
Fungi from peatlands

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The understanding of microbial biodiversity in peatlands has grown considerably over the past two decades. This is encouraging, given the global distribution of peatlands and their potentially increasing significance under a changing climate, particularly as it pertains to carbon cycling. The purpose of this review is to compile a comprehensive list of fungi that have been reported from peatlands and to summarize their general roles in these ecosystems. To date, 601 species of fungi have been identified globally from peatlands. Ascomycetes are the largest group with 276 species (46%), followed by basidiomycetes (243 species, 40%), zygomycetes (55 species, 9%), and chytridiomycetes (26 species, 4%). The most species-rich genera are *Penicillium* (48 species), *Galerina* (41 species), and *Mortierella* (20 species). The 20 most common fungal genera account for 252 of the 601 species (42%) in peatlands. From a functional perspective, most fungi in peatlands are saprobes and are involved in the decomposition of organic matter. A better understanding of this group of fungi will allow us to better predict carbon dynamics in the future.

Key words: ascomycetes, basidiomycetes, chytridiomycetes, zygomycetes

Introduction

Wetlands cover about 4% of the world's landscape (National Wetlands Working Group, 1988). They are characterized by water levels that are at or near the soil surface, hydrophytic vegetation, and hydric soils with their unique biogeochemical processes. Most wetlands are located in the northern hemisphere, particularly in Canada and Russia (170 and 150 M ha, respectively; Gorham, 1991). More specifically, most of the Canadian and Russian wetlands are bog and fen peatlands, which have accumulated significant quantities of peat since the last glaciation. This peat consists of about 45-50% carbon (Clymo, 1984; Clymo *et al.*, 1998) and has received considerable attention in the recent past due to its potential impacts on the

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global carbon cycle under a changing climate (Gorham, 1991; Moore *et al.*, 1998; Blodau, 2002).

It has long been suggested that fungi are the dominant microbes and principal decomposer organisms in many acidic ecosystems, such as peatlands, and that they assume a more dominant role than bacteria (Kox, 1954; Latter *et al.*, 1967; Williams and Crawford, 1983; Andersen *et al.*, 2006). Until recently though, relatively little was known about the microbial diversity and roles in these ecosystems. Thormann (2006a,b) previously elucidated the diversity and roles of fungi in peatlands; however, his studies generally excluded macrofungi and information from the Russian literature. The purpose of this review is to compile a comprehensive list of fungi that have been reported from bog and fen peatlands and to summarize their general roles in these important ecosystems.

Methods

In order to compile information about fungi known from peatlands, we reviewed mycological and ecological journals, including *Mycologia*, *Mycotaxon*, *Mycological Research*, *Canadian Journal of Botany*, *Fungi Canadensis*, and *New Phytologist*, as well as *Sylloge Fungorum* (Saccardo 1882-1931, 1972) and the *Index of Fungi* (1920-present). In addition, numerous treatises of basidiomycetes (e.g., *Lactarius*, *Galerina*, *Russula*, *Omphalina*, *Pholiota*, and *Psathyrella*) reported from peatlands served as valuable resources. Lastly, Internet data bases, including those from the Centraalbureau voor Schimmelcultures (CBS) in The Netherlands, the Systematic Botany and Mycology Laboratory (SBML) in Maryland, USA, and the University of Alberta Microfungus Collections and Herbarium (UAMH) in Alberta, Canada, served as sources for additional information.

Two criteria were employed to compile this list: (1) the report had to be verifiable in a peer-reviewed publication. Unpublished, mimeographed, and locally distributed reports, herbarium information, anecdotal references, and check lists were not included; and (2) the fungus had to be a true fungus, i.e., it had to belong to one of the five accepted divisions of fungi (Chytridiomycota, Zygomycota, Glomeromycota, Ascomycota, and Basidiomycota). Ascomycetous and basidiomycetous anamorphic taxa, unidentified taxa, and fungi without known taxonomic affinities were also included in this list. It was not the purpose of our study to provide a complete taxonomic history of each fungus. Instead, it was intended to serve as a compilation of those fungi that have been found growing in peatlands, including peat and peatland plants. We relied exclusively on the habitat descriptions of each fungus in the appropriate

publications. Collection locations are provided; however, we realize that these data are likely incomplete. In some instances, collection locations could not be determined from the available literature; these records are marked as “n.i.” (no information). No fungal specimens were examined as part of this study.

In addition to the previously published reports of fungi from peatlands, we include several we recently isolated from various peatlands in central Alberta and eastern Saskatchewan, Canada, and western Siberia, Russia. Our records originated from specific peatland plant species and peat samples from varying depths. Detailed isolation protocols and site descriptions are provided elsewhere (Thormann *et al.*, 2001, 2003; Rice and Currah, 2006; Rice *et al.*, 2006).

Fungal taxonomies follow the Index Fungorum or the CBS data bases (online at <http://www.indexfungorum.org> and <http://www.cbs.knaw.nl>, respectively).

Results and discussion

A diverse assemblage of fungi consisting of more than 600 identified species and an additional 109 taxa identified only to genus have been reported from peatlands (Table 1). Ascomycetes and basidiomycetes form the largest component of this assemblage with 519 species (86% of all species). Within these two taxonomic groups, species of *Penicillium* and *Galerina* predominate with 48 and 41 species, respectively. There are 81 species are chytridiomycetes and zygomycetes. *Rhizophydium* and *Mortierella* spp. predominate in these two taxonomic groups (Table 1). One taxon, the yeast *Schizoblastosporon starkeyi-henricii*, is of uncertain taxonomic position. The five richest genera for each of the four fungal divisions account for 42% of all species known from peatlands. Many species of these genera are not restricted to peatlands and occur in other ecosystems as well, which indicates their generalist nature. Numerous records remain entirely unidentified (77 records) or have only been grouped into major growth forms, such as yeasts (20 records) and basidiomycetes (11 records). Without an accessioned specimen, these records will remain unidentifiable and of little value for future research.

Ascomycetes represent the largest group of fungi reported from peatlands (Table 1). In this group, the anamorphic ascomycete taxa *Penicillium funiculosum*, *P. spinulosum*, and *P. thomii* occur most frequently (Table 2). Other very commonly isolated taxa include *Aureobasidium pullulans*, *Cladosporium herbarum*, *Geomyces pannorum*, *Oidiodendron maius*, *Trichoderma koningii*, and *T. viride* (Table 2). All of these taxa are generalists, heavy sporulators, and predominantly fast growing. Hence, their

preponderance in peatlands, and many other ecosystems, is not surprising. Moreover, these traits likely overestimate their dominance in peatlands at the expense of slower growing and less sporulating taxa, including many asidiomycetes.

Table 1. Taxonomic summary of fungi from bog and fen peatlands.

Fungal group	Different species	Richest genera	Genera with most records
Ascomycetes	276	<i>Acremonium</i> (8 spp.) <i>Aspergillus</i> (9 spp.) <i>Oidiodendron</i> (11 spp.) <i>Penicillium</i> (48 spp.) <i>Trichoderma</i> (9 spp.)	<i>Acremonium</i> <i>Aspergillus</i> <i>Oidiodendron</i> <i>Penicillium</i> <i>Trichoderma</i>
Basidiomycetes	243	<i>Cortinarius</i> (14 spp.) <i>Cryptococcus</i> (11 spp.) <i>Galerina</i> (41 spp.) <i>Lactarius</i> (18 spp.) <i>Mycena</i> (19 spp.)	<i>Cryptococcus</i> <i>Galerina</i> <i>Lactarius</i> <i>Mycena</i> <i>Omphalina</i>
Chytridiomycetes	26	<i>Chytridium</i> (2 spp.) <i>Chytriomycetes</i> (2 spp.) <i>Phlyctochytrium</i> (5 spp.) <i>Rhizophydium</i> (10 spp.) <i>Septosperma</i> (2 spp.)	<i>Chytridium</i> <i>Chytriomycetes</i> <i>Phlyctochytrium</i> <i>Rhizophydium</i> <i>Septosperma</i>
Zygomycetes	55	<i>Absidia</i> (3 spp.) <i>Mortierella</i> (20 spp.) <i>Mucor</i> (13 spp.) <i>Syncephalis</i> (2 spp.) <i>Umbelopsis</i> (5 spp.)	<i>Absidia</i> <i>Mortierella</i> <i>Mucor</i> <i>Syncephalis</i> <i>Umbelopsis</i>
Unknown affinities	1	<i>Schizoblastosporon</i> (1 sp.)	<i>Schizoblastosporon</i>
Unidentified	---*	---	Basidiomycete spp. (11 records) <i>MRA</i> (2 records) ** Pycnidial taxa (7 records) Yeasts (20 records) Unidentified taxa (77 records)
Total	601	252	

*not applicable, **MRA = *Mycelium radialis atrovirens*

Basidiomycetes are the second-largest taxonomic group of fungi in peatlands. *Cryptococcus albidus*, *Galerina paludosa*, *G. sphagnorum*, *Phaeogalera stagnina*, and *Tephrocye palustris* have been reported most frequently. Most of the other records are known only from one or very few collections. Unlike ascomycetes, which are dominated by anamorphic taxa, most basidiomycetes are teleomorphic in nature. This is likely a reflection of the challenges associated with identifying anamorphic basidiomycetes and previous sampling protocols. Further contrasting ascomycetes and basidiomycetes, many fungi of the latter group appear to be known only from the type collection (e.g., *Pholiota chromocystis*) or may be restricted to peatlands and/or specific bryophytes (e.g., *Psathyrella laurentiana* and *Omphalina philonotis*). The latter suggests a much more specialized niche for many of the basidiomycetes.

Chytridiomycetes are the least known group of fungi in peatlands (Table 1). *Rhizophydium* and *Phlyctochytrium* are the dominant genera with 15 of the 26 known species (58%). All records originate from four studies in Poland and the USA. Clearly, more work is required to expand our understanding of the diversity and roles of chytridiomycetes in peatlands. There are undoubtedly many more species of chytridiomycetes in peatlands, given the saturated soils prevalent in these ecosystems.

Mucor, *Mortierella*, and *Umbelopsis* are the dominant zygomycete genera, accounting for 33 of the 55 identified species (60%; Table 2). Within these genera, *Mortierella alpina*, *Mucor hiemalis*, *Umpelopsis ramanniana*, and *U. vinacea* are the most frequently reported species. Given that there are only about 1,000 species of zygomycetes globally and more than 5% of them have been isolated in peatlands, this group is the best represented of the five divisions of fungi. In comparison, about 3% of all known chytridiomycetes and less than 1% of all basidiomycetes and ascomycetes have been reported from peatlands.

Previous research has shown that fungi are the dominant decomposer organisms in peatlands and assume a more dominant role than bacteria (Kox, 1954; Latter *et al.*, 1967; Williams and Crawford, 1983; Andersen *et al.*, 2006). Most fungi in peatlands are saprobes and are involved in the decomposition of organic matter (see review in Thormann 2006a,b; Table 2). This is accomplished via suites of extracellular enzymes that degrade simple leachates and complex structural plant polymers, including cellulose, lignin, and their derivatives (Thormann *et al.*, 2001, 2002). Many of the basidiomycetes in peatlands are ectomycorrhizal taxa (principally species of *Cortinarius*,

