

Contribution to Umbilicariaceae (lichenized Ascomycota) studies in Russia I. Mainly arctic species

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Abstract: DAVYDOV, E. A. & ZHURBENKO, M. P. 2008. Contribution to Umbilicariaceae (lichenized Ascomycota) studies in Russia. I. Mainly arctic species. – Herzogia 21: 157–166.

Two species of *Lasallia* and 18 of *Umbilicaria* are reported from the Arctic, North-East Sakha-Yakutia Republic and Magadan Region of Russia. Of these, *Umbilicaria cinereorufescens* and *U. nylanderiana* are new for the Russian Arctic, *U. aprina* is new for Sakha-Yakutia and Krasnoyarsk Territory, *U. hirsuta* is new for Sakha-Yakutia and *U. virginis* is new for Taimyr Peninsula. Previous reports of *Lasallia caroliniana*, *L. pustulata*, *L. rossica*, *Umbilicaria crustulosa*, *U. hirsuta*, *U. muehlenbergii* and *U. polyphylla* are considered doubtful for the Russian Arctic.

Zusammenfassung: DAVYDOV, E. A. & ZHURBENKO, M. P. 2008. Beitrag zu den Umbilicariaceae (lichenisierte Ascomycota) Untersuchungen in Russland. I. Hauptsächlich arktische Arten. – Herzogia 21: 157–166.

Zwei *Lasallia*- und 18 *Umbilicaria*-Arten werden aus dem arktischen Russland, der Republik Nord-Ost Sacha-Jakutien und der Magadan Region gemeldet. *Umbilicaria cinereorufescens* und *U. nylanderiana* sind Neufunde für die russische Arktis. *U. aprina* ist neu für die Republiken Sacha-Jakutien und das Krasnoyarsk Gebiet, *U. hirsuta* ist ein Neufund für die Republik Sacha-Jakutien, *U. virginis* ist neu für die Taimyr-Halbinsel. Das Vorkommen von *Lasallia caroliniana*, *L. pustulata*, *L. rossica*, *Umbilicaria crustulosa*, *U. hirsuta*, *U. muehlenbergii* und *U. polyphylla* wird in der russischen Arktis als zweifelhaft eingeschätzt.

Key words: Biogeography, *Umbilicaria*, *Lasallia*, new records.

Introduction

The Umbilicariaceae Chevall. (Umbilicariales J.C.WEI & Q.M.ZHOU) is a distinctive and phylogenetically isolated family of lichenized Ascomycetes, comprising about one hundred predominantly saxicolous species from two genera, *Lasallia* Mérat and *Umbilicaria* Hoffm. These are found mainly at high altitudes and latitudes worldwide. Although members of the Umbilicariaceae are rarely overlooked in the field, being conspicuous and often abundant macrolichens, their identification is sometimes quite difficult. The taxonomy of the family is based mainly on the studies by FREY (1933, 1936, 1949), LLANO (1950) and WEI & JIANG (1993). The most significant treatments of Umbilicariaceae for the territory of the former Soviet Union were undertaken by ELENKIN & SAVICZ (1910), SAVICZ (1914, 1922, 1950), RASSADINA (1929), OXNER (1968), DOMBROVSKAYA (1970, 1978) and GOLUBKOVA & SAVICZ (1978). Records of Umbilicariaceae, including data on 37 species published for the former Soviet Union, were summarized in the Handbook of the lichens of the USSR (GOLUBKOVA & SAVICZ 1978) and several regional checklists of lichens, for example for the Russian Arctic (ANDREEV et al. 1996: 21 spp., KRISTINSSON et al. 2006: 20 spp.), for the north of Central

Siberia (ZHURBENKO 1996: 12 spp.), for the Urals (RYABKOVA 1998: 19 spp.) and for Sakha-Yakutia Republic (PORYADINA 2005: 20 spp.). A total of 38 species of Umbilicariaceae have been reported from the territory of Russia. If all species that occur in Russia and neighboring areas are considered (OXNER 1968, BYAZROV 1986, POELT 1977, POELT & VÉZDA 1981, WEI & JIANG 1993), the estimated species richness of Umbilicariaceae in Russia can be estimated to be about 40–45 species.

The Umbilicariaceae have never been the subject for monographic study in Russia. The literature compilations cited above are based partly on outdated species concepts with the absence of voucher specimens in herbaria. The latter makes it impossible to verify doubtful records. The aim of the present study is to present new data on the Umbilicariaceae from the Arctic and several boreal regions of Russia, and to critically analyze earlier literature records.

Material and methods

This paper is based on the study of about 100 Umbilicariaceae specimens from Russia, 69 of which are from the arctic regions. Most of the specimens investigated (79) were collected by the second author (M. Z.). Voucher specimens are deposited in herbaria ESS (now HAL), GZU, H, LE and M. Additional specimens studied were from herbaria ALTB, LE, LECB, M, SYKO, TU and UUH. All the material was examined using standard microscopic techniques with LOMO MBS-10 and MM-2 microscopes.

Main collecting localities (Fig. 1)

Note: Localities are designated on Fig. 1 by their numbers below.

