

The lichens from the City of Petrozavodsk in the Herbarium of the Botanical Museum, University of Helsinki

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Abstract: A historical lichen collection in the Herbarium of the Botanical Museum, University of Helsinki, collected in the 19th and 20th centuries from the territory of Petrozavodsk (Republic of Karelia, Russia) was examined. A revision of 354 herbarium packets containing 674 specimens resulted in a list of 227 species of lichens and lichenicolous or non-lichenized saprobic fungi. Our historical list added 102 new species to the lichen flora of the city, which now contains 330 species. *Xylographa trunciseda* is a new lichen record for North-Western Russia. Seven species were registered for Karelia for the first time. 40 species are new to the biogeographic province *Karelia olonetsensis* and four species – to *Karelia onegensis*.

Keywords: lichens, Petrozavodsk, herbarium H, historical collection

INTRODUCTION

Herbarium specimens collected in the past may be a valuable source of information on the changes in species composition of a certain territory. The unique historical collection of lichens from the City of Petrozavodsk (Republic of Karelia, Russia) has been preserved in the Herbarium of the Botanical Museum, University of Helsinki (H) for more than 150 years. The City of Petrozavodsk was founded on the bank of Lake Onega in 1703 by Peter the Great. The city's appearance has changed significantly over the last 150 years. Its area has increased from 9 to 135 km² while the share of residential area has increased from 4 to 34%. Wooden buildings and bridges were replaced by concrete and brick constructions. The population has grown from 11,400 in 1863 to 272,100 in 2014.

Early studies of lichens on the territory of the city were carried out by Finnish collectors in the 19th century. In 1850–1898 lichens were collected in Petrozavodsk by the following visiting Finnish botanists: T. Simming, H. A. Kullhem, M. Brenner, W. Nylander, J. P. Norrlin, A. K. Cajander, and J. I. Lindroth (Liro). Some data were published by themselves (Nylander, 1866; Norrlin, 1876) but many only in later publications (e.g., Moberg, 1977; Vitikainen, 1968, 1994; Halonen et al., 1999). There was also a local collector, A. K. Günther, who worked

as a pharmacist in Petrozavodsk. Many of his samples collected in 1863 from Petrozavodsk are also preserved in Helsinki. During the World War II, between 1941 and 1944, when Petrozavodsk was under the Finnish occupation, the Finnish botanists A. Koskinen, M. Laurila, L. Fagerström, and V. Räsänen collected lichens in Petrozavodsk, and some of their records were also published (e.g., Fagerström, 1945; Koskinen, 1961). The modern period started in the 1990s when lichens were mainly recorded and collected by T. Ahti, M. Fadeeva, V. Tarasova, V. Stepanova (V. Androsova), and A. Sonina.

The data from the above mentioned papers as well as direct citations of some herbarium specimens were included in the List of lichens of Republic of Karelia (Fadeeva et al., 2007). In total, 1256 lichen species and allied fungi were reported from Karelia in that checklist.

This work is a continuation of the survey of lichens from Petrozavodsk where currently 228 lichen species have been reported for the territory of the city (Tarasova et al., 2013). The aim of this study was to make a historical list of lichens from the City of Petrozavodsk in its present limits based on the specimens in H; besides the historical collections, also recent specimens in H (collected by Ahti since 1990s) were considered.

MATERIALS AND METHODS

All specimens in H collected from Petrozavodsk (altogether 354 herbarium packets) were examined. The samples had been collected from the following localities within the present limits of the city: Petrozavodsk (either from centre or from uncertain locality), Sulazhgora (biogeographic province *Karelia olonetsensis*, Kol), and Solomennoe or Nikolsky islands (biogeographic province *Karelia onegensis*, Kon). As noted by Ahti & Boychuk (2006: 4, 17), the delimitation of these provinces in Petrozavodsk has differed in various publications and herbaria. We follow here the Karelian practice (e.g., Kravchenko et al., 2000: 6; Fadeeva et al., 2007) by including the northern suburb Solomennoe of Petrozavodsk into Kon, while the Finnish authors since J. P. Norrlin (1871: 124–125, 1923: 151–152) have usually included them in Kol. The Finnish authors have used the Shuya River ('Suojunjoki', 'Suoju-dalen', 'Suojutal') as the precise limit between the provinces, while the Karelians have favoured a more diffuse limit located between centre of Petrozavodsk and Solomennoe on floristic grounds. All this confusion means that the specimens from Solomennoe that are actually located in the section Kol in the Helsinki herbarium, are here cited to belong to Kon.

Working with herbarium specimens, special attention was paid to the mixed samples, in which all included species were identified.

The specimens were identified by using standard microscopic technique and spot tests. Lichen substances were analyzed by standard technique of high performance thin-layer chromatography (HPTLC) in the Laboratory of Lichenology and Bryology, Komarov Botanical Institute of RAS (St. Petersburg) and Herbarium of the Botanical Museum, University of Helsinki, using solvent systems A, B and C (Orange et al., 2001).

Several specimens have been revised and confirmed by specialists of different taxonomic groups: T. Ahti, L. Gagarina, S. Gowan, P. Halonen, A. Launis, R. Moberg, L. Myllys, J. Pykälä, S. Stenroos, L. Tibell, E. Timdal, A. Vězda, O. Vitikainen, L. Yakovchenko, and A. Zavarzin. However, most of the specimens in H collected from Petrozavodsk in the 19th and 20th centuries had not been critically examined recently before us.

