

**A CHECKLIST OF MYCOBIOTA RECORDED IN BURNT AND UNBURNT *PINUS MUGO* PLANTATIONS IN THE CURONIAN SPIT (LITHUANIA)**
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**Abstract**

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A devastating crown-fire occurred in May 2006 in mountain pine (*Pinus mugo*) plantations located in the Curonian Spit (Lithuania). During different seasons (spring and autumn) from 2007 to 2009, the mycobiota (including myxobiota) of burnt and unburnt *P. mugo* stands was examined in permanent sampling plots. The mycobiota checklist provides data on species composition and substrates occupied by fungi and myxomycetes. A total of 390 species of fungi and myxomycetes were recorded. At unburnt sites, 262 species were identified, 215 – at burnt sites. Forty three species were registered for the first time in Lithuania. Rare and noteworthy species are commented.

**Keywords:** fungi, lichens, myxomycetes, mountain pine, crown-fire, coastal sand dunes.

**INTRODUCTION**

A mountain pine (*Pinus mugo* Turra) is an alien plant species in Lithuania (GUDŽINSKAS, 2000), which was widely used for reforestation and stabilization of drifting sand in the Curonian Spit since the early 19<sup>th</sup> century (OLŠAUSKAS, 2009). *P. mugo* grows as a bush, reaching 4–6 m in height with roots spreading densely in sandy soil. Hundred years and older plantations form dense, hardly penetrable stands. Fallen woody debris and oily needles make a thick litter that is very susceptible to fires. In their natural distribution area, fires happen approximately every 250 years in climax stands of *P. mugo* (STÄHLI et al., 2006) and human activities may increase fire frequencies (FAVILI et al., 2010).

Mycobiota of natural *Pinus mugo* stands has been intensively studied in Europe (RONIKIER, 2009). In Lithuania, though *P. mugo* stands make a considerable part (27 %) of coniferous forests in the Curonian Spit (OLŠAUSKAS, 2009), they have received only cursory attention during long-standing and rather intensive mycological investigations (KUTORGA, 1989; MOTIEJŪNAITĖ et al., 1998; LYGIS et al., 2010; AUČINA et al., 2011; MARKOVSKAJA et al., 2011).

Mycobiota is an important component of an ecosystem, ensuring its formation and stability: fungi play important role in organic matter decomposition and soil formation, participate in nutrient cycling both directly and by assisting nutrient uptake by plants, regulate plant communities both by mu-

tualistic and biotrophic life modes. Post-fire fungal communities have been studied since the end of the forties of the 20<sup>th</sup> century (MOSER, 1949), however, their community structure, diversity and ecological role remain insufficiently known. Pathogenic, wood-inhabiting and mycorrhizal macrofungi (FROELICH & DELL, 1967; PETERSEN, 1970, 1971, 1975; DICKMAN & COOK, 1989; PENTTILÄ & KOTIRANTA, 1996; STENDELL et al., 1999; FRIEDRICH, 2001; SUMOROK, 2001; DAHLBERG, 2002; CAIRNEY & BASTIAS, 2007; JUNNINEN et al., 2008; LYGIS et al., 2010; GASSIBE et al., 2011) and, to some extent, lichens (MAIKAWA & KERSHAW, 1976; ALSTRUP & VESTERGAARD, 2006; JOHANSSON et al., 2006; KETNER-OOSTRA et al., 2006, etc.) so far have received most attention in the mycological studies carried out in post-fire areas.

In 2006, a devastating crown-fire occurred in the stands of *Pinus mugo* in the northern part of the Curonian Spit that belongs to Kuršių Nerija National Park, Smiltynė forest department. The fire resulted in the death of all trees, and a significant burn of the thick litter cover on sandy soil in the territory of ca. 230 ha. This event as well as different post-fire management practices has triggered the investigation of mycobiota and myxobiota in burnt and unburnt *P. mugo* stands in this area. The aim of this article was to present a list of all fungus and myxomycete species recorded during the surveys in *P. mugo* plantations between 2007 and 2009. The analysed data on succession and structure of fungal communities in differently managed post-fire *P. mugo* stands are presented in a separate publication (KUTORGA et al., 2012).

## MATERIALS AND METHODS

The investigation was carried out in burnt and unburnt *P. mugo* plantations in 2007–2009. Three permanent sampling plots (square, each 500 m<sup>2</sup> in size) were established for the unburnt sites and for each differently treated burnt site (burnt, not managed; burnt, clear-cut; burnt, clear-cut and replanted with Scots pine (*Pinus sylvestris*) in 2008). In total 12 sampling plots were inspected thoroughly three times per year during one visit in spring (May) and two visits in autumn (September–October). Lichenized ascomycetes were registered once a year in autumn.

Within a plot, fruiting structures of nonlichen-

ized fungi, hypogeous sclerotia of *Cenococcum geophilum* and thalli of lichens were surveyed and samples were collected from all substrata (soil, litter, woody material, dead or living herbaceous plants and mosses). All distinct microhabitats were checked in order to find as many species as possible. Additionally, during every visit, samples of substrates (litter and bark of *P. mugo*) for the preparation of moist chamber cultures of myxomycetes were collected in the field after HÄRKÖNEN (1977). The samples of fungal species that were difficult to identify *in situ* were collected for microscopic examination in the laboratory and identified following routine mycological methods (MUELLER et al., 2004). Voucher specimens are deposited at the Herbaria of the Institute of Botany of Nature Research Centre (BILAS) and Vilnius University (WI).

Taxa of teleomorphic and anamorphic ascomycetes, basidiomycetes, zygomycetes and myxomycetes were treated separately in alphabetical order. Fungal functional groups were defined after HALLINGBÄK (1994), RINALDI et al. (2008), KOTIRANTA et al. (2009). The nomenclature of fungal taxa follows the Index Fungorum database (<http://www.indexfungorum.org>) and the literature cited therein. Myxomycete taxonomy follows that of NANNENGA-BREMEKAMP (1991), and nomenclature follows that of LADO (2005–2012). Author citation was used according to the Authors of Fungal Names (2 ed., <http://www.indexfungorum.org/authorsoffungalnames.htm>).

## RESULTS AND DISCUSSION

A total of 390 species of fungi and myxomycetes were recorded in the study area, of which 350 were identified to species and 40 to genus (Table 1). Forty three species (11 % of all recorded species) were registered for the first time in Lithuania, of these, 14 species of teleomorphic ascomycetes, 28 species of anamorphic ascomycetes, and 2 myxomycete species. A total of 262 species were observed in unburnt and 215 – in burnt *P. mugo* plantations. Eighty six species were recorded at both unburnt and burnt sites.

Saprobic fungi made up 227 species (wood saprobes – 132 species, litter saprobes – 76, soil saprobes – 19), biotrophs – 24, mycorrhizal fungi – 34, lichenized fungi – 47 and phagotrophic myxo-

Table 1. A Checklist of fungus and myxomycete taxa recorded from *Pinus mugo* plots. Species marked with an asterisk (\*) are new to Lithuania.

