

NEW AND NOTEWORTHY RECORDS OF FUNGI ASSOCIATED WITH WOODY PLANTS IN TAIMYR DISTRICT OF KRASNOYARSK KRAI (ARCTIC SIBERIA, RUSSIA)

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There are 42 species of fungi (*Ascomycota*, *Basidiomycota*) collected for the first time in Taimyr district of Krasnoyarsk Krai, and 13 species are the second – fourth finds. 25 species were collected on driftwood along the shores of lakes and rivers, and 11 species on firewood at the mountain base. 23 species develop in anthropogenic habitats on alien substrate, building structures, firewood and lumber. Four species were identified in anthropogenic conditions, which are first reported in the Russian Arctic (*Cytospora chrysosperma*, *Didymella pomorum*, *Pleurotus abieticola*, *Sporocadus lichenicola*).

Keywords: Arctic greening, global warming, plant pathogens, urban mycobiota

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INTRODUCTION

The rate of study of the Arctic mycobiota biodiversity lags significantly behind that of the planet's more southern biomes (Dahlberg, Bültmann, 2013). Identification of the taxonomic and functional structure of various biota components, including mycobiota, is relevant in connection with rapid climate change and the growth of economic activity in high latitudes. In the Russian Arctic, the Kola and Polar Ural sectors have been most thoroughly studied, while vast Siberian and Far Eastern territories still remain “white spots” (Karatygin et al., 1999).

In Taimyr, various fungal groups have been identified for over a century (Karatygin et al., 1999), but active research began only in the 1990s (Shiryayev, 2024). This study primarily presents materials on *Basidiomycota*, including agaricoid, aphyllorphoroid and gasteroid fungi, as well as phytopathogenic *Ascomycota*. The region is experiencing some of the highest rates of climate warming in the Arctic as well as an increase in the rate of economic development (Druckenmiller et al., 2023; Report., 2023). This introduces significant changes in

the mycobiota biodiversity that develops at the Arctic treeline.

The goal of this work is to study the diversity of mycobiota in Taimyr and identify previously unknown species in this region.

MATERIALS AND METHODS

The material was gathered in the Taimyr district of Krasnoyarsk Krai, predominantly between July and September 2024, with a few exceptions (previous collections were carried out with the assistance of our local team members; further details can be found in the acknowledgments section). The research locations are outlined below.

Natural habitats, on local substrates:

1) Putorana Plateau, southern shore of Lake Lama, confluence of the Omon-Yuryakh River. On coniferous and broadleaved driftwood (69.43405°N, 91.11368°E, 58 m a.s.l.);

2) Putorana Plateau, southern shore of Lake Lama, confluence of the Omon-Yuryakh River. On burnt forest along the lake shore (69.42795°N, 91.09582°E, 90 m a.s.l.);

- 3) Emercom Island on Melkoye Lake (69.33378°N, 88.93272°E, 105 m a.s.l.); Anthropogenic habitats, on alien substrates;
- 4) Dikson village (73.5085°N, 80.5233°E, 12 m a.s.l.);
- 5) Dudinka town (69.4062°N, 86.1819°E, 30 m a.s.l.);
- 6) Norilsk town (69.3527°N, 88.1955°E, 77 m a.s.l.) and its districts (Kayerkan, Talnakh, Valek).

Fungal names are given according to the Index Fungorum online database (www.indexfungorum.org). The materials are deposited in the Biological Museum of the Institute of Plant and Animal Ecology of the Ural Branch of the Russian Academy of Sciences, Ekaterinburg (SVER) and in the Scientific herbarium of the Institute of Biology of Komi Scientific Center of the Ural Branch of the Russian Academy of Sciences (SYKO).

In the annotated list, new species for the Russian Arctic are marked with an exclamation mark, and new species for Taimyr are marked with an asterisk.

RESULTS AND DISCUSSION

Annotated list of species

Ascomycota

!**Cytospora chrysosperma* (Pers.) Fr. — 6: on willow branch, coll. A. Shiryayev, det. A. Budimirov, 04.08.2024, SVER(F) 86770.

!**Didymella pomorum* (Thüm.) Qian Chen et L. Cai — 6: glasshouse, on *Prunus padus* L., coll. A. Shiryayev, det. A. Budimirov, 05.09.2024, SVER(F) 86783.

!**Sporocadus lichenicola* Corda — 6 (Talnakh): private garden, on *Dasiphora fruticosa* (L.) Rydb., coll. A. Shiryayev, det. A. Budimirov, 06.09.2024, SVER(F) 86769.

