A Check List of Myxomycetes from Former Yugoslavia

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Abstract

111 species of myxomycetes are reported from former Yugoslavia, a further ten published species are rejected for geographical and ecological reasons.

Introduction

The republics and regions of the former federation of Yugoslavian states have not been well studied by mycologists and this is especially true of the myxomycetes. Only 23 publications have been traced, the latest being from 1963. However, some herbarium material, not associated with the published reports, has been studied and recent collections have been made by the present authors and associates. The following list contains a number of uncommon and interesting species and suggests that more intensive work in the future will reveal a healthy diversity of these organisms in the forests and mountains of former Yugoslavia. The use of the regional names implies no particular political association, they are merely convenient, and well marked, units for recording purposes.

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The mountainous character of the country, the relatively poor communications, and the recent sad conflicts, do not encourage much mycological activity. It is to be hoped that this check list will form a basis for extended research in the future. It is to be regretted that there are no specimens to validate the published accounts as the records must, in some cases, be regarded as uncertain in their absence. This is especially true of the long list provided by DORDEVIC (1928) which includes some names which are certainly incorrect and others for which the given information suggests misidentifications. All these taxa are discussed and are not included in the total number of species, or the regional totals.

The following abbreviations are used: Mon. = monastery; Mt. = mountain.

Myxomycota

Acrasiomycetes, Acrasidales, Acrasidaceae

Pocheina rosea (CIENK.) LOEBLICH & TAPPAN

Montenegro: Petrovac, 1990, B. ING.

On bark of living *Melia azedarach* and *Phoenix canariensis*. Common in Europe on acid-barked trees and those subject to acid deposition; recorded from Greece among neighbouring countries.

Ceratiomyxomycetes

Ceratiomyxales, Ceratiomyxaceae

Ceratiomyxa fruticulosa (Müll.) MACBR.

Kosovo: Sar Planina, Brezovica, 1995, J. BERONJA. – Macedonia: Sar Planina, Jelak; 1995, J. BERONJA. – Serbia: Goc Mt, 1950, V. LINDTNER; Mt. Jublanik, Bebici, 1954, V. LINDTNER; Stara Planina, Mizdreja, 1994, B. IVANCEVIC. – Slovenia: Ljubljana (VOSS 1883).

On fallen wood of *Fagus sylvatica* and in Querco-Carpinetum. Very common throughout Europe and recorded from most neighbouring countries.

C. porioides (ALB. & SCHW.) SCHRÖT.

Serbia: Topcider Park, Beograd (RANOJEVIC 1905, 1910). Jurini Kusaj, near Cuprija, 1947, V. LINDTNER. Goc Mt, 1950, V. LINDTNER.

On *Betula* and *Fagus* stumps. This is often regarded as a variety of the previous species but it appears to be distinct and constant and is widespread in Central and southern Europe; recorded from Greece.

Myxomycetes

Echinosteliales, Echinosteliaceae

Echinostelium arboreum KELLER & BROOKS

Montenegro: Virpazar-Petrovac road, 1990, B. ING.

On bark of living *Quercus pubescens*. This was the first record for Europe; subsequently reported in Spain, Switzerland and Scotland.

E. colliculosum WHITNEY & KELLER

Montenegro: Petrovac; Milocer, 1990, B. ING.

On bark of living *Acer monspessulanus*, *Cedrus atlantica*, *Cupressus sempervirens* and *Fraxinus ornus*. Widespread and common in Europe; recorded from Austria and Greece.

E. fragile NANN.-BREMEK.

Montenegro: Petrovac, 1990, B. ING.

On bark of living *Pinus nigra* ssp. *dalmatica*. Widespread and common in Europe; recorded from Greece.

E. minutum de Bary

Montenegro: Petrovac, 1990, B. Ing.

On bark of living *Cedrus atlantica*. Cosmopolitan and very common; recorded from Austria, Greece and Romania.

Liceales, Cribrariaceae

Cribraria aurantiaca Schrad. [*vulgaris* Schrad. pro parte]

Bosnia: Vares area – Mijakovic, Dubostica and Dabrovika (Protic 1989, 1901). – **Slovenia**: near Ljubljana (Voss 1879).

On rotten wood. Common in temperate coniferous forests; reported from most surrounding countries.

C. cancellata (Batsch) Nann.-Bremek. [*Dictydium cernuum* (Pers.) Nees]

Serbia: Kosutnjak Beograd (Ranojevic 1905). Jelak on Kopaonik, 1800m (Ranojevic 1910). Goc Mt. (Dordevic 1928). – **Slovenia**: Ljubljana (Voss 1883).

On fallen wood of *Picea abies* and *Tilia tomentosa*. Common and widespread in temperate regions; reported from most neighbouring countries.

C. macrocarpa Schrad.

Serbia: Avala, near Beograd, 1941, V. Lindtner.

On rotten wood of *Fagus sylvatica*. Uncommon throughout Europe except in mountain forests.

Lindbladia tubulina Fr. [*effusa* (Ehrenb.) Rostaf.]

Serbia: Rakovicka Forest, Beograd (Ranojevic 1905). Beljanica; Jelak on Kopaonik; Mt. Tara (Ranojevic 1910). Topcider, Beograd (Ranojevic 1937).

Recorded on *Quercus cerris* and *Fagus sylvatica* stumps and *Euonymus* branches, also on *Picea* and *Pinus* wood; usually associated with conifer litter and sawdust. Widespread in temperate coniferous forests.

Dictydiaethaliaceae

Dictydiaethalium plumbeum (Schum.) Rostaf.

Serbia: Zlatibor Mt. (Ranojevic 1904).

On stump. Common throughout Europe.

Liceaceae

Licea belmontiana Nann-Bremek.

Montenegro: Milocer, 1990, B. Ing.