Arctic

Arkhangel'sk Region, Novaya Zemlya, tundra

- [1] Mityushev I.
- [2] Abrosimov Bay

Yamalo-Nenetskii Autonomous Region, Yamal Peninsula, tundra

- [3] Baidaratskaya Bay

Krasnoyarsk Territory

- Taimyr Peninsula, tundra
 - [4] Dikson I.
 - [5] Ragozinka River
 - [6] Pravaya Uboinaya River
 - [7] Byrranga Mts.
- Severnaya Zemlya Archipelago, polar desert
 - [8] Oktyabr'skoi Revolutsii I.
 - Bol'shevik I.
 - [9] Kropotkin Glacier
 - [10] Cape Baranova, Mushketova glacier, Ostantsovaya River, Akhmatov Bay
 - [11] Cape Antsev, Golyshev River

Republic Sakha-Yakutiya

- Novosibirskie Is.
 - [12] Novaya Sibir' I., tundra
 - [13] Bennett I., polar desert
- [14] Pokhodskaya Edoma upland, tundra

Chukotskii Autonomous Region, tundra

- [15] Kytep-Guiten'ryveem and Pogynden Rivers
- [16] Televeem and Erguveen Rivers

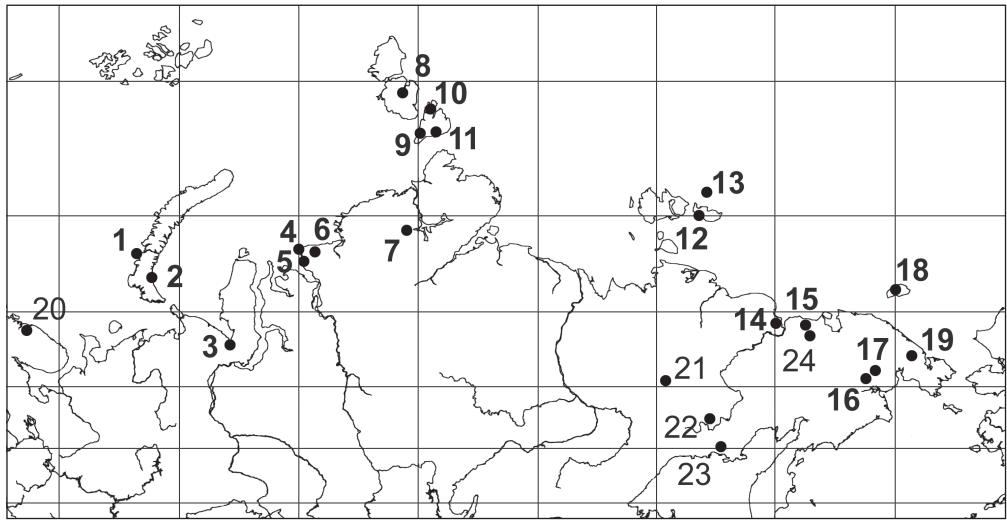


Fig. 1: Main collecting localities in Russia. The numbers correspond to those in the text. The arctic localities are in bold.

- [17] Bezymyanoe Lake
- [18] Wrangel' I.
- [19] Amguema River, Iul'tin

Outside the Arctic

Murmansk Region, forest-tundra

- [20] Barents Sea coast

Republic Sakha-Yakutiya, from boreal forest till mountain tundra

- [21] Indigirka River

Magadan Region, mountain tundra

- [22] Susuman
- [23] Magadan

Chukotskii Autonomous Region, forest-tundra

- [24] Lyupveem River

Catalogue of species

Lasallia caroliniana (Tuck.) E.A.Davydov

Republic Sakha-Yakutiya, [21], Indigirka River, near Ust'-Nera, 64°30'N/143°10'E, alt. 650 m, stone field near the stream within the open *Larix* forest, on stones, 11 July 1992, M. Z. 9296 [reported as *Umbilicaria polyrrhiza* (L.) Fr. in FEIGE & LUMBSCH (1993)]. – Magadan Region, [23], Magadan, Nagaevskaya Mt., 59°34'N/150°45'E, alt. 400 m, 7 Sept. 2004, 5 July 2005, N. Sazanova.

Reports of *Lasallia caroliniana* for the Russian Arctic (ANDREEV et al. 1996, KRISTINSSON et al. 2006) were based on the data of OXNER (1940), who collected the species in Kharaulakh Mountains (North Sakha-Yakutia) in forest-tundra, which actually does not belong to the Arctic.

Lasallia pennsylvanica (Hoffm.) Llano

Krasnoyarsk Territory, [7], Taimyr Peninsula, near Levinson-Lessing Lake, 74°24'N/98°49'E, alt. 100 m, on boulders, 29 July 1995, M. Z. – Republic Sakha-Yakutiya, [21], Indigirka River, near Ust'-Nera, 64°30'N/143°10'E, alt. 650 m, stone field near the stream within the open *Larix* forest, 11 July 1992, M. Z. 9295; [21], same river, 54 km N-NNW of Ust'-Nera, 65°03'N/143°09'E, alt. 450 m, in stone field within open *Larix* forest, 15 July 1992, M. Z.; [21], same river, 21 km WNW of Tyubelyakh, 65°25'N/142°43'E, alt. 400 m, rocks in a canyon with a stream, 18

July 1992, M. Z. 92546; [21], same river, 43 km NW of Tyubelyakh, Moma rapids, 65°42'N/142°39'E, alt. 300 m, base of forested (*Larix*) rocks, 19 July 1992, M. Z. – Magadan Region, [23], Magadan, Nagaevskaya Mt., 59°34'N/150°45'E, alt. 400 m, 4 July 2003, N. Sazanova.

Umbilicaria aprina Nyl., Synops. Lich. 2: 12 (1869). [= *Gyrophora canescens* Domb. Lich. of Khibiny: 131 (1970). – *Umbilicaria canescens* (Domb.) Domb. comb. illeg. Consp. Lich. Fl. Murmansk Region and Northeastern Finland: 67 (1970). – *Umbilicaria canescens* (Domb.) N. S. Golubk., Handb. Lich. USSR 5: 115 (1978)]

Krasnoyarsk Territory, [10], Severnaya Zemlya Archipelago, Bol'shevik I., Ostantsovaya River canyon, 79°13'N/102°02'E, alt. 40 m, on schistose rocks with bird colony, 12 July 1996, M. Z. 9614. – Republic Sakha-Yakutiya, [13], Novosibirskie Is., Bennett I., c. 76°40'N/149°00'E, alt. 130 m, coastal terrace, on big boulders, 23 July 1989, M. Z. 8990; same locality, alt. 160 m, coastal terrace, 9 Aug. 1989, M. Z. 8991. – Chukotskii Autonomous Region, [15], North part of Anyui Upland, Kytap-Guiten'ryveem River, c. 69°05'N/165°30'E, near the headwaters of the Baranii Stream, 21 Aug. 1977, M. P. Andreev.

