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REVIEW

Fungicolous fungi: terminology, diversity, distribution, evolution, and species checklist

Jing-Zu Sun[1,2] · Xing-Zhong Liu[1,7] · Eric H. C. McKenzie[3] · Rajesh Jeewon[4] · Jian-Kui (Jack) Liu[5] · Xiao-Ling Zhang[1] · Qi Zhao[6] · Kevin D. Hyde[2]

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Abstract

Fungicolous fungi are a very large, diverse, ecological and trophic group of organisms that are associated with other fungi. This association occurs with species of different lineages across the fungal kingdom. They are recognized as symbionts, mycoparasites, saprotrophs, and even neutrals. Wherever fungi have been found, fungicolous taxa have also been found. Homogeneous environments favour the development of highly adapted and coevolved fungicolous species, which could have led to host-specificity aspects. As a primary consumer, fungicolous fungi decrease the turnaround time of certain nutrients in food webs, due to their special often-rapid life cycles. They may also significantly affect population dynamics and population sizes of their hosts in aquatic or terrestrial ecosystems. As mycoparasites of pathogenic fungi, some fungicolous fungi have been explored as biocontrol agents. They may also cause serious diseases of cultivated edible and medicinal mushrooms, decreasing both yield and quality. Fungicolous fungi could be used as model organisms that may help determine better understanding of species interactions, fungal evolution and divergence, and fungicolous mechanisms. This review summarizes our current understanding of fungicolous fungi, with a particular focus on the terminology, diversity, global distribution, and interaction with their hosts. We also provide a checklist including 1552 fungicolous fungal taxa so far recorded following the updated classification schemes. There is a need for further investigations on this ecologically important group of fungi to better understand their biology, ecological aspects, origin and divergence, host-specificity and application in biocontrol. Accurate identification of these fungi as pathogens and their significance in quarantine purposes on the mushroom industry need further evaluations so that efficient control measures can be developed for better disease management purposes.

Keywords Biocontrol · Host-specificity · Mushroom diseases · Mycoparasites · Species diversity

✉ Xing-Zhong Liu
liuxz@im.ac.cn

✉ Kevin D. Hyde
kdhyde3@gmail.com

1 State Key Laboratory of Mycology, Institute of Microbiology, Chinese Academy of Sciences, No. 3 Park 1, Beichen West Road, Chaoyang District, Beijing 100101, People's Republic of China

2 Center of Excellence in Fungal Research, Mae Fah Luang University, Chiang Rai 57100, Thailand

3 Manaaki Whenua Landcare Research, Private Bag 92170, Auckland, New Zealand

4 Department of Health Sciences, Faculty of Science, University of Mauritius, Reduit, Mauritius

5 Center for Bioinformatics, School of Life Science and Technology, University of Electronic Science and Technology of China, Chengdu 611731, People's Republic of China

6 Key Laboratory for Plant Diversity and Biogeography of East Asia, Kunming Institute of Botany, Chinese Academy of Science, Kunming 650201, People's Republic of China

7 Department of Microbiology, College of Life Science, Nankai University, Jinnan District, Tianjin 300350, People's Republic of China

Introduction

Fungi as symbionts are found associated with every major group of prokaryotes and eukaryotes: bacteria, algae, animals, insects, and plants (Blackwell 2011; Liu et al. 2010; Swe et al. 2008a, b, 2011; Wijayawardene et al. 2017a, b, 2018a, b). Some fungi consistently associated with other fungi are named as fungicolous (or mycophilic) fungi (Barnett 1963; Rudakov 1978). Fungicolous fungi have evolved across different lineages within the fungal kingdom (Deighton 1969; Poinar and Buckley 2007; Põldmaa 2011; Pintye et al. 2015; Melo et al. 2016; Powell et al. 2017). These taxa survive alongside their hosts (Fig. 1), which co-occur in aquatic or terrestrial ecosystems from temperate and tropical to arctic regions (Deighton 1969; Freeman et al. 2009; Opik et al. 2010; Põldmaa 2011; Pintye et al. 2015). As one of the primary consumers, fungicolous fungi decrease the turnaround time of certain nutrients in food webs, due to their special living strategy and have often rapid life cycles (Marano et al. 2011; Hargreaves et al. 2018). They may significantly affect population dynamics and population sizes of their hosts in aquatic or terrestrial ecosystems (Marano et al. 2011; Parratt and Laine 2018). Most of the fungicolous species are mycoparasites or hyperparasites (Barnett 1963; Boosalis 1964; Bartkowska 2007; Baiswar et al. 2014) and can cause devastating diseases of mushroom in nature and industry by reducing the yield and quality worldwide (Foulongne-Oriol et al. 2011; Sun et al. 2016a; Kim et al. 2017). On the other hand, they are also important in suppressing fungal diseases of plants and act as potential biocontrol agents (Bartkowska 2007; Baiswar et al. 2014; Videira et al. 2015).

Studies on fungicolous fungi can be traced back to two centuries ago (Nees von Esenbeck 1817; Fries and Nordholm 1817; Willdenow et al. 1833) and their mycoparasitic activity on mushrooms in the field was observed in the 1760s (Gray and Morganjones 1981). *Cladobotryum agaricina* was the first fungicolous ascomycete on *Agaricus* sp. and *Asterophora agaricoides* was the first fungicolous basidiomycete on the fruiting body of an *Agaricus* species (Fries and Nordholm 1817). The zygomyceteous *Mucor fusiger* was found to infect some species of Agaricales (Willdenow et al. 1833). Consequently, many more diverse species of fungicolous fungi associated with different taxonomic lineages were reported (Tubaki 1955; Nicot 1967; Hashioka and Nakai 1980; Rogerson and Samuels 1989, 1993, 1994; Gupta and Mukerji 2010; Põldmaa 2011; Ellenberger et al. 2014; Pintye et al. 2015).

The diversity of fungicolous fungi was extensively investigated during the 1960s and 1970s (Barnett 1963; Barnett 1964; Curtis et al. 1978; De Hoog 1978), and consequently studies led to the discovery of asexual-sexual morph connections of fungicolous fungi in the Hypocreales, and mycoparasitic Heterobasidiomycetes (Reid 1990; Helfer 1991; Põldmaa and Samuels 1999). Apparently, most surveys mainly focused on fungicolous fungi associated with fruiting bodies of mushrooms (Rogerson and Samuels 1989, 1993, 1994). Gams et al. (2004) reported that there were 1700 fungicolous taxa (including sexual and asexual morphs, and fungus-like oomycetes). Wijayawardene et al. (2017a, b) listed 55 genera of Ascomycota having potential fungicolous features. Oberwinkler (2017) reviewed yeast-form fungicolous fungi in Pucciniomycotina. Recently microbiome analyses revealed that diversity of fungicolous species associated with fungal fruiting bodies are much more than expected (Leonardi et al. 2018).

Fungicolous fungi could kill their hosts via antagonistic involving the secretion of enzymes or antibiotics, or competition of nutrition and niche (Kubicek et al. 2011; Chaverri and Samuels 2013; Karlsson et al. 2015). The aggressive fungicolous taxa, such as *Gliocladium* spp. and *Trichoderma* spp., have been explored as biological fungicides (Rosenheim et al. 1995). *Ampelomyces quisqualis*, a cosmopolitan host-specific mycoparasite of Erysiphales, has been explored as a biocontrol agent to suppress powdery mildew disease (Sundheim 1982; Siozios et al. 2015). *Sphaerellopsis filum* (*Eudarluca caricis*), a host-specific mycoparasite of *Puccinia*, has been applied to suppress plant rust disease (Pei and Yuan 2005; Black 2012). The secondary metabolites from fungicolous fungi are considered as potential candidates for exploring antifungal drugs (Lorito et al. 1994; Mudur et al. 2006; Sun et al. 2016b; Junker et al. 2018). Gliotoxin and gliovirin produced by *Trichoderma virens* have received much attention for their role in biocontrol of soil-borne fungal pathogens (Mukherjee et al. 2013). More than 50 commercial biocontrol agents based on these fungicolous taxa and their secondary metabolites have been successfully developed to suppress plant fungal pathogens (Black 2012; Karlsson et al. 2015).

Previous studies have made considerable progress on the diversity, ecology, taxonomy, and application of fungicolous fungi (Barnett 1963; Barnett 1964; Curtis et al. 1978; Gupta and Mukerji 2010; Põldmaa 2011; Atanasova et al. 2013; Kosawang et al. 2014; Karlsson et al. 2015; Siozios et al. 2015; Powell et al. 2017). However, the diversity of fungi are possibly still underestimated due to inherent problems associated with culture-independent DNA sequencing methods (Hoppe et al. 2016; Carini et al. 2017; Leonardi et al. 2018), species concepts, classification, asexual- and sexual morph connections, and nomenclatural compliance to the 'one fungus one name' principle (Rossman et al. 2013; De Beer et al. 2016).

Fig. 1 Fungicolous fungi associated with host fungi. **a** *Hypomyces boletuphus* on Boletaceae sp., **b** *Asterophora agaricoides* on *Agaricus* sp., **c** *Hypomyces boletus* on *Boletus* sp., **d** *Hypomyces mycophilus* on Agaricomycetes **e** *Lecanicillium fungicola* var. *aleophilum* on *Agaricus bisporus*, **f** *Hypomyces rosellus* on *Agaricus bisporus*, **g** *Mycogone perniciosa* on *Agaricus bisporus*, **h** *Hypomyces* sp. on Polyporaceae, **i** *Fusarium solani* on *Tuber* sp., **j** *Diploospora longispora* on *Morchella sextelata*, **k** *Polycephalomyces sinensis* on *Ophiocordyceps sinensis*, **l** *Calcariporium cordycipiticola* on *Cordyceps militaris*, **m** *Clonostachys rosea* on *Alternaria* sp. **n** *Simplicillium lanosoniveum* on rust on a leaf of *Coffea arabica*, **o** *Cladosporium cladosporioides* on rust on a leaf of *Tectona grandis*, **p** *Ramularia uredinicola* on *Melampsora* sp., **q** fungus colonized on stroma of Ascomycetes, **r** fungus associated with *Asteridiella* sp., **s** *Penicillium georgiense* on *Aspergillus* sp.

Terminology related to fungicolous fungi

Fungi growing consistently with or on other fungi can have many different sorts of relationships, varying from mutualistic, commensal, parasitic, or saprotrophic, (Moore et al. 2011). A number of terms have been used to define these fungi and their relationships with their hosts. The terms mostly used in the literature are as follows: fungicolous fungi, hyperparasites, mycoparasites, mycophilic fungi, mycotrophic fungi, and sporocarp-inhabiting fungi, etc. (Barnett 1963; Boosalis 1964; Rudakov 1978; Jeffries 1995; Gams et al. 2004). However, some of these definitions are still vague (Hawksworth 1981; Jeffries 1995; Moore et al. 2011). Before we go into further details, we provide a comprehensive understanding of those terms.

Fungicolous has sometimes been referred in the literature as fungi on macromycetes (Gilman and Tiffany 1952; Tubaki 1955; Nicot 1967), but also more widely to embrace a very wide spectrum of interspecific relationships among fungi (Gilman and Tiffany 1952; Barnett 1963). It was used as a general term by Barnett (1963) and by Barnett and Binder (1973) for cases where the definite nutritional relationship has not been demonstrated. Hawksworth (1981) considered that the term fungicolous fungi should also include the associations where such relationships have been confirmed. Although this term was recommended to define the relationship in which nutrients transfer directly from live fungi to live parasite, their natural relationship is difficult to observe (Jeffries 1995). ***Fungicolous fungi***, therefore, refers to fungal species consistently associated with other fungi, which may act as symbionts, mycoparasites, saprotrophs or neutrals (Jeffries 1995). Jeffries (1995) and Gams et al. (2004) accepted fungi that consistently grow on lichens as fungicolous fungi. However, Hawksworth (1981) suggested ***lichenicolous*** as the preferable definition of the relationship among fungi occurring on lichen, which is accepted by mycologist (Lawrey and Diederich 2018). Herein, fungicolous fungi are suggested as the preferable term to define fungi that are consistently associated with other fungi but exclude the lichens.

Mycoparasites specially refers to the fungi that have the ability to parasitize their mycohosts (Barnett 1963). By analogy with plant pathogens, fungicolous fungi could be divided into 'necrotrophs' and 'biotrophs' according to the trophic mechanism (Jeffries 1995). ***Biotrophic***, where a relatively balanced relationship is established, is when the fungicolous fungus grows on the still-living mycelium or of the fungal host. Most biotrophic mycoparasites are members of the *Chytridiomycota* and other zoosporic fungi, such as the genera *Dispira*, *Dimargaris*, *Piptocephalis*, and *Tieghemomyces*. These fungi can be grown as dual cultures with their hosts, but grow poorly without the host fungus *in vitro* (Jeffries 1995). ***Necrotrophic*** refers to when destructive parasites that invade and kill their hosts, and these fungicolous fungi often grow well as saprotrophs including a large number of mitosporic genera from Ascomycota such as *Clonostachys* and *Trichoderma*. *Clonostachys rosea* and *Trichoderma viride* are the typically mycoparasitic fungi, that have a wide range of hosts including both plant pathogenic fungi and saprophytic fungi. They could kill their host by special enzymes and anti-fungal chemicals (Krauss et al. 2013; Borges et al. 2015; Karlsson et al. 2015). Despite this, a few mycologists considered that the term mycoparasite is inappropriate as it also is employed for a fungus parasitic on any organisms and not only on other fungi (Cooke 1977), mycoparasites have been extensively accepted to refer the necrotrophic group (Hawksworth 1981; Jeffries 1995). The interrelationships of these fungi and their host are so specially termed ***mycoparasitism*** (Barnett 1963).

Hyperparasite introduced by Boosalis (1964) was employed as an alternative to mycoparasite and has been adopted by several mycologists and phytopathologists (Deighton 1969; Deighton and Pirozynski 1972). However, ***Hyperparasite*** was considered referring to a parasite whose host is also a parasite. The relationship between these parasites and parasitic hosts, is defined as ***hyperparasitism*** (Cooke 1977). Therefore, ***hyperparasitic fungi*** are a group of fungi that particularly parasitized on other parasitic organisms including algae, animals, fungi, and plants (Kirk et al. 2008). *Ampelomyces quisqualis* and *Sphaerellopsis filum* are two typically hyperparasitic fungi, which infect plant powdery mildew disease-causing agents from Erysiphales and plant rust disease-causing agents from *Puccinia*, respectively (Black 2012; Siozios et al. 2015).

Mycophilic fungi introduced by Rudakov (1978) refer to fungi that colonize or parasitize another fungus (Rudakov 1978). These fungi also have been grouped into biotrophic and necrotrophic, with particular emphasis on physiological relationships (Rudakov 1978). However, the term ***mycophilic*** means fond of fungi, and is employed to describe the human, animal, or insects, which have a specific bias on fungi or mushroom (Cooke1977; Peintner et al. 2013). The term ***mycotrophism*** usually refers to a plant that gets all or part of its nutrients through a symbiotic association with fungi. Some mycologists found that mycotrophism is frequently observed among those fungi that form large fruiting bodies. These phenomena could be obvious, such as species in *Pseudoboletus parasiticus*. They also can be unnoticed ascribing to the 'victim' fungal host can be blackened and nearly unrecognizable, such as *Collybia cirrhata* colonized basidiomycete (Arnold 1935). They can even be hidden underground, such as members of *Elaphocordyceps* (*Tolypocladium*) and their host *Elaphomyces* (Sung et al. 2007; Quandt et al. 2016). These fungi, restricted to growing on the fruiting body of other fungi or slime molds were also termed ***sporocarp-inhabiting fungi*** (Gams et al. 2004).

The other two terms e.g. ***facultative*** and ***obligate*** are also applied for fungicolous fungi. ***Facultative*** fungicolous fungi are necrotrophic and normally occur fortuitously or regularly on fungi, while ***obligate fungicolous fungi*** are biotrophic (Hawksworth 1981).

The interrelationship between fungicolous fungi and their mycohosts can also be described based on their interfaces. Generally, there are six distinguished interaction interfaces: fusional, haustorial, intracellular, non-contact necrotrophic, contact necrotrophic and invasive necrotrophic (Jeffries 1995) (Fig. 2).

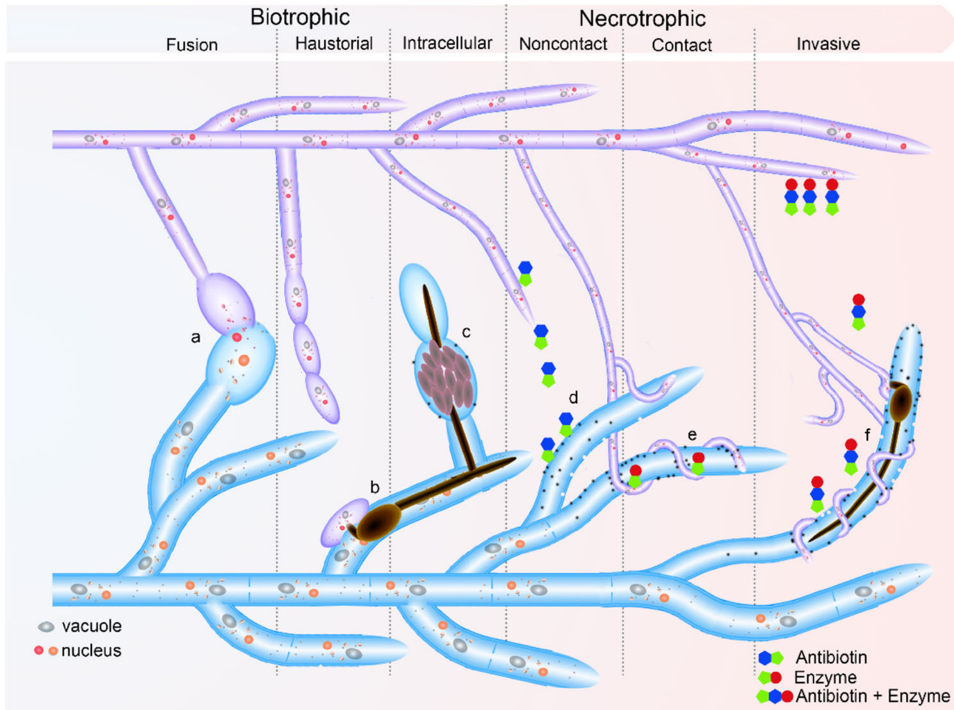

Fig. 2 Interaction interface model among fungicolous fungi and host fungi. **a** Fusional, **b**. Haustorial, **c** Intracellular, **d** Non-contact necrotrophic, **e** Contact necrotrophic; **f** Invasive necrotrophic

Fusional. Fusional is an unusual type of interface between fungicolous fungi and their hosts (Fig. 2a). Micropores develop in the walls of hyphae of the host, and allow cytoplasm contact and nutrition and genetic information transfer (Jeffries 1995; James et al. 2013; Powell et al. 2017). Typically, the biotrophic fungicolous taxa could form special structure during the fusion with their hosts (Jeffries 1995; Powell et al. 2017). The '***three-membrane layers***' structure, which was interpreted as the parasite's plasma membrane (inner one layer) and a host cisterna (outer two layers), usually occurred on the interface between fungicolous fungi and their host, especially in early diverging fungi include Chytridiomycota, Rozellomycota, and other zoosporic fungi, (Letcher et al. 2017; Powell et al. 2017). The special haustoria including colacosme, and cystobasidial and tremelloid ones usually occurred on the interface between basidiomycetous fungicolous taxon and their hosts. ***Colacosome*** is exclusively known from species of Pucciniomycotina, which has a central core surrounded by a membrane that finally fuses with its host plasmalemma (Bauer and Oberwinkler 1991).

Haustorial. The parasites form a short or long haustorial branch from their hypha which penetrates the hypha of the hosts, while the host cytoplasm remains healthy (Fig. 2) (Jeffries 1995). ***Cystobasidial*** and ***tremelloid haustoria*** are structurally similar, which are characterized by short hyphal branches subtended by a clamp, basally swollen and apically tapering into a narrow filament. These haustoria could capture the mycelia of host fungi, and interact with the host cytoplasm through nanometer-pores (Oberwinkler 2017). Generally, cystobasidial haustoria occur in Pucciniomycotina, especially in Cryptomycocalomycetes (Kirschner et al. 2001), whereas tremelloid haustoria particularly occur in fungicolous species from Tremellomycetes (Oberwinkler 2012).

Intracellular. The mycoparasite completely enters the hypha of the host, the cytoplasm of the host keeps healthy over time, and sometimes the host will die (Fig. 2) (Jeffries 1995; Pintye et al. 2015). *Ampelomyces quisqualis* is a common biotrophically fungicolous fungus of Erysiphales, which produces pycnidia inside the hyphae, conidiophores and immature ascomata of its mycohost and can kill the host over time (Kiss et al. 2010; Siozios et al. 2015).

Non-contact necrotrophic. The hyphae of parasites are not in contact with host hyphae or form haustoria during the interaction with the hosts, but, subsequently they produce anti-fungal chemicals to necrotize the host cell cytoplasm (Fig. 2) (Rudakov 1978; Jeffries 1995; Karlsson et al. 2015). *Clonostachys rosea* is a typical non-contact necrotrophic fungus which can kill the host through secondary metabolites (Karlsson et al. 2015).

Contact necrotrophic. The hyphae of the parasite coil around hyphae of the host but do not penetrate the host mycelium or form haustoria during interactions with the host (Fig. 2e). A strong cell wall proliferation occurs at the site of coiling and the cytoplasm of these cells subsequently disintegrates (Jeffries 1995). A good example is *Arthrobotrys oligospora*, which parasitizes *Rhizoctonia solani* by coiling around the host hyphae and killing the cells under the coils (Olsson and Persson 1994; Singh et al. 2012).

Invasive necrotrophic. The hyphae of the parasite penetrate into the host cell and grow within the host hyphae, the host cytoplasm rapidly degenerates, often followed by hyphal lysis (Fig. 2f) (Jeffries 1995).

Isolation methods for fungicolous fungi

According to the hosts and their ecological niches, fungicolous fungi have been divided into four major ecological subgroups: the mushroom associated group (Fig. 1a–l); the folicolous fungi associated group (Fig. 1n–m); the soil-borne and airborne fungi associated group (Fig. 1s); and the aquatic fungi associated group (Gams et al. 2004; Powell et al. 2017). Methods for studying the fungicolous fungi are similar to that of their hosts. It is generally impossible to directly observe the relationship between fungicolous fungi and their hosts (Jeffries 1995), unless the mycoparasites form some special structures, such as deformation of the hosts and haustoria (Hunter and Butler 1975; Jeffries 1995). However, the more erratic occurrence of fungicolous fungi than their hosts normally resulted in additional difficulty in survey and sampling (Arnolds 1992). Therefore, methods to study fungicolous fungi depend on the niches and hosts.

Macro-fruiting formation fungi are those with relatively large fruiting bodies including most Basidiomycota and some Ascomycota (Mueller et al. 2007; Zhao et al. 2017). It is easy to observe fungicolous fungi on the mushroom surfaces, as visible deformations and color changes (Rogerson and Samuels 1989, 1994) (Fig. 1a–l). Mushrooms are, however, seasonal and short-lived, and their presence may be shortened by infection of the fungicolous fungi in the field. Collection of fungicolous fungi, therefore, relies on fresh host collection in a similar way to that used to collect mushrooms (Miles and Chang 1997). The saprobic fungi or the asexual morph of hosts mostly appear on the decayed fruiting body. Therefore, fresh samples need be isolated by single spore or tissue isolation, and rapid preparation of herbarium material, otherwise the fungicolous taxa will disappear (Miles and Chang 1997).

Epiphytic fungi, to a broad extent, include the biotrophic and necrotrophic plant pathogens. The biotrophic plant pathogens including the powdery mildew, rusts, and smuts are frequently infected by fungicolous fungi (Ranković 1997) (Fig. 1m–p). The powdery mildews, rusts, smuts, and sooty molds can be randomly collected by looking for tissues of infected plants (Ranković 1997; Chomnunti et al. 2014). However, with exceptions (e.g. *Ampelomyces quisqualis* which causes large patches of powdery mildew to disintegrate), fungicolous associations with foliicolous fungi are often inconspicuous (Ranković 1997). When the samples are returned to the laboratory, they are usually incubated in a moist chamber until screening (Byler et al. 1972).

Fungi associated with soil fungi and aquatic fungi. Soil and aquatic environments are complex and accommodate divergent fungal taxonomic groups. The fungicolous fungi are always found living inside of the hyphae, sporangia or zygospores of Glomeromycota and Zygomycota (Castrillo and Hajek 2015), or zoosporangia of Chytridiomycota (Krings et al. 2009), as well as sclerotia of Ascomycota and Basidiomycota (Inglis and Kawchuk 2002; Amasya et al. 2015) in the relatively moist soil environment. A baiting technique is often used for the collection of fungicolous fungi associated with sclerotia (Hadar and Papadopoulou 2012). Fungal sclerotia for the bait can be easily collected, either by sifting field soil or by a trapping device whereby the bait is sealed in a membrane filter or nylon gauze bag and buried in the soil (Ayers and Adams 1981). This method is also used in studying the fungicolous fungi associated the large spores of Glomeromycota and Zygomycota (Hajek et al. 2013; Castrillo and Hajek 2015) or sporangia of Chytridiomycota (Krings et al. 2009).

The isolation of fungicolous fungi is similar to the method used to study other ecological groups of fungi. Single spore isolation and tissue isolation are usually used for isolation of fungicolous fungi from foliicolous fungi (Yurkov et al. 2012; Kouser and Shah 2013; Chomnunti et al. 2014). Dilution plating methods are used for fungicolous fungi associated with soil fungi (Gams et al. 2004). However, it is difficult to extrapolate *in vitro* results to real scenarios in soil. Soil particles or root material are washed, or even unwashed soil or fragments of root material are plated without destroying the fungicolous relationship (Parkinson and Williams 1960).

Research progress

Species diversity

How many fungicolous fungi has so far been proposed? Rudakov (1978) proposed 1700 fungicolous species excluding lichenicolous fungi. Hawksworth (1981) reported 1100 fungicolous species including the fungi on lichens. However, Gams et al. (2004) suspected the number of fungicolous fungi around 920 species. In this study, based on the literature investigation, the number of fungicolous species is about 1550 (Table 1, checklist). The checklist of fungicolous fungi followed the current classification scheme including the databases of Index Fungorum (http://www.indexfungorum.org), MycoBank (http://www.

Table 1 Approximate numbers of fungicolous fungi from families of each fungal lineage

Taxonomical groups				Fungicolous type			
Phylum	Class	Order	Family	Colonized	Parasitized	Obligate parasitized	Ambiguous
Ascomycota	Dothideomycetes	Asterinales	Asterinaceae	2			
		Botryosphaeriales	Phyllostictaceae		2		1
			Planistromellaceae		1		
		Capnodiales	Cladosporiaceae	9	5		1
			Dissoconiaceae		2		
			Euantennariaceae		1		
			Mycosphaerellaceae	2	12		3
			Neodevriesiaceae	1			
			Teratosphaeriaceae	1	2		
		Dothideales	Saccotheciaceae	1			
		Microthyriales	Microthyriaceae	9			
		Mytilinidiales	Mytilinidiaceae	1			
		Patellariales	Patellariaceae	1			
		Pleosporales	Amniculicolaceae	1			
			Coniothyriaceae	2	1		
			Dictyosporiaceae		1		
			Didymellaceae	4	1		
			Didymosphaeriaceae	4	4		
			Leptosphaeriaceae	3			
			Lophiostomataceae	1			
			Massarinaceae	5			
			Microsphaeropsidaceae	2			
			Montagnulaceae	1			
			Periconiaceae			1	
			Phaeosphaeriaceae	6	12		
			Pleosporaceae	3			
			Roussoellaceae	1			
			Lentitheciaceae	1			
			Sporormiaceae				2
			Sporidesmiaceae	1	4		
			Torulaceae		1		
			incertae sedis	3			
		Tubeufiales	Tubeufiaceae	4	1		
		Venturiales	Venturiaceae	2	2		
		Incertae sedis	Dimeriaceae	2			5

Table 1 (continued)

Taxonomical groups				Fungicolous type			
Phylum	Class	Order	Family	Colonized	Parasitized	Obligate parasitized	Ambiguous
			Meliolinaceae				3
			Nematotheciaceae			6	
			Paranectriellaceae	2	6	7	
			Parmulariaceae				1
			Parodiopsidaceae		8		
			Perisporiopsidaceae				4
			Trichopeltinaceae	2			
		Incertae sedis	Incertae sedis	24	5	21	24
	Eurotiomycetes	Chaetothyriales	Herpotrichiellaceae	15			1
		Coryneliales	Coryneliaceae	2			
		Eurotiales	Aspergillaceae	6	8		1
			Incertae sedis		1		
		Mycocaliciales	Mycocaliciaceae	2			
		Onygenales	Gymnoascaceae		1		
			Onygenaceae		1		
	Laboulbeniomycetes	Pyxidiophorales	Pyxidiophoraceae		4	1	
	Leotiomycetes	Erysiphales	Erysiphaceae				2
		Helotiales	Cordieritidaceae	4			7
			Helicogoniaceae	1	19		
			Helotiaceae	4	2		
			Hyaloscyphaceae	5			1
			Loramycetaceae	1			
			Mollisiaceae	2			
			Sclerotiniaceae				1
			Incertae sedis	5	1		
		Phacidiales	Helicogoniaceae	4	4		
		Incertae sedis	Myxotrichaceae	3			
			Incertae sedis	3	1		2
			Pyronemataceae	1	1		
	Sordariomycetes	Amphisphaeriales	Sporocadaceae		1		
		Boliniales	Boliniaceae	1			
		Chaetosphaeriales	Chaetosphaeriaceae	3	1		
		Calosphaeriales	Calosphaeriaceae	2			
		Coronophorales	Ceratostomataceae	2	3		1

Table 1 (continued)

Taxonomical groups				Fungicolous type			
Phylum	Class	Order	Family	Colonized	Parasitized	Obligate parasitized	Ambiguous
			Chaetosphaerellaceae		1		
			Nitschkiaceae	3			
			Incertae sedis	1	4		
		Diaporthales	Melanconiellaceae		2		
		Glomerellales	Glomerellaceae	1			
			Plectosphaerellaceae		7	1	
			Reticulascaceae	1			
			Incertae sedis	2			
		Hypocreales	Bionectriaceae	29	22		1
			Calcarisporiaceae		3	1	
			Clavicipitaceae	2	10	2	1
			Cordycipitaceae		14		
			Hypocreaceae		328	7	
			Nectriaceae	13	18		5
			Niessliaceae	1	1		1
			Tilachlidiaceae		1		
			Incertae sedis	5	8		1
		Lulworthiales	Lulworthiaceae	1			
		Magnaporthales	Magnaporthaceae	1			
			Pyriculariaceae	1			
		Microascales	Ceratocystidaceae	1			
			Graphium		2		
			Microascaceae	2	2		
			Incertae sedis			2	
		Ophiostomatales	Ophiostomataceae	1	7		
		Sordariales	Chaetomiaceae		4		
			Helminthosphaeriaceae	9	5		
		Togniniales	Togniniaceae	1			
		Xylariales	Hypoxylaceae	2			
			Microdochiaceae	1	1		
			Xylariaceae	3	2		
		Incertae sedis	Apiosporaceae	2			
			Cephalothecaceae		2		
			Sporidesmiaceae			5	

Table 1 (continued)

Taxonomical groups				Fungicolous type			
Phylum	Class	Order	Family	Colonized	Parasitized	Obligate parasitized	Ambiguous
			Trichosphaeriaceae	2	1		
			Woswasiaceae	1			
	Incertae sedis	Incertae sedis	Incertae sedis		2		
	Saccharomycetes	Saccharomycetales	Dipodascaceae	1	6		
			Debaryomycetaceae			1	
			Endomycetaceae	1	9		
			Pichiaceae	1			
			Saccharomycodaceae	2	21		
			Trichomonascaceae	2			1
			Incertae sedis	11	3		
	Schizosaccharomycetes	Schizosaccharomycetales	Schizosaccharomyces	1			
	Taphrinomycetes	Taphrinales	Eoterfeziaceae		2		
	Incertae sedis	Incertae sedis	Incertae sedis	64	37	2	9
Basidiomycota	Agaricomycetes	Agaricales	Agaricaceae		1		
			Entolomataceae		7		
			Lyophyllaceae		2	8	
			Niaceae		1		
			Pluteaceae		1		
			Physalacriaceae		4		
			Tricholomataceae	3	1	2	
			Typhulaceae		1		
		Auriculariales	Auriculariaceae		3		
		Boletales	Boletaceae		2	4	
		Cantharellales	Botryobasidiaceae		2		
			Tulasnellaceae	1	1		
		Polyporales	Fomitopsidaceae		2		
			Meruliaceae		2		
			Phanerochaetaceae	4	2		
			Polyporaceae	3			
			Xenasmataceae	1			
		Russulales	Lachnocladiaceae	1			
		Sebacinales	Sebacinaceae	1	4		
		Thelephorales	Thelephoraceae		2		
		Incertae sedis	Incertae sedis		5		

Table 1 (continued)

Taxonomical groups				Fungicolous type			
Phylum	Class	Order	Family	Colonized	Parasitized	Obligate parasitized	Ambiguous
	Tremellomycetes	Cystofilobasidiales	Cystofilobasidiaceae		1		
		Tremellales	Asterotremellaceae		1		
			Bulleribasidiaceae		1		
			Carcinomycetaceae		1		
			Cuniculitremaceae		8		
			Hyaloriaceae		2		
			Sirobasidiaceae		1		
			Tremellaceae		38		
			Trichosphaeriaceae		1		
			Incertae sedis		3		
	Agaricostilbomycetes	Agaricostilbales	Agaricostilbaceae		5		
			Chionosphaeraceae		4		
			Incertae sedis		1		
	Atractiellomycetes	Atractiellales	Atractogloeaceae		1		
			Phleogenaceae		2		
	Classiculomycetes	Classiculales	Classiculaceae		2		
	Cryptomycocolacomycetes	Cryptomycocolacales	Cryptomycocolacaceae		2		
	Cystobasidiomycetes	Cystobasidiales	Cystobasidiaceae		8		
		Naohideales	Naohideaceae		1		
	Exobasidiomycetes	Georgefischeriales	Gjaerumiaceae		1		
		Robbauerales	Robbaueraceae		1		
			Tilletiariaceae		2		
	Microbotryomycetes	Heterogastridiales	Heterogastridiaceae		5		
		Leucosporidiales	Leucosporidiaceae		1		
		Sporidiobolales	Sporobolomycetaceae		3		
			Incertae sedis		1		
	Pucciniomycetes	Helicobasidiales	Helicobasidiaceae		1		
		Platygloeales	Platygloeaceae		19		
		Incertae sedis	Incertae sedis		2		
	Spiculogloeomycetes	Spiculogloeales	Spiculogloeaceae		4		
	Tritirachiomycetes	Tritirachiales	Tritirachiaceae		3		
	Incertae sedis	Incertae sedis	Incertae sedis		2		
Blastocladiomycota	Blastocladiomycetes	Blastocladiales	Catenariaceae		1	1	
Chytridiomycota	Chytridiomycetes	Chytridiales	Chytridiaceae			3	

Table 1 (continued)

Taxonomical groups				Fungicolous type			
Phylum	Class	Order	Family	Colonized	Parasitized	Obligate parasitized	Ambiguous
			Chytriomycetaceae			7	
			Phlyctochytriaceae			3	
		Incertae sedis	Sparrowiaceae			7	
	Rhizophydiomycetes	Rhizophlyctidales	Rhizophlyctidaceae		1	1	
		Rhizophydiales	Rhizophydiaceae			1	17
		Spizellomycetales	Caulochytriaceae		4		
Entomophthoromycota	Entomophthoromycetes	Entomophthorales	Ancylistaceae		2		
Glomeromycota	Incertae sedis	Incertae sedis	Incertae sedis		1		
Kickxellomycota	Dimargaritomycetes	Dimargaritales	Dimargaritaceae			12	
			Incertae sedis			1	
Mortierellomycota	Mortierellomycetes	Mortierellales	Mortierellaceae			9	
Mucoromycota	Mucoromycetes	Mucorales	Backusellaceae		2		
			Cunninghamellaceae		2		
			Lentamycetaceae		2		
			Mucoraceae		9	2	
			Rhizopodaceae			2	1
			Phycomycetaceae		5		
	Incertae sedis	Incertae sedis	Incertae sedis		1		
Zoopagomycota	Zoopagomycetes	Zoopagales	Piptocephalidaceae		25	20	
			Sigmoideomycetaceae		5		

mycobank.org), and recent publications (Zhao et al. 2017; Spatafora et al. 2017; Tedersoo et al. 2018; Wijayawardene et al. 2018a, b). Taxonomic diversity of fungicolous fungi is high and they are distributed among 499 genera, 177 families, 66 orders, 35 classes and twelve phyla (Table 1). In addition, this checklist provides detailed information for each fungicolous fungus including nomenclature, taxonomy, classification rank, distribution, fungicolous criteria, and host range. The references are omitted when the fungi were originally described as fungicolous species. The fungicolous criteria are described as colonized, parasitized, and obligate parasitized or ambiguous based on the original publications. Ambiguous is used for the description that the fungicolous relationship is obscure (please see detail in the species checklist part).

