

Red List of Estonian Fungi – 2019 update

Irja Saar¹, Jane Oja¹, Kadri Põldmaa¹, Kadri Pärtel^{1,2}, Irma Zettur³, Urmas Kõljalg^{1,3}

¹Institute of Ecology and Earth Sciences, University of Tartu, Ravila St. 14A, 50411 Tartu, Estonia

E-mail: irja.saar@ut.ee

²Mycological Collections, Institute of Agriculture and Environmental Sciences, Estonian University of Life Sciences, Kreutzwaldi St. 5, 51006 Tartu, Estonia

³Natural History Museum, University of Tartu, Ravila St. 14A, 50411 Tartu, Estonia

Abstract: In 2019 the conservation status of 214 fungal species in Estonia was assessed according to IUCN criteria and an IUCN category was assigned to each taxon. Altogether 94 species were categorized as threatened (CR, EN, VU), 42 least concern (LC), 60 near threatened (NT), three regionally extinct (RE) and six as data deficient (DD). Changes compared to the previous red list and threats to the species are discussed.

Kokkuvõte: Eesti seente Punane nimestik – 2019. aasta uuendus

2019. aastal hinnati 214 seeneliigi ohustatust Eestis kasutades IUCN kategooriaid ja kriteeriume. Hinnatud liikidest kuulus 94 ohustatuse kategooriatesse CR, EN ja VU, 42 hinnati kui soodsas seisundis (LC), 60 ohulähedased (NT), 3 piirkonnas välja surnud (RE) ja 6 puuduliku andmestikuga (DD). Artikkel käsitleb muudatusi võrreldes eelmise punase nimestikuga ja olulisemate seeneliikide ohutegureid.

Keywords: Ascomycota, Basidiomycota, threats, red list

INTRODUCTION

The first Estonian Red Data Book, which was compiled in 1979 and published a few years later (Kumari, 1982), did not include any fungal species. However, the second Estonian Red List, compiled in 1988, comprised 12 non-lichenized fungal species (Kalamees, 1990; Anonymous, 1993) and the following Estonian Red Data Book (Lilleleht, 1998) included already 91 fungal species (Järva et al., 1998; Järva et al., 1999). Threatened taxa in the last list belonged to the phyla Ascomycota and Basidiomycota and were assigned to five categories based on intuitive criteria: 0 – extinct or probably extinct, 1 – endangered, 2 – vulnerable, 3 – rare, 4 – care demanding, 5 – indeterminate (no species belonged to the last category).

The revised version of Estonian Red Data Book, based on IUCN categories and established criteria (Standards and Petitions Working Group, 2006), was finished in 2008, with the data available at the Estonian biodiversity portal eElurikkus (Red Data Book of Estonia, 2008). The status of 183 fungal species in Estonia was assessed applying the seven categories adopted by IUCN. As a result, 119 species were evaluated as threatened (Critically Endangered – CR,

Endangered – EN, Vulnerable – VU) and five as Regionally Extinct.

The aim of this study is to present an updated Red List of Estonian fungi, except for lichen-forming taxa and polypores, and to compare the current assessment with previous ones. For the first time, all *Lactarius* species and selected telephoroid species were assessed due to the availability of specialists and sufficient data. In addition, the paper discusses the main habitats of threatened species and the major factors that endanger the distribution of these fungi in Estonia.

MATERIAL AND METHODS

The aim of the Environmental Board procurement, announced in 2019, was to carry out regional assessment of the threat status of selected fungal species occurring in Estonia, except for lichenised fungi and polypores that have been recently evaluated. Species from the two last groups, assessed to belong to the threatened categories CR, EN, VU have been outlined by Lõhmus et al. (2019) and Lõhmus et al. (2018). Due the limited time the following

fungal taxa were selected for the assessment:

- 1) 135 species assessed in 2008 according to the Estonian Red Data Book (2008), including 33 species protected by law (Parmasto, 2006; I ja II kaitsekategooria...; III kaitsekategooria...);
- 2) all 75 species of *Lactarius* known from Estonia (as of 01.11.2018);
- 3) 20 selected species of Thelephorales.

