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STUDIES IN THE CORTICIA OF YUGOSLAVIA  
III. SELECTED SPECIES FROM THE PLITVIČKA  
JEZERA NATIONAL PARK

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About 130 species of corticia in wide sense were collected to date in the Plitvička Jezera National Park; twenty of those are presented here. Although some belong to generally common fungi, only twelve have been found also in a few other localities in Yugoslavia. Sixteen are published here for the first time for this country.

Introduction

Extensively exploited forests, and nature reserves and national parks even more, are an Eldorado for lignicolous fungi, but also, one must fear, the last refuge for many species.

In Yugoslavia, one of such places is the Plitvička Jezera National Park (= Lakes of Plitvice), in the region of Lika in the Republic of Croatia, named after its famous lakes, but covered for the most part by large stretches of forests, mainly those of beech, alone or mixed with fir, an area of about 80 ha having the character of a virgin forest. During the few years of investigations there, the author has collected about 130 species of corticioid fungi, from very common to very rare, only a small part of which she has already published (TortiĆ 1978, 1979a, 1980, 1981, 1982, TortiĆ and Jelić 1972, TortiĆ and Sylejmani 1982).

Owing to an »embarras de richesse« and lack of space, it was possible to present here, arranged alphabetically, only a selection of species which deserve to be mentioned, mostly as being new for Yugoslavia. All are not necessarily rare, some even appear from the literature to be quite frequent in various parts of Europe and will surely prove in time to be so in this country, too. Other localities, if known, are added. The position of the Plitvice Nat. Park, as well as other localities, are shown on the map (Fig. 1). If not stated otherwise, the specimens were collected by the author, mostly jointly with her husband, prof. S. TortiĆ,

and are preserved at the Department of Botany, Faculty of Science, Zagreb (ZA). Most finds were determined by her and she has also revised some collections by V. Lindtner from the Natural History Museum in Beograd (BEO), which are marked as such in the text. Several specimens were determined by K. Hjortstam (Alingsås, Sweden).

### List of Species

*Amphinema byssoides* (Fr.) John Erikss. In Plitvice collected several times: in Oct. 1979, Aug. and Oct. 1980, Oct. 1981, July 1982, in forests of beech and those of beech and fir, including the virgin forest, on prostrate branches of *Fagus sylvatica* and *Abies alba*, logs of *Picea abies*, at altitudes from 700 to 950 m. A specimen collected by V. Lindtner in Avala Mountain near Beograd (Serbia) in Nov. 1940 in beech forest on soil, alt. about 300 m, was determined by the present author (BEO herb. Lindtner 5415). Recently, several other localities were established. One of them is in Slovenia, virgin forest nature reserve of Strmec near Kočevje, beech and fir forest, alt. about 900 m, on a branch and log of *Abies alba*, Aug. 1982, one in Croatia (in fact two a few km apart) on the slopes of Mt. Učka near Rijeka, above Lovran and Opatija, on a dead stump and branch of *Pinus* (cf. *nigra*) alt. about 400 m, Febr. 1983, and three in Bosna and Hercegovina: Igman Mountain near Sarajevo, spruce forest, alt 1200 m, on logs and branches of *Picea abies*, Trnovo near Sarajevo, spruce forest 900 m, on a log of *Picea abies*, and the virgin beech and fir forest Peručica in Sutjeska National Park, alt. about 1200 m, on logs of *Abies alba* and *Pinus nigra*. All the three collections were made in Sept. 1982.

This species is, according to Eriksson and Ryvar den (1973) common in Scandinavia, and seems to be spread in Yugoslavia, too, even if not many localities are known as yet.

*Athelia decipiens* (Höhn. et Litsch.) John Erikss. Found in two places in Plitvice, in beech and fir virgin forest and pine forest in July 1977, Apr. 1979, Oct. 1980 on rotten prostrate trunks of *Abies alba*, *Picea abies* and *Pinus sylvestris* at alt. from 800 to 950 m. The specimens were determined by K. Hjortstam. This is also a most frequent species in Scandinavia (Eriksson and Ryvar den 1973).