Ascomycota

More than 60% of cultivable fungi belong to Ascomycota (Hawksworth and Luecking 2017; Wijayawardene et al. 2018a). The majority of fungicolous fungi are also in Ascomycota and mainly in the Dothideomycetes, Eurotiomycetes, Laboulbeniomycetes, Leotiomycetes, Orbiliomycetes, Pezizomycetes, Saccharomycetes, Sordariomycetes, Taphrinomycetes, and some Ascomycota genera incertae sedis. Generally, fungicolous Ascomycota are richn in Dothideomycetes and Sordariomycetes and there are 265 and 615 fungicolous species in those two classes, respectively.

The fungicolous Dothideomycetes belong to the Asterinales, Botryosphaeriales, Capnodiales, Microthyriales, Patellariales, Pleosporales, Tubeufiales, Venturiales, and some uncertain orders and families. However, fungicolous species in Capnodiales and Pleosporales are dominant and somewhat less species belong to the other orders (Table 1, checklist). These fungicolous species are usually associated with epiphytic fungi, such as powdery mildews (Erysiphales), sooty moulds, and rust fungi. According to the fungicolous criteria, fungicolous Dothideomycetes comprise 100 colonizers, 67 parasites, 44 obligate parasites, and 44 ambiguous associations (Table 1). The fungicolous fungi in the orders of Sordariomycetes include Amphisphaeriales, Boliniales Chaetosphaeriales, Coronophorales, Diaporthales, Glomerellales, Hypocreales, Melanosporales, Microascales, Ophiostomatales, Sordariales, Togniniales, Trichosphaeriales and Xylariales, and some phylogenic uncertain orders. However, fungicolous fungi are especially diverse in Hypocreales.

There are 97 colonizers, 461 parasites, 46 obligate parasites, and 11 ambiguous associations are recorded so far as fungicolous fungi from Sordariomycetes (Table 1). Within Hypocreales, most species form Calcarisporiaceae and Hypocreaceae and some species from Nectriaceae and from Bionectriaceae are fungicolous. There is strong evidence that host adaptation occurs between these fungicolous Hypocreales and their hosts. *Hypomyces* (Hypocreaceae) and its allied asexual genera *Cladobotryum*, *Mycogone*, and *Sepedonium* are all fungicolous, and parasitize fruiting bodies of mushrooms, especially on Agaricomycetes (Tamm and Põldmaa 2013). *Hypomyces* species that parasitize boletes or agarics present host-specificity in genus or family level (Rogerson and Samuels 1989; Tamm and Põldmaa 2013). *Calcarisporium* (Calcarisporiaceae) species are almost fungicolous fungi (Sun et al. 2017). All species of *Elaphocordyceps* (Ophiocordycipitaceae) are parasites of *Elaphomyces* (Elaphomycetaceae, Eurotiales) and their relatives (Sung et al. 2007; Quandt et al. 2014). The most fungiclous *Cosmospora* (Nectriaceae) species occur on carbonized perithecia of Ascomycota, most notably members of the Xylariales (Herrera et al. 2016). There are also some fungicolous sordariomycetes that exhibit broad-spectrum host range across the fungal kingdom, including the destructively mycoparasites of *Trichoderma* spp. and *Clonostachys rosea.*

Fungicolous fungi are relatively uncommon in Eurotiomycetes, Leotiomycetes, and Saccharomycetes and only 38, 72 and 56 fungicolous species are recorded so far, respectively In Eurotiomycetes, Aspergillaceae (Eurotiales) and Herpotrichiellaceae (Chaetothyriales) have fourteen and fifteen fungicolous species, respectively. The fungicolous fungi in Leotiomycetes are mainly from Helotiales and Phacidiales, the fungicolous fungi in Dipodascaceae, Endomycetaceae, and Saccharomycodaceae count 67% of fungicolous Saccharomycetes. Furthermore, Laboulbeniomycetes comprises five fungicolous species including four parasites and one obligate parasite, which are mainly associated with the Pyxidiophoraceae (Table 1, checklist). Orbiliomycetes reported only twelve fungicolous species including three *Arthrobotrys* species. These *Arthrobotrys* species are contact mycoparasites, which are also well-known as nematode-trapping fungi (Olsson and Persson 1994; Singh et al. 2012). In addition, high ranks of 112 species in 66 genera of fungicolous fungi in Ascomycota are remain undefined.

Basidiomycota

Basidiomycota is the second largest fungal phylum of fungi (Zhao et al. 2017), which comprises a large number of fungicolous species. Based on the literature survey, 208 species from 110 genera of Basidiomycota can parasitize or colonize on other fungi. These taxa are mainly in Agaricomycetes, Agaricostilbomycetes, Atractiellomycetes, Classiculomycetes, Cryptomycocolacomycetes, Cystobasidiomycetes, Exobasidiomycetes, Microbotryomycetes, Pucciniomycetes, Tremellomycetes, Tritirachiomycetes, and Ustilaginomycetes (Table 1). The most common fungicolous fungi in Basidiomycota are in Agaricomycetes and Tremellomycetes and count 73 and 62 fungicolous species, respectively. Fungicolous species from Agaricales, Boletales and Polyporales represent the majority of fungicolous fungi in Agaricomycetes. Most fungicolous Agaricales occur on species of Agaricomycetes except *Entoloma byssisedum* which colonized truffles (Ascomycota) reported in Switzerland (Danell 1999). All species of *Asterophora* (Lyophyllaceae, Agaricales) are host-specific to infect Agaricaceae and Russulaceae, and rarely *Gymnopus* sp., producing plentiful chlamydospores in host fruiting bodies (Redhead and Seifert 2001). Several species of *Pseudoboletus* and *Xerocomus* (Boletales) are obligate parasites of the allied taxa in Boletales, such as *Astraeus* and *Boletus* (Redhead et al. 1994).

The fungicolous Tremellomycetes are mainly in Asterotremellaceae, Bulleribasidiaceae, Carcinomycetaceae, Cuniculitremaceae, Cystofilobasidiaceae, Hyaloriaceae, Sirobasidiaceae, Tremellaceae, and Trichosphaeriaceae (Table 1). Generally, all sexual species in Tremellomycetes are mycoparasites, though the yeast states are widespread and not restricted to fungal hosts (Bandoni 1987; Millanes et al. 2014). For example, the genus *Syzygospora* (Carcinomycetaceae) can be found on many fungal hosts, especially on the fruiting body of Polyporaceae (Ginns 1986). *Asterotremella* (Asterotremellaceae) include fungicolous basidiomycetous yeasts isolated from *Asterophora* spp. (Prillinger et al. 2007). Some *Itersonilia* species are mycoparasites of powdery mildews (Gams et al. 2004) and have potential biocontrol ability. The interaction between fungicolous Tremellomycetes and their hosts hyphae usually involve specialized structures, such as tremelloid haustoria or haustorial branches (Oberwinkler 2012), and occasionally through anti-biotins (Liu et al. 2015).

Tremelloid haustoria and colacosomes and hyphae clamps were considered as the typical structures of fungicolous dimorphic Basidiomycota (Oberwinkler 2012). There is evidence that many species in the Agaricostilbomycetes, Classiculomycetes and Spiculogloeomycetes may be fungicolous rather than saprobic, resulted from the production of tremelloid haustorial cells that are commonly found in other known mycoparasitic fungi, especially those in Tremellales (Agaricomycotina) (Bauer et al. 2006; Oberwinkler 2017). In addition, the colacosomes and hyphae clamps forming fungi, such as species in Cryptomycocolacomycetes, Cystobasidiomycetes, Microbotryomycetes, and Pucciniomycetes were also considered to be fungicolous (Table 1). Fungicolous fungi occasionally occur in Exobasidiomycetes and Ustilaginomycetes and their yeast stage parasitizes on powdery mildew (Klecan et al. 1990; Gafni et al. 2015).

Blastocladiomycota

Blastocladiomycota is an early-diverging clade on the tree of true fungi producing zoospores, which established from Blastocladiales, an order in Chytridiomycota previously (Spatafora et al. 2017; Wijayawardene et al. 2018b). There are only two fungicolous (biotrophic) chytrides, e.g. *Catenaria allomyci* and *Catenaria anguillulae* in Catenariaceae. They are endobiotic parasites of *Allomyces* or *Blastocladiella* species in the nature (Couch 1945) while can infect any saprolegnialean hosts under laboratory conditions (Whipps 1997).

Chytridiomycota

Although primarily aquatic, Chytridiomycota includes fungi (chytrids) in diverse habitats from the Arctic to the tropics and from aquatic to terrestrial ecosystems, including alpine soils (Perrott 1960; Freeman et al. 2009). So far, 44 species from thirteen genera in Chytridiomycota are recorded to be fungicolous. These taxa are obligate parasites (Table 1) of fungal hosts and mainly in Chytridiomycetes and Rhizophydiomycetes. These fungi parasitize their hosts in the same ecosystems and are usually treated as ‘trophic species’ in consideration of ecologically similar functions and food web chain (Powell 1993; Marano et al. 2011).

Entomophthoromycota

Species of Entomophthoromycota are usually parasites of animals (Tedersoo et al. 2018; Wijayawardene et al. 2018b). However, two species of *Conidiobolus* were reported as mycoparasites of Agaricales in India (Srinivasan and Thirumalachar 1965).

Glomeromycota

Species of Glomeromycota are all arbuscular mycorrhizal fungi and act as symbionts of plant (Hoffmann et al. 2011). However, a fossil record presented that *Kryphiomyces catenulatus* as an endobiotic mycelial thallus in a large spore of a glomeromycotan fungus from the Lower Devonian Rhynie chert (Krings et al. 2010).

Kickxellomycota

Species of Kickxellomycota are usually parasites or saprobes, or symbionts that associated with animals, insects, plants, and even fungi (Tedersoo et al. 2018;

Wijayawardene et al. 2018b). Fourteen fungicolous Kickxellomycotan species are recorded. All of these fungi are accommodated in Dimargaritales (Tanabe et al. 2000; Wijayawardene et al. 2018b). Generally, those fungicolous fungi are obligate parasitizes on Mortierellomycotina and Mucoromycotina. All species of *Dimargaris* parasitize both Mortierellomycotina and Mucoromycotina. All members of *Dispira* mainly parasitize Mucoromycotina. However, *Dispira implicata* and *D. simplex* could parasitize *Chaetomium* (Ascomycoata) (Benjamin 1979). All species of *Tieghemiomyces* and *Spinalia* particularly parasitize *Cokeromyces* (Mucoromycotina). Glycerol and glycerol related amino acid may be the key nutrients that *Tieghemiomyces* acquired from host fungi (Binder and Barnett 1973).

Mortierellomycota

Members of Mortierellomycota are usually saprobes living in soil and dung, some species are also reported as nematophagous (Jiang et al. 2011) or human pathogens (Tedersoo et al. 2018; Wijayawardene et al. 2018b). However, the type species of Mortierellomycota, *Mortierella polycephala*, was originally isolated from a mushroom. Subsequently, another six species of *Mortierella* were found to be fungicolous on Basidiomycota (checklist), while *Mortierella diffluens* and *M. amoeboidea* are fungicolous fungi on *Mucor* and *Chromelosporium*, respectively (Gams 1977).

Mucoromycota

Mucoralean fungi are mainly saprobes, plant pathogens, and mycoparasites (Hoffmann et al. 2011, 2013). The fungicolous fungi in this group have been found in Mucoromycetes including 25 species that are associated with Ascomycota and Basidiomycota, and also Mucoromycotes (Fig. 4). In general, fungicolous species from Phycomycetaceae and Rhizopodaceae colonize the fruiting body of Agaricomycotina, and the species from Lentamycetaceae and Mucoraceae are associated with fungi within Mucoromycotina. However, *Absidia cylindrospora* was detected inside tubers of *Tuber excavatum* in Italy (Pacioni et al. 2007). The fungicolous relationship within Mucoromycotina is recognized as biotrophic, which involves the fusion between fungicolous fungi and their hosts (Hoffmann and Voigt 2009).

Rozellomycota

As recently established and early divergent phylum, most members of Rozellomycota are parasites of Oomycota, phytoplankton, zooplankton, and tiny invertebrates (Tedersoo et al. 2018; Wijayawardene et al. 2018b). *Rozella* is the sole endoparasitic genus on other fungi in Rozellomycota (Table 1). *Rozella allomycis* is an obligate biotrophic parasitic fungus of *Allomyces* species (Blastocladiomycota) (Held 1981; Gleason et al. 2017), whereas six other *Rozella* are obligate biotrophic fungicolous fungi associated with members of Chytridiomycota (Held 1981; Gleason et al. 2017; Checklist).

Zoopagomycota

Zoopagomycota are terrestrial fungi mainly associated with animals (Spatafora et al. 2016). However, numerous fungicolous fungi are also included in this phylum (Spatafora et al. 2016), especially in Piptocephalidaceae and Sigmoideomycetaceae in Zoopagales (Table 1). Some of them are obligate parasites of other zoosporic fungi, for example, species of *Piptocephalis* and *Syncephalis* are usually parasites of Mortierellomycotina and Mucoromycotina, whereas species of *Reticulocephalis* and *Thamnocephalis* are parasites of some species in Zoopagomycotina (checklist). As obligate parasites, these fungi form small haustoria in the host cell (Gams et al. 2004; Hoffmann and Voigt 2009).

Physiological diversity

The interactions between fungicolous fungi and their mycohosts mainly respond to their physiological relationships. Biotrophic fungiclous fungi are obligate, which are able to obtain nutrients from living host cells, even exchange the nutrition and genetic information with their hosts, and cause little or no apparent harm to the hosts (Jeffries 1995; James et al. 2013; Powell et al. 2017). Therefore, these taxa are usually recognized as symbionts and can benefit both fungicolous fungi and hosts (mutualism) (Burmester et al. 2013; Ellenberger et al. 2016, 2018), or benefit the fungicolous fungi (commensalism) (Wöstemeyer et al. 2016). This mutualistic relationship mostly occurs among the early divergent fungal groups in aquatic and soil environments, such as *Rozella* (Rozellomycota) and their host (Gleason et al. 2012; Powell et al. 2017). This commensalism relationship usually exists among members of Zygomycota in aquatic and soil environments (Wöstemeyer et al. 2016). For example, *Parasitella parasitica* is traditionally recognized as a biotrophic fungicolous fungus of many, but not all, mucoralean fungi (Kellner et al. 1993). However, *P. parasitica* can grow on artificial media, representing facultative biotrophic (Kellner et al. 1993).

Most known fungicolous fungi are necrotrophic, and they first kill host cells and then utilize them as a food source (Schmoll et al. 2016; Karlsson et al. 2017) (Fig. 2).

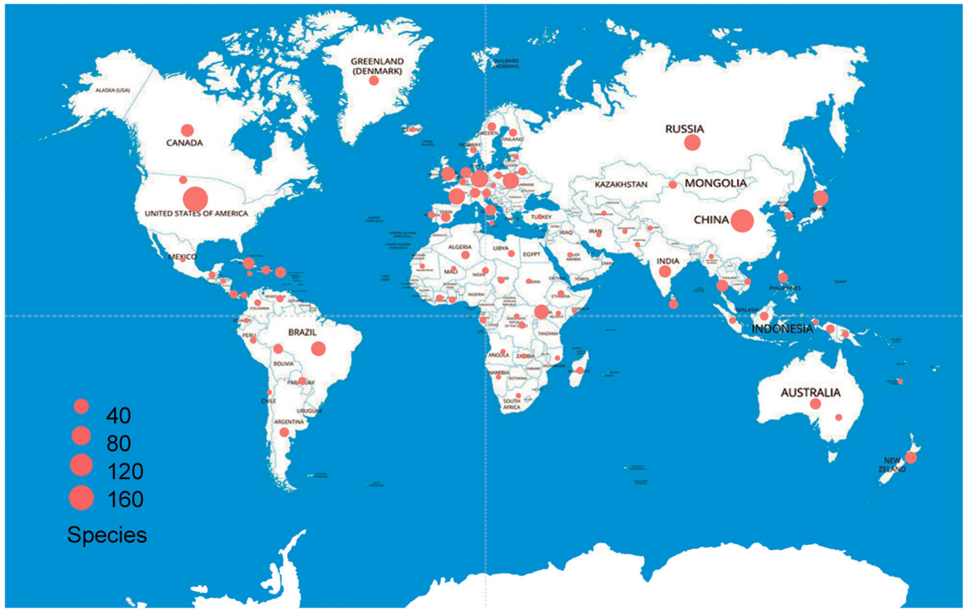

Fig. 3 Distribution of fungicolous fungi (based on the checklist, table 1). Size of the red circle represents the number of fungicolous fungi

These necrotrophic fungicolous fungi are usually reported as parasites of mushrooms and plant fungal pathogens (Põldmaa 2011; Tamm and Põldmaa 2013; Siozios et al. 2015; Sun et al. 2016a; Karlsson et al. 2017). These fungi are relatively unspecialized in their host range than biotrophically fungicolous fungi (Karlsson et al. 2017). The necrotrophic fungicolous taxa, mainly in Ascomycota (Gams et al. 2004; Karlsson et al. 2017), grow well on artificial media and are broadly recognized as facultative ones (Rudakov 1978). *Arthrobotrys oligospora*, *Clonostachys rosea*, and *Trichoderma viride* are the typically necrotrophic fungicolous taxa and can inhibit almost all filamentous fungi by secreting special enzymes and antifungal chemicals, and competition for nutrition and niche (Krauss et al. 2013; Mukherjee et al. 2013; Borges et al. 2015; Karlsson et al. 2015).

However, many taxa are able to change their physiology, responding to the health of the hosts and the state of balance of both the abiotic and biotic conditions of the environment (Rudakov 1978; Siozios et al. 2015; Pacioni and Leonardi 2016). Although *Ampelomyces quisqualis* is culturable on artificial media, it usually recognized as a universal biotrophic mycoparasite of Erysiphales to produce pycnidia inside the hyphae, conidiophores and immature ascomata of its mycohosts and can kill the host over time (Kiss et al. 2010; Siozios et al. 2015). *Hypomyces* and its allied asexual genera *Cladobotryum*, *Mycogone*, and *Sepedonium* parasitize fruiting bodies of mushrooms, especially on Agaricomycetes (Põldmaa 2011; Tamm and Põldmaa 2013). These fungi always cause necrosis of their host's cell. However, Rudakov (1981) found *Sepedonium chrysospermum* could grow biotrophically inside the mycelia of *Botrytis cinerea* and *Trichothecium roseum* when they co-colonized on a boletoid host, or when it was co-cultivated with one of the later fungi *in vitro*.

Geographic distribution

The fungicolous fungi survive alongside their hosts, which co-occur in aquatic or terrestrial ecosystems from temperate, tropical, or arctic regions (Deighton 1969; Johnston 1999; Freeman et al. 2009; Gea et al. 2010; Opik et al. 2010; Põldmaa 2011; Sun et al. 2016a, b, 2017) (Fig. 3). Most fungicolous fungi, especially the taxa associated with mushrooms and plant soil-borne pathogens, are distributed throughout temperate to sub-tropical regions (Fig. 3), whereas, the taxa growing on sooty molds are frequently isolated from sub-tropical to tropical areas, resulting from sooty molds being most common in sub-tropical and tropical regions (Johnston 1999; Chomnunti et al. 2014) (Fig. 3). In addition, more fungicolous taxa have been reported in Europe than from other regions (Fig. 3). This indicates that species richness in Europe is high, and therefore a high species diversity of fungicolous fungi can be expected in other, so far, poorly studied regions.

Like other fungal parasites of plants and animals, the distribution of these fungicolous fungi is restricted to their hosts and geography (Põldmaa 2011; Tamm and Põldmaa 2013; Siozios et al. 2015; Sun et al. 2016a, b, 2017). Geographic analysis and host observation show that the species diversity of *Hypomyces* is determined by both geography and hosts (Põldmaa 2011; Tamm and Põldmaa 2013). Compared with tropics, *Hypomyces* presents a higher diversity in temperate regions (Põldmaa 2011). Several species of *Hypomyces* are probably cosmopolitan, which could cause 'cobweb disease' of *Agaricus bisporus*

(Potocnik et al. 2009; Tamm and Põldmaa 2013, Kim et al. 2017). *Hypomyces rosellus* (*Cladobotryum dendroides*) is common causing agent in Europe (Potocnik et al. 2009; Tamm and Põldmaa 2013), while *Cladobotryum mycophilum* has been found frequently on *A. bisporus* in East Asia and European countries during the last decade (Tamm and Põldmaa 2013; Kim et al. 2017). Similarly, the biodiversity of *Trichoderma* reflects the geography (Jaklitsch and Voglmayr 2015). A considerable proportion of *Trichoderma* are temperate (Jaklitsch and Voglmayr 2015). Mycoparasitic *Trichoderma atroviride*, *T. harzianum*, and *T. longibrachiatum* have been widely applied as biocontrol agents, but they can cause 'green mold disease' on cultivated *Agaricus* and *Pleurotus* worldwide (Hatvani et al. 2007; Miyazaki et al. 2009). *Trichoderma aggressivum*, *T. asperellum*, *T. ghanense*, *T. pleurotum* and *T. pleuroticola* also have isolated from *A. bisporus*, but popular in Europe (Hatvani et al. 2007). *Trichoderma eijii* and *T. pseudolacteum* are two mycoparasites isolated from *Lentinula edodes* at a mushroom farm in Japan (Kim et al. 2013). Geographic and host phylogenic analyses present that the species diversity of *Ampelomyces* is restricted to geography at the continent-scale rather than the mycohosts or plant host species (Pintye et al. 2015). Beside of cosmopolitan mycoparasites, a large number of fungicolous fungi are known as single records from different regions. However, these fungi may not be considered as endemics due to the scarcity of data (Pintye et al. 2015; Reynolds et al. 2019).

Host-specificity

The fungicolous relationship occurs in many lineages across the fungal kingdom (Poinar and Buckley 2007; Krings et al. 2009, 2011; Põldmaa 2011; Sun et al. 2016a, b; 2017). Most fungicolous species present apparent host specificity, with the exception of several destructive mycoparasites, such as *Arthrobotrys oligospora*, *Clonostachys rosea*, and *Trichoderma viride* (Krauss et al. 2013; Mukherjee et al. 2013; Borges et al. 2015; Karlsson et al. 2015). Generally, different fungal hosts harbor different fungicolous associations in the field (Põldmaa 2011; Tamm and Põldmaa 2013; Gleason et al. 2014; Powell et al. 2017; Fig. 4).

The host specificity presents diversity from phylum-level to species level. As we mentioned in the lifestyle section, the biotrophic species are strictly associated with the host fungi (Rudakov 1978; Ellenberger et al. 2018). Almost all biotrophically fungicolous fungi belong to the basal clades of fungi. *Rozella allomycis* (Rozellomycotina) is an obligate fungicolous fungi, which lives as obligate endoparasites in *Allomyces* species (Blastocladiomycota) (Held 1981; Gleason et al. 2017), suggesting a potential host-specificity relationship between Rozellomycotina and Blastocladiomycota. All members of Dimargaritales (Kickxellomycota) are haustoria-forming fungicolous fungi, especially of Mortierellomycotina and Mucoromycotina, which support host-specificity between Kickxellomycota and Mortierellomycotina, and between Kickxellomycota and Mucoromycotina. However, *Dispira implicata* is fungicolous on *Chaetomium bostrychodes* (Ascomycota) colonizing on dung in the field, as well as on *Chaetomium bostrychode* on Yeast extract soluble starch agar (Benjamin 1979). Whether the fungicolous Dimargaritales are strictly restricted to Mortierellomycotina and Mucoromycotina is uncertain. The fungicolous relationship of these fungi presents a biotrophic interaction, which is mainly among zoosporic fungi, and occasionally among Ascomycota and Basidiomycota (Fig. 4). Fungi from 18 genera in Chytridiomycota comprise fungicolous fungi, which have a wide host range including Chytridiomycota, Mortierellomycota, Mucoromycota, Ascomycota and Basidiomycota (Fig. 4). Within Chytridiomycota, *Blyttiomyces rhizophlyctidis* was found inhabiting *Rhizophlyctis rosea* (Dogma and Sparrow 1969). *Chytridium parasiticum* also inhabits other chytrids, such as *Chytridium suburceolatum*, *Septosperma rhizophydii* and *Rhizidium richmondense* (Barnett 1963; Willoughby 1956). *Rhizophydium mycetophagum* was found in mycelia of *Choanephorella cucurbitarum* (Mucoromycota), whereas *Chytriomyces mortierellae* parasitizes *Mortierella* sp. (Mortierellomycota) (Letcher and Powell 2002). Species of *Phlyctochytrium* have been isolated from vesicular-arbuscular mycorrhizal fungi (Glomeromycotina) (Daniels and Menge 1980; Hajek et al. 2013). *Olpidium uredinis* was reported as inhabiting rust fungi, *Uromyces ernesti-ulei*, *U. guraniae*, and *U. novissimus* (Basidiomycota) (Berndt 2013). One species of *Rhizophlyctis* has been found growing on *Dacrymyces stillatus* (Basidiomycota) (Canter and Ingold 1984). *Caulochytrium protostelioides* was found inside of the mycelium of *Cladosporium* (Ascomycota) on *Acalypha hispida* (Powell 1981).

As we mentioned above, fungicolous taxa are rich in Ascomycota and Basidiomycota (Fig. 4, Checklist). Most of the destructive fungicolous fungi are Ascomycota, and with a wide host range (Fig. 4). With exception of destructively fungicolous species, most fungicolous fungi in Ascomycota are also host-specific. For instance, all species of *Hypomyces* parasitize on fruiting bodies of mushrooms (Tamm and Põldmaa 2013). This genus has been linked to the asexual species of *Cladobotryum*, *Mycogone*, and *Sepedonium* (Rossman et al. 2013; Wijayawardene et al. 2017a). Those asexual morphs may prefer certain hosts, *Cladobotryum* is usually associated with agaricoid mushrooms (Põldmaa 2011; Tamm and Põldmaa 2013), while *Stephanoma* species are commonly

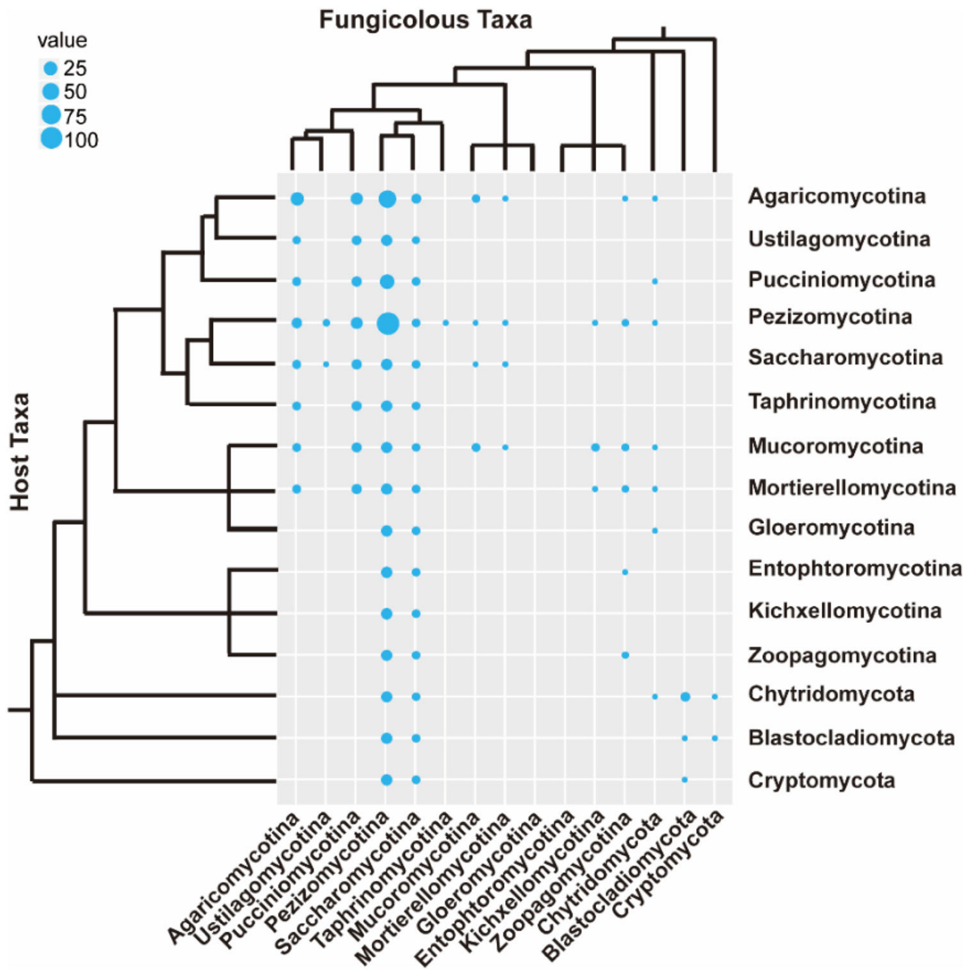

Fig. 4 Lineages of fungicolous fungi and mycohosts. Cladogram of the Fungi adapted on published phylogeny (Taylor and Berbee 2006; Jones et al. 2011; Spatafora et al. 2017). Size of the blue circle represents the number of fungicolous taxa (data based on the checklist)

found on boletoid fungi (Rogerson and Samuels 1989; Rossman et al. 2013). All species of *Elaphocordyceps* (*Tolypocladium*) are parasites of *Elaphomyces* and their relatives (Sung et al. 2007; Quandt et al. 2014). Fungicolous fungi in Basidiomycota are also host-specific, and their fungal hosts are mainly distributed in Ascomycota and Basidiomycota. Among these fungi, fungicolous fungi in Agaricales and Boletales always parasitize their close relatives. For examples, the agaricoid *Asterophora* species colonize on *Lactarius* and *Russula* hosts, often in the old or decaying fruiting body, which are mostly considered as saprobes. However, the hyphae of the *Asterophora* are often inhabit in inter- and intracellular of the hosts (Oberwinkler 2012). The boletoid *Pseudoboletus parasiticus* consistently inhabits the fruiting body of *Scleroderma* species, particularly *Scleroderma citrinum* (Redhead et al. 1994; Both 2006; Binder and Hibbett 2006). Generally, all sexual species in Tremellomycetes are parasites of other fungi or lichens, though the yeast states are widespread and not restricted to fungal hosts (Bandoni 1987; Millanes et al. 2012). The interaction between fungicolous Tremellomycetes with their host hyphae is usually mediated by specialized structures, named tremelloid haustoria or haustorial branches (Boekhout et al. 1998, Chen 1998), and rarely by antibiotin (Liu et al. 2015).

Ecological niches of fungiclous fungi and their host are similar, which favor the host adaptation and specification. Shifts in host specificity may broaden or limit host range and result in host-switching (Chaverri and Samuels 2013; Gladieux et al. 2014; Millanes et al. 2014; Zhang et al. 2018). Host shift and host jump are two typical mechanisms of host-switching. Host shift reflects the ability of an organism to colonize a new host that is phylogenetically closely related to its original host (Jacques et al. 2016). A good example is fungicolous *Cosmospora*, which always colonized Xylariales on the field, cophylogeny analysis indicated there are at least five unequal host-shift events early in the evolution of *Cosmospora* (Herrera et al. 2016).

