yamanohana, KM 6211; Miike–Usagi, KM 6075.

Stereocaulon nigrum Hue. Previously reported by Asahina (1952). Not found during our fieldwork.

Stereocaulon octomerellum Müll.Arg. Occasional, on rock. Miike–Usagi, KM 6242.

Stereocaulon octomerum Müll.Arg. Occasional, on rock. Miike–Hirosawa, HK 44098.

Stereocaulon pileatum Ach. Not found during our fieldwork. However, only one specimen was collected in the present areas by Asahina. Ayamedaira, Oze, Prov. Iwashiro, July 14, 1950, Y. Asahina 5074.

Stereocaulon vesuvianum Pers. Locally abundant around the summit of Mt. Hiuchi. Mt. Hiuchi summit, MI 30174.

Stereocaulon vesuvianum var. nodulosum (Wallr.) I.M.Lamb. Occasional, on rock. Miike–Hirosawa, HK 43096.

Sticta insinuans Nyl. Occasional, on bark. Hatomachi–Yamanohana, HK 44444; Oyama–Mt. Koshibutsu, KM 6158; Ryugu–Yamanohana, MI 30490.

Sticta nylanderiana Zahlbr. Occasional, on bark. Hatomachi–Yamanohana, HK 44386.

Sulcaria sulcata (Lév.) Bystrek ex Brodo & D. Hawksw. Occasional, on bark. Hatomachi–Yamanohana, HK 44453 & 44469.

Tephromela aglaea (Sommerf.) Hertel & Rambold. Rare, found on exposed rocks. Mt. Hiuchi summit, MI 30164.

Tephromela atra (Huds.) Hafellner. Common on bark and rarely found on exposed rocks. Hatomachi–Mt. Akusawa, KM 6120; Hatomachi–Yamanohana, HK 44374; Mt. Shibutsu summit, MI 30359.

Thamnolia subliformis (Ehrh.) W.L.Culb. Previously reported from the summit area of Mt. Shibutsu by Asahina (1952). Not found during our fieldwork.

Thamnolia vermicularis Ach. Common on ground around the summits of Mt. Hiuchi and Mt. Shibutu. Mt. Hiuchi summit, MI 30212; Mt. Kasagatake summit, MI 30526; Oyama–Mt. Koshibutsu, HK 44316 & MI 30287.

Thelotrema lepadiunum (Ach.) Ach. Occasional, on bark of *Tsuga*. Hatomachi–Yamanohana, HK 44411; Kumasawa–Mt. Hiuchi, HK 44288.

Thelotrema similans Nyl. Occasional, on bark of *Abies* and *Tsuga*, Miike–Hirosawa, HK 44121 & 44129.

Thelotrema subtile Tuck. Occasional, on bark of *Abies*. Kumasawa–Mt. Hiuchi, HK 44280; Miike–Hirosawa, HK 44177.

Trapelia coarctata Schaer. Occasional, on exposed rocks. Mt. Hiuchi summit, MI 30165.

Trapelia mooreana (Carroll) P.James. Occasional, on inundated or exposed rocks. Fujimi–Ryugu, MI 30499; Hatomachi–Fujimi MI 30410; Mt. Hiuchi summit, MI 30167.

Tremolecia atrata (Ach.) Hertel. Rare, on exposed rocks. Mt. Shibutsu summit, MI 30356.

Tuckermannopsis americana (Spreng.) Hale. Occasional, on bark of coniferous trees. Hirosawa–Kumasawa, HK 44207.

Tuckermannopsis gilva (Asahina) M.J.Lai. Occasional, on bark of coniferous trees. Hatomachi–Yamanohana, HK 44427; Miike–Usagi, KM 6253.

Tuckermannopsis sepincola (Ehrh.) Hale. Rare, collected at only one locality. Miike–Usagi, KM 6215.

Umbilicaria caroliniana Tuck. Rare, restricted to the summit area of Mt. Hiuchi. Mt. Hiuchi summit, MI 30149 & 30243.

