

## Checklist of lichenicolous fungi and lichenicolous lichens of Svalbard, including new species, new records and revisions

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**Abstract:** ZHURBENKO, M. P. & BRACKEL, W. v. 2013. Checklist of lichenicolous fungi and lichenicolous lichens of Svalbard, including new species, new records and revisions. – *Herzogia* 26: 323–359.

*Hainesia bryonora* Zhurb. (on *Bryonora castanea*), *Lichenochora caloplacae* Zhurb. (on *Caloplaca* species), *Sphaerellothecium epilecanora* Zhurb. (on *Lecanora epibryon*), and *Trimmatostroma cetrariae* Brackel (on *Cetraria islandica*) are described as new to science. Forty four species of lichenicolous fungi (*Arthonia apotheciorum*, *A. aspicilliae*, *A. epiphyscia*, *A. molendoi*, *A. pannariae*, *A. peltigerina*, *Cercidospora ochrolechia*, *C. trypteliza*, *C. verrucosaria*, *Dacampia engeliana*, *Dactylospora aeruginosa*, *D. frigida*, *Endococcus fusiger*, *E. sendtneri*, *Epibryon conductrix*, *Epilichen glaucogigellus*, *Lichenochora coppinsii*, *L. weilii*, *Lichenopeltella peltigericola*, *L. santessonii*, *Lichenostigma chlaroterae*, *L. maureri*, *Llimoniella vinosa*, *Merismatium decolorans*, *M. heterophractum*, *Muellerella atricola*, *M. erratica*, *Pronectria erythrinella*, *Protothelenella croceae*, *Skyttella mulleri*, *Sphaerellothecium parmeliae*, *Sphaeropezia santessonii*, *S. thamnoliae*, *Stigmidium cladoniicola*, *S. collematis*, *S. frigidum*, *S. leucophlebiae*, *S. mycobilimbiae*, *S. pseudopeltideae*, *Taeniolella pertusariicola*, *Tremella cetrariicola*, *Xenonectriella lutescens*, *X. ornamentata*, and *Zwackhiomyces berengerianus*) and six species of lichens (*Agonimia globulifera*, *Carbonea assimilis*, *Lecidella anomaloides*, *Steinia geophana*, *Tetramelas phaeophysciae*, and *Thelocarpon impressellum*) are newly reported from Svalbard. *Endococcus sendtneri* is also new to the Arctic. Thus, 136 species of lichenicolous fungi and 42 species of lichens occurring on other lichens are known from the archipelago, which makes it one of the best studied areas in the Arctic regarding lichenicolous mycobiota. Eight species of lichenicolous fungi or lichens are reported on new host genera, and seven species on new host species.

**Zusammenfassung:** ZHURBENKO, M. P. & BRACKEL, W. v. 2013. Checkliste der flechtenbewohnenden Pilze und flechtenbewohnenden Flechten von Svalbard mit neuen Arten, neuen Nachweisen und Revisionen. – *Herzogia* 26: 323–359.

*Hainesia bryonora* Zhurb. (auf *Bryonora castanea*), *Lichenochora caloplacae* Zhurb. (auf *Caloplaca* spp.), *Sphaerellothecium epilecanora* Zhurb. (auf *Lecanora epibryon*) und *Trimmatostroma cetrariae* Brackel (auf *Cetraria islandica*) werden neu beschrieben. Vierundvierzig Arten lichenicoler Pilze (*Arthonia apotheciorum*, *A. aspicilliae*, *A. epiphyscia*, *A. molendoi*, *A. pannariae*, *A. peltigerina*, *Cercidospora ochrolechia*, *C. trypteliza*, *C. verrucosaria*, *Dacampia engeliana*, *Dactylospora aeruginosa*, *D. frigida*, *Endococcus fusiger*, *E. sendtneri*, *Epibryon conductrix*, *Epilichen glaucogigellus*, *Lichenochora coppinsii*, *L. weilii*, *Lichenopeltella peltigericola*, *L. santessonii*, *Lichenostigma chlaroterae*, *L. maureri*, *Llimoniella vinosa*, *Merismatium decolorans*, *M. heterophractum*, *Muellerella atricola*, *M. erratica*, *Pronectria erythrinella*, *Protothelenella croceae*, *Skyttella mulleri*, *Sphaerellothecium parmeliae*, *Sphaeropezia santessonii*, *S. thamnoliae*, *Stigmidium cladoniicola*, *S. collematis*, *S. frigidum*, *S. leucophlebiae*, *S. mycobilimbiae*, *S. pseudopeltideae*, *Taeniolella pertusariicola*, *Tremella cetrariicola*, *Xenonectriella lutescens*, *X. ornamentata* und *Zwackhiomyces berengerianus*) und sechs Arten von Flechten (*Agonimia globulifera*, *Carbonea assimilis*, *Lecidella anomaloides*, *Steinia geophana*, *Tetramelas phaeophysciae* und *Thelocarpon impressellum*) werden als neu für Svalbard angegeben. *Endococcus sendtneri* ist auch neu für die Arktis. Damit sind nun 136 Arten lichenicoler Pilze und 42 Arten parasitischer Flechten von dem Archipel bekannt; dies macht es hinsichtlich lichenicoler Mycobiota zu einer der am besten untersuchten Regionen der Arktis. Acht Arten lichenicoler Pilze bzw. Flechten werden auf neuen Wirtsgattungen, sieben Arten auf neuen Wirtsarten angegeben.

**Key words:** Biodiversity, Ascomycota, parasites, taxonomy, new species, biogeography, Spitsbergen.

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## Introduction

The archipelago of Svalbard with its main island Spitsbergen is the northernmost part of Europe. Although it was difficult to reach in former times, its lichenological investigation began long ago with the fundamental works of T. M. Fries in the 1860s (FRIES 1860, 1867), who also studied lichenicolous fungi with great emphasis. To date 17 types of lichenicolous fungi and three types of lichenicolous lichens are from Svalbard, so the investigation in the area contributed a lot to the knowledge of Arctic lichenicolous mycobiota.

Nowadays the archipelago is easy to reach by plane, but it is still difficult to work in its wilderness due to the lack of roads and the presence of polar bear. Thus most records of lichenicolous fungi are either from the surroundings of three main settlements, namely Longyearbyen, Barentsburg, and Ny-Ålesund, or from a few additional places reached by some explorers, such as Bockfjorden by J. Hafellner, Sørkapp Land by M. Olech or Edgeøya by A. Aptroot.

All in all we could find 52 publications with records on lichenicolous fungi and lichens from Svalbard (summaries underlined): ACOCK (1940), APTROOT & ALSTRUP (1991), ALSTRUP & ELVEBAKK (1996), ALSTRUP & HAWKSWORTH (1990), ALSTRUP & OLECH (1993), BSM (2006–2012), CHRISTIANSEN (1993), DIEDERICH et al. (2007), ELVEBAKK (1984), ELVEBAKK & HERTEL (1996), ELVEBAKK & TØNSBERG (1992), ERIKSSON & SANTESSON (1986), FRIES (1860, 1867), HAFELLNER (1982), HAFELLNER & OBERMAYER (1995), HAGEN (1950), HANSEN et al. (1987), HERTEL (1977, 1981, 1991, 2001), HERTEL & RAMBOLD (1990), HERTEL & ULLRICH (1976), HOFFMANN & HAFELLNER (2000), KEISSLER (1928), KRISTINSSON et al. (2010), LYNGE (1926), MAYRHOFER (1987), MAYRHOFER & POELT (1985), NAVARRO-ROSINÉS et al. (2010), NIMIS (1985), NORDIN (2010), OBERMAYER (1994), OLECH (1990), ØVSTEDAL et al. (2009), PAULSON (1923), POELT (1969), POELT & VÉZDA (1977), RAMBOLD & TRIEBEL (1990), REDCHENKO et al. (2010), SØCHTING et al. (2008), TIMDAL (1991), TRIEBEL (1989), ZHURBENKO (2009a, 2009b, 2009c, 2010a, 2012), ZHURBENKO & ALSTRUP (2004), ZHURBENKO & TRIEBEL (2005), and ZHURBENKO et al. (2005). These publications contain data on 96 species of lichenicolous fungi and 35 species of lichenicolous lichens (in the broadest sense) found on the archipelago.

Our paper aims to: 1) present new data on 90 species of lichenicolous fungi and 15 species of lichens from Svalbard; 2) summarize the previous knowledge of these organisms in the study area. Additional information on the host selection and taxonomy of the treated species is provided. As some genera (e.g. *Protothelenella* or *Thelocarpon*) include lichenized and non-lichenized lichenicolous fungi, and sometimes the degree of lichenization is unclear, we decided to list all fungi living on lichens, notwithstanding their degree of lichenization. We also decided catalog not only obligate lichenicolous lichens, but all lichens found on other lichens.

## Material and methods

New data were obtained from the study of 292 specimens of lichenicolous fungi and lichens collected in Svalbard by M. P. Zhurbenko in 2003 (185 specimens), W. & G. v. Brackel in 2009 (100 specimens), and N. V. Matveeva in 2007 (seven specimens), and from three herbarium specimens revised by W. v. Brackel. The material was examined and photographed using microscopes Olympus BX 51, Stemi 2000-CS and/or Axio Imager A1 equipped with Nomarski differential interference contrast optics. Microscopical examination was based on thin hand-cut sections mounted in water, 10% KOH (K), Lugol's iodine, directly (I) or after a KOH

pre-treatment (K/I), Steiner's solution, phloxine, lactic acid, cotton blue or brilliant cresyl blue (BCr). Measurements were taken from water mounts, unless otherwise indicated, and in the case of ten or more measurements indicated as (minimum)  $\bar{X} - \sigma_x - \bar{X} + \sigma_x$  (-maximum) followed by the number of measurements; the length/breadth ratios of the ascospores and conidia are indicated as l/b and given in the same way. The geographical names follow the topographic map of Svalbard (NORSK POLARINSTITUTT 2009). The nomenclature of lichens mainly follows ØVSTEDAL et al. (2009). Examined specimens are mainly deposited in the private herbarium of W. v. Brackel at the Institut für Vegetationskunde und Landschaftsökologie (hb ivl) and in the mycological herbarium of the V. L. Komarov Botanical Institute in St.-Petersburg (LE-Fungi). The restudied pertinent herbarium specimens are from the herbarium of the Botanische Staatssammlung München (M).

### Main collecting localities of the authors in Svalbard, Spitsbergen

B01–B15: leg. W. & G. v. Brackel, det. W. v. Brackel. Z01–Z21: leg. & det. M. P. Zhurbenko.

B01: Nordenskiöld Land, Longyearbyen, Nybyen, 78°12'05.4"N/15°35'08.9"E, 110 m, soil with grus, 4.08.2012.

B02: ibidem, SW Nybyen in direction of the Nordenskiöldfjellet, 78°11'38.5"N/15°33'09.2"E, 180 m, soil with pebbles in front of a glacier, 5.08.2012.

B03: ibidem, coast SW of the airport, 78°14'01.4"N/15°19'42.7"E, 25 m, tundra with rock outcrops, 6.08.2012.

B04: Nordenskiöld Land, Adventdalen SE of Longyearbyen, 78°10'47.2"N/15°55'12.4"E, 20 m, tundra and fen, 6.08.2012.

B05: Nordenskiöld Land, Barentsburg, 78°03'51.3"N/14°12'59.9"E, 70 m, mountain slope, 7.08.2012.

B06: Albert I Land, Vasahalvøya, Sallyhamn, 79°48'59.6"N/11°35'34.5"E, 5 m, shore with pebbles, 8.08.2012.

B07: Albert I Land, Reinsdyrfla, Worsleyhamna, 79°41'36.8"N/13°36'34.1"E, 10 m, tundra with grus, 8.08.2012.

B08: Oskar II Land, Ny-Ålesund, near zeppelin tower, 78°55'17.4"N/11°56'47.0"E, 20 m, soil with pebbles, 9.08.2012.

B09: Nordenskiöld Land, Longyearbyen, Nybyen, 78°12'02.6"N/15°35'22.8"E, 125 m, schist scree, 10.08.2012.

B10: Nordenskiöld Land, Adventdalen SE of Longyearbyen, 78°10'04.8"N/15°59'35.7"E, 50 m, tundra, 11.08.2012.

B11: ibidem, 78°09'48.5"N/16°00'01.1"E, 90 m, tundra, 11.08.2012.

B12: ibidem, 78°09'47.2"N/16°01'06.2"E, 220 m, tundra, 11.08.2012.

B13: Nordenskiöld Land, near Longyearbyen, top of Sarkofagen mountain, 78°11'24.6"N/15°33'48.4"E, 515 m, grus and outcrops in tundra, 12.08.2012.

B14: Nordenskiöld Land, Longyearbyen, coast near the lighthouse, 78°14'33.7"N/15°22'21.4"E, 15 m, tundra, 13.08.2012.

B15: ibidem, coast SE of the lighthouse, 78°13'56.7"N/15°19'37.5"E, 20 m, schist scree, 13.08.2012.

Z01: Nordenskiöld Land, S coast of Adventfjorden, 5 km NW of Longyearbyen near the airport, 78°16'N/15°26'E, 2 m, coastal tundra, 11.07.2003.

Z02: Nordenskiöld Land, E coast of Grøn fjorden, Barentsburg, 78°04'N/14°13'E, 100 m, coastal tundra, 12.07.2003.

Z03: ibidem, 4 km S of Barentsburg, near Grøndalselva river mouth, 78°02'N/14°19'E, 5–20 m, coastal tundra, 13.07.2003.

Z04: ibidem, 3 km N of Barentsburg, top of a mountain, 78°05'N/14°13'E, 100 m, fellfield and tundra, 14.07.2003.

Z05: Nordenskiöld Land, W coast of Grøn fjorden between Aldegondabreen glacier and the Brydebekken river mouth, 78°00'N/14°12'E, 10–25 m, coastal tundra, 15.07.2003.

Z06: Nordenskiöld Land, W coast of Grøn fjorden near Aldegondabreen glacier, 78°00'N/14°12'E, 100 m, fellfield and tundra, 16.07.2003.

Z07: ibidem, 50 m, moist tundra, 16.07.2003.

Z08: Nordenskiöld Land, W coast of Grøn fjorden between Aldegondabreen glacier and Brydebekken river mouth, 78°00'N/14°12'E, 5–10 m, coastal tundra, 17.07.2003.

Z09: Bünsow Land, NE extremity of Billefjorden near Kapp Napier, near Norddammen lake, 78°38'N/16°44'E, 10–50 m, tundra, 19.07.2003.

- Z10: ibidem, 1–10 m, coastal tundra with pebble, 20.07.2003.  
 Z11: ibidem, 10 m, moist tundra, 21.07.2003.  
 Z12: ibidem, 5–10 m, coastal tundra, 22.07.2003.  
 Z13: Dickson Land, W coast of Billefjorden, 7 km S of Pyramiden, near Nidedalselva river mouth, 78°37'N/16°20'E, 2–5 m, rocks, fellfield and tundra, 23.07.2003.  
 Z14: ibidem, 6 km S of Pyramiden, top of Garmaksla mountain, 78°37'N/16°20'E, 250–300 m, rocks, fellfield and tundra, 23.07.2003.  
 Z15: ibidem, 5 km S of Pyramiden, 78°37'N/16°20'E, 200 m, mossy tundra, 23.07.2003.  
 Z16: ibidem, 100 m, tundra, 23.07.2003.  
 Z17: ibidem, 250 m, gravelly tundra, 23.07.2003.  
 Z18: Bünsow Land, NE extremity of Billefjorden near Kapp Napier, near Norddammen lake, 78°38'N/16°44'E, 10 m, tundra, 25.07.2003.  
 Z19: ibidem, 30–50 m, stony tundra, 25.07.2003.  
 Z20: Nordenskiöld Land, E coast of Grønfjorden, near Barentsburg, 78°04'N/14°14'E, 100–150 m, gravelly tundra, 31.07.2003.  
 Z21: Nordenskiöld Land, S coast of Adventfjorden, 10 km NW of Longyearbyen, 78°14'N/15°28'E, 100 m, stony tundra, 3.08.2003.

## The species

Species known only from literature records are in non-bold, those marked with “L” are lichenized. An asterisk “\*” means that the species has been cited in the list of ALSTRUP & ELVEBAKK (1996).

*Acanthonitschkea peltigericola* (Alstrup & Olech) O.E.Erikss. & R.Sant.

Sørkapp Land, Palflyodden, on *Peltigera scabrosa* (ALSTRUP & OLECH 1993, as *Hystrix peltigericola* Alstrup & Olech)\*.

<sup>L</sup>*Agonimia globulifera* Brand & Diederich

**B11:** on *Peltigera* sp. moribund thallus (hb ivl 6172).

This autonomous lichen, usually growing on soil, detritus or bryophytes, also occurs on damaged or moribund thalli of *Peltigera* spp. (BRACKEL 2010a).

New to Svalbard.

*Arthonia apotheciorum* (A.Massal.) Almq.

**Z08:** on *Lecanora polytropa* hymenium (LE 261170).

Ascomata brownish black, rounded, flat to slightly convex, up to 0.4 mm diam., deeply immersed in host hymenium, dispersed. Epithymenium medium to dark brown, K+ olive, non-granulose, 15–20 µm tall; apices of paraphysoids somewhat thickened, but not capitate, 2.5–3.5 (–5) µm diam. Hymenium colourless, 40–45 µm tall. Subhymenium colourless to pale brown, 20–30 µm tall. Ascromatal gel I+ red [which fits the species description in ALMQUIST (1880: 59), but not in SMITH et al. (2009: 158), where it is reported I+ blue], K/I+ blue. Ascospores hyaline, (11.4–)13.2–15.4 (–15.8) × (4.0–)4.6–5.2 (–5.5) µm, l/b=(2.5–)2.7–3.1 (–3.3) (n=22, in water, K or K/I), 1-septate. Distinct pathogenicity not observed.

*Lecanora polytropa* is a new host species. New to Svalbard.

*Arthonia* cf. *apotheciorum* (A.Massal.) Almq.

**Z10:** on hymenium of *Lecanora* sp. on lignum belonging to the ‘*L. subfusca*’ group (LE 261016a).

The specimen differs from the species description (SMITH et al. 2009: 158) in its shorter ascospores [(8.5–)10.2–12.6 (–14.3) × (3.4–)3.9–4.9 (–5.6) µm, l/b=(2.1–)2.3–2.9 (–3.3) (n=47, in water or K/I) vs. 9–15 × 3–5 µm] and partly pale olive or brown hymenium. The infected host tissues are bleached. The specimen also resembles *Arthonia caerulescens* (Almq.) R.Sant., which has ascospores of similar size, 10–12 × 4–6 µm, but differs from the latter in the I+ blue hymenium (ALMQUIST 1880).

*Arthonia aspiciliae* Alstrup & E.S.Hansen

Svalbard, Edgeøya: Kapp Lee, Rosenbergdalen, on rock in tundra, on *Aspicilia nikrapensis*, 8./9.1986, leg. C. M. van Herk, det. V. Alstrup [as *Arthonia clemens* (Tul.) Th.Fr.], rev. W. v. Brackel (M–0045080).

