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A SHORT SURVEY OF THE FAMILY *LACHNOCLADIACEAE (BASIDIOMYCETES)* IN YUGOSLAVIA

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Eight species, belonging to three genera of the family *Lachnocladiaceae* have been established in Yugoslavia up to now. Their distribution in this country is presented. Reactions of hyphae and spores in cresyl blue have been investigated.

Introduction

Lachnocladiaceae Reid represent a small family, numbering six genera, three of which occur solely in the tropics.

In Yugoslavia only three species, belonging to two genera, have been published until now, each from a single locality. Now, as a result of recent investigations, three genera with eight species of this family are known in this country, some at several localities, and are discussed here (see the map Fig. 1). If not stated otherwise, the specimens were collected by the present author, mosty jointly with her husband, S. Tortić, and are preserved at the Department of Botany, Faculty of Science, Zagreb (ZA). In addition to her collections, she has determined or revised also some specimens from other herbaria, as indicated in the text.

Characteristic of and well known for this family are dextrinoid and cyanophilous reactions of skeletal hyphae and other thick-walled elements, although not always very pronounced. The author has now investigated the reactions of those structures in cresyl blue.* These are rather difficult to study in those species, since the hyphae are often very densely intertwined and the dye cannot penetrate inside. The reaction is therefore clear only in places, usually best at the margin of the sections.

* The product used: Dr. G. Grübler et Co, Leipzig

The species investigated

Asterostroma cf. *ochroleucum* Bres. ex Torrend. Only a single locality is known for the moment: beech and fir virgin forest in the nature reserve Krokar near Kočevje (Slovenia) on rotten wood of *Abies alba*, alt. about 900—1000 m, August 26, 1982. Its brownish, thick-walled asteroseate did not change colour in Melzer's reagent and in cotton blue but asterohyphidia with thin almost hyaline walls were clearly cyanophilous. In cresyl blue those structures turned bluish and the thin-walled clampless hyphae light red. According to the literature (Parmasto 1970, Jülich and Stalpers 1980) the differences between this species and the closely related *A. medium* Bres. are very slight, mostly in the shape of amyloid spores with elongate tubercles. The spores in my specimen fit better those of *A.ochraceum*, which are more or less globose, than of *A.medium*, where they are rather angular. However, without a comparison with good material of both species it is not certain whether this determination is quite correct.

Scytinostroma galactinum (Fr.) Donk. Tortić and Lisiewska 1978.

The locality published, near Petrinja (about 70 km S of Zagreb) alt. 250 m, is still the only one known. According to Parmasto (1970) this is the single species in *Lachnocladiaceae* attacking live trees and it really grew at the injured base of a living tree of *Castanea sativa*. It is known as a pathogen in North America (Lentz and Burdsall Jr. 1973). In cresyl blue the skeletals in the upper part of the fruitbody, nearer the hymenium, turned red, while lower down, nearer the substrate, they became darker, partly almost dark blue.

S. odoratum (Fr.) Donk. Only two localities were established. The first is in Slovenia: Ljubljana, on coniferous wood, alt. about 300 m August 1882, leg. W. Voss, det. M. Tortić. The specimen is preserved in the Natural History Museum in Ljubljana (LJUM). It was determined and published by Voss (1889—92) as *Corticium leave* (= *Cylindrobasidium evolvens*). The second locality is in Croatia, in Plitvička Jezera National Park, Čorkova Uvala beech and fir virgin forest, alt. 900 to about 950 m, where it was found growing abundantly on prostrate trunks of *Abies alba* and collected on June 22, 1978 and September 13, 1980. In cresyl blue the skeletal hyphae in the specimens examined turned dark blue.

S. hemidichophyticum Pouz. and *S. portentosum* (Berk. et Curt.) Donk are very similar and their only difference is apparently in the form of the endings of the skeletal hyphae in the hymenium: in the former they are short, parallel to basidia and 2—3 times branched, and in the latter they are long and parallel to the substrate. This difference is clearly seen in mature specimens (Pouzar 1966). Parmasto (1970) was somewhat doubtful whether *S. hemidichophyticum* and *S. portentosum* were really different taxa, since in some specimens from the USSR which he had studied the endings of the skeletals had an intermediate form. Later investigations have proved that they represent two good species, since they are incompatible in pure cultures (Lanquetin 1973).

