

Contributions to the myxomycete flora of Iceland

HENRIK F. GØTZSCHE

University of Copenhagen, Institut for Sporeplanter,
Ø. Farimagsgade 2D, DK-1353 Copenhagen K
Denmark

ABSTRACT: Earlier literature on Icelandic myxomycetes is reviewed. Until now nine species of myxomycetes have been known from the island. In the present paper four of these are reported from new localities, and 19 species are reported new to Iceland. Detailed descriptions are provided for a number of taxa, among these is a specimen of *Lamproderma* believed to represent an undescribed species. Notes on the distribution and ecology of Icelandic myxomycetes are added.

Very little attention has hitherto been directed to Icelandic myxomycetes. The present paper summarizes earlier works on the subject and gives information on 25 taxa of slime-moulds, these being either new records for Iceland or finds on new localities. The list can thus be regarded as a preliminary checklist to the myxomycete flora of Iceland. For a number of taxa detailed descriptions are provided.

The first account on Icelandic myxomycetes seems to be that of ROSTRUP from 1903. Six species, collected by Ólafur Davíðsson, were recorded, viz.: *Lamproderma columbinum* (Pers.) Rost. (sub nom. *L. physarioides* A. et S.), *L. arcyrioides* (Sommerf.) Rost. (sub nom. *L. violaceum* (Fr.) Rstf.), *Lepidoderma carestianum* (Rab.) Rost., *Physarum cinereum* (Batsch) Pers., *Reticularia olivacea* (Ehrenb.) Fries (sub nom. *Enteridium olivaceum* Ehrenb.) and *Trichia contorta* (Ditmar) Rost. Four of Rostrup's specimens (*L. columbinum*, *L. carestianum*, *P. cinereum* and *T. contorta*) are still kept in the herbarium of the Botanical Museum, Copenhagen (C). In 1932 LARSEN, in his enumeration of Icelandic fungi, cited these six species and himself added one, *Comatricha nigra* (Pers.) Schroet.

After a pause of almost another thirty years, in which no reports appeared, the finds of two additional species, *Lycogala epidendrum* (L.) Fries and *Mucilago crustacea* Wiggers (sub nom. *M. spongiosa*) were published by HALLGRÍMSSON (1960).

To the species mentioned above, this paper adds 19, bringing the total number known from Iceland to 28.

MATERIALS AND METHODS

In total 58 collections of myxomycetes have been examined. The major part consists of the myxomycete collection of the Akureyri Museum of Natural History (AMNH). It comprises 33 collections representing 13 species. From the herbarium at the Institute of Biology, University of Iceland in Reykjavik (here abbreviated RVK) five specimens of six species were seen.

During a fortnight stay in Iceland in the summer of 1981 the author collected six species of slime-moulds and 31 samples of bark and plant debris for moist chamber culture. The moist chambers revealed another four species. These specimens will be deposited at c.

Moist chambers were prepared according to the method described by GILBERT and MARTIN (1933). They were not established until more than three months after collecting; in spite of this, almost 30% of the cultures yielded myxomycete sporangia.

Species were identified according to MARTIN and ALEXOPOULOS (1969), NANNENGA-BREMEKAMP (1974), KOWALSKI (1970) and WHITNEY (1980). Distributional information has been drawn mainly from the same sources. Spore dimensions are based on 25 or more measurements in distilled water and are given as follows: smallest spore measured - mean - largest spore measured. Administrative districts (sýslur) are abbreviated according to JØRSTAD (1951).

LIST OF SPECIES

AMAUROCHAETE ATRA (Alb. & Schw.) Rost., Mon. 211. 1874.

EYF.: Grund í Eyjafirði, 20 VIII 1980, H. Kristinsson (H.Kr.) no. 45391 (RVK), on bark of *Pinus* sp. - Distribution: N. America, Europe and Japan. New to Iceland.

The material is scarce and in bad condition, but the differential characters of spores and pseudocapillitium are clearly present.

ARCYRIA INCARNATA (Pers.) Pers., Obs. Myc. 1: 58. 1796.

S.-ÞING.: Vaglaskógur, 31 VIII 1970, leg. H.Kr. (AMNH), on decaying wood.
S.-MÚL.: Hallormsstaðarskógur, in the thicket above the camping ground, 22 VII 1981, H.F. Gøtzsche (HFG) 346 and 348 (C), on decaying wood of *Betula tortuosa*.
A.-SKAFT.: Skaftafell Nat. Park, in the thicket above the camping ground, 20 VII 1981, HFG 342 (C), on decaying branch of *B. tortuosa*.
ÁRN.: Írafoss S of Þingvallavatn, at the power station, 17 VII 1981, HFG 340 (C), on decaying log of *B. tortuosa*. - Cosmopolitan. New to Iceland.