*Athelia epiphylla* Pers. (sensu lato). For Yugoslavia published only by Tortić and Sylejmani (1982) who briefly mention also the finds at Plitvice. It is common in the area of this National Park, and was collected there at least a dozen times from 1977 on, in Sept., Oct., and Nov. in forests of alder, of pine, of beech, as well as in the beech and fir virgin forest on branches and trunks of *Alnus glutinosa*, *Abies alba*, *Fagus sylvatica*, probably also *Picea abies*, from 550 to 950 m alt. Several collections were determined by K. Hjortstam. Other localities in Croatia are on Velika Kapela Mountain near Ogulin, about 800 m, in beech and fir forest, on a log of *Picea abies*, Sept. 1978, and nature reserve Prašnik near Okučani, lowland oak forest at ca 100 m on the wood of *Quercus robur*, Oct. 1981. It was found also in Slovenia, in the nature reserve of Krakovski gozd near Kostanjevica, lowland oak forest, alt. 150 m, on *Alnus glutinosa*, Febr. 1980. The locality published is in the Province of Kosovo, Ošljak Mountain, a northern branch of Šar Mountain, at about 1600 m, on the wood of *Pinus leucodermis*. The species was taken here in the wide sense according to Eriksson and Ryvar den (1973) and as such seems to be widely distributed

in various biotopes, at altitudes ranging from 100—1600 m. There is not enough herbarium material available to divide into a number of smaller taxa according to Jülich (1972) and Jülich and Stalpers (1980).

*Botryobasidium angustisporum* Boid. Easily recognised owing to its narrowly cylindrical spores and partly clamped hyphae. Collected at Plitvice three times in the virgin beech and fir forest, at 850—950

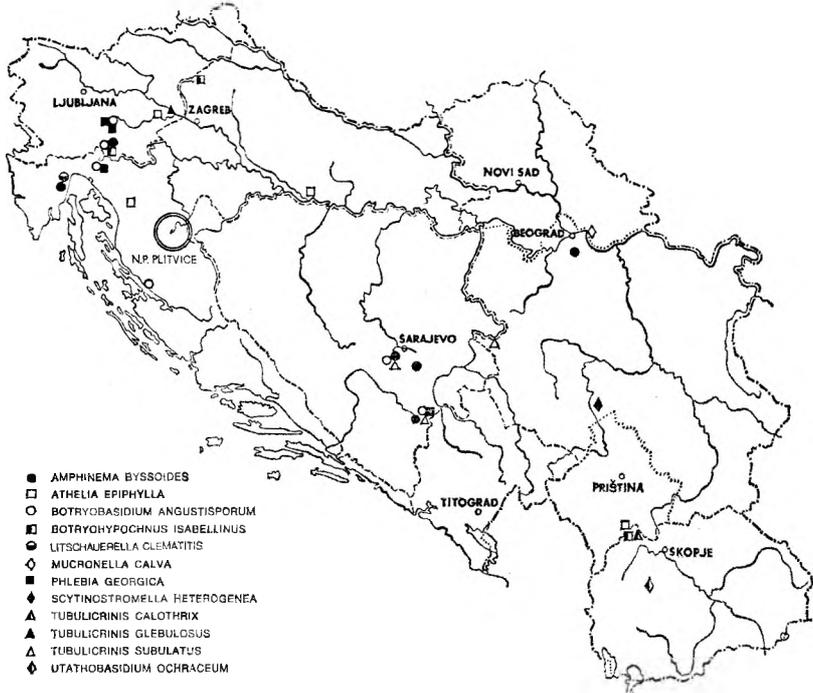


Fig. 1.