Host jumps refer to the ability of an organism to colonize a new host that is phylogenetically distant from its original hosts (Jacques et al. 2016). The interkingdom host-switchings result in typical host jump, which have occurred in many fungicolous fungi, especially in species of Hypocreales, jumping from insect associates to plant biotrophs or fungicolous fungi and vice versa (Kepler et al. 2012; Chaverri and Samuels 2013; Spatafora et al. 2017; Zhang et al. 2018). Species of *Cordyceps s.l.* are mostly entomogenous taxa (Sung et al. 2007), linked with the genera of *Isaria*, *Lecanicillium*, and *Simplicillium* (Sung et al. 2007; Zare and Gams 2008). Several species of *Lecanicillium* and *Simplicillium* can colonize or infect mushrooms, powdery mildews, rusts and sooty molds (Zare et al. 2001; Zare and Gams 2008; Ward et al. 2011; Chomnunti et al. 2014; Genne et al. 2014; Huang et al. 2018; Wei et al. 2018). Insects may play a key role in transferring the facultative fungicolous fungi from insects to fungi (Sung et al. 2007). *Arthrobotrys oligospora,* a nematode-trapping fungus (Persson and Friman 1993; Li et al. 2005; Niu and Zhang 2011), also infects many soil-borne fungi (Singh et al. 2012), suggesting a host-switching between nematodes and fungi. The potential factor to drive host transfer between nematodes and fungi might be that both hosts have chitin, where chitinase alters the host-switching between nematodes and fungi (Niu and Zhang 2011). *Ramularia* comprises many important pathogens which cause leaf spot disease of many plants; interestingly, *Ramularia coleosporii*, *R. uredinearum*, and *R. uredinis* have been found on telial and uredinial stages of many rusts (Bartkowska 2007; Baiswar et al. 2014; Videira et al. 2015). It is supposed that a host-switching of facultative fungicolous fungi occurred between plant and fungi. With the exception of insects, air and soil also take a part in horizontal transmission of fungicolous fungi, especially the fungal pathogens of cultivated mushrooms, such as *Trichoderma* and *Cladobotryum* (Hatvani et al. 2007; Miyazaki et al. 2009; Põldmaa 2011; Tamm and Põldmaa 2013).

Interaction mechanism of fungicolous fungi

Fungicolous strategies occur in many lineages across the fungal kingdom (Fig. 4) (Poinar and Buckley 2007; Krings et al. 2009, 2011; Põldmaa 2011). Based on the interaction pattern, these fungicolous fungi have been divided into two physiological groups, namely, biotrophic (symbionts) (Barnett 1963; James et al. 2013; Powell et al. 2017) and necrotrophic (mycoparasites) (Barnett 1963; Karlsson et al. 2015; Olsson and Persson 1994; Yang et al. 2013; Schmoll et al. 2016). Biotrophic and necrotrophic fungicolous fungi generally differ from each other (Barnett 1963; Boosalis 1964; Barnett and Binder 1973); The host cytoplasm usually remains healthy when interact with biotrophic fungicolous fungi (Barnett1963; Goh and Vujanovic 2010). In contrast, the necrotrophic group includes species that kill host cells and thereupon utilize them as food (Barnett1963; Hunter and Butler 1975; Rudakov 1978; Melo et al. 2011, 2016). However, in responding to the health of the hosts and the state of balance of both the abiotic and biotic conditions of the environment, a few fungicolous taxa could change their physiological states (Rudakov 1978; Siozios et al. 2015). The interaction mechanism could vary from mutualism to commensalism (Powell et al. 2017), or from commensalism to mycoparasitism (Siozios et al. 2015; Oberwinkler 2017).

Mutualism among early divergent fungi. Species of *Rozella* (Rozellomycota) are obligate endoparasites of Blastocladiomycota, Chytridiomycota, Oomycota, and even green algae (Gleason et al. 2014). They produce unwalled, multinucleate sporangial plasmodium eventually completely inside of the host (Gleason et al. 2014; Powell et al. 2017). The interspecific interaction among them represents the mutualistic symbiosis among the early divergent fungal groups (Gleason et al. 2012; Letcher et al. 2017; Powell et al. 2017). The fungicolous mechanism among these fungi could be primarily understood by partners of *Rozella* and its hosts. *Rozella allomycis* is biotrophic inside *A. anomalus* (Blastocladiomycota), whereas *R. rhizoclosmatii* is biotrophic inside *Rhizoclosmatium globosum* (Chytridiomycota) (Letcher et al. 2017; Powell et al. 2017). In the laboratory, the relationship between *Rozella* and their hosts have been well characterized by microscopy (Held 1981; Letcher et al. 2017; Powell et al. 2017). In general, the chemotactic zoospore recognizes and attaches to host cell. Consequently, fusion occurs between parasites and hosts, the naked amoeboid *Rozella* protoplast penetrates into the host cell. Once *Rozella* enters the host, the entire parasite cell develops into a sporangium and produces resting spores (Letcher et al. 2017; Powell et al. 2017). Previous studies showed that phagotrophic nutrition of *Rozella* is different to the osmotrophic nutrition of traditional fungi (Gleason et al. 2012). Recently, the developing plasmodia of *R. allomycis* in host hyphae was confirmed by electron microscopy, which shows the interface consisting of three-membrane layers, the parasite's plasma membrane (inner layer) and a host cisterna (outer two layers) (Powell et al. 2017). The three-membrane layers help the fungicolous fungi and hosts exchange nutrition and energy (James et al. 2013; Powell et al. 2017).

Commensalism among Zygomycota. *Parasitella parasitica* is traditionally recognized as a facultatively biotrophic parasite of many but not all mucoralean fungi (Kellner et al. 1993; Wöstemeyer et al. 2016). The interspecific interaction among these fungi represents the fungicolous relationship among members of Zygomycota. Therefore, the fungicolous mechanism among these fungi could be primarily understood by partners of *Parasitella parasitica* and *Absidia glauca* to the host's hyphae and develops the primary sikyotic cell by formation of a septum. Consequently, the primary sikyotic cell fuses with the host mycelium and some nuclei of *P. parasitica* are released in *A. glauca*. The secondary sikyotic cell gradually is formed by *P. parasitica* and is surrounded by a gall-like structure formed by its host. Eventually, the secondary sikyotic cell forms a sikyospore (persistent spore), which is able to germinate (Wöstemeyer et al. 1995, 2016). Nutrition and gene exchange both occur during the infection (Wöstemeyer et al. 1995; Burmester et al. 2013). Genetic analysis found that gene transfer is not unidirectional from *P. parasitica* to *A. glauca* (Burmester et al. 2013). It was supported by the auxotrophic mutants of *A. glauca* which are complemented by their prototrophic counterparts of the *P. parasitica* (Burmester et al. 2013; Wöstemeyer et al. 2016), and also by adenine-deficient *P. parasitica* is reverse complemented by the wild-type *A. glauca* (Burmester et al. 2013). It is also hypothesized there is a parasexual system existing between *P. parasitica* and *A. glauca* attributing to the mate-type gene exchange (Wöstemeyer et al. 1995, 2016; Burmester et al. 2013). Although the host still forms sporangia with viable sporangiospores, even in the immediate vicinity to infection sites, the number of spores decreases by approximately 40% (Wöstemeyer et al. 2016), suggesting commensalism among Zygomycota.

Commensalism among Dikarya. Commensalism popularly occurs in the fungicolous Ascomycota and Basidiomycota and their hosts (Kiss et al. 2010; Siozios et al. 2015). The ascomycete genus *Ampelomyces* contains obligate biotrophic fungicolous fungi associated with Erysiphales worldwide, which produce pycnidia inside the hyphae, conidiophores and immature ascomata of their mycohosts (Kiss et al. 2010; Siozios et al. 2015). The germination of conidia of *A. quisqualis* is enhanced by a water-soluble substance from the host, suggesting the hosts are able to trigger its germination (Gu and Ko 1997; Siozios et al. 2015). However, *A. quisqualis* can negatively affect the growth of hyphae and the conidial production of Erysiphales (Kiss et al. 2010; Siozios et al. 2015). The inter-fungal cellular interactions among basidiomycetous fungi were thought of as symbiosis (Bauer et al. 2004). Some fungicolous basidiomycetous yeasts require the fungal hosts for their sexual production, such as *Tremella mesenterica* and its host *Phanerochaete cremea*, and *Tuberculina maxima* on *Gymnosporangium sabinae* (Zugmaier and Oberwinkler 1995; Aghayeva et al. 2016). These fungi evolve specific organelles (colacosome) involved in the establishment of the minute cytoplasm-to-cytoplasm contacts (Bauer et al. 2004). Transmission electron microscopy shows an alteration of the chemical composition occurs after separation of the colacosome from the cytoplasm, suggesting energy exchange between colacosome and host fungi (Bauer and Oberwinkler 2008). Whether the nutrients flux unidirectionally or not, and genetic substance exchange between tremelloid fungi and their mycohosts have not been demonstrated (Aghayeva et al. 2016).

Mycoparasitism. The relationship between the destructive fungicolous taxa and their hosts was defined as mycoparasitism including a complex mechanism of antagonism, or competition (Olsson and Persson 1994; Yang et al. 2013; Karlsson et al. 2015; Schmoll et al. 2016), but mostly antagonism and competition (Schmoll et al. 2016). *Arthrobotrys* spp., *Clonostachys* spp. and *Trichoderma* spp., are able to parasitize and kill other fungi and are used as biocontrol agents (Olsson and Persson 1994; Druzhinina et al. 2011; Singh et al. 2012; Schmoll et al. 2016). Therefore, the mycoparasitic mechanisms of these fungi interact with their hosts can represent the typically necrotrophic fungicolous groups. *Arthrobotrys oligospora* is a nematophagous fungus, which also parasitizes *Rhizoctonia solani* by coiling around the host hyphae and killing the cells under the coils and adjacent cells without penetrating the host cell wall (Olsson and Persson 1994; Singh et al. 2012). Phosphorus is transferred from *R. solani* to *A. oligospora* during parasitism (Olsson and Persson 1994). Like the fungicolous *Trichoderma*, chitinases play a key role in the degradation of host fungi, coordinating chitinase genes expansion in its genome and chitinases such as AO-59, AO-190 and AO-801 enhanced expressions during interaction with *R. solani* (Yang et al. 2013). In contrast, *Clonostachys rosea* is another fungicolous necrotroph that can control several important plant fungal diseases mainly through secondary metabolites (Karlsson et al. 2015). Compared with other fungi in the Hypocreales, genomic analyses present that gene families including ATP-binding cassette transporters, cytochrome P450 monooxygenases, glucose-methanol-choline oxidoreductases, lytic polysaccharide monooxygenases, pectin lyases, and polyketide synthases are significantly rich in *C. rosea*. *Clonostachys rosea* contains very few chitinases in contrast to fungicolous *Trichoderma* (Karlsson et al. 2015). Fungicolous *Trichoderma* species are effective in controlling and suppressing plant pathogens by both antagonism and competition (Howell 2003; Kubicek et al. 2011; Mukherjee et al. 2013). These fungi can produce antifungal compounds to inhibit host growth or cover the host by fast-growing hyphae, and mostly they penetrate and destroy the cytoplasm (Howell 2003). Genomic analysis reveals a gene expansion occurred in both lytic enzymes and secondary metabolic coding and related regulatory genes (Kubicek et al. 2011; Mukherjee et al. 2013).

Neutralism. The fungi living together, which neither activate nor affect the growth or reproduction of each other, have been considered as neutrals (Cooke and Rayner 1984; Boddy 2016). These phenomena are common in fungi that form large fruiting-bodies and their inhabitants or colonizer, such as *Acremonium strictum* isolated from the cap of *Psilocybe fasciata* (He et al. 2006) and the truffle-inhabiting fungi (Pacioni and Leonardi 2016). Microscopy shows that neither are scarcely influenced during dual culture of *A. strictum* and *P. fasciata*, and no appressoria or haustoria, hyphal coiling, or infection pegs were observed in the interaction zone. In addition, chitinase and b-1, 3-glucanase activity of *A. strictum* were not enhanced by inducing *P. fasciata* (He et al. 2006). However, like other microbes of living organisms, there is a continuity of relationships between guest fungi and their hosts. A transition from neutralism to commensalism, or to minor parasitism, even to saprophytism on the dying or dead hosts largely depends on the health of hosts and the state of balance of both the abiotic and abiotic factors of the environment (He et al. 2006; Pacioni and Leonardi 2016).

Origin, and evolution fungicolous fungi

The relationships between fungicolous fungi and their hosts are diverse and the origin and divergence of obligate/facultative biotrophic/necrotrophic should have different mechanisms. It is obvious that fungicolous fungi should have multiple origins and divergence times in different lineages (Zhang et al. 2018). Fossil provides direct evidence to emergence of fungicolous fungus and its subsequent evolution (Krings et al. 2011). 'Mycoparasitism' between Ascomycota and Basidiomycota, and within Basidiomycota was confirmed by an Early Cretaceous amber (Poinar and Buckley 2007). *Palaeoagaracites antiquus* (Basidiomycota) was parasitized by the mycoparasite, *Mycetophagites atrebora* (Basidiomycota), which in turn was parasitized by the *Entropezites patricii* (Ascomycota), suggesting a sophisticated patterns of fungicolous relationship within Darkye was well developed 100 million years ago (Mya) (Poinar and Buckley 2007). A fossil Ascomycota present that *Dubiocarpon* is fungicolous on zygomycotan fungi from Lower Pennsylvanian, suggesting a sophisticated of fungicolous pattern between Ascomycota and Zygomycota was well developed 200–300 Mya. In addition, a fossil record presented that *Kryphiomyces catenulatus* as an endobiotic mycelial thallus in a large spore of a glomeromycotan fungus from the Lower Devonian, which indicating a fungicolous relationship within Glomeromycota was developed 400 Myr ago (Krings et al. 2010). A fossil fungicolous Chytridiomycota, *Globicultrix nugax*, was found to inhabit inside of spore of a glomeromycotan fungus in Early Devonian. Based on fossil evidences, it is deduced that the evolution and divergence of fungicolous fungi is around 400 Mya (Krings et al. 2011).

Genome-scale and multi-gene phylogenies proposed that the earliest-diverging fungus, *Rozella*, seem to be derived from an endoparasitic aphelid ancestor (Karpov et al. 2013; Spatafora et al. 2017). Fungicolous *Rozella* species obtain their nutrition by obligate phagotroph and form 'three-membrane layers' at the interfaces (Gleason et al. 2012, 2014; Karpov et al. 2013). However, Tedersoo et al. (2018) suggested the earliest-diverging fungi seems to be derived from a free-living ancestor based on phylogeny analysis and divergence time establishment. Whether the these fungicolous fungi derive from an endoparasitic aphelid ancestor or a free-living ancestor is in argument (Powell et al. 2017; Spatafora et al. 2017).

Oberwinkler (2012) summarised the evolutionary trends o the lifestyle of Basidiomycota. These fungi evolve from fungicolous fungi to plant parasites or mycorrhizal associations, from plant parasites to saprobes (Oberwinkler 2012). Generally, the facultative biotroph is common in fungicolous yeast-like Basidiomycota including Pucciniomycotina, Ustilaginomycotina, and Tremellomycetes (Oberwinkler 2012; Powell et al. 2017). The facultative necrotroph is common in Agaricomycotina (Oberwinkler 2012), while the necrotroph often appears in Ascomycota (Karlsson et al. 2015; Schmoll et al. 2016). Therefore, the evolutionary trends in trophic stages of fungicolous Basidiomycota could be from biotrophic to necrotrophic. Tremelloid haustoria and colacosomes and hyphae clamps are considered as the typical structures of fungicolous Basidiomycota (Oberwinkler 2012; Powell et al. 2017). Whether these fungicolous fungi are derived from plant parasites, is still uncertain. However, it is confirmed that Basidiomycota contains a larger number of plant parasites than fungicolous species.

Hypocreales embrace a large number of known fungicolous fungi. Zhang et al. (2018) supported that the fungicolous Hypocreales arose from multi-ancestors, from plant pathogen such as species in Nectriaceae, or from insect pathogens in Cordycipitaceae and Ophiocordycipitaceae, even from endophytes in Clavicipitaceae. Host switching frequently occurs in Hypocreales (Sung et al. 2007, Chaverri and Samuels 2013; Millanes et al. 2014). Introgression might be main mechanisms to drive lifestyle differentiation and evolution and host shift of hypocrealean fungi (Zhang et al. 2018). The duplication and expansion of the chitinase gene and anti-fungal compound gene clusters facilitate the fungicolous fungi to adapt to the divergence of terrestrial fungi (Kosawang et al. 2014; Karlsson et al. 2015; Schmoll et al. 2016; Letcher et al. 2017; Powell et al. 2017). A phylogenetic analysis showed that the mycoparasitic *Trichoderma reesei* and saprobic *T. virens* were derived relative to mycoparasitic *T. atroviride*. Comparative genomic analysis presented that mycoparasitic-genes, such as chitinolytic enzymes related genes and secondary metabolism-related genes were rich in two mycoparasitic *Trichoderma*, but poor even lose in *T. reesei*, suggesting that the fungicolous lifestyle is an ancestral trait of *Trichoderma* (Kubicek et al. 2011; Mukherjee et al. 2013). The evolution of trophism of *Trichoderma* is likely to be from mycoparasitism to saprotrophism / endophytism (Kubicek et al. 2011; Chaverri and Samuels 2013; Mukherjee et al. 2013).

In general, with the evolution of fungicolous fungi, 'three-membrane layers' (Rozellomycota), 'haustoria' (Zygomycota), 'specific haustoria' (Basidiomycota), and 'infection pegs' (Ascomycota and Basidiomycota) are formed at the interfaces between fungicolous taxa and their hosts (Jeffries 1995; Oberwinkler 2012; Powell et al. 2017) (Fig. 2). The trophic stages of fungicolous fungi towards obligate biotroph in the early diverging fungi include Chytridiomycota, Cryptomycota, and other zoosporic fungi (Wöstemeyer et al. 2016; Letcher et al. 2017; Powell et al. 2017), and a multi-nutrition model comprise facultative biotroph (Aghayeva et al. 2016; Oberwinkler 2012, 2017), facultative necrotroph (Siozios et al. 2015), and necrotroph in Dikarya (Kosawang et al. 2014; Karlsson et al. 2015; Schmoll et al. 2016). A putative evolutionary tendency among fungicolous fungi evolved from mutualism within early divergent fungi, commensalism within Zygomycota, multiple mechanisms including mutualism, commensalism, antagonism, competition, and neutralism among fungicolous Dikarya and their fungal host.

Conclusion and future work

In this review, we have summarized recent understanding of fungicolous fungi, particularly focused on the terminology, diversity, distribution, and interaction mechanisms. The fungicolous fungi are suggested as a general term to define the fungi that are consistently associated with the other fungal hosts. Fungicolous fungi survive alongside their hosts, which co-occur in aquatic or terrestrial ecosystems from temperate, tropical, or arctic regions (Figs. 1, 3, checklist). These fungi are represented in all fungal groups, and fungicolous relationship occurs in many lineages across the fungal kingdom (Fig. 4, checklist). These fungi interact with their host by forming special structure, or via special enzymes and anti-fungal chemicals (Fig. 2). With the exception of the destructively fungicolous fungi, most of fungicolous fungi are host-specific in generic level or higher classification ranks. It is confirmed that homogeneous environments favor the development of highly adapted and coevolved fungicolous fungi and also shape the host specificity. The checklist provided by this review will also serve as building blocks for an extensive framework enabling scientists to ask a broad spectrum of biological, ecological, evolutionary, and other questions about role of fungicolous fungi in global nutrient cycles, crop protection, as well as the effects on mushroom cultivation.

However, a number of key questions still need to be answered. How many fungicolous fungi are there? An updated estimation of global fungal diversity supported there are about 2.2 to 3.8 million fungi existing on our planet (Hawksworth and Lücking 2017), and more than 140,000 fungal species have been described and accepted currently. However, parasitic species are supposed to be much more than the non-parasitic organisms in the ecosystem (Lafferty et al. 2008). Without a doubt, the number of fungicolous species is substantially underestimated. In addition, previous studies on fungicolous taxa usually used culture-dependent methods, however, next-generation sequencing has shown fungal fruiting bodies contain many more fungicolous taxa than expected (Pacioni and Leonardi 2016; Leonardi et al. 2018). A combination of culture-dependent and culture-independent approaches may reveal a greater diversity of fungicolous taxa in the future.

How do fungicolous fungi live in association with other mycohosts? How do the hosts respond? Are they obligate or facultative? Based on previous studies, the interaction mechanisms of fungicolous fungi and their host evolved from mutualism within early divergent fungi (Gleason et al. 2014; Powell et al. 2017), commensalism within Zygomycota (Kellner et al. 1993; Wöstemeyer et al. 2016), and multiple mechanisms including mutualism, commensalism, mycoparasitism, and neutralism among the fungicolous Dikarya and their fungal host (Kiss et al. 2010; Singh et al. 2012; Siozios et al. 2015; Schmoll et al. 2016). There are genetic exchanges and nutrition transitions between mutualistic and commensalistic fungi and their hosts (Powell et al. 2017). The duplication and expansion of the chitinase gene and anti-fungal compound gene clusters facilitate the necrotrophic mycoparasites to survive. An important future topic will be to assess and delineate the ecological niche(s) and life histories of fungicolous fungi. Numerous fungicolous fungi are host specific, constrained to their hosts and geography as well (Põldmaa 2011; Tamm and Põldmaa 2013; Siozios et al. 2015; Hargreaves et al. 2018). However, some mycoparasites infect a wide spectrum of fungal hosts, can even change their lifestyle from fungicolous fungi to insect pathogens (Zare and Gams 2008; Ward et al. 2011; Chomnunti et al. 2014; Zhang et al. 2018) or plant pathogens (Bartkowska 2007; Baiswar et al. 2014; Videira et al. 2015; Herrera et al. 2016; Quandt et al. 2018; Zhang et al. 2018). Comparative analyses of genomic and large-scale transcriptomic and proteomic data will not only offer further important clues to our understanding of the molecular basis of the fungicolous relationship but could help host switching and heteroecism always occurred on fungicolous fungi.

The origin and divergence remain to be extensively explained. Fossil evidence confirms that the fungicolous relationship could be traced back to 400 Mya ago (Krings et al. 2010). However, divergence time estimates suggest that the fungicolous taxa may have derived from early endoparasitic aphelid ancestors (Karpov et al. 2013), which in accordance with other estimates of origins and divergence of the fungi Hyde et al. 2017; Spatafora et al. 2017; Zhao et al. 2017). Tedersoo et al. (2018) argue that the earliest-diverging fungi may be derived from a free-living ancestor. Whether the fungicolous lifestyle derived is from an endoparasitic aphelid or a free-living ancestor requires further investigation. Combination of phylogenomic analysis, divergence time estimation, and more fossil evidence will help us reveal the origin and divergence of fungicolous taxa.

Fungicolous mycoparasites provide an important resource for biocontrol agents and anti-fungal chemical discovery (Benuzzi and Baldoni 2000; Zeilinger and Omann 2007; Pintye et al. 2012; Junker et al. 2018). Microbiome analysis, meta-genomics, meta-transcriptomics, and meta-proteomics offer a further approach to understand the ecological impact of large-scale applications of a single or combined fungicolous species as biocontrol agents. The mycoparasitic fungal taxa are also potential pathogens of edible and medicinal mushrooms. Identification of fungal pathogens and their importance in quarantine should be investigated properly as this impact on the mushroom industry, and this will aslo help to design better disease control management strategies.

Species checklist of fungicolous fungi

ASCOMYCOTA Caval.-Sm.
Subphylum *PEZIZOMYCOTINA* O.E. Erikss. & Winka
Class *Dothideomycetes* sensu O.E. Erikss. & Winka

Asterinales M.E. Barr ex D. Hawksw. & O.E. Erikss.
Asterinaceae Hansf.
Pirozynskiella S. Hughes

Pirozynskiella costaricensis (Speg.) S. Hughes, Mycologia 99(4): 633 (2007)

≡ *Dendryphion costaricense* Speg., Boln Acad. nac. Cienc. Córdoba 23(3-4): 590 (1919)

Costa Rica, colonized, *Asterostomella*

Pirozynskiella solaninum (Sacc. & P. Syd.) S. Hughes, Mycologia 99(4): 632 (2007)

≡ *Helminthosporium solaninum* Sacc. & P. Syd. Mem. Reale Ist. Veneto Sci.: 13 (1902)

Sierra Leone, Ghana, colonized, asterinaceous fungi

Botryosphaeriales C.L. Schoch, Crous & Shoemaker
Phyllostictaceae Fr.
Asbolisia Speg.

Asbolisia indica G.P. Agarwal & N.D. Sharma, Sydowia 26(1-6): 260 (1974)

≡ *Fumiglobus indicus* (G.P. Agarwal & N.D. Sharma) D.R. Reynolds & G.S. Gilbert, Cryptogamie Mycologie 27 (3): 254 (2006)

India, ambiguous, *Microxyphium alangii*

Phyllosticta Pers.

Phyllosticta aecidiorum Petr., Sydowia 12(1-6): 50 (1959)

Australia, prasitized, uredinia of *Puccinia andropogonis-hirti*

Phyllosticta figuerasii Unamuno, Mauritania 13 (153): 260 (1940)

Morocco, prasitized, uredinia of *Puccinia andropogonis-hirti*

Planistromellaceae M.E. Barr

Microcyclus Sacc.

Microcyclus pruni T.Z. Li & W.H. Hsieh, Bot. Bull. Acad. Sin., Taipei 32(2): 135 (1991)

China, parasitized, *Paranectriella arcuata*

Capnodiales Woron.
Cladosporiaceae Chalm. & R.G. Archibald
Cladosporium Link

Cladosporium asterinae Deighton, Mycol. Pap. 118: 30 (1969)

≡ *Parapericoniella asterinae* (Deighton) U. Braun, et al., Schlechtendalia 13: 59 (2006)

Sierra Leone, colonized, *Asterina contigua*

Cladosporium balladynae Deighton, Mycol. Pap. 118: 32 (1969)

Uganda, colonized, *Balladyna magnifica*

Cladosporium cladosporioides (Fresen.) G.A. de Vries, Contrib. Knowledge of the Genus *Cladosporium* Link ex Fries: 57 (1952)

≡ *Penicillium cladosporioides* Fresen., Beit. Mykol. 22 (1850)

≡ *Hormodendrum cladosporioides* (Fresen.) Sacc., Michelia 2(6): 148 (1880)

Mexico, parasitized, powdery mildew; Thailand, parasitized, rust fungi (Torres et al. 2017)

Cladosporium chalastosporoides Bensch et al., Stud. Mycol. 67: 27 (2010)

South Africa, ambiguous, fruiting bodies of *Teratosphaeria proteae-arboreae*

Cladosporium elsinoes H.C. Greene, Trans. Wis. Acad. Sci. Arts Lett. 47: 127 (1959)

USA, colonized, *Elsinoe wisconsinensis*

Cladosporium exile Bensch, et al., Stud. Mycol. 67: 43 (2010)

USA, parasitized, chasmothecia of *Phyllactinia guttata*

Cladosporium exobasidii* var. *verruculosum Heuchert et al., Schlechtendalia 13: 27 (2005)

Czech Republic, parasitized, *Exobasidium vaccinii*

Cladosporium gallicola B. Sutton, Mycol. Pap. 132: 37 (1973)

Canada, colonized, galls of *Endocronartium harknessii*

Cladosporium herbarum (Pers.) Link, Mag. Gesell. Naturf. Freunde, Berlin 8: 37 (1816)

≡ *Dematium herbarum* Pers., Ann. Bot. (Usteri) 11: 32 (1794)

Thailand, parasitized, powdery mildew and rust fungi (Torres et al. 2017)

Cladosporium gerwasiae Heuchert et al., Schlechtendalia 13: 31 (2005)

Guatemala, colonized, *Gerwasia*

Cladosporium lophodermii Georgescu & Tutunaru, Revue Biol. Bucarest 3(1): 61 (1958)

Romania, colonized, apothecia of *Lophodermium pinastri*

Cladosporium pseudocladosporioides Bensch et al., Stud. Mycol. 67: 69 (2010)

Mexico, parasitized, powdery mildew and rust fungi (Torres et al. 2017)

Cladosporium phyllactiniicola Bensch et al., Stud. Mycol. 67: 67 (2010)

USA, colonized, *Phyllactinia guttata*

Didymaria Corda

Didymaria acervulicola Bat. & Nascim., Publicações Inst. Micol. Recife 33: 4 (1956)

Brazil, colonized, *Gloeotrochila anthuriicola*

Hoornsmania Crous

Hoornsmania pyrina Crous, Fungal Planet 11(2): 11-21 (2007)

Netherlands, colonized, perithecia of *Neonectria ditissima*

Dissoconiaceae Crous & de Hoog

Dissoconium de Hoog, Oorschot & Hijwegen

Dissoconium aciculare de Hoog et al., Ser. C, Biol. Med. Sci. 86(2): 198 (1983)

Germany, parsitized, *Erysiphe*

Ramichloridium Stahel ex de Hoog

Ramichloridium schulzeri (Sacc.) de Hoog, Stud. Mycol. 15: 64 (1977)

USA, parasitized, *Puccinia allii* (Uma & Taylor 1987)

Euantennariaceae Hughes & Corlett

Septoria Sacc.

Septoria leptosphaeriicola Bat. et al., Iqbal, Atas Inst. Micol. 4: 139 (1967)

Pakistan, parasitized, *Leptosphaeria rumicis*

Mycosphaerellaceae Lindau

Annellophora S. Hughes

Annellophora dendrographii M.B. Ellis, Mycol. Pap. 103: 36 (1965)

Paraguay, colonized, conidiophores of *Dendrographium atrum*

Annellophora sydowii M.B. Ellis, Mycol. Pap. 82: 44 (1961)

Ecuador, ambiguous, *Sporidesmium baccharidis*

Cercospora Fresen. ex Fuckel

Cercospora aecidiicola Rao & M.A. Salam, Sci. Cult. 25: 601 (1960)

India, prasitized, *Trochodium sampathens*

Cercospora phyllanthicola S.A. Khan & M. Kamal, Indian Phytopath. 15(3-4): 296 (1963)

Singapore, prasitized, *Phaeosaccardinula*

Cercospora riveae Rao & M.A. Salam, Sci. Cult. 25: 602 (1960)

India, prasitized, *Trochodium ajrekarii*

Cladosporiella Deighton

Cladosporiella cercosporicola Deighton, Mycol. Pap. 101: 35 (1965)

Malaysia, ambiguous, *Cercospora koepkei*

Cladosporiella deightonii R.F. Castañeda & U. Braun, Cryptog. Bot. 1(1): 43 (1989)

Cuba, ambiguous, *Cercospora coffeicola*

Cladosporiella uredinicola Deighton, Mycol. Pap. 118: 33 (1969)

Sierra Leone, parasitized, *Puccinia eucomi*

Cladosporiella uredinis Deighton, Mycol. Pap. 118: 36 (1969)

Philippines, parasitized, rust fungi of *Scirpus grossus*

Mycosphaerella Johanson et al.

Mycosphaerella mycoparasitica H.J. Swart, Trans. Br. Mycol. Soc. 65(1): 88 (1975)

Canada, parasitized, *Thallomyces oritis*

Mycovellosiella Rangel

Mycovellosiella raveneliae M.D. Mehrotra & R.K. Verma, Mycol. Res. 97(8): 1020 (1993)

≡ *Passalora raveneliae* (M.D. Mehrotra & R.K. Verma) U. Braun & Crous, CBS Diversity Ser. (Utrecht) 1: 468 (2003)

Brazil, parsitized, uredia and telia of *Ravenelia clemensiae*

Periconiella Sacc.

Periconiella ellisii Merny & B. Huguenin, Revue Mycol., Paris 27(1): 37 (1962)

Dominica, parasitized, *Meilola rogeri*

Pseudocercospora Speg.

Pseudocercospora uromycestri (Pollack) U. Braun & Crous, CBS Diversity Ser. (Utrecht) 1: 417 (2003)

≡ *Cercospora uromycestri* Pollack, Mycologia 63(3): 691 (1971)

USA, parasitized, *Uromyces cestris*

Ramularia Unger

Ramularia coleosporii Sacc., Michelia 2(no. 6): 170 (1880)

≡ *Cylindrosporium coleosporii* (Sacc.) J. Schröt., Krypt.-Fl. Schlesien (Breslau) 3-2(10): 493 (1897)

Asia, Europe, North America, parasitized, *Chrysomyx* and *Coleosporium* (Bartkowska 2007; Braun et al. 2013; Baiswar et al. 2014)

Ramularia cylindroides* var. *angustispora U. Braun & Chevassut, Mycotaxon 51: 54 (1994)

France, parasitized, *Pulmonaria officinalis*

Ramularia uredinearum Hulea, J. Pl. Prot. Japan 22(4): 210 (1939)

Asia, Europe, parasitized, Pucciniaceae (Pollack 1971; Bartkowska 2007; Braun et al. 2013)

Ramularia uredinis (W. Voss) Sacc., Syll. fung. (Abellini) 4: 199 (1886)

≡ *Cylindrosporium uredinis* W. Voss, Verh. zool.-Bot. Ges. Wien 29: 684 (1879)

Asia, Europe, Russia, parasitized, *Cronartium*, *Melampsora*, *Melampsoridium*, *Pucciniastrum* (Bartkowska 2007; Braun et al. 2013)

Sphaerulina Sacc.

Sphaerulina coffeicola* f. *parasitica C. Moreau & M. Moreau, Revue Mycol., Paris 16: 43 (1951)

≡ *Sphaerulina coffeicola* Speg., Anal. Mus. Nac. Hist. Nat. B. Aires 31: 412 (1922)

Ivory Coast, colonized, *Gibberella*

Neodevriesiaceae Quaedvl. & Crous

Tripospermum *Speg.*

Tripospermum meliolicola Cif., Atti Ist. Bot. Univ. Lab. crittog. Pavia, sér. 5 19: 132 (1962)

Dominica, colonized, *Meliola kadua*

Teratosphaeriaceae Crous & U. Braun

Acrodontium de Hoog

Acrodontium crateriforme (J.F.H. Beyma) de Hoog, Stud. Mycol. 1: 26 (1972)

≡ *Chloridium crateriforme* J.F.H. Beyma, Centbl. Bakt. ParasitKde, Abt. II 89: 241 (1933)

Brazil, parasitized, powdery mildew and rust fungi (Samuels et al. 1997)

Acrodontium intermissum de Hoog & V. Rao, Persoonia 8(2): 207 (1975)

Brazil, parasitized, rust fungi (Samuels et al. 1997)

Acrodontium myxomyceticola J.L. Crane & Schokn., Trans. Br. Mycol. Soc. 79(2): 346 (1982)

Brazil, colonized, sporangia of *Stemonitis fusca* (Samuels et al. 1997)

Dothideales Lindau

Saccotheciaceae Bonord.

Pringsheimia Schulzer

Pringsheimia apiosporicola A. Pande, Biovigyanam 6(2): 181 (1981)

India, colonized, *Apiospora montagnei*

Microthyriales G. Arnaud,

Microthyriaceae Sacc.

Actinopeltis Höhn.

Actinopeltis ciliaris S.K. Bose & E. Müll., Indian Phytopath. 17: 17 (1964)

India, colonized, *Lembosia decolorans*

Hansfordiella S. Hughes

Hansfordiella asterinearum S. Hughes, Mycol. Pap. 47: 11 (1951)

Ghana, colonized, *Anterina baphiae*

Hansfordiella diedickiae Deighton, Mycol. Pap. 78: 31 (1960)

Sierra Leone, colonized, *Diedickia piptadeniae*

Trichothyriomyces Bat. & H. Maia

Trichothyriomyces notatus Bat. & H. Maia, Anais Soc. Biol. Pernambuco 13(2): 104 (1955)

Brazil, colonized, *Irene melastomacearum*

Trichothyrium Speg.

