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Mycodiversity in the southwestern part of Jablanica mountain

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Abstract

Fungi are vital components of ecosystems, serving as crucial decomposers and playing an important role in nutrient cycling. This study explored fungal diversity in southern part of Jablanica Mountain, a potential future protected area. Field and lab work identified plenty of species not yet found in the area, as well as new data for Macedonian mycobiota, and some species listed in the national red list of fungi.

These findings significantly enhance knowledge of Jablanica's mycodiversity and underscore the area's ecological importance. The results can support conservation efforts and the mountain's designation as a protected national park, showcasing its incredible fungal diversity within a small area. The research contributes to understanding fungi's role in ecosystems and their value to local communities and biodiversity preservation.

Key words: fungal diversity, ecology, Jablanica Mountain, N. Macedonia

Introduction

Jablanica Mountain is found on the border between Macedonia and Albania, the eastern slope of the mountain is located in the southwestern part of Macedonia, between the valleys of Debar and Ohrid-Struga, west of the river Black Drim and the shore of the Ohrid Lake. The lake has influence on the local climate of the mountain with its moderating effects, it creates a unique microclimate characterized by high humidity and mild temperatures, conditions that are particularly favorable for fungal growth. The area of research was the southern part of Jablanica Mountain (Fig. 1)., with main focus on the habitats: planted *Pinus nigra* at the locality Kjafasan, mixed forest of *Quercus* sp. and *Castanea sativa* at locality Kalishta and above the Radozhda village, mixed forest of *Quercus pubescens* and *Carpinus orientalis* located along the border patrol path, pure forest of *Quercus* sp. found above Radozhda village. Also, fungal material was collected from park area planted with *Abies*, *Cupressus*, *Acer* and *Populus* trees located at Camp Treska, as well as from meadows found along all the previously mentioned habitats. However, the mycodiversity of Jablanica Mt. remains relatively understudied. The first published data on diversity of fungi on this mountain were provided by Karadelev et al. (2007) in a preliminary study. Despite this initial effort, comprehensive studies of the fungal diversity in this area are still lacking. Given the ecological importance of the fungi and the mountain's potential designation as a

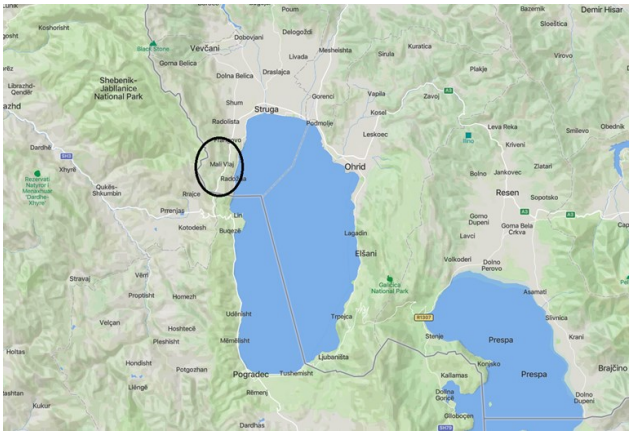

Figure 1 The study area in the most southwestern part of North Macedonia

protected area, understanding its fungal composition is crucial. This study aims to expand the existing knowledge by exploring the fungal diversity of the southern Jablanica region and provide data for future selection of important fungal areas on this mountain.

Methodology

The field work was realized in spring and autumn season in 2023, where a total of 12 visits were done. Most of the mycological material was photographed on the field and the specimens were collected in aluminum foil and refrigerated until determination and analysis in the Mycological laboratory (Institute of Biology, Faculty of Natural Science and Mathematics in Skopje). Notes on the location, coordinates, altitude, habitat, substrate type and date were taken for each collection. The lab work included using various literature for determination of the specimen based on their macro- and microscopic features, such as: Breitenbach & Kränzlin (1981, 1986, 1991, 1995, 2000), Calogne (1998), Galli (2001), Galli (2003), Kränzlin (2005), Knudsen & Vesterholt (2012). Microscopical analyses were conducted using reagents, such as KOH, Melzer, Lactophenol cotton blue and Congo Red. Index Fungorum 2023 was used to provide the current name

Figure 2 New data for Macedonian mycobiota: a. Schizopora flavipora, b. Inocybe muricellata, c1.-c2. Marasmiellus vaillantii (hymenium and basidiocarps, respectively).

of the species. After analysis the specimens were dried in a dehydrator and stored in the Macedonian Collection of Fungi (MCF) in the Mycological.

