

Ecology and Distribution of Lignicolous Fungi in Albania

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ABSTRACT

The paper includes results of eco-taxonomic studies of lignicolous fungi (Ascomycota and Basidiomycota) in Albania. Generally, these fungi are found in a wide range of broadleaved trees and conifers. The study has been conducted during the period 2011-2014 on different localities in the country but the National Parks have been identified as priority areas for systematic research. A total number of 187 lignicolous fungi have been observed, growing mainly as saprobes or parasites on dead fallen or still attached branch, lying trunks and stumps. High fungal diversity has been established and a number of rare and sensitive species recorded with the current study. The promising results and a lack of earlier data on Albanian fungi have triggered the decision that the pioneer methodical investigation should continue. Some of the recorded species are rare and interesting, and the following should be pinpointed: *Pyrofomes demidoffii*, *Antrodia juniperina*, *Hexagonia nitida*, *Tremiscus helvelloides*, *Amylocortium subsulphureum*, *Asterodon ferruginosus*, etc.

Key words: lignicolous fungi, distribution, ecology, Albania

INTRODUCTION

Macromycetes are species most commonly considered under the term 'fungi', including mushrooms and toadstools, bracket fungi and other fungi of greatest significance in the context of conservation of biodiversity, natural habitats and nature overall. Field research has been done in Llogora NP, Prespa NP, Valbonë Valley NP, Fir of Hotova NP, Shebenik – Jabllanice NP and Korab-Koritnik Natural Park, yielding records of more than 580 species. Systematic research into mycodiversity has not been conducted up till now, and there is only one publication making reference to species (Ivančević & Karadelev, 2013). This paper includes a list – a preliminary inventory of lignicolous fungi species in Prespa NP. The outcome of the activities hitherto within our project 'Fungi Albanici: Establishing Fungi Checklist and Preliminary Red List and Proposing Important Fungal Areas in Albania', sponsored by the Rufford Foundation, was poster-presented at the prestigious Third International Congress on Fungal Conservation, held in Mugla, Turkey, 11-15th November 2013. In due course, our conservation research results will be published in the Fungal Conservation Newsletter of the International Society for Fungal Conservation.



Fig 1. Study areas in Albania.

MATERIAL AND METHODS

The resources of this paper have been exsiccates deposited in the Macedonian Collection of Fungi (MCF) at the Institute of Biology, Faculty of Natural Science, Ss. Cyril and Methodius University in Skopje, papers published and research notes of the present authors. A data input has been made in specially prepared database software called MACFUNGI.

The determination of the species has been performed during field research and in the Mycological Laboratory within the Institute of Biology, Faculty of Natural Science and Mathematics, Skopje.

For species identification, standard methods have been applied, implying microscoping, application of reagents (Melzer's reagent, Sulphovanilin, Cotton blue, KOH, etc.) and consulting specialised books for identification. The following keys and monographs have been used as resources for determination of the collected fungi: Breitenbach & Kränzlin (1981, 1986, 1991, 1995, 2000), Moser (1983), Boertmann et al. (1992), Hansen & Knudsen (1992), Corfixen et al. (1997), Ahti et al. (2000), Krieglsteiner (2000), Horak (2005), Bernicchia & Gorjón (2010), etc. In a few cases, the names of the species have been modified according to Index Fungorum (<http://www.indexfungorum.org/names/names.asp>) and Mycobank (<http://www.mycobank.org/MycoTaxo.aspx>.)

RESULTS

A total of 187 species-level taxa of fungi has been recorded during the research.