**Abbreviations.** *Function:* Bi – biotrophs, L – lichenized ascomycetes, M – mycorrhizal fungi, Ph – phagotrophic myxomycetes, Sl – litter saprobes, Ss – soil saprobes, Sw – wood saprobes. *Substrates:* Ba – bark, Co – cones, F – fungi, E – excrements, H – herbs, Li – litter, Lv – leaves, Mo – mosses, N – needles, S – soil, W – wood. *Sampling plots:* U – unburnt, B – burnt and not managed, C – burnt and clear-cut, R – burnt, clear-cut and reforested. Taxa recorded (+) or not recorded (–) in 2007, 2008 and 2009 in U, B and C plots, and in 2008 and 2009 in R plots.

Taxa	Function	Substrates	Sampling plots			
			U	B	C	R
<b>ASCOMYCETES</b>						
<i>Absconditella delutula</i> (Nyl.) Coppins & H. Kilius	L	Li	---	---	---+	---
<i>Apiochynchostoma</i> sp.	Sw	W	---+	---	---	---
<i>Byssolophis</i> sp.	Sw	Ba	---	---	---	---
* <i>Bryoscyphus dicrani</i> (Ade & Höhn.) Spooner	Bi	Mo	---	---	---	---
<i>Calycina conorum</i> (Rehm) Baral	Sl	Co	---+	---	---	---
<i>Cenococcum geophilum</i> Fr. <sup>1</sup>	M	S	---	---	---	---
* <i>Ceratocystis pilifera</i> (Fr.) C. Moreau	Bi	Ba	---	---	---	---
<i>Cetraria islandica</i> (L.) Ach.	L	S	+++	---	---	---
<i>Cetraria sepincola</i> (Ehrh.) Ach.	L	B	+++	---	---	---
<i>Chaenotheca ferruginea</i> (Turner ex Sm.) Mig.	L	B	+++	---	---	---
* <i>Cheilymenia</i> cf. <i>magnipila</i> J. Moravec	Sl	Li	---	---	---	---
<i>Cyclaneusma minus</i> (Butin) DiCosmo	Sl	N	---	---	---	---
<i>Cladonia arbuscula</i> (Wallr.) Flot. s. l.	L	S	+++	+++	---	---
<i>Cladonia cenotea</i> (Ach.) Schaer.	L	Ba, W	+++	---	---	---
<i>Cladonia chlorophaea</i> aggr.	L	Ba, W	+++	+++	---	---
<i>Cladonia coniocraea</i> (Flörke) Spreng.	L	Ba, W	+++	---	---	---
<i>Cladonia digitata</i> (L.) Hoffm.	L	Ba, W	+++	---	---	---
<i>Cladonia fimbriata</i> (L.) Fr.	L	B, W, S	+++	---	---	---
<i>Cladonia furcata</i> (Huds.) Schrad.	L	S	+++	---	---	---
<i>Cladonia incrassata</i> Flörke	L	W	+++	---	---	---
<i>Cladonia macilenta</i> Hoffm.	L	Ba, W	+++	---	---	---
<i>Cladonia ochrochlora</i> Flörke	L	W	+++	---	---	---
<i>Cladonia portentosa</i> (Dufour) Coem.	L	S	+++	---	---	---
<i>Cladonia rangiferina</i> (L.) Weber ex F. H. Wigg.	L	S	+++	---	---	---
<i>Cladonia subulata</i> (L.) Weber ex F. H. Wigg.	L	S	+++	---	---	---
<i>Coenogonium pineti</i> (Ach.) Lücking & Lumbsch	L	B	+++	---	---	---
* <i>Coniochaeta</i> cf. <i>lignaria</i> (Grev.) Masseur	Sw	W	---	---	---	---
<i>Cosmospora</i> sp.	Sw	W	---	---	---	---
<i>Dasyscyphella montana</i> Raitv.	Sl	Co	---	---	---	---
* <i>Delitschia perpusilla</i> Speg.	Ss	E	---	---	---	---
<i>Erysiphe betae</i> (Vaňha) Weltzien	Bi	H	---	---	---	---
<i>Evernia prunastri</i> (L.) Ach.	L	Ba, W	---	---	---	---
<i>Gorgoniceps aridula</i> (P. Karst.) P. Karst.	Sw	Ba, C	+++	---	---	---
<i>Hamatocanthoscypha laricionis</i> (Velen.) Svrček	Sw	Ba, N	---	---	---	---
<i>Hyalopeziza trichodea</i> (W. Phillips & Plowr.) Raitv.	Sl	N	---	---	---	---
<i>Hyaloscypha aureliella</i> (Nyl.) Huhtinen	Sw	W	---	---	---	---
* <i>Hyaloscypha leuconica</i> var. <i>bulbopilosa</i> (Feltg.) Huhtinen	Sw	W, B, Co	+++	---	---	---
<i>Hypocenyomyce scalaris</i> (Ach. ex Lilj.) M. Choisy	L	Ba, W	+++	---	---	---
* <i>Hypocopra stephanophora</i> Krug & Cain	Ss	E	---	---	---	---
<i>Hypogymnia physodes</i> (L.) Nyl.	L	Ba, W, S, Li	+++	+++	+++	---
<i>Lachnellula pseudopharinacea</i> (P. & H. Crouan) Dennis	Sw	B	+++	---	---	---

<sup>1</sup> *Cenococcum geophilum* is an anamorphic ascomycete not producing any sporulating structures.

