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Polypore (Aphyllophorales, Basidiomycetes) studies in Russia. 1. South Ural

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One hundred and thirty-nine polypore species are reported from the South Urals. One of them, *Skeletocutis vulgaris* (Fr.) Dai & Niemelä, is reported for the first time from Russia, and the westernmost known growth site of *Phellinus sulphurascens* Pilát is in the South Urals. The material consists of 829 collections and observations, and according to these, the most frequent species are *Trichaptum fuscoviolaceum* (Ehrenb. : Fr.) Ryvarden, followed by *Fomes fomentarius* (L. : Fr.) Fr., *Fomitopsis pinicola* (Sw. : Fr.) P. Karst., *Trametes hirsuta* (Wulfen : Fr.) Pilát and *T. versicolor* (L. : Fr.) Pilát. These constitute around 25% of all the observations, but only 3.6% of all the species. Forty-eight species were collected only once (34.5% of all species), 20 species twice (14%) and 12 species three times (8.6%). Some large and old oak (*Quercus robur*) dwelling species, like *Buglossoporus pulvinus* (Pers.) Donk, *Hapalopilus croceus* (Pers. : Fr.) Bondartsev & Singer, *Fistulina hepatica* Schaeff. : Fr. and *Inonotus dryophilus* (Berk.) Murrill should especially be included in the red-list of the South Urals when the listing becomes official. Another group threatened is the old-growth forest species like e.g., *Amylocystis lapponica* (Romell) Singer, *Fomitopsis officinalis* (Vill. : Fr.) Bondartsev & Singer, *Junghuhnia collabens* (Fr.) Ryvarden, and *Rigidoporus crocatus* (Pat.) Ryvarden. The collecting sites are described, the host trees listed, and descriptions and illustrations of some species given.

Key words: Aphyllophorales, floristics, polypores, South Ural, threatened species

Introduction

The Ural Mountains form the traditional boundary between Europe and Asia, and divide the East European and West Siberian plains. In the north they reach the Kara Sea, and 2000 km to the south, Kazakhstan. The mountains comprise several central ranges and some lateral, separated, low passes. The width of the Urals is 40–150 km, and the highest peak is Mt. Narodnaya, 1895 m above sea level (Gerasimov 1968). The mountain system was born in the beginning of the Devonian Period, and is divided into five geographical regions: polar, subpolar, north, middle and south.

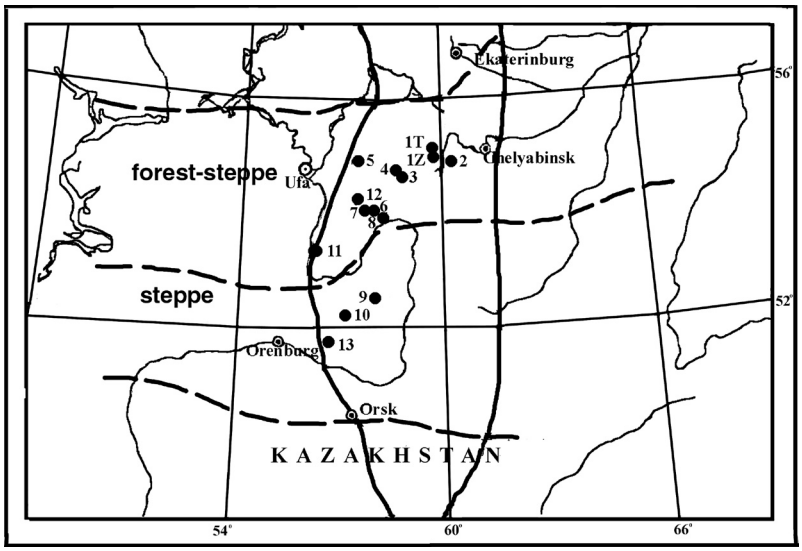

Fig. 1. The collecting sites in the South Urals.

The South Urals is the mountain relief from the Ufa river in the north (55°55´N) to the town of Orsk (51°N) in the south, on the border of Kazakhstan (Fig. 1). Administratively it belongs to the Chelyabinsk Region, Orenburg Region and the Republic of Bashkortostan (Bashkir Republic). The relief of the South Urals is diverse — mountain ranges which widen to the south, broad foothills and plains. The mountain region includes the massifs Taganai, Iremel and Yamantau (1000–1600 m). The climate there is continental and moderately warm, the mean annual temperature being 0–2 °C, annual precipitation 360–420 mm and the coefficient of humidity 0.8–1.0. The length of the growing period is 140–160 days (Smolonogov 1995).

The climate and vegetation of the eastern slopes of the South Urals differs considerably from that of the western slopes. Moreover, the long distance (over 500 km) between the northernmost and southernmost area along the mountain range makes the climate and vegetation very diverse throughout the area. On the western slopes, broad-leaved forests dominate (*Acer platanoides*, *Quercus rubra*, *Tilia cordata*, *Ulmus scabra*) intermixed with conifers (*Abies sibirica*), while the forests on the eastern slopes are mainly pine and birch (*Pinus sylvestris*, *Betula pendula*, *B. pubescens*). In the northern parts of the South Urals and in the central part of the mountain range, the forests are predominantly coniferous: *Abies sibirica*, *Larix sibirica*, *Picea obovata*, *Pinus sylvestris*, whereas in the southern part there is forest–steppe vegetation with *Alnus incana*, *Betula pendula*, *Populus alba* and *Salix* spp.

Because of its geographical position — between the East European and West Siberian plains, Turgai, West Kazakhstan and Middle Asia — the South Urals are mycologically interesting. The first data of South Uralian fungi were published by Karakulin and Lobik (1915). They listed 20 polypore species from Ufa province, including the surroundings of the town Zlatoust. Also Naumov (1915) published some records of fungi close to the town of Kishtim, in the northern part of the South Urals. Moreover, in Andreev's (1935) studies of the heart-rot of *Abies* in the north-eastern part of the South Urals some fragmentary data on polypores are given, and Morochkovskii (1948) mentioned some polypores in his paper devoted to Bashkirian fungi. Stepanova-Kartavenko's (1967) large work summarizes many studies of Aphyllophorales in the Urals. It also includes data on polypores from the Chelyabinsk region and Bashkortostan. Later, papers devoted partly or only to aphyllophoroid fungi of the South Urals were published by Stepanova (1977), Stepanova and Mukhin (1979) and Mukhin and Stepanova (1979), Safonov (1999, 2000) and Ushakova and Mukhin (2003).

The list of species below is based only on our own collections. We had no opportunity to study the specimens published earlier from the South Urals.

Material and methods

The specimens were collected in August 2001 (Dai), October 2001 (Ushakova), August 2002 (Mukhin, Ushakova, Kotiranta) and September 2002 (Mukhin, Ushakova), and are preserved either in the herbarium of the Institute of Plant and Animal Ecology, Russian Academy of Sciences, Ural Division, Ekaterinburg (IEE) or in the herbarium of the University of Helsinki (H). The specimens collected by Victor Mukhin (VM) and Nadya Ushakova (NU) are in IEE and those of Yu-Cheng Dai (Dai) and Heikki Kotiranta (HK) in H.

The mounting media used were IKI (Melzer's reagent), CB (Cotton Blue) or KOH (5%). In many cases only a few spores are measured, and then the number of spores (*n*) is not given. The nomenclature of polypores mostly follows Niemelä (2003) and Ryvarden and Gilbertson (1993, 1994). The nomenclature of vascular plants is according to Czerepanov (1995). The authors of host names are found in that publication and are not given here. In this paper the epithets "spruce" and "*Picea*" refer to *Picea obovata*, "pine" and "*Pinus*" to *Pinus sylvestris*, "birch" to *Betula pendula* or *B. pubescens* and "aspen" and "*Populus*" to *Populus tremula*, "willow" to *Salix* spp., "*Tilia*" to *Tilia cordata*, "larch" or "*Larix*" to *Larix sibirica* and "fir" or "*Abies*" to *Abies sibirica*, respectively.

The species are arranged alphabetically according to genus and after the number of the collecting site (*see* below). The substrate(s) and collector(s) are cited.

The descriptions of the natural conditions and relief of the South Urals is by VM and NU, and of the collecting sites by VM, NU and HK. The discussion is by HK and the text was finished by all authors. The descriptions of the species, and also the measurements and drawings are by HK, and the map of collecting sites by NU.

Collection sites (Fig. 1)

Chelyabinsk region

1. Taganai National Park 7–10.VIII.2002.

1Z. Near the town of Zlatoust (53°13´N, 59°44´E), 7–8.VIII.2002, 10.VIII.2002, 24–25.VIII.2002.

1T. Mt. Taganai (55°13´N, 59°44´E), 9.VIII.2002.

The area of the National Park is 56 800 hectares, and a large part of it comprises of three mountain ranges: Bolshoi Taganai, Sredniy Taganai and Maliy Taganai (Gorchakovskiy 1975).

The predominant trees are fir and spruce, intermixed with pine, aspen, birches, willows and (along brooks and rivers) alders (*Alnus glutinosa*) and bird cherries (*Padus racemosa*). The forests are almost in a virgin state and, in part, very luxuriant.

The mean annual precipitation is 450 mm and the climate of the central mountain area is harsh, cool and wet, and the period without frost 50–90 days. The mean annual temperature is –2.3 °C. In the warmest month, (July) +12.3 °C, and in the coldest month, (January) –15.6°C.

2. Ilmenskii National Reserve (55°10´N, 60°16´E), 25.VII.1997, 12.VIII.1998, 20–21.VII.1998.

There are two mountain ranges in the National Reserve: the Ilmen range and the Ishkul range and the forests are predominantly pine–birch (*B. pendula*) intermixed with aspen, willows, alder (*A. glutinosa*) and bird cherries (*Padus racemosa*). On the mountain tops some larches also grow. The main parts are 400–700 m above sea level and the climate is moderately warm and moist. The period without frost lasts about 100–110 days and the mean annual temperature is +1.9 °C (maximum 39.6 °C and minimum –45 °C).

3. Iremel Massif (54°34´E, 58°50´E), 20–24.VIII.2001, 13–14.VIII.2002, 27.VIII.2002.

The massif consists of two parts: Maliy (1449 m) and Bolshoi Iremel (1582 m). From 700 m to 1150 m fir and spruce predominate, intermixed with larch plus aspen trees, birches and willows. The forests are mostly almost virgin state, with very large trunks, and in part very luxuriant with large herbs (*Solidago* spp., *Urtica* sp., *Lactuca* sp., *Campanula* spp.).

The tops of the mountains are treeless, and at the altitude of around 1200 metres the forests and herb-rich tall-grassed meadows form a semi open mosaic. The forest line is composed of birches and spruces only.

The temperatures are similar to those of Taganai, but at the high altitudes, 1000–1600 m above sea level, the annual precipitation is 800–900 mm. The frost free period is 50–90 days.

4. Tyulyuk (54°36´N, 58°45´E), 12.VIII.2002, 26.VIII.2002, 28.VIII.2002.

This small village lies at the foothills of Malyi Iremel, and plenty of abandoned wood (trunks of birches, pines, spruces, aspen trees, boards, etc.) was lying around the village in open fields (collector HK). The forests around the village are mostly pine dominated, intermixed with spruce, and shows signs of human impact (collectors VM and NU).

5. Mt. Veselaya (729 m a.s.l.) and Vilayi village (54°48´N, 57°20´E), 25.VIII.2001, 16–18.VIII.2002, 29.VIII.2002.

The site is on the western slope of the South Urals and the forests are mainly broad-leaved at the altitude of 450–500 m. The forests are mostly at least slightly affected by humans, but large, old trees occur commonly in the area. The forests consist of *Acer platanoides*, *Alnus incana*, *Betula* spp., *Corylus avellana*, *Padus racemosa*, *Populus alba*, *P. nigra*, *P. tremula*, *Quercus robur*, *Ulmus glabra*, *U. laevis*, *Tilia cordata*. Softwoods are rare, but here and there grow firs, pines and larches.

