

New data on lichenicolous fungi in Norway

ANDREAS FRISCH, HÅKON HOLIEN, JON T. KLEPSLAND, AVE SUIJA and MIKA BENDIKSBY

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We report 31 species of lichenicolous fungi as new to Norway. Of these, 16 are new to Fennoscandia. Based on molecular phylogenetic results and newly discovered pycnidia in *Phacographa protoparmeliae*, the combination *Phacographa lapponica* (Ihlen) Frisch & Ihlen is introduced for *Epicladonia lapponica* Ihlen. A lectotype is selected for *Phaeospora geographicola* Arnold [= *Opegrapha geographicola* (Arnold) Hafellner]. New distribution data are given for 53 rare or seldom reported lichenicolous fungi. Our results evidence the limited state of knowledge on this diverse group of fungi in Norway. This study highlights the importance of intensified mapping efforts and of scientific collections for documenting unknown species diversity.

Andreas Frisch, NTNU University Museum, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway. Email: andreas.frisch@ntnu.no (corresponding author).

Håkon Holien, Nord University, Faculty of Bioscience and Aquaculture, P.O.Box 2501, NO-7729 Steinkjer, Norway, and NTNU University Museum, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway.

Jon Klepsland, Biorehab Klepsland, Sønderhellene 10, NO-3404 Lier, Norway.

Ave Suija, University of Tartu, Institute of Ecology and Earth Sciences, 50409 Tartu, Estonia.

Mika Bendiksby, NTNU University Museum, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway, and Natural History Museum, University of Oslo, NO-0318 Oslo, Norway.

Introduction

Lichenicolous fungi are a taxonomically and ecologically diverse group of lichen-inhabiting fungi with a parasymbiotic, parasitic, or saprotrophic lifestyle. They occur in all habitats where lichens are observed, but are particularly common in alpine environments, nitrophytic *Xanthorion* communities, and in forest communities with long ecological continuity. Lichenicolous fungi have been collected in Norway since the mid-19th century (e.g., Fries 1856–1866, Norman 1868–1871, Sommerfelt 1826). In total 362 species are known from Norway to date, of which 31 alone have been newly reported since 2020 (Diederich et al. 2022, Frisch et al. 2020, Holien & Frisch 2022, Klepsland 2020, Westberg et al. 2021, 2022). Despite this high number in reported species, representing ca 70% of the lichenicolous fungi known in Fennoscandia and ca 18% of all described lichenicolous fungi (Diederich et al. 2018, Westberg et al. 2021), the group remains poorly studied. The majority of species is known from a few collections only, and their distribution, frequency, and habitat affiliation in Norway is insufficiently established. Most records are found dispersed through the vast body of taxonomic literature on lichenicolous fungi and in occasional reports on lichenological excursions and field trips (e.g., Alstrup et al. 2008, Hafellner 1993, Holien et al. 2016).

Lichenicolous fungi were previously studied in Norway in the Norwegian Biodiversity Information Centre (NBIC) funded project named *Three storied diversity (TSD) – mapping and barcoding crustose lichens and lichenicolous fungi in the Norwegian rainforests*. In this project, we focused on species occurring in highly oceanic forest communities along the Norwegian coastline.

The TSD project resulted in the discovery of 16 species of lichenicolous fungi new to Norway or Fennoscandia (Frisch et al. 2020), and a substantial amount of additional distribution data for a total of 87 species.

In the ongoing NBIC-funded project *Mapping Uncharted Diversity (MUD): a first comprehensive survey of lichenicolous fungi in Norway*, we monitor lichenicolous fungi throughout the country. We build on data obtained in the TSD project but extend our focus towards the mountains and less oceanic forest communities. Beside natural and semi-natural environments, we monitor suitable habitats in the agricultural and urban space including wooded pastures, old alley trees, and ancient stone-work and murals. Within this project, we performed fieldwork in three so called observatories (Fig. 1), each of about 2500 km² in Møre og Romsdal and Sør-Trøndelag (observatory 1), Nord-Trøndelag (observatory 2), and Nordland (observatory 3). Each observatory encompasses a wide variety of nature types from coastal to alpine, and includes a large proportion of calcareous habitats, which are known to hold a large number of interesting and often rare species.

In this report, we focus on species that are newly discovered for Norway or Fennoscandia, rarely reported, or otherwise interesting. In addition to our new collections, we include new species and interesting findings discovered in the lichen collections in Trondheim (TRH). Finally, we add new identifications from the material collected during the TSD project.

Material and Methods

This account is based on the investigation of about 1800 specimens collected in 2020 and 2021 in Møre og Romsdal, Sør-Trøndelag, Nord-Trøndelag, and Nordland. Additional about 4000 collections representing 172 lichen species in TRH have been screened for lichenicolous fungi and a few occurrences have been added from UPS.

The specimens have been identified using standard light microscopy and available reference literature. Type material has been studied for *Opegrapha geographicola*. TLC of lichen hosts has been performed following Orange et al. (2010). The procedures for the molecular data production and phylogenetic analyses followed Frisch & Holien (2018). A total of 59 DNA sequences of three loci (i.e., mtSSU, nrLSU, and *RPB2*) from seven genera and 22 species of Arthoniales were analyzed for the study of *Phacographa lapponica*, of which six sequences are new (Table 1).

Ecology and distribution in Norway are shortly presented for each species and comments on the identification of the Norwegian collections are given if necessary. The known world distribution of all species is summarized, but we did not aim at completeness in cited references of more common and widespread species. A species is accepted as new to Norway or Fennoscandia if it is not listed in the current Checklist of Fennoscandian lichen-forming and lichenicolous fungi (Westberg et al. 2021) or other published literature. In few cases, when supporting literature references could not be found for species listed for Norway in Westberg et al. (2021), we consulted *Virtuella Herbariet*, since many of these undocumented reports are based on collections preserved in UPS and other fungaria. The identification of these collections has not been verified by us.

Abbreviations:

- K: Color reaction in 10% aqueous KOH
- I: Color reaction in Lugol's iodine solution
- KI: Color reaction in Lugol's iodine solution after K pretreatment

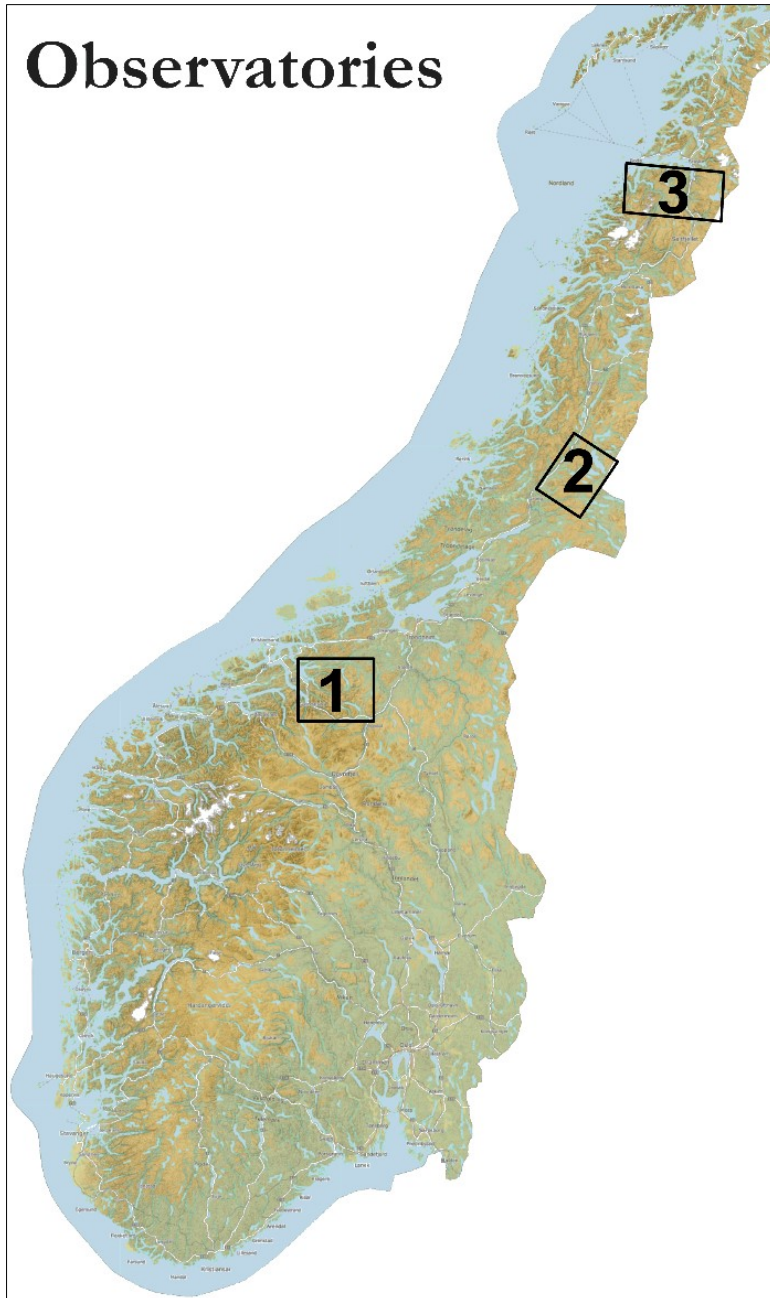


Figure 1. Observatories visited in the MUD project during the summer of 2021: 1. Sunndal – Oppdal – Surnadal, including Trollheimen and surroundings (Møre og Romsdal and Sør-Trøndelag), 2. Grong – Namsskogan – Lierne – Røyrvik, including parts of Blåfjella-Skjækerfjella NP (Nord-Trøndelag), 3. Beiarn – Bodø – Gildeskål – Saltdal, including parts of Saltfjellet-Svartisen and Junkerdal NPs (Nordland).

Table 1. Voucher information for the phylogenetic analysis of *Phacographa lapponica* and GenBank accession numbers. Sequences generated for this study are in bold.

Species	Voucher	mtSSU	nrLSU	RPB2
<i>Alyxoria ochrocheila</i>	Ertz 7519 (BR)	EU704072	EU704100	EU704036
<i>A. mougeotii</i>	L10058 (LD)	KJ851007	KJ851078	---
<i>A. varia</i>	Frisch 11/Se1 (UPS)	KJ851006	KJ851027	KJ851147
<i>Heterocyphelium leucampyx</i>	Van den Broeck 6326 (BR)	KY360242	---	KY360246
<i>H. triseptatum</i>	Ohmura 12401 (TNS)	MZ265289	MZ265286	---
<i>Lecanographa amylacea</i>	Thor 26176 (UPS)	KF707650	KF707639	---
<i>L. farinosa</i>	Ertz 14053 (BR)	KY360245	---	HQ454687
<i>L. uniseptata</i>	Ertz 9859 (BR)	MG845015	HQ454561	HQ454701
<i>Opegrapha brevis</i>	L10094 (LD)	KJ851005	KJ851077	KF707659
<i>O. celtidicola</i>	Diederich 16053 (BR)	EU704066	EU704094	EU704030
<i>O. lithyrga</i>	Ertz 8784 (BR)	EU704068	EU704096	EU704032
<i>O. vermicellifera</i>	Ertz 7562 (BR)	EU704077	EU704105	EU704041
<i>O. vulgata</i>	Ertz 7564 (BR)	EU704080	EU704108	EU704044
<i>Phacographa glaucomaria</i>	Frisch 11/Se33 (UPS)	KJ851022	KJ851028	KJ851136
<i>P. lapponica</i>	Frisch 18/No152 (TRH)	ON705014	ON705016	ON646187
<i>P. protoparmeliae</i>	Frisch 15/No57 (TRH)	MZ265287	MZ265285	MZ272017
<i>P. zwackhii</i> 1	Frisch 11/Se3 (UPS)	KJ851021	KJ851048	---
<i>P. zwackhii</i> 2	Frisch 18/No233dpl (TRH)	ON705015	ON705017	ON646188
<i>Plectocarpon lichenum</i>	Thor 26770 (UPS)	KJ850988	---	KJ851140
<i>P. nephromeum</i>	Nordin 5813 (UPS)	KJ851004	---	KJ851139
<i>P. scrobiculatae</i>	Frisch 15/No90 (TRH)	MZ265288	---	---
<i>Zwackhia soreidifera</i>	Thor 26210 (UPS)	KJ851024	KJ851055	KJ851142
<i>Z. viridis</i>	Ertz 7619 (BR)	EU704078	EU704106	EU704042

Results

Based on our microscopical investigations of ca 5800 specimens (incl. types), literature search, TLC, and molecular phylogenetic analysis (the latter only for the study of *Phacographa lapponica*), we report 31 species of lichenicolous fungi as new to Norway, 16 of which were not previously known from Fennoscandia.

The species new to Fennoscandia include: *Abrothallus bryoriarum* Hafellner, *Diplolaeviopsis symmictae* Diederich & Coppins, *Lasiosphaeriopsis supersparsa* (Zopf) Triebel, *Lecanora lasalliae* Pérez-Ortega & Etayo, *Lichenopeltella ramalinae* Etayo & Diederich, *Muellerella atricola* (Linds.) Sacc. & D. Sacc., *Opegrapha arthoniicola* Coppins & S.Y. Kondr., *Opegrapha geographicola* (Arnold) Hafellner, *Pronectria dillmaniae* Zhurb., *Protothelenella santessonii* H. Mayrhofer, *Sphaerellothecium atryneae* (Arnold) Roux & Triebel, *Sphaeropezia rhizocarpicola* (Zhurb., Diederich & Himelbr.) Baloch & Wedin, *Stigmidium cladoniicola* Zhurb. & Diederich, *Stigmidium exasperatum* Etayo, *Zwackhiomyces martinianus* (Arnold) Triebel & Grube, and *Zwackhiomyces physciicola* Alstrup.

The species new to Norway are: *Arthonia coronata* Etayo, *A. farinacea* (H. Olivier) R. Sant., *Didymocyrtis peltigerae* (Fuckel) Hafellner, *Niesslia cladoniicola* D. Hawksw. & W. Gams, *Phacopsis vulpicidae* Zhurb. & Diederich, *Polycoccum superficiale* D. Hawksw. & Miądl., *Pronectria leptaleae* (J. Steiner) Lowen, *P. xanthoriae* Lowen & Diederich, *Rhagadostoma brevisporum* (Nav.-Ros. & Hladun) Nav.-Ros., *Roselliniella nephromatis* (Crouan) Matzer & Hafellner, *Sphaeropezia thamnoliae* (Zhurb., Diederich & Etayo) Baloch & Wedin, *Tremella christiansenii* Diederich, *T. pertusariae* Diederich, *Unguiculariopsis groenlandiae* (Alstrup & D. Hawksw.) Etayo & Diederich, and *U. lettaui* (Grumann) Coppins.

Jointly, this represents an 8.7% increase in known species of lichenicolous fungi in Norway. In the following, we present the more detailed results on each of these (A) as well as new distribution data for 53 species of lichenicolous fungi (B).

A) Species new to Fennoscandia or Norway

Abrothallus bryoriarum Hafellner

Fig. 2

New to Fennoscandia. This species was found on moribund basal thalli of *Bryoria fremontii* and *Bryoria capillaris* growing in humid boreal spruce forests in Klæbu municipality (Sør-Trøndelag) and Lierne municipality (Nord-Trøndelag). *Abrothallus bryoriarum* is an apparently rare species that was previously known from scattered localities in the Alps and the U.S.A. (Hafellner 1994a, Gross et al. 2021, Zimmermann & Feusi 2018, GBIF 2022).

The two specimens from Lierne include numerous pycnidia adjacent to the apothecia of *A. bryoriarum* (Fig. 2). The pycnidia are sessile, black, glossy, and ca 50–60 µm in diam. Phialides or conidiospores have not been observed. It needs to be demonstrated whether or not these pycnidia represent the *Vouauxiomyces* anamorph of *A. bryoriarum* or another lichenicolous fungus. Numerous empty pycnidia were likewise reported from the type collection (Hafellner 1994a). All Norwegian collections are scanty and bear only a few apothecia.

Specimens examined: Sør-Trøndelag: Klæbu, Selbusjøen, 63.2581°N, 10.5836°E, 160 m, on *B. fremontii*, 27 Mar 1979, T. Tønberg 3638 (TRH-L-25090). Nord-Trøndelag: Lierne, Styggdalen, 64.7129°N, 13.5532°E, 369 m, on *B. capillaris*, 8 Jun 2021, A. Frisch 21/No159 (TRH-L-24826); *ibid.*, Havdalselva, 64.6382°N, 13.6777°E, 371 m, on *B. capillaris*, 6 Jun 2021, A. Frisch 21/No237 (TRH-L-24836).

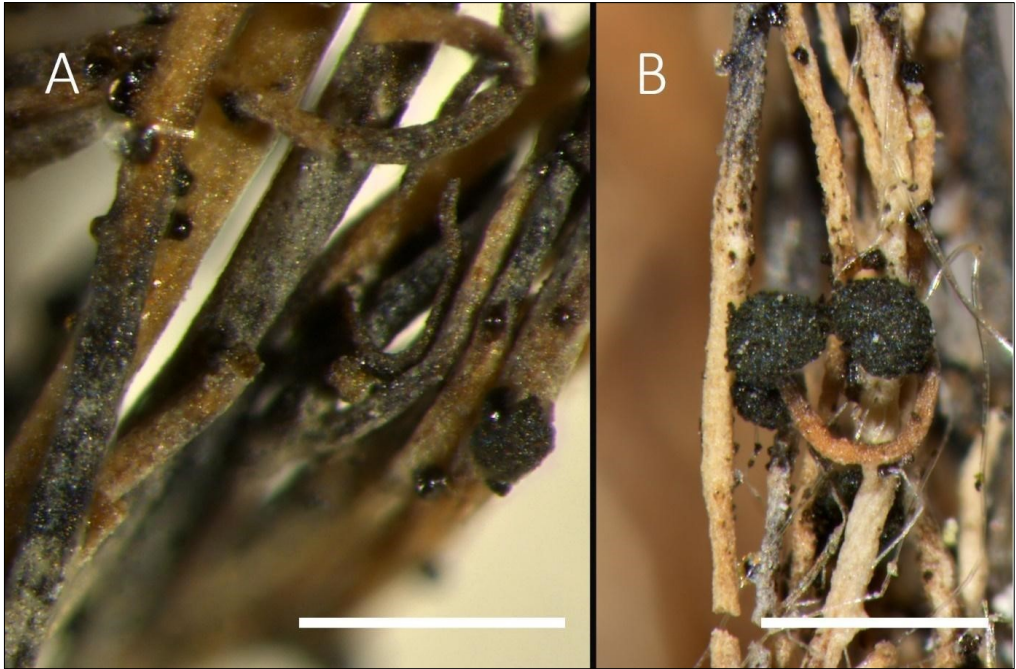


Figure 2. *Abrothallus bryoriarum* (on *Bryoria capillaris*). A. TRH-L-24836, B. TRH-L-24826. Scales: A, B = 0.5 mm. Photos: A. Frisch.

Arthonia coronata Etayo

New to Norway. This species was found on the sorediate podetia of *Cladonia ochrochlora* growing on stumps and snags of *Alnus incana*, *Betula pubescens*, and *Picea abies* in boreal spruce forest, mixed spruce-birch forest, and riverine alder forest from Rindal to Røyrvik municipalities (Sør- and Nord-Trøndelag). *Arthonia coronata* was originally described from the soralia of *Flavoparmelia caperata* in France and Spain (Etayo 1996), and is reported from the same host in Portugal (van den Boom & Giralt 2012). It was later discovered to be a widespread lichenicolous fungus on sorediate *Cladonia* spp. throughout Europe (e.g., Cannon et al. 2020, Łubek & Kukwa 2017, Roux et al. 2020, Svensson & Westberg 2010, Tsurykau et al. 2016, van den Boom 2013, Zhurbenko & Kobzeva 2016) and further reported from the Canary Islands (van den Boom & Ertz 2012), Canada, India (Joshi 2018), and the U.S.A. (Lendemer & Harris 2012, Zhurbenko & Pino-Bodas 2017).

Specimens examined (all on *Cladonia ochrochlora*): *Møre og Romsdal*: Sunndal, Viromdalen: Ålvundelva, 62.7433°N, 8.6632°E, 213 m, 28 Aug 2021, A. Frisch 21/No1397 (TRH-L-24879). *Sør-Trøndelag*: Melhus, Gammelvollmoen, 63.0924°N, 10.1910°E, 204 m, 14 May 2021, A. Frisch 21/No131 (TRH-L-24862); Orkland, Resdalen V, 62.9678°N, 9.7059°E, 249 m, 3 Aug 2021, A. Frisch 21/No1238 (TRH-L-23480); Rindal, Bulu, 63.0357°N, 9.2054°E, 139 m, 2 Sep 2021, A. Frisch 21/No995 (TRH-L-32996). *Nord-Trøndelag*: Røyrvik, Klumplia Høgda, 64.8378°N, 13.5881°E, 510 m, 4 Jun 2021, A. Frisch 21/No305 (TRH-L-24987).

Arthonia farinacea (H. Olivier) R. Sant.

Fig. 3

New to Norway. This species was found on the soralia of *Ramalina farinacea* growing on *Alnus incana* in ravine landscapes in Trondheim and Rindal municipalities (Sør-Trøndelag). In both



Figure 3. *Arthonia farinacea* (on *Ramalina farinacea*). TRH-L-32987. Scale = 1mm. Photo: A. Frisch.

localities, it grew in rather open, disturbed forests with *Alnus incana*, *Betula pubescens*, *Picea abies*, *Salix caprea*, *Sorbus aucuparia*, and other tree species. *Arthonia farinacea* is a widespread but seldom collected species in Europe (e.g., Marcos Laso 1993, Roux et al. 2020, Suija et al. 2005, Westberg et al. 2021) and the U.S.A. (Diederich 2003).

Specimens examined (all on *Ramalina farinacea*): *Sør-Trøndelag*: Rindal, Bulu, 63.0333°N, 9.2057°E, 194 m, 2 Sep 2021, A. Frisch 21/No937 (TRH-L-32981); Trondheim, Mælbudalen, 63.2851°N, 10.4703°E, 105 m, 15

Nov 2021, A. Frisch & V. Stormes Moen 20/No54 (TRH-L-23433); *ibid.*, 63.2848°N, 10.4703°E, 115 m, 5 May 2021, A. Frisch 21/No96 (TRH-L-32987).

***Didymocyrtis peltigerae* (Fuckel) Hafellner**

New to Norway. This species was found on *Peltigera rufescens* growing on calcareous boulders in open boreal birch forest in Røyrvik municipality (Nord-Trøndelag). *Didymocyrtis peltigerae* is a widely distributed species in Europe (e.g., Brackel 2014 and references therein, Rettig 2016, Roux et al. 2020, Stordeur et al. 2018, Suija 2005a, Tsurykau 2017, Westberg et al. 2021, Zhurbenko 2004) and further reported from Siberia (Zhurbenko 2012), Turkey (Halici et al. 2012), and the U.S.A. (Alstrup 2004).

Specimen examined: Nord-Trøndelag: Røyrvik, Renseleva: Marmorgrotta, 64.8869°N, 13.9156°E, 535 m, on *Peltigera rufescens*, 1 Jun 2021, A. Frisch, H. Holien & M.H. Kirkhus 21/No289 (TRH-L-24984).

***Diplolaeviopsis symmictae* Diederich & Coppins**

Fig. 4

New to Fennoscandia. This species was found in hymenia of *Lecanora symmicta* growing on dead, exposed branches of *Pinus sylvestris* in a calcareous pine forest in Bodø municipality (Nordland). *Diplolaeviopsis symmictae* is a seldom collected species being further known from Scotland (Diederich & Coppins 2014), the U.S.A. (Diederich & Coppins 2014, Haldeman 2019), and possibly Ukraine (Darmostuk et al. 2020).

The small specimen from Norway lacks apothecia. The immersed to semi-immersed, subglobose pycnidia are 65–95 µm in diam. (N = 4); the pycnidial wall is brownish olive in section, K–, 8–12 µm wide, and composed of 2–3 layers of pseudoparenchymatous cells. The conidiogenous cells are (5–)5.1–6.5(–7) × (2–)2.4–2.9(–3) µm (n=15; length: mean = 5.8, SD = 0.70; width: mean = 2.7, SD = 0.31), the conidia are (7–)7.6–9.0(–10) × (2.5–)2.9–3.3(–3.5) µm (n=30; length: mean = 24.21, SD = 1.74; width: mean = 8.18, SD = 0.48).

The pycnidia are distinctly smaller and the pycnidial walls are thinner than reported for the type: pycnidia 100–160 µm large, with walls 8–20 µm thick, composed of 2–6 layers of pseudoparenchymatous cells (Diederich & Coppins 2014). Otherwise, the specimen from Norway agrees well with the description of the species. Pycnidial dimensions agree with a specimen reported as *D. cf. symmictae* from Ukraine, which differs in the aeruginose pigmentation of the pycnidial wall that turns olive brown in K (Darmostuk et al. 2020).

Specimen examined: Nordland: Bodø, Grugglia, 67.1931°N, 14.6439°E, 30 m, on *Lecanora symmicta*, 19 Jul 2021, J. Klepsland & A. Frisch 21/No1687 (TRH-L-24947).

***Lasiosphaeriopsis supersparsa* (Zopf) Triebel**

Fig. 5

New to Fennoscandia. This species was found on the thallus of *Porpidia tuberculosa* growing on exposed iron-rich rocks in alpine meadows and alpine heath in Beiarn and Bodø municipalities (Nordland). *Lasiosphaeriopsis supersparsa* was previously known only from the type locality in northern Italy (Triebel 1989).

Few perithecia with well-developed hymenia have been seen in the investigated material. The specimens from Norway have somewhat longer ascospores than reported for the type collection (20–28 × 8–11 µm (n=10) vs. (19–)20–23(–24) × (8.5–)9–10.5(–11) µm). Otherwise, they agree well with the detailed description of the species (Triebel 1989). Host of the type collection is the slightly calciphilous *Porpidia zeoroides*.

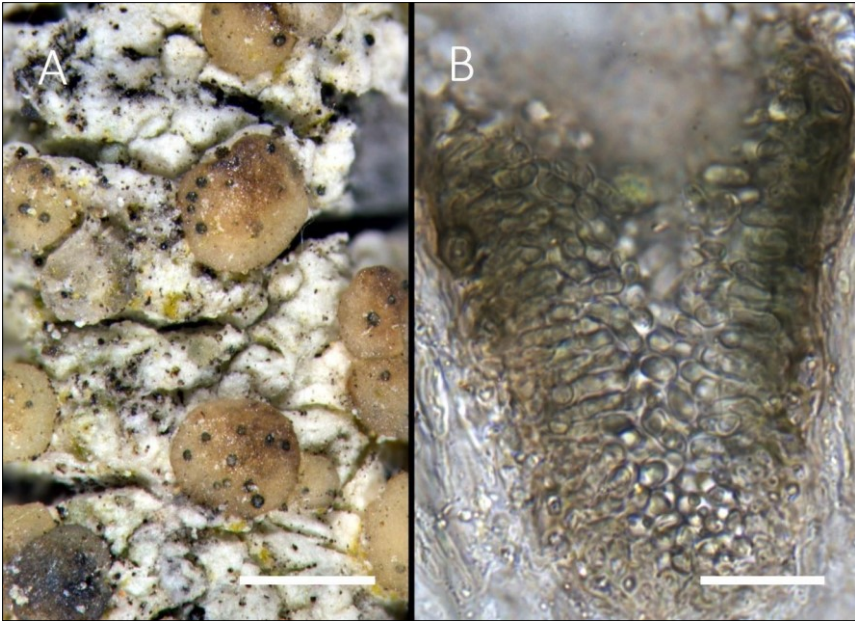


Figure 4. *Diplolaeviopsis symmictae* (on *Lecanora symmicta*). TRH-L-24947. A. Habitus, B. Section through pycnidium. Scales: A = 0.25 mm, B = 20 μ m. Photos: A. Frisch.