The species was described from a single collection on *Aspicilia elevata* from Greenland (ALSTRUP & HANSEN 2001). CALATAYUD et al. (2004) restudied the type and gave more detailed measurements of the ascospore size and shape. The ascospores of the Svalbard specimen are somewhat smaller than in the type, viz. (12.0–)12.3–13.3(–14.0) × (4.0–)4.1–5.2(–6.0) μm, l/b=(2.1–)2.5–3.1(–3.3) (n=20) vs. (11–)12–14.5(–16) × 5–6.5(–7) μm, l/b=(1.8–)2–2.5(–3.5) (n=59).

New to Svalbard.

*Arthonia clemens* (Tul.) Th.Fr.

Ny-Friesland: Sorgfjorden, on *Rhizoplaca melanophthalma* (FRIES 1867)\*.

Records on *Candelariella vitellina* and *Aspicilia* sp. (APTROOT & ALSTRUP 1991, BSM 2006–2012)\* belong to *Arthonia* sp. 2 (see below) and *A. aspiciliae* (see above) respectively.

*Arthonia epiphyscia* Nyl.

**Z13**: on *Physcia dubia* thallus (LE 261199).

New to Svalbard.

*Arthonia excentrica* Th.Fr.

**Z06** (LE 260910); **Z16** (LE 261100). Both specimens on thalli of *Lepraria* spp.

Previously reported from Nordaustlandet: Brennevinsfjorden and Ny-Friesland: Lovénfjellet (FRIES 1867)\*.

*Arthonia molendoi* (Frauenf.) R.Sant.

**Z10**: on *Caloplaca ammiospila* discoloured hymenium (LE 261460).

*Caloplaca ammiospila* is a new host species. New to Svalbard.

*Arthonia obscurior* Triebel

Nordenskiöld Land: Bolterdalen, on *Pilophorus dovrensis* (TRIEBEL 1989, ZHURBENKO & TRIEBEL 2005)\*.

*Arthonia pannariae* Zhurb. & Grube

**B02** (hb ivl 6119); **Z02** (LE 261419b); **Z05** (LE 261279a); **Z08** (LE 261219). All specimens on the hymenium of *Psoroma hypnorum*.

New to Svalbard.

*Arthonia peltigerina* (Almq.) H.Olivier

**B01**: on upper side of *Peltigera didactyla* lobes (hb ivl 6114); **B02**: on lower side of *P. leucophlebia* lobes (hb ivl 6127); **B07**: on *Solorina bispora* var. *subspungiosa* lobes (hb ivl 6140); **B09**: on lower side of *P. leucophlebia* lobes (hb ivl 6155), on lower side of *P. scabrosa* lobes (hb ivl 6158); **B12**: on *Peltigera* sp. lobes (hb ivl 6176); **B13**: on lower side of *P. leucophlebia* lobes (hb ivl 6182, in the specimen of *Cercidospora punctillata*); **B10**: on upper side of *P. cf. rufescens* lobes (hb ivl 6167); **B14**: on *P. leucophlebia* lobes (hb ivl 6188, in the specimen of *Stigmidium leucophlebiae*); **Z02**: on lower side of *P. leucophlebia* lobes near margins (LE 261340); **Z05**: on apothecia and upper or occasionally lower sides of *Solorina crocea* lobes near their margins (LE 260690a); **Z08**: on *P. lepidophora* lobe margin (LE 261400), on central and marginal parts of *P. rufescens* lobes (LE 261430b); **Z20**: on apothecia and upper or occasionally lower sides of *S. crocea* lobes near their margins (LE 260780).

According to ALMQUIST (1880), the only difference between *Arthonia peltigeriae* and *A. peltigerina* is the size of the ascomata, viz. 0.5–1.75 mm in *A. peltigeriae* and much smaller (“apothecia minutissima”) in *A. peltigerina*. Some authors characterize the apothecia of *A. peltigerina* as “grouped together” (IHLEN & WEDIN 2008) or forming “subconcentric rings” (HAFELLNER 1999), while those of *A. peltigeriae* are “well separated” (IHLEN & WEDIN 2008). Main discriminating features between these species are presented in Table 1.

*Peltigera didactyla* and *Solorina bispora* var. *subspungiosa* are new hosts. New to Svalbard.

**Table 1:** Discriminating features between *Arthonia peltigerae* and *A. peltigerina* according to ZHURBENKO & SANTESSON (1996), IHLEN & WEDIN (2008) and GRUBE (pers. comm.).

	<i>Arthonia peltigerae</i>	<i>Arthonia peltigerina</i>
position on the host lobes	on the central parts of the lobes, only on their upper side	mainly on the marginal parts of the lobes, on their both sides
diameter of apothecia (mm)	0.5–2	0.1–0.3
shape and grouping of apothecia	convex but not constricted at base, well separated	strongly convex to hemispherical, constricted at the base, often grouped together
colour of hypothecium	dark brown	pale brown
size of ascospores ( $\mu\text{m}$ )	15–21 $\times$ 6.5–8	13–18 $\times$ 4–6
hosts	<i>Peltigera</i> , <i>Solorina</i> (but not <i>S. crocea</i> )	<i>Peltigera</i> , <i>Solorina</i> (including <i>S. crocea</i> )

***Arthonia rufidula*** (Hue) D.Hawksw., R.Sant. & Øvstedal

**B15:** on *Umbilicaria cylindrica* thallus (hb ivl 6190).

Previously reported from Edgeøya: Kapp Lee, on *Umbilicaria rigida* [APTROOT & ALSTRUP 1991, as *Arthonia pelvetii* (Hepp) Almq.; revised by ALSTRUP & ELVEBAKK (1996), BSM 2006–2012].

***Arthonia stereocaulina*** (Ohlert) R.Sant.

**Z06:** on *Stereocaulon* sp. phyllocladia (LE 260999).

Previously reported from Nordenskiöld Land: Barentsburg and W coast of Grøn fjorden, on *Stereocaulon botryosum* and *S. rivulorum* (ZHURBENKO 2010a).

***Arthonia varians*** (Davies) Nyl.

Edgeøya: Kapp Lee, on *Lecanora swartzii* [APTROOT & ALSTRUP 1991, as *Arthonia glaucomaria* (Nyl.) Nyl., BSM 2006–2012]\*.

***Arthonia* sp. 1**

**Z06:** on *Cladonia trassii* moribund podetia (LE 260947).

Ascomata black, convex, irregularly rounded or elongated in surface view, 125–250  $\mu\text{m}$  lengthways, dispersed to sometimes confluent. Epithymenium distinctly pigmented, medium to dark olive-brown, granulose, 5–10  $\mu\text{m}$  tall, K+ becoming lighter or more olivaceous. Hymenium colourless or pale olive-brown, partly granulose, 40–45  $\mu\text{m}$  tall. Paraphysoids 1.5–2.5  $\mu\text{m}$  wide, tips sometimes with dark caps, thickened to capitate, 2.5–5.5  $\mu\text{m}$  diam. Subhymenium pale olive-brown, 15–20  $\mu\text{m}$  tall. Asci (33–)34–42(–47)  $\times$  (12–)14–17(–18)  $\mu\text{m}$  (n=15, in water, K or I), with K/I+ blue ring in the tholus, 8-spored. Ascospores persistently hyaline, (10.2–)11.1–13.7(–16.7)  $\times$  (3.8–)4.1–5.1(–5.5)  $\mu\text{m}$ , l/b=(2.2–)2.4–3.0(–3.7) (n=55, in water, K or I), 1-septate, not or rarely constricted at the septum, with wider upper cell, smooth-walled, rarely with indistinct halo c. 0.5  $\mu\text{m}$  thick. Ascomatal gel I+ red, K/I+ blue. The specimen fits the protologue of *Arthonia digitatae* Hafellner (HAFELLNER 1999), except of the sizes of the asci and ascospores, which were reported smaller, viz. 20–25  $\times$  12–15  $\mu\text{m}$  and 9–11  $\times$  3–4.5  $\mu\text{m}$  respectively.

***Arthonia* sp. 2**

Svalbard, Edgeøya: Kapp Lee, Rosenbergdalen, on *Candelariella vitellina* growing on syenite in tundra, 8./9.1989, leg. C. M. van Herk, det. V. Alstrup (as *Arthonia clemens*), rev. W. v. Brackel (M–0045003).

Ascomata black, 100–150  $\mu\text{m}$  diam., confluent. Epithymenium dark bluish black, hymenium hyaline, subhymenium slightly brownish, all K–. Ascomatal gel I+ blue, K/I+ blue. Asci c. 30–35  $\times$  13–15  $\mu\text{m}$ , 8-spored. Ascospores hyaline, halonate, 0–1-septate, 8–11  $\times$  3–4.5  $\mu\text{m}$ . The specimen is distinguished from *Arthonia clemens* (restricted to *Rhizoplaca*) and from *A. apotheciorum* (restricted to *Lecanora*, often reported as *A. clemens*) by the I-reaction of the ascomatal gel, I+ red in the latter two.



<sup>1</sup>*Arthrorhaphis alpina* (Schaer.) R.Sant.

Ny-Friesland: Lovénberget, Oskar II Land: Brøggerhalvøya, Haakon VII Land: Bockfjorden and Amsterdamøya, all records without indication of hosts (OBERMAYER 1994); Sørkapp Land: Hohenlohefjellet, without indication of a lichenicolous habit [OLECH 1990, as *Arthrorhaphis citrinella* var. *alpina* (Schaerer) Poelt].

According to OBERMAYER (1994) and ELVEBAKK & HERTEL (1996), the records of HERTEL & ULLRICH (1976) from Albert I Land: Amsterdamhalvøya, HERTEL (1977) from Oskar II Land: Brøggerhalvøya, and most likely of FRIES (1867) from N-Spitsbergen: Wijdefjorden, Ny-Friesland: Lovénberget and Sorgfjorden, and southern Spitsbergen: Bellsund, belong to this species.

<sup>1</sup>*Arthrorhaphis citrinella* (Ach.) Poelt

Haakon VII Land: Bockfjorden, without indication of a lichenicolous habit (HAFELLNER 1982, OBERMAYER 1994).

<sup>1</sup>*Buellia insularis* Øvstedal

Wedel Jarlsberg Land: Berzeliusfjell, Nordenskiöld Land: Colesdalen, northern Spitsbergen: Lifdefjorden, on *Pannaria hookeri*, *Vestergrenopsis* sp. (ØVSTEDAL et al. 2009).

Type from Svalbard.

<sup>1</sup>*Caloplaca castellana* (Räsänen) Poelt

**Z13**: on *Placynthium asperellum* thallus (LE 260949).

Previously reported from Haakon VII Land: Blomstrandhalvøya and Bünsow Land: Gipsdalen, on lichens, especially on *Placynthium* spp. (ØVSTEDAL et al. 2009); without location, on lichens (SØCHTING et al. 2008).

<sup>1</sup>*Caloplaca cerina* (Ehrh. ex Hedwig) Th.Fr.

**B10**: on *Peltigera leucophlebia* thallus (hb ivl 6166), on *P.* cf. *rufescens* thallus (hb ivl 6168), on *Peltigera* sp. thallus (hb ivl 6170, in the specimen of *Merismatium nigritellum*); **B11**: on moribund *Peltigera* sp. thallus (hb ivl 6172, in the specimen of *Agonimia globulifera*).

Previously reported from Svalbard as a common species over bryophytes and on wood, but not indicated as lichenicolous (OLECH 1990, ØVSTEDAL et al. 2009, REDCHENKO et al. 2010). FRIES (1860) reported *Caloplaca cerina* var. *stillicidiorum* "... supra ... lichenes emortuos ..." for Svalbard.

<sup>1</sup>*Caloplaca coccinea* (Müll.Arg.) Poelt

Oskar II Land: Brøggerhalvøya, on lichens growing on rock (SØCHTING et al. 2008).

According to ØVSTEDAL et al. (2009) the species is parasitic on *Aspicilia* spp.

<sup>1</sup>*Caloplaca epithallina* Lynge

**B09**: on *Peltigera leucophlebia* thallus and cephalodia (hb ivl 6153).

Previously reported from northern Spitsbergen: Wijdefjorden, on *Dimelaena oreina* (ØVSTEDAL et al. 2009) and Nordenskiöld Land: Grønsteinfjellet, without indication of a host (SØCHTING et al. 2008).

The species was described by LYNGE (1940) from Greenland as lichenicolous on such species as *Melanelia disjuncta* (as *Parmelia disjuncta*), *Dimelaena oreina* (as *Rinodina hueana*) and *Rhizoplaca melanophthalma* (as *Lecanora melanophthalma*) without designating a type host. Subsequently it was reported on many other non-related lichen genera (e.g. HANSEN et al. 1987, THOMSON 1997, ØVSTEDAL et al. 2009).

*Peltigera* is a new host genus.

<sup>1</sup>*Caloplaca invadens* Lynge

Nordenskiöld Land: Diabasodden, Grønsteinfjellet, Kongsfjorden, on *Aspicilia* sp. (SØCHTING et al. 2008, ØVSTEDAL et al. 2009).

<sup>1</sup>*Caloplaca magni-filii* Poelt

Albert I Land, Amsterdamøya, on *Miriqidica nigroleprosa* (HERTEL & ULLRICH 1976, SØCHTING et al. 2008, ØVSTEDAL et al. 2009).

This is an obligately lichenicolous lichen restricted to *Miriqidica nigroleprosa*.

<sup>†</sup>*Candelariella dispersa* (Räsänen) Hakul.

**Z13:** on *Placynthium asperellum* thallus (LE 261169).

Previously reported from Svalbard without location, on *Placynthium pannariellum* (POELT 1969, POELT & VEZDA 1977); Sørkapp Land: Sergeijevfjellet, Liddalen, Sergeijevskardet, Kulmrabben, and Wiederfjellet, on *Placynthium* spp. and *Vestergrenopsis elaeina* (OLECH 1990); Heerland: Kjellstrømdalen, on *Placynthium* spp. (ØVSTEDAL et al. 2009); and Wedel Jarlsberg Land: Calypsostranda, on *Placynthium* spp. (ØVSTEDAL et al. 2009).

*Carbonea aggregantula* (Müll.Arg.) Diederich & Triebel

**B03** (hb ivl 6131); **B06** (hb ivl 6135). Both specimens on thalli of *Lecanora polytropa*.

Previously reported from Albert I Land: Amsterdamøya (HERTEL & ULLRICH 1976)\* and Sørkapp Land (OLECH 1990)\* on *Lecanora polytropa* as *Carbonea vitellinaria* and *Lecidea vitellinaria* respectively. ALSTRUP & ELVEBAKK (1996) suggested that these reports refer to *Carbonea aggregantula*. As *Carbonea invadens* and *C. supersparsa* also grows on *Lecanora polytropa* this suggestion should be checked.

<sup>†</sup>*Carbonea assimilis* (Körb.) Hafellner & Hertel

**B14:** on *Tephromela atra* thallus (hb ivl 6186, in the specimen of *Muellerella atricola*).

The specimen fits well the species description in HERTEL (1969), but lacks a well-developed own thallus. New to Svalbard.

*Carbonea supersparsa* (Nyl.) Hertel

Albert I Land: Amsterdamøya, on *Lecanora polytropa* (BSM 2006–2012).

*Carbonea vitellinaria* (Nyl.) Hertel

Nordaustrlandet: Murchisonfjorden, Nordvika, 80°03'N/18°55'E, 10 m, polar desert, on *Candelariella placodizans* thallus, 19.08.2007, N. V. Matveeva (LE 232114).

Previously reported from southern Spitsbergen: Hornsund, on *Candelariella vitellina* (FRIES 1860, 1867, as *Lecidea vitellinaria* Nyl.)\*.

*Catillaria stereocaulorum* (Th.Fr.) H.Olivier

**Z16:** on *Stereocaulon rivulorum* thallus (LE 261189b).

Previously reported from Ny-Friesland: Lovénberget and Nordaustrlandet: Wahlenbergfjorden, on *Stereocaulon alpinum* and *S. arcticum* (FRIES 1867, as *Biatorina stereocaulorum* Th.Fr.)\*; Nordaustrlandet: Hinlopenstredet, Murchisonfjorden, Lady Franklinfjorden, and Wahlenbergfjorden, on *S. botryosum* and *S. rivulorum* (HAGEN 1950)\*; Haakon VII Land: Bockfjorden, on *Stereocaulon* sp. [HAFELLNER 1982, as *Lecidea stereocaulorum* (Th.Fr.) Anzi]\*, (ALSTRUP & OLECH 1993)\*; Dickson Land: Pyramiden, on *S. rivulorum* (ZHURBENKO 2010a). The type of *Biatorina stereocaulorum* Th.Fr. is from Svalbard.

*Cecidonia umbonella* (Nyl.) Triebel & Rambold

Haakon VII Land: Blomstrandhalvøya and Nordenskiöld Land: Longyearbyen, without indication of a host (HERTEL 1981, as *Lecidea umbonella* Nyl.)\*; Kolffjellet, on *Lecidea lapicida* var. *pantherina* (HERTEL 1991)\*.

*Cercidospora cladonicola* Alstrup

Bünsow Land, on *Cladonia pocillum*, *C. symphycarpia* (ZHURBENKO & ALSTRUP 2004).

*Cercidospora decolorella* (Nyl.) O.E.Erikss. & J.Z.Yue

Albert I Land: Smeerenburg, on sand and bryophytes (ØVSTEDAL et al. 2009).

Possibly this is a synonym of *Cercidispورا punctillata* (Nyl.) R.Sant. (ZHURBENKO & TRIEBEL 2005).

*Cercidospora epipolytropa* (Mudd) Arnold

Albert I Land: Amsterdamøya, on *Lecanora polytropa* var. *leucococca* (FRIES 1867, as *Cercidospora ulothii* Körb.)\*.

According to the ascospore size, 16–18 × 5–6 µm, and the host lichen this is *Cercidospora epipolytropa*, not *C. macrospora* (Uloth) Hafellner & Nav.-Ros. (syn. *C. ulothii* Körb.), which has longer



ascospores, mainly  $20\text{--}24 \times 5\text{--}7 \mu\text{m}$  (HAFELLNER 1987) and lives on members of the *Lecanora muralis* group. VOUAUX (1913) also mentioned *Didymella epipolytropha* var. *ulothii* (Körb.) Vouaux for Svalbard, based on FRIES (1867). The specimen from Edgeøya on *Aspicilia* sp. (APTROOT & ALSTRUP 1991, BSM 2006–2012)\* proved to be *Zwackhiomyces* cf. *aspiciliae*.

#### *Cercidospora ochrolechia* Zhurb.

**B06**: on *Ochrolechia frigida* thallus (hb ivl 6137); Albert I Land: Amsterdamøya, coast and foreland near Smeerenburg,  $79^{\circ}44'30''\text{--}79^{\circ}45'00''\text{N}/10^{\circ}54'\text{--}11^{\circ}02'\text{E}$ , on *O. grimmiae*, 15–19.07.1975, leg. H. Hertel & H. Ullrich, det. W. v. Brackel (M–0045639).

