# The lichens of Maly Island (Peninsaari) in the Gulf of Finland (Leningrad Region)

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**Abstract.** A lichen checklist for Maly Island (Leningrad Region, Russia) comprises 160 species, including 150 lichens, 9 lichenicolous fungi and 1 non-lichenized saprobic fungus. *Lecidella effugiens* is new to North-Western European Russia, *Diplotomma pharcidium* and *Taeniolella delicata* are new to the Leningrad Region. The lichen biota of Maly Island is relatively poor due to natural and anthropogenic factors: the island is small, sandy, lacking rocky outcrops, with low diversity of plant communities; all its forests are disturbed and young. The most valuable habitats for lichens on Maly Island are seashore communities and open pine stands on sand.

**Keywords:** lichen diversity, seashore communities, Baltic Sea, Karelia australis, Kingisepp District, Russia.

## Лишайники острова Малый (Peninsaari) в Финском заливе (Ленинградская область)

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**Резюме.** Список лишайников о. Малый (Ленинградская обл., Россия) включает 160 видов, в том числе 150 — лишайники, 9 — лихенофильные грибы и 1 — нелихенизированный сапротрофный гриб. *Lecidella effugiens* приводится впервые для Северо-Запада европейской части России, *Diplotomma pharcidium* и *Taeniolella delicata* являются новыми для Ленинградской обл. Лихенофлора о. Малый относительно бедна по естественным и антропогенным причинам: остров небольшой по размеру, песчаный, без скальных обнажений, его растительные сообщества не отличаются разнообразием, леса значительно нарушены и молоды. Наиболее ценными местообитаниями для лишайников на о. Малый являются прибрежные сообщества и редкостойные сосняки на песках.

**Ключевые слова:** прибрежные растительные сообщества, разнообразие лишайников, Балтийское море, Karelia australis, Кингисеппский район, Россия.

Maly Island (Peninsaari, Pieni Lavansaari in Finnish) is situated in the Russian part of the Gulf of Finland. This small remote island has never been permanently in-

habited. It is not surprising that lichenologists did not investigate Maly Island until recently. The only small lichen collection was made in 1993 by a phycologist Nataliya B. Balashova, later it was carefully studied by Nadezhda M. Alexeeva. Altogether 36 corticolous, terricolous, and saxicolous species were identified and published (Herbarium of the Botany Department of the Saint Petersburg State University — LECB; Alexeeva, 2000, 2005). Most of these species are rather common and widespread in the Leningrad Region and Eastern Fennoscandia.

Field study of the lichen diversity of Maly Island, on which present paper is based, was carried out by Irina S. Stepanchikova (IS) and Dmitry E. Himelbrant (DH) in 2017 in the frame of the Complex Expedition "Gogland" of the Russian Geographical Society. In this paper, we present the results of our field trip, as well as of the revision of herbarium specimens and literature records.

## Study area

Maly Island lies ca. 25 km NNW of the Kurgal'sky Peninsula and 6 km E of Moschny Island (Lavansaari), and occupies an area of ca. 1.8 km$^2$. Administratively it belongs to the Kingisepp District of the Leningrad Region, and biogeographically to Karelia australis, a traditional province of the Eastern Fennoscandia (Kotiranta *et al.*, 1998). The island is elongated from NW to SE and consists of two parts, connected by narrow (100–150 m wide) sandy isthmus (Fig. 1). The relief of the Maly Island is similar to nearby Moschny Island and is represented by low flatland with average height less than 10 m and maximum of 16 m a. s. l. The island is composed of sedimentary (marine) and moraine sand with granite moraine boulders. Rocky outcrops, as well as true dunes, are absent. Maly Island is mainly covered with young pine forests, which turn into open pine forests with lichens at the isthmus and partly along the shores. Also small patches of young secondary aspen and black alder forests occur, as well as seashore plant communities with boulders (Glazkova, 2001).

Maly Island has not been permanently inhabited during last 100 years, though at least in XVIII century there were several households present. In 1920–1940 the island belonged to Finland, during this period it was used for hay harvesting and forest logging (Piispa, 2013). In 1920$^{ies}$ Maly Island was used by contrabandists to store alcohol which later was illegally transported into Soviet Russia (Custom..., 2010). The Island has been used from time to time as temporary camping site, mostly by fishermen. During the World War II Maly Island was involved into battles. Nowadays the only building on the Island is a lighthouse in the NW part. In the course of its history the island was burnt, most probably several times, and as a result is covered only by young secondary plant communities.