The specimen from Vaglaskógur has somewhat smaller spores (5.6 - 6.8 - 7.7 µm) than mentioned in MARTIN and ALEXOPOULOS (1969), but is in accordance with the dimensions given by LISTER (1925). In all other features the Icelandic specimens are typical.

BADHAMIA MACROCARPA (Ces.) Rost., Mon. 143. 1874.

EYF.: Ytra-Gil, Hrafnagilshreppi, 20 III 1975, leg. H.Kr. (AMNH), on withered grass leaves. Hraungerði, Hrafnagilshreppi, 23 IV 1975, leg. H.Kr. (AMNH), on grass (*Agrostis*) in a depression. Laugabrekka, Hrafnagilshreppi, 23 IV 1975, H.Kr. and Bjarni Guðleifsson (B.Guðl.) 45038 (AMNH), det. N.E. Nannenga-Bremekamp, on withered grass at snowdrift. Ytra-Fell, Hrafnagilshreppi, 23 IV 1975, H.Kr. and B. Guðl. 45039 (AMNH), det. N.E. Nannenga-Bremekamp, on withered grass at snowdrift. Stóru-Hámundarstaðir, Árskógsströnd, 24 IV 1975, H.Kr. 59A (AMNH) det. N.E. Nannenga-Bremekamp, on withered grass. Dæli, Skíðadal, 24 IV 1975, H.Kr. 63A (AMNH), on hay-debris. Hnjúkur, Skíðadal, 24 IV 1975, H.Kr. 68 (AMNH) det. N.E. Nannenga-Bremekamp, on hay-debris on a hay-field. Þverá, Svarfaðardal, 24 IV 1975, H.Kr. 70 (AMNH), on old grass straw in hay-field. Hlíð, Ólafsfirði, 24 IV 1975, H.Kr. 91 (AMNH), on withered grass in hay-field. Hlíð, Ólafsfirði, 24 IV 1975, (AMNH), on grass leaves in hay-field. Syðri-Varðgjá, spring 1975, leg. H.Kr. (AMNH), on withered grass. - Widely distributed. New to Iceland.

Sporangia sessile, pulvinate to globose or confluent to short plasmodiocarps, gregarious to clustered, 0.6 - 2 mm in diam., greyish brown and iridescent varying to greyish white from lime. Hypothallus inconspicuous, pale yellow to reddish brown, continuous under a group of sporangia. Peridium thin, membranous, single layered, hyaline, becoming slightly yellowish towards base, limeless to almost completely covered with lime. Columella none. Capillitium forming an intricate net of thin, hyaline tubules, finely roughened and often expanded at nodes, attached to peridium; capillitium varying from completely badhamoid to completely limeless. Spores globose, dark brown to almost black in mass, greyish to violaceous brown in transmitted light, paler on one side, spinulose, in some specimens the spines are slightly more prominent on one side, 10.2 - 12.7 - 15.8 μ m in diam.

The specimens examined show a large degree of variation. This includes sporangial size, presence of lime on peridium as well as in capillitium, spore-size and to some extent ornamentation of spores. Mrs. N.E. Nannenga-Bremekamp, who has examined four specimens (59A, 68, 45038 and 45039), adds to the variability the fact that the spores are paler on one side, a feature noted in no current flora (personal communication). Whether this justifies the erection of a new variety or it is merely a modification induced by substrate or climate, remains to be investigated.

COMATRICHA NIGRA (Pers.) Schroet., Krypt.-Fl. Schles. 3(1):118.1885.

GULL.: Reykjavík, Selás, 1979, H.Kr. 45394 (RVK), on decaying wood. S.-MÚL.: Hallormsstaður, in the thicket above the camping ground, 22 VII 1981, HFG 347 (C), on decaying wood of *Betula tortuosa*. A.-SKAFT.: Skaftafell Nat. Park, in the thicket above the camping ground, 20 VII 1981, HFG 343 (C), on decaying branch of *B. tortuosa*. - Cosmopolitan.

First reported by LARSEN (1932) from Þingvellir. HALLGRÍMSSON (1960) mentions one find, but gives no locality, and states his belief that it is common all over Iceland.

CRATERIUM LEUCOCEPHALUM (Pers.) Ditmar, in Sturm, Deuts.Fl. Pilze 1: 21. 1813.

Two collections, both by T.W. Johnson. Probably GULL.: near Reykjavík, ca 1972 (notes missing). One specimen on bark of *Betula* and one on dead leaves of *Deschampsia caespitosa*. - Cosmopolitan. New to Iceland.