THE SPECIES

For each species, annotations are given with the following information: localities [Petrozavodsk, Sulazhgora (Kol), Solomennoe (Kon)], collector(s), and year of collection; literature sources where the species has been mentioned as occurring in Petrozavodsk (in parentheses).

The nomenclature follows mainly Nordin et al. (2011).

Abbreviations and symbols: # – lichenicolous fungi; + – non-lichenized fungi; ! – new species for Karelia; * – taxa which occurred in the historical collections but were not recorded in Tarasova et al. (2013); Kol! – new species for the biogeographical province Karelia olonetsensis, Kon! – new species for the biogeographical province Karelia onegensis.

- +*AGYRIUM RUFUM (Pers.) Fr. – Petrozavodsk, A. K. Günther, 1863. Kol!
- *ACAROSPORA PELISCYPHA Th. Fr. – Petrozavodsk, H. A. Kullhem, 1863. Kol!
- *ALYXORIA VARIA (Pers.) Ertz & Tehler – Petrozavodsk, T. Simming, 1863, (Nylander, 1866).
- AMANDINEA PUNCTATA (Hoffm.) Coppins & Scheid. – Petrozavodsk, T. Simming, 1863; Solomennoe, H. A. Kullhem, 1863, (Norrin, 1876).
- ARCTOPARMELIA CENTRIFUGA (L.) Hale – Petrozavodsk, T. Simming, 1863, H. A. Kullhem, 1863.
- *ARTHONIA PUNCTIFORMIS Ach. – Petrozavodsk, A. Koskinen, 1942. Kol!
- *ARTHONIA RADIATA (Pers.) Ach. – Solomennoe, H. A. Kullhem, 1863, (Norrin, 1876).
- *ARTHONIA SPADICEA Leight. – Petrozavodsk, H. A. Kullhem, 1863, (Norrin, 1876).
- +*ARTHOTHELIUM SCANDINAVICUM Th. Fr. [syn. *Arthonia onegensis* Nyl. – lectotype (H-NYL 5749 = H 9507693), isolectotype (H 9503318)] – Solomennoe, H. A. Kullhem, 1863, (Norrin, 1876).
- *ARTHROSPORUM POPULORUM A. Massal. – Petrozavodsk, A. Koskinen, 1942. Kol!
- ASPICILIA CINEREA (L.) Körb. – Petrozavodsk, H. A. Kullhem, 1863; Solomennoe, T. Simming, 1863, (Nylander, 1866; Norrlin, 1876).
- *ASPICILIA LAEVATA (Ach.) Arnold – Petrozavodsk, H. A. Kullhem, 1863, (Nylander, 1866; Norrlin, 1876).
- *ASPICILIA LAEVATOIDES (H. Magn.) Oxner – Petrozavodsk, H. A. Kullhem, 1863, (Magnusson, 1939).