Table 1 continued

Taxa	Function	Substrates	Sampling plots			
			U	B	C	R
<i>Laetinaevia</i> sp.	Sw	Ba	---	---+	---+	--
<i>Lasiosphaeria</i> sp.	Sl	W, Li	+++	---	---	--
<i>Lecanora pulicaris</i> (Pers.) Ach.	L	Ba	+++	---	---	---+
<i>Lecanora symmicta</i> (Ach.) Ach.	L	Ba	+++	---	---	--
<i>Lecanora varia</i> (Hoffm.) Ach.	L	Ba	---+	---	---	--
<i>Lecidea nylanderii</i> (Anzi) Th. Fr.	L	Ba	+++	---	---	--
<i>Lepraria</i> spp.	L	Ba	+++	---	---	--
* <i>Leptosphaeria ogilviensis</i> (Berk. & Broome) Ces. & De Not.	Sl	Li	---	---	---	---+
<i>Lophodermium conigenum</i> (Brunaud) Hilitzer	Bi	N	---	---	---	---+
<i>Lophodermium pinastri</i> (Schrad.) Chevall.	Sl	N, Co	---+	---	---	---+
<i>Lophodermium seditiosum</i> Minter	B	N	---	---	---	---+
<i>Melanelixia subaurifera</i> (Nyl.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch	L	Ba	---	---+	---	--
<i>Melanohalea exasperatula</i> (Nyl.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch	L	Ba	---	---+	---	--
<i>Micarea micrococca</i> (Körb.) Gams	L	Ba	+++	---	---	--
<i>Micarea misella</i> (Nyl.) Hedl.	L	W	---+	---	---	--
<i>Micarea nitchkeana</i> (J. Lahm ex Rabenh.) Harm.	L	B	---+	---	---	--
<i>Microsphaera trifolii</i> (Grev.) U. Braun	Bi	H	---	---	---+	--
<i>Mycoblastus fucatus</i> (Stirt.) Zahlbr.	L	Ba	+++	---	---	---+
<i>Mollisia cinerea</i> (Batsch : Fr.) P. Karst.	Sw	W	---	---+	---	--
<i>Mollisia discolor</i> (Mont.) W. Phillips	Sw	Ba	---	---+	---	--
<i>Mollisia fusca</i> (Pers. : Fr.) P. Karst.	Sw	W, Ba	---+	---	---	--
<i>Mollisia ligni</i> (Desm.) P. Karst.	Sw	W, Ba	---+	---	---	--
<i>Mollisia lividofusca</i> (Fr.) Gillet	Sw	W, Ba	---+	---+	---+	---+
<i>Mollisia melaleuca</i> (Fr.) Sacc.	Sw	W	---+	---+	---	--
<i>Mollisia palustris</i> (Roberge ex Desm.) P. Karst.	Sl	H	---	---+	---	--
<i>Mollisia pastinacae</i> Nannf.	Sl	H	---	---	---+	--
<i>Mollisia perparvula</i> (P. Karst.) P. Karst.	Sw	B	---	---+	---	--
<i>Naemacyclus fimbriatus</i> (Schwein.) DiCosmo, Peredo & Minter	Sl	Co	+++	---	---+	---+
<i>Nectria</i> cf. <i>magnusiana</i> Rehm	Sw	W	---	+++	---	--
<i>Octospora rustica</i> (Velen.) J. Moravec	Bi	Mo	---	---	---+	--
<i>Orbilia delicatula</i> (P. Karst.) P. Karst.	Sw	W, Ba	---+	---	---	--
<i>Parmelia sulcata</i> Taylor	L	W	---	---+	---+	--
<i>Parmeliopsis ambigua</i> (Wulfen) Nyl.	L	Ba, W	+++	---	---	--
<i>Pezicula eucrita</i> (P. Karst.) P. Karst.	Sw	Ba, C	+++	+++	+++	++
* <i>Phaeosphaeria eustoma</i> (Fuckel) L. Holm	Sl	Li	---+	---	---+	--
* <i>Phaeosphaeria luctuosa</i> (Niessl ex Sacc.) Otani & Mikawa	Sl	Li	---	---	---	---+
<i>Phaeosphaeria</i> sp.	Sl	Li	---	---	---+	---+
<i>Physcia tenella</i> (Scop.) DC.	L	W	---	+++	---+	++
<i>Placynthiella icmalea</i> (Scop.) DC.	L	W, Li	---+	---+	---+	++
<i>Placynthiella oligotropha</i> (J. R. Laundon) Coppins & P. James	L	Li, S	---	---+	---+	---+
<i>Placynthiella uliginosa</i> (Schrad.) Coppins & P. James	L	Li, S	---	---+	---+	---+
<i>Platismatia glauca</i> (L.) W. L. Culb. & C. F. Culb.	L	Ba	+++	---	---	--
<i>Pleospora vagans</i> Biessl	Sl	Li	---	---	---+	--
<i>Pseudevernia furfuracea</i> (L.) Zopf	L	Ba, Li, S	+++	---	---+	---+
* <i>Rhamphoria</i> cf. <i>oblique</i> (P. Karst.) Sacc.	Sw	W	---	---+	---	--
<i>Rhizina undulata</i> Fr.	Bi	S, W	---	+++	+++	--
<i>Ropalospora viridis</i> (Tønsberg) Tønsberg	L	Ba	+++	---	---	--
<i>Sordaria fimicola</i> (Hansen) P. Cannon & Hawksw.	Ss	E	---	+++	---	---+
* <i>Sordaria superba</i> De Not.	Ss	E	---	---+	---	--

Table 1 continued

Taxa	Function	Substrates	Sampling plots			
			U	B	C	R
<i>Sporormiella australis</i> (Speg.) Ahmed & Cain	Ss	E	---	---+	---	---+
<i>Sporormiella lageniformis</i> (Fuckel) Ahmed & Cain	Ss	E	---	---+	---	---
<i>Sporormiella octomera</i> (Auersw.) Ahmed & Cain	Ss	E	---	---+	---	---
<i>Tapesia strobilicola</i> (Rehm) Sacc.	Sl	Co	+++	---+	+++	---+
<i>Trapeliopsis flexuosa</i> (Fr.) Coppins & P. James	L	W	---	---+	---+	---+
<i>Trapeliopsis granulosa</i> (Hoffm.) Lumbsch	L	Li, S	+++	---	---+	---
<i>Trapeliopsis pseudogranulosa</i> Coppins & P. James	L	W	+++	---	---	---
<i>Tuckermanopsis chlorophylla</i> (Willd.) Hale	L	B	+++	---	---	---
<i>Usnea hirta</i> (L.) Weber ex F. H. Wigg.	L	B	+++	---	---	---
* <i>Valsa friesii</i> (Duby) Fuckel	Sw	W	---	---+	---	---
* <i>Venturiocistella pini</i> (Höhn.) Baral	Sw	Ba	---+	---	---	---
<i>Xanthoria polycarpa</i> (Hoffm.) Rieber	L	W	---	---+	---+	---
<b>Anamorphic ascomycetes</b>						
<b>Coelomycetes</b>						
<i>Ceuthospora pinastri</i> (Fr.) Höhn.	Sl	Li	---	---	---	++
* <i>Coniothyrium dispersellum</i> P. Karst.	Bi	C, N	---	---	---	++
<i>Coniothyrium pini</i> Corda	Bi	N	---	---+	---	++
<i>Dothistroma</i> cf. <i>septosporum</i> (Dorog.) M. Morelet	Bi	N	---	---	---	++
<i>Fujimyces oödes</i> (Bayl. Ell.) Minter & Caine	Sl	N	---+	---	---	---
<i>Fujimyces oödes</i> var. <i>curvatisporus</i> Treigienė	Sl	N	---+	---	---	++
<i>Leptostroma pinastri</i> Desm.	Bi	N	---+	---	---	++
<i>Phoma</i> sp.	Bi	W	---	---+	---	---
<i>Sclerophoma</i> sp.	Bi	W	---	---	---	---+
* <i>Scleropycnis piceana</i> (Naumov) Sutton & Livsey	Bi	W	---	---	+-	---
<i>Sphaerollopsis filum</i> (Biv.) B. Sutton	Bi	F	---	---+	---+	++
<i>Sphaeropsis sapinea</i> (Fr.) Dyko & B. Sutton	Bi	N, W	---+	---	---	++
<i>Truncatella conorum-piceae</i> (Tubef) Steyaert	Bi	Co, N	---+	---	---	++
<b>Hyphomycetes</b>						
<i>Acremonium</i> sp.	Sl	Li	---	+++	---	---
<i>Acrodontium crateriforme</i> (J. F. H. Beyma) de Hoog	Sl	Li	---+	---+	---+	---
<i>Actinocladium rhodosporum</i> Ehrenb. ex Pers.	Sw	W	+++	---	---	---
<i>Alternaria alternata</i> (Fr.) Keissl.	Sl	Li, Lv	---+	+++	+++	---
<i>Alternaria</i> sp.	Sw	W	---	+++	---	---
<i>Alternaria tenuissima</i> (Kunze) Wiltshire.	Sw	W	---+	---	---	---
<i>Anavirga laxa</i> Sutton	Sl	Li, N	---+	---	---	---
* <i>Anungitea continua</i> Matsush.	Sl	N	+++	---	---+	---+
<i>Asperisporium</i> sp.	Sl	Li	---	---	---	---+
* <i>Blastophorum pini</i> Minter & Hol.-Jech.	Sw	W	+++	---	---	---
<i>Botrytis cinerea</i> Pers.	Sl	Li	---+	---+	---+	---+
* <i>Capnobotrys</i> cf. <i>dingleyae</i> S. Hughes	Sw	W	+++	---	---	---+
* <i>Chalara</i> cf. <i>parvispora</i> Nag Raj & S. Hughes	Sl	Li	+++	---	---	---
<i>Chalara microchona</i> W. Gams	Sl	Li	---+	---	---	---
<i>Cheiromycella microscopica</i> (P. Karst.) S. Hughes	Sw	W	+++	---	---+	---+
<i>Chloridium virescens</i> var. <i>caudigerum</i> (Höhn.) W. Gams & Hol.-Jech.	Sw	W	---+	---	---	---
<i>Chloridium virescens</i> var. <i>virescens</i> (Pers.) W. Gams & Hol.-Jech.	Sw	W	---	---	+-	---
<i>Cladosporium gallicola</i> B. Sutton	Sw	W	+++	---	---	---
<i>Cladosporium herbarum</i> (Pers.) Link	Sl	Li	---	---	---+	---+
<i>Cladosporium macrocarpum</i> Preuss	Sl	Li	---	---+	---	---
<i>Cladosporium</i> sp.	Sw	W	---+	+-	+-	---+
* <i>Cladosporium staurophorum</i> (Kendrick) M. B. Ellis	Sl	Li, N	---+	---	---+	+-
<i>Corynesporiopsis quercicola</i> (Borowska) P. M. Kirk	Sw	W	+++	---	---	---