On bark of living *Ostrya carpinifolia*. Frequent and scattered across Europe.

L. denudescens Keller & Brooks

Montenegro: Petrovac, 1990, B. Ing.

On bark of living *Olea europaea*. Frequent but scattered across Europe; recorded from Austria and Greece.

L. inconspicua Brooks & Keller

Montenegro: Petrovac; Virpazar-Petrovac road, 1990. B. Ing.

On bark of living *Carpinus orientalis* and *Cedrus atlantica*. Frequent but scattered in Europe; reported from Greece.

L. kleistobolus Martin

Montenegro: Milocer; Virpazar-Petrovac road, 1990, B. Ing.

On bark of living *Carpinus orientalis* and *Vitis vinifera*. Common in Europe on thin-barked trees and vines; recorded from Austria and Greece.

L. parasitica (Zukal) Martin

Montenegro: Petrovac, 1990, B. Ing.

On bark of living *Ficus carica*. The commonest member of the genus on the bark of trees; reported from Austria and Greece.

L. perexigua Brooks & Keller

Montenegro: Petrovac, 1990, B. Ing.

On bark of living *Tamarix ?hampeana*. Widespread but uncommon in Europe; reported from Austria.

Lycogalaceae

Enteridium lycoperdon (Bull.) Farr [*Reticularia lycoperdon* Bull.]

Serbia: Vranje (Simic 1897). Kosutnjak, Beograd (Ranojevic 1905).

On Quercus cerris wood. Common in Europe, and all surrounding countries, often on wood used in house construction.

Lycogala epidendrum agg.

Bosnia: Vares area – Zvijeda, Pobrin ham, Dubostica and Pajatov ham (Protic 1898, 1901). – **Croatia**: Kastel Novi, near Split (Jaap 1916). – **Serbia**: Zlatibor Mt. (Ranojevic 1904). Topcider Park and Kosutnjak, Beograd (Ranojevic 1905). Jelak on Kopaonik (Ranojevic 1910). Goc Mt. (Dordevic 1928). – **Slovenia**: in and around Ljubljana (Voss 1878).

On fallen wood, including that of *Picea abies*, *Quercus cerris* and *Salix*. The aggregate is cosmopolitan and is recorded from all neighbouring countries. Herbarium material allows the two following taxa to be discriminated on spore colour and cortical characters.

L. epidendrum (L.) Fr.

Macedonia: Sar Planina, Jelak, 1995, J. Beronja. – **Montenegro**: Biogradska Gora, 1993, B. Ivancevic. – **Serbia**: Goc Mt, 1950, V. Lindtner. – **Slovenia**: near Smartna, Ljubljana, 1928, V. Lindtner.

On rotten wood, including *Fagus* and *Picea*. This is the segregate differentiated by olive-grey spore mass, scarlet plasmodium and complex cortical scales. It is usually darker in colour and is commonest in the tropics.

L. terrestre Fr.

Bosnia: Trebevic Mt. and Jahorin Mt, near Sarajevo (Klinger 1963). – **Kosovo**: Sar Planina, Brezovica, 1995, J. Beronja. – **Macedonia**: Sar Planina, Jelak, 1995, J. Beronja. – **Montenegro**: Biogradska Gora, 1993, B. Ivancevic. – **Serbia**: Dubasnica, 1993; Avala, 1993; Divcibare; Stara Planina, Babin Zub, 1994, B. Ivancevic.

On *Fagus* stumps. This segregate has pink plasmodium, pink spore mass, simple cortical scales and is usually pale in colour. It is by far the commoner species in temperate regions.

L. flavofuscum (Ehrenb.) Rostaf.

Serbia: Medja Planina (Ranojevic 1910). Kosutnjak, Beograd (Dordevic 1928). Deliblati-Dolivic, 1947, V. Lindtner. – **Slovenia**: Kronau (Keissler 1912).

On *Fagus* and *Fraxinus* trunks. Uncommon but scattered across Europe, often in hollow standing trunks and sometimes on worked timber.

Tubifera ferruginosa (Batsch) Gmel.

Serbia: Rogot, Kragujerac (Simic 1900). Zlatibor Mt. (Ranojevic 1904). Goc Mt. (Dordevic 1928); 1950, V. Lindtner Beograd, 1941; Pancevo, 1954, V. Lindtner. Beograd, Park Usce, 1997, B. Ivancevic. Pancevacki Rit, 1998, Z. Zizack. – **Slovenia**: near Smartna, Ljubljana, 1929, V. Lindtner.

On fallen trunks of *Fagus sylvatica*, *Picea abies*, *Prunus* and *Salix alba*. This is a common and characteristic species of coniferous forests in temperate regions but also occurs in *Alnus* swamp woodland.

Physarales, Didymiaceae

Diachea leucopodia (Bull.) Rost.

Serbia: Avala, near Beograd, 1954, V. Lindtner. Stara Planina, Mezdreja, 1994, B.

IVANCEVIC. – **Slovenia**: near Ljubljana (VOSS 1879).

On leaf litter of *Carpinus betulus* and *Quercus cerris*. A common and widespread species in southern Europe, much less common in the north.

Diderma chondrioderma (de BARY & ROSTAF.) G. LISTER

Montenegro: Petrovac; Milocer, 1990, B. ING.

On bark of living *Melia azedarach* and *Ostrya carpinifolia*. Frequent in Europe, recorded from Austria, Greece and Romania.

D. deplanatum FR.

Croatia: Gravosa, near Dubrovnik (JAAP 1916, as *D. niveum*).

On plant litter. This is the lowland species once included in the alpine *D. niveum*. It is widespread in Europe.

D. effusum (SCHW.) ROSTAF.

Slovenia: near Ljubljana, 1928, V. LINDTNER.

In grass litter. Widespread in Europe and recorded from most surrounding countries.