## Material and methods

The material was collected 19 VIII 2017 by IS and DH. Altogether 11 localities were investigated (Fig. 1): 5 standard 20 × 20 m sample areas (or inside natural boundaries of the community), where lichen diversity on each substrate was described in as much detail as possible; 6 additional plots, where only individual units of substrates

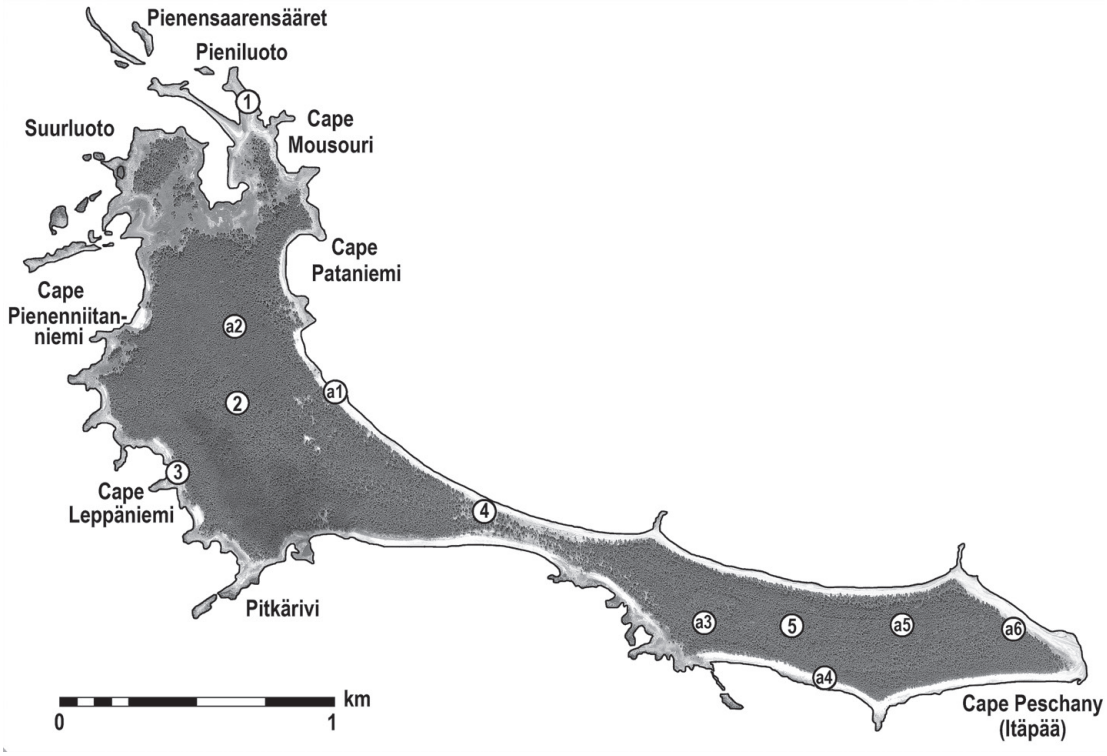


Fig. 1. The study area, Maly Island (Peninsaari), with location of collection sites.

and species were recorded. Additionally we included in this paper herbarium and literature records (LECB; Alexeeva, 2000, 2005), based on the collections made in 1993. These data are indicated as MI (Maly Island) in the lists of sampling locations and species. Each locality in the list is provided with short description of geographical position and biotope, coordinates, names of the collectors, and field number. All geographical coordinates are given in the coordinate system WGS 1984.

Chromatography was performed by IS and DH according to the standard techniques of high performance thin-layer chromatography using solvent systems A and C (Orange *et al.*, 2001). The specimens were mainly identified by IS, DH, and Agata A. Rodionova; if otherwise, the identifier's names are indicated in the species list: Jurga Motiejūnaitė performed identification of several lichenicolous fungi, Ulf Schiefelbein identified or confirmed some lichenicolous fungi and seashore saxicolous lichens, Teuvo Ahti confirmed critical *Cladonia* specimens, Liudmila Konoreva identified some *Micarea* specimens. The nomenclature of taxa generally follows Nordin *et al.* (2011), Diederich *et al.* (2018), and Lawrey, Diederich (2018). The numbers of lichen species in different communities and on different substrates, referred to in the Discussion are given based on our collections; other records are not analyzed due to very scarce information on ecology in Alexeeva (2000, 2005) and on the herbarium labels.

The specimens are deposited mainly in LECB. Few specimens (indicated in the list of species) are kept in the herbaria of the Botanical Museum, University of Helsinki (H), and the Institute of Botany, Nature Research Centre in Vilnius (BILAS).

**Sampling location:** Leningrad Region, Kingisepp District, Karelia australis, Maly Island (Peninsaari, Pieni Lavansaari).