New for the Republic Sakha-Yakutiya and Krasnoyarsk Territory. *Umbilicaria aprina* is a rare cosmopolitan species from high latitudes and altitudes. In the Arctic, it has been reported from the Baffin Island (HALE 1954), Central West Greenland (HANSEN 2003), both c. 70°N, as well as from Iceland (KRISTINSSON 1972) and Svalbard (ELVEBAKK & TØNSBERG 1992). The first record of the species for Russia was made by DOMBROVSKAYA (1970), based on the type of *Gyrophora canescens* (= *U. aprina* Nyl.) from Khibiny Mountains (Kola Peninsula). The species was reported from the Russian Arctic by ANDREEV (1984) as *Umbilicaria canescens*, but was not included in checklists (ANDREEV et al. 1996, KRISTINSSON et al. 2006) due to a different concept of this species: the authors followed SANTESSON (1993) and SANTESSON et al. (2004) who treated *Umbilicaria canescens* as *U. cylindrica* (L.) Delise ex Duby var. *delisei* Nyl. In contrast to the authors mentioned above, J. C. Wei referred the holotype of *Gyrophora canescens* Domb. (LE L266!) to *U. aprina* Nyl. var. *halei* Llano (tested in 1995). After careful examination of the relevant specimen, we support the opinion of J. C. Wei that *Gyrophora canescens* Domb. is conspecific with *Umbilicaria aprina* Nyl. In Russia, *U. aprina* has been also reported for South Siberia (Baikal area) by URBANAVICHENE & URBANAVICHUS (2001) and was found by the first author in the Russian Altai.

Umbilicaria arctica (Ach.) Nyl.

Arkhangel'sk Region, [1], Novaya Zemlya, Mityushev I., 73°25'N/54°02'E, alt. 20 m, 1997, V. Shevchenko. – Krasnoyarsk Territory, [4], Taimyr Peninsula, Dikson I., 73°30'N/80°20'E, alt. 30 m, in boulder field, 7 July 1990, M. Z. 90253; same peninsula, near Ragozinka River mouth, 72°48'N/80°53'E, alt. 30 m, on boulders by the river, 3 & 14 July 1990, M. Z.; [5], same peninsula, near Pravaya Uboinaya River, "217" Mt., 73°25'N/82°51'E, alt. 150 m, on boulders, 5 Aug. 1990, M. Z. – Chukotskii Autonomous Region, [19], at 178 km of the road from Egvekinot to Iul'tin, 67°47'N/178°36'W, rock outcrops by the Amguema River, 8 Aug. 1979, I. Makarova. – Murmansk Region, [20], Barents Sea coast, 4 km E of Dal'nie Zelentsy settlement, 69°07'N/36°09'E, alt. 60 m, on boulders, 24 Aug. 1997, M. Z. 97324.

Umbilicaria cinereorufescens (Schaer.) Frey

Arkhangel'sk Region, [1], Novaya Zemlya, Mityushev I., 73°25'N/54°02'E, alt. 20 m, 1997, V. Shevchenko. – Chukotskii Autonomous Region, [17], near Bezmyannoe Lake, 66°39'N/176°40'E, unnamed mountain, on stones, 9 July 1979, I. Makarova.

New for the Russian Arctic. In the Arctic, this species was reported from North Alaska and West Greenland (THOMSON 1984). Records from Russia are yet to be verified, because in the Handbook of Lichens of USSR (GOLUBKOVA & SAVICZ 1978) the species is not well separated from *U. vellea* (L.) Hoffm. The specimens examined allow us to confirm the occurrence of the species in the Russian Altai, Baikal region and Kamchatka.

Umbilicaria cylindrica (L.) Delise ex Duby var. *cylindrica*

Krasnoyarsk Territory, [8], Severnaya Zemlya Archipelago, Oktyabr'skoi Revolutsii I., near Bazarnaya Mt., 79°43'N/97°15'E, alt. 200 m, on stone, 6 Aug. 1985, M. Gavrilov; same archipelago, Bol'shevik I., [10], Ostantsovaya River canyon, 79°13'N/102°02'E, alt. 40 m, on schistose rocks with bird colony, 12 July 1996, M. Z. 96143; [10], same island, near Mushketova glacier, 79°11'N/102°09'E, alt. 200 m, on stone at terrace, 11 July 1996, M. Z. 96141. – Chukotskii Autonomous Region, [19], at 178 km of the road from Egvekinot to Iul'tin, 67°47'N/178°36'W, rock

outcrops by the Amguema River, 8 Aug. 1979, I. Makarova. – Republic Sakha-Yakutiya, [21], Indigirka River, near Ust'-Nera, 64°30'N/143°10'E, alt. 700 m, on boulders near stream, 11 July 1992, M. Z.

***Umbilicaria cylindrica* var. *delisei* Nyl.**

Murmansk Region, [20], Barents Sea coast, near Voron'ya River mouth, 69°09'N/35°50'E, alt. 20 m, on stones in the *Empetrum* tundra, 30 Aug. 1997, M. Z. 97325.

***Umbilicaria decussata* (Vill.) Zahlbr.**

Krasnoyarsk Territory, [7], Taimyr Peninsula, Bol'shaya Bootankaga River, at 5 km NW of Krasnoe Lake, 74°30'N/ 97°40'E, alt. 200 m, rocks in the river valley, 15 Aug. 1995, M. Z. 95226; [7], same peninsula, near Levinson-Lessing Lake, 74°26'N/98°55'E, alt. 250 m, in boulder field, 28 July 1995, M. Z.; [7], same lake, 74°24'N/98°49'E, alt. 100 m, on boulders, 30 July 1995, M. Z.; [7], same lake, 74°36'N/98°35'E, alt. 250 m, rocks on a mountain slope, 24 Aug. 1995, M. Z. – Severnaya Zemlya Archipelago, [10], Bol'shevik I., Ostantsovaya River canyon, 79°13'N/102°02'E, alt. 40 m, on schistose rocks with bird colony, 12 July 1996, M. Z.; [10], same island, Ostantsovaya River at 2 km above its mouth, 79°13'N/102°02'E, alt. 40–50 m, on rocks by the river, 12 July 1996, M. Z. 96135; [10], same island, W coast of Akhmatov Bay, 79°01'N/102°43'E, alt. 60 m, dry to mesic rocks by the river canyon, on rock, 16 July 1996, M. Z. 96139. – Republic Sakha-Yakutiya, [14], Nizhnekolymskii District, northwards of Pokhodsk, base of Pokhodskaya Edoma upland, c. 69°30'N/160°30'E, on stones, 11 Aug. 1981, T. F. Galaktionova.