Basidiomycota

**Aleurodiscus lapponicus* Litsch. — 1; on *Salix* driftwood branch, coll. et det. D. Kosolapov, 18.08.2024, SYKOf 6842.

Antrodia serialis (Fr.) Donk [= *Neoantrodia serialis* (Fr.) Audet] — 6: greenhouse, walls of tubs made of pine boards, coll. et det. A. Shiryayev, 05.08.2024, SVER(F) 86621; 5: trash can, rotting *Pinus sibirica* Du Tour boards, coll. et det. A. Shiryayev, 03.08.2024, SVER(F) 86669. Third and fourth record in the region (GBIF, 2025a).

A. sinuosa (Fr.) P. Karst. — 5: port, foundation of a house made of *Pinus sibirica* logs, 03.08.2024, SVER(F) 86559; 6: near Correctional Colony No. 15 of the Federal Penitentiary Service of Russia for the Krasnoyarsk Territory, decomposing pine sawdust and bark, coll. N. Khomchenko, det. A. Shiryayev, 26.08.2019, SVER(F) 86569. Second and third record in the region (Shiryayev, 2024).

**Aphanobasidium filicinum* (Bourdot) Jülich — 1: on *Larix gmelinii* (Rupr.) Rupr. trunk driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86784.

**Athelia epiphylla* Pers. — 1: on *Picea obovata* Ledeb. driftwood, coll. et det. D. Kosolapov, 18.08.2024, SYKOf 6844.

Butyrea luteoalba (P. Karst.) Miettinen — 1: on *Picea obovata* driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86785. Second record in the region (Mukhin, Kotiranta, 2001).

**Ceraceomyces borealis* (Romell) J. Erikss. et Ryvarden — 1: on *Picea obovata* driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86771.

**Ceriporiopsis subvermispora* (Pilát) Gilb. et Ryvarden — 1: on *Picea obovata* driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86786.

**Cinereomyces lindbladii* (Berk.) Jülich — 1: on *Larix gmelinii* driftwood, coll. et det. D. Kosolapov, 18.08.2024, SYKOf 6849.

Coniophora puteana (Schumach.) P. Karst. — 6: glasshouse, on pine boards, coll. et det. A. Shiryayev, 03.08.2024 SVER(F) 86782; *ibid.*, woody floor made of *Pinus sibirica* boards, coll. I. Pestereva, det. A. Shiryayev, 31.07.2024, SVER(F) 86619. Third and fourth record in the region (Shiryayev, 2024; GBIF, 2025b).

**Corticium roseum* Pers. — 1: on *Salix* driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86768.

**Crucibulum laeve* (Huds.) Kambly — 6: greenhouse, tub walls made of *Pinus sylvestris* wood, coll. et det. A. Shiryayev, 05.08.2024, SVER(F) 86599; 4: port, rotten pine boards, coll. et det. A. Shiryayev, 03.08.2024, SVER(F) 86582.

**Cyanosporus caesius* (Schrad.) McGinty — 1: on *Picea obovata* driftwood, coll. et det. D. Kosolapov, 17.08.2024, SYKOf 6840.

C. simulans (P. Karst.) B.K. Cui et Shun Liu — 1: on *Picea obovata* driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86787. Second record in the region (Shiryayev, 2024).

**Cyathus striatus* Willd. — 6: greenhouse, tub walls made of *Pinus sylvestris* wood, coll. et det. A. Shiryayev, 05.08.2024, SVER(F) 86552.

Dacrymyces stillatus Nees — 1: on *Salix* driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86781. Second record in the region (GBIF, 2025c).

**Exidia nigricans* (With.) P. Roberts — 1: on *Salix* driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86767.

**Fibroporia vaillantii* (DC.) Parmasto — 6 (Kayerkan): on *Pinus sibirica* logs in the foundation of garages, coll. et det. A. Shiryayev, 28.08.2024, SVER(F) 86640; *ibid.*, greenhouse, tub walls made of *Pinus sylvestris* wood, coll. et det. A. Shiryayev, 05.08.2024, SVER(F) 86667.

**Fomitopsis officinalis* (Vill.) Bondartsev et Singer — 2: on alive *Larix gmelinii*, coll. et det. A. Shiryayev, 11.08.2024, SVER(F) 86641.

**Globulicium hiemale* (Laurila) Hjortstam — 1: on *Picea obovata* driftwood, coll. et det. D. Kosolapov, 18.08.2024, SYKOf 6846.