**Standard sample areas:** 1 — NW half of the island, the northernmost cape (Pieniluoto), 60°02'11.9"N, 28°00'19.5"E, 1 m a. s. l., open sand-pebble seashore with granite boulders, *DH and IS Mal-1*; 2 — *ibidem*, local flat hill in the central part, 60°01'36.5"N, 28°00'15.9"E, 16 m a. s. l., young pine forest with green mosses and *Vaccinium myrtillus* L., *DH and IS Mal-2*; 3 — *ibidem*, W shore, Cape Leppäniemi, 60°01'28.4"N, 28°00'01.7"E, 1 m a. s. l., black alder and aspen stand on sandy shore with *Leymus arenarius* (L.) Hochst. and *Lathyrus maritimus* Bigel., *DH and IS Mal-3*; 4 — central part of the island, narrow sandy isthmus, 60°01'23.3"N, 28°01'13.6"E, 2 m a. s. l., open young pine stand with lichens on sand, *DH and IS Mal-4*; 5 — SE half of the island, central part, 60°01'09.3"N, 28°02'25.5"E, 6 m a. s. l., young aspen stand (ca. 20 year-old) with mosses, *Convallaria majalis* L., and *Avenella flexuosa* (L.) Drej., surrounded by young pine forest, *DH and IS Mal-5*.

**Additional collection points:** a1 — NW half of the island, E shore S to Cape Pataniemi, 60°01'37.6"N, 28°00'39.0"E, 2 m a. s. l., edge of sandy shore and young pine forest with lichens, *DH and IS Mal-a1*; a2 — *ibidem*, E to Cape Pienenniitanniemi, 60°01'45.5"N, 28°00'15.6"E, 10 m a. s. l., young pine forest with mosses and *Avenella flexuosa*, *DH and IS Mal-a2*; a3 — SE half of the island, SE of the isthmus, 60°01'09.8"N, 28°02'04.9"E, 3 m a. s. l., open sandy area with lichens, *DH and IS Mal-a3*; a4 — *ibidem*, W shore, 60°01'03.1"N, 28°02'33.0"E, 1 m a. s. l., logs and driftwood on open sandy seashore, *DH and IS Mal-a4*; a5 — *ibidem*, central part, 60°01'09.2"N, 28°02'51.4"E, 10 m a. s. l., granite boulders in young pine forest, *DH and IS Mal-a5*; a6 — *ibidem*, E shore N to Cape Peschany (Itäpää), 60°01'08.5"N, 28°03'17.5"E, 3 m a. s. l., old burnt pine stump in young pine forest near the seashore, *DH and IS Mal-a6*.

**Literature records:** MI — without exact locality, [60°00–01'N, 28°00–03'E], coll. *Balashova*, det. *Alexeeva* (Alexeeva, 2000, 2005).

## Results and discussion

An annotated list of species of Maly Island is presented below. The species reported for the first time for the Leningrad Region are marked with !, lichenicolous fungi are marked with #, non-lichenized fungi with +, species included in the Red Data Book of the Leningrad Region (Krasnaya..., 2018) with *; regions are abbreviated as follows: LR — Leningrad Region, SPb — St. Petersburg. For each species the substrates and localities are listed. Species new to the Leningrad Region or larger regions are accompanied by information on diagnostic characteristics and distribution in North-Western European Russia, Fennoscandia and the Baltic countries. Lichen substances are given for HPTLC-analyzed species. Special comments are provided in several cases.

**Acarospora fuscata** (Schrad.) Th. Fr. — on granite; 1.

**Amandinea cacuminum** (Th. Fr.) H. Mayrhofer et Sheard — on granite; 1.

**A. coniops** (Wahlenb.) M. Choisy ex Scheid. et H. Mayrhofer — on granite; 1.

**A. punctata** (Hoffm.) Coppins et Scheid. — on bark of *Alnus glutinosa*, on granite; 1, 3, MI (Alexeeva, 2005).

**Arthonia apatetica** (A. Massal.) Th. Fr. — on bark of *Populus tremula*; 3.

**#Arthonia caerulescens** (Almq.) R. Sant. — on apothecia of *Lecanora varia* on wood; a4. Det. *Motiejūnaitė* (BILAS). The species was not recorded in the Leningrad Region during last 100 years. Previously it was collected in 1895 and 1917 in mainland part of Karelian isthmus (Kuznetsova *et al.*, 2012).

**+A. punctiformis** Ach. — on bark of *Alnus glutinosa*; 3.

**Athallia cerinelloides** (Erichsen) Arup et al. — on bark of *Populus tremula*; 5.

**A. pyracea** (Ach.) Arup et al. — on bark of *Populus tremula*; 3, 5.

**A. scopularis** (Nyl.) Arup et al. — on granite; 1. Conf. *Schiefelbein* (H).

**Bacidia arceutina** (Ach.) Arnold — on bark of *Populus tremula*; 5.

**Bacidina phacodes** (Körb.) Vězda — on bone; a1.

**Brianaria sylvicola** (Flot. ex Körb.) S. Ekman et M. Svensson — on iron; a2.

**Bryoria fuscescens** (Gyeln.) Brodo et D. Hawksw. — on wood of *Pinus sylvestris*; 2, MI (Alexeeva, 2000, 2005).

**Buellia griseovirens** (Turner et Borrer ex Sm.) Almb. — on bark of *Populus tremula* and burnt wood of *Pinus sylvestris*; 5, a4, a6.