Table 2. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
Ascomycota				
<i>Acremoniella atra</i> (Corda) Sacc.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Acremonium charticula</i> (J. Lindau) W. Gams	Bog, fen; soil	Russia	S	Zvyagintsev <i>et al.</i> (1991)
<i>Acremonium chrysogenum</i> (Thirum. & Sukapure) W. Gams	Bog; <i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Acremonium fusidioides</i> (Nicot) W. Gams	Peatland; soil	Italy	S	Dal Vesco (1974/75)
<i>Acremonium kiliense</i> Grütz	Bog, fen; soil	Austria, Italy, U.K.	S	Stenton (1953), Thornton (1956), Loub (1960), Dal Vesco (1974/75)
<i>Acremonium massei</i> (Sacc.) W. Gams	Peatland; soil	Italy	S	Dal Vesco (1974/75)
<i>Acremonium murorum</i> (Corda) W. Gams	<i>Sphagnum</i>	Russia	S	Czastukhin (1967)
<i>Acremonium rutilum</i> W. Gams	Fen; soil	U.K.	S	Stenton (1953)
<i>Acremonium strictum</i> W. Gams	Bog; soil, <i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003), Thormann and Rice (this study)
<i>Acremonium</i> spp.	Bog, fen; soil, peat moss	Canada, Italy, Russia, U.K., USA	S	Bisby <i>et al.</i> (1935), Stenton (1953), Boswell (1955), Thornton (1956), Sewell (1959 a,b), Christensen and Whittingham (1965), Dickinson and Dooley (1969), Dooley and Dickinson (1971), Maciejowska-Pokacka (1971), Dal Vesco (1974/75), Cormier <i>et al.</i> (1988), Golovchenko <i>et al.</i> (2002), Thormann and Rice (this study)
<i>Acrostalagmus albus</i> Preuss	Fen; soil	U.K.	S	Thornton (1956)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Acrostalagmus luteoalbus</i> (Link) Zare, W. Gams & Schroers	Fen; soil	U.K.	S	Stenton (1953)
<i>Alternaria alternata</i> (Fr.) Keissl.	Bog, fen; soil, <i>Sphagnum</i>	Canada, Ireland, Russia, U.K.	S	Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Hurley (1981), Zvyagintsev <i>et al.</i> (1991), Thormann and Rice (this study), Tsuneda (pers. comm.)*
<i>Alternaria tenuissima</i> (Kunze) Wiltshire	Bog, peatland; soil	Austria, Italy	S	Loub (1960), Dal Vesco (1974/75)
<i>Alternaria</i> spp.	Fen; soil	Canada, U.K.	S	Bisby <i>et al.</i> (1935), Stenton (1953)
<i>Anguillospora longissima</i> (Sacc. & P. Syd.) Ingold	Bog; water	Poland	S	Czeczuga (1993)
<i>Anguillospora pseudolongissima</i> Ranzoni	Bog; water	Poland	S	Czeczuga (1993)
<i>Arthrimum</i> state of <i>Apiospora</i> <i>montagnei</i> Sacc.	Fen; <i>Sphagnum</i> , <i>Carex</i> rhizomes	Canada	S	Thormann <i>et al.</i> (2001, 2003), Tsuneda (pers. comm.)*
<i>Arthrotrys oligospora</i> Fresen.	Bog; water	Poland	N	Czeczuga (1993)
<i>Ascochyta microspora</i> Trail	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Ascochyta</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Aspergillus amstelodami</i> Thom & Church	Fen; soil	U.K.	S	Stenton (1953)
<i>Aspergillus candidus</i> Link	Bog; soil	Canada, Ireland	S	Dickinson and Dooley (1969), Thormann and Rice (this study)
<i>Aspergillus fischeri</i> Wehmer	Fen; soil	U.K.	S	Stenton (1953)
<i>Aspergillus fumigatus</i> Fresen.	Bog, peatland; soil	Ireland, Italy, USA	S	Christensen and Whittingham (1965), Dickinson and Dooley (1969), Dooley and Dickinson (1971), Dal Vesco (1974/75)
<i>Aspergillus nidulans</i> (Eidam) G. Winter	Bog, fen; soil	Ireland, Russia, U.K.	S	Stenton (1953), Dickinson and Dooley (1969), Zvyagintsev <i>et al.</i> (1991)
<i>Aspergillus niger</i> Tiegh.	Bog; <i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Aspergillus sydowii</i> (Bainier & Sartory) Thom & Church	Fen; soil	U.K.	S	Stenton (1953)
<i>Aspergillus terreus</i> Thom	Fen; soil	U.K.	S	Stenton (1953)
<i>Aspergillus versicolor</i> (Vuill.) Tirab.	Bog, fen; soil, <i>Sphagnum</i>	Canada, Ireland, U.K.	S	Stenton (1953), Dickinson and Dooley (1969), Thormann <i>et al.</i> (2001, 2003)
<i>Aspergillus</i> spp.	Bog, fen, peatland; soil, <i>Sphagnum</i>	Argentina, Canada, Ireland, Russia, U.K.	S	Bisby <i>et al.</i> (1935), Stenton (1953), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Maciejowska-Pokacka (1971), Hurley (1981), Croft <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002), Robson <i>et al.</i> (2004), Thormann and Rice (this study)
<i>Aureobasidium pullulans</i> (de Bary) G. Arnaud	Bog, fen, peatland, heathland; soil, <i>Sphagnum</i> , <i>Nothofagus</i> leaves, <i>Picea</i> rhizosphere	Argentina, Canada, Ireland, Italy, Russia, U.K., USA	S	Sewell (1959 a,b), Christensen and Whittingham (1965), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Maciejowska-Pokacka (1971), Dal Vesco (1974/75), Golubev <i>et al.</i> (1981), Hurley (1981), Golubev (1986), Searles <i>et al.</i> (2001), Robson <i>et al.</i> (2004), Summerbell (2005)
<i>Aureobasidium pullulans</i> var. <i>pullulans</i>	Fen; <i>Carex</i> leaves	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Aureobasidium</i> spp.	Bog, fen, peatland; soil, <i>Sphagnum</i>	Argentina, Russia, U.K.	S	Boswell (1955), Maciejowska-Pokacka (1971), Golovchenko <i>et al.</i> (2002), Robson <i>et al.</i> (2004)
<i>Bactridiopsis</i> sp.	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Beauveria bassiana</i> (Bals.-Criv.) Vuill.	Bog, heathland; soil	Ireland, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969)
<i>Beauveria brongniartii</i> (Sacc.) Petch	Bog; soil	USA	S	Christensen and Whittingham (1965)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Belonopsis iridis</i> (P. Crouan & H. Crouan) Graddon	Bog; <i>Scirpus</i> stems	Germany	S	Beyer (1994)
<i>Biverticillium</i> sp.	<i>Sphagnum</i>	Argentina	S	Robson <i>et al.</i> (2004)
<i>Botryosporium longibrachiatum</i> (Oudem.) Maire	Fen; soil	U.K.	S	Stenton (1953)
<i>Botryosporium pulchrum</i> Sacc. & Ell.	Fen; soil	U.K.	S	Stenton (1953)
<i>Botrytis cinerea</i> Pers.	Bog, fen, heathland, peatland; soil, <i>Sphagnum</i> , <i>Carex</i> leaves	Canada, Ireland, Italy, U.K.	S	Stenton (1953), Sewell (1959 a,b), Dickinson and Dooley (1969), Dal Vesco (1974/75), Hurley (1981), Thormann <i>et al.</i> (2001, 2003)
<i>Botrytis rhinotrichoides</i> Sacc. & Ell.	<i>Sphagnum</i>	USA	S	Saccardo (1898), Oudemans (1919), Seymour (1929)
<i>Botrytis sphagnorum</i> Cooke	<i>Sphagnum</i>	USA	S	Saccardo (1898)
<i>Botrytis</i> spp.	Bog, fen; soil	Russia, U.K.	S	Boswell (1955), Thornton (1956), Latter <i>et al.</i> (1967), Maciejowska-Pokacka (1971)
<i>Bryophytomyces sphagni</i> (Navashin) Cif.	<i>Spagnum</i>	Canada, Slovakia	P	Saccardo (1898), Oudemans (1919), Redhead and Spicer (1981)
<i>Bryorella gregaria</i> Döbbeler	<i>Sphagnum</i>	Sweden	P	Döbbeler (1978)
<i>Candida catenulata</i> Diddens & Lodder	Bog, fen; peat	Canada	S	Thormann <i>et al.</i> (unpubl.)
<i>Candida edax</i> van der Walt & E.E. Nel	Bog, fen; peat	Russia	S	Thormann <i>et al.</i> (unpubl.)
<i>Candida haemulonis</i> (Uden & Kolip.) S.A. Mey & Yarrow	Bog, fen; peat	Canada, Russia	S	Thormann <i>et al.</i> (unpubl.)
<i>Candida sake</i> (Saito & M. Ota) Uden & H.R. Buckley	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Candida valida</i> (Leberle) Uden & H.R. Buckley	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Candida vartiovaarai</i> (Capr.) Uden & H.R. Buckley	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Candida zeylanoides</i> (Castell.) Langeron & Guerra	Bog, fen; peat	Canada	S	Thormann <i>et al.</i> (unpubl.)
<i>Candida</i> spp.	Bog, fen, peatland; soil	Ireland, Russia	S	Dickinson and Dooley (1967), Zvyagintsev <i>et al.</i> (1991), Polyakova <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002)
<i>Cenococcum geophilum</i> Fr.	Bog; <i>Picea</i> and <i>Pinus</i> roots	Canada, USA	EM	Glenn <i>et al.</i> (1991), Wurtzburger <i>et al.</i> (2004), Summerbell (2005)
<i>Cenococcum</i> sp.	Bog; <i>Picea</i> roots	Canada	EM	Robertson <i>et al.</i> (2006)
<i>Cephalosporium</i> sp.	Peatland; soil	Russia	S	Gantimurova (1970)
<i>Cephalotrichum microsporium</i> (Sacc.) P.M. Kirk	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Cephalotrichum purpureofuscum</i> (Schwein.) S. Hughes	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Cephalotrichum stemonitis</i> (Pers.) Nees	Bog; soil	Canada, Ireland	S	Dickinson and Dooley (1969), Thormann and Rice (this study)
<i>Cephalotrichum</i> sp.	Peatland; soil	Russia	S	Golovchenko <i>et al.</i> (2002)
<i>Ceratocystis pilifera</i> (Fr.) Moreau	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Chaetomium cochlioides</i> Palliser	Fen; soil	U.K.	S	Stenton (1953)
<i>Chaetomium funicola</i> Cooke	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Chaetomium globosum</i> Kunze	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Chaetomium sphaerale</i> Chivers	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Chaetomium spinosum</i> Chivers	Fen; soil	U.K.	S	Stenton (1953)
<i>Chaetomium</i> sp.	Fen; soil	Russia	S	Maciejowska-Pokacka (1971)
cf. <i>Chaetopsis</i> sp.	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Chaunopycnis alba</i> W. Gams	Bog, fen; peat	Sweden	S	Nilsson <i>et al.</i> (1992)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Chloridium chlamydosporis</i> (J.F.H. Beyma) S. Hughes	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Chloridium virescens</i> var. <i>chlamydosporicum</i> (J.F.H. Beyma) W. Gams & Hol.-Jech.	Fen; soil	U.K.	S	Latter <i>et al.</i> (1967)
<i>Chloridium</i> sp.	Peatland; soil	Russia	S	Golovchenko <i>et al.</i> (2002)
<i>Chrysosporium sepedonioides</i> (Harz) Dominik	Fen; soil	U.K.	S	Stenton (1953)
<i>Chrysosporium</i> spp.	Bog, fen, peatland; soil	Canada, Russia	S	Christensen and Cook (1970), Golovchenko <i>et al.</i> (2002)
<i>Cladosporium brevicompactum</i> Pidopl. & Deniak	Bog; soil	Canada	S	Thormann and Rice (this study)
<i>Cladosporium cladosporioides</i> (Fresen.) G.A. de Vries	Bog, fen, peatland; soil	Canada, Ireland, Italy, U.K.		Thornton (1956), Dickinson and Dooley (1969), Dal Vesco (1974/75), Hurley (1981), Thormann and Rice (this study)
<i>Cladosporium herbarum</i> (Pers.) Link	Bog, fen, peatland; soil, <i>Sphagnum</i> , <i>Carex</i> leaves, <i>Salix</i> roots	Argentina, Austria, Canada, Ireland, Russia, U.K.	S	Stenton (1953), Sewell (1959 a,b), Loub (1960), Dickinson and Dooley (1969), Maciejowska-Pokacka (1971), Hurley (1981), Thormann <i>et al.</i> (2001, 2003), Robson <i>et al.</i> (2004), Thormann and Rice (this study)
<i>Cladosporium sphaerospermum</i> Penz.	Bog, fen; soil	Canada, U.K.	S	Latter <i>et al.</i> (1967), Thormann and Rice (this study)
<i>Cladosporium</i> spp.	Bog, fen; soil, peat moss, <i>Sphagnum</i> , <i>Carex</i> and <i>Nothofagus</i> leaves	Argentina, Canada, Ireland, Sweden, U.K., USA	S	Boswell (1955), Christensen and Whittingham (1965), Dickinson and Dooley (1969), Christensen and Cook (1970), Dickinson and Maggs (1974), Cormier <i>et al.</i> (1988), Nilsson <i>et al.</i> (1992), Searles <i>et al.</i> (2001), Thormann and Rice (this study)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Clonostachys</i> cf. <i>pseudobotryis</i>	Fen; soil	U.K.	S	Stenton (1953)
<i>Coniochaeta</i> spp.	Bog; soil	Ireland, USA	S	Christensen and Whittingham (1965), Dooley and Dickinson (1971)
<i>Coniothyrium</i> spp.	Fen, heathland; soils	Russia, U.K.	S	Sewell (1959 a,b), Maciejowska-Pokacka (1971)
<i>Coremium</i> sp.	Fen; soil	U.K.	S	Stenton (1953)
<i>Coronellaria benkertii</i> Svrcek	Bog; <i>Carex</i> leaves	Germany	S	Beyer (1994)
<i>Cudoniella buckowensis</i> Henn.	<i>Sphagnum</i>	Germany	P	Oudemans (1919)
<i>Cylindrocarpon destructans</i> (Zinssm.) Scholten	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Cylindrocarpon destructans</i> var. <i>destructans</i> (Zinssm.) Scholten	Bog; soil	U.K.	S	Stenton (1953)
<i>Cylindrocarpon didymum</i> (Harting) Wollenw.	Fen, peatland; soil	Italy, Russia, U.K.	S	Thornton (1956), Maciejowska-Pokacka (1971), Dal Vesco (1974/75)
<i>Cylindrocarpon orthosporum</i> (Sacc.) Wollenw.	Peatland; soil	Italy	S	Dal Vesco (1974/75)
<i>Dactylella candida</i> (Nees) de Hoog	Bog; water	Poland	N	Czeczuga (1993)
<i>Debaryomyces hansenii</i> (Zopf) Lodder & Kreger	Bog, fen, peatland; soil	Russia	S	Golubev <i>et al.</i> (1981), Zvyagintsev <i>et al.</i> (1991), Polyakova <i>et al.</i> (2001)
<i>Debaryomyces vanrijiae</i> (van der Walt, M.T. Sm. & Tscheuschner) Abadie, Pignal & J.L. Jacob	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Debaryomyces</i> sp.	Peatland; soil	Russia	S	Golovchenko <i>et al.</i> (2002)
<i>Dematium</i> sp.	Peatland; soil	Russia	S	Gantimurova (1970)
<i>Dimorphospora foliicola</i> Tubaki	Fen; <i>Carex</i> leaves	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Diplodia</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Epibryon bryophilum</i> (Fuckel) Döbbeler	<i>Sphagnum</i>	Germany, France, Romania, Scotland, Spain	P	Döbbeler (1978)
<i>Epibryon casaresii</i> (Bubák & Gonz. Frag.) Döbbeler	<i>Sphagnum</i>	Germany	P	Döbbeler (1978)
<i>Epibryon turfosorum</i> (Mout.) Döbblers	<i>Sphagnum</i>	Austria, Belgium, Germany	P	Saccardo (1898), Oudemans (1919), Döbblers (1978, 1984)
<i>Epicoccum nigrum</i> Link	Bog, fen, peatland; soil	Canada, Ireland, Italy, U.K.	S	Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Dal Vesco (1974/75), Thormann and Rice (this study)
<i>Epicoccum</i> spp.	Fen, heathland; soils	Russia, U.K.	S	Sewell (1959 a,b), Maciejowska-Pokacka (1971)
<i>Fusarium aquaeductuum</i> (Rabenh. & Radlk.) Sacc.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Fusarium aquaeductuum</i> var. <i>medium</i> Wollenw.	Bog, fen; <i>Sphagnum</i> , <i>Carex</i> rhizomes	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Fusarium avenaceum</i> (Fr.) Sacc.	Bog, fen; soil	Ireland, Russia	S	Dickinson and Dooley (1969), Zvyagintsev <i>et al.</i> (1991)
<i>Fusarium chlamydosporum</i> Wollenw. & Reinking	Fen; <i>Salix</i> roots	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Fusarium culmorum</i> (W.G. Sm.) Sacc.	Bog, fen; soil	Ireland, U.K.	S	Stenton (1953), Dickinson and Dooley (1969), Dooley and Dickinson (1971)
<i>Fusarium melanochlorum</i> (Casp.) Sacc.	Peatland; soil	Italy	S	Dal Vesco (1974/75)
<i>Fusarium oxysporum</i> Schtdl.	Fen, peatland; soil, <i>Carex</i> rhizomes	Canada, Italy, Russia	S	Maciejowska-Pokacka (1971), Dal Vesco (1974/75), Thormann <i>et al.</i> (2001, 2003)