Trichothyrium asterolibertiae Deighton, Mycol. Pap. 78: 28 (1960)

Sierra Leone, colonized, *Asterolbertia*

Trichothyrium asterophorum* var. *singulatum Bat. & H. Maia, Anais Soc. Biol. Pernambuco 15(2): 469 (1957)

Brazil, colonized, *Meliola*

Trichothyrium caruaruense Bat. & H. Maia, Anais Soc. Biol. Pernambuco 15(2): 470 (1957)

Brazil, colonized, *Irenina melastomacearum*

Trichothyrium hansfordii S. Hughes, Mycol. Pap. 50: 83 (1953)

Ghana, colonized, *Meliola*

Trichothyrium modestum Bat. & H. Maia, Anais Soc. Biol. Pernambuco 15(2): 473 (1957)

Brazil, colonized, *Meliola*

Mytilinidiales Boehm et al.

Mytilinidiaceae Kirschst.

Septonema Corda

Septonema trichomeriicola Cif., Bat. & Nascim. Public. Inst. Micol. Recife 47: 4 (1956)

Sierra Leone, colonized, *Asterolbertia*

Patellariales D. Hawksw. & O.E. Erikss.

Patellariaceae Corda

Patellaria Fr.

Patellaria jamaicensis Dennis, Kew Bull. 9(2): 345 (1954)

Jamaica, colonized, gall of *Sphaeropsis tumefaciens*

Pleosporales Luttr. ex M.E. Barr

Amniculicolaceae Zhang et al.

Anguillospora Ingold

Anguillospora rosea J. Webster & Descals, Can. J. Bot. 76(9): 1651 (1999)

UK, colonized, apothecium of *Orbilia*

Coniothyriaceae W.B. Cooke

Coniothyrium Corda

Coniothyrium hyperparasiticum Subhedar & V.G. Rao, J. Univ. Poona 52: 317 (1979)

India, parasitized, *Stauronema spinificis*

Coniothyrium nematostomatis Petr., Sydowia 9(1-6): 554 (1955)

Argentina, colonized, *Nematostoma singer*

Coniothyrium sarcinellae V.P. Sahni, Mycopath. Mycol. appl. 36(3-4): 276 (1968)

≡ *Microsphaeropsis sarcinellae* (V.P. Sahni) Morgan-Jones, Can. J. Bot. 52(12): 2578 (1975)

India, colonized, *Sarcinella palawanensis*

Dictyosporiaceae Boonmee & K.D. Hyde

Dictyosporium Corda

Dictyosporium elegans Corda, Weitenweber's Beitr. Nat.: 87 (1836)

In lab, parasitized, *Sclerotinia* (Adams 1989)

Didymellaceae Gruyter et al.

Ascochyta Lib.

Ascochyta mycoparasitica Cartwr. & R.K. Webster, Mycologia 89(1): 164 (1997)

USA, colonized, sclerotia of *Sclerotium oryzae*

Epicoccum Link

Epicoccum nigrum Link, Mag. Gesell. Naturf. Freunde, Berlin 7: 32 (1816)

Spain, colonized, *Monilinia* (Larena et al. 2005)

Leptosphaerulina McAlpine

Leptosphaerulina mycophaga Bat. & J.L. Bezerra, Atas Inst. Micol. Univ. Recife 3: 17 (1966)

France, colonized, *Phytihysterium fuscum*

Phoma Fr.

Phoma glomerata (Corda) Wollenw. & Hochapfel., Z. ParasitKde 3(5): 592 (1936)

≡ *Didymella glomerata* (Corda) Qian Chen & L. Cai, Stud. Mycol. 82: 176 (2015)

USA, parasitized, powdery mildew (Sullivan and White 2000)

Phoma pyrenophoricola Bat., Peres & S.H. Iqbal, Atas Inst. Micol. 4: 137 (1967)

Pakistan, colonized, *Pytenophora*

Didymosphaeriaceae Munk

Didymosphaeria Fuckel

Didymosphaeria cocoes-capitatae Caball., An. Jard. Bot. Madr. 1: 180 (1941)

Spain, colonized, *Cocconia spurcaria*

Didymosphaeria coryneliae Spooner, Trans. Br. Mycol. Soc. 85(3): 545 (1985)

New Caledonia, colonized, ascomata of *Corynelia uberata*

Didymosphaeria geminella Lettau, Feddes Repert. 61(2): 161 (1958)

Germany, colonized, *Verrucaria muralis*

Didymosphaeria kalmiae (Peck) Malloch & Mallik, Can. J. Bot. 76(7): 1273 (1998)

≡ *Phylleutypa kalmiae* (Peck) M.E. Barr, Mycotaxon 39: 141 (1990)

USA, parsitized, *Orphnodactylis kalmiae* on palm fossil (Malloch and Mallik 1998)

Letendraea Sacc.

Letendraea helminthicola (Berk. & Broome) Weese, Trans. Br. Mycol. Soc. 21(3-4): 277 (1938)

UK, parasitized, *Helminthosporium appendiculatum*

Letendraea kamatii A. Pande, J. Univ. Poona 52: 313 (1979)

Inida, parasitized, *Helminthosporium*

Paraconiothyrium Verkley

Paraconiothyrium fungicola Verkley & Wicklow, Stud. Mycol. 50(2): 331 (2004)

≡ *Paracamarosporium fungicola* (Verkley & Wicklow) Wijayaw. & K.D. Hyde, Stud. Fung. 1(1): 4 (2016)

Georgia, colonized, old Polyporale

Phaeodothis Syd. & P. Syd.

Phaeodothis winteri (Niessl) Aptroot, Nova Hedwigia 60(3-4): 358 (1995)

Worldwide, parasitized, many ascomycetes (Malloch and Mallik 1998)

Leptosphaeriaceae M.E. Barr

Leptosphaeria Ces. & De Not.

Leptosphaeria caucana Petr., Sydowia 5(3-6): 244 (1951)

Colombia, colonized, *Phyllachora*

Leptosphaeria didymellae-vincetoxici E. Müll., Sydowia 5(1-2): 51 (1951)

Switzerland, colonized, *Didymella vincetoxici*

Leptosphaeria platychorae E. Müll., Sydowia 7(1-4): 275 (1953)

France, colonized, *Phytihysterium fuscum*

Lophiostomataceae Sacc.

Muroia I. Hino & Katum.

Muroia nipponica I. Hino & Katum., J. Jap. Bot. 33: 79 (1958)

Japan, colonized, *Hypoxylon* (Bandoni 1998)

Massarinaceae Munk

Helminthosporium Link

Helminthosporium balladynae Hansf., Proc. Linn. Soc. London 157(1944-45): 39 (1945)

≡ *Eriocercospora balladynae* (Hansf.) Deighton, Mycol. Pap. 118: 6 (1969)

Uganda, colonized, *Balladynocallia glabra*

Helminthosporium crassiseptum Cif., Sydowia 9(1-6): 302 (1955)

Dominica, colonized, *Meliola abrupta*

Helminthosporium conviva Malençon & Bertault, Acta Phytotax. Barcinon. 11: 19 (1972)

Spain, colonized, *Hyphoderma calyciferum*

Helminthosporium dorycarpum* var. *amazoniae S. Hughes, Mycol. Pap. 50: 24 (1953)

≡ *Spiropes dorycarpus* (Mont.) M.B. Ellis, Mycol. Pap. 114: 11 (1968)

Togo, colonized, *Amazonia psychotriae*

Helminthosporium xylopiifolii Bat., Atas Inst. Micol. Univ. Recife 1: 261 (1960)

Brazil, colonized, *Asterina*

Microsphaeropsidaceae Q. Chen et al.

Microsphaeropsis Höhn.

Microsphaeropsis centaureae Morgan-Jones, Can. J. Bot. 52(12): 2575 (1975)

Canada, colonized, *Sclerotinia sclerotiorum*

Microsphaeropsis ochracea Carisse & Bernier, Mycologia 94(2): 298 (2002)

Canada, colonized, *Venturia inaequalis*

Montagnulaceae M.E. Barr

Cryptophaeella Höhn.

Cryptophaeella trematosphaeriicola Frolov, Nov. sist. Niz. Rast., 5: 187 (1968)

Turkmenistan, colonized, *Trematosphaeria*

Periconiaceae (Sacc.) Nann

Periconia Tode.

Periconia melioliphila Cif., Atti Ist. Bot. Univ. Lab. crittog. Pavia, sér. 5 19: 120 (1962)

Dominica, obligate parasitized, *Meliola agusta*

Phaeosphaeriaceae M.E. Barr

Ampelomyces Ces. ex Schltdl.

Ampelomyces abramovii Teterevn.-Babajan & Nelen, Nov. sist. Niz. Rast. 12: 226 (1975)

Belarus, parasitized, hyphae of *Mucor*

Ampelomyces quisqualis Ces., Bot. Ztg. 10: 301 (1852)

Worldwide, parasitized, powdery mildew (Sundheim 1982; Pintye et al. 2015; Parratt et al. 2017)

Cicinobolus Ehrenb.

Cicinobolus novoae Unamunos, Mauritania, Tänger 13(no. 149): 133 (1940)

≡ *Ampelomyces novoae* (Unamuno) Rudakov, Mikol. Fitopatol. 13(2): 110 (1979)

Morocco, colonized, *Oidium leucoconium*

Cicinobolus pharbitis Unamuno, Mauritania, Tänger 13(no. 153): 261 (1940)

Morocco, colonized, *Oidium erysiphoides*

Cicinobolus senecionis Unamuno, Mauritania, Tänger 15(no. 178): 285 (1942)

Morocco, colonized, *Oidium erysiphoides*

Cicinobolus sporophagus Golovin, Centr. Asian Univ. Stud., N.S. 14(no. 5): 28 (1950)

≡ *Ampelomyces sporophagus* (Golovin) Rudakov, Mikol. Fitopatol. 13(2): 109 (1979)

Russia, colonized, *Helmimthosporium delphinii*

Darluca Castagne

Darluca bauhiniicola Bat. & Peres, Publicações Inst. Micol. Recife 358: 14 (1962)

Brazil, parasitized, *Uredo bauhiniicola*

Darluca teliosporae Subhedar & V.G. Rao, J. Univ. Poona, Sci. Techn. 48: 63 (1976)

USA, parasitized, *Puccinia operta*

Eudarluca Speg.

Eudarluca australis Speg., Revta Mus. La Plata 15(2): 22 (1908)

Worldwide, parasitized, Uredinales (Katumoto 1986)

Eudarluca biconica Katum., Trans. Mycol. Soc. Japan 27(1): 14 (1986)

Japan, colonized, stromata of *Botryosphaeria*

Eudarluca indica T.S. Ramakr., Proc. Indian Acad. Sci., Pl. Sci. 34: 158 (1951)

India, parasitized, *Uredo amomi*

Eudarluca mycophila (Petr.) Arx, Beitr. Kryptfl. Schweiz 11(no. 2): 314 (1962)

Philippines, parasitized, rust fungi

Eudarluca quinqueseptata Katum., Trans. Mycol. Soc. Japan 27(1): 13 (1986)

Japan, colonized, stromata of *Botryosphaeria dothidea*

Hendersonia aberrans Petr.

Hendersonia leptostromatis Petr., Sydowia 8(1-6): 181 (1954)

Pakistan, parasitized, *Leptostroma ahmadii*

Sphaerellopsis Cooke

Sphaerellopsis anomala Nag Raj, Coelomycetous Anamorphs with Appendage-bearing Conidia (Ontario): 896 (1993)

Colombia, parasitized, *Puccinia* (Liesebach and Zaspel 2004)

Sphaerellopsis filum (Biv.) B. Sutton, Mycol. Pap. 141: 196 (1977)

Worldwide, parasitized, Pucciniales (Yuan et al. 1999)

Sphaerellopsis macroconidialis Crous & Trakun., IMA Fungus 5(2): 410 (2014)

Netherlands, parasitized, *Puccinia allii*

Sphaerellopsis paraphysata Crous & Alfenas, IMA Fungus 5(2): 411 (2014)

Brazil, parasitized, rust fungus of *Pennisetum*

Pleosporaceae Nitschke

Alternaria Nees

Alternaria pulvinifungicola E.G. Simmons, CBS Diversity Ser. (Utrecht) 6: 514 (2007)

USA, colonized, unknown fungal pad on dead wood of *Quercus*

Macrosporium Fr.

Macrosporium meliolicola Cif., Atti Ist. Bot. Univ. Lab. crittog. Pavia, sér. 5 19: 114 (1962)

Dominica, colonized, *Meliola kadua*

Pleospora Rabenh. ex Ces. & De Not.

Pleospora rhytidhysterii Petr., Sydowia 16(1-6): 243 (1963)

Argentina, colonized, *Phytihysterium rufulum*

Roussoellaceae J.K. Liu et al.

Cytoplea Bizz. & Sacc.

Cytoplea parasitica Petr., Feddes Repert. Spec. Nov. Regni Veg., Beih. 42: 446 (1927)

Pakistan, colonized, fruiting body of *Hypoxylon rubiginosum*

Lentitheciaceae Y. Zhang et al.

Keissleriella Höhn.

Keissleriella bavarica Butin, Phytopath. Z. 100(2): 187 (1981)

Germany, colonized, *Ascodichaena rugosa*

Sporormiaceae Munk

Sporormiella Ellis & Everh.

Sporormiella minima (Auersw.) S.I. Ahmed & Cain, Pakist. J. Scient. Ind. Res. 12(3): 241 (1970)

Worldwide, ambiguous, Coprophilous fungi (Richardson 2002)

Sporormiella minimoides S.I. Ahmed & Cain, Can. J. Bot. 50(3): 450 (1972)

Worldwide, ambiguous, coprophilous fungi (Richardson 2002)

Torulaceae Corda

Torula Pers.

Torula epistromata Cif., Sydowia 10(1-6): 176 (1957)

Dominica, parasitized, *Phyllachora guazumae*

Pleosporales genera *incertae sedis*

Repetophragma Subram.

Repetophragma gondwanamycetis Marinc., M.J. Wingf. & Crous, CBS Diversity Ser. (Utrecht) 7: 118 (2008)

South Africa, colonized, ascoma of *Gondwanamyces*

Scolecobasidium E.V. Abbott

Scolecobasidium dendroides Piroz. & Hodges, Can. J. Bot. 51(1): 162 (1973)

USA, colonized, *Circinotrichum fertile*

Scolecobasidium pusillum Deighton & Piroz., Mycol. Pap. 128: 82 (1972)

≡ *Dactylaria pusilla* (Deighton & Piroz.) de Hoog & Arx, Kavaka 1: 58 (1974)

Sierra Leone, colonized, *Exosporium stilbaceum*

Tubeufiales Boonmee & K.D. Hyde

Tubeufiaceae M.E. Barr

Tubeufia Penz. & Sacc.

Tubeufia aciculospora Katum. & Y. Harada, Trans. Mycol. Soc. Japan 20(4): 423 (1979)

Japan, Norway, parsitized, mycelium of *Perisporiopsis quinqueseptata* (Gams et al. 2004)

Tubeufia asclepiadis Bat. & R.G. de Souza, Brotéria, N.S. 14: 67 (1961)

Brazil, colonized, *Parasterina laxiuscula*

Tubeufia aurantiella (Penz. & Sacc.) Rossman, Mycotaxon 8(2): 489 (1979)

Java, colonized, *Asteridiella*

Tubeufia brevispina (M.E. Barr & Rogerson) J.L. Crane et al., Can. J. Bot. 76(4): 611 (1998)

≡ *Acanthostigmella brevispina* M.E. Barr & Rogerson, Mycotaxon 17: 247 (1983)

USA, colonized, stromata of *Hypoxylon deustum*

Tubeufia cerea (Berk. & M.A. Curtis) Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 128(7-8): 562 (1919)

China, colonized, stromata of Xylariales (Zhou and Boland 1998)

Venturiales Yin. Zhang & K.D. Hyde

Venturiaceae E. Müll. & Arx ex M.E. Barr

Ectosticta Speg.

Ectosticta mindoensis Petr., Sydowia 4(1-6): 559 (1950)

Ecuador, parasitized, *Meliola capsicola*

Ectosticta popowiae Bat., Revta Biol., Lisb. 1(2): 148 (1957)

Uganda, parasitized, *Parasterina uvariae* var. *singulatum*

Fusicladium Bonord.

Fusicladium poricola Bonar, Mycologia 57(3): 393 (1965)

≡ *Porophilomyces poricola* (Bonar) U. Braun, Schlechtendalia 5: 42 (2000)

USA, colonized, *Poria ferrea*

Phragmogibbera Samuels & Rogerson

Phragmogibbera xylariicola Samuels & Rogerson, Mem. N. Y. Bot. Gdn 64: 178 (1990)***

Venezuela, colonized, *Xylaria*

Dothideomycetes, famlies *incertae sedis*

Dimeriaceae E. Müll. & Arx ex Arx & E. Müll.

Dimerium (Sacc. & P. Syd.) McAlpine

Dimerium alpinum W.B. Cooke, Mycologia 41(6): 609 (1950)

≡ *Antennulariella alpina* (W.B. Cooke) M.E. Barr, Mycotaxon 29: 501 (1987)

Switzerland, colonized, Discomycete

Dimerium andicola Petr., Sydowia 4(1-6): 471 (1950)

Ecuador, ambiguous, *Meliola ambigua*

Dimerium asterinacearum M.L. Farr, Sydowia 38: 66 (1986)

Colombia, ambiguous, *Asterina*

Dimerium costaricense Syd., Annls Mycol. 24(5/6): 322 (1926)

USA, colonized, Englerulaceae

Dimerium detectum Petr., Sydowia 4(1-6): 473 (1950)

Ecuador, ambiguous, *Meliola*

Dimerium ecuadoricum Petr., Sydowia 4(1-6): 474 (1950)

Ecuador, ambiguous, *Meliola*

Dimerium stromaticola Petr., Sydowia 4(1-6): 477 (1950)

Ecuador, colonized, Polystomellaceae

Dimerium vanderystii Hansf., Beih. Sydowia 1: 121 (1957)

Congo, ambiguous, *Parodiopsis kwangensis*

Meliolinaceae S. Hughes

Meliolina Syd. & P. Syd.

Meliolina irenicola (Doidge) F. Stevens, Annls Mycol. 25(5/6): 416 (1927)

South Africa, ambiguous, *Perisporium irenicolum*

Meliolina meliolae (F. Stevens) F. Stevens, Annls Mycol. 25(5/6): 416 (1927)

≡ *Perisporium meliolae* F. Stevens, Bot. Gaz. 65(3): 228 (1918)

Porto Rico, ambiguous, *Perisporium meliolae*

Meliolina suspecta Cif., Atti Ist. Bot. Univ. Lab. crittog. Pavia, sér. 5 19: 116 (1962)

Dominica, ambiguous, *Meliola monilipes*

Nematotheciaceae Boonmee & K.D. Hyde

Nematothecium Syd. & P. Syd.

Nematothecium asterinae Hansf., Proc. Linn. Soc. London 157: 26 (1945)

≡ *Saccardomyces asterinae* (Hansf.) Bat. & H. Maia, Anais Soc. Biol. Pernambuco 13(2): 101 (1955)

Uganda, obligate parasitized, *Asterina geniospori*

Nematothecium australiense Hansf., Proc. Linn. Soc. N.S.W. 79(3-4): 115 (1954)

Australia, obligate parasitized, *Irenina acmenae*

Nematothecium hansfordii Sathe & Vaidya, Curr. Sci. 45(4): 146 (1976)

India, obligate parasitized, *Meliola memecyli*; Vietnam, obligate parasitized, *Meliola quadan* (Johnston 1999)

Nematothecium horridum (Pat.) Rossman, Mycol. Pap. 157: 57 (1987)

≡ *Hyaloderma horridum* Pat., Bull. Soc. Mycol. Fr. 12: 126 (1896)

Brazil, obligate parasitized, *Monilinia laxa* (Larena et al. 2005)

Nematothecium ugandense Hansf., Proc. Linn. Soc. London 158(1): 39 (1947)

Uganda, obligate parasitized, *Irenina entebbeensis*

Nematothecium vinosum Syd. & P. Syd., Leafl. Philipp. Bot. 5(no. 76): 1534 (1912)

Philippines, obligate parasitized, Meliolales

Paranectriellaceae S. Boonmee & K.D. Hyde

Paranectriella (Henn. ex Sacc. & D. Sacc.) Höhn.

Paranectriella arcuata (Hansf.) Rossman, Mycol. Pap. 157: 24 (1987)

China, Uganda, obligate parasitized, *Asterina*, *Mircrocylus pruni* (Li and Hsieh1991)

Paranectriella hemileiae (Hansf.) Piroz., Kew Bull. 31(3): 598 (1977)

≡ *Titaea hemileiae* Hansf., Mycol. Pap. 15: 207 (1946)

Uganda, obligate parasitized, *Hemileia vastatix*

Paranectriella imperconspicua (Höhn.) Piroz., Kew Bull. 31(3): 598 (1977)

≡ *Paranectria imperconspicua* Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 822 (1909)

Java, obligate parasitized, *Discodothis filicum*

Paranectriella meliolicola (F. Stevens) Piroz., Kew Bull. 31(3): 598 (1977)

≡ *Paranectria meliolicola* F. Stevens, Bot. Gaz. 65(3): 232 (1918)

Uganda, obligate parasitized, *Meliola paulliniae*

Paranectriella miconiae (F. Stevens) Rossman, Mycol. Pap. 157: 27 (1987)

≡ *Paranectria miconiae* F. Stevens, Bot. Gaz. 65(3): 233 (1918)

Puerto Rico, obligate parasitized, Microthyriaceae

Paranectriella minuta (Hansf.) Piroz., Kew Bull. 31(3): 600 (1977)

≡ *Paranectria minuta* Hansf., Proc. Linn. Soc. London 153: 30 (1941)

Uganda, parasitized, *Meliola paulliniae*

Paranectriella stromaticola (Henn.) Magnus, Botan. Zbl. 98: 587 (1905)

≡ *Paranectria stromaticola* Henn., Bot. Jb. 34: 50 (1904)

Uganda, obligate parasitized, Microthyriaceae

Puttemansia Henn.

Puttemansia brachytricha Syd., Annls Mycol. 23(3/6): 361 (1925)

Costa Rica, parasitized, rust-like fungi

Puttemansia hyperparasitica (Sivan. & J. Kranz) Piroz., Kew Bull. 31(3): 601 (1977)

≡ *Annajenkinsia hyperparasitica* Sivan. & J. Kranz, Trans. Br. Mycol. Soc. 64(1): 11 (1975)

Malesia, parasitized, *Phyllachora cinnamomi*

Puttemansia lanosa Henn., Hedwigia 41: 112 (1902)

Brazil, Costa Rica, Indonesia, Paraguay, parasitized, *Phyllachora phoebes* (Pirozynski 1977; Rossman 1987)

Puttemansia rickiana (Sacc., Syd. & P. Syd.) Petr., Annls Mycol. 29(5/6): 339 (1931)

≡ *Calonectria rickiana* Sacc., Syd. & P. Syd., Annls Mycol. 5(2): 177 (1907)

Brazil, Dominica, parasitized, *Phaeodomus erupens* (Pirozynski 1977; Rossman 1987)

Puttemansia stromatica (Cooke) Rossman, Mycol. Pap. 157: 35 (1987)

≡ *Helotiella stromatica* Cooke, Grevillea 20(no. 95): 91 (1892)

Brazil, Dominican Republic, India, parasitized, *Nectandra*, *Ocotea floribunda*, *Phaeodomus erumpens*, *Phyllachora amphidyma*

Puttemansia stromaticola (Henn.) Rossman, Mycol. Pap. 157: 36 (1987)

≡ *Calonectria stromaticola* Henn., Bot. Jb. 40: 226 (1908)

Peru, colonized, *Polystromella nerviseguia*

Puttemansia verrucosa R. Kirschner, Sydowia 62(2): 227 (2010)

Panam, colonized, Discomycete

Puttemansia wildemaniana (Henn.) Piroz., Kew Bull. 31(3): 601 (1977)

≡ *Paranectria wildemaniana* Henn., Mission. E. Laurent. 3: 316 (1906)

Africa, Congo, Uganda, parasitized, *Meliola* (Pirozynski 1977; Rossman 1987)

Parmulariaceae E. Müll. & Arx ex M.E. Barr

Hysterostomella *Speg.*

Hysterostomella tetracerae (F. Rudolphi) Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 1541 (1909)

Ghana, ambiguous, *Hysterostomella tetracericola*

Parodiopsidaceae Toro

Phaeophragmeriella Hansf.

Phaeophragmeriella cirsosiae Bat., Publicações Inst. Micol. Recife 211: 42 (1962)

Brazil, parasitized, *Cirsosia moquileae*

Phaeophragmeriella constricta Bat. & A.F. Vital, Anais Soc. Biol. Pernambuco 13(2): 97 (1955)

Brazil, parasitized, *Phaeosaccardinula pipernigricola* and *P. constricta*

Phaeophragmeriella englerulae Hansf., Proc. Linn. Soc. London 157: 25 (1945)

Uganda, parasitized, *Englerula macarangae*

Phaeophragmeriella stegasphaeriae Hansf., Proc. Linn. Soc. London: 108 (1944)

Uganda, parasitized, *Stegasphaeria ugandensis*

Phaeophragmeriella tecleae Hansf., Proc. Linn. Soc. London 156: 108 (1944)

Uganda, parasitized, *Meliola teclea*

Phaeophragmeriella ugandensis Hansf., Mycol. Pap. 15: 98 (1946)

Uganda, parasitized, *Meliola teclea*

Phaeophragmeriella ugandensis* var. *etoumbii C. Moreau & Moreau, Revue Mycol., Paris 14(suppl. colon. 2): 63 (1949)

≡ *Phaeophragmeriella ugandensis* Hansf., Mycol. Pap. 15: 98 (1946)

Uganda, parasitized, *Meliola teclea*

Phaeophragmeriella ugandensis* var. *ugandensis Hansf., Mycol. Pap. 15: 98 (1946)

≡ *Phaeophragmeriella ugandensis* Hansf., Mycol. Pap. 15: 98 (1946)

Uganda, colonized, *Meliola teclea*

Perisporiopsidaceae E. Müll. & Arx

Cicinnobella Henn.

Cicinnobella andicola Petr., Sydowia 4(1-6): 553 (1950)

Ecuador, ambiguous, *Meliola ambigua*

Cicinnobella ecuadorica Petr., Sydowia 4(1-6): 554 (1950)

Ecuador, ambiguous, *Meliola*

Cicinnobella stromaticola Petr., Sydowia 4(1-6): 555 (1950)

Ecuador, ambiguous, Polystomellaceae

Cicinnobella truncatula Cif., Sydowia 8(1-6): 249 (1954)

Dominica, colonized, *Meliola coronata* var. *triumfettae*

Phaeodimeriellaceae Boonmee et al.

Phaeodimeriella Speg.

Phaeodimeriella appendiculata (Earle) R.E.D. Baker, Mycol. Pap. 33: 44 (1951)

≡ *Dimerosporium appendiculatum* Earle, Bull. New York Bot. Gard. 3(no. 11): 303 (1905)

Trinidad-Tobago, obligate parasitized, *Asterina diplopoda*

Phaeodimeriella asperula Syd., Annls Mycol. 23(3/6): 333 (1925)

Costa Rico, obligate parasitized, *Asterina acalyphae*

Phaeodimeriella asterinae Y.M. Ahn & J.L. Crane, Can. J. Bot. 82(11): 1629 (2004)

USA, obligate parasitized, *Asterina acalyphae*

Phaeodimeriella asterinarum (Speg.) Theiss., Beih. Bot. Zbl., Abt. 2 29: 68 (1912)

≡ *Dimerosporium asterinarum* Speg., Boln Acad. nac. Cienc. Córdoba 11(4): 484 (1889)

Brazil, obligate parasitized, *Asterina*
Phaeodimeriella asterinicola Doidge, Trans. Roy. Soc. South Africa 8(2): 115 (1920)
Costa Rico, obligate parasitized, *Asterina acalyphae*
Phaeodimeriella echinulospora Hansf., Proc. Linn. Soc. London 157: 24 (1945)
Uganda, obligate parasitized, *Meliola macarangicola*
Phaeodimeriella fevilleae Bat., Nascim. & M.L. Farr, Publicações Inst. Micol. Recife 1: 334 (1960)
Dominica, obligate parasitized, Meliolaceae
Phaeodimeriella meliolicola (Petr.) M.E. Barr, Mycotaxon 64: 160 (1997)
≡ *Dimerium meliolicola* (Petr.) Hansf., Mycol. Pap. 15: 77 (1946)
Dominica, obligate parasitized, Meliolaceae
Phaeodimeriella meliolinae (Toro) Toro, J. Agric. Univ. Puerto Rico 36: 79 (1952)
≡ *Chaetostigmella meliolinae* Toro, Annls Mycol. 32(1/2): 112 (1934)
Dominica, obligate parasitized, Meliolaceae
Phaeodimeriella parvula (Cooke) Hansf., Mycol. Pap. 15: 64 (1946)
≡ *Dimerosporium parvulum* Cooke, Grevillea 20(no. 93): 5 (1891)
Guatemala, obligate parasitized, Meliolaceae
Phaeodimeriella parvula* var. *echidnodellae Bat. & Nascim., Revta Biol., Lisb. 1(2): 153 (1957)
≡ *Phaeodimeriella parvula* (Cooke) Hansf., Mycol. Pap. 15: 64 (1946)
Guatemala, obligate parasitized, *Echidnodella guatemalensis*
Phaeodimeriella piperis Bat. & Peres, Riv. Patol. veg., Pavia, sér. 4 1(1-2): 65 (1965)
Brazil, parasitized, Asbolisiaceae, Capnodiaceae, *Phaeosaccardinula*
Phaeodimeriella trinitensis R.E.D. Baker & W.T. Dale, Mycol. Pap. 33: 44 (1951)
Asterina solanicola Berk. & M.A. Curtis, Soc., Bot. 10(no. 46): 374 (1868)
Trinidad, obligate parasitized, *Asterina diplopoda*
Phaeodimeriella uncinata (Theiss.) Hansf., Mycol. Pap. 15: 64 (1946)
≡ *Dimeriella uncinata* Theiss., Brotéria, sér. Bot. 9: 21 (1910)
Trinidad, obligate parasitized, *Meliola tecleae*

Trichopeltinaceae Bat. et al.
Trichothyrinula Petr.
Trichothyrinula petrakii (Cif.) Arx, Schweiz 11(no. 2): 561 (1962)
Africa, colonized, *Schiffnerula*
Trichothyrinula sydowii Petr., Sydowia 4(1-6): 171 (1950)
Ecuador, colonized, *Trichothyrinula petrakii*, Polystomellaceae

Dothideomycetes genera *incertae sedis*
Acanthostigmella Höhn.
Acanthostigmella brevispina M.E. Barr & Rogerson, Mycotaxon 17: 247 (1983)
USA, colonized, stromata of *Hypoxylon deustum*
Acanthostigmella pallida Dennis & M.E. Barr, Mycotaxon 6(1): 21 (1977)
UK, colonized, stromata of *Hypoxylon mammatum*
Annajenkinsia Thirum. & Naras.
Annajenkinsia fungicola Thirum. & Naras., Mycologia 47(5): 760 (1955)
India, parasitized, *Phyllachora amphibola*
Annajenkinsia hyperparasitica Sivan. & J. Kranz, Trans. Br. Mycol. Soc. 64(1): 11 (1975)
Indonesia, parasitized, *Phyllachora cinnamomi*
Byssocallis Syd.
Byssocallis capensis (Doidge) Rossman, Mycotaxon 8(2): 496 (1979)
≡ *Calonectria capensis* Doidge, Bothalia 1(4): 218 (1924)
South Africa, obligate parasitized, *Irene podocarpi*
Byssocallis phoebes Syd., Annls Mycol. 25(1/2): 14 (1927)
Costa Rica, obligate parasitized, *Meliola*
Catulus Malloch & Rogerson
Catulus aquilonius Malloch & Rogerson, Can. J. Bot. 56(19): 2345 (1978)
Canada, colonized, *Seuratia millardetii*
Chionomyces Deighton & Piroz.
Chionomyces chorleyi (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 78 (1972)
Uganda, ambiguous, *Meliola chorleyi*
Chionomyces ellipsoideus B. Sutton, Mycol. Pap. 167: 19 (1993)
USA, ambiguous, fungal ascomata on dead stems
Chionomyces meliolicola (Cif.) Deighton & Piroz., Mycol. Pap. 128: 75 (1972)
Uganda, ambiguous, *Meliola chorleyi*
Chionomyces sclerochitonis (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 80 (1972)
Uganda, ambiguous, *Meliola sclerochitonis*
Eriomycopsis Speg.
Eriomycopsis acrophioglossa Cif., Sydowia 8(1-6): 256 (1954)
Dominica, ambiguous, Microthyriaceae
Eriomycopsis africana Hansf., Bothalia 4: 466 (1942)
≡ *Trichoconis africana* (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 14 (1972)
Uganda, ambiguous, *Asterina*

Eriomycopsis angustispora Hansf., Bothalia 4: 466 (1942)

≡ *Trichoconis angustispora* (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 7 (1972)

Uganda, ambiguous, *Hysterostomella tetracerae*

Eriomycopsis biseptata Chevaug., Les Maladies Cryptogamiques du Manioc en Afriqu Occidentale (Encycl. Mycol. 28): 81 (1956)

Uganda, colonized, *Irenina entebbeensis*

Eriomycopsis bomplandi Speg., Anal. Mus. nac. Hist. nat. B. Aires 20(13): 429 (1910)

Argentina, ambiguous, *Meliola*

Eriomycopsis bosquieae Hansf., Bothalia 4: 466 (1942)

Uganda, ambiguous, *Meliola sorocea*

Eriomycopsis chinensis Hansf., Farlowia 3(3): 280 (1948)

≡ *Paratrichoconis chinensis* (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 32 (1972)

China, ambiguous, *Asterina linderae*

Eriomycopsis chorleyi Hansf., Bothalia 4: 468 (1942)

≡ *Chionomyces chorleyi* (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 78 (1972)

Uganda, ambiguous, *Meliola chorleyi*

Eriomycopsis englerulae Hansf., Proc. Linn. Soc. London 157(1944-45): 39 (1945)

≡ *Trichoconis englerulae* (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 12 (1972)

Uganda, ambiguous, *Meliola macarangicola*

Eriomycopsis guaranitica (Speg.) U. Braun, Mycotaxon 51: 42 (1994)

Brazil, ambiguous, *Phomatospora botryosphaerioide*

Eriomycopsis hamata Hansf., Bothalia 4: 465 (1942)

≡ *Trichoconis hamata* (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 9 (1972)

Uganda ambiguous, *Meliola*

Eriomycopsis lasiosphaeriicola U. Braun & Melnik, Mikol. Fitopatol. 32(1): 3 (1998)

Russia, colonized, stromata of *Lasiosphaeria hirsute*

Eriomycopsis meliolinae Hansf., Proc. Linn. Soc. London 158: 48 (1947)

Uganda, ambiguous, *Meliola tecleae* and *Meliolina octospora*

Eriomycopsis minima Hansf., Bothalia 4: 465 (1942)

≡ *Rhytidenglerula minima* (Hansf.) Arx, Schweiz 11(no. 2): 159 (1962)

Uganda, ambiguous, *Irenina galbra*

Eriomycopsis minuta Deighton & Piroz., Mycol. Pap. 128: 60 (1972)

Sierra Leone, ambiguous, *Melanographium citri*

Eriomycopsis paraensis Bat. & Peres, Mycopath. Mycol. appl. 25: 168 (1965)

Brazil, ambiguous, Meliolaceae

Eriomycopsis robusta Hansf., Bothalia 4: 468 (1942)

Uganda, ambiguous, *Meliola*

Eriomycopsis schiffnerulae Hansf., Bothalia 4: 467 (1942)

≡ *Trichoconis schiffnerulae* (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 22 (1972)

Uganda, ambiguous, *Schiffnerula mirabilis*

Eriomycopsis tenuis Syd., Annls Mycol. 25(1/2): 137 (1927)

Brazil, ambiguous, *Parodiopsidis stevensii*

Eriomycopsis trichiliae Hansf., Bothalia 4: 467 (1942)

≡ *Trichoconis trichiliae* (Hansf.) Deighton & Piroz., Mycol. Pap. 128: 10 (1972)

Uganda, ambiguous, *Asterina*

Eriomycopsis ugandae Hansf., Bothalia 4: 467 (1942)

Uganda, ambiguous, *Schiffnerula bridelia*

Gibberidea Fuckel

Gibberidea parasitica Petr., Sydowia 13(1-6): 124 (1959)

≡ *Lophiostoma parasiticum* (Petr.) L. Holm, Svensk Bot. Tidskr. 62: 234 (1968)

Iraq, parasitized, *Calonectria kurdica* and *Cucurbitaria kurdica*

Hyalocrea Syd. & P. Syd.

