

## A contribution to the lichen flora of Iceland

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**Abstract:** A total of 202 taxa of lichens are reported from nine localities in Iceland. 12 lichens are new to Iceland, viz. *Acarospora rhizobola*, *Caloplaca fraudans*, *Candelariella dispersa*, *C. terrigena*, *C. xanthostigma*, *Lecanora argopholis*, *L. atromarginata*, *Lecidella scabra*, *Lichenomphalia alpina*, *Rhizocarpon lecanorinum*, *R. pusillum* and *Stereocaulon symphycheilum*. Geology, climate and vegetation of the investigation area are briefly treated.

**Kokkuvõte:** Lisandusi Islandi lihhenofloorale.

Loetletakse 202 sambliku taksonit üheksast leiukohast Islandil. 12 liiki on Islandile uued: *Acarospora rhizobola*, *Caloplaca fraudans*, *Candelariella dispersa*, *C. terrigena*, *C. xanthostigma*, *Lecanora argopholis*, *L. atromarginata*, *Lecidella scabra*, *Lichenomphalia alpina*, *Rhizocarpon lecanorinum*, *R. pusillum* ja *Stereocaulon symphycheilum*. Lühidalt iseloomustatakse uurimisala geoloogiat, kliimat ja taimkatet.

### INTRODUCTION

Phytogeographically and floristically Iceland forms an interesting link between North America/Greenland and the Scandinavian Peninsula. Therefore it is no matter for surprise that the big island has the attention of many botanists including lichenologists over a period of many years. All parts of the island, which covers an area of c. 100,000 km<sup>2</sup>, have been rather equally investigated lichenologically, and the lichen flora of Iceland must be considered fairly well-known. Kristinsson & Heidmarsson (2009) list about 750 lichens from the area. However, some new revisions of recent Icelandic collections refer that additions to the lichen flora of the island still can be done in areas which are comparatively difficult of access, for example, in North West and central Island.

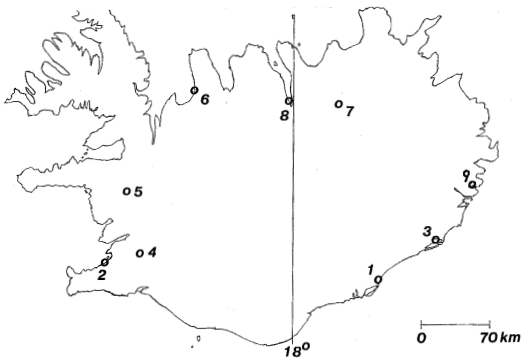
Grønlund (1870) and Branth (1903) give a survey of the earliest collectors of lichens in Iceland. J. G. König visited Iceland in 1765–66 with the intention to collect plants for Flora Danica. The lichens, totally about 50, were listed by O. F. Müller (1770). C. Grønlund made extensive collections of lichens in Iceland in the second half of the 19th century (Grønlund, 1870, 1881, 1885, 1995) and the known number of Icelandic lichens was more than doubled. They were revised by Deichmann Branth, some also by Th. M. Fries. Many lichenologists have dealt with different aspects of the lichen flora of Iceland in the 20th century: after discussing his special species concept Galløe (1920) lists

a number of lichens known so far from Iceland and Greenland; Cernohorský (1954) mentions some Icelandic *Cladonia* species; Lynge (1940) outlines the macrolichens collected by Norwegian botanists in Iceland in 1937 and 1939; Magnusson (1944) describes some new species of *Acarospora* collected during these two trips; Degelius (1957) gives a survey of the epiphytic lichen flora of the birch stands in Iceland; Kershaw (1962) lists about 70 lichens from some inland areas. Since then numerous important contributions to the lichen flora of Iceland have been made by H. Kristinsson (1968, 1969, 1972, 1974a & b; 1975, 1981, 1999). The latest version of “Checklist of Icelandic Lichens” (Kristinsson & Heidmarsson, 2009) contains a complete list of references dealing with these lichens. The last-mentioned author has recently outlined the genus *Dermatocarpon* in the Nordic countries including Iceland (Heidmarsson, 2001). Thomson (1984, 1997) has mapped the distribution of many Icelandic lichens, but the maps are in need of updating because of the many recent records. On the basis of his lichen collections from 1984 the author reported on 11 new lichens from Iceland (Hansen, 1990). The Icelandic lichen collections of S. Svane, totally about 2000 specimens, were transferred to herbarium C in 2003. They are rich in new and interesting Icelandic lichens, which will be published in near future.

## Localities and geology

Geologically Iceland is a very young country. Two formations are presented in Iceland, viz. tertiary basalts and quaternary, palagonite tuffs originating from basaltic glass (Malmström, 1958; Stender & Hedemann, 1983). The following nine localities (Fig. 1) were investigated by the author.

1. Fagurhólsmýri. 63°53'N, 16°40'W. Alt. 0–150 m. 4–7 July 1984. Quaternary, porphyritic basalts, basalt-breccias; lava.
2. Reykjavík. 64°09'N, 21°50'W. Alt. 0–50 m. 30 June 1984. Quaternary, porphyritic basalts.
3. Höfn. 64°15'N, 15°14'W. 0–50 m. 8 July 1984. Tertiary basalts.
4. Thingvellir. 64°16'N, 21°07'W. Alt. 0–50 m. 1–3 July 1984. Quaternary, porphyritic basalts; lava.
5. Bifröst. 64°46'N, 21°33'W. Alt. 0–100 m. 16–19 July 1984. Tertiary basalts; lava. Lichens were collected both in the lowland and on a postglacial crater (Grábrók).
6. Blönduós. 65°40'N, 20°16'W. Alt. 0–100 m. 14–15 July 1984. Tertiary basalts.
7. Reykjahlíd (Mývatn). 65°40'N, 16°55'W. Alt. 0–50 m. 10 July 1984. Quaternary, more or less porous lava; porphyritic basalts.
8. Akureyri. 65°42'N, 18°10'W. Alt. 0–1,144 m. 11–13 July 1984. Tertiary basalts. The collecting was carried out in the area SW of the town including the mountain, Súlur).
9. Breiddalsvík. 64°43'N, 14°00'W. Alt. 0–50 m. 9 July 1984. Tertiary basalts.