<i>Fusarium</i> cf. <i>oxysporum</i>	Fen; soil	U.K.	S	Stenton (1953)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Fusarium sporotrichioides</i> Sherb.	Fen; <i>Salix</i> roots	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Fusarium</i> spp.	Bog; fen, peatland, soil	Canada, Ireland, Russia, U.K.	S	Bisby <i>et al.</i> (1935), Stenton (1953), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Gantimurova (1970), Maciejowska-Pokacka (1971)
<i>Gelasinospora cerealis</i> Dowding	Bog, heathland; soil	Ireland, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969)
<i>Gelasinospora retispora</i> Cain	Heathland; soil	U.K	S	Sewell (1959 a,b)
<i>Gelasinospora</i> sp.	Bog, fen; soil	Canada	S	Christensen and Cook (1970)
<i>Geoglossum glabrum</i> Pers.	<i>Sphagnum</i>	Europe, India, Russia, USA	S	Oudemans (1919)
<i>Geoglossum sphagnophilum</i> Ehrenberg: Wallroth	<i>Sphagnum</i>	Germany, Scandinavia	S	Dähncke (1993)
<i>Geomyces pannorum</i> (Link) Sigler & Carmich.	Bog, fen; soil, <i>Picea</i> rhizosphere	Canada, Ireland, Russia, U.K., USA	S	Stenton (1953), Christensen and Whittingham (1965), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Zvyagintsev <i>et al.</i> (1991), Summerbell (2005), Rice <i>et al.</i> (2006)
<i>Geosmithia namyslowskii</i> (K.M. Zalesky) Pitt	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Geotrichum candidum</i> Link	Bog; soil, <i>Sphagnum</i>	Canada, USA	S	Christensen and Whittingham (1965), Dickinson and Maggs (1974), Hurley (1981)
<i>Geotrichum</i> spp.	Bog, peatland; soil, <i>Sphagnum</i>	Ireland, Russia	S	Dickinson and Dooley (1969), Dooley and Dickinson (1971), Golovchenko <i>et al.</i> (2002), Tsuneda (pers. comm.)*
<i>Gliocladium catenulatum</i> J.C. Gilman & E.V. Abbott	Fen; soil	Russia, U.K.	S	Stenton (1953), Maciejowska-Pokacka (1971)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Gliocladium deliquescens</i> Sopp	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Gliocladium penicillioides</i> Corda	Fen; soil	Russia	S	Maciejowska-Pokacka (1971)
<i>Gliocladium roseum</i> Bainier	Bog, fen; soil	Ireland, U.K.	S	Stenton (1953), Thornton (1956), Dickinson and Dooley (1969)
<i>Gliocladium</i> sp.	Peatland; soil	Russia	S	Golovchenko <i>et al.</i> (2002)
<i>Gliomastix murorum</i> var. <i>murorum</i> (Corda) S. Hughes	Fen; soil	U.K.	S	Stenton (1953)
<i>Gliomastix</i> sp.	Peatland; soil	Russia	S	Golovchenko <i>et al.</i> (2002)
<i>Gloeosporium</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Graphium</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Hainesia rhoina</i> (Sacc.) Ellis & Sacc.	Peatland; soil	Italy	S	Dal Vesco (1974/75)
<i>Hainesia</i> sp.	Peatland; soil	Russia	S	Golovchenko <i>et al.</i> (2002)
<i>Hanseniaspora uvarum</i> (Niehaus) Shehata, Mrak & Phaff	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Hansenula saturnus</i> var. <i>saturnus</i> (Klöcker) anon. ined	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Haptocillium balanoides</i> (Drechsler) Zare & W. Gams	Fen; <i>Salix</i> roots	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Helicoon pluriseptatum</i> Beverw.	Peatland; soil	France	S	Gilbert <i>et al.</i> (1998)
<i>Helotium schimperi</i> Navashin	<i>Sphagnum</i>	Canada, Finland, Japan, Russia, Sweden, USA	P	Oudemans (1919), Chau (1979), Redhead and Spicer (1981)
<i>Helotium</i> sp.	Bog; soil	Italy	S	Dickinson and Dooley (1969)
<i>Heteroconium chaetospora</i> (Grove) Ellis	Fen; <i>Amelanchier</i> roots	Canada	E	Wilson <i>et al.</i> (2004)
<i>Histoplasma</i> sp.	Bog; soil	USA	S	Christensen and Whittingham (1965)
cf. <i>Hormiactis</i> sp.	Fen; soil	U.K.	S	Stenton (1953)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Hormonema</i> sp.	Bog; <i>Picea</i> rhizosphere	Canada	S	Summerbell (2005)
<i>Humaria sphagni</i> (Bong.) Sacc.	<i>Sphagnum</i>	n.i.	S	Saccardo (1898), Oudemans (1919)
<i>Humaria sydowii</i> (Rehm.) Sacc.	<i>Sphagnum</i>	Germany, Ukraine	S	Oudemans (1919)
<i>Humicola grisea</i> Traaen	Bog, fen, peatland; soil	Italy, Russia, U.K.	S	Thornton (1956), Dal Vesco (1974/75), Zvyagintsev <i>et al.</i> (1991)
<i>Humicola</i> spp.	Peatland, heathland; soil	Italy, U.K.	S	Sewell (1959a,b), Dal Vesco (1974/75)
<i>Hymenoscyphus procerus</i> (P. Karst.) Dennis	<i>Sphagnum</i>	Finland, Italy	S	Saccardo (1898), Oudemans (1919)
<i>Hymenoscyphus vasaensis</i> (P. Karst.) Dennis	<i>Sphagnum</i>	Germany	S	Saccardo (1898)
<i>Illosporium muscorum</i> Rostr.	<i>Sphagnum</i>	Hungary	S	Oudemans (1919)
<i>Kernia retardata</i> Udagawa & Muroi	<i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001)
<i>Kuraishia capsulata</i> (Wick.) Y. Yamada, K. Maeda & Mikata	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Lasiosphaeria muscicola</i> De Not.	<i>Sphagnum</i>	Italy, New Zealand, Norway	S	Döbbeler (1978)
<i>Lasiosphaeria sphagni</i> Delacr.	<i>Sphagnum</i>	France	S	Oudemans (1919), Döbbeler (1978)
<i>Lasiosphaeria sphagnorum</i> (Crou.) Sacc.	<i>Sphagnum</i>	France	S	Saccardo (1898), Oudemans (1919), Döbbeler (1978)
<i>Lecanicillium lecanii</i> (Zimm.) Zare & W. Gams	Bog, fen; soil, <i>Sphagnum</i> , <i>Carex</i> rhizomes	Canada, Russia	S	Zvyagintsev <i>et al.</i> (1991), Thormann <i>et al.</i> (2001, 2003)
<i>Lecanicillium psalliotae</i> (Treschew) Zare & W. Gams	Bog; <i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Lemonniera aquatica</i> De Wild.	Bog; water	Poland	S	Czeczuga (1993)
<i>Leptographium</i> sp.	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Lizoniella sphagni</i> (Cooke) Sacc. & Sacc.	<i>Sphagnum</i>	USA	S/P	Saccardo (1898), Oudemans (1919), Seymour (1929), Döbbeler (1978)
<i>Macrophoma</i> spp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Melanconium</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Meliniomyces variabilis</i> Hambleton & Sigler	Bog; plant roots	Canada	E/Er	Hambleton and Currah (1997), Summerbell (2005)
<i>Metarhizium anisopliae</i> (Metschn.) Sorkin	Bog, fen; soil	Russia	S	Zvyagintsev <i>et al.</i> (1991)
<i>Metschnikowia pulcherrima</i> Pitt & M.W. Mill.	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Microdiplodia</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Microscypha muelleri</i> (Graddon) ined	Bog; <i>Eriophorum</i> leaves	Germany	S/P	Beyer (1994)
<i>Mitrula borealis</i> Redhead	<i>Sphagnum</i>	Canada, Estonia, Germany, USA	S	Redhead (1977)
<i>Mitrula elegans</i> Berk.	<i>Sphagnum</i>	Canada, USA	S	Redhead (1977)
<i>Mitrula lunulatospora</i> Redhead	<i>Sphagnum</i>	Canada, USA	S	Redhead (1977)
<i>Mitrula paludosa</i> Fr.	<i>Sphagnum</i>	Europe, Japan	S	Redhead (1977), Kirk and Spooner (1983/84)
<i>Moellerodiscus tenuistipes</i> (J. Schröt.) Dumont	Bog; <i>Lysimachia</i> leaves	Germany	S/P	Beyer (1994)
<i>Monacrosporium</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Monascostroma</i> cf. <i>innumerosa</i>	Fen; soil	U.K.	S	Latter <i>et al.</i> (1967)
<i>Monascostroma sphagnophilum</i> Döbbeler & Poelt	<i>Sphagnum</i>	Germany, Sweden	S	Döbbeler (1978, 1984)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Monocillium constrictum</i> W. Gams	Bog, fen; <i>Sphagnum</i> , <i>Carex</i> leaves, <i>Salix</i> roots	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Monocillium nordinii</i> (Bourch.) W. Gams	Fen; <i>Carex</i> leaves, <i>Salix</i> roots	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Monocillium</i> sp.	Peat moss samples	Canada	S	Cormier <i>et al.</i> (1988)
<i>Monodictys levis</i> (Wiltshire) S. Hughes	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Myrothecium</i> sp.	Fen; soil	U.K.	S	Stenton (1953)
<i>Nadsonia elongata</i> Konok.	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Nakaseomyces delphensis</i> (van der Walt & Tscheuschner) Kurtzman	Bog, fen; soil	Canada	S	Thormann <i>et al.</i> (unpubl.)
<i>Nigrospora</i> sp.	Fen; soil	U.K.	S	Stenton (1953)
<i>Nodulisporium</i> spp.	Bog, fen; soil, <i>Sphagnum</i> , <i>Carex</i> leaves	Canada, USA	S	Christensen and Whittingham (1965), Thormann <i>et al.</i> (2001, 2003)
<i>Oedocephalum</i> sp.	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Oidiodendron cerealis</i> (Thum.) Barron	Bog; soil	Canada	S	Barron (1962)
<i>Oidiodendron chlamydosporicum</i> Morrall	Bog; <i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Oidiodendron echinulatum</i> Barron	Bog, fen; soil	Canada, Russia	S	Barron (1962), Maciejowska-Pokacka (1971)
<i>Oidiodendron flavum</i> von Szilvinyi	Bog; soil	Canada	S	Barron (1962)
<i>Oidiodendron fuscum</i> Robak	Bog, fen; soil	Canada, U.K.	S	Thornton (1956), Barron (1962)
<i>Oidiodendron griseum</i> Robak	Bog; soil	Canada, Ireland	S	Barron (1962), Dickinson and Dooley (1969), Dooley and Dickinson (1971), Rice <i>et al.</i> (2006)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Oidiodendron maius</i> Barron	Bog, fen; soil, <i>Sphagnum</i> , ericaceous roots	Canada, Russia, Sweden	S/Er	Barron (1962), Nilsson <i>et al.</i> (1992), Hambleton and Currah (1997), Thormann <i>et al.</i> (2001, 2003), Rice and Currah (2002), Rice <i>et al.</i> (2006), Thormann and Rice (this study)
<i>Oidiodendron maius</i> var. <i>citrinum</i> Rice & Currah	Bog; soil	Canada	S	Barron (1962)
<i>Oidiodendron periconioides</i> Morrall	Bog; peat	Canada	S	Rice <i>et al.</i> (2006)
<i>Oidiodendron rhodogenum</i> Robak	Bog; peat	Canada	S	Rice <i>et al.</i> (2006)
<i>Oidiodendron tenuissimum</i> (Pk.) S. Hughes	Bog, fen; soil, <i>Picea</i> rhizosphere	Canada, Russia, U.K., USA	S	Barron (1962), Christensen and Whittingham (1965), Latter <i>et al.</i> (1967), Maciejowska-Pokacka (1971), Summerbell (2005)
<i>Oidiodendron truncatum</i> Barron	Bog; soil	Canada, USA	S	Barron (1962), Christensen and Whittingham (1965)
<i>Oidiodendron</i> spp.	Bog, fen, peatland; soil	Canada, Russia, U.K.	S	Stenton (1953), Golovchenko <i>et al.</i> (2002), Rice <i>et al.</i> (2006)
<i>Orbilia rubella</i> (Pers.) P. Karst	Bog; <i>Rumex</i> stems	Germany	P	Beyer (1994)
<i>Pachybasium candidum</i> (Sacc.) Peyronel	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Paecilomyces carneus</i> (Duché & R. Heim) A.H.S. Br. & G. Sm.	Bog, fen; soil	Russia	S	Zvyagintsev <i>et al.</i> (1991)
<i>Paecilomyces farinosus</i> (Holmsk.) A.H.S. Br. & G. Sm.	Bog; soil	Ireland, USA	S	Christensen and Whittingham (1965), Dickinson and Dooley (1969)
<i>Paecilomyces marquandii</i> (Masse) S. Hughes	Bog, fen; soil, <i>Sphagnum</i>	Canada, U.K.	S	Stenton (1953), Thormann <i>et al.</i> (2001, 2003)
<i>Paecilomyces variotii</i> Bainier	Bog, fen; soil	Ireland, U.K.	S	Stenton (1953), Dickinson and Dooley (1969)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Paecilomyces</i> spp.	Bog, fen, peatland; soil, peatmoss samples	Canada, Ireland, Russia, U.K.	S	Stenton (1953), Dickinson and Dooley (1969), Cormier <i>et al.</i> (1988), Golovchenko <i>et al.</i> (2002)
<i>Papularia arundinis</i> (Corda) Fr.	Fen; soil	U.K.	S	Stenton (1953)
<i>Papulaspora</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Penicillium adametzii</i> K.M. Zalessky	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Penicillium albidum</i> Sopp	Fen; soil	U.K.	S	Stenton (1953)
<i>Penicillium aurantiogriseum</i> Dierckx	Bog; soil	Ireland	S	Dickinson and Dooley (1967, 1969)
<i>Penicillium brevicompactum</i> Dierckx	Bog, fen, heatland; soil	Ireland, U.K., USA	S	Thornton (1956), Sewell (1959 a,b), Christensen and Whittingham (1965), Dickinson and Dooley (1969)
<i>Penicillium canescens</i> Sopp	Bog, peatland; soil	Canada, Ireland, Italy	S	Dickinson and Dooley (1969), Dal Vesco (1974/75), Thormann and Rice (this study)
<i>Penicillium</i> cf. <i>canescens</i>	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Penicillium chrysogenum</i> Thom	Bog, fen; soil, <i>Carex</i>	Canada, Ireland, U.K.	S	Thormann <i>et al.</i> (2001, 2003), Thormann and Rice (this study)
<i>Penicillium citreonigrum</i> Dierckx	Bog, heathland; soil	Ireland, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969)
<i>Penicillium commune</i> Thom	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Penicillium corylophilum</i> Dierckx	Bog, peatland; soil	Ireland, Italy	S	Dickinson and Dooley (1969), Dal Vesco (1974/75)
<i>Penicillium cyclopium</i> Westling	Bog, peatland, heathland; soil	Ireland, Italy, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969), Dal Vesco (1974/75)
<i>Penicillium decumbens</i> Thom	Bog; soil	Austria	S	Loub (1960)
<i>Penicillium dierckxii</i> Biourge	Bog, peatland, heathland; soil	Ireland, Italy, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969), Dal Vesco (1974/75)
<i>Penicillium duclauxii</i> Delacr.	Bog, fen; soil	Russia, USA	S	Christensen and Whittingham (1965), Zyganintsev <i>et al.</i> (1991)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Penicillium expansum</i> Link	Fen; soil	U.K.	S	Stenton (1953)
<i>Penicillium funiculosum</i> Thom	Bog, fen, peatland; soil, <i>Sphagnum</i> , <i>Carex</i>	Canada, Ireland, Russia, U.K., USA	S	Stenton (1953), Christensen and Whittingham (1965), Czastukhin (1967), Dickinson and Dooley (1969), Dooley and Dickinson (1971), Hurley (1981), Thormann <i>et al.</i> (2001, 2003), Golovchenko <i>et al.</i> (2002), Thormann and Rice (this study)
<i>Penicillium glabrum</i> (Wehmer) Westling	Bog, fen, peatland; soil, <i>Sphagnum</i>	Argentina, Canada, Ireland, Italy, U.K.	S	Stenton (1953), Thornton (1956), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Dal Vesco (1974/75), Robson <i>et al.</i> (2004), Thormann and Rice (this study)
<i>Penicillium griseum</i> (Sopp) Biourge	Bog; soil	Austria	S	Loub (1960)
<i>Penicillium herqueri</i> Bainier & Sartory	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Penicillium implicatum</i> Biourge	Fen; soil	U.K.	S	Thornton (1956)
<i>Penicillium islandicum</i> Sopp	Bog; soil	Canada, USA	S	Christensen and Whittingham (1965), Thormann and Rice (this study)
<i>Penicillium jensenii</i> K.M. Zalesky	<i>Sphagnum</i>	U.K.	S	Dickinson and Maggs (1974)
<i>Penicillium lanosum</i> Westling	Bog; soil	Canada, Ireland	S	Dickinson and Dooley (1969), Hurley (1981)
<i>Penicillium luteum</i> Sopp	Bog; soil	Austria	S	Loub (1960)