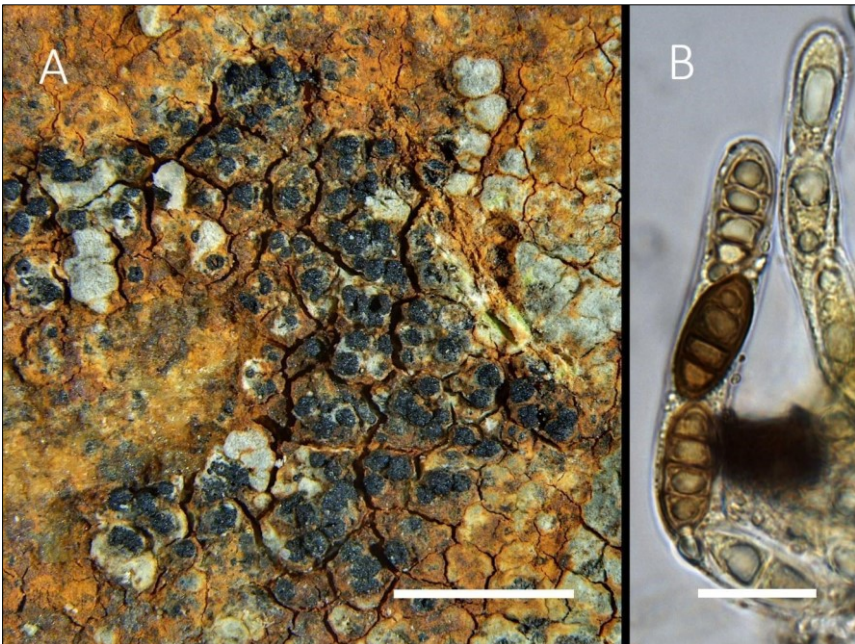


Figure 5. *Lasiophaeriopsis supersparsa* (on *Porpidia tuberculosa*). TRH-L-24907. A. Habitus, B. Ascus with spores. Scales: A = 2 mm, B = 20 μ m. Photos: A. Frisch.

Specimens examined (all on Porpidia tuberculosa): Nordland: Beiarn, Sokumdalen S, 66.9284°N, 14.3714°E, 497 m, 21 Jul 2021, A. Frisch & J. Klepsland 21/No1528 (TRH-L-24907); Bodø, Kvernelvvatnet N, 67.0258°N, 14.9272°E, 605 m, 22 Jul 2021, A. Frisch & J. Klepsland 21/No1539 (TRH-L-24910).

***Lecanora lasalliae* Pérez-Ortega & Etayo**

Fig. 6

New to Fennoscandia. This species was discovered in collections of *Lasallia pustulata* from Larvik, Vestfold, and Herøy municipalities (Nordland) in TRH. In the Herøy locality, it was collected in coastal *Calluna* heath. *Lecanora lasalliae* was previously known from northern Spain (Pérez-Ortega & Etayo 2008). The specimens from Norway agree well with the detailed description and illustration provided in the protologue (Pérez-Ortega & Etayo 2008).

Specimens examined (all on Lasallia pustulata): Vestfold: Larvik, Frederiksværn, 26 Oct 1877, J.M. Norman s.n. (TRH-L-35707, 35708). *Nordland.* Herøy, Indre Øksningan, 65.9860°N, 12.2191°E, ca 20 m, 15 Jul 1990, T. Prestø s.n. (TRH-L-651858).

***Lichenopeltella ramalinae* Etayo & Diederich**

Fig. 7

New to Fennoscandia. This species was found on *Ramalina farinacea* growing on *Alnus incana* in riverine alder forest in Sunndal municipality (Møre og Romsdal) and in boreal rainforest in Grong municipality (Nord-Trøndelag). *Lichenopeltella ramalinae* is a widespread but seldom collected species in Europe (e.g., Hawksworth 2003, Roux et al. 2020, Suija 2005a, van den Boom & Etayo 2000) and further reported from eastern Siberia (Zhurbenko 2007b), the Canary Islands (Etayo 1996), Papua New Guinea (Aptroot et al. 1997), Bolivia (Flakus & Kukwa 2012), and Ecuador (Etayo 2017).

Specimens examined (all on Ramalina farinacea): Møre og Romsdal: Sunndal, Grøa: Knutsløyen, 62.6422°N, 8.7542°E, 52 m, 29 Aug 2021, A. Frisch 21/No944 (TRH-L-32983). *Nord-Trøndelag:* Grong, Fiskumfoss, 64.5426°N, 12.4606°E, 35 m, 9 Jun 2021, A. Frisch 21/No527 (TRH-L-32920).

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

Fig. 8

New to Fennoscandia. This species was found on the thallus and apothecia of *Tephromela atra* growing on calcareous boulders and rocks in alpine heath, boreal deciduous forest, and coastal shoreline in Oppdal municipality (Sør-Trøndelag) and Bodø, Fauske, and Saltdal municipalities (Nordland). *Muellerella atricola* has previously not been distinguished from *M. lichenicola* (Sommerf.: Fr.) D. Hawksw. in Fennoscandia. It is a widespread but seldom reported species in Europe (e.g., Brackel 2008, Hafellner 2007, van den Boom & Giralt 2012) and further known from Madeira (Hafellner 2007), Siberia (Zhurbenko 2009), and Svalbard (Zhurbenko & Brackel 2013).

The genus *Muellerella* needs a critical revision. Here, we follow Hafellner (2007) who accepts *Muellerella* populations growing on *Tephromela atra* as distinct from *M. lichenicola*. *Muellerella atricola* agrees in ascospore number with *M. lichenicola* (ca 100/ascus), but ascoma size and ascospore dimensions are intermediate between *M. lichenicola* and *M. erratica* (A. Massal.) Hafellner & V. John. Perithecia of *M. atricola* in Norway are 150–220 µm diam., slightly larger than reported in the literature (150–200 µm; Hafellner 2007). Ascospores are medium brown and rather variable in size, 4–7(–8) × 3–3.5(–4) µm, as compared to 6–7.5 × 3–4 µm (Hafellner 2007). A recent phylogenetic study of *Muellerella* shows that accessions of *Muellerella atricola* and its “*Lichenodiplis lecanorae*” anamorph form a well-supported lineage within the genus together with, but distinct from, accessions of *M. lichenicola* and its “*Lichenodiplis lecanorae*” anamorph (Muggia et al. 2019).



Figure 6. *Lecanora lasalliae* (on *Lasallia pustulata*). TRH-L-35707. Scale = 2 mm. Photo: A. Frisch.



Figure 7. *Lichenopeltella ramalinae* (on *Ramalina farinacea*). TRH-L-32983. Scale = 1 mm. Photo: A. Frisch.

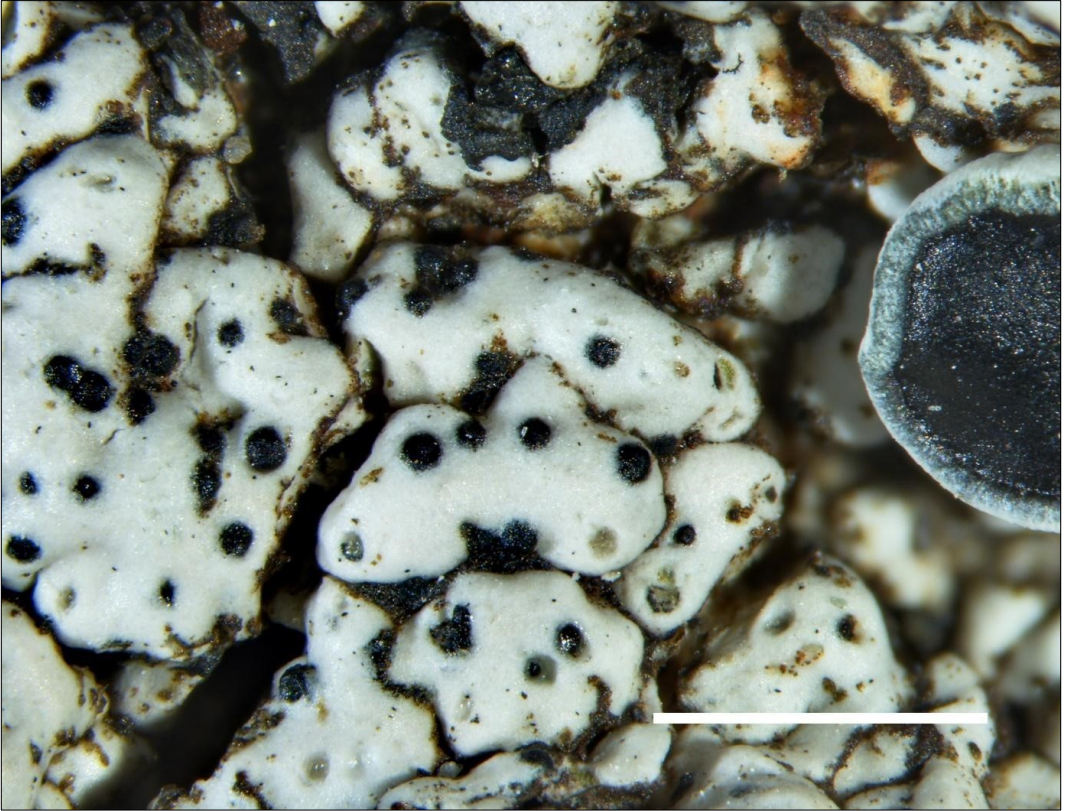


Figure 8. *Muellerella atricola* (on *Tephromela atra*). TRH-L-24890. Scale = 2 mm. Photo: A. Frisch.

Specimens examined (all on *Tephromela atra*): *Sør-Trøndelag*: Oppdal, Brattskarven, 62.7125°N, 9.6383°E, 1174 m, 31 Aug 2021, A. Frisch 21/No1443 (TRH-L-24890). *Nordland*: Bodø, Straumøya: Seivåg NV, 67.2331°N, 14.4718°E, 9 m, 15 Jul 2021, A. Frisch & J. Klepsland 21/No1471 (TRH-L-24898); *ibid.*, 67.2331°N, 14.4733°E, 14 m, 15 Jul 2021, J. Klepsland & A. Frisch 21/No1663 (TRH-L-24945); Fauske, Annavatnet, 67.0833°N, 15.9924°E, 662 m, 28 Jul 2021, A. Frisch 21/No788 (TRH-L-32957); Saltdal, Junkerdalen, 66.8150°N, 15.4181°E, 118 m, 12 Jul 2021, J. Klepsland & A. Frisch 21/No1736 (TRH-L-24958).

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

New to Norway. This species was found on squamules and podetia of *Cladonia pyxidata* growing on a *Sorbus aucuparia* log in dense, boulder-rich, boreal deciduous forest in Orkland municipality (Sør-Trøndelag). *Niesslia cladoniicola* is a widely distributed species in the Northern Hemisphere (e.g., Brackel 2014 and references therein, Hafellner & Mayrhofer 2020, Roux et al. 2020, Westberg et al. 2021, Zhurbenko & Brackel 2013, Zhurbenko & Kobzeva 2016, Zhurbenko & Pino-Bodas 2017, Zimmermann & Berger 2018) and further reported from Antarctica (Alstrup & Cole 1998), Argentina (Zhurbenko & Pino-Bodas 2017), Chile (Etayo & Sancho 2008), and New Zealand (Zhurbenko & Pino-Bodas 2017).

Our specimen is scanty but agrees well with the detailed description of the species provided in Zhurbenko & Pino-Bodas (2017). The adnate perithecia are 80–120 µm large, with numerous spines

that are 19–38 μm long and 4–5 μm wide below, with inflated base up to 8 μm wide. The 8-spored, subcylindrical asci are 42–45 \times 4.5–5.5 μm ($n=5$). The hyaline, thin-walled ascospores are fusiform to narrow ellipsoid and occasionally slightly curved, 1-septate, and 7–9 \times 2–2.2(–2.5) μm ($n=15$). Slightly smaller dimensions for asci (25–30 \times 3.5–4 μm) and ascospores (4.5–8 \times 1.5–2 μm) are reported for the holotype specimen collected from *Cladonia rangiferina* in Wales (Gams et al. 2019, Hawksworth 1975).

Specimen examined: Sør-Trøndelag: Orkland, Osplihaugen, 63.0537°N, 9.6469°E, 140 m, on *Cladonia pyxidata*, 3 Aug 2021, A. Frisch 21/No1254 (TRH-L-23479).

***Opegrapha arthoniicola* Coppins & S.Y. Kondr.**

Fig. 9

New to Fennoscandia. This species was found on *Arthonia radiata* growing in an oceanic, hazel-dominated deciduous forest in Surnadal municipality (Møre og Romsdal). It was accompanied by *Stigmidium arthoniae*, *Vouauxiella lichenicola* (on *Lecanora* cf. *chlarotera*) and *Opegrapha pertusariicola* (on *Pertusaria leioplaca*). *Opegrapha arthoniicola* was long recognized from the British Isles but only recently described (Coppins et al. 2021).

Specimen examined: Møre og Romsdal: Surnadal, Soløyneset, 62.9507°N, 8.4242°E, 5 m, on *Arthonia radiata*, 3 Sep 2021, A. Frisch 21/No1403 (TRH-L-24880).

***Opegrapha geographicola* (Arnold) Hafellner**

Fig. 10

New to Fennoscandia. This species was found on the thallus of *Rhizocarpon geographicum* growing in rocky outcrops in calcareous alpine heath in Beiarn and Bodø municipalities (Nordland). *Opegrapha geographicola* is a widespread but seldom collected species in the Holarctic, being reported from Alaska (Dillman et al. 2012), Austria (Arnold 1896, Hafellner 1994a, 2010), Greenland (Alstrup & Hawksworth 1990), New Zealand (Hafellner & Mayrhofer 2007), Poland (Kukwa & Flakus 2009), Siberia (Zhurbenko 2009, Zhurbenko et al. 2016), and Spain (Etayo 2010a).

Arnold (1896) mentions two numbers of his *Lichenes exsiccati* when describing *Phaeospora geographicola*. The primary collection, no. 1670, is here selected as lectotype: Austria, Tirol. Parasitisch auf *Rhizocarpon geographicum* auf Glimmersteinen der ehemaligen Knappenhütte ober den Albon-Seen ober St. Christoph auf dem Arlberg, 5 Sep 1895, F. Arnold s.n. (Arnold, Lich. exs. no. 1670; M-0042626!, lectotype—here selected). *Phaeospora geographicola* is further present in the holotype of *Stigmidium gyrophorarum* (Arnold) D. Hawksw., Lich. exs. no. 1669 (M-0043665!), cited in the protologue.

The Norwegian collections agree well with the investigated type material. We provide a short description based on the type material and the Norwegian collections since published information on the species has been conflicting, in particular with respect to ascospore characters (Arnold 1896, Saccardo & Saccardo 1905, Wieczorek 2018). The only detailed description available for *O. geographicola* is based on a specimen growing on *Rhizocarpon badioatrum* in Poland (Wieczorek 2018) which, judged from the detailed description and illustration provided in the cited literature, differs in a lower hymenium and hypothecium, and 2–3-septate ascospores with more rounded ends, lacking both constrictions at the septa and an ornamented perispore.

Description: Apothecia rounded to short elliptical, immersed singly or in small groups of 2–3 in the host areoles, dark brown, 0.25–0.35 mm wide, the rim low and ca 0.03–0.04 mm wide; exciple dark olive-brown, continuous at base, 60–70 μm laterally, up to 40–60 μm below the hymenium; epihymenium pale brownish olive, ca 30–35 μm ; hymenium 80–100 μm , hyaline to pale olive brown,

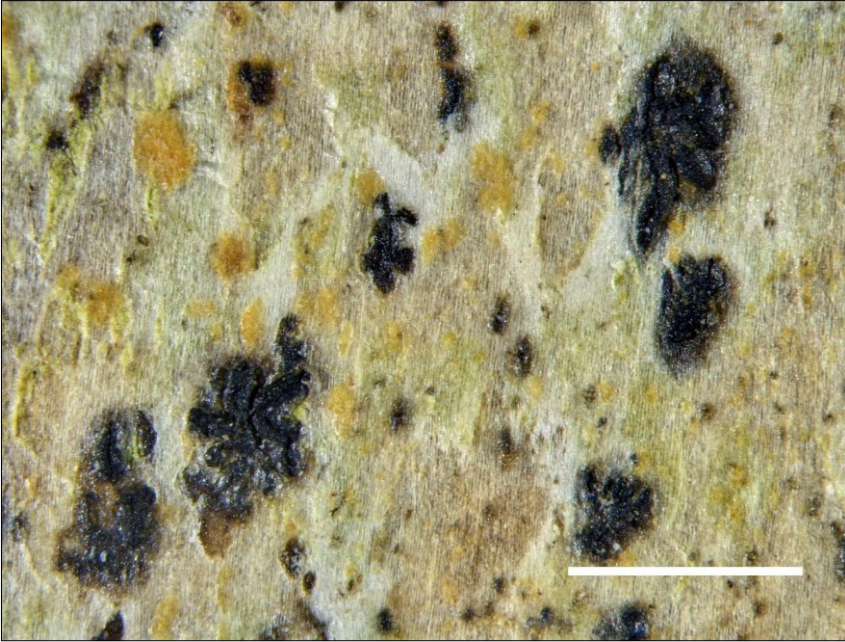


Figure 9. *Opegrapha arthoniicola* (on *Arthonia radiata*). TRH-L-24880. Scale = 2 mm. Photo: A. Frisch.



Figure 10. *Opegrapha geographicola* (on *Rhizocarpon geographicum*). TRH-L-24906. A. Habitus, B. Ascus with semi-mature ascospores. Scale: A = 2 mm, B = 20 μ m. Photos: A. Frisch.

I+ blue turning red, KI+ blue; subhymenium 35–40 µm, unpigmented; paraphyses 2.5–3.5 µm wide, with ca 0.5 µm thick walls, the tips widened to 3–5 µm and occasionally with dark brown pigment caps. Asci clavate, 60–80 × 17–22 µm, a tiny KI+ blue ring observed. Ascospores (6–)8/ascus, 3-septate, medium to dark brown, narrow elliptical with rounded to subacute ends, constricted at the septa, with strong ornamentation of dark brown warts, (21–)22.5–26.0(–27) × (7.5–)7.7–8.7(–9) µm (n=31; length: mean = 24.21, SD = 1.74; width: mean = 8.18, SD = 0.48); young ascospores with up to 2 µm wide hyaline perispore. Apothecial pigments unchanged in K.

Specimens examined (all on Rhizocarpon geographicum): Nordland: Beiarn, Beiarskardvatnet SØ, 67.0325°N, 14.9031°E, 675 m, 22 Jul 2021, J. Klepsland & A. Frisch 21/No1619 (TRH-L-24936); Bodø, Skjevlfjellet N, 67.0119°N, 15.1283°E, 686 m, 14 Jul 2021, A. Frisch & J. Klepsland 21/No1480, 21/No1488, 21/No1491 (TRH-L-24902, 24904, 24906).

Phacopsis vulpicidae Zhurb. & Diederich

Fig. 11

New to Norway. This recently described species (Zhurbenko et al. 2019) is widespread in Norway, with collections seen from Vestfold to Finnmark. It appears to be rather common in calcareous alpine environments, both on stems of *Juniperus communis* and on the ground. It has further been collected in open boreal birch, spruce, and pine dominated forest communities. Many of the specimens are rather scanty, but easily identifiable by the ± numerous brownish, convex patches along the lobe margins or on gall-like swellings of the host lichen. *Phacopsis vulpicidae* is widely distributed in the northern Hemisphere, being known from Mongolia, Russia, the U.S.A. (Alaska), and Sweden (Zhurbenko et al. 2019).

Specimens examined (all on Vulpicida juniperina): Vestfold: Larvik, Ulleberg, s.d., J. Norman s.n. (TRH-L-46786). *Hedmark:* Tynset, Østerdalen, 14 Aug 1910, B. Lynges s.n. (TRH-L-46777). *Møre og Romsdal:* Rindal, NØ for Steinkjerka, 63.0690°N, 9.3661°E, 660 m, 17 May 1984, B. Wilmann s.n. (TRH-L-650157). *Sør-Trøndelag:* Oppdal, N for Gåvålvatnet, 62.2782°N, 9.6262°E, 25 Jun 1972, A.A. Frisvoll s.n. (TRH-L-651146); *ibid.*, Kongsvold, 62.3052°N, 9.6075°E, 900–940 m, 9 Aug 1980, H. Holien 516-80 (TRH-L-4630); *ibid.*, Toppen N. Knutshø, 62.3245°N, 9.6561°E, 4 Jul 1971, A.A. Frisvoll s.n. (TRH-L-651153); *ibid.*, 2 km nord for Drivstua st., 62.4414°N, 9.6103°E, 2 Apr 1971, K.I. Flatberg & A.A. Frisvoll s.n. (TRH-L-651144); Trondheim, sør for Loholt, 18 Oct 1931, O.A. Hoeg s.n. (TRH-L-46804); *ibid.*, Theissendammen, 27 Dec. 1936, O.A. Hoeg s.n. (TRH-L-46805). *Nord-Trøndelag:* Meråker, Steinfjellet, 63.3199°N, 12.0118°E, 860 m, 29 Aug 2013, T. Prestø s.n. (TRH-L-651945); Namdalseid, N of Holstad, 64.2011°N, 11.2346°E, 80 m, 4 Aug 1981, H. Holien 736-81 (TRH-L-7963); Røyrvik, Renselelva: Marmorgrotta, 64.8891°N, 13.9286°E, 482 m, 1 Jun 2021, A. Frisch, H. Holien & M.H. Kirkhus 21/No161 (TRH-L-24932); *ibid.*, Stormyrfjellet, 64.8946°N, 13.8899°E, 823 m, 5 June 2021, A. Frisch 21/No227 (TRH-L-24972); *ibid.*, Stormyrfjellet, 64.8950°N, 13.8923°E, 835 m, 5 June 2021, A. Frisch 21/No265 (TRH-L-24980); *ibid.*, Stormyrfjellet, 64.8951°N, 13.8958°E, 830 m, 5 June 2021, A. Frisch 21/No569 (TRH-L-32961); Snåsa, Bergsåsen, 1966, E.M. Lauritzen s.n. (TRH-L-46806); *ibid.*, Grønningseidet, 64.0866°E 12.8636°E, 480 m, 29 Mar 2007, H. Holien 11173 (TRH-L-11976); *ibid.*, Reinshorntjønna, 64.0104°N, 12.4044°E, 560 m, 1 Jul 2009, H. Holien 12230 (TRH-L-13172); *ibid.*, Bergsåsen nature reserve, 64.2518°N, 12.4295°E, 190 m, 4 Jun 2015, H. Holien 14688 (TRH-L-16588). *Nordland:* Bodø, Skjevlfjellet N, 67.0139°N, 15.1298°E, 660 m, 14 Jul 2021, A. Frisch & J. Klepsland 21/No1174 (TRH-L-23465); Hattfjelldal, NE of Simskarvatn, 65.2817°N, 13.8748°E, 910 m, 1 Aug 1974, T. Tønsberg s.n. (TRH-L-46815); Meløy, Høyde 787 nord for Stor-Glomvann, 2 Aug 1949, O. Gjærevoll s.n. (TRH-L-46812); Rana, nær Kjeldelvas dal, 66.6320°N, 15.0282°E, 760 m, 16 Jul 1976, E.I. Aune & O. Kjærem s.n. (TRH-L-46811); Vefsn, N of Vefsn: Honggardsåsen, 65.8553°N, 13.2833°E, 140 m, 22 May 2003, H. Holien 9389 (TRH-L-9660). *Troms:* Balsfjord, Storstennæs, s.d., J.M. Lynges s.n. (TRH-L-46817). *Finnmark:* Kautokeino, Virdne'javrrre, 69.5606°N, 23.7589°E, 3 Aug 1983, S. Sivertsen s.n. (TRH-L-40184); Karasjok, juxta flumen Karasjok Finmarkiae ad Norojokgortsje, s.d., J. Norman s.n. (TRH-L-46821).

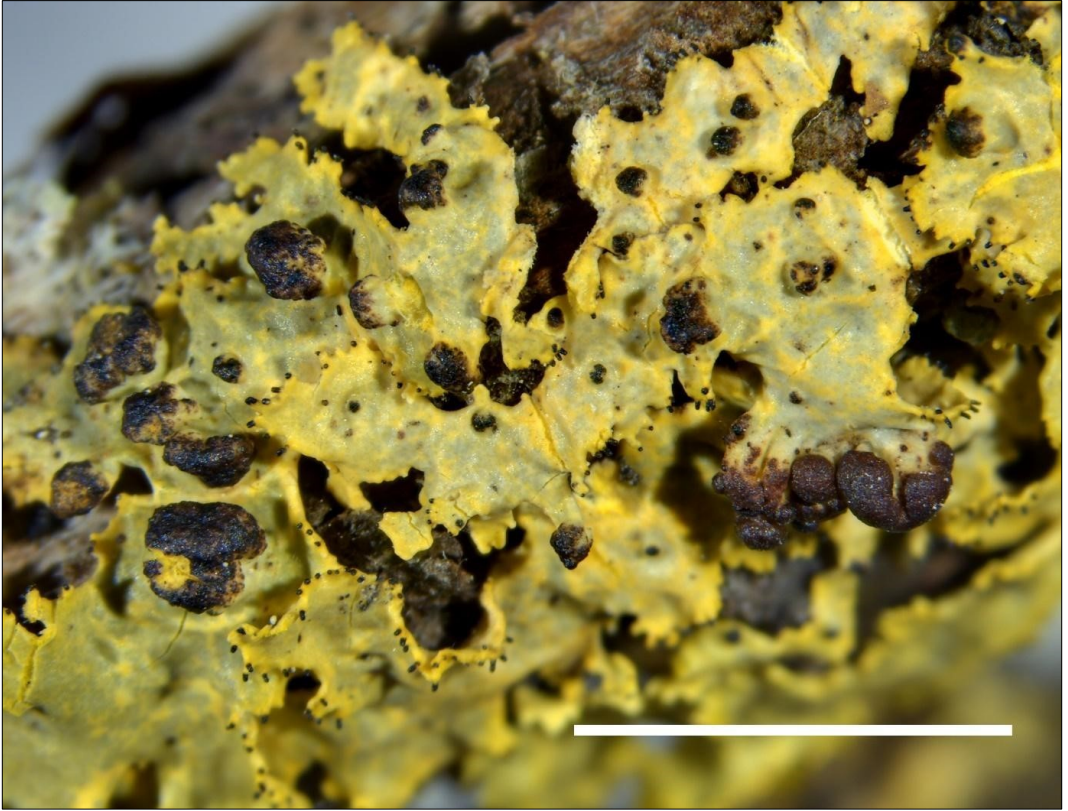


Figure 11. *Phacopsis vulpicidae* (on *Vulpicida juniperina*). TRH-L-24932. Scale = 5 mm. Photo: A. Frisch.

***Polycoccum superficiale* D. Hawksw. & Miądl.**

Fig. 12

New to Norway. This species was found on *Peltigera canina* coll. and *P. britannica* growing on semi-shaded to shaded rock walls and boulders in humid boreal forests in Sokndal municipality (Rogaland), Indre Fosen municipality (Sør-Trøndelag), and Inderøy and Namsos municipalities (Nord-Trøndelag). *Polycoccum superficiale* is widely distributed in Europe (Hawksworth & Miadlikowska 1997, Motiejūnaitė et al. 2005, Puolasmaa et al. 2012, Westberg et al. 2021) and further reported from Siberia (Zhurbenko & Vershinina 2014).