Aug. 1980, July and Sept. 1982, on trunks and branches of *Abies alba*. Other localities in Croatia are Risnjak National park, 700—800 m, on a trunk of *Abies alba* and a log of *Picea abies* in beech and fir forest in July 1982, and Paklenica National Park in Velebit Mountain, beech forest, on a trunk of *Fagus sylvatica*, alt. 700—800 m, May 1963, leg. V. Lindtner. BEO 8504. This specimen was determined by K. Hjortstam. Two localities are known from Slovenia: Pečke, the virgin forest nature reserve on Kočevski Rog Mountain near Novo Mesto, 800—900 m, Aug. 1976 and Strmec near Kočevje, virgin forest nature reserve, alt. 900 m, Aug. 1982, both on logs or stumps of *Abies alba* in beech and fir forests. In Bosna and Hercegovina two localities have also been established: Sutjeska Nat. Park, the beech and fir virgin forest Peručica, alt. 1200 m, on trunks of *Abies alba*, July 1980, and Igman Mountain near Sarajevo, spruce forest, 1200 m, on a trunk of *Picea abies*, Sept. 1982.

This species is probably not as common as some others of the same genus are; nevertheless, it seems to be widely spread in Yugoslavia. The localities are all at higher altitudes from 700 to 1200 m.

*Botryohypocnus isabellinus* (Fr.) John Erikss. Litschauer (1939) as *Tomentella isabellina* (Fr) Höhn. et Litsch.

The published locality is in Šar Mountain in Macedonia at over 1500 m and the fungus grew there on *Fagus* in a beech forest. The material is deposited at PRM and has not been revised. In Plitvice the species was collected three times in beech and fir forests (including the virgin forest) at 850—950 m in June and Aug. 1980 and Sept. 1981 on prostrate trunks of *Fagus sylvatica* and *Abies alba*. Another locality in Croatia is Donji Macelj in Hrv. Zagorje, about 70 km N of Zagreb, in fir forest, on a prostrate trunk of *Abies alba*, at 300—350 m, July 1982. In Slovenia it was collected in the virgin forest nature reserve of Strmec near Kočevje, beech and fir forest, at 900 m, on a log of *Fagus sylvatica*, Aug. 1982.

The altitude range is wide, from 300 to 1500 m or higher. The species is easily recognised by its globose, echinulate spores, strongly cyanophilous in cotton blue.

*Chaetoderma luna* (Rom. ex Rog. et Jacks.) Parm.

Collected only twice at the same locality, in pine forest at about 800—950 m, on prostrate branches of *Pinus sylvestris*, Aug. 1980 and 1981. The second collection was quite fresh and an interesting smell of pepper was noticed.

*Hyphodontia alienata* (Lund.) John Erikss. A rare species, according to Eriksson and Ryvar den (1976). In Plitvice it was found in two places in beech and fir forest (including the virgin forest) from 850 to 950 m in Aug. 1980, on very rotten trunks of *Abies alba*.

*Litschauerella clematitidis* (Bourd. & Galz.) Erikss. & Ryv. A very rare species, collected in Plitvice only once in beech and fir forest on a prostrate branch of *Abies alba*, at about 850 m, Aug. 1980. Another known locality is on the slopes of mt. Učka near Rijeka, above Opatija, on a branch of *Pinus* (cf. *nigra*), alt. 400 m, Febr. 1983. It is easily recognisable owing to its globose ornamented spores, and particularly because of conical, thick-walled incrusting cystidia which are cyanophilous in cotton blue, and have often a covering of liane-like hyphae.

*Mucronella calva* (Fr.) Fr. was collected in Plitvice on a prostrate trunk of *Abies alba* in beech and fir virgin forest at about 900—950 m, in Oct. 1981. The only other locality known at the moment in Yugoslavia is in Serbia, lowland forest along the river Tamiš near Pančevo (vicinity of Beograd), on trunks of *Populus* sp., alt. about 75 m, leg. V. Lindtner in Sept. 1952, BEO 4684. Det. K. Hjortstam. The ecological range of this clavarioid species is consequently very broad since the habitats are quite different.

*Phlebia cremoealutacea* (Parm.) Larss. & Hjortst. A single collection in virgin beech and fir forest (900—950 m) on a prostrate rotten trunk of *Abies alba*, Aug. 1980. A little known species according to Eriksson, Hjortstam and Ryvar den (1981) which is characterized by thick-walled cystidia broadened in the basal part and with an incrusting projecting narrower upper part.