D. hemisphaericum (BULL.) HORNEM.

Croatia: Kastel Novi, near Split (JAAP 1916). Porec, Istra, 1966, M.C. CLARK.

In damp leaf litter. Widespread and frequent in Europe.

D. radiatum (L.) MORG. or *umbilicatum* PERS.

Bosnia: Mt. Trebevic, near Sarajevo (PICBAUER 1929). – **Montenegro**: Vojnik Mt, 1700m (BUBAK 1915).

On herbaceous stems. This was recorded under the former name although *umbilicatum* is generally commoner, especially on woody herbaceous stem litter; true *radiatum* is usually on fallen branches. In the absence of herbarium material is it not possible to allocate these records to either species.

D. spumarioides FR.

Bosnia: Trebevic Mt, near Sarajevo (PICBAUER 1930).

On dry litter. This is a characteristic species of evergreen woodlands in the Mediterranean region.

D. clavus (ALB.& SCHW.) RABENH.

Serbia: Goc Mt, 1950, V. LINDTNER.

On *Fagus* litter. A common and characteristic species in the beechwoods of Central and southern Europe.

D. crustaceum FR.

Serbia: Vlaika Polj, near Mladenovac, 1950, V. LINDTNER.

On herbaceous litter. This species is never common but is widely reported across Europe.

D. difforme (PERS.) S. F. GRAY

Croatia: Kastel Novi, near Split (JAAP 1916). – **Serbia**: Topcider, Beograd (RANOJEVIC 1910; DORDEVIC 1928). – **Slovenia**: Golovec hills, near Ljubljana (VOSS 1883).

On *Quercus cerris* and other leaf and twiggy litter. Cosmopolitan; clearly underrecorded in Yugoslavia.

D. iridis (DITM.) FR.

Croatia: Porec, Istra, 1966, M.C. CLARK.

On bark of living *Quercus pubescens*. Usually a litter species, this is the first report on bark. The *D. iridis* complex is one of the most difficult to identify with certainty in the myxomycetes. Most European material belongs to *D. bahiense* or *D. nigripes*, neither of which has yet been recorded from Yugoslavia, and the following species occurs quite commonly. True

D. iridis, as currently understood, is rare in Europe, although commonly reported from the Americas.

D. megalosporum Berk.& Curt.

Slovenia: near Ljubljana, 1928, V. Lindtner.

On old carpet. This taxon is often found on unusual substrates, especially textiles, but is more usually reported from mixed herbaceous litter. Quite common in Europe and reliably recorded from Greece.

D. melanospermum (Pers.) Macbr. [*farinaceum* Schrad.]

Bosnia: Vares and Pajatov ham (Protic 1898, 1901). – Croatia: Kastel Novi, near Split (Jaap 1916).

On conifer litter. A common and characteristic species of temperate conifer forests.

D. squamulosum (Alb.& Schw.) Fr.

Croatia: Opatija, Istra (Jaap 1916). – Serbia: Kosutnjak, Beograd, 1957, V. Lindtner.

On straw and leaf litter. Cosmopolitan; clearly under-recorded in Yugoslavia.

Mucilago crustacea Wiggers [*spongiosa* (Leyss.) Morg.; *Spumaria alba* DC.]

Bosnia: Vares – Zvijezda, Dubostica and Mijakovic (Protic 1898, 1901). – Serbia: Kosutnjak, Beograd; Pod Koprenon, Nisavska oblast (Ranojevic 1905). Medja Planina (Ranojevic 1910). – Slovenia: near Ljubljana, 19028, V. Lindtner.

On living grass stems and adjacent surfaces, which may be woody. Common throughout the limestone areas of Europe.

Physaraceae

Badhamia capsulifera (Bull.) Berk.

Serbia: near Beograd (Ranojevic 1910).

On fallen bark. Frequent across Europe on bark, either still on the tree or recently fallen.

B. foliicola Lister

Serbia: Topcider, Beograd (Ranojevic 1910).

In needle litter of *Abies alba* and *Pinus sylvestris*. Frequent in Europe in litter, short grass and, occasionally, on the bark of living trees.

B. macrocarpa (Ces.) Rostaf.

Serbia: Topcider, Beograd (Ranojevic 1905).

On stump of *Quercus cerris* and old *Auricularia* basidiocarp. Generally uncommon in Europe, but widespread.

B. panicea (Fr.) Rostaf.

Serbia: Goc Mt. (Dordevic 1928).

On fallen trunks, usually of *Fagus*. Common and widespread in Europe.

B. utricularis (Bull.) Berk.

Serbia: Topcider, Beograd (Ranojevic 1910). Lisina, Kopaonik, 1955, V. Lindtner. – Slovenia: near Ljubljana, 1928, V. Lindtner.

On *Fagus* logs, usually associated with *Phlebia* or *Stereum*. Common and widespread.

Craterium leucocephalum (Pers.) Ditm.

Serbia: Stara Planina, Jabucko Ravaniste, 1994, B. Ivancevic.

In *Fagus* leaf litter. Common and widespread.

C. minutum (Leers) Fr.

Serbia: Lipovica, 1941, V. Lindtner. Avala, 1954, V. Lindtner. Stara Planina, 1994, B. Ivancevic. Obedska Bara, Debela Gora, 1997, J. Beronja.

In leaf litter of *Fagus* and *Quercus*. Common, probably cosmopolitan.

Fuligo septica (L.) Wiggers [*Aethalium septicum* Fr.]

Bosnia: Vares – Zvijezda. and Ocevlja (Protic 1898, 1901). – Kosovo: Sar Planina, Brezovica, 1995, J. Beronja. – Montenegro: Durmitor Mt. (Buback 1903). – Serbia: Goc Mt; Vitovnica Mon. (Dordovic 1928). – Slovenia: Vini Vrh, near Ljubljana (Voss 1879). Near Ljubljana, 1928, V. Lindtner.