**Fig. 1.** The position of the nine investigated localities on Iceland. 1 – Fagurhólsmýri, 2 – Reykjavík, 3 – Höfn, 4 – Thingvellir, 5 – Bifröst, 6 – Blönduós, 7 – Reykjahlíd, 8 – Akureyri, 9 – Breiddalsvík.

## Climate

Iceland is located in the border area between the temperate and the polar climatic zones. The lowland areas are situated in the temperate zone. The climate is strongly influenced by a relatively warm sea current coming from the south and a cold current from the north. Warm air currents from the south and cold from the north often result in depressions, which from southwest move across Iceland (Stender & Hedemann, 1983). The mean maximal temperature of the warmest month, July, is c. 14.7°C at Reykjavík, whereas the mean temperature of the coldest month, January, is 2.4°C. The mean maximal temperature of July is 14.3°C at Akureyri, while the mean temperature of January is 1.8°C (1931–60). The annual precipitation is 805 mm at Reykjavík, and only 474 mm at Akureyri. The annual precipitation at Mývatn and the Blönduós area is comparable to that of Akureyri. The highest annual precipitation is found in South (up to more than 2,000 mm) and East (c. 1,300 mm) Iceland (1931–60).

## MATERIAL AND METHODS

Lichens were collected at numerous sample plots at the nine localities studied in Iceland in 1984. The collected material, a total of 900 specimens, was studied with Zeiss light microscopes. Selected specimens of *Lepraria* were identified by means of TLC. Reagents for thalline spot tests such as K, C, KC and PD were used for determination of many samples of *Cladonia*, *Stereocaulon* etc. The material is deposited at the Botanical Museum, University of Copenhagen (C).

## RESULTS AND DISCUSSION

While the geological conditions of Iceland are relatively simple compared with those of, for example, Greenland, the vegetation patterns on the island are fairly complicated. Lichens occur in the following types of plant communities: different types of heath- and grassland, fell-fields, bogs, snowbeds, woodland dominated by *Betula pubescens* and saxicolous plant communities. Scrubs are more or less common in oceanic places along the coast, whereas taller brushwood and trees are restricted to inland areas with a somewhat continental climate (Kristins-

son, 2005). Proper forests were not included in the present investigation, but have previously been studied as regards the epiphytic lichen flora by, for example, Degelius (1957).

### General remarks on the lichen vegetation

At Fagurhólsmýri areas of heath- and grassland alternate with different types of basaltic rocks. *Alectoria nigricans*, *Cetraria aculeata*, *Stereocaulon arcticum* and *Thamnolia vermicularis* occur more or less abundantly in dwarf shrub heaths with *Dryas octopetala*, *Empetrum hermaphroditum*, *Vaccinium uliginosum* and mosses, mainly *Racomitrium lanuginosum*. Bare patches on grassy slopes are colonized by lichens such as *Baeomyces placophyllus*, *B. rufus* and *Peltigera didactyla*. *Peltigera venosa* has cavities used by sheeps as shelter and mossy walls in not too shady basaltic caves as the preferred habitats at the locality just as seen in, for example, South Greenland (Hansen, 1971). *Collema flaccidum*, *Gyalecta foveolaris*, *Peltigera collina*, *P. praetextata*, *Placidium lachneum*, *Solorina bispora* and *S. saccata* also grow in such caves and in moist depressions with nutritious matters in the rocks. Species such as *Acarospora smaragdula*, *Placopsis gelida*, *Porpidia melinodes* and *Tremolecia atrata* occur on reddish, porous lava. Basaltic rocks influenced by gulls, terns and other sea birds hold *Aspicilia caesiocinerea* (dominant), *Candelariella vitellina*, *Parmelia saxatilis*, *Physcia caesia* and *Xanthoria elegans*. *Umbilicaria cylindrica* and *U. torrefacta* occur in places with a small influence of guano, only. White to pale grey thalli of *Pertusaria corallina* and *P. lactea* are more or less common on the rock faces.

The terricolous lichen vegetation in the coastal area near Reykjavik is distinctly influenced by the fairly rich soil conditions due to the weathered basaltic rocks. It is developed as mosaics composed of fell-field and heath species such as, for example, *Cetraria aculeata*, *Cladonia arbuscula*, *C. macrophyllodes*, *C. uncialis*, *Leptogium lichenoides*, *Peltigera collina*, *P. membranacea*, *Sphaerophorus globosus*, *Stereocaulon alpinum* and *Thamnolia vermicularis*. The community is rich in sedges and grasses. The scattered basaltic boulders hold a more or less nitrophilous lichen vegetation with *Aspicilia caesiocinerea*, *Candelariella vitellina*, *Lecanora intricata*, *L. polytropa*, *Protoparmelia badia*, *Protoparmeliopsis muralis*, *Rhizocarpon geographicum* and *Xanthoria parietina*.

Lichens with a distinct preference for a neutral to slightly alkaline soil substrate such as *Gyalecta foveolaris*, *Peltigera rufescens*, *P. venosa* and *Solorina saccata* are fairly characteristic components of the terricolous lichen flora occurring in the basaltic area at Höfn. *Peltigera aphthosa*, *P. didactyla*, *P. malacea*, *P. praetextata* and *Polychidium muscicola* grow on mosses on the ground. "Bird rocks", i.e. rocks and boulders manured by birds occur abundantly near the shore at Höfn. *Anaptychia runcinata* and *Xanthoria parietina* are the dominant lichen on some investigated vertical rock faces, which also support *Caloplaca holocarpa*, *Dermatocarpon miniatum*, *Ochrolechia parella*, *Physcia caesia*, *P. dubia*, *Protoparmeliopsis muralis*, *Ramalina subfarinacea*, *Rhizocarpon geminatum* and *Xanthoria elegans*.