- **ASPICILIA ZONATA* (Ach.) R. Sant. – Petrozavodsk, A. Koskinen, 1942, (Fadeeva et al., 2007).
- **BACIDIA CIRCUMSPECTA* (Nyl. ex Vain.) – Petrozavodsk, H. A. Kullhem, 1863, A. Koskinen, 1942. Kol!
- **BACIDIA IGNIARII* (Nyl.) Oxner – Petrozavodsk, T. Simming, 1863. Kol!
- BACIDIA SUBINCOMPTA* (Nyl.) Arnold – Petrozavodsk, T. Simming, 1863, (Vainio, 1922).
- **BACIDIA VERMIFERA* (Nyl.) Th. Fr. – Petrozavodsk, T. Simming, 1863, (Nylander, 1866; Norrlin, 1876; Vainio, 1922).
- BACIDINA INUNDATA* (Fr.) Vězda – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876; Vainio, 1922).
- BAEOMYCES RUFUS* (Huds.) Rebent. – Petrozavodsk, A. K. Günther, 1863, Solomennoe, H. A. Kullhem, 1863.
- BELLEMERIA CINEREORUFESCENS* (Ach.) Clauzade & Cl. Roux – Solomennoe, H. A. Kullhem, 1863, (Nylander, 1866; Norrlin, 1876).
- **BIATORA GLOBULOSA* (Flörke) Fr. – Petrozavodsk, T. Simming, 1863; Solomennoe, T. Simming, 1863, (Norrlin, 1876). Kol!
- **BIATORA MEIOCARPA* (Nyl.) Arnold – Solomennoe, T. Simming, 1863. Kon!
- BIATORA OCELLIFORMIS* (Nyl.) Arnold – Petrozavodsk, H. A. Kullhem, 1863, A. Koskinen, 1942.
- **BIATORA SUBDUPLEX* (Nyl.) Printzen – Petrozavodsk, T. Simming, 1863. Kol!
- BRYORIA CAPILLARIS* (Ach.) Brodo & D. Hawksw. – Petrozavodsk, T. Simming, 1863; Solomennoe, T. Simming, 1863, (Norrlin, 1876; Räsänen, 1920; Fagerström, 1945).
- BRYORIA FURCELLATA* (Fr.) Brodo & D. Hawksw. – Petrozavodsk, H. A. Kullhem, 1863, (Elfving, 1878; Räsänen, 1922).
- BRYORIA FUSCESCENS* (Gyeln.) Brodo & D. Hawksw. – Petrozavodsk, W. Nylander, 1863, H. A. Kullhem, 1863, A. K. Günther, 1863. Det. L. Myllys, 2015.
- **BRYORIA IMPLEXA* (Hoffm.) Brodo & D. Hawksw. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863; Solomennoe, T. Simming, 1863. Det. L. Myllys, 2015. Kol!
- !**BRYORIA VRANGIANA* (Gyeln.) Brodo & D. Hawksw. – Petrozavodsk, T. Simming, 1863. Det. L. Myllys, 2015. Kol!
- !**BUELLIA ARNOLDII* Servit – Petrozavodsk, A. K. Günther, 1863. Kol!
- BUELLIA DISCIFORMIS* (Fr.) Mudd – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863; Solomennoe, T. Simming, 1863.
- **BUELLIA ERUBESCENS* Arnold – Petrozavodsk, H. A. Kullhem, 1863. Kol! Det. D. E. Himelbrant, 2015.
- **BUELLIA INSIGNIS* (Nägeli ex Hepp) Th. Fr. – Petrozavodsk, A. K. Günther, 1863. Kol!
- **BUELLIA SCHAERERI* De Not. – Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- CALICIUM GLAUCELLUM* Ach. – Petrozavodsk, H. A. Kullhem, 1863.
- !**CALICIUM PINASTRI* Tibell – Petrozavodsk, T. Simming, 1863. Kol!
- **CALICIUM SALICINUM* Pers. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863.
- **CALICIUM VIRIDE* Pers. – Petrozavodsk, H. A. Kullhem, 1863. Kol!
- **CALICIUM TRABINELLUM* (Ach.) Ach. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, (Norrlin, 1876).
- **CALOPLACA AHTII* Søchting – Solomennoe, H. A. Kullhem, 1863.
- CALOPLACA CERINA* (Hedw.) Th. Fr. – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863, A. Koskinen, 1942, M. Laurila, 1942; Solomennoe, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876).
- CALOPLACA PYRACEA* (Ach.) Zwackh – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863; Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- !**CALOPLACA SUSPICIOSA* (Nyl.) H. Magn. – Petrozavodsk, A. K. Günther, 1863; Solomennoe, H. A. Kullhem, 1863. Kol! Kon!
- CANDELARIELLA VITELLINA* (Hoffm.) Müll. Arg. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863, A. Koskinen, 1942, M. Laurila, 1942; Solomennoe, T. Ahti, 2000, (Norrlin, 1876).
- CANDELARIELLA XANTHOSTIGMA* (Ach.) Lettau – Petrozavodsk, A. Koskinen, 1942, (Hakulinen, 1954).
- CETRARIA ERICETORUM* Opiz – Petrozavodsk, T. Simming, 1863, (Norrlin, 1876).
- CETRARIA ISLANDICA* (L.) Ach. – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863.
- CETRARIA ODONTELLA* (Ach.) Ach. – Petrozavodsk, T. Simming, 1863.

