

***Sarcoporia polyspora* and *Jahnoporus hirtus*: two rare polypores collected in South Bohemia, Czech Republic**

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Two very rare polypores are reported from the Czech Republic: *Sarcoporia polyspora*, for the first time, and *Jahnoporus hirtus*, for the second time. Several basidiocarps of both polypores were collected and their growth and development were monitored for a period of three months. The collections and localities are described and their world distribution as well as affinities with other fungi are commented.

Key words: *Parmastomyces transmutans*, *Albatrellus*, *Polyporales*, Czech Republic.

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Byly nalezeny dva velmi vzácné choroše: *Sarcoporia polyspora* je hlášena z České republiky vůbec poprvé, *Jahnoporus hirtus* podruhé. V obou případech bylo sbíráno několik plodnic a jejich růst a vývin byl sledován po dobu tří měsíců. Nalezené houby a lokality jsou popsány a krátce je diskutována taxonomie a celosvětové rozšíření obou druhů.

INTRODUCTION

Two extremely rare, but conspicuous and for their ever abundant and unique basidiospores hardly mistakable polypores, were collected close to Hluboká nad Vltavou. The find of *Sarcoporia polyspora* (syn. *Parmastomyces transmutans*) was the first in the Czech Republic, *Jahnoporus hirtus* (syn. *Albatrellus hirtus*) was found for the second time. *J. hirtus* was in fact collected several times at three different sites. The most important characteristics of both fungi and their localities are described, and their world distribution is shortly commented. Also, the complicated history of their identification and description is given.

MATERIAL AND METHODS

Specimens studied

Sarcoporia polyspora: Czech Republic, South Bohemia, Hluboká nad Vltavou – Purkarec, Karlův Hrádek Ruins, 375 m a. s.l., 49° 6' 45" N, 14° 36' 42" E, *Picea abies* log, 2 Aug 2009, leg. et det. J. Vlasák, private herbarium J. Vlasák JV0908/4b,c (duplicate in National Museum, Prague, PRM 915663); *ibid.*, 11 Aug 2009 (JV0908/15b,c; duplicate PRM 915664); *ibid.*, 16 Aug 2009 (JV0908/20); *ibid.*, 1 Sep 2009 (JV0909/1). The locality of Karlův Hrádek Ruins is a warm, open forest, on a steep bank of the Vltava River, predominantly with oak, occasionally pine, spruce and beech. The whole area is based on acid soil.

Jahnoporus hirtus: Czech Republic, South Bohemia, Hluboká nad Vltavou – Libochovka Nature Reserve, 425 m a. s. l., 49° 4' 44" N, 14° 29' 17" E, *Picea abies* log, 15 Aug 2009, leg. et det. J. Vlasák, private herbarium J. Vlasák JV0908/16a (duplicate in National Museum, Prague, PRM 915665); *ibid.*, *Picea abies* stump No. 1, 27 Sep 2009, JV0909/35, *ibid.*, 11 Oct 2009, JV0910/4 (duplicate in National Museum, Prague, PRM 915959); *ibid.*, *Picea abies* stump No. 2, 11 Oct 2009, JV0910/5. Libochovka Nature Reserve is a deep valley with preserved remnants of an old-growth beech forest with sporadic fir and minor spruce stands of over 200 years old. It is a part of the Nová obora game park.

Microscopic characters were observed in Melzer's reagent and in 5 % KOH under an Olympus BX41 microscope, using an oil immersion lens.

RESULTS

Sarcoporia polyspora P. Karst. 1894

Figs. 1–3

= *Parmastomyces transmutans* (Overh.) Ryvarden & Gilb. 1984

Description (based on the collection cited above). Basidiocarps annual, resupinate to effused-reflexed, margin forming pileus at first adnate, up to 0.7 cm thick, later pileus reflexed up to 1 cm, laterally elongated up to 20 cm, soft and fleshy, drying brittle; upper surface of pileus at first white with ochre or reddish tints, bruised and drying reddish brown, matted-strigose; pore surface white, after bruising turning very slowly (5 min.) reddish brown, on drying greyish, locally with ochre tints, pores circular, 2–4 per mm, tube layer fragile, brittle and pulverising easily when dry, 5 mm thick; context white, soft, with about 3 mm thick, darker gelatinous layer under the tubes, which is sometimes dispersed into a number of resinous drops or streaks and forms a thin dark line in the context after drying. Spore print white.