<i>Penicillium melinii</i> Thom	Bog, fen; soil	Ireland, U.K.	S	Thornton (1956), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969)
<i>Penicillium cf. melinii</i>	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Penicillium miczynskii</i> K.M. Zalesky	Bog, fen; soil	Russia	S	Zvyagintsev <i>et al.</i> (1991)
<i>Penicillium montanense</i> M. Chr. & Backus	Bog; soil, <i>Sphagnum</i>	Canada, USA	S	Christensen and Whittingham (1965), Thormann <i>et al.</i> (2001, 2003)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Penicillium nigricans</i> K.M. Zalesky	Bog, fen, heathland; soil	Canada, Ireland, U.K.	S	Stenton (1953), Thornton (1956), Sewell (1959 a,b), Dickinson and Dooley (1969), Dooley and Dickinson(1971), Thormann and Rice (this study)
<i>Penicillium phoeniceum</i> J.F.H. Beyma	Fen; soil	U.K.	S	Stenton (1953)
<i>Penicillium primulinum</i> Pitt	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Penicillium purpurogenum</i> Stoll	Bog, fen, peatland; soil, <i>Sphagnum</i> , <i>Carex</i> rhizomes	Austria, Canada, Italy, Russia	S	Loub (1960), Dal Vesco (1974/75), Zvyagintsev <i>et al.</i> (1991), Thormann <i>et al.</i> (2001, 2003)
<i>Penicillium raciborskii</i> K.M. Zalesky	Fen; soil	Russia	S	Maciejowska-Pokacka (1971)
<i>Penicillium</i> cf. <i>raistrickii</i>	Bog; soil	Ireland	S	Dooley and Dickinson (1971)
<i>Penicillium resticulosum</i> Birkinshaw, Raistrick & G. Sm.	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Penicillium restrictum</i> J.C. Gilman & E.V. Abbott	Bog, heathland; soil	Austria, Ireland, U.K.	S	Sewell (1959 a,b), Loub (1960), Dickinson and Dooley (1969)
<i>Penicillium rolfsii</i> Thom	Bog; soil	Canada, USA	S	Christensen and Whittingham (1965), Hurley (1981)
<i>Penicillium</i> cf. <i>rolfsii</i>	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Penicillium roseopurpureum</i> Dierckx	Bog; soil	Austria, Ireland	S	Loub (1960), Dickinson and Dooley (1969)
<i>Penicillium rubrum</i> Stoll	Fen; soil	U.K.	S	Thornton (1956)
<i>Penicillium rugulosum</i> Thom	Bog, fen; soil	Canada, Ireland	S	Bisby <i>et al.</i> (1935), Dickinson and Dooley (1969)
<i>Penicillium simplicissimum</i> (Oudem.) Thom	Bog, fen, peatland; soil	Canada, Italy, Russia	S	Maciejowska-Pokacka (1971), Dal Vesco (1974/75), Hurley (1981), Thormann and Rice (this study)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Penicillium spinulosum</i> Thom	Bog, fen, heathland, peatland; soil, <i>Sphagnum</i> , <i>Picea</i> rhizosphere	Austria, Canada, Ireland, Russia, Sweden, U.K., USA	S	Stenton (1953), Thornton (1956), Sewell (1959 a,b), Loub (1960), Christensen and Whittingham (1965), Czastukhin (1967), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Dooley and Dickinson (1971), Hurley (1981), Nilsson <i>et al.</i> (1992), Thormann <i>et al.</i> (2001, 2003), Golovchenko <i>et al.</i> (2002), Summerbell (2005)
<i>Penicillium steckii</i> K.M. Zalesky	Bog; soil	Canada, Ireland	S	Dickinson and Dooley (1969), Hurley (1981)
<i>Penicillium thomii</i> Maire	Bog, fen, heathland, peatland; soil, <i>Sphagnum</i> , <i>Carex</i> rhizomes, <i>Picea</i> rhizosphere	Argentina, Canada, Ireland, Italy, Russia, Sweden, U.K., USA	S	Bisby <i>et al.</i> (1935), Stenton (1953), Thornton (1956), Sewell (1959 a,b), Christensen and Whittingham (1965), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Dooley and Dickinson (1971), Dal Vesco (1974/75), Dickinson and Maggs (1974), Hurley (1981), Nilsson <i>et al.</i> (1992), Thormann <i>et al.</i> (2001, 2003), Golovchenko <i>et al.</i> (2002), Robson <i>et al.</i> (2004), Summerbell (2005), Thormann and Rice (this study)
<i>Penicillium thomii</i> -series	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Penicillium variabile</i> Sopp	Bog, fen; soil	Ireland, U.K.	S	Stenton (1953), Dickinson and Dooley (1969)
<i>Penicillium verruculosum</i> Peyronel	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Penicillium vinaceum</i> J.C. Gilman & E.V. Abbott	Bog; soil	Ireland	S	Dickinson and Dooley (1969)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Penicillium viridicatum</i> Westling	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Penicillium vulpinum</i> (Cooke & Masseur) Seifert & Samson	Fen; soil	U.K.	S	Stenton (1953)
<i>Penicillium waksmanii</i> K.M. Zalessky	Fen, peatland; soil	Italy, Russia, U.K.	S	Thornton (1956), Maciejowska-Pokacka (1971), Dal Vesco (1974/75)
<i>Penicillium</i> spp.	Bog, fen, peatland, heathland; soil, peat, <i>Sphagnum</i> , <i>Nothofagus</i> leaves, <i>Picea</i> rhizosphere	Argentina, Canada, Ireland, Italy, Russia, U.K., USA	S	Bisby <i>et al.</i> (1935), Stenton (1953), Boswell (1955), Thornton (1956), Sewell (1959 a,b), Christensen and Whittingham (1965), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Christensen and Cook (1970), Gantimurova (1970), Maciejowska-Pokacka (1971), Dal Vesco (1974/75), Hurley (1981), Cormier <i>et al.</i> (1988), Croft <i>et al.</i> (2001), Searles <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002), Summerbell (2005), Rice <i>et al.</i> (2006)
cf. <i>Penicillium</i> sp.	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Periconia minutissima</i> Corda	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Periconia</i> sp.	Fen; soil	U.K.	S	Stenton (1953)
<i>Perisporium arundinis</i> Desm. ex Fr.	Fen; soil	U.K.	S	Stenton (1953)
<i>Pestalotia</i> sp.	Fen; soil	U.K.	S	Stenton (1953)
<i>Pestalotiopsis</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Petriella guttulata</i> G.L. Barron & Cain	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Pezicula myrtilina</i> (P. Karst.) P. Karst.	Bog; <i>Vaccinium</i> branches	Germany	P	Beyer (1994)
<i>Phialocephala dimorphospora</i> W.B. Kendrick	Bog, fen; soil, <i>Carex</i> rhizomes, <i>Salix</i> roots	Canada, Ireland	S	Dickinson and Dooley (1969), Thormann <i>et al.</i> (2001, 2003)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Phialocephala fortinii</i> C.J.K. Wang & H.E. Wilcox	Bog, fen; soil, <i>Carex</i> rhizomes, plant roots, <i>Picea</i> rhizosphere	Canada, Russia	S/E	Hambleton and Currah (1997), Addy <i>et al.</i> (2000), Thormann <i>et al.</i> (2001, 2003), Wilson <i>et al.</i> (2004) Summerbell (2005), Thormann and Rice (this study)
<i>Phialocephala sphaeroides</i> B.J. Wilson	Fen; plant roots	Canada	E	Wilson <i>et al.</i> (2004)
<i>Phialophora alba</i> J.F.A. Beyma	Fen; <i>Carex</i> , <i>Salix</i> roots	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Phialophora</i> cf. <i>alba</i>	Fen; <i>Carex</i> , <i>Salix</i> roots	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Phialophora fastigiata</i> (Lagerb. & Melin) Conant	Fen; soil	U.K.	S	Latter <i>et al.</i> (1967)
<i>Phialophora</i> cf. <i>fastigiata</i>	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Phialophora melinii</i> (Nannf.) Conant	Fen; <i>Salix</i> roots	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Phialophora</i> spp.	Bog, fen, peatland; soil	Canada, Ireland, Italy, Russia	S	Dickinson and Dooley (1969), Christensen and Cook(1970), Dooley and Dickinson (1971), Dal Vesco(1974/75), Golovchenko <i>et al.</i> (2002)
<i>Phialophorophoma litoralis</i> Linder	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Phoma glomerata</i> (Corda) Wollenw. & Hochapfel	Bog; <i>Picea</i> rhizosphere	Canada	S	Summerbell (2005)
<i>Phoma</i> sp.	Bog, fen, heathland; soil, <i>Sphagnum</i>	Canada, Ireland, Russia, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969), Maciejowska-Pokacka (1971), Dickinson and Maggs(1974), Thormann and Rice (this study)
<i>Phomatospora dinemasporium</i> J. Webster	Bog, fen; soil	Ireland, U.K.	S	Latter <i>et al.</i> (1967), Dickinson and Dooley (1969)
<i>Phomopsis</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Pichia capsulata</i> (Wick.) Kurtzman	Bog; soil	Russia	S	Polyakova et al. (2001)
<i>Pichia inositovora</i> Golubev, Blagod., Suetin & R.S. Trots	Peatland; soil	Russia	S	Golubev et al. (1981)
<i>Pichia jadinii</i> (Satory, A. Weill, R. Weill & J. Mey.) Kurtzman	Bog, peatland; soil	Russia	S	Golubev et al. (1981), Polyakova et al. (2001)
<i>Pichia toletana</i> (Socias, Ramirez & Peláez) Kreger	Peatland; soil	Russia	S	Golubev et al. (1981)
<i>Pichia</i> spp.	Bog, peatland; soil	Russia	S	Polyakova et al. (2001), Golovchenko et al. (2002)
<i>Piptocephalis</i> sp.	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Plectania melaena</i> (Fr.) Paden	<i>Sphagnum</i>	Canada, USA	S	Oudemans (1919)
<i>Pleurostomorpha richardsiae</i> (Nannf.) L. Mosert, W. Gams & Crous	Bog; soil	USA	S	Christensen and Whittingham (1965)
<i>Pochonia bulbillosa</i> (W. Gams & Malla) Zare & W. Gams	Bog, fen, peatland; soil, <i>Sphagnum</i> , <i>Picea</i> roots	Canada, Italy, Sweden	S	Dal Vesco (1974/75), Dickinson and Maggs (1974), Nilsson et al. (1992), Thormann et al. (2001, 2003), Summerbell (2005)
<i>Pseudeurotium</i> sp.	Bog; soil	Canada	S	Thormann and Rice (this study)
<i>Pseudogymnoascus appendiculatus</i> Rice & Currah	Bog; soil	Canada	S	Rice et al. (2006), Rice and Currah (2006)
<i>Pseudogymnoascus roseus</i> Raillo	Fen, peatland; soil	Italy, Russia	S	Maciejowska-Pokacka (1971), Dal Vesco (1974/75)
<i>Pseudogymnoascus verrucosus</i> Rice & Currah	Bog; soil	Canada	S	Rice et al. (2006), Rice and Currah (2006)
<i>Pyrenochaeta</i> spp.	Bog, fen, heathland; soil	Italy, Russia, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969), Maciejowska-Pokacka (1971)
<i>Pyricularia submersa</i> Ingold	Bog; water	Poland	S	Czczuga (1993)
<i>Pyronema omphalodes</i> (Bull.) Fuckel	Fen; soil	U.K.	S	Stenton (1953)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Rhinotrichum</i> sp.	Fen; soil	U.K.	S	Stenton (1953)
<i>Rhizoctonia</i> spp.	Bog, fen; soil, <i>Salix</i> roots	Canada, Ireland	S/P	Dickinson and Dooley (1969), Thormann <i>et al.</i> (2001, 2003)
<i>Rhizoscyphus ericae</i> (D.J. Read) W.Y. Zhuang & Korf	Bog; ericaceous roots	Canada	Er	Hambleton and Currah (1997)
<i>Saccharomyces kloeckerianus</i> van der Walt	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Saccharomyces paradoxus</i> Bach.-Raich.	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Saccharomyces terrestris</i> (V. Jensen) G.I. Naumov	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Saccharomyces</i> sp.	Bog; soil	U.K.	S	Boswell (1955)
<i>Sarcinella</i> sp.	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Sarcoleotia globosa</i> (Sommerf. ex Fr.) Korf	<i>Sphagnum</i>	Canada, Finland, Iceland, Japan, Russia, Sweden, USA	S	Schumacher and Sivertsen (1987)
<i>Sarcoleotia turficola</i> (Boud.) Dennis	<i>Sphagnum</i>	U.K.	S/P	Oudemans (1919)
<i>Scleroconidioma sphagnicola</i> Tsuneda, Currah & Thormann	<i>Sphagnum</i>	Canada	P	Tsuneda <i>et al.</i> (2000)
<i>Sclerotinia kirschsteineriana</i> Henn.	<i>Sphagnum</i>	The Netherlands	S	Oudemans (1919)
<i>Scopulariopsis brevicaulis</i> (Sacc.) Bainier	Fen; soil, <i>Carex</i> rhizomes	Canada, U.K.	S	Stenton (1953), Thormann <i>et al.</i> (2001, 2003)
<i>Scopulariopsis carbonaria</i> F.J. Morton & G. Sm.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Scopulariopsis parva</i> (A.H.S. Br. & G. Sm.) Samson	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Rhinocladiella</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Scopulariopsis</i> spp.	Bog, fen, peatland, heathland; soil	Italy, Russia, U.K, USA	S	Sewell (1959 a,b), Christensen and Wittingham (1965), Maciejowska- Pokacka (1971), Dal Vesco (1974/75)
<i>Scutellinia jaczewskiana</i> (Henn.) Le Gal	<i>Sphagnum</i>	Germany	S	Oudemans (1919)
<i>Septonema</i> sp.	Peatland; soil	Russia	S	Golovchenko <i>et al.</i> (2002)
<i>Septoria</i> spp.	Bog, fen; soil	Ireland, U.K.	S	Latter <i>et al.</i> (1967), Dickinson and Dooley (1969)
<i>Sordaria destruens</i> (Shear) Hawker	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Sordaria fimicola</i> (Roberge ex Desm.) Ces. & de Not.	Bog; <i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Sordaria humana</i> (Fuckel) G. Winter	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Sordaria</i> sp.	Bog; soil	Canada	S	Thormann and Rice (this study)
<i>Sphaeronaema</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Sporidesmiella hyalosperma</i> var. <i>hyalosperma</i> (Corda) Kirk	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Sporocybe</i> sp.	Fen; soil	U.K.	S	Stenton (1953)
<i>Sporonema</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Sporomiella intermedia</i> (Auersw.) Ahmed & Cain	Bog, heathland; soil, <i>Sphagnum</i>	Canada, U.K.	S	Sewell (1959 a,b), Thormann <i>et al.</i> (2001, 2003)
<i>Sporothrix schenckii</i> Hektoen & Perkins	Bog; soil, <i>Sphagnum</i>	USA	S	Christensen and Whittingham (1965), Zhang and Andrews (1993)
<i>Sporothrix</i> state of <i>Ophiostoma</i> <i>stenoceras</i> (Robak) Melin & Nannf.	Bog; <i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Sporothrix</i> spp.	Bog, fen; soil, <i>Sphagnum</i> , <i>Salix</i> roots	Canada	S	Thormann <i>et al.</i> (2001, 2003), Thormann and Rice (this study)
<i>Sporotrichum flavovirens</i> Link	Fen; soil	U.K	S	Thornton (1956)
<i>Sporotrichum</i> sp.	Fen; soil	U.K.	S	Stenton (1953)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Stachybotrys chartarum</i> (Ehrenb.) S. Hughes	Bog, peatland; soil	Italy, U.K.	S	Stenton (1953), Dal Vesco (1974/75)
<i>Stagonospora caricis</i> (Oudem.) Sacc.	Fen; <i>Carex</i> leaves	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Stagonospora</i> sp.	Fen; soil	U.K.	S	Latter <i>et al.</i> (1967)
<i>Stemphylium botryosum</i> Wallr.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Stemphylium</i> spp.	Fen; soil	Ireland, U.K.	S	Stenton (1953), Latter <i>et al.</i> (1967)
<i>Stysanus stemonites</i> (Pers.) Corda	Fen; soil	U.K.	S	Stenton (1953)
<i>Stysanus</i> sp.	Fen; soil	U.K.	S	Stenton (1953)
<i>Talaromyces wortmannii</i> (Klöcker) C.R. Benj.	Bog, fen; soil	Ireland, U.K.	S	Stenton (1953), Dickinson and Dooley (1969)
<i>Thielavia terricola</i> (J.C. Gilman & E.V. Abbott) C.W. Emmons	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Thielavia</i> spp.	Fen, heathland; soil	Russia, U.K.	S	Sewell (1959 a,b), Maciejowska-Pokacka (1971)