On dead wood, especially stumps. Common, probably cosmopolitan. The common form is the yellow var. *flava* (Pers). R.E.Fr. The available material and records are not adequate and so it is not possible to record this variety, although it is the most likely.

Leocarpus fragilis (Dicks.) Rostaf.

Kosovo: Sar Planina, Brezovica, 1995. J. Beronja.

On fallen cone of *Pinus peuce*. Common and widespread, especially in coniferous forests.

Physarum auriscalpium Cooke

Montenegro: Petrovac; Milocer, 1990, B. Ing. – Serbia: Goc Mt. (Dordevic 1928).

On bark of living *Cupressus sempervirens* and *Melia azedarach*. Not common but widely distributed in Central and southern Europe on tree bark; recorded from Greece, Italy and Romania. The Goc record is doubtful.

[*Physarum bitectum* G. Lister was reported from Vrnjacka Banja, Serbia, by Dordevic (1928). The record was on dry wood, whereas this species is characteristic of leaf litter and *Rubus* stems. In the absence of herbarium material this record must remain doubtful.]

P. cinereum (Batsch) Pers.

Serbia: Avala, near Beograd, 1936, V. Lindtner. – Slovenia: near Ljubljana, 1928, V. Lindtner.

On grass litter. Common and widespread in Europe, sometimes 'troublesome' in lawns.

P. citrinum Schum.

Kosovo: Sar Planina, Brezovica, 1995, J. Beronja. – Serbia: Goc Mt. (Dordevic 1928). – Slovenia: Ljubljana, 1928, V. Lindtner.

On terrestrial mosses and old fungus fruit bodies. An uncommon species scattered across Europe.

P. compressum Alb. & Schw.

Serbia: Vrnacka Banja (Dordevic 1928). Avala, Beograd, 1941, V. Lindtner.

On herbaceous remains, especially crop residues, such as *Zea mays*. Common and widespread.

P. daamsii Nann.-Bremek.

Slovenia: Lovnone, 1932, V. Lindtner.

In leaf litter. This rare species, which superficially resembles *P. confertum* Macbr., *P. didermoides* (Pers.) Rostaf. and *P. obscurum* (List.) Ing, has hitherto been recorded from the Netherlands, France, Italy and Finland.

[*Physarum dictyosporum* Lister was reported from Goc Mt, Serbia, by Dordevic (1928). This rare species is only known from a few scattered sites in the tropics and warm temperate regions of the southern hemisphere, and also, curiously, from Switzerland. However, in the absence of herbarium material the record must be discounted.]

P. lateritium (Berk. & Rav.) Morg.

Macedonia: Sar Planina, Jelak, 1995, J. Beronja.

On fallen *Picea* bark. This rare species has a scattered distribution and in Europe is known

from Great Britain, the Netherlands, France, Switzerland and Romania.

P. leucophaeum Fr. [nutans var. *leucophaeum* Lister]

Croatia: Kastel Novi, near Split (Jaap 1916). – **Montenegro**: Petrovac, 1990, B. Ing. – **Serbia**: Topcider, Beograd (Dordevic 1928). Stara Planina, Jabucko Ravaniste, 1994, B. Ivancevic, 1997, J. Beronja. – **Slovenia**: Tivoli Park, Ljubljana (Voss 1883).

On fallen wood of *Fagus* and *Quercus* and on bark of living *Olea europaea*. Common and widespread, recorded in most surrounding countries.

P. murinum Lister

Serbia: Stara Planina, 1994, J. Beronja.

On fallen wood, probably *Fagus*. A rare and declining species in Europe, with few recent records. It differs from the less rare *P. globuliferum* (Bull.) Pers. in having brown rather than white lime in the sporocarp and maybe, therefore, only a variant induced by local environmental chemistry.

P. nucleatum Rex

Serbia: Goc Mt. (Dordevic 1928).

On fallen wood. An uncommon species scattered across Europe, reported from Romania. As with many of the records made by Dordevic this may be a mis-determination.

P. nutans Pers.

Kosova: Sar Planina, Brezovica, 1995, J. Beronja. – **Serbia**: Jurini Kusaj, Cuprija, 1947, V. Lindtner. Goc Mt, 1950, V. Lindtner. Stara Planina, Babin Zub, Jabucko Ravaniste and Mezdreja, 1994, B. Ivancevic. – **Slovenia**: Ljubljana, 1928, V. Lindtner.

In fallen wood, mainly *Fagus* in Yugoslavia. Very common, cosmopolitan.

P. pezizoideum (Junghg.) Pav.& Lag. [*Trichamphora pezizoidea* Jungh.]

Croatia: Crikvenica, near Rijeka (Picbauer 1928). – **Serbia**: Smederevska Palanka, 1950, V. Lindtner.

On old fruit bodies of *Auricularia mesenterica* on logs. A rare species in Europe and only in the warmer, Mediterranean regions.

P. polycephalum Schw.

Serbia: Pancicevo, 1940, V. Lindtner. Beograd, Park Usce, 1997, B. Ivancevic.

On fallen bark of *Populus* and *Salix alba*. A rare, southern species, reported in Europe hitherto only from France, Germany, Italy and Romania.

P. psittacinum Ditmar

Serbia: Goc Mt. (Dordevic 1928).

On fallen logs and stumps. An uncommon and very beautiful species, characteristic of ancient forest.

P. pusillum (Berk. & Curt.) G. Lister

Montenegro: Petrovac, 1990, B. Ing. – **Serbia**: Avala, Beograd, 1941, V. Lindtner.

On bark of living *Cupressus sempervirens* and on herbaceous litter, such as *Zea mays*. Widespread in Europe on bark and grass-based litter, recorded from most of the surrounding countries.