The specimen 6137 fits well the original description (ZHURBENKO 2010b), except of the sometimes almost sessile ascomata. *Cercidospora groenlandica* Alstrup nom. nud. reported from Greenland on *Ochrolechia frigida* (ALSTRUP et al. 2009) has longer and narrower ascospores [ $22\text{--}27 \times 3.5\text{--}4 \mu\text{m}$  vs.  $(15\text{--})17.5\text{--}21.5\text{--}(25) \times (4\text{--})4.5\text{--}5.5\text{--}(6.5) \mu\text{m}$ ] (V. Alstrup, pers. comm.).

So far the species was known with certainty only from the Russian Arctic. New to Svalbard.

#### *Cercidospora punctillata* (Nyl.) R.Sant.

**B01**: on dead thallus of *Peltigera* sp. and partly on thallus of neighbouring *Ochrolechia frigida* (hb ivl 6116); **B09**: on *P. leucophlebia* thallus (hb ivl 6152); **B13**: on *P. leucophlebia* thallus (hb ivl 6182); **Z02**: on *Placopsis gelida* cephalodia (LE 261009), on *Protopannaria pezizoides* apothecia and decayed thallus (LE 261398); on *Solorina crocea* thallus (LE 260670); **Z04**: on *Pilophorus dovrensis* thallus (LE 261120); on *Protopannaria pezizoides* apothecia and thallus (LE 261308); **Z08**: on *P. pezizoides* apothecia and thallus (LE 261439); on *Rinodina turfacea* decaying thallus (LE 261499); **Z21**: on *Solorina crocea* thallus (LE 260630).

Previously reported from Sørkapp Land: Lisbetelva, on *Psoroma hypnorum* [ALSTRUP & OLECH 1993, as *Cercidospora lichenicola* (Zopf) Hafellner]\*; Haakon VII Land: Bockfjorden, on *Solorina crocea* (HAFELLNER 1982, 1987, as *C. lichenicola*)\*; Nordenskiöld Land: Grønfjorden, on *Cladonia pyxidata* agg. (ZHURBENKO & ALSTRUP 2004), actually on *C. pocillum* and adjacent decaying thallus of an unidentified terricolous lichen (M. Zhurbenko 03189, LE-Fungi); Nordaustlandet: Murchisonfjorden, on *Protopannaria pezizoides* (ZHURBENKO 2009a); Nordenskiöld Land: E coast of Grønfjorden, on *P. pezizoides* (ZHURBENKO 2009b).

*Rinodina* is a new host genus.

#### *Cercidospora soror* Obermayer & Triebel

Haakon VII Land: Bockfjorden, on *Arthrorhaphis alpina* (HAFELLNER & OBERMAYER 1995)\*.

#### *Cercidospora stereocaulorum* (Arnold) Hafellner

**B02**: on *Stereocaulon alpinum* thallus (hb ivl. 6117); **Z06**: on *S. groenlandicum* phyllocladia, cephalodia, and stems (LE 260940b); **Z16**: on *S. rivulorum* thallus (LE 261189a); Nordaustlandet: Murchisonfjorden, Nordvika,  $80^{\circ}03'\text{N}/18^{\circ}48'\text{E}$ , 200 m, polar desert, on *S. groenlandicum* stems, 17.08.2007, N. V. Matveeva.

Previously reported from Sørkapp Land: Wiederfjellet, on *Stereocaulon arcticum* (ALSTRUP & OLECH 1993)\*; Nordaustlandet: Murchisonfjorden, on *S. groenlandicum*; and Dickson Land: S of Pyramiden, on *S. rivulorum* (ZHURBENKO 2010).

#### *Cercidospora trypteliza* (Nyl.) Hafellner & Obermayer

**Z16**: on *Arthrorhaphis alpina* thallus (LE 261069a).

Ascospores  $1\text{--}(3)\text{-septate}$ ,  $16\text{--}18.5\text{--}(20) \times (4\text{--})4.5\text{--}5.5\text{--}(6) \mu\text{m}$ ,  $l/b = (2.8\text{--})3.1\text{--}3.9\text{--}(4.2)$  ( $n = 14$ ).

New to Svalbard.

#### *Cercidospora verrucosaria* (Linds.) Arnold

**Z10**: on *Megaspora verrucosa* thalline margin of apothecia (LE 261039).

New to Svalbard.

#### *Chalara lichenicola* M.S.Christ.

Sørkapp Land: Hohenloheskardet, on *Cladonia gracilis*, partly growing also on immature basidiomata of *Tremella* sp. on the same podetia (CHRISTIANSEN 1993)\*.

Type from Svalbard.

*Clypeococcum grossum* (Körb.) D.Hawksw.

Bjørnøya, on *Umbilicaria cylindrica* (LYNGE 1926, as *Tichothecium grossum* Körb.)\*.

*Collemopsisidium cephalodiorum* (Triebel & Grube) Grube

Oskar II. Land: Brøggerhalvøya, on *Pilophorus dovrensis* (TRIEBEL 1989, as *Cercidospora cephalodiorum* Triebel & Grube)\*.

*Corticifraga peltigerae* (Fuckel) D.Hawksw. & R.Sant.

**Z01:** on *Peltigera rufescens* thallus (hb ivl 6112); **Z06:** on *P. rufescens* thallus (LE 261470b); **Z08:** on *P. rufescens* lobes: upper and occasionally inside-out lower parts near margins (LE 261430a); **Z15:** on *P. canina* thallus (LE 261440).

Previously reported from Sørkapp Land, on *Peltigera canina* (ALSTRUP & OLECH 1993)\*.

*Dacampia engeliana* (Saut.) A.Massal.

**Z11** (LE 261129, LE 260800b); **Z12** (LE 261030a). All specimens on thalli of *Solorina saccata*.

New to Svalbard.

<sup>L</sup>*Dacampia hookeri* (Borrer) A.Massal.

**Z12** (LE 260750b); **Z16** (LE 260790b); **Z17** (LE 260770b); **Z19** (LE 260720b).

Previously reported from Bjørnøya (LYNGE 1926)\*; Haakon VII Land: Kongsfjorden and Liefdefjorden [ELVEBAKK 1984, as *Pleospora hookeri* (Borrer) Keissl.]\*; Sørkapp Land, on *Solorina saccata* (ALSTRUP & OLECH 1993)\*; and central and western Spitsbergen, on *Solorina* sp. (ALSTRUP & ELVEBAKK 1996).

*Dactylospora aeruginosa* Holien & Ihlen

**Z02:** on *Lecidea epiphyaea* thallus (LE 260638).

Apothecia black, 0.2–0.4 mm diam. Ascospores pale to medium brown, (10.0–)11.7–13.9(–14.2) × (4.0–)4.6–6.0(–6.6) μm, l/b=(1.8–)2.1–2.7(–3.0) (n=24, in K), (0–)1-septate, not or slightly constricted at the septum, halo not observed. Hymenium and exciple with dispersed violet K+ blue green patches.

Most finds of the species are from boreal biomes of the northern hemisphere (IHLEN et al. 2004). So far it has been known in the Arctic from one collection at Chukotka (ZHURBENKO 2009a).

*Lecidea epiphyaea* is a new host species. New to Svalbard.

*Dactylospora amygdalariae* Triebel

Oskar II Land: Brøggerhalvøya, on *Amygdalaria panaeola* (TRIEBEL 1989)\*.

*Dactylospora cladoniicola* Alstrup & Olech

Sørkapp Land: Lidfjellet, on *Cladonia macrophyllodes* (ALSTRUP & OLECH 1993)\*.

Type from Svalbard.

*Dactylospora diminuta* (Th.Fr.) Triebel

**Z06:** on *Lecanora epibryon* thallus (LE 261180); **Z07:** on *L. epibryon* apothecia and thallus (LE 261067, LE 260906); **Z08:** on *Megaspora verrucosa* thallus (LE 261179a); **Z15:** on thalli of neighbouring *Ochrolechia inaequatula*, decaying *Cladonia pocillum*, and unidentified terricolous lichens, also on decaying mosses (LE 261478); **Z16:** on *Biatora subduplex* thallus (LE 260956); on *Lecanora luteovernalis* apothecia and thallus (LE 260680b); on *Lecidea epiphyaea* thallus (LE 261250); **Z21:** on *L. collodea* thallus (LE 261389); on *Lopadium coralloideum* apothecia and thallus (LE 261299); on *Protopannaria pezizoides* thallus (LE 261438).

The examined material confirms a significant variation of the species ascospore size and septation (ZHURBENKO 2009b). In some specimens (LE 260906, LE 260956, LE 261067, LE 261179) the ascospores were (1–)3(–5)-septate and shorter than usual, viz. (10.4–)12.7–16.7(–20.0) × (4.2–)4.9–6.3(–7.0) μm, l/b=(1.9–)2.2–3.0(–3.7) (n=91, in water or K). Pathogenicity was never observed.

Previously reported from Ny-Friesland: Sorgfjorden (as *Treurenbergbay*) and Lovénberget; Nordaustlandet: Murchisonfjorden, Fosterøya, and Brennevinsfjorden, on *Biatora cuprea*, *B. vernalis*, *Lopadium pezizoideum*, and *Mycobilimbia tetramera* (FRIES 1860, as *Buellia urceolata* Th.Fr. and *B. urceolata* var. *diminuta* Th.Fr.; FRIES 1867, as *B. urceolata* var. *majuscula* Th.Fr.); Haakon

VII Land: Bockfjorden, on a sterile white crust on soil [HAFELLNER 1982, as *Dactylospora urceolata* (Th.Fr.) Arnold]; Ny-Friesland: Sorgfjorden, on *Rinodina turfacea* (TRIEBEL 1989)\*; Sørkapp Land: Sergeijevskardet, on *Biatora vernalis* and *Lecanora epibryon* (ALSTRUP & OLECH 1993)\*; Nordenskiöld Land: E coast of Grønfjorden, on *Pannaria pezizoides* (ZHURBENKO 2009b); Dickson Land: Petuniabukta, on *Lecanora epibryon* (REDCHENKO et al. 2010, as *D. urceolata*). Type from Svalbard.

*Megaspora* is a new host genus; *Lecanora luteovernalis* and *Lecidea collodea* are new host species.

***Dactylospora frigida*** Hafellner

**Z02:** on *Brigantiaea fuscolutea* thallus (LE 260678a).

New to Svalbard.

*Dactylospora purpurascens* Triebel

Oskar II Land: Brøggerhalvøya, on *Pilophorus dovrensis* (TRIEBEL 1989)\*.

*Dactylospora saxatilis* (Schaer.) Hafellner

Edgeøya: Rosenbergdalen, “on soil” (BSM 2006–2011).

***Dactylospora* cf. *suburceolata*** Coppins & Fryday

**Z10:** on *Mycobilimbia carneoalbida* thallus (LE 261076).

Blue-violet, K+ green granules in the exciple and hypothecium characteristic for *Dactylospora deminuta* were not observed. Ascospores (15.2–)15.7–18.7(–20.3) × (5.4–)5.8–6.8(–7.0) μm, l/b = 2.3–3.1(–3.8) (n = 17), (1–)3(–4)-septate, verruculose. The material is rather scant for a certain identification. This recently described species has so far been reported from Great Britain and Switzerland on species of *Megaspora*, *Mycobilimbia*, *Protopannaria*, and *Protothelenella* (FRYDAY & COPPINS 2012).

*Dactylospora urceolata* (Th.Fr.) Arnold

Svalbard, without indication of location, on *Protothelenella sphinctrinoides* (FRIES 1860, as *Buellia urceolata*).

According to TRIEBEL (1989), the species in its strict sense is confined to the host *Protothelenella sphinctrinoides*.

*Didymellopsis pulposi* (Zopf) Grube & Hafellner

Bjørnøya, on *Leptogium lichenoides* var. *pulvinatum* [LYNGE 1926: 48, 74, as *Didymella pulposa* (Zopf) Vouaux].

According to ALSTRUP & ELVEBAKK (1996), LYNGE (1926) reported “*Didymella sphinctrinoides* on *Leptogium lichenoides*”, but we could not find this citation.

<sup>1</sup>*Diplotomma nivalis* (Bagl. & Carestia) Hafellner

Svalbard, without location, on *Xanthoria elegans* (HAFELLNER 1979).

***Endococcus fusiger*** Th.Fr. & Almq.

**B03:** on sterile grey-brown lichen areoles presumably belonging to *Rhizocarpon* (hb ivl 6132); **B07:** on *R. geminatum* thallus (hb ivl 6145).

The ascomata are more or less globose, c. 200 μm diam., with 8-spored asci and medium brown, thin-walled ascospores with rounded ends, c. 13 × 7 μm.

The species is possibly restricted to non-yellow species of *Rhizocarpon*, although it was reported also on *R. geographicum* (SVANE & ALSTRUP 2004).

New to Svalbard.

*Endococcus* cf. *macrosporus* (Arnold) Nyl.

Sørkapp Land: Hornsund, on *Rhizocarpon inarense* (ALSTRUP & OLECH 1993).

The identification is uncertain as the authors mentioned thick-walled ascospores, 17–20 × 8–9 μm, while *Endococcus macrosporus* has thin-walled ascospores, 16.5–19.5(–22) × 5.5–7(–8) μm (SERUSIAUX et al. 1999, KAINZ & TRIEBEL 2004).

*Endococcus propinquus* (Körb.) D.Hawksw. agg.

Sörkapp Land: Hornsund, Albert I Land: Kobbe fjorden, Ny-Friesland: Sorgfjorden, and Nordaustlandet: Wahlenbergfjorden, on *Lecanora* spp., *Lecidea* spp., and *Sporastatia polyspora* [FRIES 1860, 1867, as *Endococcus gemmifer* (Taylor) Th.Fr.]\*; Bjørnøya, on *Lecidea confluens* (PAULSON 1923)\*.

These reports refer to *Endococcus propinquus* agg., as *E. propinquus* s. str. is restricted to hosts of the genus *Porpidia* (SÉRUSIAUX et al. 1999).

*Endococcus propinquus* (Körb.) D.Hawksw. s. str.

Wedel Jarlsberg Land: Rålstranda and Låkpynten, on *Porpidia cinereoatra* (KUKWA & JABLOŃSKA 2008).

*Endococcus rugulosus* Nyl. agg.

Haakon VII Land: Bockfjorden, on *Rhizocarpon superficiale* (HAFELLNER 1982)\*; Sörkapp Land, on *Aspicilia* sp. (ALSTRUP & OLECH 1993)\*.

These reports refer to *Endococcus rugulosus* agg., as *E. rugulosus* s. str. is restricted to hosts of the genus *Verrucaria* (SÉRUSIAUX et al. 1999).

*Endococcus sendtneri* (Arnold) Hafellner

**Z08:** on *Polyblastia* sp. thallus (LE 261349); **Z11:** on *P. sendtneri* thallus (LE 261448).

Perithecia 100–250 µm diam., subglobose, sometimes slightly papillate, erumpent in the upper part to almost superficial, dispersed to occasionally confluent by a few. Hymenial gel I+ reddish. Ascospores pale to medium brown, narrowly obovate, oblong or occasionally elliptic, with rounded ends, (10.5–)13.1–17.7(–22.0) × (5.0–)6.4–9.2(–12.5) µm, l/b=(1.2–)1.6–2.4(–3.1) (n=75), (0–)1-septate, not or rarely somewhat constricted at the septum, finely verruculose, non-halonate, 8 per ascus.

New to Svalbard and the Arctic.

“*Endococcus*” sp.

**Z11:** on *Steinia geophana* thallus (LE 261278).

Perithecia black, glossy, pyriform, 125–250 µm diam., semi-immersed, dispersed. Asci 8-spored. Ascospores pale to medium brown, K+ vinaceous grey, mostly narrowly obovoid, sometimes with an attenuated lower cell, occasionally obovoid, ellipsoid or broadly ellipsoid, ends rounded or the lower one acute, (13.1–)16.5–22.7(–28.7) × (6.0–)7.4–9.4(–11.7) µm, l/b=(1.3–)1.8–2.8(–4.0) (n=126, in water, K or K/I), (0–)1(–3)-septate, not or rarely constricted at the median septum, distinctly verruculose, often with several large lipid drops, non-halonate, irregularly biseriate in an ascus. Pathogenicity not observed. According to KAINZ & TRIEBEL (2004), ascospores with more than 1-septum are not known in the genus, which makes the generic position of the examined material somewhat uncertain.

*Epibryon conductrix* (Norman) Nik.Hoffm. & Hafellner

**Z16:** on *Catapyrenium daedaleum* thallus (LE 260990b).

New to Svalbard.

*Epicladonia stenospora* (Harm.) D.Hawksw.

Bünsow Land, on *Cladonia pocillum* (ZHURBENKO & ALSTRUP 2004).

*Epicoccum nigrum* Link

Bjørnøya, on *Ochrolechia frigida* (LYNGE 1926, as *Epicoccum neglectum* Desm. according to ALSTRUP & ELVEBAKK 1996, citation not found).

This cosmopolitan saprotroph is known from numerous phanerogams and also from lichen species of *Diploschistes*, *Peltigera* and *Xanthoria* (DIEDERICH 2003, SANTESSON et al. 2004, ETAYO & BERGER 2009).

*Epilichen glauconigellus* (Nyl.) Hafellner

**Z06:** on *Baeomyces rufus* thallus (LE 260919); **Z21:** on *B. carneus* thallus (LE 261139).

New to Svalbard.

<sup>1</sup>*Epilichen scabrosus* (Ach.) Clem.

Nordenskiöld Land: Reindalen, on *Baeomyces rufus* (ELVEBAKK & TØNSBERG 1992); Nordaustlandet: Murchisonfjorden, on *Baeomyces* sp. (ZHURBENKO 2009a).

*Geltingia associata* (Th.Fr.) Alstrup & D.Hawksw.

**Z02**: on *Ochrolechia frigida* thallus (LE 260678b); **Z04**: on *O. frigida* thallus (LE 261149); **Z05**: on *O. grimmiae* apothecia and thallus (LE 233089b); **Z06**: on *O. frigida* thallus (LE 260969).