**Calicium glaucellum** Ach. — on wood of *Pinus sylvestris*; 2.

***C. tigillare** (Ach.) Pers. — on wood of *Pinus sylvestris*; a4.

**Caloplaca cerina** (Hedw.) Th. Fr. — on bark of *Populus tremula*; 5.

**Candelariella efflorescens** R. C. Harris et W. R. Buck — on bark of *Populus tremula*; 5.

**C. lutella** (Vain.) Räsänen — on bark of *Populus tremula*; 5.

**C. vitellina** (Hoffm.) Müll. Arg. — on granite; 1.

**Catillaria nigroclavata** (Nyl.) Schuler — on bark of *Populus tremula*; 5.

**Cetraria aculeata** (Schreb.) Fr. — on sandy soil; 4, a3, MI (Alexeeva, 2005).

**C. ericetorum** Opiz subsp. **ericetorum** — on sandy soil; 4.

**C. islandica** (L.) Ach. subsp. **islandica** [incl. "f. **sorediata** (Schaer.) Arnold"] — on sandy soil; 4, a1, a3, MI (Alexeeva, 2005).

**C. muricata** (Ach.) Eckfeldt — on sandy soil; MI (Alexeeva, 2005).

**Chaenotheca chrysocephala** (Turner ex Ach.) Th. Fr. — on wood of *Pinus sylvestris*; a2.

**C. ferruginea** (Turner ex Sm.) Mig. — on wood of *Pinus sylvestris*; 2.

**Cladonia arbuscula** (Wallr.) Flot. subsp. **arbuscula** — on sandy soil; 2, 4, a3, MI (Alexeeva, 2005).

**C. borealis** S. Stenroos — on sandy soil; MI (Alexeeva, 2000, 2005).

**C. carneola** (Fr.) Fr. — on sandy soil; a3.

**C. cenotea** (Ach.) Schaer. — on plant debris and wood of *Pinus sylvestris*; 2, 4.

**C. chlorophaea** (Flörke ex Sommerf.) Spreng. — on sandy soil; 4. Thallus contains fumarprotocetraric acid.

**C. coniocraea** (Flörke) Spreng. — on bark of *Populus tremula* and wood of *Pinus sylvestris*; 2, 5.

**C. cornuta** (L.) Hoffm. subsp. **cornuta** — on wood of *Pinus sylvestris*; 2.

**C. deformis** (L.) Hoffm. — on sandy soil; 4.

**C. digitata** (L.) Hoffm. — on wood of *Pinus sylvestris*; 2.

**C. floerkeana** (Fr.) Flörke — on sandy soil; 4.

**C. furcata** (Huds.) Schrad. — on sandy soil; 2, a3, MI (Alexeeva, 2005). Det. *Ahti* (H).

**C. gracilis** (L.) Willd. subsp. **gracilis**, subsp. **turbinata** (Ach.) Ahti — on sandy soil; 4.

**C. macilenta** Hoffm. — on sandy soil; MI (Alexeeva, 2005).

**C. merochlorophaea** Asahina — on sandy soil; 4. Thallus contains merochlorophaeic, 4'-O-methylmerochlorophaeic and fumarprotocetraric acids.

**C. mitis** Sandst. — on sandy soil; 4, a3.

**C. phyllophora** Hoffm. — on sandy soil; 4.

**C. pleurota** (Flörke) Schaer. — on sandy soil; a3.

**C. pyxidata** (L.) Hoffm. — on sandy soil; 4, MI (Alexeeva, 2005).

**C. ramulosa** (With.) J. R. Laundon — on sandy soil; 4, a3. Conf. *Ahti* (H).

**C. rangiferina** (L.) F. H. Wigg. — on sandy soil; 2, 4, a3, MI (Alexeeva, 2005).

**C. rei** Schaer. — on sandy soil; 4, a3. Thalli contain homosekikaic and fumarprotocetraric acids.

***C. scabriuscula** (Delise) Nyl. — on sandy soil; 4, a1, a3. Conf. *Ahti* (H).

**C. stellaris** (Opiz) Pouzar et Vězda — on sandy soil; 4, MI (Alexeeva, 2005).

**C. subulata** (L.) F. H. Wigg. — on sandy soil; 4.

**C. sulphurina** (Michx.) Fr. — on sandy soil and wood of *Pinus sylvestris*; 2, a3.

**C. turgida** Hoffm. — on sandy soil; MI (Alexeeva, 2005).

**C. uncialis** (L.) F. H. Wigg. subsp. **uncialis**, subsp. **biuncialis** (Hoffm.) M. Choisy — on sandy soil; 4, a3.

**#Clypeococcum hypocenomycis** D. Hawksw. — on thallus of *Hypocenomyce scalaris* on old burnt stump; 2.

**!Diplotomma pharcidium** (Ach.) Choisy — on bark of *Populus tremula*, *Mal-5*; 5. New to LR, previously known from SPb (Stepanchikova *et al*., 2010). Characterized by mainly 3-septate spores, developed exciple surrounded by more or less developed thalline rim, and thallus C– (Foucard *et al*., 2002).

