

New findings of rare aphyllorphoroid fungi from the Murmansk Region, eastern Fennoscandia (North-West Russia)

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Abstract: The present paper provides new information on the distribution of three rare aphyllorphoroid fungi (*Haploporus odorus* (Sommerf.) Bondartsev & Singer, *Skeletocutis lilacina* A. David & Jean Keller, *Trametes trogii* Berk.) in East Fennoscandia. Their distributions and ecological features are discussed.

Keywords: aphyllorphoroid fungi; *Haploporus odorus*; *Skeletocutis lilacina*; *Trametes trogii*; Murmansk Region; Fennoscandia; rare species

INTRODUCTION

Eastern Fennoscandia comprises eastern part of the Fennoscandian (Baltic) shield, including Finland and the Murmansk Region, Republic of Karelia, northern part of the Leningrad Region and part of the Arkhangelsk Region (the left banks of Onega River and Ken River) in Russia. The Murmansk Region is an industrially developed area; however, old-growth forests of high interest for mycological studies are still presented there. The main part of the Murmansk Region is situated in the Northern boreal zone according to T. Ahti et al. (1968). For a long time, aphyllorphoroid fungi of the Murmansk Region remained poorly explored as compared with other parts of Fennoscandia, although they were studied since late XIX century (Kotkova, 2007). During the last decade the situation has changed significantly. A check-list of aphyllorphoroid fungi of the Murmansk Region, which included 321 species (Isaeva & Khimich, 2011), was published based on literature data and herbarium specimens. According to present data, the biota of aphyllorphoroid fungi of the Murmansk Region includes 375 species (Khimich et al., 2016, 2017; Bolshakov et al., 2016). Majority of the new records deals with species fairly common in Northern Europe. However, among them there are very rare species in Fennoscandia. In the present study, *Haploporus odorus*, *Skeletocutis lilacina*, and *Trametes trogii* are reported from the Murmansk Region (Fig. 1), their localities are listed and ecological features and distributions are outlined.

MATERIAL AND METHODS

The material for this study was collected by the authors in 2014–2015 in different parts of the Murmansk Region, in both spruce forests and urban areas. Representative specimens are deposited in the herbarium of the Institute of the Industrial Ecology Problems of the North KSC (INEP), data on specimens will be available in CRIS (Cryptogamic Russian Information System, <http://kpabg.ru/cris/?q=node/16>). In the process of identification fruit body samples were examined with light microscope and with use of standard mountants (KOH, Melzer's reagent) (Kirk et al., 2008). Geographical coordinates were recorded with a GPS navigator.

The taxa are arranged below in an alphabetical order, and the names follow Index Fungorum (February 2017). Abbreviations for collectors/identifiers were marked as follows: EB – E.A. Borovichev, LI – L.G. Isaeva, YK – Y.R. Khimich. Red listed categories are abbreviated as follows: NT – Near Threatened, VU – Vulnerable, EN – Endangered, CR – Critically Endangered.

RESULTS AND DISCUSSION

HAPLOPORUS ODORUS (Sommerf.) Bondartsev & Singer – Murmansk Region, Kandalaksha District, near Oriyarvi Lake, right side of the stream, above the road, 66°48'N, 31°13'35"E, on living *Salix caprea* L. in spruce forest, 27.08.2014, coll. LI, det. YK (INEP 1452, 1639) (Fig. 2); foot of the northern slope of Tyurtoyva Mt., 66°52'10"N,