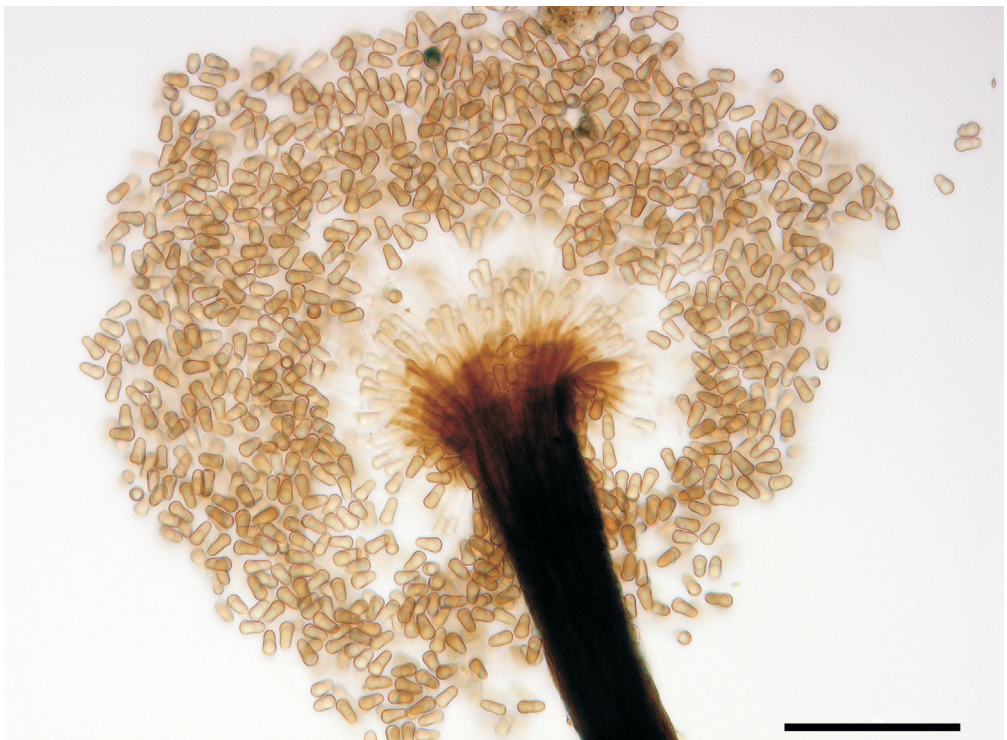
Previously reported from Albert I Land: Danskøya and Gustav V Land: Lågøya, on *Ochrolechia frigida* (FRIES 1867, as *Lecidea associata* Th.Fr.)\*; Oskar II Land: Brøggerhalvøya [ELVEBAKK 1984, as *Nesolechia associata* (Th.Fr.) Sacc. & D.Sacc.]\*; Albert I Land: Amsterdamøya, without indication of the host (RAMBOLD & TRIEBEL 1990). Type from Svalbard.

*Graphium aphthosae* Alstrup & D.Hawksw.

(Fig. 1)

**B09**: on *Peltigera leucophlebia* thallus (hb ivl 6154); **B10**: on *P. leucophlebia* thallus (hb ivl 6165; hb ivl 6166, in the specimen of *Caloplaca cerina*); **B12**: on *P. leucophlebia* thallus (hb ivl 6175); **B13**: on *P. didactyla* thallus (hb ivl 6178; hb ivl 6180, in the specimen of *Niesslia peltigericola*); **Z02**: on *P. leucophlebia* moribund parts of lobes (LE 261490); **Z15**: on *P. leucophlebia* moribund parts of lobes (LE 261010b).

Conidiophores medium yellowish brown, strongly varying in size, 120–370 × 35–75 µm. Conidiogenous cells hyaline in the upper half, yellowish brown in the lower half, 15–25 × 2–2.5 µm. Conidia cuneiform or dolabriform, occasionally slightly divided above into two lobes, with more or less rounded ends, first hyaline, then pale brown, indistinctly guttulate, (6–)6.5–8 × 3.5–4 (–4.5) µm, l/b=(1.6–)1.7–2 (–2.1) (n=20; hb ivl 6154) or (5.6–)6.4–7.4 (–7.9) × (2.8–)3.2–4.0 (–4.8) µm, l/b=(1.3–)1.6–2.2 (–2.5) (n=85; LE 261010b). The sizes of conidia and conidiophores evidently vary in the species. In its protologue the conidiophores were reported –175 × –50 µm and conidia 7.5 × 3.5–4 µm (ALSTRUP & HAWKSWORTH 1990). MARTÍNEZ



**Fig. 1:** *Graphium aphthosae* (hb ivl 6154): conidia (in water). Bar=50 µm.



(1999) reported conidiophores  $60\text{--}65 \times 25\text{--}45 \mu\text{m}$  and conidia  $7\text{--}8.5 \times 4\text{--}4.5 \mu\text{m}$ , and ZHURBENKO (2009b) reported conidia  $(6\text{--})8\text{--}10\text{--}(11) \times (3\text{--})3.5\text{--}4\text{--}(4.5) \mu\text{m}$ ,  $l/b = (1.7\text{--})2.1\text{--}3.9\text{--}(3.2)$  ( $n = 60$ ).

*Graphium aphthosae* seems to live saprophytically on moribund parts of host lichens, so coinfections with other fungi are not rare. In the examined specimens it occurred together with *Illosporium carneum*, *Niesslia peltigericola*, *Steinia geophana*, *Stigmatidium leucophlebiae*, *S. peltideae*, and *Thelocarpon epibolum*.

Previously reported from Nordenskiöld Land: Aldegondabergen, on *Peltigera leucophlebia* (ZHURBENKO 2009b).

***Hainesia bryonorae*** Zhurb. sp. nov. [MycoBank No.: MB 805869] (Fig. 2)

Similar to *Hainesia pertusariae*, but with smaller conidiomata,  $30\text{--}100 \mu\text{m}$  diam. vs.  $80\text{--}150 \mu\text{m}$  diam., and somewhat longer conidia,  $(12.0\text{--})18.1\text{--}24.5\text{--}(29.1) \times (1.1\text{--})1.3\text{--}1.5\text{--}(1.6) \mu\text{m}$  vs.  $14\text{--}22 \times 1\text{--}1.5 \mu\text{m}$ .

**Type:** Svalbard, Spitsbergen, Nordenskiöld Land, W coast of Grönfjorden between Aldegondabreen glacier and the Brydebekken river mouth,  $78^{\circ}00'N/14^{\circ}12'E$ , 10 m, coastal tundra, on apothecia of *Bryonora castanea*, 15.07.2003, M. P. Zhurbenko (LE 261469 – holotype).

**Vegetative hyphae** indistinct. **Conidiomata** dark brown to blackish, glossy, initially immersed, then erumpent and becoming superficial,  $30\text{--}100 \mu\text{m}$  diam., at first more or less hemispherical with an irregular opening  $10\text{--}20 \mu\text{m}$  across, later often cupulate, with a gape up to  $70 \mu\text{m}$  across exhibiting the pale yellow glossy interior, surrounded by a dark torn rim of reduced lateral wall, dispersed or adjacent to confluent by a few; basal wall colourless to pale brown, c.  $10 \mu\text{m}$  thick, in section of rounded or elongated cells  $1.5\text{--}4.5 \mu\text{m}$  lengthways; lateral wall medium to dark brown (colouration uneven), thin, in surface view resembling *textura angularis* or *textura porrecta*. **Conidiophores** hyaline, formed from the inner wall of the conidioma, composed of 1–3 elongated, often slightly cuneiform cells,  $(4.1\text{--})4.9\text{--}7.9\text{--}(9.1) \times (1.5\text{--})1.9\text{--}2.7\text{--}(2.8) \mu\text{m}$  ( $n = 18$ , in phloxine). **Conidiogenous cells** hyaline, enteroblastic, phialidic, with a minute collarette and an inconspicuous channel, determinate, integrated, acropleurogenous, narrowly lageniform to fusiform,  $(5.2\text{--})6.1\text{--}8.5\text{--}(10.9) \times (1.4\text{--})1.7\text{--}2.1\text{--}(2.5) \mu\text{m}$  ( $n = 66$ , in phloxine or water), smooth-walled. **Conidia** hyaline, bacilliform to filiform, straight, with a more or less truncate base and rounded apex,  $(12.0\text{--})18.1\text{--}24.5\text{--}(29.1) \times (1.1\text{--})1.3\text{--}1.5\text{--}(1.6) \mu\text{m}$ ,  $l/b = (9.2\text{--})13.3\text{--}18.3\text{--}(22.2)$  ( $n = 120$ , in phloxine or water),  $(0\text{--})1$ -septate, not constricted at the septum, smooth-walled, sometimes with inconspicuous small guttules.

**Distribution and host:** Known from the arctic tundra and polar desert biomes of Svalbard and the Canadian Arctic archipelago, growing on the hymenium of apothecia of terricolous *Bryonora castanea*. The species is pathogenic, as it causes a bleaching of the infected hymenium.

**Observations:** The examined material fits the generic description of *Hainesia* Ellis & Sacc. as presented in SUTTON (1980), except for the conidia, which are characterized there as aseptate, cymbiform to allantoid. However, septate, bacilliform or filiform conidia are known in three subsequently described lichenicolous species of the genus, viz. *Hainesia peltigerae* Zhurb. & Davydov growing on *Peltigera* species (ZHURBENKO 2013a), *H. pertusariae* Etayo & Diederich on epiphytic *Pertusaria* sp. (ETAYO & DIEDERICH 1996), and *H. xanthoriae* Brackel on *Xanthoria* species (BRACKEL 2009). *Hainesia peltigerae* is quite distinct from the new species by its much shorter conidia,  $(8.3\text{--})10.6\text{--}14.6\text{--}(16.5) \times (1.0\text{--})1.1\text{--}1.5\text{--}(1.7) \mu\text{m}$ ; *H. pertusariae* has larger conidiomata,  $80\text{--}150 \mu\text{m}$  diam., and somewhat shorter conidia,  $14\text{--}22 \times 1\text{--}1.5 \mu\text{m}$ ; and *H. xanthoriae* has larger conidiomata,  $100\text{--}220 \mu\text{m}$  diam., and  $0\text{--}(5)$ -septate, longer conidia,  $(53\text{--})57\text{--}63\text{--}(70) \times (1.9\text{--})2.1\text{--}2.8\text{--}(3.2) \mu\text{m}$ .

**Additional specimens examined** (all on apothecia of *Bryonora castanea*): **Z08** (LE 261239). CANADA: Canadian Arctic archipelago, Ellef Ringnes island, Isachsen bay, polar desert,  $78^{\circ}47'N/103^{\circ}32'W$ , 30 m, N. V. Matveeva, 23.07.2005 (LE 261097).

***Hainesia* sp.**

**B09:** on *Thamnomlia vermicularis* var. *subuliformis* thallus (hb ivl 6162).

Conidiomata cupulate, round in surface view, superficial on the host thallus, medium brown, separate, c.  $180 \mu\text{m}$  wide; wall brown, basally  $5 \mu\text{m}$  thick, tapering to a 1-celled layer of  $1\text{--}2 \mu\text{m}$  thick,



hyphal, composed of elongate dark brown cells connected with pale brown 0.5 µm thick membranes, first closed, later opening and releasing the conidia. Conidiophores filiform, straight to curved, branched, septate, hyaline, arising from the basal stroma, which is c. 10 µm thick and composed of hyaline cells of irregular shape. Conidiogenous cells integrated, hyaline, smooth-walled, appearing as lateral and terminal branches at the septa of the conidiophores, c. 8–12 × 1.5–2 µm. Conidia holoblastic, hyaline, smooth, simple, filiform, rounded at the upper and slightly truncate at the lower end, c. 30–55 × 1.5–2 µm.

The specimen is too scant for a proper investigation and formal description, but probably represents an undescribed species. The similar *Hainesia xanthoriae* Brackel, mostly growing on *Xanthoria* and *Physcia* species, has longer and broader conidia, (53–)57–63(–70) × (1.9–)2.1–2.8(–3.2) µm (BRACKEL 2009). All other described *Hainesia* species have much shorter conidia. The recently described *Epithamnolia karatyginii* Zhurb. (ZHURBENKO 2012) differs in an exciple of well-built, not membranaceous cells, the absence of conidiophores, and shorter conidia.

<sup>1</sup>*Halecania alpivaga* (Th.Fr.) M.Mayrhofer

Haakon VII Land: Bockfjorden, without indication of the host (MAYRHOFFER 1987).

This is a facultatively lichenicolous lichen on rocks.

### *Illosporium carneum* Fr.

**B10**: on *Peltigera didactyla* thallus (hb ivl 6163), on *P. rufescens* thallus (hb ivl 6169); **B11**: on *P. cf. rufescens* thallus (hb ivl 6171); **B13**: on *P. didactyla* thallus (hb ivl 6179); **Z02**: on *P. rufescens* thallus (LE 261380); **Z06**: on *P. rufescens* thallus (LE 261470a); **Z08**: on *P. rufescens* thallus (LE 261370); **Z10**: on *P. rufescens* thallus (LE 261210); **Z20**: on moribund thalli of *Solorina crocea* and partly of adjacent *Peltigera* sp. (LE 260660).

Previously reported from Haakon VII Land: Liefdefjorden and some other unnamed places, on *Peltigera didactyla* (ALSTRUP & ELVEBAKK 1996).

*Solorina* is a new host genus.

### *Illosporium carneum* var. *macrosporium* Keissl.

Nordauslandet: Murchisonfjorden, on *Dermatocarpon minutum* (HAGEN 1950)\*.

This taxon is listed in ALSTRUP & ELVEBAKK (1996) under “excluded or undetermined species”, but it is validly described and has not been reduced to synonymy or recombined.

### *Intralichen christiansenii* (D.Hawksw.) D.Hawksw. & M.S.Cole

Nordauslandet: Murchisonfjorden, Nordvika, 80°02'N/18°49'E, 100 m, polar desert, on hymenium of *Lecanora epibryon* apothecia, 17.08.2007, N. V. Matveeva (LE 261028).

Previously reported as *Bispora christiansenii* D.Hawksw. from Edgeøya: Kapp Lee, on *Caloplaca castellana* (APTROOT & ALSTRUP 1991, BSM 2006–2012)\*; and Sørkapp Land: Sørkappneset, on *Lecanora polytropa* (ALSTRUP & OLECH 1993)\*.

*Lecanora epibryon* is a new host species.

### *Intralichen lichenicola* (M.S.Christ. & D.Hawksw.) D.Hawksw. & M.S.Cole

Sørkapp Land, without indication of the host (DUBIEL & OLECH 1990)\*.

### *Lasiosphaeriopsis* cf. *lecanorae* Pérez-Ortega & Halici

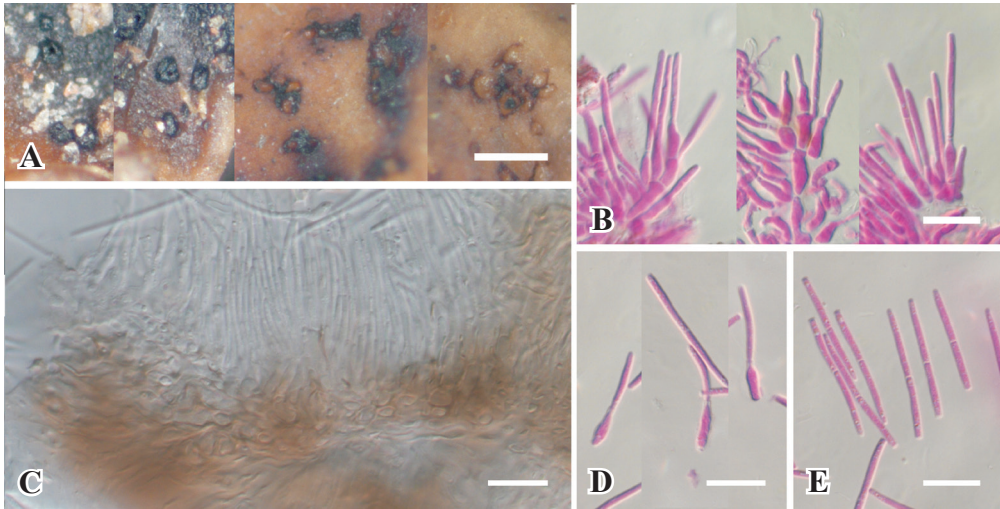
Sørkapp Land: Sergeijevfjellet, on *Lecanora polytropa* (ALSTRUP & OLECH 1993, as *Lasiosphaeriopsis christiansenii* Alstrup & D.Hawksw.)\*.

As *Lasiosphaeriopsis christiansenii* is described from *Porpidia*, the specimen should be compared with the recently described *L. lecanorae* Pérez-Ortega & Halici (PÉREZ-ORTEGA & HALICI 2008).

### *Lasiosphaeriopsis pilophorii* Zhurb. & Triebel

**Z04**: on *Pilophorus dovrensis* thallus (LE 261000).

Previously reported from Nordenskiöld Land: Grøn fjorden and Adventfjorden, on *Pilophorus dovrensis* (ZHURBENKO & TRIEBEL 2005).



**Fig. 2:** *Hainesia bryonora* [A – holotype (left), LE 261239 (right); B–E – holotype]. **A** – habitus of conidiomata. **B** – conidiophores (in phloxine). **C** – section of conidioma (in water). **D** – conidiogenous cells (in phloxine). **E** – conidia (in phloxine). Bars: A=200  $\mu$ m; B–E=10  $\mu$ m.

***Lasiosphaeriopsis stereocaulicola*** (Linds.) O.E.Erikss. & R.Sant.

Nordautlandet: Murchisonfjorden, Nordvika, 80°03'N/18°55'E, 10 m, polar desert, on *Stereocaulon depressum* phyllocladia and stems, 19.08.2007, N. V. Matveeva (LE 210368).

Previously reported from Ny-Friesland: Lovénsberget, on *Stereocaulon alpinum* (FRIES 1867, as *Sphaeria* sp.; ERIKSSON & SANTESSON 1986)\*; Sørkapp Land: Hornsundneset, Breinesflya, Hohenlohefjellet, Sørkappneset, and Lisbetelva, on *S. alpinum*, *S. condensatum*, and *S. rivulorum* (ALSTRUP & OLECH 1993)\*; Nordautlandet: Murchisonfjorden, on *S. depressum*; and Nordenskiöld Land: Grønffjorden, on *S. groenlandicum* (ZHURBENKO 2010a). Type from Svalbard.

<sup>L</sup>*Lecidea verruca* Poelt

Nordenskiöld Land: Longyearbyen, on *Aspicilia* spp. (HERTEL 1981, ELVEBAKK & HERTEL 1996, ØVSTEDAL et al. 2009).

This is an obligate dioecious parasite on *Aspicilia* species; the male thalli bearing spermogonia are mostly smaller than the female ones (POELT 1980).

*Leptosphaeria* sp.

Albert I Land: Danskøya, Kobbefjorden; Gustav V Land: Lågøya, on *Lopadium pezizoideum* (FRIES 1867)\*.

