

A new species, *Sagediopsis vasilyevae*, and other lichenicolous fungi from Zabaikal'skii Territory of Russia, southern Siberia

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Abstract: Thirty seven species of lichenicolous fungi are reported from southern Siberia. *Sagediopsis vasilyevae* (on *Rhizocarpon inarense*) is described as new to science. *Rosellinula haplospora* is new to Russia. *Abrothallus peyritschii*, *Arthonia apotheciorum* and *Lichenostigma cosmopolites* are new to Siberia. *Cetraria* is a new host genus for *Stigmidium microcarpum*. *Ameroconium cladoniae* and *Plectocarpon hypogymniae* are newly documented on *Cladonia alaskana* and *Hypogymnia tubulosa* correspondingly.

INTRODUCTION

Lichenicolous fungi of Siberia are comparatively well studied only in its arctic part (Zhurbenko, 2007, 2009a,b). Information on their diversity in southern Siberia is still very scant (Zhurbenko & Davydov, 2000; Zhurbenko & Otnyukova, 2001; Zhurbenko, 2012b). Herewith we try to slightly fill this gap and report from its territory 37 species, one of which is new to Russia and three new to Siberia. One species is described as new to science; pertinent notes on taxonomy, biogeography and ecology of the treated fungi are provided.

The study is based on material from Sokhondinskii Reserve (43 specimens) and Alkhanai National Park in Aginskii Buryatskii District (5 specimens) obtained during the lichenological investigations by the second author (Yakovchenko, 2009; Yakovchenko & Galanina, 2009). Both territories are characterized by a sharply continental climate, mountainous terrain with the highest peaks Sokhondo Mt. (2505 m) and Alkhanai Mt. (1662 m) respectively and altitudinal vegetation belts ranging from forest-steppe to mountain tundra.

MATERIAL AND METHODS

The material was identified by the first author using Zeiss microscopes Stemi 2000-CS and Axio Imager A1 equipped with Nomarski dif-

ferential interference contrast (DIC) optics. Microscopical examination was done in water, 10% KOH (K), Lugol's iodine directly (I) or after a KOH pre-treatment (K/I) or Brilliant Cresyl blue. The length, breadth and length/breadth ratio (l/b) of asci, ascospores and conidia (when $n > 10$) are given as: (min–){X-SD}–{X+SD}{(-max)}, where min and max are the extreme values, X the arithmetic mean, and SD the corresponding standard deviation. Measurements were taken from water mounts, unless otherwise indicated. The nomenclature of the host lichens follows Esslinger (2012). Examined specimens are deposited in the mycological herbarium of the V. L. Komarov Botanical Institute in Saint Petersburg, Russia (LE-Fungi).

THE SPECIES

All collections are from Zabaikal'skii Territory of Russia; all species except *Stigmidium microcarpum* are new to this territory.

ABROTHALLUS BERTIANUS De Not. – Sokhondinskii Reserve, Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1182 m, *Betula-Larix* forest, on *Melanohalea olivacea* (lobes, apothecia; often on galls induced by *Nesolechia oxyspora*), 22.07.2008, L. S. Yakovchenko, LE 260994a.

Note – Formerly known in Siberia only from Polar Ural (Zhurbenko, 2008).

ABROTHALLUS CAERULESCENS I. Kotte – Sokhondinskii Reserve, 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1180 m, *Betula-Larix* forest, on *Xanthoparmelia stenophylla* (thallus), 22.07.2008, L. S. Yakovchenko, LE 260924.

Note – Formerly known in Siberia from Polar Ural (Zhurbenko, 2008), vicinities of Krasnoyarsk (Zhurbenko, 2012b) and Tuva Republic (Zhurbenko & Otnyukova, 2001).

ABROTHALLUS PEYRITSCHII (Stein) I. Kotte – Sokhondinskii Reserve, Sopkoyan Mt., 2 km NW of Verkhnyaya Enda Cabin, 49°35.987'N, 110°46.578'E, alt. 1902 m, *Pinus pumila* shrubs, on *Vulpicida pinastri* (thallus), 6.07.2007, L. S. Yakovchenko, LE 261194a.

Notes – Formerly known in Russia from Severnaya Osetiya Republic, Leningrad Region, Khabarovsk Territory and Kamchatka Territory (Vainio, 1899; Kuznetsova et al., 2007; Zhurbenko, 2007; Zhurbenko et al., 2012). New to Siberia.

AMEROCONIUM CLADONIAE U. Braun & Zhurb. – Sokhondinskii Reserve, Balbashnyi Mt., 49°48'57.7"N, 110°51'54.8"E, alt. 1864 m, mountain lichen tundra with *Pinus pumila*, on *Cladonia alaskana* (podetia), 3.07.2007, L. S. Yakovchenko, LE 261164.

Note – This recently described species was known from *Cladonia arbuscula* and *C. rangiferina* (Zhurbenko & Braun, 2013). *Cladonia alaskana* is a new host species.

ARTHONIA APOTHECIORUM (A. Massal.) Almq. – Sokhondinskii Reserve, Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1182 m, *Betula-Larix gmelinii* forest, on *Lecanora symmicta* (apothecia) growing on *Larix*, 22.07.2008, L. S. Yakovchenko, LE 260983b.