*Phlebia georgica* Parm. The area of this species, which was described only recently, is still little known. In Yugoslavia it was collected to date in several national parks and nature reserves, everywhere in abundance, and is apparently frequent at least in such habitats. In Plitvice it was found in forests of pine and those of beech and fir (including the virgin forest) on rotten wood mostly of *Abies alba*, but also on *Picea abies* and (probably) *Pinus sylvestris* in June, Aug., Sept. and Oct. 1981, July 1982, at altitudes from 850 to about 950 m. Another locality in Croatia

is Risnjak Nat. Park in Gorski kotar, beech and fir forest, alt. ca 700—800 m, on prostrate trunks, branches and stumps of *Abies alba*, July 1980. In Slovenia it was collected in virgin forests of beech and fir in the nature reserves of Pečke and Rajhenavski Rog on Kočevski Rog Mountain, on trunks of *Abies alba*, at alt. 800—900 m in Nov. 1977, July 1978 and Sept. 1979 (all specimens det. K. Hjortstam), and in Bosna and Hercegovina in Sutjeska National Park, virgin beech and fir forest Peručica, on a log of *Abies alba* and a prostrate trunk of *Picea abies*, at 1200 m, in July 1980. The altitudes range from 700—1200 m and the species apparently prefers mountainous forests of beech and fir. Further finds in similar habitats may be expected.

*Scytinostromella heterogenea* (Bourd. et Galz.) Parm. Tortić 1979.

The locality published is Kopaonik Mountain in Serbia, on *Picea abies*, probably at 1600 m. Recently (July 1982) it was found also in Plitvice, in beech and fir virgin forest at the alt. of 850 m, in a hollow at the base of an enormous living tree of *Abies alba*. The fresh specimen was white, pellicular, with a merulioid upper surface. As stated in the mentioned paper (Tortić 1979) thickwalled hyphae and cystidia are strongly metachromatic in cresyl blue. They are also cyanophilous in cotton blue, a feature not mentioned by Jülich and Stalpers (1980).

*Sistotremastrum niveo-cremeum* (Höhn. et Litsch.) John Erikss.

On a prostrate branch of *Fagus sylvatica* in beech forest, alt. 600 m, Oct. 1979. Det. K. Hjortstam.

*Sistotremastrum suecicum* Litsch. ex John Erikss. A prostrate trunk of *Abies alba* in beech and fir forest, alt. 850 m, Nov. 1978. Det. K. Hjortstam.

*Steccherinum subcrinale* (Peck) Ryv. Found at Plitvice in beech and fir forest, on a branch of a prostrate trunk of *Abies alba*, Aug. 1980, alt. 850 m. A rare species, known in North America and in several localities in Europe both on hardwoods and conifers (Ryvarden 1978). Macroscopically it resembles *S. fimbriatum*, but the generative hyphae are clampless. The skeletal hyphae and cystidia are metachromatic in cresyl blue.

*Tubulicrinis calothrix* (Pat.) Donk. On a log of *Picea abies* in pine forest, at about 850 m, Aug. 1980. The only other locality known at present is Ljuboten at Šar Mountain (Macedonia), alt. 1500—1800 m, on *Juniperus nana*. It was collected by A. Pilát and V. Lindtner in July 1939 and is preserved at PRM 489311. The envelope was labelled *Odontia arguta* and indeed contains this species (= *Hyphodontia arguta* (Fr.) John Erikss.) on some of the wood fragments, but more than a half of the material proved to be *T. calothrix* which the collectors apparently did not notice, since it was not published in their joint paper (Pilát and Lindtner 1938).

*Tubulicrinis glebulosus* (Bres.) Donk. The locality at Plitvice is in alder forest, alt. 550 m, on a root and branch of *Salix* sp., Aug. 1980. The species was collected also in Slovenia, in a lowland oak forest near Brežice, alt. about 150 m, on a prostrate branch of *Quercus* cf. *robur* in Sept. 1980.

*Tubulicrinis subulatus* (Bourd. et Galz.) Donk. Tortić 1981.

