

# Wood-Inhabiting Macrofungi Proposed for Conservation from the Primeval Bog of Bátorliget

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**Abstract** – Short description and evaluation of the wood-inhabiting macrofungi proposed for conservation in the primeval bog of Bátorliget is presented here for the species *Irpex lacteus* (Fr.) Fr., *Kavinia himantia* (Schw.: Fr.) Erikss., *Perenniporia fraxinea* (Bull.: Fr.) Ryv., *Phlebia livida* (Pers.: Fr.) Bres., *Artomyces pyxidatus* (Pers.: Fr.) Jülich, *Antrodia albida* (Fr.: Fr.) Donk, *Antrodiella semisupina* (Berk. et Curt.) Ryv. et Johansen, *Ceriporiopsis resinascens* (Rom.) Domanski, *Oxyporus latemarginatus* (Dur. et Mont.) Donk, *Spongipellis pachydon* (Pers.) Kotl. et Pouzar, and *Pleurotus cornucopiae* (Paulet: Pers.) Roll.

**xilophagous macrofungi / Fraxino pannonicae–Ulmelum / Convallario–Quercetum roboris tilietosum / conservation of macrofungi**

**Kivonat** – Fán élő védendő nagyombák a Bátorligeti Ósláp társulásaiban. A Bátorligeti ósláp területén előforduló fán élő, védendő nagyombák közül az alábbiak rövid ismertetését és értékelését adjuk: *Irpex lacteus* (Fr.) Fr., *Hydnocristella himantia* (Schwein.) R. H. Petersen, *Perenniporia fraxinea* (Bull.: Fr.) Ryv., *Phlebia livida* (Pers.: Fr.) Bres., *Artomyces pyxidatus* (Pers.: Fr.) Jülich, *Antrodia albida* (Fr.: Fr.) Donk, *Antrodiella semisupina* (Berk. et Curt.) Ryv. et Johansen, *Ceriporiopsis resinascens* (Rom.) Domanski, *Oxyporus latemarginatus* (Dur. et Mont.) Donk, *Sarcodontia pachydon* (Pers.) Spirin, *Pleurotus cornucopiae* (Paulet: Pers.) Roll.

**xilofág nagyombák / keményfa ligetredők / hárssal elegyes gyöngyvirágos tölgyes / védendő nagyombák**

## 1 INTRODUCTION

The primeval bog of Bátorliget was discovered in 1914 by János Tuzson. The outstanding diversity of its flora originates from the beech and birch-pine epoch of the Great Hungarian Plain (Boros 1932, Soó 1934, Simon 1991).

The macrofungi of the region were listed by Ubrizsy (1937, 1940, 1941, 1943, 1953, 1957) for the first time. The latest monograph on the primeval bog of Bátorliget contains (Mahunka 1991) no information on the macrofungi, though several works have been published discussing thoroughly the macrofungi of other protected areas and of national parks.

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The macrofungi of the Bog has been continuously investigated since 1995 (Lenti–Máté 1995, 1996, Rimóczi 2002). Moreover, today the survey involves also the nearby ‘great pasture’ of Bátorliget (Lenti et al. 2004) and the Fényi forest (Lenti 2007).

## 2 METHODS

We regularly documented the mushroom species inhabiting living and dead wood in the two plant communities, that cover the majority of the Bog: in the lowland oak woodlands mixed with lime (*Convallario–Quercetum roboris tilietosum*) and in the oak-elm-ash woodlands (*Fraxino pannonicae–Ulmetum*). The first results of this survey were published in 1997 (Rimóczi et al. 1997). This work, however, did not discuss the conservation status of these fungi, since the plan of the Red List of our mushrooms has been developed simultaneously (Rimóczi 1997). The revised version of the Red List, which is still today valid for the Hungarian macrofungi, was published in 1999 (Rimóczi et al. 1999). Fungal species being under legal protection (35 species altogether) are compiled in the governmental decree № 23/2005 (VIII. 31.) Ministry of Environment and Waters. This list of the Ministry, containing astonishingly and inexplicably few species, is not reasonable from any scientific aspect.

