Folia Cryptog. Estonica, Fasc. 59: 17–22 (2022)
https://doi.org/10.12697/fce.2022.59.04

New records of lichens and allied fungi from the Leningrad Region, Russia. XII

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Abstract: Three lichen species and eight lichenicolous fungi were recorded for the first time for St. Petersburg or Eastern Leningrad Region. In addition, the protected species *Lobaria scrobiculata* was rediscovered in the Leningrad Region. The lichenicolous fungus *Arthonia parietinaria* is new to Russia, and two species, *Didymocyrtis melanelixiae* and *Tremella everniae*, are new for European Russia.

Keywords: lichen diversity, protected areas, St. Petersburg, Kotlin Island.

INTRODUCTION

We present a new contribution to the knowledge of diversity of lichens and allied fungi of St. Petersburg and Leningrad Region. This paper continues the series of publications related to the topic (see e.g., Kuznetsova et al., 2007; Stepanchikova et al., 2010; Himelbrant et al., 2016, 2018; Stepanchikova & Himelbrant, 2021) and is dedicated mainly to the new records of lichenicolous fungi. Several additional records to comprehensively studied lichen biota of the Zapadny Kotlin Protected Area (Stepanchikova & Himelbrant, 2021) are reported.

Nowadays the revealed lichen biota of Leningrad Region and St. Petersburg counts ca. 1180 species, of which 1000 are lichens, 150 are lichenicolous fungi, and 30 are allied saprobic fungi (such as calicioid fungi, *Sarea* spp., *Stictis* spp. etc.).

MATERIAL AND METHODS

The lichen specimens were mainly collected by Dmitry E. Himelbrant, Irina S. Stepanchikova, Andrei Tsurykau, and Mikhail P. Andreev in 2020 and 2021 in the Leningrad Region and St. Petersburg. The specimens were deposited in the lichen herbaria of St. Petersburg State University (LECB), Komarov Botanical Institute (LE), Francisk Skorina Gomel State University (GSU), and Institute of Botany, Nature Research Centre in Vilnius (BILAS). The field photo of *Lobaria scrobiculata* was taken by Irina S. Stepanchikova using Olympus Tough TG-5 camera.

The names of the collectors in the species list are abbreviated as follows: AT – Andrei Tsurykau, DH – Dmitry E. Himelbrant, and IS – Irina S. Stepanchikova. The subdivision of the Leningrad Region (LR) was published in our previous paper (Stepanchikova et al., 2010); the biogeographical border between the eastern and western parts of the region is the Volkhov River (see Kuznetsova et al., 2007). The following abbreviations are used here: ELR – Eastern Leningrad Region, SPb – St. Petersburg, WLR – Western Leningrad Region. The biogeographical provinces of Eastern Fennoscandia are abbreviated traditionally (Kotiranta et al., 1998): Ik – Isthmus karelicus, Ka – Karelia australis. All geographical coordinates are given in the spatial reference system WGS 1984; coordinates are given in square brackets when specified approximately based on interactive maps. Lichenicolous fungi are marked with #. The nomenclature of taxa generally follows Westberg et al. (2021) for lichens and Diederich et al. (2018) for lichenicolous fungi.

RESULTS AND DISCUSSION

Altogether 12 species are reported, including four lichens and eight lichenicolous fungi. *Arthonia parietinaria* is new for Russia, *Didymocyrtis melanelixiae* and *Tremella everniae* are new for European Russia. Three species (*Acarospora privigna*, *Polycoccum peltigerae*, and *Telogalla olivieri*) are new for North-Western European Russia; *Muellerella lichenicola* and *Nesolechia oxyspora* var. *oxyspora* are new for Eastern Leningrad Region, *Bacidina assulata*, *Carbonicola anthracophila*, and *Phoma peltigerae* are new for St. Petersburg. The protected *Lobaria scrobiculata* has been rediscovered in Leningrad Region. The lichen biota of the Zapadny Kotlin Protected Area in St. Petersburg is updated by

three lichenicolous fungi and now its cumulative list includes 167 species.