Specimens examined: Rogaland: Sokndal, Skåras, 58.3401°N, 6.2643°E, 120 m, on *Peltigera* sp., 14 Jul 2017, A. Frisch 17/No61 (TRH-L-23426). Sør-Trøndelag: Indre Fosen, Vanvikan, 63.5578°N, 10.2278°E, 60–100 m, on *P. britannica*, 5 May 1981, H. Holien 61-81 (TRH-L-9134). Nord-Trøndelag: Flatanger, between Stigodden and Innervika, 64.5535°N, 11.0756°E, 40–60 m, on *P. britannica*, 22 Sep 1980, H. Holien 930-80 (TRH-L-9131); Inderøy, Langdalsvatnet, 63.8860°N, 10.9316°E, on *P. britannica*, 90 m, 27 Jun 2000, T. Prestø s.n. (TRH-L-652239); Namsos, Valhaugen, 64.5200°N, 11.1117°E, 40 m, on *P. britannica*, 18 Sep 2002, H. Holien 9274 (TRH-L-7477).

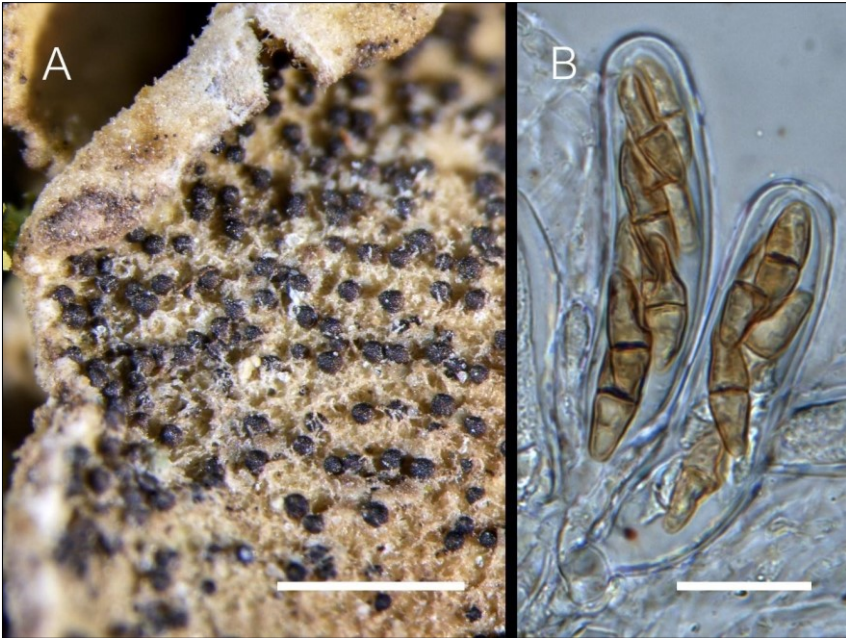


Figure 12. *Polycoccum superficiale* (on *Peltigera britannica*). TRH-L-9131. A. Habitus. B. Asci with ascospores. Scale: A = 2 mm, B = 20 μ m. Photos: A. Frisch.

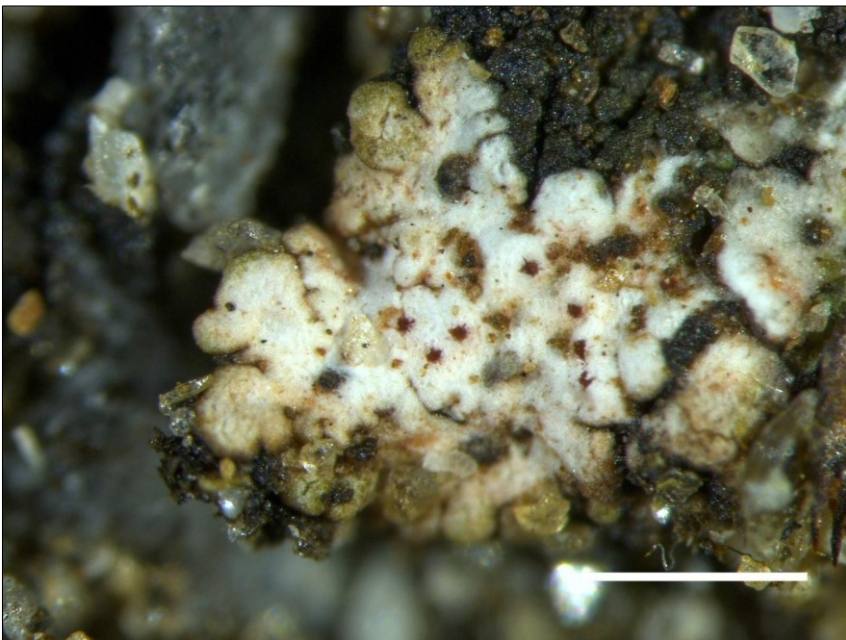


Figure 13. *Pronectria dillmaniae* (on *Catapyrenium cinereum*). TRH-L-32972. Scale = 2 mm. Photo: A. Frisch.

Pronectria dillmaniae* Zhurb.*Fig. 13**

New to Fennoscandia. This species was found on *Catapyrenium cinereum* growing in calcareous alpine heath in Gildeskål municipality (Nordland). *Pronectria dillmaniae* was previously known from two nearby localities in Alaska (Zhurbenko et al. 2005) and tentatively reported on a specimen growing on *Placidium squamulosum* from Ukraine (Khodosovtsev & Darmostuk 2017).

The Norwegian collection agrees well with the description of the species, including the small, broad elliptical ascospores $9\text{--}11 \times 5\text{--}6 \mu\text{m}$ being 1-seriate in the asci, cylindrical asci of $65\text{--}70 \times 6\text{--}9 \mu\text{m}$, and K-negative, up to $200 \mu\text{m}$ wide perithecia that are fully immersed in the host thalli.

Specimen examined: Nordland: Gildeskål, Sandhornøya: Djupdalen-Vågaksla, 67.1213°N , 14.0640°E , 155 m, on *Catapyrenium cinereum*, 17 Jul 2021, A. Frisch & J. Klepsland 21/No886 (TRH-L-32972).

***Pronectria leptaleae* (J. Steiner) Lowen**

New to Norway. This species was discovered on the apothecia (hymenium) of a specimen of *Physcia aipolia* preserved in TRH, collected from an aspen tree in Hamarøy municipality (Nordland). *Pronectria leptaleae* is a widely distributed but not often reported species on *P. aipolia*, *P. leptalea*, and *P. stellaris* across Europe (e.g., Berger et al. 2020, Brackel 2014 and references therein, Roux et al. 2020, Westberg et al. 2021). According to Berger et al. (2020), previous literature records refer to several *Pronectria* and *Xenonectriella* species, but records with ascomata in apothecial discs of the host lichens are likely to be correct.

Specimen examined: Nordland: Hamarøy, Hellemobotn, on *Physcia aipolia*, 18 Aug 1978, A. Elvebakk s.n. (TRH-L-21862).

Pronectria xanthoriae* Lowen & Diederich*Fig. 14**

New to Norway. This species was found on *Xanthoria parietina* growing on *Populus tremula* roadside trees in Melhus municipality (Sør-Trøndelag). *Pronectria xanthoriae* is a widely distributed but not often reported species throughout Europe (e.g., Brackel 2014 and references therein, Darmostuk et al. 2018, Motiejūnaitė 2002, Roux et al. 2020, Westberg et al. 2021) and Turkey (Halici et al. 2009).

Specimen examined (on Xanthoria parietina): Sør-Trøndelag: Melhus, Hovin, 63.1042°N , 10.2163°E , 99 m, 15 May 2021, A. Frisch 21/No126 (TRH-L-23485).

Protothelenella santessonii* H. Mayrhofer*Fig. 15**

New to Fennoscandia. This species was found on basal squamules and podetia of *Cladonia* cf. *macrophyllodes* and *Cladonia* sp. growing in calcareous alpine heath and a subalpine boulder field in Beiarn municipality, and on a shady rock wall in Meløy municipality (Nordland). *Protothelenella santessonii* is a widely distributed but not often reported species in the Holarctic (Alstrup 1995, Berger 1996, Berger & Zimmermann 2021, Brackel 2010 and references therein, Hafellner & Türk 1995, Zhurbenko 2004, Zhurbenko & Alstrup 2004, Zhurbenko & Pino-Bodas 2017).

The Norwegian collections agree well with the available descriptions for this species (Mayrhofer 1987, Zhurbenko & Alstrup 2004). The ascospores are ellipsoid to lemon-shaped, appendiculate in one end, $19\text{--}28 \times 8\text{--}10 \mu\text{m}$ in size, and muriform with 5 transverse septa and 1 longitudinal septum in the central locules.

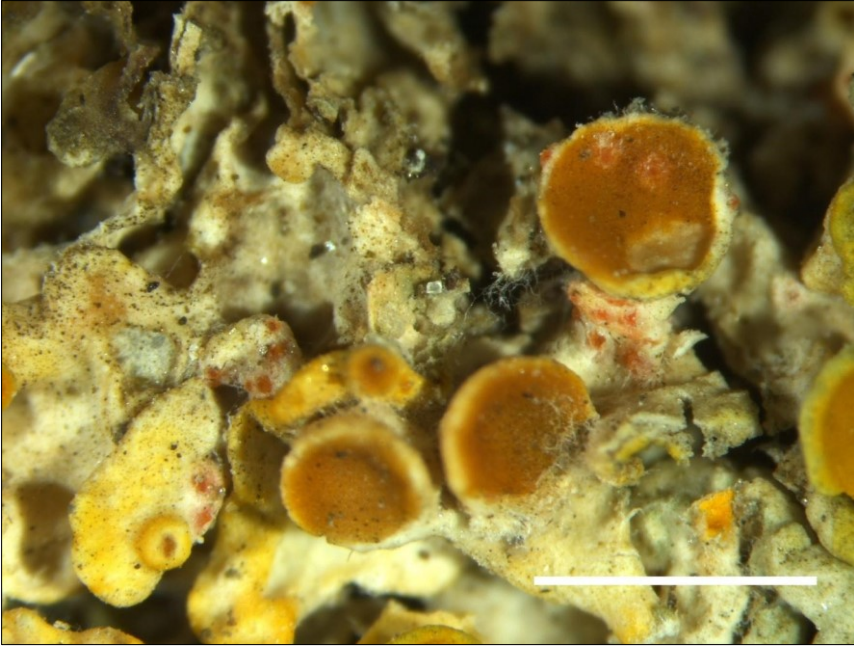


Figure 14. *Pronectria xanthoriae* (on *Xanthoria parietina*). TRH-L-23485. Scale = 2 mm. Photo: A. Frisch.

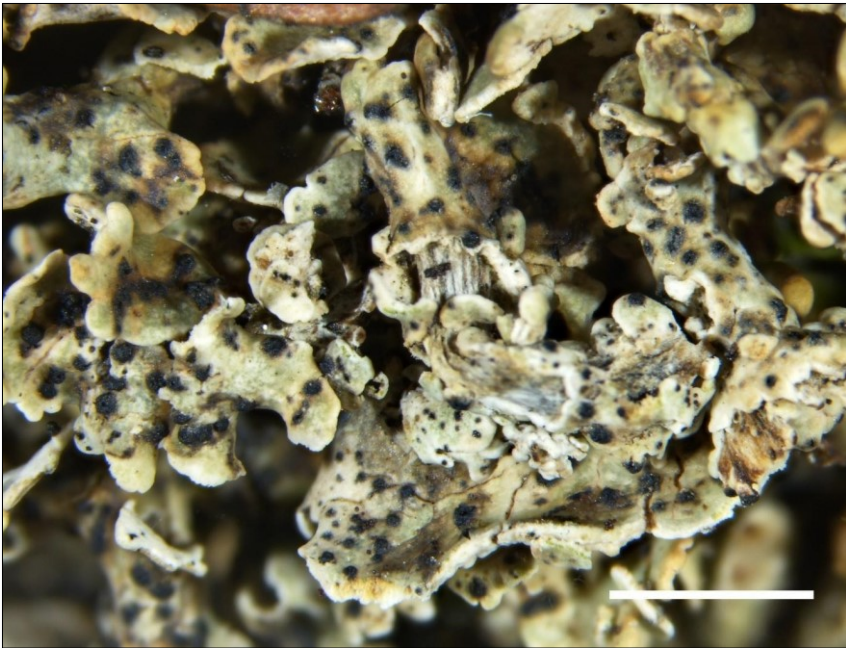


Figure 15. *Protothelenella santessonii* (on *Cladonia cf. macrophyllodes*). TRH-L-24921. Scale = 2 mm. Photo: A. Frisch.

Specimens examined: Nordland: Beiarn, Sokumdalen SV, 66.9345°N, 14.3334°E, 604 m, on *Cladonia* sp., 21 Jul 2021, A. Frisch & J. Klepsland 21/No1573 (TRH-L-24919); *ibid.*, on *Cladonia* cf. *macrophyllodes*, 21 Jul 2021, A. Frisch & J. Klepsland 21/No1582 (TRH-L-24921); *ibid.*, 66.9303°N, 14.3528°E, 495 m, on *Cladonia* sp., 21 Jul 2021, J. Klepsland & A. Frisch 21/No1758 (TRH-L-24960); Meløy, Kunna, 66.9395°N, 13.4981°E, 53 m, on *Cladonia* sp., 16 Jul 2021, A. Frisch & J. Klepsland 21/No1109 (TRH-L-23455).

***Rhagadostoma brevisporum* (Nav.-Ros. & Hladun) Nav.-Ros.**

New to Norway. This species was found on *Peltigera rufescens* growing on a mossy boulder in open boreal birch forest in Røyrvik municipality (Nord-Trøndelag). *Rhagadostoma brevisporum* is a widely distributed but seldom collected species in Europe (Brackel 2014 and references therein, Puolasmaa et al. 2012, Roux et al. 2020, Westberg et al. 2021) and further reported from Iceland (Berger 2000, Brackel 2010), Greenland (Alstrup et al. 2009), and Siberia (Zhurbenko 2009). Ascospore size in the Norwegian specimen has been measured to $(27-)\text{30-38}(-42) \times (6-)\text{7.4-9.2}(-10) \mu\text{m}$ (n=25), with a length/width-ratio of $(2.7-)\text{3.3-5.1}(-6.66)$ (n=25).

Specimen examined: Nord-Trøndelag: Røyrvik, Renseleva: Marmorgrotta, 64.8869°N, 13.9156°E, 535 m, on *Peltigera rufescens*, 1 Jun 2021, A. Frisch, H. Holien & M.H. Kirkhus 21/No290 (TRH-L-24985).

***Roselliniella nephromatis* (Crouan) Matzer & Hafellner**

New to Norway. This species was found on *Nephroma laevigatum*, *N. parile*, and *N. resupinatum* growing in boreal deciduous and coniferous forests from Øyer municipality (Oppland) to Saltdal municipality (Nordland). *Roselliniella nephromatis* is a widely distributed but seldom collected species throughout Europe (e.g., Hafellner et al. 2005, Martínez 2002, Matzer & Hafellner 1990, Roux et al. 2020, Westberg et al. 2022, Zimmermann & Feusi 2020) and further reported from the Azores (Kondratyuk & Galloway 1995), the Canary Islands (Etayo 1996), Madeira (Kalb & Hafellner 1992), Alaska (Spribille et al. 2010), and Canada (Alstrup & Cole 1998, Diederich 2003, Etayo & Breuss 1998, Goward et al. 1996).

Specimens examined: Oppland: Øyer, Hunder st., on *N. parile*, 9 Jul 1908, B. Lynges s.n. (TRH-L-20936). *Sør-Trøndelag:* Orkland, Resdalen V, 62.9663°N, 9.7105°E, 274 m, on *N. resupinatum*, 3 Aug 2021, A. Frisch 21/No1273 (TRH-L-23488). *Nord-Trøndelag:* Grong, Ø for Namsen, 64.4859°N, 12.3467°E, 30 m, on *N. laevigatum*, 19 Sep 1977, T. Tønsberg 2419 (TRH-L-27709). *Nordland:* Saltdal, Rognan: Dversetelva, 67.1618°N, 15.3790°E, 170 m, on *N. parile*, 14 Jul 2021, A. Frisch & J. Klepsland 21/No1131 (TRH-L-23460); *ibid.*, 67.1621°N, 15.3835°E, 129 m, on *N. resupinatum*, 14 Jul 2021, A. Frisch & J. Klepsland 21/No1482 (TRH-L-24903).

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

New to Fennoscandia. This species was discovered in a specimen of *Lecanora swartzii* preserved in TRH, growing in a siliceous rock underhang in alpine heath in Røros municipality (Sør-Trøndelag). *Sphaerellothecium atryneae* is a widely distributed but seldom collected species throughout the Northern Hemisphere (e.g., Darmostuk et al. 2018, Hafellner 1982, 1997, 2002, Kukwa & Flakus 2009, Roux & Triebel 1994, Roux et al. 2020, Schiefelbein et al. 2017).

Specimen examined: Sør-Trøndelag: Røros, SW of Heksemtjønnå, 62.5736°N, 11.6971°E, ca 940 m, on *Lecanora swartzii*, 24 Jun 2006, H. Holien 10776 (TRH-L-11487).

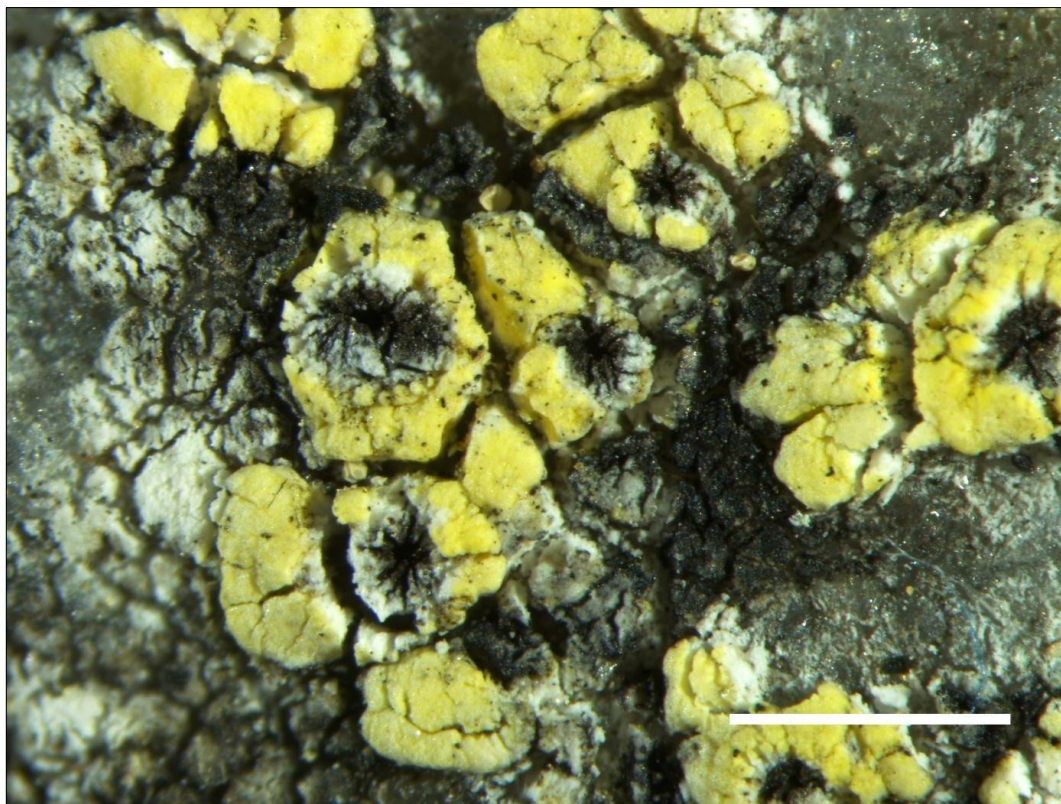


Figure 16. *Sphaeropezia rhizocarpicola* (on *Rhizocarpon geographicum*). TRH-L-24993. Scale = 2 mm. Photo: A. Frisch.

***Sphaeropezia rhizocarpicola* (Zhurb., Diederich & Himmelbr.) Baloch & Wedin** **Fig. 16**

New to Fennoscandia. This species was found on *Rhizocarpon geographicum* growing on a siliceous boulder in young, open, boreal, spruce and birch dominated forest in Lierne municipality (Nord-Trøndelag). *Sphaeropezia rhizocarpicola* was previously known from its type locality in Karelia Keretina, Russia (Diederich et al. 2002, Zhurbenko & Himmelbrandt 2002).

Specimen examined: Nord-Trøndelag: Lierne, Havdalselva, 64.6364°N, 13.6800°E, 395 m, on *Rhizocarpon geographicum*, 6 Jun 2021, A. Frisch 21/No349 (TRH-L-24993).

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

New to Norway. This species was discovered in a specimen of *Thamnolia vermicularis* preserved in TRH, collected in Oppdal municipality (Sør-Trøndelag). *Sphaeropezia thamnoliae* is a seldom collected species that is known from scattered localities throughout the Northern Hemisphere (e.g., Diederich et al. 2002, Esslinger 2021, Suija & Jüriado 2020, Westberg et al. 2021, Zhurbenko & Brackel 2013).

Specimen examined: Sør-Trøndelag: Oppdal, Kongsvoll, on *Thamnolia vermicularis*, Jul 1933, E.P. Vrang s.n. (TRH-L-22957).

***Stigmidium cladoniicola* Zhurb. & Diederich**

Fig. 17

New to Fennoscandia. This species was found on *Cladonia* sp. growing on a siliceous boulder near a stream in boreal deciduous forest in Saltdal municipality (Nordland). *Stigmidium cladoniicola* is a widespread but seldom collected species in Europe (e.g., Kukwa & Flakus 2009, Suija et al. 2008, Zhurbenko & Diederich 2008, Zimmermann & Berger 2018) and further reported from the Canary Islands (van den Boom & Clerc 2017) and Svalbard (Zhurbenko & Brackel 2013).

Specimen examined: Nordland: Saltdal, Russelvdalen, 66.9170°N, 15.2950°E, 145 m, on *Cladonia* sp., 30 Jul 2021, A. Frisch 21/No1321 (TRH-L-24866).

***Stigmidium exasperatum* Etayo**

New to Fennoscandia. This species was found on *Melanohalea olivacea* growing on *Salix caprea* in subalpine birch forest in Namsskogan municipality (Nord-Trøndelag). *Stigmidium exasperatum* was previously known from *Melanohalea exasperata* in northern Spain (Etayo 2010a) and the Canary Islands (van den Boom 2020).

Specimen examined: Nord-Trøndelag: Namsskogan, Steinfjellet, 64.8615°N, 13.2555°E, on *M. olivacea*, 578 m, 7 Jun 2021, A. Frisch 21/No394 (TRH-L-24999).

***Tremella christiansenii* Diederich**

Fig. 18

New to Norway. This species was discovered on a specimen of *Physcia stellaris* preserved in TRH, collected in Oslo. *Tremella christiansenii* was recently reported as new to Fennoscandia from Sweden (Ekman et al. 2019). It is further known from Austria (Hafellner 2018b), Canada (Brodo et al. 2021, Freebury 2014), Denmark (Diederich 1996), France (Roux et al. 2020), Greece (Diederich et al. 2022), Spain (Diederich et al. 2022), Siberia (Zhurbenko 2009), and Switzerland (Berger & Zimmermann 2021).

Specimen examined: Oslo: Smestad, on *Physcia stellaris*, 20 Apr 1894, s.c., s.n. (TRH-L-28371).

***Tremella pertusariae* Diederich**

Fig. 19

New to Norway. This species was found on *Pertusaria hymenea* growing in a beech forest in Larvik (Vestfold). Barcode sequences obtained when barcoding *P. hymenea* in Norway indicate that it might be widespread in western Norway. *Tremella pertusariae* was recently reported as new to the Nordic Countries from Denmark and Sweden (Knutsson & Johansson 2011, Millanes et al. 2014). It is a widespread species in Europe (Diederich 1996, Diederich et al. 2022, Roux et al. 2020).

Specimen examined: Vestfold: Larvik, Utsikten, 59.0628°N, 10.0245°E, 50 m, on *P. hymenea*, 20 May 2020, A. Frisch 20/No9 (TRH-L-23437).

***Unguiculariopsis groenlandiae* (Alstrup & D. Hawksw.) Etayo & Diederich**

Fig. 20

New to Norway. This species was found on *Athallia holocarpa* growing on a large boulder in calcareous alpine heath in Oppdal municipality (Sør-Trøndelag). *Unguiculariopsis groenlandiae* is a widespread but seldom collected species in Europe (Diederich & Etayo 2000, Hawksworth 2003,



Figure 17. *Stigmidium cladoniicola* (on *Cladonia* sp.). TRH-L-24866. Scale = 1 mm. Photo: A. Frisch.



Figure 18. *Tremella christiansenii* (on *Physcia stellaris*). TRH-L-28371. Scale = 3 mm. Photo: A. Frisch.



Figure 19. *Tremella pertusariae* (on *Pertusaria hymenea*). TRH-L-23437. A. Habitus, B. Habitat of *T. pertusariae* at Utsikten, Larvik. Scale = 2 mm. Photos: A. Frisch.



Figure 20. *Unguiculariopsis groenlandiae* (on *Athallia holocarpa*). TRH-L-24893. Scale = 1 mm. Photo: A. Frisch.

Sparris et al. 2002, Stordeur et al. 2015), Greenland (Alstrup & Hawksworth 1990), Peru (Etayo 2010b), Svalbard (Zhurbenko 2009), and Turkey (Halici et al. 2007).

The Norwegian specimen agrees well with the description provided in Diederich & Etayo (2000) including the interspersed hymenium.

Specimen examined: Sør-Trøndelag: Oppdal, Brattskarven, 62.7132°N, 9.6415°E, 1179 m, on *A. holocarpa*, 31 Aug 2021, A. Frisch 21/No1456 (TRH-L-24893).

***Unguiculariopsis lettaui* (Grumann) Coppins**

New to Norway. This species was found on *Evernia prunastri* growing on *Sorbus aucuparia* in open agricultural landscapes in Bergen and Tynes municipalities (Hordaland), and on *Alnus incana* in mixed boreal forests in ravine landscapes in Trondheim municipality (Sør-Trøndelag). *Unguiculariopsis lettaui* is a widespread species in Europe and Macaronesia (e.g., Diederich & Etayo 2000, Etayo & Pérez-Ortega 2016, Hafellner 1995d, Roux et al. 2020), and further reported from Asia (Zhurbenko 2017, Zhurbenko & Otte 2012, Zhurbenko et al. 2016) and the U.S.A. (Diederich 2003).

Specimens examined (all on *Evernia prunastri*): Hordaland: Bergen, Espeland-Myntevik, 60.2692°N, 5.2261°E, 10 m, 11 May 2018, J. Klepsland JK18-157 (O L-226352); Tynes, Hovadnes, 59.9931°N, 5.4599°E, 11 m, 9 May 2018, A. Frisch 18/No32, 18/No73 (TRH-L-24471, 28978). Sør-Trøndelag: Trondheim, Klæbu: Mælbudalen, 63.2866°N, 10.4794°E, 120 m, 5 May 2021, A. Frisch 21/No89 (TRH-L-32974); *ibid.*, 63.2872°N, 10.4801°E, 125 m, 5 May 2021, A. Frisch 21/No95 (TRH-L-32986); *ibid.*, 63.2848°N, 10.4703°E, 115 m, 5 May 2021, A. Frisch 21/No97 (TRH-L-32991); *ibid.*, Nideng, 63.3153°N, 10.4176°E, 130–140 m, 15 Nov 2020, A. Frisch & V. Stornes Moen 20/No82 (TRH-L-23434).

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

Fig. 21

New to Fennoscandia. This species was found on *Porpidia crustulata* growing on a siliceous pebble in a forestry road bank in Orkland municipality (Sør-Trøndelag). Two additional specimens were discovered in collections of *P. crustulata* from Oslo preserved in TRH. *Zwackhiomyces martinianus* is probably a common though seldom collected species in central and southern Europe (e.g., Berger & Zimmermann 2021, Ertz et al. 2008, Grube & Hafellner 1990, Kossowska & Szczepacska 2013, Roux et al. 2020, Sérusiaux et al. 1999, Triebel 1989) and further reported from Iceland (Brackel 2010), Japan (Zhurbenko et al. 2015), and Siberia (Zhurbenko 2008). *Porpidia crustulata* is the most often reported host lichen, beside *P. macrocarpa* and *P. platycarpoides* (Grube & Hafellner 1990, Zhurbenko 2008).