Selection of resupinate thelephoroid species was based on specimen as well as rDNA ITS data available in UNITE and Estonian collection databases. Thelephoroid species may include cryptic species which are often formally not described. Therefore, we selected species where DNA sequence data are available for the precise identification and communication via UNITE DOI (digital object identifier) codes (Kõljalg et al., 2013). Fourteen of the assessed *Lactarius* species were excluded from the evaluation because of three main reasons:

- 1) synonymous species names;
- 2) species that have been misinterpreted in Estonia; or
- 3) species with unreliable reports in literature before 2000s that lack specimens in fungaria.

The species in the latter category usually belong to complex species groups, the taxonomy of which has been clarified only recently. Often, only the use of DNA sequence comparison can reliably distinguish such morphologically indistinguishable species. The data on the ecology and distribution of Estonian *Lactarius* species was summarized by Kuulo Kalamees (Kalamees, 2011), whose monograph includes valuable observation data from the last 60 years.

The threat status of the species was assessed based on the IUCN categories, criteria and guidelines (IUCN, 2012a, b), considering specifications of use for fungi (Dahlberg and Mueller, 2011). The possible conservation status of species was evaluated based on specimens in TAAM and TU fungaria and all data (rDNA ITS sequences, observations, reference-based occurrences) available in various public open databases (UNITE datasets, Kõljalg et al. 2013; Estonian Fungal Specimen National Database; Observations Database in PlutoF; Nature Observations Database in EELIS, Environmental registry) and in literature.

We have considered fungal species lacking any documented records after 1950 to be regionally

extinct (RE). Due to lacking or limited data, only IUCN criteria A, B and D were used in the evaluation process.

RESULTS AND DISCUSSION

Out of the all 7692 fungal species registered in Estonia (according to open data in PlutoF, 10.05.2019), 220 polypore species were assessed in 2017 (Runnel, 2017; Lõhmus et al., 2018), and 214 non-lichenised species by the authors of the current paper in 2019 (see Supplement). Among these 434 assessed species, 36% have been categorized as least concern (LC), 35% species as threatened (CR, EN, VU), 18% as near threatened (NT) and 2% as regionally extinct (RE). Species for which the category was data deficient (DD), not applicable (NA) or not evaluated (NE) comprised 5%, 3% and 0.7% of the species, respectively (Table 1). The considerably high proportion of categories of threatened species is due to the fact that species in previous red lists formed the main part of taxa assessed in 2017 and 2019.

Table 1. The distribution of 434 fungal species for which conservation status in Estonia was evaluated in 2008 and later in 2017 (polypores) or 2019 among the IUCN categories

Category	2008	2017	2019	2017+ 2019
Regionally extinct	5	6	3	9
Critically endangered	45	11	25	36
Endangered	38	24	28	52
Vulnerable	36	24	41	65
Near threatened	44	20	60	80
Least concern	14	113	42	155
Data deficient	0	15	6	21
Not applicable	1	4	9	13
Not evaluated	not applied	3	not applied	3
Total	183	220	214	434

Two species, *Geoglossum atrovirens* Kunze & J.C. Schmidt and *Leucopaxillus salmonifolius* M.M. Moser & Lamoure, assessed as CR in 2008 received NA in 2019 because there are no verified records of the former species and the only

specimen from Estonia, identified as *L. salmonifolius* (TAAM182586) belongs to *Notholepista subzonalis* (= *Leucopaxillus subzonalis*) based on the comparison of ITS sequences (UDB017848/SH1177032.08FU). The ITS sequence of the holotype of *L. salmonifolius* (UDB023944/IB19750174) confirms the distinctness of this species (SH1551975.08FU).