Umbilicaria neocylindrica J.C.Wei & Y.M.Jiang. Rare, restricted to the summit area of Mt. Hiuchi. Mt. Hiuchi summit, MI 30146 & 30250.

Usnea diffracta Vain. Occasional, on bark. Fujimi–Ryugu, MI 30438; Kumasawa–Mt. Hiuchi, HK 44233; Miike–Usagi, KM 6076.

Usnea longissima Ach. Occasional, on bark. Hatomachi–Yamanohana, KM 6210; Miike–Usagi, KM 6060.

Usnea trichodeoides Vain. Occasional, on bark. Fujimi–Ryugu, MI 30432: Miike–Hirosawa, HK 44120.

Vulpicid apinastri (Scop.) Mattson & M.J.Lai. Occasional, on bark of *Pinus pumila*. Hirosawa–Kumasawa, HK 44225; Mt. Hiuchi summit, MI 30159; Oyama–Mt. Koshibutsu, HK 44307 & KM 6152.

Xanthoria mandschurica (Zahlbr.) Asahina. Occasional, on rock. Mt. Kasagatake summit, MI 30550; Mt. Shibutsu summit, MI 30352 & 30361b; Oyama–Mt. Koshibutsu, HK 44318.

Summary

A totalof 262 lichen taxa representing 38 families, 96 genera, 254 species, 3 subspecies and 5 varieties were collected during fieldwork at Ozegahara moor and its adjacent areas. Although most taxa reported in the present paper are common or widely distributed in Japan, *Brigantiaea sorediata* is described as new to science and *Adelolecia pilati*, *Farnoldia jurana*, *Leptogium subtile* and *Orphniospora moriopsis* are reported as new to Japan. *Bacidia baculifera*, *Fuscidea intercincta*, *Pyrenopsis controbatula* and *Rhizocarpon fujiyamae* are second records for each species in Japan. It is noteworthy that an extensive colony of *Dermatocarpon tuzibei*, an endangered species in Japan, is found on exposed serpentine rocks along ridge between Mt. Koshibutsu and Mt. Shibutsu.

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要　　約

尾瀬ヶ原は周囲を囲む燧岳や至仏山と共に日光国立公園の中心をなす景勝地である．高層湿原，火山，蛇紋岩地を含むこの一帯の地衣類に関してはこれまでにほとんど分類学的研究がなされておらず，朝比奈 (1952) により葉状，樹枝状地衣類を中心とした75種が報告されているに過ぎない．また，地衣類研究者による本格的な調査が行われた記録もない．

本報告では主として2001年10月に著者等が尾瀬ヶ原，燧岳，至仏山を中心とする地域から採集した約1450点の標本を基に38科96属262種類の地衣類を報告した．それらの大部分は日本のブナ帯–高山帯に普通に分布する種類であるが，次に示すような分類学的に或いは植物地理学上，興味深い種が含まれる．すなわち，*Brigantiaea sorediata* Kashiw., Mas.Inoue & K.H.Moonは新種として記載された．*Adelolecia pilati* (Hepp) Hertel & Hafellner, *Farnoldia jurana* (Schaer.) Hertel, *Leptogium subtile* (Schrad.) Torss., *Orphniospora moriopsis* (A.Massal.) D.Hawksw.は日本からは最初の報告である．また，*Bacidia baculifera* (Nyl.) Zahlbr., *Fuscidea intercincta* (Nyl.) Poelt, *Pyrenopsis controbatula* Nyl., *Rhizocarpon fujiyamae* Räsänenは日本では第2の報告である．また，日本産地衣類としては絶滅危惧種に指定されているミヤマウロコゴケ *Dermatocarpon tuzibei* の大群落が小至仏山附近の蛇紋岩上で確認された．以下これらについて述べる．

Adelolecia pilati（アカゾメチャクロイボゴケ，新称）：欧州や北極圏及び北米大陸に分布する種であるが，アジアではじめての報告である．厚膜で放射状に走る菌糸組織から成るよく発達した果殻(excipulum)が水酸化カリウム(K)で紫色あるいは紫赤色の反応を示す．