- CETRARIA SEPINCOLA (Ehrh.) Ach. – Petrozavodsk, H. A. Kullhem, 1863; Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- *CETRARIELLA COMMIXTA (Nyl.) A. Thell & Kärnefelt – Petrozavodsk, H. A. Kullhem, 1863.
- *CETRELIA CETRARIOIDES (Delise) W.L. Culb. & C.F. Culb. – Petrozavodsk, A. K. Günther, 1863. Kol!
- *CHAENOTHECA BRUNNEOLA (Ach.) Müll. Arg. – Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- CHAENOTHECA CHRYSOCEPHALA (Ach.) Th. Fr. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863; Solomennoe, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876; Vainio, 1927).
- CHAENOTHECA FERRUGINEA (Turner & Sm.) Mig. – Petrozavodsk, T. Simming, 1863; Solomennoe, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876; Vainio, 1927).
- *CHAENOTHECA STEMONEA (Ach.) Müll. Arg. – Petrozavodsk, T. Simming, 1863; Solomennoe, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876; Vainio, 1927).
- CHAENOTHECA TRICHIALIS (Ach.) Hellb. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876; Vainio, 1927).
- #CHAENOTHECOPSIS PUSILLA (Ach.) A. F. W. Schmidt – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863, (Norrlin, 1876).
- #CHAENOTHECOPSIS SAVONICA (Räsänen) Tibell – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863; Solomennoe, H. A. Kullhem, 1863.
- CLADONIA AMAUROCRAEA (Flörke) Schaer. – Petrozavodsk, H. A. Kullhem, 1863, (Norrlin, 1876).
- *CLADONIA ARBUSCULA (Wallr.) Flot. – Petrozavodsk, T. Simming, 1863.
- CLADONIA BOREALIS S. Stenroos – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, (Stenroos, 1989).
- CLADONIA BOTRYTES (K. G. Hagen) Willd. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863.
- CLADONIA CENOTEA (Ach.) Schaer. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863; Solomennoe, H. A. Kullhem, 1863; Nikol'sky islands, H. A. Kullhem, 1863, (Norrlin, 1876).
- CLADONIA CORNUTA (L.) Hoffm. – Petrozavodsk, T. Simming, 1863.
- CLADONIA CRISPATA (Ach.) Flot. – Petrozavodsk, T. Simming, 1863.
- CLADONIA DEFORMIS (L.) Hoffm. – Petrozavodsk, H. A. Kullhem, 1863.
- CLADONIA DIGITATA (L.) Hoffm. – Solomennoe, T. Simming, 1863, (Norrlin, 1876).
- CLADONIA FIMBRIATA (L.) Fr. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, (Norrlin, 1876).
- CLADONIA FURCATA (Huds.) Schrad. – Solomennoe, T. Simming, 1863, (Norrlin, 1876).
- *CLADONIA GRACILIS SUBSP. GRACILIS (L.) Willd. – Petrozavodsk, H. A. Kullhem, 1863. Kol!
- CLADONIA GRACILIS SUBSP. TURBINATA (Ach.) Ahti – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863.
- CLADONIA MITIS Sandst. – Petrozavodsk, H. A. Kullhem, T. Simming, 1863.
- CLADONIA PHYLLOPHORA Hoffm. – Petrozavodsk, A. K. Günther, 1863, (Norrlin, 1876).
- CLADONIA PYXIDATA (L.) Hoffm. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863. The specimens contain fumarprotocetraric acid.
- CLADONIA RANGIFERINA (L.) F. H. Wigg. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863.
- *CLADONIA REI Schaer. – Petrozavodsk, H. A. Kullhem, 1863.
- CLADONIA SUBULATA (L.) F. H. Wigg. – Petrozavodsk, T. Simming, 1863.
- CLADONIA SULPHURINA (Michx.) Fr. – Petrozavodsk, H. A. Kullhem, 1863.
- *CLADONIA VERTICILLATA (Hoffm.) Schaer. – Petrozavodsk, T. Simming, 1863.
- *COLLEMA FLACCIDUM (Ach.) Ach. – Petrozavodsk, A. K. Günther, 1863, G. Degelius, 1945.
- COLLEMA FURFURACEUM (Arnold) Du Rietz – Solomennoe, H. A. Kullhem, 1863, (Degelius, 1954).
- *CYPHELUM TIGILLARE (Ach.) Ach. – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863; Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876; Vainio, 1927).
- DERMATOCARPON LURIDUM (With.) J. R. Laundon – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876).
- DIPLOSCHISTES SCRUPOSUS (Schreb.) Norman – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863.
- *EVERNIA DIVARICATA (L.) Ach. – Petrozavodsk, A. K. Günther, 1863, (Nylander, 1866; Norrlin, 1876).
- EVERNIA MESOMORPHA Nyl. – Petrozavodsk, A. K. Günther, 1863; Solomennoe, T. Simming, 1863, (Elfving 1878; Ahlner 1948; Norrlin, 1876).

- EVERNIA PRUNASTRI (L.) Ach. – Petrozavodsk, A. K. Günther, 1863, Simming, 1863; Solomennoe, T. Simming, 1863, (Nylander, 1866; Norrlin, 1876).
- *FLAVOCETRARIA NIVALIS (L.) Kärnefelt & A. Thell – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Norrin, 1876).
- GRAPHIS SCRIPTA (L.) Ach. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863; Solomennoe, H. A. Kullhem, 1863, (Nylander, 1866; Norrlin, 1876).
- HYPOCENOMYCE SCALARIS (Ach.) M. Choisy – Petrozavodsk, T. Simming, 1863; Solomennoe, T. Simming, 1863, (Nylander, 1866; Norrlin, 1876).
- HYPOGYMNA PHYSODES (L.) Nyl. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863, T. Ahti, 2000; Solomennoe, T. Simming, 1863, (Norrin, 1876).
- HYPOGYMNA TUBULOSA (Schaer.) Hav. – Petrozavodsk, A. K. Günther, 1863.
- *ICMADOPHILA ERICETORUM (L.) Zahlbr. – Solomennoe, T. Simming, 1863, (Norrin, 1876).
- IMMERSARIA CUPREOATRA (Nyl.) Calat. & Rambold – Petrozavodsk, Kullhem, 1863; Solomennoe, H. A. Kullhem, 1863, (Norrin, 1876).
- LECANIA CYRTELLA (Ach.) Th. Fr. – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863. Kol!
- *LECANIA CYRTELLINA (Nyl.) Sandst. – lectotype (H-NYL 26468 = H 9506894), isolectotype (H 9503380); Petrozavodsk, Simming, 1863, A. Koskinen, 1942, (Nylander, 1866; Norrlin, 1876).
- *LECANIA DUBITANS (Nyl.) A. L. Sm. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, (Norrin, 1876).
- LECANIA NAEGELII (Hepp) Diederich & van den Boom – Petrozavodsk, A. Koskinen, 1942.
- LECANORA ALBELLULA (Nyl.) Th. Fr. – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863, A. Koskinen, 1942; Solomennoe, T. Ahti, 2000, (Norrin, 1876).
- LECANORA ALLOPHANA Nyl. – Petrozavodsk, H. A. Kullhem, 1863; Solomennoe, H. A. Kullhem, 1863.
- *LECANORA ARGENTATA (Ach.) Malme – Petrozavodsk, H. A. Kullhem, 1863.
- *LECANORA ANOPTA Nyl. – Petrozavodsk, A. K. Günther, 1863; Solomennoe, H. A. Kullhem, 1863. Kol!
- *LECANORA CATEILEA (Ach.) A. Massal. – Petrozavodsk, M. Brenner, 1861, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863, (Norrin, 1876).
- *LECANORA CENISIA Ach. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, A. Koskinen, 1942, (Norrin, 1876).
- *LECANORA CHLOROPHAEODES Nyl. – Solomennoe, H. A. Kullhem, 1863, (Norrin, 1876).
- LECANORA HAGENII (Ach.) Ach. – Petrozavodsk, M. Laurila, 1942.
- *LECANORA HYPOPTA (Ach.) Vain. – Petrozavodsk, A. K. Günther, 1863. Kol!
- *LECANORA LEPTYRODES G. B. F. Nilsson – Petrozavodsk, H. A. Kullhem, 1863; Solomennoe, H. A. Kullhem, 1863. Kol!
- *LECANORA MUGHICOLA Nyl. – Petrozavodsk, T. Simming, 1863. Kol!
- LECANORA MURALIS (Schreb.) Rabenh. – Solomennoe, H. A. Kullhem, 1863, (Norrin, 1876).
- *LECANORA PHAEOSTIGMA (Körb.) Almb. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Norrin, 1876).
- LECANORA POLYTROPA (Ehrh. ex Hoffm.) Rabenh. – Petrozavodsk, H. A. Kullhem, 1863.
- LECANORA POPULICOLA (DC.) Duby – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, (Norrin, 1876).
- LECANORA PULICARIS (Pers.) Ach. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863, A. Koskinen, 1942.
- *LECANORA SAMBUCI (Pers.) Nyl. – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863, A. Koskinen, 1942. Kol!
- LECANORA SYMMICTA (Ach.) Ach. – Petrozavodsk, Solomennoe, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863, T. Ahti, 2000, (Norrin, 1876).
- *LECIDEA ERYTHROPHAEA Flörke ex Sommerf. – Petrozavodsk, W. Nylander, 1863. Kol!
- *LECIDEA NYLANDERI (Anzi) Th. Fr. – Petrozavodsk, T. Simming, 1863, A. Koskinen, 1942. Kol! The specimens contain divaricatic acid. Det. I. Stepanchikova, 2015.
- *LECIDELLA ANOMALOIDES (A. Massal.) Hertel & H. Kiliás – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863.
- LECIDELLA EUPHOREA (Flörke) Hertel – Solomennoe, H. A. Kullhem, 1863, (Norrin, 1876).
- *LEPRARIA cf. DIFFUSA (J. R. Laundon) Kukwa – Petrozavodsk, A. K. Günther, 1863.
- LEPTOGIUM SATURNINUM (Dicks.) Nyl. – Solomennoe, T. Simming, 1863.