Results and discussion

From a total of 238 specimens collected, 181 species were determined at species level (Tab. 1.) out of which 126 represent new data for the mycobiota of Jablanica Mt., and 55 species are confirmed findings (Karadelev et al., 2007).

Highest number of taxa are identified in Basidiomycota phylum with 167 species while in Ascomycota phylum only 9 species and Myxomycota has 5 identified species. The species discovered belong to 65 families, of which the most numerous are Russulaceae with 18, Boletaceae with 15, Tricholomataceae with 14 and Mycenaceae with 10 species present. According to the type of substrate, 128 species are terricolous, 47 lignicolous, 4 foliicolous, 1 on chestnut husk, and 1 coprophilous. Considering the ecology of the species saprotrophic fungi dominate with 100 species, 72 are mycorrhizal and 9 are parasitic.

Three species are registered for the first time for the country: *Shizopora flavipora* (Berk. & M.A. Curtis ex Cooke) Ryvarden, *Marasmiellus vaillantii* (Pers.) Singer and *Inocybe muricellata* Bres.

Shizopora flavipora is a widely distributed polypore in Central and Southern Europe and concerning its ecology it is a saprotroph on deadwood of various deciduous trees (rarely on conifers) (Ryvarden and Gilbertson, 1993-1994). The collected specimen was found on fallen branch of *Quercus* sp.

Marasmiellus vaillantii is a widespread saprotroph that grows on various remnants of different grasses (*Carex, Juncus)*, but also on wood remains (Breitenbach & Kränzlin., 1991). The collection in this study was found on stump of *Quercus* sp.

Inocybe muricellata is a mycorrhizal fungus found in various deciduous forests (rarely in coniferous) from summer to autumn (Vesterholt, 2012). The specimen identified in this study was collected near planted Abies sp.in late autumn.

Five identified species are assessed in the National Red List of Fungi (Karadelev et al, 2021): *Hericium erinaceus* (Bull.) Pers. as endangered (EN), *Sarcosphaera coronaria* (Jacq.) J. Schröt., *Butyriboletus regius* (Krombh.) D. Arora & J.L. Frank and *Tricholoma acerbum* (Bull. ex Pers.) Quél. as vulnerable (VU) and *Amanita caesarea* (Scop.) Pers. categorized as least concern (LC).

Tab. 1. List of registered species on Mt. Jablanica

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
1	*Agaricus campestris* L.	5 Nov.	meadow	soil	41.093411, 20.633588 41.136098, 20.634478
2	*Agaricus macrosporus* Mont.	2 Nov.	meadow	soil	41.093411, 20.633588
3	*Agaricus xanthodermus* Genev.	2 Nov.	meadow	soil	41.093411, 20.633588
4	*Agrocybe praecox* (Pers.) Fayod	21 May	oak forest	soil	41.060482, 20.374495
5	*Aleuria aurantia* (Pers.) Fuckel	3 Nov.	planted black pine forest	soil	41.102961, 20.619442
6	*Amanita caesarea* (Scop.) Pers.	2 Nov., 5 Nov.	oak forest	soil	41.091308, 20.630482, 41.136098, 20.634478
7	*Amanita citrina* Pers.	2 Nov.	oak forest	soil	41.091308, 20.630482
8	*Amanita pantherina* (DC.) Krombh.	20 May	oak forest	soil	41.085128, 20.382094
9	*Amanita phalloides* Fr.: Fr. Link	5 Nov.	oak forest	soil	41.136098, 20.634478
10	*Amanita rubescens* Pers.	20 May	oak forest	soil	41.085128, 20.382094