<i>Tolypocladium geodes</i> W. Gams	<i>Sphagnum</i>	The Netherlands, U.K.	S	Dickinson and Maggs (1974)
<i>Tolypocladium inflatum</i> W. Gams	Bog, fen; soil, <i>Sphagnum</i>	Russia, Sweden	S	Zvyagintsev <i>et al.</i> (1991), Nilsson <i>et al.</i> (1992)
<i>Torula</i> sp.	Peatland; soil	Russia	S	Golovchenko <i>et al.</i> (2002)
cf. <i>Torula</i> sp.	Fen; soil	U.K.	S	Thornton (1956)
<i>Torulasporea</i> sp.	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Torulopsis</i> sp.	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Torulomyces lagena</i> Delitsch	Bog; soil	Ireland	S	Dickinson and Dooley (1967, 1969), Dooley and Dickinson (1971)
<i>Trichobotrys</i> spp.	Fen, heathland; soil	U.K.	S	Thornton (1956), Sewell (1959 a,b)
<i>Trichocladium asperum</i> Harz	Bog, heathland; soil	Ireland, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Trichocladium opacum</i> (Corda) S. Hughes	Peatland; soil	Italy	S	Dal Vesco (1974/75)
<i>Trichoderma aureoviride</i> Rifai	Bog; <i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Trichoderma glaucum</i> E.V. Abbott	Fen; soil	Canada	S	Bisby <i>et al.</i> (1935)
<i>Trichoderma hamatum</i> (Bonord) Bainier	Bog, fen; soil	Russia	S	Zvyagintsev <i>et al.</i> (1991)
<i>Trichoderma harzianum</i> Rifai	Bog, fen; <i>Sphagnum</i> , <i>Carex</i> , <i>Salix</i> roots	Canada, Russia	S	Czastukhin (1967), Thormann <i>et al.</i> (2001, 2003)
<i>Trichoderma koningii</i> Oudem.	Bog, fen, peatland; soil, <i>Carex</i> , <i>Salix</i> roots	Canada, Italy, Russia	S	Bisby <i>et al.</i> (1935), Maciejowska-Pokacka (1971), Dal Vesco (1974/75), Thormann <i>et al.</i> (2001, 2003), Golovchenko <i>et al.</i> (2002), Thormann and Rice (this study)
<i>Trichoderma piluliferum</i> J. Webster & Rifai	Fen; <i>Salix</i> roots, <i>Carex</i> rhizomes	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Trichoderma polysporum</i> (Link) Rifai	Bog, fen; soil, <i>Sphagnum</i> , <i>Carex</i> rhizomes, <i>Salix</i> roots	Canada, Ireland USA	S	Christensen and Whittingham (1965), Dickinson and Dooley (1967), Thormann <i>et al.</i> (2001, 2003), Thormann and Rice (this study)
<i>Trichoderma pseudokoningii</i> Rifai	Fen; <i>Carex</i> rhizomes	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Trichoderma viride</i> Pers.	Bog, fen, peatland, heatland; soil, <i>Sphagnum</i> , <i>Carex</i> , <i>Salix</i> roots, <i>Picea</i> rhizosphere	Canada, Ireland, Italy, Russia, U.K.	S	Bisby <i>et al.</i> (1935), Stenton (1953), Thornton (1956), Sewell (1959 a,b), Latter <i>et al.</i> (1967), Dooley and Dickinson (1971), Maciejowska-Pokacka (1971), Dal Vesco (1974/75), Hurley (1981), Zvyagintsev <i>et al.</i> (1991), Thormann <i>et al.</i> (2001, 2003), Golovchenko <i>et al.</i> (2002), Summerbell (2005), Thormann and Rice (this study)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Trichoderma viride</i> aggr. Pers. ex S.F. Gray	<i>Sphagnum</i>	U.K.	S	Dickinson and Maggs (1974)
<i>Trichoderma</i> spp.	Bog, fen, peatland; soil	Canada, Ireland, Russia, U.K., USA	S	Boswell (1955), Christensen and Whittingham (1965), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Gantimurova (1970), Dooley and Dickinson (1971), Croft <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002)
<i>Trichoglossum hirsutum</i> (Pers.) Boud.	<i>Sphagnum</i>	Europe, New Zealand, USA	S	Oudemans (1919)
<i>Trichosporiella paludigena</i> (Golubev & Blagod.) de Hoog, Rant.-Leht. & M.T. Sm	Bog, peatland; soil	Russia	S	Golubev <i>et al.</i> (1981), Polyakova <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002)
<i>Trichothecium</i> sp.	Peat moss samples	Canada	S	Cormier <i>et al.</i> (1988)
<i>Tricladium anomalum</i> Ingold	Bog; water	Poland	S	Czeczuga (1993)
<i>Tripospermum camelopardus</i> Ingold, Dann & P.J. McDougall	Bog; water	Poland	S	Czeczuga (1993)
<i>Tritirachium</i> sp.	Bog, heathland; soil	Ireland, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969)
<i>Tuber</i> sp.	Bog; <i>Picea</i> roots	USA	EM	Glenn <i>et al.</i> (1991)
<i>Ulocladium</i> sp.	Bog, <i>Nothofagus</i> leaves	Argentina	S	Searles <i>et al.</i> (2001)
<i>Venturia turfosorum</i> Mouton	<i>Sphagnum</i>	Belgium	S	Saccardo (1898), Oudemans (1919)
<i>Verticillium fungicola</i> (Preuss) Hassebr.	Bog; <i>Picea</i> rhizosphere	Canada	S	Summerbell (2005)
<i>Verticillium leptobactrum</i> W. Gams	Bog; <i>Picea</i> rhizosphere	Canada	S	Summerbell (2005)
<i>Verticillium luteoalbum</i> (Link) Subram.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Verticillium</i> spp.	Bog, fen; soil, peat	Canada, Ireland, Russia, U.K., USA	S	Stenton (1953), Thornton (1956), Christensen and Whittingham (1965), Dickinson and Dooley (1967, 1969), Latter <i>et al.</i> (1967), Maciejowska- Pokacka (1971), Cormier <i>et al.</i> (1988), Croft <i>et al.</i> (2001), Thormann and Rice (this study)
<i>Volutella ciliata</i> (Alb. & Schwein.) Fr.	Fen; soil	U.K.	S	Stenton (1953)
<i>Williopsis saturnus</i> var. <i>saturnus</i> (Klöcker) Zender	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Xylaria hippotrichoides</i> Sowerby	<i>Sphagnum</i>	Belgium, France, Germany, U.K.	S	Oudemans (1919)
<i>Xylomyces aquaticus</i> (Dudka) K.D. Hyde & Goh	Bog; water	Poland	S	Czeczuga (1993)
<i>Yarrowia lipolytica</i> (Wick., Kurtzman & E.A. Herrn.) van der Walt & Arx	Bog, fen; soil	Canada	S	Thormann <i>et al.</i> (unpubl.)
Basidiomycetes				
<i>Amphinema</i> spp.	Bog; <i>Pinus</i> and <i>Picea</i> roots	Canada, USA	EM	Wurtzburger <i>et al.</i> (2004), Robertson <i>et al.</i> (2006)
<i>Armillaria sinapina</i> Bérubé & Dessur.	Fen; <i>Carex</i>	Canada	P	Thormann <i>et al.</i> (2001, 2003)
<i>Arrhenia latispora</i> (J. Favre) Bon & Courtec.	<i>Sphagnum</i>	Andorra, Spain, Switzerland	S	Oudemans (1919)
<i>Arrhenia lobata</i> (Pers.) Kühner & Lamoure ex Redhead	Bog	Canada, Europe, USA	S	Redhead (1985)
<i>Arrhenia sphagnicola</i> (Berk.) Redhead, Lutzoni, Moncalvo & Vilgalys	<i>Sphagnum</i>	Europe	S	Oudemans (1919), Moser (1967)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Bjerkandera adusta</i> (Willd.) P. Karst.	Bog, fen; <i>Sphagnum</i> , <i>Carex</i> rhizomes	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Boletinus grisellus</i> Pk.	<i>Sphagnum</i>	USA	EM	Seymour (1929)
<i>Boletinus paluster</i> (Pk.) Pk.	<i>Sphagnum</i>	USA	EM	Seymour (1929)
<i>Boletus subtomentosus</i> L.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Bullera punicea</i> (Komag. & Nakase) Nakase & M. Suzuki	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Cantharellus tubaeformis</i> (Bull.) Fr.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Cheimonophyllum candidissimum</i> (Berk. & M.A. Curtis) Singer	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Chroogomphus rutilus</i> (Schaeff.) O.K. Mill.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Clavulina amethystinoides</i> (Pk.) Corner	<i>Sphagnum</i>	USA	S	Oudemans (1919)
<i>Clavulinopsis luteo-ochracea</i> (Cavara) Corner	<i>Sphagnum</i>	Germany, The Netherlands, U.K., USA	S	Saccardo (1898), Oudemans (1919)
<i>Clitocybe incompta</i> Fr.	<i>Sphagnum</i>	n.i.	S	Oudemans (1919)
<i>Clitocybe stygia</i> Fr.	<i>Sphagnum</i>	n.i.	S	Oudemans (1919)
<i>Collybia admissa</i> Britzelm.	<i>Sphagnum</i>	n.i.	S	Oudemans (1919)
<i>Collybia caldarii</i> Berk.	<i>Sphagnum</i>	U.K.	S	Oudemans (1919)
<i>Collybia clusilis</i> (Fr.) Sacc.	<i>Sphagnum</i>	Sweden	S	Oudemans (1919)
<i>Collybia obstans</i> Britzelm.	<i>Sphagnum</i>	Germany	S	Oudemans (1919)
<i>Cortinarius chrysolithus</i> Kauffman	<i>Sphagnum</i>	Czech Republic, Slovak Republik, U.K.	EM	Seymour (1929)
<i>Cortinarius cf. impolitus</i>	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Cortinarius phoeniceus</i> var. <i>occidentalis</i> A.H. Sm.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Cortinarius periscelis</i> Fr.	<i>Sphagnum</i>	Austria, U.K.	EM	Oudemans (1919)
<i>Cortinarius pseudotubaris</i> T.L. Robar, K.A. Harrison & Grund	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Cortinarius scaurus</i> (Fr.) Fr.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Cortinarius sphagneti</i> P.D. Orton	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Cortinarius sphagnophilus</i> Pk.	among <i>Sphagnum</i>	Russia	EM	Moser (1967)
<i>Cortinarius sterilis</i> Kauffman	<i>Sphagnum</i>	n.i.	EM	Oudemans (1919)
<i>Cortinarius subscaurus</i> (M.M. Moser) M.M. Moser	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Cortinarius tubarius</i> Ammirati & A.H. Sm.	<i>Sphagnum</i>	USA	EM	Moser (1967)
<i>Cortinarius</i> cf. <i>turibulosus</i>	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Cortinarius uliginosus</i> Berk.	<i>Sphagnum</i>	n.i.	EM	Seymour (1929)
<i>Cortinarius vanduzerensis</i> A.H. Sm. & Trappe	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Cortinarius</i> sp.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Craterellus caeruleofuscus</i> A.H. Sm.	<i>Sphagnum</i>	Canada, USA	S	Smith (1968)
<i>Cryptococcus aerius</i> (Saito) Nann.	Bog, fen; soil	Canada	S	Thormann <i>et al.</i> (unpubl.)
<i>Cryptococcus albidus</i> (Saito) C.E. Skinner	Peatland; soil	Russia, USA	S	Golubev <i>et al.</i> (1981), Golubev (1986), Zvyagintsev <i>et al.</i> (1991), Polyakova <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002)
<i>Cryptococcus albidus</i> var. <i>albidus</i> (Saito) C.E. Skinner	Bog, fen; soil	Canada, Russia	S	Golubev <i>et al.</i> (1981), Thormann <i>et al.</i> (unpubl.)
<i>Cryptococcus gastricus</i> Reiersöl & di Menna	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Cryptococcus gilvescens</i> Chernov & Babeva	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Cryptococcus hungaricus</i> (Zsolt) Phaff & Fell	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Cryptococcus laurentii</i> (Kuff.) C.E. Skinner	Bog, fen; soil	Russia	S	Zvyagintsev <i>et al.</i> (1991), Polyakova <i>et al.</i> (2001)
<i>Cryptococcus magnus</i> (Lodder & Kreger) Baptist & Kurtzman	Peatland; soil	Russia	S	Golubev (1986)
<i>Cryptococcus podzolicus</i> (Babeva & Reshetova) Golubev	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Cryptococcus terreus</i> Di Menna	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Cryptococcus terricolus</i> T.A. Pedersen	Bog, fen; soil	Russia	S	Zvyagintsev <i>et al.</i> (1991)
<i>Cryptococcus</i> spp.	Peatland; soil	Russia	S	Polyakova <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002)
<i>Dermocybe</i> sp.	Bog; <i>Pinus</i> and <i>Picea</i> roots	USA	EM	Wurtzburger <i>et al.</i> (2004)
<i>Eccilia sphagnophila</i> Pk.	<i>Sphagnum</i>	USA	S	Oudemans (1919)
<i>Entoloma</i> cf. <i>lucidum</i>	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Entoloma mammosum</i> (L.) Heslan	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Entoloma peckianum</i> Burt.	<i>Sphagnum</i>	Canada	S	Oudemans (1919)
<i>Entoloma turbidum</i> (Fr.) Quél.	<i>Sphagnum</i>	U.K.	S	Oudemans (1919)
<i>Entoloma variabile</i> Pk.	<i>Sphagnum</i>	USA	S	Oudemans (1919), Seymour (1929)
<i>Flammulina velutipes</i> (Curtis) Singer	<i>Sphagnum</i>	Russia	S	Czastukhin (1967)
<i>Galerina andina</i> Singer	<i>Sphagnum</i>	Bolivia	S	Smith and Singer (1964)
<i>Galerina atkinsoniana</i> var. <i>sphagnorum</i> Sm.	<i>Sphagnum</i>	USA	S	Smith and Singer (1964), Gulden (1980)
<i>Galerina boliviana</i> Singer	<i>Sphagnum</i>	Bolivia	S	Smith and Singer (1964)
<i>Galerina cainii</i> A.H. Sm.	<i>Sphagnum</i>	Canada	S	Smith and Singer (1964)
<i>Galerina calyptrata</i> P.D. Orton	<i>Sphagnum</i>	New Zealand, U.K.	S	Gulden (1980)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Galerina cerina</i> A.H. Sm. & Singer	<i>Sphagnum</i>	Canada, USA	S	Smith and Singer (1964)
<i>Galerina cerina</i> var. <i>ampullicystis</i> A.H. Sm. & Singer	among <i>Sphagnum</i>	Canada, USA	S	Smith and Singer (1964)
<i>Galerina clavata</i> (Velen.) Kühner	among <i>Sphagnum</i>	Europe, Jamaica, Japan, Russia	S	Smith and Singer (1964)
<i>Galerina evelata</i> (Singer) A.H. Sm. & Singer	<i>Sphagnum</i>	Canada, Russia, USA	S	Smith and Singer (1964)
<i>Galerina emmetensis</i> A.H. Sm. & Singer	<i>Sphagnum</i>	USA	S	Smith and Singer (1964)
<i>Galerina fallax</i> A.H. Sm. & Singer	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Galerina farinacea</i> A.H. Sm.	<i>Sphagnum</i>	USA	S	Smith and Singer (1964)
<i>Galerina fennica</i> A.H. Sm.	<i>Sphagnum</i>	Finland	S	Smith and Singer (1964)
<i>Galerina frigida</i> V.L. Wells & Kempton	<i>Sphagnum</i>	USA	S	Wells and Kempton (1969)
<i>Galerina gibbosa</i> J. Favre	among <i>Sphagnum</i>	Europe	S	Moser (1967)
<i>Galerina hypnorum</i> (Schrank) Kühner	<i>Sphagnum</i>	Argentina, Canada, Europe, Russia, USA	S	Horak and Miller (1992)
<i>Galerina laeta</i> Singer	<i>Sphagnum</i>	Bolivia	S	Smith and Singer (1964)
<i>Galerina leptocystis</i> V.L. Wells & Kempton	<i>Sphagnum</i>	USA	S	Wells and Kempton (1969)
<i>Galerina luteosperma</i> A.H. Sm. & Singer	<i>Sphagnum</i>	Norway	S	Smith and Singer (1964)
<i>Galerina macrospora</i> (Velen.) Singer	among <i>Sphagnum</i>	Czech Republic	S	Smith and Singer (1964), Moser (1967)
<i>Galerina mniophila</i> (Lasch) Kühner	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Galerina norvegica</i> A.H. Sm.	<i>Sphagnum</i>	Fennoscandia	S	Smith and Singer (1964), Moser (1967), Gulden (1980)
<i>Galerina nubigena</i> A.H. Sm. & Singer	<i>Sphagnum</i>	Bolivia	S	Smith and Singer (1964)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Galerina paludosa</i> (Fr.) Kühner	Bog; <i>Sphagnum</i>	Canada, Europe, USA	S	Oudemans (1919), Smith and Singer (1964), Moser(1967), Watling (1978), Redhead (1981, 1989), Roberts <i>et al.</i> (2004)
<i>Galerina praticola</i> (F.H. Møller) P.D. Orton	<i>Sphagnum</i>	Canada, Germany, USA	S	Oudemans (1919), Horak and Miller (1992)
<i>Galerina pseudomycesopsis</i> Pilát	<i>Sphagnum</i>	Argentina, Canada, Europe, Russia, USA	S	Gulden <i>et al.</i> (1985), Horak and Miller (1992)
<i>Galerina pumila</i> (Pers.) M. Lange	<i>Sphagnum</i>	France	S	Oudemans (1919)
<i>Galerina</i> cf. <i>pumila</i>	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Galerina riparia</i> Singer	among <i>Sphagnum</i>	Argentina	S	Smith and Singer (1964)
<i>Galerina semiglobata</i> Singer	<i>Sphagnum</i>	Brazil	S	Smith and Singer (1964)