Hyalocrea arcuata (Hansf.) Rossman, Mycotaxon 8(2): 489 (1979)

≡ *Paranectriella arcuata* (Hansf.) Rossman, Mycol. Pap. 157: 24 (1987)

China, Uganda, ambiguous, *Asterina*, *Mircrocylus pruni* (Li and Hsieh 1991)

Hyalosphaera F. Stevens

Hyalosphaera ciliata Rossman, Mycol. Pap. 157: 53 (1987)

Venezuela, obligate parasitized, *Irene hyptidicola*

Malacaria Syd.

Malacaria australiensis Hansf., Proc. Linn. Soc. N.S.W. 79(3-4): 116 (1954)

Australia, New Zealand, obligate parasitized, *Irenina fraseriana* (McKenzie et al. 2006)

Malacaria entebbeensis Hansf., Proc. Linn. Soc. London 157: 26 (1945)

Australia, Uganda, obligate parasitized, *Irenina fraseriana* and *Meliola artabotrydis*

Malacaria flagellata (Hansf.) Hansf., Mycol. Pap. 15: 128 (1946)

≡ *Paranectria flagellata* Hansf., Proc. Linn. Soc. London 153(1): 28 (1941)

Uganda, obligate parasitized, *Irenina glabra*

Malacaria luxurians (Rehm) Rossman, Mycol. Pap. 157: 12 (1987)

≡ *Paranectria luxurians* Rehm, Leafl. of Philipp. Bot. 8(no. 117): 2924 (1915)

Philippines, obligate parasitized, *Irenina glabra*

Malacaria meliolicola Syd., Annls Mycol. 28(1/2): 69 (1930)
Uganda, obligate parasitized, *Irenina glabra*
Malacaria ugandensis Hansf., Mycol. Pap. 15: 127 (1946)
Uganda, obligate parasitized, *Meliola*
Malacaria violacea (Racib.) Hansf., Mycol. Pap. 15: 127 (1946)
Indonesia, obligate parasitized, *Meliola*
Meliolíphila Speg.
Melioliphila adianti (Rehm) Piroz., Kew Bull. 31(3): 596 (1977)
≡ *Calonectria adianti* Rehm, Hedwigia 37: 197 (1898)
Uganda, obligate parasitized, *Meliola*
Melioliphila appendiculata (Rehm) Rossman, Mycotaxon 8(2): 488 (1979)
≡ *Calonectria appendiculata* Rehm, Hedwigia 37: 197 (1898)
Brazil, Ghana, obligate parasitized, *Meliola*
Melioliphila balanseana (Berl. & Roum.) Piroz., Kew Bull. 31(3): 596 (1977)
≡ *Calonectria balanseana* Berl. & Roum., Revue Mycol., Toulouse 10(no. 38): 77 (1888)
Brazil, Paraguay, Uganda, obligate parasitized, *Meliola* including *M. rhois*, *M. tecleae* (Rossman 1987)
Melioliphila coralloides (Maubl.) Rossman, Mycotaxon 8(2): 500 (1979)
≡ *Calonectria coralloides* Maubl., Bull. Soc. Mycol. Fr. 36(1): 37 (1920)
Brazil, Kenya, obligate parasitized, *Meliola celastracearum*, *M. feflxxa*
Melioliphila erysiphoides (Berl. & Roum.) Piroz., Kew Bull. 31(3): 596 (1977)
≡ *Calonectria erysiphoides* Berl. & Roum., Revue Mycol., Toulouse 10(no. 38): 76 (1888)
Philippines, South Africa, obligate parasitized, *Meliola*
Melioliphila graminicola Speg., Boln Acad. nac. Cienc. Córdoba 26(2-4): 344 (1921)
≡ *Calonectria graminicola* F. Stevens, Bot. Gaz. 65(3): 232 (1918)
Porto Rico, obligate parasitized, *Meliola* (Pirozynski 1977)
Melioliphila longisetosa (Hansf.) Rossman, Mycotaxon 8(2): 526 (1979)
≡ *Calonectria longisetosa* Hansf., Mycol. Pap. 15: 125 (1946)
Uganda, obligate parasitized, *Meliosla chorleyi*
Melioliphila melioloides (Speg.) Piroz., Kew Bull. 31(3): 596 (1977)
≡ *Calonectria melioloides* Speg., Anal. Soc. Cient. Argent. 19(1): 41 (1885)
Paraguay, Puerto Rico, USA, obligate parasitized, *Appendiculella sororcula*, *Meliola*
Melioliphila piliferum (Pat. & Gaillard) Piroz., Kew Bull. 31(3): 598 (1977)
≡ *Hyaloderma piliferum* Pat. & Gaillard, Bull. Soc. Mycol. Fr. 4(2): 102 (1888)
Venezuela, obligate parasitized, *Meliola*
Melioliphila volutella (Berk. & Broome) Rossman, Mycotaxon 8(2): 488 (1979)
≡ *Nectria volutella* Berk. & Broome, J. Linn. Soc., Bot. 14(no. 74): 115 (1873)
Brazil, Chile, Costa Rica, Jamaica, Paraguay, Puerto Rico, Sri Lanka, Uganda, Venezuela, Zaire, obligate parasitized, *Appendiculella natalensis*, *Meliola*
Melioliphila winkleriana (Henn.) Rossman, Mycol. Pap. 157: 22 (1987)
≡ *Hyaloderma winklerianum* Henn., Bot. Jb. 38: 125 (1905)
Brazil, Cameroon, obligate parasitized, *Meliola*
Oncopodiella G. Arnaud 1954
Oncopodiella hyperparasitica D. Hawksw., Trans. Br. Mycol. Soc. 64(1): 93 (1975)
UK, parasitized, *Lasiosphaeria spermoides*
Philonectria Hara
Philonectria carpinensis Bat. & H. Maia, Atas Inst. Micol. Univ. Recife 3: 19 (1966)
Brazil, colonized, Meilolaceae
Philonectria insignis* var. *macrospora Bat. & A.F. Vital, Anais Soc. Biol. Pernambuco 15(2): 502 (1957)
USA, colonized, *Sporoschisma*
Philonectria meliolaceicola Bat. & H. Maia, Publicações Inst. Micol. Recife 211: 45 (1962)
Brazil, colonized, *Meliola*
Pseudovirgaria H.D. Shin et al.
Pseudovirgaria hyperparasitica H.D. Shin et al., Stud. Mycol. 58: 87 (2007)
South Korea, parasitized, *Pucciniastrum agrimoniae*
Syrropeltis Bat. et al.
Syrropeltis xylopiae Bat. et al. Portug. Acta Biol., Sér. B 7(4): 377 (1964)
Brazil, colonized, *Meliola*
Titaea Sacc.
Titaea formosa Peláez, R.F. Castañeda & Arenal, Mycotaxon 70: 56 (1999)
Spain, colonized, *Dasyscyphus fuscenses*
Titaea mimeoma Cif., Sydowia 9(1-6): 330 (1955)
Dominica, colonized, *Meliola coronata* var. *triumfettae*
Titaea tetrabrachiata R. Kirschner, Fungal Divers. 21: 94 (2006)
Panama, colonized, stromata of Ascomycete

Class *Eurotiomycetes* O.E. Erikss. & Winka

Chaetothyriales M.E. Barr
Herpotrichiellaceae Munk
Capronia Sacc.

Capronia baeomycetis Diederich, Biblthca Lichenol. 64: 45 (1997)

New Guinea, colonized, apothecia of *Baeomyces heteromorphus*

Capronia castlerockii (Subhedar & V.G. Rao) Friebes, Ascomycete.org 3(2): 38 (2011)

≡ *Berlesiella castlerockii* Subhedar & V.G. Rao, Curr. Sci. 46(24): 868 (1977)

India, colonized, *Rhytidhysteron*

Capronia dactylotricha Unter., Cand. & Samuels, Antonie van Leeuwenhoek 68(1): 5 (1995)

France colonized, *Hapalopilus rutilans*

Capronia epimyces M.E. Barr, Mycotaxon 41(2): 428 (1991)

USA, colonized, *Nectria*

Capronia fungicola (Samuels & E. Müll.) E. Müll., Petrini, P.J. Fisher, Samuels & Rossman, Trans. Br. Mycol. Soc. 88(1): 73 (1987)

≡ *Berlesiella fungicola* Samuels & E. Müll., Sydowia 31(1-6): 154 (1979)

Brazil, colonized, old pyrenomyetous ascomata

Capronia glabra W.H. Hsieh, Chi Y. Chen & Sivan., Mycol. Res. 101(8): 899 (1997)

China, colonized, apothecium of *Rhytidhysteron rufulum*

Capronia moravica (Petr.) E. Müll., Petrini, P.J. Fisher, Samuels & Rossman, Trans. Br. Mycol. Soc. 88(1): 73 (1987)

≡ *Herpotrichiella moravica* Petr., Annls Mycol. 12(5): 472 (1914)

USA, colonized, *Hypoxylons*

Capronia mycophila Schmid-Heckel, Pilze in den Berchtesgadener Alpen, Nationalpark Berchtesgaden Forschungsberichte (Regensberg): 42 (1988)

Germany, colonized, *Antrodia xanthan*

Capronia nigerrima (R.R. Bloxam) M.E. Barr, Mycotaxon 41(2): 431 (1991)

≡ *Sphaeria nigerrima* R.R. Bloxam, Trans. Linn. Soc. London 22: 272 (1859)

UK, colonized, *Diatrypes speciebus*

Capronia parasitica (Ellis & Everh.) E. Müll., Petrini, P.J. Fisher, Samuels & Rossman, Trans. Br. Mycol. Soc. 88(1): 67 (1987)

USA, colonized, *Hypoxylons cohaerens*

Capronia porothelia (Berk. & M.A. Curtis) M.E. Barr, Mycotaxon 41(2): 432 (1991)

≡ *Sphaeria porothelia* Berk. & M.A. Curtis, Grevillea 4(no. 32): 142 (1876)

Europe, North America, colonized, Pyrenomycetes (Friebes 2012)

Capronia spinifera (Ellis & Everh.) E. Müll., Petrini, P.J. Fisher, Samuels & Rossman, Trans. Br. Mycol. Soc. 88(1): 69 (1987)

≡ *Melanomma spiniferum* Ellis & Everh., N. Amer. Pyren. (Newfield): 184 (1892)

Europe, North America, colonized, old basidiomycetes (Müller et al. 1987; Friebes 2012)

Cladophialophora Borelli

Cladophialophora floridana Obase, Douhan, Yos. Matsuda & M.E. Sm., Mycoscience 57(1): 29 (2016)

USA, colonized, sclerotium of *Cenococcum geophilum*

Cladophialophora pucciniophila M.J. Park & H.D. Shin, Mycotaxon 116: 450 (2011)

South Korea, parasitized, *Puccinia polygoni-amphibii*

Cladophialophora tortuosa Obase, Douhan, Yos. Matsuda & M.E. Sm., Mycoscience 57(1): 31 (2016)

USA, parasitized, *Cenococcum geophilum*

Phialophora Medlar

Phialophora pinicola Morgan-Jones, Mycotaxon 7(2): 327 (1978)

USA, ambiguous, *Cronartium queruum* f. *fusiforme*

Coryneliales Seaver & Chardón

Coryneliaceae Sacc. ex Berl. & Voglino

Coryneliopsis Butin

Coryneliopsis antarctica Butin, Nova Hedwigia 21(2-4): 471 (1972)

Chile, colonized, *Cyttaria hookeri*

Coryneliopsis cupulifera Butin, Nova Hedwigia 21(2-4): 468 (1972)

Chile, colonized, *Cyttaria hookeri*

Eurotiales G.W. Martin ex Benny & Kimbr.

Aspergillaceae Link

Aspergillus P. Micheli

Aspergillus aculeatus Iizuka, J. agric. Chem. Soc. Japan 27: 806 (1953)

China, parasitized, *Sclerotinia sclerotiorum* (Hu et al. 2013)

Aspergillus polyporicola Hubka, A. Nováková, M. Kolařík & S.W. Peterson, Mycologia 107(1): 194 (2015)

USA, parasitized, *Earliella scabrosa*

Aspergillus terreus Thom, Am. J. Bot. 5: 84 (1918)

Brazil, parasitized, *Sclerotinia sclerotiorum* (Melo et al. 2006)

Paecilomyces Bainier

Paecilomyces odonatae Zuo Y. Liu, Z.Q. Liang & A.Y. Liu, Mycosystema 8-9: 84 (1996)

China, colonized, stroma of *Cordyceps odonatae*

Penicillium Link

Penicillium angulare S.W. Peterson, E.M. Bayer & Wicklow, Mycologia 96(6): 1289 (2004)

North America, ambiguous, old Polyporaceae

Penicillium decaturense S.W. Peterson, E.M. Bayer & Wicklow, Mycologia 96(6): 1290 (2004)

North America, colonized, old Polyporaceae

Penicillium jiangxiense H.Z. Kong & Z.Q. Liang, Mycosystema 22(1): 4 (2003)

China, parasitized, *Cordyceps jiangxiensis*

Penicillium oxalicum Currie & Thom, Journal of Biological Chemistry 22(2): 289 (1915)

Spain, parasitized, *Nigrospora oryzae* (Sempere and Santamarina 2008)

Penicillium pancosmium Houbraken, Frisvad & Samson, Stud. Mycol. 70: 108 (2011)

Canada, parasitized, *Armillaria mellea*

Penicillium psychrosexualis Houbraken & Samson, IMA Fungus 1(2): 174 (2010)

Netherlands, parasitized, *Fibulorhizoctonia psychrophila*

Penicillium restrictum J.C. Gilman & E.V. Abbott, Journal of Iowa State College, Sci. 1: 297 (1927)

In lab, parasitized, many plant pathogens (Nicoletti & De Stefano 2012)

Penicillium thiersii S.W. Peterson, E.M. Bayer & Wicklow, Mycologia 96(6): 1283 (2004)

North America, parasitized, wood decay fungi

Talaromyces C.R. Benj.

Talaromyces flavus (Klöcker) Stolk & Samson, Stud. Mycol. 2: 10 (1972)

≡ *Gymnoascus flavus* Klöcker, Hedwigia 41: 80 (1902)

Worldwide, parasitized, plant fungal pathogen (Madi et al. 1997)

Talaromyces funiculosus (Thom) Samson, N. Yilmaz, Frisvad & Seifert, Stud. Mycol. 70: 176 (2011)

≡ *Penicillium funiculosum* Thom, Bull. U.S. Department of Agriculture, Bureau Animal Industry 118: 69 (1910)

China, parasitized, plant fungal pathogens

Walzia Sorokīn

Walzia racemosa Sorokīn, Trudy Obshchestva ispytateleĭ prirody pri Imperatorskom Khar'kovskom universitê 3(3): 47 (1871)

Ukraine, colonized, *Mucor mucedo*

Eurotiales genera *incertae sedis*

Diehliomyces Gilkey

Diehliomyces microsporus (Diehl & E.B. Lamb.) Gilkey, Mycologia 46: 790 (1954)

≡ *Pseudobalsamia microspora* Diehl & E.B. Lamb., Mycologia 22(5): 223 (1930)

Worldwide, parasitized, *Agaricus*

Mycocaliciales Tibell & Wedin

Mycocaliciaceae A.F.W. Schmidt

Phaeocalicium A.F.W. Schmidt

Phaeocalicium polyporaeum (Nyl.) Tibell, Publications from the Herbarium, University of Uppsala, Sweden 4: 7 (1979)

Hungary, colonized, *Trametes versicolor*, *Trichaptum biforme* (Tibell 1984; Hutchison 1987)

Sphinctrina Fr.

Sphinctrina tigillaris Berk. & Broome, Ann. Mag. nat. Hist., Ser. 3 15: 450 (1865)

≡ *Chaenothecopsis tigillaris* (Berk. & Broome) D. Hawksw., Lichenologist 46(6): 730 (2014)

UK, colonized, *Perenniporia meridionalis*

Onygenales Cif. ex Benny & Kimbr.

Gymnoascaceae Baran.

Arachniotus J. Schröt.

Arachniotus ruber (Tiegh.) J. Schröt., Krypt.-Fl. Schlesien (Breslau) 3.2(1–2): 210 (1893)

USA, parasitized, *Macrophomina phaseolina* (Grishkan et al. 2006)

Onygenaceae Berk.

Chrysosporium Corda

Chrysosporium synchronum Oorschot, Stud. Mycol. 20: 42 (1980)

Canada, parasitized, *Agaricus bisporus*

Class ***Laboulbeniomycetes*** Engl., Natürl. Pflanzenfam.

Pyxidiophorales P.F. Cannon

Pyxidiophoraceae G.R.W. Arnold

Gliocephalis Matr.

Gliocephalis hyalina Matr., Bull. Soc. Mycol. Fr. 15: 259 (1899)

Canada, obligate parasitized, *Fusarium* (Jacobs et al. 2005)

Pleurocatena G. Arnaud 1952

Pleurocatena acicularis G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 68: 195 (1952)

France, Germany, parasitized, *Hymenochaete tabacina* and *Phialea albida*

Pyxidiophora Bref. & Tavel

Pyxidiophora asterophora (Tul. & C. Tul.) Lindau, Nat. Pflanzenfam., Teil. I (Leipzig) 1(1): 316 (1897)

≡ *Hypomyces asterophorus* Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 54 (1865)

In lab, parasitized, many fungi (Gams et al. 2004)

Pyxidiophora fusispora (Tul. & C. Tul.) Maire, Annls Mycol. 9(4): 317 (1911)

≡ *Hypomyces fusisporus* Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 56 (1865)

Gaul, UK, parasitized, *Fusarium poae* and *Russula adusta* (Wakefield and Bisby 1941)

Pyxidiophora lundqvistii Corlett, Can. J. Bot. 64(4): 805 (1986)

USA, parasitized, *Fusarium poae*

Class ***Leotiomycetes*** O.E. Erikss. & Winka

Erysiphales Warm.

Erysiphaceae Tul. & C. Tul.

Oospora Wallr.
Oospora lasiosphaeriae G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 68: 195 (1952)
France, ambiguous, *Lasiosphaeria*
Oospora tholispora G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 68: 195 (1952)
France, ambiguous, *Gibberella*

Helotiales Nannf.
Cordieritidaceae *Sacc.*
Hemiphacidium Korf
Hemiphacidium convexum (Dearn.) Korf, Mycologia 54(1): 27 (1962)
≡ *Phacidium convexum* Dearn., Mycologia 18(5): 238 (1926)
Canada, colonized, *Bifusella* or *Lophodermella*
Hemiphacidium longisporum Ziller & A. Funk, Can. J. Bot. 51(10): 1960 (1974)
Canada, colonized, *Bifusella* or *Lophodermella*
Hemiphacidium planum (Davis) Korf, Mycologia 54(1): 27 (1962)
≡ *Phacidium planum* Davis, Trans. Wis. Acad. Sci. Arts Lett. 20: 424 (1922)
Canada, colonized, *Bifusella* or *Lophodermella*
Llimoniella Hafellner & Nav.-Ros.
Llimoniella adnata Hafellner & Nav.-Ros., Herzogia 9(3-4): 773 (1993)
Spain, colonized, *Catapyrenium squamulosum*
Unguiculariopsis Rehm
Unguiculariopsis adirondacensis W.Y. Zhuang, Mycotaxon 32(1): 24 (1988)
USA, ambiguous, *Lachnellula*
Unguiculariopsis changbaiensis W.Y. Zhuang, Mycol. Res. 104(4): 507 (2000)
China, ambiguous, Pyrenomyete
Unguiculariopsis godroniicola W.Y. Zhuang, Mycotaxon 32(1): 32 (1988)
France, ambiguous, *Godronia confertus*
Unguiculariopsis hysterigena (Berk. & Broome) Korf, Phytologia 21(4): 206 (1971)
China, ambiguous, *Rhytidhysteron rufulum*
Unguiculariopsis ravenelii (Berk. & M.A. Curtis) W.Y. Zhuang & Korf, Mycotaxon 29: 395 (1987)
Panama, ambiguous, *Rhytidhysteron rufulum*
Unguiculariopsis rehmii W.Y. Zhuang & Korf, Mycotaxon 32(1): 55 (1988)
Austria, ambiguous, *Cucurbitaria*
Unguiculariopsis robergei **subsp.** ***coelomyceticola*** W.Y. Zhuang, Mycotaxon 32(1): 61 (1988)
UK, ambiguous, *Septoriella*

Helotiaceae Rehm
Bisporella Sacc.
Bisporella iodocyanescens Korf & Bujak., Agarica 6(12): 304 (1985)
USA, colonized, stroma of *Melanomma pulvis-pyrius*
Bisporella nannfeldtii Svrček, Thunbergia 10: 6 (1990)
Sweden, colonized, stromata of unknown fungi
Deltosperma W.Y. Zhuang
Deltosperma dimorphum W.Y. Zhuang, Mycotaxon 32(1): 31 (1988)
USA, colonized, Pyrenomycete
Deltosperma infundibuliforme W.Y. Zhuang, Mycotaxon 32(1): 42 (1988)
Trinidad-Tobago, colonized, Diatrypaceae
Durella Tul. & C. Tul.
Durella polyporicola Svrček, Česká Mykol. 21(3): 146 (1967)
Former Czechoslovakia, parasitized, *Trametes serialis* f. *callosa*
Hymenoscyphus Gray
Hymenoscyphus sclerotigerus Svrček, Česká Mykol. 46(1-2): 36 (1992)
Former Czechoslovakia, parasitized, *Typhula*
Scytalidium Pesante
Scytalidium ganodermophthorum Kang et al. Mycologia 102(5): 1179 (2010)
South Korea, parasitized, *Ganoderma lucidum*
Hyaloscyphaceae Nannf.
Hyaloscypha Boud.
Hyaloscypha epiporia Huhtinen, Karstenia 29(2): 126 (1990)
Finland, colonized, *Amylocystis lapponica*
Hyphodiscus Kirschst.
Hyphodiscus brevicollaris (W. Gams) Hosoya, IMA Fungus 5(1): 101 (2014)
≡ *Phialophora brevicollaris* W. Gams, Stud. Mycol. 13: 71 (1976)
Germany, colonized, *Phellinus*
Hyphodiscus hymeniophilus (P. Karst.) Baral, Z. Mykol. 59(1): 7 (1993)
≡ *Peziza hymeniophila* P. Karst., Syn. Peziz. Ascob. Fenn.: 21 (1861)
Rassia, colonized, basidiomycetes
Hyphodiscus incrustatus (Ellis) Raitv., Scripta Mycol., Tartu 20: 74 (2004)
≡ *Peziza incrustata* Ellis, Am. Nat. 17(1): 192 (1883)
UK, colonized, Polyporaceae
Hyphodiscus stereicola Raitv., Pärtel & K. Põldmaa, Mycotaxon 115: 12 (2011)
Estonia, ambiguous, decaying *Stereum subtomentosum*
Unguiculella Höhn.
Unguiculella jamaicensis W.Y. Zhuang & Korf, Mycotaxon 34(2): 652 (1989)
Jamaica, colonized, *Diaporthe*

Unguiculella meliolicola Dennis, Kew Bull. 10(3): 366 (1955)

Sierra Leone, colonized, *Meliola sorindeiae*

Loramycetaceae Dennis ex Digby & Goos

Obtectodiscus E. Müll.

Obtectodiscus nectrioides Samuels & Rogerson, Acta Amazon., Supl. 14(1-2): 90 (1986)

Brazil, colonized, Basidiomycete

Mollisiaceae Rehm

Mollisia (Fr.) P. Karst.

Mollisia abacina (Fr.) Gillet, Champignons de France, Discom.(5): 129 (1882)

UK, colonized, Pyrenomycetes (Holm 1975)

Mollisia peritheciorum L. Holm, Svensk Bot. Tidskr. 69(2): 146 (1975)

Sweden, colonized, *Physalospora hyperborean*

Sclerotiniaceae Whetzel

Botrytis P. Micheli

Botrytis yuae Munt.-Cvetk., Phytopathology 44: 237 (1954)

Argentina, ambiguous, *Cercospora unamunoi*

Helotiales genera *incertae sedis*

Dactylaria Sacc.

Dactylaria dimorpha Matsush., Icon. Microfung. Matsush. lect. (Kobe): 49 (1975)

Japan, colonized, *Glomerella*

Dactylaria domina-gregum Cif., Sydowia 9(1-6): 332 (1955)

Dominica, colonized, *Meliola*

Dactylaria lanosa Malla & W. Gams, Persoonia 6(2): 193 (1971)

Netherlands, colonize, *Pseudohydnum gelatinosum*

Dactylaria mycophila Tubaki, Nagaoa 5: 17 (1955)

Japan, parasitized, *Bulgaria*, *Hirneola polytricha*, *Marasmius*

Polydesmia Boud.

Polydesmia pruinosa (Berk. & Broome) Boud., Hist. Class. Discom. Eur. (Paris): 100 (1907)

≡ *Cyphella pruinosa* Berk. & Broome, J. Linn. Soc., Bot. 14(no. 74): 74 (1873)

France, colonized, Xylariales Ellis and Ellis (1988)

Parencoelia Petr.

Parencoelia andina Petr., Sydowia 4(1-6): 349 (1950)

Ecuador, colonized, *Phyllachora ulei*

Phacidiales C.E. Bessey

Helicogoniaceae Baral

Calloriopsis Syd. & P. Syd.

Calloriopsis gelatinosa (Sacc.) Syd. & P. Syd., Annls Mycol. 15(3/4): 254 (1917)

Philippines, colonized, *Meliola ramosii*

Eleutheromyces Fuckel

Eleutheromyces geoglossi (Ellis & Everh.) Seaver, Mycologia 1(2): 48 (1909)

≡ *Hypomyces geoglossi* Ellis & Everh., J. Mycol. 2(7): 73 (1886)

USA, parasitized, *Groglossum*

Eleutheromyces longisporus W. Phillips & Plowr., Grevillea 13(no. 67): 78 (1885)

≡ *Rhynchonectria longispora* (W. Phillips & Plowr.) Höhn. et al., Wien, Math.-naturw. Kl., Abt. 1 111: 1023 (1902)

Japan, parasitized, *Trametes versicolor*

Eleutheromyces mycophilus (Höhn.) Nag Raj, Coelomycetous Anamorphs with Appendage-bearing Conidia (Ontario): 345 (1993)

≡ *Eleutheromycella mycophila* Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 117: 1023 (1908)

Austria, parasitized, *Polystictus versicolor*

Eleutheromyces subulatus (Tode) Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 183 (1870)

≡ *Sphaeria subulata* Tode, Fung. Mecklenb. sel. (Lüneburg) 2: 44 (1791)

Canada, parasitized, *Lentinula edodes*

Gelatinopsis Rambold & Triebe

Gelatinopsis hysteropatellae Baral & G. Marson, Micologia 2000 (Trento): 36 (2001)

Luxembourg, colonized, apothecia of Hysteropatella elliptica

Gelatinopsis polyconidiata Baral & G. Marson, Micologia 2000 (Trento): 39 (2001)

Luxembourg, colonized, *Trechispora*

Gelatinopsis exidiophila Baral & G. Marson, Micologia 2000 (Trento): 28 (2001)

Luxembourg, colonized, *Exidia recisa*

Helicogonium W.L. White

Helicogonium conniventis Baral & G. Marson, Nova Hedwigia 69(1-2): 30 (1999)

Germany, parasitized, hymenium of *Durella connivens*

Helicogonium cyathiculae Baral, Nova Hedwigia 69(1-2): 32 (1999)

Luxembourg, parasitized, apothecia of *Cyathicula* cf. *cacaliae*

Helicogonium fusisporum Baral & Kutorga, Mycotaxon 113: 332 (2010)

Lithuania, parasitized, apothecia of *Orbilia eucalypti* on old ascomata of *Colpoma quercinum*

Helicogonium gemmisporum (S.E. Carp.) Baral, Nova Hedwigia 69(1-2): 34 (1999)

≡ *Crocicreas gemmisporum* S.E. Carp., Mem. N. Y. Bot. Gdn 33: 109 (1981)

USA, parasitized, *Crocicreas helios*

Helicogonium hyphodisci Baral & G. Marson, Nova Hedwigia 69(1-2): 37 (1999)

Luxembourg, parasitized, apothecia of *Hyphodiscus*

Helicogonium jacksonii W.L. White, Canadian Journal of Research, Section C 20: 390 (1942)

Canada, parasitized, *Corticium microsporum*

Helicogonium melanochlorae Baral, Nova Hedwigia 69(1-2): 41 (1999)

Luxembourg, parasitized, apothecia of *Durella melanochlora*

Helicogonium mollisiophilum Baral, Nova Hedwigia 69(1-2): 43 (1999)

Germany, parasitized, hymenium of *Mollisia phalaridis*

Helicogonium odontiae (Cain) Baral, Nova Hedwigia 69(1-2): 46 (1999)

≡ *Myriogonium odontiae* Cain, Mycologia 40(2): 159 (1948)

Austria, parasitized, old *Odontia sudans*

Helicogonium orbiliarum Baral & G. Marson, Nova Hedwigia 69(1-2): 47 (1999)

Austria, parasitized, hymenium of *Orbilia* cf. *coccinella*

Helicogonium parorbiliopsidis Baral, Nova Hedwigia 69(1-2): 52 (1999)

Luxembourg, parasitized, apothecia of *Parorbiliopsis minuta*

Helicogonium petiolaridis Baral, Nova Hedwigia 69(1-2): 53 (1999)

Germany, parasitized, apothecia of Pyrenopeziza petiolaris

Helicogonium prunicolae Baral, Nova Hedwigia 69(1-2): 55 (1999)

Germany, parasitized, apothecia of *Mollisia prunicola*

Helicogonium psilachni Baral, Nova Hedwigia 69(1-2): 57 (1999)

Austria, parasitized, hymenium of *Psilachnum* aff. *Chrysostigmum*

Helicogonium scrupulosae Baral, Nova Hedwigia 69(1-2): 58 (1999)

Germany, parasitized, apothecia of *Olla scrupulosa*

Helicogonium trabinelloides Baral, Nova Hedwigia 69(1-2): 59 (1999)

Switzerland, parasitized, hymenium of *Pyrenopeziza* cf. *atrata*

Helicogonium transeuntis Baral, Nova Hedwigia 69(1-2): 62 (1999)

Germany, parasitized, apothecia of Olla transiens

Helicogonium vogesiacum Baral, Nova Hedwigia 69(1-2): 64 (1999)

France, parasitized, apothecia of *Hyaloscypha albohyalina*

Micropyxis Seeler

Micropyxis tryblidariae A. Carter & Malloch, Mycologia 74(2): 346 (1982)

≡ *Gelatinopsis tryblidariae* (A. Carter & Malloch) Hosoya & Y. Otani, Mycologia 87(5): 695 (1995)

USA, colonized, hymenium of *Tryblidaria*

Leotiomycetes family *incertae sedis*

Myxotrichaceae Locq. ex Currah

Oidiodendron Robak

Oidiodendron fimicola A.V. Rice & Currah, Stud. Mycol. 53: 80 (2005)

USA, colonized, mushroom

Oidiodendron muniellense M. Calduch, Stchigel, Gené & Guarro, Stud. Mycol. 50(1): 161 (2004)

Spain, colonized, Basidiomycete

Oidiodendron ramosum M. Calduch, Stchigel, Gené & Guarro, Stud. Mycol. 50(1): 162 (2004)

Spain, colonized, Basidiomycete

Leotiomycetes genera *incertae sedis*

Exochalara W. Gams & Hol.-Jech.

Exochalara longissima (Grove) W. Gams & Hol.-Jech., Stud. Mycol. 13: 56 (1976)

Germany, colonized, *Bulgaria polymorpha*

Metapezizella Petr.

Metapezizella phyllachorivora Petr., Sydowia 20: 208 (1968)

Mexico, parasitized, *Phyllachora araliarum*

Hyphozyma de Hoog & M.T. Sm.

Hyphozyma lignicola L.J. Hutchison, Sigler & Y. Hirats., Mycol. Res. 97(12): 1411 (1993)

Canada, colonized, stromata of Xylariales

Mollisiella Boud.