Seventy-eight fungal species were assessed for the first time in 2019, of these 10 were assigned to the three threat categories (CR, EN, VU). Among the remaining 135 species that had been evaluated before, the threat category was raised for 10, downgraded for 14 and left unchanged for 99 species. In case the species condition had deteriorated, it could directly be linked to the observed or suspected decline of the habitat area and quality, its predicted continuation and destruction of suitable habitats at the sites where the species had previously been observed. Upgrading was due to the observed increase in the size and/or number of known populations of the species. In Estonia, there are 153 (94 of these assessed in 2019) fungal species in the three threat categories (CR, EN, VU). Most of these species inhabit particular habitats, changes in which table 2 presents the main threat factors endangering their survival:

- 1) old-growth forests, the area of which has decreased rapidly in Estonia, also decline of wood of different tree species in various stages of decay (Lõhmus et al., 2004);
- 2) semi-natural habitats (meadows, alvars, parks, wooded meadows) where extensive management (grazing, mowing) has stopped;
- 3) decline of small-scale farming that limits suitable growth substrata, e.g. keratin-containing

Table 2. Threats to species assigned in threatened categories (CR, EN, VU) in 2019

Threat	Species (214)
Forestry (clear cutting, decrease of old-growth forests, removal of wood)	191
Altered management of semi-natural communities	11
Drainage of bogs (including ditching)	1
Sticking/ destroying the dunes	5
Other (e.g. absence of suitable specific substrate)	6

material (hoofs of horses or cows, cow horns) and horse manure (preferably from animals feeding on semi-natural pastures).

In addition, the fungal species at the margin (northern, north-eastern, eastern) of their species distribution range were treated as needing protection.

Most of the evaluated species in Estonia are endangered by forest management (clear cutting and other methods of intensive forestry), especially species that need long-lived stands for their growth. Habitats suitable for wood-decaying fungi have remarkably reduced because of removing fallen tree trunks and stumps during the intensive management of forests. Many species growing in association with broad-leaved trees inhabit semi-open habitats, mostly woodland meadows, less frequently parks and alvar margins. All of these semi-natural habitats depend on regular extensive management: mowing, grazing and other activities that prevent their change to forests or thickets. The cessation of extensive management and resulting developing of these habitats into forests might also lead to the loss of their key species such as *Quercus* and *Corylus*. By contrast, intensive management, such as overgrazing and soil fertilization, can significantly reduce the frequency of the occurrence of several species.

The species evaluated in 2019 were dominated by ectomycorrhizal fungi (60%), followed by saprotrophs on soil and litter (20%) and wood-decayers (17%); remaining four taxa are fungicolous (2), coprophilous (1) or decomposers of keratin-containing material (1) (Table 3).

The majority of the assessed ectomycorrhizal species in threatened categories (CR, EN, VU) grow either in *Quercus-Corylus-Tilia* dominated deciduous forests (including semi-open woodland-meadows) or conifer (*Picea abies* or *Pinus sylvestris* dominated) forests, with many species restricted to calcareous soil. Only a very few taxa are associated with other habitats, such as *Amanita friabilis* (P. Karst.) Bas (VU) in moist *Alnus* spp. forests. In Estonia, many of the red-listed ectomycorrhizal species are confined to the coastal calcareous regions, especially the Island of Saaremaa, where extensively managed, semi-open *Quercus-Corylus* woodlands as well as calcareous pine forests prevail. Because the

Table 3. The assessed fungal species can be divided into following categories with respect to their lifestyle

Category	Ectomycorrhizal fungi	Saprotrophs	Wood-decayers	Others
RE	2	0	1	0
CR	15	9	2	0
EN	13	6	8	1
VU	18	10	10	2
NT	32	14	13	1
LC	40	0	2	0
DD	3	2	1	0
NA	5	3	0	0
Total	128	44	37	4

distribution of many fungal groups in the Estonian calcareous forests, including alvars has not been assessed (e.g. *Cortinarius* and *Entoloma* as well as several saprotrophic species), further inventories of these habitats are needed.