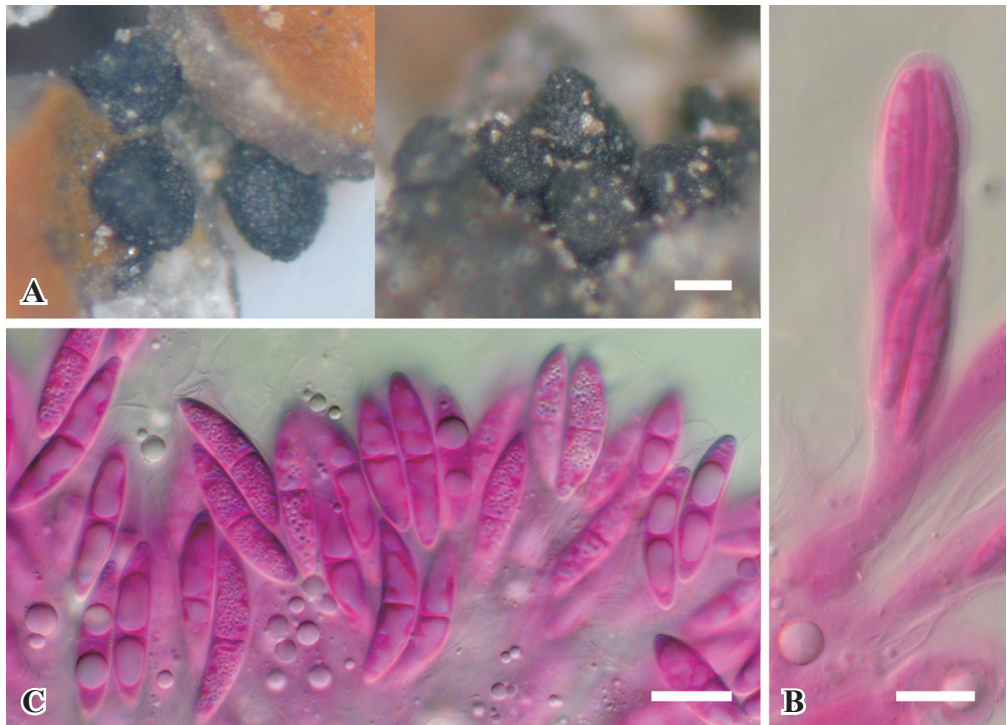
Asci 8-spored; ascospores 4–pluri-septate, hyaline, 26–38  $\times$  4–5  $\mu$ m (FRIES 1867).

***Lichenochora caloplacae*** Zhurb. sp. nov. [Mycobank No.: MB 805871] (Fig. 3)

Similar to *Lichenochora inconspicua*, but with narrower ascospores (3.5–)4.0–5.0(–6.0)  $\mu$ m wide.

**Type:** Svalbard, Spitsbergen, Nordenskiöld Land, W coast of Grønffjorden between Aldegondabreen glacier and Brydebekken river mouth, 78°00'N/14°12'E, 10 m, coastal tundra, on apothecia and thallus of *Caloplaca tetraspora*, 17.07.2003, M. P. Zhurbenko (LE 261240a – holotype).

**Vegetative hyphae** hyaline to pale brown, sparingly branched, septate, not or slightly constricted at the septum, immersed. **Ascomata** black, slightly glossy, rough, ovoid to pyriform, sometimes with neck, 125–270  $\mu$ m diam., 170–310  $\mu$ m tall, with a tiny hardly discernible pore, semi-immersed to almost sessile, dispersed to aggregated in clusters, sometimes fused up to 7 together; the interior filled with numerous lipid droplets. Exciple in surface view of *textura angularis*, composed of cells 3–20  $\mu$ m across with walls c. 1–2  $\mu$ m thick; in cross section c. 20  $\mu$ m thick, inner cell layers hyaline to pale



**Fig. 3:** *Lichenochora caloplacae* [A – LE 261350 (left), holotype (right); B – holotype, C – LE 261290]. **A** – habitus of ascomata. **B** – ascus (in phloxine). **C** – ascospores (in phloxine). Bars: A = 100  $\mu$ m; B, C = 10  $\mu$ m.

brown, outer layers dark brown (K+ olive), outwardly with tubercles up to 30  $\mu$ m diam.; ostiolar area framed by slightly protruding, pale to medium brown, non-septate, not branched excipular filaments, 20–30  $\times$  2(–3)  $\mu$ m, with much darker, mostly spatulate apices up to 4.5  $\mu$ m wide. **Periphyses** hyaline, 3–7  $\mu$ m wide at the base, tapering towards the apices, 15–20  $\mu$ m long, 0–2-septate, guttulate. **Paraphyses** hyaline, septate, often markedly constricted at the septa, with large lipid droplets, composed of irregularly elongated cells 4–11  $\mu$ m across with delicate walls, sometimes indistinct. **Asci** subcylindrical to narrowly clavate, wall not thickened at the apex, (65–)70–74(–80)  $\times$  10–13(–14)  $\mu$ m (n = 10, in phloxine), 8-spored, I– except cytoplasm becoming yellow. **Ascospores** hyaline, very narrowly ellipsoid to fusiform, straight to occasionally somewhat bent, with rather acute ends, (14.0–) 17.4–22.8(–27.0)  $\times$  (3.5–)4.0–5.0(–6.0)  $\mu$ m, l/b = (3.0–)3.8–5.2(–6.3) (n = 185, in water or Lugol), 1-septate, not constricted at the septum, not or only slightly heteropolar, often with conspicuous lipid droplets, wall smooth, without halo, in fascicles or irregularly biserial in the ascus.

**Distribution and hosts:** Known from the arctic tundra and polar desert biomes of Svalbard and Central Siberia, growing on thalli and hymenium of apothecia of terricolous *Caloplaca ammiospila*, *C. cerina*, and *C. tetraspora*. Pathogenicity not observed.

**Observations:** Previously described *Lichenochora* species with exclusively or mainly 1-septate, hyaline, narrowly ellipsoid (l/b = 3–7) ascospores include *L. aprica* Hafellner & Nik.Hoffm. (growing on *Aspicilia* spp.), *L. elegantis* Hafellner (on *Xanthoria elegans*), *L. inconspicua* Hafellner (on *Bilimbia sabuletorum*, *Lecidea sanguineoatra*, *Lecidoma demissum*, and *Mycobilimbia berengeriana*, the latter being its type host), *L. lepidiotae* (on species of Pannariaceae), and *L. rinodinae* Zhurb. (on terricolous *Rinodina* species) (ETAYO & NAVARRO-ROSINÉS 2008, HAFELLNER et al. 2008, ZHURBENKO & THOR 2013, ZHURBENKO 2013b). All these are quite distinct from *Lichenochora caloplacae*: *L. aprica*

has much wider ascospores, (18–)19–28(–30) × 6–9 µm; the ascospores of *L. elegantis* are longer, 28–33 × 4.5–6 µm, l/b=5–6, and mostly 4 per ascus; *L. inconspicua* has larger or at least wider ascospores, (19–)20.5–35(–39) × 6–7.5(–9) µm (NAVARRO-ROSINÉS et al. 1998) or (18–)19.5–23(–25.5) × (4.5–) 5.5–7.5(–8.5) µm, l/b=(2.6–)2.9–3.9(–4.5) (ZHURBENKO & THOR 2013); *L. lepidiotae* has longer ascospores, (20.5–)23–32(–34.5) × (4–)4.5–6 µm, l/b=(3.5–)4.0–6.4(–6.8), which occasionally have up to 5 septa; *L. rinodinae* has longer ascospores, (15.0–)24.0–34.8(–45.0) × (3.5–) 4.5–5.9(–7.8) µm, l/b=(2.4–)4.4–7.2(–10.0). It is also noteworthy that *Lichenochora* species are usually specific to particular host genus, and none of them has been reported on *Caloplaca*.

**Additional specimens examined** (all on *Caloplaca* species): **Z02**: on *C. ammiospila* (LE 261280); **Z05**: on *C. tetraspora* (LE 261270); **Z15**: on *C. cerina* (LE 261410b); **Z16**: on *C. tetraspora* (LE 261290). RUSSIA: Severnaya Zemlya archipelago, Bol'shevik island, in the vicinities of Antseva cape, polar desert, on *C. cerina*, 78°13'N/103°15'E, 30 m, N. V. Matveeva, 17.08.2000 (LE 261350).

*Lichenochora collematum* Nik.Hoffm. & Hafellner

Albert I Land: Amsterdamøya, on *Collema ceranicum* (HOFFMANN & HAFELLNER 2000).

Type from Svalbard.

*Lichenochora coppinsii* Etayo & Nav.-Ros.

**Z04** (LE 261229); **Z21** (LE 261318). Both specimens on thalli of *Protopannaria pezizoides*.

Asci 2–4-spored. Ascospores fusiform, hyaline, (32.0–)35.1–49.9(–56.0) × (4.6–)5.4–7.0(–9.3) µm, l/b=(3.8–)5.6–8.4(–10.0) (n=31), 3–7-septate (in LE 261229 just 3-septate spores were observed). In the species protologue based on material from Scotland the ascospores were reported 50–75 × 5.5–6 µm, 3–9-septate (ETAYO & NAVARRO-ROSINÉS 2008). However, the other examined Arctic specimens of the species also have shorter ascospores, (26–)38–56(–62) × (5–)6–7.5(–8) µm (ZHURBENKO 2009b). Pathogenicity not observed.

New to Svalbard.

*Lichenochora weillii* (Werner) Hafellner & R.Sant.

**Z18**: on upper side of *Physconia muscigena* lobes (LE 260869a).

Perithecia subglobose, immersed to erumpent in the ostiolar region, 100–180 µm diam., aggregated in groups. Asci (65–)70–90(–100) × (9–)10–14(–16) µm (n=16; with additional measurements from LE 233484, LE 207134, and LE 233201a), 8-spored. Ascospores hyaline, broadly ellipsoid with rounded ends to subglobose, (5.8–)7.9–10.7(–13.3) × (5.0–)6.1–7.7(–9.0) µm, l/b=(1.0–)1.2–1.6(–1.8) (n=79, in water or K; with additional measurements from LE 233484, LE 207134, and LE 233201a), (0–)1-septate, slightly constricted at the septum, non-halonate, smooth-walled, with a large guttule in each cell, more or less uniseriate. Host lobes are somewhat darker and epruinose under infection. The sizes of the ascospores evidently vary in the species, in its protologue (WERNER 1937) they were given as 7–11 × 5–6 µm, and in HAFELLNER (1989) as 10–12 × 8–9.5 µm.

New to Svalbard.

*Lichenochora* sp. 1

**Z02**: on *Psoroma hypnorum* thallus (LE 261259).

Ascospores hyaline, fusiform, gradually tapering to the apices, (24.8–)30.5–41.5(–45.0) × (4.5–) 6.3–8.7(–9.6) µm, l/b=(3.3–)3.7–6.3(–8.0) (n=14), 0–1-septate, 2(?) per ascus. Possibly this material represents an atypical *Lichenochora coppinsii* Etayo & Nav.-Ros.

*Lichenochora* sp. 2

**Z08**: on *Lopadium coralloideum* thallus (LE 261309a).

Ascospores hyaline, (15.7–)17.3–21.9(–24.0) × (3.5–)3.8–4.2(–4.5) µm, l/b=(3.7–)4.2–5.6(–6.0) (n=18), 1-septate, 8 per ascus.

*Lichenocodium lecanorae* (Jaap) D.Hawksw.

Sørkapp Land: Hornsund, on *Arctopeltis thuleana* (ALSTRUP & OLECH 1993)\*.



*Lichenocodium usneae* (Anzi) D.Hawksw.

Sørkapp Land: Raksodden, on *Cladonia gracilis* (ALSTRUP & OLECH 1993)\*.

*Lichenodiplis lecanorae* (Vouaux) Dyko & D.Hawksw.

Bjørnøya, on *Lecanora hagenii* (KESSLER 1928, as *Diplodia lecanorae* Keissl.)\*.

*Lichenopeltella peltigericola* (D.Hawksw.) R.Sant.

**B09**: on both sides of *Peltigera* sp. lobes (hb ivl 6157).

New to Svalbard.

*Lichenopeltella santessonii* (P.M.Kirk & Spooner) R.Sant.

**B09**: on lower side of *Peltigera* sp. lobes (hb ivl 6156); **Z15**: on lower side of *P. canina* lobes (LE 261410a).

New to Svalbard.

*Lichenostigma alpinum* (R.Sant., Alstrup & D.Hawksw.) Ertz & Diederich

**B02**: on *Ochrolechia frigida* thallus (hb ivl 6118; 6124, in the specimen of *Sphaerellothecium araneosum*); **B03**: on *O. frigida* thallus (hb ivl 6126), on saxicolous *Ochrolechia* or *Pertusaria* species thallus (hb ivl 6133, in the specimen of *Llimoniella vinosa*); **B04**: on *O. frigida* thallus (hb ivl 6134, in the specimen of *Pronectria walkerorum*); **B07**: on *O. frigida* thallus (hb ivl 6139); **B13**: on *O. frigida* thallus (hb ivl 6177, in the specimen of *Pseudopyrenidium tartaricola*, hb ivl 6183); **Z16**: on adjacent to partly confluent thalli of *O. frigida* and *Lecanora luteovernalis* (LE 260680a); **Z19**: on thalli of neighbouring *L. luteovernalis* and *O. frigida* (LE 261479); Nordaustlandet: Murchisonfjorden, Nord bay, 80°02'N/18°49'E, 40 m, polar desert, on *O. frigida* thallus, 14.08.2007, N. V. Matveeva (LE 210427a); ibidem, 80°03'N/18°55'E, 10 m, on *O. frigida* apothecia and thallus, 19.08.2007, N. V. Matveeva (LE 210489).

This species, currently referred to *Lichenostigma* (ERTZ et al. 2013), is known throughout the Arctic from numerous reports as *Phaeosporobolus alpinus* R.Sant., Alstrup & D.Hawksw.

Previously reported from Haakon VII Land: Blomstrandhalvøya near Ny-Ålesund (ALSTRUP & HAWKSWORTH 1990)\*; Edgeøya, on *Ochrolechia frigida* (APTROOT & ALSTRUP 1991)\*; Sørkapp Land: Raksodden, Kulmrabben, and Hornsund, on *O. frigida* (ALSTRUP & OLECH 1993, BSM 2006–2012)\*; and Bünsow Land, on *Cladonia pocillum* (ZHURBENKO & ALSTRUP 2004).

*Lichenostigma chloroterae* (F.Berger & Brackel) Ertz & Diederich

**B07**: on *Lecanora polytropa* apothecia and thallus (hb ivl 6143); **Z10**: on apothecia and thallus of *Lecanora* sp. from the '*L. subfusca*' group growing on lignum (LE 261016b).

*Lecanora polytropa* is a new host species. New to Svalbard.

*Lichenostigma maureri* Hafellner

**B13**: on *Cladonia macroceras* podetia (hb ivl 6184), on *Bryoria chalybeiformis* thallus (hb ivl 6185).

Conidiomata 20–75 µm diam., with rough surface. Conidia verruculose, 10–15 µm diam., with 5–20 cells 3–4 µm diam. each.

The species is very common and widespread in temperate regions, where it mainly grows on foliose and fruticose epiphytic lichens. In the Arctic it is probably more rare (see e.g. KRISTINSSON et al. 2010) and colonizes saxicolous and terricolous fruticose and foliose lichens such as *Bryoria chalybeiformis*, *Evernia perfragilis* or *Physcia caesia* (ALSTRUP & HAWKSWORTH 1990, ZHURBENKO 1996, BRACKEL 2010a).

New to Svalbard.

*Lichenostigma* subgen. *Lichenogramma* sp.

**B02**: on *Cladonia uncialis* podetia (hb ivl 6585).

Vegetative hyphae dark brown or grey, rough, often in two or more rows, ascumata c. 45 µm diam., ascospores brown, smooth, 1-septate, c. 8 × 3 µm.

*Llimoniella groenlandiae* (Alstrup & D.Hawksw.) Triebel & Hafellner

Bünsow Land: Kapp Napier, on *Fulgensia bracteata* (ZHURBENKO 2009b).

***Llimoniella vinosa*** (Holien & Triebel) Diederich & Etayo

**B03:** on thallus of a sterile white, areolate crust on siliceous rock probably belonging to *Ochrolechia* or *Pertusaria* species, coinfecting by *Lichenostigma alpinum*, a species frequently found on these hosts (hb ivl 6133).

The species has been known until now only from Norway and the British Isles (HOLIEN & TRIEBEL 1996, HAWKSWORTH 2003). New to Svalbard.

***Merismatium decolorans*** (Rehm ex Arnold) Triebel

**Z13:** on *Arthrorhaphis alpina* thallus (LE 261428); **Z16:** on plant remnants adjacent to *A. alpina* and possibly partly on its prothallus (LE 261069b).

New to Svalbard.

***Merismatium heterophractum*** (Nyl.) Vouaux

**Z06:** on *Pilophorus dovrensis* thallus (LE 260980); **Z07:** on *Biatora subduplex* thallus (LE 261300); **Z08:** on *Caloplaca tetraspora* thallus (LE 261248, LE 261240b); **Z16:** on *B. subduplex* thallus (LE 261310c); **Z21:** on *Buellia insignis* thallus (LE 261049).

Ascospores (7.6–)9.8–14.2(–17.5) × (3.8–)4.4–7.0(–9.0) μm, l/b=(1.5–)1.8–2.4(–3.2) (n=59).

*Caloplaca* and *Pilophorus* are new host genera. New to Svalbard.

***Merismatium nigritlellum*** (Nyl.) Vouaux

**B10:** on *Peltigera* sp. thallus (hb ivl 6170); **Z05:** on *Psoroma hypnorum* thallus (LE 261279b); **Z07:** on *Mycobilimbia carneoalbida* thallus (LE 261230); **Z08:** on sterile lichen thallus on sandy soil (LE 261399); on sterile yellow granulose lichen thallus on soil (LE 261289); on *M. tetramera* thallus (LE 261408); on moribund marginal parts of *Lecidea epiphyaea* thallus (LE 261378); **Z11:** on white lichen thallus growing above mosses (LE 261488b); **Z15:** on decayed unidentified lichen thallus growing on mosses (LE 261388b); **Z16:** on *L. epiphyaea* thallus (LE 261260b); on *Biatora* sp. thallus (LE 261260a); **Z18:** on upper side of *Physconia muscigena* lobes (LE 260869b).

The species often grows on decayed parts of host thalli. The ascospores strongly vary in size, (12.6–)17.8–24.4(–34.0) × (6.9–)9.0–11.4(–14.4) μm, l/b=(1.0–)1.7–2.5(–3.5) (n=169). With its multitude of different hosts and large variability of ascospore size *Merismatium nigritlellum* is likely to comprise several species. The specimen growing on *Physconia* recalls *Pleospora physciae* (Brackel) Hafellner & E.Zimm. (syn. *Merismatium physciae* Brackel) described from *Physcia* spp., which has 3(–5) transseptate, smaller ascospores of (14.0–)14.9–16.4(–17.0) × (5.5–)6.3–7.2(–7.5) μm and possesses pseudoparaphyses (BRACKEL 2010b, HAFELLNER & ZIMMERMANN 2012).

Previously reported from Sørkapp Land: Rafenodden, on *Protopannaria pezizoides* (ALSTRUP & OLECH 1993)\*.

*Physconia* is a new host genus.

<sup>L</sup>***Miriquidica nigroleprosa*** (Vain.) Hertel & Rambold var. *nigroleprosa*

Sjuøyane (north of Nordaustlandet): Phippsøya (ØVSTEDAL et al. 2003).

This is an occasionally lichenicolous lichen on siliceous rocks.

***Muellerella atricola*** (Linds.) Sacc. & D.Sacc.

**B14:** on *Tephromela atra* thallus (hb ivl 6186).

The species was previously known from scattered locations in Europe, Madeira (HAFELLNER 2007), and Asian Russia (ZHURBENKO 2009b). New to Svalbard.