New for Nizhnekolymskii District of the Sakha-Yakutiya Republic.

***Umbilicaria deusta* (L.) Baumg.**

Krasnoyarsk Territory, [5], Taimyr Peninsula, near Ragozinka River mouth, 72°48'N/80°53'E, alt. 20 m, in stone field by the river bank, 12 July 1990, M. Z. 90255; [5], same locality, alt. 40 m, rock outcrops with boulders, 18 July 1990, M. Z. 901137. – Chukotskii Autonomous Region, [16], Televeem River, 65°50'N/175°05'E, on rocks by a stream, 22 July 1979, I. Makarova. – Republic Sakha-Yakutiya, [21], Indigirka River, near Ust'-Nera, 64°30'N/143°10'E, alt. 700 m, on boulders near stream, 11 July 1992, M. Z. 92547.

***Umbilicaria hirsuta* (Sw. ex Westr.) Hoffm.**

Republic Sakha-Yakutiya, [21], Indigirka River, 54 km N–NNW of Ust'-Nera, 65°03'N/143°09'E, alt. 450 m, in stone field within open *Larix* forest, 15 July 1992, M. Z. 9254; [21], same river, 21 km WNW of Tyubelyakh, 65°25'N/142°43'E, alt. 400 m, rocks in a canyon with a stream, in wet situation, 18 July 1992, M. Z.; [21], same river, 43 km NW of Tyubelyakh, Moma rapids, 65°42'N/142°39'E, alt. 300 m, base of rocks among *Larix* forest by the river, 19 July 1992, M. Z. 92530.

New for the Republic Sakha-Yakutiya.

***Umbilicaria hyperborea* (Ach.) Hoffm.**

Arkhangel'sk Region, [2], Novaya Zemlya, Abrosimov Bay, 71°56'N/55°17'E, alt. 5 m, on wooden wall of a cabin, 31 Aug. 1996, N. Vekhov. – Krasnoyarsk Territory, [5], Taimyr Peninsula, near Ragozinka River mouth, 72°48'N/80°53'E, alt. 30 m, on boulders by the river, 2 & 3 July 1990, M. Z.; [5], same locality, alt. 50 m, top of rock outcrops with boulders, 18 July 1990, M. Z. 90254; [6], same peninsula, near Pravaya Uboinaya River, "217" Mt., 73°25'N/82°51'E, alt. 150 m, on boulders, 5 Aug. 1990, M. Z.; [7], same peninsula, Bol'shaya Bootankaga River, c. 74°20'N/98°00'E, alt. 300 m, moss-*Dryas-Novosiversia* tundra, 5 Aug. 1991, V. B. Kuvaev 2095; [7], same peninsula, near Levinson-Lessing Lake, 74°35'N/98°20'E, alt. 160 m, on rocks by Krasnaya river valley, 12 Aug. 1995, M. Z.; [7], same lake, 74°33'N/98°26'E, alt. 180 m, on rocks by a stream, 26 Aug. 1995, M. Z.; [7], same lake, 74°24'N/98°49'E, alt. 100 m, on boulders, 29 July 1995, M. Z. – Chukotskii Autonomous Region, [19], near Iul'tin, 67°55'N/178°40'E, slope of unnamed Mt., stony lichen tundra, on stones, 23 July 1971, I. Makarova; [19], same okrug, at 178 km of the road from Egvekinot to Iul'tin, 67°47'N/178°36'W, base of unnamed Mt., in stone field, 23 July 1971, I. Makarova. – Murmansk Region, [20], Barents Sea coast, near Olenka River mouth, 69°02'N/36°24'E, alt. 50 m, on boulders, 5 Sept. 1997, M. Z. – Republic Sakha-Yakutiya, [21], Indigirka River, near Ust'-Nera, Dva brata Mt., 64°31'N/143°08'E, alt. 700 m, in stone field within subalpine belt, 23 July 1992, M. Z.; [21], same river, 43 km NW of Tyubelyakh, Moma rapids, 65°42'N/142°39'E, alt. 300 m, base of forested (*Larix*) rocks, 19 July 1992, M. Z. – Magadan Region, [22], 35 km ESE of Susuman, Pereval'naya pass, 62°43'N/148°51'E, alt. 900 m, stones in subalpine belt, 26 July 1992, M. Z.; [22], same region, 26 km S of Myakit, Tal'skii pass, 61°11'N/152°06'E, alt. 1100 m, stones in subalpine belt, 27 July 1992, M. Z. 92529; [23], same region, Magadan, Nagaevskaya Mt., 59°34'N/150°45'E, alt. 400 m, 7 Sept. 2004, N. Sazanova.

***Umbilicaria krascheninnikovii* (Savicz) Zahlbr.**

Republic Sakha-Yakutiya, [12], Novosibirskie Is., Novaya Sibir' I., Derevyannye Gory, c. 75°10'N/147°10'E, alt. 76 m, on stone, 12 Aug. 1980, V. Perfil'eva.