The climate is strongly continental with cold winters and hot and dry summers. The mean annual precipitation is 400–419 mm, the mean temperature of January is –4.3 °C (minimum –49 °C) and of July +19 °C (maximum +42 °C).

Bashkortostan

6. Bolshoi Inzer river (53°58´N, 57°51´E), 14–16.X.2001.

The forest is middle-aged, predominantly broad leaved forest with *Acer platanoides*, *Quercus robur* and *Ulmus* spp. In the area are also small woods of fairly young firs and spruces, and along the river very large *Populus alba* trees grow.

7. Bolshoi Inzer river (53°58´N, 57°50´E), 4.IX.2002.

Approximately the same place as above. Pre forest–steppe with pine–birch forests intermixed with *Sorbus aucuparia*, *Alnus glutinosa* and *Padus racemosa* along the river.

8. Belaya river–Inzer river (53°55´N, 58°03´E), 5.IX.2002.

Middle-aged coniferous forests with spruce and fir, intermixed with birches, *Alnus glutinosa*, *Sorbus aucuparia*, *Padus racemosa* and aspen trees along the river.

The area lies 400–500 m above sea level, and the climate is slightly continental but moist; the annual precipitation being 700 mm and the mean temperature for the year is +0.5 °C.

9. The Uraltau mountain range (52°33´N, 58°15´E), 4.IX.2002.

The forests in this forest–steppe area are pine–birch forests intermixed with aspen trees.

The climate is continental, moderately dry with an annual precipitation of 500 mm and a mean temperature of +2.5 °C.

10. Zilairskoe plateau, Bolshoi Suren river (52°07´N, 56°43´E), 3.IX.2002.

A dry forest–steppe area, but near the river there are some deciduous trees (*Alnus incana* and *Padus racemesa*) and very large *Populus alba* and *Salix alba* trees.

The annual precipitation is 500 mm and the mean temperature +2.5 °C.

11. Sterlitamak, the Urals side of the river Belaya (53°33´N, 56°05´E), 31.VIII.2002.

The area belongs to forest–steppe and the dominating trees are *Alnus*, *Ulmus*, *Tilia*, *Quercus* and aspens.

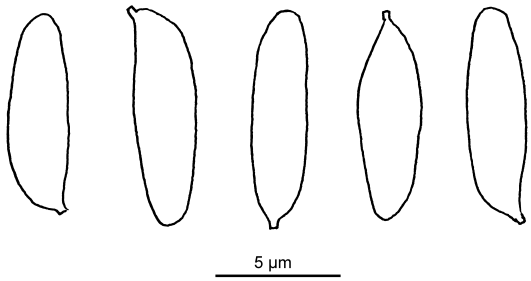

Fig. 2. *Amylocystis lapponica* (from *Kotiranta 19568*), spores.

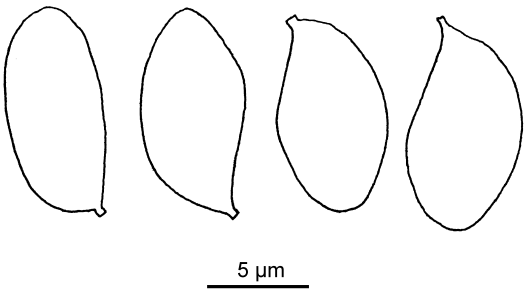

Fig. 3. *Antrodia heteromorpha* (from *Kotiranta 19544*), spores.

The climate is continental, the mean annual precipitation being 400 mm and mean annual temperature +2.5 °C.

12. Beloretsk NW, (54°10´N, 57°40´E), 25.VIII.2001.

A human-influenced mixed forest, with pines, birches, aspen trees and oaks. Even if the forest was not in a natural state, it contained fairly much dead wood.

Orenburg region

13. Zilairskoe plateau, Belguska river (51°46´N, 56°42´E), 2.IX.2002.

This area is almost steppe, but small forests of *Alnus incana*, *Betula pendula*, *Padus racemosa* and *Salix alba* grow close to the river.

Polypores from the South Urals, Russia

Amylocystis lapponica (Romell) Singer (Fig. 2)

3 *Picea* (HK 19568).

Spores cylindrical or subfusiform (7.5–)8–9.4(–9.6) × 2.5–3.1(–3.3) µm, L = 8.6 µm, W = 2.8 µm, Q = 2.8–3.5, Q^* = 3.1, thin-walled, CB–, IKI– (*HK 19568*, measured from sp. print, n = 30).

The spore size given by Ryvarden and Gilbertson (1993) is almost the same as in our specimen, even if we did not see spores over 10 µm long.

The habitat of *A. lapponica* was an old-growth forest.

Antrodia heteromorpha (Fr. : Fr.) Donk (Fig. 3)

3 *Abies* (HK 19544), *Picea* (VM 22409, HK 19600).

Basidiocarp pileate, nodulose, relatively small, corky. Upper surface rough, in young state white, later brownish white, and in old fruit bodies slightly shining. Pore surface white. Pores close to edge roundish or angular, in oldest parts labyrinthine or daedaleoid, (0.5–)1–2/mm. Context and trama white. Dissepiments thick, entire or sometimes blunt dentate. Hyphal system dimitic. Skeletals dominate both in context and trama. Contextual skeletals solid, with a very narrow, sometimes subinvisible, lumen, (2–)3–4 µm wide, CB–, IKI–. Generative hyphae thin-walled, clamped, 2.5–3.5(–4) µm wide. Tramal skeletals subparallel, thick-walled, with a very narrow lumen, (2–)3–4 µm wide. Generative hyphae clamped, thin-walled, (2.5–)3–4 µm wide. Subhymenial hyphae clamped, richly branched, thin-walled, 2.5–3.5 µm wide. Both skeletals and generative hyphae reach dissepiment edge. Cystidia none, but thin-walled, pointed cystidioles here and there, smaller than basidia. Basidia basally clamped, clavate, (23–)28–37 × (6–)7 µm, with four stout, up to 8 µm long, sterigmata. Spores cylindrical, broadly fusiform or broadly almond shaped, (9–)9.5–12.2 × 4.6–5.8 µm, L = 10.4 µm, W = 5.2 µm, Q^* = 2, CB–, IKI–. (*HK 19544*, *19600*, n = 8).

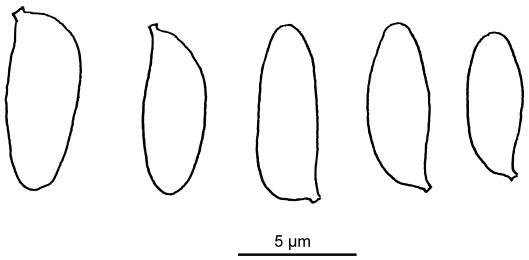

Fig. 4. *Antrodia serialis* (from *Kotiranta 19470a*), spores.

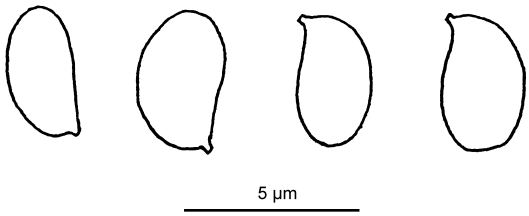

Fig. 5. *Antrodiella faginea* (from *Kotiranta 19488*), spores.

According to Ryvarden and Gilbertson (1993) *A. albida* (Fr. : Fr.) Donk, may be confused with *A. heteromorpha*, but rarely grows on coniferous trees and its spores are narrower, viz. 3.5–5 µm wide.

Antrodia macra (Sommerf.) Niemelä

3 *Populus* (Dai 3349).

Grows mostly on small branches of fallen aspens.

Antrodia mellita Niemelä & Pentt.

13 *Populus* (VM 22401).

Antrodia pulvinascens (Pilát) Niemelä

3 *Populus* (Dai 3347).

Antrodia serialis (Fr.) Donk (Fig. 4)

3 *Picea* (VM 22127, 22167, HK 19509, 19605, sight), **4** *Picea* (VM 22419, HK 19470a), coniferous timber (HK 19479), **6** *Picea* (NU 940), *Abies*, (NU 944), **7** *Pinus* (VM 22320).

Basidiocarp effused-reflexed or resupinate, corky. When young, upper surface white, later warm brown-coloured. Pore surface white. Context and tubes white. Pores angular, (3–)4–5/mm, dissepiments fairly thin, ciliate. Hyphal system dimitic and robust, up to 4 µm wide skeletals (IKI–) dominate. Generative hyphae thin-walled, clamped. Cystidia none, but thin-walled, pointed or finger-like cystidioles relatively abundant, 13–15 × 3.5–5.5 µm. Basidia basally clamped, clavate, 15–18 × 5–6 µm. Spores cylindrical, 6.2–7.5(–9.7) × 2.5–2.9(–3.4) µm, L = 7 µm, W = 2.7 µm, Q = 2.2–3, Q^* = 2.6 (*HK 19470a*, *19605*, n = 17).

Antrodia sinuosa (Fr.) P. Karst.

3 *Larix* (Dai 3320), *Picea* (Dai 3298, VM 22402), **4** *Picea* timber (HK 19483, 3 X sight), **12** *Pinus* (Dai 3362).

Antrodia xantha (Fr.) Ryvarden

3 *Picea* (Dai 3310, VM 22155, HK 19363, 19570), **4** coniferous timber (VM 22164), *Picea* (VM 22166, 22190), **7** *Pinus* (VM 22282).

Antrodiella faginea Vampola & Pouzar (Fig. 5)

4 *Padus* (HK 19488).

Basidiocarp strictly resupinate. Pore surface cream-coloured or yellowish. Pores angular, 5–7(–8)/mm, dissepiments thin, somewhat lacerate. Hyphal system dimitic, skeletals sometimes branched, 2–2.5 µm wide, generative hyphae clamped, thin-walled, 2–3 µm wide. Tramal hyphae intertwined and hyphal pegs occur. Gloeocystidia rare and difficult to find in pore bottoms, 20–36 × 4.5–6 µm. Basidia basally clamped, clavate or subcylindrical 15–20 × 4–4.5 µm. Spores ellipsoid with a convex ventral side, 3.2–3.9 × 2–2.3 µm, L = 3.6 µm, W = 2.2 µm, Q^* = 1.7, thin-walled, CB–, IKI– (*HK 19488*, n = 8).

Due to the rareness of gloeocystidia, *A. faginea* is most reliably distinguished from *A. semisupina* by the shape of the spores. In *A. faginea* the ventral side is convex, whereas in *A. semisupina* it is straight or slightly concave (in mature spores). Moreover, they are slightly narrower in *A. semisupina*, viz. 1.7–2 μm wide, than in *A. faginea*.

Reported from the Russian Far East by Dai and Niemelä (1997) and this is the westernmost collection site in Russia.

Antrodiella pallasii Renvall, Johannesson & Stenlid (Figs. 6 and 7)

3 *Picea* (Dai 3323).

Basidiocarp resupinate, relatively thick. Pore surface cream-coloured, pores roundish or somewhat angular, 5–7(–11)/mm, dissepiments entire. Margin distinct, loosening from substrate. Hyphal system trimitic, with skeletal hyphae, binding hyphae and clamped generative hyphae. Subiculum next to substrate almost monomitic, consisting of richly branched, tightly intertwined, 1.5–2(–2.5) μm wide generative hyphae, and a few (2–)2.5–3 μm wide skeletals. Below this thin layer (ab. 50 μm) randomly orientated slightly cyanophilous skeletals dominate with a very narrow lumen, together with up to 2 μm wide binding hyphae. Upper trama predominantly composed by skeletals with mostly a distinct lumen, 2–2.5 μm in diam., and some of skeletals reach middle trama. Dissepiments composed solely by very thin-walled 2–3 μm wide, naked generative hyphae, with often slightly widening apex. Cystidia none, but a few bottle-shaped cystidioles may be present. Basidia basally clamped, clavate, 10–12 × 4–5 μm, with four short sterigmata. Spores ellipsoid, 2.8–3.3(–3.5) × (1.6–)1.8–2.1 μm, L = 3.1 μm, W = 1.9 μm, Q = 1.5–2, Q^* = 1.7, very thin-walled, CB–, IKI– (*HK 12333*, n = 30).