P. serpula Morgan

Croatia: Porec, Istra, 1966, M.C. Clark.

On bark of living *Quercus pubescens*. Not common in Europe, known from Austria and Switzerland.

[*Physarum stellatum* (Massee) Martin (as *columbinum* Sturgis) was reported from Goc Mt, Serbia, by Dordevic (1928.) This is an exclusively tropical species, unknown in Europe. In the absence of herbarium material the record should be discounted.]

P. viride (BULL.) PERS. var. *viride*

Serbia: Topcider, Beograd; Medja Planina (RANOJEVIC 1910). Goc Mt, 1950, V. LINDTNER.

P. viride (BULL). PERS. var. *aurantium* (BULL). LISTER

Serbia: Goc Mt. (DORDEVIC 1928).

On fallen *Fagus* wood. Common and widespread.

Stemonitales

Stemonitaceae

Brefeldia maxima (FR.) ROSTAF.

Slovenia: near Ljubljana (VOSS 1878).

On roots of *Castanea sativa*. Widespread in Europe but not common.

Collaria arcyrionema (ROSTAF.) NANN-BREMEK. [*Lamproderma arcyrionema* ROSTAF.]

Serbia: Goc Mt. (DORDEVIC 1928).

On stumps. Frequent and widespread in Europe, especially in beechwoods.

[*Collaria rubens* (LISTER) NANN.-BREMEK. (as *Comatricha rubens* LISTER) was reported from Goc Mt, Serbia, by DORDEVIC (1928). It was listed as on wood but this rare species is confined to leaf litter. In the absence of herbarium material this record must be discounted.]

Comatricha alta PREUSS [*nigra* var. *alta* LISTER]

Serbia: Goc Mt. (DORDEVIC 1928).

On dead wood. Uncommon and scattered, but a distinctive taxon.

C. laxa ROSTAF.

Serbia: Goc Mt. (DORDEVIC 1928).

On dead wood. Common and widespread.

C. nigra (PERS.) SCHROET.

Kosovo: Sar Planina, Brezovica, 1995, J. BERONJA. – Serbia: Topcider, Beograd (RANOJEVIC 1905, 1910). Jurini Kusaj, Cuprija, 1947, V. LINDTNER. – Slovenia: Ljubljana, 1928, V. LINDTNER.

On dead wood of *Fagus* and conifers. Cosmopolitan, one of the commonest myxomycetes everywhere, The absence of this species from the list of DORDEVIC (1928) casts doubt on the identity of the other *Comatricha* species listed from there.

Enerthenema papillatum (PERS.) ROSTAF.

Serbia: Stara Planina, Babin Zub, 1994, B. IVANCEVIC. – Slovenia: Ljubljana, 1928, V. LINDTNER.

On fallen wood, especially *Fagus*. Common and widespread, often on bark of living trees.

Lamproderma atrosporum MEYLAN

Kosovo: Sar Planina, Brezovica, 1995, J. BERONJA.

On fallen branch of *Pinus peuce*. This is one of the commoner snowline myxomycetes at, and above, the upper limit of forest in the mountains of Central Europe and elsewhere.

L. columbinum (PERS.) ROSTAF.

Serbia: Jurini Kusaj, Cuprija, 1947, V. LINDTNER.

On fallen *Fagus* wood. Widespread in Europe in damp forests.

Macbrideola cornea (G. LISTER & CRAN) ALEXOP.

Croatia: Porec, Istra, 1966, M. C. CLARK. – Montenegro: Petrovac; Milocer; Virpazar, 1990, B. ING.

On bark of living *Melia azedarach*, *Olea europaea*, *Ostrya carpinifolia*, *Quercus pubescens* and *Salix alba*. Common throughout Europe on bark of trees, especially of covered with epiphytic bryophytes; recorded from Austria and Greece.

M. synsporos (ALEXOP.) ALEXOP.

Montenegro: Virpazar-Petrovac road, 1990, B. ING.

On bark of living *Quercus pubescens*. Scattered across Europe, from the British Isles to Greece, from where it was described.

Paradiacheopsis fimbriata (G. LISTER & CRAN) HERTEL

Montenegro; Virpazar-Petrovac road, 1990, B. ING.

On bark of living *Crataegus monogyna*. Common throughout Europe on acid-barked trees or in areas where the atmosphere is polluted with acid gases; recorded in Italy, Austria and Greece.

P. solitaria (NANN.-BREMEK.) NANN.-BREMEK.

Montenegro: Petrovac, 1990, B. ING.

On bark of living *Cedrus atlantica*. Common throughout Europe in older forests and on less acid bark; recorded from Austria and Greece.

[*Stemonaria irregularis* (REX) NANN.-BREMEK. (as *Comatricha irregularis* REX) was reported from Goc Mt, Serbia, by DORDEVIC (1928). This species is doubtfully known from Europe and in the absence of herbarium material this record must be discounted.]

Stemonitis axifera (BULL.) MACBR. [*ferruginea* EHRENB.]

Kosovo: Sar Planina, Brezovica, 1995, J. BERONJA. – Serbia: Topcider Park, Beograd (RANOJEVIC 1905). Jelak on Kopaonik (RANOJEVIC 1910). Goc Mt. (DORDEVIC 1928). – Slovenia: Ljubljana, 1928, V. LINDTNER.

On fallen wood of *Fagus*, *Picea* and *Quercus*. Common, probably cosmopolitan.

S. flavogenita JAHN

Serbia: Vitovnica Mon. (DORDEVIC 1928). Stara Planina, Babin Zub, 1994; Beograd, Usce, 1995, B. IVANCEVIC. Bocinska Suma, 1998, anon.

On fallen wood of *Fagus* and *Salix*. Common, probably cosmopolitan.