The above mentioned facts led us to the decision, that in the present article we describe such species of the wood-inhabiting macrofungi of Bátorliget, that are included in the Red List, but their legal protection was rejected by the Ministry. Some species of our compilation were found in the Bog in the past few years and are published here for the first time.

## 3 RESULTS

### *Irpex lacteus* (Fr.) Fr.

Annual basidiocarps are effuse, effuse-reflexed or composed of shelf-like pilei with a diameter of 1–2 cm. Reflexing surfaces are crinite, velvety. The trama is quite varying: composed of narrow pores when young, then the pores elongate forming lamellae, finally split into teeth and spines. The sporocarps can be observed throughout the year: from the early spring right till the persistent frosts. This saprotrophic species causes white-rot. It fruits on standing or lying trunks and logs of deciduous trees.

In 1783, Batsch regarded this species as a member of Hydnaceae. Fries classified it into its current genus in 1818, under the name *Irpex pavichii*. Pilát considered it as a lamellate polypore: *Trametes lacteae* (Fr.) Pilát.

According to Igmándi (1999), in Hungary this species is widespread from the lowlands to the mountains. It fruits not only on *Fagus*, *Quercus*, *Prunus* and *Populus* species, but also on *Robinia* and *Ailanthus*, and rarely even on the wood of *Pinus*. He does not assign this species to any community.

Krieglsteiner (2000) describes it as a rare species, which is characteristic of oak-elm-ash woodlands and ash-alder swamp woodlands. He observed it mostly on the wood of *Fraxinus excelsior*, *Frangula alnus*, *Betula pendula* and *Salix* species in the forests of the lowland and the hills, less frequently in the mountains of medium elevation.

We found it on the twigs of *Fraxinus angustifolia* subsp. *pannonica* and *Betula pendula*. Nature conservation status: very rare in the Netherlands and in Italy, rare in Sweden, Germany and Switzerland. On our Red List, this species belongs to Category ‘3’, because it prefers principally the wetlands, the communities of which are also proposed for conservation (Borhidi – Sánta 1999).

*Hydnocristella himantia* (Schwin.) R. H. Petersen

(= *Kavinia himantia* (Schw.: Fr.) Erikss.)

(= *Clavaria himantia* Fr.)

The widely effused sporocarp is thin, soft and felty, often with risomorphs. The odontoid trama is composed of dense, needle-shaped, rarely branching teeth of 2-7 mm length, hanging down from the sporocarp ('Hängezähnen').

Spore print is pale yellow. *Kavinia himantia* fruits on decayed, often mossy trunks and logs, in autumn or in late autumn. It is a characteristic circumpolar species of the riverine woodlands, found on the timber of *Salix*, *Fraxinus* and *Carpinus*. In Bátorliget we found it on the fallen trunk of *Fraxinus angustifolia* subsp. *pannonica*. This fungus is distributed in the sub-Atlantic regions of the temperate zone of Europe. It is a very rare species of the Red List.

*Perenniporia fraxinea* (Bull.: Fr.) Ryv.

(= *Fomes cytisinus* [Bk.] Gill.), (= *Fomitopsis cytisina* [Berk.] Bontd. et Sing.)

This species lives as a parasite of deciduous trees on the fringes of riverine woodlands, and it can also be found as a saprotrophic polypore, on logs and fallen dead wood in tree lines. It turns the timber white and soft. Fruit bodies may also be observed in the sunny areas of parks. Contrary to its scientific name, it is more frequent on black locust, than on ash. *Perenniporia fraxinea* can be come across throughout the whole year; partially because it is perennial, and also because new sporocarps may be produced in almost each months. The basidiocarp is broadly attached to the substratum. Its diameter is 10-20 cm, even reaching 50 cm, if several fruitbodies coalesce. The margin is irregularly crispate. The sporocarp often encloses plant remnants by its growth. Pores of the young fruit body are narrow, later they may become larger cream-coloured, turning brown if pressed.

It is rare (Netherlands, Germany, Switzerland) or sporadic (Italy) in Europe. On our Red List it belongs to Category '4', principally because of its preference of humid riverine habitats. However, it also lives in antropogenic habitats, even on the trunk of *Robinia* or *Aesculus*.