A very conspicuous rift valley cuts through the lava and basaltic rocks at the historical locality, Thingvellir (Fig. 2). The lichen vegetation covering the west-exposed, vertical rock faces differs essentially from that occurring on the south (to southeast)-exposed faces in the valley. The first-mentioned is composed of *Lecanora polytropa*, *Placopsis gelida*, *Rhizocarpon geographicum* and other crustaceous lichens. In some places species with a conspicuous white and pale grey thallus such as *Ochrolechia parella*, *O. tartarea*, *Pertusaria dactylina* and *P. lactea* cover up to 50 % of the rock face, which generally is moist and shady. The east and southeast-exposed faces hold lichens with a distinct preference for nutritious matters. *Caloplaca castellana*, *C. crenularia*, *Candelariella vitellina*, *Lecanora argopholis*, *Placynthium*



**Fig. 2.** Thingvellir with the investigated cleft.

*asperellum* and *Rhizocarpon geminatum* are typical examples. *Solorina bispora* and *Peltigera venosa* grow on moist soil in rock fissures, and *Dermatocarpon miniatum* and *Vestergrenopsis elaeina* on seepages. Scattered boulders in the bottom of the valley support lichens such as *Acarospora smaragdula*, *Lecanora intricata*, *L. polytropa*, *Lecidea lapicida* var. *pantherina*, *Rhizocarpon geographicum*, *Stereocaulon vesuvianum* (dominant), *Umbilicaria cylindrica* and *U. torrefacta*. *Cetraria aculeata* and *Thamnolia vermicularis* grow on *Racomitrium lanuginosum* cushions.

The last-mentioned species is an important component of the *Empetrum hermaphroditum*-*Vaccinium uliginosum* heaths at Bifröst. They are fairly rich in macrolichens such as *Cetraria muricata*, *C. islandica*, *Cladonia mitis*, *C. rangiferina*, *C. uncialis*, *Peltigera aphthosa*, *P. rufescens*, *Sphaerophorus globosus* and *Thamnolia vermicularis*. The microlichen, *Ochrolechia grimmiae*, grows commonly on *Racomitrium* in these heaths. A fairly well-developed epiphytic lichen flora consisting of species such as *Cetraria sepincola*, *Lecanora circumborealis*, *L. symmicta*, *Melanelia exasperata* and *Pertusaria carneopallida* occurs in the extensive thickets of *Betula pubescens* at Bifröst. The lichen flora on the very hard basaltic rocks is contrasting sharply with that on the more easily weathering, porous lava blocks. Basaltic "bird rocks" support the following lichens: *Amygdalaria pelobotryon*, *Aspicilia caesiocinerea* (dominant), *Candelariella vitellina*, *Lecanora intricata*, *L. polytropa*, *Melanelia hepatizon*, *Parmelia saxatilis*, *Placopsis lambii*, *Protoparmelia badia*, *Rhizocarpon geographicum*, *Umbilicaria cylindrica* and *U. torrefacta*. *Dryas octopetala* grows sparsely on these rocks. Lava blocks in the same area hold lichens such as *Parmelia omphalodes*, *P. saxatilis*, *Pertusaria dactylina*, *P. lactea*, *Porpidia melinodes* (dominant), *Rhizocarpon geographicum*, *Sphaerophorus fragilis*, *Stereocaulon vanoyei*, *S. vesuvianum*, *Tremolecia atrata*, *Umbilicaria cylindrica* and *U. hyperborea*. *Racomitrium lanuginosum* is of great importance in the lava block fields and evidently is favoured by the moist conditions prevailing here. Most of these lichens also occur on Grábrók. However, *Stereocaulon vesuvianum* is the dominant lichen on this crater. *Alectoria nigricans*, *Cetraria islandica*, *C. muricata*, *Cladonia mitis*, *C. uncialis*, *Ochrolechia grimmiae*,

*Sphaerophorus globosus* and *Thamnolia vermicularis* all grow in mosses, predominantly *Racomitrium*, on Grábrók.

Extensive areas with different types of grass- and heathland occur at Blönduós. Openings in heaths and fell-fields are often covered by lichens, mostly macrolichens such as *Cetraria islandica*, *C. muricata*, *Cladonia amaurocraea*, *C. borealis*, *C. gracilis*, *C. macrophyllodes*, *C. mitis*, *C. rangiferina*, *Peltigera rufescens*, *Stereocaulon alpinum* and *S. glareosum*. However, microlichens such as *Arthrorhaphis alpina*, *Baeomyces carneus*, *Caloplaca ammiospila*, *Ochrolechia frigida*, *O. upsaliensis*, *Polychidium muscicola* and *Protopannaria pezizoides*, are also important components of the heath mosaics. The snowbed-lichens, *Cladonia ecmocyna*, *Pertusaria oculata* and *Solorina crocea*, usually occur together with *Salix herbacea* at north-exposed localities. Marine lichens, for example, *Caloplaca marina*, *Verrucaria ceuthocarpa*, *V. maura* and *V. mucosa*, were studied and collected on vertical, basaltic seashore rocks near the town. The uppermost part of these rocks are often heavily manured by seabirds and accordingly hold a dense vegetation of nitrophilous lichens, for example, *Amandinea punctata*, *Caloplaca verruculifera*, *Physcia caesia*, *Physconia muscigena*, *Rhizocarpon geminatum* and *Xanthoria elegans*. A well-developed zonation pattern was also found on coastal rocks at Breiddalsvík. A zone with *Caloplaca marina* occurs above the *Verrucaria maura* zone. The top of these basaltic rocks is covered by a community consisting of strongly nitrophilous species such as *Caloplaca verruculifera*, *Physcia caesia*, *P. dubia*, *P. tenella*, *Xanthoria candelaria* and the algae, *Prasiola* (dominant).