THE SPECIES

Acarospora privigna (Ach.) A. Schneid. (= *Polysporina simplex* (Davies) Vězda) – WLR, Ka, Vyborg District, 4.3 km SE to Ozerki (former Seivästö), Razinsky creek near shore of Gulf of Finland, 60°10'51.2"N, 29°02'54.1"E, alt. 3 m, pine forest with spruce undergrowth and granite boulders, on granite boulder, 25.05.2021, M. P. Andreev (LE). – New to North-Western European Russia. The nearest locality in European Russia is in the Murmansk Region (Urbanavichus et al., 2008). Distribution in Fennoscandia and Baltic countries: Norway, Sweden, Finland (Westberg et al., 2021), Estonia (Randlane et al., 2021), Latvia (Āboliņa et al., 2015). Characterized by subgyrose to gyrose black apothecia, multispored asci and minute bacilliform to narrowly ellipsoid ascospores 3–5(5.5) × 1.0–1.5 µm (Hitch et al., 2009).

Arthonia parietinaria Hafellner & Fleischhacker – SPb, Kronshtadt District, W part of Kotlin Island, Zapadny Kotlin Protected Area, ca. 1 km E of the fort Rif, 60°01'51.0"N, 29°38'51.1"E, alt. 3 m, trees near the road, on thallus of *Xanthoria parietina* (L.) Th. Fr. on bark of *Populus tremula* L., 07.11.2021, AT, DH & IS (GSU); same place, S shore W to the fort Shantz, 60°01'33.9"N, 29°39'43.3"E, alt. 1 m, black alder forest on sandy shore, with willows, rowans, and aspen undergrowth, on thallus of *Xanthoria parietina* on bark of *Salix* sp., 07.11.2021, AT, DH & IS (GSU). – New to Russia. Distribution in Fennoscandia and Baltic countries: Estonia (Randlane et al., 2021), Latvia (Moisejevs et al., 2019), Lithuania (Motiejūnaitė, 2017). This recently described species can be distinguished from *Arthonia molendoi* (Heufl. ex Frauenf.) R. Sant. and *A. epiphyscia* Nyl. in causing larger infection spots and also by the higher mean numbers of ascomata. Furthermore, these species differ by pigmentation of epihymenium which is dark brown with a bluish tinge in *A. parietinaria*, dark brown with a red brown tinge in *A. molendoi*, and olive brown in *A. epiphyscia* (Fleischhacker et al., 2016).

Bacidina assulata (Körb.) S. Ekman – SPb, Krasnoselsky District, central part of Polezhaevsky Park, [59°50'25"N, 30°11'44"E], on bark of *Malus* sp., 26.02.1995, Malysheva N. V. (LE). – New to SPb, previously known from WLR (H s. n., H-NYL 17854; Brenner, 1886, as *Lecidea effusa* (Sm.) Nyl. var. *intermedia* Hepp). Distribution in North-Western European Russia outside of LR: Republic of Karelia (Fadeeva et al., 2007). Distribution in Fennoscandia and Baltic countries: Estonia (Randlane et al., 2021), Lithuania (Motiejūnaitė, 2017). The species is characterized by having thin to thick and warted thallus, which may be in small spots dissolved into goniocysts. Apothecia are orange-brown pigmented (intensified in K, but not K+ purple), with pale hypothecium. It is morphologically close to *Bacidina phacodes* (Körb.) Vězda which differs by much paler apothecia and non-septate conidia (Ekman, 1996). Apothecia of *Bacidina assulata* resemble those of *Bacidia rubella* (Hoffm.) A. Massal. and have the same pigment, but are much smaller (Coppins & Aptroot, 2009).