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
11	*Amanita simulans* Contu	2 Nov.	under planted Abies	soil	41.093411, 20.633588
12	*Amanita vaginata* (Bull.) Lam.	20 May	planted black pine forest	soil	41.060604, 20.371194
13	*Arcyria incarnata* Pers. ex J.F. Gmel.	20 May	Quercus sp.	branch	41.085128, 20.382094
14	*Armillaria mellea* (Vahl) P. Kumm.	2 Nov., 5 Nov.	Quercus sp.	stump	41.091308, 20.630482, 41.136098, 20.634478
15	*Aspropaxillus candidus* (Bres.) M.M. Moser	5 Nov.	meadow	soil	41.136098, 20.634478
16	*Astraeus hygrometricus* (Pers.) Morgan	20 May, 21 May, 2 Nov., 5 Nov.	meadow	soil	41.085128, 20.382094, 41.060482, 20.374495, 41.093411, 20.633588, 41.136098, 20.634478
17	*Aureoboletus gentilis* (Quél.) Pouzar	5 Nov.	chestnut forest	soil	41.136098, 20.634478
18	*Auricularia auricula- judae* (Bull.) Quél.	20 May, 17 June	*Pinus nigra*, Quercus sp.	branch	41.060604, 20.371194, 41.060482, 20.374495
19	*Auricularia mesenterica (Dicks.) Pers.*	2 Nov.	*Populus tremula*	stump	41.093411, 20.633588
20	*Bjerkandera adusta* (Willd.) P. Karst.	2 Nov.	*Populus tremula*	stump	41.093411, 20.633588
21	*Bolbitius titubans* (Bull.) Fr.	17 June	oak forest	soil	41.060482, 20.374495
22	*Boletus edulis* Bull.	5 Nov.	oak forest	soil	41.136098, 20.634478
23	*Bovista plumbea* Pers.	22 Apr., 20 May, 21 May, 2 Nov.	meadow	soil	41.093005, 20.633481, 41.060604, 20.371194, 41.060482, 20.374495, 41.093411, 20.633588
24	*Bovista dermoxantha* (Vittad.) De Toni	8 Oct.	meadow	soil	41.060482, 20.374495
25	*Butyriboletus regius* (Krombh.) D. Arora & J.L. Frank	17 June	oak forest	soil	41.060482, 20.374495
26	*Caloboletus calopus* (Pers.) Vizzini	20 May, 5 Nov.	oak forest	soil	41.085128, 20.382094, 41.136098, 20.634478
27	*Caloboletus polygonius* (A.E. Hills & Vassiliades) Vizzini	5 Nov.	oak forest	soil	41.136098, 20.634478
28	*Caloboletus radicans* (Pers.) Vizzini	5 Nov.	oak forest	soil	41.136098, 20.634478

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
29	*Calocera cornea* (Batsch) Fr.	20 May, 5 Nov., 3 Nov.	*Pinus nigra*, Quercus sp.	dry branch	41.060604, 20.371194, 41.136098, 20.634478, 41.102881, 20.625116
30	*Calonarius elegantissimus* (Rob. Henry) Niskanen & Liimat.	5 Nov.	oak forest	soil	41.136098, 20.634478
31	*Calvatia cyathiformis* (Bosc) Morgan	5 Nov.	meadow	soil	41.136098, 20.634478
32	*Cantharellus cibarius* Fr.	20 May	planted black pine forest	soil	41.060604, 20.371194
33	*Ceratiomyxa fruticulosa* T. Macbr.	20 May	*Pinus nigra*	branch	41.060604, 20.371194
34	*Cerrena unicolor* (Bull.) Murrill	23 Apr.	Quercus sp.	stump	41.083000, 20.384552
35	*Clitocybe nebularis* (Batsch) P. Kumm.	5 Nov.	oak forest	soil	41.136098, 20.634478
36	*Clitocybe odora* (Bull.) P. Kumm.	3 Nov.	planted black pine forest	soil	41.102961, 20.619442
37	*Clitocybe dealbata* (Sowerby) P. Kumm.	3 Nov.	Planted black pine forest	soil	41.102961, 20.619442
38	*Clitocybe metachroa* (Fr.) P. Kumm.	3 Nov.	planted black pine forest	soil	41.102961, 20.619442
39	*Clitopilus prunulus* (Scop.) P. Kumm.	2 Nov.	Oriental hornbeam forest	soil	41.091308, 20.630482
40	*Collybia fusipes* (Bull.) Quél.	18 June	Quercus sp.	stump	41.060482, 20.374495
41	*Coprinopsis picacea* (Bull.) Redhead, Vilgalys & Moncalvo	2 Nov.	Oriental hornbeam forest	soil	41.091308, 20.630482
42	*Cortinarius anomalus var. anomalus* (Fr.) Fr.	3 Nov.	oak forest	soil	41.102881, 20.625116
43	*Cortinarius cotoneus* Fr.	3 Nov.	oak forest	soil	41.102881, 20.625116
44	*Cortinarius duracinus* Fr.	2 Nov., 3 Nov.	oak forest	soil	41.091308, 20.630482, 41.102881, 20.625116
45	*Cortinarius trivialis* J.E. Lange	5 Nov.	chestnut forest	soil	41.136098, 20.634478
46	*Craterellus cornucopioides* (L.) Pers.	5 Nov.	chestnut forest	soil	41.136098, 20.634478
47	*Crepidotus luteolus* Sacc.	2 Nov.	*Carpinus orientalis*	branch	41.091308, 20.630482
48	*Crucibulum laeve* (Huds.) Kambly	20 May, 3 Nov.	*Pinus nigra*	branch	41.060604, 20.371194, 41.102881, 20.625116
49	*Dacrymyces stillatus* Nees	23 Apr.	*Pinus nigra*	branch	41.083000, 20.384552