*Phlebia livida* (Pers.: Fr.) Bres.

(= *Corticium lividum* Pers.)

The effused sporocarp forms a 2-4 mm thick, wax-like crust on the surface of decaying deciduous trees. The trama is smooth or granulose, warty, involute, cracking with drying. Its colour is quite varying.

*Phlebia livida* fruits throughout the whole year, but most frequently in late autumn. It causes the white-rot of deciduous trees, in the intermediate phases of decay. We have observed it on the lying trunks of *Fraxinus angustifolia* subsp. *pannonica* and *Alnus glutinosa*. According to the literature, it inhabits also the timber of *Quercus*, *Carpinus* and *Fagus* (Kreigsteiner 2000), beside that of *Betula*, *Tilia* (Arnolds et al. 1995), or *Picea* (Breitenbach-Kränzlin 1986). It is considered rare in the Netherlands. It is not frequent anywhere in Europe. It belongs to Category '3' of our Red List, because it primarily lives in mesophilic woodlands and riverine forests.

*Artomyces pyxidatus* (Pers.: Fr.) Jülich

(= *Clavicornia pyxidata* /Pers: Fr./ Donk)

The terminal branches of *Artomyces pyxidatus* (crown-tipped coral fungus) end in minute cups with tapering edge. Its flesh is tough, yellowish or greyish brown, turning brown with aging. Its taste is hot spicy, and the fungus is inedible. It fruits from the beginning of summer till late autumn, on decaying and mossy wood.

On the first sight, its fruiting body resembles a well-developed coral fungus, though it is not a relative of them. The terminal branches form small cups. From the edges of these cups, 4-6 thin branches derive that end in even smaller cups. The edges of the smallest cups bear only small, needle-like outgrowths. Its flesh is springy, whitish yellow when young, changing into brown with a flesh tint with aging. Its smell is very spicy, later it becomes stinking. Its taste turns gradually ever bitter, finally burning hot.

*Artomyces pyxidatus* fruits on the logs and lying trunks of deciduous trees (and rarely those of *Pinus* or *Abies*) in the intermediate and final decay phases, from the mid-summer till the first frosts. This Holarctic species (Corner 1970) was observed in Bátorliget on thick, well-decayed fallen trunks of *Populus*, *Salix* and *Fraxinus angustifolia* subsp. *pannonica*, in the heart of riverine forests that are always moist. It is under protection everywhere in Europe, becoming more and more rare due to the lack (or insufficient amount) of dead wood in the natural riverine forests. It belongs to Category '2' on our Red List.

*Antrodia albida* (Fr.: Fr.) Donk

(= *Lenzites albida* Fr.) (= *Antrodia serpens* (Fr.: Fr.) G. Karst.)

Sporocarp is effused, or emerges at the margins, forming hat-like structures, which arrange above each other in a tile-like manner. Its surface is slightly felty, white or cream-coloured. Pores are whitish, wide and slightly angular at the effused parts of the sporocarp, while at the hat-like emergences they gradually turn into lamellae, elongating in a labyrinth-like way, . It fruits from early summer till late autumn, and the basidiocarps pulverize by the next spring. *Antrodia albida* is a rare species everywhere in Europe. It causes the brown-rot of the trees in *Salix* and *Alnus* forests and in other riverine woodlands. In Bátorliget, we found it on the timber of poplar and ash. It belongs to the Category '3' on our Red List.

*Antrodiella semisupina* (Berk. et Curt.) Ryv. et Johansen

Fruit bodies appear as mycelial patches, attached close to the substratum, later they become effused, conchiform. Its thickness is some mm, and the sporocarp tapers into a stem-like stalk near the substratum. Its surface is slightly undulate with irregularly lobed margin. Pores of the underside are round, or slightly elongated. Flesh is white, quite elastic, almost rubber-like. Its smell is uncharacteristic, its taste is sweetish.

This fungus lives in beech forests mixed with hornbeam, and in oak-elm-ash or alder woodlands of the Great Plain. It fruits on lying, well-decomposed twigs and trunks, being in the intermediate and terminal phases of decay. Sporocarps often turn up on the soil-facing side of the trunks. It causes white-rot.