Note – New to Siberia.

ARTHONIA STEREOCAULINA (Ohlert) R. Sant. – Sokhondinskii Reserve, near Verkhniy Bukukun Cabin at Bukukun River, 49°37.467'N, 111°02.147'E, alt. 1755 m, *Pinus sibirica-Larix gmelinii* forest, on *Stereocaulon tomentosum*

(phyllocladia), 10.08.2001, I. A. Galanina, LE 260965a.

Note – Frequently recorded in Russia, particularly in the Arctic (Zhurbenko, 2010).

BACHMANNIOMYCES UNCIALICOLA (Zopf) D. Hawksw. – Sokhondinskii Reserve, near Bukukun Lake, 49°41.310'N, 110°58.288'E, alt. 1680 m, *Pinus sibirica-Larix gmelinii* forest, on *Cladonia amaurocraea* (podetia), 29.06.2007, L. S. Yakovchenko, LE 260944.

Note – Formerly known in Siberia from Tuva Republic (Zhurbenko & Otnyukova, 2001) and Taimyr Peninsula (Zhurbenko, 1998).

CAPRONIA PELTIGERAE (Fuckel) D. Hawksw. – Sokhondinskii Reserve, Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1182 m, *Betula-Larix* forest, on *Peltigera leucophlebia* (cephalodia, lobes), 22.07.2008, L. S. Yakovchenko, LE 261114.

Note – Formerly known in Siberia from Taimyr Peninsula and Yakutiya (Zhurbenko 2009b).

CERCIDOSPORA STEREOCAULORUM (Arnold) Hafellner – Sokhondinskii Reserve, top of Tcagan-Ula Mt., 49°38.389'N, 111°03.493'E, alt. 1938 m, on *Stereocaulon apocalypticum* (phyllocladia), 24.07.2005, L. S. Yakovchenko, LE 260935.

Note – Frequently recorded in Russia, particularly in the Arctic (Zhurbenko, 2010).

CLYPEOCOCCUM CETRARIAE Hafellner – Sokhondinskii Reserve, Sopkoyan Mt., 2 km NW of Verkhnyaya Enda Cabin, 49°35.987'N, 110°46.578'E, alt. 1902 m, *Pinus pumila* shrubs, on *Vulpicida pinastri* (thallus), 6.07.2007, L. S. Yakovchenko, LE 261194b.

Notes – Formerly known in Siberia from Evenkiya (Zhurbenko & Zhdanov, 2013) and arctic Yakutiya (Zhurbenko, 2002). Most reports of this species are from *Cetraria islandica*, but it has been reported from *Vulpicida pinastri* as well (Zhurbenko & Zhdanov, 2013).

ENDOCOCCUS NANELLUS Ohlert – Sokhondinskii Reserve, near Verkhniy Bukukun Cabin at Bukukun River, 49°37'34.4"N, 111°02'11.9"E, alt. 1775 m, *Pinus sibirica-Larix gmelinii* forest, on *Stereocaulon tomentosum* (phyllocladia, stems), 20.07.2005, L. S. Yakovchenko, LE 260955.

Note – Frequently recorded in Russia, particularly in the boreal regions (Zhurbenko, 2010).

ENDOCOCCUS RUGULOSUS Nyl. – Sokhondinskii Reserve, Sopkoyan Mt., 2 km NW of Verkhnyaya Enda Cabin, 49°35.987'N, 110°46.578'E, alt. 1900 m, stone field among *Pinus pumila* shrubs, on *Aspicilia* sp. (thallus), 6.07.2007, L. S. Yakovchenko, LE 260964.

Note – Frequently recorded in Russia (Zhurbenko, 2007, 2009a,b).

EPICLADONIA SANDSTEDEI (Zopf) D. Hawksw. – Sokhondinskii Reserve: near Verkhniy Bukukun Cabin at Bukukun River, 49°38'01.8"N, 111°02'23.7"E, alt. 1885 m, alpine stone field, on *Cladonia furcata* (podetia), 15.07.2001, I. A. Galanina, LE 261134; near Bukukun Lake, 49°42'14.7"N, 110°59'52.4"E, alt. 1800 m, *Pinus sibirica*-*Larix gmelinii* forest, on *Cladonia gracilis* (podetia), 29.06.2007, L. S. Yakovchenko, LE 260914.

Note – Formerly known in Siberia only from Taimyr Peninsula (Zhurbenko, 1998).

EPINEPHROMA KAMCHATICA Zhurb. & Stepanchikova – Sokhondinskii Reserve: Kumyl-Aliya River, near Agutsa Cabin, 49°41'12.6"N, 111°26'00.4"E, alt. 1180 m, *Betula*-*Larix* forest, on *Nephroma helveticum* (lobes) growing on

mossy stones, 30.08.2009, L. S. Yakovchenko, LE 260943; 1.09.2009, L. S. Yakovchenko, LE 260923.