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
50	*Daedalea quercina* (L.) Pers.	17 June	oak forest	soil	41.060482, 20.374495
51	*Delicatula integrella* (Pers.) Fayod	20 May	*Pinus nigra*	pine needles	41.060604, 20.371194
52	*Dichomitus squalens* (P. Karst.) D.A. Reid	20 May	*Pinus nigra*	trunk	41.060604, 20.371194
53	*Entoloma rhodopholium* (Fr.) P. Kumm.	5 Nov.	oak forest	soil	41.136098, 20.634478
54	*Exidia glandulosa* Fr.	20 May, 17 June	*Pinus nigra*, Quercus sp.	branch	41.060604, 20.371194, 41.060482, 20.374495
55	*Exidia saccharina* Fr.	20 May	*Pinus nigra*	trunk	41.060604, 20.371194
56	*Fistulina hepatica* (Schaeff.) With.	8 Oct.	*Castanea sativa*	bark	41.060482, 20.374495
57	*Flammulina velutipes* (Curtis) Singer	2 Nov.	*Populus tremula*	stump	41.093411, 20.633588
58	*Fuligo septica* (L.) F.H. Wigg.	3 Nov.	planted black pine forest	soil	41.102961, 20.619442
59	*Galerina marginata* (Batsch) Kühner	23 Apr.	*Pinus nigra*	branch	41.083000, 20.384552
60	*Ganoderma lucidum* (Curtis) P. Karst.	2 Nov.	*Populus tremula*	stump	41.093411, 20.633588
61	*Gymnopilus penetrans* (Fr.) Murrill	3 Nov.	planted black pine forest	soil	41.102961, 20.619442
62	*Gymnopus erythropus* (Pers.) Antonín, Halling & Noordel.	2 Nov.	oak forest	soil	41.091308, 20.630482
63	*Gymnopus dryophilus* (Bull.) Murrill	2 Nov., 20 May, 17 June	meadow, planted black pine forest, oak forest	soil	41.093411, 20.633588, 41.060604, 20.371194, 41.085128, 20.382094, 41.060482, 20.374495
64	*Gymnopus foetidus* (Sowerby) P.M. Kirk	5 Nov.	Quercus sp.	branch	41.136098, 20.634478
65	*Gymnopus hariolorum* (Bull.) Antonín, Halling & Noordel.	5 Nov.	oak forest	soil	41.136098, 20.634478
66	*Gyroporus castaneus* (Bull.) Quél.	5 Nov.	chestnut forest	soil	41.136098, 20.634478
67	*Hebeloma sinapizans* (Paulet) Gillet	5 Nov.	chestnut forest	soil	41.136098, 20.634478
68	*Helvella lacunosa* Afzel.	20 May, 21 May	oak forest, planted black pine forest	soil	41.060604, 20.371194, 41.060482, 20.374495