Complete assessment of the genus *Lactarius* was performed for the first time. Altogether, the occurrence of 61 species in Estonia was confirmed, based on reliable (sequenced) fungarium material, more rarely sequences from ectomycorrhizal root tips. Many threatened *Lactarius* species are habitat-specialists, often associated solely with one or very few tree hosts, and are vulnerable to decline due to the decrease of suitable habitats. Some species, typically associated with the semi-open, calcareous deciduous woodlands, such as *Lactarius mairei* Malençon (CR) and *L. acerrimus* Britzelm. (VU), have their northernmost populations in Estonia. These seem to be associated with rare, declining habitats also in other regions, and are included in the red data lists of several North European countries.

Obviously, in order to understand the threat status of biota in complex ecosystems in Estonia, such as forests and semi-natural habitats, it is necessary to perform an IUCN assessment for a significantly larger number of fungal species. The evaluation of threat status revealed the need for taxonomic research and DNA barcoding in case of several species' complexes. In addition, many species have not been collected during the last decades, indicating a need for further

inventories. Fungal inventories of semi-natural habitats (meadows, woodland meadows, alvars, parks) and marshes should particularly be initiated because fungal communities of these habitats have been rather poorly studied in Estonia.

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Supplement. Estonian Red List of selected fungal species compiled in 2019. For abbreviations of categories see Results and Discussion. IUCN category and criteria of 2008 are not presented if identical to 2019.

Species	IUCN category/ criteria 2019	IUCN category/ criteria 2008	Protected by the law (categories I–III)
<i>Catathelasma imperiale</i>	RE		
<i>Sarcodontia crocea</i>	RE		
<i>Tricholoma acerbum</i>	RE		
<i>Butyriboletus fechtneri</i>	CR B2ab(iii); D		II
<i>Caloboletus calopus</i>	CR B2ab(iii); D		
<i>Cantharellus melanoxeros</i>	CR B2ab(iii); D		II
<i>Chamaemyces fracidus</i>	CR B2ab(iii); D		II
<i>Geastrum berkeleyi</i>	CR B2ab(iv); D		
<i>Geastrum elegans</i>	CR B2ab(iii); D		
<i>Hemileccinum impolitum</i>	CR B2ab(iii); D		II
<i>Hygrocybe intermedia</i>	CR B2ab(iii); D		
<i>Hygrocybe russocoriacea</i>	CR B2ab(iii); D		
<i>Hygrocybe spadicea</i>	CR B2ab(iii); D	RE	
<i>Hygrophorus hyacinthinus</i>	CR B2ab(iii); D		
<i>Lactarius auriolla</i>	CR B2ab(iii); D		
<i>Lactarius hysginus</i>	CR B2ab(iii); D		
<i>Lactarius mairei</i>	CR B2ab(iii); D		II
<i>Lactarius serifluus</i>	CR B2ab(iii); D		
<i>Lilaceocephelia tremelloidea</i>	CR B2ab(iii); D		
<i>Microglossum atropurpureum</i>	CR B2ab(iii); D		II
<i>Peziza ammophila</i>	CR B2ab(iii, iv), D		II
<i>Poronia punctata</i>	CR A2c; B2ab(iii, iv); D	VU D1	
<i>Porphyrellus porphyrosporus</i>	CR B2ab(iii); D	EN D1	
<i>Punctularia strigosozonata</i>	CR B2ab(iii); D		
<i>Ramaria botrytis</i>	CR B2ab(iv); D		
<i>Sarcodon fuligineoviolaceus</i>	CR B2ab(iii); D		I
<i>Sutorius luridiformis</i>	CR B2ab(iii); D	EN B1; D1	II
<i>Tricholoma colossus</i>	CR B2ab(iii); D		III
<i>Morchella semilibera</i>	EN B2ab(iii,iv); D	CR B1; D1	II
<i>Amanita strobiliformis</i>	EN B2ab(iii); D		
<i>Asterodon ferruginosus</i>	EN B2ab(iii); D	CR A2a	
<i>Asterostroma cervicolor</i>	EN B2ab(iii); D	CR D1	
<i>Aureoboletus gentilis</i>	EN B2ab(iii); D		
<i>Bankera violascens</i>	EN B2ab(iii); D		III
<i>Bovista paludosa</i>	EN B2ab(iii, iv); D		II
<i>Geastrum coronatum</i>	EN B2ab(iv); D	VU D2	
<i>Geastrum striatum</i>	EN B2ab(iv)	VU D1	
<i>Hemistropharia albocrenulata</i>	EN B2ab(iii); D		
<i>Hydnellum auratile</i>	EN B2ab(iii); D		
<i>Hygrocybe punicea</i>	EN B2ab(iii, v); D	VU D1	
<i>Hygrophorus chrysodon</i>	EN B1ab(iii); D		II