Antrodiella pallasii was first reported from Russia by Niemelä *et al.* (2001). According to Johannesson *et al.* (2000) there are 5–6 pores per mm., but in our material it is very variable, from 5 to 11 pores/mm. Moreover, the spore size given by Johannesson *et al.* (2000) is slightly larger, viz. (3.1–)3.2–3.8 × 1.9–2.2 μm, L = 3.4 μm, W = 2 μm, Q = 1.68–1.72, than in our material.

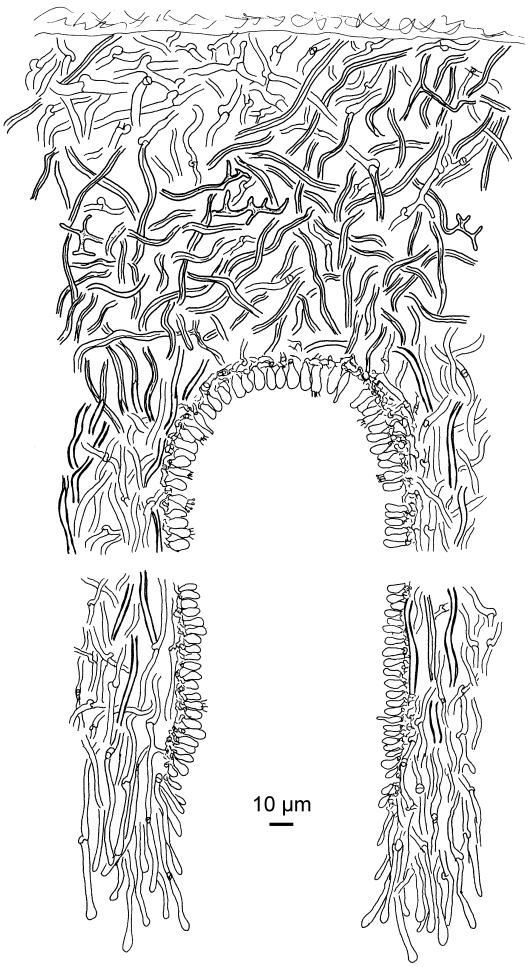

Fig. 6. *Antrodiella pallasii* (from *Kotiranta 12333*), a section through fruit body.

Because the specimen *Dai 3323* is sterile, the measurements and drawings are made from *Kotiranta 12333* (Russian Far East: Magadan Region, Sukhakhy, 62°23´N, 149°31´E, small, fairly hard, *Larix gmelinii*, 18.VIII.1995).

Aurantioporus fissilis (Berk. & M.A. Curtis) H. Jahn (Fig. 8)

5 *Acer* (HK 19655).

Monomitic, hyphae clamped; contextual hyphae radially subparallel, rather thin-walled with oil droplets; tramal hyphae subparallel,

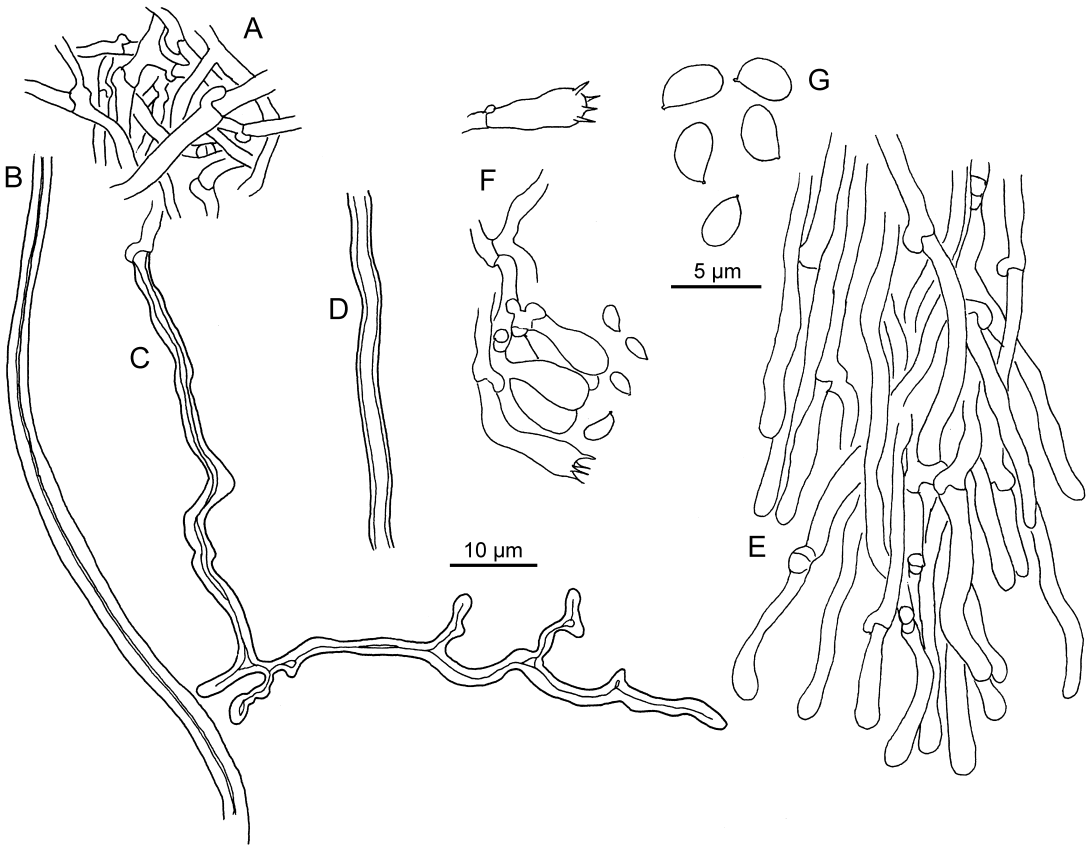

Fig. 7. *Antrodiella pallasii* (from *Kotiranta 12333*). — **A**: Thin-walled subicular hyphae next to the substrate. — **B**: Thick-walled skeletal hypha in subiculum. — **C**: Binding hyphae in subiculum. — **D**: Skeletal hypha with a wide lumen in trama. — **E**: Thin-walled dissepimental hyphae. — **F**: Basidioles, basidia and spores. — **G**: Spores.

thin-walled, 3–4(–5) μm wide. Cystidia none. Basidia basally clamped, subclavate, 23 × 5 μm. Spores ellipsoid, (4–)4.2–5 × (2.5–)2.7–3.2 μm, L = 4.5 μm, W = 3 μm, Q = 1.3–1.7, Q^* = 1.5, thin- or fairly thin-walled, CB–, IKI– (*HK 19655*, n = 30).

Bjerkandera adusta (Willd. : Fr.) P. Karst.

1Z *Alnus* (VM 22084), **1T** *Betula* (HK sight), **3** *Betula* (VM 22140), **4** *Betula* (VM 22151, HK 19491 + 2 X sight), **5** *Padus* (VM 22148), *Tilia*, (VM 22227), *Ulmus* (VM 22237), *Populus* (VM 22245, 22265), *Acer* (VM 22371), **7** *Betula* (VM 22312), **9** *Populus* (VM 22285, 22302), **10** *Alnus* (VM 22044).

Bjerkandera fumosa (Pers. : Fr.) P. Karst.

5 *Padus* (VM 22403), **6** *Quercus* (NU 926).

Buglossoporus pulvinus (Pers.) Donk (Fig. 9)

Piptoporus quercinus (Schrad.) Pilát

5 *Quercus* (HK 19656, VM 22371).

Basidiocarp annual, pileate, reflecting 10 cm from substrate. Upper surface dark rusty brown, matted, without a cuticle. Context corky, at base 5 cm thick, wood-coloured, or pale ochraceous. Pore layer dark rusty brown, pores up to 0.5 cm long. Pores radially elongated, 4–5/mm. Dimitic, generative hyphae clamped. In context only skeletals and skeleto-binding hyphae of *Bovista*-type seen (dominating). Skeletals with a narrow lumen, CB– (greenish in some parts), IKI–, up to 7 μm wide, partly strongly swelling in KOH and then much wider. Trama monomitic, hyphae clamped, parallel,

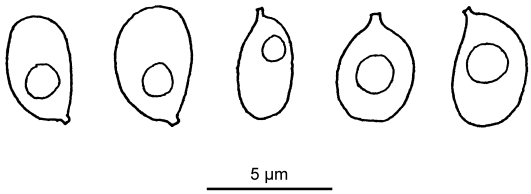

Fig. 8. Spores of *Aurantioporus fissilis* (from *Kotiranta 19655*).

relatively thin-walled, 2.5–3 µm wide, dissepimental hyphae with roundish tips. Subhymenial hyphae richly branched, thin-walled, CB–, IKI–. Cystidia none, but narrow cystidioles present, (18.5–)21–28 × 3.5–4(–5) µm. Basidia basally clamped, clavate, 21–26 × 6–7 µm, with four, up to 6 µm long sterigmata. Spores broadly navicular, tapering to both ends, (6.6–)6.8–8.7(–9) × 2.7–3.3(–3.5) µm, L = 7.6 µm, W = 3 µm, Q = 2.1–3, Q^* = 2.5, thin-walled, CB–, IKI– (*HK 19656*, n = 30).

The unbranched skeletal hyphae in context and monomitic trama distinguishes *Buglossoporus* from *Piptoporus* (*see*, e.g., Thorn 2000).

Ceriporia purpurea (Fr.) Donk

3 *Pinus* (VM 22388), **4** *Pinus* (HK 19458), **9** *Pinus* (VM 22383).

Basidiocarp strictly resupinate, thin. Pore surface pink, margin paler, whitish pink. Pores shallow, angular, 2–4(–5)/mm. Hyphal system monomitic, all hyphae without clamp connexions. Subicular hyphae randomly orientated, forming an open texture, hyphae thin- or slightly thick-walled, often with finger-like appendices, 3–4 µm in diameter. Between hyphae often crystals. Tramal hyphae very thin-walled, subparallel (2–)2.5–3 µm wide. Dissepimental hyphae smooth, 2.8 µm wide with rounded tips. Spores subcylindrical, suballantoid or slightly sigmoid, 5.6–7.8 × 1.7–2 µm, L = 7 µm, W = 1.9 µm, Q = 3.3–4.3, Q^* = 3.5, thin-walled, CB–, IKI– (*HK 19458*, n = 10).

In the study area *Ceriporia purpurea* mostly grows on very hard, fallen decorticated trunks. In Fennoscandia the host is often an advanced decayed deciduous tree, even if in there are collections also from hard, decorticated pines.

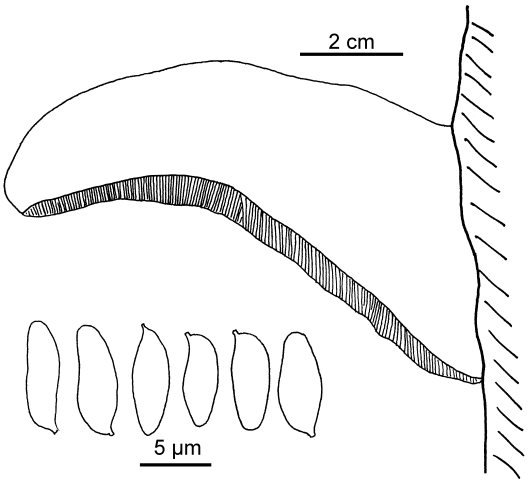

Fig. 9. Section through fruit body and spores of *Buglossoporus pulvinus* (from *Kotiranta 19656*).

Another red *Ceriporia* species is *C. tarda* (Berk.) Ginns. Its basidiocarps are much larger than those of *C. purpurea*, the consistency is much softer, and above all, the spores are quite different, in being oblong to cylindric-ellipsoid (Gilbertson & Ryvarden 1986, Pieri & Rivoire 1997). According to Niemelä (pers. comm.) the size of the spores of *C. tarda* is 3.4–4.2 × 2–2.3 µm, L = 3.9 µm, W = 2.1 µm, Q^* = 1.9 (n = 30).