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
69	*Helvella queletti* Bres.	22 Apr.	Park, under *Populus tremula*	soil	41.093005, 20.633481
70	*Hericium erinaceus* (Bull.) Pers.	3 Nov.	Quercus sp.	living tree	41.102881, 20.625116
71	*Heterobasidion annosum* (Fr.) Bref.	18 June	oak forest	soil	41.060482, 20.374495
72	*Hydnellum scabrosum* (Fr.) E. Larss., K.H. Larss. & Kõljalg	5 Nov.	chestnut forest	soil	41.136098, 20.634478
73	*Hydropus scabribes* (Murrill) Singer	20 May	Quercus sp.	stump	41.060604, 20.371194
74	*Hygrocybe conica var.conicopalustris* R. Haller Aar. ex Heinem.	5 Nov.	meadow	soil	41.136098, 20.634478
75	*Hygrophorus eburneus* (Bull.) Fr.	5 Nov., 3 Nov.	oak forest	soil	41.136098, 20.634478, 41.102881, 20.625116
76	*Hyphodontia quercina* Pers. J. Erikss.	20 May	Quercus sp.	branch	41.085128, 20.382094
77	*Hypholoma eryceaeoides* P.D. Orton	21 May	oak forest	soil	41.060482, 20.374495
78	*Hypholoma fasciculare* (Huds.) P. Kumm.	22 Apr., 23 Apr., 20 May, 3 Nov.	*Pinus nigra*	stump	41.093005, 20.633481, 41.083000, 20.384552, 41.060604, 20.371194, 41.102961, 20.619442
79	*Hymenochaete rubiginosa* (Dicks.) Lév.	23 Apr.	*Castanea sativa*	trunk	41.083129, 20.383060
80	*Infundibulicybe gibba* (Pers.) Harmaja	2 Nov.	meadow	soil	41.093411, 20.633588
81	*Inocybe adequata* (Britzelm.) Sacc.	20 May	oak forest	soil	41.060604, 20.371194
82	*Inocybe curvipes* P. Karst.	20 May	planted black pine forest	soil	41.060604, 20.371194
83	*Inocybe geophylla* P. Kumm.	2 Nov.	park, under planted Abies	soil	41.093411, 20.633588
84	*Inocybe lilacina* (Peck) Kauffman	2 Nov.	park, under planted Abies	soil	41.093411, 20.633588
85	*Inocybe muricellata* Bres.	2 Nov.	park, under planted Abies	soil	41.093411, 20.633588
86	*Inocybe phaeoleuca* Kühner	21 May	oak forest	soil	41.060482, 20.374495
87	*Irpex lacteus* (Fr.) Fr.	23 Apr.	Quercus sp.	branch	41.083129, 20.383060
88	*Laccaria laccata* (Scop.) Cooke	5 Nov.	chestnut forest	soil	41.136098, 20.634478