Notes – This recently described species was so far known only from Kamchatka Peninsula growing on *Nephroma parile* (Zhurbenko et al., 2012). In its type material pycnidia were immersed in a clypeus and dispersed over the upper surface of the host lobes. Conidia were more or less cuneiform, rounded at the apex and usually truncate at the base, $(4.5\text{--}6.5\text{--}8.5\text{--}14.0) \times (4.0\text{--}4.5\text{--}5.5\text{--}6.5) \mu\text{m}$, $l/b = (1.0\text{--}1.2\text{--}1.8\text{--}3.1)$, hyaline and with smooth walls. In the newly examined specimens pycnidia are mostly sessile on the host lobe margins, not associated with a clypeus and look like belonging to the lichen, only rarely semi-immersed in the central parts of the host lobes (Fig. 1). Conidia are of similar shape and size, $(5.8\text{--}7.3\text{--}9.9\text{--}12.6) \times (4.2\text{--}4.7\text{--}5.7\text{--}6.3) \mu\text{m}$, $l/b = (1.1\text{--}1.3\text{--}2.1\text{--}2.8)$ ($n = 72$), but becoming pale brown (K+ olive) and verruculose. It is noteworthy, that proper conidia of *Nephroma* species are bacilliform (James & White, 2009). Examined material strongly recalls a *Vouauxiomyces* anamorph of the lichenicolous genus *Abrothallus* de Not. and possibly presents an asexual stage of *Abrothallus welwitschii* Tul. reported on *Nephroma* (Santesson et al., 2004; Zhurbenko et al., 2012), which conidiomata are so far not known with certainty (Diederich, 2004a).

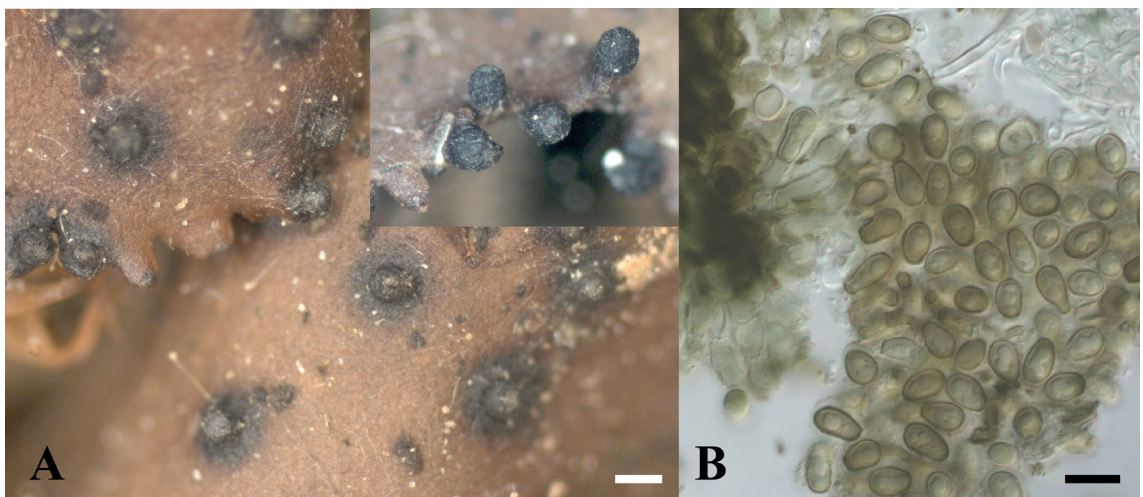


Fig. 1. *Epinephroma kamchatica* (A – LE 260923, B – LE 260943). A – pycnidia. B – conidia (in K). Bars: A = 200 μm ; B = 10 μm .

LICHENOCONIUM LECANORAE (Jaap) D. Hawksw. – Sokhondinskii Reserve, Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1182 m, *Betula-Larix gmelinii* forest, on *Lecanora symmicta* (apothecia) growing on *Larix*, 22.07.2008, L. S. Yakovchenko, LE 260983a.

Note – Common throughout Russia (Zhurbenko, 2007, 2009a, b).

LICHENOCONIUM USNEAE (Anzi) D. Hawksw. – Sokhondinskii Reserve, Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1182 m, *Betula-Larix* forest, on *Physcia aipolia* (decaying lobe bases) growing on *Betula*, 22.07.2008, L. S. Yakovchenko, LE 260904.

Note – Formerly known in Siberia from Taimyr Peninsula (Zhurbenko, 2012a) and Olekminskii Reserve in Yakutiya (Zhurbenko & Vershinina, 2014).

LICHENOSTICTA ALCICORNARIA (Linds.) D. Hawksw. – Sokhondinskii Reserve, near Verkhniy Bukukun Cabin at Bukukun River, 49°37'19.5"N, 111°02'17.6"E, alt. 1800 m, *Larix* forest, on *Cladonia* sp. (basal squamules), 22.07.2005, L. S. Yakovchenko, LE 260954.

Note – Formerly known in Siberia from Yamal Peninsula and vicinities of Krasnoyarsk (Zhurbenko, 2008, 2012b).

LICHENOSTIGMA COSMOPOLITES Hafellner & Calat. – Sokhondinskii Reserve, near Verkhniy Bukukun Cabin at Bukukun River, 49°37'34.4"N, 111°02'11.9"E, alt. 1775 m, boulders in *Larix gmelinii-Pinus sibirica* forest, on *Xanthoparmelia stenophylla* (thallus), 19.07.2005, L. S. Yakovchenko, LE 261034.

Notes – Formerly known in Russia only from Karelia Republic (Alstrup et al., 2005). New to Siberia.