Ceriporia reticulata (Hoffm. : Fr.) Domański.

12 *Populus* (Dai 3358).

Ceriporia viridans (Berk. & Broome) Donk

3 *Populus* (HK 19534).

Basidiocarp strictly resupinate, thin. Pore layer white with a pinkish hue when fresh, olivaceous brownish or greenish when dry, margin whitish. Pores roundish or subangular, 5–7/mm, dissepiments thin, slightly lacerate. Hyphal system monomitic, all hyphae without clamp connexions. Subicular hyphae with thickened walls, randomly orientated, (3–)4.5–6(–7) µm in diameter. Spores suballantoid, 4.2 × 1.5 µm (*HK 19534*).

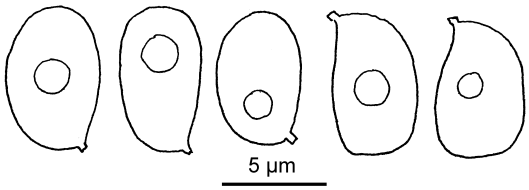

Fig. 10. Spores of *Climacocystis borealis* (from *Kotiranta 19823*).

Ceriporiopsis pannocincta (Romell) Gilb. & Ryvarden

Gelatoporia pannocincta (Romell) Niemelä

3 *Betula* (HK 19572, 19583), **9** *Betula* (VM 22379), **12** *Populus* (Dai 3357).

Basidiocarp strictly resupinate, relatively thin. Pore surface pale greenish, pores angular (5–)7–9(–10)/mm. Subiculum next to substrate white, below it a dark line and between the dark line and tubes sometimes a very narrow white line, pores up to 1 mm long. Monomitic, all hyphae clamped. Cystidia none, but apically subulate cystitioles common. Basidia basally clamped, cylindrical, forming a dense palisade, 14–16.5 × 3.5–4 µm. Spores allantoid, 3.5–4.6 × 0.6–0.7 µm, thin-walled, CB–, IKI– (*HK 19572*, *19583*).

Ceriporiopsis pannocincta mostly grows on advanced decayed deciduous trees.

Ceriporiopsis resinascens (Romell) Domanski

4 *Crataegus* (VM 22377), **6** *Populus*, (NU 934a), **13** *Alnus* (VM 22057), *Acer* (VM 22064).

Cerrena unicolor (Bull. : Fr.) Murrill

1T *Betula* (HK 19402), *Salix* (VM 22256), **3** *Betula* (VM 22133, 22137, HK 19556), **4** *Alnus* (VM 22171), *Picea* (VM 22192), *Betula* (VM 22396), **7** *Betula* (VM 22307), **9** *Padus* (VM 22362).

Climacocystis borealis (Fr.) Kotl. & Pouzar (Fig. 10)

1Z *Picea* (VM 22417), **3** *Picea* (Dai 3303, VM 22154, HK 19518), **4** *Picea* (VM 22184).

Pores radially elongated or ellipsoid, 1–3/mm. Spores broadly ellipsoid, ellipsoid or sometimes "box-shaped", i.e., with a truncate apice, (5.7–)6–6.4 × (3.7–)3.9–4.3 µm, L = 6.2 µm, W = 4 µm, Q = 1.5–1.7, Q^* = 1.5, CB–, IKI– (*HK 19823*, n = 11).

Climacocystis borealis is a parasite of old spruces in old-growth forests.

Coltricia perennis (L. : Fr.) Murrill

2 on ground in pine forest (NU 325).

Daedalea quercina (L. : Fr.) Pers.

5 *Quercus* (VM 22254, 22330), **12** *Quercus* (Dai sight).

Daedaleopsis confragosa (Bolton : Fr.) J. Schroet.

4 *Alnus* (VM 22188), *Salix* (HK 19623, sight X 11), **5** *Acer* (VM 22293), *Salix* (VM 22068, 22246, HK 19626), **6** *Salix* (VM 22288), **10** *Salix* (VM 22023), **13** *Padus* (VM 22022).

The specimens collected in autumn are sterile (fruiting period in spring). The elegant basidiocarps of *D. confragosa* are distinguished from *D. septentrionalis* and *D. tricolor* in having radially elongated pores (1–2/mm) and not a lamellate hymenophore, unlike the two others. Moreover, *D. septentrionalis* grows solely on birch and in this area *D. tricolor* is extremely rare on *Salix*, which is the most common host for *D. confragosa*.

Daedaleopsis septentrionalis (P. Karst.) Niemelä

3 *Betula* (Dai 3299, VM 22132, 22138, 22168), **5** *Betula* (VM 22289), **6** *Betula* (NU 938a).

Daedaleopsis tricolor (Bull. : Fr.) Bondartsev & Singer

1Z *Alnus* (HK 19446), **1T** *Betula* (HK 19427, sight), **3** *Betula* (HK 19535), *Sorbus* (HK 19584), **4** *Padus* (VM 22117), *Alnus* (VM 22364), **5** *Alnus* (VM 22073), *Tilia* (VM 22226), *Padus* (VM 22233), *Quercus* (VM 22331), **6** *Padus* (NU 936a, 946), **7** *Betula* (VM 22311), *Padus* (VM 22323), *Alnus* (VM 22349), **9** *Padus* (VM 22266), *Betula* (VM 22342), *Populus* (VM 22305), *Alnus* (VM 22354), **10** *Padus* (VM 22034).

Datronia mollis (Sommerf. : Fr.) Donk

3 *Betula* (HK 19593), *Populus* (HK 19506), **4** *Alnus* (VM 22186), **5** *Acer* (VM 22263, 22314, 22329, 22370), **9** *Populus* (VM 22335).

Pore surface uneven, pores roundish or angular to almost daedaleoid, 1–2(–3)/mm. Dissepiments fairly thick, entire.

Datronia stereoides (Fr. : Fr.) Ryvarden

3 *Populus* (VM 22103), **5** *Padus* (VM 22378), **13** *Alnus* (VM 22039), *Salix* (VM 22277).

Dichomitus squalens (P. Karst.) D.A. Reid (Fig. 11)

3 *Picea* (Dai 3294), **4** *Pinus* (VM 22381), *Picea* (HK 19494, 4 X sight).

Pores roundish or slightly angular, 5–6/mm. Hyphal system thoroughly dimitic, generative hyphae clamped. Skeletals thick-walled, 3.5–5 μm in diam., branching like in genus *Polyporus* and look like binding hyphae. Generative hyphae thin-walled, 3 μm wide. Subhymenial hyphae very thin-walled, richly branched, 2.5–3.5 μm wide. Spores cylindrical, (6.5–)6.8–8 × (2.1–)2.4–3 μm, L = 7.3 μm, W = 2.7 μm, Q = 2.3–2.8, Q^* = 2.7, thin-walled, CB–, IKI– (*HK 19494*, n = 15).

Dichomitus squalens favors dry and hot habitats, such as sun-exposed fields with coniferous logs and burned areas, where it grows on charred wood and can be locally frequent.

Diplomitoporus crustulinus (Bres.) Domański

3 *Picea* (Dai 3295, VM 22397).

Diplomitoporus flavescens (Bres.) Domański

3 *Pinus* (VM 22325).

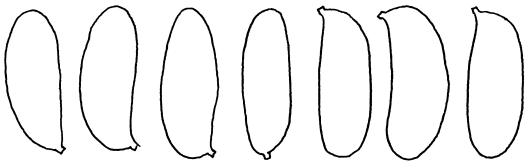

Fig. 11. Spores of *Dichomitus squalens* (from *Kotiranta 19494*).

Diplomitoporus lindbladii (Berk.) Gilb. & Ryvarden

3 *Picea* (Dai 3301).

Fistulina hepatica (Schaeff. : Fr.) Fr.

5 *Quercus* (VM 22366), **6** *Quercus* (NU 952).

Fomes fomentarius (L. : Fr.) Fr.

1Z *Betula* (HK 19367, sight), **1T** *Betula* (HK sight), **3** *Betula* (VM 22131, 22205, HK sight X 17), *Populus* (HK sight), **4** *Betula* (VM 22092, HK sight X 10), *Alnus* (VM 22174), **5** *Acer* (VM 22079, 22261, 22316), *Tilia* (VM 22220), *Ulmus* (VM 22232, 22258), *Betula* (VM 22251), **7** *Betula* (VM 22310), **9** *Betula* (VM 22271, 22341), *Populus* (VM 22286), **10** *Populus alba* (VM 22357), **11** *Salix* (VM 22027), **13** *Alnus* (VM 22020), *Acer* (VM 22040), *Padus* (VM 22043).

Fomitopsis officinalis (Vill. : Fr.) Bondartsev & Sing.

Laricifomes officinalis (Vill. : Fr.) Kotl. & Pouzar

3 *Larix* (VM 22163, 22185, 22203).

Fomitopsis officinalis grows only on very old, large larches and in this area only in primeval forests.

Fomitopsis pinicola (Sw. : Fr.) P. Karst.

1Z *Abies* (VM 22106, 22119), *Alnus* (VM 22086, 22112, HK 19390, sight), *Picea* (HK 19330), **1T** *Picea* (HK 19425, sight X 6), **3** *Picea* (VM 22100, 22145, HK 19508, sight X 3), *Abies* (HK sight X 2), **4** *Betula* (VM 22093), *Picea* (VM 22179, HK sight X 4), **5** *Acer* (VM 22080), *Alnus* (VM 22072, 22328), *Tilia* (VM 22225), *Ulmus* (VM 22257), **7** *Pinus* (VM 22281), **9** *Alnus* (VM 22348), *Betula* (VM 22295).

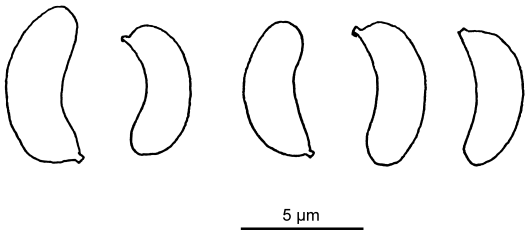

Fig. 12. Spores of *Funalia cervina* (from *Kotiranta 19558*).

Normally there are no difficulties in distinguishing *F. pinicola* from *F. rosea* even in the field, but if the context of the previous is pink, as it seldom is, the pore size is a good deviating character: *F. pinicola* has 2–4 pores/mm, while *F. rosea* has (4–)6–8. Microscopically they are easily distinguished (if spores occur), because the spores of *F. pinicola* are subcylindrical and large (ab. 8 × 3 µm), while those of *F. rosea* are much smaller, normally only (5–)6–6.8 × 2.2–2.5(–2.9) µm.

Fomitopsis rosea (Alb. & Schwein. : Fr.) P. Karst.

1T *Picea* (HK 19438), **3** *Picea* (Dai 3296, 3304, 3305, sight X 8, VM 22101, 22128, 22143, 22161, HK 19569, 19585, 19622, sight X 4), *Betula* (VM 22141), **4** *Picea* (VM 22177).

Funalia cervina (Schwein.) Y.C. Dai (Fig. 12)

Trametes cervina (Schwein.) Bres.

3 *Abies* (VM 22204), *Populus* (VM 22253, HK 19558).

Basidiocarp pileate. Upper part at first almost white, later cream-coloured with brown agglutinated hairs, which makes upper surface rough. Context pale cream-coloured. Pore surface first white, in old specimens rusty brown, pores 1–2(–3)/mm, at first roundish, later almost daedaleoid or irpicoid. Hyphal system pseudotrimitic, with skeletals, a few skeletobinding hyphae and clamped generative hyphae. Contextual skeletal hyphae swell slightly or strongly in KOH and are slightly but clearly cyanophilous. Skeletobinding hyphae relatively rare, generative hyphae thin-walled, fairly richly branched, up to 5 µm wide, but normally 2.5–3.5 µm in diameter. Trama dimitic. Hyphae somewhat intertwined in upper parts of tubes where skeletals dominate, subparallel in lower parts where generative hyphae dominate. Skeletals 3–5 µm wide, thin- to fairly thick-walled (1–1.5 µm thick) and they do not reach dissepiment. Generative hyphae thin-walled, 2.5–3 µm in diameter. Spores subcylindrical, bent, 5.1–6.5 × 1.8–2.2 µm, thin-walled, CB–, IKI– (*HK 19558*, *n* = 5).