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
89	*Laccaria amethystina* Cooke	2 Nov., 3 Nov., 5 Nov., 22 Apr.	oak forest, park	soil	41.093411, 20.633588, 41.102881, 20.625116, 41.136098, 20.634478, 41.093005, 20.633481
90	*Lactarius chrysorrheus* Fr.	18 June, 5 Nov.	oak forest	soil	41.060482, 20.374495, 41.136098, 20.634478
91	*Lactarius piperatus* (L.) Pers.	17 June	oak forest	soil	41.060482, 20.374495
92	*Lactarius queitus* (Fr.) Fr.	17 June	oak forest	soil	41.060482, 20.374495
93	*Lactarius subumbonatus* Lindgr.	21 May	oak forest	soil	41.060482, 20.374495
94	*Lactarius volemus* (Fr.) Fr.	17 June	oak forest	soil	41.060482, 20.374495
95	*Lanzia echinophila* (Bull.) Korf	5 Nov.	*Castanea sativa*	chestnut husk	41.136098, 20.634478
96	*Lentinus strigosus* Fr.	21 May	*Castanea sativa*	stump	41.060482, 20.374495
97	*Lentinus arcularius* (Batsch) Zmitr.	22 Apr., 3 Nov.	Quercus sp.	branch	41.102881, 20.625116, 41.090195, 20.631455
98	*Lepiota cristata* (Bolton) P. Kumm.	2 Nov.	meadow	soil	41.093411, 20.633588
99	*Lepista inversa* (Scop.) Pat.	21 May	chestnut forest	soil	41.060482, 20.374495
100	*Leucoagaricus leucothides* (Vittad.) Wasser	2 Nov.	meadow	soil	41.093411, 20.633588
101	*Leucopaxillus tricolor (Peck) Kühner*	5 Nov.	chestnut forest	soil	41.136098, 20.634478
102	*Lycogala epidendrum* (J.C. Buxb. ex L.) Fr.	23 Apr.	Quercus sp.	rotten wood	41.083129, 20.383060
103	*Lycoperdon atropurpureum* Vittad.	23 Apr.	chestnut forest	soil	41.083129, 20.383060
104	*Lycoperdon molle* Pers.	8 Oct.	meadow	soil	41.060482, 20.374495
105	*Macrolepiota mastoidea* (Fr.) Singer	3 Nov.	oak forest	soil	41.102881, 20.625116
106	*Macrolepiota procera* (Scop.) Singer	2 Nov., 3 Nov., 5 Nov.	Oriental hornbeam and oak forest	soil	41.091308, 20.630482, 41.102881, 20.625116, 41.136098, 20.634478
107	*Marasmiellus vaillantii* (Pers.) Singer	18 June	Quercus sp.	stump	41.060482, 20.374495
108	*Marasmius oreades* (Bolton) Fr.	17 June	oak forest	soil	41.060482, 20.374495
109	*Marasmius rotula* (Scop.) Fr.	2 Nov., 3 Nov.	Quercus sp., *Carpinus orientalis*	trunk	41.091308, 20.630482, 41.102881, 20.625116
110	*Marasmius wynneae* Berk. & Broome	17 June	oak forest	leaves	41.060482, 20.374495

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
111	*Marasmius epiphylus* (Pers.) Fr.	22 Apr., 23 Apr., 2 Nov.	oak forest	fallen leaves	41.093005, 20.633481, 41.083129, 20.383060, 41.093411, 20.633588
112	*Melanoleuca excissa* (Fr.) Singer	20 May	meadow	soil	41.060604, 20.371194
113	*Melanoleuca meloleuca* (Pers.) Murrill	22 Apr.	meadow	soil	41.093005, 20.633481, 41.090195, 20.631455
114	*Melanoleuca polioleuca* (Fr.) Kühner & Maire	22 Apr.	park	soil	41.093005, 20.633481
115	*Melanoleuca substrictipes* Kühner	3 Nov.	planted black pine forest	soil	41.102961, 20.619442
116	*Mycena cyanorhiza* Quél	20 May	*Pinus nigra*	branch	41.060604, 20.371194
117	*Mycena olida* Bres.	20 May	oak forest	soil	41.060604, 20.371194
118	*Mycena pelianthina* (Fr.) Quél.	20 May, 3 Nov.	oak forest, planted black pine forest	soil	41.060604, 20.371194, 41.102881, 20.625116
119	*Mycena polygramma* (Bull.) Gray	5 Nov.	Quercus sp.	living tree	41.136098, 20.634478
120	*Mycena pura* (Pers.) P. Kumm.	3 Nov.	oak forest	soil	41.102881, 20.625116
121	*Mycena renatii* Quél.	5 Nov., 3 Nov.	Quercus sp.	branch	41.136098, 20.634478, 41.102881, 20.625116
122	*Mycena rosea* Gramberg	3 Nov., 5 Nov.	planted black pine forest, oak forest	soil	41.102961, 20.619442, 41.136098, 20.634478
123	*Neoboletus erythropus* Pers.	17 June	oak forest	soil	41.060482, 20.374495
124	*Omphalotus olearius* (DC.) Singer	17 June	oak forest	soil	41.060482, 20.374495
125	*Panaeolus accuminatus* (P. Kumm.) Quél.	20 May	meadow	soil	41.060604, 20.371194
126	*Panaeolus reticulatus* Overh.	21 May	oak forest	soil	41.060482, 20.374495
127	*Panellus stipticus* (Bull.) P. Karst.	21 May, 17 June	Quercus sp.	stump	41.060482, 20.374495, 41.060482, 20.374495
128	*Paxillus involutus* (Batsch) Fr.	2 Nov.	park	soil	41.093411, 20.633588
129	*Paxina acetabulum* (L.) Kuntze	20 May	oak forest	soil	41.060604, 20.371194
130	*Peniophora lycii* (Pers.) Höhn. & Litsch.	22 Apr.	Quercus sp.	branch	41.090195, 20.631455
131	*Peziza badia* Pers.	20 May	planted black pine forest	soil	41.060604, 20.371194