Specimens examined (all on *Porpidia crustulata*): Oslo: Bryn, 1876, C. Kindt s.n. (TRH-L-28476); *ibid.*, 1870, N.G. Moe s.n. (TRH-L-28478). Sør-Trøndelag: Orkland, Resdalen, 62.9679°N, 9.7156°E, 306 m, 3 Aug 2021, A. Frisch 21/No1448 (TRH-L-24892).

***Zwackhiomyces physciicola* Alstrup**

Fig. 22

New to Fennoscandia. This species was discovered on two specimens of *Physcia caesia* preserved in TRH, which were collected from a gravestone near Trondheim cathedral and from a wooden bridge in Ørland municipality (Sør-Trøndelag). *Zwackhiomyces physciicola* was described from Denmark (Alstrup 1993) and is widely distributed in Europe (e.g., Calatayud & Barreno 1995, Diederich et al. 2014, Hafellner 1994b, Hafellner & Türk 1995, Kocourková & van den Boom 2005,

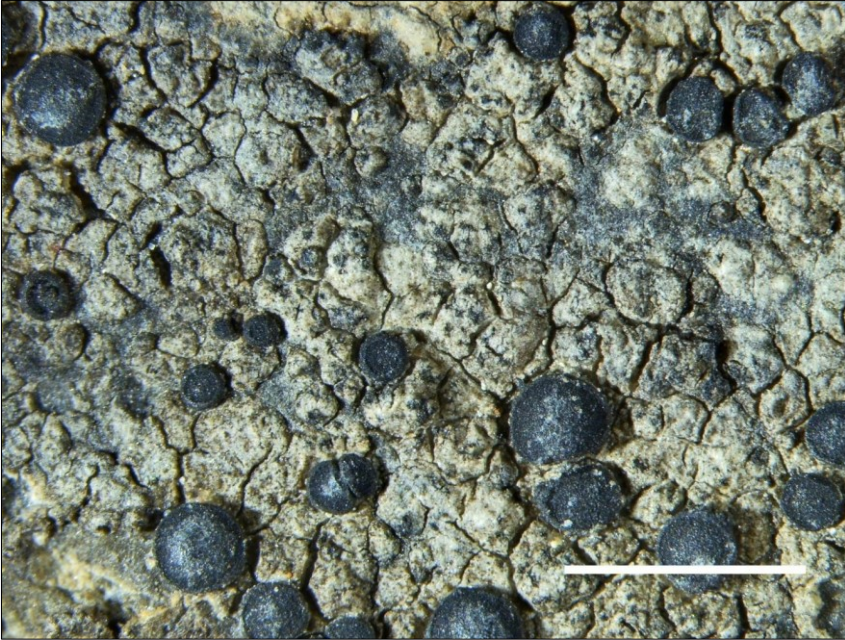


Figure 21. *Zwackhiomyces martinianus* (on *Porpidia crustulata*). TRH-L-28478. Scale = 2 mm. Photo: A. Frisch.



Figure 22. *Zwackhiomyces physciicola* (on *Physcia caesia*). TRH-L-28348. Scale = 2 mm. Photo: A. Frisch.

Sérusiaux et al. 1999, Suija 2005a), the Canary Islands (van den Boom & Clerc 2015), and Siberia Zhurbenko 2009).

The Norwegian collections agree well with the description in Alstrup (1993), except that the perithecia were slightly larger, ca 0.1–0.2 mm diam. As discussed in Sérusiaux et al. (1999), *Z. physciicola* does not fit well in *Zwackhiomyces* as circumscribed by Grube & Hafellner (1990) and should probably be excluded from the genus. The presence of setulae on the ascospores as described in Sérusiaux et al. (1999) could not be confirmed on our specimens that are old and have ascospores that appear not fully developed.

Specimens examined (all on Physcia caesia): Sør-Trøndelag: Trondheim, Domkirkegården, 10 Dec 1933, O.A. Høeg s.n. (TRH-L-28348); Ørland, Ørlandet: Østråt, 22 Jul 1933, O.A. Høeg s.n. (TRH-L-28601).

B) New data on rare or otherwise interesting species

Abrothallus usneae Rabenh.

Fig. 23

This species was found on *Usnea subfloridana* growing on a *Picea abies* branch in Leikanger municipality (Sogn og Fjordane), and on *Alnus incana* trees lining Ålvundelva in Sunndal municipality (Møre og Romsdal). It was previously reported from the same host from Skorgedalen in Vestnes (Holien 2001). *Abrothallus usneae* is widely distributed in the Holarctic (e.g., Brackel 2013, Cezanne et al. 2008, Cole & Hawksworth 2001, Diederich 2003, 2004, Diederich & Christiansen 1994, Etayo & Breuss 1998, Groner 2006, Hafellner 1995a, Hafellner et al. 2002, Hawksworth 1983, Kalb & Hafellner 1992, Roux et al. 2020, Suija 2005a, van den Boom & Ertz 2012, Zimmermann & Berger 2018), Africa (Diederich & Christiansen 1994, Keissler 1933), Australasia (Aptroot et al. 1997, Diederich & Christiansen 1994, Hafellner & Mayrhofer 2007), and South America (Etayo 2002, 2017, Etayo & Sancho 2008).

The Norwegian specimens were growing on galls formed by a species in the *Biatoropsis usnearum* complex that could not be identified. Other than reported in Hawksworth (1983) and Holien (2001), the ca 0.2–0.4 mm large, strongly convex apothecia are often clearly greenish pruinose (Fig. 23). The spores have been measured to 11–13 × 4.5–6 µm (n=20), which is considerably smaller than reported for the species in Clauzade et al. (1989; 14–18 × 5–7 µm), but similar to the spore size given by Fink (1935; 8–12 × 4–5 µm) and Cole & Hawksworth (2001; 11 × 4.5 µm) for specimens from the U.S.A., and Jatta (1909; 10–14 × 4 µm) for specimens from Italy.

One of the authors (AS) has examined *Abrothallus usneae* in Rabenhorst's exsiccate series (Rabenhorst, Lich. Eur. Exs. no. 551, M-0044135). The ascospore size of this specimen, 11–(11.95)–14 × 4.5–(5.3)–6 µm, agrees well with the ascospores measured for the collections from Norway. Another *Abrothallus* species described from *Usnea*, *A. chrysanthus* Stein, was distinguished by its author from *A. usneae* by the distinct “green-golden” pruina on its apothecia and narrower ascospores, 3–4 µm wide (Stein, 1879: 211). Examination of the original material of this species, deposited in WRSL, showed that this name should be synonymized with *A. usneae* (AS, unpublished). However, it is highly possible that *Usnea* can be host for several species taking into account specimens' descriptions or comments given in some publications (e.g., Clauzade et al. 1989, Diederich 2004, Etayo & van den Boom 2006, Etayo & Sancho 2008).

Specimens examined (all on Usnea subfloridana): Sogn og Fjordane: Leikanger, Flete-Vestrheim, 61.2089°N, 6.6108°E, 120 m, 19 May 2019, J. Klepsland JK19-047 (O-L-227674). Møre og Romsdal: Sunndal, Dalsbø: Ålvundelva, 62.7433°N, 8.6630°E, 215 m, 28 Aug 2021, A. Frisch 21/No1360 (TRH-L-24872); Vestnes, Skorgedalen: Skorgelva, 62.5671°N, 07.0650°E, 14 Nov 1997, G. Gaarder 2430 (TRH-L-5613).



Figure 23. *Abrothallus usneae* (on *Usnea subfloridana*). TRH-L-24872. Scale = 1 mm. Photo: A. Frisch.

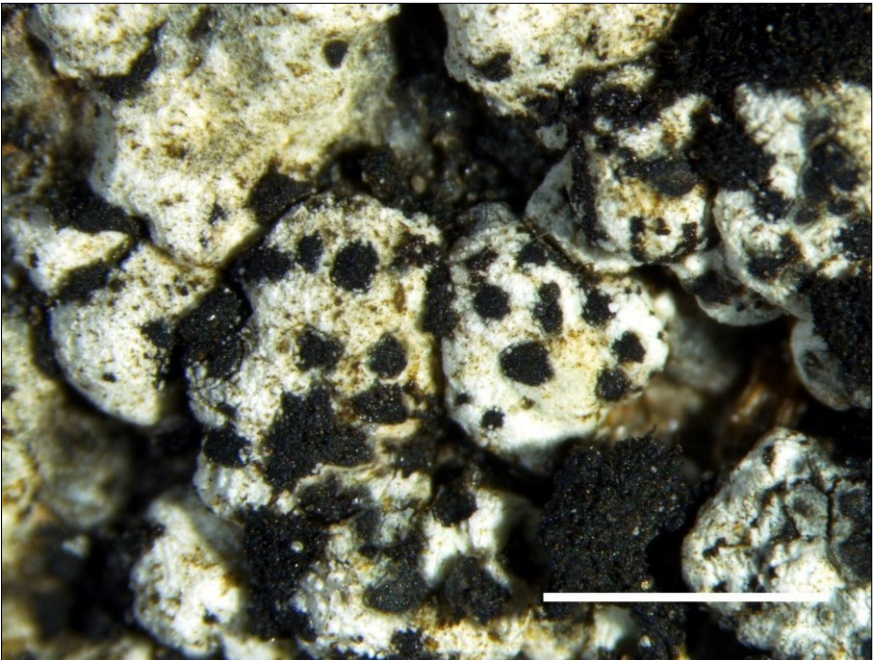


Figure 24. *Arthonia amylospora* (on *Porpidia rugosa*). TRH-L-32968. Scale = 2 mm. Photo: A. Frisch.

Arthonia amylospora* Almq.*Fig. 24**

This species was found on *Porpidia rugosa* growing on shaded boulders at Ingeborgforsen in Saltdal municipality (Nordland). It was first reported for Norway from a single collection made in Bygland municipality, Aust-Agder (Klepsland 2020). *Arthonia amylospora* is a seldom collected species at world level being additionally known from scattered localities in the British Isles (Cannon et al. 2020), Spain (Etayo & Diederich 1998), and Sweden (Almquist 1880, Triebel 1989).

Specimen examined: Nordland: Saltdal, Botnvatnet: Ingeborgforsen, 67.0830°N, 15.5334°E, 55 m, on *P. rugosa*, 29 Jul 2021, A. Frisch 21/No818 (TRH-L-32968).

***Arthonia parietinaria* Hafellner & Fleischhacker**

This species was found on *Xanthoria parietina* growing on *Fraxinus excelsior* and *Lonicera tartarica* in agricultural landscapes in Frederikstad municipality (Østfold) and Indre Fosen municipality (Sør-Trøndelag). An additional specimen growing on *Populus balsamifera* in Byneset west of Trondheim has been discovered in a collection of *X. parietina* preserved in TRH. *Arthonia parietinaria* was known in Norway from a single locality in Rogaland (Frisch & Holien 2018). It is a widespread species in Europe (e.g., Berger 2019, Brackel 2019, Fleischhacker et al. 2016, Hitch 2018a, 2018b, Obermayer 2017, Powell 2018, Roux et al. 2020, Schiefelbein et al. 2018, Shivarov et al. 2021, Teuber et al. 2021, Varga et al. 2021, Wagner & Schacherer 2019) and further reported from Armenia (Fleischhacker et al. 2016) and the Canary Islands (Fleischhacker et al. 2016).

Specimens examined (all on Xanthoria parietina): Østfold: Fredrikstad, Skallebakke N, 59.1892°N, 11.0308°E, 5 m, 26 Jul 2017, J. Klepsland JK17-430 (O L-226259); Halden, Berg kirke, 59.1378°N, 11.3292°E, 75 m, 19 Aug 2017, J. Klepsland JK17-494 (O L-226258). Sør-Trøndelag: Indre Fosen, Reinsklosteret, 63.5639°N, 9.9245°E, 28 m, 14 Nov 2020, A. Frisch, M.H. Kirkhus, V. Stornes Moen 20/No32 (TRH-L-23428); Trondheim, Byneset: Rye, 20 Mar 1935, O.A. Høeg s.n. (TRH-L-46854).

Arthonia punctella* Nyl.*Fig. 25**

This species was found on *Diplotomma alboatrum* partly parasitizing *Rusavskia elegans* in sheltered crevices and underhangs of calcareous boulders and rocks in alpine heath and boreal deciduous forest in Oppdal municipality (Sør-Trøndelag) and Saltdal municipality (Nordland). It was previously known in Norway from a single locality in Oppland (Frisch et al. 2020). *Arthonia punctella* is a widely distributed but seldom collected species in Europe (Brackel 2014 and references therein, Roux et al. 2020, Westberg et al. 2021) and Turkey (Yazici et al. 2007).

Specimens examined (all on Diplotomma alboatrum): Sør-Trøndelag: Malvik, Hommelvik: Gammelåsdaalen, 63.4167°N, 10.8327°E, 40–100 m, 3 Oct 1990, H. Holien 4026 (TRH-L-255); Oppdal, Brattskarven, 62.7125°N, 9.6383°E, 1174 m, 31 Aug 2021, A. Frisch 21/No968 (TRH-L-32989); *ibid.*, 62.7132°N, 9.6415°E, 1179 m, 31 Aug 2021, A. Frisch 21/No1456 pr.p. (TRH-L-24893). Nordland: Saltdal, Junkerdalen, 66.8155°N, 15.4174°E, 122 m, 21 Jul 2021, A. Frisch & J. Klepsland 21/No1468, 21/No1470 (TRH-L-24896, 24897).

Arthrorhaphis muddii* Obermayer*Fig. 26**

This species was collected in alpine heath in Surnadal municipality (Møre og Romsdal) and on sandy soils in a mining area in Fauske municipality (Nordland). An additional specimen was found in a collection of *Dibaeis baeomyces* preserved in TRH, being collected from soils of a road cut in boreal spruce forest in Grong municipality (Nord-Trøndelag). *Arthrorhaphis muddii* was first reported for Norway by Ihlen (1998). It is a widespread but seldom collected species in Europe (Berger 2019,

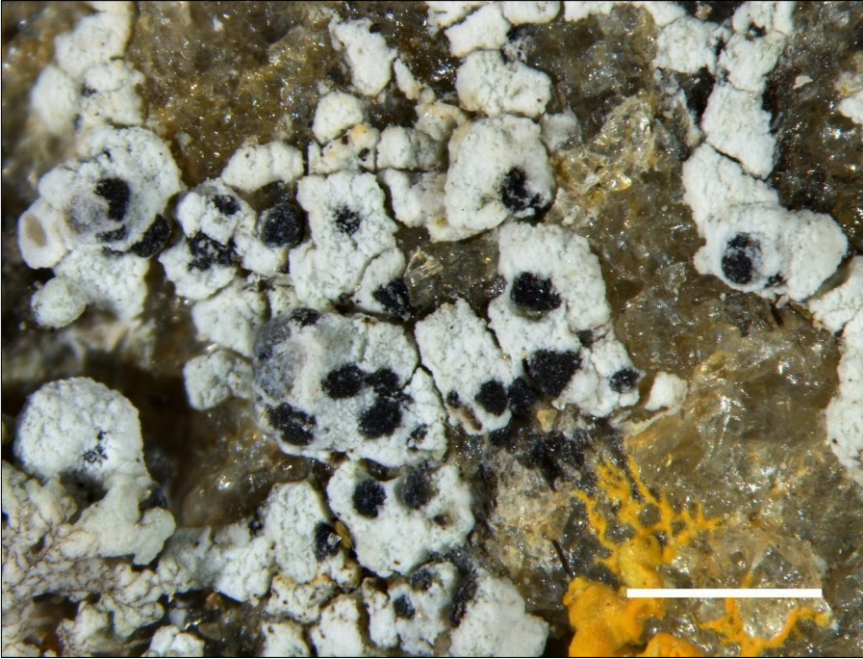


Figure 25. *Arthonia punctella* (on *Diplotomma alboatrum*). TRH-L-24897. Scale = 1 mm. Photo: A. Frisch.

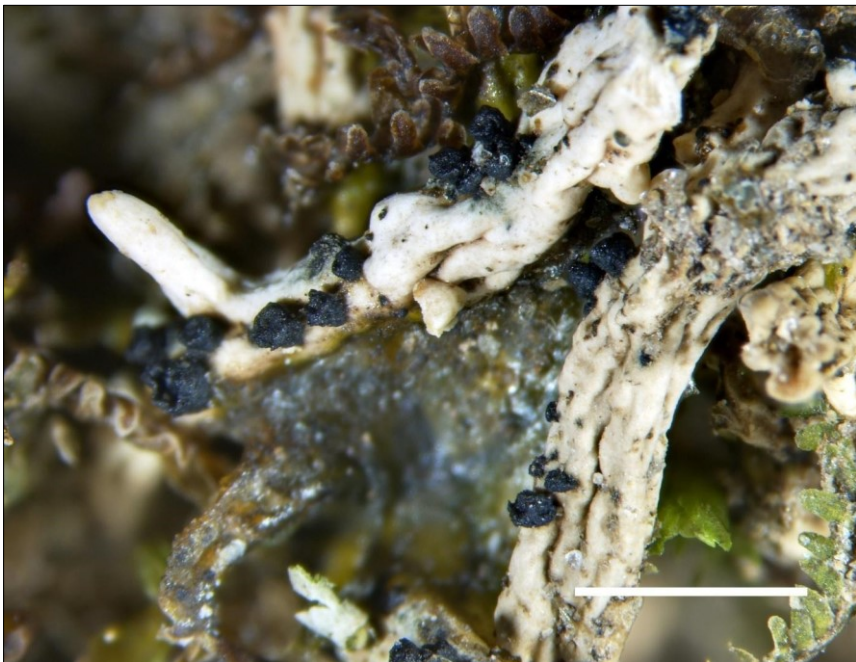


Figure 26. *Arthrorhaphis muddii* (on *Siphula ceratites*). TRH-L-32990. Scale = 2 mm. Photo: A. Frisch.

Ertz et al. 2008, Kocourková 2000, Obermayer 1994) and further reported from Alaska (Spribille et al. 2020).

One specimen, TRH-L-32990 (Fig. 26), was found on the basal portions of *Siphula ceratites* bordering large granitic rock plates on Snota, Møre og Romsdal. In the same locality, *A. muddii* was also growing on its common host, *Dibaeis baeomyces*. All material agrees well with the description of the species in Obermayer (1994) and Ihlen (1998), notably by the hymenium that is densely interspersed in the upper part only. The ascospores, however, have been measured markedly longer than previously reported (specimens TRH-L-32903, TRH-L-32990): 70–120 × 3.5–5 µm, 12–17-transversely septate vs. 55–95 × 3.5–5 µm, 10–15-septate in Obermayer (1994), and 45–90 × 3–7 µm, 7–13-septate in Ihlen (1998). ITS sequence data for the specimen growing on *Siphula ceratites* (GenBank ON668104) differ in a single nucleotide from ITS2 sequences obtained from specimens growing on *Dibaeis baeomyces* in Norway (Røros) and Czech Republic (GenBank OL895794, OL895795; Frisch et al. 2022). A similar single nucleotide polymorphism corresponding to host choice has been observed in the lichenicolous genus *Epithamnolia* (Suija et al. 2017).

Specimens examined: Møre og Romsdal: Surnadal, Snota, 62.8758°N, 9.0617°E, 1159 m, on *D. baeomyces*, 4 Sep 2021, A. Frisch 21/No422 (TRH-L-32903); *ibid.*, 62.8771°N, 9.0488°E, 1081 m, on *S. ceratites*, 4 Sep 2021, A. Frisch 21/No969 (TRH-L-32990); *ibid.*, 62.8775°N, 9.0488°E, 1064 m, on *D. baeomyces*, 4 Jul 2021, A. Frisch 21/No1036 (TRH-L-23444). Nord-Trøndelag: Grong, Harran, 64.5676°N, 12.4900°E, ca 100 m, on *D. baeomyces*, 25 Aug 1999, H. Holien 7762 (TRH-L-4303). Nordland: Fauske, Jakobsbakkan, 67.0972°N, 16.0021°E, 636 m, on *D. baeomyces*, 26 Jul 2021, A. Frisch 21/No710 (TRH-L-32949); *ibid.*, 67.0956°N, 16.0040°E, 598 m, on *D. baeomyces*, 26 Jul 2021, A. Frisch 21/No1575 (TRH-L-24920).

***Bachmanniomyces varius* (Coppins, Rambold & Triebel) Diederich & Pino-Bodas Fig. 27**

This species was found on *Trapeliopsis gelatinosa* growing on soil below the root plate of a fallen spruce tree in boreal rainforest in Rissa municipality (Sør-Trøndelag). It was previously reported for Norway from Hordaland (Westberg et al. 2021), likely based on a specimen collected by T. Tønstad & D.O. Øvstedal in Stord (UPS-F-522330). *Bachmanniomyces varius* is a widespread but seldom collected species throughout Europe (Berger 2019, Hafellner & Obermayer 2007, Roux et al. 2020, Sérusiaux et al. 1999, Triebel 1989, Rambold & Triebel 1990, van den Boom & Giralt 1999) and further reported from Iceland (Heiðmarsson et al. 2012).

Specimens examined: Sør-Trøndelag: Rissa, Nordelva naturreservat, 63.7894°N, 10.1741°E, 55–85 m, on *T. gelatinosa*, 3 May 2017, A. Frisch N02-2-Extra 5, N02-2-Extra 8 (TRH-L-32998, 32999).

***Briancoppinsia cytospora* (Vouaux) Diederich, Ertz, Lawrey & van den Boom**

This species was found on thallus of *Hypogymnia tubulosa* growing on *Pinus sylvestris* in open pine forest, on *Salix caprea* in boreal birch forest, and on twigs of *Picea abies* in a small spruce plantation in Oppdal municipality (Sør-Trøndelag) and Beiarn municipality (Nordland). It was previously reported from Oppland (Hafellner 1993). *Briancoppinsia cytospora* is a widely distributed species throughout Europe (e.g., Brackel 2014 and references therein, Himelbrant et al. 2013, Roux et al. 2020, Svensson et al. 2017, Thor & Söchting 2018, Tsurykau 2017, Westberg et al. 2021) and further reported from Chile (Etayo & Sancho 2008), Guatemala (Etayo & van den Boom 2006), Siberia (Zhurbenko et al. 2012), and the U.S.A. (Cole & Hawksworth 2001, Diederich 2003).

Specimens examined (all on *Hypogymnia tubulosa*): Sør-Trøndelag: Oppdal, Storfallet and Gravaune, 62.5808°N, 9.3399°E, 435 m, 1 Sep 2021, A. Frisch 21/No1004 (TRH-L-23439). Nordland: Beiarn, Bjørnstad N, 67.0025°N, 14.4533°E, 190 m, 20 Jul 2021, J. Klepsland & A. Frisch 21/No1636 (TRH-L-24942, sub

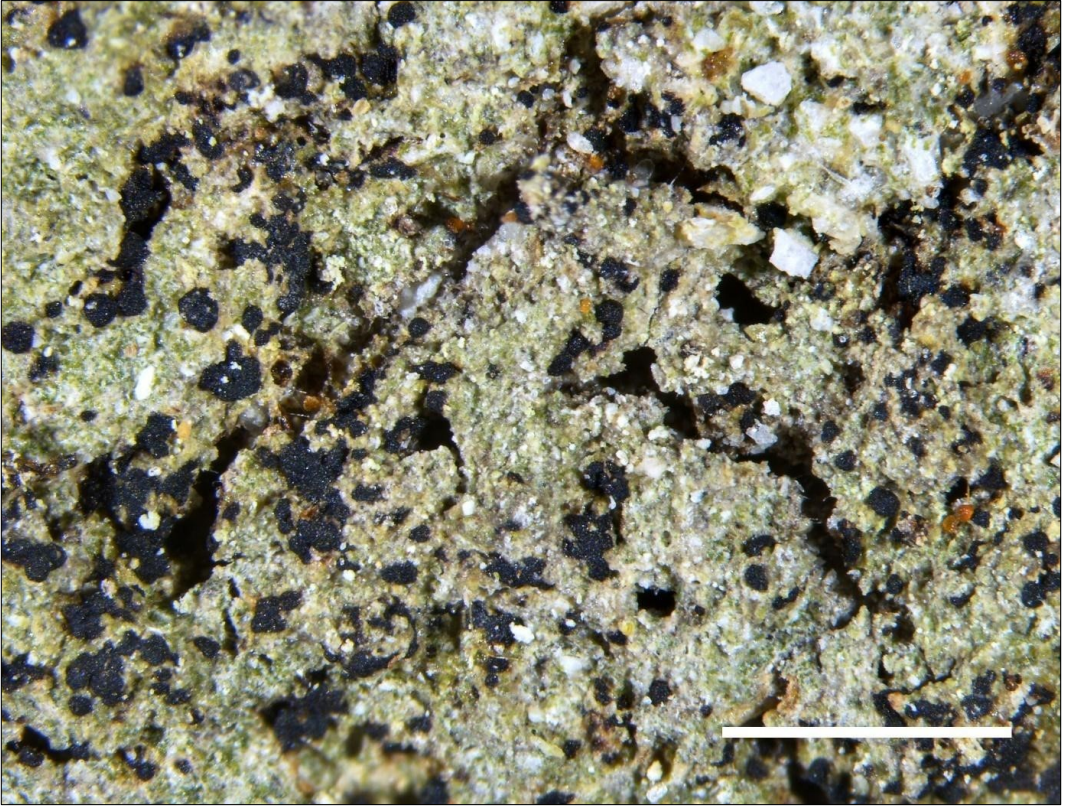


Figure 27. *Bachmanniomyces varius* (on *Trapeliopsis gelatinosa*). TRH-L-32999. Scale = 2 mm. Photo: A. Frisch.

Epithamnolia xanthoriae); *ibid.*, Leirvika, 67.0333°N, 14.6142°E, 10 m, 20 Jul 2021, J. Klepsland & A. Frisch 21/No1768 (TRH-L-24962).

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

This species was found on *Lecanora intricata* and *L. polytropa* growing on exposed boulders and rocks in alpine heath, old mine heaps, and boreal birch forest in Oppdal municipality (Sør-Trøndelag), Bodø, Fauske and Gildeskål municipalities (Nordland), and Lyngen municipality (Troms). It was previously reported for Norway from scattered localities from Hordaland to Sør-Trøndelag (Hafellner 1993, Westberg et al. 2021). *Carbonea aggregantula* is a widely distributed species throughout the Northern Hemisphere (e.g., Brackel 2014 and references therein, Pirogov et al. 2014, Roux et al. 2020, Westberg et al. 2021) and further reported from Australia (Brackel 2014, Alstrup et al. 2000) and Venezuela (Brackel 2014).

Specimens examined: Sør-Trøndelag: Oppdal, Brattskarven, 62.7134°N, 9.6423°E, 1173 m, on *L. polytropa*, 31 Aug 2021, A. Frisch 21/No1020, 21/No1352 (TRH-L-23442, 24868). Nordland: Bodø, Kvernelvvatnet N, 67.0256°N, 14.9269°E, 605 m, on *L. polytropa*, 22 Jul 2021, J. Klepsland & A. Frisch 21/No1701, 21/No1766 (TRH-L-24953, 24961); Fauske, Annaskavlen to Ávvilumtjähkkå, 67.1041°N, 15.9368°E, 810 m, on *L.*

polytropa, 27 Jul 2021, A. Frisch 21/No1214, 21/No1217 (TRH-L-23473, 23471); *ibid.*, Ávvilumtjåhkkå, 67.1091°N, 15.9064°E, 901 m, on *L. polytropa*, 27 Jul 2021, A. Frisch 21/No1229 (TRH-L-23477); Jakobsbakkan, 67.0957°N, 16.0019°E, 624 m, on *L. polytropa*, 26 Jul 2021, A. Frisch 21/No657, 658, 684, 793 (TRH-L-32937, 32938, 32944, 32960); Gildeskål, Sandhornøya: Djupdalen-Vågaksla, 67.1239°N, 14.0689°E, 55 m, on *L. intricata*, 17 Jul 2021, J. Klepsland & A. Frisch 21/No1698 (TRH-L-24950). *Troms*: Lyngseidet, Kjøstindane, 69.5953°N, 20.1757°E, 866 m, on *L. polytropa*, 29 Jul 2015, A. Frisch 15/No58 (TRH-L-652395).