Fig. 1. *Sarcoporia polyspora*, young basidiocarp, 11 Aug 2009 (JV0909/1). Photo by J. Vlasák.



Fig. 2. *Sarcoporia polyspora*, old basidiocarp, 1 Sep 2009 (JV0909/1). Photo by J. Vlasák.

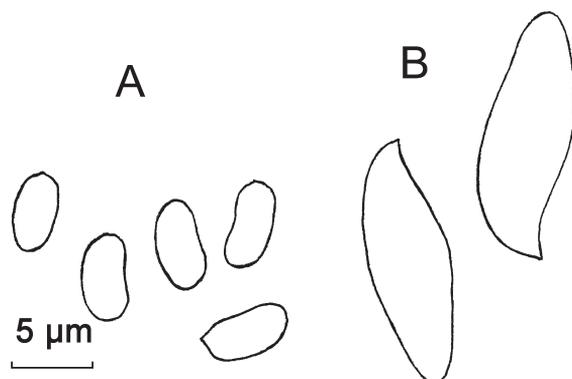


Fig. 3. Basidiospores of *Sarcoporia polyspora* (A) and *Jahnoporus hirtus* (B).

Hyphal system monomitic with thin to thick-walled, frequently branched hyphae with clamps. Cystidia none, basidia clavate, 4-sterigmate, 20–25 × 5–6 μm. Spores always very abundant, ellipsoid, slightly bent, smooth, hyaline, somewhat thick-walled, strongly dextrinoid, 4–6 × 2–2.8 μm (Fig. 3). Causes brown cubical rot; yet it shows a positive reaction to phenolic oxidases.

Substrate and habitat. On a 5 m long top part of a spruce (*Picea abies*) log, lying on soil. The log had been monitored for about 15 years; its lower part decayed and pulverised a long time ago, but its top had always remained surprisingly hard, even when moss-covered and with pulverised sap-wood, and no polypores had ever appeared on it. On 7 Jul 2009 we noted several basidiocarps about 10 cm long on both sides of the log. The basidiocarps grew here until the end of September eventually changing to a brown, dry and disintegrating pellicle.

Distribution. This is the first collection of *S. polyspora* in the Czech Republic. In Europe, it is a very rare species. Ryvarden and Gilbertson (1994) collected data on its occurrence in ten countries only, most of them situated in the Mediterranean and Northern Europe. A few other countries could be added to the list according to recent reports (Gyosheva et al. 2006, Westerberg 2006). From the Central European region it is known only from Poland (Ryvarden and Gilbertson 1994, as *Parmastomyces transmutans*). Several collections were reported from the Asian part of Russia (Kotiranta 1998) and China (Dai 1996, Dai and Penttila 2006), and it was also found in Algeria, northern Africa (Maire 1945). On the other hand, it is a common species in North America, where it is known from Ontario, Canada and from many localities in the USA (Kotiranta 1998, Gilbertson and Ryvarden 1987).

Notes. This soft polypore with reddish tints after drying or bruising looks very much like *Oligoporus fragilis* (Fr.) Gilb. & Ryvarden and *O. leucomallellus* (Murrill) Gilb. & Ryvarden, but its ellipsoid, slightly bent, thick-walled and

dextrinoid spores (Fig. 3) are quite unique in polypores. Macroscopically, it is characterised by the thick gelatinous layer in the context that is best seen after ripping the pileus apart. Also, the pilei were only narrowly reflexed in our material and much smaller than in most *O. fragilis* collections, and the colour change in the first minutes after bruising was much slower and without yellowish tones.

