

New or interesting lichens and lichenicolous fungi from Iceland

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ABSTRACT: Fourteen lichenized and seven lichenicolous fungi are reported as new to Iceland; each species is briefly described. The chemotypes of the *Peltigera aphthosa* group are discussed.

Lichens and lichenicolous fungi were collected by the author in Iceland in 1987, during an expedition of the Department of Botany of the National Museum of Wales. Species for which there are no published records from Iceland, or records of particular interest, are listed below. The short descriptions of each lichen refer to Icelandic material only. Thin-layer chromatography (TLC) was carried out according to the methods of WHITE & JAMES (1985). Solvent systems G and EH were used for separation of triterpenoids in the *Peltigera aphthosa* group.

ARTHONIA FUSCOPURPUREA (Tul.) R. Sant.

Apothecia arthonioid, becoming convex, 550-750 µm diameter, blackish. Hypothecium and epithecium reddish-brown, K+ dull (greenish-) brown. Hymenium I+ red. Spores 1-septate, 14-17.5 x 5-6.5 µm. Lichenicolous.

Specimens examined: Vestur-Skaftafellssýsla: west of Kirkjubæjarklaustur, Hunkubakkar, 63° 46'N, 18° 10'W, alt. 100 m, 9 July 1987, A. Orange 6146 (NMW). - Suður-Þingeyjarsýsla: south of Kinnarfjöll, north side of lake Ljósavatn, 65°42'N, 17°38'W, 2 July 1987, A. Orange 5918a (NMW).

New to Iceland. Both collections on the thallus of *Peltigera rufescens*.

ARTHORRHAPHIS VACILLANS Th.Fr.

Thallus on soil, areolae lemon-yellow, convex, without soralia, weakly radiating at thallus margin. Apothecia black, 300-800 µm diameter. Epithecium and exciple green, K+ brown; spores 3-septate, 15-19 x 3-3.5 µm.

Specimen examined: Norður-Bingeyjarsýsla: Hólssandur, near Dettifoss, 65°49'N, 16°23'W, alt. 340 m, on soil, 3 July 1987, A. Orange 5971 (NMW).
New to Iceland.

BELONIA NIDAROSIENSIS (Kindt.) P.M. Jørg. & Vêzda

Thallus powdery, orange-pink when fresh, fading to cream in the herbarium; photobiont trentepohlioid. Ascomata colourless, globose, with apical pore. Spores colourless, muriform, strongly tapered to apices.

Specimen examined: Vestur-Skaftafellssýsla: west of Kirkjubæjarklaustur, Hunkubakkar, 63°46'N, 18°10'W, alt. 100 m, on dry, slightly basic cliffs near river, 9 July 1987, A. Orange 6151 (NMW, AMNH).

New to Iceland. Previously known from Norway and the British Isles (JØRGENSEN et al. 1983).

CALOPLACA CHLORINA (Flotow) Sandst.

Thallus light brownish-grey, areolate, areolae crenulate-lobed, plane or becoming somewhat verrucose, without isidia or soralia. Apothecia numerous, lecanorine, 700-1100 µm diameter, margin grey, smooth at first, becoming crenulate; disc plane to slightly convex, yellowish-orange, epruinose. Thalline excipulum colourless within, surface layer dilute greyish. Spores 12-14 x 7-8 µm, septum 5-8 µm long.

Specimen examined: Snæfellsnessýsla: west of Grundarfjörður, Lárdalur, Hólalækur, 64°55'N, 23°21'W, alt. 220 m, on nutrient-enriched basalt cliffs, 30 June 1987, A. Orange 5876 (NMW, AMNH).

New to Iceland.

CALOPLACA EXSECUTA (Nyl.) Dalla Torre & Sarnth.

Thallus pale grey, rimose, without isidia or soralia. Apothecia lecideine, 260-600 µm diameter, scattered or in small groups, margin persistent, dark grey to black, smooth or eventually irregularly crenulate; disc orange to dark brown, pruinose or not, ± plane. Exciple not containing algae, purplish-grey, K+ purple, or the inner part colourless; hypothecium colourless to brown. Spores 10-12 x 6-8 µm, septum 2.5-4 µm long.