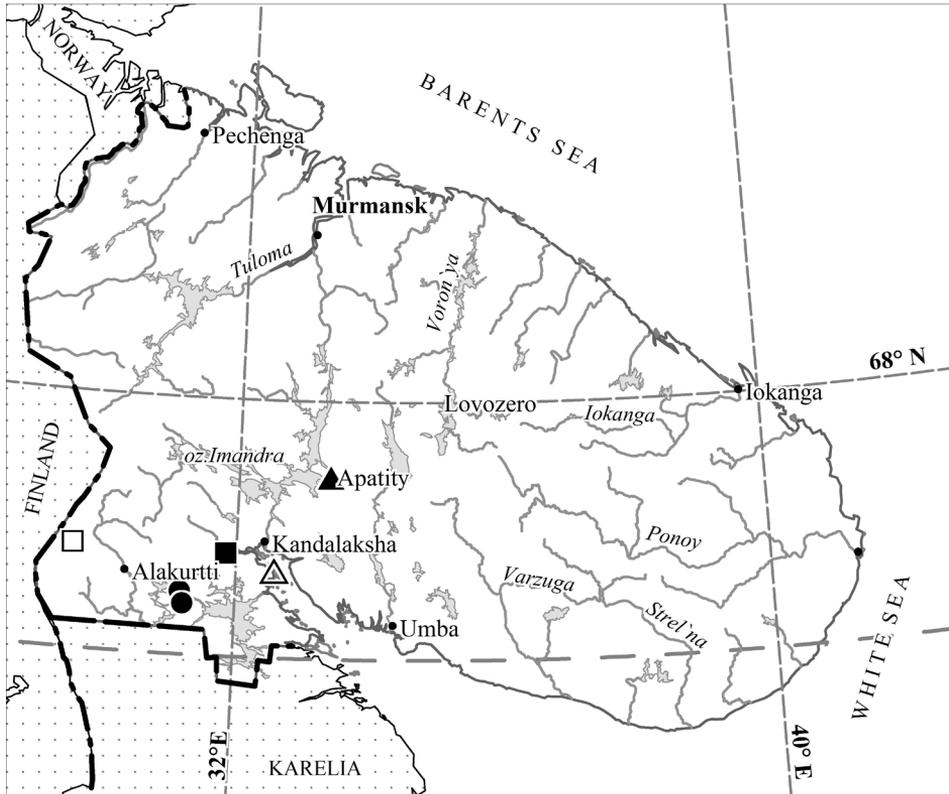


Fig. 1. The location of the findings in Murmansk Region, Russia: *Haploporus odorus* – circles, *Trametes trogii* – triangles, *Skeletocutis lilacina* – squares. The solid figures are based on specimens examined, open figures refer to literature records.

31°10'46"E, *Salix caprea* windbreak in spruce forest, 25.08.2014, coll. LI, det. YK (INEP 1640).

The species is characterized by the pale-coloured perennial basidiocarp and anise smell in fresh condition. The main diagnostic microscopical features are trimitic hyphal system and dextrinoid thick-walled echinulate basidiospores.

This is the first record of the species from the Murmansk Region. *Haploporus odorus* is a rare circumboreal species occurring in Europe (Norway, Sweden, Finland, Poland), Russia (the European part, Urals, Siberia, Far East), Asia and North America (a few scattered localities in Canada) (Bondartseva, 1998; Ryvardeen, Melo, 2014; Anonymous, 2017). In Europe the species prefers humid and shaded old forests with scattered *Salix caprea* (Ivanter, Kuznetsov, 2007; Kosolapov, 2008; Ezhov, 2013; Ryvardeen, Melo, 2014). Also some other host trees are mentioned: species of *Acer*, *Alnus*, *Betula*, *Cerasus*, *Fraxi-*

nus, *Padus*, *Prunus cerasus*, *Salix* ssp., *Syringa*, *Tilia*, *Ulmus* (Bondartseva, 1998; Ryvardeen, Melo, 2014). In Fennoscandia the species seems to grow only on large, old, living *Salix caprea* trees (Niemelä, 1971). Fruit bodies of *Haploporus odorus* grow solitarily or in groups mostly 1.5–3 m above the ground. It is believed that modern forestry has altered the distribution and population density of this species. It is included in Fennoscandian Red lists: Finland – NT, Norway – VU, Sweden – VU, the Republic of Karelia – 3 (VU) (Ivanter, Kuznetsov, 2007; Rassi et al., 2010; Anonymous, 2015; Westling, 2015). Our record is probably the northernmost in Russia. The species may also be wider distributed in southern Murmansk Region in old-growth spruce forests with willows. *H. odorus* is a good candidate to be included in the third edition of the Red Data Book of the Murmansk Region.



Fig. 2. *Haploporus odorus* on living *Salix* sp. in spruce forest (INEP 1452). Photo by Gennadii Urbanavichus.

SKELETOCUTIS LILACINA A. David & Jean Keller – Murmansk Region, Kandalaksha District, neighborhood of Kanda River, 67°6'11.27"N, 31°50'36.29"E, in spruce forest, on fallen trunk of *Picea obovata* 24.07.2015, coll. and det. YK (INEP 1450) (Fig. 3).

In the field, the species may be easily identified due to resupinate basidiocarp with a bittersweet black currants (*Ribes nigrum*)-like odor in fresh condition and lilac colour of fruit body. The fungus is similar to *Trichaptum abietinum*, but has smaller pores.