We know *S. polyspora* very well from the USA where it grows abundantly, most often on pines (Gilbertson and Ryvarden 1987, Vlasák 2004). It occurs in the USA also on hardwoods, especially on *Prunus serotina*, on which it forms very thick, soft basidiocarps that look quite different, but the spores are determining.

P. A. Karsten (1894) described *S. polyspora* already in the 19th century but this name has been abandoned for years. Niemelä et al. (2005) only recently revised Karsten's type material and discovered the true identity of the type of *Sarcoporia polyspora*. Meanwhile, a number of other names had been used for this fungus. R. Maire described the species from North Africa in 1945 as *Tyromyces mollissimus* (Pouzar 1984), but the type material was lost and so this name was never fully accepted. From the USA, L. O. Overholts (1941) described the species as *Polyporus subcartilagineus* without a Latin diagnosis, and later again (thick specimen from black cherry) as *Polyporus transmutans* (Overholts 1952). Independently, based on collections from Estonia and Siberia, it was described by Parmasto (1957) as *Tyromyces kravtzevianus* Bondartsev & Parmasto. Kotlaba and Pouzar (1964) created the genus *Parmastomyces* for this unique polypore and the name *P. transmutans* was mostly used until recently.

The affinities of the monotypic genus *Sarcoporia* with other polypore genera are unclear. Basidiocarps, hyphae and brown rot suggest a similarity with *Oligoporus* (*Postia*) species but the spores are very different. Ryvarden and Gilbertson (1994) speculate that it belongs to the *Coniophoraceae* family, because of the similar spores. The phylogenetic analysis by Hibbet and Binder (2002) based primarily on the sequence of rather conserved 18S rDNA could not confirm or refute any of these hypotheses because of a small species set. *P. transmutans* remained rather isolated in their phylogenetic tree. The more variable sequence of 28S rDNA present in the GenBank shows highest similarity (97 %) with *Amylocystis lapponica* (Romell) Bondartsev & Singer, which makes sense, as the two species are quite similar, bruising and drying reddish brown, both cause brown rot and some of their microstructures stain in Melzer's reagent.

Jahnoporus hirtus (Quél.) Nuss 1980

Figs. 3–5

Description (based on the collections cited above). Basidiocarps annual, stipitate, very variable: six out of the seven basidiocarps found were spatulate to laterally stipitate and one had a more or less central stipe. Stipe 1–2 cm long and 1–2 cm in diam., with signs of branching from the base, pileus 3–10 cm in diam.,

upper surface of pileus and stipe greyish to tan, azonate, hispid, tube layer white, continuous with the context, decurrent on stipe, sometimes to its very base, 5 mm thick, pores white, angular, labyrinthic in older basidiocarps, 1–2 per mm, with entire or somewhat lacerate dissepiments. Taste bitter.

Hyphal system monomitic, tramal hyphae thin-walled with clamps, contextual hyphae often somewhat thick-walled, with inflated parts, 5–13 µm in diam. Cystidia absent, basidia clavate, very large, 38–43 × 8–11 µm, with swollen sterigmata. Basidiospores abundant, fusiform with distinctly narrowed ends, slightly bent towards apiculus, smooth, negative in Melzer's reagent, very large, 12–15 × 4–5 µm (Fig. 3).

Substrate and habitat. The first specimen was collected in August under a big spruce log lying in a somewhat muddy basin for about 15 years. The log had been monitored since the live tree was broken at the base in 1994. No remarkable polypores had ever appeared on it. At present (year 2009), it is covered with many basidiocarps of *Ischnoderma benzoinum*, *Oligoporus balsameus* and *Gloeophyllum odoratum* – a typical population of polypores on these kind of live-fallen logs in Libochovka Nature Reserve. No other basidiocarp appeared here in the following two months, but at the end of September, another site was discovered at about 100 m distance in a nearby wild boar enclosure, on a strongly rotten, disintegrated spruce stump of about twenty years old. Three basidiocarps grew on it but two of them were already highly decayed so that only the youngest one was collected. Two weeks later, a new and large basidiocarp was found here which was already rather old (Fig. 4), and another one grew on a nearby stump, 10 m from the former (Fig. 5). We infer from this that the fruitbodies of *Jahnoporus hirtus* develop quickly.