***Cercidospora cecidiiformans* Grube & Hafellner**

This species was found on *Rhizocarpon geographicum* growing on exposed siliceous rocks in Snåsa and Namsskogan municipalities (Nord-Trøndelag). An additional specimen has been discovered in TRH, growing on the same host near Grimsdalshytta in Dovre municipality (Oppland). *Cercidospora cecidiiformans* was described from Hordaland (Hafellner 1993) and is further reported from Skibotndalen in Troms (Alstrup et al. 2008). It is additionally known from Austria (Hafellner 1993), Italy (Brackel & Berger 2019), Sweden (Ihlen & Wedin 2005), Switzerland (Hafellner 1993), and the U.S.A. (Knudsen & Kocourková 2014).

Specimens examined (all on Rhizocarpon geographicum): *Oppland*: Dovre, NW of Grimsdalshytta, 62.0938°N, 9.6281°E, ca 1130 m, 5 Jul 2011, H. Holien 13171 (TRH-L-14498, sub *Lecanora rupicola*). *Nord-Trøndelag*: Namsskogan, Steinfjellet, 64.8626°N, 13.2558°E, 593 m, 7 Jun 2021, A. Frisch 21/No438 (TRH-L-32905); Snåsa, Jørstad: Tynestangen, 64.1946°N, 12.1523°E, 25 m, 30 Apr 2021, A. Frisch 21/No22 (TRH-L-24970).

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

This species was discovered in a collection of *Thamnolia vermicularis* in TRH, growing on *Megaspora verrucosa* in alpine *Dryas* vegetation in Snåsa municipality (Nord-Trøndelag). It was previously reported for Norway from Troms and Finnmark (Westberg et al. 2021), likely based on collections by Th.M. Fries in Mortensnes, Nordland (UPS F-520207), and on Fløya (“Fløjffjeldet”), Troms (UPS F-520206). *Cercidospora verrucosaria* is a widely distributed but seldom collected species in the Northern Hemisphere (Berger & Etayo 1998, Brackel 2014 and references therein, Westberg et al. 2021, Zhurbenko 2004, 2008, 2017) and further reported from New Zealand (Hafellner & Mayrhofer 2007).

Specimen examined: *Nord-Trøndelag*: Snåsa, N of Reinshorntjøna, 64.0281°N, 12.4441°E, ca 665 m, on *M. verrucosa*, 1 Jul 2009, H. Holien 12260 (TRH-L-13198).

***Dacampia rufescentis* (Vouaux) D. Hawksw.**

This species was found on *Peltigera rufescens* growing in calcareous rocky outcrops in alpine heath in Fauske municipality (Nordland). It was tentatively reported from Oppland (Westberg et al. 2021), likely based on a collection by Th.M. Fries from “Geteryggen, Dovre” in 1863 (UPS F-170757). According to Tommy Prestø (pers. com.), this locality name could refer to Geitberget S of Hjerkin. *Dacampia rufescentis* is a widely distributed but seldom collected species throughout Europe (Alstrup 2004, Martínez & Hafellner 1998, Puolasmaa et al. 2012, Zhurbenko 2004, Zhurbenko 2017) and further reported from Argentina (Wedin 1994), Canada (Zhurbenko & Daniëls 2003), Iceland (Brackel 2010), Siberia (Zhurbenko 2007b), and Turkey (Candan et al. 2010).

Specimen examined: *Nordland*: Fauske, Øvre Beritvatnet, 67.0793°N, 15.9715°E, 741 m, on *P. rufescens*, 28 Jul 2021, A. Frisch 21/No715, 746 (TRH-L-32951, 32954).

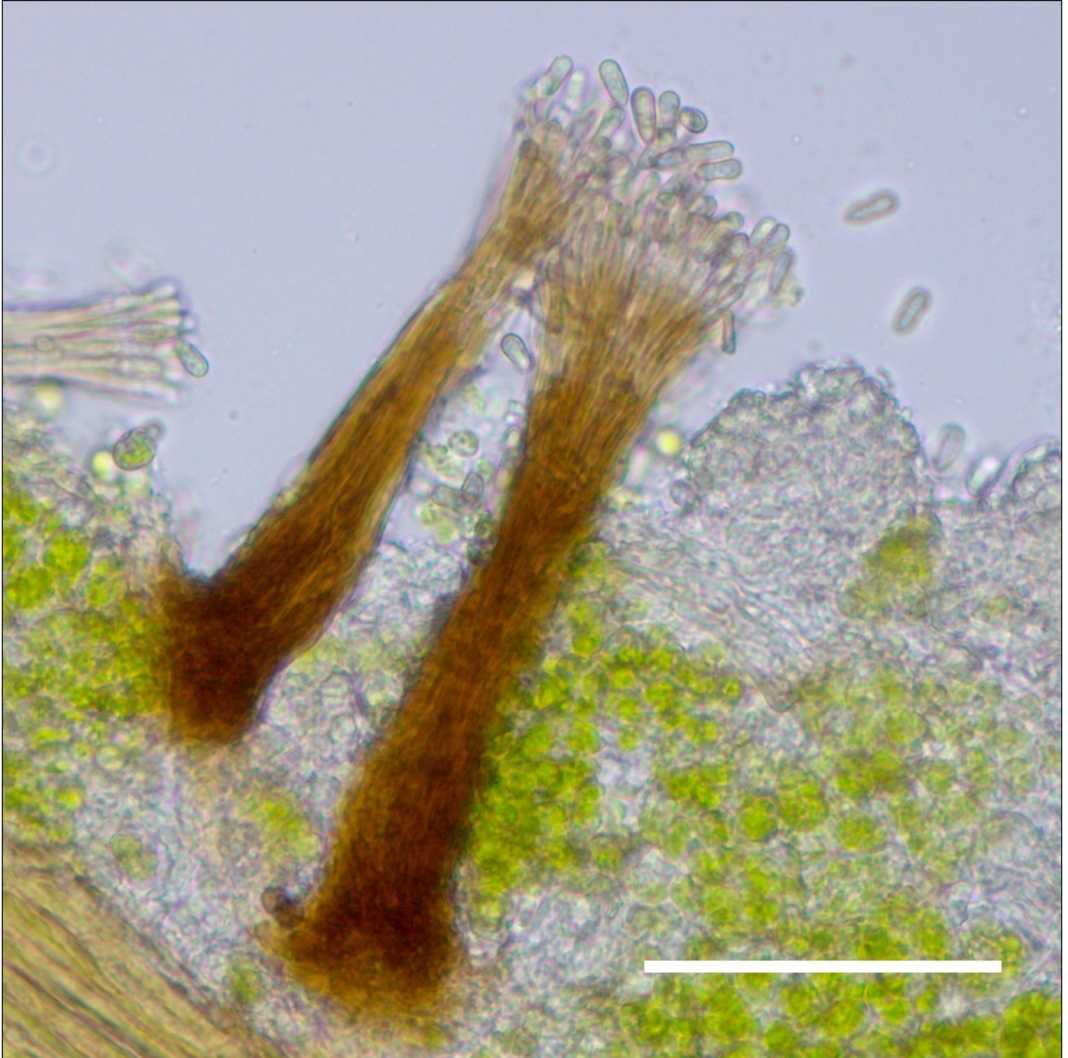


Figure 28. *Graphium apthosae* (on *Bryobilimbia hypnorum*). TRH-L-16033. Scale = 50 μ m. Photo: H. Holien.

***Graphium apthosae* Alstrup & D. Hawksw.**

Fig. 28

This species was found on the thallus of *Bryobilimbia hypnorum* growing terricolous in calcareous spruce forest in Steinkjer municipality (Nord-Trøndelag). It was previously reported for Norway from Oppdal in Sør-Trøndelag (Kümmerling & Alstrup 1992), Nordland (Westberg et al. 2021), and Troms (Alstrup et al. 2008). *Graphium apthosae* is a widely distributed species in Europe (e.g., Diederich et al. 2012, Kukwa & Adamska 2006, Kukwa & Jabłońska 2008, Martínez & Hafellner 1998 and references therein, Otte et al. 2017, Puolasmaa et al. 2012, Suija 2005b, Suija & Jüriado 2020, Tretiach & Hafellner 2000, van den Boom 2013, Zhurbenko 2004) and further reported from

Greenland (Alstrup & Hawksworth 1990), North America (Esslinger 2021), Siberia (Zhurbenko 2007b), and Svålbard (Zhurbenko 2009, Zhurbenko & Brackel 2013).

Graphium aphthosae mainly occurs on *Peltigera* spp. and *Solorina* spp., but is additionally reported from terricolous algae, goniocysts of *Vezdaea retigera*, and *Cladonia pocillum* (Diederich et al. 2012), as well as from terricolous algae growing together with *Vezdaea leprosa* (Otte et al. 2017). *Bryobilimbia hypnorum* is a new host for the species.

Specimen examined: Nord-Trøndelag: Steinkjer, Bardalshalla, 64.0483°N, 11.3981°E, ca 120 m, on *B. hypnorum*, 12 Apr 2015, H. Holien 14635 (TRH-L-16033).

***Knufia peltigerae* (Fuckel) Réblová & Unter.**

This species was discovered on a specimen of *Peltigera leucophlebia* collected in Oslo. It was previously known for Norway from Telemark (Alstrup 2004). *Knufia peltigerae* is a widely distributed species in Europe and North America (Brackel 2014 and references therein [sub *Capronia peltigerae*], Esslinger et al. 2021, Suija & Jüriado 2020, Westberg et al. 2021).

Specimen examined: Oslo: Vestre Aker, on *P. leucophlebia*, 17 Jun 1905, H. Printz s.n. (TRH-L-22576).

***Lecanora lecanoricola* (Alstrup, D. Hawksw. & R. Sant.) Rambold & Triebel Fig. 29**

This species was found on *Lecanora cenisia* growing on exposed subalpine and alpine boulders and rocks in Oppdal municipality (Sør-Trøndelag), Røyrvik municipality (Nord-Trøndelag), and Saltdal municipality (Nordland). It was first reported for Norway from a single collection in Helligskogen (Troms; Haugan 1994). *Lecanora lecanoricola* is probably a widely distributed and rather common species in the Norwegian mountains but has been seldom collected. It is further known from Austria (Hafellner 1991), France (Roux et al. 2020), Greenland (Alstrup & Hawksworth 1990), Kosovo (Hafellner & Mayrhofer 2020), and Sweden (Westberg et al. 2016).

Specimens examined (all on Lecanora cenisia): Sør-Trøndelag: Oppdal, Brattskarven, 62.7134°N, 9.6423°E, 1172 m, 31 Aug 2021, A. Frisch 21/No934, 21/No1018 (TRH-L-32980, 23440). *Nord-Trøndelag:* Røyrvik, Seterfjellet, 64.8107°N, 13.6756°E, 680 m, 3 Jun 2021, A. Frisch 21/No575 (TRH-L-32926). *Nordland:* Saltdal, Junkerdalen, 66.8161°N, 15.4197°E, 130 m, 17 Jul 2021, J. Klepsland & A. Frisch 21/No1613 (TRH).

***Leptosphaerulina peltigerae* (Fuckel) Riedl**

This species was found on *Peltigera* sp. growing over soil in an old marble quarry in Bodø municipality (Nordland). *Leptosphaerulina peltigerae* was previously reported in Norway from Skibotndalen in Troms (Alstrup et al. 2008). It is a widely distributed species in Europe and further reported from Canada, Colombia, Iceland, and Papua New Guinea (Brackel 2014 and references therein), Greenland (Alstrup et al. 2000), and Madeira (Berger & Zimmermann 2016).

Specimen examined: Nordland: Bodø, Beinвика, 67.1606°N, 14.8897°E, 10 m, on *Peltigera* sp., 19 Jul 2021, J. Klepsland & A. Frisch 21/No1717 (TRH-L-24956).

***Lichenopeltella cetrariicola* (Nyl.) R. Sant.**

This species was discovered in a specimen of *Cetrariella delisei* collected near Oslo. It was previously known in Norway from Sør-Trøndelag (Westberg et al. 2021), likely based on a collection made by E. Dahl in Glåmos in 1940 (UPS-L-174154). *Lichenopeltella cetrariicola* is a widely distributed but seldom reported species in the Northern Hemisphere (Alstrup et al. 2009,

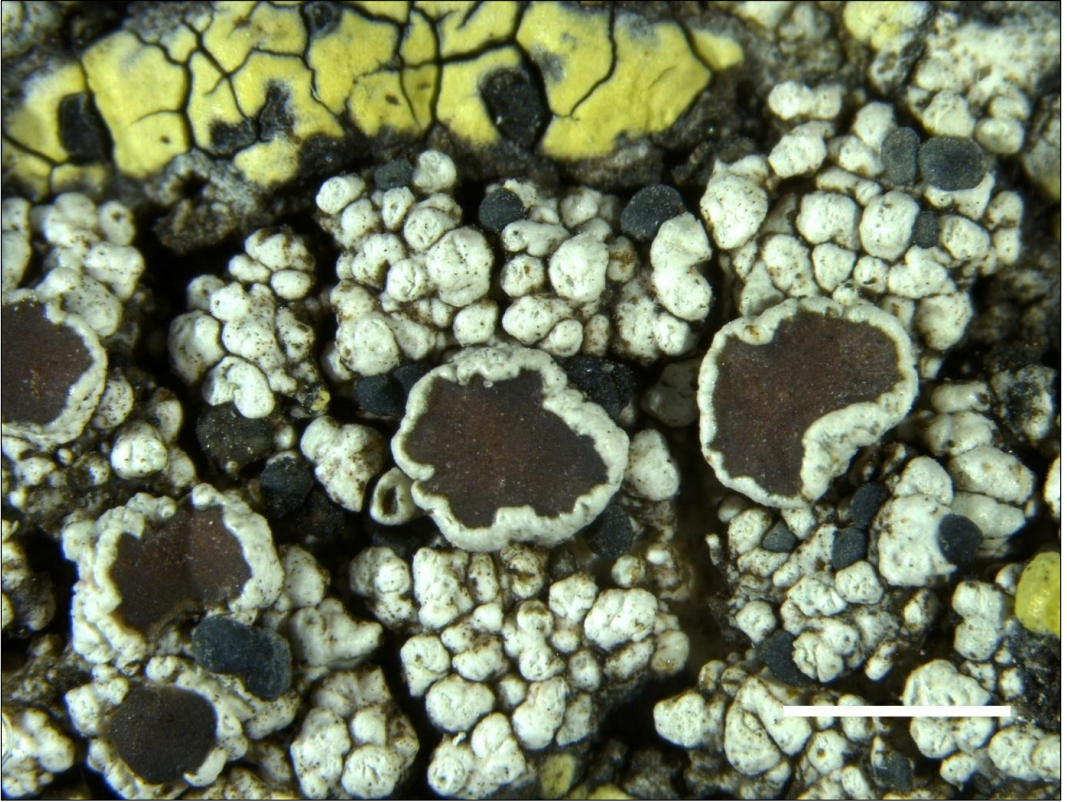


Figure 29. *Lecanora lecanoricola* (on *Lecanora cenisia*). TRH-L-32980. Scale = 2 mm. Photo: A. Frisch.

Hawksworth 1980, Roux et al. 2020, Spooner & Kirk 1990, Suija 2005a, Türk & Berger 1999, Westberg et al. 2021, Zhurbenko & Kobzeva, 2016, Zhurbenko & Vershinina 2014) and additionally reported from Chile (Etayo & Sancho 2008).

Specimen examined: Oslo: Nordmarken, on *C. delisei*, 14 Sep 1868, N.G. Moe s.n. (TRH-L-47112).

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

Fig. 30

This species was found on *Ochrolechia juvenalis* growing on branches of a solitary spruce in a mire in Røyrvik municipality (Nord-Trøndelag). *Llimoniella vinosa* is a rare species that was previously known in Norway from scattered localities in Hedmark, Oppland, Nord- and Sør-Trøndelag (Holien 1998, Holien & Triebel 1996, Nygård et al. 2014). It is further reported from the British Isles (Hawksworth 2003) and Svalbard (Zhurbenko & Brackel 2013).

Specimen examined: Nord-Trøndelag: Røyrvik, Klumplia Høgda, 64.8386°N, 13.5915°E, on *O. juvenalis*, 571 m, 4 June 2021, A. Frisch 21/No543 (TRH-L-32923).



Figure 30. *Llimoniella vinosa* (on *Ochrolechia juvenalis*). TRH-L-32923. Scale = 0.5 mm. Photo: A. Frisch.

***Milospium lacoizquetae* Etayo & Diederich**

This species was found on *Cladonia polydactyla* growing on *Pinus sylvestris* in coastal pine forest in Surnadal municipality (Møre og Romsdal). *Milospium lacoizquetae* was first reported for Norway from Sogn og Fjordane (Frisch et al. 2020). It is a widely distributed species in Europe (e.g., Berger 2019, Brackel 2014 and references therein, Brackel 2016, Brackel & Kocourková 2006, Khodosovtsev et al. 2016, Schiefelbein et al. 2012, Šoun et al. 2006) and further reported from Vietnam (Zhurbenko et al. 2020a).

Specimen examined: Møre og Romsdal: Åsbøsyntå, 62.8845°N, 8.6078°E, 88 m, on *C. polydactyla*, 3 Sep 2021, A. Frisch 21/No978 (TRH-L-32992).

***Nigropuncta rugulosa* D. Hawksw.**

Fig. 31

This species was found on *Bellemeria cinereorufescens* growing on calcareous boulders and cliffs in Oppland municipality (Sør-Trøndelag), and Fauske and Saltdal municipalities (Nordland). Additional specimens were discovered in collections of *B. cinereorufescens* from Kongsvoll (Sør-Trøndelag) and Steinkjer (Nord-Trøndelag) preserved in TRH. *Nigropuncta rugulosa* was previously known in Norway from Sogn og Fjordane and Oppland (Hafellner 1993), and from

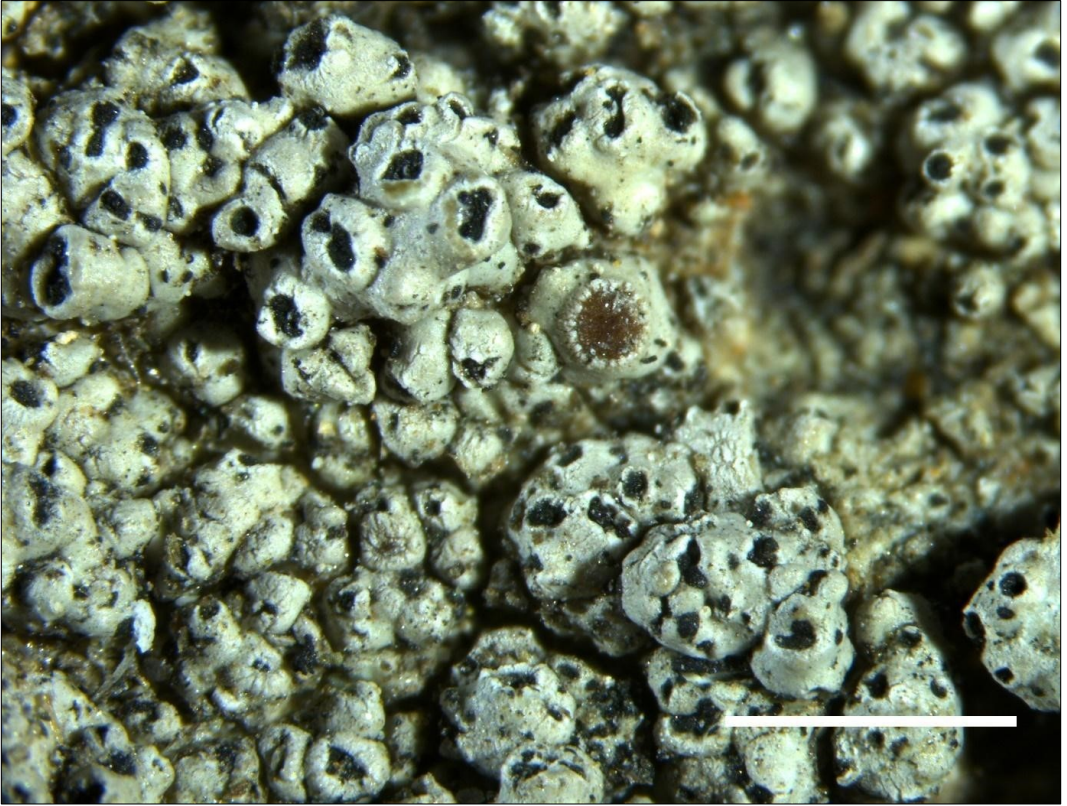


Figure 31. *Nigropuncta rugulosa* (on *Bellemerea cinereorufescens*). TRH-L-32985. Scale = 2 mm. Photo: A. Frisch.

Skibotndalen in Troms (Alstrup et al. 2008). It is probably a frequent but overlooked fungus on *B. cinereorufescens* in Norway and a widely distributed species in Europe (e.g., Etayo 2010a, Hafellner 2012, 2015, Hawksworth 1981, Tarasova et al. 2020, Westberg et al. 2021, Wirth 1992). It was further reported from Svalbard (Alstrup & Elvebakk 1996), Greenland (Alstrup et al. 2009), Canada (Alstrup & Cole 1998), Turkey (Hafellner & John 2006), and New Zealand (Hafellner & Mayrhofer 2007).

Specimens examined (all on Bellemerea cinereorufescens): Sør-Trøndelag: Oppdal, Brattskarven, 62.7136°N, 9.6639°E, 1146 m, 31 Aug 2021, A. Frisch 21/No946, 21/No1462 (TRH-L-32985, 24895); *ibid.*, Kongsvoll, 1878, C. Kindt s.n. (TRH-L-20244, 25314); Roros, Skaar Hammerdal, Jul 1926, E.P. Vrang s.n. (TRH-L-20245). *Nord-Trøndelag:* Steinkjer, Grønliheia, 63.9393°N, 11.9108°E, ca 395 m, 23 Aug 2009, H. Holien 12459 (TRH-L-13572). *Nordland:* Fauske, Åvvilumtjåhkkå, 67.1091°N, 15.9064°E, 901 m, 27 Jul 2021, A. Frisch 21/No1225, 21/No1228 pr.p. (TRH-L-23475, 23476); Saltdal, Solvågli N 66.8350°N, 15.4975°E, 750 m, 13 Jul 2021, J. Klepsland & A. Frisch 21/No1785 (TRH-L-24965).

***Opegrapha pertusariicola* Coppins & P. James**

This species was found on thallus of *Pertusaria leioplaca* growing on *Corylus avellana* in highly oceanic, deciduous forests in Surnadal municipality (Møre og Romsdal) and Indre Fosen

municipality (Sør-Trøndelag). It was reported as new to Fennoscandia from Hordaland and Møre og Romsdal (Frisch et al. 2020). *Opegrapha pertusariicola* is further known from the British Isles (Coppins & James 1979, Cannon et al. 2021), Italy (Brackel 2016), and the Canary Islands (Hafellner 1995b).

Specimens examined (all on P. leioplaca): Møre og Romsdal: Surnadal, Soløyneset, 62.9507°N, 8.4241°E, 5 m, 3 Sep 2021, A. Frisch 21/No1404, 21/No1406 (TRH-L-24881, 24884); *ibid.*, 62.9504°N, 8.4241°E, 14 m, 3 Sep 2021, A. Frisch 21/No992 (TRH-L-32994). *Sør-Trøndelag:* Indre Fosen, Varggangslia II, 63.5127°N, 9.9297°E, 100 m, 14 Nov 2020, A. Frisch 20/No89 (TRH-L-23436).

***Opegrapha pulvinata* Rehm**

This species was discovered in collections of *Dermatocarpon miniatum* from Kongsvoll (Sør-Trøndelag) and Træna municipality (Nordland) preserved in TRH. It was previously known from scattered localities in southeastern Norway and a single locality in Gildeskål municipality, Nordland (Westberg et al. 2021). *Opegrapha pulvinata* is a widely distributed but not often collected species in the Northern Hemisphere (Cannon et al. 2021, Brackel 2014 and references herein, Hafellner 2018a, Lisická 1998, Roux et al. 2020, Urbanavichus & Ismailov 2013, Urbanavichus et al. 2011).

Specimens examined (all on Dermatocarpon miniatum): Sør-Trøndelag: Oppdal, Kongsvoll, 1970, A.A. Frisvoll s.n. (TRH-L-651397). *Nordland:* Gildeskål, Indyr, s.d., J.M. Norman s.n. (TRH-L-27569, sub *Dermatocarpon miniatum*); Træna, Sanda, 31 Aug 1927, O.A. Hoeg s.n. (TRH-L-27568).

***Opegrapha sphaerophorica* Isbrand & Alstrup**

This species was found on *Sphaerophorus globosus* growing on siliceous boulders and rocks in highly oceanic, boreal, deciduous forests in Gildeskål and Meløy municipalities (Nordland). *Opegrapha sphaerophorica* was first reported for Fennoscandia from coastal pine forests in Flora, Sogn og Fjordane (Frisch et al. 2020). The new collections represent a considerable range extension for the species and the northernmost localities known to date. *Opegrapha sphaerophorica* is further reported from Central Europe (Hafellner 1994a, Hawksworth 2003, Martínez 2002), the Canary Islands (Hafellner 1995b), and North America (Esslinger 2021).

Specimens examined (all on Sphaerophorus globosus): Nordland: Gildeskål, Novika, 66.9813°N, 13.8639°E, 19 m, 16 Jul 2021, A. Frisch & J. Klepsland 21/No638 (TRH-L-32936); Meløy, Kunna, 66.9391°N, 13.4961°E, 12 m, 16 Jul 2021, J. Klepsland & A. Frisch 21/No1187 (TRH-L-23464); *ibid.*, 66.9386°N, 13.4961°E, 10 m, J. Klepsland & A. Frisch 21/No1627 (TRH-L-24940).

***Phacographa lapponica* (Ihlen) Frisch & Ihlen, comb. nov.**

Mycobank: MB 846348

Basionym: *Epicladonia lapponica* Ihlen, in Ihlen & Wedin, Nova Hedwigia 81: 495 (2005).

Illustrations: Ihlen & Wedin (2005); Frisch et al. (2020).

nrITS-barcode: GenBank ON705018 (specimen Frisch 18/No152; TRH-L-24114).

Epicladonia lapponica was reported as new to Norway in Frisch et al. (2020). Recently obtained molecular data (Fig. 32) place this species in *Phacographa* and the necessary combination is made. *Phacographa lapponica* is known only in the pycnidial state.