The fresh fruiting body can be observed from the beginning of June till the persistent frosts. It distributes throughout Europe, but it is not a frequent species. It lives from the sub-Mediterranean region to the boreal forests, where it was found also on the trunks of spruce and fir.

In Bátorliget we have found it on the trunks of ash, English oak and poplar. Often inhabiting humid, semi-natural habitats, *Antrodiella semisupina* may become endangered in the future.

*Ceriporiopsis resinascens* (Rom.) Domanski

(= *Poria aneirina* [Somm.] Sacc.) (= *Tyromyces polyetes* Parm.)

Sporocarp is closely attached to the substratum, forming a 1-2 mm thick, wax-like crust. Its surface is finely porous, whitish or cream white when young, turning ochre and dark orange-brown with aging. Pores are initially round, later becoming angular or elongated.

It is the characteristic species of alder and willow forests, and also of riverine woodlands. It fruits from the end of summer, even over milder winters, mainly on the lying and standing

decayed trunks of *Salix*, but it also to be found on the wood of *Populus*, *Fraxinus* and even *Sambucus*. It causes white-rot. In Bátorliget we found it on the fallen twigs of *Salix* and *Populus*.

This Holarctic species is rare throughout Europe. This fungus of humid, semi-natural habitats would worth legal protection even in Hungary.

*Oxyporus latemarginatus* (Dur. et Mont.) Donk

(= *Poria ambigua* Bres.)

*Oxyporus latemarginatus* is the characteristic species of riverine woodlands. It fruits on the lying, well-decayed twigs and trunks of poplar and alder. It prefers the quickly warming, open parts of the forests. It is sporadic everywhere in the sub-Mediterranean regions of Europe and also in Central Europe. Bánhegyi – Bohus – Kalmár – Ubrizsy (1953) mentioned it several times, as a rare wood-rotting mushroom, but they never described the accurate location of the species. Igmándy (1991) regards it as a sporadic species in Hungary, fruiting on decomposing trunks and branches of deciduous trees. In Bátorliget, we found it on the branches of *Ulmus*, *Fraxinus* and presumably *Salix*.

*Sarcodontia pachydon* (Pers.) Spirin

(= *Spongipellis pachydon* (Pers.) Kotl. et Pouzar)

Its sporocarp is effused, or forms pilei growing above each other, in a tile-like manner. It fruits from early spring till late autumn. The surface of the fruiting body is finely felty, partly becoming glabrous. Its cream white colour turns light brown with aging. The trama is composed of flattened, spiny projections (or teeth), sometimes of 10–15 mm length. At the edge of the sporocarp, these spines fuse to form lamellae. Its flesh is cartilaginous when young, turning brittle with aging.

The fruit bodies of *Spongipellis pachydon* occurs in deciduous forests, on standing dead trunks or on fallen branches or logs. It causes white-rot. In Bátorliget, we found this species on the twigs of *Populus* and *Quercus robur*. It is a rare species all over Europe, being under protection. It belongs to Category ‘3’ on our Red List, i.e. it is ‘endangered’.

*Pleurotus cornucopiae* (Paulet: Pers.) Roll.

In deeply shaded habitats the cap is bright yellow, turning paler in the more sunny ones. The dense gills are white, often with a pink tint. They are running right down the stem, where they anastomose reticularly. Its snow-white flesh is soft when young, later becoming fibrose. It is slightly flour-flavored, delicious.

Most often, thus also in Bátorliget, it fruits on the decomposing logs and fallen trunks of *Ulmus*, always forming groups of numerous fruit bodies. Sometimes it is found on other deciduous trees, like poplar or ash.

This species is characteristic of oak-elm-ash woodlands. It fruits from early summer till the first frosts. It is a rarefying species throughout Europe. It belongs to Category ‘3’ on the Hungarian Red List. The main reasons for this position are the decline of its habitats, diminishing of its substrata, and also its delicious taste. It is the most delicate oyster mushroom, containing the ‘least amount of fibres’. Its cultivation has been under development for decades.

Approximately 120-140 species from 75 genera of the order Aphyllophorales lives in Bátorliget. 55-70% of them are characteristic of the area, which can be assigned to a certain plant community.

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