**Gloeophyllum abietinum* (Bull.) P. Karst. — 6: on pillars and foundations of buildings made from logs of *Pinus sibirica* and *P. sylvestris*, coll. et det. A. Shiryayev, 07.08.2024, SVER(F) 86680.

G. protractum (Fr.) Imazeki — 6: on pillars and foundations of buildings made from logs of *Pinus sibirica* and *P. sylvestris*, coll. et det. A. Shiryayev, 31.07.2024, SVER(F) 86618. Second record in the region (Mukhin, Kotiranta, 2001).

G. sepiarium (Wulfen) P. Karst. — 6: on pillars and foundations of buildings made from logs of *Pinus sibirica* and *P. sylvestris*, coll. et det. A. Shiryayev, 05.08.2024 SVER(F) 86581. Fourth record in the region (Mukhin, Kotiranta, 2001; GBIF, 2025d, 2025e).

**G. trabeum* (Pers.) Murrill — 6: on pillars and foundations of buildings made from logs of *Pinus sibirica* and *P. sylvestris*, coll. et det. A. Shiryayev, 30.07.2024 SVER(F) 86570.

Hydnomerulius pinastri (Fr.) Jarosch et Besl [= *Leucogyrophana pinastri* (Fr.) Ginns et Weresub] — 6: on pine pillars, coll. et det. A. Shiryayev, 02.08.2024, SVER(F) 86666; 6 (Kayerkan): mine entrance, burnt *P. sibirica* log, coll. et det. A. Shiryayev, 05.09.2016, SVER(F) 86780. Second record in the region (Shiryayev, 2024).

**Hypholoma capnoides* (Fr.) P. Kumm. — 6: greenhouse, on rotten pine logs, coll. A. Shiryayev et det. O. Shiryayeva, 5.08.2024, SVER(F) 86641.

**Hypochnicium lundellii* (Bourdot) J. Erikss. — 2: fired forest with larches and birches, on semi fired trunk of *Betula tortuosa* Ledeb., coll. et det. D. Kosolapov, 15.08.2024, SYKOf 6839.

**Irpex litschaueri* (Bourdot et Galzin) Kotir. et Saaren. — 1: on *Salix* driftwood, coll. et det. D. Kosolapov, 18.08.2024, SYKOf 6851.

**Laxitextum bicolor* (Pers.) Lentz — 2: semi-fired *Betula* trunk, coll. A. Shiryayev, det. I. Zmitrovich, 15.08.2024, SVER(F) 86766; 3: fallen branch of *Alnus fruticosa*, coll. et det. D. Kosolapov, 08.08.2024, SYKOf 6838.

**Megalocystidium perticatum* Spirin et Volobuev — 1: on willow driftwood, coll. et det. D. Kosolapov, 18.08.2024, SYKOf 6843.

**Meruliporia pulverulenta* (Sowerby) Zmitr., Kalinovskaya et Myasnikov [= *Leucogyrophana pulverulenta* (Sowerby) Ginns] — 6: glasshouse, on pine board, coll. et det. A. Shiryayev, 06.08.2024, SVER(F) 86601; 6 (Val-ek): garages on the river pier, pine logs, coll. et det. A. Shiryayev, 10.08.2024, SVER(F) 86617.

Mycoacia livida (Pers.) Zmitr. — 1: on *Picea obovata* driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86772. Third record in the region (Mukhin, Kotiranta, 2001; Shiryayev, 2024).

**Neolentinus lepideus* (Fr.) Redhead et Ginns — 6 (Kaerkan): mine entrance, on rotting pine rafters, coll. A. Shiryayev, det. O. Shiryayeva, 31.07.2024, SVER(F) 86616.

**Paxillus involutus* (Batsch) Fr. — 6: greenhouse, on rotting pine board, coll. A. Shiryayev, det. O. Shiryayeva, 13.09.2024, SVER(F) 86571.

Penttilamyces romellii (Ginns) Zmitr., Kalinovskaya et Myasnikov [= *Leucogyrophana romellii* Ginns] — 6 (Kaerkan): on processed pine wood, coll. et det. A. Shiryayev, 29.08.2024, SVER(F) 86603. Second record in the region (Shiryayev, 2024).

**Phanerochaete calotricha* (P. Karst.) J. Erikss. et Ryvarden — 2: on semi-fired *Sorbus sibirica* Hedl. branch, coll. A. Shiryayev, det. I. Zmitrovich, 18.08.2024, SVER(F) 86788.