LICHENOSTIGMA MAURERI Hafellner – Alkhanai National Park, N slope of Alkhanai Mt., Kur-lukhta top, 50°52.425'N, 113°19.826'E, alt. 1455 m, *Pinus sibirica-Larix gmelinii* forest in upper forest belt, on *Evernia esorediosa* (thallus) growing on *Larix dahurica*, 7.07.2006, L. S. Yakovchenko, LE 260907. – Sokhondinskii Reserve: Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1182 m, *Betula-Larix* forest, on *Usnea dasypoga* (thal-

lus) growing on *Betula platyphylla*, 22.07.2008, L. S. Yakovchenko, LE 260925; near Bukukunskoe Lake, 49°42'20.00"N, 111°01'03.60"E, alt. 1838 m, on *Evernia esorediosa* (thallus) growing on *Larix* bark, 1.07.2007, L. S. Yakovchenko, LE 260974; near Bukukunskoe Lake, 49°41'31"N, 110°58'29"E, alt. 1680 m, *Pinus sibirica-Larix* forest, on *Evernia mesomorpha* (thallus) growing on *Pinus* bark, 1.07.2007, L. S. Yakovchenko, LE 261084.

Note – Common throughout Russia (Zhurbenko, 2007, 2009b).

MUELLERELLA PYGMAEA (Körb.) D. Hawksw. – Sokhondinskii Reserve, N coast of Bukukunskoe Lake, 49°42'20"N, 111°02'39"E, alt. 1912 m, subalpine belt with *Pinus sibirica*, on *Rhizocarpon geographicum* (thallus), 30.06.2007, L. S. Yakovchenko, LE 261166.

Note – Frequently recorded in Russia, particularly from the Arctic (Zhurbenko, 2007, 2009b).

MUELLERELLA VENTOSICOLA (Mudd) D. Hawksw. – Sokhondinskii Reserve, Balbashnyi Mt., 49°48'57.7"N, 110°51'54.8"E, alt. 1864 m, mountain lichen tundra with *Pinus pumila*, on *Rhizocarpon alpicola* (thallus), 3.07.2007, L. S. Yakovchenko, LE 260915).

Note – Formerly known in non-Arctic Siberia only from Altai Republic (Zhurbenko & Davydov, 2000).

NESOLECHIA OXYSPORA (Tul.) A. Massal. – Alkhanai National Park, 50°52.077'N, 113°22.107'E, alt. 1535 m, *Pinus sibirica-Larix gmelinii* forest in the upper forest belt (near the pilgrim trail), on *Parmelia sulcata* (thallus) growing on *Larix gmelinii*, 11.07.2006, L. S. Yakovchenko, LE 261088. – Sokhondinskii Reserve: Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1180 m, *Betula-Larix* forest, on *Parmelia sulcata* (thallus) growing on *Betula*, 22.07.2008, L. S. Yakovchenko, LE 261104; on *Melanohalea olivacea* (lobes), 22.07.2008, L. S. Yakovchenko, LE 260994b; Sokhondo Mt., 49°40.497'N, 111°02.751'E, alt. 2100 m, on *Melanohalea olivacea* (thallus) growing on twig, 24.07.2005, L. S. Yakovchenko, LE 261118.

Note – Common throughout Russia (Zhurbenko, 2007, 2009a, 2012b; Zhurbenko et al., 2012).

NISSLIA CLADONICOLA D. Hawksw. & W. Gams – Sokhondinskii Reserve, Sokhondo Mt., near Bukukunskoe Lake, 49°42.474'N, 111°04.749'E, alt. 2295 m, on *Cladonia furcata* (moribund podetia), 24.07.2005, L. S. Yakovchenko, LE 261004.

Note – Formerly known in Siberia from Taimyr Peninsula (Zhurbenko & Alstrup, 2004) and from an unknown place within Krasnoyarsk Territory (Alstrup, 2004).

PHACOPSIS CEPHALODIODES (Nyl.) Triebel & Rambold – Alkhanai National Park, 50°52.077'N, 113°22.107'E, alt. 1535 m, *Pinus sibirica-Larix gmelinii* forest, in the upper forest belt (near the pilgrim trail), on *Hypogymnia physodes* (thallus) growing on *Larix gmelinii*, 11.07.2006, L. S. Yakovchenko, LE 260945.

Note – Formerly known in Siberia from Tuva Republic (Zhurbenko & Otnyukova, 2001) and Irkutsk region (Zhurbenko & Vershinina, 2014).

PHACOPSIS HUUSKONENII Räsänen – Sokhondinskii Reserve, near Verkhonii Bukukun Cabin at Bukukun River, 49°37'34.4"N, 111°02'11.9"E, alt. 1775 m, *Pinus sibirica-Larix gmelinii* forest, on *Bryoria simplicior* (thallus), 20.07.2005, L. S. Yakovchenko, LE 261154.

Note – Sporadically reported in boreal Siberia (Zhurbenko, 2009a, 2012b; Zhurbenko & Zhdanov, 2013).