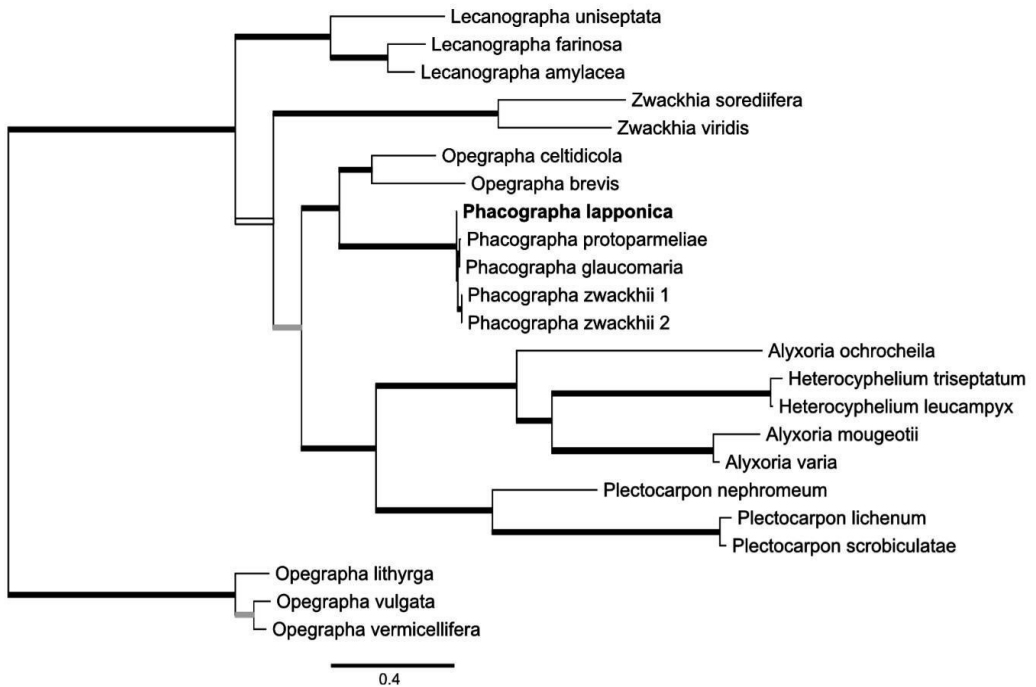


Figure 32. RAxML tree of selected genera and species in the Lecanographaceae showing the position of *P. lapponica*. Branches supported by ML BS ≥ 70 and BPP ≥ 0.95 are indicated by thick black lines. ML BS support only is indicated by thick grey lines, BPP support only by thin double lines.

Phacographa lapponica was described by its author in the anamorphic genus *Epicladonia* with some hesitation. It differed from other species in that genus by a continuous and brown pycnidial wall (subhyaline except around the ostiole in other *Epicladonia* species), the simple, bacilliform conidia (at least partly 1-septate in *E. sandstedei* and *E. stenospora*), and by not infesting *Cladonia* species. The characteristic galls of the host thallus induced by *E. sandstedei* and *E. simplex* are absent (Ihlen & Wedin 2005). Our molecular analyses show that *P. lapponica* differs from all other *Phacographa* species accepted so far, although genetic variation within the genus is extremely low with the current molecular markers (mtSSU, nrLSU, *RPB2*). The different host taxa and the morphological differences described in Hafellner (2009) are reasons for keeping them separate.

The pycnidia of *P. lapponica* have been extensively described and illustrated in Ihlen & Wedin (2005). Pycnidia were previously unknown in *Phacographa* (Hafellner 2009) but have been observed in a specimen of *P. protoparmeliae* described below.

***Phacographa protoparmeliae* Hafellner**

Fig. 33

This species was found on *Protoparmelia badia* growing in calcareous alpine heath and meadows in Oppdal municipality (Sør-Trøndelag), Namsskogan municipality (Nord-Trøndelag), and Beiarn municipality (Nordland). It was first reported for Fennoscandia from Røros (Westberg et al. 2015)



Figure 33. *Phacographa protoparmeliae* (on *Protoparmelia badia*). TRH-L-24864. Pycnidia. Scale = 2 mm. Photo: A. Frisch.

and further known from Lyngseidet, Troms (Frisch et al. 2020). *Phacographa protoparmeliae* is a widely distributed but seldom collected species in Europe (Fryday 2011, Hafellner 2009 and references therein, Roux et al. 2020, Westberg et al. 2015, 2016).

The specimen collected in Oppdal (TRH-L-24864) bears numerous pycnidia that closely resemble those of *P. lapponica*. Since pycnidia have not been described for *P. protoparmeliae*, they are shortly characterized below.

Description: Pycnidia 0.2–0.5 mm, up to nine in a host areole, at first subglobose and immersed, later breaking through the host thallus and emergent, rounded to sublobate, brownish black, matt, with a rough surface; pore elongated, with a few short branches in larger pycnidia, ca 0.03–0.05 mm wide; margin deeply fissured. Wall in section dark brown, 15–25 μm thick, continuous, well-delimited from the host tissue, composed of rounded to elongated cells, 3–5 μm wide, with dark brown pigment deposited along the walls. Conidiophores absent. Conidiogenous cells phialidic, lining the inner wall of the pycnidial cavity, hyaline, subcylindrical to elongate-ampulliform, (7–)8.4–13.6(–16) \times (1.5–)1.7–2.9(–4) μm (n=15; length: mean=11.0, SD=2.56; width: mean=2.29, SD=0.56), tapering towards the apex. Conidia formed at the apex of the conidiogenous cells, arising singly, simple, bacilliform to long bacilliform with rounded ends, (6–)6.4–8.4(–10) \times (1.2–)1.2–1.7(–2) μm (n=30; length: mean=7.4, SD=1.07; width: mean=1.43, SD=0.23).

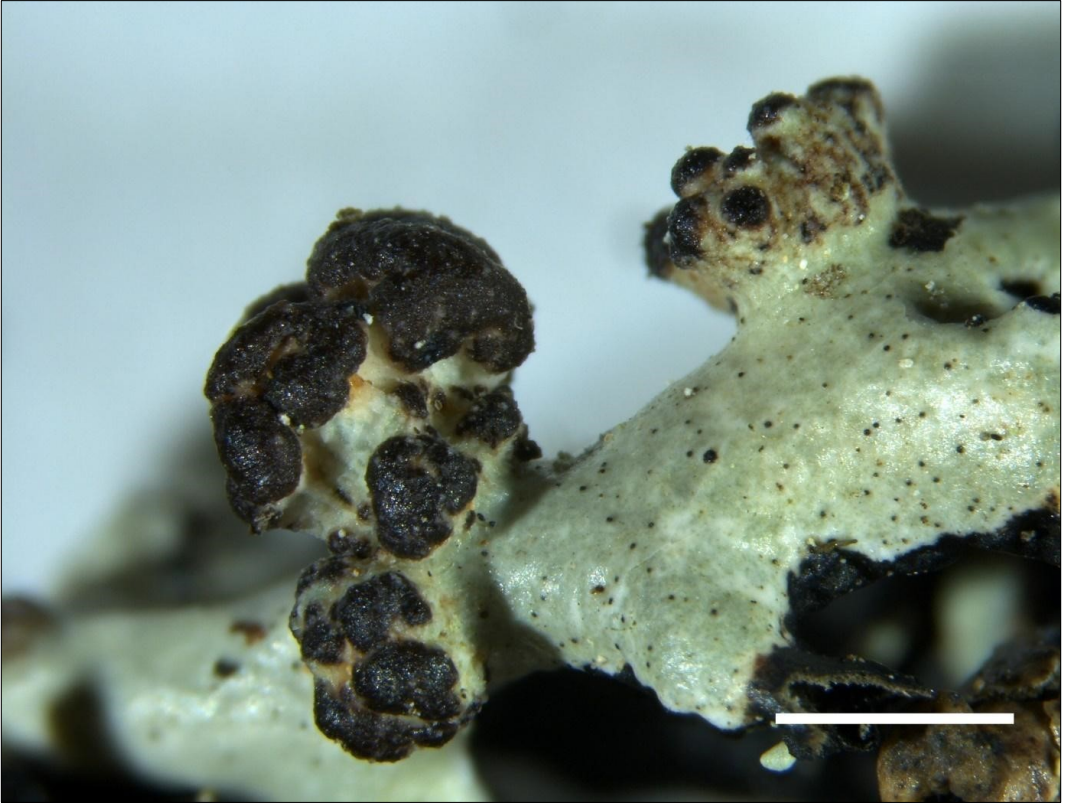


Figure 34. *Phacopsis cephalodioides* (on *Hypogymnia physodes*). TRH-L-32984. Scale = 2 mm. Photo: A. Frisch.

Specimens examined (all on *Protoparmelia badia*): *Sør-Trøndelag*: Oppdal, Brattskarven, 62.7128°N, 9.6694°E, 1178 m, 31 Aug 2021, A. Frisch 21/No1319 (TRH-L-24864). *Nord-Trøndelag*: Namsskogan, Steinfjellet, 64.8718°N, 13.2653°E, 750 m, 7 Jun 2021, A. Frisch 21/No449 (TRH-L-32906). *Nordland*: Beiarn, Sokumdalen SV, 66.9330°N, 14.3355°E, 575 m, 21 Jul. 2021, A. Frisch & J. Klepsland 21/No1555 (TRH-L-24915); *ibid.*, Beiarskardvatnet SØ, 67.0303°N, 14.9142°E, 675 m, 22 Jul 2021, A. Frisch & J. Klepsland 21/No1566 (TRH-L-24917); *ibid.*, 67.0325°N, 14.9017°E, 665 m, 22 Jul 2021, J. Klepsland & A. Frisch 21/No1604 (TRH-L-24927); *ibid.*, 67.0325°N, 14.9031°E, 675 m, 22 Jul 2021, J. Klepsland & A. Frisch 21/No1616 (TRH-L-24935).

***Phacographa zwackhii* (A. Massal. ex Zwackh) Hafellner**

This species was found on *Phlyctis argena* growing on a siliceous boulder in dense, boulder-rich, boreal deciduous forest in Orkland municipality (*Sør-Trøndelag*), and on an *Acer platanoides* alley tree in Steinkjer municipality (*Nord-Trøndelag*). *Phacographa zwackhii* was first reported for Norway in Frisch et al. (2020). It is a widely distributed but uncommon species throughout Europe (Brackel 2014 and references therein, Khodosovtsev et al. 2013, Roux et al. 2020, Westberg et al. 2021).

Specimens examined (all on Phlyctis argena): Sør-Trøndelag: Orkland, Osplihaugen, 63.0534°N, 9.6468°E, 153 m, 3 Aug 2021, A. Frisch 21/No330 (TRH-L-24991). *Nord-Trøndelag:* Steinkjær, Østbyevegen, 64.0317°N, 11.4501°E, 53 m, 29 Mar 2021, A. Frisch, H. Holien & M.H. Kirkhus 21/No24 (TRH-L-24974).

***Phacopsis cephalodioides* (Nyl.) Triebel & Rambold**

Fig. 34

This species was found on *Hypogymnia physodes* and *H. tubulosa* growing in various coniferous and deciduous forest communities in Rindal municipality (Sør-Trøndelag), Grong and Namsos municipalities (Nord-Trøndelag), and Gildeskål municipality (Nordland). It was previously reported for Norway from Nord-Trøndelag and Nordland (Westberg et al. 2021). *Phacopsis cephalodioides* is a rarely reported species being known so far from western and northern Europe (Triebel & Rambold 1988, Triebel et al. 1995, Hirschheydt et al. 2021, Roux et al. 2020, Westberg et al. 2021, Zhurbenko & Zhdanov 2013), Canada (Diederich 2003), Chile (Etayo & Sancho 2008), Macaronesia (Ertz & Diederich 2008, Hafellner 1995c), Siberia (Zhurbenko 2004, Zhurbenko & Kobzeva 2014, Zhurbenko & Otnyukova 2001, Zhurbenko & Vershinina 2014), and Turkey (Hafellner & John 2006).

Specimens examined: Sør-Trøndelag: Rindal, Bulu, 63.0366°N, 9.2040°E, 134 m, on *H. physodes*, 2 Sep 2021, A. Frisch 21/No945 (TRH-L-32984). *Nord-Trøndelag:* Grong, Solemsmoen, 64.5749°N, 12.5848°E, 113 m, on *H. physodes*, 10 Jun 2021, A. Frisch 21/No453 (TRH-L-32908); *ibid.*, Solem, 64.5761°N, 12.5559°E, 90 m, on *H. physodes*, 10 Jun 2021, A. Frisch 21/No509 (TRH-L-32916); *ibid.*, 64.5764°N, 12.5560°E, 89 m, on *H. physodes*, 10 Jun 2021, A. Frisch 21/No506 (TRH-L-24851); Namsos, S of Trebostad by river Austerelva, 64.2446°N, 11.3206°E, 80 m, on *H. tubulosa*, 4 Aug 1980, H. Holien 494 a-80 (TRH-L-8533, sub *Nephroma bellum*). *Nordland:* Gildeskål, Kransvika S, 67.0883°N, 14.2086°E, 25 m, on *H. tubulosa*, 15 Jul 2021, J. Klepsland & A. Frisch 21/No1609 (TRH-L-24931).

***Plectocarpon cladoniae* R. Sant.**

Fig. 35

This species was found on *Cladonia pyxidata* growing on mossy boulders in humid boreal deciduous forests in Beiarn, Gildeskål, and Saltdal municipalities (Nordland). According to Santesson (1994), collections of *P. cladoniae* were first reported in Norway from Saltdal under the name *Dothidea lichenum* (= *Plectocarpon lichenum*; Sommerfelt 1826). *Plectocarpon cladoniae* is further known from Hordaland and Sogn og Fjordane (Westberg et al. 2021). It is a widely distributed but seldom collected species throughout the Northern Hemisphere (Brodo et al. 2013, Ertz et al. 2005, Santesson 1994, Spribille et al. 2010, Thor 1992, Westberg et al. 2021, Zhurbenko & Alstrup 2004, Zhurbenko & Himelbrant 2002, Zhurbenko & Ohmura 2019, Zhurbenko & Pinos-Bodas 2017).

Specimens examined (all on Cladonia pyxidata): Nordland: Beiarn, Leirvika, 67.0359°N, 14.6129°E, 7 m, A. Frisch & J. Klepsland 21/No1547 (TRH-L-24912); Gildeskål, Djupdalen-Vågaksla, 67.1206°N, 14.0636°E, 170 m, 17 Jul 2021, J. Klepsland & A. Frisch 21/No1599 (TRH-L-24925); Saltdal, Storjord: Junkerdalen, 66.8161°N, 15.4198°E, 119 m, 13 Jul 2021, A. Frisch & J. Klepsland 21/No624 (TRH-L-32933); *ibid.*, Russelvdalen, 66.9165°N, 15.2957°E, 142 m, 30 Jul 2021, A. Frisch 21/No1306 (TRH-L-24863); *ibid.*, 66.9173°N, 15.2943°E, 150 m, 30 Jul 2021, A. Frisch 21/No1446 (TRH-L-24891).

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

Fig. 36

This species was found on *Lobaria linita* growing in calcareous alpine heath in Beiarn and Fauske municipalities (Nordland). It is a seldom collected species that was previously reported from Nordland, Troms, and Finnmark (Ertz et al. 2005). *Plectocarpon linitae* is further known from

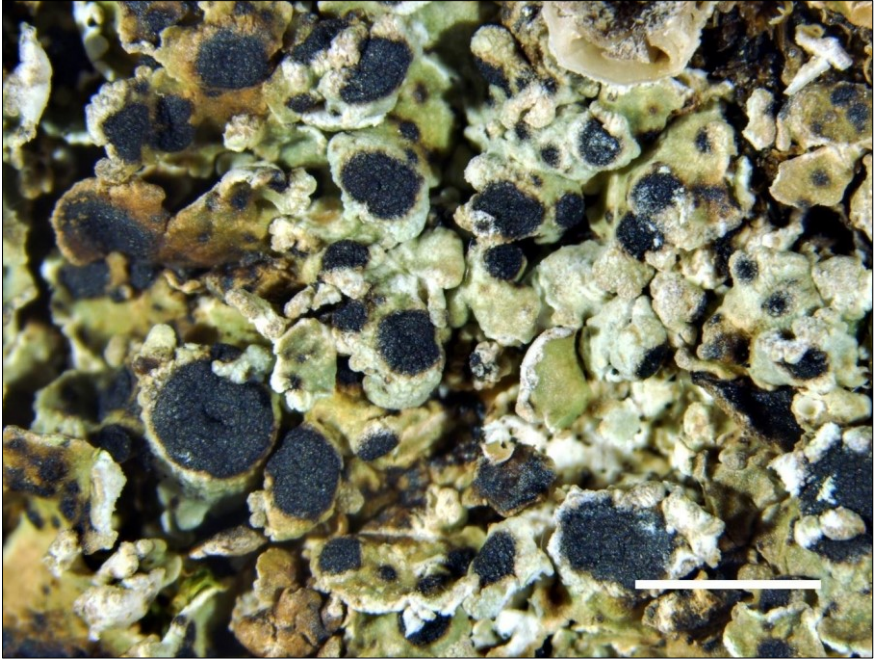


Figure 35. *Plectocarpon cladoniae* (on *Cladonia pyxidata*). TRH-L-24925. Scale = 2 mm. Photo: A. Frisch.



Figure 36. *Plectocarpon linitae* (on *Lobaria linita*). TRH-L-32970. Scale = 2 mm. Photo: A. Frisch.

Finland (Suija & Jürriado 2020), North America (Esslinger 2021), Siberia (Ertz et al. 2005), Svalbard (Zhurbenko & Brackel 2013), and Sweden (Santesson 1988, Wedin & Hafellner 1998, Westberg 2021).

Specimens examined (all on Lobaria linita): Nordland: Beiarn, Sokumdalen S, 66.9283°N, 14.3714°E, 500 m, J. Klepsland & A. Frisch 21/No328 (TRH-L-24990); Fauske, Jakobsbakkan, 67.1047°N, 15.9929°E, 707 m, 26 Jul 2021, A. Frisch 21/No859 (TRH-L-32970).

***Plectocarpon peltigerae* Zhurb., Ertz, Diederich & Miädl.**

A scanty specimen was discovered in a collection of *Peltigera aphthosa* from Kongsvoll (Sør-Trøndelag) preserved in TRH. The species was previously known from Nord-Trøndelag (Westberg et al. 2021), likely based on a specimen collected by R. Santesson from *P. leucophlebia* in Snåsa (UPS-F-667310). *Plectocarpon peltigerae* was described from British Columbia (Ertz et al. 2003) and is further known from Finland (Puolasmaa et al. 2012, Suija & Jürriado 2020, Toivanen 2008), Russia (Ertz et al. 2003, Zhurbenko 2004, 2009, Zhurbenko et al. 2012), Sweden (Westberg et al. 2021), and the U.S.A. (Gockman et al. 2020).

Specimen examined: Sør-Trøndelag: Oppdal, Kongsvoll, 62.3067°N, 09.6075°E, on *P. aphthosa*, 5 Apr 1971, A.A. Frisvoll s.n. (TRH-L-651475).

***Polycoccum clauzadei* Nav.-Ros. & Cl. Roux**

This species was found on *Rusavskia elegans* growing on a steep boulder face in boreal deciduous forests in Saltdal municipality (Nordland). It was previously reported from Oppland (Frisch et al. 2020) and Troms (Alstrup 2004). *Polycoccum clauzadei* is a seldom collected species being further known from Canada (Diederich 2003, Freebury 2014), France (Navarro-Rosinés & Roux 1998), India (Zhurbenko 2013), Korea (Kondratyuk et al. 2017), Siberia (Urbanavichene & Urbanavichus 2009), Sweden (Alstrup 2004), Switzerland (Zimmermann & Feusi 2020), and the U.S.A. (Hafellner et al. 2002).

Specimens examined (all on Rusavskia elegans): Nordland: Fauske, Storjord, Junkerdalen, 66.8150°N, 15.4135°E, 121m, 12 Jul 2021, A. Frisch & J. Klepsland 21/No1092 (TRH-L-23451); *ibid.*, 66.8161°N, 15.4198°E, 119 m, 13 Jul. 2021, A. Frisch & J. Klepsland 21/No1192 (TRH-L-23468).

***Polycoccum microsticticum* (Leight.) Arnold**

A scanty specimen has been discovered growing on *Acarospora* sp. in a sand dune area in Klepp municipality (Rogaland) preserved in TRH. The species was previously reported from Sogn og Fjordane (Westberg et al. 2021), likely based on a specimen collected by R. Santesson from *Ionaspis lacustris* near Husum, Lærdal municipality (UPS-F-174173). *Polycoccum microsticticum* is known throughout Europe (Brackel 2014 and references therein, Darmostuk & Golovenko 2016, Roux et al. 2020) and further reported from the Canary Islands (Etayo & van den Boom 2005), Greenland (Alstrup & Hawksworth 1990), and the U.S.A. (Hawksworth & Diederich 1988, Santesson 1986).

Specimen examined: Rogaland: Klepp, 58.8128°N, 5.5455°E, 5m, on *Acarospora* sp., 26 Jul 1978, T. Reve s.n. (TRH-L-30250, sub *Buellia aethalea*).

***Protounguicularia nephromatis* (Zhurb. & Zavarzin) Huhtinen, D. Hawksw. & Ihlen**

This species was found on thallus of *Nephroma bellum*, *N. laevigatum*, *N. parile*, and *N. resupinatum* growing in oceanic or locally humid forest communities from Rindal Municipality (Sør-Trøndelag) to Saltdal municipality (Nordland). It was previously known from scattered localities in Nord-Trøndelag, Nordland, and a single locality in Hordaland (Frisch et al. 2020, Huhtinen et al. 2008, Puolasmaa et al. 2008, Westberg et al. 2021). *Protounguicularia nephromatis* is a widely distributed but seldom collected species in the Holarctic (Haldeman 2021, Huhtinen et al. 2008, Puolasmaa et al. 2008, Zhurbenko 2007a, Zhurbenko et al. 2015) and further reported from Bolivia (Flakus et al. 2019) and Peru (Etayo 2010).

Specimens examined: *Sør-Trøndelag*: Melhus, Gammelvollmoen, 63.0937°N, 10.1890°E, 161 m, on *N. bellum*, 14 May 2021, A. Frisch 21/No121 (TRH-L-23470); Orkland, Resdalen V, 62.9663°N, 9.7105°E, 274 m, on *N. resupinatum*, 3 Aug 2021, A. Frisch 21/No1273 (TRH-L-23488); Rindal, Bulu, 63.0357°N, 9.2054°E, 139 m, on *N. laevigatum*, 2 Sep 2021, A. Frisch 21/No994 (TRH-L-32995); Trondheim, Donøyelva S for Selbusjøen, 63.2581°N, 10.5836°E, 160–250 m, on *N. bellum*, 16 Oct 1977, T. Tønsberg 2511 (TRH-L-27943); *ibid.*, W of Løkkstadåsen, 63.3559°N, 10.5589°E, 200 m, on *N. parile*, 6 Sep 2003, H. Holien 9761 (TRH-L-9582). *Nord-Trøndelag*: Grong, Solem, 64.5764°N, 12.5560°E, 91 m, on *Nephroma* sp., 10 Jun 2021, A. Frisch 21/No514 (TRH-L-32917); *ibid.*, Gartlandselva naturreservat, 64.5443°N, 12.3758°E, 82 m, on *N. bellum*, 9 Jun 2021, A. Frisch, H. Holien & M.H. Kirkhus 21/No529 (TRH-L-32921); *ibid.*, Sandøla, 64.4678°N, 12.8834°E, 206 m, on *N. bellum*, 2 Aug 2021, A. Frisch 21/No1266 (TRH-L-23486); *ibid.*, Ekermymra, 64.4269°N, 12.3108°E, 100 m, on *N. laevigatum*, 14 Nov 1977, T. Tønsberg 2579 (TRH-L-27698); Namsos, NW of Hallaberget, 64.2097°N, 11.2559°E, 80–100 m, on *N. laevigatum*, 6 Jun 1981, H. Holien 260b-81 (TRH-L-7575). Nordland. Gildeskål, Kransvika S, 67.0883°N, 14.2086°E, 25 m, on *N. bellum*, 15 Jul 2021, J. Klepssland & A. Frisch 21/No1626 (TRH-L-24939); Hattfjeldal, Djupdalen, 65.4821°N, 13.9972°E, 328 m, on *N. resupinatum*, 15 Aug 2016, P. Marstad, H. Bjørgaas 196-16 (TRH-L-17166); Saltdal, Botnvatnet, 67.0804°N, 15.5257°E, 57 m, on *N. bellum*, 29 Jul 2021, A. Frisch 21/No810 (TRH-L-32964).

***Raesaenenia huuskonenii* (Räsänen) D. Hawksw., Boluda & H. Lindgr.**

This species is a widely distributed and common lichenicolous fungus in Norway, being known from Kinn (Sogn og Fjordane) and Stor-Elvdal (Hedmark) municipalities in the south to Bindal and Saltdal municipalities in Nordland. In total 133 specimens have been identified from 620 *Bryoria* specimens preserved in TRH and recent field collections. *Raesaenenia huuskonenii* is most often collected in humid boreal forest communities in central Norway, with 65 specimens from Namsos municipality (Nord-Trøndelag) alone. *Bryoria capillaris* and *B. implexa* are the most common host lichens, but *R. huuskonenii* has also been observed on other *Bryoria* species including *B. americana*, *B. fremontii*, *B. fuscescens*, *B. glabra*, and *B. smithii*. *Raesaenenia huuskonenii* was previously reported from Oppland (Santesson 1986) and Nord-Trøndelag (Westberg et al. 2021). It is furthermore known from scattered localities across the Northern Hemisphere (e.g., Boluda et al. 2015, Gockman et al. 2020, Hafellner 1987, Hafellner & Mayrhofer 2020, Hawksworth 1982, Himmelbrant et al. 2018, 2019, Lindgren et al. 2015, Santesson 1988, van den Boom & Ertz 2012, Westberg et al. 2021, Zhurbenko & Ohmura 2019, Zhurbenko & Vershinina 2014).