The species is reported for the second time from the Murmansk Region. Earlier, *Skeletocutis lilacina* was found by the Finnish mycologist M. Laurila in the summer of 1937, in southwestern Murmansk Region, near the present Russian-Finnish border, on the southern shore of Autiajärvi Lake, on a fallen spruce trunk (Kotkova, 2007). *S. lilacina* is characterized by disjunctive distribution and is known from Europe (Finland, Norway, Switzerland), Russia (the European part, the Urals, Siberia), Asia (China) and North America (Canada) (Korsunov et al., 2002; Dai et al., 2004; Mukhin, 2005; Kosolapov, 2008; Ryvardeen, Melo, 2014).

S. lilacina was not mentioned for the Republic of Karelia (Krutov et al., 2014), but it is recorded from the Paanajarvi National Park



Fig. 3. *Skeletocutis lilacina* on fallen trunk of *Picea obovata* (INEP 1450). Scale bar: 2 cm. Photo by Yuliia Khimich.

(in northern part of the Republic on the border with the Murmansk Region) without an exact indication of the locality (Ylisirniö et al., 2012). Thus, our finding is probably the northernmost in Russia. This species seems to grow mostly on *Picea* but it was also collected on *Larix*, *Pinus pumila* and *Pinus sylvestris* (Dai et al., 2004; Korsunov et al., 2002; Mukhin, 2005; Ryvardeen, Melo, 2014). This species is red listed in Finland – VU, Norway – EN, Sweden – VU and Murmansk Region – 2 (VU) (Rassi et al., 2010; Konstantinova et al., 2014; Anonymous, 2015; Westling, 2015).

TRAMETES TROGII Berk. – Murmansk Region, Apatity City, plantation of deciduous trees near buildings, 67°34'03"N, 33°23'36"E, on stump of *Populus tremula*, 09.2014, coll. EB, det. YK (INEP 1451) (Fig. 4).

Trametes trogii has cream-coloured annual pilei and tomentose upper surface. The small basidia and basidiospores are important microscopic features.

This is the second record of *Trametes trogii* from the Murmansk Region. Previously, it was

found on the coast of Ryazhkov Island (Kandalaksha State Nature Reserve) on charred wood (Pystina et al., 1969), which could have been timber brought to the island, or a log that the sea had carried to the coast.

Trametes trogii is widespread in southern Europe, rarer in southern part of Fennoscandia, recorded in Asia, North America and Russia (European part, the Urals, Siberia, and Far East). It is most common on *Populus* and *Salix*, but was also collected on *Acer*, *Alnus*, *Betula*, *Eucalyptus*, *Fagus*, *Quercus*, *Ulmus*, *Juglans*, *Morus* and exceptionally on coniferous trees (*Pinus*) (Bondar-

tseva, 1998; Ryvarden & Melo, 2014). *Trametes trogii* is a thermophilous species and prefers open habitats (Martikainen et al., 2000), but it can occur in unusually habitats. As was stressed by O. Ezhov et al. (2012, 2014) this fungus can grow under extreme temperature conditions and it is recorded as a newcomer (on timber wood) in treeless conditions, such as polar deserts, albeit as rudimentary fruit bodies only. This species is red listed in Finland – VU, Norway – VU and Sweden – CR (Rassi et al., 2010; Anonymous, 2015; Westling, 2015). *T. trogii* is not included in the Red Book of the Republic of Karelia. It is distributed within the region in the middle taiga zone and is quite common in central Petrozavodsk City (Ruokolainen, 2003). The species hardly occurs in natural northern taiga in the Murmansk Region, probably being confined to anthropogenic habitats only.

Our findings of *Haploporus odorus* and *Skeletocutis lilacina* are the northernmost in Russia. Further species inventories are needed to assess the distribution of the mentioned aphyllorphoid fungi in the Murmansk Region.

ACKNOWLEDGEMENTS

We are very grateful to Dr. I. Zmitrovich (LE) and Dr. N. Koroleva (KPABG) for improving the English of the manuscript and valuable comments. Mr. A. Savchenko (KPABG) is thanked for preparing the map. This study was carried out within the framework of the State Assignment Scientific Research (No. 0233-2014-0001) of the Institute of the Industrial Ecology Problems of the North of the Kola Science Center of the Russian Academy of Sciences (INEP KSC RAS) and was supported in part by the Russian Foundation of Basic Researches (grants no. 15-29-02662).

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Fig. 4. *Trametes trogii* on stump of *Populus tremula* (INEP 1451). Scale bar: 2 cm. Photo by Yuliia Khimich.

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