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
132	*Phellinus torulosus* (Pers.) Bourdot & Galzin	21 May	chestnut forest	soil	41.060482, 20.374495
133	*Phellodon confluens* (Pers.) Pouzar	5 Nov.	oak forest	soil	41.136098, 20.634478
134	*Phlegmacium glaucopus* (Schaeff.) Wünsche	2 Nov.	park, under planted Abies	soil	41.093411, 20.633588
135	*Pluteus cervinus* (Schaeff.) P. Kumm.	20 May	*Pinus nigra*	stump	41.060604, 20.371194
136	*Pluteus exsiguus* (Pat.) Sacc.	18 June	oak forest	soil	41.060482, 20.374495
137	*Polyporus umbellatus* (Pers.) Fr.	17 June	oak forest	soil	41.060482, 20.374495
138	*Protostropharia semiglobata* (Batsch) Redhead, Moncalvo & Vilgalys	18 June	meadow	dung	41.060482, 20.374495
139	*Psathyrella candolleana* (Fr.) Maire	22 Apr., 21 May	oak forest	soil	41.093005, 20.633481, 41.060482, 20.374495
140	*Psilocybe coronilla* (Bull.) Noordel.	20 May, 2 Nov.	meadow	soil	41.091308, 20.630482, 41.060604, 20.371194
141	*Ramaria aurea* (Schaeff.) Quél.	5 Nov.	oak forest	soil	41.136098, 20.634478
142	*Ramaria botrytis* (Pers.) Bourdot	20 May	oak forest	soil	41.085128, 20.382094
143	*Resupinatus trichotis* (Pers.) Singer	3 Nov.	Quercus sp.	branch	41.102881, 20.625116
144	*Rhytisma acerinum* (Pers.) Fr.	2 Nov.	*Acer campestre*	leaf	41.093411, 20.633588
145	*Rickenella fibula* (Bull.) Raithelh.	21 May	Quercus sp.	branch	41.060482, 20.374495
146	*Russula adusta* (Pers.) Fr.	20 May	planted black pine forest	soil	41.060604, 20.371194
147	*Russula cyanoxantha* (Schaeff.) Fr.	20 May, 21 May, 17 June	planted black pine forest, oak forest, chestnut forest	soil	41.060604, 20.371194, 41.085128, 20.382094, 41.060482, 20.374495, 41.060482, 20.374495
148	*Russula heterophylla* (Fr.) Fr.	17 June	oak forest	soil	41.060482, 20.374495
149	*Russula luteotacta* Rea	18 June	oak forest	soil	41.060482, 20.374495
150	*Russula virescens* (Schaeff.) Fr.	17 June	oak forest	soil	41.060482, 20.374495
151	*Russula emetica* (Schaeff.) Pers.	2 Nov.	Oriental hornbeam forest	soil	41.091308, 20.630482