Specimens examined: Snæfellsnessýsla: Breiðavík, Búðahraun, near Búðir, 64°49'N, 23°24'W, alt. <20 m, in gully in lava field, 29 June 1987, A. Orange 5780 (NMW, AMNH) - same locality and date, A. Orange 5821 (NMW). - Snæfellsnessýsla, west of Grundarfjörður, Lárdalur, Hólalækur, 64°55'N, 23°21'W, alt. 220 m, on nutrient-enriched basalt cliff, 30 June 1987, A. Orange 5884 (NMW).

New to Iceland.

CALOPLACA OBLITERANS (Nyl.) Blomb. & Forss.

Thallus of ± scattered lobules, lobules not or very weakly radiating, 160-500 µm wide, scarcely longer than wide, slightly convex, orange, epruinose; soralia present, slightly paler than the lobules, yellow-orange, discrete at first, 160-240 µm

diameter, sometimes several becoming confluent. Apothecia absent.

Specimen examined: Austur-Skaftafellssýsla: north of Höfn, east of Hoffellsá river, near Krossbæjargerði, 64°22'N, 15°15'W, alt. 20 m, on vertical rock outcrop in field, 7 July 1987, A. Orange 6066 (NMW).

New to Iceland.

CARBONEA SUPERSPARSA (Nyl.) Hertel

Apothecia black, glossy, epruinose, 350-600 µm diameter; disc plane. Hymenium in section bright pale blue; exciple dull blue, hypothecium brown. Spores simple, colourless, ellipsoid with rounded apices, 9-11 x 5-5.5 µm. Lichenicolous.

Specimen examined: Norður-Múlasýsla: south-west of Seyðisfjörður, near road south of Stafðalsfell, 65°13'N, 14°7'W, alt. 560 m, on thallus of *Lecanora polytropa*, 6 July 1987, A. Orange 6044 (NMW).

New to Iceland.

CLADONIA PORTENTOSA (Dufour) Coem.

Thallus 70 mm high, densely (2-)3(-4)-chotomously branched, pale yellow-grey, branch apices not oriented in one direction. Thallus K-, Pd-, UV+ white. Contains perlatolic acid and usnic acid by TLC.

Specimen examined: Snæfellsnessýsla: Breiðavík, Búðahraun, near Búðir, 64°49'N, 23°24'W, alt. 10 m, over rocks in lava fields, 29 June 1987, A. Orange 5779 (NMW).

New to Iceland.

C. arbuscula differs in the Pd+ red, UV- thallus (fumar-protocetraric acid) and the branches which tend to be oriented in one direction. *C. mitis* differs in the Pd-, UV- thallus (rangiformic acid).

GYALIDEA FRITZEI (Stein) Vězda var. *FRITZEI*

Thallus brown, very thin. Apothecia 300-380 µm diameter, disc concave, disc and margin mid to dark brown, margin entire or sometimes with a whitish, slightly crenulate layer at apex. Exciple colourless within, brown near surface; hymenium I-, pale brownish in uppermost part, otherwise colourless. Spores 4 or 8 per ascus, colourless, muriform, 25-42 x 13-23 µm.

Specimen examined: Vestur-Skaftafellssýsla: west of Kirkjubæjarklaustur, Holtsdalur, 63°46'N, 18°15'W, alt. 80 m, on non-basic vertical rocks near stream, with *Polyblastia cruenta*, 9 July 1987, A. Orange 6138 (NMW).

New to Iceland. Reported from Czechoslovakia, Sweden and Scotland (VĚZDA 1966). Closely related to *G. lecideopsis*, which differs in the colour of the hymenium and in the drier, basic habitat. Spores from 8-spored asci measured up to 30 µm long. Several asci had 4 mature spores up to 42 µm long, together with 4 small aborted spores. Four-spored asci were not reported for this species by Vězda; their occurrence parallels the 4-spored var. *eucarpa* (Serv.) Vězda (var. *convarians* (Nyl.) Vězda) of *G. lecideopsis*.