Sporangia stipitate, obovate to almost globose, 0.3 - 0.6 mm in diam., 0.5 - 1.2 mm tall, gregarious. Hypothallus disc-shaped, reddish brown. Stalk about half the total sporangial height, cylindrical, reddish brown, translucent. Peridium ochraceous to reddish brown, covered with white lime except at the base, dehiscing by an ill defined lid. Capillitium an open net of thin hyaline tubules with large, white lime bodies at nodes, in most sporangia the lime bodies are massed in the center to form a large, ochraceous pseudo-columella. Spores globose, dark brown to nearly black in mass, violaceous brown in transmitted light, finely warted, 8.2 - 10.1 - 13.3 μm in diam.

Both specimens fit the description of var. *scyphoides* (Cooke & Balf.) G. Lister as given by NANNENGA-BREMEKAMP (1974) except for the larger spores.

DIDERMA NIVEUM (Rost.) Macbr., N. Am. Slime-moulds. 100. 1899.

SKAG.: Hraun í Fljótum, H.Kr. 45393 (RVK), on dry grass leaves. EYF.: Karlsá, Upsaströnd, 26 IV 1972, leg. H.Kr. (AMNH), on grass leaves just appearing from underneath the snow. Locality unknown, 12 VI 1977 (AMNH), on grass and stems of *Vaccinium myrtillus*, alt. 250-300 m. - Widely distributed on the northern hemisphere. New to Iceland.

Sporangia sessile, subglobose to hemispherical, 0.7 - 1.5 mm in diam., scattered to gregarious or even crowded and then somewhat angular from mutual pressure. Hypothallus membranous, more or less impregnated with white lime, continuous under a group of sporangia. Peridium double, outer layer a white, smooth eggshell-like crust closely applied to the inner membranous layer, which is pale yellow in transmitted light becoming reddish brown towards base of sporangium. Columella hemispherical to pulvinate, about one third of sporangial diam., yellow to ochraceous, sometimes roughened. Capillitium abundant, consisting of more or less parallel threads radiating from columella, ca 4 μm in diam. tapering to 1 μm at peridium, dark brown becoming pale at extremities, roughened, branched with many anastomoses. Spores globose, dark brown to almost black in mass, violaceous brown in transmitted light, somewhat unevenly warted, 10.7 - 11.6 - 13.3 μm in diam. in the second cited specimen, even up to 15.3 μm in the third.

These specimens are referred to *D. niveum* on account of the true sporangial habit and, in most cases, the distinctly hemispherical columella by which it is separated from the closely related *D. alpinum* Meylan. The spore size, however, which is larger than noted in most floras, e.g. MARTIN & ALEXOPOULOS (1969), points to the latter species, but according to KOWALSKI (1975) there are no differences in the spores between the two species in question.

DIDERMA cf. *SPUMARIOIDES* (Fries) Fries, Syst. Myc. 3: 104. 1829.

EYF.: Grund, Hrafnagilshreppi, 12 VIII 1961, leg. Helgi Hallgrímsson (AMNH), on leaves of *Populus tremula*. - Cosmopolitan.

Sporangia sessile, globose to short plasmodiocarpous, 0.3 - 0.8 mm in diam., gregarious to crowded, white. Hypothallus inconspicuous, hyaline, membranous. Peridium double, outer layer white, crustose, somewhat roughened, closely applied to the inner hyaline, delicate layer. Columella none or a small crest-shaped, white structure. Capillitium consisting of thin, hyaline, flexuose threads with warts and swellings, tapering towards periphery, only with few anastomoses. Spores globose or slightly angular, dark brown in mass, pale violaceous brown in transmitted light, with scattered warts, 9.2 - 11.0 - 14.3 μ m in diam.

The specimen is prematurely dried making a definite determination difficult, still there seems to be no doubt that it belongs in the *D. globosum* - *D. spumarioides* complex. It is tentatively referred to *D. spumarioides* due to the closely applied peridial layers and in spite of the total lack of lime on the hypothallus, a feature that may be attributed to the premature drying as may the spore size, which is slightly larger than usual.

ECHINOSTELIUM BROOKSII Whitney, Mycologia 72: 957. 1980. Fig. 1c.

S.-MÚL.: Hallormsstaður, HFG C255 (C), on bark of *Betula tortuosa*, developed in moist chamber, sporangia appeared 4 days after incubation. - Reported from North America: California, Michigan and Ohio and Europe: the Netherlands and Great Britain (ING, 1982). New to Iceland.

Sporangia globose, stalked, pink fading to brownish pink when dry, scattered. Stalk whitish, hyaline in transmitted light, tapering towards apex, swollen below columella, with little or no refuse matter at base; stalk and columella 65 - 110 μ m high. Peridium early evanescent leaving at most a minute collar at base. Columella ovoid to somewhat flattened, 4 - 5 x 2 - 3 μ m, dark brown. Spores globose, pink fading to brownish pink in mass, hyaline to very pale pinkish in transmitted light, minutely warted, 9.2 - 10.6 - 11.7 μ m in diam.