***Umbilicaria leiocarpa* DC.**

Chukotskii Autonomous Region, [15], North part of Anyui Upland, Pogynden River basin, near the headwaters of the Lel'vergyryn River, c. 69°10'N/165°15'E, rocks on the top of Mt., 18 July 1977, M. P. Andreev. [15], same region, Kytep-Guiten'ryveem River, c. 69°05'N/165°30'E, in stone field, 21 Aug. 1977, M. P. Andreev. – Murmansk Region, Lovoserskiye Mts., Seidosero Lake, S slope of the Kuamdespakh Mt., c. 700 m, on stones in mountain tundra, 22 Aug. 1966, A. V. Dombrovskaya.

The record of *U. leiocarpa* for Novaya Zemlya was based on the single report of DEICHMANN-BRANTH (1885). However, DU RIETZ (1925), FREY (1949) and SAVICZ (1950) assumed that the report required additional confirmation because it might have been confused with *U. desussata* or *U. lyngei*. Since there were no additional collections from Novaya Zemlya for *U. leiocarpa* (often been confused with *U. lyngei*), the record is considered here as doubtful.

***Umbilicaria lyngei* Schol.**

Krasnoyarsk Territory, [5], Taimyr Peninsula, near Ragozinka River mouth, 72°48'N/80°53'E, alt. 50 m, top of rock outcrops with boulders, 18 July 1990, M. Z. 90256; [6], same peninsula, near Pravaya Uboinaya River, "217" Mt., 73°25'N/82°51'E, alt. 150 m, on boulders, 5 Aug. 1990, M. Z. 901136; [7], same peninsula, near Levinson-Lessing Lake, 74°31'N/98°33'E, alt. 300 m, on rocks on a mountain slope, 24 July 1995, M. Z.; [7], same lake, 74°24'N/98°49'E, alt. 100 m, on boulders, 29 July 1995, M. Z. 95267; [7], same lake, 74°35'N/98°20'E, alt. 160 m, rocks along the Krasnaya River valley, 12 Aug. 1995, M. Z. 95238; [7], same lake, 74°31'N/98°33'E, alt. 300 m, on rocks on slope of mountain "451.9", 24 July 1995, M. Z. 95146; [7], same lake, 74°24'N/98°49'E, alt. 100 m, 28 Aug. 1995, M. Z. 95268. – Severnaya Zemlya Archipelago, [8], Oktyabr'skoi Revolutsii I., near Bazarnaya Mt., 79°43'N/97°15'E, alt. 200 m, on stone. 6 Aug. 1985, M. Gavrilov; [10], same archipelago, Bol'shevik I., peninsula with Cape Baranova, 79°16'N/101°40'E, alt. 20 m, top of a hill, on stone stripe, 10 July 1996, M. Z. 96888; [10], same island, Ostantsovaya River canyon, 79°13'N/102°02'E, alt. 40 m, on schistose rocks with bird colony, 12 July 1996, M. Z. 96136.

***Umbilicaria muehlenbergii* (Ach.) Tuck.**

Republic Sakha-Yakutiya, [21], Indigirka River, near Ust'-Nera, 64°30'N/143°10'E, alt. 650 m, in stone field near stream within open *Larix* forest, 11 July 1992, M. Z. 9294; [21], same place, 64°31'N/143°08'E, alt. 700 m, in stone field within *Larix* sp. – *Alnus fruticosa* belt, 23 July 1992, M. Z.; same river, 21 km WNW of Tyubelyakh, 65°25'N/142°43'E, alt. 400 m, rocks in a canyon with a stream, in wet situation, 18 July 1992, M. Z. – Chukotskii Autonomous Region, [24], middle part of the North Anyui Upland, Lyupveem River at the middle section, c. 69°10'N/165°15'E, in granite stone fields, 14 July 1978, M. P. Andreev.

Umbilicaria muehlenbergii was reported by OXNER (1940) for the North of Sakha-Yakutia, however the most northern locality was in the Indigirka River basin at 67°42'N and alt. c. 500 m, outside of the Arctic. The record of *U. muehlenbergii* for the Continental Chukotka (ANDREEV 1984) was based on the specimens from the Anyui Upland in forest-tundra zone (see the Catalogue); however the area is not the Arctic.

***Umbilicaria nylanderiana* (Zahlbr.) H.Magn.**

Krasnoyarsk Territory, [5], Taimyr Peninsula, near Ragozinka River mouth, 72°48'N/80°53'E, alt. 30 m, rocks and boulders by the river, 2 & 14 July 1990, M. Z.; same locality, alt. 50 m, top of rock outcrops, 18 July 1990, M. Z. 901134.

New for the Russian Arctic. In the Arctic, the species was reported from Baffin Island (LLANO 1950), Central West, North West and South Greenland (HANSEN 2006) and Alaska and Svalbard (KRISTINSSON et al. 2006). In Russia, the species was previously known from the Caucasus Mountains (GOLUBKOVA & SAVICZ 1978, LE), East Siberia (Baikal Lake region) (URBANAVICHENE & URBANAVICHUS 1998) and the Altai Mountains (DAVYDOV 2001).

***Umbilicaria proboscidea* (L.) Schrad.**

Tyumen' Region, [3], Yamal Peninsula, E coast of Baidaratskaya Bay near Yarayakha River mouth, 69°15'N/68°15'E, on stones, 8 Aug. 2007, I. Zhdanov. – Krasnoyarsk Territory, [7], Taimyr Peninsula, near Levinson-Lessing Lake, "529.1" Mt., 74°31'N/98°27'E, alt. 450 m, on boulders, 10 Aug. 1995, M. Z.; [7], same lake, "451.9" Mt., 74°31'N/98°33'E, alt. 300 m, on rocks, 24 July 1995, M. Z.; [7], same lake, 74°26'N/98°55'E, alt. 250 m, on boulders, 29 July 1995, M. Z.; [7], same lake, 74°25'N/98°48'E, alt. 50 m, on boulders by the lake shore, 31 July 1995, M. Z. – Severnaya Zemlya Archipelago, [10], Bol'shevik I., near Mushketova glacier, 79°11'N/102°09'E, alt. 200 m, terrace slope along the glacier, on stones, 11 July 1996, M. Z. 96142; [10],