Abortiporus biennis (Bull.) Singer
Amphinema byssoides (Pers.) J. Erikss.
Amylocortcium subsulphureum (P. Karst.) Pouzar
Amylostereum chailletii (Pers.) Boidin
Antrodia albidoides A. David & Dequatre
Antrodia juniperina (Murrill) Niemelä & Ryvar den
Antrodia ramentacea (Berk. & Broome) Donk
Armillaria cepistipes Velen.
Armillaria mellea (Vahl) P. Kumn.
Armillaria tabescens (Scop.) Emel
Artomyces pyxidatus (Pers.) Jülich
Asterodon ferruginosus Pat.
Auricularia auricula-judae (Bull.) J. Schröt.
Auricularia mesenterica (Dicks.) Pers.
Auriscalpium vulgare Gray
Bisporella citrina (Batsch) Korf & S.E. Carp.
Botryobasidium botryosum (Bres.) J. Erikss.
Botryobasidium laeve (J. Erikss.) Parmasto
Botryobasidium subcoronatum (Höhn. & Litsch.) Donk
Byssomerulius corium (Pers.) Parmasto
Calocera cornea (Batsch) Fr.
Ceriporia reticulata (Hoffm.) Domanski
Cerrera unicolor (Bull.) Murrill
Clavulinopsis corniculata (Schaeff.) Corner
Collybia tuberosa (Bull.) P. Kumm.
Coprinus micaceus (Bull.) Fr.
Corticium polygonioides P. Karst.
Corticium juniperophilum Litsch.
Corticium meridioroseum Boidin & Lanq.
Corticium roseum Pers.
Crepidotus cesatii (Rabenh.) Sacc.
Crepidotus lundellii Pilát
Crepidotus mollis (Schaeff.) Staude
Crepidotus versutus (Peck) Peck
Crucibulum laeve (Huds.) Kambly
Cyathicula cyathoidea (Bull.) Thüm.
Cyathus striatus (Huds.) Willd.
Cylindrobasidium evolvens (Fr.) Jülich
Dacrymyces variisporus McNabb
Daedaleopsis confragosa (Bolton) J. Schröt.
Diatrype disciformis (Hoffm.) Fr.
Diatrype stigma (Hoffm.) Fr.
Dichomitus campestris (Quél.) Domanski & Orlicz
Exidia pithya (Alb. & Schwein.) Fr.
Exidia truncata Fr.
Exidiopsis calcea (Pers.) K. Wells
Exidiopsis effusa Bref.
Fistulina hepatica (Schaeff.) With.
Fomes fomentarius (L.) Fr.
Fomitopsis pinicola (Sw.) P. Karst.
Funalia gallica (Fr.) Bondartsev & Singer
Galerina autumnalis (Peck) A.H. Sm. & Singer
Galerina marginata (Batsch) Kühner
Galerina stylifera (G.F. Atk.) A.H. Sm. & Singer
Gloeocystidiellum luridum (Bres.) Boidin
Gloeocystidiellum porosum (Berk. & M.A. Curtis) Donk
Gloeopeniophorella convolvens (P. Karst.) Boidin
Gloeophyllum abietinum (Bull.) P. Karst.
Gloeophyllum sepiarium (Wulfen) P. Karst.
Gloiothele citrina (Pers.) Ginns & G.W. Freeman
Gymnopilus bellulus (Peck) Murrill
Gymnopilus penetrans (Fr.) Murrill
Gymnopilus sapineus (Fr.) Maire
Gymnopilus sordidostipes Hesler
Gymnosporangium clavariiforme (Wulfen) DC
Hemimycena pithya (Fr.) Dörfelt
Hericium coralloides (Scop.) Pers.
Hericium erinaceus (Bull.) Pers.
Hexagonia nitida Durieu & Mont.
Humaria hemisphaerica (Hoffm.) Fuckel
Hymenochaete rubiginosa (Dicks.) Lév.
Hymenoscyphus conscriptus (P. Karst.) Korf
Hymenoscyphus imberbis (Bull.) Dennis
Hyphoderma argillaceum (Bres.) Donk
Hyphoderma praetermissum (P. Karst.) J. Erikss. & Å. Strid
Hyphoderma setigerum (Fr.) Donk
Hyphodermella corrugata (Fr.) J. Erikss. & Ryvar den
Hyphodontia alutaria (Burt) J. Erikss.
Hyphodontia aspera (Fr.) J. Erikss.
Hyphodontia crustosa (Pers.) J. Erikss.
Hyphodontia juniperi (Bourdot & Galzin) J. Erikss. & Hjortstam
Hyphodontia sambuci (Pers.) J. Erikss.
Hypholoma capnoides (Fr.) P. Kumm.
Hypholoma lateritium (Schaeff.) P. Kumm
Hypholoma sublateritium (Fr.) Quél.
Hypocrea citrina (Pers.) Fr.
Hypocrea rufa (Pers.) Fr.
Hypoxylon fragiforme (Pers.) J. Kickx f.
Kuehneromyces mutabilis (Schaeff.) Singer & A.H. Sm.
Laetiporus sulphureus (Bull.) Murrill
Lentinellus omphalodes (Fr.) P. Karst.
Lenzites betulina (L.) Fr.
Lycogala epidendrum (L.) Fr.
Lycoperdon pyriforme Willd.
Marasmius bulliardii Quél.
Marasmius rotula (Scop.) Fr.
Megacollybia platyphylla (Pers.) Kotl. & Pouzar
Merulius tremellosus Schrad.
Microsphaera alphitoides Griffon & Maubl.
Multiclavula mucida (Pers.) R.H. Petersen
Mycena crocata (Schrad.) P. Kumm.
Mycena epipterygia (Scop.) Gray
Mycena galericulata (Scop.) Gray
Mycena inclinata (Fr.) Quél
Mycena polygramma (Bull.) Gray
Mycena renati Quél.
Mycena sanguinolenta (Alb. & Schwein.) P. Kumm.
Mycena stipata Maas Geest. & Schwöbel
Mycocacia fuscoatra (Fr.) Donk
Omphalotus olearius (DC.) Singer
Onnia tomentosa (Fr.) P. Karst.
Osmoporus odoratus (Wulfen) Singer
Panellus stipticus (Bull.) P. Karst.
Peniophora incarnata (Pers.) P. Karst.
Peniophora lycii (Pers.) Höhn. & Litsch.
Peniophora meridionalis Boidin
Peniophora piceae (Pers.) J. Erikss.
Peniophora pini (Schleich.) Boidin