The spore dimensions given here are slightly smaller than those of WHITNEY (1980), who also mentions that the spore wall has a distinctly thinner area. In most spores this was not observed and only indistinctly so in a few spores.

ECHINOSTELIUM CORYNOPHORUM Whitney, Mycologia 72: 963. 1980. Fig. 1a.

EYF.: Akureyri, thicket on W slope c. 1 km S of the town, HFG C260 - C263 (C), on bark of *Betula tortuosa*, HFG C264b (C), on needles of *Pinus* sp. on the ground, HFG C266 (C), on bark of *Pinus* sp., all developed in moist chamber, sporangia appeared from 2 to 9 days after incubation. - Reported from North America: California and North Carolina and Europe: Great Britain (ING, 1982). New to Iceland.

Sporangia globose, stalked, white, scattered to gregarious. Stalk whitish, hyaline in transmitted light, tapering towards apex,

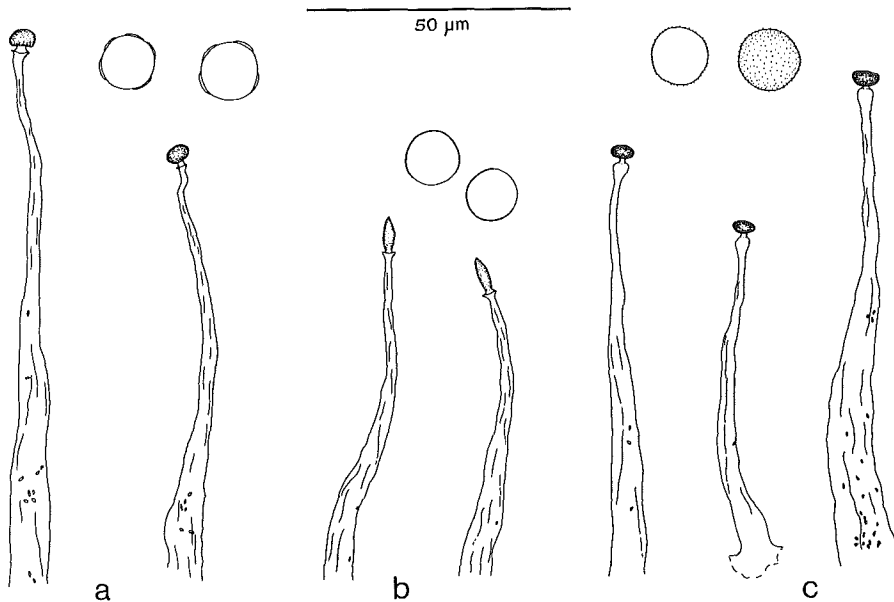


Fig. 1. Sporangia and spores of three species of *Echinostelium*. Spores seen in optical section. a: *E. corynophorum*, b: *E. fragile* and c: *E. brooksii* (one spore seen in surface view). Free-hand sketches. Only stalk and columella are depicted due to the difficulty in handling the sporangia without inducing shedding of the spores.

slightly longitudinally furrowed, only little refuse matter at base; stalk and columella 50 - 135 μm high. Peridium early evanescent, persisting only at base as a small collar. Columella ovoid to hemispherical, flattened below, ca 2.5 x 1.5 μm , light brown. Spores globose, white, hyaline in transmitted light, thin-walled, smooth with prominent thickened areas, typically 8.2 - 9.7 - 11.2 μm in diam. as in C266, slightly larger, 9.2 - 10.5 - 12.2 μm in C264b.

ECHINOSTELIUM FRAGILE Nann.-Brem., Acta Bot. Neerl. 10: 65. 1961.
Fig. 1b.

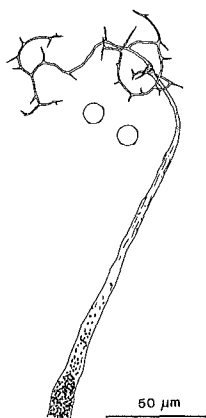
A.-SKAFT.: Skaftafell Nat. Park, HFG C247 (C), on bark of *Betula tortuosa*, developed in moist chamber, sporangia appeared 9 days after incubation. - Reported from several localities in the United States and from Europe: the Netherlands and the British Isles. New to Iceland.