**#Endococcus exerrans** Nyl. — on thallus of *Rhizocarpon richardii* on seashore granite boulder; 1.

**Evernia prunastri** (L.) Ach. — on bark of *Populus tremula*; 5.

***Flavocetraria nivalis** (L.) Kärnefelt et A. Thell — on sandy soil; MI (Alexeeva, 2000, 2005; Krasnaya..., 2018).

**Flavoplaca marina** (Wedd.) Arup et al. — on granite; 1. Det. *Schiefelbein* (H).

**Fuscidea pusilla** Tønsberg — on bark of *Pinus sylvestris*; 2.

**Gyalolechia flavorubescens** (Huds.) Søchting et al. — on bark of *Populus tremula*; 3, 5.

**Hydropunctaria maura** (Wahlenb.) Keller et al. — on granite; 1.

**Hypocenomyce scalaris** (Ach.) M. Choisy — on bark and burnt wood of *Pinus sylvestris*; 2, a4, a6.

**Hypogymnia physodes** (L.) Nyl. — on bark and wood of *Pinus sylvestris*, on bark of *Populus tremula*, on granite and sandy soil; 2, 4, 5, a3–a5, MI (Alexeeva, 2005).

**H. tubulosa** (Schaer.) Hav. — on bark and wood of *Pinus sylvestris*, on bark of *Populus tremula*; 2, 4, 5.

**Lecania cyrtella** (Ach.) Th. Fr. — on bark of *Populus tremula*; 3.

**L. naegelii** (Hepp) Diederich et van den Boom — on bark of *Populus tremula*; 3, 5.

**L. sylvestris** (Arnold) Arnold — on bone; a1.

**Lecanora albellula** (Nyl.) Th. Fr. — on wood of *Pinus sylvestris*; a4.

**L. allophana** Nyl. — on bark of *Populus tremula*; 3, 5.

**L. argentata** (Ach.) Malme — on wood of *Pinus sylvestris*; a4.

**Lecanora carpinea** (L.) Vain. — on bark of *Alnus glutinosa*, *Populus tremula*, wood of *Pinus sylvestris*; 3, 5, a4, MI (Alexeeva, 2005).

**L. chlarotera** Nyl. — on bark of *Populus tremula*; 5.

**L. compallens** van Herk et Aptroot — on bark of *Populus tremula*; 3. Thallus contains usnic acid and zeorin.

**L. helicopis** (Wahlenb.) Ach. — on granite; 1. Det. *Schiefelbein* (H).

**L. polytropa** (Ehrh. ex Hoffm.) Rabenh. — on granite; a5.

**L. populicola** (DC.) Duby — on bark of *Populus tremula*; 3, 5.

**L. pulicaris** (Pers.) Ach. — on bark of *Alnus glutinosa*, *Pinus sylvestris*; 2, 3.

**L. rimicola** H. Magn. — on granite; 1. Det. *Schiefelbein* (H).

**L. symmicta** (Ach.) Ach. — on bark of *Alnus glutinosa*, wood of *Pinus sylvestris*; 3, a4.

**L. umbrina** (Ach.) A. Massal. — on bark of *Populus tremula*; 5.

**L. varia** (Hoffm.) Ach. — on wood of *Pinus sylvestris*; a4.

**Lecidea nylanderi** (Anzi) Th. Fr. — on bark of *Pinus sylvestris*; 2.

**!Lecidella effugiens** (Nilson) Knoph et Hertel — on granite boulder in supralittoral zone, *Mal-1*; 1. New to North-Western European Russia. In European Russia it is known from the Murmansk Region (Urbanavichus *et al*., 2008). Distribution in Fennoscandia and Baltic countries: Norway, Sweden, Finland (Nordin *et al*., 2011). Characterized by poorly developed granular to verruculose whitish-grey thallus which reacts K– and C+ orange-red, non-inspersed hymenium, and red-brown hypothecium (Foucard, 2001; Wirth *et al*., 2013).

**L. elaeochroma** (Ach.) M. Choisy — on bark of *Alnus glutinosa* and *Populus tremula*; 3, 5, MI (Alexeeva, 2005).

**L. euphorea** (Flörke) Hertel — on bark of *Populus tremula*; 3, 5.

**Lepraria elobata** Tønsberg — on bark of *Pinus sylvestris*; 2.

**L. jackii** Tønsberg — on bark of *Pinus sylvestris*; 2.

**Leptorhaphis atomaria** (Ach.) Szatala — on bark of *Populus tremula*; 3, 5.

**#Lichenoconium lecanorae** (Jaap) D. Hawksw. — on thallus of *Hypogymnia physodes* on bark of *Pinus sylvestris*; 2. Det. *Motiejūnaitė* (BILAS).