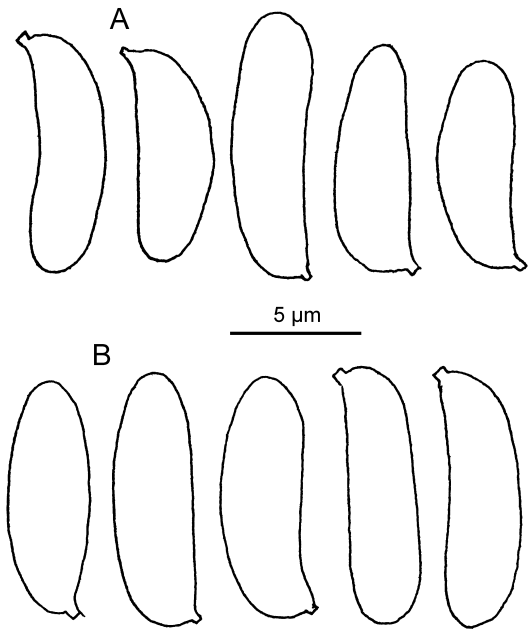

Fig. 13. Spores of *Funalia trogii* (**A** from *Kotiranta 19495*, **B** from *Penttilä 13.X.2002*).

Funalia trogii (Berk.) Bondartsev & Singer (Fig. 13)

3 unknown host (VM 22162), *Populus* (VM 22199), *Salix* (Dai 3289), **4** *Picea* (HK 19495), *Populus* (HK 19496, sight X 5), *Betula* (HK 19500), **5** *Populus* (VM 22392), **9** *Populus* (VM 22332), **10** *Salix* (VM 22004), *Populus* (VM 22031, 22047), **11** *Salix* (VM 22025), **13** *Salix* (VM 22279).

Basidiocarp pileate or effused reflexed, fairly large. Upper surface brown, with stiff hairs. Pore surface brown, pores angular or roundish, 1–2/mm, dissepiments sometimes faintly

lacerate. Spores cylindrical, slightly bent, (7.4–)9–10.4(–11.6) × 2.8–3.5 μm, *L* = 9.4 μm, *W* = 3.2 μm, *Q* = 2.6–3.7, *Q** = 3, thin-walled, CB–, IKI– (*HK 19495*, *n* = 10).

Funalia trogii mostly grows on deciduous trees in sun-exposed habitats, and seems to favor human influenced sites. The collections of HK were all almost sterile, and the only fertile basidiocarp was collected from spruce. Spores (*n* = 30) from spore print of one reference specimen from Finland were measured, (8.6–)9–10.6(–10.8) × 3–3.5(–3.7) μm, *L* = 9.8 μm, *W* = 3.3 μm, *Q* = 2.7–3.3, *Q** = 2.9 (Uusimaa: Inkoo, Fagervik, *Ulmus* sp. trunk in a pile, *Penttilä 13. X. 2002*, H).

Ganoderma lipsiense (Batsch) G.F. Atk.

1T *Betula* (VM 22087), **3** *Betula* (VM 22074), *Populus* (VM 22198, HK 19589), **4** buried wood (HK 19462), **5** *Alnus* (VM 22071), *Tilia* (VM 22078), *Quercus* (VM 22241, 22242), *Betula* (VM 22249), *Acer* (VM 22262, 22315), *Ulmus* (VM 22359), **6** *Populus* (NU 937), **9** *Populus* (VM 22303), **10** *Populus alba* (VM 22358), **12** *Populus* (Dai 3355), **13** *Ulmus* (VM 22035), *Populus* (VM 22400).

Ganoderma lucidum (M.A. Curtis : Fr.) P. Karst.

4 *Larix* (VM 22367).

Gloeophyllum abietinum (Bull. : Fr.) P. Karst.

1Z *Abies* (HK 19323), **3** *Picea* (Dai 3336, VM 22158), *Sorbus* (VM 22209), *Abies* (VM 22213), **4** *Picea* (VM 22113, HK 19472), coniferous timber (HK 19480).

Gloeophyllum protractum (Fr.) Imazeki

4 coniferous timber (VM 22374).

Gloeophyllum sepiarium (Wulfen. : Fr.) P. Karsten

1Z *Abies* (VM 22107, 22121), **3** *Abies* (HK 19529), *Picea* (VM 22207, HK 19618), **4** *Abies* (VM 22094), **6** *Abies* (NU 932).

Gloeophyllum trabeum (Pers. : Fr.) Murrill

12 coniferous tree (Dai sight).

Gloeoporus dichrous (Fr. : Fr.) Bres.

1Z *Alnus* (HK 19392), **3** *Betula* (VM 22135), **9** *Betula* (VM 22343), *Alnus* (VM 22351, 22412), **10** *Padus* (VM 22011).

Gloeoporus taxicola (Pers. : Fr.) Gilb. & Ryvarden

3 *Picea* (Dai 3340, HK 19603).

Hapalopilus croceus (Pers. : Fr.) Bondartsev & Sing.

5 *Quercus* (VM 22375).

Hapalopilus rutilans (Pers. : Fr.) P. Karst.

1Z *Betula* (VM 22122), **3** *Abies* (VM 22097), *Betula* (VM 22114), *Sorbus* (Dai 3302), **5** *Populus* (VM 22156), **9** *Betula* (VM 22345).

Hyphodontia flavipora (Cooke) Sheng H. Wu

Schizopora flavipora (Cooke) Ryvarden

12 deciduous wood (Dai sight).

Hyphodontia radula (Pers. : Fr.) E. Langer & Vesterholt

Schizopora radula (Pers. : Fr.) Hallenb.

1Z *Alnus* (HK 19381), **9** *Populus* (VM 22385).

Basidiocarp strictly resupinate. Pore surface pale cream- or honey-coloured, pores angular, 2–3(–4)/mm, dissepiments relatively thick, nearly entire. Hyphal system dimitic. Skeletals in context few, 3–3.5 μm wide, with up to 1 μm thick walls. Generative hyphae fairly thick-walled, clamped, 3 μm wide. Dissepimental hyphae

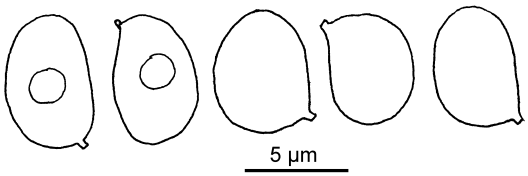

Fig. 14. Spores of *Laetiporus sulphureus* (from *Kotiranta 19604*).

thin-walled, clamped, 2–3 µm wide, heavily encrusted with small rod-like crystals, which form star-looking aggregates, similar to those seen in *Trechispora cohaerens* (Schwein.) Jül. & Stalpers (individual rods up to 3.5 µm long). Cystidia none, but subulate cystidioles 22–24 × 4–4.5 µm and capitate cystidioles 24–25 × 6 µm, common. Spores ellipsoid, 4.4–5 × 2.7–3.1 µm, L = 4.6 µm, W = 2.9 µm, Q = 1.4–1.7, Q^* = 1.6, thin-walled, CB–, IKI– (*HK 19381*, n = 15).

Inonotus dryophilus (Berk.) Murrill

Inocutis dryophila (Berk.) Fiasson & Niemelä

5 *Quercus* (VM 22369).

Inonotus obliquus (Pers. : Fr.) Pilát

3 *Betula* (Dai sight X 3, VM 22217, HK 19607, sight X 5), **4** *Alnus* (VM 22365), **7** *Betula* (VM 22301), **9** *Betula* (VM 22338).

Inonotus radiatus (Sowerby : Fr.) P. Karst.

3 *Alnus* (Dai sight), **4** *Alnus* (VM 22195), **13** *Alnus* (VM 22010, 22050).

Inonotus rheades (Pers.) P. Karst.

Inocutis rheades (Pers.) Fiasson & Niemelä

13 *Populus* (VM 22032).

Irpex lacteus (Fr. : Fr.) Fr.

1Z *Alnus* (HK 19393), **3** *Betula* (VM 22130), **4** *Alnus* (VM 22180, 22187), *Padus* (HK 19489), **5** *Ulmus* (VM 22067, 22082, 22222), *Padus* (VM 22147), *Acer* (VM 22239, 22244, 22294), **6** *Padus* (NU 950), **9** *Alnus* (VM 22268, 22350, 22355), *Padus* (VM 22274), *Betula* (VM 22340), **11** *Salix* (VM 22028).

Ischnoderma benzoinum (Wahlenb. : Fr.) P. Karst.

1Z *Picea* (VM 22090), **3** *Abies* (VM 22183, 22210).

Junghuhnia collabens (Fr.) Ryvarden

Irpex collabens (Fr.) Kotir. & Saarenoksa

12 *Pinus* (Dai 3364).

Junghuhnia luteoalba (P. Karst.) Ryvarden

Steccherinum luteoalbum (P. Karst.) Vesterholt
Irpex luteoalbus (P. Karst.) Kotir. & Saarenoksa

10 *Padus* (VM 22062).

Junghuhnia nitida (Pers. : Fr.) Ryvarden

Steccherinum nitidum (Pers. : Fr.) Vesterholt
Irpex nitidus (Pers. : Fr.) Saarenoksa & Kotir.

4 *Alnus* (VM 22415), **12** *Populus* (Dai 3359).

Laetiporus sulphureus (Bull. : Fr.) Murrill (Fig. 14)

3 *Larix* (VM 22089), *Picea* (HK 19604), **5** *Quercus* (NU 953), **10** *Populus alba* (VM 22008).

Basidiocarp pileate, yellow or yellow orange, large. Pore surface sulphur yellow, pores at first angular, later elongated, 2–4/mm, dissepiments thin, dentate. Tramal hyphae almost parallel, simple septate, some thin-walled, some with clearly thickened walls (up to 1.8 µm thick), fairly sparingly branched, 4–5 µm wide, here and there covered with rhomboidal crystal plates and bipyramids. Cystidia none. Basidia clavate, with one constriction, basally simple septate, ab. 20 × 7.5 µm. Spores broadly ellipsoid, 5.6–6.8(–7)

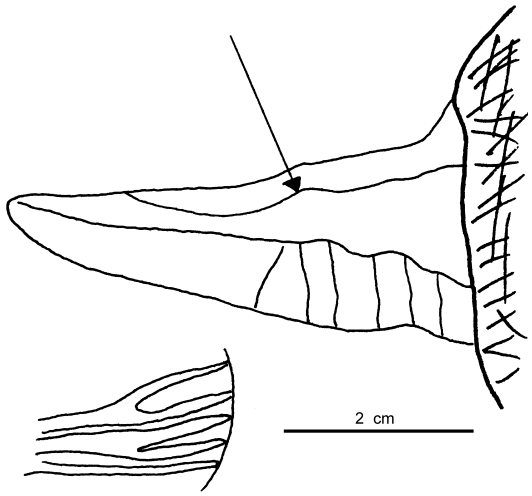

Fig. 15. Section through fruit body showing the black line in context (arrow) and lamellae of *Lenzites warnieri* (from *Kotiranta 19624*).

× (3.7–)4–4.8(–5) μm, L = 6.2 μm, W = 4.5 μm, Q = 1.2–1.5, Q^* = 1.4, fairly thin-walled, CB–, IKI– (*HK 19604*, n = 20).

Laetiporus montanus Černý grows at high altitudes on softwood in central Europe, like the specimen *HK 19604*, but its caps are sharp-edged and spores somewhat longer than in *L. sulphureus*, viz. 6–8(–9) μm (Černý 1989).

Lenzites betulinus (L. : Fr.) Fr.

4 *Betula* (HK 18490, sight), **6** *Acer* (NU 935), **9** *Populus* (VM 22283), *Betula* (VM 22344).