Mollisiella trinitensis E.K. Cash, J. Wash. Acad. Sci. 48: 256 (1958)

Trinidad-Tobago, colonized, Phyllachoraceae

Triposporium Corda

Triposporium bicorne Morgan, J. Cincinnati Soc. Nat. Hist. 18: 43 (1895)

USA, ambiguous, *Diplodia zeae* (Siozios et al. 2015)

Triposporium ledermannii Hansf., Sydowia 9(1-6): 88 (1955)

Papua New Guinea, ambiguous, *Balladynopsis ledermannii*

Class *Orbiliomycetes* O.E. Erikss. & Baral

Orbiliales Baral, O.E. Erikss., G. Marson & E. Weber

Orbiliaceae Nannf.

Arthrobotrys Corda

Arthrobotrys conoides Drechsler, Mycologia 29(4): 476 (1937)

In lab, parasitized, many fungi (Campos and Campos 1997)

Arthrobotrys oligosporus Fresen. eitr. Mykol. 1: 18 (1850)

In lab, parasitized, *Mucor silvaticus*, *Penicillium spinulosum*, *Rhizoctonia solani* and *Dactylellina haptotyla* (Gams et al. 2004)

Arthrobotrys irregularis (Matr.) Mekht., Dokl. Akad. Nauk Azerb. SSR 27(2): 73 (1971)

In lab, parasitized, *Rhizoctonia solani* (Tzean and Estey 1978)

Dactylella Grove

Dactylella helminthodes Drechsler, Mycologia 44(4): 553 (1952)

USA, parasitized, *Cochlonema megaspirema*

Dicranidion Harkn.

Dicranidion inaequalisTubaki & T. Yokoy., Trans. Mycol. Soc. Japan 12(1): 22 (1971)

Japan, parasitized, *Diaporthe*

Monacrosporium Oudem.

Monacrosporium janus S.D. Li & Xing Z. Liu, Mycol. Res. 107(7): 890 (2003)

≡ *Arthrobotrys janus* (S.D. Li & Xing Z. Liu) Z.F. Yu et al., Fungal Divers 23: 75 (2014)

China, parasitized, *Sclerotinia sclerotiorum*

Orbilia Fr.

Orbilia inflatula (P. Karst.) P. Karst., Bidr. Känn. Finl. Nat. Folk 19: 108 (1871)

≡ *Peziza inflatula* P. Karst., Not. Sällsk. Fauna et Fl. Fenn. Förh. 10: 175 (1869)

Germany, colonized, *Hypoxylon fragiforme* (Helfer (1991)

Trinacrium Riess

Trinacrium minus Speg., Fungi Fuegiani: no. 436 (1888)

Argentina, ambiguous, *Fumagine*

Trinacrium mycogonis Tassi, Bulletin Labor. Orto Bot. de R. Univ. Siena 3: 131 (1900)

Italy, ambiguous, *Nectria* (Braun 1998)

Trinacrium parvisporum Matsush., Matsush. Mycol. Mem. 5: 32 (1987)

China, ambiguous, *Tremella foliacea*

Trinacrium subtile Riess, Beitr. Mykol. 1: 42 (1850)

Italy, ambiguous, *Stilbospora* (Braun 1998)

Trinacrium tropicale Speg., Boln Acad. nac. Cienc. Córdoba 23(3-4): 591 (1919)

USA, ambiguous, sooty mould fungi

Class *Pezizomycetes* O.E. Erikss. & Winka

Pezizales J. Schröt.

Pezizaceae Dumort.

Peziza Pers.

Peziza ostracoderma Korf, Mycologia 52(4): 650 (1961)

France, parasitized, *Agaricus* (Jeffries and Young 1994)

Pyronemataceae Corda

Coprobia Boud.

Coprobia pileiformis Svrček, Česká Mykol. 32(1): 11 (1978)

Former Czechoslovakia, parasitized, *Lacterius vellerus*

Sporocephalum G. Arnaud

Sporocephalum peniophorae G. Arnaud, Bull. trimest. Soc. Mycol. Fr. 68: 189 (1952)

France, colonized, *Peniophora longispora*

Class *Sordariomycetes* O.E. Erikss. & Winka

Amphisphaeriales D. Hawksw. & O.E. Erikss

Sporocadaceae *Corda*

Pestalotiopsis Steyaert

Pestalotiopsis disseminata (Thüm.) Steyaert, Bull. Jard. Bot. État Brux. 19: 319 (1949)

In lab, parasitized, many fungi (Deyrup et al. 2006)

Boliniales P.F. Cannon

Boliniaceae Rick

Camarops P. Karst.

Camarops flava Samuels & J.D. Rogers, Mycotaxon 28(1): 52 (1987)

New Zealand, colonized, rotten Polyporaceae

Chaetosphaeriales Huhndorf, A.N. Mill. & F.A. Fernández

Chaetosphaeriaceae Locq.

Chaetosphaeria Tul. & C. Tul.

Chaetosphaeria phaeostroma (Durieu & Mont.) Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 166 (1870)

Europe, colonized, diatrypaceous fungi (Ellis and Ellis 1988)

Cryptophiale Piroz.

Cryptophiale sphaerospora Umali & D.Q. Zhou, Mycoscience 40(2): 189 (1999)

China, colonized, *Janetia synnematosa*

Hemicorynespora M.B. Ellis

Hemicorynespora multiseptata Sivan. & H.S. Chang, Mycol. Res. 101(7): 847 (1997)

China, colonized, perithecium of *Chaetosphaeria ampulliformis*

Hemicorynespora ovata Subram., Kavaka 20/21(1-2): 5 (1995)

Singapore, parasitized, *Stachylidium*

Calosphaeriales M.E. Barr

Calosphaeriaceae Munk

Calosphaeria Tul. & C. Tul.

Calosphaeria cryptospora Munk, Dansk Bot. Ark. 14(no. 8): 5 (1952)

Denmark, colonized, *Cryptospora suffusa*

Wegelina Berl.

Wegelina polyporina M.E. Barr, Cryptog. Bryol.-Lichénol. 19(2-3): 170 (1998)

Sweden, colonized, old *Fomes fomentarius*

Coronophorales Nannf.

Ceratostomataceae G. Winter

Arxiomyces P.F. Cannon & D. Hawksw.

Arxiomyces campanulatus Y. Horie, Udagawa & P.F. Cannon, Mycotaxon 25(1): 231 (1986)
Japan, parasitized, *Stachybotrys chartarum*
Gonatobotrys Corda
Gonatobotrys africanus Saccas, Bull. Trimest. Soc. Mycol. Fr. 5(2): 115 (1954)
Morocco, ambiguous, *Alternaria alternate*
Melanospora Corda
Melanospora simplex (Corda) D. Hawksw., IMA Fungus 7(1): 137 (2016)
≡ *Gonatobotrys simplex* Corda, Prachtflora: 9 (1839)
In lab, parasitized, *Alternaria tenuis* (Jordan and Barnett 1978)
Melanospora subterranea L. Fan, C.L. Hou, P.F. Cannon & Yu Li, Mycologia 104(6): 1434 (2012)
China, colonized, *Tuber indicum*
Melanospora tulasnei Udagawa & Cain, Can. J. Bot. 47(12): 1932 (1970)
France, colonized, *Hydnocytis arenaria*
Melanospora zobelii (Corda) Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 127 (1870)
In lab, parasitized, many fungi (Jordan and Barnett 1978)

Chaetosphaerellaceae Huhndorf, A.N. Mill. & F.A. Fernández
Chaetosphaerella E. Müll. & C. Booth
***Chaetosphaerella** fusca* (Fuckel) E. Müll. & C. Booth, Trans. Br. Mycol. Soc. 58(1): 77 (1972)
Europe, parasitized, Diatrypaceous fungi (Ellis and Ellis 1988)
Chaetosphaerella phaeostroma (Durieu & Mont.) E. Müll. & C. Booth, Trans. Br. Mycol. Soc. 58(1): 77 (1972)
≡ *Sphaeria phaeostroma* Durieu & Mont., Expl. Sci. Alg., Fl. Algér. 1(livr. 13): 491 (1846)
Europe, parasitized, Diatrypaceous fungi (Ellis and Ellis 1988)
Oedemium Link
Oedemium fungicola Bat. & A.F. Vital, Publicações Inst. Micol. Recife 33: 7 (1956)
Brazil, parasitized, *Stromatopycnis rosetum*
Nitschkiaceae (Fitzp.) Nannf.
Nitschkia Nitschke ex Fuckel
Nitschkia corticata (Ellis & Everh.) Kuntze, Revis. gen. pl. (Leipzig) 3(2): 501
≡ *Coelosphaeria corticata* Ellis & Everh., Proc. Acad. nat. Sci. Philad. 42: 221 (1890)
USA, colonized, *Zignoella*
Nitschkia parasitans (Schwein.) Nannf., Svensk Bot. Tidskr. 69(1): 52 (1975)
≡ *Sphaeria parasitans* Schwein., Trans. Am. phil. Soc., New Series 4(2): 206 (1832)
Russia, colonized, *Nectria cinnabarina*
Nitschkia parasitans* var. *mijuskovicii Vujan., Mycotaxon 82: 123 (2002)
≡ *Nitschkia parasitans* (Schwein.) Nannf., Svensk Bot. Tidskr. 69(1): 52 (1975)
Canada, colonized, stroma of *Nectria cinnabarina*

Coronophorales genus *incertae sedis*
Papulaspora Preuss
Papulaspora stoveri J.R. Warren, Mycologia 40(4): 400 (1948)
Europe, parasitized, soilborne plant pathogens (Jeffries 1995)
Sphaerodes Clem.
Sphaerodes beatonii (D. Hawksw.) P.F. Cannon & D. Hawksw., Bot. J. Linn. Soc. 84(2): 145 (1982)
≡ *Microthecium beatonii* D. Hawksw., Trans. Mycol. Soc. Japan 18(2): 145 (1977)
Australia, colonized, *Labyrinthomyces tessellatus*
Sphaerodes mycoparasitica Vujan., Mycol. Res. 113(10): 1173 (2009)
Canada, parasitized, *Fusarium avenaceum*
Sphaerodes perplexa (D. Hawksw.) P.F. Cannon & D. Hawksw., Bot. J. Linn. Soc. 84(2): 148 (1982)
≡ *Microthecium perplexum* D. Hawksw., Trans. Mycol. Soc. Japan 18(2): 151 (1977)
Australia, parasitized, *Sphaerozone* cf. *ellipsporum*
Sphaerodes quadrangularis Dania García, Stchigel & Guarro, Stud. Mycol. 50(1): 64 (2004)
In Lab, parasitized, *Fusarium avenaceum* (Goh and Vujanovic 2010)
Sphaerodes retispora (Udagawa & Cain) P.F. Cannon & D. Hawksw., Bot. J. Linn. Soc. 84(2): 149 (1982)
≡ *Microthecium retisporum* Udagawa & Cain, Can. J. Bot. 47(12): 1926 (1970)
In Lab, parasitized, *Fusarium avenaceum* (Goh and Vujanovic 2010)

Diaporthales Nannf.
Melanconiellaceae Senan. et al.
Sphaeronaemella P. Karst.
Sphaeronaemella fimicola Marchal, Champ. Copr. Belg. 6: 12 (1891)
In Lab, parasitized, *Ryparobius pachyascus* (Games et al. 2004)
Sphaeronaemella helvellae (P. Karst.) P. Karst., Hedwigia 23(1): 18 (1884)
Canada, parasitized, *Helvella*, *Pseudorhizina sphaerospora* (Pfister 1982)

Glomerellales Chadef. ex Réblová, W. Gams & Seifert
Glomerellaceae Locq. ex Seifert & W. Gams
Schizotrichella E.F. Morris
Schizotrichella lunata E.F. Morris, Mycologia 48(5): 735 (1956)

Panama, colonized, *Cantherellus odoratus*

Plectosphaerellaceae W. Gams et al
Verticillium Nees 1816

Verticillium biguttatum W. Gams, Neth. J. Plant Path. 88(2): 65 (1982)

In lab, obligate parasitized, *Rhizoctonia solani*, many plant pathogens (Jager and Velvis 1985)

Verticillium chlamydosporium Goddard, Bot. Gaz. 56: 275 (1913)

≡ *Metacordyceps chlamydosporia* (H.C. Evans) G.H. Sung, J.M. Sung, Hywel-Jones & Spatafora, Stud. Mycol. 57: 35 (2007)

Brazil, parasitized, *Fusarium udum*, rust fungi

Verticillium fusisporum W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 182 (1971)

≡ *Lecanicillium fusisporum* (W. Gams) Zare & W. Gams, Nova Hedwigia 73(1-2): 34 (2001)

Netherlands, parasitized, *Coltricia perennis*

Verticillium griseum (Petch) W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 191 (1971)

≡ *Acremonium griseum* Petch, Trans. Br. Mycol. Soc. 11(3-4): 262 (1926)

≡ *Chlorocillium griseum* (Petch) Zare & W. Gams, Mycol. Progr. 15: 1007 (2016)

Brazil, parasitized, rust fungi

Verticillium hemileiae Bouriquet, Encyclop. Mycol. 12: 155 (1946)

Indonesia, parasitized, *Hemileia vastatrix*

Verticillium incurvum Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 77 (1991)

Germany, parasitized, *Ganoderma applanatum*

Verticillium olivaceum W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 129 (1971)

Germany, parasitized, *Inonotus nodulosus*

Verticillium villosum Rudako, Mikofil'nye Griby Ikh Biologiya i Prakticheskoe Znachenie, Moscow (Moscow): 95 (1981)

Russia, parasitized, *Cladosporium herbarum*

Reticulascaceae Réblová & W. Gams
Cylindrotrichum Bonord.

Cylindrotrichum curvatum Morgan-Jones, Mycotaxon 12(1): 250 (1980)

USA, colonized, *Stereum*

Glomerellales genus *incertae sedis*
Ascocodinaea Samuels et al.

Ascocodinaea polyporicola Samuels, Cand. & Magni, Mycologia 89(1): 159 (1997)

USA, colonized, *Polyporus pargamenus*

Ascocodinaea stereicola Samuels, Cand. & Magni, Mycologia 89(1): 156 (1997)

USA, colonized, *Stereum*; India, colonized, *Cercospora atromarginata* (Summerbell et al. 2011)

Hypocreales Lindau
Bionectriaceae Samuels & Rossman

Acremonium Link

Acremonium acutatum W. Gams, Trans. Br. Mycol. Soc. 64(3): 394 (1975)

India, parasitized, *Cercospora atromarginata*

Acremonium bactrocephalum W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 44 (1971)

≡ *Sarocladium bactrocephalum* (W. Gams) Summerb., Stud. Mycol. 68: 158 (2011)

Canada, parasitized, *Ustilaginales*

Acremonium berkeleyanum (P. Karst.) W. Gams, Neth. J. Plant Path. 88(2): 76 (1982)

≡ *Cosmospora berkeleyana* (P. Karst.) Gräfenhan, Seifert & Schroers, Stud. Mycol. 68: 95 (2011)

Finland, parasitized, Polyporaceae (Summerbell et al. 2011)

Acremonium byssoides W. Gams & T.M. Lim, Trans. Br. Mycol. Soc. 64(3): 391 (1975)

Malaysia, parasitized, *Oidium heveae* (Summerbell et al. 2011)

Acremonium crotocinigenum (Schol-Schwarz) W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 112 (1971)

≡ *Trichothecium crotocinigenum* (Schol-Schwarz) Summerb., Seifert & Schroers, Stud. Mycol. 68: 160 (2011)

Germany, parasitized, *Trametes versicolor*

Acremonium cymosum W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 131 (1971)

≡ *Cosmospora cymosa* (W. Gams) Gräfenhan & Seifert, Stud. Mycol. 68: 96 (2011)

Germany, parasitized, *Inonotus radiates*

Acremonium domschii W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 124 (1971)

Germany, parasitized, *Inonotus radiates*

Acremonium exiguum W. Gams, Trans. Br. Mycol. Soc. 64(3): 390 (1975)

Sri Lanka, parasitized, *Tubulicium dussii*

Acremonium incrustatum W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 80 (1971)

Finland, parasitized, *Armillariella mellea*

Acremonium olidum W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 108 (1971)

Poland, parasitized, *Phellinus*

Acremonium pedatum Lowen, Mem. N. Y. Bot. Gdn 49: 248 (1989)

≡ *Pronectria anisospora* (Lowen) Lowen, Mycotaxon 39: 461 (1990)

USA, parasitized, *Hypogymnia physodes*

Acremonium psychrophilum C. Möller & W. Gams, Mycotaxon 48: 445 (1993)

Antarctica, parasitized, *Turgidosculum complicatulum*

Acremonium salmoneum W. Gams & Lodha, Trans. Br. Mycol. Soc. 64(3): 399 (1975)

Italy, unknown fungi

Acremonium sordidulum* f.sp. *colletotrichi-dematii U.P. Singh, Vishwak. & K.C.B. Chaudhary, Mycologia 70(2): 455 (1978)

India, parasitized, *Colletotrichum dematium* f. *truncatum*

Acremonium strictum W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 42 (1971)

≡ *Sarocladium strictum* (W. Gams) Summerb., Stud. Mycol. 68: 158 (2011)

Germany, parasitized, *Botrytis cinerea*, *Helminthosporium*

Acremonium terricola (J.H. Mill., Giddens & A.A. Foster) W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 67 (1971)

≡ *Sarocladium terricola* (J.H. Mill., Giddens & A.A. Foster) A. Giraldo, Gené & Guarro, i Persoonia 34: 22 (2014)

Italy, parasitized, *Puccinia graminis* (Summerbell et al. 2011)

Acremonium tulasnei G.R.W. Arnold, Nov. sist. Niz. Rast. 8: 129 (1971)

Austria, parasitized, *Lactarius delicious*

Battarrina (Sacc.) Clem. & Shear

Battarrina inclusa (Berk. & Broome) Clem. & Shear, Gen. Fung., Edn 2 (Minneapolis): 279 (1931)

≡ *Hypocrea inclusa* Berk. & Broome, Ann. Mag. nat. Hist., Ser. 3 7: 451 (1861)

Australia, colonized, *Tuber melanosporum* (Pacioni & Leonardi 2016)

Clonostachys Corda

Clonostachys byssicola Schroers, Stud. Mycol. 46: 80 (2001)

Costa Rica, parasitized, *Trichoderma* (Krauss et al. 2013)

Clonostachys pseudosetosa (Samuels) Schroers, Stud. Mycol. 46: 182 (2001)

≡ *Sesquicillium pseudosetosum* Samuels, Mem. N. Y. Bot. Gdn 49: 282 (1989)

Colombia, parasitized, unknown Ascomycete

Clonostachys rosea (Link) Schroers, Samuels, Seifert & W. Gams, Mycologia 91(2): 369 (1999)

Worldwide, parasitized, many fungi

Clonostachys subquaternata Schroers & Samuels, Stud. Mycol. 46: 162 (2001)

Puerto Rico, parasitized, unknown fungus

Dendrodochium Bonord.

Dendrodochium parasiticum Chevaug., Les Maladies Cryptogamiques du Manioc en Afriqu Occidentale (Encycl. Mycol. 28): 100 (1956)

Ivory Coast, parasitized, *Lasiodiplodia theobromae*

Dimerosporiella Speg. 1908

Dimerosporiella amomi (Berk. & Broome) Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 1178 (1909)

Sri Lanka, ambiguous, Meliolales

Hydropisphaera Dumort.

Hydropisphaera fungicola Rossman, D.F. Farr & G. Newc., Fungal Planet no. 24 (2008)

USA, colonized, *Ulocladium atrum*

Hydropisphaera hypoxantha (Penz. & Sacc.) Rossman & Samuels, Stud. Mycol. 42: 31 (1999)

China, colonized, *Hypoxylon* (Nong and Zhuang 2005)

Hydropisphaera peziza (Tode) Dumort., Comment. Bot. (Tournay): 90 (1822)

Germany, colonized, *Polyporus* (Samuels 1976)

Nectriella Nitschke ex Fuckel

Nectriella anisospora Lowen, Mem. N. Y. Bot. Gdn 49: 248 (1989)

USA, colonized, *Hypogymnia physodes*

Nectriella santessonii Lowen & D. Hawksw., Lichenologist 18(4): 322 (1986)

UK, colonized, *Anaptychia runcinata*

Nectriella balansiae R.H. Arnold, Mycologia 59(2): 248 (1967)

Congo, colonized, *Balansia volkensii*

Nectriopsis Maire

Nectriopsis aureonitens (Tul. & C. Tul.) Maire, Annls Mycol. 9(4): 323 (1911)

Europe, colonized, *Meruliophana* Samuels (1988)

Nectriopsis epimyces Samuels, Mem. N. Y. Bot. Gdn 48: 53 (1988)

Indonesia, colonized, *Omphalina*

Nectriopsis epimycota Samuels, Mem. N. Y. Bot. Gdn 48: 64 (1988)

French Guiana, colonized, *Kretzschmaria*

Nectriopsis epinectria (Teng) Samuels, Mem. N. Y. Bot. Gdn 48: 64 (1988)

China, colonized, Ascomycetes

Nectriopsis hongkongensis W.Y. Zhuang & X.M. Zhang, Nova Hedwigia 74(1-2): 276 (2002)

China, colonized, old ascomata of fungi

Nectriopsis hyperbiota Samuels, Mem. N. Y. Bot. Gdn 48: 38 (1988)

New Zealand, colonized, perithecia of *Nectria pseudotrichia*

Nectriopsis lasiodermopsis Samuels, Mem. N. Y. Bot. Gdn 48: 32 (1988)

New Zealand, colonized, perithecia of *Nectria*

Nectriopsis leucorrhodina (Mont.) Samuels, Mem. N. Y. Bot. Gdn 48: 42 (1988)

New Zealand, colonized, *Nectria*

Nectriopsis macroephichloe Samuels, Mem. N. Y. Bot. Gdn 48: 72 (1988)

Venezuela, colonized, stroma of *Hypocrella cyperacearum*

Nectriopsis oxyspora Samuels, Mem. N. Y. Bot. Gdn 48: 60 (1988)

Brazil, colonized, *Nectria*

Nectriopsis septofusidiae Samuels, Mem. N. Y. Bot. Gdn 48: 51 (1988)

Japan, colonized, *Diaporthe*

Nectriopsis sibicola Samuels, Mem. N. Y. Bot. Gdn 48: 37 (1988)

New Zealand, colonized, *Nectria*

Nectriopsis sororicola Samuels, Mem. N. Y. Bot. Gdn 48: 33 (1988)

New Zealand, colonized, perithecia of *Nectria*

Nectriopsis tubariicola W. Gams, Neth. J. Plnat Path. 88(2): 67 (1982)

New Zealand, colonized, *Tubaria*

Nectriopsis uredinophila (Syd.) W.Y. Zhuang & X.M. Zhang, Nova Hedwigia 76(1-2): 192 (2003)

China, colonized, rust fungi

Paranectria Sacc.

Paranectria juruana Henn., Hedwigia 43(4): 245 (1904)

Uganda, colonized, Meliolales

Peristomialis (W. Phillips) Boud.

Peristomialis leucocarpa Samuels, Mem. N. Y. Bot. Gdn 48: 16 (1988)

Jamaica, colonized, *Nectria jungneri*

Peristomialis paraparilis Samuels, Mem. N. Y. Bot. Gdn 48: 16 (1988)

Guiana, colonized, black fungus on bamboo

Trichonectria Kirschst.

Trichonectria albidopilosa (Rogerson & Samuels) Samuels, Mem. N. Y. Bot. Gdn 48: 13 (1988)

≡ *Nectria albidopilosa* Rogerson & Samuels, Mycologia 77(5): 781 (1985)

Venezuela, colonized, mollisioid discomycete

Trichonectria hirta (A. Bloxam) Petch, Naturalist 35: 282 (1937)

Afirica, colonized, Meliolales (Gams et al. 2004)

Trichonectria horrida Samuels, Mem. N. Y. Bot. Gdn 48: 13 (1988)

New Zealand, colonized, *Chaetosphaeria*

Trichonectria rectipila Samuels et al., Mem. N. Y. Bot. Gdn 48: 11 (1988)

USA, colonized, Sphaeriaceae

Calcarisporiaceae Jing Z. Sun et al.

Calcarisporium Preuss

Calcarisporium arbuscula Preuss, Linnaea 24: 124 (1851)

Worldwide, parasitized, Agaricales, rust fungi (Hutchison and Barron 1996; Zhu and Zhuang (2013)

Calcarisporium cordycipiticola Jing Z. Sun et al., Phytotaxa 268(2): 139 (2016)

China, parasitized, *Cordyceps militaris*

Calcarisporium ovalisporum (Petch) de Hoog 1978

Germany, ambiguous, *Hirsutella citriformis*

Calcarisporium xylariicola Jing Z. Sun et al., Mycol. Progr. 16(4): 435 (2017)

Italy, parasitized, *Xylaria*

Clavicipitaceae Earle

Aphanocladium W. Gams

Aphanocladium aranearum* var. *sinense J.D. Chen, Acta Mycol. Sin. 3(2): 96 (1984)

China, parasitized, *Agaricus bisporus*

Aphanocladium dimorphum J.D. Chen, Acta Mycol. Sin. 4(4): 230 (1985)

China, parasitized, *Agaricus bisporus*

Atkinsonella Diehl

Atkinsonella hypoxylon (Peck) Diehl, Agric. Monogr. U.S.D.A. 4: 49 (1950)

USA, colonized, *Hypoxylon*

Epicrea Petr.

Epicrea insignis Petr., Sydowia 4(1-6): 325 (1950)

Ecuador, colonized, *Hypocrella chusqueae*

Neobarya Lowen

Neobarya agaricicola (Berk.) Samuels & Lowen, Sydowia 59(2): 185 (2007)

New Zealand, parasitized, *Agaricus*

Neobarya aurantiaca (Plowr. & A.S. Wilson) Samuels & Cand., Sydowia 59(2): 189 (2007)

≡ *Barya aurantiaca* Plowr. & A.S. Wilson, Gard. Chron., N.S. 21: 176 (1884)

UK, parasitized, *Claviceps purpurea*

Neobarya byssicola (Thaxt. ex Rossman) Rossman & Samuels, Sydowia 59(2): 194 (2007)

≡ *Barya byssicola* Thaxt. ex Rossman, Mycologia 69(2): 370 (1977)

Europe, ambiguous, coprophilous fungi

Neobarya danica J.G.B. Nielsen & Læssøe, Sydowia 59(2): 196 (2007)

Denmark, colonized, Corticioid fungus

Neobarya lutea Samuels & Lodge, Sydowia 59(2): 200 (2007)

Puerto Rico, colonized, *Xylaria*

Neobarya parasitica (Fuckel) Lowen, Syst. Ascom. 5(1): 121 (1986)

Bear Island, France, Germany, UK, USA, parasitized, *Bertia moriformis*, *B. moriformis*, and *Cucurbitaria*

Neobarya xylariicola Cand., J.D. Rogers & Samuels, Sydowia 59(2): 209 (2007)

USA, France, colonized, *Xylaria*

Tyrannicordyceps Kepler & Spatafora

Tyrannicordyceps clavicipiticola (Tokun. & S. Imai) Kepler & Spatafora, Index Fungorum 12: 1 (2012)

≡ *Cordyceps clavicipiticola* Tokun. & S. Imai, Trans. Sapporo nat. Hist. Soc. 14: 104 (1935)

Japan, colonized, *Claviceps*

Tyrannicordyceps clavicipitis (Örtegren) Kepler & Spatafora, Index Fungorum 12: 1 (2012)

≡ *Cordyceps clavicipitis* Örtegren, Svensk Bot. Tidskr. 10: 57 (1916)

Sweden, colonized, *Claviceps purpurea*

Tyrannicordyceps ergoticola (Tanda & Kawat.) Kepler & Spatafora, Index Fungorum 12: 1 (2012)

≡ *Cordyceps ergoticola* Tanda & Kawat., J. Jap. Bot. 52(1): 19 (1977)

Japan, colonized, *Claviceps*

Tyrannicordyceps fratricida (Tanda & Kobayasi) Kepler & Spatafora, Index Fungorum 12: 1 (2012)

≡ *Cordyceps fratricida* Tanda & Kobayasi, J. agric. Sci. Tokyo Nogyo Daigaku 29(1): 36 (1984)

Japan, colonized, *Claviceps microcephala*

Tyrannicordyceps sclerotium (Kobayasi) Kepler & Spatafora, Index Fungorum 12: 1 (2012)

Japan, colonized, sclerotia of *Cordyceps*

Cordycipitaceae Kreisel ex G.M. Sung et al.

Isaria Pers.

Isaria farinosa (Holmsk.) Fr., Syst. Mycol. (Lundae) 3(2): 271 (1832)

Germany, parasitized, Erysiphaceae (Hijwegen and Buchenauer 1984)

Isaria fuciformis Berk., J. Linn. Soc., Bot. 13: 175 (1872)

USA, parasitized, *Laetisaria*

Isaria fumosorosea Wize, Bull. Int. Acad. Sci. Lett. Cracovie, Cl. Sci. Math. Nat. Sér. B, Sci. Nat.: 721 (1904)

Former Czechoslovakia, parasitized, *Sphaerotheca fuliginea*

Lecanicillium W. Gams & Zare 2001

Lecanicillium acerosum W. Gams, H.C. Evans & Zare, Nova Hedwigia 73(1-2): 37 (2001)

Brazil, parasitized, *Crinipellis perniciosa*

Lecanicillium antillanum (R.F. Castañeda & G.R.W. Arnold) Zare & W. Gams, Nova Hedwigia 73(1-2): 34 (2001)

≡ *Verticillium antillanum* R.F. Castañeda & G.R.W. Arnold, Feddes Repert. Spec. Nov. Regni Veg. 98(7-8): 411 (1987)

Cuba, parasitized, Basidiomycete

Lecanicillium dimorphum (J.D. Chen) Zare & W. Gams, Nova Hedwigia 73(1-2): 24 (2001)

≡ *Aphanocladium dimorphum* J.D. Chen, Acta Mycol. Sin. 4(4): 230 (1985)

China, paraisitized, *Agaricus bisporus*

Lecanicillium fungicola (Preuss) Zare & W. Gams, Mycol. Res. 112(7): 818 (2008)

≡ *Acrostalagmus fungicola* Preuss, Linnaea 24: 124 (1851)

≡ *Verticillium fungicola* (Preuss) Hassebr., Phytopathologische Zeitschrift 9: 514 (1936)

Worldwide, paraisitized, *Agaricus*

Lecanicillium fusisporum (W. Gams) Zare & W. Gams, Nova Hedwigia 73(1-2): 34 (2001)

≡ *Verticillium fusisporum* W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 182 (1971)

Netherlands, parasitized, *Coltricia perennis*

Lecanicillium lecanii (Zimm.) Zare & W. Gams, Nova Hedwigia 72(3-4): 333 (2001)

≡ *Cephalosporium lecanii* Zimm., Teysmannia 9: 243 (1898)

Thailand, India, USA, parasitized, powdery mildew, rust fungi (Vandermeer et al. 2009)

Lecanicillium longisporum (Petch) Zare & W. Gams, Nova Hedwigia 73(1-2): 16 (2001)

≡ *Cephalosporium longisporum* Petch, Trans. Br. Mycol. Soc. 10(3): 171 (1925)

Worldwide, parasitized, *Sphaerotheca fuliginea* (Kim et al. 2010)

Lecanicillium muscarium (Petch) Zare & W. Gams, Nova Hedwigia 73(1-2): 13 (2001)

≡ *Cephalosporium muscarium* Petch, Naturalist (Hull), ser. 3: 102 (1931)

Worldwide, parasitized, Powdery mildew, and some fungal pathogens (Kim et al. 2010)

Lecanicillium psalliotae (Treschew) Zare & W. Gams, Nova Hedwigia 73(1-2): 21 (2001)

≡ *Lecanicillium Verticillium psalliotae* Treschew, Dansk Bot. Ark. 11(no. 1): 7 (1941)

China, Thailand, parasitized, *Phakopsora pachyrhizi*

Simplicillium W. Gams & Zare

Simplicillium lamellicola (F.E.V. Sm.) Zare & W. Gams, Nova Hedwigia 73(1-2): 42 (2001)

≡ *Cephalosporium lamellicola* F.E.V. Sm., Trans. Br. Mycol. Soc. 10(1-2): 93 (1924

Worldwide, parasitized, rust fungi (Shin et al. 2017)

Simplicillium lanosoniveum (J.F.H. Beyma) Zare & W. Gams, Nova Hedwigia 73(1-2): 39 (2001)

≡ *Cephalosporium lanosoniveum* J.F.H. Beyma, Antonie van Leeuwenhoek 8: 121 (1942)

USA, parasitized, *Phakopsora pachyrhizi* (Ward et al. 2012)

Hypocreaceae De Not.

Apiocrea Syd. & P. Syd.