<i>Galerina septentrionalis</i> A.H. Sm.	<i>Sphagnum</i>	Canada	S	Smith and Singer (1964)
<i>Galerina sphagnicola</i> (Atk.) A.H. Sm. & Singer	<i>Sphagnum</i>	Canada, USA	S	Smith and Singer (1964)
<i>Galerina sphagnorum</i> (Pers.) Kühner	<i>Sphagnum</i>	Americas, Asia, Europe	S	Oudemans (1919), Seymour (1929), Smith and Singer(1964), Moser (1967), Gulden (1980)
<i>Galerina stordalii</i> A.H. Sm.	<i>Sphagnum</i>	Greenland, The Netherlands, Scandinavia, USA	S	Smith and Singer (1964), Gulden (1980)
<i>Galerina subarctica</i> A.H. Sm. & Singer	<i>Sphagnum</i>	USA	S	Smith and Singer (1964), Horak and Miller (1992)
<i>Galerina subtibiicystis</i> Singer	among <i>Sphagnum</i>	Brazil	S	Smith and Singer (1964)
<i>Galerina taimbesinhoensis</i> Singer	<i>Sphagnum</i>	Brazil	S	Smith and Singer (1964)
<i>Galerina tibiicystis</i> (Atk.) Kühner	among <i>Sphagnum</i>	Canada, Europe, Japan, USA	S	Smith and Singer (1964), Moser (1967)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Galerina turfosa</i> A.H. Sm. & Singer	among <i>Sphagnum</i>	USA	S	Smith and Singer (1964)
<i>Galerina uchumachiensis</i> Singer	<i>Sphagnum</i>	Bolivia	S	Smith and Singer (1964)
<i>Galerina</i> spp.	Bog; <i>Sphagnum</i>	Canada	S	Singer (1975), Roberts <i>et al.</i> (2004)
<i>Guepiniopsis alpina</i> (Tracy & Earle) Brasf.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Gymnopus acervatus</i> (Fr.) Murrill	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Gymnopus confluens</i> (Pers.) Antonin, Halling & Noordel.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Gymnopus dryophilus</i> (Bull.) Murrill	<i>Sphagnum</i>	Russia	S	Czastukhin (1967)
<i>Hebeloma crustuliniforme</i> (Bull.) Quél.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Hebeloma</i> cf. <i>pumilium</i>	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Hebeloma</i> spp.	Bog; <i>Picea mariana</i> roots	Canada	EM	Roberts <i>et al.</i> (2004), Robertson <i>et al.</i> (2006)
<i>Hohenbuehelia culmicola</i> Bon	<i>Sphagnum</i>	France, Denmark, U.K.	S	Oudemans (1919)
<i>Hygrocybe laeta</i> var. <i>laeta</i> (Pers.) P. Kumm.	among <i>Sphagnum</i>	U.K.	EM	Hesler and Smith (1963)
<i>Hygrocybe lilacina</i> (C. Laest.) M.M. Moser	among <i>Sphagnum</i>	Finland, Greenland, U.K.	EM	Laursen and Ammirati (1982)
<i>Hygrophorus eburneus</i> (Bull.) Fr.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Hygrophorus erubescens</i> var. <i>erubescens</i> A.H. Sm. & Hesler	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Hygrophorus hypothejus</i> (Fr.) Fr.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Hygrophorus mephiticus</i> Pk.	<i>Sphagnum</i>	U.K.	EM	Oudemans (1919)
<i>Hygrophorus miniatus</i> f. <i>longipes</i> A.H. Sm. & Hesler	among <i>Sphagnum</i>	USA	EM	Hesler and Smith (1963)
<i>Hygrophorus nitidus</i> Burk. & Curtis	among <i>Sphagnum</i>	Canada, USA	EM	Hesler and Smith (1963)
<i>Hygrophorus obconicus</i> Pk.	<i>Sphagnum</i>	USA	EM	Oudemans (1919)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Hygrophorus palustris</i> V.L. Wells & Kempton	<i>Sphagnum</i>	USA	EM	Wells and Kempton (1975)
<i>Hygrophorus turundus</i> var. <i>sphagnophilus</i> (Pk.) Hesler & A.H. Sm.	among <i>Sphagnum</i>	Canada, Europe, Japan, USA	EM	Hesler and Smith (1963)
<i>Hygrophorus turundus</i> var. <i>turundus</i> (Fr.) Fr.	<i>Sphagnum</i>	Europe, Japan, USA	EM	Hesler and Smith (1963)
<i>Hygrophorus virginea</i> var. <i>virginea</i> (Wulfen) P.D. Orton & Watling	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Hypholoma elongatipes</i> (Pk.) A.H. Sm.	<i>Sphagnum</i>	Canada, U.K., USA	S	Oudemans (1919), Lange and Lange (1982)
<i>Hypholoma elongatum</i> (Pers.) Ricken	Bog; <i>Sphagnum</i>	Canada, Finland, USA	S	Oudemans (1919), Seymour (1929), Smith (1951), Guzmán (1983), Salo (1993)
<i>Hypholoma irroratum</i> (P. Karst.) Sacc.	<i>Sphagnum</i>	n.i.	S	Oudemans (1919)
<i>Hypholoma myosotis</i> (Fr.) Lange	<i>Sphagnum</i>	Finland, Scotland	S	Salo (1993)
<i>Hypholoma polytrichi</i> (Fr.) Ricken	<i>Sphagnum</i>	Europe, U.K., USA	S	Lange and Lange (1982)
<i>Hypholoma udum</i> (Pers.) Kühner	Bog; <i>Sphagnum</i>	USA	S	Seymour (1929), Smith (1951), Lange and Lange (1982), Guzmán (1983)
<i>Inocybe hirculus</i> Vauras	<i>Sphagnum</i>	Finland	EM	Vauras (1994)
<i>Inocybe relicina</i> (Fr.) Quél.	<i>Sphagnum</i>	France, Finland	EM	Oudemans (1919)
<i>Inocybe teraturgus</i> Moser	<i>Sphagnum</i>	Sweden	EM	Moser (1992)
<i>Kuehneromyces mutabilis</i> (Schaeff.) Singer & A.H. Sm.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Laccaria laccata</i> (Scop.) Fr.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Lactarius canadensis</i> A.H. Sm.	<i>Sphagnum</i>	Canada, USA	EM	Hesler and Smith (1979)
<i>Lactarius deterrimus</i> Gröger	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Lactarius duplicatus</i> A.H. Sm.	<i>Sphagnum</i>	Canada, USA	EM	Hesler and Smith (1979)
<i>Lactarius griseus</i> Pk.	among <i>Sphagnum</i>	Canada, USA	EM	Hesler and Smith (1979)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Lactarius helvus</i> (Fr.) Fr.	<i>Sphagnum</i>	U.K., USA	EM	Seymour (1929)
<i>Lactarius hibbardae</i> Pk.	among <i>Sphagnum</i>	USA	EM	Hesler and Smith (1979)
<i>Lactarius lignyotus</i> var. <i>canadensis</i> A.H. Sm. & Hesler	<i>Sphagnum</i>	Canada, USA	EM	Hesler and Smith (1979)
<i>Lactarius lignyotus</i> var. <i>nigroviolascens</i> (Atk.) Hesler & A.H. Sm.	<i>Sphagnum</i>	USA	EM	Hesler and Smith (1979)
<i>Lactarius mucidus</i> var. <i>fuscogriseus</i> Hesler & Smith	<i>Sphagnum</i>	USA	EM	Hesler and Smith (1979)
<i>Lactarius occidentalis</i> A.H. Sm.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Lactarius oculatus</i> (Pk.) Burl.	<i>Sphagnum</i>	USA	EM	Hesler and Smith (1979)
<i>Lactarius omphaliformis</i> Romagn.	among <i>Sphagnum</i>	Europe	EM	Hesler and Smith (1979)
<i>Lactarius paludinellus</i> Pk.	among <i>Sphagnum</i>	USA	EM	Hesler and Smith (1979)
<i>Lactarius rufus</i> (Scop.) Fr.	among <i>Sphagnum</i>	Canada, USA	EM	Hesler and Smith (1979)
<i>Lactarius sphagneti</i> (Fr.) Neuhoff	<i>Sphagnum</i>	China, Europe	EM	Moser (1967), Dörfelt (1972)
<i>Lactarius theiogalus</i> J. Schröt.	<i>Sphagnum</i>	USA	EM	Hesler and Smith (1979)
<i>Lactarius torminosus</i> var. <i>torminosus</i> (Schaeff.) Gray	among <i>Sphagnum</i>	USA	EM	Laursen and Ammirati (1982)
<i>Lactarius volemus</i> (Fr.) Fr.	among <i>Sphagnum</i>	Canada, Europe, USA	EM	Hesler and Smith (1979)
<i>Lactarius</i> sp.	Bog; <i>Picea mariana</i> roots	Canada	EM	Robertson <i>et al.</i> (2006)
<i>Laetiporus sulphureus</i> (Bull.) Murrill	<i>Sphagnum</i>	Russia	S	Czastukhin (1967)
<i>Leccinum holopus</i> (Rostk.) Watling	<i>Sphagnum</i>	Canada, Finland, USA	EM	Laursen and Ammirati (1982)
<i>Leccinum rotundifoliae</i> (Singer) A.H. Sm., Thiers & Watling	among <i>Sphagnum</i>	Canada, Estonia, Iceland, Greenland, USA	EM	Gulden <i>et al.</i> (1985)
<i>Hiatula benzoni</i> (Fr.) Fr.	<i>Sphagnum</i>	n.i.	S	Oudemans (1919)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Lepiota cepistipes</i> var. <i>flos-sulphuris</i> (Schnizl.) Rick	<i>Sphagnum</i>	France, India, Japan, The Netherlands	S	Oudemans (1919)
<i>Lepiota lilacinogranulosa</i> Henn.	<i>Sphagnum</i>	Germany	S	Oudemans (1919)
<i>Leptonia gillettii</i> Quél.	<i>Sphagnum</i>	France	S	Saccardo (1898), Oudemans (1919)
<i>Leucosporidium antarcticum</i> Fell, Statzell, I.L. Hunter & Phaff	Peatland; soil	Russia	S	Golubev <i>et al.</i> (1981)
<i>Lichenomphalia hudsoniana</i> (H.S. Jenn.) Redhead, Lutzoni, Moncalvo & Vilgalys	among <i>Sphagnum</i>	Canada, Denmark, Switzerland, USA	S	Gulden <i>et al.</i> (1985)
<i>Marasmius salalis</i> Desjardin & Redhead	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Melanotus horizontalis</i> (Bull.) P.D. Orton	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Mrakia frigida</i> (Fell, Statzell, I.L. Hunter & Phaff) Y. Yamada & Komag.	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Mycena acicula</i> (Schaeff.) P. Kumm.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Mycena adonis</i> var. <i>adonis</i> (Bull.) Gray	<i>Sphagnum</i>	Canada, U.K.	S	Oudemans (1919)
<i>Mycena alcalina</i> (Fr.) P. Kumm.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Mycena caesia</i> Pk.	<i>Sphagnum</i>	n.i.	S	Oudemans (1919)
<i>Mycena dissimulabilis</i> (Britzelm.) Lapl.	among <i>Sphagnum</i>	Greenland, Scandinavia	S	Laursen and Ammirati (1982)
<i>Mycena epipterygia</i> Lange	Bog; among <i>Sphagnum</i>	Canada	S	Laursen and Ammirati (1982), Roberts <i>et al.</i> (2004)
<i>Mycena filopes</i> (Bull.) P. Kumm.	Bog; <i>Sphagnum</i>	Canada	S	Oudemans (1919), Roberts <i>et al.</i> (2004)
<i>Mycena</i> cf. <i>lowhagii</i>	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Mycena</i> cf. <i>metata</i>	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Mycena murina</i> Murrill	Bog	Canada	S	Roberts <i>et al.</i> (2004)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Mycena permixta</i> (Britzelm.) Sacc.	<i>Sphagnum</i>	Germany, Norway	S	Saccardo (1898), Oudemans (1919)
<i>Mycena</i> cf. <i>picta</i>	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Mycena praelonga</i> Pk.	<i>Sphagnum</i>	USA	S	Saccardo (1898), Seymour (1929)
<i>Mycena receptibilis</i> (Britzelm.) Sacc.	<i>Sphagnum</i>	Germany	S	Saccardo (1898), Oudemans (1919)
<i>Mycena rorida</i> (Scop.) Quél.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Mycena rosella</i> (Fr.) P. Kumm.	<i>Sphagnum</i>	Canada, Scandinavia, USA	S	Oudemans (1919)
<i>Mycena sanguinolenta</i> (Alb. & Schwein.) P. Kumm.	Bog; <i>Sphagnum</i>	Canada, Norway, U.K.	S	Oudemans (1919), Roberts <i>et al.</i> (2004)
<i>Mycena stylobates</i> (Pers.) P. Kumm.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Mycena vitilis</i> (Fr.) Quél.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Mycoacia aurea</i> (Fr.) J. Erikss. & Ryvarden	<i>Sphagnum</i>	U.K., USA	S	Oudemans (1919)
<i>Naucoria elatior</i> Pk.	<i>Sphagnum</i>	U.K., USA	S	Saccardo (1898)
<i>Naucoria paludosella</i> Atk.	<i>Sphagnum</i>	U.K.	S	Oudemans (1919)
<i>Naucoria sphagneti</i> P.D. Orton	among <i>Sphagnum</i>	Scotland	S	Moser (1967)
<i>Naucoria sphagnophila</i> Pk.	<i>Sphagnum</i>	U.K.	S	Oudemans (1919)
<i>Naucoria suspiciosa</i> (Britzelm.) Sacc.	<i>Sphagnum</i>	Germany	S	Oudemans (1919)
<i>Naucoria vexabilis</i> (Britzelm.) Sacc.	<i>Sphagnum</i>	Germany	S	Oudemans (1919)
<i>Nolanea juncea</i> (Fr.) Gillet	<i>Sphagnum</i>	U.K.	S	Oudemans (1919)
<i>Nolanea promiscua</i> (Britzelm.) Sacc.	<i>Sphagnum</i>	Germany	S	Oudemans (1919)
<i>Omphalia nevillae</i> Berk.	<i>Sphagnum</i>	U.K.	S	Saccardo (1898), Oudemans (1919)
<i>Omphaliaster borealis</i> (Lange & Skifke) Lamoure	among <i>Sphagnum</i>	Canada, Germany, USA	S	Laursen and Ammirati (1982)
<i>Omphalina affricata</i> (Fr.) Raithelh.	<i>Sphagnum</i>	Sweden	S	Oudemans (1919)
<i>Omphalina brevibasidiata</i> (Singer) Singer	<i>Sphagnum</i>	Canada	S	Redhead (1985)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Omphalina epichysium</i> (Pers.) Quél.	<i>Sphagnum</i>	Finland, Greenland, Iceland	S	Oudemans (1919), Lange and Lange (1982)
<i>Omphalina ericetorum</i> (Bull.) M. Lange	Bog; <i>Sphagnum</i>	Canada, USA	S	Oudemans (1919), Seymour (1929), Lange and Lange(1982), Roberts <i>et al.</i> (2004)
<i>Omphalina fulvopallens</i> P.D. Orton	<i>Sphagnum</i>	U.K.	S	Orton (1983)
<i>Omphalina gerardiana</i> (Pk.) Singer	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Omphalina oniscus</i> (Fr.) Quél.	Bog; <i>Sphagnum</i>	Canada	S	Oudemans (1919), Roberts <i>et al.</i> (2004)
<i>Omphalina philonotis</i> (Lasch) Quél.	<i>Sphagnum</i>	Finland	S	Oudemans (1919), Lange and Lange (1982), Salo (1993)
<i>Omphalina sphagnophila</i> (Pk.) H.E. Bigelow	<i>Sphagnum</i>	USA	S	Saccardo (1898), Oudemans (1919), Seymour (1929)
<i>Omphalina telmatiaea</i> (Berk. & Cooke) Singer	<i>Sphagnum</i>	n.i.	S	Oudemans (1919)
<i>Peniophora aurantiaca</i> (Bres.) Bourdot & Galzin	Bog	Canada	S/P	Roberts <i>et al.</i> (2004)
<i>Phaeogalera stagnina</i> (Fr.) Pegler & T.W.K. Young	among <i>Sphagnum</i>	Argentina, Canada, Europe, USA	S	Oudemans (1919), Smith and Singer (1964), Moser(1967), Gulden (1980), Laursen and Ammirati (1982)
<i>Phellodon niger</i> (Fr.) P. Karst.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Pholiota chromocystis</i> A.H. Sm. & Hesler	among <i>Sphagnum</i>	Canada, USA	S	Smith and Hesler (1968)
<i>Pholiota elongatipes</i> (Pk.) A.H. Sm. & Hesler	<i>Sphagnum</i>	Argentina, Canada, Chile, Europe, USA	S	Smith and Hesler (1968)
<i>Pholiota paludosella</i> (Atk.) A.H. Sm.& Hesler	among <i>Sphagnum</i>	USA	S	Smith and Hesler (1968)
<i>Pholiota sphagnicola</i> (Pk.) A.H. Sm. & Hesler	<i>Sphagnum</i>	USA	S	Seymour (1929), Smith and Hesler (1968)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Piloderma</i> sp.	Bog; <i>Picea</i> roots	Canada	EM	Robertson <i>et al.</i> (2006)
<i>Pluteus cervinus</i> P. Kumm.	Bog	Canada, USA	S	Roberts <i>et al.</i> (2004)
<i>Polyporus badius</i> Weinm.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Psathyrella laurentiana</i> A.H. Sm.	<i>Sphagnum</i>	Canada	S	Smith (1972)
<i>Psathyrella paludosa</i> A.H. Sm.	<i>Sphagnum</i>	USA	S	Smith (1972)
<i>Psathyrella sphagnicola</i> (Maire) J. Favre	<i>Sphagnum</i>	U.K.	S	Oudemans (1919), Guzmán (1983)
<i>Psilocybe sphagnicola</i> A.H. Sm.	<i>Sphagnum</i>	USA	S	Guzmán (1983)
<i>Psilocybe turficola</i> J. Favre	among <i>Sphagnum</i>	Europe, USA	S	Oudemans (1919), Guzmán (1983)
<i>Psilocybe uda</i> f. <i>sphagnicola</i> J.E. Lange	<i>Sphagnum</i>	Denmark	S	Lange (1936)
<i>Resinomyцена saccharifera</i> (Berk. & Broome) Redhead	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Rhodocollybia butyracea</i> (Bull.) Lennox	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Rhodotorula acheniorum</i> (Buhagiar & J.A. Barnett) Rodr. Mir.	Bogs, fens; soil	Canada, Russia	S	Thormann <i>et al.</i> (unpubl.)
<i>Rhodotorula aurantiaca</i> (Saito) Lodder	Bog, fen; soil	Canada	S	Thormann <i>et al.</i> (unpubl.)