same island, peninsula with Cape Baranova, 79°16'N/101°40'E, alt. 20 m, top of a hill, on stones, 10 July 1996, M. Z. 96140; [11], same island, Bol'shaya Mt. near Cape Antsev, 78°12'N/103°17'E, alt. 100 m, 27 Aug. 1998, N. Matveeva. – Chukotskii Autonomous Region, [16], at junction of Erguveen and Vatamkaivaam Rivers, 65°55'N/175°50'W, unnamed mountain, on stones, 1 July 1970, I. Makarova; [19], same okrug, at 174 km of the road from Egvekinot to Iul'tin, 67°44'N/178°35'W, base of unnamed Mt., in stone field, 17 Aug. 1979, I. Makarova; [19], same okrug, at 178 km of the road from Egvekinot to Iul'tin, 67°47'N/178°36'W, base of unnamed Mt., in stone field, 8 Aug. 1979, I. Makarova. – Murmansk Region, [20], Barents Sea coast, near Olenka River mouth, 69°02'N/36°24'E, alt. 50 m, boulders on coastal terrace, 5 Sept. 1997, M. Z. – Republic Sakha-Yakutiya, [21], Indigirka River, near Ust'-Nera, Dva brata Mt., 64°31'N/143°08'E, alt. 700 m, in stone field within subalpine belt, 23 July 1992, M. Z. – Magadan Region, [22], 35 km ESE of Susuman, Pereval'naya pass, 62°43'N/148°51'E, alt. 900 m, on stones in subalpine belt, 26 July 1992, M. Z. 92549; [22], same region, 26 km S of Myakit, Tal'skii pass, 61°11'N/152°06'E, alt. 1100 m, on stones in subalpine belt, 27 July 1992, M. Z. 92533; [23], same region, Magadan, Nagaevskaya Mt., 59°34'N/150°45'E, alt. 400 m, 19 July 2001, N. Sazanova.

***Umbilicaria rigida* (Du Rietz) Frey**

Chukotskii Autonomous Region, [18], Wrangel' I., Mamontovaya River basin, top of a plateau near Matyushkina Mt., 70°59'N/179°45'E, alt. 470 m, in stony lichen community, on stone, 1996, S. Kholod; [18], same island, the top of Berry Peak, in stone fields, 21 Aug. 1938, B. N. Gorodkov; [18], same island, Rodgers Bay, on the top of unnamed Mt. alt. c. 400 m, lichen tundra, 11 Aug. 1938, B. N. Gorodkov; [18], same island, right bank of the Neozhidannaya River, 29 Aug. 1986, A. A. Dobrysh.

***Umbilicaria torrefacta* (Lightf.) Schrad.**

Tyumen' Region, [3], Yamal Peninsula, E coast of Baidaratskaya Bay near Yarayakha River mouth, 69°15'N/68°15'E, on stones, 8 Aug. 2007, I. Zhdanov. – Chukotskii Autonomous Region, [19], near Iul'tin, 67°55'N/178°40'E, on stones, 19 Aug. 1977, I. Makarova; [19], same okrug, at 174 km of the road from Egvekinot to Iul'tin, 67°44'N/178°35'W, base of unnamed Mt., in stone field, 7 Aug. 1970, I. Makarova; [19], same locality, base of unnamed Mt., in stone field, 23 July 1971, I. Makarova. – Republic Sakha-Yakutiya, [21], Indigirka River, 21 km WNW of Tyubelyakh, 65°25'N/142°43'E, alt. 400 m, rocks in a canyon with a stream, in wet situation, 18 July 1992, M. Z.; [21], same river, 43 km NW of Tyubelyakh, Moma rapids, 65°42'N/142°39'E, alt. 300 m, on rocks among *Larix* forest, 19 July 1992, M. Z.

***Umbilicaria vellea* (L.) Hoffm.**

Krasnoyarsk Territory, [6], Taimyr Peninsula, near Pravaya Uboinaya River, "217" Mt., 73°25'N/82°51'E, alt. 150 m, abundant on wet rocks, 5 Aug. 1990, M. Z. 90252, 901114; [7], same peninsula, near Levinson-Lessing Lake, 74°26'N/98°55'E, alt. 250 m, on rocks, 28 July 1995, M. Z. 95269; [7], same lake, 74°24'N/98°49'E, alt. 100 m, on wet rocks, 28 Aug. 1995, M. Z. 95124. – Severnaya Zemlya Archipelago, [8], Oktyabr'skoi Revolutsii I., Bazarnaya Mt., 79°43'N/97°15'E, alt. 400 m, on stones at the mountain top, 6 Aug. 1985, M. Gavrilov. – Republic Sakha-Yakutiya, Novosibirskie Is., [13], Bennett I., c. 76°40'N/149°00'E, alt. 160–180 m, stony coastal terrace, 9 Aug. 1989, M. Z. 8992; [21], same republic, Indigirka River, 21 km WNW of Tyubelyakh, 65°25'N/142°43'E, alt. 400 m, on wet rocks in a canyon with a stream, 18 July 1992, M. Z.

***Umbilicaria virginis* Schaeer.**

Krasnoyarsk Territory, Taimyr Peninsula, [7], Bol'shaya Bootankaga River at 5 km NW of Krasnoe Lake, 74°30'N/97°40'E, alt. 200 m, on rocky walls of the river valley, 15 & 17 Aug. 1995, M. Z. 95272, 95239; [7], same peninsula, near Levinson-Lessing Lake, 74°33'N/98°26'E, alt. 180 m, rocks by a stream, 26 Aug. 1995, M. Z.; [7], same lake, "451.9" Mt., 74°31'N/98°33'E, alt. 300 m, on rocks, 24 July 1995, M. Z. 95271; [7], same lake, 74°25'N/98°48'E, alt. 50 m, on boulders by the lake shore, 31 July 1995, M. Z. – Severnaya Zemlya Archipelago, [9], Bol'shevik I., a plateau southwards of Kropotkin Glacier, 78°15'N/100°45'E, alt. 150 m, on scree, 17 Aug. 1998, N. Matveeva; [10], same island, Ostantsovaya River canyon, 79°13'N/102°02'E, alt. 40 m, on schistose rocks with bird colony, 12 July 1996, M. Z. 96226; [11], same island, Golyshev River basin, 78°26'N/104°28'E, alt. 150 m, on stony slope, 3 Aug. 2000, N. Matveeva. – Chukotskii Autonomous Region, [19], Nunyamuveem River, 65°45'N/179°55'W, alt. 200 m, in dry bed of a stream on mountain slope, 15 Aug. 1985, A. Katenin.