Sporangia globose, stalked, pink fading to brownish pink, scattered. Stalk whitish, hyaline in transmitted light, tapering from ca 5 μm in diam. at base to ca 2 μm at apex, longitudinally furrowed,

with no or only little refuse matter at base. Peridium early evanescent, leaving a small collar below the columella. Columella fusiform, ca $2 \times 4.5 \mu\text{m}$, light brown. Spores globose, pink fading to brownish pink in mass, hyaline in transmitted light, smooth to finely roughened, wall with a thinner area, $10.2 - 11.0 - 12.2 \mu\text{m}$ in diam.

ECHINOSTELIUM MINUTUM de Bary, in Rost., Mon. 215. 1874. Fig. 2.

EYF.: Akureyri, thicket on W slope ca 1 km S of the town, HFG C264a and C265 (C), on needles of *Pinus* sp. on the ground, developed in moist chamber, sporangia appeared 6 days after incubation. - Cosmopolitan. New to Iceland.



Sporangia globose, stalked, white or pink fading to brownish pink, $200 - 300 \mu\text{m}$ high, scattered. Stalk whitish, tapering towards apex, furrowed, with refuse matter, $170 - 230 \mu\text{m}$ high. Peridium early evanescent. Columella a short, cylindric extension of stalk. Capillitium of hyaline threads, sparsely branched, with many pointed free ends. Spores globose, white (C265) or pink (C264a) in mass, hyaline in transmitted light, smooth to very delicately punctured, with more or less distinct articular areas on surface, $8.7 - 9.5 - 10.7 \mu\text{m}$ (in C265) to $12.2 - 13.8 - 14.8 \mu\text{m}$ (in C264a) in diam.

Fig. 2. *Echinostelium minutum*. Free-hand sketch of sporangium and spores.

LAMPRODERMA ARCYRIOIDES (Sommerf.) Rost., Mon. 206. 1874.

EYF.: Ytra Gil, Hrafnagilshreppi, 20 III 1975, H.Kr. and B. Guól. (AMNH), on dry grass leaves. S.-PING.: Hvammur, Höfðahverfi, 25 IV 1972, leg. B.Guól. and H.Kr. (AMNH), on grass stems at snowdrift in a depression. - North and Central America, Europe, Tasmania.

First reported by ROSTRUP (1903) from Möðruvellir.

LAMPRODERMA COLUMBINUM (Pers.) Rost., in Fuckel, Jahrb. Nass. Ver. Nat. 27 - 28: 69. 1873.

Reported by ROSTRUP (1903) from Hofsfjall.

LAMPRODERMA SAUTERI Rost., Mon. 205. 1874.

SKAG.: Hraun í Fljótum, 4 VII 1978, H.Kr. 45393 (RVK), on dry grass leaves. EYF.: Stóri Hvammur, Hrafnagilshreppi, 15 IV 1974, H.Kr. 45031 (AMNH), on withered grass from beneath a snowdrift. - Distributed in North America and Europe. New to Iceland.

Sporangia sessile to shortly stipitate, globose, up to 1 mm in diam., total height less than 1.5 mm, gregarious to clustered.

Hypothallus membranous, reddish brown, confluent under a group of sporangia. Stalk, when present, short, shining black, tapering from a wide and often flattened base. Peridium thin, membranous, iridescent, splitting irregularly, long persistent. Columella dark brown, blunt, reaching about half way to sporangial apex. Capillitium forming an intricate net of flexuose threads with many angular expansions, dark reddish brown with pale tips. Spores globose, black in mass, dark violaceous brown in transmitted light, most spores paler on one side, densely and somewhat unevenly spinulose, 12.8 - 14.4 - 15.8 μm in diam.

The sporangia from Hraun í Fljótum are few, and due to the fact that they unconsciously have been kept together with the specimen of *Diderma niveum* from the same locality, they are contaminated with spores from this species. Consequently they are referred to *L. sauteri* only tentatively.

LAMPRODERMA sp. Fig. 3.

EYF.: Glerárdalur, 12 VI 1977, leg. H.Kr. (AMNH), on moss and grass from beneath a snowdrift, alt. 250-300 m.

Sporangia sessile or shortly stipitate, globose to obovate, 1-2 mm in diam., total height 1-2 mm, dark brown, gregarious to clustered. Hypothallus membranous, dark brown to black. Stalk, when present, short, shining black. Peridium thin, membranous, iridescent, very pale brownish in transmitted light, persistent, splitting irregularly. Columella black, tapering towards a blunt apex, attaining about one third of sporangial height. Capillitium forming a dense net of flexuose threads, threads ca 10 μm in diam. at columella tapering to ca 2 μm at periphery, with occasional nodular swellings and angular expansions, brown, colourless only at the extreme tips. Spores globose to ovoid, dark brown in mass, pale violaceous brown in transmitted light, marked with irregularly distributed, branched or unbranched, ca 0.5 μm high ridges, 11.2-13.7 - 15.3 μm in diam.