Table 1 continued

Taxa	Function	Substrates	Sampling plots			
			U	B	C	R
* <i>Costantinella terrestris</i> (Link) S. Hughes	Ss	S, Ba	---	+	---	--
<i>Dactylaria parvispora</i> (Preuss) de Hoog & Arx	Sl	Li	---	---	---	--
<i>Dactylaria</i> sp.	Sl	Li	+++	---	---	+
* <i>Dactylella bembicodes</i> Drechsler	Sl	Li	---	---	---	+
<i>Dactylella</i> sp.	Sl	Li	---	+	+	+
<i>Dendryphion comosum</i> Wallr.	Sl	Li	---	---	---	--
<i>Dendryphion nanum</i> (C. G. Nees ex S. F. Gray) S. Hughes	Sl	Li	---	---	---	--
<i>Dicyma</i> sp.	Sl	Li	---	+	+	+
<i>Diplococcium</i> sp.	Sw	W	---	+	---	--
<i>Drechslera</i> sp.	Sl	Li, Lv	---	---	---	+
* <i>Drechslera sorokiniana</i> (Sacc.) Subram. & B. L. Jain	Sw	W	---	+	---	--
<i>Epicoccum nigrum</i> Link	Sl	Li	---	+	---	+
<i>Exochalara</i> sp.	Sw	W	---	---	---	--
* <i>Helicoön fuscoporum</i> Linder	Sw	W	---	+	---	--
<i>Hormiactella fusca</i> (Presus) Sacc.	Sw	W	+++	---	---	--
* <i>Isthmolongispora basitruncata</i> Matsush.	Sl	Li, N	+++	---	---	--
<i>Mariannaea elegans</i> var. <i>elegans</i> (Corda) Samson	Sl	Li	---	---	---	--
<i>Menispora ciliata</i> Corda	Sw	W	---	---	---	--
* <i>Neofusicoccum mangiferae</i> (Syd. & P. Syd.) Crous, Slippers & A. J. L. Phillips	Sw	W	---	---	---	--
<i>Oidiodendron tenuissimum</i> (Peck) S. Hughes	Sl	Li	---	---	---	+
* <i>Parasymptodiella clarkii</i> B. Sutton	Sl	Li	+++	---	---	+
<i>Penicillium</i> sp.	Sw	W, Li	---	---	---	+
* <i>Phaeostalagmus cyclosporus</i> (Grove) W. Gams	Sw	W	+++	---	---	--
<i>Phaeostalagmus tenuissimus</i> (Corda) W. Gams	Sw	W	---	---	---	--
* <i>Polyscytalum fecundissimum</i> Riess	Sw	Li, W	---	+	---	+
* <i>Polyscytalum pini</i> P. M. Kirk	Sl	N	---	---	---	--
* <i>Pseudocercospora deightonii</i> Minter	Sl	Li	---	---	---	+
<i>Selenosporella curvispora</i> Mac Garvie	Sw	W	---	---	---	--
* <i>Septonema fasciculare</i> (Corda) S. Hughes	Sw	W	---	---	---	+
* <i>Septonema secedens</i> Corda	Sw	W	---	---	---	--
<i>Spadicoides atra</i> (Corda) S. Hughes	Sw	W	---	---	---	+
<i>Spadicoides grovei</i> M. B. Ellis	Sw	W	---	---	---	--
<i>Spegazzinia</i> sp.	Sw	W	---	---	---	--
<i>Sporidesmiella hyalosperma</i> var. <i>hyalosperma</i> (Corda) P. M. Kirk.	Sw	W	---	---	---	--
* <i>Sporidesmium doliiforme</i> Minter & Hol-Jech.	Sw	W	---	---	---	--
<i>Sporidesmium</i> sp.	Sl	Li	---	---	---	--
<i>Stigmina</i> sp.	Sw	W	---	---	---	--
* <i>Symptodiella acicola</i> Kendrick	Sl	N	+++	---	---	+
<i>Symptodiella foliicola</i> P. M. Kirk	Sl	N	---	---	---	+
<i>Taeniolella</i> sp.	Sw	W	---	---	---	--
<i>Taeniolina scripta</i> (P. Karst.) P. M. Kirk	Sw	W	---	---	---	--
* <i>Thermomyces lanuginosus</i> Tsiklinsky	Sl	Li, N	---	---	---	--
<i>Torula herbarum</i> (Pers.) Link	Sl	Li	---	---	---	--
* <i>Trichocladium opacum</i> (Corda) S. Hughes	Sl	W, Li	---	---	---	--
* <i>Trichoderma polysporum</i> (Link ex Pers) Rifai	Sl	W, Li	---	---	---	--
<i>Trichoderma viride</i> Pers.	Sw	W, Ba	+++	+++	+++	++
* <i>Tridentaria implicans</i> Drechsler	Sl	Li, N	---	---	---	--
<i>Trimmatostroma scutellare</i> (Berk. & Broome) M. B. Ellis	Sw	W, Ba	---	---	---	+
<i>Trimmatostroma</i> sp.	Sw	W	---	---	---	--
<i>Troposporella monospora</i> (W. B. Kendr.) M. B. Ellis	Sl	N	---	---	---	--