Lenzites warnieri Dur. & Mont. (Fig. 15)

5 *Populus* (HK 19624).

Fruit body pileate, sharp-edged. Upper surface almost smooth in oldest parts, and margin cream-coloured, otherwise dark brown or blackish, matted. Lamellae 1.5 cm deep, pale yellowish or cream-coloured, furcated, 3–4/cm, wavy when dry. Context of same colour as lamellae, divided by a sharp black line which in fact starts from black surface and continues to base of fruit body. Cystidia none, but thick-walled, apically thin-walled, sword-like hyphal ends of skeletoid origin common. Neither basidia nor spores seen (*HK 19624*).

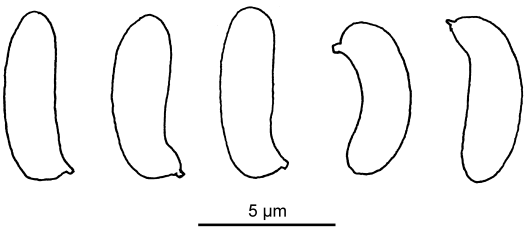

Fig. 16. Spores of *Leptoporus mollis* (from *Kotiranta 19602*).

The black line in context was not mentioned by Ryvarden and Gilbertson (1996) and therefore an illustration of the cut basidiocarp is given.

Leptoporus mollis (Pers. : Fr.) Quél. (Fig. 16)

3 *Picea* (HK 19602), **4** on grass (VM 22370), **12** *Picea* (Dai 3290).

Fruit body effused-reflexed, with a very narrow cap. Upper surface pale pink or buff, pore surface meat red, tubes angular, 3–5/mm, dissepiments paler than rest of tubes, thin. Context pink, tubes meat red. Monomitic, simple septate. Context relatively open, consisting of parallel, slightly thick-walled hyphal strands (hyphae 6 μm wide) and thin-walled, 3–5 μm wide hyphae. Tramal hyphae strictly parallel, agglutinated and difficult to observe, except in dissepiment edge, 2.5–3 μm wide. Between hyphae very characteristic pale reddish-brown particles. Cystidia none. Spores subcylindrical, bent or suballantoid, (5–)5.5–6.1 × (1.5–)1.7–2.1 μm, L = 5.8 μm, W = 1.9 μm, Q = 2.9–3.5, Q^* = 3.1, very thin-walled, CB–, IKI– (*HK 19602*, n = 20).

Oligoporus obductus (Berk.) Gilb. & Ryvarden

9 on coniferous sleeper (VM 22243).

Oligoporus sericeomollis (Romell) Bondartseva (Fig. 17)

3 *Picea* (Dai 3321, HK 19505).

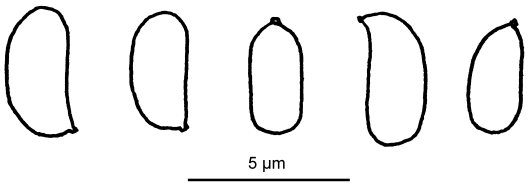

Fig. 17. Spores of *Oligoporus sericeomollis* (from *Kotiranta 19505*).

Basidiocarp strictly resupinate. Pore surface when fresh, white; when dry, pale cream-coloured, pores angular (3–)4–5/mm, dissepiments entire but fimbritae. Monomitic, clamped. Dissepimental hyphae smooth, up to 4 µm wide, apically roundish. Cystidia numerous, ventricose, thick-walled especially in KOH, more thin-walled in CB, apically mostly naked, but also with crystalline caps, 15–24 × 3.5–7 µm. Spores short cylindrical or narrowly ellipsoid, ventral side slightly concave, (3.5–)3.7–4.3 × 1.8–2.2 µm, $L = 4$ µm, $W = 2$ µm, $Q = 1.8–2.2$, $Q^* = 2$, with a very small apiculus, with thickened walls, cyanophilous, IKI– (*HK 19505*, $n = 25$). Smell pungent when fresh.

Onnia leporina (Fr.) H. Jahn

3 *Abies* (VM 22109), *Picea* (Dai sight X 4, VM 22149, 22191, HK 19526), **4** *Picea* (VM 22178).

Onnia tomentosa (Fr.) P. Karst.

2 on ground in pine forest (NU 348).

Phellinus alni (Bondartsev) Parmasto

1Z *Alnus incana* (HK sight X 3), **4** Padus (VM 22116), **5** *Acer* (VM 22376), *Ulmus* (VM 22399), **6** *Alnus* (NU 929), **9** *Alnus* (VM 22267, 22298), **13** *Alnus* (VM 22018, 22019, 22021).

Phellinus chrysoloma (Fr.) Donk

Porodaedalea chrysoloma (Fr.) Fiasson & Niemelä

3 *Picea* (Dai 3292, 3308, 3292, 3307, 3313, 3337, VM 22144, 22157, 22208, HK 19516, 19613, 19618, sight X 6).

Phellinus cinereus (Niemelä) M. Fischer

3 *Betula* (VM 22075, 22206, 22216, 22406, HK 19606, sight X 13), **4** *Betula* (HK sight), **6** *Betula* (NU 951).

Phellinus conchatus (Pers. : Fr.) Quél.

12 *Salix* ? (Dai sight).

Phellinus ferrugineofuscus (P. Karst.) Bourdot

Phellinidium ferrugineofuscum (P. Karst.) Fiasson & Niemelä

3 *Picea* (Dai 3339, 3338, VM 22126, HK 19571), **4** *Picea* (VM 22380).

Phellinus ferruginosus (Schrad. : Fr.) Pat.

Fuscoporia ferruginosa (Schrad. : Fr.) Murrill

5 *Alnus* (VM 22228).

Phellinus hartigii (Allesch. & Schnabl) Bondartzev

Fomitiporia hartigii (Allesch. & Schnabl) Fiasson & Niemelä

1Z *Abies* (HK 19340, 19347, sight, VM 22374), **1T** *Abies* (HK sight), **3** *Abies* (Dai sight X 4, VM 22214, HK sight X 3), **4** *Abies* (VM 22167).

Phellinus igniarius (L. : Fr.) Quél.

10 *Salix* (VM 22005, 22045), **13** *Salix* (VM 22029, 22416).

Phellinus laevigatus (P. Karst.) Bourdot & Galzin

3 *Betula* (VM 22091, 22115, 22139, HK 19573, 19579), **9** *Betula* (VM 22336).

In this area *P. laevigatus* is more common than its effused-reflexed counterpart *P. lundellii*.

Sometimes they are difficult to distinguish, but *P. laevigatus* has smaller pores, (6–)7–8/mm, while *P. lundellii* has 5–6 pores per mm. Moreover, the tramal hyphae of *P. laevigatus* are strictly parallel and in *P. lundellii* they are tightly intertwined.

Phellinus linteus (Berk. & M.A. Curt.) Teng.

10 *Lonicera* (VM *22046*).

Phellinus lundellii Niemelä

12 *Betula* (Dai sight).

Phellinus niemelaei (M. Fischer) Y.-C. Dai

Porodaedalea niemelaei M. Fisher

3 *Larix* (Dai 3290a, 3291, 3291a, 3291b, 3293, VM 22095).

According to Fisher (2000) there are no clear morphological differences between *P. niemelaei*, *P. chrysoloma* and *P. pini*. The only reliable distinguishing characteristic seems to be the host tree: *P. niemelaei* grows on *Larix sibirica*, *P. chrysoloma* on spruces and *P. pini* on pines. If this is true, *P. niemelaei* is widely distributed in e.g., the West Siberian plain (Kotiranta 1995).

Phellinus nigrolimitatus (Romell) Bourdot & Galzin

Phellopilus nigrolimitatus (Romell) Niemelä, Wagner & M. Fischer

3 *Picea* (Dai 3314, VM 22098, 22196, 22414, HK 19504, 19611).

Phellinus pini (Brot. : Fr.) A. Ames

Porodaedalea pini (Brot. : Fr.) Murrill

7 *Pinus* (VM 22321), **9** *Pinus* (VM 22300).

Phellinus populicola Niemelä

12 *Populus* (Dai 3365).

Phellinus punctatus (P. Karst.) Pilát

Fomitiporia punctata (P. Karst.) Murrill

1Z *Salix* (HK 19373), **4** *Padus* (VM 22111, 22193), *Alnus* (VM 22175, 22181), **5** *Padus* (HK 19630, VM 22234), *Salix* (VM 22069, 22247), **6** *Salix* (NU 927, 928, 936c), **9** *Padus* (VM 22276, 22410), **10** *Padus* (VM 22012), **11** *Salix* (VM 22026), **13** *Padus* (VM 22060, 22061).

Phellinus robustus (P. Karst.) Bourdot & Galzin

Fomitiporia robusta (P. Karst.) Fiasson & Niemelä

5 *Quercus* (VM 22240), **6** *Quercus* (NU 925).

Phellinus sulphurascens Pilát

Phellinidium sulphurascens (Pilát) Y.C. Dai

3 *Picea* (Dai 3319).

Reported earlier from the Russian Far East by Dai (1995, 1998) and this is the westernmost known locality in Russia.

Phellinus tremulae (Bondartsev) Bondartsev & Borissov

1Z *Populus* (VM 22361), **3** *Populus* (Dai 3346, VM 22104, HK 19590, sight), **5** Populus (VM 22264), **9** *Populus* (VM 22306, 22346), **7** *Populus* (VM 22313).

Phellinus viticola (Schwein. : Fr.) Donk

12 *Picea* (Dai sight).

Phellinus cf. ***weirii*** (Murrill) Gilb.

Phellinidium cf. *weirii* (Murrill) Y.-C. Dai

3 *Picea* (VM 22393).

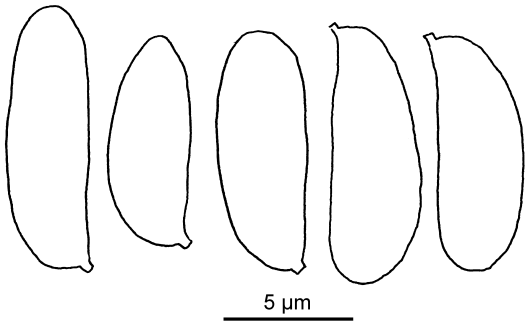

Fig. 18. Spores of *Polyporus alveolaris* (from *Kotiranta 19493*).

This specimen may be *P. sulphurascens*, because *P. weirii* mostly grows on *Juniperus* (Dai & Qin 1998).

Piptoporus betulinus (Bull. : Fr.) P. Karst.

1Z *Betula* (VM 22291, HK sight), **3** *Betula* (VM 22215), **4** *Betula* (VM 22152), **7** *Betula* (VM 22308), **9** *Betula* (VM 22297, 22339).

Polyporus alveolaris (DC. : Fr.) Bondartzev & Singer (Fig. 18)

2 *Caragana* (NU 349), **4** advanced decayed wood (*Abies*?) (HK 19493), **5** *Acer* (VM 22081, 22238), *Tilia* (VM 22142, 22411).

Basidiocarp pileate, with a short lateral stipe. Upper surface buff with small brown flattened, triangular squamules. Pores angular, radially elongated, 0.5–2/mm, decurrent to stipe, dissepiments fairly thin, wavy. Spores cylindrical, (8.8–)9–11(–11.3) × 3.3–3.9 µm, L = 9.7 µm, W = 3.6 µm, Q = 2.4–3, Q^* = 2.7, thin-walled, CB–, IKI– (*HK 19493*, n = 30).

Polyporus alveolaris is confusingly similar to *P. choseniae* (Vassilkov) Parmasto, rather than *P. varius* (= *P. leptocephalus*) as stated by Núñez and Ryvarden (1995). The only difference between *P. alveolaris* and *P. choseniae* seems to be that the former is smaller and its pores are larger. However, we are not sure if these characteristics are sufficient enough to separate these two species.

Polyporus badius (Pers.) Schwein.

5 *Ulmus* (VM 22317, 22375), **10** *Populus alba* (VM 22003), *Salix* (VM 22013).