The distinctive feature of this specimen is the ornamentation of the spores, which seems to be unique within the genus. According to KOWALSKI (1970) only three species of *Lamproderma* have spores with ornamentation different from spines or warts. They are *L. cristatum* with minutely warted crests (vesicular crests, according to MARTIN and ALEXOPOULOS (1969)), *L. atrosporum* with spines in a complete or incomplete reticulum and *L. cribrarioides* with a complete reticulum of raised ridges. None of these descriptions fit the actual spore-markings which at most could be referred to as a very fragmentary reticulum (fig. 3b).

Premature drying of myxomycetes is known to induce distortion of many differential characters. Spore ornamentation, however, seems to be a character which remains constant even under such circumstances. Furthermore, the present specimen shows no other sign of improper maturation and spore-markings are remarkably uniform in all sporangia examined. The specimen is thus believed to represent an undescribed species. As, however, only this rather sparse collection is available, taxonomic recognition awaits further finds.

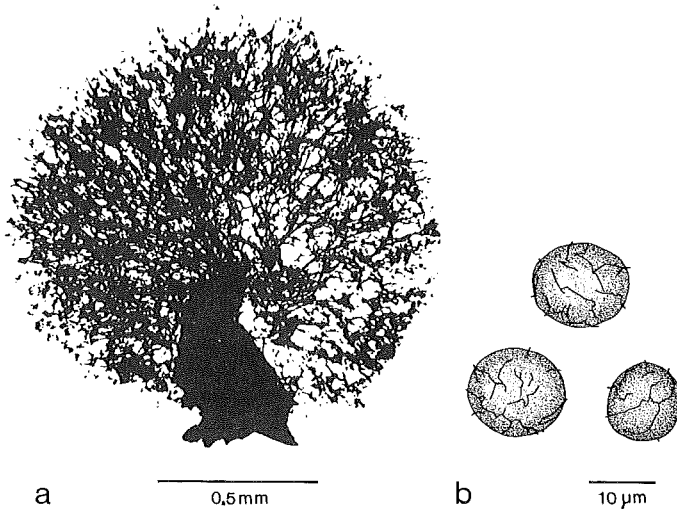


Fig. 3. *Lamproderma* sp. a: Sporangium showing the short stalk, the columella and the capillitium. Hard printed photo. b: Spores. Free-hand sketch.

LEOCARPUS FRAGILIS (Dicks.) Rost., Mon. 132. 1874.

ÍSAF.: Skeggjastaðir, Langadal, 3 IX 1969, leg. Helgi Hallgrímsson (H.Hg.) 8872 (AMNH), det. H.Hg., on moss in *Betula*-bush. - Cosmopolitan. New to Iceland. Few, but typical sporangia.

LEPIDODERMA CARESTIANUM (Rab.) Rost., Mon. 188. 1874.

Reported by ROSTRUP (1903) from Hestahraun in Þorvaldsdalur.

LICEA VARIABILIS Schrad., Nov. Gen. Pl. 18. 1797.

GULL.: Reykjavík, Selás, 20 IX 1980, leg. H.Kr. (RVK), on decaying wood. - Distributed in N. America, Europe, India (LAKHANPAL and MUKERJI, 1981) and Japan (EMOTO, 1977). New to Iceland.

LYCOGALA EPIDENDRUM (L.) Fries, Syst. Myc. 3: 80. 1829.

MÝR.: Hreðavatn, 21 VII 1961, leg. et det. H.Hg. (AMNH), on decaying wood. EYF.: Eyrarland, Kaupangssveit, 2 IX 1972, leg. et det. H.Kr. (AMNH), on stump of *Betula*. S.-ÞING.: Vaglaskógur, 13 VIII 1961, leg. et det. H.Hg. (AMNH), on decaying stump of *Betula*. Vaglaskógur, 13 VIII 1961, leg. et det. H.Hg. (AMNH), on decaying wood of *Betula*. N.-ÞING.: Ásbyrgi, 5 IX 1972, leg. et det. H.Kr. (AMNH), on decaying wood of *Betula*. S.-MÚL.: Hallormsstaður, 10 IX 1970, leg. et det. H.Hg. (AMNH), on stump of *Betula*. Hallormsstaður, in the thicket above the camping ground, 22 VII 1981, HFG 345 (C), on decaying wood of *Betula tortuosa*. ÁRN.: Írafoss S of Þingvallavatn, at the power station, 17 VII 1981, HFG

341 (C), on decaying wood of *B. tortuosa*. - Cosmopolitan.

