

## CONTRIBUTION TO MACEDONIAN RED LIST OF FUNGI

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### Abstract

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The paper provides information about the Red List of fungi in Macedonia where the current IUCN Red List categories are put into practice. It includes 213 species of Ascomycota and Basidiomycota. The following IUCN criteria were implemented: Critically Endangered, (CR) – 21 species, Endangered (EN) – 30 species, Vulnerable (VU) – 71 species, Near Threatened (NT) – 40 species, Least Concern (LC) – 9 species and Data Deficient (DD) – 42 species. The main goals of this work are to upgrade the Preliminary red list of macromycetes in the Republic of Macedonia (Karadelev, 2000), to improve fungal conservation status and to accelerate proposals for legal measures in order to conserve fungal diversity.

**Key words:** Macedonia, conservation of fungi, Red List.

### Извод

Караделев, М., Русевска, К. (2013) Придонес кон црвената листа на габи на Република Македонија. Зборник на трудови од IV Конгрес на еколозите на Македонија со меѓународно учество, Охрид, 12-15 октомври 2012 година. Македонско еколошко друштво, посебно издание 28, Скопје.

Главната цел на овој труд е изработка на Црвена листа на габи на Македонија што ќе придонесе за забрзување на постапките за преземање легални мерки и заштита на микодиверзитетот во Македонија. Таа претставува дополнување на Прелиминарната црвена листа на габи на Македонија (Karadelev, 2000). Во оваа листа се наведени 213 вида кои припаѓаат на типовите Ascomycota и Basidiomycota. Видовите се категоризирани според критериумите на IUCN, при што во категоријата критично загрозувани (CR) има 21 вид, загрозувани (EN) – 30 вида, ранливи (VU) – 71 вид, близу засегнати (NT) – 40 вида, најмалку загрижувачки (LC) – 9 вида и недоволно податоци (DD) – 42 вида.

**Клучни зборови:** Македонија, заштита на габи, Црвена листа.

### Introduction

Fungi are a large and an ecologically very important group of organisms. Like the majority of other organisms living on our planet, fungi may also be threatened by human activities. They are mostly endangered by the disappearance and degradation of habitats, but there are also other important causes of threat such as pollution, climate change and excessive gathering of fruiting bodies of edible species. The preparation of Red List of Macedonian Fungi is essential step in their conservation.

The Preliminary Red List of macromycetes in the Republic of Macedonia (Karadelev 2000) included 67 species, all belonging to class Basidiomycetes. In that list, three threat categories were applied – a particularly rare or rare species in Macedonia, a species existing only in endangered or rare habitats and a particularly rare or rare species, endangered due to excessive exploitation. Its main goals were to initiate an important research in fungal conservation and to accelerate proposals for legal measures in order to conserve fungal diversity.

Thus, the Macedonian mycobiota in the last

10 years was quite well investigated. These data enabled preparation of contemporary Red List of Macedonian Fungi, where the current IUCN Red List categories (IUCN 2001, 2003a, b) were used. Data source used are as follows: exsiccates and notes from own studies, Macedonian collection of Fungi (MCF), data base (MAK FUNGI),

as well as specimens from other collectors.

Macedonian Red List of Fungi (Table 1) includes the total of 213 species, both ascomycetes and basidiomycetes, as follows: 21 Critically Endangered (CR), 30 Endangered (EN), 71 Vulnerable (VU), 40 Near Threatened (NT), 9 Least Concern (LC) and 42 Data Deficient (DD).