***Muellerella erratica*** (A.Massal.) Hafellner & Volk.John

**B03:** on *Lecanora polytropia* thallus (hb ivl 6131, in the specimen of *Carbonea aggregantula*); **B07:** on *Lecanora* sp. thallus (hb ivl 6143, in the specimen of *Lichenostigma chloroterae*); **Z10:** on *Lecidella anomaloides* thallus (LE 261489a, LE 261238a); on *L. stigmatia* thallus (LE 261358b); **Z11:** on *Bacidia bagliettoana* thallus (LE 261269); **Z15:** on damaged parts of *Fulgensia bracteata* lobes (LE 260989); **Z16:** on *Biatora subduplex* thallus (LE 261310b).

According to TRIEBEL (1989), ascospores of the species are (5.5–)6–8(–8.5) × (2.5–)3–4.5(–5) μm. In some of the examined specimens the ascospores are slightly narrower, viz. (4.7–)5.7–7.7(–11.4) ×



(2.1–)2.6–3.4(–3.9)  $\mu\text{m}$ ,  $l/b=(1.6–)1.9–2.7(–4.2)$  ( $n=158$ ; LE 261238a, LE 261269, LE 261310b) or longer, viz. (6.9–)7.2–8.8(–10.2)  $\times$  (2.9–)3.3–4.1(–4.5)  $\mu\text{m}$ ,  $l/b=(1.6–)2.0–2.4(–2.8)$  ( $n=55$ ; LE 261358b).

*Bacidia* and *Biatora* are new host genera, *Lecidella anomaloides* is a new host species. New to Svalbard. According to ØVSTEDAL et al. (2009), the host lichen *Lecidella anomaloides* is also new to Svalbard.

*Muellerella lichenicola* (Sommerf.: Fr.) D.Hawksw.

Ny-Friesland: Sorgfjorden and Nordaustlandet: Repøyane, on *Xanthoria elegans* and *Fulgensia bracteata* [FRIES 1867, as *Endococcus pygmaeus* (Körb.) Th.Fr., revised by R. Santesson according to ALSTRUP & ELVEBAKK (1996)].

*Muellerella polyspora* Hepp ex Müll.Arg.

Edgeøya: Kapp Lee, on *Aspicilia elevata* and *Verrucaria* sp. (APTROOT & ALSTRUP 1991)\*; ibidem, on *Aspicilia caesiocinerea* (BSM 2006–2011).

*Muellerella pygmaea* (Körb.) D.Hawksw. s. str.

**B07**: on *Lecidea lapicida* thallus (hb ivl 6145, in the specimen of *Endococcus fusiger*).

Previously reported from Nordenskiöld Land: Longyearbyen, Trollsteinen, on *Caloplaca* sp. (TRIEBEL 1989) and Edgeøya: Kapp Lee, on *Lecanora polytropa* (BSM 2006–2012).

*Muellerella pygmaea* (Körb.) D.Hawksw. s. l.

Albert I Land: Smeerenburg, Magdalenefjorden, and Kobbefjorden; Ny-Friesland: Sorgfjorden, Lovénberget, Lomfjorden, and Hinlopen; Nordaustlandet: Brennevinsfjorden and Rypön, on *Bilimbia sabuletorum*, *Lecanora albescens*, *L. polytropa*, *Lecidea fuscoatra*, *Protoblastenia rupestris*, *Rhizocarpon geographicum* (FRIES 1860, 1867)\*; Bjørnøya, on *Lecidea lapicida* (PAULSON 1923, LYNGE 1926)\*; Haakon VII Land: Bockfjorden, on *Lecanora polytropa* (HAFELLNER 1982)\*; Edgeøya: Kapp Lee, on *Aspicilia elevata*, *Lecanora polytropa*, and *Lecidea swartzoides* (APTROOT & ALSTRUP 1991, BSM 2006–2012)\*.

<sup>1</sup>*Mycobilimbia hypnorum* (Lib.) Kalb & Hafellner

Haakon VII Land: Bockfjorden, on old thallus of *Peltigera* sp. (HAFELLNER 1982, as *Lecidea hypnorum* Lib.).

*Niesslia* cf. *cladoniicola* D.Hawksw. & W.Gams

**B13**: on lower part of *Cladonia arbuscula* subsp. *mitis* podetium (hb ivl 6181).

We found only one partially destroyed perithecium c. 100  $\mu\text{m}$  diam., with stiff brown setae, 25–50  $\times$  4–5  $\mu\text{m}$ , but without asci.

The species has been sporadically reported from the Holarctic and also from Chile (e.g. HANSEN & ALSTRUP 1995, ETAYO & SANCHO 2008, ZHURBENKO & ALSTRUP 2004), but not yet from Svalbard.

*Niesslia peltigericola* (D.Hawksw.) Etayo

**B13**: on *Peltigera didactyla* thallus (hb ivl 6180).

Ascomata 55–100  $\mu\text{m}$  diam. Asci cylindrical, arranged in a fascicle. Ascospores hyaline, 1-septate, 12–17  $\times$  3–4  $\mu\text{m}$ .

Previously reported from Sørkapp Land: Sergeijevskardet, on *Peltigera aphthosa* (ALSTRUP & OLECH 1993, as *Wentomyces peltigericola* D.Hawksw.)\*.

*Nigropuncta rugulosa* D.Hawksw.

Albert I Land: Danskøya and Kobbefjorden, on *Bellemeria cinereorufescens* (ALSTRUP & ELVEBAKK 1996).

*Opegrapha stereocaulina* Alstrup & D.Hawksw.

Nordenskiöld Land: Grønfjorden, on *Stereocaulon groenlandicum* (ZHURBENKO 2010a).

*Phaeospora parasitica* (Lönnr.) Arnold

Central Spitsbergen: Billefjorden, on *Lecanora marginata* (ACOCK 1940)\*.

*Phaeospora peltigericola* D.Hawksw.

Haakon VII Land: Bockfjorden, on old thallus of *Peltigera* sp. (HAFELLNER 1982)\*.

*Phoma denigricans* Hafellner

**Z11:** on hymenium of *Lecanora epibryon* apothecia (LE 261050).

Previously reported from Bünsow Land: Kapp Napier, on *Lecanora epibryon* (ZHURBENKO 2009b).

*Phoma grumantiana* Zhurb. & Diederich

Bünsow Land, on *Cladonia symphyrcarpia* (ZHURBENKO & ALSTRUP 2004, as *Phoma* sp.; DIEDERICH et al. 2007).

Type from Svalbard.

*Plectocarpon linitae* (R.Sant.) Wedin & Hafellner

Sørkapp Land: Wiederfjellet and Sergajevfjellet, on *Lobaria linita* [ALSTRUP & OLECH 1993, as *Plectocarpon lichenum* (Sommerf.) D.Hawksw.]\*.

According to ERTZ et al. (2005), this material should be *Plectocarpon linitae*.

*Polycoccum bryonthae* (Arnold) Vězda

**Z13:** on hymenium of *Lecanora epibryon* apothecia (LE 261130); **Z16:** on destroyed hymenium of *Caloplaca jungermanniae* apothecia (LE 261500); on hymenium of *L. epibryon* apothecia (LE 261040).

Previously reported from Bünsow Land: Kapp Napier, on *Lecanora epibryon* (ZHURBENKO 2009b).

*Polycoccum tryphelioides* (Th.Fr.) R.Sant.

**Z06:** on *Stereocaulon groenlandicum* phyllocladia and stems (LE 260940a).

Previously reported from Sørkapp Land: Lisbetelva, on *Stereocaulon condensatum* (ALSTRUP & OLECH 1993)\*; and Nordenskiöld Land: Grønfjorden, on *S. groenlandicum* (ZHURBENKO 2010a).

*Polysporina subfuscescens* (Nyl.) K.Knudsen & Kocourk.

Nordautlandet: Prins Oscars Land, on *Acarospora* spp. (NORDIN 2010).

According to K. Knudsen (pers. comm.) the species is not lichenized.

*Pronectria erythrinella* (Nyl.) Lowen

**B11:** on *Peltigera* cf. *rufescens* thallus (hb ivl 6173).

Ascomata causing star-like fissures when breaking through the host cortex, with a prominent, dark papilla. Ascospores hyaline, ends rounded to slightly attenuated, (16.0–)18.2–20.8(–21.0) × (7.0–)7.7–8.6(–9.0) μm, l/b=(1.9–)2.2–2.6(–2.7) (n=20), smooth or rarely slightly verruculose.

New to Svalbard.

*Pronectria lecideicola* Zhurb.

Nordautlandet: Murchisonfjorden, on *Lecidea ramulosa* (ZHURBENKO 2009c).

Type from Svalbard.

*Pronectria robergei* (Mont. & Desm.) Lowen agg.

**B10:** on *Peltigera didactyla* thallus (hb ivl 6164, cf.); **B11:** on *P.* cf. *rufescens* thallus (hb ivl 6171, in the specimen of *Illosporium carneum*, identification uncertain as perithecia are immature); **Z13:** in hymenium of *Solorina bispora* apothecia (LE 261160); **Z16:** in hymenium of *S. bispora* apothecia (LE 260960).

In specimen 6164 ascospores are 13–16 × 7–8 μm, which is relatively large for the species (ZHURBENKO 2009b). Specimens growing on *Solorina* have ascospores (10.6–)11.7–13.9(–14.2) × (3.3–)3.5–4.1(–4.2) μm, l/b=(2.7–)2.9–3.9(–4.0) (n=12, in water or K) and fit the previously reported species modifications on this host genus (ZHURBENKO 2009b).

Previously reported from Sørkapp Land, on *Solorina bispora* (ALSTRUP & OLECH 1993)\*. The species was also reported from Haakon VII Land: Bockfjorden on *Ochrolechia frigida* (HAFELLNER 1982)\*. However, this is a doubtful record probably referring to *Pronectria walkerorum* Zhurb., as *P. robergei* seems to be restricted to *Peltigera* and *Solorina* species.

***Pronectria walkerorum*** Zhurb.

**B04:** on *Ochrolechia frigida* thallus (hb ivl 6134).

Ascomata orange, 250–300 µm diam., immersed in the host thallus, K–. Ascospores usually broadly elliptic or subglobose with rounded ends, occasionally narrowly elliptic with acute ends, hyaline, 1-septate, (11.0–)12.3–15.1(–16.0) × (6.0–)6.7–8.0(–8.5) µm, l/b=(1.4–)1.6–2.2(–2.7) (n=20), granulate or sometimes smooth, ± uniseriate in the asci.

Previously reported from Dickson Land: Pyramiden, on *Ochrolechia* sp. (ZHURBENKO et al. 2005); and most probably from Haakon VII Land: Bockfjorden on *Ochrolechia frigida* [HAFELLNER 1982, as *Nectriella robergei* (Mont. & Desm.) Weese].

***Protothelenella croceae*** (Bagl. & Carestia) Hafellner & H.Mayrhofer

**B09:** on *Peltigera aphthosa* thallus (hb ivl 6148).

Lichenized thallus missing or rarely present as small agglomerations of green algae beneath the ascomata. Ascomata perithecioid, superficial, suborbicular, 250–280 × 200–230 µm, black. Ascomatal wall in the upper part dark brown with a reddish tinge, 20–50 µm thick, composed of several indistinct layers of elongated cells; in the lower part hyaline and 10–20 µm thick. Hamathecial filaments simple or sparsely ramified and anastomosing, (1–)2 µm thick. Asci (4–)8-spored, c. 80–150 × 15–23 µm, with an I+ blue apical ring. Ascospores hyaline, submuriform to muriform, sometimes with an apiculus, c. 2 × 1 µm, in the biggest ascoma with (7–)9(–11) transversal and (0–)1(–2) longitudinal (sometimes oblique) septa, (22–)25–31.5(–35) × (8–)8.5–11.5(–13) µm, l/b=(2.2–)2.5–3.2(–3.8) (n=40), in a smaller ascoma with 5–7 transversal and 0–1 longitudinal septa, (18–)19.5–22.5(–24) × 7–8.5(–9) µm, l/b=(2.4–)2.5–3(–3.4) (n=20). The infected thallus areas are distinctly bleached, but not destroyed. As the bleached areas occur as circular patches amidst the obviously healthy thallus of *Peltigera aphthosa*, the taxon seems to be a mild parasite and not a saprotroph.

New to Svalbard.

***Protothelenella santessonii*** H.Mayrhofer

**Z13:** on *Cladonia pocillum* squamules growing above old podetia (LE 261019); **Z15:** on moribund basal squamules of *C. pocillum* (LE 261339); **Z16:** on basal squamules of *C. pyxidata* (LE 260620).

Ascospores measured with apiculi (18.4–)20.6–28.0(–31.0) × (6.0–)7.8–12.6(–16.2) µm, l/b=(1.7–)2.0–3.0(–3.3) (n=25).

Previously reported from Bünsow Land, on *Cladonia* sp. (ZHURBENKO & ALSTRUP 2004), actually on *C. pocillum*.

<sup>1</sup>***Protothelenella sphinctrinoidella*** (Nyl.) H.Mayrhofer & Poelt

**Z04** (LE 232785); **Z06** (LE 232789). Both specimens on partly bleached lobe bases of *Cetrariella delisei*.

Previously reported from Haakon VII Land: Bockfjorden, without indication of a lichenicolous habit (HAFELLNER 1982, as *Microglaena sphinctrinoidella* Nyl.; MAYRHOFFER & POELT 1985).

*Cetrariella* is a new host genus.

***Pseudopyrenidium tartaricola*** (Lindsay) Nav.-Ros., Zhurb. & Cl.Roux

**B13:** on *Ochrolechia frigida* thallus (hb ivl 6177); **Z05:** on *O. grimmiae* thallus (LE 233089a); on *O. frigida* thallus (LE 233079); Albert I Land: Amsterdamøya, coast and foreland near Smeerenburg, 79°44'30"–79°45'00"N/10°54'–11°02'E, on *O. grimmiae*, 15–19.07.1975, leg. H. Hertel & H. Ullrich, det. W. v. Brackel (M–0045639).

Previously reported from Sørkapp Land: Hohenlohjellet, on *Ochrolechia frigida* (ALSTRUP & OLECH 1993)\*; and from Nordenskiöld Land: Barentsburg, on *O. frigida* and *Ochrolechia* sp. (NAVARRO-ROSINÉS et al. 2010).

***Rhagadostoma lichenicola*** (De Not.) Keissl.

**Z20** (LE 260650); **Z21** (LE 260700a). Both specimens on upper side of partly bleached lobes of *Solorina crocea*.

Previously reported from Sørkapp Land: Wiederfjellet, on *Solorina crocea* (ALSTRUP & OLECH 1993)\*.

<sup>L</sup>*Rhizocarpon dahlia* Øvstedal

Barentsøya, on *Rhizocarpon geographicum* prothallus (ØVSTEDAL et al. 2009).

Type from Svalbard.

<sup>L</sup>*Rhizocarpon furax* Poelt & V.Wirth

Northern Spitsbergen: Wijdefjorden and Nordaustlandet: Brennevinsfjorden, on *Lecidea lapicida* and *Rhizocarpon geminatum* (ØVSTEDAL et al. 2009).

This is an epikapylic obligately lichenicolous lichen.

<sup>L</sup>*Rhizocarpon kakurgon* Poelt

Gustav V Land: Lady Franklinfjorden and Nordenskiöld Land: Gipsdalen, on *Aspicilia* cf. *aliena* (ØVSTEDAL et al. 2009).

This is an epikapylic obligately lichenicolous lichen.

<sup>L</sup>*Rhizocarpon* aff. *parvum* Runemark

Northern Spitsbergen: Wijdefjorden, on *Aspicilia* sp. on sandstone (ØVSTEDAL et al. 2009).

This is an epikapylic lichenicolous lichen, becoming independent.

<sup>L</sup>*Rhizocarpon pusillum* Runemark

Oskar II Land: Brøggerhalvøya, Haakon VII Land: Blomstrandhalvøya, and Nordenskiöld Land: Bolterdalen (HERTEL 1977, ELVEBAKK & HERTEL 1996); Haakon VII Land: Germaniahelvøya (HERTEL 2001); Nordenskiöld Land: Adventfjorden and Bünsow Land: Gipsdalen (ELVEBAKK & HERTEL 1996, ØVSTEDAL et al. 2009). All records on *Sporastatia testudinea*.

This is an epikapylic obligately lichenicolous lichen.

<sup>L</sup>*Rhizocarpon* cf. *rapax* V.Wirth & Poelt

Dickson Land: Kapp Thordsen, on *Tremolecia atrata* (ØVSTEDAL et al. 2009).

This is an epikapylic obligately lichenicolous lichen.

<sup>L</sup>*Rhizocarpon tephromelae* Øvstedal

Nordenskiöld Land: Adventfjorden, on *Tephromela atra* (ØVSTEDAL et al. 2009).

This is possibly a lichenicolous lichen. Type from Svalbard.

***Rhymbocarpus neglectus*** (Vain.) Diederich & Etayo

**Z06** (LE 261029); **Z15** (LE 261388a); **Z16** (LE 261140). All specimens on *Lepraria* spp. thalli.

Previously reported from Bjørnøya, without indication of a host (LYNGE 1926, as *Lecidea neglecta* Nyl.)\*.

*Rhymbocarpus stereocaulorum* (Alstrup & D.Hawksw.) Etayo & Diederich

Sørkapp Land: Lidfjellet, on *Stereocaulon rivulorum* (ALSTRUP & OLECH 1993, as *Geltlingia stereocaulorum* Alstrup & D.Hawksw.)\*.

<sup>L</sup>*Rimularia furvella* (Mudd) Hertel & Rambold

Nordenskiöld Land: Reindalen and Oskar II Land: Brøggerhalvøya, on unidentified crustose lichens (ØVSTEDAL et al. 2009).

This is a plurivorous species invading several silicicolous crustose lichens pertaining to different lineages of discomycetes (HAFELLNER 2008).

<sup>L</sup>*Rimularia insularis* (Nyl.) Rambold & Hertel

Nordenskiöld Land: Bjørndal, on *Lecanora rupicola* agg. (HERTEL & RAMBOLD 1990, ELVEBAKK & HERTEL 1996); Longyearbyen and Colesdalen, on *L. rupicola* s. l. (ØVSTEDAL et al. 2009).

<sup>L</sup>*Rinodina mniarea* (Ach.) Körb.

Nordenskiöld Land: Longyeardalen (LYNGE 1924); Haakon VII Land: Bockfjorden, on *Peltigera* sp. old thallus (HAFELLNER 1982).

<sup>1</sup>*Rinodina olivaceobrunnea* C.W.Dodge & G.E.Baker

**B09**: on *Peltigera aphthosa* thallus (hb ivl 6149; 6153, in the specimen of *Caloplaca epithallina*); **B13**: on *P. leucophlebia* thallus (hb ivl 6182, in the specimen of *Cercidospora punctillata*).

This is an autonomous lichen, usually living on bryophytes or plant debris, but occasionally also on moribund or weakened lichen thalli.

Previously reported from “a few scattered occurrences” in Svalbard (ØVSTEDAL et al. 2009), but not in a lichenicolous habit.

<sup>1</sup>*Rinodina parasitica* H.Mayrhofer & Poelt

Nathorst Land: Ullafjellet, on *Rhizocarpon geminatum* (ØVSTEDAL et al. 2009).

This is an epikapylic obligately lichenicolous lichen.