**#L. usneae** (Anzi) D. Hawksw. — on thallus of *Cetraria islandica* "f. *sorediata*" on sandy soil; a1. Det. *Motiejūnaitė* (BILAS).

**Melanelixia glabratula** (Lamy) Sandler et Arup — on bark of *Populus tremula*; 3.

**M. subaurifera** (Nyl.) O. Blanco et al. — on bark of *Alnus glutinosa*, *Populus tremula*; 3, 5.

**Melanohalea exasperata** (De Not.) O. Blanco et al. — on bark of *Alnus glutinosa* and *Populus tremula*; 3, 5.

**M. exasperatula** (Nyl.) O. Blanco et al. — on bark of *Pinus sylvestris*; 4, MI (Alexeeva, 2005).

**M. olivacea** (L.) O. Blanco et al. — on bark of *Pinus sylvestris*; 4, MI (Alexeeva, 2005).

**Micarea denigrata** (Fr.) Hedl. — on bark of *Populus tremula*; 5.

**M. melaena** (Nyl.) Hedl. — on wood of *Pinus sylvestris*; 2. Det. *Konoreva*.

**M. misella** (Nyl.) Hedl. — on wood of *Pinus sylvestris*; 2. Conf. *Konoreva*.

**M. prasina** Fr. — on wood of *Pinus sylvestris*; 2. Thallus contains micareic acid. Det. *Konoreva*.

**#Muellerella lichenicola** (Sommerf.) D. Hawksw. — on apothecia of *Athallia pyracea* on bark of *Populus tremula*; 3.

**Myriolecis hagenii** (Ach.) Śliwa et al. — on bark of *Populus tremula*; 3.

**M. salina** (H. Magn.) Śliwa et al. var. **aberrans** Erichsen — on granite; 1. Det. *Schiefelbein* (H).

**Naetrocymbe punctiformis** (Pers.) R. C. Harris — on bark of *Alnus glutinosa*; 3.

**Ochrolechia microstictoides** Räsänen — on burnt wood of *Pinus sylvestris*; a6.

**Parmelia saxatilis** (L.) Ach. — on granite; a5, MI (Alexeeva, 2005).

**P. sulcata** Taylor — on bark of *Alnus glutinosa*, *Populus tremula*, on sandy soil and wood of *Pinus sylvestris*; 2–5, a4, MI (Alexeeva, 2005).

**Parmeliopsis ambigua** (Wulfen) Nyl. — on bark and wood of *Pinus sylvestris*; 2, 4, a4, a6, MI (Alexeeva, 2005).

**Peltigera canina** (L.) Willd. — on sandy soil; MI (Alexeeva, 2005).

**P. neckeri** Hepp ex Müll. Arg. — on sandy soil; MI (Alexeeva, 2005).

**P. rufescens** (Weiss) Humb. — on sandy soil; MI (Alexeeva, 2005).

**Phaeophyscia ciliata** (Hoffm.) Moberg — on bark of *Populus tremula*; 5.

**P. orbicularis** (Neck.) Moberg — on bark of *Populus tremula*, on granite; 1, 5.

**Phlyctis argena** (Spreng.) Flot. — on bark of *Populus tremula*; 5.

**Physcia adscendens** H. Olivier — on bark of *Alnus glutinosa*, *Populus tremula*; 3, 5.

**P. aipolia** (Ehrh. ex Humb.) Fürnr. — on bark of *Alnus glutinosa*, *Populus tremula*; 3, 5.

**P. alnophila** (Vain.) Loht. et al. — on bark of *Populus tremula*; 5.

**P. caesia** (Hoffm.) Fürnr. — on granite; 1.

**P. dubia** (Hoffm.) Lettau — on bark of *Alnus glutinosa* and burnt wood of *Pinus sylvestris*, on granite; 1, 3, a6.

**P. tenella** (Scop.) DC. — on bark of *Populus tremula*, on granite; 1, 3, 5, MI (Alexeeva, 2005).

**Placynthiella dasaea** (Stirt.) Tønsberg — on wood of *Pinus sylvestris*; 2.

**P. icmalea** (Ach.) Coppins et P. James — on wood of *Pinus sylvestris*; 2.

**P. oligotropha** (J. R. Laundon) Coppins et P. James — on sandy soil; 4.

**P. uliginosa** (Schrad.) Coppins et P. James — on sandy soil; 4.

**Platismatia glauca** (L.) W. L. Culb. et C. F. Culb. — on wood of *Pinus sylvestris*; 2, a4, MI (Alexeeva, 2005).

**Polycauliona candelaria** (L.) Frödén et al. — on bark of *Alnus glutinosa*, on granite; 1, 3.

**P. polycarpa** (Hoffm.) Frödén et al. — on bark of *Alnus glutinosa*, on bark and wood of *Pinus sylvestris*, on granite; 1, 3, 4, a4, MI (Alexeeva, 2005).