The comparatively dry climate prevailing at the lake, Mývatn, is distinctly reflected in the surrounding terricolous and saxicolous lichen vegetation. Contrary to the above-mentioned localities species such as *Alectoria nigricans*, *A. ochroleuca*, *Flavocetraria cucullata*, *F. nivalis* and *Physconia muscigena* are relatively common in openings in heath- and grassland. Here they grow together with *Cetraria aculeata*, *C. muricata*, *Cladonia arbuscula*, *C. borealis*, *C. gracilis*, *C. mitis*, *Peltigera rufescens*, *Sphaerophorus globosus*, *Stereocaulon alpinum* and *Thamnolia vermicularis* in a fell-field like community. The comparatively young lava fields are of great interest as regards their contents of lichens. *Rhizocarpon geographicum* is dominant

on the top of the flow lines, which characterize the surface of the almost glassy lava in many places. *Candelariella vitellina* mainly grows in the depressions in the lava, which in addition hold lichens such as *Lecanora intricata*, *L. polytropa*, *Lecidea lapicida* var. *pantherina*, *Pseudephebe minuscula*, *Stereocaulon vesuvianum*, *Umbilicaria cylindrica*, *U. hyperborea* and *U. torrefacta*. “Birdstones” composed of lava support *Candelariella vitellina*, *Lecidea atrobrunnea*, *Parmelia sulcata*, *Physcia caesia*, *P. dubia*, *Protoparmelia badia*, *Protoparmeliopsis muralis* (dominant together with *Xanthoria candelaria*), *Rhizocarpon geminatum*, *Rhizoplaca melanophthalma*, *Umbilicaria arctica*, *U. decussata* and *Xanthoria elegans*. This nitrophilous lichen community also occurs on stone fences in the area near Reykjahlid. The two species of *Placopsis* and *Porpidia* species with ochreous or rust-coloured thallus are rare and *Tremolecia atrata* of minor importance in this area.

The *Empetrum-Dryas-Vaccinium uliginosum* heaths occurring at Akureyri is similar to those of the Mývatn area as regards their contents of lichens with comparatively great abundance of species such as *Alectoria ochroleuca* and *Flavocetraria nivalis*. *Cetrariella delisei*, *Cladonia ecemocyna*, *Pertusaria oculata* and *Solorina crocea* are restricted to *Salix herbacea* snowbeds and north-facing slopes rich in grasses and sedges. The saxicolous lichen flora on Sútur (Fig. 3) is fairly rich and consists of species such as, for example, *Lecanora intricata*, *L. polytropa*, *Lecidea lapicida* (both varieties), *Melanelia hepatizon*, *Parmelia saxatilis*, *Pseudephebe minuscula*, *Sphaerophorus fragilis*, *Umbilicaria cylindrica*,



Fig. 3. Sútur.

*U. hyperborea*, *U. torrefacta* and *U. proboscidea*. *Usnea sphacelata* is abundantly occurring at higher levels on the mountain. “Birdstones” with nitrophilous lichens such as *Melanelia disjuncta*, *Parmelia sulcata*, *Physcia dubia*, *Protoparmelia badia* and *Xanthoria candelaria* are fairly common.

### Annotated list of lichens

The following list of lichens is based on the author’s collections, which comprise totally 202 taxa. The list cannot be considered representative as regards genera such as *Acarospora*, *Aspicilia*, *Lecidea* and other lecideoid lichens, which have been neglected during the present investigation. Nomenclature follows Santesson et al. (2004). Numbers 1, 2, 3 etc. indicate the nine localities listed above. Annotations are given as regards the substrate of the lichens, the plant community, in which they occur, and presence of apothecia (ap.) or perithecia (pe.); “st.” means that the specimen is sterile. The frequency is mentioned, where it was possible to estimate it. Selected references are cited.

- ACAROSPORA RHIZOBOLA (Nyl.) Alstrup – 4. On soil; st., rare. New to Iceland.
- A. SINOPICA (Wahlenb.) Körb. – 5. On basaltic rocks and lava, together with *Tremolecia atrata*; ap.
- A. SMARAGDULA (Wahlenb.) A. Massal. – 1, 3, 4, 5. On basaltic rocks and lava; ap.
- ALECTORIA NIGRICANS (Ach.) Nyl. – 1, 5, 6, 7, 8. On soil in heaths and fell-fields, together with *Flavocetraria cucullata*, *Sphaerophorus globosus* and *Thamnotia vermicularis*; st.; common.
- A. OCHROLEUCA (Hoffm.) A. Massal. – 7, 8. On soil in heaths and fell-fields, together with *Cetraria muricata* and *Flavocetraria nivalis*; st.
- AMANDINEA PUNCTATA (Hoffm.) Coppins & Scheid. – 6. On basaltic rock; ap.
- AMYGDALARIA PELOBOTRYON (Wahlenb.) Norman – 4, 5, 8. On basaltic rocks and lava; ap.
- ANAPTYCHIA RUNCINATA (With.) J.R. Laundon – 3. On basaltic seashore rocks manured by birds; st. The species was observed, but not collected.
- ARTHRORHAPHIS ALPINA (Schaer.) R. Sant. – 4, 5, 6, 7. On soil; st.
- A. CITRINELLA (Ach.) Poelt – 7, 8. On soil; st.