Tab. 1. Macedonian Red List of Fungi

Таб. 1. Црвена листа на габи на Република Македонија

	Species	IUCN category	IUCN criteria
1	<i>Agaricus luteomaculatus</i>	DD	
2	<i>Agaricus urinascens</i>	NT	
3	<i>Albatrellus citrinus</i>	VU	D2
4	<i>Albatrellus pes-caprae</i>	VU	D1
5	<i>Amanita boudieri</i>	VU	D1
6	<i>Amanita caesarea</i>	EN	A2acd
7	<i>Amanita curtipes</i>	VU	D1
8	<i>Amanita dryophila</i>	DD	
9	<i>Amanita strobiliformis</i>	NT	
10	<i>Amanita vittadinii</i>	VU	B2a
11	<i>Amylostereum areolatum</i>	EN	D
12	<i>Antrodia gossypium</i>	CR	D
13	<i>Antrodia juniperina</i>	CR	C2a(i)
14	<i>Antrodia malicola</i>	NT	
15	<i>Antrodia variiformis</i>	CR	D
16	<i>Antrodiella citrinella</i>	CR	D
17	<i>Arrhenia spathulata</i>	NT	
18	<i>Artomyces pyxidatus</i>	NT	
19	<i>Asterophora parasitica</i>	NT	
20	<i>Aurantiporus fissilis</i>	VU	B2a
21	<i>Battarrea phalloides</i>	CR	B2ab(iv)
22	<i>Boletopsis leucomelaena</i>	VU	D2
23	<i>Boletus aereus</i>	VU	A2acd
24	<i>Boletus dupainii</i>	VU	D1
25	<i>Boletus impolitus</i>	VU	C1; D1
26	<i>Boletus lupinus</i>	EN	D
27	<i>Boletus luteocupreus</i>	EN	D
28	<i>Boletus pinophilus</i>	VU	A2acd
29	<i>Boletus regius</i>	VU	C1
30	<i>Boletus rhodopurpureus</i>	VU	A2ac
31	<i>Boletus satanas</i>	VU	A2ac
32	<i>Boletus torosus</i>	VU	D1
33	<i>Boletus pulchrotinctus</i>	EN	B2a
34	<i>Calocybe onychina</i>	DD	
35	<i>Campanella caesia</i>	DD	
36	<i>Cantharellus cibarius</i>	LC	
37	<i>Clathrus ruber</i>	NT	
38	<i>Clavaria falcata</i>	VU	A2ac
39	<i>Clavariadelphus pistillaris</i>	VU	A3acd
40	<i>Clavariadelphus truncatus</i>	VU	A3acd
41	<i>Clavulinopsis laeticolor</i>	VU	A2ac

	Species	IUCN category	IUCN criteria
42	<i>Cortinarius alnetorum</i>	VU	B2ab(iii)
43	<i>Cortinarius amarescens</i>	DD	
44	<i>Cortinarius balteatocumatilis</i>	DD	
45	<i>Cortinarius coerulescens</i>	DD	
46	<i>Cortinarius humicola</i>	DD	
47	<i>Cortinarius nanceiensis</i>	DD	
48	<i>Cortinarius odorifer</i>	LC	
49	<i>Cortinarius prasinus</i>	NT	
50	<i>Cortinarius rapaceus</i>	DD	
51	<i>Cortinarius rufo-olivaceus</i>	DD	
52	<i>Cotyldia diaphana</i>	CR	B2ab(iv)
53	<i>Craterellus cornucopioides</i>	NT	
54	<i>Creolophus cirrhatus</i>	VU	B2ab(iii)
55	<i>Cudonia circinans</i>	VU	D1
56	<i>Cystoderma superbum</i>	NT	
57	<i>Dacryobolus karstenii</i>	VU	D1
58	<i>Dendrocollybia racemosa</i>	CR	B2ab(iv)
59	<i>Dentipellis fragilis</i>	VU	D1
60	<i>Dichomitus albidofuscus</i>	VU	D1
61	<i>Dichostereum durum</i>	VU	D1
62	<i>Diplomitoporus flavescens</i>	VU	B2ab(iii,iv)
63	<i>Discina parma</i>	CR	D
64	<i>Disciotis venosa</i>	VU	D1
65	<i>Disciseda bovista</i>	CR	A4ac; B2ab(iii,iv); D;
66	<i>Disciseda candida</i>	CR	A4ac; B2ab(iii,iv); D;
67	<i>Endoptychum agaricoides</i>	EN	B2ab(iii,iv)
68	<i>Entoloma aprile</i>	VU	B2a
69	<i>Entoloma corvinum</i>	VU	A3c; D1
70	<i>Entoloma incanum</i>	VU	D1
71	<i>Epithele typhae</i>	DD	
72	<i>Erastia salmonicolor</i>	CR	D
73	<i>Exobasidium rhododendri</i>	VU	D2
74	<i>Faerberia carbonaria</i>	NT	
75	<i>Galerina jaapi</i>	CR	A4ac; C2a(i); D;
76	<i>Galerina sphagnorum</i>	CR	A4ac; C2a(i); D;
77	<i>Galerina tibiicystis</i>	CR	A4ac; C2a(i); D;
78	<i>Ganoderma pfeifferi</i>	EN	B2ab(iii,iv)
79	<i>Geastrum berkeleyi</i>	VU	D1
80	<i>Geastrum melanocephalum</i>	VU	D1
81	<i>Geastrum minimum</i>	VU	B2a
82	<i>Grifola frondosa</i>	EN	B2ab(iii,iv)
83	<i>Gyrodon lividus</i>	VU	B2ab(iii)
84	<i>Helvella atra</i>	EN	B2a
85	<i>Helvella ephippium</i>	DD	
86	<i>Hericium coralloides</i>	NT	
87	<i>Hericium erinaceus</i>	VU	B2ab(iii,iv)
88	<i>Hexagonia nitida</i>	VU	A2ac
89	<i>Heyderia abietis</i>	NT	
90	<i>Hohenbuehelia atrocoerulea</i>	DD	
91	<i>Hydnellum aurantiacum</i>	VU	D2
92	<i>Hydnellum caeruleum</i>	VU	D2
93	<i>Hydnellum spongiosipes</i>	EN	B2ab(iii,iv)
94	<i>Hydropus subalpinus</i>	DD	