PLECTOCARPON HYPOGYMNAE Zhurb. & Diederich – Sokhondinskii Reserve, Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1182 m, *Betula-Larix* forest, on *Hypogymnia tubulosa* (lobes), 22.07.2008, L. S. Yakovchenko, LE 261074. – Alkhanai National Park, 50°52.077'N, 113°22.107'E, alt. 1535 m, *Pinus sibirica-Larix gmelinii* forest, in the upper forest belt (near the pilgrim trail), on *Hypogymnia bitteri* (thallus) growing on *Larix gmelinii*, 11.07.2006, L. S. Yakovchenko, LE 261064.

Note – The species was so far known from the type collected in Tuva Republic of Russia (Zhurbenko et al., 2008). and from Olekminskii Reserve in Yakutiya (Zhurbenko & Vershinina, 2014).

POLYCOCCUM PULVINATUM (Eitner) R. Sant. – Sokhondinskii Reserve, Agutsa River at 1 km N of

Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E, alt. 1182 m, *Betula-Larix* forest, on *Physcia aipolia* (lobes) growing on *Betula*, 22.07.2008, L. S. Yakovchenko, LE 260984.

Note – Formerly known in Siberia from Yakutiya and Chukotka (Zhurbenko, 2009b).

ROSELLINULA HAPLOSPORA (Th. Fr. & Almq. ex Th. Fr.) R. Sant. – Alkhanai National Park, northern slope of Dimchik-Sume Mt., 50°50.060'N, 113°23.424'E, alt. 1162 m, rocks in *Larix-Betula* forest, on *Aspicilia* sp. (thallus), 22.09.2009, L. S. Yakovchenko, LE 261058.

Notes – Ascospores are somewhat smaller than reported by Hafellner (1985), viz. (5.5–)5.8–8.8(–11.1) × (3.5–)4.1–4.9(–5.4) μm, 1/b = (1.3–)1.4–1.8(–2.4) (n = 34) vs. 7–11 × 4.5–6.5 μm. Formerly known in Asia only from Turkey (Halici & Candan, 2007). New to Russia.

SAGEDIOPSIS VASILYEVAE Zhurb. sp. nov.

Mycobank No.: MB 809173.

Lichenicolous fungus growing on species of *Rhizocarpon*. Similar to *Sagediopsis aquatica*, but with longer ascospores, (37.5–)41.7–50.3(–53.0) × (2.5–)2.9–3.5(–3.8) μm.

Typus: Russia, southern Siberia, Zabaikal'skii Territory, Sokhondinskii Reserve, Sopkoyan Mt., 2 km NW of Verkhnyaya Enda Cabin, 49°35.987'N, 110°46.578'E, alt. 1902 m, stone field among *Pinus pumila* shrubs, on *Rhizocarpon inarense* (thallus), 6.07.2007, L. S. Yakovchenko, LE 260905 – holotypus.

Description (Fig. 2) – *Ascomata* perithecioid, not clypeate, but with markedly thickened above wall, black, more or less subglobose to obovate, often flattened above, slightly protruding, exposed part coarsely radially split and becoming dentate, opening by an irregular broad pore, sometimes finally gaping up to 70 μm across, (60–)100–200 μm diam., discrete to adjacent. *Exciple* in cross section more or less pseudoparenchymatous, consisting of two layers. The outer layer composed of rounded to ellipsoid cells with walls 1–2 μm thick; apically dark brown, mostly 30–50 μm thick, composed of 6–12 cell layers; laterally dark to medium brown, 15–30 μm thick, composed of 4–8 cell layers; basally pale to medium brown, 5–10 μm thick, composed of 2–4 cell layers; K+ lighter yel-