**Ph. sordida* (P. Karst.) J. Erikss. et Ryvarden — 1: on willow driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 18.08.2024, SVER(F) 86779; 2: on fired willow branch, coll. A. Shiryayev, det. I. Zmitrovich, 18.08.2024, SVER(F) 86773; *ibid.*; fallen dead branch of *Betula pendula*, coll. A. Shiryayev, det. I. Zmitrovich, 15.08.2024, SVER(F) 86774.

**Pholiota spumosa* (Fr.) Singer — 6: greenhouse, rotting pine board, coll. A. Shiryayev, det. O. Shiryayeva, 05.08.2024, SVER(F) 86553.

Picipes melanopus (Pers.) Zmitr. et Kovalenko — 1: on *Picea obovata* driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 18.08.2024, SVER(F) 86778; *ibid.*, on larch driftwood, coll. D. Kosolapov, det. I. Zmitrovich, 18.08.2024, SYKOF 6848. Second and third record in the region (GBIF, 2025f).

**Piloderma byssinum* (P. Karst.) Jülich — 2: on fired larch trunk, coll. A. Shiryayev, det. I. Zmitrovich, 18.08.2024, SVER(F) 86789.

!**Pleurotus abieticola* R.H. Petersen et K.W. Hughes — 6: warehouse of pine sawdust near the Penal Colony-15 of the Main Directorate of the Federal Penitentiary Service of Russia for Krasnoyarsk Krai, coll. A. Shiryayev, det. O. Shiryayeva, 05.08.2024, SVER(F) 86579.

**Poriella subacida* (Peck) Donk — 1: on *Picea obovata* driftwood, coll. et det. D. Kosolapov, 17.08.2024, SYKOF 6841.

**Resinoporia crassa* (P. Karst.) Audet — 1: on *Picea obovata* driftwood, coll. D. Kosolapov, A. Shiryayev, det. D. Kosolapov, 18.08.2024, SYKOF 6847.

**Scytinostroma odoratum* (Fr.) Donk — 1: on *Salix* driftwood, coll. D. Kosolapov, A. Shiryayev, det. D. Kosolapov, 17.08.2024, SYKOF 6850.

**Serpula lacrymans* (Wulfen) J. Schröt. — 5: greenhouse, pine boards at the base of the bed, coll. et det. A. Shiryayev, 05.08.2024, SVER(F) 86646; 6 (Talnakh): woody house base, 30.07.2024, SVER(F) 86652; 6: near Thermal Power Plant-1, on *Pinus sibirica* logs at the base of the garage, coll. et det. A. Shiryayev, 07.08.2024, SVER(F) 86612.

**Sphaerobolus stellatus* Tode — 6 (Kayerkan): rotting pine plywood, coll. et det. A. Shiryayev, 03.09.2024 SVER(F) 86578; 6: greenhouse, rotting walls of pine tub, coll. et det. A. Shiryayev, 05.08.2024 SVER(F) 86647.

**Steccherinum bourdotii* Saliba et A. David — 1: on willow driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86775.

**S. ochraceum* (Pers. ex J.F. Gmel.) Gray — 1: on willow driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86790; 2: burned brunch of *Betula pubescens*, coll. et det. A. Shiryayev, 18.08.2024, SVER(F) 86789.

**Subulicystidium longisporum* (Pat.) Parmasto — 1: on coniferous driftwood, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86778; 2: fired birch trunk, coll. A. Shiryayev, det. I. Zmitrovich, 19.08.2024, SVER(F) 86791.

Trechispora farinacea (Pers.) Liberta — 2: fired birch branch, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86792. Second record in the region (GBIF, 2025g).

**T. microspora* (P. Karst.) Liberta — 2: fired birch branch, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86777; *ibid.*; fallen birch branch, coll. A. Shiryayev, det. I. Zmitrovich, 17.08.2024, SVER(F) 86776.

**Tubulicrinis angustus* (D.P. Rogers et Weresub) Donk — 1: on *Picea obovata* driftwood, coll. et det. D. Kosolapov, 18.08.2024, SYKOF 6845.

During this study, 42 species of fungi were identified for the first time in Taimyr, including four new species for the Russian Arctic (*Cytospora chrysosperma*, *Didymella pomorum*, *Pleurotus abieticola*, *Sporocadus lichenicola*), whereas 13 species were indicated for the region in question for the second or fourth time.