The published locality is Tara Mountain in Serbia, on *Abies* (alt. about 1000 m). At Plitvice it was found in two places, in beech and fir forest (including the virgin forest) and in pine forest, from 800 to 950 m, on prostrate branches of *Abies alba* and *Pinus sylvestris*

in Sept. and Oct. 1981 and July 1982. It was collected also in two localities in Bosna and Hercegovina. Igman Mountain near Sarajevo, 1200 m, spruce forest, on a log of *Picea abies*, and the virgin beech and fir forest Perućica in Sutjeska Nat. Park, alt. 1200 m, on a prostrate branch of *Picea abies*, both in Sept. 1982.

Up to now, few localities of the species of this genus are known in Yugoslavia and further investigations will show whether they are really rare or were only overlooked, which is more probable. Characteristic thick-walled cystidia, which dissolve in KOH and are amyloid or not, remain hyaline in cresyl blue or at most turn faintly light violet blue in all the three species discussed as well as in some others examined, which probably means, in all of them.

*Urnobasidium sernanderi* (Litsch.) Parm. A stump of *Fagus sylvatica* in beech forest, alt. 600 m, Oct. 1979. Det. K. Hjortstam.

*Utathobasidium ochraceum* (Mass.) Donk. On very rotten wood of *Fagus sylvatica* in two places in beech forest, June 1980, alt. 600—700 m. This species was collected also by V. Lindtner in Macedonia, at Kurtovića above Papradište in Mountain Dautica, on dead wood of *Fagus*, alt. 1450 m, Aug. 1938, BEO herb. Lindtner 4589. Det. K. Hjortstam.

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My great and sincere thanks are due to Mr. K. Hjortstam (Alingsås, Sweden), without whom this contribution would contain fewer species new for Yugoslavia, since, as pointed out in the text, he has determined a considerable number of specimens. I am also much indebted to the warden of the Kočevska Reka Forest Estate, ing. Jože Šteblaj, as well as to prof. Stana Hočev ar and mr Dušan J u r c of the Institute for Forest and Wood Economy, Ljubljana, for making possible, in various ways, my visit to the virgin forest of Strmec. As usual, I am deeply grateful to my husband, prof. S. Tortić, for his assistance in the field work.

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## SAŽETAK

 ISTRAŽIVANJA KORTICIOIDNIH GLJIVA JUGOSLAVIJE  
 III. ODABRANE VRSTE IZ NACIONALNOG PARKA PLITVIČKA JEZERA

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Nacionalni parkovi i prirodni rezervati predstavljaju, zbog mnoštva mrtvog drveta, pravi Eldorado za lignikolne gljive, ali nažalost i posljednje utočište mnogobrojnih vrsta.

Jedno je od takvih područja u Jugoslaviji i Nacionalni park Plitvička jezera. Intenzivnim istraživanjima u toku posljednjih nekoliko godina ustanovila je autorica između ostalog i oko 130 vrsta korticioidnih gljiva, od vrlo čestih do vrlo rijetkih. Samo je malen dio dosad publiciran (radovi su citirani u engleskom tekstu).

Zbog obilja materijala i pomanjkanja prostora ovdje je ukratko navedeno samo 20 vrsta. Od njih su za Jugoslaviju objavljene dosad četiri, jedna pred mnogo godina (Litschauer 1939), a tri tek nedavno (Tortić 1979, 1981, Tortić i Sylejmani 1982). Ostalih 16 ovdje se prvi put objavljuje za našu zemlju. Za dvanaest vrsta poznato i po jedno do nekoliko drugih nalazišta, a osam je sabrano zasad jedino na Plitvicama, no vjerojatno će se, barem neke, naći i drugdje.

Od ustanovljenih vrsta poznate su u drugim zemljama kao česte, pa su takve vjerojatno i u nas, npr. *Amphinema byssoides*, *Athelia decipiens*, *A. epiphylla* i još neke. *Phlebia georgica* opisana je tek u novije vrijeme i još se malo zna o njezinoj rasprostranjenosti, no u Jugoslaviji je čini se česta osobito u nacionalnim parkovima u šumama bukve i jele u planinskom području. Zanimljivi su nalazi rijetkih i slabije poznatih vrsta kao *Litschauerella clematitidis*, *Phlebia cremeoalutacea*, *Scytinostromella heterogenea* i *Steccherinum subcrinale*.

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