New for Taimyr Peninsula.

Discussion

This catalogue provides verified records for Russia of the two *Lasallia* and 18 *Umbilicaria* species (including one additional variety), of which one *Lasallia* and 16 *Umbilicaria* species are from the Arctic. Previous reports of two of the mentioned species: *Lasallia caroliniana*

(from Kharaulakh Mts.) and *Umbilicaria muehlenbergii* (Yana-Kolyma Area and Continental Chukotka), were based on specimens from the adjacent mountain areas (Verhojansky Range, Anyui and Kondakovskoye Uplands) with forest-tundra vegetation, which actually do not belong to the Arctic. Reports of the further five species in the Russian Arctic (ANDREEV et al. 1996, KRISTINSSON et al. 2006) could not be confirmed by examination of the voucher specimens from herbaria and are therefore considered to be doubtful: *Lasallia pustulata* (L.) Mérat (Polar Ural), *L. rossica* Dombr. (Polar Ural, Kharaulakh Mts.), *Umbilicaria crustulosa* (Ach.) Frey (Polar Ural, East Chukotka), *U. hirsuta* (Polar Ural) and *U. polyphylla* (Polar Ural, Severnaya Zemlya, Novaya Zemlya and Franz-Josef Land). The record of *L. rossica* was evidently based on its single collection (LE 6436!, 11 July 1925, B. N. Gorodkov) from Polar Ural (ANDREEV et al. 1996). The specimen was originally identified by K. A. Rassadina as *Lasallia pennsylvanica*, but later referred by DOMBROVSKAYA (1978) to *L. rossica*. However, this specimen is typical *Lasallia pennsylvanica* in the opinion of the first author. MAKAROVA (1989) reported the finding of *Lasallia rossica* from the vicinity of Tiksi (Kharaulakh Mts.), but voucher specimens are absent. *Lasallia pustulata* was reported from Polar Ural in the compilation of RYABKOVA (1998). The species was many times reported in Russia since GEORGI (1775). However, all revised herbaria specimens of *Lasallia pustulata* from the Urals and Asian Russia belong to *L. pennsylvanica* or *L. rossica*. Reports of *Umbilicaria crustulosa*, *U. hirsuta* and *U. polyphylla* (ANDREEV et al. 1996) remain uncertain due to the absence of voucher specimens.

The majority of the Arctic Umbilicariaceae species have circumpolar distribution. The most widespread species in the Russian Arctic, i.e. *Umbilicaria cylindrica*, *U. hyperborea*, *U. proboscidea* and *U. torrefacta*, are also very common in the whole Arctic. The Umbilicariaceae species composition of the Russian Arctic is less specific in comparison with the American Arctic. While all species of the Umbilicariaceae of the Russian Arctic occur in the American Arctic, the latter has a number of specific ones, for instance *Umbilicaria angulata* Tuck., *U. mammulata* (Ach.) Tuck. and *Umbilicaria scholanderi* (Llano) Krog. This may reflect relative independence of recolonization of the Eurasian and American Arctic after the last glacial epoch.

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References

- ANDREEV, M. P. 1984. The systematical composition of lichen flora of Anjui upland. – *Novosti Sist. Nizsh. Rast.* **21**: 136–140. (In Russ.).
- ANDREEV, M., KOTLOV, Y. & MAKAROVA, I. 1996. Checklist of lichens and lichenicolous fungi of the Russian Arctic. – *Bryologist* **99**: 137–169.
- BYAZROV, L. G. 1986. Additions to the lichen flora in Khangai (Mongolian People's Republic). 1. The family Umbilicariaceae Fee. – *Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol.* **91**: 100–101. (In Russ.).
- DAVYDOV, E. A. 2001. Annotated list of lichens of Western part of Altai (Russia). – *Novosti Sist. Nizsh. Rast.* **35**: 140–161. (In Russ.).