- *LEPTORHAPHIS ATOMARIA (Ach.) Szatala – Petrozavodsk, H. A. Kullhem, 1863, A. Koskinen, 1942. Koll!
- #LEPTORHAPHIS EPIDERMIDIS (Ach.) Th. Fr. – Petrozavodsk, A. K. Günther, 1863, Räsänen, 1943; Solomennoe, T. Simming, 1863, (Norrlin, 1876).
- LOBARIA PULMONARIA (L.) Hoffm. – Petrozavodsk, T. Simming, 1863, (Fagerström, 1945).
- MELANELIXIA SUBARGENTIFERA (Nyl.) O. Blanco et al. – Petrozavodsk, H. A. Kullhem, 1863; Solomennoe, T. Ahti, 2000, (Räsänen, 1939).
- MELANELIXIA SUBAURIFERA (Nyl.) O. Blanco et al. – Petrozavodsk, H. A. Kullhem, 1863, A. Koskinen, 1942; Solomennoe, T. Ahti, 2000, (Norrlin, 1876).
- MELANOHALEA OLIVACEA (L.) O. Blanco et al. – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863, A. Koskinen, 1942.
- *MICAREA DENIGRATA (Fr.) Hedl. – Solomennoe, T. Simming, 1863, (Norrlin, 1876). Det. A. Launis, 2015.
- *MONTANELIA SOREDIATA (Ach.) Divakar et al. – Petrozavodsk, A. K. Günther, 1863, A. Koskinen, 1942.
- MYCOBILIMBIA CARNEALBIDA (Müll. Arg.) Printzen – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863.
- *MYCOBILIMBIA TETRAMERA (De Not.) Vitik. et al. ex Hafellner & Türk – Petrozavodsk, A. K. Günther, 1863, T. Simming, 1863. Koll!
- *+MYCOCALICIUM SUBTILE (Pers.) Szatala – Petrozavodsk, A. K. Günther, 1863, (Vainio, 1927).
- *NEPHROMA ARCTICUM (L.) Torss. – Petrozavodsk, H. A. Kullhem, 1863, (Norrlin, 1876).
- *NEPHROMA BELLUM (Spreng.) Tuck. – Petrozavodsk, T. Simming, 1863, (1). Koll!
- NEPHROMA PARILE (Ach.) Ach. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863; Solomennoe, Fagerström, 1942, (Norrlin, 1876).
- NEPHROMA RESUPINATUM (L.) Ach. – Petrozavodsk, M. Brenner, 1861, T. Simming, 1863; Solomennoe, T. Simming, 1863, (Norrlin, 1876; Fagerström, 1945).
- OCHROLECHIA ANDROGYNA S. LAT. (Hoffm.) Arnold – Petrozavodsk, T. Simming, 1863; Solomennoe, H. A. Kullhem, 1863. Koll! The specimens contain gyrophoric acid. Det. I. Stepanchikova, 2015.
- *OCHROLECHIA MICROSTICTOIDES Räsänen – Petrozavodsk, H. A. Kullhem, 1863. The specimens contain variolaric and lichesterinic acids. Det. I. Stepanchikova, 2015.
- OCHROLECHIA PALLESCENS (L.) A. Massal. – Petrozavodsk, M. A. Fadeeva, 2003.
- *OXNERIA FALLAX (Arnold) S.Y. Kondr. & Kärnefelt – Petrozavodsk, A. Koskinen, 1942, V. Räsänen, 1943.
- PACHYPHIALE FAGICOLA (Hepp ex Arnold) Zwackh – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876).
- PARMELIA OMPHALODES (L.) Ach. – Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- PARMELIA SAXATILIS (L.) Ach. – Petrozavodsk, T. Simming, 1863.
- PARMELIA SULCATA Taylor – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863, T. Ahti, 2000; Solomennoe, T. Simming, 1863, T. Ahti, 2000, (Norrlin, 1876).
- *PARMELIELLA TRIPTOPHYLLA (Ach.) Müll. Arg. – Petrozavodsk, T. Simming, 1863, (Norrlin, 1876).
- PARMELIOPSIS AMBIGUA (Wulfen) Nyl. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863; Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- PARMELIOPSIS HYPEROPTA (Ach.) Arnold – Petrozavodsk, T. Simming, 1863, Laurila, 1942; Solomennoe, H. A. Kullhem, 1863.
- PELTIGERA CANINA (L.) Willd. – Petrozavodsk, H. A. Kullhem, 1863, (Vitikainen, 1994).
- PELTIGERA DIDACTYLA (With.) J. R. Laundon – Sulazhgora, L. Fagerström, 1942, (Vitikainen, 1994).
- PELTIGERA LEUCOPHLEBIA (Nyl.) Gyeln. – Petrozavodsk, H. A. Kullhem, 1863; Solomennoe, L. Fagerström, 1942, (Fagerström, 1945; Vitikainen, 1994).
- PELTIGERA MALACEA (Ach.) Funck – Petrozavodsk, A. K. Günther, 1863, (Vitikainen, 1994).
- PELTIGERA NECKERI Hepp ex Müll. Arg. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, L. Fagerström, 1942.
- PELTIGERA PRAETEXTATA (Flörke ex Sommerf.) Zopf – Petrozavodsk, H. A. Kullhem, 1863.
- PELTIGERA RUFESCENS (Weiss) Humb. – Drevlyanka, A. K. Cajander, 1898, (Vitikainen, 1994; Ahti & Boychuk 2006).
- PHAEOPHYSCIA CILIATA (Hoffm.) Moberg – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876).