LECIDELLA SUBINCONGRUA (Nyl.) Hertel

Thallus pale yellowish grey, cracked-areolate. Apothecia black. Epithecium green-blue, K-; hypothecium brown, K+ yellow-brown. Contains unidentified xanthonces by TLC.

Specimens examined: Snæfellsnessýsla: Breiðavík, Búðahraun, 64°49'N, 23°24'W, alt. <20 m, on side of lava-block, 29 June 1987. A. Orange 5797 (NMW).

New to Iceland. GRÖNLUND (1885) recorded *Lecidea latypea* from Iceland, but it is uncertain whether this refers to the present species.

NECTRIELLA ROBERGEI (Mont. & Desm.) Weese

Sporodochia 300-500 µm diameter, erumpent through host cortex; conidial mass orange-pink. Conidia subglobose, 5-7 µm diameter, often adhering in masses up to 50-30 µm, separating with difficulty. Ascomata absent. Lichenicolous.

Specimens examined: Suður-Þíngeyjarsýsla: Mývatnssveit, Búrfellshraun, south of Sandfell, 65°38'N, 16°44'W, alt. 370 m, on the thallus of *Peltigera rufescens*, 4 July 1987. A. Orange 6020b (NMW).

The description is of the anamorph, *Illosporium carneum* Fr. *Illosporium corallinum* Roberge was reported on *Peltigera* in LARSEN (1931), but the identity of the host suggests that the record may refer to *I. carneum*. A common species in Iceland on *Peltigera didactyla* (H. KRISTINSSON, in litt.), but not previously published.

PARMELIA SEPTENTRIONALIS (Lynge) Ahti

Thallus brown, lobes up to 3 mm wide, sparse pseudocypbellae present at least on margins; isidia and soralia absent. Apothecia numerous, 0.7-1.9 mm diameter, margin ± smooth. Medulla K-, C-, Pd+ orange-red.

Specimen examined: Suður-Þíngeyjarsýsla: east side of Mývatn, Markhraun, 65°35'N, 16°56'W, alt. 280 m, on twigs of *Betula pubescens*, with *Cetraria sepincola*, 4 July 1987, A. Orange 5993b (NMW).

A rare species in Iceland, reported from the south-east by AHTI (1966). The closely related *P. olivacea*, which has not been confirmed from Iceland, has somewhat larger lobes, apothecia and spores, and the apothecial margin is crenulate (AHTI 1966, ESSLINGER 1977).

PARMELIA SUBAURIFERA Nyl.

Thallus mid-brown, lobes glossy when young, later matt. Soralia numerous, laminal, at first punctiform, later confluent and forming extensive yellowish or whitish areas, very quickly isidiate, isidia small, up to 0.4 mm long (longer in sheltered pockets on thallus). Cortex HNO₃-, medulla K-, C+ red.

Specimen examined: Snæfellsnessýsla: west of Grundarfjörður, Lárdalur, Hólalækur, 64°55'N, 23°21'W, alt. 220 m, dry vertical basalt on cliffs, 30 June 1987, A. Orange 5869 (NMW, AMNH).

New to Iceland. Widespread in North America and Europe, usually on bark and wood but occasionally on rock (ESSLINGER 1977). Differs from *P. glabrata* in the presence of soralia.

PELTIGERA BRITANNICA (Gyelnik) Holt.-Hartw. & Tønsb.

Differs from *P. aphthosa* in the peltate, easily detached cephalodia.

Specimens examined: Ísafjarðarsýsla: Skálavík, Breiðaból, alt. 20-30 m, on the edge of a ravine on soil, 22 July 1968, H. Kristinsson 10279 (AMNH). - Austur-Skaftafellssýsla: Kvísker, Múli, June 1971, H. Björnsson (AMNH). - Snæfellsnes-sýsla: Breiðavík, Búðahraun, 64°49'N, 23°24'W, alt. <20 m, amongst moss over rocks in lava-field, 29 June 1987. A. Orange 5815 (NMW).