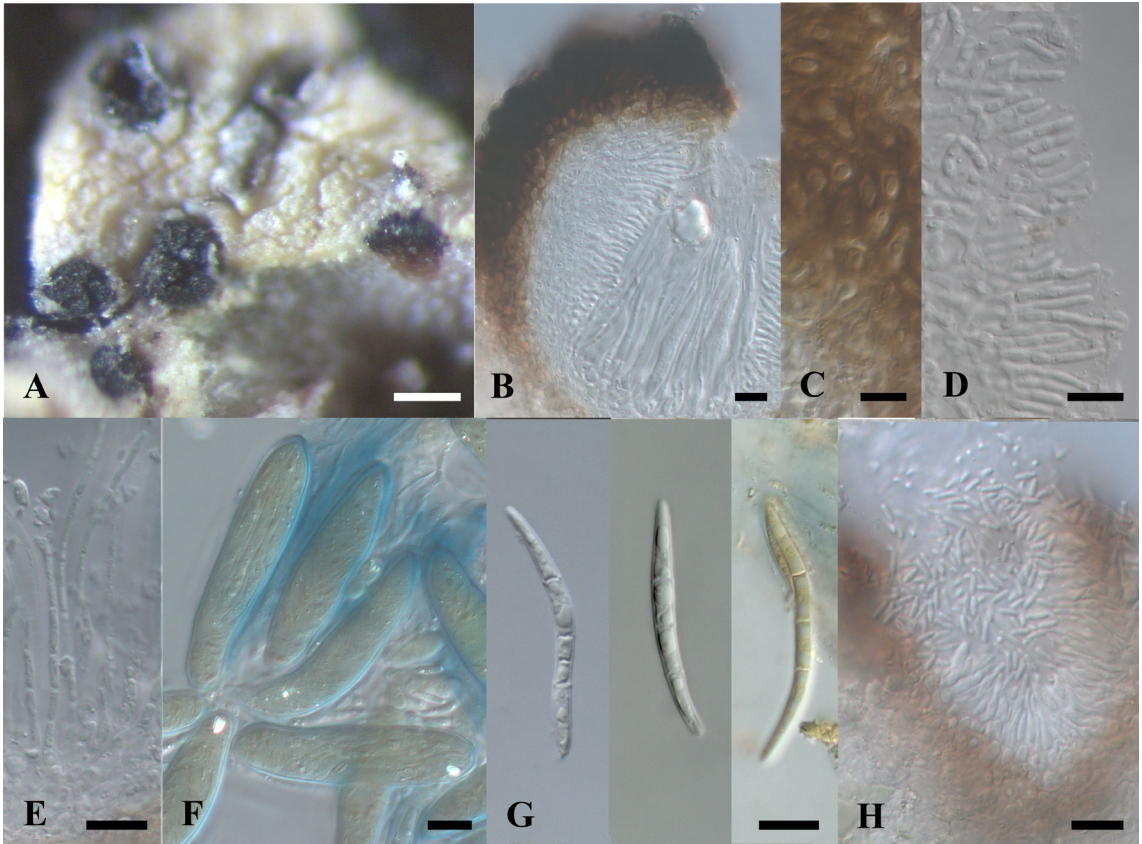


Fig. 2. *Sagediopsis vasilyevae* (holotype). A – ascomata habitus, note cross sectioned ascoma on the right. B – ascoma section (in water). C – exciple in cross section (in K). D – periphysoids (in K). E – interascal filaments (in water). F – asci (in K/I). G – ascospores (in water or I, the rightmost). H – conidioma with conidia in cross section (in water). Bars: A = 100 μm ; B–H = 10 μm .

low to orange-brown. The inner layer colourless; laterally 15–25 μm thick, composed 4–8 layers of rounded to ellipsoid cells; basally 5–10 μm thick, composed of 2–4 layers of tangentially elongated cells forming subhymenium. Ostiolar canal and periphyses not observed. *Periphysoids* abundant, hyaline, not swollen at the apex, ca. 10–20 \times 1–1.5 μm , 1–4-septate, branches and anastomoses not observed, densely lining upper part of ascomatal cavity and merging below with interascal filaments developing from its basal part. *Interascal filaments* paraphysis-like, persistent, longer than asci, cylindrical, not thickened at the apex, (1–)1.5(–2) μm diam., not or rarely scarcely branched, septate, not or slightly constricted at the septa, somewhat guttulate. *Hymenial gel* I and K/I+ immediately blue

throughout. *Asci* narrowly ellipsoid to narrowly clavate, rounded at the base, mostly without distinct foot, wall 0.5–1 μm thick throughout or slightly thickened at the apex up to 2.5 μm , without distinct apical structures, (50.5–)52–64(–69) \times (9.5–)10.5–14.5(–17) μm ($n = 15$, in I or K/I), 8-spored, wall I and K/I+ evenly blue. *Ascospores* hyaline, elongate-bacilliform to acicular, acuminate at both ends, straight or somewhat curved (artefact ?) in microscopic slides, (37.5–)41.7–50.3(–53.0) \times (2.5–)2.9–3.5(–3.8) μm , 1/b = (11.1–)12.5–16.9(–20.0) ($n = 26$, in water or I), 3(–4)-septate, not constricted at the septa, guttulate, with thin and smooth wall, non-halonate, arranged in an ascus in a fascicle. *Conidiomata* sac-shaped, ca. 50 \times 70 μm , with pale brown wall ca. 10 μm thick. *Conidiogenous cells* lageni-

form, ca. $7\text{--}10 \times 2\text{--}3 \mu\text{m}$ ($n = 5$). *Conidia* hyaline, bacilliform, $(3.7\text{--})3.9\text{--}4.5\text{--}(4.9) \times 1.2\text{--}1.4\text{--}(1.5) \mu\text{m}$, $l/b = (2.6\text{--})2.9\text{--}3.5\text{--}(3.9)$ ($n = 34$, in I) μm , aseptate. *Pathogenicity* not observed.

Etymology – The species is named after Dr. Larissa N. Vasilyeva to honor her outstanding contribution to mycology.