S. fusca ROTH

Bosnia: Vares – Mijalovic and Dubostica (PROTIC 1898, 1901). – Serbia: Ada Ciganlija, Beograd (SCHROETER 1890; SIMIC 1895). Surdulica (SIMIC 1895). Kosutnjak, Beograd (RANOJEVIC 1910). Goc Mt. (DORDEVIC 1928). Dubasnica Perast, 1994, M. LJALJEVIC. Stara Planina, 1994, J. BERONJA. Beograd, Park Usce, 1997, B. IVANCEVIC. – Slovenia: Dubrova, near Ljubljana (VOSS 1878).

On fallen wood of many kinds. The commonest species of the genus in Europe, probably cosmopolitan. A var. *pinnata* CEL. was also reported from Goc but no information is available – it may be another reference to the record of *Stemonaria irregularis*.

S. splendens ROSTAF.

Serbia: Topcider, Beograd (RANOJEVIC 1910). Goc Mt. (DORDEVIC 1928). Beograd, Usce, 1995; Jajinci, Beograd, 1996, B. IVANCEVIC. Odedska Bara, Debela Gora and Obren Matijeva, 1997, J. BERONJA. – Slovenia: Ljubljana, 1928, V. LINDTNER.

On fallen wood of *Pinus*, *Quercus* and *Salix* etc. Common in the warmer parts of Europe and abundant in the tropics.

S. amoena (NANN.-BREMEK.) NANN.-BREMEK.

Croatia: Porec, Istra, 1966, M.C. CLARK.

On bark of living *Quercus pubescens*. An uncommon species with a scattered distribution across Europe; recorded from Greece.

S. gracilis (G. LISTER) NANN.-BREMEK. [*Comatricha pulchella* (C. BAB.) ROSTAF. var. *gracilis* G. LISTER]

Serbia: Goc Mt. (DORDEVIC 1928).

On rotten wood. Generally rare across Europe.

Stemonitopsis hyperopta (MEYLAN) NANN.-BREMEK.

Serbia: Stara Planina, 1994, J. BERONJA.

On rotten conifer wood. Common in temperate coniferous forest and recorded from most surrounding countries.

S. typhina (WIGGERS) NANN.-BREMEK. [*Comatricha typhoides* (BULL.) ROSTAF.]

Kosovo: Sar Planina, Brezovica, 1995, J. BERONJA. – **Montenegro**: Biograska Jezera, 1996, B. IVANCEVIC. – **Serbia**: Topcider, Beograd (RANOJEVIC 1905). Kosmovacko Vrelo (RANOJEVIC 1910). Goc Mt. (Dordevic 1928).; 1950, V. LINDTNER. Jurini Kusaj, Cuprija, 1947, V. LINDTNER. Avala, near Beograd, 1993; Stara Planina, Babin Zub and Jabucko Ravaniste, 1994, B. IVANCEVIC. – **Slovenia**: Vrata valley, Mojstrana (KEISSLER 1912). Lovrenc, 1932, V. LINDTNER.

On fallen wood of *Fagus* and *Quercus cerris*. Very common, cosmopolitan.

Symphytocarpus flaccidus (LISTER) ING & NANN.-BREMEK.

Slovenia: Ljubljana (VOSS 1882).

On fence posts – a typical habitat for this widespread European species.

Trichiales

Arcyriaceae

[*Arcyria annulifera* TORREND was reported from Goc Mt, Serbia, by DORDEVIC (1928). This species has only been reported reliably from the Iberian Peninsular. The collection probably refers to *A. pomiformis* (LEERS) ROSTAF. – a common species not otherwise reported from Yugoslavia – but in the absence of herbarium material the record should be ignored.]

Arcyria cinerea (BULL.) PERS.

Croatia: Mt. Petravac, near Dubrovnik (JAAP 1916). – **Serbia**: Kosutnjak, Beograd; Kopren, Nisavska Oblast, Nis (RANOJEVIC 1905). Topcider, Beograd; Komnenski Potok; Medja Planina (RANOJEVIC 1910). Goc Mt. (DORDEVIC 1928); 1950, V. LINDTNER. Stara Planina, Babin Zub and Jabucko Ravaniste, 1994, B. IVANCEVIC. – **Slovenia**: Ljubljana (VOSS 1883); 1928, V. LINDTNER.

On fallen *Fagus* wood. A very common species on fallen wood and bark of living trees; cosmopolitan.

A. denudata (L.) WETTST. [*punicea* PERS.]

Serbia: Beograd, Ada Ciganlija (SCHROETER 1890; SIMIC 1895). Topcider Park, Beograd (RANOJEVIC 1905). Komnenski Potok; Medja Planina (RANOJEVIC 1910). Goc Mt. (DORDEVIC 1928). Beograd, 1992; Beograd Usce, 1995, B. IVANCEVIC. – **Slovenia**: near Ljubljana (VOSS 1878); Ljubljana, 1928, V. LINDTNER.

On fallen wood, especially *Fagus*. Very common throughout Europe. A var. *globosa* was described by DORDEVIC (1928) but no material can be traced. It is probably of no taxonomic value as globose forms are of frequent occurrence among normal developments.

A. ferruginea SAUTER [incl. var. *heterotrichia* TORR.]

Serbia: Goc Mt; Vitovnica Mon. (DORDEVIC 1928).

On rotten wood. A widespread species in Europe, especially in winter.

[*Arcyria glauca* LISTER was reported from Goc Mt, Serbia, by DORDEVIC (1928). This species is confined to Japan, Tahiti and Australia so, in the absence of herbarium material, the record must be discounted. The greenish phase of *A. cinerea* may have been found.]

A. incarnata (PERS.) PERS.

Croatia: Porec, Istra, 1966, M.C. CLARK. – **Serbia**: Goc Mt. (DORDEVIC 1928).