Species	IUCN category/ criteria 2019	IUCN category/ criteria 2008	Protected by the law (categories I–III)
<i>Hygrophorus russula</i>	EN B2ab(iii); D		
<i>Kavinia albobiridis</i>	EN B2ab(iii); D		
<i>Lactarius chrysorrheus</i>	EN B2ab(iii); D	CR D1	II
<i>Lactarius controversus</i>	EN B2ab(iii); D		II
<i>Microstoma protractum</i>	EN A2c; B2ab(ii); D	VU D1	
<i>Mutinus caninus</i>	EN B2ab(iv); D	VU D1	
<i>Onygena equina</i>	EN A2c; D		
<i>Pseudotomentella nigra</i>	EN B2ab(iii); D		
<i>Pseudotomentella vepallidospora</i>	EN B2ab(iii); D		
<i>Rhodotus palmatus</i>	EN B2ab(iii); D		I
<i>Steccherinum robustius</i>	EN B2ab(iii); D		
<i>Stereopsis vitellina</i>	EN B2ab(iii); D		
<i>Tomentella atroarenicolor</i>	EN B2ab(iii); D		
<i>Tricholoma apium</i>	EN B1ab(iii); D		II
<i>Tricholomella constricta</i>	EN B1ab(iii, v); D		
<i>Amanita friabilis</i>	VU D1		II
<i>Amaurodon mustialaensis</i>	VU D1	EN A3c	
<i>Bolbitius variicolor</i>	VU B2ab(ii, iii); D1		
<i>Caloboletus radicans</i>	VU D1	EN B1; D1	II
<i>Chlorencoelia versiformis</i>	VU D1		
<i>Clavulinopsis corniculata</i>	VU B2ab(iv); D1		III
<i>Dentipellis fragilis</i>	VU D1	EN A2a	
<i>Entoloma bloxamii</i>	VU B2ab(iii, v); D1	NT	II
<i>Eocronartium muscicola</i>	VU D1		
<i>Gloiodon strigosus</i>	VU D1	EN A2a; D1	
<i>Gomphus clavatus</i>	VU A2c; D1		
<i>Gyroporus castaneus</i>	VU B2ab(iii); D1		
<i>Hohenbuehelia petaloides</i>	VU D1	CR B1; D1	
<i>Hydnellum aurantiacum</i>	VU D1		
<i>Hygrophorus piceae</i>	VU B2ab(iii); D1		
<i>Hypholoma flavorhizum</i>	VU B2ab(iii); D1		
<i>Hypocreopsis lichenooides</i>	VU D1		
<i>Ionomidotis irregularis</i>	VU D1		
<i>Lactarius acerrimus</i>	VU D1	not assessed	
<i>Lepiota grangei</i>	VU D1	CR B1; D1	
<i>Marasmius wynneae</i>	VU D1	EN B1; D1	
<i>Odontia ferruginea</i>	VU D1	not assessed	
<i>Phellodon fuligineoalbus</i>	VU D1		III
<i>Phellodon niger</i>	VU D1		III
<i>Phleogena faginea</i>	VU D1		
<i>Rugosomyces ionides</i>	VU D1		
<i>Sabuloglossum arenarium</i>	VU D1		II
<i>Sarcosoma globosum</i>	VU A2c; D1		I
<i>Sarcosphaera coronaria</i>	VU D1		II