Polyporus brumalis (Pers. : Fr.) Fr.

5 *Padus* (VM 22235), **6** deciduous tree (NU 942), **9** *Padus* (VM 22368).

Polyporus ciliatus Fr. : Fr.

1Z *Salix* (VM 22223), **4** *Betula* (HK 19497, sight), **5** *Alnus* (VM 22218), **13** *Alnus* (VM 22041).

Polyporus leptocephalus (Jacq. : Fr.) Fr.

Polyporus varius Fr.

5 *Populus* (HK 19625), *Ulmus* (VM 22236), **9** *Padus* (VM 22353).

Polyporus melanopus (Pers. : Fr.) Fr.

2 on ground under *Populus* (NU 340).

Polyporus squamosus (Huds. : Fr.) Fr.

3 *Populus* (Dai 3350), **5** *Acer* (VM 22260), *Ulmus* (VM 22248, 22291, HK sight), **6** deciduous wood (NU 941), **13** *Ulmus* (VM 22037),

Polyporus tubaeformis (P. Karst.) Ryvarden & Gilbertson

3 *Populus* (VM 22159).

Postia alni Niemelä & Vampola (Fig. 19)

5 *Betula* (VM 22360), **9** *Populus* (VM 22333), *Acer* (VM 22408).

Postia alni is the hardwood dwelling counterpart of *P. caesia*. Macroscopically they are

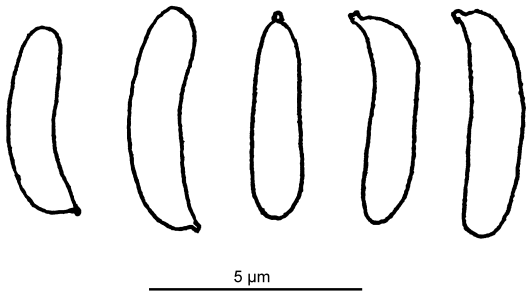

Fig. 19. Spores of *Postia alni* (from *Kotiranta 12276*).

very similar, but the width of the spores of *P. alni* is commonly 0.9–1.3 µm, while in *P. caesia* 1.3–1.6 µm. Also the pores of *P. caesia* are somewhat larger, measuring 4–5(–6)/mm. In *P. alni* they are (5–)6–7(–8)/mm in *P. alni*. According to Niemelä (2001) the width of the spores of *P. alni* is (1–)1.1–1.3(–1.5) µm and of *P. caesia* 1.3–1.7(–1.9) µm.

Postia subcaesia (A. David) Jülich has spores very similar to those seen in *P. alni*, viz. 4–5(–6) × 1–1.25, its basidiocarps are fleshy, relatively large, 6–10 cm wide, and its upper surface is velutinous or hispid. Moreover, it grows in the Mediterranean area (David 1974).

Postia balsamea (Peck) Jülich

Oligoporus balsameus (Peck) Jülich

6 deciduous wood? (NU 946).

Postia caesia (Schrad. : Fr.) P. Karst. (Fig. 20)

1Z *Picea* (VM 22221), **4** *Picea* (HK 19464).

Spores subcylindrical, bent, (4.4–)4.7–5.3 × 1.3–1.6 µm, L = 4.9 µm, W = 1.4 µm, Q = 2.9–3.8, Q^* = 3.4, thin-walled, CB–, faintly amyloid (*HK 19464*, n = 10).

Postia floriformis (Quél.) Jülich

1Z *Abies* (VM 22404).

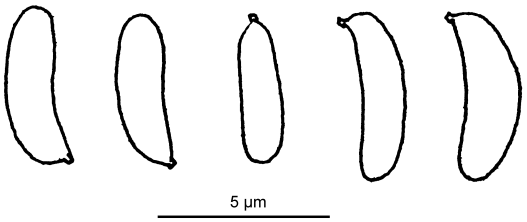

Fig. 20. Spores of *Postia caesia* (from *Kotiranta 19464*).

Postia fragilis (Fr. : Fr.) Jülich

12 *Pinus* (Dai 3370).

Postia guttulata (Peck) Jülich

3 *Picea* (VM 22373), **6** *Abies* (NU 930, 933), **9** *Pinus* (VM 22382).

Postia lactea (Fr. : Fr.) P. Karst.

3 *Betula* (Dai 3311), **12** *Populus* (Dai 3360).

Postia leucomallella (Murrill) Jülich

3 *Picea* (Dai 3334), **4** *Pinus* (VM 22389).

Postia lowei (Pilát) Jülich

Oligoporus lowei (Pilát) Gilb. & Ryvarden

3 *Picea* (Dai 3322), **12** *Pinus* (Dai 3368).

Postia placenta (Fr.) M.J. Larsen & Lombard

12 *Populus* (Dai 3356).

Postia septentrionalis (Vampola) Renvall

12 *Pinus* (Dai 3361).

Postia stiptica (Pers. : Fr.) Jülich

3 *Abies* (VM 22272).

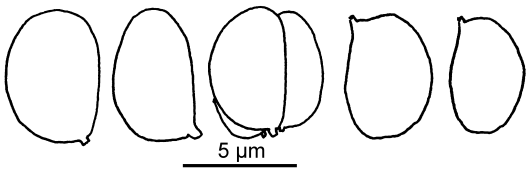

Fig. 21. Spores of *Rigidoporus corticola* (from *Kotiranta 19645*).

Postia undosa (Peck) Jülich

12 *Pinus* (Dai 3368).

Pycnoporellus fulgens (Fr.) Donk

3 *Abies* (VM 22096, HK 19513), *Picea* (VM 22099), **7** *Pinus* (VM 22280).

Pycnoporellus fulgens mostly grows on large (d.b.h over 30 cm) trees which have been previously decayed by *F. pinicola*.

Pycnoporus sanguineus (L. : Fr.) Murrill

12 deciduous wood (Dai sight).

Rigidoporus crocatus (Pat.) Ryvarden

3 *Abies* (VM 22201), *Betula* (VM 22387).

Rigidoporus crocatus inhabits mostly fallen trunks of birches in old-growth forests and is an indicator of long dead wood continuity.

Rigidoporus corticola (Fr.) Pouzar (Fig. 21)

Oxyporus corticola (Fr.) Ryvarden

3 *Populus* (HK 19555), **5** *Acer* (VM 22384), deciduous wood (HK 19645), **10** *Ulmus* (VM 22059), **13** *Acer* (VM 22063), *Alnus* (VM 22056, 22058).

Basidiocarp resupinate, seldom with pseudopilei. Pore surface cream-coloured when fresh, slightly brownish when dry, pores often large, especially when growing on vertical substrate, 1–3/mm, smaller when growing horizontally, 3–5/mm, dissepiments thin, lacerate or dentate. Hyphal system monomitic. All hyphae simple septate, with thickened walls in subiculum, 2.5–3.5 μm wide, in trama nearly parallel, thin-walled. Cystidia of two kinds: in tube bottoms some large gloeocystidia and in hymenium between basidia thin- or thick-walled, often apically encrusted, cylindrical or oblong cystidia. Spores ellipsoid or broadly ellipsoid, often glued in tetrads, 5.4–6.6(–7) × 3.6–4.4 μm, L = 6 μm, W = 4 μm, Q = 1.3–2.1, Q^* = 1.5, with thickened walls, CB–, IKI– (*HK 19645*, n = 15).

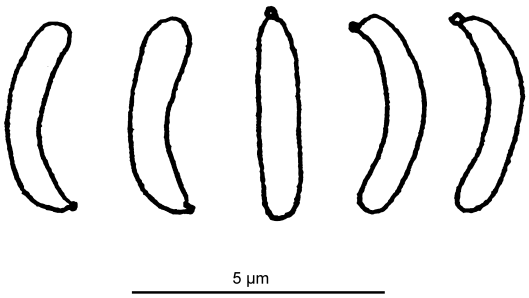

Fig. 22. Spores of *Skeletocutis kuehneri* (from *Kotiranta 19422*).

Rigidoporus populinus (Schumach. : Fr.) Pouzar

Oxyporus populinus (Schumach. : Fr.) Donk

3 *Betula* (VM 22212), **5** *Acer* (VM 22105, 22292), *Ulmus* (VM 22118), **9** *Betula* (VM 22270).

Skeletocutis amorpha (Fr. : Fr.) Kotl. & Pouzar

4 *Picea* (VM 22394), **12** *Pinus* (Dai 3352).

Skeletocutis carneogrisea A. David

3 *Picea* (Dai 3335), **11** *Quercus* (VM 22054).

Skeletocutis kuehneri A. David (Fig. 22)

1T *Picea* (HK 19422, 19436), **3** *Picea* (Dai 3326, VM 22395).

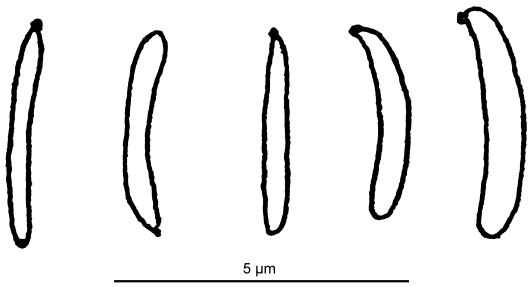

Fig. 23. Spores of *Skeletocutis nivea* (from *Kotiranta 19635*).

Basidiocarp strictly resupinate, fairly thin. Pore surface, when dry, cream- or pale honey-coloured, pores angular, variable in size, (4–)5–7/mm, dissepiments thin, lacerate or dentate. Both subiculum and trama dimitic, generative hyphae thin-walled, clamped, skeletals IKI–, KOH–, straight in trama, 3 μm wide, dissepimental generative hyphae 2–2.5 μm wide, encrusted with rose-thorn shaped crystals. Cystidia none, but bottle-shaped or mucronate cystidioles common, (7–)9.5–10.5 × 3–4 μm. Basidia basally clamped, clavate, 9–11 × 3.5–4.5 μm, with up to 4 μm long, thin sterigmata. Spores allantoid, 3.2–3.9 × 0.6–0.9 μm, L = 3.5 μm, W = 0.8 μm, Q^* = 4.6, very thin-walled, CB–, IKI– (*HK 19422*, n = 8).

Skeletocutis lenis (P. Karst.) Niemelä

12 *Pinus* (Dai 3367).

Skeletocutis lilacina A. David & Jean Keller

1T *Picea* (HK 19421), together with *S. kuehneri* and *Trichaptum abietinum*, **4** *Pinus* (VM 22372), *Picea* (VM 22373).

Basidiocarp resupinate or effused-reflexed with a narrow cap. Pore surface dark lilac when fresh, lilac brown when dry. Pores shallow, angular, 6–8/mm, dissepiments thin, entire.

Skeletocutis nivea (Jungh.) Keller (Fig. 23)

1Z *Betula* (HK 19360), **5** *Corylus* (VM 22391), *Tilia* (HK 19635).

Basidiocarp effused-reflexed, often totally resupinate. Pores surface white or greenish.

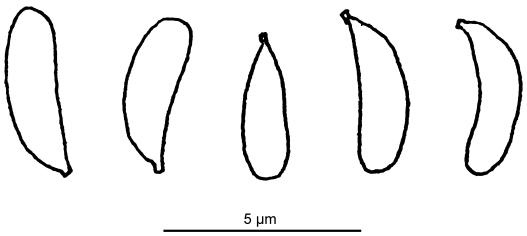

Fig. 24. Spores of *Skeletocutis papyracea* (from *Dai 3369*).

Pores roundish or subangular, (7–)9–10(–11)/mm, dissepiments thin, entire or finely fimbriate. Hyphal system di/trimitic; subicular generative hyphae sometimes covered with crystals and look like embebbed cystidia, skeletals (2–)2.5–3.5 μm wide. Trama consists almost solely of thin-walled, parallel or subparellel thin-walled, clamped, 2–2.5 μm wide generative hyphae. Dissepimental hyphae straight, mostly naked, but some might be heavily encrusted. Heavily encrusted hyphal ends may also penetrate into tubes and look like cystidia. Cystidia none, but a few thin-walled, bottle-shaped cystidioles of same size of basidia present. Basidia basally clamped, subcylindrical, 7–8(–10) × 3–3.5 μm, with four needle-like, up to 2.5 μm long sterigmata. Spores allantoid, 2.8–3.3(–3.5) × 0.3–0.6 μm, L = 3.6 μm, W = 0.4 μm, Q = 4.7–11, Q^* = 10, CB–, IKI– (*HK 19635*, n = 17).