On fallen branches. Common and widespread in Europe, especially in *Quercus* forests.

A. minuta Buchet [*carnea* Lister]

Serbia: Goc Mt. (Dordevic 1928).

On fallen wood. An uncommon species is the cooler parts of Europe, perhaps less rare in Mediterranean regions.

A. obvelata (Oeder) Onsberg [*nutans* (Bull.) Rostaf.]

Serbia: Topcider, Beograd (Ranojevic 1905, 1910). Goc Mt, 1950, V. Lindtner. – Slovenia: Ljubljana, 1928, V. Lindtner.

On fallen wood of *Carpinus betulus* and *Fagus sylvatica*. Common throughout Europe, especially in beechwoods.

A. stipata (Schw.) Lister

Serbia: Stara Planina, 1994, J. Beronja.

On rotten wood, probably *Fagus*. An uncommon species, scattered across Europe.

A. versicolor Phill.

Serbia: Goc Mt, 1050m, 1950, V. Lindtner.

On fallen wood of *Fagus*. A montane forest species which is not uncommon in the mountains of Central Europe and north America.

Perichaena chrysosperma (Currey) Lister

Croatia: Porec, Istra, 1966, M.C. Clark. – Montenegro: Milocer, 1990, B. Ing.

On bark of living *Cupressus sempervirens*, *Ostrya carpinifolia* and *Quercus pubescens*. Common on bark throughout Europe, less common on fallen wood; recorded from Austria, Greece, Italy and Romania among the surrounding countries.

P. luteola (Kowalski) Gilert

Croatia: Velibet Mt, near Mandekic, 1977, N. Lundqvist.

On cow dung. A rare species known only from France, Spain, Scotland and north America.

P. vermicularis (Schw.) Rostaf.

Serbia: Goc Mt. (Dordevic 1928).

Reported on wood, although it is commoner in leaf litter and occasionally occurs on bark from living trees in most chamber culture. Widespread in Europe.

Trichiaceae

Hemitrichia abietina (Wigand) Lister was reported on wood from Goc Mt, Serbia, by Dordevic (1928). The usual habitat for this rare species is the bark of living trees so, in the absence of herbarium material, the record must be discounted.

[*Hemitrichia botrytis* was described as new by Dordevic (1928) from Goc Mt, Serbia. In the absence of material there is no way in which this name may be evaluated so it is best treated as a *nomen nudum*. The paper by Dordevic does not include the very common *Trichia botrytis* but this may not be relevant.]

Hemitrichia clavata agg.

Bosnia: Vares – Zvijezda and Oceclje (Protic 1898, 1901). – Serbia: Goc Mt. (Dordevic 1928). – see below. – Slovenia: Tivoli Park, Ljubljana (Voss 1878).

On dead wood. Since these records were made the aggregate has been split into the two common species which follow. The above records are not supported by specimens and cannot be segregated.

H. calyculata (Speg.) Farr

Serbia: Jurini Kusaj, Cuprija, 1947; Goc Mt, 1950, V. Lindtner. Stara Planina, Jabucko Ravaniste, 1994; Beograd, Park Usce,

1997, B. IVANCEVIC.

On fallen wood of *Fagus* and *Salix*. This is the commoner segregate in warmer climates and the only form to be found in the tropics. Because of the earlier confusion it is not possible to comment on its European distribution.

H. clavata (PERS.) ROSTAF.

Kosovo: Sar Planina, Brezovica, 1995, J. BERONJA. – Serbia: Goc Mt, 1950, V. LINDTNER. – Slovenia: Ljubljana, 1928, V. LINDTNER.

On fallen *Fagus* wood. This segregate is more montane than the previous species but the same remarks re distribution apply.

H. leiotricha (LISTER) G. LISTER

Serbia: Goc Mt. (DORDEVC 1928).

On twiggy litter. Uncommon in Europe, as elsewhere. Some doubt must rest with this record.

H. serpula (SCOPOLI) ROSTAF.

Serbia: Goc Mt. (DORDEVIC 1928). – Slovenia: Ljubljana (VOSS 1878).

On dead wood. A conspicuous species in the warmer parts of Europe.

Metatrichia floriformis (SCHW). NANN.-BREMEK. [*Trichia floriformis* (SCHW). G. LISTER]

Serbia: Stara Planina, Babin Zub and Mezdreja, 1994, B. IVANCEVIC.

On fallen *Fagus* wood. An increasingly common species in Europe, especially in secondary woodland.

M. vesparium (BATSCH) NANN.-BREMEK. [*Hemitrichia vesparium* (BATSCH) MACBR., *H. rubiformis* PERS., *Trichia pyriformis* HOFFM.]

Bosnia: Vares – Dubostica and Bobovac (PROTIC 1898, 1901). – Serbia: Kosutnjak, Beograd (RANOJEVIC 1905, 1910). Goc Mt. (DORDEVIC 1928); 1950, V. LINDTNER. Jurini Husaj, Cuprija, 1947; Avala, 1955, V. LINDTNER. Divicibare, 1997, B. IVANCEVIC.

On fallen trunks of *Fagus sylvatica* and *Quercus cerris*. Common and widespread in the warmer parts of Europe.

Oligonema schweintzii (BERK.) MARTIN [*nitens* (LIB.) ROSTAF.]

Serbia: Goc Mt. (DORDEVIC 1928).

Usually on wet sticks at edges of wetlands; widespread in Europe but nowhere common.

Trichia affinis de BARY

Kosovo: Sar Planina, Brezovica, 1995, J. BERONJA. – Macedonia: Sar Planina, Jelak, 1995, J. BERONJA. – Serbia: Jurini Kusaj, Cuprija, 1947; Goc Mt, 1950, V. LINDTNER. – Slovenia: Ljubljana (VOSS 1882); 1928, V. LINDTNER.