**#Polycoccum pulvinatum** (Eitner) R. Sant. — on thalli of *Physcia caesia* and *P. tenella* on granite boulders; 1.

**Pseudevernia furfuracea** (L.) Zopf — on bark and wood of *Pinus sylvestris*, on bark of *Populus tremula*; 2, 4, 5, a4, MI (Alexeeva, 2005).

**Ramalina farinacea** (L.) Ach. — on bark of *Populus tremula*; 5, MI (Alexeeva, 2005).

**R. fraxinea** (L.) Ach. — on bark of deciduous tree; MI (Alexeeva, 2000, 2005).

**R. pollinaria** (Westr.) Ach. — on bark of *Alnus glutinosa*; 3.

**R. subfarinacea** (Nyl. ex Cromb.) Nyl. — on bark of *Alnus glutinosa*; 3.

**Rhizocarpon distinctum** Th. Fr. — on granite; 1.

**R. intersitum** Arnold — on granite; 1.

**R. lecanorinum** Anders — on granite; a5.

**R. richardii** (Lamy ex Nyl.) Zahlbr. — on granite; 1.

**Rinodina pyrina** (Ach.) Arnold — on bark of *Alnus glutinosa*, *Populus tremula*; 3.

**Ropalospora viridis** (Tønsberg) Tønsberg — on bark of *Alnus glutinosa*, *Populus tremula*; 3, 5.

**#Roselliniella cladoniae** (Anzi) Matzer et Hafellner — on podetia of *Cladonia* sp. on sandy soil; a3. Det. *Motiejūnaitė* (BILAS).

**Scoliciosporum chlorococcum** (Graewe ex Stenh.) Vězda — on bark of *Populus tremula* and wood of *Pinus sylvestris*; 5, a4.

**S. sarothamni** (Vain.) Vězda — on bark of *Alnus glutinosa*, *Populus tremula*, on bark and wood of *Pinus sylvestris*; 2–5, a4.

**S. umbrinum** (Ach.) Arnold — on granite; 1.

**Stereocaulon alpinum** Laurer — on sandy soil; 4, a3, MI (Alexeeva, 2005).

**S. glareosum** (L. I. Savicz) H. Magn. — on sandy soil; 4.

**S. incrustatum** Flörke — on sandy soil; 4.

**!#Taeniolella delicata** M. S. Christ. et D. Hawksw. — on thallus of *Lecidella* sp. and on thallus and apothecia of *Lecania naegelii* on bark of *Populus tremula*, *Mal-5*; 5. New to LR. Distribution in North-Western European Russia outside of LR: Republic of Karelia (Fadeeva *et al*., 2007). Distribution in Fennoscandia and Baltic countries: Sweden (Nordin *et al*., 2011), Estonia (Randlane *et al*., 2018). Obviously pathogenic lichenicolous fungus, usually destroying infected apothecia and thalli. Infects a wide range of lichens. Characterized by pale brown to brown conidiophores 8–56(–90) × 3.5–7 μm, conidia catenate, mostly in unbranched chains, 4–17 × 3–8 μm, (0–)1–2(–3)-septate, smooth, finally irregularly verruculose (Heuchert *et al*., 2018).

**Tephromela atra** (Huds.) Hafellner — on granite; 1.

**Trapeliopsis flexuosa** (Fr.) Coppins et P. James — on wood of *Pinus sylvestris*; 2, a4.

**T. granulosa** (Hoffm.) Lumbsch — on sandy soil; 4.

**Tuckermannopsis chlorophylla** (Willd. ex Humb.) Hale — on bark and wood of *Pinus sylvestris*; 2, 4, a4, MI (Alexeeva, 2005).

**Umbilicaria deusta** (L.) Baumg. — on granite; MI (Alexeeva, 2005).

**U. polyphylla** (L.) Baumg. — on granite; a5.

**Usnea hirta** (L.) F. H. Wigg. — on bark of coniferous tree; MI (Alexeeva, 2005).

**Vulpicida pinastri** (Scop.) J.-E. Mattsson et M. J. Lai — on bark of *Pinus sylvestris*; 2, 4.

**Xanthoparmelia conspersa** (Ehrh. ex Ach.) Hale — on granite; 1, a5.

***X. pulla** (Ach.) O. Blanco et al. — on granite; 1.

**Xanthoria parietina** (L.) Th. Fr. — on bark of *Alnus glutinosa* and *Populus tremula*, on granite; 1, 3, 5, MI (Alexeeva, 2005).