Specimens examined (selection): *Hedmark*: Stor-Elvdal, SE of Mt Ledsagaren, 61.7475°N, 10.6711°E, 650 m, on *B. implexa*, 22 Sep 1994, H. Holien 6454 (TRH-L-3301). *Oppland*: Lillehammer, Lillehammer: Nordsæter, on *B. implexa*, 2 Jul 1937, E.P. Vrang s.n. (TRH-L-27168); Rendalen, Hanestad: Moen, on *B. implexa*, 13 Jun 1918, B. Lyngre s.n. (TRH-L-27166); Ringebu, Skjerdingsfjell: Skardsæterlia, 61.7241°N, 10.5979°E, 806 m, on *B. implexa*, 30 Jun 1994, H. Holien 6197 (TRH-L-3167); Søndre Land, Land: Odnæsberget, on *B. fremontii*, 7 Jun 1880, J.M. Norman s.n. (TRH-L-25153). *Sogn og Fjordane*: Kinn, Lykkjebøvatnet, 61.6303°N, 5.6223°E, 80 m, on *B. capillaris*, 4 Jul 2007, H. Holien 11206 (TRH-L-12251). *Sør-Trøndelag*: Heim, Røstøya,

63.4412°N, 8.9048°E, 40 m, on *B. capillaris*, 12 May 1999, H. Holien 7656 (TRH-L-4169); Oppdal, Lønset: Nerhoel, on *B. fuscescens*, 2 Nov 1940, J.E. Haugen s.n. (TRH-L-25136); Orkland, E of Svorkmo: Sprangåsen, 63.1659°N, 9.8041°E, 200–220 m, on *B. americana*, 15 Sep 1993, H. Holien 5975 (TRH-L-2490); *ibid.*, NE of Mjovatnet, 63.1029°N, 9.8420°E, 400–420 m, *B. americana*, 9 Sep 1992, H. Holien 5395 (TRH-L-2424); Rindal, Bulu, 63.035232°N, 9.203082°E, 184 m, on *Bryoria* sp., 2 Sep 2021, A. Frisch 21/No912 (TRH-L-32978); Skaun, Råbygda: Mellingsetra, 63.2008°N, 9.9641°E, 330–340 m, on *B. capillaris*, 30 Jun 1993, H. Holien 5704 (TRH-L-2878); Trondheim, Bymarka, 63.3828°N, 10.2773°E, 200 m, on *B. implexa*, 5 Sep 1999, H. Holien 7777 (TRH-L-4577); *ibid.*, Selbusjøen: Donøyelva, 63.2581°N, 10.5836°E, 160–250 m, on *B. capillaris*, 16 Oct 1977, T. Tønsberg 2515 (TRH-L-25351); Åfjord, Mørrivatnet SØ, 63.9035°N, 10.2419°E, 60 m, on *B. capillaris*, 15 Jun 1996, T. Prestø s.n. (TRH-L-23198); *ibid.*, Kringelstoltjørna, 64.0668°N, 10.5063°E, 220–240 m, *B. implexa*, 21 May 1983, H. Holien 17-83 (TRH-L-9469). *Nord-Trøndelag*: Flatanger, Eidbygds Gardet, 64.3925°N, 11.0323°E, 140–200 m, on *B. capillaris*, 5 Oct 1987, H. Holien 3027 (TRH-L-671); Grong, Gartlandselva naturreservat, 64.5508°N, 12.3744°E, 81 m, on *Bryoria* sp., 8 Jun 2021, A. Frisch 21/No318 (TRH-L-24989); *ibid.*, Fiskumfoss, 64.5424°N, 12.4656°E, 94 m, on *Bryoria* sp., 9 Jun 2021, A. Frisch 21/No462 (TRH-L-32909); *ibid.*, Solem, 64.5734°N, 12.5546°E, 88 m, on *Bryoria* sp., 10 Jun 2021, A. Frisch 21/No505 (TRH-L-32915); Høylandet, Bjøråa: Kongsmoen, 64.8621°N, 12.3740°E, 240 m, on *Bryoria implexa*, 15 Jul 1998, H. Holien 7322 a (TRH-L-3995); Lierne, Styggdalen, 64.7129°N, 13.5532°E, 369 m, on *Bryoria* sp., 2 Jun 2021, A. Frisch 21/No160, 21/No163 (TRH-L-24926, 24941); *ibid.*, Havdalselva, 64.6368°N, 13.6821°E, 404 m, on *Bryoria* sp., 6 Jun 2021, A. Frisch 21/No241 (TRH-L-24975); *ibid.*, 64.6382°N, 13.6777°E, 371 m, on *Bryoria* sp., 6 Jun 2021, A. Frisch 21/No264 (TRH-L-24979); *ibid.*, Fagernesbekken, 64.6460°N, 13.6068°E, 423 m, on *Bryoria* sp., 6 June 2021, A. Frisch 21/No286 (TRH-L-24983); Tunnsjøen, 64.6919°N, 13.6422°E, 366 m, on *Bryoria* sp., 6 June 2021, A. Frisch 21/No389 (TRH-L-24998); Namsskogan, Spunstjønnbekken, 64.8883°N, 13.1770°E, 361 m, on *Bryoria* sp., 8 Jun 2021, A. Frisch 21/No179 (TRH-L-24966); Namsos, Finnsvoldvatnet: Storvassbukta, 64.1957°N, 10.9870°E, 180–200 m, on *B. fremontii*, 8 Jun 1981, H. Holien 267-81 (TRH-L-679); *ibid.*, Handbågåbukta, 64.1864°N, 11.0069°E, 200–240 m, on *B. capillaris*, 16 Jul 1981, H. Holien 373-81 (TRH-L-641); *ibid.*, Møltnåa, 64.2827°N, 11.1792°E, 60–120 m, on *B. implexa*, 9 Jun 1994, H. Holien 6103 (TRH-L-2615); Overhalla, Granbekkdalen, 64.4339°N, 11.7938°E, 20–60 m, on *B. capillaris*, 13 Aug 1981, H. Holien 948 b-81 (TRH-L-654); Røyrvik, Arndalen, 64.8009°N, 13.6738°E, 552 m, on *Bryoria* sp., 3 Jun 2021, A. Frisch 21/No178 (TRH-L-24964); *ibid.*, 64.7992°N, 13.6637°E, 505 m, on *Bryoria* sp., 3 Jun 2021, A. Frisch 21/No364 (TRH-L-24994); *ibid.*, 64.8002°N, 13.6705°E, 521 m, on *Bryoria* sp., 3 Jun 2021, A. Frisch 21/No370 (TRH-L-24996); *ibid.*, Klumplia Høgda, 64.8386°N, 13.5915°E, 571 m, on *Bryoria* sp., 4 Jun 2021, A. Frisch 21/No544 (TRH-L-32924). *Nordland*: Bindal, Terråk: Terråkelva, 65.0862°N, 12.3849°E, 20 m, on *B. fuscescens*, 5 Oct 2006, H. Holien 11122 a (TRH-L-11856); Saltdal, Dverset V, 67.1619°N, 15.3803°E, 165 m, on *B. fuscescens*, 14 Jul 2021, J. Klepsland & A. Frisch 21/No1682 (TRH-L-24946); *ibid.*, Botnvatnet, 67.0803°N, 15.5265°E, 76 m, on *Bryoria* sp., 29 Jul 2021, A. Frisch 21/No817 (TRH-L-32967).

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

This species was collected from *Lepraria alpina*, *L. elobata*, and *L. neglecta* coll. growing in boreal deciduous forest, subalpine birch forest, and exposed alpine boulders in Namsskogan and Røyrvik municipalities (Nord-Trøndelag), and Beiarn, Fauske and Saltdal municipalities (Nordland). It was previously reported from Hordaland, Finnmark, and Troms (Alstrup et al. 2008, Frisch et al. 2020, Westberg et al. 2021). *Rhombocarpus neglectus* is a widely distributed but seldom collected species throughout the Northern Hemisphere (e.g., Berger & Zimmermann 2021, Diederich & Etayo 2000, Hafellner 1995d, Kümmerling et al. 1993 and references therein, Roux et al. 2020, Santesson 1998, Svane & Alstrup 2004, Zhurbenko 2004, 2009, Zhurbenko & Brackel 2013, Zhurbenko et al. 2020b).

Specimens examined: *Nord-Trøndelag*: Namsskogan, Steinfjellet, 64.8615°N, 13.2564°E, 572 m, on *L. elobata*, 7 Jun 2021, A. Frisch 21/No397 (TRH-L-25000); *ibid.*, 64.8616°N, 13.2563°E, 579 m, on *L. neglecta* coll., 7 Jun 2021, A. Frisch 21/No406 (TRH-L-32902); Røyrvik, Stormyrfjellet, 64.8914°N, 13.9249°E, 510 m, on *L. elobata*, 5 Jun 2021, A. Frisch 21/No243 (TRH-L-24976); *ibid.*, Klumplia Høgda, 64.8344°N, 13.5936°E, 418

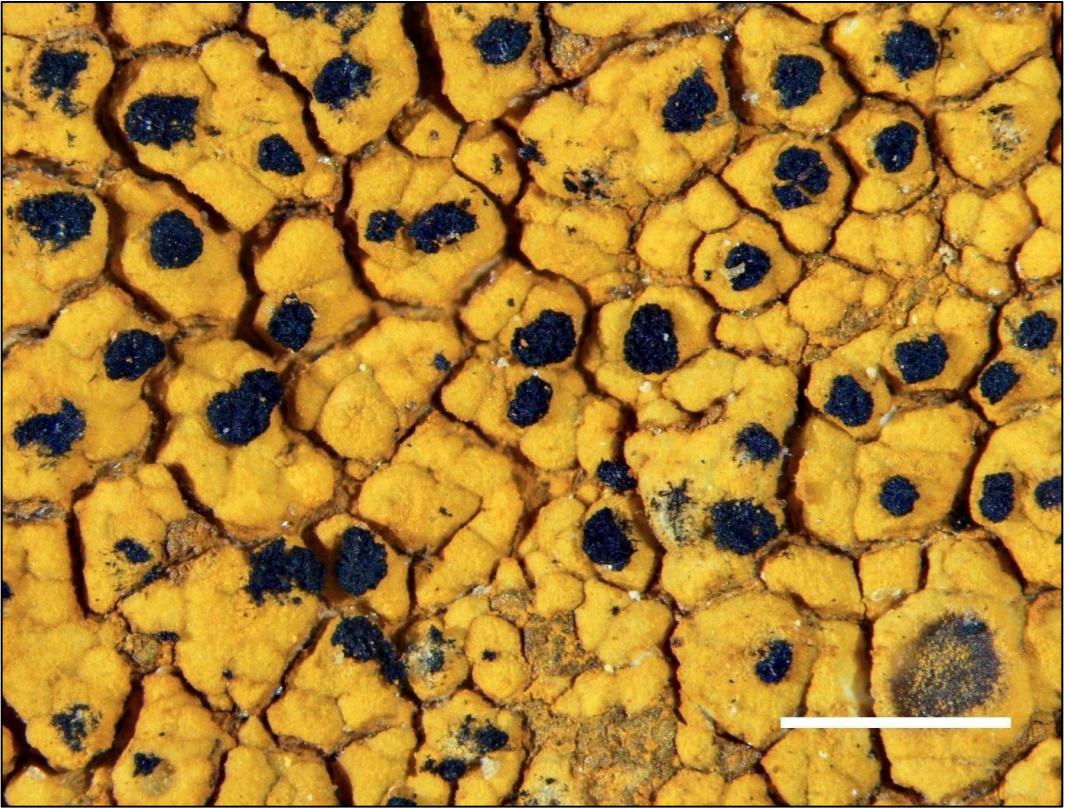


Figure 37. *Sclerococcum verrucisporum* (on *Bellemerea diamarta*). TRH-L-24967. Scale = 1 mm. Photo: A. Frisch.

m, on *Lepraria* sp., 4 Jun 2021, A. Frisch 21/No270 (TRH-L-24981). Nordland: Beiarn, Sokumdalen SV, 66.9303°N, 14.3507°E, 501 m, on *L. alpina*, 21 Jul 2021, A. Frisch & J. Klepsland 21/No1594 (TRH-L-24922); *ibid.*, 66.9303°N, 14.3506°E, 500 m, on *L. neglecta* coll., 21 Jul 2021, J. Klepsland & A. Frisch 21/No1600 (TRH-L-24924); *ibid.*, Beiarskardvatnet SØ, 67.0325°N, 14.9019°E, 670 m, on *L. neglecta* coll., 22 Jul 2021, J. Klepsland & A. Frisch 21/No1710 (TRH-L-24954); Fauske, Jakobsbakkan, 67.1030°N, 15.9922°E, 698 m, on *L. elobata*, 26 Jul 2021, A. Frisch 21/No660 (TRH-L-32939); *ibid.*, Ávvilumtjáhkkå, 67.1091°N, 15.9064°E, 900 m, on *L. alpina*, 26 Jul 2021, A. Frisch 21/No682 (TRH-L-32943); Saltdal, Storjord: Solvågli N, 66.8370°N, 15.5014°E, 733 m, on *L. neglecta* coll., 17 Jul 2021, A. Frisch & J. Klepsland 21/No1143 (TRH-L-23462); *ibid.*, Botnvatnet, 67.0826°N, 15.5357°E, 118 m, on *Lepraria* sp., 29 Jul 2021, A. Frisch 21/No814 (TRH-L-32965); *ibid.*, 67.0740°N, 15.5372°E, 22 m, on *L. elobata*, 29 Jul 2021, A. Frisch 21/No1246 (TRH-L-23481).

***Rhymbocarpus pubescens* (Etayo & Diederich) Diederich & Etayo**

This species was found on *Lepraria finkii* growing on rain-sheltered stem bases and stumps of spruce and pine in broad-leaf deciduous forest in Sunndal municipality (Møre og Romsdal), old boreal spruce forests in Skaun and Trondheim municipalities (Sør-Trøndelag), and on marble boulders in a spruce plantation in Beiarn municipality (Nordland). It was previously reported from *Lepraria rigidula* in Hordaland, based on a collection by T. Tønsvåg in Osterøy (Westberg et al. 2021).

Rhymbocarpus pubescens is further known from the British Isles, Spain, and Papua New Guinea (Etayo & Diederich 1998), Russia (Urbanavichus et al. 2020), and Ukraine (Darmostuk et al. 2020).

Specimens examined: Møre og Romsdal: Sunndal, Sunndalsfjorden nordside: Flåstranda, 62.7456°N, 8.4926°E, 19 m, on *Lepraria finkii*, 27 Aug 2021, A. Frisch 21/No1316 (TRH-L-24865). *Sør-Trøndelag:* Melhus, Gammelvollmoen, 63.0943°N, 10.1896°E, 153 m, on *L. finkii*, 14 May 2021, A. Frisch 21/No119, 21/No122 (TRH-L-23467, 23474); Trondheim, Bymarka: Stadsheia, 63.4391°N, 10.2539°E, 255 m, on *L. finkii*, 2 May 2021, A. Frisch 21/No50 (TRH-L-23431). *Nordland:* Beiarn, Leirvika, 67.0317°N, 14.6131°E, 10 m, on *Lepraria* sp., 20 Jul 2021, J. Klepsland & A. Frisch 21/No1638 (TRH-L-24943).

***Sagediopsis lomnitzensis* (Stein) Orange**

This species was found on *Ionaspis lacustris* growing on boulders in a shady, humid hazel groove within coastal pine forest in Sunndal municipality (Møre og Romsdal). It was previously reported for Norway from *Ionaspis odora* in Aurland municipality, Sogn og Fjordane (Orange 2002). *Sagediopsis lomnitzensis* is further reported from Alaska (Spribille et al. 2010), the British Isles (Orange 2002), Czech Republic (Kocourková 2000, Orange 2002), Poland (Stein 1879), and Sweden (Nordin 2002).

Specimens examined (all on Ionaspis lacustris): Møre og Romsdal: Sunndal, Sunndalsfjorden nordside: Flåstranda, 62.7462°N, 8.4904°E, 23 m, 27 Aug 2021, A. Frisch 21/No1374 (TRH-L-24875); *ibid.*, 62.7462°N, 8.4904°E, 24 m, 27 Aug 2021, A. Frisch 21/No1388 (TRH-L-24877).

***Sclerococcum verrucisporum* Alstrup**

Fig. 37

This species was found on *Bellemeria diamarta* growing on iron-rich rocks at a stream and in alpine heath in Namsskogan municipality (Nord-Trøndelag). It was previously reported for Norway from Oppland (Westberg et al. 2021), likely based on collections made by J.E. Zetterstedt in Dovre (UPS-F-523321, UPS-F-523322). *Sclerococcum verrucisporum* is further reported from the Czech Republic (Kocourková 2000) and Sweden (Alstrup 1993, Westberg et al. 2021).

Specimens examined (all on Bellemeria diamarta): Nord-Trøndelag: Namsskogan, Spunstjønnbekken, 64.8851°N, 13.1877°E, 456 m, 8 June 2021, A. Frisch 21/No181 (TRH-L-24967); *ibid.*, Steinfjellet, 64.8729°N, 13.2655°E, 736 m, 7 Jun 2021, A. Frisch 21/No450 (TRH-L-32907).

***Skyttea tephromelarum* Kalb & Hafellner**

Fig. 38

This species was found on *Tephromela atra* growing on calcareous boulders in alpine heath in Oppdal municipality (Sør-Trøndelag) and on calcareous coastal rocks in Bodø municipality (Nordland). It was previously known from Hordaland (Hafellner 1993) and Troms (Alstrup et al. 2008). *Skyttea tephromelarum* has a worldwide distribution and is the most frequently reported lichenicolous fungus on *Tephromela atra* (e.g., Brackel 2010, Hafellner 2007 and references therein, van den Boom & Ertz 2012, Zhurbenko 2009). Most older reports have been made under the names *Skyttea elachistophora* (Nyl.) Sherwood & D. Hawksw. and *Rhymbocarpus elachistophorus* (Nyl.) Triebel.

Specimens examined (all on Tephromela atra): Sør-Trøndelag: Oppdal, Brattskarven, 62.7132°N, 9.6415°E, 1179 m, 31 Aug 2021, A. Frisch 21/No1457 pr.p. (TRH-L-24894). *Nordland:* Bodø, Tverrlandet, Godøystraumen, 67.2406°N, 14.7124°E, 2 m, 18 Jul 2021, A. Frisch & J. Klepsland 21/No622 (TRH-L-32932); *ibid.*, 67.2428°N, 14.7106°E, 2 m, 18 Jul 2021, J. Klepsland & A. Frisch 21/No1618, 21/No1621 (TRH-L-24934, 24937).

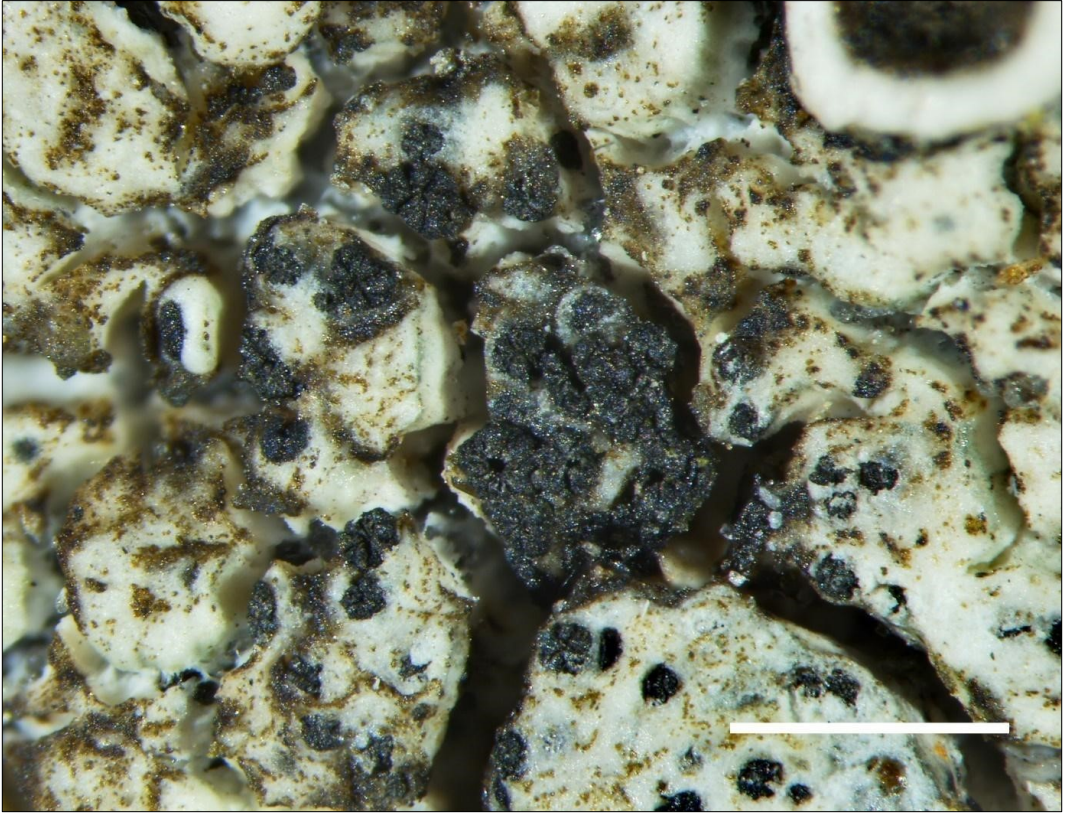


Figure 38. *Skyttea tephromelarum* (on *Tephromela atra*). TRH-L-32932. Scale = 1 mm. Photo: A. Frisch.

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

Fig. 39

This species was found on *Peltigera praetextata* and *P. canina* coll. growing on mossy boulders in Sunndal municipality (Møre og Romsdal), and on *Sorbus aucuparia* trees and logs in humid, boreal, deciduous and coniferous forests in Melhus municipality (Sør-Trøndelag). It was previously reported for Norway from Hordaland, Nord-Trøndelag, and Nordland (Alstrup 2004, Westberg et al. 2021). *Skyttella mulleri* is a widely distributed species in Europe (Alstrup 2004, Brackel 2014 and references therein, Christensen et al. 1995, Motiejūnaitė & Skridlaitė 2017, Roux et al. 2020) and further known from Canada (Alstrup & Cole 1998, Diederich 2003), Ecuador (Etayo 2017), Greenland (Alstrup 2004, Alstrup et al. 2009), Svalbard (Zhurbenko & Brackel 2013), and the U.S.A. (Hawksworth & Santesson 1988).

Specimens examined: Møre og Romsdal: Sunndal, Grøa: Knutsløyen, 62.6434°N, 8.7490°E, 53 m, on *P. cf. praetextata*, 29 Aug 2021, A. Frisch 21/No1413, 21/No1413dpl. (TRH-L-24886, 24887). Sør-Trøndelag: Melhus, Gammelvollmoen, 63.0934°N, 10.1936°E, 148 m, on *P. cf. praetextata*, 15 May 2021, A. Frisch 21/No130 (TRH-L-23490); *ibid.*, Osplihaugen, 63.0537°N, 9.6469°E, 140 m, on *P. canina* coll., 3 Aug 2021, A. Frisch 21/No1255 (TRH-L-23483).

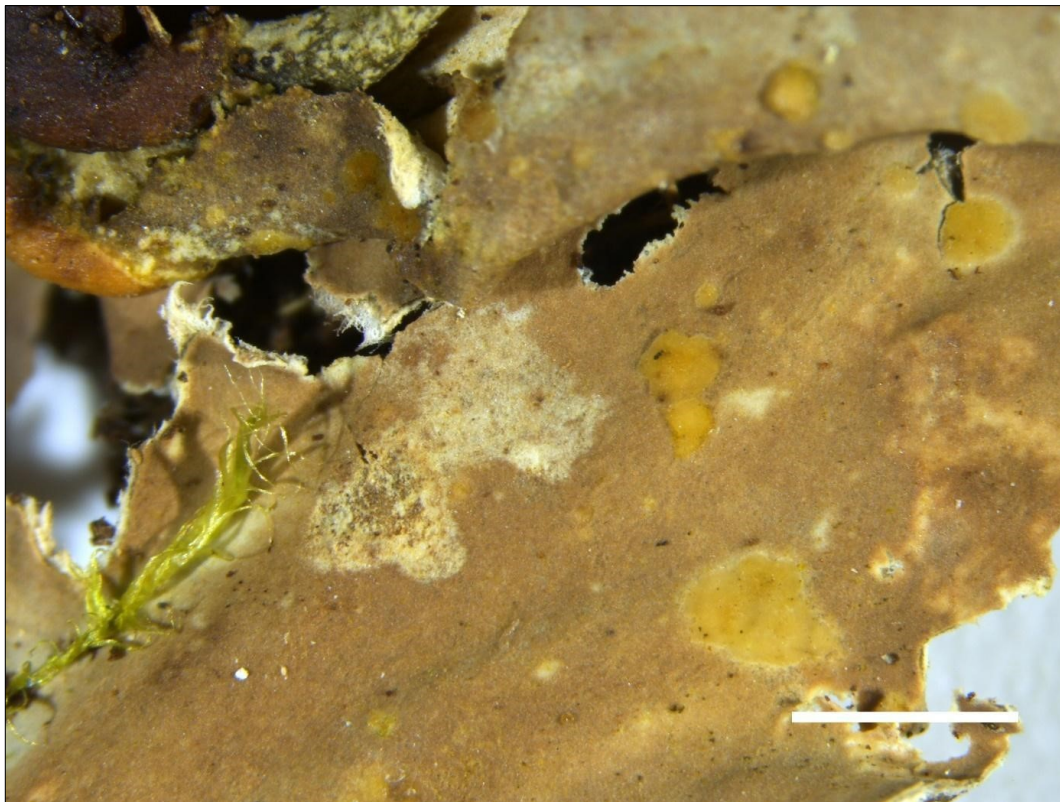


Figure 39. *Skytella mulleri* (on *Peltigera cf. praetextata*). TRH-L-24887. Scale = 2 mm. Photo: A. Frisch.

***Sphaerellothecium pumilum* (Lettau) Nav.-Ros., Cl. Roux & Hafellner**

This species was found on *Physcia caesia* growing in calcareous alpine heath in Fauske and Gildeskål municipalities (Nordland). Additional specimens have been discovered on the same host in Ringsaker municipality (Hedmark) and Namdalseid municipality (Nord-Trøndelag), and on a collection of *Physcia phaea* made near Kongsvoll in Oppdal municipality (Sør-Trøndelag), preserved in TRH. *Sphaerellothecium pumilum* was previously reported for Norway from Finnmark (Westberg et al. 2021). The species is widely distributed in the Northern Hemisphere (Brackel 2014 and references therein, Matzer & Hafellner 1990, Navarro-Rosinés et al. 2018, Zhurbenko 2004) and further reported from Antarctica (Hawksworth & Itturiaga 2006), Chile (Etayo & Sancho 2008, Wedin 1994), Ecuador (Etayo 2017), New Zealand (Matzer & Hafellner 1990, Hafellner & Mayrhofer 2007), and Peru (Etayo 2010b).

Specimens examined: Hedmark: Ringsaker, Helgøen, on *Physcia caesia*, Sep 1908, B. Lynges s.n. (TRH-L-46847). Sør-Trøndelag: Oppdal, Kongsvoll, on *Physcia phaea*, Jul 1933, E.P. Vrang s.n. (TRH-L-21824). Nord-Trøndelag: Namdalseid, Holvasslietran, 64.1570°N, 11.0738°E, ca 380 m, on *Physcia caesia*, 12 Sep 2000, H. Holien 8251 (TRH-L-6187). Nordland: Fauske, Annvatnet, 67.0833°N, 15.9924°E, 662 m, on *Physcia caesia*, 28 Jul 2021, A. Frisch 21/No789 (TRH-L-32958); Gildeskål, Sandhornøya, Djupdalen-Vågaksla, 67.1213°N, 14.0640°E, 155 m, on *Physcia caesia*, 17 Jul 2021, A. Frisch & J. Klepsland 21/No1085 (TRH-L-23453).

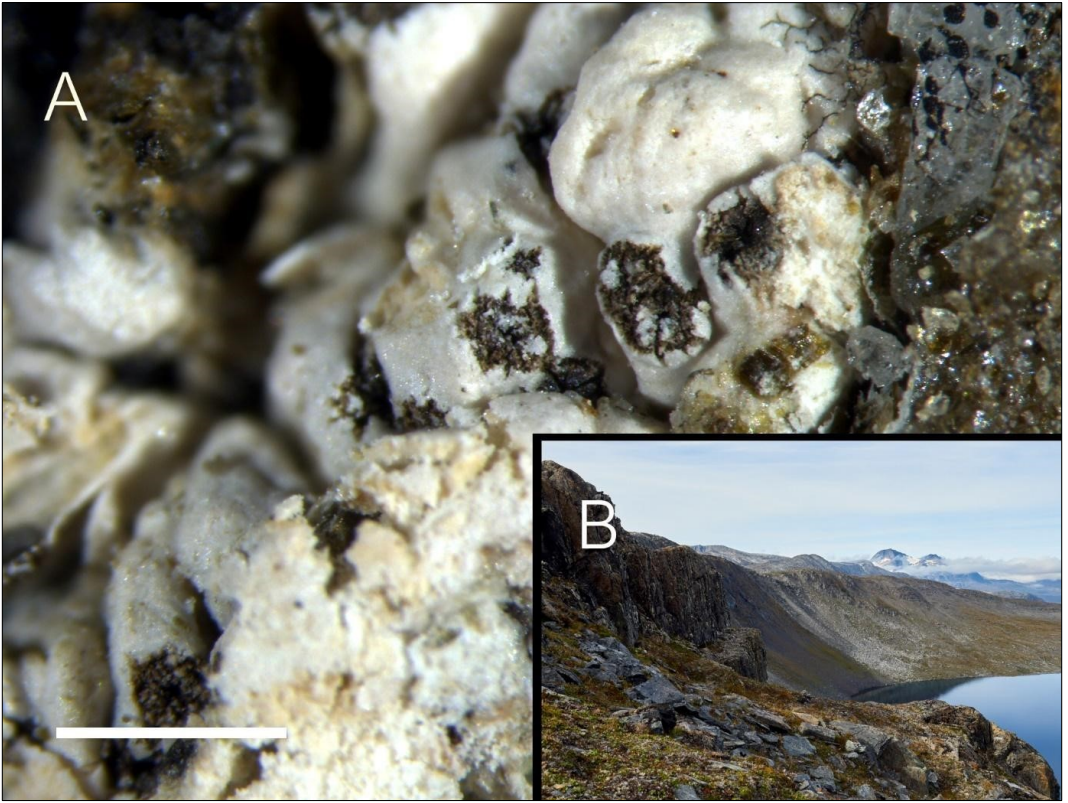


Figure 40. *Sphaeropezia ochrolechiae* (on *Ochrolechia frigida*). A. TRH-L-32955, B. Alpine heath at Riarskaret, a rich locality for lichenicolous fungi in Trollheimen (observatory 1). Scale = 1 mm. Photos: A. Frisch.