Species	IUCN category/ criteria 2019	IUCN category/ criteria 2008	Protected by the law (categories I–III)
<i>Sowerbyella imperialis</i>	VU D1	NT	III
<i>Sowerbyella radiculata</i>	VU D1	NT	
<i>Sparassis crispa</i>	VU D1	EN D1	II
<i>Thelephora caryophyllea</i>	VU D1		
<i>Tomentella botryoides</i>	VU D1	not assessed	
<i>Tomentella galzinii</i>	VU D1	not assessed	
<i>Tomentella subclavigera</i>	VU D1	not assessed	
<i>Tomentella subtestacea</i>	VU D1	not assessed	
<i>Tomentella viridula</i>	VU D1	not assessed	
<i>Tulostoma fimbriatum</i>	VU D1		
<i>Xylaria polymorpha</i>	VU D1		
<i>Xylobolus frustulatus</i>	VU D1		
<i>Auricularia mesenterica</i>	NT		
<i>Bulgaria inquinans</i>	NT		
<i>Caloscypha fulgens</i>	NT		
<i>Geastrum minimum</i>	NT		
<i>Geastrum rufescens</i>	NT		
<i>Geastrum schmidelii</i>	NT		
<i>Geastrum triplex</i>	NT		
<i>Guepinia helvelloides</i>	NT		
<i>Gyroporus cyanescens</i>	NT		
<i>Hericium coralloides</i>	NT		
<i>Hohwaya mucida</i>	NT		
<i>Hydnellum ferrugineum</i>	NT		
<i>Hymenochaete ulmicola</i>	NT		
<i>Hypholoma radicosum</i>	NT		
<i>Kuehneromyces lignicola</i>	NT		
<i>Laccaria maritima</i>	NT		
<i>Lactarius citriolens</i>	NT	not assessed	
<i>Lactarius fennoscandicus</i>	NT	not assessed	
<i>Lactarius flavopalustris</i>	NT	not assessed	
<i>Lactarius fuliginosus</i>	NT	not assessed	
<i>Lactarius fulvissimus</i>	NT	not assessed	
<i>Lactarius leonis</i>	NT	not assessed	
<i>Lactarius lignyotus</i>	NT	not assessed	
<i>Lactarius luridus</i>	NT	not assessed	
<i>Lactarius musteus</i>	NT	not assessed	
<i>Lactarius pilatii</i>	NT	not assessed	
<i>Lactarius piperatus</i>	NT	not assessed	
<i>Lactarius repraesentaneus</i>	NT	not assessed	
<i>Lactarius resimus</i>	NT	not assessed	
<i>Lactarius sanguifluus</i>	NT	not assessed	
<i>Lactarius semisanguifluus</i>	NT	not assessed	
<i>Lactarius sphagnetii</i>	NT	not assessed	

Species	IUCN category/ criteria 2019	IUCN category/ criteria 2008	Protected by the law (categories I–III)
<i>Lactarius vellereus</i>	NT	not assessed	
<i>Lactarius volemus</i>	NT	not assessed	
<i>Lactarius zonarioides</i>	NT	not assessed	
<i>Lactarius zonarius</i>	NT	not assessed	
<i>Lentaria epichnoa</i>	NT		
<i>Leucoagaricus nymphaeum</i>	NT		II
<i>Leucopaxillus compactus</i>	NT		II
<i>Lycoperdon caudatum</i>	NT		
<i>Lycoperdon echinatum</i>	NT		
<i>Marchandiomyces quercinus</i>	NT		
<i>Mycenastrum corium</i>	NT		
<i>Neottiella hetieri</i>	NT		
<i>Pleurotus calyptratus</i>	NT		
<i>Pseudotomentella mucidula</i>	NT	not assessed	
<i>Rubroboletus satanas</i>	NT		
<i>Sarcodon glaucopus</i>	NT		
<i>Sistotrema raduloides</i>	NT		
<i>Suillus collinitus</i>	NT	EN B1; D1	
<i>Thelephora penicillata</i>	NT		
<i>Tolypocladium capitatum</i>	NT		
<i>Tomentella asperula</i>	NT	not assessed	
<i>Tomentella badia</i>	NT	not assessed	
<i>Tomentella cinerascens</i>	NT	not assessed	
<i>Tomentellopsis zygodemoides</i>	NT	not assessed	
<i>Tulostoma brumale</i>	NT		
<i>Verpa digitaliformis</i>	NT		
<i>Volvariella bombycina</i>	NT		
<i>Xerula pudens</i>	NT		
<i>Athelia arachnoidea</i>	LC		
<i>Lactarius aquizonatus</i>	LC	not assessed	
<i>Lactarius aspideus</i>	LC	not assessed	
<i>Lactarius aurantiacus</i>	LC	not assessed	
<i>Lactarius azonites</i>	LC	not assessed	
<i>Lactarius badiusanguineus</i>	LC	not assessed	
<i>Lactarius camphoratus</i>	LC	not assessed	
<i>Lactarius cyathuliformis</i>	LC	not assessed	
<i>Lactarius deliciosus</i>	LC	not assessed	
<i>Lactarius deterrimus</i>	LC	not assessed	
<i>Lactarius evosmus</i>	LC	not assessed	
<i>Lactarius flexuosus</i>	LC	not assessed	
<i>Lactarius glyciosmus</i>	LC	not assessed	
<i>Lactarius helvus</i>	LC	not assessed	
<i>Lactarius lacunarum</i>	LC	not assessed	
<i>Lactarius lilacinus</i>	LC	not assessed	