<i>Rhodotorula glutinis</i> (Fresen.) F.C. Harrison	Peatland; soil	Russia	S	Golubev (1986), Polyakova <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002)
<i>Rhodotorula mucilaginoso</i> (A. Jörg.) F.C. Harrison	Bog; soil	Russia	S	Polyakova <i>et al.</i> (2001)
<i>Rhodotorula</i> spp.	Peatland; soil	Russia	S	Zvyagintsev <i>et al.</i> (1991), Polyakova <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002)
<i>Russula claroflava</i> Grove	<i>Sphagnum</i>	U.K.	EM	Watling (1978)
<i>Russula nitida</i> (Pers.) Fr.	<i>Sphagnum</i>	U.K.	EM	Oudemans (1919)
<i>Russula olivaceoviolescens</i> Gillet	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Russula pulchella</i> I.G. Borshch.	<i>Sphagnum</i>	Greenland	EM	Laursen and Ammirati (1982)
<i>Russula</i> cf. <i>atropurpurea</i>	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Russula</i> cf. <i>zelleri</i>	Bog	Canada	EM	Roberts <i>et al.</i> (2004)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Russula</i> sp.	Bog; <i>Pinus</i> roots	USA	EM	Wurtzburger <i>et al.</i> (2004)
<i>Sistotrema brinkmanii</i> (Bres.) J. Erikss.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Sporidiobolus salmonicolor</i> Fell & Tallman	Peatland; soil	Russia	S	Golubev (1986)
<i>Sporobolomyces roseus</i> Kluyver & C.B. Niel	Peatland; soil	Russia	S	Polyakova <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002)
<i>Stereum sanguinolentum</i> (Alb. & Schwein.) Fr.	Bog	Canada	S	Roberts <i>et al.</i> (2004)
<i>Suillus granulatus</i> (L.) Snell	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Suillus tomentosus</i> (Kauffman) Singer	Bog; <i>Pinus</i> roots	Canada, USA	EM	Roberts <i>et al.</i> (2004), Wurtzburger <i>et al.</i> (2004)
<i>Suillus umbonatus</i> E.A. Dick & Snell	Bog; <i>Pinus</i> roots	Canada, USA	EM	Roberts <i>et al.</i> (2004), Wurtzburger <i>et al.</i> (2004)
<i>Tephroclybe palustris</i> (Pk.) Donk	<i>Sphagnum</i>	Canada, Europe, Japan, Russia	P	Saccardo (1898), Seymour (1929), Watling (1978), Redhead (1981), Untiedt and Müller (1985), Simon (1987), Salo (1993), Roberts <i>et al.</i> (2004)
<i>Tomentella</i> sp.	Bog; <i>Picea</i> roots	Canada	EM	Robertson <i>et al.</i> (2006)
<i>Trichaptum abietinum</i> (Dicks.) Ryvardin	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Tricholoma equestre</i> (L.) P. Kumm.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Tricholoma focale</i> (Fr.) Ricken	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Tricholoma sejunctum</i> (Sowerby) Quél.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Tricholoma virgatum</i> (Fr.) P. Kumm.	Bog	Canada	EM	Roberts <i>et al.</i> (2004)
<i>Trichosporon inkin</i> (Oho) Carmo Souza & Uden	Bog, fen; soil	Russia	S	Thormann <i>et al.</i> (unpubl.)
<i>Trichosporon pullulans</i> (Lindner) Diddens & Lodder	Peatland; soil	Russia	S	Golubev (1986), Polyakova <i>et al.</i> (2001)
<i>Trichosporon</i> sp.	Peatland, soil	Russia	S	Golovchenko <i>et al.</i> (2002)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Tubaria conspersa</i> (Pers.) Fayod	<i>Sphagnum</i>	Ireland, U.K.	S	Oudemans (1919)
<i>Tubaria privigna</i> Speg.	<i>Sphagnum</i>	n.i.	S	Saccardo (1898)
<i>Xeromphalina cornui</i> (Quél.) J. Favre	<i>Sphagnum</i>	Canada, Finland, France, Sweden, USA	S	Oudemans (1919)
<i>Xeromphalina fulvipes</i> (Murrill) A.H. Sm.	Bog	Canada	S	Richards <i>et al.</i> (2004)
<i>Xerotus degener</i> Fr.	<i>Sphagnum</i>	n.i.	S	Oudemans (1919)
Chytridiomycota				
<i>Blastocladiopsis parva</i> (Whiffen) Sparrow	Bog; water	USA	S	Czeczuga (1993)
<i>Blyttomyces helicus</i> Sparrow	Bog; soil	USA	S	Sparrow and Lange (1977), Zattau (1981)
<i>Catenaria</i> cf. <i>sphaerocarpa</i>	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Chytriomycetes</i> cf. <i>hyalinus</i>	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Chytriomycetes poculatus</i> Willoughby & Townley	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Chytridium parasiticum</i> Willoughby	Bog; soil	USA	P	Sparrow and Lange (1977)
<i>Chytridium xylophilum</i> Cornu	Bog; water	Poland	S	Czeczuga (1993)
<i>Nowakowskiella elegans</i> (Nowak.) J. Schröt.	Bog; water	Poland	S	Czeczuga (1993)
<i>Olpidium pendulum</i> Zopf	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Phlyctochytrium aureliae</i> Ajello	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Phlyctochytrium furcatum</i> Sparrow	Bog; soil	USA	S	Sparrow (1966), Sparrow and Lange (1977)
<i>Phlyctochytrium incrustans</i> Sparrow & Lange	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Phlyctochytrium mucronatum</i> Canter	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Phlyctochytrium</i> cf. <i>reinboldtii</i>	Bog; soil	USA	S	Sparrow and Lange (1977)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Polychytrium aggregatum</i> Ajello	Bog; water	Poland	S	Czeczuga (1993)
<i>Polyphlyctis unispina</i> (R.A. Paterson) Karling	Bog; soil	USA	S	Zattau (1981)
<i>Rhizophydium elyense</i> Sparrow	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Rhizophydium keratinophilum</i> Karling	Bog; water	Poland	S	Czeczuga (1993)
<i>Rhizophydium pollinis-pini</i> (A. Braun) Zopf	Bog; water	Poland	S	Czeczuga (1993)
<i>Rhizophydium porosum</i> Sparrow & Lange	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Rhizophydium sphaerotheca</i> Zopf	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Rhizophydium</i> cf. <i>stipitatum</i>	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Rhizophydium subangulosum</i> (A. Braun) Rabenh.	Bog; soil	USA	S	Zattau (1981)
<i>Rhizophydium undulatum</i> Sparrow & Lange	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Rhizophydium</i> sp.	Bog; soil	USA	S	Sparrow and Lange (1977)
cf. <i>Rhizophydium</i> sp.	Bog; soil	USA	S	Sparrow and Lange (1977)
<i>Septosperma multiforme</i> Canter	Bog; soil	USA	S	Zattau (1981)
<i>Septosperma rhizophydii</i> Whiffen ex W.H. Blackw. & M.J. Powell	Bog; soil	USA	P	Sparrow and Lange (1977), Zattau (1981)
Zygomycota				
<i>Absidia coerulea</i> Bainier	Bog, heathland; soil	Canada, U.K.	S	Sewell (1959 a,b), Hurley (1981)
<i>Absidia cylindrospora</i> var. <i>cylindrospora</i> Hagem	Fen; soil	U.K.	S	Stenton (1953)
<i>Absidia glauca</i> Hagem	Fen; soil	U.K.	S	Stenton (1953)
<i>Coemansia aciculifera</i> Linder	Peatland; <i>Sphagnum</i>	USA	S	Linder (1943)
<i>Coemansia pectinata</i> (Coem.) Bainier	Bog, fen; soil	Ireland, U.K.	S	Stenton (1953), Dickinson and Dooley (1969)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Endogone pisiformis</i> Link	<i>Sphagnum</i>	Canada, Finland, Germany, U.K.	S/EM	Seymour (1929), Berch and Fortin (1983), Dalpé (1984)
<i>Endogone xylogena</i> J. Schröt.	<i>Sphagnum</i>	n.i.	S	Seymour (1929)
<i>Mortierella alpina</i> Peyronel	Bog, fen; soil, <i>Sphagnum</i>	Argentina, Austria, Canada, Ireland, Russia, U.K.	S	Thornton (1956), Loub (1960), Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Maciejowska-Pokacka(1971), Thormann <i>et al.</i> (2001, 2003), Robson <i>et al.</i> (2004)
<i>Mortierella bainieri</i> Costantin	Bog, heathland; soil	Ireland, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969)
<i>Mortierella bisporalis</i> (Thaxt.) Björl.	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Mortierella elongata</i> Linnem.	Bog, fen; soil, <i>Sphagnum, Carex</i>	Canada, Ireland, U.K.	S	Thornton (1956), Dooley and Dickinson (1971), Thormann <i>et al.</i> (2001, 2003)
<i>Mortierella exigua</i> Linnem.	Fen; soil	U.K.	S	Thornton (1956)
<i>Mortierella globulifera</i> O. Rostr.	Fen; <i>Salix</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Mortierella horticola</i> Linnem.	Bog; <i>Sphagnum</i>	Canada	S	Thormann <i>et al.</i> (2001, 2003)
<i>Mortierella humicola</i> Oudem.	Bog, fen; soil	Ireland, U.K.	S	Latter <i>et al.</i> (1967), Dickinson and Dooley (1969)
<i>Mortierella humilis</i> Linnem.	Bog, fen; soil, <i>Sphagnum</i>	Canada, Ireland, U.K.	S	Thornton (1956), Dickinson and Dooley (1969), Thormann <i>et al.</i> (2001, 2003)
<i>Mortierella hyalina</i> (Harz) W. Gams	Peatland; soil	U.K.	S	Sewell (1959 a,b)
<i>Mortierella jenkinsii</i> (A.L. Sm.) Naumov	Peatland; soil	Italy, U.K.	S	Thornton (1956), Dal Vesco (1974/75)
<i>Mortierella macrocystis</i> W. Gams	Bog; soil, <i>Picea</i> rhizosphere	Canada	S	Sumerbell (2005)
<i>Mortierella minutissima</i> von Tiegh.	Bog, fen; soil, <i>Sphagnum</i>	Canada, U.K., USA	S	Stenton (1953), Thornton (1956), Christensen and Whittingham (1965), Thormann <i>et al.</i> (2001, 2003)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Mortierella parvispora</i> Linnem.	Bog, fen; soil, <i>Picea</i> rhizosphere	Canada, Ireland, U.K.	S	Thornton (1956), Sewell (1959 a,b), Dooley and Dickinson (1971), Sumerbell (2005)
<i>Mortierella polycephala</i> Coem.	Fen; soil	U.K.	S	Thornton (1956)
<i>Mortierella pulchella</i> Linnem.	Bog, fen; soil, <i>Sphagnum</i>	Canada, Ireland, Sweden, U.K.	S	Sewell (1959 a,b), Dooley and Dickinson (1971), Nilsson <i>et al.</i> (1992), Sumerbell (2005)
<i>Mortierella stylospora</i> Dixon-Stew.	Fen; soil	U.K.	S	Thornton (1956)
<i>Mortierella turficola</i> Y. Ling	Bog; soil, <i>Sphagnum</i>	Ireland, U.K.	S	Dickinson and Dooley (1969), Dickinson and Maggs(1974)
<i>Mortierella verticillata</i> Linnem.	Bog, heathland; soil, <i>Sphagnum</i>	Canada, Italy, U.K.	S	Sewell (1959 a,b), Dal Vesco (1974/75), Thormann <i>et al.</i> (2001, 2003)
<i>Mortierella zychae</i> Linnem.	Bog, heathland; soil	Ireland, U.K.	S	Sewell (1959 a,b), Dickinson and Dooley (1969)
<i>Mortierella</i> spp.	Peatland; soil, <i>Sphagnum</i>	Argentina, Austria, Canada, Ireland, Italy, Russia	S	Loub (1960), Dickinson and Dooley (1969), Dal Vesco (1974/75), Hurley (1981), Searles <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002)
<i>Mucor corticola</i> Hagem	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Mucor fragilis</i> Bainier	Bog; soil	Canada	S	Hurley (1981)
<i>Mucor globosus</i> P. Micheli	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Mucor circinelloides</i> f. <i>griseocyanus</i> (Hagem) Schipper	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Mucor hiemalis</i> Wehmer	Bog, fen, heathland; soil, <i>Sphagnum</i> , <i>Carex</i> , <i>Salix</i>	Canada, Ireland, Argentina, Austria, U.K.	S	Sewell (1959 a,b), Loub (1960), Latter <i>et</i> <i>al.</i> (1967), Dickinson and Dooley (1969), Hurley (1981), Thormann <i>et al.</i> (2001, 2003), Robson <i>et al.</i> (2004), Thormann and Rice (this study)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Mucor plumbeus</i> Bonord.	Bog, peatland; soil, <i>Sphagnum</i>	Canada, Italy, U.K.	S	Stenton (1953), Seymour (1929), Dal Vesco (1974/75), Thormann and Rice (this study)
<i>Mucor racemosus</i> Bull.	Bog, peatland; soil	Canada, Italy	S	Dal Vesco (1974/75), Hurley (1981), Thormann and Rice (this study)
<i>Mucor odoratus</i> Treschew	Bog; soil	Austria, Canada	S	Loub (1960), Hurley (1981)
<i>Mucor saturninus</i> Hagem	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Mucor subtilissimus</i> Berk.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Mucor hiemalis</i> f. <i>silvaticus</i> (Hagem) Schipper	Fen; soil	U.K.	S	Stenton (1953)
<i>Mucor</i> spp.	Peatlands; soil, <i>Picea</i> rhizosphere, <i>Sphagnum</i>	Argentina, Canada, Ireland, Russia, U.K.	S	Latter <i>et al.</i> (1967), Dickinson and Dooley (1969), Gantimurova (1970), Maciejowska-Pokacka (1971), Cormier <i>et al.</i> (1988), Searles <i>et al.</i> (2001), Golovchenko <i>et al.</i> (2002), Sumerbell (2005), Rice <i>et al.</i> (2006)
<i>Pilaira anomala</i> (Ces.) J. Schröt.	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Piptocephalis cylindrospora</i> Bainier	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Pythium</i> sp.	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Rhizomucor pusillus</i> (Lindt) Schipper	Bog; soil	Ireland	S	Dickinson and Dooley (1969)
<i>Rhizopus nigricans</i> Ehrenb.	Fen; soil	U.K.	S	Stenton (1953)
<i>Rhizopus</i> sp.	Peatland; <i>Sphagnum</i>	Argentina	S	Robson <i>et al.</i> (2004)
<i>Spinalia tenuis</i> (Thaxt.) Zycha	<i>Sphagnum</i>	Poland, USA	S	Saccardo (1898), Oudemans (1919)
<i>Syncephalis pendula</i> Tiegh.	<i>Sphagnum</i>	France	S	Saccardo (1898)
<i>Syncephalis tenuis</i> Thaxt.	<i>Sphagnum</i>	Germany	S	Saccardo (1898), Seymour (1929)
<i>Syncephalis</i> sp.	Fen; soil	U.K.	S	Stenton (1953)
<i>Thamnocephalis quadrupedata</i> Blakeslee	<i>Sphagnum</i>	n.i.	S	Oudemans (1919)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
<i>Mucor mucedo</i> de Bary & Woron.	Bog; soil	Canada, Ireland	S	Dickinson and Dooley (1969), Thormann and Rice(this study)
<i>Mucor cf. mucedo</i>	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Mucor piriformis</i> Scop.	Heathland; soil	U.K.	S	Sewell (1959 a,b)
<i>Umbelopsis angularis</i> W. Gams & M. Sugiy.	Bog; soil, <i>Sphagnum</i>	Canada, Ireland	S	Dickinson and Dooley (1969), Thormann <i>et al.</i> (2001, 003), Thormann and Rice (this study)
<i>Umbelopsis isabellina</i> (Oudem.) W. Gams	Peatland, heathland; soil, <i>Sphagnum</i> , <i>Carex</i>	Canada, Sweden, U.K.	S	Bisby <i>et al.</i> (1935), Stenton (1953), Sewell (1959 a,b), Christensen and Whittingham (1965), Nilsson <i>et al.</i> (1992), Thormann <i>et al.</i> (2001, 2003)
<i>Umbelopsis nana</i> (Linnem.) Arx	Fen; soil	U.K.	S	Thornton (1956)
<i>Umbelopsis ramanniana</i> (A. Møller) W. Gams	Peatland, heathland; soil, <i>Sphagnum</i>	Canada, Italy, U.K., USA	S	Stenton (1953), Thornton (1956), Sewell (1959 a,b), Christensen and Whittingham (1965), Christensen and Cook (1970), Dal Vesco (1974/75), Hurley (1981), Thormann <i>et al.</i> (2001, 2003), Thormann and Rice(this study)
<i>Umbelopsis vinacea</i> (Dixon-Stew.) Arx	Bog, fen; soil, <i>Sphagnum</i>	Argentina, Canada, Russia, U.K., USA	S	Bisby <i>et al.</i> (1935), Thornton (1956), Christensen and Whittingham (1965), Maciejowska-Pokacka (1971), Robson <i>et al.</i> (2004)
<i>Zygodesmus</i> sp.	Peatland; soil	Russia	S	Golovchenko <i>et al.</i> (2002)
<i>Zygorhynchus moelleri</i> Vuill.	Bog, fen; soil	Austria, Canada, Russia, U.K.	S	Thornton (1956), Loub (1960), Hurley (1981), Maciejowska-Pokacka (1971)
<i>Zygorhynchus</i> spp.	Bog, fen; soil	Ireland, Russia	S	Dickinson and Dooley (1969), Maciejowska- Pokacka(1971)