- ASPICILLA AQUATICA Körb. – 4. On moist basaltic rocks; ap; rare.
- A. CAESIOCINEREA (Nyl. ex Malbr.) Arnold – 1, 2, 3, 5, 7. On basaltic rocks manured by birds; ap.
- BAEOMYCES CARNEUS Flörke – 6. On soil; st.
- B. PLACOPHYLLUS Ach. – 1, 5, 8. On soil rich in humus and on mosses; st.
- B. RUFUS (Huds.) Rebent. – 1, 6, 7, 8. On soil; st.
- BELLEMEREA CINEREORUFESCENS (Ach.) Clauzade & Cl. Roux – 8. On basaltic rock; ap.; rare.
- BRYONORA CASTANEA (Hepp) Poelt – 5, 7. On mosses and plant remains; ap.
- BRYORIA CHALYBEIFORMIS (L.) Brodo & D. Hawksw. – 4. On soil in fell-field; st.
- CALOPLACA ALCARUM Poelt – 1, 7, 8. On lava and basaltic seashore rocks; also on mortar; ap.
- C. AMMIOSPILA (Wahlenb.) H. Olivier – 6, 7. On soil and mosses; ap.
- C. CASTELLANA (Räsänen) Poelt – 3, 4. On more or less moist basaltic rocks; ap.
- C. CITRINA (Hoffm.) Th. Fr. – 1. On manured basaltic rock; st.
- C. CRENULARIA (With.) J. R. Laundon – 1, 4. On basaltic rocks; ap.
- C. FRAUDANS (Th. Fr.) H. Olivier – 2. On basaltic rock; ap. New to Iceland.
- C. HOLOCARPA (Hoffm. ex Ach.) A. E. Wade – 3. On basaltic rock; ap.
- C. MARINA (Wedd.) Zahlbr. – 1, 6. On basaltic seashore rocks; ap.
- C. PYRACEA (Ach.) Th. Fr. – 6. On old wood; ap.
- C. TIROLIENSIS Zahlbr. – 7. On plant remains; ap.
- C. VERRUCULIFERA (Vain.) Zahlbr. – 6. On basaltic seashore rocks; ap.
- CALVITIMELA AGLAEA (Sommerf.) Hafellner – 5, 6, 7. On basaltic rocks and lava; ap.
- C. ARMENIACA (DC.) Hafellner – 1. On basaltic rock; ap.
- CANDELARIELLA AURELLA (Hoffm.) Zahlbr. – 3, 7, 8. On mortar; ap.
- C. DISPERSA (Räsänen) Hakul. – 4. On *Placynthium asperellum* on basaltic rock; ap. New to Iceland.
- C. PLACODIZANS (Nyl.) H. Magn. – 3, 4, 5, 7. On soil; ap.; common.
- C. TERRIGENA Räsänen – 7. On soil; ap. New to Iceland.
- C. VITELLINA (Hoffm.) Müll. Arg. – 1, 2, 4, 5, 7. On manured basaltic rocks and lava; ap.; common.
- C. XANTHOSTIGMA (Ach.) Lettau – 7; st. New to Iceland.
- CETRARIA ACULEATA (Schreb.) Fr. – 1, 4, 7. On soil on grassland and in heaths; st.
- C. ISLANDICA (L.) Ach. – 1, 3, 4, 5, 6, 7, 8. Among mosses on soil in heaths, fell-fields; ap.; common.
- C. MURICATA (Ach.) Eckfeldt – 5, 6, 7, 8. Among mosses on soil; st.; common.
- C. SEPINCOLA (Ehrh.) Ach. – 5. On twigs of *Betula pubescens*; ap.
- CETRARIELLA DELISEI (Bory ex Schaer.) Kärnefelt & A. Thell – 8. Among mosses on soil in heath; st.
- CLADONIA AMAUROCRAEA (Flörke) Schaer. – 1, 5, 6, 7. Among mosses on soil in heaths and fell-fields; st.
- C. ARBUSCULA (Wallr.) Flot. ssp. ARBUSCULA – 4, 7. Among mosses on soil in heaths; st.
- C. ARBUSCULA (Wallr.) Flot. ssp. MITIS (Sandst.) Rouss – 1, 5, 6, 7, 8. Among mosses on soil in heaths; st.
- C. BOREALIS S. Stenroos – 1, 3, 4, 5, 6, 7, 8. On soil in heaths and fell-fields; ap.; common.
- C. CERVICORNIS (Ach.) Flot. – 4, 5. Among mosses on soil; st.
- C. CHLOROPHAEA (Flörke ex Sommerf.) Spreng. – 5. On soil and plant remains; st.
- C. COCCIFERA (L.) Willd. – 5. On soil; st.
- C. CORNUTA (L.) Hoffm. – 5. Among mosses on soil; st.
- C. CRISPATA (Ach.) Flot. – 2, 8. Among mosses on soil; ap.
- C. ECMOCYNA Leight. – 6, 7, 8. On soil rich in humus near snow-patches; st.
- C. FURCATA (Huds.) Schrad. – 1, 2, 3, 5, 6, 8. Among mosses in patches in grassland and heaths ap.; common.
- C. GRACILIS (L.) Willd. – 4, 5, 6, 7, 8. Among mosses on soil in heaths; ap.
- C. LUTEOALBA Wheldon & A. Wilson – 8. Among mosses on soil; st.
- C. MACROPHYLLODES Nyl. – 4, 6, 7. Among mosses on soil rich in humus; ap.
- C. PHYLLOPHORA Hoffm. – 4, 5, 7, 8. Among mosses on soil rich in humus; st.
- C. POCILLUM (Ach.) Grognot – 1, 5, 6. On soil rich in humus; st.
- C. PYXIDATA (L.) Hoffm. – 3, 4, 5, 7, 8. On soil rich in humus; ap.
- C. RANGIFERINA (L.) F. H. Wigg. – 5, 6, 8. Among mosses on soil; st.
- C. RANGIFORMIS Hoffm. – 2. On soil; st.