	Species	IUCN category	IUCN criteria
95	<i>Hygrocybe ceracea</i>	DD	
96	<i>Hygrocybe helobia</i>	EN	B2ab(iii,iv)
97	<i>Hygrocybe lepida</i>	VU	D2
98	<i>Hygrocybe lilacina</i>	EN	B2ab(iii,iv)
99	<i>Hygrocybe punicea</i>	NT	
100	<i>Hygrocybe reae</i>	DD	
101	<i>Hygrocybe turunda</i>	DD	
102	<i>Hygrophorus marzuolus</i>	EN	B2ab(iii,v)
103	<i>Hygrophorus poetarum</i>	VU	C1
104	<i>Hymenochaete cruenta</i>	VU	D2
105	<i>Hyphoderma guttuliferum</i>	VU	D1
106	<i>Hyphoderma macedonicum</i>	EN	B2a
107	<i>Hyphodontia juniperi</i>	NT	
108	<i>Inocybe dunensis</i>	EN	B2ab(I,ii,iii)
109	<i>Inocybe posterula</i>	EN	B2ab(iii,iv)
110	<i>Inonotus obliquus</i>	VU	C2a(i)
111	<i>Inonotus tamaricis</i>	CR	C2a(I,ii)
112	<i>Junghuhnia separabilima</i>	DD	
113	<i>Kavinia alboviridis</i>	EN	D
114	<i>Kavinia himantia</i>	VU	D1
115	<i>Lactarius acris</i>	NT	
116	<i>Lactarius albocarneus</i>	NT	
117	<i>Lactarius azonites</i>	NT	
118	<i>Lactarius cyathuliformis</i>	DD	
119	<i>Lactarius deliciosus</i>	LC	
120	<i>Lactarius deterrimus</i>	NT	
121	<i>Lactarius lilacinus</i>	VU	D1
122	<i>Lactarius omphaliformis</i>	CR	B2ab(iii,iv)
123	<i>Lactarius sanguifluus</i>	LC	
124	<i>Lactarius semisanguifluus</i>	LC	
125	<i>Lactarius violascens</i>	NT	
126	<i>Lactarius volemus</i>	LC	
127	<i>Leccinum quercinum</i>	NT	
128	<i>Lentinus strigosus</i>	LC	
129	<i>Lenzites warnieri</i>	NT	
130	<i>Lenzitopsis oxycedri</i>	CR	D
131	<i>Lepiota grangei</i>	DD	
132	<i>Lepiota oreadiformis</i>	NT	
133	<i>Leucocortinarius bulbiger</i>	NT	
134	<i>Leucopaxillus compactus</i>	VU	D1
135	<i>Leucopaxillus giganteus</i>	VU	C1, D1
136	<i>Leucopaxillus lepistoides</i>	VU	B2b(ii,iii,iv,v)
137	<i>Limacella illinita</i>	NT	
138	<i>Lindtneria trachyspora</i>	VU	D1
139	<i>Lyophyllum transforme</i>	DD	
140	<i>Metulodontia nivea</i>	DD	
141	<i>Microglossum viride</i>	NT	
142	<i>Microstoma protracta</i>	DD	
143	<i>Mitrula paludosa</i>	DD	
144	<i>Morchella elata</i>	NT	
145	<i>Mutinus caninus</i>	NT	
146	<i>Mycena juniperina</i>	CR	C2a(i)
147	<i>Mycenastrum corium</i>	EN	B2ab(iii,iv,v)