Table 1 continued

Taxa	Function	Substrates	Sampling plots			
			U	B	C	R
<i>Ulocladium chartarum</i> (Preuss) Simmons	Sl	Li	---	---	---	-+
<i>Verticicladium trifidum</i> Preuss	Sl	Li, N	+++	---	---+	-+
<i>Verticillium</i> sp.	Sl	Li, N	---+	---+	---+	++
* <i>Xylohypha</i> cf. <i>pinicola</i> D. Hawksw.	Sw	W	---+	---	---	--
<i>Xylohypha</i> sp.	Sw	W	+++	---	---	--
<b>BASIDIOMYCETES</b>						
<i>Amphinema byssoides</i> (Pers.) J. Erikss.	M	W, Li	+++	+++	+---	-+
<i>Antrodia ramentacea</i> (Berk. & Broome) Donk	Sw	W	+++	---	+---	--
<i>Antrodia sinuosa</i> (Fr.) P. Karst.	Sw	W	---+	---+	---+	++
<i>Antrodia xantha</i> (Fr.) Ryvardeen	Sw	W	---	---	---	--
<i>Armillaria mellea</i> (Vahl) P. Kumm.	Sw	W	---	---	++	--
<i>Asterostroma laxum</i> Bres.	Sw	W, Li	+++	---	---	--
<i>Athelia bambacina</i> (Link) Pers.	Sw	W, Li	+++	---	---	--
<i>Athelia decipiens</i> (Höhn. & Litsch.) J. Erikss.	Sw	W, Li	---+	---	-+-	--
<i>Athelia epiphylla</i> Pers.	Sw	W, Li	+++	+-	---	+-
<i>Auriscalpium vulgare</i> Gray	Sl	Li	+++	---	---	--
<i>Baeospora myosura</i> (Fr.) Singer	Sl	Li	+++	---	---	--
<i>Basidiodendron caesiocinereum</i> (Höhn. & Litsch.) Luck-Allen	Sw	W	+++	---	---	--
<i>Bjerkandera adusta</i> (Willd.) P. Karst.	Sw	W	---	---	---	++
<i>Boletellus projectellus</i> (Murrill) Singer	M	S	+++	---	---	--
<i>Boletus chrysenteron</i> Bull.	M	S	---	---	---	--
<i>Botryobasidium obtusisporum</i> J. Erikss.	Sw	W, Li	---+	+-	+---	+-
<i>Botryobasidium subcoronatum</i> (Höhn. & Litsch.) Donk	Sw	W, Li	+++	+-	-+-	++
<i>Botryobasidium vagum</i> (Berk. & M. A. Curtis) D. P. Rogers	Sw	W, Li	+++	+++	+++	++
<i>Ceriporia excelsa</i> S. Lundell ex Parmasto	Sw	W	+++	---	---	--
<i>Chroogomphus rutilus</i> (Schaeff.) O. K. Mill.	M	S	+++	---	---	--
<i>Clitocybe clavipes</i> (Pers.) P. Kumm.	Ss	S	---+	---	---	--
<i>Clitocybe vibecina</i> (Fr.) Quél.	Sl	Li	---	---	---	--
<i>Coniophora arida</i> (Fr.) P. Karst.	Sw	W	+++	+-	---	-+
<i>Coniophora fusispora</i> (Cooke & Ellis) Cooke	Sw	W	---	---	---	--
<i>Cortinarius balteatus</i> (Fr.) Fr.	M	S	---	---	---	--
<i>Cortinarius caperatus</i> (Pers.) Fr.	M	S	+++	---	---	--
<i>Cortinarius cinnamomeus</i> (L.) Fr.	M	S	+++	---	---	--
<i>Cortinarius flexipes</i> (Pers.) Fr.	M	S	+++	---	---	--
<i>Cortinarius semisanguineus</i> (Fr.) Gillet	M	S	+++	---	---	--
<i>Cortinarius</i> sp.	M	S	+++	---	---	--
<i>Crepidotus</i> sp.	Sw	W	+++	---	---	--
<i>Cystoderma amianthinum</i> (Scop.) Fayod	Ss	S	+++	---	---	--
<i>Cystoderma carcharias</i> (Pers.) Fayod	Ss	S	---+	---	---	--
<i>Dacrymyces stillatus</i> Nees	Sw	W	---+	---	---	--
<i>Dacryobolus karstenii</i> (Bres.) Oberw. ex Parmasto	Sw	W	---+	---	---	--
<i>Diplomitoporus flavescens</i> (Bres.) Domański	Sw	W	---	---	-+-	--
<i>Entoloma</i> sp.	Ss	S	+++	---	---	--
<i>Fomitopsis pinicola</i> (Sw.) P. Karst.	Sw	W	---+	+++	---+	++
<i>Galerina calyprata</i> P. D. Orton	Sl	Li	+++	---	---	--
<i>Galerina camerina</i> (Fr.) Kühner	Sw	W	+++	---	---	--
<i>Galerina hypnorum</i> (Schrank) Kühner	Sl	Li	+++	---	---	--
<i>Galerina triscopa</i> (Fr.) Kühner	Sw	W	---+	---	---	--
<i>Galerina</i> sp.	Sl	Li	+++	---	---	--
<i>Gymnopus confluens</i> (Pers.) Antonín, Halling & Noordel.	Sl	Li	+++	---	---	--
<i>Gloeophyllum sepiarium</i> (Wulfen) P. Karst.	Sw	W	---	+++	---+	+-