***Sphaeropezia ochrolechiae* (Diederich, Holien & Zhurb.) Baloch & Wedin**

Fig. 40

This species was found on *Ochrolechia frigida* growing in calcareous alpine heath and boulder scree at Riarskaret, Oppdal municipality (Sør-Trøndelag). *Sphaeropezia ochrolechiae* was first described from *Ochrolechia* sp. growing on dead wood in boreal spruce forest near Trondheim (Sør-Trøndelag) and additionally reported from Finnmark (Diederich et al. 2002). A third specimen from Målselv in Troms (TRH-L-16118) has been revised to *Sagediopsis campsteriana*. *Sphaeropezia ochrolechiae* is further known from North America (Diederich et al. 2002) and Sweden (Baloch et al. 2013, Diederich et al. 2002).

Specimens examined (all on *Ochrolechia frigida*): Sør-Trøndelag: Oppdal, Riarskaret, 62.7576°N, 9.2789°E, 1312 m, 30 Aug 2021, A. Frisch 21/No753 (TRH-L-32955); *ibid.*, 62.7577°N, 9.2782°E, 1312 m, 30 Aug 2021, A. Frisch 21/No964 (TRH-L-32988).

***Stigmatidium arthoniae* (Arnold) Hafellner**

This species was found on thallus of *Arthonia radiata* growing on *Corylus avellana* in a highly oceanic deciduous forest in Surnadal municipality (Møre og Romsdal), and on *Alnus incana* in



Figure 41. *Stigmidium conspurcans* (on *Psora rubiformis*). TRH-L-13193. Scale = 2 mm. Photo: A. Frisch.

boreal spruce-dominated rainforest in Rissa municipality (Sør-Trøndelag). *Stigmidium arthoniae* was first reported for Norway from boreo-nemoral rainforests in Rogaland and Hordaland (Frisch et al. 2020). It is a widely distributed but seldom collected species throughout Europe (e.g., Hafellner 1994a, Hawksworth 2003, Hofmann et al. 1995, Keissler 1930, Roux et al. 2020) and further reported from the Canary Islands (Pitard & Harmand 1911).

Specimens examined (all on Arthonia radiata): Møre og Romsdal: Surnadal, Soløyneset, 62.9507°N, 8.4241°E, 5 m, 3 Sep 2021, A. Frisch 21/No1407 (TRH-L-24883). Sør-Trøndelag: Rissa, Storlidalen, 63.6673°N, 9.9612°E, 135 m, 20 Jun 2017, A. Frisch N01-1-Ai1-1 (TRH-L-32997).

***Stigmidium conspurcans* (Th. Fr.) Triebel & R. Sant.**

Fig. 41

This species is frequently observed on its lichen host, *Psora rubiformis*, in calcareous alpine habitats from Oppland to Finnmark (Triebel 1989) and here newly reported for Nordland. Additional specimens from Sør- and Nord-Trøndelag have been discovered in collections of *Psora rubiformis* preserved in TRH. *Stigmidium conspurcans* is a widely distributed species throughout the Northern Hemisphere (e.g., Alstrup & Hawksworth 1990, Kristinsson 1999, Roux et al. 2020, Spribille et al. 2010, Triebel 1989, Zhurbenko 2009, Zhurbenko & Brackel 2013, Zhurbenko et al. 2016).

Specimens examined (all on Psora rubiformis): Sør-Trøndelag: Levanger, Hårskallen, 63.6558°N, 11.5185°E, 640 m, 19 Jun 2007, H. Holien 11529 (TRH-L-12064). *Nord-Trøndelag:* Meråker, Steinfjellet, 63.3187°N, 12.0132°E, 910 m, 29 Aug 2013, H. Holien 14285 (TRH-L-15874); Namsskogan, Skorovatn: Rundtjørna, 64.5837°N, 13.1728°E, 720 m, 17 Jul 1978, A. Garthe s.n. (TRH-L-47328); Snåsa, Fjellskjækra, 64.0281°N, 12.4432°E, 660 m, 1 Jul 2009, H. Holien 12255 (TRH-L-13193); Steinkjer, Mokka: Litklumpen, 63.9504°N, 12.1338°E, 580 m, 21 Jun 2015, H. Holien 14732 (TRH-L-16600). *Nordland:* Bodø, Skjjevfjellet N, 67.0119°N, 15.1283°E, 686 m, 14 Jul 2021, A. Frisch & J. Klepsland 21/No1140 (TRH-L-23461).

***Stigmidium eucline* (Nyl.) Vězda**

Fig. 42

This species was found on *Varicellaria lactea* growing in an exposed boulder field in Sunndal municipality (Møre og Romsdal). It was previously reported for Norway from Oppland, Troms, and Finnmark (Westberg et al. 2021). *Stigmidium eucline* is a widely distributed species in Europe (e.g., Kison et al. 2016, Litterski et al. 2021, Roux et al. 2020, Sérusiaux et al. 2003, Tretiach & Hafellner 2000, Urbanavichus & Urbanavichene 2014, Vězda 1970, Westberg et al. 2021, Wittmann & Türk 1994) and further reported from Bolivia (Flakus & Kukwa 2012), Greenland (Alstrup et al. 2008), Siberia (Zhurbenko & Yakovchenko 2014), and Turkey (Hafellner & John 2006).

Specimen examined: Møre og Romsdal: Sunndal, Sunndalsfjorden nordside: Flåstranda, 62.7454°N, 8.4936°E, 35 m, on *V. lactea*, 27 Aug 2021, A. Frisch 21/No1365 (TRH-L-24873).

***Stigmidium psorae* (Anzi) Hafellner**

Fig. 43

This species was found on *Psora decipiens* growing in calcareous rock outcrops and cliffs in alpine heath in Snåsa and Røyrvik municipalities (Nord-Trøndelag), and in Bodø and Fauske municipalities (Nordland). It was previously reported for Norway from Finnmark (Westberg et al. 2021), likely based on specimens collected by J.M. Norman near Neverfjord in Hammerfest (UPS-F-523797, O-L-38590). *Stigmidium psorae* is a widely distributed species in Europe (e.g., Calatayud & Triebel 1999, Roux et al. 2020, Stordeur et al. 2020, Triebel 1989, van den Boom & Giralt 2012, Westberg et al. 2021) and further known from Afghanistan (Triebel 1989), the Canary Islands (Hafellner 1996), Iceland (Kristinsson 1999), Mongolia (Zhurbenko et al. 2020b), Morocco (Werner 1935), Siberia (Zhurbenko 2009, Urbanavichene & Urbanavichus 2009), Turkey (Halici et al. 2007), and the U.S.A. (Knudsen 2006, Triebel 1989).

Specimens examined (all on Psora decipiens): Nord-Trøndelag: Røyrvik, Stormyrfjellet, 64.8951°N, 13.8958°E, 830 m, 5 Jun 2021, A. Frisch 21/No568 (TRH-L-32925); Snåsa, Fjellskjækra, 64.0264°N, 12.4397°E, 640 m, 1 Jul 2009, H. Holien 12250 (TRH-L-13190). *Nordland:* Bodø, Skjjevfjellet N, 67.0131°N, 15.1291°E, 665 m, 14 Jul 2021, A. Frisch & J. Klepsland 21/No635, 21/No1101 (TRH-L-32934, 23456); *ibid.*, 67.0131°N, 15.1289°E, 665 m, 14 Jul 2021, J. Klepsland & A. Frisch 21/No1607 (TRH-L-24929); Fauske, Øvre Beritvatnet, 67.0793°N, 15.9716°E, 741 m, 28 Jul 2021, A. Frisch 21/No714 (TRH-L-32950).

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

This species was found on *Solorina saccata* and *Solorina* sp. growing on calcareous rock walls and cliffs (incl. marble) in heathlands and boreal birch, birch-pine, and spruce forests in Namsskogan and Røyrvik municipalities (Nord-Trøndelag), and in Saltdal municipality (Nordland). It was previously reported for Norway from Skibotndalen in Troms (Alstrup et al. 2008, Westberg et al. 2021). *Stigmidium solorinarum* is a widely distributed species in the Northern Hemisphere (e.g., Alstrup & Hawksworth 1990, Diederich et al. 1991, Hawksworth 1986, Roux & Triebel 1994, Roux et al. 2020, Westberg et al. 2021, Zhurbenko 2004, 2009, Zhurbenko & Brackel 2013, Zhurbenko & Kobzeva 2016, Zhurbenko et al. 2016).

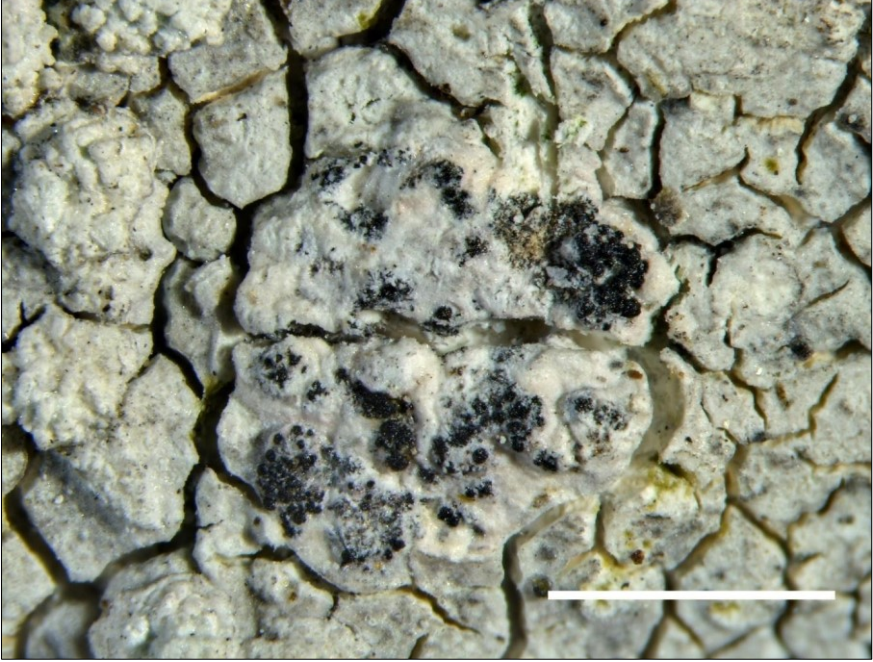


Figure 42. *Stigmidium eucline* (on *Varicellaria lactea*). TRH-L-24873. Scale = 2 mm. Photo: A. Frisch.



Figure 43. *Stigmidium psorae* (on *Psora decipiens*). TRH-L-32934. Scale = 2 mm. Photo: A. Frisch.



Figure 44. *Telogalla olivieri* (on *Xanthoria parietina*). TRH-L-24952. Scale = 2 mm. Photo: A. Frisch.

Specimens examined: Nord-Trøndelag: Namsskogan, Steinfjellet, 64.8729°N, 13.2655°E, 736 m, on *Solorina* sp., 7 Jun 2021, A. Frisch 21/No404 (TRH-L-32901); Røyrvik, Renseelva: Marmorgrotta, 64.8891°N, 13.9286°E, 482 m, on *S. saccata*, 1 Jun 2021, A. Frisch, H. Holien & M.H. Kirkhus 21/No211 (TRH-L-24969); *ibid.*, Klumplia Høgda, 64.8354°N, 13.5875°E, 450 m, on *S. saccata*, 4 Jun 2021, A. Frisch 21/No225 (TRH-L-24971); *ibid.*, 64.8399°N, 13.5930°E, 563 m, on *S. saccata*, 4 Jun 2021, A. Frisch 21/No279 (TRH-L-24982). Nordland: Saltdal, Stranglidalen, 66.9159°N, 15.3290°E, 141 m, on *S. saccata*, 30 Jul 2021, A. Frisch 21/No1219 (TRH-L-23472).

***Syzygospora bachmannii* (Diederich & M.S. Christ.) Diederich, Millanes & Wedin**

This species was found on *Cladonia* cf. *ecmocyna* growing in subalpine dwarf-shrub community (*Salix-Betula*) and boulder field in Beiarn municipality (Nordland). *Syzygospora bachmannii* was previously reported in Norway from Møre og Romsdal (Westberg et al. 2021). It is a widely distributed species in the Northern Hemisphere (Diederich 2003, Diederich et al. 2022, Zhurbenko and Pino-Bodas 2017) and further reported from Papua New Guinea (Diederich 2003, Diederich et al. 2022).

Specimen examined (all on Cladonia cf. ecmocyna): Nordland: Beiarn, Sokumdalen SV, 66.9303°N, 14.3506°E, 500 m, 21 Jul 2021, J. Klepsland & A. Frisch 21/No1608 (TRH-L-24930); *ibid.*, Sokumdalen S, 66.9283°N, 14.3714°E, 21 Jul 2021, J. Klepsland & A. Frisch 21/No1612 (TRH-L-24933).

Telogalla olivieri* (Vouaux) Nik. Hoffm. & Hafellner*Fig. 44**

This species was found on thallus of *Xanthoria parietina* growing on siliceous coastal rocks in Meløy municipality (Nordland). It was previously known in Norway from Buskerud, Hordaland, and Nordland (Lofoten) (Westberg et al. 2021). *Telogalla olivieri* is a widely distributed species in Europe (e.g., Brackel 2014 and references therein, Motiejūnaitė et al. 2017, Roux et al. 2020, Urbanavichene & Urbanavichus 2021) and further reported from Iran, Israel, and Turkey (Brackel 2014).

Specimen examined: Nordland: Meløy, Kunna, 66.9336°N, 13.5028°E, 1 m, on *X. parietina*, 16 Jul 2021, J. Klepsland & A. Frisch 21/No1700 (TRH-L-24952).

Tremella cetrariellae* Millanes, Diederich, M. Westb., Pippola & Wedin*Fig. 45**

This species was found on *Cetrariella delisei* growing in calcareous alpine heath in Surnadal municipality (Møre og Romsdal). Additional collections from Vest-Agder to Finnmark discovered in TRH show that *Tremella cetrariellae* is a widely distributed and probably common species in Norway. It was previously known from Båtsfjord, Nesseby, and Sør-Varanger municipalities in Finnmark and further reported from Finland, Greenland, Russia, Svalbard, and Sweden (Millanes et al. 2015, Suija & Jüriado 2020, Diederich et al. 2022).

Specimens examined (all on Cetrariella delisei): Hedmark: Alvdal, Østerdalen: Tronfjeld, 19 Aug 1910, B. Lynges s.n. (TRH-L-25822, 25826). *Aust-Agder:* Bykle, Meien I Byklum, 6 Jul 1906, B. Lynges s.n. (TRH-L-25828). *Hordaland:* Kvam, Strandebarm: Vesoldens top, 1000 m, 7 Sep 1924, Lillefosse s.n. (TRH-L-25829, 25830). *Møre og Romsdal:* Surnadal, Snota, 62.8758°N, 9.0622°E, 1157 m, 4 Sep 2021, Frisch 21/No1048 (TRH-L-23447). *Sør-Trøndelag:* Oppdal, Stohaugfjell i Storlidal, 6 Sep 1942, J. Haugen s.n. (TRH-L-25834); *ibid.*, Haugen i Storlidal, 4 Jul 1936, J. Haugen s.n. (TRH-L-25836), *ibid.*, 25 Jul 1933, J. Haugen s.n. (TRH-L-25842). *Nord-Trøndelag:* Lierne, Bukkerauva: Berglidalen, 64.2109°N, 13.5477°E, 400 m, 7 Jul 1979, R. Hjelmsstad s.n. (TRH-L-25846). *Nordland:* Grane, Rørskarskien, 65.2078°N, 13.6215°E, 1220 m, 29 Jun 1974, T. Tønsberg 40 (TRH-L-25853); Hattfjelldal, Cevlarfjellet, 65.2114°N, 14.0916°E, 1100 m, 10 Sep 1976, T. Tønsberg 1019 (TRH-L-25854). *Finnmark:* Nesseby, Thomasdal Varangria borealis, s.d., J.M. Norman s.n. (TRH-L-25865).

Unguiculariopsis thallophila* (P. Karst.) W.Y. Zhuang*Fig. 46**

Several specimens have been discovered in TRH and UPS, growing on *Lecanora carpinea* and *L. chlarotera* coll. thalli collected in natural and artificial habitats from Trondheim (Sør-Trøndelag) to Beiarn municipalities (Nordland). Host trees include *Alnus incana*, *Corylus avellana*, *Populus balsamifera*, *P. tremula*, and *Prunus domestica*. The species was previously reported for Norway from two collections from Akershus and Møre og Romsdal (Hafellner 1993, Westberg et al. 2021). *Unguiculariopsis thallophila* is a widely distributed species in Europe (e.g., Brackel 2008, Bricaud et al. 1993, Darmostuk & Naumovych 2016, Hafellner 2018a, Hawksworth 2003, Kukwa & Czarnota, 2006, Roux et al. 2020, Suija et al. 2010) and further reported from the Canary Islands (Hafellner 1995d), Siberia (Zhurbenko 2009), and the U.S.A. (Diederich 2003).

Specimens examined: Sør-Trøndelag: Trondheim, Lerkendal, on *L. carpinea*, 5 Apr 1927, O.A. Høeg s.n. (TRH-L-28384); *ibid.*, Bynesset: Rye, on *L. carpinea*, 29 Mar 1935, O.A. Høeg (TRH-L-30360, sub *Caloplaca cerina*). *Nord-Trøndelag:* Levanger, Ytterøya: Sjømyrtangen, 63.7481°N, 11.0015°E, 18 m, on *L. carpinea*, 28 May 2009, H. Holien 12047 (TRH-L-13466); Namsos, Almlia, 64.1351°N, 11.1605°E, 206 m, on *L. carpinea*, 20 Sep 2000, H. Holien 8320 (TRH-L-6224); *ibid.*, Furudalen: Langvatnet, 64.2081°N, 11.0194°E, 180 m, on *L. chlarotera* coll., 4 June 2006, H. Holien 10544 (TRH-L-11527); Overhalla, Overhalla Kirkegården, on *L. carpinea*, 25 Jul 1931, O.A. Høeg s.n. (TRH-L-35799); Steinkjer, Heggəsasen, 64.0247°N, 11.4944°E, 54 m,



Figure 45. *Tremella cetrariellae* (on *Cetrariella delisei*). TRH-L-23447. Scale = 2 mm. Photo: A. Frisch.



Figure 46. *Unguiculariopsis thallophila* (on *Lecanora carpinea*). UPS-L-60916. Scale = 1 mm. Photo: A. Frisch.

on *L. carpinea*, 26 Apr 2011, H. Holien 12815 (TRH-L-14155). *Nordland*: Beiarn, Strand V, 66.9969°N, 14.7129°E, 9 m, on *L. carpinea*, 20 Jul 2021, A. Frisch & J. Klepsland 21/No1072 pr.p. (TRH-L-23450); Vega Island, Kolstad, on *L. carpinea*, 14 Jun 1982, G. Degelius V-2778 (UPS-L-60916).

***Vouauxiella lichenicola* (Linds.) Petr. & Syd.**

This species was found on apothecia and thallus of *Lecanora chlarotera* coll. and *L. subfusca* coll. growing in agricultural landscape and highly oceanic, deciduous forest in Sarpsborg municipality (Østfold), Horten municipality (Vestfold), and Surnadal municipality (Møre og Romsdal). An additional collection from *Lecanora pulicaris* growing on spruce in agricultural landscape in Rindal municipality (Sør-Trøndelag) has been discovered in TRH. *Vouauxiella lichenicola* was also present in the collections of *Opegrapha arthoniicola*, *O. pertusariicola*, and *Stigmatidium arthoniae* reported from Soløyneset above. It was previously reported for Norway from Vest-Agder, Rogaland, and Hordaland (Westberg et al. 2021), likely based in part on collections made by R. Santesson in Mandal (UPS-L-536986) and Eigersund (UPS-L-536987). *Vouauxiella lichenicola* is a widely distributed species throughout the Holarctic (Brackel 2014 and references therein, Christensen 2016, Kukwa 2000, Motiejūnaitė et al. 1998, Roux et al. 2020, Tadome & Ohmura 2022, van den Boom & Giralt 2012, Westberg et al. 2021) and further reported from India (Zhurbenko 2013).

Specimens examined: Østfold: Sarpsborg, Vik-Sandåker, 59.2446°N, 11.1877°E, 60 m, on *L. subfusca* coll., 27 Jul 2017, J. Klepsland JK17-458 (O L-223407). Vestfold: Horten, Lystlunden, 59.4187°N, 10.4875°E, 8 m, on *L. subfusca* coll., 2 Aug 2021, J. Klepsland JK21-249 (Herb. Klepsland). Møre og Romsdal: Surnadal, Soløyneset, 62.9507°N, 8.4241°E, 5 m, on *L. chlarotera* coll., 3 Sep 2021, A. Frisch 21/No1405 (TRH-L-24882). Sør-Trøndelag: Rindal, mellom Løset og Rindal kirke, 63.0488°N, 9.2422°E, 110 m, on *L. pulicaris*, 15 Feb 2011, G. Bureid 15a/11 (TRH-L-13763).

***Xanthoriicola physciae* (Kalchbr.) D. Hawksw.**

This species was found on thallus and apothecia of *Xanthoria parietina* growing on a *Fraxinus excelsior* alley tree and a *Salix caprea* roadside tree in Indre Fosen and Orkdal municipalities (Sør-Trøndelag). Two additional specimens have been discovered in TRH, growing on the same host in Sandefjord municipality (Vestfold) and Trondheim municipality (Sør-Trøndelag). It was previously reported for Norway from Rogaland and Finnmark (Westberg et al. 2021), likely based on specimens collected by R. Santesson in Porsanger (UPS-F-536855) and P.M. Jørgensen in Sandnes: Høle (UPS-F-536854). *Xanthoriicola physciae* is widely distributed in Eurasia (e.g., Etayo & Pérez-Ortega 2016, Hafellner 2012, Hafellner & Mayrhofer 2020, Halici 2015, Hawksworth 1979, Hawksworth & Punithalingam 1973, Kapets & Kondratyuk 2019, Kondratyuk et al. 2005, Kukwa & Motiejūnaitė 1999, Lököš et al. 2016, Motiejūnaitė 1999, Roux et al. 2020, Santesson 1984, 1986, Sohrabi & Alstrup 2007, van den Boom & Aptroot 1997, van den Boom & Giralt 2012, Westberg et al. 2021, Zhurbenko & Kobzeva 2016) and further reported from Australasia (Galloway 2007), Libya (Thor & Nascimbene 2010), and the Canary Islands (Hafellner 1995d, 2005, van den Boom & Ertz 2012).

Specimens examined (all on *Xanthoria parietina*): Vestfold: Sandefjord, Stavnum, 3 Jan 1922, O.A. Høeg s.n. (TRH-L-680618). Sør-Trøndelag: Indre Fosen, Reinsklosteret, 63.5639°N, 9.9245°E, 26 m, 14 Nov 2020, A. Frisch, M.H. Kirkhus, V. Stormes Moen 20/No33 (TRH-L-23429); Orkland, Osplihaugen, 63.0535°N, 9.6489°E, 134 m, 3 Aug 2021, A. Frisch 21/No1436 (TRH-L-24888); Trondheim, Gløshaugen, 17 Feb 1928, O.A. Høeg s.n. (TRH-L-680642).

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

This species was found on *Peltigera didactyla* growing in a mossy boulder field in Sunndal municipality (Møre og Romsdal). Additional specimens were discovered in collections of *P. lepidophora* and *P. didactyla* from Oppdal and Rennebu municipalities (Sør-Trøndelag) preserved in TRH. *Xenonectriella ornamentata* was previously reported for Norway from Skibotndalen in Troms (Alstrup et al. 2008). It is a widely distributed but seldom collected species throughout Europe (e.g., Alstrup 2004, Cezanne et al. 2008, Martínez & Hafellner 1998, Puolasmaa et al. 2012, Westberg et al. 2021, Zhurbenko 2009, Zhurbenko & Himelbrant 2002) and further reported from Chile (Etayo & Sancho 2008), Greenland (Alstrup & Hawksworth 1990, Alstrup et al. 2009), and Svalbard (Zhurbenko & Brackel 2013).

Specimens examined: Møre og Romsdal: Sunndal, Gjøra: Småvolla, 62.5749°N, 9.1411°E, 237 m, on *P. didactyla*, 26 Aug 2021, A. Frisch 21/No1383 (TRH-L-24878). Sør-Trøndelag: Oppdal, Kongsvold, 62.3072°N, 09.6085°E, on *P. lepidophora*, 8 Jul 1971, S. Bretten & A.A. Frisvoll s.n. (TRH-L-651492); Rennebu, Jøldalshytta, on *P. didactyla*, 15 Apr 1931, O.A.Høeg s.n. (TRH-L-41530).

Discussion

The interest in lichenicolous fungi has renewed recently with increasing efforts in biodiversity mapping and nature conservation in Norway. Within this context, the present study adds to a growing body of literature on the diversity of Norwegian lichenicolous fungi (e.g., Frisch & Holien 2018, Frisch et al. 2020, Holien & Frisch 2022a, b, Holien et al. 2016, Klepsland 2020, Motiejūnaitė et al. 2019, Suija & Jūriado 2020) and Fennoscandia (e.g., Ekman et al. 2019, Millanes et al. 2015, Myllys & Launis 2018, Pippola 2010, Puolasmaa et al. 2012, Svensson & Westberg 2010, Svensson et al. 2020, Westberg et al. 2022, Zamora et al. 2018).

The 84 rare or seldom reported species that are treated here, including 31 that are new to Norway or Fennoscandia, are based on results of a single field season and additional investigation of merely 4000 fungarium specimens of 172 lichen species preserved in TRH fungarium. This bears witness to the still limited knowledge on distribution and habitat affiliation of this diverse fungal group in the study area. Estimating abundance and commonness of the reported species is difficult due to the scarcity of fungarium collections and published information on lichenicolous fungi. Based on our field observations and the cited literature under each species, however, it can be assumed that our data include species that are rare or of low abundance throughout the country and elsewhere (e.g., *Abrothallus bryoriarum*, *Lasiophaeriopsis supersparsa*, *Opegrapha geographicola*, *Sphaeropezia geographicola*, *S. ochrolechia*, and *S. thamnoliae*). Other species, such as *Opegrapha arthoniicola*, *O. pertusariicola*, *O. sphaerophoricola*, and *Periglyphis superveniens* (see Holien & Frisch 2022 for the latter), appear to be confined in Norway to hyperoceanic forests in coastal areas. Hence, oceanicity may represent a limiting factor for their distribution and possible population sizes. Contrasting with these are species like *Arthonia coronata*, *Briancoppinsia cytospora*, *Lecanora lecanoricola*, *Rhymbocarpus neglectus*, *Stigmatidium psorae*, *S. solorinarium*, *Phacopsis vulpicidae*, *Raesaenenia huuskonenii*, *Tremella cetrariellae*, and *Vouauxiella lichenicola* that seem to be widely distributed and partly common in suitable habitats throughout Norway.

Screening the lichen collections in TRH fungarium for lichenicolous fungi proved to be a valuable supplement to the targeted field collections in the TSD and MUD projects. Eleven of the species reported herein were observed in preserved fungarium specimens only, partly dating back to the late 19th century. For an additional 14 species, new distribution data could be gathered. Clearly, fungaria like those in TRH provide valuable though still underexplored resources for studying

lichenicolous fungi and other neglected biodiversity. Together with increased mapping efforts, fungarium studies involving taxonomic revisions and DNA barcoding will decisively contribute to revealing the full diversity of lichenicolous fungi in Norway.

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