	Species	IUCN category	IUCN criteria
148	<i>Mycoacia nothofagi</i>	DD	
149	<i>Myriostoma coliforme</i>	EN	D
150	<i>Myxomphalia maura</i>	DD	
151	<i>Omphalina baeospora</i>	VU	C1, D1
152	<i>Omphalina grossula</i>	EN	D
153	<i>Pachyella violaceonigra</i>	VU	D1
154	<i>Pachykytospora tuberculosa</i>	NT	
155	<i>Parmastomyces mollissimus</i>	DD	
156	<i>Peniophora erikssonii</i>	DD	
157	<i>Peniophora tamaricicola</i>	VU	B2ab(iii,iv,v)
158	<i>Perenniporia narymica</i>	DD	
159	<i>Perenniporia rosmarini</i>	EN	B2a
160	<i>Phaeomarasmium rimulincola</i>	DD	
161	<i>Phallus hadriani</i>	EN	C1, D
162	<i>Phallus impudicus</i> var. <i>togatus</i>	DD	
163	<i>Phellinus rimosus</i>	VU	D2
164	<i>Phellodon connatus</i>	EN	B2a
165	<i>Phellodon melaleucus</i>	EN	B2a
166	<i>Phylloporus rhodoxanthus</i>	NT	
167	<i>Phyllotopsis nidulans</i>	NT	
168	<i>Pisolithus arrhizus</i>	NT	
169	<i>Pithya cupressina</i>	VU	D2
170	<i>Pleurotus cornucopiae</i>	EN	C1
171	<i>Pleurotus eryngii</i>	EN	C1
172	<i>Podofomes trogii</i>	EN	B2ab(i,ii,iv)
173	<i>Polyporus umbellatus</i>	EN	C1
174	<i>Poronia punctata</i>	CR	C1; D
175	<i>Porphyrellus porphyrosporus</i>	NT	
176	<i>Pseudomerulius aureus</i>	DD	
177	<i>Pseudoomphalina compressipes</i>	DD	
178	<i>Pseudoomphalina kalchbrenneri</i>	DD	
179	<i>Pyrofomes demidoffii</i>	CR	C2a(i)
180	<i>Radiigera atrogleba</i>	VU	D2
181	<i>Ramariopsis clavuligera</i>	DD	
182	<i>Rhodophyllus whiteae</i>	VU	A3c; D1
183	<i>Rozites caperatus</i>	LC	
184	<i>Russula amethystina</i>	DD	
185	<i>Rutstroemia bulgarioides</i>	EN	B2ab(iii,iv)
186	<i>Sarcodon leucopus</i>	VU	B2a
187	<i>Sarcosphaera coronaria</i>	VU	B2a
188	<i>Scleroderma meridionale</i>	NT	
189	<i>Scleroderma polyrhizum</i>	NT	
190	<i>Skeletocutis alutacea</i>	DD	
191	<i>Skeletocutis odora</i>	VU	D2
192	<i>Skeletocutis tschulymica</i>	VU	D2
193	<i>Spathularia flavida</i>	VU	D1
194	<i>Steccherinum bourdotii</i>	VU	D1
195	<i>Steccherinum litschaueri</i>	NT	
196	<i>Steccherinum subcrinale</i>	VU	D1
197	<i>Suillus flavidus</i>	VU	D1
198	<i>Suillus sibiricus</i>	EN	B2a
199	<i>Tephrocybe atrata</i>	NT	
200	<i>Trametes ljubarskyi</i>	DD	

	Species	IUCN category	IUCN criteria
201	<i>Trichoglossum hirsutum</i>	VU	D1
202	<i>Tricholoma colossus</i>	DD	
203	<i>Tricholoma lascivum</i>	DD	
204	<i>Tulostoma caespitosum</i>	DD	
205	<i>Tulostoma fimbriatum</i>	NT	
206	<i>Tulostoma melanocyclum</i>	NT	
207	<i>Tulostoma squamosum</i>	LC	
208	<i>Urnula craterium</i>	VU	D1
209	<i>Verpa conica</i>	VU	A3acd
210	<i>Xeromphalina junipericola</i>	CR	B2a
211	<i>Xerula melanotricha</i>	NT	
212	<i>Xylobolus frustulatus</i>	VU	A2ac
213	<i>Xylobolus subpileatus</i>	VU	A2ac

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