Species	IUCN category/ criteria 2019	IUCN category/ criteria 2008	Protected by the law (categories I–III)
<i>Lactarius mammosus</i>	LC	not assessed	
<i>Lactarius necator</i>	LC	not assessed	
<i>Lactarius obscuratus</i>	LC	not assessed	
<i>Lactarius olivinus</i>	LC	not assessed	
<i>Lactarius pubescens</i>	LC	not assessed	
<i>Lactarius pyrogalus</i>	LC	not assessed	
<i>Lactarius quieticolor</i>	LC	not assessed	
<i>Lactarius quietus</i>	LC	not assessed	
<i>Lactarius rufus</i>	LC	not assessed	
<i>Lactarius scoticus</i>	LC	not assessed	
<i>Lactarius scrobiculatus</i>	LC	not assessed	
<i>Lactarius spinosulus</i>	LC	not assessed	
<i>Lactarius tabidus</i>	LC	not assessed	
<i>Lactarius torminosus</i>	LC	not assessed	
<i>Lactarius trivialis</i>	LC	not assessed	
<i>Lactarius uvidus</i>	LC	not assessed	
<i>Lactarius vietus</i>	LC	not assessed	
<i>Lactarius violascens</i>	LC	not assessed	
<i>Phyllotopsis nidulans</i>	LC	NT	
<i>Pseudotomentella tristis</i>	LC	not assessed	
<i>Tomentella bryophila</i>	LC	not assessed	
<i>Tomentella ferruginea</i>	LC	not assessed	
<i>Tomentella punicea</i>	LC	not assessed	
<i>Tomentella stiposa</i>	LC	not assessed	
<i>Tomentellopsis echinospora</i>	LC	not assessed	
<i>Tomentellopsis submollis</i>	LC	not assessed	
<i>Butyriboletus appendiculatus</i>	DD	CR B1; D1	
<i>Clavulina amethystina</i>	DD	CR D1	
<i>Clitocella mundula</i>	DD	CR B1; D1	
<i>Pterula multifida</i>	DD	EN D1	
<i>Sowerbyella rhenana</i>	DD	NT	
<i>Strobilomyces strobilaceus</i>	DD	CR B1; D1	
<i>Gomphidius maculatus</i>	NA	NT	
<i>Lactarius circellatus</i>	NA	LC	
<i>Lactarius rostratus</i>	NA	not assessed	
<i>Lactarius ruginosus</i>	NA	not assessed	
<i>Leucopaxillus salmonifolius</i>	NA	CR B1; D1	I
<i>Microglossum atrovirens</i>	NA	CR B1; D1	
<i>Mutinus ravenelii</i>	NA	NT	
<i>Suillus americanus</i>	NA	NA	
<i>Suillus cavipes</i>	NA	EN D1	II