Peniophora proxima Bres.
Peniophora quercina (Pers.) Cooke
Phanerochaete sordida (P. Karst.) J. Erikss. & Ryvar den
Phanerochaete tuberculata (P. Karst.) Parmasto
Phanerochaete velutina (DC.) P. Karst.
Phellinus conchatus (Pers.) Qué l.
Phellinus hartigii (Allesch. & Schnabl) Pat.
Phellinus punctatus (P. Karst.) Pilát
Phellinus ribis (Schumach.) Qué l.
Phellinus robustus (P. Karst.) Bourdot & Galzin
Phlebia queletii (Bourdot & Galzin) M.P. Christ.
Phlebia tremellosa (Schrad.) Nakasone & Burds.
Phlebiopsis gigantea (Fr.) Jülich
Phlebiopsis ravenelii (Cooke) Hjortstam
Pholiota cerifera (P. Karst.) P. Karst.
Pholiota squarrosa (Oeder) P. Kumm.
Pleurotus pulmonarius (Fr.) Qué l.
Pluteus nanus f. *nanus* (Pers.) P. Kumm.
Pluteus thomsonii (Berk. & Broome) Dennis
Polyporus arcularius (Batsch) Fr.
Polyporus brumalis (Pers.) Fr.
Polyporus ciliatus Fr.
Polyporus varius (Pers.) Fr.
Porothelium fimbriatum (Pers.) Fr.
Postia subcaesia (A. David) Jülich
Postia tephroleuca (Fr.) Jülich
Propolis versicolor (Fr.) W. Phillips
Pseudohydnum gelatinosum (Scop.) P. Karst.
Pycnoporus cinnabarinus (Jacq.) P. Karst.
Pyrofomes demidoffii (Lév.) Kotl. & Pouzar
Radulomyces molaris (Chaillet ex Fr.) M.P. Christ.
Resupinatus applicatus (Batsch) Gray
Rhytisma acerinum (Pers.) Fr.
Rugosomyces ionides (Bull.) Bon
Sarcoscypha coccinea (Scop.) Sacc.