Table 1 continued

Taxa	Function	Substrates	Sampling plots			
			U	B	C	R
<i>Hygrophoropsis aurantiaca</i> (Wulfen) Maire	Sl	Li	+++	----	----	--
<i>Hyphoderma praetermissum</i> (P. Karst.) J. Erikss. & Å. Strid	Sw	W	+++	----	----	++
<i>Hyphoderma setigerum</i> (Fr.) Donk	Sw	W	----	+++	----	--
<i>Hyphodontia aspera</i> (Fr.) J. Erikss.	Sw	W	+++	----	++	--
<i>Hyphodontia breviseta</i> (P. Karst.) J. Erikss.	Sw	W	+++	----	----	--
<i>Hyphodontia crustosa</i> (Pers.) J. Erikss.	Sw	W	+++	----	----	--
<i>Hyphodontia hastata</i> (Litsch.) J. Erikss.	Sw	W	++	----	----	--
<i>Hyphodontia pallidula</i> (Bres.) J. Erikss.	Sw	W	+++	----	----	--
<i>Hyphodontia subalutacea</i> (P. Karst.) J. Erikss.	Sw	W	+++	++	----	--
<i>Hypholoma capnoides</i> (Fr.) P. Kumm.	Sw	W	----	+++	----	++
<i>Hypholoma fasciculare</i> (Huds.) P. Kumm.	Sw	W	----	----	----	++
<i>Inocybe lanuginosa</i> (Bull.) P. Kumm.	M	S	+++	----	----	--
<i>Kuehneromyces lignicola</i> (Peck) Redhead	Sw	W	----	++	----	--
<i>Laccaria bicolor</i> (Maire) P. D. Orton	M	S	----	----	++	--
<i>Lactarius necator</i> (Bull.) Pers.	M	S	++	----	----	--
<i>Lactarius rufus</i> (Scop.) Fr.	M	S	+++	----	----	--
<i>Marasmius androsaceus</i> (L.) Fr.	Sl	Li	+++	----	----	--
<i>Marasmius rotula</i> (Scop.) Fr.	Sl	Li	+++	----	----	--
<i>Melampsorium betulinum</i> (Pers.) Kleb.	Bi	Lv	----	----	----	++
<i>Meruliopsis taxicola</i> (Pers.) Bondartsev	Sw	W	++	----	----	--
<i>Mycena epipterygia</i> (Scop.) Gray	Sl	Li	+++	----	----	--
<i>Mycena galericulata</i> (Scop.) Gray	Sw	W	----	++	----	--
<i>Mycena galopus</i> (Pers.) P. Kumm.	Sl	Li	++	----	----	--
<i>Mycena metata</i> (Secr. ex Fr.) P. Kumm.	Sl	Li	----	++	----	--
<i>Mycena sanguinolenta</i> (Alb. & Schwein.) P. Kumm.	Sl	Li	++	----	----	--
<i>Mycena stipitata</i> Maas Geest. & Schwöbel	Sl	Li	+++	----	----	--
<i>Myxomphalia maura</i> (Fr.) H. E. Bigelow	Ss	S	----	++	++	++
<i>Panaeolus</i> sp.	Ss	E	----	++	----	--
<i>Panellus mitis</i> (Pers.) Singer	Sw	W	++	----	----	--
<i>Paxillus involutus</i> (Batsch) Fr.	M	S	++	----	----	--
<i>Peniophora incarnata</i> (Pers.) P. Karst.	Sw	W	----	++	++	++
<i>Peniophora pini</i> (Schleich.) Boidin	Sw	W	++	++	----	--
<i>Peniophora pithya</i> (Pers.) J. Erikss.	Sw	W	----	++	----	--
<i>Phanerochaete sanguinea</i> (Fr.) Pouzar	Sw	W	+++	----	----	--
<i>Phanerochaete sordida</i> (P. Karst.) J. Erikss. & Ryvarden	Sw	W	+++	----	++	++
<i>Phlebiella sulphurea</i> (Pers.) Ginns & M. N. L. Lefebvre	M	W, Li	+++	++	----	--
<i>Phlebiopsis gigantea</i> (Fr.) Jülich	Sw	W	+++	++	----	--
<i>Pholiota flavida</i> (Schaeff.) Singer	Sw	W	++	----	----	--
<i>Pholiota highlandensis</i> (Peck) Singer	Ss	S	----	++	++	++
<i>Pholiota spumosa</i> (Fr.) Singer	Sl	Li	----	++	----	++
<i>Piloderma fallax</i> (Lib.) Stalpers	M	W, Li	++	----	----	--
<i>Pluteus cervinus</i> (Schaeff.) P. Kumm.	Sw	W	++	----	----	--
<i>Postia ceriflua</i> (Berk. & M. A. Curtis) Jülich	Sw	W	+++	----	----	--
<i>Postia lactea</i> (Fr.) P. Karst	Sw	W	+++	----	----	--
<i>Postia leucomallella</i> (Murrill) Jülich	Sw	W	+++	----	----	--
<i>Postia tephroleuca</i> (Fr.) Jülich	Sw	W	++	----	----	--
<i>Psathyrella pennata</i> (Fr.) A. Pearson & Dennis	Ss	S	----	----	++	--
<i>Psathyrella</i> sp.	Sl	Li	++	----	----	--
<i>Pseudomerulius aureus</i> (Fr.) Jülich	Sw	W	++	----	----	--
<i>Puccinia</i> cf. <i>variabilis</i> Grev.	B	H	----	----	----	++
<i>Puccinia coronata</i> Corda	B	H	----	++	++	++



Table 1 continued

Taxa	Function	Substrates	Sampling plots			
			U	B	C	R
<i>Puccinia pygmaea</i> Erikss.	B	H	---	---	+++	++
<i>Puccinia pulverulenta</i> Grev.	B	H	---	---	---+	+-
<i>Resinicium bicolor</i> (Alb. & Schwein.) Parmasto	Sw	W	+++	---	---	++
<i>Rhizopogon luteolus</i> Fr.	M	S	+-	---	---	--
<i>Russula aeruginea</i> Fr.	M	S	+++	---	---	--
<i>Russula emetica</i> (Schaeff.) Pers.	M	S	+++	---	---	--
<i>Russula fragilis</i> (Pers.) Fr.	M	S	---	---	+-	--
<i>Russula</i> sp.	M	S	---+	---	---	--
<i>Schizophyllum commune</i> Fr.	Sw	W	+++	+++	+++	+-
<i>Sistotrema brinkmannii</i> (Bres.) J. Erikss.	Sw	W, Li	---	+-	+++	--
<i>Sistotrema diademiferum</i> (Bourdot & Galzin) Donk	Sw	W, Li	---	---+	---	--
<i>Sistotrema muscicola</i> (Pers.) S. Lundell	M	W, Li	+-	---	---	--
<i>Sistotremastrum suecicum</i> Litsch. ex J. Erikss.	Sw	W	+-	---	---	+-
<i>Skeletocutis kuehneri</i> A. David	Sw	W	---	+++	---	--
<i>Stereum hirsutum</i> (Willd.) Pers.	Sw	W	---	+-	+++	+-
<i>Stereum sanguinolentum</i> (Alb. & Schwein.) Fr.	Sw	W	+++	+++	---	+-
<i>Suillus bovinus</i> (Pers.) Roussel	M	S	+-	---	---	--
<i>Suillus variegatus</i> (Sw.) Kuntze	M	S	+++	---	---	--
<i>Tapinella atrotomentosa</i> (Batsch) Šutara	Sw	W	+-	---	---	--
<i>Tephrocye anthracophila</i> (Lasch) P. D. Orton	Sl	Li	---	+++	---	+-
<i>Thelephora terrestris</i> Ehrh.	M	W, Li	+++	+++	---+	+-
<i>Tomentella radiosa</i> (P. Karst.) Rick	M	W, Li	---+	---	---	--
<i>Tomentella subclavigera</i> Litsch.	M	W, Li	+-	---	---	--
<i>Tomentellopsis echinospora</i> (Ellis) Hjortstam	M	W, Li	+++	---	---	--
<i>Tomentellopsis zygoesmoides</i> (Ellis) Hjortstam	M	W, Li	+++	---	+++	--
<i>Trametes hirsuta</i> (Wulfen) Lloyd	Sw	W	---	+++	+-	--
<i>Trechispora cohaerens</i> (Schwein.) Jülich & Stalpers	Sw	W, Li	+++	---	---	--
<i>Trechispora farinacea</i> (Pers.) Liberta	Sw	W, Li	+++	---	---	--
<i>Trechispora mollusca</i> (Pers.) Liberta	Sw	W, Li	+++	---	---	--
<i>Tremella encephala</i> Willd.	Sw	W	+-	+++	---	+-
<i>Trichaptum fuscoviolaceum</i> (Ehrenb.) Ryvardeen	Sw	W	+++	+-	+++	++
<i>Tricholoma columbetta</i> (Fr.) P. Kumm.	M	S	+++	---	---	--
<i>Tricholoma equestre</i> (L.) P. Kumm.	M	S	+-	---	---	--
<i>Tubulicrinis accedens</i> (Bourdot & Galzin) Donk	Sw	W	+-	---	---	--
<i>Tubulicrinis gracillimus</i> (D.P. Rogers & H. S. Jacks.) G. Cunn.	Sw	W	+++	---	---	--
<i>Tubulicrinis medius</i> (Bourdot & Galzin) Oberw.	Sw	W	---+	---	---	--
<i>Tubulicrinis subulatus</i> (Bourdot & Galzin) Donk	Sw	W	+++	---	---	--
<i>Tulasnella violea</i> (Quél.) Bourdot & Galzin	Sw	W	---	+-	---	--
<i>Uromyces airae-flexuosae</i> (Liro) Ferd. & Winge	Bi	H	---	+-	---	++
<i>Xerocomus chrysenteron</i> (Bull.) Quél.	M	S	+-	---	---	--
<b>ZYGOMYCETES</b>						
<i>Mortierella dichotoma</i> Linnem. ex W. Gams	Ss	Li, S	+++	---	---	--
<i>Mortierella hyalina</i> var. <i>hyalina</i> (Harz) W. Gams	Ss	Li, S	---	---+	---+	+-
<i>Umbelopsis isabellina</i> (Oudem.) W. Gams	Ss	Li, S	---	---	---	+-
<b>MYXOMYCETES</b>						
<i>Amaurochaete tubulina</i> (Alb. & Schwein.) T. Macbr.	Ph	W	---	+++	---	--
<i>Arcyria cinerea</i> (Bull.) Pers.	Ph	Ba	+++	+++	+++	+-
<i>Arcyria incarnata</i> (Pers. ex J. F. Gmel.) Pers.	Ph	W	+++	+++	---+	++
<i>Arcyria minuta</i> Buchet	Ph	Ba	---	+++	---	--
<i>Arcyria pomiformis</i> (Leers) Rostaf.	Ph	Ba	+++	---	---	--
<i>Badhamia dubia</i> Nann.-Bremek.	Ph	Ba	---	---	---	+-
<i>Badhamia utricularis</i> (Bull.) Berk.	Ph	Ba	---	+++	+++	++