Distribution. This polypore is known from the USA (Gilbertson and Ryvarden 1986), Far East Asia (Dai et al. 2009) and Europe but everywhere, especially in Europe (Jahn 1973), it is very rare. It grows on stumps and logs of fir and spruce in Europe (Jahn 1973), in the USA and Asia it also occurs on other conifers (Gilbertson and Ryvarden 1986) or hardwoods (Dai et al. 2009). In the Czech Republic, it was earlier collected in Polom Nature Reserve, Železné hory Mts. in 1987, and this was reputedly only the sixth collection from Europe (Antonín et al. 1989). We have not learned of any other finds in Europe since then. The three sites at the locality where this fungus had never appeared before suggest, however, that the species may not be so rare. Perhaps, it needs special environmental conditions for basidiocarp development that were met just that year.

Notes. This strange fungus was described by Quélet (1873: 356) from the Jura Mts. around Neuchâtel, Switzerland, as *Polyporus hirtus*. In the course of years, the species has been transferred to several polypore genera (Jahn 1973) but the most appropriate seemed to be the combination *Albatrellus hirtus* (Quélet) Donk (1971), as this species reminds *Albatrellus* very much in its fleshy, stipitate, annual



Fig. 4. *Jahnoporus hirtus* (JV0910/4). Photo by J. Vlasák.



Fig. 5. *Jahnoporus hirtus* (JV0909/5). Photo by J. Vlasák.

basidiocarps and white, monomitic context. Yet, it differs in growing on wood, having a hirsute stipe and pileus, bitter taste and very different basidiospores. Accordingly, Nuss (1980) established the monotypic genus *Jahnoporus* for this species in honour of H. Jahn, who first treated this species in detail in one of his papers (Jahn 1973). Nuss (1980) stressed that *Jahnoporus* context overgrows small twigs and debris deposited on the pileus surface in contrast to *Albatrellus*, but inspecting our specimens we could not see any signs of such overgrowing.

rDNA ITS1 and ITS2 sequences of two *Jahnoporus hirtus* collections from the USA are in the GenBank and they are nearly identical. The *Albatrellus ovinus* sequence is the most similar but still very different (84 % similarity), indicating only a low level of kinship. One of the published sequences of *J. hirtus* is annotated as an “attempt to split *Albatrellus* sensu lato to be published in 2009”, but nothing has been published yet.

DISCUSSION

The first half of the year 2009 was very rainy around Hluboká nad Vltavou, South Bohemia, Czech Republic. Compared to 2007 and 2008, the precipitation rate in 2009 was twice as high, close to the 100-year maximum, according to data of the Czech Hydrometeorological Institute. This is perhaps the reason why some rare fungi appeared for the first time at otherwise well-known localities. Both rare polypores were collected by the first author on spruce logs that had been inspected regularly for about fifteen years, three to four times a year, with negative result. Many other rare polypores such as *Rhodonía placenta*, *Oligoporus cerifluus* and *Antrodia gossypium*, which were observed there in the past but had not been seen for several years, appeared in 2009 as well. We may wonder which other rare or perhaps unknown fungi grow concealed in the wood-mass of old trees at these localities protected since the early Middle Ages as game lands of the aristocratic landowners and were only in the past few decades shattered and spoilt by production forest management. This is probably a too optimistic view, but just the prospect of it exhilarated us a lot, in the summer of 2009.