- *PHAEOPHYSCIA ENDOCOCINA (Körb.) Moberg – Petrozavodsk, H. A. Kullhem, 1863.
- PHAEOPHYSCIA NIGRICANS (Flörke) Moberg – Petrozavodsk, T. Ahti, 2000.
- PHAEOPHYSCIA ORBICULARIS (Neck.) Moberg – Petrozavodsk, A. Koskinen, 1942, V. Räsänen, 1943; Solomennoe, T. Ahti, 2000, (Norrlin, 1876).
- PHAEOPHYSCIA SCIASTRA (Ach.) Moberg – Petrozavodsk, A. Koskinen, 1942, M. Laurila, 1942; Solomennoe, T. Ahti, 2000, (Norrlin, 1876).
- PHYSCIA ADSCENDENS H. Olivier – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, Solomennoe, T. Ahti, 2000.
- PHYSCIA AIPOLIA (Ehrh. ex Humb.) Fűrnr. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, T. Ahti, 2000; Solomennoe T. Simming, 1863, T. Ahti, 2000, (Norrlin, 1876).
- PHYSCIA AIPOLIA V. ALNOPHILA (Vain.) Lynge – Petrozavodsk, H. A. Kullhem, T. Simming, 1863; Solomennoe, T. Ahti, 2000.
- PHYSCIA CAESIA (Hoffm.) Fűrnr. – Petrozavodsk, A. K. Günther, 1863, V. Räsänen, 1943, A. Koskinen, 1942, M. Laurila, 1942; Solomennoe, T. Ahti, 2000, (Norrlin, 1876).
- PHYSCIA DUBIA (Hoffm.) Lettau – Petrozavodsk, A. K. Günther, 1863, M. Laurila, 1942, T. Ahti, 2000, (Laurila, 1940).
- PHYSCIA PHAEA (Tuck.) J.W. Thomson – Petrozavodsk, A. K. Günther, H. A. Kullhem, 1863, (Fadeeva et al., 2007).
- PHYSCIA STELLARIS (L.) Nyl. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863; Solomennoe, T. Simming, 1863, (Räsänen, 1921; Norrlin, 1876).
- *PHYSCIA SUBALBINEA Nyl. – Solomennoe, T. Ahti, 2000. Kon!
- PHYSCONIA DETERSA (Nyl.) Poelt – Petrozavodsk, H. A. Kullhem, 1863, (Vitikainen 1968).
- PHYSCONIA DISTORTA (With.) J.R. Laundon – Petrozavodsk, A. K. Günther, 1863; Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- *PHYSCONIA ENTEROXANTHA (Nyl.) Poelt – Petrozavodsk, V. Räsänen, 1943, (Vitikainen 1968).
- *PHYSCONIA PERISIDIOSA (Erichsen) Moberg – Petrozavodsk, H. A. Kullhem, 1863; Solomennoe, H. A. Kullhem, 1863, (Vitikainen 1968).
- !*PICCOLIA OCHROPHORA (Nyl.) Hafellner – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863. Kol!
- PLACYNTHIELLA ICMALEA (Ach.) Coppins & P. James – Petrozavodsk, H. A. Kullhem, 1863.
- *PLACYNTHIUM NIGRUM (Huds.) Gray – Petrozavodsk, H. A. Kullhem, 1863. Kol!
- PLATISMATIA GLAUCA (L.) W. L. Culb. & C. F. Culb. – Petrozavodsk, T. Simming, 1863.
- PORPIDIA CRUSTULATA (Ach.) Hertel & Knoph – Petrozavodsk, H. A. Kullhem, 1863.
- *PORPIDIA GRISEA Gowan – Petrozavodsk, A. K. Günther, 1863, (Fadeeva et al., 2007).
- *PORPIDIA MACROCARPA (DC.) Hertel & A.J. Schwab – Petrozavodsk, H. A. Kullhem, 1863, (Norrlin, 1876).
- PROTOPARMELIA BADIA (Hoffm.) Hafellner – Petrozavodsk, H. A. Kullhem, 1863, (Fadeeva et al., 2007).
- RAMALINA DILACERATA (Hoffm.) Hoffm. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876).
- RAMALINA POLLINARIA (Westr.) Ach. – Petrozavodsk, H. A. Kullhem, 1863.
- *RAMALINA SINENSIS Jatta [syn. *Ramalina fastigiata* var. *nervosa* Nyl. – lectotype (H-NYL 36889 = H 9504948)] – Petrozavodsk, A. K. Günther, T. Simming, 1863, (Norrlin, 1876).
- *RAMALINA THRAUSTA (Ach.) Nyl. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, (Norrlin, 1876).
- *RHIZOCARPON GRANDE (Flörke) Arnold – Petrozavodsk, A. K. Günther, H. A. Kullhem, 1863. Det. E. Timdal, 2015.
- *RHIZOCARPON POLYCARPUM (Hepp) Th. Fr. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863. Kol! Det. E. Timdal, 2015.
- *RINODINA ARCHAEA (Ach.) Arnold – Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- *RINODINA EXIGUA (Ach.) Gray – Petrozavodsk, Solomennoe, H. A. Kullhem, 1863; Petrozavodsk, Fadeeva, 2003, (Norrlin, 1876). Kol!
- *RINODINA GENNARI (Bagl.) – Petrozavodsk, M. Laurila, 1942. Kol!
- *RINODINA METABOLIZA Vain. – Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- RINODINA MILVINA (Wahlenb.) Th. Fr. – Petrozavodsk, T. Simming, 1863.
- *RINODINA POLYSPORA Th. Fr. – Solomennoe, H. A. Kullhem, 1863, (Norrlin, 1876).
- *RINODINA PYRINA (Ach.) Arnold – Petrozavodsk, T. Simming, 1863, A. Koskinen, 1942, M. Laurila, 1942. Kol!
- *RINODINA SOPHODES (Ach.) A. Massal. – Petrozavodsk, A. K. Günther, 1863; Solomennoe, T. Ahti, 2000, (Norrlin, 1876). Kol!