Carbonicola anthracophila (Nyl.) Bendiksby & Timdal – SPb, Ik, Kurortny District, Komarovo, Komarovsky Bereg Protected Area, S of the railway and Kurortnaya Str., E of Sportivnaya Str., 60°11'17"N, 29°46'02"E, pine forest with *Calluna vulgaris* (L.) Hull and mosses, on bark of old burnt *Pinus sylvestris* L., 21.05.2021, DH & IS (LE). – This is the first reliable record in SPb. The species was erroneously reported from Levashovo (SPb) based on the specimen of *Carbonicola myrmecina* (Ach.) Bendiksby & Timdal, collected by V. M. Artsikhovsky in 1902 (LE, s. n.; Malysheva, 2003). *Carbonicola anthracophila* is known from ELR and WLR (Himelbrant, 2016; Himelbrant et al., 2018). Distribution in North-Western European Russia outside of LR: Republic of Karelia (Fadeeva et al., 2007). Distribution in Fennoscandia and Baltic countries: Norway, Sweden, Finland (Westberg et al., 2021), Estonia (Randlane et al., 2021), Latvia (Āboliņa et al., 2015), Lithuania (Motiejūnaitė, 2017). *Carbonicola anthracophila* is the indicator species of biologically valuable forests in the Southern Taiga of North-Western European Russia (Andersson et al., 2009). It differs from *C. myrmecina* by the squamules with lighter edge, and presence of protocetraric and fumarprotocetraric acids (thallus and soralia P+ red) (Himelbrant & Urbanavichus, 2008).

#Didymocyrtis melanelixiae (Brackel) Diederich, Harris & Etayo – SPb, Ik, Kurortny District, Komarovo, Komarovsky Bereg Protected Area,

S to the railway and Kurortnaya Str., E to Sportivnaya Str., 60°11'17"N, 29°46'02"E, pine forest with *Calluna vulgaris* and green mosses, on thallus of *Cetraria islandica* (L.) Ach. on soil, 21.05.2021, DH & IS (BILAS). – New to European Russia, recently reported from Republic of Adygea, Russian Caucasus (Urbanavichus et al., 2020). Distribution in Fennoscandia and Baltic countries: not reported. The species forms pale necrotic areas surrounded by a black zone line on a host thallus, with numerous black pycnidia. Conidia broad ellipsoid, 4–5 × 3–3.5 µ in our specimen, which corresponds to the description (Ertz et al., 2015). Teleomorph was not observed in our material.

Lobaria scrobiculata (Scop.) DC. – ELR, Podporozh'e District, "Verkhovya reki Sondala" Proposed Protected Area, Sondala River valley, left bank, steep slope of valley, 60°34'47.1"N, 35°06'19.3"E, alt. 217 m, spruce forest with old willows and rowans, with ferns and grasses, on bark of old *Salix caprea* L., 10.07.2021, DH & IS (not collected; Fig. 1). – Rediscovered for LR, latest collection was made in 1991 in Podschel'e cape, Lake Onega, Podporozh'e District (H 8005333; Kuznetsova et al., 2007). However, the habitat in Podschel'e cape was recently lost due to mining activity. In 19th and beginning of 20th century *Lobaria scrobiculata* was known from several localities in Karelian Isthmus, but recent investigations did not confirm the presence of the species in the region (Geltman, 2018). Distribution in North-Western European Russia outside of LR: Republic of Karelia (Fadeeva et al., 2007). Distribution in Fennoscandia and Baltic countries: Norway, Sweden, Finland (Westberg et al., 2021), Estonia (Randlane et al., 2021), Latvia (Āboliņa et al., 2015), Lithuania (Motiejūnaitė, 2017).