Notes – Placement of the new species in the genus *Sagediopsis* (Sacc. & D. Sacc.) Vain. (Adeleococcaceae) requires further assessment as the latter is characterized by hemiamyloid hymenial gel and thick-walled asci (Hoffmann & Hafellner, 2000: 99). However, hymenial gel of the type species of the genus *Sagediopsis aquatica* (Stein) Triebel is also I+ pale blue, staining red only by concentrated Lugol solution (Rambold et al., 1990) and the depiction of its ascus wall (op. cit., Fig. 7B) fits well the examined material. Within the genus, *Sagediopsis vasilyevae* shows most similarity with *S. aquatica* referring to subgen. *Sagediopsis* (Sacc.) Vain., which is characterized by asci with poorly developed ocular chamber and bacilliform to acicular ascospores (Hafellner, 1993). *Sagediopsis aquatica* differs from *S. vasilyevae* by its clypeate ascomata, a peridium bearing brown, long-celled hyphae around ostium, (0–)3(–6)-septate, shorter ascospores, $(22\text{--})27\text{--}36\text{--}(45) \times (2.5\text{--})3\text{--}3.5\text{--}(4) \mu\text{m}$ and its different host lichen *Koerberiella wimmeriana* growing on wet rocks in humid places (Rambold et al., 1990). Respecting the other lichenicolous ascomycetes with immersed dark brown perithecioid ascomata and colourless, bacilliform, vermiform or acicular, septate ascospores *Sagediopsis vasilyevae* also resembles species of *Sarcopyrenia* Nyl. (Sordariomycetes, genera incertae sedis) and *Spirographa* Zahlbr. (Helotiales, genera incertae sedis). Species of the former differ from the new species in having ascomata with an involucrellum, evanescent interascal filaments, and I– hymenial gel and asci (Navarro-Rosinés & Hladun, 2004), species of the latter differ by the absence of distinct periphysoids, in having at first closed, later deeply urceolate ascomata, 16–32-spored asci and I and K/I– hymenial gel and asci (Diederich, 2004b). By its asci with I+ blue wall and some other ascocarp characteristics *Sagediopsis vasilyevae* resembles species of Epigloeaceae and Protothelenellaceae (Cannon & Kirk, 2007). The former differ from the new species, for instance, in having superficial ascomata, which are composed of thin-walled hyphae

and immersed in a thin gelatinous algal film. The latter can be distinguished by asci with I+ blue apical ring and usually muriform ascospores.

SPHAERELLOTHECIUM RETICULATUM (Zopf) Etayo – Sokhondinskii Reserve: Agutsa River at 1 km N of Buninda Cabin, $49^{\circ}42'58.5''\text{N}$, $111^{\circ}22'49.6''\text{E}$, alt. 1182 m, *Betula-Larix* forest, on *Hypogymnia physodes* (lobes), 22.07.2008, L. S. Yakovchenko, LE 261184; near Verkhonii Bukukun Cabin at Bukukun River, $49^{\circ}38.175'\text{N}$, $111^{\circ}00.498'\text{E}$, alt. 1551 m, *Pinus sibirica-Larix gmelinii* forest, on *Hypogymnia physodes* (lobes), 28.06.2007, L. S. Yakovchenko, LE 260934).

Note – Frequently recorded in Russia (Zhurbenko, 2007, 2009a, b; Zhurbenko & Otte, 2012).

SPHAERELLOTHECIUM cf. **STEREOCAULORUM** Zhurb. & Triebel – Sokhondinskii Reserve, near Verkhonii Bukukun Cabin at Bukukun River, $49^{\circ}37.432'\text{N}$, $111^{\circ}02.214'\text{E}$, alt. 1751 m, *Pinus sibirica-Larix gmelinii* forest, on *Stereocaulon tomentosum* (phyllocladia, sometimes on its bleached portions), 10.08.2001, I. A. Galanina, LE 260965b.

Notes – The species has hyaline to occasionally pale olive, 1(–3)-septate ascospores and characteristically grows in the epinecral layer of etomentose, naked stems of *Stereocaulon* spp. (Zhurbenko & Triebel, 2008). In the examined material the ascospores were hyaline, 1-septate, and the fungus was not associated with epinecral layer of the host's stems. The only other *Sphaerellothecium* species known on *Stereocaulon* is *S. cladoniae* (Alstrup & Zhurb.) Hafellner, which differs from the examined material in its shorter ascospores, $(7.5\text{--})8.5\text{--}11\text{--}(12.5) \times (3\text{--})3.5\text{--}4.5\text{--}(5) \mu\text{m}$ (Zhurbenko & Triebel, 2008) vs. $(9.3\text{--})10.6\text{--}15.4\text{--}(16.0) \times (3.1\text{--})3.7\text{--}4.9\text{--}(5.4) \mu\text{m}$, $l/b = (2.4\text{--})2.7\text{--}3.3\text{--}(3.5)$ ($n = 21$). So far *Sphaerellothecium stereocaulorum* has been reported only from the northern regions of the Holarctic (Zhurbenko & Triebel, 2008; Brackel, 2010).

“STIGMIDIUM” EUCLINE (Nyl.) Vězda – Sokhondinskii Reserve, Sopkoyan Mt., 2 km NW of Verkhnyaya Enda Cabin, $49^{\circ}35.987'\text{N}$, $110^{\circ}46.578'\text{E}$, alt. 1902 m, stone field among *Pinus pumila* shrubs, on *Varicellaria lactea* (thallus), 6.07.2007, L. S. Yakovchenko, LE 261174.

Note – Formerly known in Russia only from Taimyr Peninsula (Zhurbenko, 2009a).

STIGMIDIUM MICROCARPUM Alstrup & J.C. David – Sokhondinskii Reserve, Sokhondo Mt., near Bukukunskoe Lake, 49°42.474'N, 111°04.749'E, alt. 2295 m, on *Cetraria laevigata* (over the entire lobe surface), 24.07.2005, L. S. Yakovchenko, LE 261013.