Schizophyllum commune Fr.
Schizopora paradoxa (Schrad.) Donk
Schizopora radula (Pers.) Hallenb.
Scopuloides hydroides (Cooke & Masee) Hjortstam & Ryvar den
Scopuloides rimoso (Cooke) Jülich
Scutellinia scutellata (L.) Lambotte
Scytinostroma aluta Lanq.
Scytinostroma hemidichophyticum Pouzar
Sebacina grisea Bres.
Skeletocutis amorpha (Fr.) Kotl. & Pouzar
Steccherinum ochraceum (Pers. ex J.F. Gmel.) Gray
Stereum hirsutum (Willd.) Pers.
Stereum insignitum Qué l.
Stereum rugosum Pers
Stereum sanguinolentum (Alb. & Schwein.) Fr.
Strobilurus tenacellus (Pers.) Singer
Subulicystidium longisporum (Pat.) Parmasto
Tomentella atramentaria Rostr.
Tomentella bryophila (Pers.) M.J. Larsen
Tomentella terrestris (Berk. & Broome) M.J. Larsen
Trametes hirsuta (Wulfen) Pilát
Trametes versicolor (L.) Lloyd
Trechispora farinacea (Pers.) Liberta
Trechispora microspora (P. Karst.) Liberta
Tremiscus helvelloides (DC.) Donk
Trichaptum abietinum (Pers. ex J.F. Gmel.) Ryvar den
Trichaptum hollii (J.C. Schmidt) Kreisel
Tubulicrinis glebulosus (Fr.) Donk
Volvariella bombycina (Schaeff.) Singer
Vuilleminia comedens (Nees) Maire
Vuilleminia coryli Boidin
Vuilleminia megalospora Bres.
Xerula radicata (Relhan) Dörfelt
Xylaria hypoxylon (L.) Grev.

CONCLUSION

Field study has been conducted at over 30 localities, and, for the purpose of achieving greater diversity of species, research has been conducted on different substrates and associations.

The field studies have included sites with representative vegetation, consisting of meadows and pastures, deciduous and coniferous forests and specific forest stands with junipers, molika pine, Mediterranean maquis, etc.

The total number of species recorded is 187, primarily from Basidiomycota (171). There are 15 species belonging to Ascomycota and one species to Myxomycota. Some of the observed species are rare and interesting, and the following can be highlighted: *Pyrofomes demidoffii*, *Antrodia juniperina*, *Hexagonia nitida*, *Tremiscus helvelloides*, *Amylocorticium subsulphureum*, *Asterodon ferruginosus*, etc.

Pertaining to lignicolous species, most of them have been collected in different pine associations (*Pinus nigra*, *P. silvestris*, *P. heldreichii*), oak forests (*Quercus frainetto*, *Q. cerris*, *Q. trojana*, *Q. coccifera*, *Q. macrolepis*, *Q. ilex*, *Q. pubescens*), beech, spruce and fir forests, then azonal vegetation (*Salix alba*, *Populus tremula*, *Platanus orientalis*, etc.), juniper forest (*Juniperus excelsa* and *J. foetidissima*), *Pinus halepensis* plantings, etc.

Part of the registered species, such as *Antrodia juniperina* and *Pyrofomes demidoffii*, are characteristic parasites or saprobes on juniper trees, predominantly on *Juniperus excelsa*, while *Hexagonia nitida* is typical of the Macedonian oak (*Quercus trojana*).

The species *Amphinema byssoides*, *Amylocorticium subsulphureum*, *Amylostereum chailletii*, *Auriscalpium vulgare*, *Collybia tuberosa*, *Hyphodontia aspera*, *Mycena epipterygia*, *Phanerochaete sordida*, *Porothelium*

fimbriatum, *Stereum sanguinolentum*, *Strobilurus tenacellus*, *Trichaptum hollii* and *Tubulicrinis glebulosus* have been found only once on black pine, while species such as *Gloeophyllum abietinum*, *Phlebiopsis gigantea*, *Schizopora radula*, *Sebacina grisea* are known only from Aleppo pine (*Pinus halepensis*). The species *Gymnopilus sordidostipes*, *Peniophora pini* and *Tomentella atramentaria*, are well-known saprotrophs on *Pinus leucodermis*.

The species *Auricularia auricula-judae*, *Exidia truncata*, *Exidiopsis effusa*, *Peniophora quercina*, *Radulomyces molaris* and *Vuilleminia megalospora* are saprobes more or less characteristic of oak trees. The rest of the species are not so substrate-specific.

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