Table 1 continued

Taxa	Function	Substrates	Sampling plots			
			U	B	C	R
<i>Ceratiomyxa fruticulosa</i> (O. F. Müll.) T. Macbr.	Ph	W	+++	---	---	--
<i>Comatricha elegans</i> (Racib.) G. Lister	Ph	W	---+	---	---	--
<i>Comatricha ellae</i> Härk.	Ph	Ba	---	---	-+-	+-
<i>Comatricha nigra</i> (Pers. ex J. F. Gmel.) J. Schröt.	Ph	W, Ba	+++	+--	---+	++
<i>Comatricha pulchella</i> (C. Bab.) Rostaf.	Ph	Li	+++	+--	---	--
<i>Cribraria cancellata</i> (Batsch) Nann.-Bremek.	Ph	W	---+	---	---	--
<i>Cribraria cf. intricata</i> Schrad.	Ph	W	---+	---	---	--
<i>Cribraria microcarpa</i> (Schrad.) Pers.	Ph	W, Li	---+	---	---+	-+
<i>Diderma effusum</i> (Schwein.) Morgan	Ph	Li	---+	+++	---+	-+
<i>Didymium anellus</i> Morgan	Ph	Ba	---	-+	---	--
<i>Didymium difforme</i> (Pers.) Gray	Ph	Ba	---+	---+	---+	-+
<i>Didymium dubium</i> Rostaf.	Ph	Ba	---	-+	---+	-+
<i>Didymium melanospermum</i> (Pers.) T. Macbr.	Ph	Mo	---+	---	---	--
<i>Didymium nigripes</i> (Link) Fr.	Ph	Mo	-+-	---	---	--
<i>Echinostelium apitectum</i> K. D. Whitney	Ph	Ba	+++	-+-	---	--
<i>Echinostelium minutum</i> de Bary	Ph	Ba	+++	+++	+++	++
<i>Enerthenema papillatum</i> (Pers.) Rostaf.	Ph	Ba	---+	---	---	--
<i>Fuligo candida</i> Pers.	Ph	Li	---+	---	---	--
<i>Fuligo septica</i> (L.) F. H. Wigg.	Ph	Li	---+	---	---	--
<i>Lamproderma scintillans</i> (Berk. & Broome) Morgan	Ph	Li	---	---	---	-+
<i>Leocarpus fragilis</i> (Dicks.) Rostaf.	Ph	Li	+++	---	---	-+
<i>Licea biforis</i> Morgan	Ph	Ba	---	+++	-+-	+-
<i>Licea kleistobolus</i> G. W. Martin	Ph	Ba	+++	-+-	---	--
* <i>Licea marginata</i> Nann.-Bremek.	Ph	Ba	-+-	---	---	--
<i>Licea minima</i> Fr.	Ph	Ba	+++	---+	---+	++
<i>Licea parasitica</i> (Zukal) G. W. Martin	Ph	Ba	+++	---	---	--
<i>Licea pygmaea</i> (Meyl.) Ing	Ph	Ba	---	---	-+-	+-
<i>Licea variabilis</i> Schrad.	Ph	Ba	+++	---	---	--
<i>Lycogala epidendrum</i> (L.) Fr.	Ph	W	---+	---	---+	-+
<i>Oligonema shchweinitzii</i> (Berk.) G. W. Martin	Ph	Li	---	---	---	+-
<i>Paradiacheopsis fimbriata</i> (G. Lister & Cran) Hertel ex Nann.-Bremek.	Ph	Ba	+++	---	---	--
<i>Paradiacheopsis solitaria</i> (Nann.-Bremek.) Nann.-Bremek.	Ph	Ba	+++	---	---	--
<i>Perichaena depressa</i> Lib.	Ph	Li	---	-+-	---	--
* <i>Perichaena luteola</i> (Kowalski) Gilert	Ph	Li	---	+++	+++	++
<i>Physarum bivalve</i> Pers.	Ph	Li, Ba	---	+++	---+	-+
<i>Physarum nutans</i> Pers.	Ph	Li	---+	---	---	--
<i>Physarum pusillum</i> (Berk. & M.A. Curtis) G. Lister	Ph	Ba	---	-+-	---	--
<i>Physarum sp.</i>	Ph	Ba	---+	---	---	--
<i>Physarum virescens</i> Ditmar	Ph	Mo	---+	---	---	--
<i>Physarum viride</i> (Bull.) Pers.	Ph	Ba, W	+++	---	---	--
<i>Reticularia liceoides</i> (Lister) Nann.-Bremek.	Ph	W	---+	---	---	--
<i>Reticularia lycoperdon</i> Bull.	Ph	W	---	+++	---+	++
<i>Symphytocarpus flaccidus</i> (Lister) Ing & Nann.-Bremek.	Ph	W	---+	---	---	--
<i>Stemonitis flavogenita</i> E. Jahn	Ph	W	---	---+	---	++
<i>Stemonitis fusca</i> Roth	Ph	W	---+	---+	---+	-+
<i>Stemonitopsis amoena</i> (Nann.-Bremek.) Nann.-Bremek.	Ph	W	---+	---	---	--
<i>Trichia cf. flavicoma</i> (Lister) Ing	Ph	Ba	---	---	+--	--
<i>Trichia contorta</i> (Ditmar) Rostaf.	Ph	W	---	-+-	---+	+-
<i>Trichia erecta</i> Rex	Ph	Li	---	---+	---	--
<i>Trichia persimilis</i> P. Karst.	Ph	W	---	---+	---	--
<i>Trichia sp.</i>	Ph	Ba	---	---	---+	--