A total of 30 new regional records of aphyllorhizoid fungi were made. Taking into account previously published data (Karatygin et al., 1999; Mukhin, Kotiranta, 2001; Shiryayev, 2011, 2024; Shiryayev et al., 2025), a total of 278 species of aphyllorhizoid fungi are currently known in Taimyr. However, this number is lower than the lists known for high-latitude regions. In the richest Russian Arctic territory, Murmansk Region, 491 species of aphyllorhizoid fungi are known (Bolshakov et al., 2022; Khimich, 2023; Svetasheva et al., 2023; Volobuev et al., 2023; Volobuev et al., 2024), and 326 species were identified in Yamal-Nenets Autonomous District (Shiryayev et al., 2020).

The largest number of species (25) was collected on coniferous and broadleaved driftwood along the shore of the Lama Lake. Ten species collected on the broadleaved substrates (*Aleurodiscus lapponicus*, *Corticium roseum*, *Dacrymyces stillatus*, *Exidia nigricans*, *Irpex litschaueri*, *Megalocystidium perticatum*, *Phanerochaete sordida*, *Scytinostroma odoratum*, *Steccherinum bourdotii*, *S. ochraceum*). All these species were collected on the willows only. On the coniferous substrates collected 15 species, were 12 species growing on *Picea obovata* (*Athelia epiphylla*, *Butyrea luteoalba*, *Ceraceomyces borealis*, *Ceriporiopsis subvermispore*, *Cyanosporus caesius*, *C. simulans*, *Globulicium hiemale*, *Mycoacia livida*, *Picipes melanopus*, *Poriella subacida*, *Resinoporia crassa*, *Tubulicrinis angustus*), and three species on *Larix gmelinii* (*Aphanobasidium filicinum*, *Cinereomyces lindbladii*, *Picipes melanopus*) as well as one species (*Subulicystidium longisporum*) collected on unspecified coniferous.

Ten fungal species (*Fomitopsis officinalis*, *Hypochnicium lundellii*, *Laxitextum bicolor*, *Phanerochaete calotricha*, *P. sordida*, *Piloderma byssinum*, *Steccherinum ochraceum*, *Subulicystidium longisporum*, *Trechispora farinacea*, *T. microspora*) were collected at the site of a burnt forest, consisting mainly of *Betula tortuosa* and *Larix gmelinii*. A denrotopathogenic polypore, *Fomitopsis officinalis*, which is included in the Red data book of the Krasnoyarsk Territory (2022), was identified in Taimyr for the first time.

Over anthropogenic areas a total of 23 species of fungi were collected, including 15 species on houses timber

(*Antrodia serialis*, *A. sinuosa*, *Coniophora puteana*, *Crucibulum laeve*, *Fibroporia vaillantii*, *Gloeophyllum abietinum*, *G. protractum*, *G. sepiarium*, *G. trabeum*, *Hydnomerulius pinastri*, *Meruliporia pulverulenta*, *Neolentinus lepideus*, *Penttilamyces romellii*, *Serpula lacrymans*, *Sphaerobolus stellatus*), in greenhouses 13 species were collected (*Antrodia serialis*, *Coniophora puteana*, *Crucibulum laeve*, *Cyathus striatus*, *Cytospora chrysosperma*, *Didymella pomorum*, *Fibroporia vaillantii*, *Hypholoma capnoides*, *Meruliporia pulverulenta*, *Paxillus involutus*, *Pholiota spumosa*, *Serpula lacrymans*, *Sphaerobolus stellatus*), in a private garden *Sporocadus lichenicola* was collected on *Dasiphora fruticosa*, and *Antrodia sinuosa* and *Pleurotus abieticola* were collected on building timber sawdust.

Previously, the diversity of fungi in Taimyr was studied mainly in natural conditions. This study shows that the number of fungal species is associated with anthropogenic habitats. Moreover, species new not only to Taimyr, but to the entire Russian Arctic, are penetrating here.

Investigations on the regional mycobiotas of Arctic Russia is planned to be continued.

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Новые и интересные находки грибов, ассоциированных с древесными растениями в Таймырском районе Красноярского края (Арктическая Сибирь, Россия)

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В Таймырском р-не Красноярского края впервые выявлено 42 вида грибов (*Ascomycota*, *Basidiomycota*), а 13 видов являются вторыми и третьими находками. 25 видов собраны на топляке вдоль береговой линии озер и рек, а 10 видов — на пожарах в нижнем поясе гор. 23 вида развивается в антропогенных местообитаниях на заносном субстрате, строительных конструкциях, дровах и пиломатериалах. Именно в антропогенных условиях выявлены четыре вида, которые впервые указываются в российской Арктике (*Cytospora chrysosperma*, *Didymella potorum*, *Pleurotus abieticola*, *Sporocadus lichenicola*).

Ключевые слова: городская микобиота, патогены растений, потепление климата, *Agaricomycetes*