Specimens collected in Yugoslavia could in most cases be easily referred to the one or the other of those species; still, there are a few collections which are somewhat doubtful.

Localities of *S. hemidichophyticum.* Croatia: Medvednica Mountain near Zagreb, on an injured part of a living trunk of *Robinia pseudacacia* (near human habitation), alt. 400—500 m, June 14, 1974.— Klek Mountain near Ogulin, beech forest, alt. 800—900 m, on a prostrate trunk

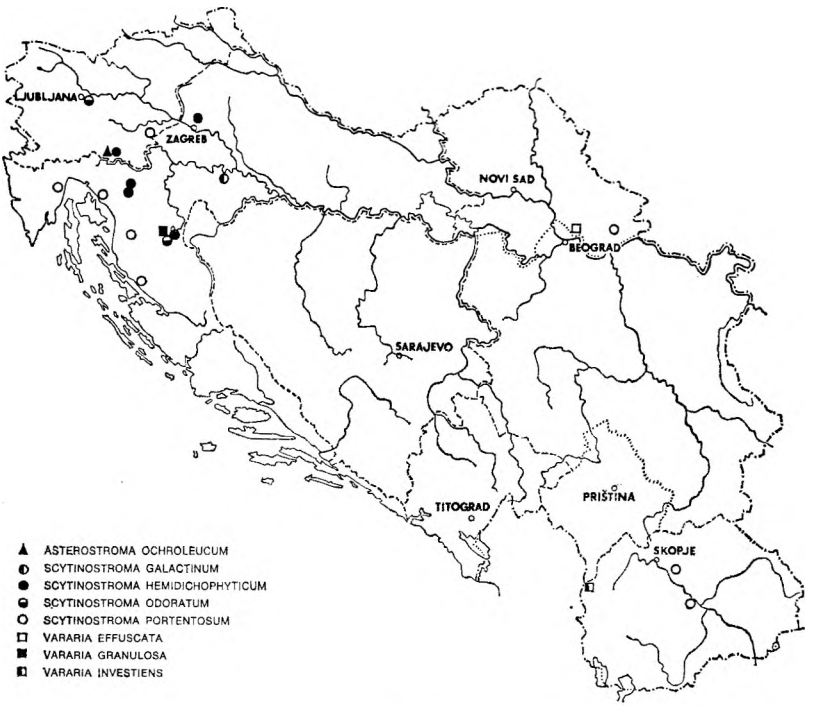

Fig. 1.

of *Fagus sylvatica*, April 30, 1978.— Jasenak near Ogulin, beech and fir forest, alt. 650—700 m, on a prostrate branch of *Fagus sylvatica*, May 2, 1982. A fresh specimen, with the characteristic smell of mothballs. — Plitvička Jezera National Park. Typical specimens were collected in various parts of the park in forests of beech and of beech and fir, on the wood of *Fagus sylvatica* and *Corylus avellana* several times since 1975, and several specimens were preserved (July 1976, July 1977, Oct. 1979). The altitudes were from 600—850 m. In four collections (May 1975, May 1976, February 1977, October 1976) on *Fagus*, *Corylus* and *Acer* cf.*obtusatum* the ends of skeletals could not be observed clearly, but the specimens seem to belong here rather than to *S.portentosum.* Slovenia: Nature reserve of Krokar, (near Kočevje) virgin forest of beech and fir, on the wood of *Fagus sylvatica*, alt. about 900—1000 m, August 26, 1982. The specimen is sterile and the endings of the skeletals are of an intermediate form between this species and *S. portentosum*,

since they are parallel to basidia but some branches are longer and parallel to the surface. However, it seems to be nearer to *S.hemidichophyticum.*