mycetes – 58 species. Five species – *Myxomphalia maura*, *Octospora rustica*, *Pholiota highlandensis*, *Rhizina undulata* and *Tephrocybe anthracophila* recorded in the burnt plots are considered to be pyrophilic.

Core part of the recorded species are widespread both in the Curonian Spit and in the continental part of the country. Species associated with various parts of *Pinus mugo* (wood, bark, cones and needles) are also known to occur on *P. sylvestris* and other native trees (KUTORGA, 1989; URBONAS, 1996; GRICIUS et al., 1999; MARKOVSKAJA & TREIGIENĖ, 2005, 2009; TREIGIENĖ et al., 2010; IRŠENAITĖ, 2010). Species listed in the Red Data Book of Lithuania (RAŠOMAVIČIUS, 2007) were not observed during this study.

Previous mycological investigations based on examination of macroscopic fungi revealed that natural subalpine *P. mugo* shrubland can be greatly favourable for the development of fungi and it is very rich in rare fungi despite the absence of fungal species characteristic of it (RONIKIER, 2009). During our investigation in unburnt coastal plantations we found only 6 species recorded by RONIKIER (2009) in relevé plots, all of these, however, are widespread and common in Lithuania. However, several noteworthy fungi rarely collected in Europe were found during our investigation. One of these was alien mycorrhizal basidiomycete *Boletellus projectellus* recorded in the Curonian Spit for the first time in Europe (MOTIEJŪNAITĖ et al., 2011). Ectomycorrhizal fungus *Tomentellopsis zygoesmoides* and wood saprobe *Postia ceriflua* are rather rare in Europe (RYVARDEN & GILBERTSON, 1994; KÖLJALG, 1996); however, they were abundant in unburnt *P. mugo* plots. Bryoparasitic ascomycete *Bryoscyphus dicrani* was observed on mats of *Ceratodon purpureus*, which overgrew recently burnt soil. The fungus produced abundant apothecia and caused numerous discolored necrotic patches in the moss mats. Species of the genus *Bryoscyphus* occur on thalli of *Bryophyta*, and most of these are known from only few collections (VERKLEY et al., 1997).

Coelomycetous fungus *Fujimyces oödes* var. *curvatisporus*, which was found on fallen needles of *P. mugo* and *P. sylvestris* during this investigation, was previously described as new variety (TREIGIENĖ, 2009). Several very rarely observed in Europe wood saprobes such as *Blastophorum pini*, *Cladosporium* cf. *gallicola*, *Hyaloscypha leuconi-*

*ca* var. *bulbopilosa*, *Neofusicoccum mangiferae*, *Sporidesmium doliiforme*, and *Taeniolina scripta* were recorded in unburnt *Pinus mugo* forest. *Blastophorum pini* was known before only from former Czechoslovakia and only on *P. sylvestris* (MINTER & HOLUBOVA-JECHOVA, 1981), during our study it was found on *P. mugo*. *Cladosporium gallicola* originally described from Canada as mycoparasite on galls caused by rust fungi infecting pines (SUTTON, 1973) was found on bark and wood of *Pinus mugo*. Potentially pathogenic fungus *Neofusicoccum mangiferae* until recently mostly known under synonym name *Nattrassia mangiferae* and associated with various plant diseases and human dermatomycoses (SIGLER et al., 1997; MISIKITA et al., 2005), was recorded on dead branch as a saprobe during the present study. For the first time in Lithuania three rare needle saprobes *Istmolongispora basitruncata*, *Tridentaria implicans* and *Troposporaella monospora* were found also in unburnt forest plots. *Istmolongispora basitruncata* was first described from Japan (MATSUSHIMA, 1975) and, apparently, the Curonian Spit is the second locality of this very rare fungus in Europe, first one being in Spain (HERNÁNDEZ-CRESPO, 2006). In some unburnt and burnt plots an interesting thermophilic soil saprobe *Thermomyces lanuginosus* was frequently found. Two myxomycetes *Licea marginata* and *Perichaena luteola* were registered for the first time in Lithuania, the latter species, uncommon worldwide, was recorded on litter only at burnt sites.

For lichenized ascomycetes, no new records to the country and very few noteworthy ones were made. At unburnt sites, two uncommon in the country species were recorded: *Micarea nitchkeana* and *Trapeliopsis pseudogranulosa*. First species was found on twigs of *Pinus mugo*, it is known so far from seven localities, three of these in the Curonian Spit, the second one is confined to rotten wood and is known from three localities. Generally, at burnt sites, common lichen species were found, as such lichens usually colonize post-fire areas (EVERSMAN & HORTON, 2004). The record of *Absoconditella delutula* in 3-year-old burnt and cut plots is noteworthy. This lichen is considered to be rare, especially in lowlands (CZARNOTA & KUKWA, 2008); however, being an inconspicuous pioneer species it is most probably under-recorded.

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## DEGUSIŲ IR NEDEGUSIŲ KALNINĖS PUŠIES (*PINUS MUGO*) PLANTACIJŲ KURŠIŲ NERIJOJE (LIETUVA) MIKOBİOTOS KONSPEKTAS

**Ernestas KUTORGA, Gražina ADAMONYTĖ, Reda IRŠĖNAITĖ, Jonas KASPARAVIČIUS, Svetlana MARKOVSKAJA, Jurga MOTIEJŪNAITĖ, Aušra TREIGIENĖ**

### Santrauka

Kuršių nerijoje (Lietuva) Smiltynės girininkijoje 2006 m. gegužės mėn. gaisro metu sudegė apie 230 ha kalninės pušies (*P. mugo*) plantacijų. Mikobiotos (įskaitant ir miksobiota) tyrimai atlikti 2007–2009 m. stacionariuose tyrimo laukeliuose, kurie buvo įrengti degvietėje ir nedegusiuose *P. mugo*

medynuose. Konspekte pateikiama informacija apie identifikuotų grybų ir gleivūnų įvairovę bei substratus. Iš viso nustatyta 390 aukšliagybių, grybščių, kerpių, papėdgrybių, zigomicetų ir gleivūnų rūšių. 43 rūšys Lietuvoje užregistruotos pirmą kartą. Straipsnyje detaliau aptariami rasti itin reti grybai Europoje.