New to Iceland. Known from the British Isles, western Norway and western North America (TØNSBERG & HOLTAN-HARTWIG 1983). When 33 specimens from AMNH, labelled as *P. aphthosa*, were examined, two were found to be *P. britannica*. TØNSBERG & HOLTAN-HARTWIG reported only one chemotype in Norwegian material of *P. britannica*, which was identical to chemotype V of *P. aphthosa*. Two of the Icelandic specimens had an identical chemistry to *P. aphthosa* race V, except that the unknown terpenoid 33 of TØNSBERG & HOLTAN-HARTWIG was not detected. The third Icelandic specimen, Kristinsson 10279, had a triterpenoid chemistry corresponding to chemotype II of *P. aphthosa* (dolichorrhizin and zeorin as major constituents, hopane-15 α , 22-diol (trace), 2 unknown triterpenoids (trace)).

In 28 confirmed specimens of *P. aphthosa* from Iceland (mainly in AMNH), chemotypes I, II, III, IV and V of TØNSBERG & HOLTAN-HARTWIG occurred in the proportion of 8:2:3:0:15. An additional 3 Icelandic specimens with the morphology of *P. aphthosa* possessed a chemistry said to be characteristic of *P. leucophlebia* by TØNSBERG & HOLTAN-HARTWIG (1983, fig. 5), with unidentified terpenoids 7 and 14 present in addition to terpenoids 9 and 19 which characterise chemotype III of *P. aphthosa*. Terpenoids 7 and 14 occurred in amounts varying from a trace to apparently as abundant as terpenoid 9, both in *P. aphthosa* and in British and Icelandic specimens of *P. leucophlebia*. These results suggest that it may not be possible to separate *P. aphthosa* chemotype III from *P. leucophlebia* on the basis of chemistry. Good separation of unidentified terpenoids 9 and 14 was achieved by running plates twice in solvent system EH.

PELTIGERA SCABROSA Th.Fr.

Thallus lobes large, upper surface without hairs, scabrid with minute β conical warts; underside with pale brown, indistinct veins and dark brown fasciculate rhizines. Photobiont blue-green.

Specimen examined: Snæfellsnessýsla: Fróðárheiði, Miðfellsdalur, 64°51'N, 23°29'W, alt. 360 m, on mossy ground below cliffs, 28 June 1987, A. Orange 5755 (NMW).

Very rare in Iceland (H.KRISTINSSON, in litt.) Reported from 4 localities by KRISTINSSON (1972).

PERTUSARIA CHIODECTONOIDES Bagl. ex Massal.

Thallus light grey, cracked-areolate, margin not zoned, without isidia or soralia. Apothecial discs expanded, irregular or stellate, concave, black, often greyish-pruinose. Spores 8 per ascus, 32-40 x 18-21 μm . Contains stictic acid by TLC.

Specimen examined: Snæfellsnessýsla; west of Grundarfjörður; Lárdalur; Hólalækur. 64°55'N, 23°21'W. Alt. 220 m. Dry vertical basalt on cliffs. 30 June 1987. A. Orange 5868 (NMW, AMNH).

New to Iceland. The thallus of the specimen is K- and Pd- due to the low concentration of stictic acid.

PHRAGMONAEVIA PELTIGERAE (Nyl.) Rehm

Apothecia in circular groups, immersed in host thallus, discs black, up to 220 μm diameter. Exciple thin. Spores 3(-4)-septate, colourless, 19-24 x 4.5-6 μm . Lichenicolous.

Specimen examined: Suður-Bingeyjarsýsla: south of Kinnarfjöll, north side of lake Ljósavatn, 65°42'N, 17°38'W, alt. 140 m, on thallus of *Peltigera rufescens*, 2 July 1987, A. Orange 5914b (NMW).

New to Iceland.

POLYCOCCUM TRYPETHELIODES (Th.Fr.) R.Sant.

Perithecia 140-190 μm wide, immersed in gall-like bodies on the host thallus. Hamathecium of branched and anastomosing hyphae. Asci 8-spored, rarely 4-spored by abortion of 4 immature spores. Spores brown, 1-septate, 14.5-16.5 x 8.5-11 μm , cells markedly unequal, surface verruculose. Lichenicolous.