- C. SCABRIUSCULA (Delise) Nyl. 5. On soil; st.  
 C. SUBCERVICORNIS (Vain.) Kernst. – 5. On soil; st.  
 C. SUBULATA (L.) Weber ex F. H. Wigg. – 5. On soil; st.  
 C. TRASSII Ahti – 4, 5, 7. Among mosses on soil in moist depressions in heaths; st.  
 C. UNCIALIS (L.) Weber ex F. H. Wigg. – 1, 5, 6, 7, 8. Among mosses on soil; st.; common.  
 COLLEMA FLACCIDUM (Ach.) Ach. – 1, 3. On basaltic rocks; st.  
 C. TENAX (Sw.) Ach. em. Degel. – 3. On more or less alkaline soil; st.  
 DERMATOCARPON MINIATUM (L.) W. Mann var. COMPLICATUM (Lightf.) Th. Fr. – 1, 3. On basaltic rocks; pe.  
 DIBAEIS BAEOMYCES (L.f.) Rambold & Hertel – 8. On soil; st.  
 DIPLOSCHISTES MUSCORUM (Scop.) R. Sant. – 4. On more or less alkaline soil; ap.; rare.  
 D. SCRUPOSUS (Schreb.) Norman – 5 On basaltic rock; ap.  
 EPHEBE HISPIDULA (Ach.) Horw. – 1. On moist basaltic rock; st.  
 EPILICHEN SCABROSUS (Ach.) Clem. – 1, 7. On *Baeomyces placophyllus* and *B. rufus* on soil and mosses; ap.  
 FLAVOCETRARIA CUCULLATA (Bellardi) Kärnefelt & A. Thell – 7. On soil in heaths and fell-fields; st.  
 F. NIVALIS (L.) Kärnefelt & A. Thell – 7. On soil in heaths and fell-fields; st.  
 FUSCOPANNARIA PRAETERMISSA (Nyl.) P. M. Jørg. – 1. On soil; st.  
 GYALECTA FOVEOLARIS (Ach.) Schaer. – 1, 3, 4, 6, 7. On soil and mosses; ap.  
 HYMENELIA ARCTICA (Lynge) Lutzoni – 4. On moist basaltic rock; ap.  
 IONASPIS LACUSTRIS (With.) Lutzoni – 1, 7. On moist basaltic rock; ap.  
 LECANORA ARGOPHOLIS (Ach.) Ach. – 2, 3, 4, 5, 6, 7. On basaltic rocks; ap. New to Iceland.  
 L. ATROMARGINATA (H. Magn.) Hertel & Rambold – 1. On basaltic rock; ap. New to Iceland.  
 L. CIRCUMBOREALIS Brodo & Vitik. – 5. On twig of *Betula pubescens*; ap.  
 L. CONTRACTULA Nyl. – 1, 6, 7, 8 On seashore basaltic rocks and lava; also on mortar; ap.  
 L. DISPERSA (Pers.) Sommerf. – 3. On manured basaltic rock and lava; ap.  
 L. HAGENII (Ach.) Ach. var. FALLAX Hepp – 6. On old bone; ap.  
 L. INTRICATA (Ach.) Ach. – 1, 4, 5, 7. On basaltic rocks and lava; ap.; common.  
 L. MARGINATA (Schaer.) Hertel & Rambold – 1, 5 On basaltic rocks and lava; ap.  
 L. POLIOPHAEA (Wahlenb.) Ach. – 9. On basaltic rock; ap.  
 L. POLYTROPA (Ehrh. ex Hoffm.) Rabenh. – 1, 3, 5, 6, 7, 8. On basaltic rocks; ap.; common.  
 L. RUPICOLA (L.) Zahlbr. – 7. On lava; ap.  
 L. SYMMICTA (Ach.) Ach. – 5. On twig of *Betula pubescens*; ap.  
 LECIDEA ATROBRUNNEA (Ramond ex Lam. & DC.) Schaer. – 4, 5, 7. On manured basaltic rocks and lava; ap.  
 L. CONFLUENS (Weber) Ach. – 4. On basaltic rock; ap.  
 L. LAPICIDA (Ach.) Ach. var. LAPICIDA – 1, 5, 8. On basaltic rock; ap.  
 L. LAPICIDA (Ach.) Ach. var. PANTHERINA Ach. – 4, 7, 8. On basaltic rocks and lava; ap.  
 L. TESSELATA Flörke – 7, 8. On basaltic rock; ap.  
 LECIDELLA SCABRA (Taylor) Hertel & Leuckert – 7. On basaltic rock; ap. New to Iceland.  
 LEPRARIA EBURNEA J. R. Laundon – 7. On soil.  
 LEPTOCHIDIUM ALBOCILIATUM (Desm.) M. Choisy – 3. Among mosses on basaltic rock; st.  
 LEPTOGIUM LICHENOIDES (L.) Zahlbr. – 1, 4, 7. On soil; st.  
 LICHENOMPHALIA ALPINA (Britzelm.) Redhead et al. – 5, 7. On soil in heaths. New to Iceland.  
 MELANELIA DISJUNCTA (Erichsen) Essl. – 8. On basaltic rock manured by birds; st.  
 M. EXASPERATA (De Not.) Essl. – 4, 5. On branches of *Betula pubescens*; ap.  
 M. HEPATIZON (Ach.) A. Thell – 5, 8. On basaltic rocks; st.  
 MIRIQUIDICA ATROFULVA (Sommerf.) A. J. Schwab & Rambold – 4. On basaltic rock; st.; rare.  
 M. GAROVAGLI (Schaer.) Hertel & Rambold – 1, 7. On basaltic rocks and lava; ap.  
 M. NIGROLEPROSA (Vain.) Hertel & Rambold – 4, 5. On basaltic rocks, together with *Porpidia flavocaerulescens*; ap.  
 MYXOBILIMBIA LOBULATA (Sommerf.) Hafellner – 1. On soil; ap.  
 NEPHROMA EXPALLIDUM (Nyl.) Nyl. – 8. Among mosses on soil; st.; rare.  
 OCHROLECHIA FRIGIDA (Sw.) Lynge – 1, 4, 5, 6, 7, 8. On soil, plant remains and mosses; ap.; common.  
 O. GRIMMIAE Lynge – 5, 6, 8. On *Racomitrium lanuginosum*; ap.; common.  
 O. PARELLA (L.) A. Massal. – 1, 3, 4, 5, 6, 7. On basaltic rocks and lava; ap.