Bacidia baculifera（ムチイボゴケ，新称）：本種はNylander (1890) が富士一合目で採集された標本

を基に新種として記載して以来報告はなかった．本調査地域ではブナやオオシラビソの樹幹上及びそれに着生するコケ類上に比較的普通に生育している．褐色で凸状の子器盤，無色で放射状に走る菌糸組織から成る果殻，26–32 × 5–7 μmの糸状の胞子を有する．

Brigantiaea sorediata（コナサビイボゴケ，新称）：本種は地衣体に顆粒状の粉芽を持つ点でサビイボゴケ属の他種からは容易に区別できる．子嚢には長さ90–120 μmの子嚢胞子を1個生じ，地衣成分としてウスニン酸とゼオリンを含んでいる．燧岳北側の海抜1650 m付近のアスナロには普通に見られるがその他の地域では発見されなかった．

Dermatocarpon tuzibei（ミヤマウロコゴケ）：本種は日本特産種で，岩手県の早池峰山，群馬県の谷川岳及び至仏山だけに産する稀種であり，絶滅危惧種にも指定されている．至仏山から小至仏山にいたる蛇紋岩の岩上には本種の広大な群落が成育している（図3）．

Farnoldia jurana（スルスミヘリトリゴケ，新称）：本種は従来欧州や北米大陸の高緯度地域を中心に広く知られていたがアジア地域からははじめての報告である．本種は石灰岩質の岩石を好むが，本調査地でも小至仏山や至仏山山稜部の蛇紋岩上に生育している．明瞭な子器縁に縁取られた黒色の子器は著しく炭質化した果殻を持ち，地衣成分としてコンフルエンチン酸を有する．

Fuscidea intercincta（アバタフスキデア，新称）：本種はこれまでInoue and Moon (1998) によって白神山地から報告されているだけである．圧着した黒色の子器，子器盤上の突起umbo，楕円形の胞子を持ち，ジバリカート酸を有する．

Leptogium subtile（タカネキノリ，新称）：欧州及び北米大陸の高緯度地域を中心にひろく分布するが，日本からははじめての報告である．地衣体は地上生で巾0.1–0.3 mm，長さ2–3 mmと小さく，多くは密集したクッション状となる．アオキノリ属の中では最も小形の地衣体を作る．日本産の標本は無子器でありさらに検討が必要ではあるが，地衣体の形状や成育状況から見て本種と同定できる．

Orphniospora moriopsis（チャイロヘリトリゴケ，新称）：本種はこれまでに欧州及び北米の高緯度地域，豪州，ニューギニアとキナバルから報告されているが日本からははじめての報告である．地衣体は褐色で光沢があり小分画化し，ヨードで赤紫の反応を呈する髄層と褐色単室の胞子を有する．

Pyrenopsis conturbatula（モツレノリ，Fig. 4）：本種はNylander (1890) が九州，高島産の標本を基に記載したものであるがその後の報告はない．本調査中に燧岳北斜面の1800 m付近の日当たりの良い岩上に成育するのがみつかった．共生藻は *Gloeocapsa* で地衣体は赤みがかった茶褐色，小形の鱗片状にわかれ，裏面全体で岩に密着する．子器は被子器状で孔口は地衣体表面にひらく，果殻は明瞭で無色，子嚢は8個の胞子を持ち，胞子は無色，単室，10–11 × 4–5 μm.

Rhizocarpon fujiyamae（フジヤマチズゴケ，新称）：本種はRäsänen (1944) によって富士山から新種として報告されたものであるが，その後の報告はない．チズゴケと同じ黄色の地衣体を有する仲間であるが，これとは地衣体の小分画がいくぶん膨れ，子嚢上層が水酸化カリウムで紫色を呈し，分室数の少ない石垣状多室の胞子を有する点で区別できる．

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