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
152	*Russula sanguinea* Fr.	5 Nov.	oak forest	soil	41.136098, 20.634478
153	*Russula torulosa* Bres.	3 Nov.	planted black pine forest	soil	41.102961, 20.619442
154	*Russula vesca* Fr.	3 Nov.	planted black pine forest	soil	41.102961, 20.619442
155	*Sarcosphaera coronaria* (Jacq.) J. Schröt.	22 Apr., 23 Apr.	park	soil	41.093005, 20.633481, 41.083000, 20.384552
156	*Schizopora flavipora* (Berk. & M.A. Curtis ex Cooke) Ryvarden	20 May	Quercus sp.	branch	41.060604, 20.371194
157	*Schizopora paradoxa* (Schrad.) Donk	22 Apr., 5 Nov.	Quercus sp. , *Carpinus orientalis*	branch	41.090195, 20.631455, 41.136098, 20.634478
158	*Steccherinum fimbriatum* (Pers.) J. Erikss.	22 Apr.	Quercus sp.	branch	41.090195, 20.631455
159	*Stemonitis fusca* Roth	20 May	*Pinus nigra*	branch	41.060604, 20.371194
160	*Stereum hirsutum* (Willd.) Pers.	17 June, 22 Apr.	Quercus sp.	branch	41.060482, 20.374495, 41.090195, 20.631455
161	*Strobilurus tenacellus* (Pers.) Singer	23 Apr., 20 May	*Pinus nigra*	pine cone	41.083000, 20.384552, 41.060604, 20.371194
162	*Stropharia caerulea* Kreisel	5 Nov.	chestnut forest	soil	41.136098, 20.634478
163	*Suillellus luridus* Schaeff.	18 June	oak forest	soil	41.060482, 20.374495
164	*Suillellus queletii* (Schulzer) Vizzini, Simonini & Gelardi	5 Nov., 17 June	oak forest	soil	41.136098, 20.634478, 41.060482, 20.374495
165	*Suillus granulatus* (L.) Roussel	20 May, 3 Nov.	planted black pine forest	soil	41.060604, 20.371194, 41.102961, 20.619442
166	*Suillus collinitus* (Fr.) Kuntze	3 Nov.	oak forest	soil	41.102881, 20.625116
167	*Suillus luteus* (L.) Roussel	3 Nov., 5 Nov.	oak forest, planted black pine forest	soil	41.102961, 20.619442, 41.136098, 20.634478
168	*Tapinella atrotomentosa* (Batsch) Šutara	3 Nov.	planted black pine forest	soil	41.102961, 20.619442
169	*Tarzetta cupularis* (L.) Lambotte	20 May	planted black pine forest	among moss	41.060604, 20.371194
170	*Trametes versicolor* (L.) Lloyd	2 Nov.	Quercus sp.	trunk	41.091308, 20.630482
171	*Tricholoma acerbum* (Bull. ex Pers.) Quél.	2 Nov.	oak forest	soil	41.091308, 20.630482
172	*Tricholoma colossus* (Fr.) Quél.	5 Nov.	oak forest	soil	41.136098, 20.634478
173	*Tricholoma focale* (Fr.) Ricken	5 Nov.	oak forest	soil	41.136098, 20.634478

Num.	Species	Date 2023	Forest type/host	Substrate	Coordinates
174	*Tricholoma sejunctum* (Sowerby) Quél.	3 Nov.	oak forest	soil	41.102881, 20.625116
175	*Tricholoma ustale* (Fr.) P. Kumm.	5 Nov.	oak forest	soil	41.136098, 20.634478
176	*Verpa conica* (O.F. Müll.) Sw.	22 Apr.	meadow	soil	41.090195, 20.631455
177	*Viteoporus dichrous* (Fr.) Zmitr.	5 Nov.	Quercus sp.	branch	41.136098, 20.634478
178	*Vuilleminia comedens* (Nees) Maire	23 Apr.	Quercus sp.	branch	41.083129, 20.383060
179	*Xerocomus ferrogineus* (Schaeff.) Alessio	17 June	oak forest	soil	41.060482, 20.374495
180	*Xerocomus subtomentosus* (L.) Quél.	20 May, 17 June	oak forest	soil	41.085128, 20.382094, 41.060482, 20.374495
181	*Xerula pudens* (Pers.) Singer	2 Nov.	Oriental hornbeam and oak forest	soil	41.091308, 20.630482

Conclusion

This study provided further understanding of the fungal biodiversity on Jablanica mountain, confirming some of the species found in the first study, as well as discovering three new data records for the country. Combining the findings of both studies the current number of fungal species in the area is 314, a number which does not represent the true diversity in the area, but provide additional significant mycological data. Further research is needed to expand the knowledge and provide arguments for future conservation of this significant habitats for the fungal biodiversity.

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