#Muellerella lichenicola (Sommerf.) D. Hawksw. – ELR, Podporozh'e District, 1.6 SE of Lake Logozero, Sondala River valley, left bank, 60°35'27.8"N, 35°05'14.6"E, alt. 198 m, wet spruce forest with *Sphagnum* spp. and *Vaccinium myrtillus* L., with birch, on apothecia of *Mycoblastus* sp. on bark of *Picea abies* (L.) Karst., 05.06.2020, DH & IS (BILAS); Boksitogorsk District, 1 km NE of Lake Tushemelskoe, 59°15'50.4"N, 34°50'23.6"E, alt. 118 m, old-growth spruce-pine forest with *Sphagnum* spp. and *Vaccinium myrtillus*, on apothecia of *Mycoblastus sanguinarius* (L.) Norman on bark of *Picea abies*, 07.07.2020, DH (BILAS). – New to ELR, previously known from WLR (Himelbrant et al., 2018). Distribution in North-Western European Russia outside of LR: not reported. Distribution in Fennoscandia and Baltic countries: Norway, Sweden, Finland (Westberg et al., 2021), Estonia (Randlane et al., 2021), Lithuania (Motiejūnaitė, 2017). This widely distributed fungus inhabits wide range of crustose lichens and is characterized by mainly immersed, small, 70–150 µm diam. perithecia with multispored (more than 64 per ascus) asci and one-septate, pale- to medium or olivaceous brown ascospores, 4.5–7 × 2–3.5 µm (Triebel & Kainz, 2004).

Fig. 1. *Lobaria scrobiculata* on bark of old *Salix caprea* in Sondala River valley. Scale bar = 1 cm.

#Nesolechia oxyspora (Tul.) A. Massal. var. oxyspora – ELR, Podporozh'e District, 2.5 SE of Lake Logozero, Sondala River valley, left bank, 60°35'33.9"N, 35°06'29.1"E, alt. 178 m, spruce-aspen forest with grasses and *Oxalis acetosella* L. in local depression, on thallus of *Platismatia glauca* (L.) W. L. Culb. & C. F. Culb. on branch of *Picea abies*, 06.06.2020, DH & IS (BILAS). – New to ELR, known from WLR (Brenner, 1886). Distribution in North-Western European Russia outside of LR: Republic of Karelia (Fadeeva et al., 2007). Distribution in Fennoscandia and Baltic countries: Norway, Sweden, Finland (Westberg et al., 2021), Estonia (Randlane et al., 2021), Lithuania (Motiejūnaitė, 2017). This cosmopolitan species infects various genera of the family Parmeliaceae, causes gall-like swellings of the host thallus, and is characterized by immersed to sessile black apothecia, 0.15–0.5 mm diam.,

8-spored asci, hyaline simple ellipsoid ascospores, 11–24.5 × 5–7 µm, with attenuated ends (Peršoh & Kainz, 2004).

#Phoma peltigerae (P. Karst.) D. Hawksw. – SPb, Kronshtadt District, W part of Kotlin Island, Zapadny Kotlin Protected Area, ca. 1 km E of the fort Rif, 60˚01'48.3"N, 29˚39'02.8"E, alt. 3 m, aspen stand, on thallus of *Peltigera rufescens* (Weiss) Humb. on soil, 07.11.2021, AT, DH & IS (GSU). – New to SPb, not reported from LR. Distribution in North-Western European Russia outside of LR: Republic of Karelia (Fadeeva et al., 2007). Distribution in Fennoscandia and Baltic countries: Norway, Sweden, Finland (Westberg et al., 2021), Estonia (Randlane et al., 2021), Lithuania (Motiejūnaitė, 2017). This is the coelomycete, common on *Peltigera* spp., characterized by simple, hyaline, narrowly ellipsoid, rounded at the apices, smooth-walled conidia (Hawksworth, 1981). The recent revision of the genus *Didymocyrtis* with *Phoma*-like anamorphs revealed no similar species inhabiting *Peltigera* within this group (Ertz et al., 2015).