- *RINODINA TREVISANII (Hepp) Körb. – Petrozavodsk, A. K. Günther, 1863.
- *+SAREA DIFFORMIS (Fr.) Fr. – Petrozavodsk, T. Simming, 1863. Kol!
- *+SAREA RESINAE (Fr.: Fr.) Kuntze – Petrozavodsk, T. Simming, 1863, (Nylander, 1866).
- SCOLIOSPORUM CHLOROCOCCUM (Graewe ex Stenh.) Vězda – Petrozavodsk, A. Koskinen, 1942, T. Ahti, 2000; Solomennoe, T. Ahti, 2000.
- *SOLORINA SACCATA (L.) Ach. – Petrozavodsk, A. K. Günther, 1863.
- *STAUROTHELE FISSA (Taylor) Zwackh – Petrozavodsk, H. A. Kullhem, 1863. Kol!
- +STENOCYBE PULLATULA (Ach.) Stein – Petrozavodsk, T. Simming, 1863.
- STEREOCAULON PASCHALE (L.) Hoffm. – Petrozavodsk, T. Simming, 1863.
- STEREOCAULON TOMENTOSUM Fr. – Solomennoe, T. Simming, 1863, (Norrlin, 1876).
- *STRANGOSPORA MORIFORMIS (Ach.) Stein – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876).
- *TEPHROMELA ATRA (Huds.) Hafellner – Petrozavodsk, A. Koskinen, 1942. Kon!
- TRAPELIOPSIS FLEXUOSA (Fr.) Coppins & P. James – Petrozavodsk, H. A. Kullhem, 1863.
- *TRAPELIOPSIS GRANULOSA (Hoffm.) Lumbsch – Petrozavodsk, A. Koskinen, 1942. Kol!
- TUCKERMANNOPSIS CHLOROPHYLLA (Willd.) Hale – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, (Elfving, 1878).
- UMBILICARIA DEUSTA (L.) Baumg. – Petrozavodsk, T. Simming, 1863, (Hakulinen, 1962).
- USNEA DASOPOGA (Ach.) Nyl. – Petrozavodsk, Solomennoe, T. Simming, 1863, (Räsänen 1920, Norrlin, 1876).
- *USNEA FULVOREAGENS (Räsänen) Räsänen – Petrozavodsk, H. A. Kullhem, 1863; Solomennoe, T. Simming, 1863, (Halonen et al., 1999).
- *USNEA GLABRATA (Ach.) Vain. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Halonen et al., 1999).
- USNEA GLABRESCENS (Nyl. ex Vain.) Vain. ex Räsänen – Solomennoe, T. Simming, 1863, (Räsänen, 1920).
- USNEA HIRTA (L.) F.H. Wigg. – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, (Räsänen, 1920).
- USNEA SUBFLORIDANA Stirt. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Halonen et al., 1999).
- VAHLELLA LEUCOPHAEA (Vahl) P.M. Jørg. – Solomennoe, L. Fagerström, 1863, (Norrlin, 1876).
- *VERRUCARIA SUBFULIGINEA Vain. – Petrozavodsk, H. A. Kullhem, 1863. Kol! Det. Y. Pykälä, 2015.
- VULPICIDA PINASTRI (Scop.) J.-E. Mattsson & M. J. Lai – Petrozavodsk, A. K. Günther, 1863, H. A. Kullhem, 1863, T. Simming, 1863, T. Ahti, 2000, Solomennoe, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876).
- XANTHOPARMELIA CONSPERSA (Ach.) Hale – Petrozavodsk, H. A. Kullhem, 1863, A. Koskinen, 1942, (Norrlin, 1876).
- XANTHOPARMELIA STENOPHYLLA (Ach.) Ahti & D. Hawksw. – Solomennoe, H. A. Kullhem, 1863, (Fagerström, 1945).
- XANTHORIA PARIETINA (L.) Th. Fr. – Petrozavodsk, T. Simming, 1863, A. Koskinen, 1942, M. Laurila, 1942; Solomennoe, T. Ahti, 2000, (Norrlin, 1876).
- !*XYLOGRAPHA PALLENS (Nyl.) Malmgren – Petrozavodsk, T. Simming, 1863. Kol!
- *XYLOGRAPHA PARALLELA (Ach.) Fr. – Petrozavodsk, H. A. Kullhem, 1863, T. Simming, 1863, (Norrlin, 1876).
- !*XYLOGRAPHA TRUNCISEDA (Th. Fr.) Minks ex Redinger – Petrozavodsk, A. K. Günther, 1863. Kol!
- *XYLOGRAPHA VITILIGO (Ach.) J. R. Laundon – Petrozavodsk, A. K. Günther, 1863. Kol! The specimens contain stictic acid. Det. I. Stepanchikova, 2015.
- XYLOPSORA FRIESII (Ach.) Bendiksby & Timdal – Petrozavodsk, T. Simming, 1863, (Nylander, 1866; Norrlin, 1876).