Apiocrea boletina (Peck) G.R.W. Arnold, Z. Pilzk. 37(1-4): 192 (1972)

≡ *Hypomyces boletinus* Peck, Bull. N.Y. St. Mus. 75: 15 (1904)

Europe, parasitized, *Boletus* (Rogerson and Samuels 1989)

Apiocrea chrysosperma* var. *strophariae Ola'h, Revue Mycol., Paris 35(1-2): 147 (1970)

Canada, parasitized, *Stropharia*

Arnoldiomyces Morgan-Jones

Arnoldiomyces clavisporus (D.J. Gray & Morgan-Jones) Morgan-Jones, Mycotaxon 11(2): 446 (1980)

Europe, parasitized, Agaricales

Arnoldiomyces macrosporus Samuels & Rogerson, Acta Amazon., Supl. 14(1/2): 81 (1986)

Brazil, parasitized, *Ganoderma applanatum*

Cladobotryum Nees 1816

Cladobotryum agaricina (Link) Nees, Syst. Pilze (Würzburg): 56 (1816)

≡ *Botrytis agaricina* Link, Mag. Gesell. Naturf. Freunde, Berlin 3(1-2): 15 (1809)

Germany, parasitized, *Agaricus*, *Russula*

Cladobotryum amazonense C.N. Bastos, H.C. Evans & Samson, Trans. Br. Mycol. Soc. 77(2): 274 (1981)

Portugal, parasitized, *Crinipellis perniciosa*

Cladobotryum apiculatum (Tubaki) W. Gams & Hooz., Persoonia 6(1): 97 (1970)

≡ *Cylindrophora apiculata* Tubaki, Nagaoa 5: 16 (1955)

India, parasitized, *Pleurotus* (Upadhyaya et al. 1987)

Cladobotryum arnoldii Rogerson & Samuels, Mycologia 85(2): 258 (1993)

≡ *Hypomyces pseudopolyporinus* Samuels & Rogerson, Acta Amazon., Supl. 14(1-2): 81 (1986)

Germany, parasitized, *Agaricus*

Cladobotryum arthrobotryoides K. Põldmaa, Sydowia 56(1): 112 (2004)

Thailand, parasitized, *Hymenochaete*

Cladobotryum asterophorum de Hoog, Persoonia 10(1): 37 (1978)

Japan, parasitized, *Agaricus*

Cladobotryum australe Viégas, Bragantia 6: 365 (1946)

Brazil, parasitized, *Septoideum didymopanacis*

Cladobotryum binatum Preuss, Fung. Hoyersw.: no. 83 (1851)

Denmark, parasitized, *Agaricus glaucopoibus*

Cladobotryum campanisporum G.R.W. Arnold, Feddes Repert. Spec. Nov. Regni Veg. 98(5-6): 352 (1987)

Cuba, parasitized, Xylariaceae

Cladobotryum capitatum Raybaud, C. r. Seanc. Soc. Biol. 84: 798 (1921)

France, parasitized, Agaricales

Cladobotryum caribense R.F. Castañeda, Fungi Cubense (La Habana): 3 (1986)

France, parasitized, *Auricularia*

Cladobotryum clavisporum (D.J. Gray & Morgan-Jones) Rogerson & Samuels, Mycologia 85(2): 252 (1993)

≡ *Arnoldia clavispora* D.J. Gray & Morgan-Jones, Mycotaxon 10(2): 376 (1980)

USA, parasitized, *Coriolus versicolor*

Cladobotryum compactum K. Põldmaa, Mycotaxon 59: 393 (1996)

Estonia, parasitized, *Steccherinum ochraceum*

Cladobotryum coriolopsicola (R.F. Castañeda) K. Põldmaa, Stud. Mycol. 68: 14 (2011)

≡ *Sibirina coriolopsicola* R.F. Castañeda, Fungi Cubenses II (La Habana): 10 (1987)

Cuba, parasitized, *Coriolopsis*

Cladobotryum croceum K. Põldmaa, Mycotaxon 59: 396 (1996)

Estonia, parasitized, *Stereum rugosum*

Cladobotryum cubitense R.F. Castañeda & G.R.W. Arnold, Feddes Repert. Spec. Nov. Regni Veg. 98(7-8): 414 (1987)

Cuba, parasitized, Agaricales

Cladobotryum curvatum de Hoog & W. Gams, Persoonia 10(1): 39 (1978)

Indonesia, parasitized, Agaricales (Põldmaa 2011)

Cladobotryum curvididymum Matsush., Matsush. Mycol. Mem. 9: 6 (1996)

Cuba, parasitized, *Ganoderma tsugae*, other Basidiomycota (Põldmaa 2011)

Cladobotryum dendroides (Bull.) W. Gams & Hooz., Persoonia 6(1): 103 (1970)

≡ *Mucor dendroides* Bull., Hist. Champ. Fr. (Paris) 1: 105 (1791)

Cladobotryum dimorphicum K. Põldmaa, Mycotaxon 59: 398 (1996)

Estonia, parasitized, *Thelephora terrestris*

Cladobotryum elegans G. Arnaud, Bull. trimest. Soc. Mycol. Fr. 68: 191 (1952)

France, parasitized, unknown fungi

Cladobotryum fungicola (G.R.W. Arnold) Rogerson & Samuels, Mycologia 85(2): 262 (1993)

≡ *Sibirina fungicola* G.R.W. Arnold, Nova Hedwigia 18(1-2): 300 (1970)

≡ *Hypomyces semitranslucens* G.R.W. Arnold, Nov. sist. Niz. Rast. 8: 132 (1971)

Worldwide, parasitized, *Lentinus* (Rogerson and Samuels 1994; Põldmaa 2011; Tamm and Põldmaa 2013)

Cladobotryum gamsii (D.J. Gray & Morgan-Jones) K. Põldmaa, Mycologia 95(5): 929 (2003)

≡ *Sibirina gamsii* D.J. Gray & Morgan-Jones, Mycotaxon 10(2): 396 (1980)

USA, parasitized, carpophores of Polyporus

Cladobotryum gracile K. Põldmaa, Folia cryptog. Estonica 34: 24 (1999)

Estonia, parasitized, *Scytinostroma*

Cladobotryum heterocladum (Penz.) Petch, Trans. Br. Mycol. Soc. 16(4): 233 (1932)

≡ *Verticillium heterocladum* Penz., Michelia 2(no. 8): 462 (1882)

Italy, parasitized, unknonwn fungi

Cladobotryum heterosporum K. Põldmaa, Stud. Mycol. 68: 20 (2011)

≡ *Hypomyces heterosporus* (K. Põldmaa) Lechat, Ascomycete.org 9(2): 23 (2016)

Cuba, parasitized, Agaricales

Cladobotryum hughesii Rogerson & Samuels, Mycologia 85(2): 263 (1993)

≡ *Sibirina variosperma* Samuels & Rogerson, Mem. N. Y. Bot. Gdn 59: 31 (1990)

Indonesia, parasitized, *Polyporus*

Cladobotryum indoafrum K. Põldmaa, Stud. Mycol. 68: 21 (2011)

Indonesia, parasitized, *Neonothopanus*

Cladobotryum leptosporum (Sacc.) W. Gams & Hooz., Persoonia 6(1): 106 (1970)

≡ *Dactylium dendroides* subsp. *leptosporum* Sacc., Syll. fung. (Abellini) 4: 189 (1886)

New Zealand, *Agaricus brunescens* (Tamm and Põldmaa 2013)

Cladobotryum longiramosum R.F. Castañeda, Fungi Cubense (La Habana): 4 (1986)

Cuba, parasitized, *Auricularia*

Cladobotryum macrosporum (Link) Nees, Syst. Pilze (Würzburg): 56 (1816)

≡ *Botrytis macrospora* Link, Mag. Gesell. Naturf. Freunde, Berlin 3(1-2): 15 (1809)

Gemany, parasitized, Agaricales

Cladobotryum multiseptatum de Hoog, Persoonia 10(1): 43 (1978)

New Zealand, parasitized, *Agaricus brunnescens*

Cladobotryum mycophilum (Oudem.) W. Gams & Hooz., Persoonia 6(1): 102 (1970)

≡ *Dactylium mycophilum* Oudem., Ned. kruidk. Archf, 2 sér. 14: 42 (1894)

South Korea, Spain, parasitized, *Agaricus bisporus* (Back et al. 2010; Gea et al. 2011)

Cladobotryum novovarium K. Põldmaa, Mycotaxon 102: 186 (2007)

Peru, parasitized, *Schizophyllum commune*

Cladobotryum obconicum W. Gams & Schroers, Can. J. Bot. 76(9): 1577 (1999)

Belgium, parasitized, *Entoloma*

Cladobotryum odorum G.R.W. Arnold, Feddes Repert. Spec. Nov. Regni Veg. 99(1-2): 29 (1988)

Cuba, parasitized, *Phellinus*

Cladobotryum orthosporum (W. Gams) K. Põldmaa, Mycotaxon 59: 390 (1996)

≡ *Sibirina orthospora* W. Gams, Persoonia 7(2): 163 (1973)

Netherlands, parasitized, Hymenochaetaceae

Calcarisporium ovalisporum (Petch) de Hoog, Persoonia 10(1): 77 (1978)

≡ *Cladobotryum ovalisporum* Petch, Trans. Br. Mycol. Soc. 16(4): 233 (1932)

New Zealand, parasitized, unknown Basidiomycetes

Cladobotryum paravirescens K. Põldmaa, Stud. Mycol. 68: 24 (2011)

Thailand, parasitized, Aphyllophorales

Cladobotryum penicillatum W. Gams, Persoonia 11(1): 71 (1979)

Netherlands, parasitized, *Sebacina effusa*

Cladobotryum pinarense R.F. Castañeda, Fungi Cubense (La Habana): 4 (1986)

Cuba, Japan, parasitized, *Auricularia* (Tokiwa and Okuda 2005)

Cladobotryum polypori (Dearn. & House) Rogerson & Samuels, Mycologia 85(2): 250 (1993)

≡ *Diplosporium polypori* Dearn. & House, N.Y. St. Mus. Bull. 266: 95 (1925)

≡ *Hypomyces mycophilus* Rogerson & Samuels, Mycologia 85(2): 250 (1993)

USA parasitized, *Polyporus fissus*

Cladobotryum protrusum K. Põldmaa, Stud. Mycol. 68: 22 (2011)

Madagascar, parasitized, Agaricales

Cladobotryum purpureum (Morgan-Jones) Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 92 (1991)

≡ *Sibirina purpurea* Morgan-Jones, Mycotaxon 10(2): 398 (1980)

USA, paraisitized, *Stereum*

Cladobotryum rubrobrunnescens Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 55 (1991)

Germany, paraisitized, *Inocybe*

Cladobotryum semicirculare G.R.W. Arnold, R. Kirschner & Chee J. Chen, Sydowia 59(1): 118 (2007)

≡ *Hypomyces semicircularis* (G.R.W. Arnold, R. Kirschner & Chee J. Chen) R. Kirschner, Fungal Sci., Taipei 32(1): 17 (2017)

Cuba, paraisitized, Aphyllophorales

Cladobotryum simplex K. Põldmaa, Sydowia 56(1): 115 (2004)

Thailand, parasitized, *Polyporus*

Cladobotryum soroaense R.F. Castañeda, Fungi Cubense (La Habana): 5 (1986)

Cuba, parasitized, Poriaceae

Cladobotryum sphaerocephalum (Berk.) Rogerson & Samuels, Mycologia 85(2): 241 (1993)

≡ *Dactylium sphaerocephalum* Berk., Ann. Mag. nat. Hist., Ser. 1 6(no. 39): 437 (1841)

UK, parasitized, Polyporales

Cladobotryum stereicola (G.R.W. Arnold) Rogerson & Samuels, Mycologia 85(2): 268 (1993)

≡ *Sympodiophora stereicola* G.R.W. Arnold, Nova Hedwigia 19(1-2): 302 (1970)

Russia, parasitized, *Stereum hisutum*; USA, parasitized, Polyporales (Rogerson and Samuels 1993)

Cladobotryum succineum Rogerson & Samuels, Brittonia 44(2): 256 (1992)

≡ *Verticillium succineum* (Rogerson & Samuels) Rogerson & Samuels, Mycologia 86(6): 861 (1995)

USA, colonized, dry culture of *Hypomyces succineus*

Cladobotryum tchimbelense K. Põldmaa, Stud. Mycol. 68: 19 (2011)

Gabon, parasitized, *Gymnopus*

Cladobotryum tenue Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 57 (1991)

Germany, parasitized, Basidiomycetes

Cladobotryum ternatum Corda, Icon. fung. (Prague) 1: 21 (1837)

Czech Republic, parasitized, Basidiomycetes

Cladobotryum terrigenum P. Karst., Meddn Soc. Fauna Flora fenn. 16: 35 (1888)

UK, parasitized, Basidiomycetes

Cladobotryum thuemenii Sacc., Michelia 1(no. 2): 272 (1878)

Germany, parasitized, Basidiomycetes

Cladobotryum tulasnei (G.R.W. Arnold) Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 36 (1991)

≡ *Acremonium tulasnei* G.R.W. Arnold, Nov. sist. Niz. Rast. 8: 129 (1971)

Austria, parasitized, *Lactarius delicious*

Cladobotryum uniseptatum (R.F. Castañeda) K. Põldmaa, Mycologia 91(1): 192 (1999)

≡ *Helminthophora uniseptata* R.F. Castañeda, Fungi Cubense (La Habana): 9 (1986)

Austria, Cube, parasitized, *Stereum*

Cladobotryum variospermum (Link) S. Hughes, Can. J. Bot. 36: 750 (1958)

≡ *Botrytis variosperma* Link, Mag. Gesell. Naturf. Freunde, Berlin 7: 36 (1816)

≡ *Hypomyces aurantius* (Pers.) Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 183 (1870)

Germany, parasitized, Basidiomycetes

Cladobotryum varium Nees, Syst. Pilze (Würzburg): 56 (1816)

≡ *Hypomyces aurantius* (Pers.) Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 183 (1870)

Liberia, parasitized, Basidiomycetes

Cladobotryum verticillatum (Link) S. Hughes, Can. J. Bot. 36: 750 (1958)

≡ *Acremonium verticillatum* Link, Mag. Gesell. Naturf. Freunde, Berlin 3(1-2): 15 (1809)

USA, parasitized, Basidiomycetes

Cladobotryum viridigriseum (G.R.W. Arnold, G.P. White & Illman) K. Põldmaa & Samuels, Sydowia 49(1): 89 (1997)

≡ *Sympodiophora viridigrisea* G.R.W. Arnold, G.P. White & Illman, Mycotaxon 32(1): 371 (1988)

Canada, parasitized, *Phellinus punctatus*

≡ *Hypomyces viridigriseus* K. Põldmaa & Samuels, Sydowia 49(1): 88 (1997)

Escovopsis J.J. Muchovej & Della Lucia

Escovopsis aspergilloides Seifert, Samson & Chapela, Mycologia 87(3): 408 (1995)

Brazil, Trinidad and Tobago, parasitized, *Leucoagaricu*

Escovopsis kreiselii L.A. Meirelles, Q.V. Montoya, S.E. Solomon & A. Rodrigues, PLoS ONE 10(1): 7 (2015)

Brazil, obligate parasitized, *Leucoagaricus*

Escovopsis lentecrescens H.C. Evans & J.O. Augustin, PLoS ONE 8(12): 5 (2013)

Brazil, obligate parasitized, *Leucoagaricus*

Escovopsis microspora H.C. Evans & J.O. Augustin, PLoS ONE 8(12): 4 (2013)

Brazil, obligate parasitized, *Leucoagaricus*

Escovopsis moelleri H.C. Evans & J.O. Augustin, PLoS ONE 8(12):4 (2013)

Brazil, obligate parasitized, *Leucoagaricus*

Escovopsis trichodermoides M. Cabello, Masiulionis, Seifert, A. Rodrigues & Pagnocca, Antonie van Leeuwenhoek 107(3): 737 (2015)

Brazil, obligate parasitized, *Leucoagaricus*

Escovopsis weberi J.J. Muchovej & Della Lucia, Mycotaxon 37: 192 (1990)

Brazil, obligate parasitized, *Leucoagaricus*

Gliocladium Corda

Gliocladium agaricinum Cooke & Massee, Grevillea 17(no. 84): 80 (1889)

UK, parasitized, *Agaricus campestris* (Petch 1939)

Gliocladium album (Preuss) Petch, Trans. Br. Mycol. Soc. 22(3-4): 261 (1939)

≡ *Penicillium album* Preuss, Fung. Hoyersw.: no. 120 (1851)

UK, parasitized, *Fomes annosus*

Gliocladium comtus Rudakov, Mikofil'nye Griby Ikh Biologiya i Prakticheskoe Znachenie, Moscow (Moscow): 102 (1981)

Russia, parasitized, *Fomes fomentarius*

Gliocladium novae-zelandiae Seifert et al., Stud. Mycol. 27: 153 (1985)

New Zealand, parasitized, Polyporales

Gliocladium polyporicola (Henn.) Seifert & W. Gams, Stud. Mycol. 27: 156 (1985)

≡ *Stilbella polyporicola* Henn., Bot. Jb. 38: 118 (1905)

Canada, USA, parasitized, *Stereum hirsutum*, *S. ostrea* (Seifert 1985)

Gliocladium roseum Bainier, Bull. Soc. Mycol. Fr. 23: 111 (1907)

≡ *Clonostachys rosea* (Link) Schroers, Samuels, Seifert & W. Gams, Mycologia 91(2): 369 (1999)

Netherlands, parasitized, *Stereum hirsutum* and *Polyporus piceus*

Hypocrea Fr.

Hypocrea alcalifuscescens Overton, Stud. Mycol. 56: 62 (2006)

≡ *Trichoderma alcalifuscescens* (Overton) Jaklitsch & Voglmayr, Mycotaxon 126: 145 (2014)

Estonia, parasitized, *Piloderma/Amauroderma*

Hypocrea ampulliformis Yoshim. Doi & Yamat., Mem. N. Y. Bot. Gdn 49: 240 (1989)

Japan, parasitized, *Hirschioporus elongatus*

Hypocrea andinogelatinosa Yoshim. Doi, Bull. natn. Sci. Mus., Tokyo, B 1(1): 20 (1975)

Colombia, parasitized, unknown fungi

Hypocrea alutacea (Pers.) Ces. & De Not., Comm. Soc. crittog. Ital. 1(fasc. 4): 194 (1863)

≡ *Sphaeria alutacea* Pers., Comm. fung. clav. (Lipsiae): 12 (1797)

≡ *Trichoderma alutaceum* Jaklitsch, Fungal Divers. 48: 69 (2011)

Germany, parasitized, *Clavaria ligula*, *Spathularia flavida* (Overton et al. 2006)

Hypocrea americana (Canham) Overton, Stud. Mycol. 56: 21 (2006)

≡ *Trichoderma americanum* (Canham) Jaklitsch & Voglmayr, Mycotaxon 126: 145 (2014)

USA, parasitized, *Fomitopsis pinicola*

Hypocrea ampulliformis Yoshim. Doi & Yamat., Mem. N. Y. Bot. Gdn 49: 240 (1989)

Japan, parasitized, *Hirschioporus elongatus*

Hypocrea avellanea Rogerson & S.T. Carey, Brittonia 28(4): 381 (1976)

≡ *Trichoderma avellaneum* (Rogerson & S.T. Carey) Jaklitsch & Voglmayr, Mycotaxon 126: 146 (2014)

Japan, parasitized, *Tremella*

Hypocrea caribbaea Samuels & Schroers, Stud. Mycol. 56: 105 (2006)

≡ *Trichoderma caribbaeum* Samuels & Schroers, Stud. Mycol. 56: 105 (2006)

France, parasitized, *Penzigia*

Hypocrea corticioides Speg., Anal. Mus. nac. Hist. nat. B. Aires 23: 75 (1912)

≡ *Trichoderma* eucorticioides (Overton) Jaklitsch & Voglmayr, Mycotaxon 126: 148 (2014)

USA, parasitized, *Corticium* (Overton et al. (2006)

Hypocrea crassa P. Chaverri & Samuels, Stud. Mycol. 48: 61 (2003)

≡ *Trichoderma neocrassum* Samuels, IMA Fungus 6(2): 278 (2015)

Thailand, parasitized, Pyrenomycete

Hypocrea fomiticola Jaklitsch, Stud. Mycol. 63: 50 (2009)

≡ *Trichoderma fomiticola* Jaklitsch, Stud. Mycol. 63: 50 (2009)

Austria, parasitized, *Fomes fomentarius*

Hypocrea fomitopsis P.G. Liu & Yoshim. Doi, Mycosystema 19(3): 324 (2000)

≡ *Trichoderma fomitopsis* P.G. Liu & Yoshim. Doi) P.G. Liu et al., Mycosystema 33(6): 1204 (2014)

China, parasitized, *Fomitopsis pinicola*

Hypocrea fungicola (P. Karst.) Sacc., Syll. fung. (Abellini) 2: 528 (1883)

≡ *Trichoderma pulvinatum* (Fuckel) Jaklitsch & Voglmayr, Mycotaxon 126: 152 (2014)

Finland, parasitized, *Polyporus vetustis*

Hypocrea hypomycella Sacc., Michelia 1(no. 3): 302 (1878)

Spain, parasitized, *Corticium*

Hypocrea hypoxyloides Henn., Hedwigia 41: 5 (1902)

Europe, parasitized, Hypoxyloid species (Jaklitsch 2011)

Hypocrea inclusa Berk. & Broome, Ann. Mag. nat. Hist., Ser. 3 7: 451 (1861)

UK, parasitized, *Tuber puberulum* (Atkinson 1905)

Hypocrea megalosulphurea Yoshim. Doi, Bull. natn. Sci. Mus., Tokyo 15(4): 702 (1972)

Japan, parasitized, *Tremella*

Hypocrea microsulfurea Yoshim. Doi, Bull. natn. Sci. Mus., Tokyo 14(3): 389 (1971)

USA, parasitized, *Heterochaeta*

Hypocrea neorufoides Jaklitsch, Fungal Diver. 48: 25 (2011)

≡ *Trichoderma neorufoides* Jaklitsch, Fungal Divers. 48: 25 (2011)

Austria, parasitized, Corticiaceae

Hypocrea parestonica Jaklitsch, Stud. Mycol. 63: 69 (2009)

≡ *Trichoderma parestonicum* Jaklitsch, Stud. Mycol. 63: 69 (2009)

Austria, parasitized, *Hymenochaete tabacina*

Hypocrea pulvinata Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 185 (1870)

≡ *Trichoderma pulvinatum* (Fuckel) Jaklitsch & Voglmayr 2014

Germany, parasitized, *Polyporus sulphurea*

Hypocrea rhizophila S.D. Patil & M.S. Patil, Indian Phytopath. 36(4): 641 (1983)

India, parasitized, *Marasmius rhizophilus*

Hypocrea rhododendri Jaklitsch, Fungal Diver. 48: 199 (2011)

Austria, parasitized, Corticiaceae

Hypocrea stipata Lib. ex Fuckel, Jb. Nassau. Ver. Naturk. 25-26: 311 (1871)

≡ *Arachnocrea stipata* (Lib. ex Fuckel) Z. Moravec, Bull. Trimest. Soc. Mycol. Fr. 72: 161 (1956)

Cuba, parasitized, *Fagus sylvaticus*

Hypocrea subalbocornea Yoshim. Doi, Mem. Natn Sci. Mus, Tokyo 6: 68 (1973)

Japan, parasitized, Aphyllophorales

Hypocrea subflavominiata Yoshim. Doi, Bull. natn. Sci. Mus., Tokyo, B 1(1): 9 (1975)

Colombia, parasitized, fungi on dead wood

Hypocrea surrotunda P. Chaverri & Samuels, Mycologia 95(6): 1134 (2003)

USA, parasitized, fungus

Hypocrea thelephoricola P. Chaverri & Samuels, Stud. Mycol. 48: 96 (2003)

≡ *Trichoderma thelephoricola* P. Chaverri & Samuels, Stud. Mycol. 48: 96 (2003)

USA, parasitized, Thelephoraceae

Hypocrea tremelloides Fr., Summa veg. Scand., Sectio Post. (Stockholm): 383 (1849)

≡ *Sphaeria tremelloides* Schumach., Enum. pl. (Kjbenhavn) 2: 173 (1803)

≡ *Trichoderma tremelloides* Jaklitsch, Fungal Divers. 48: 232 (2011)

Germany, parasitized, *Nematelia*

Hypocrea tuberosa P. Chaverri & Samuels, Stud. Mycol. 48: 97 (2003)

Costa Rica, parasitized, Ascomycete

Hypocrea xanthovirens Yoshim. Doi, Mem. Natn Sci. Mus, Tokyo 29: 102 (1996)

Japan, parasitized, *Xanthoconium* (Liu et al. 1999)

Hypocrea xylariicola Henn., Hedwigia 43(3): 206 (1904)

Brazil, parasitized, *Xylaria* (Samuels 1988)

Hypocrea yasudae Yoshim. Doi, Bull. natn. Sci. Mus., Tokyo 15(4): 707 (1972)

Japan, parasitized, Gasteromycete (Samuels 1988)

Hypomyces (Fr.) Tul. & C. Tul.

Hypomyces aconidialis K. Põldmaa, Stud. Mycol. 68: 29 (2011)

Madagascar, parasitized, Mycena

Hypomyces agaricola (Chaillet ex Fr.) Sacc., Michelia 1(no. 3): 287 (1878)

Germany, parasitized, *Agaricus vetustis*

Hypomyces albidus Rehm, Hedwigia 42(Beibl.): (291) (1903)

France, Spain, parasitized, *Stereum sanguinolentum* (Rogerson and Samuels 1993)

Hypomyces amaniticola Z.Q. Zeng & W.Y. Zhuang, Mycosystema 35(9): 1050 (2016)

China, parasitized, *Amanita*

Hypomyces amaurodermatis Rogerson & Samuels, Mycologia 85(2): 243 (1993)

French Guiana, parasitized, *Amauroderma*

Hypomyces apiculatus (Cooke & Peck) Seaver, Mycologia 2(2): 73 (1910)

USA, parasitized, Agaricales

Hypomyces apiosporus Cooke, Grevillea 12(no. 63): 80 (1884)

Europe, parasitized, Agaricales

Hypomyces arachnoideus J. Schröt., Krypt.-Fl. Schlesien (Breslau) 3.2(1–2): 268 (1893)

Europe, parasitized, *Ustulina*

Hypomyces arecae Bacc., G. Bot. Ital., n.s. 9: 497 (1902)

Italy, parasitized, Basidiomycetes (Pennycook 2009)

Hypomyces arenaceus A.L. Sm., J. Linn. Soc., London 35: 17 (1901)

USA, parasitized, Basidiomycetes (Pennycook 2009)

Hypomyces asclepiadis Zerova, Journ. Agric. Soc. Shizuoka Prefect. 11(19): 103 (1937)

Rassia, parasitized, *Fusarium coeruleum* in lab (Pennycook 2009)

Hypomyces asterophorus Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 54 (1865)

Euorpe, parasitized, *Rassula adusta* (Pennycook (2009)

Hypomyces ater Fr., Summa veg. Scand., Sectio Post. (Stockholm): 564 (1849)

Sweden, parasitized, *Agaricus* (Pennycook 2009)

Hypomyces aurantiicolor Schulzer, Oesterr. Bot. Z. 30: 50 (1880)

Austria, parasitized, *Daedalea schultzer*

Hypomyces aurantius (Pers.) Fuckel, Jb. nassau. Ver. Naturk. 23-24: 183 (1870)

Europe, USA, parasitized, *Medulla* panis, *Polyporus sulphureus* (Boddy 2000)

Hypomyces aurantius* var. *aurantius (Pers.) Fuckel, Jb. nassau. Ver. Naturk. 23-24: 183 (1870)

≡ *Hypomyces aurantius* (Pers.) Fuckel, Jb. nassau. Ver. Naturk. 23-24: 183 (1870)

Europe, USA, parasitized, *Medulla panis*, *Polyporus sulphureus* (Boddy 2000)

Hypomyces aurantius* var. *microsporus Dargan & Bhatia, J. Indian Bot. Soc. 65(1): 53 (1986)

≡ *Hypomyces aurantius* (Pers.) Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 183 (1870)

India, parasitized, *Polyporus* (Dargan and Bhatia 1986)

Hypomyces aureonitens Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 64 (1865)

≡ *Sphaerostilbella aureonitens* (Tul. & C. Tul.) Seifert et al., Stud. Mycol. 27: 145 (1985)

Europe, parasitized, *Merulius tremellosa*, *Sterum histutum* (Mihál et al. 2007)

Hypomyces auriculariicola K. Põldmaa & Samuels, Sydowia 56(1): 93 (2004)

Thailand, parasitized, *Auricularia delicata*

Hypomyces australasiaticus K. Põldmaa, Stud. Mycol. 68: 25 (2011)

Sri Lanka, parasitized, *Earliella scabrosa*

Hypomyces australbidus K. Põldmaa & Samuels, Sydowia 56(1): 96 (2004)

Thailand, parasitized, Amauroderma

Hypomyces australiensis Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 294 (1909)

Australia, parasitized, Basidiomycetes (Rogerson and Samuels 1993)

Hypomyces australis (Mont.) Höhn., Annls Mycol. 8(3): 464 (1910)

≡ *Nectria australis* Mont., Syll. gen. sp. crypt. (Paris): 225 (1856)

Australia, parasitized, Basidiomycetes

Hypomyces badius Rogerson & Samuels, Mycologia 81(3): 419 (1989)

New Zealand, parasitized, Boletaceae

Hypomyces banningiae Peck, Bot. Gaz. 4(3): 139 (1879)

USA, parasitized, *Lactaris* (Rogerson and Samuels 1994)

Hypomyces baryanus Tul., Annls Sci. Nat., Bot., sér. 4 13: 13 (1860)

Netherlands, parasitized, Basidiomycetes (Rogerson and Samuels 1994)

Hypomyces batavus G.R.W. Arnold, Z. Pilzk. 37(1-4): 189 (1972)

Netherlands, parasitized, Basidiomycetes

Hypomyces berkeleyanus Plowr. & Cooke, Grevillea 11(no. 58): 48 (1882)

≡ ***Sphaerostilbella berkeleyana*** (Plowr. & Cooke) Samuels & Cand., Mycologist 9(1): 12 (1995)

Europe, parasitized, basidiomycetes (Põldmaa et al. 2000)

Hypomyces biasolettianus (Briosi & Farneti) Sacc., Syll. fung. (Abellini) 17: 803 (1905)

Brazil, parasitized, basidiomycetes

Hypomyces boleticola (Schwein.) Sacc., Syll. fung. (Abellini) 2: 476 (1883)

≡ *Sphaeria boleticola* Schwein., Trans. Am. phil. Soc., New Series 4(2): 210 (1832)

Astrialia, parasitized, Boletaceae

Hypomyces boletinus Peck, Bull. N.Y. St. Mus. 75: 15 (1904)

USA, parasitized, Boletaceae

Hypomyces boletiphagus Rogerson & Samuels, Mycologia 81(3): 421 (1989)

USA, parasitized, Boletaceae

Hypomyces bombycinus (Fr. ex Weinm.) P. Karst., Bidr. Känn. Finl. Nat. Folk 23: 210 (1873

Finland, parasitized, *Polyporus trabeus*

Hypomyces bresadolae Sacc., Syll. fung. (Abellini) 17: 803 (1905)

Spain, parasitized, basidiomycetes

Hypomyces bresadolanus Möller, Bot. Mitt. Trop. 9: 294 (1901)

USA, parasitized, basidiomycetes

Hypomyces caledonicus Pat., Bull. Soc. Mycol. Fr. 3(2): 126 (1887)

New Caledonia, parasitized, *Stereum fasciatum*

Hypomyces camphorati Peck, Bull. N.Y. St. Mus. 105: 23 (1906)

USA, parasitized, *Lactarius vellereus*

Hypomyces cancri (Rutgers) Wollenw., J. Agric. Res., Washington 2: 271 (1914)

≡ *Nectria cancri* Rutgers, Ann. Jard. Bot. Buitenzorg 27: 62 (1913)

USA, parasitized, Corticioid fungi

Hypomyces caulicola Henn., Hedwigia 41: 2 (1902

Europe, parasitized, Basidiomycetes

Hypomyces cervinigenus Rogerson & Simms, Mycologia 63(2): 418 (1971)

USA, parasitized, *Helvella lacunosa*

Hypomyces cervinus Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 51 (1865)

Gaul, Germany, Italy, UK, parasitized, *Morchella* and *Peziza varia* (Pennycook 2009)

Hypomyces cesatii (Mont.) Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 40 (1865)

Italy, parasitized, *Polyporus* (Rogerson and Samuels 1993)

Hypomyces chlorinigenus Rogerson & Samuels, Mycologia 81(3): 423 (1989)

≡ *Sepedonium chlorinum* (Tul. & C. Tul.) Damon, Mycologia 44(1): 95 (1952)

USA, parasitized, Boletaceae

Hypomyces chlorinus Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 59 (1865)

Gaul, parasitized, *Boletus cyanescens* (Damon 1952)

Hypomyces chromaticus Berk. & Broome, J. Linn. Soc., Bot. 14(no. 74): 113 (1873)

Russia, parasitized, *Boletinus oxydabillis* (Rogerson and Samuels 1989)

Hypomyces chrysospermus Tul. & C. Tul., Annls Sci. Nat., Bot., Sér. 4 13: 16 (1860)

Europe, parasitized, Boletaceae

Hypomyces chrysospermus* f. *edulis K. Bitner, Acta Soc. Bot. Pol. 22(4): 705 (1953)

Feland, parasitized, *Boletus edulis*

Hypomyces chrysostomus Berk. & Broome, J. Linn. Soc., Bot. 14(no. 74): 113 (1873)

≡ *Sporophagomyces chrysostomus* (Berk. & Broome) K. Põldmaa & Samuels, Can. J. Bot. 77(12): 1765 (1999)

Sri Lanka, parasitized, Basidiomycetes

Hypomyces completiopsis Z.Q. Zeng & W.Y. Zhuang, Mycosystema 35(9): 1051 (2016)

China, parasitized, *Boletus*

Hypomyces completus (G.R.W. Arnold) Rogerson & Samuels, Mycologia 81(3): 415 (1989)

Russia, parasitized, *Boletinus oxydabillis*

Hypomyces convivus Bacc., G. Bot. Ital., n.s. 9: 498 (1902)

Italy, parasitized, basidiomycetes

Hypomyces corticiicola K. Põldmaa, Mycologia 91(1): 185 (1999)

Germany, parasitized, *Hyphoderma setigerum*

Hypomyces dactylarioides G.R.W. Arnold, Z. Pilzk. 37(1-4): 188 (1972)

New Zealand, parasitized, *Stereum*

Hypomyces decipiens Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 61 (1865)

Italy, parasitized, *Agaricus melleus*

Hypomyces deformans (Lagger) Sacc., Syll. Fung. (Abellini) 2: 475 (1883)

≡ *Sphaeria deformans* Lagger, Flora, Regensburg 19: 249 (1836)

Switzerland, parasitized, *Lactarius deliciosus* (Mihál et al. 2007)

Hypomyces ekmanii Petr. & Cif., Annls Mycol. 28(5/6): 382 (1930)

Dominica, parasitized, Discomycetes (Rogerson and Samuels 1985)

Hypomyces ellipsosporus Zare & W. Gams, Mycol. Progr. 15: 1017 (2016)

India, parasitized, basidiomycetes on decaying wood

Hypomyces favoli Samuels, K. Põldmaa & Lodge, Sydowia 49(1): 82 (1997)

Puerto Rico, parasitized, *Polyporus tenuiculus*

Hypomyces flavolanatus Petch, Ann. R. Bot. Gdns Peradeniya 6(3): 229 (1917)

Asia, parasitized, *Poria*

Hypomyces floccosus (Fr.) Sacc., Syll. fung. (Abellini) 2: 472 (1883)

India, parasitized, *Lactaria*

Hypomyces fulgens (Fr.) P. Karst., Bidr. Känn. Finl. Nat. Folk 23: 207 (1873)

USA, parasitized, *Polyporus*

Hypomyces fusisporus Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 56 (1865)

France, parasitized, *Russula adusta*

Hypomyces gabonensis K. Põldmaa, Stud. Mycol. 68: 31 (2011)

Gabon, parasitized, *Rigidoporus lineatus*

Hypomyces galericola Henn., Hedwigia 41: 214 (1902)

Europe, parasitized, *Galera rubiginosa*

Hypomyces geoglossi Ellis & Everh., J. Mycol. 2(7): 73 (1886)

USA, parasitized, *Geoglossum*

Hypomyces heterosporus (K. Põldmaa) Lechat, Ascomycete.org 9(2): 23 (2016)

Cuba, parasitized, *Agaricus*

Hypomyces hrubyanus Petr., Annls Mycol. 32(5/6): 371 (1934)

Germany, parasitized, *Phlebia* (Põldmaa 2011)