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REFERENCES

- ANTONÍN V., ČERNÝ A., MANN J. and VALTER J. (1989): *Albatrellus hirtus* (Cooke) Donk found in Czechoslovakia. – *Česká Mykol.* 43: 61–64. (in Czech)
- DAI Y. C. (1996): Changbai wood-rotting fungi 7. A checklist of the polypores. – *Fung. Sci.* 11: 79–105.
- DAI Y. C. and PENTTILA R. (2006): Polypore diversity of Fenglin Nature Reserve, northeastern China. – *Ann. Bot. Fennici* 43: 81–96.
- DAI Y. C., YUAN H.-S., WANG H.-C., YANG F. and WEI Y.-L. (2009): Polypores (Basidiomycota) from Qin Mts. in Shaanxi Province, central China. – *Ann. Bot. Fennici* 46: 54–61.
- DONK M. A. (1971): Notes on European polypores VI. – *Verh. Koninkl. Nederl. Akad. Wet., Ser. C*, 74: 3–4.
- GILBERTSON R. L. and RYVARDEN L. (1986): North American Polypores, Vol. 1. *Abortiporus* – *Lindtneria*. – 408 p. Oslo.
- GILBERTSON R. L. and RYVARDEN L. (1987): North American Polypores, Vol. 2. *Megasporoporia* – *Wrightoporia*. – 506 p. Oslo.
- GYOSHEVA M. M., DENCHEV C. M., EVTIMIA G., DIMITROVA E. G., ASSYOV B., PETROVA R. D. and STOICHEV G. T. (2006): Red List of fungi in Bulgaria. – *Mycol. Balcan.* 3: 81–87.
- HIBBET D. S. and BINDER M. (2002): Evolution of complex fruiting-body morphologies in homobasidiomycetes – *Proc. R. Soc. Lond. B* 269: 1963–1969.
- JAHN H. (1973): *Albatrellus hirtus* (Quél.) Donk, Rauher Scharfporling. – *Schw. Z. Pilzk.* 51: 104–108.
- KARSTEN P. A. (1894): *Fragmenta mycologica XLII*. – *Hedwigia* 33: 15–16.
- KOTIRANTA H. (1998): *Parmastomyces mollissimus* in North Europe. – *Folia Cryptog. Estonica* 33: 41–47.
- KOTLABA F. and POUZAR Z. (1964): Staining spores of Homobasidiomycetes in cotton blue and its importance for taxonomy. – *Feddes Repert.* 69: 131–142.
- LOWE J. L. (1956): Type studies of the polypores described by Karsten. – *Mycologia* 48: 270–276.
- MAIRE R. (1945): *Etudes mycologiques. Fascicle 5*. – *Bull. Soc. Hist. Nat. Afr. N.* 36: 24–42.
- NIEMELÄ T., KINNUNEN J., LARSSON K. H., SCHIGEL D. S. and LARSSON E. (2005): Genus revisions and new combinations of some North European polypores. – *Karstenia* 45: 75–80.
- NUSS I. (1980): Untersuchungen zur systematischen Stellung der Gattung *Polyporus*. – *Hoppea* 39: 127–198.
- OVERHOLTS L. O. (1941): New species of *Polyporaceae*. – *Mycologia* 33: 90–102.
- OVERHOLTS L. O. (1952): New species of polypores. – *Mycologia* 44: 224–227.
- PARMASTO E. (1957): *Mycotheca Estonica* 1, 22 (No. 25).
- POUZAR Z. (1984): Notes on four European polypores. – *Česká Mykol.* 38: 203–204.
- QUÉLET L. (1873): Les Champignons du Jura et des Vosges. – *Mém. Soc. Émul. Montbéliard, Sér. 2*, 5: 333–427.
- RYVARDEN L. and GILBERTSON R. L. (1994): European Polypores, Part 2. *Meripilus* – *Tyromyces*. – 743 p. Oslo.
- VLASÁK J. (2004): Hledání chorošů v USA (Collecting polypores in the USA). – *Mykol. Listy* 90–91: 15–19. (in Czech)
- WESTERBERG S. (2006): En för landet ny vedsvamp påträffad i Norrbotten. – *Svensk Mykologisk Tidskrift* 27: 71–73.