DISCUSSION

Our list of lichens of Petrozavodsk based on the collections in H (including H-NYL, i.e. Herb. W. Nylander) includes 227 species (identified in 674 specimens within 354 herbarium packets). Most of the revised specimens (568) were from the early historical period, 19th century, while 74 specimens were from the 1940s, and only 32 specimens were collected in 1990s or later.

These species belong to 40 families and 86 genera, and are mainly (54%) represented by crustose lichens. *Xylographa trunciseda* is a new lichen record for North-Western Russia. Seven species (*Bryoria vrangiana*, *Buellia arnoldii*,

Calicium pinastris, *Caloplaca suspiciosa*, *Piccolia ochrophora*, *Xylographa pallens*, *Xylographa trunciseda*) were registered for Karelia for the first time. Six of them were found as associated species in mixed herbarium packets. *Lecanora mughicola* was recorded for the second time on the territory of the Republic of Karelia. 40 species are new to the biogeographic province *Karelia onetsensis* and four species to *Karelia onegensis* (compared to Fadeeva et al., 2007, Tarasova et al., 2013). The following eight of recorded species are listed in the Red Data Book of Karelia (2007) as near threatened: *Chaenotheca stemonea*, *Evernia divaricata*, *Nephroma bellum*, *Lobaria pulmonaria*, *Physcia phaea*, *Ramalina dilacerata*, *Ramalina thrausta* and *Usnea glabrata*.

The historical herbarium material from Petrozavodsk includes type specimens of three lichen taxa: *Arthonia onegensis* (= *Arthothelium scandinavicum*), *Lecania cyrtellina*, and *Ramalina fastigiata* var. *nervosa* (= *Ramalina sinensis*).

The list of lichens recorded in Petrozavodsk in recent years included 228 species (Tarasova et al., 2013). Our historical list added 102 new species to the lichen flora of the city, which now contains 330 species. Only 125 species are present in both lists. The current number of lichenized species in Petrozavodsk is more than 25% of the total number of lichens in Karelia (Fadeeva et al. 2007). However, the present occurrence of many species from the historical species list in Petrozavodsk still needs checking.

Thus, the historical collection from the territory of Karelia which is preserved in H is unique and still very informative. Historical herbarium specimens represent valuable documents of natural history of the city.

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