Skeletocutis odora (Sacc.) Ginns

3 *Picea* (Dai 3315, 3316, 3317, HK 19599).

Skeletocutis papyracea A. David (Fig. 24)

12 *Pinus* (Dai 3363, 3369).

Basidiocarp resupinate, fairly thin, at beginning white, later with a pale yellow hue. Pore surface pale yellow, pores angular, (3–)4–5(–6), dissepiments uneven, lacerate or dentate. Margin distinct, white fimbriate. Hyphal system dimitic. Subiculum consisting mostly of clamped, fairly thin-walled, 2–2.5 μm wide generative hyphae and a few, 2.5–3 μm wide skeletal hyphae, CB–, IKI–, strongly swelling (up to 9 μm) and almost disappearing in KOH. Skeletals dominate

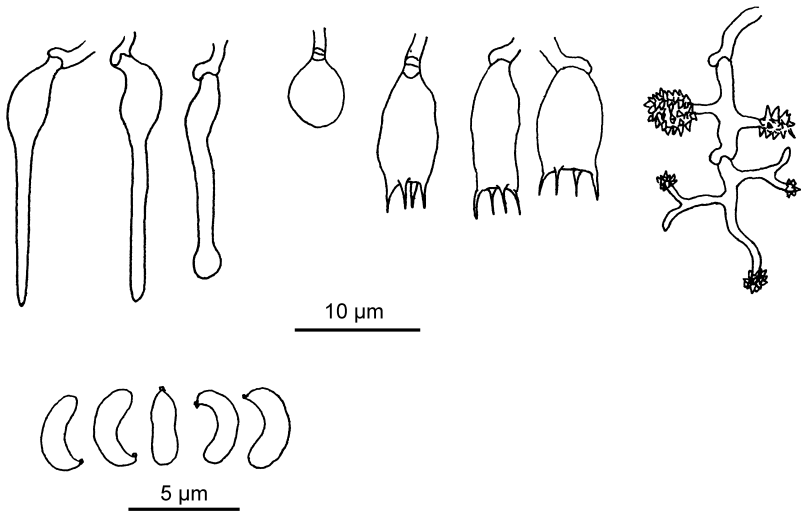

Fig. 25. Cystidioles, basidia, rosette-looking crystals and spores of *Skeletocutis vulgaris* (from *Dai 3354*).

in upper trama, 2–3(–4) µm wide (walls up to 1.7 µm thick), not glued together, subparallel, not reaching dissepiment edge, formed by fairly straight, encrusted generative hyphae. Cystidia none but clavate, often mucronate cystidioles, 10–13 × 3–4 µm, common. Basidia basally clamped, cylindrical, (8–)9–12 × 4–4.5 µm, with four needle-like, up to 3 µm long sterigmata. Spores subcylindrical, slightly bent, tapering to apiculus, (3.6–)3.8–4.3 × 1.2–1.3(–1.5) µm, L = 4 µm, W = 1.3 µm, Q = 2.6–3.4, Q^* = 3.1, very thin-walled, CB–, IKI– (*Dai 3369*, n = 15).

Niemelä's (1998) description of *S. papyracea* fits well with the Uralian specimens, except that the spore dimensions given by him are slightly larger.

Skeletocutis vulgaris (Fr.) Niemelä & Y.C. Dai (Fig. 25)

New to Russia.

12 *Populus* (Dai 3354, 3366).

Basidiocarp resupinate, relatively thick. Pore surface at first white, later cream- or pale honey-coloured. Pores roundish, or more commonly angular, 6–7/mm, dissepiments thin, lacerate or serrate. Hyphal system dimitic, all hyphae CB–, IKI–, KOH–, generative hyphae clamped. In subiculum skeletals dominating, sometimes branched, randomly orientated, 2(–2.5) µm wide, with an almost invisible lumen; generative hyphae very thin-walled (1.5–)2–2.5 µm in diameter. On subicular hyphae rosette-looking crystals, up to 10 µm in diameter. Tramal hyphae subparallel, skeletals dominate, with a very narrow lumen, 2–2.5 µm wide, generative hyphae very thin-walled, 1.5–2 µm wide, dissepimental hyphae not encrusted. Subhymenial hyphae very thin-walled, richly branched, 1.5 µm wide. Cystidia none, but fusoid, subulate or somewhat pointed cystidioles, 15–19 × 3–4 µm, fairly common. Basidioles basally clamped, ovoid, basidia cylindrical, (8–)9–11 × (3.5–)4–4.5 µm, with four, very thin, up to 2.5 µm long sterigmata. In hymenium clamped, very thin-walled, 1–2 µm wide branched hyphae, which bear crystalline rosettes on branch apices. Spores allantoid or lunate, 2.7–3.3(–4) × 0.7–1.3 µm, L = 3.1 µm, W = 1 µm, Q = 2.5–4.3, Q^* = 3.1, very thin-walled, CB–, IKI– (*Dai 3354*, n = 30).

Spongipellis spumea (Sowerby : Fr.) Pat.

5 *Acer* (VM 22088, 22125), *Ulmus* (VM 22231, 22255), **6** *Populus* (NU 934b), *Quercus* (NU 943).

Trametes gibbosa (Pers.) Fr.

5 *Acer* (VM 22077), *Ulmus* (VM 22123), *Tilia* (VM 22224), *Betula* (VM 22250), **10** *Populus alba* (VM 22007, 22038).

Trametes hirsuta (Wulfen : Fr.) Pilát

1Z *Alnus* (VM 22083, HK 19379), *Abies* (VM 22418), **3** *Betula* (VM 22129), **4** *Alnus* (VM 22172, 22363), *Betula* (HK sight X 8), **5** *Alnus* (VM 22319), *Tilia* (VM 22124), *Padus* (VM 22146), **6** *Padus* (NU 948), **7** *Padus* (VM 22322), **9** *Padus* (VM 22275, 22352), *Alnus* (VM 22356), **10** *Padus* (VM 22006), **13** *Alnus* (VM 22009, 22048), *Ulmus* (VM 22024), *Padus* (VM 22042, 22055).

Trametes ochracea (Pers.) Gilb. & Ryvarden

1Z *Tilia* (VM 22070), **3** *Populus* (VM 22200, HK sight), **4** *Betula* (HK 19465), **5** *Padus* (VM 22230), *Alnus* (VM 22327), **6** deciduous tree (NU 945), *Betula* (NU 938b), *Padus* (NU 947), **9** *Populus* (VM 22284), *Alnus* (VM 22299), **11** *Quercus* (VM 22053), **13** *Ulmus* (VM 22036).

Trametes pubescens (Schumach. : Fr.) Pilát

1Z *Alnus* (VM 22085), **3** *Betula* (VM 22134), *Populus* (HK 19588), **5** *Alnus* (VM 22229), **6** *Ulmus* (NU 939), **9** *Padus* (VM 22273), *Betula* (VM 22296), *Alnus* (VM 22413).

Trametes suaveolens (Fr. : Fr.) Fr.

12 *Salix* (Dai sight).

Trametes velutina (Fr. : Fr.) G. Cunn.

1T *Betula* (HK 19432), **12** deciduous wood (Dai sight).

Trametes versicolor (L. : Fr.) Pilát

3 *Betula* (VM 22076, 22211), *Picea* (VM 22170), **4** *Betula* (VM 22153, HK 19468, 19473, sight), *Alnus* (VM 22176, 22197), *Abies* (VM 22372), **5** *Ulmus* (VM 22066, 22259), *Tilia* (VM 22108, 22287), *Betula* (VM 22252, 22290), *Alnus* (VM 22318, 22326), **6** *Padus* (NU 936b, 949), **7** *Betula* (VM 22309), *Padus* (VM 22324), **9** *Alnus* (VM 22269), *Populus* (VM 22304, 22334), *Betula* (VM 22337), *Padus* (VM 22405), **13** *Salix* (VM 22278).

Trechispora mollusca (Pers. : Fr.) Liberta

3 *Picea* (VM 22407).

Trichaptum abietinum (Pers. : Fr.) Ryvarden

1T *Picea* (HK 19433, sight X 4), **3** *Picea* (Dai sight X 5, VM 22150, 22169, 22173, HK 19621).

Trichaptum fuscoviolaceum (Ehrenb. : Fr.) Ryvarden

1Z *Abies* (VM 22120, HK 19362), **1T** *Abie*s (HK 19429, sight X 4), *Picea* (HK 19405), **3** *Abies* (HK 19543, sight X 37), *Picea* (Dai sight X 2, VM 22102, 22160), **4** *Larix* (VM 22110, 22202), *Picea* (HK 19466), *Pinus* (HK 19498, sight X 8).

Trichaptum laricinum (P. Karst.) Ryvarden

3 *Picea* (Dai sight).

Trichaptum pargamenum (Fr.) G. Cunn.

3 *Betula* (Dai 3312), **4** *Alnus* (VM 22182), **13** *Alnus* (VM 22049).

Tyromyces chioneus (Fr. : Fr.) P. Karst.

4 *Betula* (VM 22194).

Conclusions

Altogether 829 collections and observations were made and 139 species identified. There were 48 species found only once (34.5%), 20 found twice (14%) and 12 found three times (8.6%). The rare species (1–3 observations) constitute 57% of all the species, whereas the 22 common species (over 10 observations) constitute only 15.8%, and the rest (4–9 observations) 27.2%. The 22 most common species comprised 59% of all observations.

The most common species in this material were *Trichaptum fuscoviolaceum* (62 observations = 7.5% of all observations), *Fomes fomentarius* (51/6.1%), *Fomitopsis pinicola* (36/4.4%), *Trametes hirsuta* and *T. versicolor* (28/3.6%) (altogether 205/24.7%).

The most common pathogens were *Fomes fomentarius* and *Fomitopsis pinicola*. This is easily explained by the fact that both occur

not only in primeval forest but also in strongly human-influenced habitats. Many of the pathogenic *Phellinus* species were relatively common (10–20 observations), but, e.g., *P. chrysoloma* and *P. hartigii* were found only in old-growth forests.

Five rare or extremely rare pathogens (anywhere) were detected in this study: *Aurantioporus fissilis*, *Buglossoporus pulvinus*, *Fistulina hepatica*, *Hapalopilus croceus* and *Inonotus dryophilus*. The last four are all decayers of very old oaks, and all these species should be included in the red list of the South Urals when it is published.

Other species which could be red-listed are either very rare or have special environmental requirements such as old-growth forests or old, luxuriant broad-leaved forests. To the first group belong at least *Amylocystis lapponica*, *Antrodia pulvinascens*, *Fomitopsis officinalis*, *Junghuhnia collabens*, *Onnia tomentosa*, *Phellinus sulphurascens*, and *Rigidoporus crocatus*. To the second e.g., *Antrodia mellita*, *Lenzites warnieri*, *Phellinus ferruginosus*, *P. robustus* and the other old oak dwelling species (*see* above).

The most common species was *T. fusco-violaceum*, which is explained by its very wide ecological amplitude. Here it thrives in human influenced sites, but is also very common on newly fallen conifers in old-growth forest and human influenced forests. The highest frequency was found in old-growth forest, where it infested especially newly-fallen firs, but was more rare on spruce. On the other hand, it was frequent on pine and larch in open field with corticated trunks.

Also other saprotrophs which are favored by human activities were common: *Bjerkandera adusta*, *Daedaleopsis confragosa*, *D. tricolor*, *Funalia trogii*, *Ganoderma lipsiense*, *Irpex lacteus*, *Trametes hirsuta*, *T. ochracea* and *T. versicolor* were only occasionally collected in natural habitats.

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