Identified lichen diversity of Maly Island comprises 160 species. The number is low if compared to the lichen floras of other islands in the Gulf of Finland: Moschny Island (Lavansaari) has 349 lichen species (Stepanchikova *et al*., 2019), Bolshoy Tuters (Tytärsaari) — 335 species (Stepanchikova *et al*., 2017; Himelbrant *et al*., 2019). Such difference can be partly explained by the small size of Maly Island. Additionally, the island is characterized by extremely low diversity of landscapes and plant communities. Moschny Island is not only much more diverse landscape-wise, but is also several times larger, whereas Bolshoy Tuters Island has several types of landscapes, including rocky outcrops and sandy dunes. Moreover, all forest communities of Maly Island are young and heavily disturbed, while Moschny Island

bears several older stands, and Bolshoy Tuters Island bears old-growth forests in its northern part. In spite of low general lichen diversity, on Maly Island we found two lichens — *Diplotomma pharcidium* and *Lecidella effugiens*, and one lichenicolous fungus — *Taeniolella delicata*, which were not known in the Leningrad Region before. Noteworthy that 17 species found on Maly Island are not known from neighboring Moschny Island (Stepanchikova *et al*., 2019). Among them, apart of the three mentioned above, other 14 species which are more common and widespread: *Arthonia apatetica*, *A. caerulescens*, *Athallia cerinelloides*, *Bacidia arceutina*, *Caloplaca cerina*, *Cladonia merochlorophaea*, *Lecanora argentata*, *L. compallens*, *L. populicola*, *Melanelixia glabratula*, *Muellerella lichenicola*, *Ramalina pollinaria*, *Rhizocarpon intersitum*, *Roselliniella cladoniae*.

Altogether 36 species of lichens were identified on the base of the small collection provided in 1993 by Balashova (LECB; Alexeeva, 2000, 2005). Most of them — 25 — were also found in the course of our investigations in 2017, however, we did not re-find 11 species in the course of our field studies — *Cetraria muricata*, *Cladonia borealis*, *C. macilenta*, *C. turgida*, *Flavocetraria nivalis*, *Peltigera canina*, *P. neckeri*, *P. rufescens*, *Ramalina fraxinea*, *Umbilicaria deusta*, and *Usnea hirta*. All of them, except for *Cetraria muricata* and *Flavocetraria nivalis*, are known from the nearby Moschny Island (Stepanchikova *et al*., 2019) and obviously could occur on Maly Island nowadays because suitable habitats are still present there. *Flavocetraria nivalis* was specially searched but not found in 2017, and probably has disappeared from Maly Island and the whole Leningrad Region (see Krasnaya..., 2018). Like in Moschny Island, the lack of the background data on lichen diversity of Maly Island makes it impossible to analyze the transformation of the lichen flora caused by natural or anthropogenic factors.

Of 149 species recorded on Maly Island in 2017, most are corticolous (67 species, 45.0%), with *Populus tremula* being the richest phorophyte (47 species, 31.5%); epiphytic lichens on *Alnus glutinosa* and *Pinus sylvestris* are less diverse (21 species, 14.1% and 16 species, 10.7% respectively). Pine wood is also quite rich in lichens (35 species, 23.5%), same as sandy soil and granite (31 species, 20.8% each). Lichenicolous fungi are represented by 9 species (6.0%). Two lichen species were found on bones, one on iron, and one more on plant debris. The lichen diversity on every substrate is at least two times lower than in the nearest and most similar Moschny Island (Stepanchikova *et al*., 2017).

The largest number of lichen species (76) was recorded in young pine forests (including open pine stands) which cover the most part of the island. Other communities represent smaller numbers: sandy seashores with boulders — 45 species, young aspen forest — 43 species, black alder and aspen stand on sandy shore — 36 species. Most interesting and valuable communities on Maly Island are sandy seashores with boulders, which are inhabited by specific saxicolous marine species, such as *Amandinea cacuminum*, *A. coniops*, *Athallia scopularis*, *Flavoplaca marina*, *Hydropunctaria maura*,

*Lecanora helicopis*, *L. rimicola*, *Myriolecis salina* var. *aberrans*, *Rhizocarpon richardii*, *Tephromela atra*, and *Xanthoparmelia pulla*.

Four of the recorded species are listed in the Red Data Book of the Leningrad Region (Krasnaya..., 2018): lignicolous *Calicium tigillare*, terricolous *Cladonia scabriuscula* and *Flavocetraria nivalis*, saxicolous *Xanthoparmelia pulla*. All red-listed species are confined to seashores. As all forests of Maly Island are young and secondary, their lichen biota virtually lacks indicator species of biologically valuable forests (Vyyavlenie..., 2009), with the only exception of *Calicium tigillare* which was found on wood of single old dead pine on the seashore.

The lichen flora of Maly Island is not very diverse, however, we consider the island worth to be incorporated in the Nature Reserve "Eastern Gulf of Finland" which already includes several neighboring islands, and thereby being protected as a habitat of endangered species.

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