Localities of *S.portentosum.* Slovenia: Gorjanci mountain range near Novo Mesto, beech forest, alt. ca 950 m, on a prostrate trunk of *Salix* sp., July 4 1978. — Croatia: Slopes of Mt. Učka near Rijeka, on two places a few km apart above Opatija and Ičići, alt about 300 m, on dead branches of *Cornus mas* and *Hedera helix,* Febr. 25 and 26 1983. — Otočac (a small town in the region of Lika) on dead branches of a living *Cornus mas,* alt. 450 m, July 23 1974. — Crikvenica near Rijeka, at the sea-coast in a park on a living trunk *(Quercus?),* December 1, 1980. — Starigrad-Paklenica near Zadar, at the sea-coast, on dead branches of *Quercus pubescens* and *Paliurus aculeatus,* July 20, 1966, leg. F. Kotlaba. — Serbia: Deliblatska Peščara (= sands of Deliblato) N of Beograd, alt. about 150 m, on the bark of a living *Crataegus monogyna,* May 13 1978. — Macedonia: Katlanovska Banja near Skopje, alt. 350 m, on the dead wood of *Buxus sempervirens* (Pilát and Lindtner 1938 as *Corticium portentosum*). Several speciments at PRM were revised by Z. Pouzar, and those at BEO 1742 and duplicates from PRM 489224 and 489198 by the author. — Between Vlahčane and Veles, alt. probably about 200 or 300 m, on the wood of *Buxus sempervirens,* leg. V. Lindtner, det. A. Pilát as *Corticium portentosum.* BEO herb. Lindtner 4952.

Pouzar (1966) is of the opinion that *S.portentosum* has a more southern distribution than *S.hemidichophyticum.* In Yugoslavia, both species have not been found yet in the same localities, and those of *S.portentosum* are indeed situated for the most part in warmer regions than those of *S.hemidichophyticum.* The substrates are apparently different, too. However, the collections are still too scant to allow definite conclusions about the distribution and ecological requirements of those species in this country.

Skeletal hyphae in some specimens were strongly dextrinoid, in others the reaction was very weak. Cyanophilous reaction was usually distinct,

In cresyl blue the skeletals of both species reacted similarly: they often turned partly red and partly blue in the same specimen, and in some specimens only a dark blue colour was observed. In some layered specimens of *S.hemidichophyticum,* for instance, a regularity could very well be noted in such reactions: the skeletals in the hymenium and immediately below it were red (metachromatic) and the ones near the substrate dark blue; the same phenomenon was seen, as already stated, also in *S.galactinum.* It seems therefore that this difference in reactions is due to the age: in younger specimens or younger parts of a specimen the hyphae turn red, in older they become darker and are finally dark blue. It is probable that such is the case with *S.odoratum,* too, and that the material available was too old to be metachromatic. Such a change in colour reactions during development was particularly striking in *Ischnoderma benzoinum,* where skeletals in the trama of the tubes were metachromatic in young specimens and turned dark blue in older ones (Tortić 1979).

Vararia effuscata (Cooke et Ellis) Rog. et Jacks. *(Dichostereum effuscatum* (Cooke et Ellis) Boid. et Lanq.) Only two localities are known, both near Beograd in Serbia. In the first, Pančevo, a lowland forest along the river Tamiš, on the rotten wood of *Salix alba* and *Fraxinus americana,* the species was collected by V. Lindtner several times from

1935 to 1938 in October and November, and is apparently not rare there. The specimens are deposited at BEO (herb. Lindtner 4734, 4744, 4745, 5002). A duplicate at PRM 485750 was determined by Z. Pouzar (Prague) who drew the attention of the author to this species. She accordingly found and identified the exsiccates at BEO, which were either undetermined, or (two specimens without number) tentatively named *Gloeocystidium lactescens* — determinator not indicated. The other locality is Ada Ciganlija, an island in the river Sava, on the rotten wood probably of Salix sp., collected by V. Lindtner on September 4, 1938, BEO herb. Lindtner 4637. Both localities are at about 75 m alt. not far apart and are indicated as one on the map.