<sup>1</sup>*Rinodina roscida* (Sommerf.) Arnold

Sørkapp: Hornsund (LYNGE 1924), Bjørnøya (LYNGE 1926); Haakon VII Land: Bockfjorden, on old thalli of *Peltigera* sp. (HAFELLNER 1982); Dickson Land: Petuniabukta, on decaying plants (REDCHENKO et al. 2010).

<sup>1</sup>*Rinodina turfacea* (Wahlenb.) Körb.

**B11**: on moribund thallus of *Peltigera* sp. (hb ivl 6172, in the specimen of *Agonimia globulifera*).

This is an autonomous lichen, usually living on bryophytes or plant debris, but occasionally also on moribund or weakened lichen thalli (see e.g. ALSTRUP & HAWKSWORTH 1990).

Previously reported from Svalbard as common and widespread (FRIES 1860, LYNGE 1924, OLECH 1990, ELVEBAKK & HERTEL 1997, ØVSTEDAL et al. 2009, REDCHENKO et al. 2010), but not indicated as lichenicolous.

*Sclerococcum* sp.

Edgeøya: Kapp Lee, on *Rinodina balanina* (BSM 2006–2012).

<sup>1</sup>*Scoliosporum intrusum* (Th.Fr.) Hafellner

Nordenskiöld Land: Adventdalen, on *Lecidea lapicida* [HERTEL 1991, ØVSTEDAL et al. 2009, as *Carbonea intrusa* (Th.Fr.) Rambold & Triebel].

This is an obligately lichenicolous lichen.

*Scutula tuberculosa* (Th.Fr.) Rehm

Ny-Friesland: Lovénberget, on *Solorina saccata* (FRIES 1867, as its basionym *Biatorina tuberculosa* Th.Fr.)\*.

ALSTRUP & ELVEBAKK (1996: 269) cited this report under *Scutula miliaris* (Wallr.) Trevis. and supposed that it might refer to *S. aggregata* (Bagl. & Carestia) Rehm, which is a synonym of *S. epiblastematica* (Wallr.) Rehm. However, *Scutula miliaris* and *S. epiblastematica* are restricted to *Peltigera* species, while *S. tuberculosa* is confined to *Solorina* species.

*Skyttella mulleri* (Willey) D.Hawksw. & R.Sant.

**Z16**: on *Peltigera rufescens* thallus (LE 261450).

New to Svalbard.

*Sphaerellothecium araneosum* (Rehm ex Arnold) Zopf

**B02**: on *Ochrolechia frigida* thallus (hb ivl 6124); **B03**: on *O. frigida* thallus (hb ivl 6126, in the specimen of *Lichenostigma alpinum*); **B08**: on *O. frigida* thallus (hb ivl 6147); **Z05**: on *O. grimmiae* apothecia and thallus (LE 261059); **Z06**: on *O. grimmiae* apothecia and thallus (LE 260909); **Z16**: on *O. upsaliensis* apothecia and thallus (LE 260959); Nordaustlandet: Murchisonfjorden, Nordvika, polar desert, on *O. frigida* thallus, 80°02'N/18°49'E, 40 m, 14.08.2007, N. V. Matveeva (LE 210427b); ibidem, on *O. androgyna* thallus, 14.08.2007, N. V. Matveeva (LE 210485); ibidem, 200 m, on *O. frigida* thallus, 17.08.2007, N. V. Matveeva (LE 232156); Albert I Land: Amsterdamøya, coast and foreland near Smeerenburg, 79°44'30"–79°45'00"N/10°54'–11°02'E, on *O. grimmiae*, 15–19.07.1975, leg. H. Hertel & H. Ullrich, det. W. v. Brackel (M–0045639).

Previously reported from Sørkapp Land: Sergeijevfjellet and Hornsund, on *Ochrolechia frigida* and *O. grimmiae* (ALSTRUP & OLECH 1993)\*; Edgeøya: Kapp Lee, on *Ochrolechia* sp. (BSM 2006–2012).

*Sphaerellothecium atryneae* (Arnold) Cl.Roux & Triebel

Haakon VII Land: Bockfjorden, on *Lecanora swartzii* [HAFELLNER 1982, as *Stigmidium atryneae* (Arnold) Hafellner on *Lecanora subradiosa*]\*.

*Sphaerellothecium cladoniae* (Alstrup & Zhurb.) Hafellner

**B01:** on *Cladonia pyxidata* basal squamules (hb ivl 6115); **B02:** on *C. gracilis* podetia (hb ivl 6123); **B07:** on *C. pyxidata* agg. basal squamules (hb ivl 6138); **Z09:** on *C. pocillum* basal squamules (LE 260979); **Z16:** on *C. pyxidata* podetial squamules (LE 260950); **Z18:** on both sides of *C. symphyrcarpia* basal squamules (LE 261159).

This is a common species with a predominantly (sub)arctic-(sub)alpine distribution.

Previously reported from Nordaustlandet: Wahlenbergfjorden; Nathorstland: Forsbladodden; northern Spitsbergen: Wijdefjorden, Austfjorden; Nordenskiöld Land: Grønfjorden; Bünsow Land: Billefjorden; Nordaustlandet: Murchisonfjorden; on *Cladonia pocillum* and *C. symphyrcarpia* (ZHURBENKO & ALSTRUP 2004, ZHURBENKO 2009a, BSM 2006–2012). Type from Svalbard.

*Sphaerellothecium cladoniicola* E.S.Hansen & Alstrup

**B14:** on *Cladonia arbuscula* subsp. *mitis* podetia (hb ivl 6187).

Previously reported from Albert I Land: Mitrafjellet without indication of the host (HANSEN & ALSTRUP 1995)\*.

*Sphaerellothecium epilecanora* Zhurb. **sp. nov.** [MycoBank No.: MB 804826] (Fig. 4)

Similar to *Sphaerellothecium propinquellum*, but with smaller ascomata, 20–40(–60)µm vs. 45–75µm diam., BCr– walls of asci and ascospores, shorter asci, (21–)29.5–36(–39.5)×(8.5–)11.5–16(–17.5)µm vs. 36–69×11–17µm, and somewhat smaller ascospores, (9.7–)10.9–12.9(–15.0)×(3.5–)3.6–4.4(–5.2)µm vs. (10–)11.5–15(–16)×(3–)4–5.5(–6)µm.

**Type:** Svalbard, Spitsbergen, Bünsow Land, NE extremity of Billefjorden near Kapp Napier, near Norddammen lake, 78°38'N/16°44'E, 10m, coastal tundra, on apothecia of *Lecanora epibryon*, 20.07.2003, M. P. Zhurbenko 03354 (LE 261018 – holotype).

**Vegetative hyphae** externally blackish, flexuose, branched, almost superficial to immersed (sometimes at several levels), but well visible through the hyaline host tissues, forming a conspicuous dark reticulum; microscopically pale to medium brown, in K taking on a fulvous hue, septate, markedly constricted at the septa, composed of elongated and often somewhat bent or occasionally subglobose cells (4.7–)7.6–13.8(–16.1)×(3.7–)4.3–5.9(–6.7)µm (n=26, in water) or (5.0–)6.0–9.6(–11.0)×(5.0–)6.0–8.0(–9.2)µm (n=16, in K/I), wall c. 1–1.5µm thick, evidently smooth or indistinctly ornamented, but often appearing torn and “scaly” in squashed preparations, BCr+ blue. **Ascomata** perithecioid, black, subglobose, 20–40(–60)µm diam., with an ostiole of c. 5µm diam., without appendices or projections, immersed to almost superficial, dispersed. Ascotal wall medium brown throughout, in K taking on a fulvous hue, evidently smooth or indistinctly ornamented, but often appearing torn and “scaly” in squashed preparations, composed of a few layers of angular-rounded, pseudoparenchymatous cells 4.0–10.0×3.2–6.8µm, with wall c. 0.8µm thick, BCr+ dark blue. Hymenial gel I–, K/I–. Hamathecium not observed. **Asci** saccate, narrowly ovoid/pyriform or elongate-clavate/ellipsoid, sessile or rarely with a short foot, endoascus thickened above, occasionally with indistinct ocular chamber, (21–)29.5–36(–39.5)×(8.5–)11.5–16(–17.5) (n=20, in water or BCr), 8-spored, wall and tholus BCr–. **Ascospores** narrowly obovoid with a wider upper cell, hyaline, (9.7–)10.9–12.9(–15.0)×(3.5–)3.6–4.4(–5.2)µm, l/b=(2.4–)2.8–3.2(–3.7)µm (n=93, in water, BCr, K or I), 1-septate, slightly constricted at the septum, sometimes with a compact halo c. 0.5µm thick, smooth-walled, often with several conspicuous guttules in each cell, irregularly arranged in 2–3 rows in the ascus, wall BCr–, plasma BCr+ blue, I+ orange red, K/I+ yellow.

**Distribution and host:** Circumpolarly known from arctic tundra, growing on apothecia (mostly on hymenium, sometimes also on thalline margins) and occasionally on adjacent thalli of terricolous *Lecanora epibryon*. Always associated with discoloured, usually hyaline parts of the host and thus probably pathogenic. However, similar hyaline portions of host hymenium were observed without visible traces of the fungus.



**Observations:** Most *Sphaerellothecium* species are specific to the host genus. To date four species of the genus have been reported from *Lecanora* species, viz. *Sphaerellothecium atryneae* (Arnold) Roux & Triebel, *S. contextum* Triebel, *S. minutum* Hafellner, and *S. propinquellum* (Nyl.) Cl. Roux & Triebel (TRIEBEL 1989, HAFELLNER 1993, ROUX & TRIEBEL 1994, DIEDERICH 2003, ZHURBENKO 2008, 2009b). *Sphaerellothecium atryneae*, growing in the hymenium of saxicolous *Lecanora* spp., differs from *S. epilecanora* in its somewhat larger ascomata, 40–80 µm diam., BCr+ violet walls of asci and ascospores, and at first colourless, then usually pale brown ascospores,  $(8-10-13(-14) \times (3-4-5(-5.5)) \mu\text{m}$ ; *S. contextum*, growing on thalli and apothecia of various saxicolous lichen genera, readily differs from the new species in its medium to dark brown and wider ascospores,  $(10-11.5-14(-16) \times (4.5-5-6.5(-8)) \mu\text{m}$ ; *S. minutum*, almost exclusively reported from thalli of *Sphaerophorus* spp., has larger ascomata, 60–80 µm diam., shorter asci, c.  $20-25 \times 12-16 \mu\text{m}$ , and hyaline ascospores, occasionally becoming brown when old; *S. propinquellum*, mainly growing on apothecia of epiphytic *Lecanora carpinea*, differs from the new species in its somewhat larger ascomata, 45–75 µm diam., BCr+ violet walls of asci and ascospores, longer asci,  $36-69 \times 11-17 \mu\text{m}$ , and slightly larger ascospores,  $(10-11.5-15(-16) \times (3-4-5.5(-6)) \mu\text{m}$ , sometimes becoming pale brown and finely granulose with age. *Stigmidium congestum* (Körb.) Triebel, mainly growing on apothecia of bark-inhabiting *Lecanora* species, also has distinct brown vegetative hyphae, atypical for this genus. It differs from *Sphaerellothecium epilecanora* in its larger ascomata,  $40-85 \times 33-77 \mu\text{m}$ , BCr+ walls of asci and more oblong, 1(–3)-septate, non-halonate, pseudotetrablastic ascospores (ROUX & TRIEBEL 1994).

**Additional specimens examined** (all on *Lecanora epibryon*): **Z07** (LE 261066); **Z10** (LE 260986); **Z16** (LE 260829b). CANADA: Canadian Arctic archipelago, Axel Heiberg island, Bunde fjord,  $80^{\circ}30'05''\text{N}/94^{\circ}36'07''\text{W}$ , arctic tundra, 1.08.1999, F. Daniels (LE 261178). RUSSIA: Nenetz Region, Malozemel'skaya Tundra, Seduyakha river,  $68^{\circ}23'\text{N}/53^{\circ}15'\text{E}$ , tundra, 3.08.1998, O. V. Lavrinenko (LE 260957); Sakha-Yakutiya republic, Lena river delta, 3 km E of Krest-Tumsa cape,  $72^{\circ}22'\text{N}/126^{\circ}42'\text{E}$ , 50 m, tundra, 4.08.1998, M. Zhurbenko (LE 261128b); same delta, Stolb (Ebe-Khaya) island,  $72^{\circ}24'\text{N}/126^{\circ}40'\text{E}$ , 50 m, tundra, 12.08.1998, M. Zhurbenko (LE 261068); Chukotka, Iskatén' range, pass near 32 km of Egvekinot-Iul'tin road,  $66^{\circ}35'\text{N}/179^{\circ}10'\text{W}$ , tundra, 29.07.1971, A. E. Katenin (LE 261176); ibidem, Puotena bay,  $65^{\circ}50'\text{N}/170^{\circ}32'\text{W}$ , tundra, 23.07.1972, I. I. Makarova (LE 260937).

#### *Sphaerellothecium minutum* Hafellner

**B15:** on *Sphaerophorus fragilis* thallus (hb ivl 6191); **Z05:** on *S. globosus* thallus (LE 260929a); **Z06:** on *S. globosus* thallus (LE 260920); **Z08:** on *S. globosus* thallus (LE 261079).

In heavy infections the species causes local bleaching or darkening of the host thalli.

Previously reported from Nordaustlandet: Murchisonfjorden, on *Sphaerophorus fragilis* (ZHURBENKO 2009a).

#### *Sphaerellothecium parmeliae* Diederich & Etayo

**B03:** on *Parmelia saxatilis* thallus (hb ivl 6129).

This cosmopolitan species is restricted to *Parmelia* s. str.

New to Svalbard.

#### *Sphaerellothecium thamnoliae* Zhurb. var. *thamnoliae*

**B09** (hb ivl 6160); **Z15** (LE 260820). Both specimens on thalli of *Thamnolia vermicularis* var. *subuliformis*.

Previously reported from Dickson Land, on *Thamnolia vermicularis* (ZHURBENKO 2012).

#### *Sphaeropezia santessonii* (Zhurb., Etayo & Diederich) Baloch & Wedin

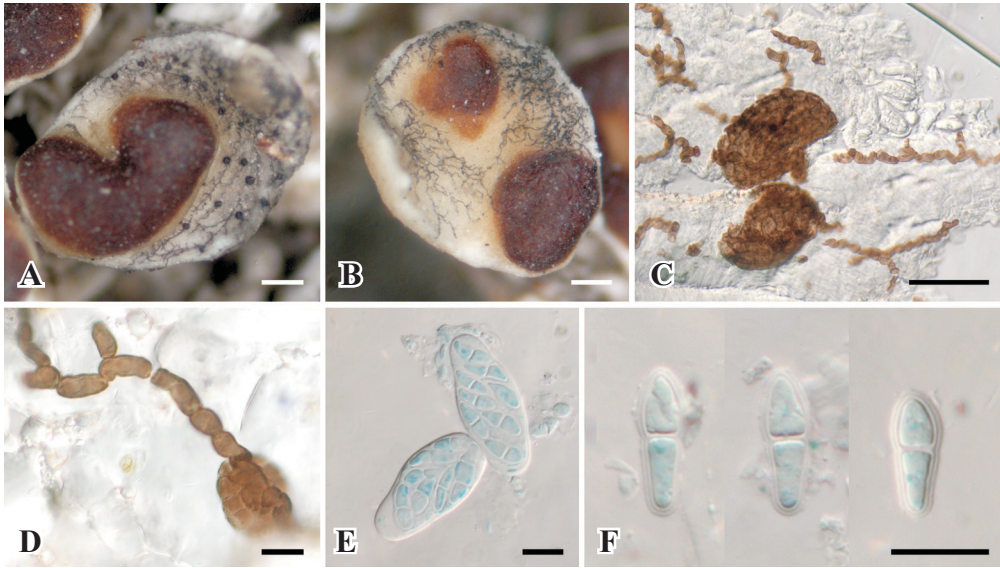
**Z15:** on *Thamnolia vermicularis* var. *subuliformis* thallus (LE 261119).

New to Svalbard.

#### *Sphaeropezia thamnoliae* (Zhurb., Diederich & Etayo) Baloch & Wedin

**B09:** on *Thamnolia vermicularis* thallus (hb ivl 6159).

New to Svalbard.



**Fig. 4:** *Sphaerellothecium epilecanora* (A, B – holotype; C – LE 261068; D – LE 260937; E, F – LE 261176). **A, B** – habitus of ascomata and hyphal reticulum. **C** – squashed ascomata and vegetative hyphae (in water). **D** – vegetative hyphae (in water). **E** – asci (in diluted BCcr). **F** – ascospores (in diluted BCcr). Bars: A, B=200  $\mu$ m; C=50  $\mu$ m; D–F=10  $\mu$ m.

#### <sup>L</sup>*Steinia geophana* (Nyl.) Stein

**B13:** on *Peltigera didactyla* thallus (hb ivl 6180, in the specimen of *Niesslia peltigericola*); **Z11:** on mossy soil (LE 261278b); **Z16:** on dead mosses (LE 260976).

This inconspicuous lichen mainly grows on soil, but also occurs on decaying thalli of *Peltigera* or *Solorina* species. So far it has been recorded in the Arctic from northern Alaska, West Greenland and Taimyr peninsula in Siberia (KRISTINSSON et al. 2010).

New to Svalbard.

#### *Stellifraga cladoniicola* Alstrup & Olech

Sørkapp Land: Hohenloheskardet, on *Cladonia gracilis* (ALSTRUP & OLECH 1993)\*.

Type from Svalbard.

#### *Stigmatidium cladoniicola* Zhurb. & Diederich

**B15:** on moribund parts of *Cladonia macroceras* podetia (hb ivl 6189).

The species is known from a few scattered localities in Europe (ZHURBENKO & DIEDERICH 2008, SUIJA et al. 2008, KUKWA & FLAKUS 2009). New to Svalbard.

#### *Stigmatidium collematis* Cl.Roux & Triebel

**Z16:** on hymenium of *Collema polycarpon* apothecia (LE 260939).

The species causes bleaching of the host tissues.

New to Svalbard.

#### *Stigmatidium conspurcans* (Th.Fr.) Triebel & R.Sant.

**Z13:** on healthy-looking and moribund squamules of *Psora rubiformis* (LE 261109).

Previously reported from northern Spitsbergen: Wijdefjorden and Ny-Friesland: Sorgfjorden, on *Psora rubiformis* (FRIES 1867, as *Arthopyrenia conspurcans* Th.Fr.)\*. Type from Svalbard.

***Stigmidium frigidum*** (Sacc.) Alstrup & D.Hawksw.

**B09**: on *Thamnolia vermicularis* var. *subuliformis* thallus (hb ivl 6161).

New to Svalbard.

***Stigmidium leucophlebiae*** Cl.Roux & Triebel

**B03** (hb ivl 6130); **B09** (hb ivl 6151); **B10** (hb ivl 6165, in the specimen of *Graphium aphthosae*); **B14** (hb ivl 6188). All specimens on thalli and cephalodia of *Peltigera leucophlebia*.

New to Svalbard.