- O. TARTAREA (L.) A. Massal. – 1, 4, 5, 8: On basaltic rocks and lava; ap.
- O. UPSALIENSIS (L.) A. Massal. – 6. On plant remains on more or less alkaline soil; ap.
- OPEGRAPHA PULVINATA Rehm – 3. On *Dermatocarpon miniatum* on basaltic rock; ap.; rare.
- PANNARIA HOOKERI (Borrer ex Sm.) Nyl. – 1, 5. On basaltic rocks; ap.
- PARMELIA OMPHALODES (L.) Ach. – 5, 7. On basaltic rocks and lava, together with *Sphaerophorus fragilis*, and on soil together with *Sphaerophorus globosus*; st.
- P. SAXATILIS (L.) Ach. – 1, 3, 4, 5, 7, 8. On basaltic rocks and on branches of *Betula pubescens*; ap.; common.
- P. SULCATA Taylor – 5, 7. On basaltic rocks and lava manured by birds; st.
- PELTIGERA APHTHOSA (L.) Willd. – 3, 5, 7. Among mosses in heaths and bogs; ap.
- P. BRITANNICA (Gyeln.) Holt.-Hartw. & Tønsberg – 5. Among mosses in heath; st.
- P. CANINA (L.) Willd. – 7. Among mosses in heath- and grassland; st.
- P. COLLINA (Ach.) Schrad. – 1, 7. Among mosses on soil; st.
- P. DIDACTYLA (With.) J. R. Laundon – 1, 3, 6, 7. Among mosses on soil; st.; common.
- P. KRISTINSSONII Vitik. – 1, 8. Among mosses on soil in sunny places; st.
- P. LEPIDOPHORA (Nyl. ex Vain.) Bitter – 7. Among mosses on soil; st.
- P. LEUCOPHLEBIA (Nyl.) Gyeln. – 1, 4, 6, 7. Among mosses in moist places in heath- and grassland; st.
- P. MALACEA (Ach.) Funck – 3, 5, 7. On soil and over mosses in heaths; st.
- P. MEMBRANACEA (Ach.) Nyl. – 2. On soil; st.
- P. PRAETEXTATA (Flörke ex Sommerf.) Zopf – 1, 3. On mosses on soil; st.
- P. RUFESCENS (Weiss) Humb. – 1, 3, 4, 5, 6, 7, 8. On mosses and soil in heaths- and grassland and fell-fields; st. ; common.
- P. VENOSA (L.) Hoffm. – 1, 3, 4. On more or less alkaline soil; ap.
- PERTUSARIA CARNEOPALLIDA (Nyl.) Anzi – 4, 5, 6. On branches of *Betula pubescens*; ap.
- P. CORALLINA (L.) Arnold – 1, 4, 5. On basaltic rocks and lava; st.
- P. CORIACEA (Th. Fr.) Th. Fr. – 7. On plant remains in heath; ap.
- P. GEMINIPARA (Th. Fr.) C. Knight ex Brodo – 1, 5, 8. On mosses and plant remains in heaths; st.
- P. LACTEA (L.) Arnold – 1, 3, 4, 5, 7. On basaltic rocks and lava; st.
- P. OCULATA (Dicks.) Th. Fr. – 1, 5, 6, 7, 8. On soil rich in humus and on plant remains in heaths and near snow-patches; st.
- PHAEOPHYSCIA ORBICULARIS (Neck.) Moberg – 7. On manured basaltic rock; st.
- P. SCIASTRA (Ach.) Moberg – 1, 4, 7, 8. On soil and mosses over basaltic rocks manured by birds; st.
- PHYLLISCUM DEMANGEONII (Moug. & Mont.) Nyl. – 4. On basaltic rocks and lava; st.
- PHYSICIA CAESIA (Hoffm.) Fűrnr. – 1, 3, 6, 9. On basaltic rocks manured by birds; also on mosses on such rocks; st.
- P. DUBIA (Hoffm.) Lettau – 3, 7. On mosses on manured lava blocks; st.
- P. TENELLA (Scop.) DC. var. MARINA (E. Nyl.) Lynge – 7, 8, 9. On basaltic seashore rocks; also on mortar; st.
- PHYSCONIA MUSCIGENA (Ach.) Poelt – 6, 7. On mosses and plant remains on more or less alkaline soil; st.
- PLACIDIUM LACHNEUM (Ach.) de Lesd. – 1, 3, 4. On soil and mosses; pe.
- PLACOPSIS GELIDA (L.) Linds. – 1, 4, 6, 7. On basaltic rocks; ap.
- P. LAMBII Hertel & V. Wirth – 1, 5. On basaltic rocks; ap.
- PLACYNTHIUM ASPERELLUM (Ach.) Trevis – 4, 5. On basaltic rocks; st.
- POLYCHIDIUM MUSCICOLA (Sw.) Gray – 3, 6, 7. On mosses; ap.
- PORPIDIA FLAVICUNDA (Ach.) Gowan – 1, 4, 5. On moist basaltic rocks and lava; ap.
- P. FLAVOCAERULESCENS (Hornem.) Hertel & A. J. Schwab – 1, 4, 5, 6. On basaltic rocks and lava; ap.
- P. MACROCARPA (DC.) Hertel & A. J. Schwab – 5, 6. On basaltic rocks and lava; ap.
- P. MELINODES (Körb.) Gowan & Ahti – 1, 5, 6. On basaltic rocks and lava; st.
- PROTOPANNARIA PEZIZOIDES (Weber) P. M. Jørg. & S. Ekman – 1, 6, 7. On soil rich in humus and on mosses in heaths; ap.
- PROTOPARMELIA BADIA (Hoffm.) Hafellner – 1, 3, 5, 6, 7. On basaltic rocks manured by birds; ap.; common.
- PROTOPARMELIOPSIS MURALIS (Schreb.) M. Choisy – 3, 7. On manured basaltic rocks and lava; ap.
- PSEUDEPHEBE MINUSCULA (Nyl. ex Arnold) Brodo & D. Hawksw. – 4, 5, 6, 7, 8. On basaltic rocks and lava; st.; common.