On very rotten wood, especially *Fagus*. Very common and widespread throughout Europe. In the past this was confused with other species such as *T. favoginea* and *T. persimilis*, under the old name *T. chrysosperma*, and in recent years these taxa have been combined under *favoginea*. This treatment is not acceptable in Europe where the three species are morphologically and ecologically distinct.

T. alpina (R. E. FR.) MEYLAN

Serbia: Goc Mt. (DORDEVIC 1928).

On dead herbaceous stalks and woody debris in montane woods and pastures, near the line of melting snow. Throughout the mountains of Europe, including Greece.

T. botrytis (GMEL.) PERS.

Serbia: Stara Planina, Babin Zub, 1994, B. IVANCEVIC.

On sticks and logs. Very common throughout Europe and clearly under-recorded in Yugoslavia.

T. contorta (Ditm.) Rostaf.

Serbia: Kosutnjak, Beograd (Ranojevic 1905). Kragujevac; Kosmovacko Vrelo (Ranojevic 1910). Goc Mt. (Dordevic 1928). Jurini Kusaj, Cuprija, 1947, V. Lindtner. Avala, near Beograd, 1993, B. Ivancevic.

On fallen sticks, especially of *Fagus*. Frequent throughout Europe, and very variable.

T. decipiens (Pers.) Macbr. var. *decipiens* [*fallax* Pers.]

Kosovo: Osljak; Sar Planina, Brezovica, 1995, J. Beronja. – **Serbia**: Kragujevac (Simic 1895). Kosutnjak, Beograd; Kopren, Nisavska Oblast, Nis (Ranojevic 1905). Topcider, Beograd; Medja Planina (Ranojevic 1910). Goc Mt. (Dordevic 1928). Jurini Kusaj, Cuprija, 1947, V. Lindtner. Stara Planina, Babin Zub and Jabucko Ravaniste, 1994, B. Ivancevic.

On fallen wood, especially *Fagus*. Very common and found throughout Europe.

T. decipiens (Pers.) Macbr. var. *olivacea* Meylan

Serbia: Jurini Kusaj, Cuprija, 1947, V. Lindtner.

On fallen *Fagus* wood. Widespread and common in Europe, although not always separated from the type variety.

T. favoginea (Batsch) Pers. [*chrysosperma* Dc.]

Bosnia: Vares area – Dubostica and Bobovac (Protic 1898, 1901). Near Stambulcic (Picbauer 1930). – **Serbia**: Kosutnjak, Beograd; Kragujevac (Ranojevic 1905). Kosmovacko Vrelo (Ranojevic 1910). Goc Mt. (Dordevic 1928). **Slovenia**: Ljubljana, 1966, M.C. Clark.

On dead wood, especially *Fagus*. Only the Ljubljana material has been checked – the other records may refer to *T. affinis* (see above).

T. lutescens (Lister) Lister

Serbia: Goc Mt. (Dordevic 1928).

On bark, attached or fallen. Widespread in Europe but never common.

T. persimilis Karst.

Serbia: Goc Mt. (Dordevic 1928).

On fallen wood. Very common throughout Europe and clearly under-recorded in Yugoslavia.

T. scabra Rostaf.

Serbia: Goc Mt. (Dordevic 1928). Stara Planina, Discino Vrelo, 1993, B. Ivancevic.

On fallen trunks, especially *Fagus*. Common throughout Europe.

{*Trichia subfusca* Rex was recorded from Goc Mt, Serbia, by Dordevic (1928). This species is rare in Europe and is similar in appearance to the very common *T. botrytis*, which the author did not include in his list.}

T. varia (Pers.) Pers.

Montenegro: Biogradska Jezero, 1996, B. Ivancevic. – **Serbia**: Kosutnjak, Beograd; Kosutnjak, Kragujevac; Kopren, Nisavska Oblast, Nis (Ranojevic 1905, 1910). Goc Mt. (Dordevic 1928). Avala, 1946; Jurini Kusaj, Cuprija, 1947, V. Lindtner. Stara Planina, Babin Zub, 1994, B. Ivancevic.

On wet, rotten wood especially of *Fagus*. Abundant throughout Europe.

Herbarium Material

The collections made by J. Beronja, B. Ivancevic,V. Lindtner and others are preserved in the herbarium of the Natural History Museum, Belgrade. Some duplicates of these and the collections made by M.C. Clark and B. Ing are preserved in the private herbarium of B. Ing at the Clwyd Mycological Institute, Mold, North Wales.

Biogeographical Note

The 111 species listed above have been found mostly in the Central European beechwood communities which are of the greatest ecological importance in Yugoslavia. Other important ecosystems which have been investigated are the Mediterranean woodlands of the Dalmatian coast, the mountain woodlands of *Pinus peuce*, including two species characteristic of the snowline in alpine situations in Central Europe, and the *Quercus cerris* woodlands of the lowlands. A few records have come from wet woodlands dominated by *Salix*. More attention needs to be given to such wet woodland and also to the potential snowline communities. Only in Croatia and Montenegro has any culture of bark from living trees been attempted and would clearly add many more records and species if used in other regions.

The uneven distribution of recorded species in the regions, viz. Bosnia, 11; Croatia, 15; Kosovo, 13; Macedonia, 5; Montenegro, 26; Serbia, 77 and Slovenia, 34, is merely a reflection of the amount of collecting. Of the ten rejected species, some may yet be confirmed. At least twenty common and widespread species have not yet been recorded from former Yugoslavia and may be expected to be present. The present list compares only moderately with the 138 species now known from Greece (ING & ZERVAKIS 2000). It is likely, with the range of ecosystems present in Yugoslavia, that over 300 species may eventually be recorded.

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