This species is probably common all over Iceland, wherever suitable substrate is to be found. It was first reported by HALLGRÍMSSON (1960) from Akureyri and Hallormsstaðarskógur. However, it appears to have been collected before. In the account on the W.T. Elliot myxomycete collection CHAMPION (1982) cites a specimen from Iceland, but gives no further details as to specific locality, date or collector.

MUCILAGO CRUSTACEA Wiggers, Prim. Fl. Holsat. 112. 1780.

S.-PING.: Gvendarstaðir, Köldukinn, IX 1968, leg. et det. H.Hg. (AMNH), on withered grass. - Cosmopolitan.

Earlier reported by HALLGRÍMSSON (1960) from Ranaskógur.

PHYSARUM CINEREUM (Batsch) Pers., Neues Mag. Bot. 1: 89. 1794.

N.-MÚL.: Droplaugarstaðir, Fljótsdalshéraði, 3 VIII 1962, leg. H.Hg. (AMNH), on withered leaves and stems of *Dryas* and herbs, alt. 400-500 m. - Cosmopolitan.

Sporangia sessile, globose to shortly plasmodiocarpous, 0.4 - 0.6 mm broad, gregarious to densely clustered. Hypothallus extending under a group of sporangia, yellowish, thin and membranous. Peridium thin and fragile, somewhat iridescent or more or less impregnated with white lime granules. Capillitium forming a net of thin, transparent threads, nodes often expanded and filled with white lime. Spores globose, dark brown in mass, yellowish brown in transmitted light, with somewhat irregularly distributed warts, 9.7 - 11.4 - 12.8 μ m in diam.

Reported by ROSTRUP (1903) from Möðruvallanes.

PHYSARUM MUTABILE (Rost.) G. Lister, in Lister, Mycet. ed. 2: 53. 1911.

One collection by T.W. Johnson. Probably GULL.: near Reykjavík, c. 1972 (notes missing), on dry grass leaves. - W. Europe, Cameroon, S. Africa, Ceylon, Ontario and California. New to Iceland.

Sporangia sessile to stalked, subglobose to ovoid, 0.8 - 1.4 mm high, less than 0.6 mm broad, scattered to gregarious. Hypothallus disc-shaped or continuous under a group of sporangia, membranous, light yellow. Stalk stout or slender, furrowed, ochraceous, up to half the sporangial height. Capillitium forming an intricate net of thin, transparent threads often with expanded nodes, mostly without lime at periphery, at center with lime massed to form a conspicuous, white pseudocolumella. Spores globose, dark brown in mass, violaceous brown in transmitted light, somewhat unevenly warted, 9.2 - 10.0 - 11.7 μ m in diam.

RETICULARIA OLIVACEA (Ehrenb.) Fries, Syst. Myc. 3: 89. 1829.

Reported by ROSTRUP (1903) from Húsafellsskógur.

STEMONITIS FUSCA Roth, Mag. Bot. Römer & Usteri 1 (2): 26. 1787.

S.-ÞING.: Vaglaskógur, 13 VIII 1961, H.Kr. 45261 (RVK), on stump of *Betula*. - Cosmopolitan. New to Iceland.

STEMONITIS FLAVOGENITA Jahn, Verh. Bot. Ver. Brand. 45: 165. 1904.

S.-MÚL.: Hallormsstaður, in the thicket above the camping ground, 22 VII 1981, HFG 349 (C), on decaying wood of *Betula tortuosa*. - Widely distributed, probably cosmopolitan. New to Iceland.

Sporangia stalked, cylindrical, 3-5 mm high, brown, gregarious to clustered. Hypothallus thin, membranous, brownish. Stalk black, hollow, reddish brown in transmitted light, from one fifth to one third of total sporangial height. Peridium early evanescent. Columella a continuation of the stalk terminating in a disc-shaped expansion below the apex, black. Capillitium arising along all parts of columella, forming an intricate net of brown threads, expanded at nodes, surface net smooth or with few spines only. Spores globose, reddish brown in mass, pale violaceous brown in transmitted light, finely warted, 7.7 - 8.5 - 9.7 µm in diam. Plasmodium sulphurous yellow.

Capillitial structure, smooth surface net and expanded nodes, suggests *S. herbatia* Peck., but in all other features the specimen is typical of *S. flavogenita*.

TRICHIA CONTORTA (Ditmar) Rost., Mon. 259. 1875.

Reported by ROSTRUP (1903) from Hofsfjall.

TRICHIA DECIPIENS (Pers.) Macbr., N. Am. Slime-Moulds 218. 1899.

ÁRN.: Írafoss S of Þingvallavatn, at the power station, 17 VII 1981, HFG 339 (C), on decaying wood of *Betula tortuosa*. - Cosmopolitan. New to Iceland.