- DEICHMANN-BRANTH, I. S. 1885. Lichener fra Novaia-Zemlia, samlede paa Dijnphna-Expeditionen 1882–83 af S. Borch og Th. Holm. – Saertryk af Dijnphna-Togtels zoologisk-botaniska Udbytte. Kjöbenhavn.
- DOMBROVSKAIA, A. V. 1970. Lichens of the Khibiny. – Izsatel'stvo „Nauka“. Leningrad: Akad. Nauk. SSSR. (In Russ.).
- DOMBROVSKAIA, A. V. 1978. *Lasallia rossica* Domb. – a new species of lichens from the USSR and it's taxa. – *Novosti Sist. Nizsh. Rast.* **15**: 176–189. (In Russ.).
- DU RIETZ, G. E. 1925. Die europäischen Arten der *Gyrophora „anthracina“*-Gruppe. – *Ark. Bot.* **19**(12): 1–14.
- ELENKIN, A. A. & SAVICZ, V. P. 1910. Enumeratio lichenum in Sibiria orientali a cl. I. Sczegolev anno 1903 lectorum. – *Trudy Bot. Muz. Imp. Akad. Nauk.* **8**: 26–49. (In Russ.).
- ELVEBAKK, A. & TØNSBERG, T. 1992. Additions to the lichen flora of Svalbard. – *Graphis Scripta* **3**: 140–147.
- FEIGE, G. B. & LUMBSCH, H. T. 1993. Umbilicariaceae Exsiccatae. Distributed by the Botanical Institute of the University of Essen. Fascicle 1 (No. 1–20). – Essen: Universität Essen.
- FREY, E. 1933. Cladoniaceae (unter Ausschuß d. Gatt. *Cladonia*) Umbilicariaceae. – In: Dr. L. Rabenhorst's Kryptogamenflora von Deutschland, Österreich und der Schweiz. Vol. 9. – Leipzig.
- FREY, E. 1936. Vorarbeiten zu einer Monographie der Umbilicariaceen. – *Ber. Schweiz. Bot. Ges.* **45**: 198–230.
- FREY, E. 1949. Neue Beiträge zu einer Monographie des Genus *Umbilicaria* Hoffm., Nyl. – *Ber. Schweiz. Bot. Ges.* **59**: 427–470.
- GEORGI, J. G. 1775. Bemerkungen einer Reise im Russischen Reich, im Jahre 1773 und 1774. Bd. II. – St.-Petersburg.
- GOLUBKOVA, N. S. & SAVICZ, V. P. 1978. Familia Umbilicariaceae. – In: Handbook of the lichens of the USSR. **5**: 89–136. Leningrad. (In Russ.).
- HALE, M. E. 1954. Lichens from Baffin Island. – *Amer. Midl. Naturalist* **51**: 232–264.
- HANSEN, E. S. 2003. New or interesting Greenland lichens and lichenicolous fungi V. – *Mycotaxon* **86**: 149–155.
- HANSEN, E. S. 2006. Lichens from Nanortalik, Aappilattoq, Narsaq Kujalleq/Frederiksdal and Tasersuaq, South Greenland. – *Folia Cryptog. Estonica* **42**: 11–23.
- KRISTINSSON, H. 1972. Additions to the lichen flora of Iceland I. – *Acta Bot. Islandica* **1**: 43–50.
- KRISTINSSON, H., HANSEN, E. S. & ZHURBENKO, M. P. 2006. Panarctic lichen checklist. http://archive.arcticportal.org/276/01/Panarctic_lichen_checklist.pdf.
- LLANO, G. A. 1950. A Monograph of the Lichen Family Umbilicariaceae in the Western Hemisphere. – Navexos P-831. Washington, D. C.: Office of Naval Research.
- MAKAROVA, I. I. 1989. Contribution to the lichen flora of lower course of the Lena River. – *Novosti Sist. Nizsh. Rast.* **26**: 118–124. (In Russ.).
- OXNER, A. N. 1940. Lichens of the Lena, Yana and Indigirka River Basins and the South Pribaikalja III. – *Zhurn. Inst. Bot. Vseukraïnsk. Akad. Nyauk.* **1**: 313–324. (In Ukrainian).
- OXNER, A. N. 1968. Flora of Lichens of the Ukraine. Volume 2. – Kiev: Naukova Dumka. (In Ukrainian).
- POELT, J. 1977. Die Gattung *Umbilicaria* (Umbilicariaceae) (Flechten des Himalaya 14). – *Khumbu Himal, Ergebnisse des Forschungsunternehmens Nepal Himalaya* **6**: 397–435.
- POELT, J. & VÉZDA, A. 1981. Bestimmungsschlüssel europäischer Flechten. *Ergänzungsheft II.* – *Biblioth. Lichenol.* **16**, J. Vaduz: Cramer.
- PORYADINA, E. N. 2005. Lichens. – In: DANILOVA, N. S. (ed.) Diversity of the plant life in Yakutia. – Novosibirsk. (In Russ.).
- RASSADINA, K. A. 1929. New spesies of *Umbilicaria* from Siberia – *Umbilicaria pertusa* n. sp. – *C. R. Acad. Sc. URSS*: 348–350. (In Russ.).
- RYABKOVA, K. A. 1998. Systematical list of lichens of Ural. – *Novosti Sist. Nizsh. Rast.* **32**: 81–87. (In Russ.).
- SANTESSON, R. 1993. The lichens and lichenicolous fungi of Sweden and Norway. – Lund: SBT-förlaget.
- SANTESSON, R., MOBERG, R., NORDIN, A., TØNSBERG, T. & VITKAINEN, O. 2004. Lichen-forming and lichenicolous fungi of Fennoscandia. – Uppsala: Museum of evolution, Uppsala University.
- SAVICZ, V. P. 1914. New species and forms of lichens from Kamchatka – *Izv. Imp. Bot. Sada Petra Velikago* **14**: 111–128. (In Russ.).
- SAVICZ, V. P. 1922. Lichens of Umbilicariaceae of Kamczatka. – *Bot. Mater. Inst. Sporov. Rast. Glavn. Bot. Sada R.S.F.S.R.* **1**: 102–109. (In Russ.).
- SAVICZ, V. P. 1950. Conspectus lichenum ad flora Umbilicariacearum in URSS. – *Bot. Mater. Otd. Sporov. Rast. Bot. Inst. Komarova Akad. Nauk S.S.S.R.* **6** (7–12): 97–108. (In Russ.).
- THOMSON, J. W. 1984. American Arctic Lichens. I. The Macrolichens. – New York: Columbia University Press.
- URBANAVICHENE, I. N. & URBANAVICHUS, G. P. 1998. Lichens of the Baikalsky strict reserve. – *Flora and fauna of the reserves* **68**. Moscow. (In Russ.).
- URBANAVICHENE, I. N. & URBANAVICHUS, G. P. 2001. Addition to the lichen flora of the Baical strict reserve. II. – *Novosti Sist. Nizsh. Rast.* **35**: 205–208. (In Russ.).

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- WEI, J. C. & JIANG, Y. M. 1993. The Asian Umbilicariaceae (Ascomycota). – *Mycosystema Monographicum Ser. No. 1*. – Beijing: International Academic Publishers.
- ZHURBENKO, M. P. 1996. Lichens and lichenicolous fungi of the northern Krasnoyarsk Territory, Central Siberia. – *Mycotaxon* 58: 185–232.

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