Table 2 continued. Fungi reported from bog and fen peatlands.

Taxa	Peatland type(s); Substrata	Location(s)	Role(s)	Reference(s)
Incertae Sedis Schizoblastosporion starkeyi-hericia Cif.	Bog, fen, peatland; soil	Canada, Russia	S	Golubev et al. (1981), Polyakova et al. (2001), Thormann et al. (unpublished)

Note: E = endophytic, EM = ectomycorrhizal, Er = ericoid mycorrhizal, N = nematophagous, n.i. = no information, P = parasitic, S = saprobic; * Tsuneda, A., University of Alberta, Edmonton, Alberta, Canada.

Hebeloma, *Hygrophorus*, *Lactarius*, *Russula*, and *Tricholoma*) and aid shrubs and trees in the acquisition of nutrients. This is not unusual in that almost all peatland plants are mycorrhizal (Thormann *et al.*, 1999). Some of the ectomycorrhizal fungi have limited abilities to decompose organic matter as well; however, their role as saprobes is minor (see Thormann 2006a,b). Lastly, relatively few pathogenic fungi are known from peatlands, most notably including species of *Epibryon* and *Lasiosphaeria*. These genera are pathogens of *Sphagnum* species and are often restricted to specific *Sphagnum* species, e.g., *Lasiosphaeria sphagnorum* is only a pathogen of *Sphagnum capillifolium*, *S. squarrosum*, *S. subsecundum*, and *S. teres* (Döbbeler 1978).

There is undoubtedly a large number of additional fungi growing in peatlands, which will be isolated in the future using different isolation protocols or direct observation. A recent study of palm fungi in a peat swamp forest in southern Thailand revealed 112 taxa, mostly ascomycetes and their anamorphs, many of which are new to science (Pinnoi *et al.*, 2006). Studies of this type are sure to reveal many more species than are listed in Table 1. Perhaps the most promising techniques to elucidate further fungal assemblages in peatlands are molecular techniques, such as PCR to identify non-sporulating fungi (Promputtha *et al.*, 2005; Wang *et al.*, 2005) or environmental PCR or DGGE (Duong *et al.*, 2006) to characterize unculturable or difficult to culture fungal taxa. Peatlands store 10-16% of the total terrestrial detrital carbon (180-277 Gt; Gorham, 1990). A better understanding of the fungal diversity and functional roles in peatlands will allow us to predict better how these ecosystems will respond to climate changes.

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