Notes – Ascomata embedded in stromatic tissue composed of brown hyphae, producing on the host lobes well-delimited, brown then black necrotic patches up to 2 mm lengthways, finally falling away (Fig. 3). Asci 25–32(–37) × (5.5–)7–9(–9.5) μm (n = 12, in K/I). Ascospores mostly hyaline, smooth-walled and 1-septate, rarely pale brown, verruculose and 2-septate, (6.5–)6.9–8.3(–9.3) × (2.3–)2.4–3.0(–3.2) μm, l/b = (2.5–)2.6–3.0(–3.2) (n = 33, in K or K/I). *Stigmidium microcarpum* was described from *Flavocetraria cucullata* (Alstrup, 1993) and subsequently also reported on species of *Vulpicida* (Zhurbenko, 2009a). *Cetraria* is a new host genus.

STIGMIDIUM PSEUDOPELTIDEAE Cl. Roux & Triebel – Sokhondinskii Reserve: Agutsakan River, 2 km N of Agutsakan Cabin, 49°36.611'N, 111°19.477'E, alt. 1125 m, *Betula platyphylla* forest with *Rhododendron dahurica* near the river, on *Peltigera canina* (thallus), 23.07.2006, L. S. Yakovchenko, LE 261148; Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N,

111°22'49.6"E, alt. 1182 m, *Betula-Larix* forest, on *Peltigera canina* (lobes), 22.07.2008, L. S. Yakovchenko, LE 261124.

Note – Formerly known in Siberia from the Arctic (Severnaya Zemlya and Sverdrupa Island in the Kara Sea) and Altai Republic (Zhurbenko, 2009b).

STIGMIDIUM TABACINAE (Arnold) Triebel – Sokhondinskii Reserve, near Buninda Cabin, 49°42'22"N, 111°22'03"E, alt. 1400 m, sparse *Pinus sylvestris* forest on steppe S-exposed slope, on *Toninia tristis* ssp. *asiae-centralis* (thallus), 6.08.2001, L. S. Yakovchenko, LE 261138.

Note – Formerly known in Siberia only from arctic Yakutiya (Zhurbenko, 2009a).

SYZYGOSPORA BACHMANNII Diederich & M.S. Christ. – Sokhondinskii Reserve, near Bukukun Lake, 49°42'14.7"N, 110°59'52.4"E, alt. 1800 m, *Pinus sibirica-Larix gmelinii* forest, on *Cladonia cornuta* (podetia), 29.06.2007, L. S. Yakovchenko, LE 261144.

Note – Formerly known in Siberia only from Sverdlovsk Region (Shiryaev et al., 2010).

TREMELLA HYPOGYMNAE Diederich & M.S. Christ. – Sokhondinskii Reserve, Agutsa River at 1 km N of Buninda Cabin, 49°42'58.5"N, 111°22'49.6"E,

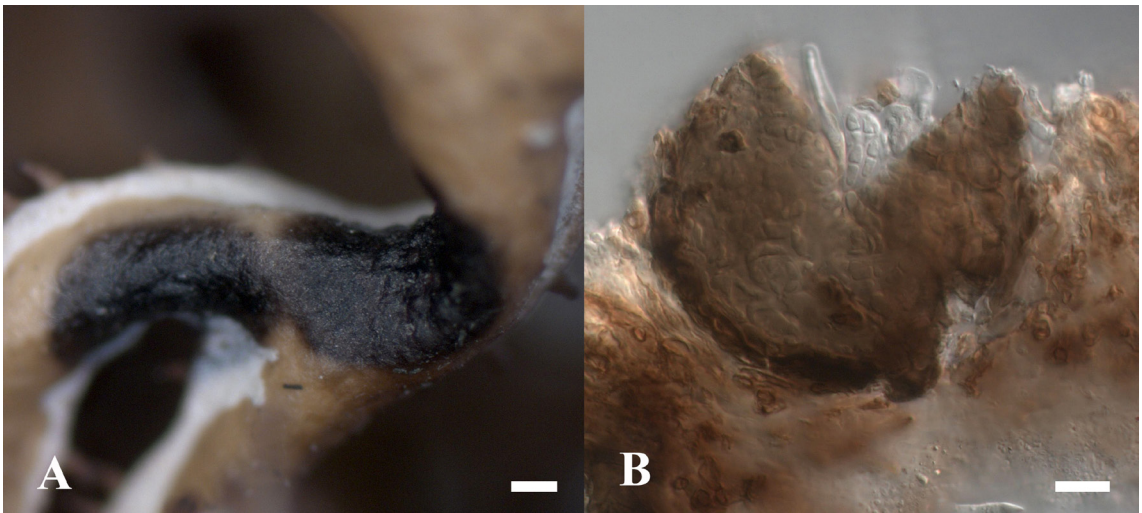


Fig. 3. *Stigmidium microcarpum* (LE 261013). A – necrotic patch with immersed ascomata. B – ascoma immersed in stroma (in water). Bars: A = 200 μm; B = 10 μm.

alt. 1182 m, *Betula-Larix* forest, on *Hypogymnia tubulosa* (thallus), 22.07.2008, L. S. Yakovchenko, LE 261054.

Note – Formerly known in Siberia from Sverdlovsk Region, Krasnoyarsk Territory and Altai Republic (Zhurbenko & Davydov, 2000; Shiryayev et al., 2010; Zhurbenko, 2012b; Zhurbenko & Zhdanov, 2013).

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