The characteristic ornamented spores are not only amyloid, but proved to be also strongly metachromatic in cresyl blue. Branched dextrinoid and cyanophilous dichohyphidia were rather rare and could not be observed in all the specimens. They appear to be metachromatic, too.

Vararia granulosa (Fr.) Laurila (*Dichostereum granulosum* (Fr.) Boid. et Lanq.). The only known locality in Yugoslavia for the moment is Čorkova Uvala virgin forest in Plitvička Jezera National Park, alt. 900 m, on a prostrate trunk of *Abies alba,* September 13, 1980. Dichohypidia, which are strongly cyanophilus, turn in cresyl blue dark blue with a reddish tinge. The ornamented amyloid spores turn a little reddish. According to Pouzar (1982) the name *granulosa* cannot be applied to this species for nomenclatural reasons and he has renamed it *Vararia borealis* Pouz.

The species of *Vararia* with ornamented amyloid spores were placed in a particular genus, *Dichostereum* emend. by Boidin and Lanquetin (1977). Their combinations are added here in brackets.

Vararia investiens (Schw.) Karst. The only known locality, Korab Mountain in Macedonia, alt 1400 m, was published by Pilát and Lindtner (1938, as *Asterostromella investiens* (Schw.) v. H. et L.). The fungus grew on *Fagus.* A specimen from PRM 489471 and its duplicate at BEO were revised; in the first a few spores were found. Dichohypidia are cyanophilous in cotton blue but remain hyaline in cresyl blue.

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SAŽETAK

KRATAK PREGLED PORODICE *LACHNOCLADIACEAE (BASIDIOMYCETES)* U JUGOSLAVIJI

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Porodica *Lachnocladiaceae* sadržava 6 rodova, od toga tri dolaze samo u tropima.

Za Jugoslaviju su iz ove porodice bile objavljene tri vrste s po jednog nalazišta. Sada ih je ustanovljeno osam, jedna iz roda *Asterostroma,* četiri iz roda *Scytinostroma* i tri iz roda *Vararia,* pa se ovdje daje kratak pregled njihove rasprostranjenosti u nas. Na po jednom su lokalitetu nađene *Asterostroma ochroleucum, Scytinostroma galactinum, Vararia granulosa* i *V. investiens,* na po dva *S. odoratum* i *V. effuscata* (ali su lokaliteti ove druge prilično nablizu). Najčešće su dvije vrlo slične vrste, svaka ustanovljena na nekoliko mjesta, *Scytinostroma hemidichophyticum* i *S. portentosum,* koje se mogu razlikovati samo mikroskopski po obliku završetaka skeletnih hifa u himeniju.

Za tu su porodicu karakteristične dekstrinoidna i cijanofilna reakcija skeletnih hifa i ostalih elemenata sa zadebljalim stijenkama, tj. one posmeđe u Melzerovom reagensu i poplave u pamučnom plavilu. Autorica je ispitivala reakcije tih struktura u krezil-plavilu. Skeletne hife *Scytinostroma odoratum* u tom su reagensu postale tamnoplave, dok one ostalih vrsta tog roda postaju u mlađim dijelovima uslojenih primjeraka ili mlađim primjercima crvene (metahromatične), a u starijim tamnoplave. Vjerojatno je da takva promjena reakcija postoji i u *S. odoratum,* samo su ispitivani primjerci već bili stariji.

U rodu *Vararia* opažene su bitne razlike u reakcijama u krezil-plavilu. Spore *V. effuscata* su metakromatične, tj. intenzivno pocrvene. Reakcija dihohifida mogla se teško opažati. Čini se da su također metakromatične. Kod *V. granulosa* spore postaju slabo crvenkaste a dihohifide tamnoplave s crvenim preljevom. Dihohifide V. *investiens* ostale su u tom reagensu bezbojne. Asterosete kod *Asterostroma ochroleucum* postaju plavkaste.

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