***Stigmidium mitchellii*** Cl.Roux & Bricaud

**B02** (hb ivl 6120); **Z02** (LE 261419a). Both specimens on *Psoroma hypnorum*: disc and thalline margins of apothecia, thalli.

Previously reported from Nordensiköld Land: E coast of Grønfyorden and near Barentsburg, on *Protopannaria pezizoides* and *Psoroma hypnorum* (ZHURBENKO 2009b).

***Stigmidium mycobilimbiae*** Cl.Roux, Triebel & Etayo

**Z07**: on *Mycobilimbia carneoalbida* thallus (LE 261268); **Z08**: on *Bilimbia lobulata* thallus (LE 261220).

New to Svalbard.

***Stigmidium peltideae*** (Vain.) R.Sant.

**B01**: on moribund parts of *Peltigera rufescens* lobes (hb ivl 6113); **B03**: on *P. rufescens* thallus (hb ivl 6125); **B07**: on *P. rufescens* thallus (hb ivl 6146); **Z10**: on inside-out underside of *Peltigera* sp. dead lobes (LE 261390), on upper side of *P. cf. rufescens* dead lobes (LE 261449); **Z15**: on moribund parts of *P. leucophlebia* lobes (LE 261010c).

Previously reported from Sørkapp Land: Stupryggen, Lisbetelva, and Wiederfjellet, on *Peltigera canina*, *P. rufescens*, and *Solorina crocea* (ALSTRUP & OLECH 1993)\*; the report on *S. crocea* probably refers to *Stigmidium solorinarium* or more likely *S. croceae* (Arnold) Cl.Roux & Triebel.

***Stigmidium pseudopeltideae*** Cl.Roux & Triebel

**Z02**: on bleached portions of *Peltigera canina* lobes (LE 261320).

New to Svalbard.

***Stigmidium schaeferi*** (A.Massal.) Trevis.

**Z12** (LE 260750a); **Z16** (LE 260790a); **Z17** (LE 260770a); **Z19** (LE 260720a). All specimens on thalli of *Dacampia hookeri*.

Ascospores hyaline to occasionally pale to medium brown when old, (11.5–)12.0–14.2(–16.3) × (3.4–)3.5–4.3(–5.0) μm, l/b=(2.8–)3.0–3.6(–3.8) (n=33), 1-septate, often pseudotetrablastic, non-halonate.

Previously erroneously reported from Svalbard by APTROOT & ALSTRUP (1991), see comments below under *Stigmidium* sp. First certain report for Svalbard.

***Stigmidium solorinarium*** (Vain.) D.Hawksw.

**B07**: on *Solorina bispora* var. *subspongiosa* thallus (hb ivl 6141); **B11**: on *S. saccata* thallus (hb ivl 6174); **Z01**: on upper side of *S. saccata* lobes (LE 260658); **Z11**: on *S. saccata* thallus (LE 260800a); **Z12**: on *S. saccata* thallus (LE 261030b).

First certain report for Svalbard.

***Stigmidium* sp.**

Edgeøya: Kapp Lee, on *Lecidea swartzoidea* [APTROOT & ALSTRUP 1991, as *Stigmidium schaeferi*]\*.

The material certainly does not belong to *Stigmidium schaeferi*, as this species is restricted to *Dacampia hookeri*. *Stigmidium congestum* (Körb.) Triebel, formerly often named *S. schaeferi*, is confined to *Lecanora* species.

***Taeniolella beschiana*** Diederich

Bünsow Land, on *Cladonia symphyrcarpia* (ZHURBENKO & ALSTRUP 2004; the host is given after the specimen in LE-Fungi).

**Taeniolella pertusariicola** D.Hawksw. & H.Mayrhofer

**Z13:** on *Pertusaria bryontha*: disc and margin of apothecia, thallus (LE 261060).

New to Svalbard.

<sup>L</sup>**Tetramelas phaeophysciae** A.Nordin & Tibell

**Z19:** on *Phaeophyscia sciastra* thallus (LE 261090).

New to Svalbard.

<sup>L</sup>**Tetramelas pulverulentus** (Anzi) A.Nordin & Tibell

**Z13:** on *Physcia caesia* thallus (LE 261070); **Z19:** on *Physconia muscigena* thallus (LE 261020a).

Previously reported from Albert I Land: Danskøya, Ny-Friesland: Sorgfjorden, Nordaustlandet: Fosterøya and Murchison fjord, on *Physcia caesia*, *Phaeophyscia orbicularis*, and *Xanthoria elegans* (FRIES 1867, as *Buellia convexa* Th.Fr.); Oskar II Land: Brøggerhalvøya, Gluutneset [NIMIS 1985, as *Buellia pulverulenta* (Anzi) Jatta]; Ny-Friesland: Sorgfjorden, on members of Physciaceae and on *Xanthoria elegans* (ØVSTEDAL et al. 2009, as *Buellia pulverulenta*). The record of this species on *Pleopsidium chlorophanum* (FRIES 1867) might refer to *Dactylospora rimulicola* (Müll.Arg.) Hafellner.

*Thamnogalla crombiei* (Mudd) D.Hawksw.

Bünsow Land, on *Thamnotia vermicularis* (ZHURBENKO 2012).

<sup>L</sup>**Thelocarpon epibolum** Nyl var. *epibolum*

**B07:** on *Solorina bispora* var. *subspingiosa* thallus (hb ivl 6142); **B10:** on *Peltigera leucophlebia* thallus (hb ivl 6165, in the specimen of *Graphium aphthosae*); **Z02:** on moribund lobes of *Peltigera aphthosa* (LE 261080); **Z05:** on upper side of *Solorina crocea* lobes (LE 260690b); **Z15:** on moribund parts of *Peltigera leucophlebia* lobes (LE 261010a); **Z20:** on *S. crocea* decaying thallus (LE 260730); **Z21:** on *S. crocea* moribund thallus (LE 260700b).

Ascospores (4.0–)4.9–6.7(–8.2) × (2.0–)2.3–2.9(–3.3) μm, l/b=(1.5–)1.9–2.7(–3.3) (n=88). Lichenization indistinct.

Previously reported from Sørkapp Land: Sergejevskardet, on *Peltigera aphthosa* (ALSTRUP & OLECH 1993)\*; and Dickson Land, on decaying lichen thallus and soil, the variety not indicated (REDCHENKO et al. 2010).

<sup>L</sup>**Thelocarpon epibolum** var. *epithallinum* (Leight. ex Nyl.) G.Salisb.

**B03:** on *Peltigera leucophlebia* thallus (hb ivl 6128); **B09:** on *P. aphthosa* and *P. leucophlebia* thalli (hb ivl 6150).

First certain report of this variety for Svalbard.

<sup>L</sup>**Thelocarpon impressellum** Nyl.

**Z01:** on cyanobacterial crust on soil (LE 260628).

Ascospores pale yellow-green, subglobose to shortly columnar, more or less truncate above, 100–200 μm diam. Paraphyses numerous, unbranched, c. 1.5 μm diam. Ascospores hyaline, ellipsoid to broadly ellipsoid, (5.2–)6.7–8.7(–9.2) × (3.4–)4.2–5.0(–5.5) μm, l/b=(1.3–)1.5–1.9(–2.1) (n=37), aseptate.

The species often grows on lichens as well as on soil, bryophytes, decaying wood, and even rock; possibly optionally lichenized (SANTESSON et al. 2004).

In the Arctic the species is known from Greenland and Siberia (Severnaya Zemlya and Taimyr peninsula) (ALSTRUP et al. 2009, ZHURBENKO 2009a, 2009b). New to Svalbard.

<sup>L</sup>**Toninia aromatica** (Turner ex Sm.) A.Massal.

Ny-Friesland: Sorgfjorden (as Treurenberg bay) and Lomfjorden, not indicated as lichenicolous [FRIES 1867, as *T. fisispora* (Hepp) Th.Fr.]; Svalbard, without indication of locality and host (TIMDAL 1991).

Parasitic on a wide range of crustose lichens, at least when young (TIMDAL op. cit.).

<sup>L</sup>**Toninia verrucarioides** (Nyl.) Timdal

Haakon VII Land: Bockfjorden, on *Placynthium asperellum* (HAFELLNER 1982, as *Toninia kolax* Poelt); Ny-Friesland: Treurenberg Bay, on *P. asperellum* (FRIES 1867, as *T. conjugens* Th.Fr., TIMDAL 1991).

Type of *Toninia conjungens* is from Svalbard.

This is an obligately lichenicolous lichen growing on cyanophilic lichens.

'*Torula lichenum* Keissl.'

Bjørnøya, on lichens (LYNGE 1926, ALSTRUP & ELVEBAKK 1996).

ALSTRUP & ELVEBAKK (1996) suggested that this report might refer to a species of *Intralichen* or *Trimmatostroma*. The name *Torula lichenum* was rejected by HAWKSWORTH (1979) because its type lacks fruiting structures.

*Tremella cetrariicola* Diederich & Coppins

**Z04** (LE 232531); **Z06** (LE 261200); **Z19** (LE 232840); **Z20** (LE 232870). All specimens on *Cetrariella delisei* lobes, mostly on their lower side.

New to Svalbard.

*Trimmatostroma cetrariae* Brackel **sp. nov.** [Mycobank No.: MB 805888] (Fig. 5)

Lichenicolous fungus growing on the thallus of *Cetraria islandica*. Colonies forming a net of brown hyphae. Conidiophores immersed and in the end erumpent. Conidiogenous cells integrated, terminal or lateral, monoblastic or rarely pauciblastic, c.  $5-6 \times 3-6 \mu\text{m}$ . Conidia in chains, ellipsoid to subcylindrical, (0-)1(-2)-septate, truncate, brown, rough-walled,  $5-22 \times 4-8 \mu\text{m}$ .

**Type:** Svalbard, Nordenskiöld Land, Longyearbyen, Nybyen,  $78^{\circ}12'02.6''\text{N}/15^{\circ}35'22.8''\text{E}$ , schist scree, on *Cetraria islandica* lobes, 10.08.2012, W. v. Brackel (M – holotype).

**Colonies** lichenicolous, forming an easy visible net of brown hyphae on bleached parts of *Cetraria islandica* lobes. Mycelium immersed, hyphae sparsely branched, 2–4  $\mu\text{m}$  wide, subhyaline to medium or dark brown, septate, thin-walled, verrucose to rugose. Stroma lacking. **Conidiophores** micronematous, developing gradually from the mycelium without a well defined demarcation, mostly immersed and erumpent only in the end, septate and partly branched, rugose, dark to medium brown,  $20-60 \times 4-5 \mu\text{m}$ , single cells twisted or rarely straight. **Conidiogenous cells** integrated, terminal or sometimes lateral, monoblastic, occasionally pauciblastic, c.  $5-6 \times 3-6 \mu\text{m}$ . **Conidia** arranged in simple, irregular, easily disarticulating chains, ellipsoid to subcylindrical, (0-)1(-2)-septate, rarely dictyosporous, with truncate ends except the uppermost conidium with rounded upper end, rugose to rimulose;  $(6.0-6.4-9.8(-11.0) \times (4.0-4.2-5.2(-6.0) \mu\text{m}$  (n=20; 1-septate conidia) or c.  $5-22 \times 4-8 \mu\text{m}$  (aseptate to dictyosporous conidia), medium to dark brown, turning slightly olivaceous in K; the inner wall layer paler and smooth, the outer one darker and cracked.

**Host and distribution:** *Trimmatostroma cetrariae* grows on *Cetraria islandica* lobes. It is an aggressive pathogen, as the infected host tissues are totally bleached, and the host cortex is finally breaking off the medulla. The species is known from arctic respectively alpine biomes of Svalbard and Italy.

**Observations:** The taxon is very close to *Trimmatostroma quercicola* Diederich, U.Braun & Heuchert in several features, especially in regard to the formation of conidia (DIEDERICH et al. 2010). Contrarily to this species, the mycelium is forming a visible dark net of hyphae on or near the surface of the host thallus. More differences are the ornamentation of the mycelium and the conidiophores, the conidiogenous cells also appearing laterally, and the occasionally pauciblastic conidiogenous cells. *Trimmatostroma dendrographae* Diederich, Ertz, U.Braun & Heuchert and *T. lecanoricola* Diederich, Etayo, U.Braun & Heuchert differ in the K+ distinctly olivaceous respectively orange-brown conidia and *T. hierrense* Diederich & Ertz in the smooth, unevenly pigmented conidia (DIEDERICH et al. 2010). On the first sight, the net of hyphae recalls a species of *Lichenostigma* subgen. *Lichenogramma* or *Sphaerellothecium*. Whereas some species of *Lichenostigma* subgen. *Lichenogramma* are forming macroconidia (*L. rupicolae* Fdez.-Brime & Nav.-Ros., *L. supertegentis* Ihlen & R.Sant.), this is not known from *Sphaerellothecium*. The macroconidia of *Lichenostigma* subgen. *Lichenogramma* are quite different from the conidia of the new *Trimmatostroma* species: they are produced directly on the surface of the ascumata or of the hyphal strands, globose to ellipsoidal, multicellular to muriform (IHLEN 2004, FERNÁNDEZ-BRIME et al. 2010).





Fig. 5: *Trimmatostroma cetrariae* (holotype): conidiophores, conidiogenous cells and conidia (in water). Bar=10  $\mu$ m.

**Additional specimens examined:** SVALBARD: Nordenskiöld Land, Longyearbyen, coast SE of lighthouse, 78°13'56.7"N/15°19'37.5"E, 20m, schist scree, on *Cetraria islandica*, 13.08.2012, W. v. Brackel (hb ivl 6193). ITALY: Abruzzo, Prov. di L'Aquila, Gran Sasso, below Rifugio Garibaldi, 42°27'30.5"N/13°32'51.9"E, 2130m, bare soil in alpine heath, on *Cetraria islandica*, 11.08.2011, W. v. Brackel (hb ivl 6455).

***Xenonectriella lutescens*** (Arnold) Weese

**Z08:** on *Solorina bispora* thallus (LE 261110).

New to Svalbard.

***Xenonectriella ornamentata*** (D.Hawksw.) Rossmann

**Z02:** on *Peltigera didactyla* thallus (LE 261420).

New to Svalbard.

***Zwackhiomyces berengerianus*** (Arnold) Grube & Triebel

**Z07:** on *Mycobilimbia carnealbida* thallus (LE 261319).

New to Svalbard.

***Zwackhiomyces macrosporus*** Alstrup & Olech

**Z08:** on *Bryonora castanea* thallus (LE 261409); on *Megaspora verrucosa* marginal prothallus (LE 261179b).

Perithecia 150–230  $\mu$ m diam. Ascospores hyaline to pale brown when overmature, verruculose, 1-septate, usually with a much longer and wider upper cell, (28.0–)31.5–40.1(–48.0)  $\times$  (7.9–)9.3–12.5(–14.0)  $\mu$ m, l/b=(2.6–)2.8–3.8(–4.8) (n=40).

Previously reported from Sørkapp Land: Lidfjellet, on *Pannaria pezizoides* (ALSTRUP & OLECH 1993)\*. Type from Svalbard.

*Bryonora* and *Megaspora* are new host genera.



**Zwackhiomyces** sp.

Edgeøya: Kapp Lee, Rosenbergdalen, on *Aspicilia nikrapensis* growing on rock in tundra, 8./9.1986, leg. C. M. van Herk, det. V. Alstrup (as *Cercidospora epipolytropa*), rev. W. v. Brackel (M-0045080).

The examined specimen is similar to *Zwackhiomyces aspiciliae* Halici & Candan (HALICI & CANDAN 2009), but has smaller ascospores,  $(15.0-15.6-18.3(-19.0) \times (5.0-5.5-6.3(-6.5)) \mu\text{m}$ ,  $l/b=(2.5-2.7-3.1(-3.4))$  ( $n=12$ ) vs.  $(18-20-25(-28)) \times (5-6-8(-9)) \mu\text{m}$ ,  $l/b=(2.3-2.6-3.4(-4.2))$  ( $n=36$ ), of somewhat different shape.

**Discussion**

The checklist includes 136 species of lichenicolous fungi from 55 genera and 42 species of lichens from 22 genera optionally or permanently growing on other lichens, which makes Svalbard one of the best studied areas in the Arctic regarding lichenicolous mycobiota. Other well-studied Arctic regions are: West Greenland (122 species of lichenicolous fungi), Taimyr (94 species) and East Chukotka (55 species) (KRISTINSSON et al. 2010). As there are 742 species of lichens known from Svalbard (ØVSTEDAL et al. 2009) and the ratio of the number of lichenicolous fungi species to the number of lichen species in the Holarctic is roughly equal from 1 : 5 (ZHURBENKO 2007) to up to 1 : 4 (in Central Europe; BRACKEL in prep.), the expected diversity of lichenicolous fungi in Svalbard is about 150–200 species.

Despite the long history of lichenological studies in Svalbard, four species of lichenicolous fungi are described as new to science, and 44 species of lichenicolous fungi and six lichen species are newly reported from the archipelago (see abstract). We also confirm for the first time the presence in Svalbard of *Stigmidium schaeereri* and *S. solorinarium*, and approve the presence of *Thelocarpon epibolum* var. *epithallinum*. The finding of a number of additional lichenicolous fungi species with deviating features, including taxa possibly unknown to science, shows that the diversity of lichenicolous fungi in the Arctic is still far from being revealed.

The following species of lichenicolous fungi are newly documented on various hosts: *Arthonia apotheciorum* on *Lecanora polytropa*, *A. molendoi* on *Caloplaca ammiospila*, *A. peltigerina* on *Peltigera didactyla* and *Solorina bispora* var. *subspungiosa*, *Cercidospora punctillata* on the host genus *Rinodina*, *Dactylospora aeruginosa* on *Lecidea epiphaea*, *D. deminuta* on the host genus *Megaspora* and on *Lecanora luteoernalis* and *Lecidea colleda*, *Illosporium carneum* on the host genus *Solorina*, *Intralichen christiansenii* on *Lecanora epibryon*, *Lichenostigma chloroterae* on *Lecanora polytropa*, *Merismatium heterophractum* on the host genera *Caloplaca* and *Pilophorus*, *M. nigritlellum* on the host genus *Physconia*, *Muellerella erratica* on the host genera *Bacidia* and *Biatora* and on *Lecidella anomaloides*, and *Zwackhiomyces macrosporus* on the host genera *Bryonora* and *Megaspora*. The lichens *Caloplaca epithallina* and *Protothelenella sphinctrinoidella* are reported for the first time on the lichen genera *Peltigera* and *Cetrariella* respectively.

The most common species of lichenicolous fungi in the study area seem to be *Arthonia peltigerina*, *Cercidospora punctillata*, *Dactylospora deminuta*, *Lichenostigma alpinum*, *Muellerella erratica*, *M. pygmaea*, *Sphaerellothecium araneosum*, *S. cladoniae*, and *S. minutum*.

**Acknowledgements**

We thank Arve Elvebakk (Tromsø) for practical information on travelling in Svalbard, Janolof Hermansson (Ludvika) for the help in identification of *Lecidella anomaloides*, Pier-Luigi Nimis (Trieste) and Maria Olech (Kraków) for the help in literature search.

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Manuscript accepted: 19 October 2013.

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