- PSORA RUBIFORMIS (Ach.) Hook. – 4, 5. On more or less alkaline soil; ap.
- PSOROMA TENUE Henssen var. BOREALE Henssen – 7. On mosses in heath; ap.
- RAMALINA SUBFARINACEA (Nyl. ex Cromb.) Nyl. – 1, 3, 4. On basaltic rocks; st.
- RHIZOCARPON BADIOATRUM (Flörke ex Spreng.) Th. Fr. – 8. On basaltic rock; ap.
- R. GEMINATUM Körb. – 3, 4, 6, 7, 8, 9. On basaltic rocks and lava manured by birds; ap.; common.
- R. GEOGRAPHICUM (L.) DC. – 1, 3, 4, 5, 6, 7, 8. On basaltic rocks and lava; ap.; common.
- R. LAVATUM (Fr.) Hazsl. – 2, 4, 7. On basaltic rock; ap.
- R. LECANORINUM Anders – 1. On basaltic rock; ap. New to Iceland.
- R. PUSILLUM Runemark – 1, 8. On *Aspicillias* and *Lecideas* on basaltic rocks; ap. New to Iceland.
- RHIZOPLACA MELANOPHTHALMA (DC.) Leuckert & Poelt – 7. On basaltic rock manured by birds; ap.
- RINODINA GENNARIi Bagl. – 2 On basaltic rock; ap.
- SOLORINA BISPORa Nyl. – 1, 3, 4, 6, 7, 8. Among mosses on alkaline soil; ap.
- S. CROCEA (L.) Ach. (infested by *Rhagadostoma lichenicola* (De Not.) Keissl.) – 6,8. On soil and mosses near snow-patches; ap.
- S. SACCATA (L.) Ach. – 1, 3. Among mosses on alkaline soil; ap.
- S. SPONGIOSA (Ach.) Anzi – 1 Among mosses on alkaline soil; ap.
- SPHAEROPHORUS FRAGILIS (L.) Pers. – 4, 5, 7, 8. On soil and basaltic rocks; ap.
- S. GLOBOSUS (Huds.) Vain. – 5, 6, 7. On soil in patches in heath- and grassland and in fell-fields; st.
- STEREOCAULON ALPINUM Laurer – 1, 5, 6, 7, 8. On soil in heaths; ap.; common.
- S. ARCTICUM Lyngé – 1, 4, 6, 8. On soil; st. Thallus contains atranorin and stictic acid.
- S. ARENARIUM (L. I. Savicz) I. M. Lamb – 7. On soil; ap. Thallus contains atranorin and porphyritic acid.
- S. BOTRYOSUM Ach. – 7. On basaltic rock; st.
- S. GLAREOSUM (L. I. Savicz) H. Magn. – 1, 5, 6, 8. Among mosses on soil; st.
- S. SYMPHYCHEILUM I. M. Lamb – 1. On basaltic rock; st. New to Iceland.
- S. VANOYEI Duv. – 5. On lava; st.
- S. VESUVIANUM Pers. – 1, 4, 5, 7. On lava; st.
- TEPHROMELA ATRA (Huds.) Hafellner – 2. On basaltic rock; ap.
- THAMNOLIA VERMICULARIS (Sw.) Schaer. var. SUBULIFORMIS (Ehrh.) Schaer. – 1, 4, 5, 6, 7, 8. On soil in heath- and grassland and in fell-fields; common.
- TREMOLECIA ATRATA (Ach.) Hertel – 1, 4, 5, 6, 8. On basaltic rocks and lava; ap. ; common.
- UMBILICARIA ARCTICA (Ach.) Nyl. – 7. On basaltic rocks and lava; ap.
- U. CYLINDRICA (L.) Delise ex Duby – 1, 4, 5,7. On basaltic rock; ap.
- U. DECUSSATA (Vill.) Zahlbr. – 7. On lava block; st.
- U. HYPERBOREA (Ach.) Hoffm. – 7, 8. On basaltic rocks and lava; ap.
- U. LYNGEI Schol. 5. On basaltic rock; ap.
- U. PROBOSCIDEA (L.) Schrad. – 5, 8. On basaltic rocks and lava; ap.
- U. TORREFACTA (Lightf.) Schrad. – 1, 4, 5, 6, 7, 8. On basaltic rock; ap; common..
- USNEA SPHACELATA R. Br. – 8. On basaltic rock; st.
- VERRUCARIA CEUTHOCARPA Wahlenb. – 6. On basaltic seashore rock; pe.
- V. MAURA Wahlenb. – 6. On basaltic seashore rock; pe.
- V. MUCOSA Wahlenb. – 6. On basaltic seashore rock; pe.
- VESTERGRENOPSIS ELAEINA (Wahlenb.) Gyeln. – 4. On basaltic rock; ap.
- XANTHORIA CANDELARIA (L.) Th. Fr. – 7, 8, 9. On basaltic rocks and lava manured by birds; also on mortar; st.
- X. ELEGANS (Link) Th. Fr. – 1, 3, 6, 7. On basaltic rocks and lava manured by birds; also on mortar; ap.;
- X. PARIETINA (L.) Th. Fr. – 2, 3, 7, 9. On basaltic rocks; ap.

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