#Polycoccum peltigerae (Fuckel) Vězda – ELR, Podporozh'e District, 1.2 SE of Lake Logozero, 60˚35'21.9"N, 35˚04'38.4"E, alt. 178 m, spruce forest with aspen, with grasses and *Oxalis acetosella*, on thallus of *Peltigera praetextata* (Flörke ex Sommerf.) Zopf on bark of *Populus tremula*, 05.06.2020, DH & IS (BILAS); same place, "Verkhovya reki Sondala" proposed protected area, ca. 1 km WNW of Lake Palozero, 60˚34'17.6"N, 35˚07'43.0"E, alt. 234 m, spruce-aspen forest with *Oxalis acetosella*, *Convallaria majalis* L., and *Rubus saxatilis* L., 11.07.2021, DH & IS (BILAS). – New to North-Western European Russia. The nearest localities in European Russia are known in the Komi Republic (Zhurbenko, 2004) and Murmansk Region (Urbanavichus, 2020). Distribution in Fennoscandia and Baltic countries: Sweden, Finland (Westberg et al., 2021), Estonia (Randlane et al., 2021), Lithuania (Motiejūnaitė, 2017). The species inhabits thalli of *Peltigera* spp., sometimes forming swellings on the host thallus. It is characterized by dark perithecia 160–190 µm diam., 8-spored asci, and brown one-septate ascospores measuring 13–15 × (4)5–6 µm, arranged in one row (Atienza et al., 2003).

#Telogalla olivieri (Vouaux) Nik. Hoffm. & Hafellner – SPb, Kronshtadt District, W part of Kotlin Island, Zapadny Kotlin Protected Area, ca. 1 km E of the fort Rif, 60˚01'51.0"N, 29˚38'51.1"E, alt. 3 m, trees near the road, on thallus of *Xanthoria parietina* on bark of *Populus tremula*, 07.11.2021, AT, DH & IS (GSU); same place, S shore SW of the fort Shantz, 60˚01'27.9"N, 29˚40'20.6"E, alt. 3 m, on thallus of *Xanthoria parietina* on bark of *Populus tremula*, 07.11.2021, AT, DH & IS (GSU). – New to North-Western European Russia. The nearest locality in European Russia known in the Nizhny Novgorod Region (Urbanavichene & Urbanavichus, 2021). Distribution in Fennoscandia and Baltic countries: Norway, Sweden (Westberg et al., 2021), Estonia (Randlane et al., 2021), Latvia (Motiejūnaitė et al., 2016), Lithuania (Motiejūnaitė, 2017). This common species can easily be identified by characteristic bullate galls on host thallus, immersed perithecia up to 230 µm and aseptate, hyaline ascospores measuring 14–28 × 4–8 µm (Tsurykau & Etayo, 2017).

#Tremella everniae Diederich – ELR, Boksitogorsk District, 2 km SSE of Lake Biruchevskoe, 59˚14'01.4"N, 34˚32'07.4"E, alt. 150 m, young birch forest with spruce, with *Sphagnum* spp., on thalli of *Evernia mesomorpha* Nyl. on branches of *Picea abies*, 11.06.2020, DH & IS (LE). – New to European Russia. In Russia, the species was previously reported from Siberia, Krasnoyarsk Territory (Zhurbenko, 2012). Distribution in Fennoscandia and Baltic countries: not reported. This rare host-specific lichenicolous basidiomycete is known only inhabiting thalli of *Evernia mesomorpha* and differs from other *Tremella* species by large bullate cerebriform gall-like deformations of 3–15 mm in diam., initially concolorous with the host thallus, but later becoming brown (Diederich, 1996).

ACKNOWLEDGEMENTS

Authors thank Vladimir N. Khramtsov and Elena A. Volkova who lead a long-term monitoring biodiversity study in protected areas of St. Petersburg. We are grateful to the students who participated in our fieldwork, and colleagues from the Baltic countries for help and consultations. We also appreciate valuable comments and corrections suggested by anonymous reviewers.

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