Specimen examined: Austur-Skaftafellssýsla: Suðursveit, north-east of Jökulsárlón, near Stemma river-bridge, 64°4'N, 16°7'W, alt. <20 m, on thallus of *Stereocaulon alpinum*, 7 July 1987, A. Orange 6091b (NMW).

New to Iceland. HAWKSWORTH & DIEDERICH (1988) describe the spores of this species as smooth.

PROTOTHELENELLA CORROSA (Körber) Mayrh. & Poelt

Thallus light dirty grey-brown, cracked-areolate. Perithecia forming projections up to 550 μm wide, covered by thallus except at apex. Exciple colourless below, thickened and dark brown to greenish-brown at apex. Paraphyses branched and anastomosing. Asci with I+ tholus. Spores 8 per ascus, colourless, muriform, 18-20 x 12-13 μm .

Specimen examined: Snæfellsnessýsla: Staðastaður, Ytri Tunga, 64°48'N, 23°5'W, alt. <20 m, on rocks on coastal plain, 29 June 1987, A. Orange 5774 (NMW, AMNH).

New to Iceland.

SCUTULA KREMPELHUBERI Körber

Apothecia superficial, 350-600 μm diameter, disc brown to black, eventually convex with excluded margin. Epithecium dull purplish-brown, K-. Hypothecium and most of exciple colourless. Hymenium I+ red. Spores ellipsoid, colourless, 1-septate, 9.5-13 x 4.5 μm . Lichenicolous.

Specimen examined: Vestur-Skaftafellssýsla: west of Kirkjubæjarklaustur, Holtsdalur, 63°46'N, 18°15'W, alt. 100 m, on thallus of *Solorina saccata*, 9 July 1987, A. Orange 6136 (NMW, AMNH).

New to Iceland. Distinguished from *S. solorinaria* by the larger apothecia and spores, and the reddish-brown rather than greenish-black epithecium (HAWKSWORTH 1986).

SCUTULA TUBERCULOSA (Th.Fr.) Rehm

Apothecia black, 120-250 µm diameter, soon convex, margin inapparent. Epithecium brown. Spores colourless, 1-septate, 13-15 x 5.5-6.5 µm. Lichenicolous.

Specimen examined: Suður-Þingeyjarsýsla: south of Kinnarfjöll, west of Ljósavatn, near Stórutjarnir, 65°42'N, 17°42'W, alt. 140 m, on thallus of *Peltigera lepidophora*, 2 July 1987, A. Orange 5907b (NMW).

New to Iceland.

TRAPELIA PLACODIODES Coppins & P. James

Thallus crustose, forming patches up to 8 mm diameter, rimose, pinkish-white; areolae plane, matt; thallus margin often slightly effigurate. Soralia developing from cracks or on upper surface of areolae, 150-300(-500) µm, pale brownish. Apothecia absent. Thallus C+ red.

Specimen examined: Snæfellsnessýsla: Breiðavík, Búðahraun, 64°49'N, 23°24'W, alt. <20 m, on slightly shaded rocks in lava-field, 29 June 1987, A. Orange 5820 (NMW).

New to Iceland. COPPINS & JAMES (1984) report the species from the British Isles, Sweden and Poland.

VERRUCARIA DEGELII R. Sant.

Thallus greenish-black, cracked-areolate. Areolae bordered by narrow, slightly prominent black ridges; low narrow ridges also present on surface of areolae. Perithecia mostly immersed, forming low black projections. Exciple colourless at sides and base; involucrellum cap-like, dark reddish-brown, K+ grey-brown. Spores 9-10 x 5.5 µm.

Specimen examined: Snæfellsnessýsla: Staðastaður, Ytri Tunga, 64°48'N, 23°5'W, on rocks on sea-shore, below high water mark, with *Fucus spiralis* and *Pelvetia canaliculata*, 29 June 1987, A. Orange 5768 (NMW, AMNH).

New to Iceland.

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