The collection consists of four withered, but typical sporangia.

TRICHIA FAVGINEA (Batsch) Pers. emend. Farr, Mycologia 50: 367. 1958.

GULL.: Reykjavík, at the lake, 7 VII 1962, leg. H.Hg. (AMNH), on bark. - Widely distributed, mainly in temperate climates. New to Iceland.

TRICHIA VARIA (Pers.) Pers., Neues Mag. Bot. 1: 90. 1794.

S.-MÚL.: Hallormsstaður, in the thicket above the camping ground, 22 VII 1981, HFG 344 (C), on decaying wood of *Betula tortuosa*. - Cosmopolitan. New to Iceland.

NOTES ON THE DISTRIBUTION AND ECOLOGY OF ICELANDIC MYXOMYCETES

Most of the myxomycete species occurring in Iceland are cosmopolitan or of very wide distribution. Only few species appear to have a more restricted distribution. *Amaurochaete atra*, *Echino-*

stelium brooksii, *E. corynophorum*, *E. fragile*, *Lamproderma sauteri* and *Lepidoderma carestianum* are only reported from the northern hemisphere. *Trichia contorta* and *Lamproderma columbinum* seem confined to areas with temperate climate.

According to ELIASSON (1977) *Amaurochaete atra* prefers bark and wood of *Pinus* spp. as substrate and is only exceptionally found on other substrates. This apparently highly discriminative substrate preference together with the northern hemispherical distribution of the genus *Pinus* could explain the range of *A. atra*. Pine is not indigenous to Iceland, so it is reasonable to assume that *A. atra* has been introduced to the island, for example with imported pine seedlings or timber.

Diderma niveum, *Lamproderma sauteri* and *Lepidoderma carestianum* are the only alpine species found in Iceland. The two last mentioned species occur in snow-patches, often melting out from beneath the snow in spring. The restriction of *D. niveum* to alpine regions has recently been questioned by BUYCK (1982).

Echinostelium fragile was described in 1961, *E. brooksii* and *E. corynophorum* as late as 1980. Moreover, as their sporangia are small and inconspicuous, the limited number of reports may be due to lacking search rather than it is a reflection of their true distribution. This is supported by two additional finds of *E. fragile* by the author (unpublished), one from Denmark and one from the northern Yugoslavia. The latter being from submediterranean *Quercus pubescens* thicket, a habitat very different from that of the Icelandic specimens, suggests a wide ecological amplitude of the species.

Based on almost 2000 Danish collections BJØRNEKÆR and KLINGE (1963) constructed a curve illustrating the occurrence of myxomycetes throughout the year. This curve, which is probably representative of other temperate areas too, shows two peaks, one in April-May and one, ten times higher, in the autumn months of September-October. A similar diagram founded on the Icelandic material is shown in fig. 4. Although based on few collections only (44 specimens collected in nature) a similar trend is present: one maximum in spring, April-May,

and one in the autumn, July-September. The scarce material in mind, it lies near at hand to assume that the small value in June is due to low activity of collecting in this month. Specific seasonal occurrence, however, substantiates the presence of two maxima. Two species, *Badhamia macrocarpa* with ten coll. and *Lamproderma areyrioides* with two coll. make up the bulk of the spring maximum. To the autumn maximum contribute several species of which *Lycogala epidendrum* (eight coll.), *Areycyria incarnata* (four coll.) and *Comatricha nigra* (two coll.)

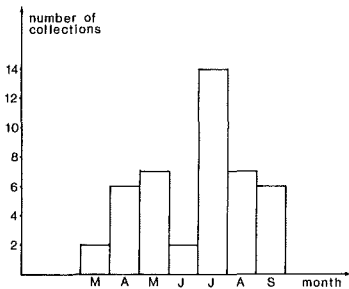


Fig. 4. Occurrence of Icelandic myxomycetes throughout the year. For explanation, see text.

are the most important. Only two alpine species contribute to both maxima, *Diderma niveum*, found in April, June and July, and *Lamproderma sauteri* in April and July. Moreover, the myxomycetes occurring in spring seem to prefer a substrate of withered grass and other herbaceous matter whereas the majority of the autumn species are found on decaying wood and bark.

Even the somewhat isolated position and the vast, inhospitable interior of the island taken in consideration, a total number of 28 species of myxomycetes is low. Certainly many more are awaiting registration. At a rough guess an area like this would house well beyond a hundred species.

As noted little collecting of myxomycetes has yet taken place in Iceland. At present the only systematic search for these fungi seems to be that of the author. In order to get a better knowledge of the flora and to shed some light on the many ecological problems of myxomycetes in the subarctic, for example whether the specific seasonal occurrence, as implicated above, holds true, more material is required.

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