Hypomyces hyacinthi Sorauer, Handb. Pflanzenkr., Edn 3 2: 34 (1908)

Germany, parasitized, Agaricales

Hypomyces hyalinus (Schwein.) Tul. & C. Tul., Annls Sci. Nat., Bot., sér. 4 13: 11 (1860)

USA, parasitized, *Russula* (Rogerson and Samuels 1994)

Hypomyces inaequalis Peck, Bull. Torrey Bot. Club 25(6): 328 (1898)

USA, parasitized, *Agaricus quodam* (Rogerson and Samuels 1994)

Hypomyces insignis Berk. & M.A. Curtis, J. Linn. Soc., Bot. 9: 424 (1867)

USA, parasitized, *Cantharellus* (Rogerson and Samuels 1994)

Hypomyces javanicus Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 118: 293 (1909)

Java, parasitized, *Coriolus elongatus*, *Polystictus* (Rogerson and Samuels 1994)

Hypomyces khaoyaiensis K. Põldmaa & Samuels, Sydowia 56(1): 100 (2004)

Thailand, parasitized, *Nigroporus durus*

Hypomyces lactifluorum (Schwein.) Tul. & C. Tul., Annls Sci. Nat., Bot., sér. 4 13: 11 (1860)

USA, parasitized, *Lactarius*

Hypomyces laeticolor Tokiwa & Okuda, Mycoscience 46(5): 297 (2005)

Japan, parasitized, *Basidioradulum*

Hypomyces lanceolatus Rogerson & Samuels, Mycologia 85(2): 249 (1993)

Puerto Rico, parasitized, *Rigidoporus microporus*

Hypomyces leotiarum Fayod, Annls Sci. Nat., Bot., sér. 7 2: 49 (1885)

≡ *Sepedonium leotiarum* (Fayod) Rogerson & Samuels, Mycologia 77(5): 771 (1985)

Germany, parasitized, Boletaceae

Hypomyces lateritius (Fr.) Tul. & C. Tul., Annls Sci. Nat., Bot., sér. 4 13: 11 (1860)

Europe, USA, parasitized, *Lactarius* (Rogerson and Samuels 1994)

Hypomyces leotiicola Rogerson & Samuels, Mycologia 77(5): 771 (1985)

≡ *Sepedonium leotiarum* (Fayod) Rogerson & Samuels, Mycologia 77(5): 771 (1985)

USA, parasitized, *Leotia lubrica*

Hypomyces leptosphaeriae (Niessl) Wollenw., Fusaria autographica delineata 1: no. 57 (1916)

≡ *Nectria leptosphaeriae* Niessl, Fung. Saxon. Exsicc., Pilze Sachsen's 4: no. 165 (1886)

Germany, parasitized, *Leptosphaeria doliolum*

Hypomyces linearis Rehm, Hedwigia 39(4): 223 (1900)

Brazil, parasitized, Agaricales

Hypomyces linkii Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 44 (1865)

France, Italy, Germany, UK, parasitized, *Agaricus*, *Boletus* (Pennycook 2009)

Hypomyces lithuanicus Heinr.-Norm., Eesti NSV Tead. Akad. Toim., Biol. seer 18: 72 (1969)

Lithuania, parasitized, *Lactarius*

Hypomyces luteovirens (Fr.) Tul. & C. Tul., Annls Sci. Nat., Bot., sér. 4 13: 12 (1860)

≡ *Sphaeria luteovirens* Fr., K. svenska Vetensk-Akad. Handl., ser. 3 38: 251 (1817)

Europe, USA, parasitized, *Lactarius* (Rogerson and Samuels 1994)

***Hypomyces macrosporus* Seaver**, Mycologia 2(2): 80 (1910)

USA, parasitized, Agaricales (Rogerson and Samuels 1994)

Hypomyces melanocarpus Rogerson & Mazzer, Michigan Bot. 10(3): 109 (1971)

USA, parasitized, *Tylopilus*

Hypomyces melanochlorus Rogerson & Samuels, Mycologia 81(3): 425 (1989)

USA, parasitized, *Boletus*

Hypomyces microspermus Rogerson & Samuels, Mycologia 81(3): 426 (1989)

UK, parasitized, Boletaceae

Hypomyces miliarius Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 43 (1865)

France, parasitized, *Russula emetica* (Rogerson and Samuels 1994)

Hypomyces moellerianus Bres., Hedwigia 35(5): 299 (1896)

Brazil, parasitized, Basidiomycetes

Hypomyces mycogones Rogerson & Samuels, Mycologia 77(5): 772 (1985)

Ecuador, parasitized, *Geoglossum pumilum:*

Hypomyces mycophilus Rogerson & Samuels, Mycologia 85(2): 250 (1993)

≡ *Cladobotryum polypori* (Dearn. & House) Rogerson & Samuels, Mycologia 85(2): 250 (1993)

USA, parasitized, *Trametes versicolor*

Hypomyces niveus Henn., Reise Österr., Syst. Arbeit. 3(1-3): 28 (1908)

Madagascar, parasitized, *Polyporus*

Hypomyces novae-zelandiae Dingley, Trans. Roy. Soc. N.Z. 79(1): 59 (1951)

New Zealand, parasitized, *Polyporus*

Hypomyces ochraceus (Pers.) Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 38 (1865)

≡ *Sphaeria ochracea* Pers., Syn. Meth. Fung. (Göttingen) 1: 18 (1801)

Europe, USA, parasitized, *Russula emetica* (Tamm and Põldmaa 2013)

Hypomyces odoratus G.R.W. Arnold, Česká Mykol. 18(3): 144 (1964)

Former Czechoslovakia, parasitized, *Tricholoma terreum*

Hypomyces orthosporus K. Põldmaa, Mycotaxon 59: 390 (1996)

Estonia, parasitized, *Inonotus leporinus*

Hypomyces paeonius Berk. & Broome, J. Linn. Soc., Bot. 14(no. 74): 113 (1873)

Sri Lanka, parasitized, *Polyporus* (Rogerson and Samuels 1993)

Hypomyces pallidus Petch, Ann. R. Bot. Gdns Peradeniya 7(2): 134 (1920)

Sri Lanka, parasitized, *Agaricus*

Hypomyces papulasporae Rogerson & Samuels, Mycologia 77(5): 766 (1985)

New Zealand, parasitized, ascomata of *Trichoglossum hirsutum*

Hypomyces papulasporae var. *americanus* Rogerson & Samuels, Mycologia 77(5): 769 (1985)

USA, parasitized, *Trichoglossum*

Hypomyces papyraceus (Ellis & Holw.) Seaver, Mycologia 2(2): 80 (1910)

USA, parasitized, fungus on decaying wood.

Hypomyces parvus Petch, Trans. Br. Mycol. Soc. 27(3-4): 142 (1945)

Sri Lanka, parasitized, *Pilobolus*

Hypomyces penicillatus Tokiwa & Okuda, Mycoscience 46(5): 299 (2005)

Japan, parasitized, *Stereum ostrea*

Hypomyces pergamenus Rogerson & Samuels, Mycologia 85(2): 252 (1993)

Brazil, parasitized, *Poria institata*

Hypomyces perniciosus Magnus, Bot. Ztg. 46: 394 (1888)

USA, parasitized, *Agaricus* (Rogerson and Samuels 1994)

Hypomyces petchii G.R.W. Arnold, Z. Pilzk. 37(1-4): 187 (1972)

New Zealand, parasitized, *Russula*

Hypomyces pezizae Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 52 (1865)

New Zealand, parasitized, *Russula* (Pennycook 2009)

Hypomyces polyporinus Peck, Ann. Rep. N.Y. St. Mus. nat. Hist. 26: 84 (1874)

USA, parasitized, *Polyporus versicolor*

Hypomyces porotheliiformis Lindtner, Annls Mycol. 36(4): 326 (1938)

Japan, parasitized, *Polyporus* (Tokiwa and Okuda 2005)

Hypomyces porphyreus Rogerson & Mazzer, Michigan Bot. 10(3): 107 (1971)

USA, parasitized, *Leptonia strigosissima*

Hypomyces pseudocorticiicola Tokiwa & Okuda, Mycoscience 46(5): 295 (2005)

Japan, parasitized, Polyporales

Hypomyces pseudopolyporinus Samuels & Rogerson, Acta Amazon., Supl. 14(1-2): 81 (1986)

Japan, parasitized, *Ganoderma applanatum*

Hypomyces puertoricensis Samuels, K. Põldmaa & Lodge, Sydowia 49(1): 85 (1997)

Puerto Rico, parasitized, *Rigidoporus lineatus*

Hypomyces purpureus Peck, Bull. Torrey Bot. Club 25(6): 327 (1898)

Russia, USA, parasitized, *Lactarius*

Hypomyces robledoi K. Põldmaa, Mycotaxon 102: 191 (2007)

Peru, parasitized, *Ganoderma australe*

Hypomyces rosellus (Alb. & Schwein.) Tul. & C. Tul., Annls Sci. Nat., Bot., sér. 4 13: 12 (1860)

Europe, parasitized, *Corticium*, *Hydnum Polyporus*, *Stereum* (Mihál et al. 2007)

Hypomyces roseus (Pers.) Sacc., Jb. Nassau. Ver. Naturk. 23-24: 182 (1870)

Germany, USA, parasitized, *Corticium terreum* (Mihál et al. 2007)

Hypomyces rostratus K. Põldmaa, Mycologia 91(1): 190 (1999)

Finland, parasitized, Corticoid fungus

Hypomyces samuelsii K. Põldmaa, Stud. Mycol. 68: 14 (2011)

Puerto Rico, parasitized, *Phellinus* cf. *chryseus*

Hypomyces semicircularis (G.R.W. Arnold, R. Kirschner & Chee J. Chen) R. Kirschner, Fungal Sci., Taipei 32(1): 17 (2017)

≡ *Cladobotryum semicirculare* G.R.W. Arnold, R. Kirschner & Chee J. Chen, Sydowia 59(1): 118 (2007)

Cuba, parasitized, Polyporaceae

Hypomyces semitranslucens G.R.W. Arnold, Nov. sist. Niz. Rast. 8: 132 (1971)

Russia, parasitized, *Lenzites betulia*

Hypomyces sepultariae Ade, Hedwigia 64: 304 (1923)

Bavaria, parasitized, *Sepultaria arenicola*

Hypomyces siamensis K. Põldmaa & Samuels, Sydowia 56(1): 107 (2004)

Thailand, parasitized, Polyporaceae

Hypomyces sibirinae Rogerson & Samuels, Mem. N. Y. Bot. Gdn 59: 31 (1990)

USA, parasitized, *Boletus*

Hypomyces sinicus W.Y. Zhuang, Shuang L. Chen, Z.Q. Zeng & H.D. Zheng, Mycosystema 31(6): 822 (2012)

China, parasitized, *Schizophyllum*

Hypomyces spadiceus Fr. ex Cooke, Grevillea 12(no. 63): 80 (1884)

Sweden, parasitized, *Agaricus*

Hypomyces stephanomatis Rogerson & Samuels, Mycologia 77(5): 775 (1985)

USA, parasitized, apothecia of *Humaria hemisphaerica*

Hypomyces stereicola Henn., Hedwigia 42(Beibl.): (79) (1903)

Austrilia, parasitized, basidiomycetes (Põldmaa and Samuels 1999)

Hypomyces subaurantius Heinr.-Norm., Eesti NSV Tead. Akad. Toim., Biol. seer 18: 74 (1969)

Russia, parasitized, Polyporaceae

Hypomyces succineus Rogerson & Samuels, Brittonia 44(2): 256 (1992)

≡ *Cladobotryum succineum* Rogerson & Samuels, Brittonia 44(2): 256 (1992)

USA, parasitized, *Pholiota*

Hypomyces sulphureus Schulzer, Oesterr. Bot. Z. 30: 49 (1880)

Philippines, parasitized, *Boletus propinquus*, *Hirneola affinis* (Rogerson and Samuels 1989)

Hypomyces sympodiophorus Rogerson & Samuels, Mycologia 85(2): 268 (1993)

≡ *Cladobotryum stereicola* (G.R.W. Arnold) Rogerson & Samuels, Mycologia 85(2): 268 (1993)

USA, parasitized, *Stereum ostrea*

Hypomyces terrestris Plowr. & Boud., Grevillea 8(no. 47): 105 (1880)

France, parasitized, *Agaricus* (Rogerson and Samuels 1994)

Hypomyces thailandicus K. Põldmaa & Samuels, Mycologia 95(5): 929 (2003)

Thailand, parasitized, *Xylobolus* cf. *illudens*

Hypomyces thiryanus Maire, Bull. Herb. Boissier 7: 145 (1899)

Japan, parasitized, *Lactarius* (Mihál et al. 2007)

Hypomyces tomentosus (Berk.) Berk., Grevillea 4(no. 29): 15 (1875)

Australia, parasitized, *Agaricus*

Hypomyces tremellicola (Ellis & Everh.) Rogerson, Mem. N. Y. Bot. Gdn 26(3): 20 (1976)

Worldwide, parasitized, *Tremella*, (Rogerson and Samuels 1994)

Hypomyces trichothecioides Tubaki, Nagaoa 7: 31 (1960)

Japan, parasitized, *Coriolus hirsutus*

Hypomyces triseptatus Rossman & Rogerson, Brittonia 33(3): 382 (1981)

Gabon, parasitized, Pyrenomycete

Hypomyces tubericola (Schwein.) Sacc., Syll. fung. (Abellini) 2: 476 (1883)

≡ *Sphaeria tubericola* Schwein., Trans. Am. phil. Soc., New Series 4(2): 191 (1832)

Worldwide, parasitized, *Tuber* (Pacioni and Leonardi 2016)

Hypomyces tuberosus Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 58 (1865)

France, parasitized, *Lactarius acris* (Rogerson and Samuels 1994)

Hypomyces villosus Samuels & Rogerson, Acta Amazon., Supl. 14(1-2): 84 (1986)

Brazil, parasitized, *Coriolus*

Hypomyces viridigriseus K. Põldmaa & Samuels, Sydowia 49(1): 88 (1997)

USA, parasitized, *Phellinus laevigatus*

Hypomyces viridis P. Karst., Bidr. Känn. Finl. Nat. Folk 23: 211 (1873)

Europe, USA, parasitized, *Lactarius*, *Russula* (Rogerson and Samuels 1994)

Hypomyces volemi Peck, Bull. Torrey Bot. Club 27: 20 (1900)

USA, parasitized, *Lactarius* (Rogerson and Samuels 1994)

Hypomyces xyloboli K. Põldmaa, Mycologia 95(5): 930 (2003)

USA, parasitized, *Xylobolus frustulatus* (Rogerson and Samuels 1994)

Hypocreopsis P. Karst.

Hypocreopsis xylariicola Samuels, Mem. N. Y. Bot. Gdn 48: 20 (1988)

Guyana, parasitized, *Xylaria*

Mycogone *Link*

Mycogone alba Pers., Mycol. eur. (Erlanga) 1: 26 (1822)

USA, parasitized, Agaricales (Mohan 2016)

Mycogone calospora (P. Karst.) Höhn., Centbl. Bakt. ParasitKde, Abt. II 60: 12 (1923)

USA, parasitized, *Clavaria decolorante* (Põldmaa 2000)

Mycogone cerasi Bérenger, Atti Ruin. sc. ital. Milano 6: 475 (1844)

France, Germany, Italy, parasitized, *Morchella*, *Peziza varia* (Hawksworth 1981)

Mycogone cinerea Morgan, J. Cincinnati Soc. Nat. Hist. 18: 45 (1895)

USA, parasitized, *Agaricus*

Mycogone jaapii Lindau, Verh. Bot. Ver. Prov. Brandenb. 47: 69 (1905)

Germany, parasitized, *Peziza*

Mycogone novae-zelandiae Matsush., Matsush. Mycol. Mem. 5: 21 (1987)

New Zealand, parasitized, *Boletus*

Mycogone ochracea Boud., Bull. Soc. Mycol. Fr. 7: 81 (1891)

Europe, parasitized, *Acetabula leucomelaena*

Mycogone perniciosa (Magnus) Delacr., Journal de l'Agriculture, Paris: 255 (1900)

Worldwide, parasitized, *Agaricus* (Põldmaa and Samuels 1999)

Mycogone psilocybina Morgan-Jones & D.J. Gray, Mycotaxon 8(1): 144 (1979)

North America, parasitized, *Psilocybe cubensis*

Mycogone puccinioides (Preuss) Sacc., Syll. Fung. (Abellini) 4: 184 (1886)

≡ *Blastotrichum puccinioides* Preuss, Deutschl. Fl., 3 Abt. (Pilze Deutschl.) 6(25/26): 21 (1848)

Europe, parasitized, *Russula*

Mycogone rosea Link, Mag. Gesell. Naturf. Freunde, Berlin 3(1-2): 18 (1809)

France, USA, parasitized, *Annularia*, *Boletus*

Mycogone roseola Pound & Clem., Bot. Surv. Nebraska 4: 6 (1896)

USA, parasitized, *Helvella albipes*

Mycogone rufa Petch, Ann. R. Bot. Gdns Peradeniya 6(3): 245 (1917)

Sri Lanka, parasitized, *Agaricus*

Mycogone simplex Corda, Icon. Fung. (Prague) 6: 2 (1854)

Sri Lanka, parasitized, *Agaricus*

Podostroma P. Karst.

Podostroma solmsii* f. *octosporum Yoshim. Doi, Bull. natn. Sci. Mus., Tokyo, B 4(1): 24 (1978)

Japan, parasitized, *Phallus impudicus*

Sepedonium Link 1809

Sepedonium agglomeriferum Letell., Figures des Champignons … (Autun): tab. 667 (1839)

France, parasitized, basidiomycetes

Sepedonium ampullosporum Damon, Mycologia 44(1): 91 (1952)

Brazil, parasitized, *Boletus bicolor*, *Hebeloma*, *Strobilomyces floccopus*

Sepedonium aureofulvum Cooke & Massee, Grevillea 16(no. 79): 76 (1888)

France, parasitized, *Polyporus mordialloc* (Samuels and Seifert 1987)

Sepedonium brunneum Peck, Ann. Rep. N.Y. St. Mus. nat. Hist. 32: 44 (1880)

USA, parasitized, basidiomycetes (Samuels and Seifert 1987)

Sepedonium candidum Peyronel, I germi astmosferici dei fungi con micelio, Diss. (Padova): 24 (1913)

Italy, parasitized, *Agaricus* (Samuels and Seifert 1987)

Sepedonium chalcipori Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 73 (1991)

Germany, parasitized, *Chalciporus*

Sepedonium chlorinum (Tul. & C. Tul.) Damon, Mycologia 44(1): 95 (1952)

≡ *Hypomyces chlorinus* Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 59 (1865)

France, parasitized, *Agaricaceae*, Boletaceae

Sepedonium chrysospermum (Bull.) Fr., Syst. Mycol. (Lundae) 3(2): 438 (1832)

≡ *Hypomyces chrysospermus* Tul. & C. Tul., Annls Sci. Nat., Bot., sér. 4 13: 16 (1860)

Europe, USA, parasitized, *Agaricus*, *Boletus*, *Craterelis* (Samuels and Seifert 1987)

Sepedonium cordae Sacc., Syll. Fung. (Abellini) 4: 146 (1886)

Bohemia, parasitized, *Peziza* (Samuels and Seifert 1987)

Sepedonium curvisetum Harz, Bull. Soc. Imp. Nat. Moscou 44(1): 110 (1871)

Austria, Germany, ambiguous, *Mucor*

Sepedonium epimeliola Cif., Sydowia 9(1-6): 333 (1955)

Dominica, colonized, *Meliola*

Sepedonium flavidum Sacc. & Ellis, Michelia 2(no. 8): 576 (1882)

USA, parasitized, Polyporaceae

Sepedonium laevigatum Sahr & Ammer, Mycologia 91(6): 939 (1999)

USA, parasitized, *Suillus punctipes*

Sepedonium macrosporum Sacc. & Cavara, G. Bot. ital., n.s. 7: 305 (1900)

Italy, parasitized, *Boletus*

Sepedonium meliola (F. Stevens) Cif., Sydowia 9(1-6): 335 (1955)

≡ *Acremonium meliola* F. Stevens, Bot. Gaz. 65(3): 234 (1918)

Puerto Rico, parasitized, *Meliola paulliniao*

Sepedonium micronemeum Peyronel, I germi astmosferici dei fungi con micelio, Diss. (Padova): 24 (1913)

Australia, parasitized, *Agaricus* (Samuels and Seifert 1987)

Sepedonium mucorinum Harz, Bull. Soc. Imp. Nat. Moscou 44(1): 110 (1871)

Australia, Germany, parasitized, *Mucorineis variis* (Samuels and Seifert 1987)

Sepedonium tuberculiferum Ellis & Everh., Am. Nat. 31: 430 (1897)

USA, parasitized, *Peziza fusicarpa*, *P. hemispharica* (Samuels and Seifert 1987)

Sepedonium tulasneanum (Plowr.) Sacc., Syll. fung. (Abellini) 2: 473 (1883)

≡ *Hypomyces tulasneanus* Plowr., Grevillea 11(no. 58): 46 (1882)

Germany, parasitized, *Boletus putrescentibus* (Samuels and Seifert 1987)

Sibirina G.R.W. Arnold

Sibirina coriolopsicola R.F. Castañeda, Fungi Cubenses II (La Habana): 10 (1987)

≡ *Cladobotryum coriolopsicola* (R.F. Castañeda) K. Põldmaa, Stud. Mycol. 68: 14 (2011)

Cuba, parasitized, *Coriolopsis*

Sibirina lutea Morgan-Jones & D.J. Gray, Mycotaxon 12(1): 244 (1980)

USA, parasitized, *Clavaria*

Sibirina nivea G.R.W. Arnold, Feddes Repert. Spec. Nov. Regni Veg. 98(5-6): 353 (1987)

Cuba, parasitized, *Phellinus*

Sibirina purpurea* var. *asterophora J.D. Chen, Acta Mycol. Sin. 8(2): 129 (1989)

≡ *Cladobotryum purpureum* (Morgan-Jones) Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 92 (1991)

China, parasitized, *Agaricus bisporus*

Sibirina variosperma Samuels & Rogerson, Mem. N. Y. Bot. Gdn 59: 31 (1990)

Indonesia, parasitized, Polyporaceae

Sphaerostilbella (Henn.) Sacc. & D. Sacc.

Sphaerostilbella aureonitens (Tul. & C. Tul.) Seifert, Samuels & W. Gams, Stud. Mycol. 27: 145 (1985)

≡ *Hypomyces aureonitens* Tul. & C. Tul., Select. Fung. Carpol. (Paris) 3: 64 (1865)

Netherlands, parasitized, *Stereum*

Sphaerostilbella aurifila (W.R. Gerard) Rossman, L. Lombard & Crous, Stud. Mycol. 80: 243 (2015)

≡ *Stilbum aurifilum* W.R. Gerard, Bull. Torrey Bot. Club 5: 39 (1874)

Netherlands, parasitized, *Stereum*

Sphaerostilbella ganodermatis K. Põldmaa & Samuels, Sydowia 56(1): 119 (2004)

Thailand, parasitized, Ganodermataceae

Sphaerostilbella micropori K. Põldmaa & Samuels, Sydowia 56(1): 122 (2004)

Thailand, parasitized, *Microporus xanthopus*

Sphaerostilbella novae-zelandiae Seifert, Samuels & W. Gams, Stud. Mycol. 27: 153 (1985)

New Zealan, parasitized, Polyporales

Sphaerostilbella parabroomeana Zare & W. Gams, Mycol. Progr. 15: 1012 (2016)

New Zealan, parasitized, Polyporales

Sphaerostilbella penicillioides (Corda) Rossman, L. Lombard & Crous, Stud. Mycol. 80: 243 (2015)

New Zealan, parasitized, Polyporales

Sporophagomyces K. Põldmaa & Samuels

Sporophagomyces chrysostomus (Berk. & Broome) K. Põldmaa & Samuels, Can. J. Bot. 77(12): 1765 (1999)

≡ *Hypomyces chrysostomus* Berk. & Broome, J. Linn. Soc., Bot. 14(no. 74): 113 (1873)

Puerto Rico, parasitized, wood-decaying homobasidiomycetes

Sporophagomyces lanceolatus (Rogerson & Samuels) K. Põldmaa & Samuels, Can. J. Bot. 77(12): 1765 (1999)

≡ *Hypomyces lanceolatus* Rogerson & Samuels, Mycologia 85(2): 249 (1993)

Puerto Rico, parasitized, *Rigidoporus microporus*

Sporophagomyces moellerianus (Bres.) K. Põldmaa & Samuels, Can. J. Bot. 77(12): 1765 (1999)

≡ *Hypomyces moellerianus* Bres., Hedwigia 35(5): 299 (1896)

Puerto Rico, parasitized, wood-decaying homobasidiomycetes

Stephanoma Wallr.

Stephanoma meliolae F. Stevens & Dalbey, Mycologia 11(1): 9 (1918)

Puerto Rico, parasitized, *Meliola torbuosa*

Stephanoma phaeosporum E.E. Butler & McCain, Mycologia 60(4): 956 (1968)

USA, obiligate parasitized *Fusarium*

Stephanoma tetracoccum Zind.-Bakker, Annls Mycol. 32(1/2): 102 (1934)

USA, parasitized, *Geoglossum glabrum*

Syspastospora parasitica (Tul.) P.F. Cannon & D. Hawksw., J. Linn. Soc., Bot. 84(2): 152 (1982)

In Lab, parasitized, *Beauveria bassiana*, *Paecilomyces tenuipes* (Lee and Nam 2000)

Trichoderma Pers.

Trichoderma aggressivum Samuels & W. Gams, Mycologia 94(1): 167 (2002)

Canada, parasitized, cultivated mushroom

Trichoderma americanum (Canham) Jaklitsch & Voglmayr, Mycotaxon 126: 145 (2014)

USA, parasitized, *Fomes pinicola*

Trichoderma asperellum Samuels, Lieckf. & Nirenberg, Sydowia 51(1): 81 (1999)

USA, parasitized, *Sclerotinia minor*

Trichoderma austriacum Jaklitsch, Fungal Divers. 48: 125 (2011)

Austria, parasitized, *Eichleriella deglubens*

Trichoderma atroviride P. Karst., Bidr. Känn. Finl. Nat. Folk 51: 363 (1892)

Worldwide, parasitized, filamentous fungi (Siozios et al. 2015)

Trichoderma catoptron P. Chaverri & Samuels, Stud. Mycol. 48: 43 (2003)

Sri Lanka, parasitized, basidiomycete

Trichoderma epimyces Jaklitsch, Mycologia 100(5): 808 (2008)

France, parasitized, *Polyporus nigricans*

Trichoderma estonicum P. Chaverri & Samuels, Stud. Mycol. 48: 66 (2003)

Estonia, parasitized, *Hymenochaete tabacina*

Trichoderma fomiticola Jaklitsch, Stud. Mycol. 63: 50 (2009)

Austria, parasitized, *Fomes fomentarius*

Trichoderma hamatum (Bonord.) Bainier, Bull. Soc. Mycol. Fr. 22(2): 131 (1906)

≡ *Verticillium hamatum* Bonord., Handb. Allgem. Mykol. (Stuttgart): 97 (1851)

Worldwide, parasitized, filamentous fungi (Karlsson et al. 2015)

Trichoderma hypoxylon Jing Z. Sun et al., Sci. R. 6(no. 37369): 5 (2016)

Thailand, parasitized, *Hypoxylon*

Trichoderma koningii Oudem., Arch. néerl. Sci., Sér. 2 7: 291 (1902)

Worldwide, parasitized, filamentous fungi (Karlsson et al. 2015)

Trichoderma neokoningii Samuels & Soberanis, Stud. Mycol. 56: 172 (2006)

Peru, parasitized, *Moniliophthora roreri*

Trichoderma parestonicum Jaklitsch, Stud. Mycol. 63: 69 (2009)

Austria, parasitized, *Hymenochaete tabacina*

Trichoderma paucisporum Samuels, Carm. Suárez & K. Solis, Mycol. Res. 110(4): 390 (2006)

Ecuador, parasitized, *Moniliophthora roreri*

Trichoderma phellinicola Jaklitsch, Fungal Divers. 48: 143 (2011)

Austria, parasitized, *Phellinus ferruginosus*

Trichoderma pleuroti S.H. Yu & M.S. Park Mycobiology 34(3): 111 (2006)

South Korea, parasitized, *Pleurotus*

Trichoderma pleuroticola S.H. Yu & M.S. Park, Mycobiology 34(3): 112 (2006)

South Korea, parasitized, *Pleurotus*

Trichoderma protopulvinatum (Yoshim. Doi) Jaklitsch & Voglmayr, Mycotaxon 126: 152 (2014)

Japan, parasitized, *Fomitopsis pinicola*

Trichoderma samuelsii Jaklitsch & Voglmayr, Mycologia 104(104): 937 (2012)

Italy, parasitized, *Hymenochaete*

Trichoderma saturnisporopsis Samuels & Jaklitsch, i Fungal Diver 55(1): 103 (2012)

USA, parasitized, *Phellinus weirii*

Trichoderma stilbohypoxyli Samuels & Schroers, Stud. Mycol. 56: 128 (2006)

Puerto Rico, parasitized, *Stilbohypoxylon moelleri*

Trichoderma stramineum P. Chaverri & Samuels, Stud. Mycol. 48: 86 (2003)

Sri Lanka, parasitized, Dematiaceous fungus

Trichoderma surrotundum P. Chaverri & Samuels, Stud. Mycol. 48: 90 (2003)

USA, parasitized, unknown fungus

Trichoderma tawa P. Chaverri & Samuels, Stud. Mycol. 48: 92 (2003)

Thailand, parasitized, unknown fungus

Nectriaceae Tul. & C. Tul.

***Allonectella* Petr.**

Allonectella rubescens Petr., Sydowia 4(1-6): 345 (1950)

Ecuador, parasitized, *Phyllachora*

Calonectria De Not.

Calonectria parasitica Saccas, Étude de la Flore Cryptogamique des Caféirs en Afrique Centrale, (Bulletin IFCC 16): 44 (1981)

Central African Republic, colonized, pyrenomycete

Cosmospora Rabenh.

Cosmospora arxii (W. Gams) Gräfenhan & Schroers, Stud. Mycol. 68: 95 (2011)

≡ *Acremonium arxii* W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 123 (1971)

Germany, parasitized, *Hypoxylon* (Gräfenhan et al. 2011)

Cosmospora aurantiicola (Berk. & Broome) Rossman & Samuels, Stud. Mycol. 42: 118 (1999)

≡ *Nectria aurantiicola* Berk. & Broome, J. Linn. Soc., Bot. 14(no. 74): 117 (1873)

New Zealand, Sri Lanka, parasitized, *Auricularia* (Tyson et al. 2005)

Cosmospora coccinea Rabenh., Fungi Europ. Exsicc.: No. 459 (1862)

France, Germany, Italy, parasitized, *Polyporus ferrugineus* (Rossman et al. 1999)

Cosmospora henanensis Y. Nong & W.Y. Zhuang, Fungal Divers. 19: 96 (2005)

China, colonized, unknown Ascomycete

Cosmospora stegonsporii Rossman, D.F. Farr & Akulov, Fungal Planet 23: 2 (2008)

Ukraine, parasitized, *Stegonsporium pyriforme*

Cosmospora vilior (Starbäck) Rossman & Samuels, Stud. Mycol. 42: 126 (1999)

Worldwide, colonized, *Xylaria* (Herrera et al. 2016)

Fusarium Link

Fusarium bactridioides Wollenw., Science, N.Y. 79: 572 (1934)

USA, parasitized, *Cronartium conigenum*

Fusarium dominicanum Cif., Sydowia 9(1-6): 325 (1955)

Dominica, colonized, *Meliola byrsonimae*

Fusarium graminearum Schwabe, Flora Anhalt 2: 285 (1839)

Canada, parasitized, *Sclerotinia sclerotiorum* (Bardin and Huang 2001)

Fusarium heterosporum Nees & T. Nees, Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 9: 235 (1818)

Canada, USA, parasitized, *Claviceps*, *Sclerotinia sclerotiorum* (Bardin and Huang 2001)

Fusarium longipes Wollenw. & Reinking, Phytopathology 15: 160 (1925)

India, parasitized, *Sclerospora graminicola* (Navi and Singh 1993)

Fusarium merismoides Corda, Icon. Fung. (Prague) 2: 4 (1838)

USA, parasitized, *Pythium ultimum* and soilborne fungi (Hoch and Abawi 1979)

Fusarium oxysporum Schltdl., Fl. berol. (Berlin) 2: 139 (1824)

Worldwide, parasitized, *Pythium ultimum* and soilborne fungi (Hoch and Abawi 1979)

Nectria (Fr.) Fr.

Nectria asakawaensis Ts. Watan., Trans. Mycol. Soc. Japan 31(2): 228 (1990)

Japan, parasitized, *Armillaria*

Nectria cytosporae Georgescu & Lungescu, Revue Biol. Bucarest 3(1): 57 (1958)

Romania, ambiguous, *Cytospora pinastri*

Nectria discicola Rogerson & Samuels, Mycologia 77(5): 782 (1985)

Ecuador, colonized, *Bioscypha*

Nectria discophila Rogerson & Samuels, Mycologia 77(5): 777 (1985)

Venezuela, colonized, *Lachnum brasiliense*

Nectria fuliginosispora Luc, Revue Mycol., Paris 16(-suppl. colon. 2): 117 (1951)

Ivory Coast, colonized, *Melanconiopsis africana*

Nectria ganymede Lowen & Minter, Trans. Br. Mycol. Soc. 88(1): 59 (1987)

Greece, parasitized, *Zeus olympius*

Nectria geastroides Samuels, Mycol. Pap. 164: 20 (1991)

Amazonas, colonized, *Hypoxylon*

Nectria puberula* var. *microspora Bat. & Nascim., Publicações Inst. Micol. Recife 33: 6 (1956)

Brazil, colonized, *Irenopsis cynophallophorae*

Nectria inventa Pethybr., Trans. Br. Mycol. Soc. 6(2): 107 (1919)

Canada, parasitized, *Alternaria brassicae* and many plant pathogens

Nectria metepisphaeria Samuels, Mycol. Pap. 164: 29 (1991)

Venezuela, colonized, Pyrenomycete

Nectria munkii Tilak, S.B. Kale & S.V.S. Kale, Sydowia 24(1-6): 295 (1971)

India, colonized, *Haplosporella*

Nectria nothepisphaeria Samuels, Mycol. Pap. 164: 30 (1991)

New Zealand, colonized, *Leptosphaeria*

Nectria pseudepisphaeria Samuels, Mycol. Pap. 164: 34 (1991)

USA, ambiguous, Diatrypaceae

Nectria tatrensis Alstrup, Biológia, Bratislava 51(1): 13 (1996)

Colombia, ambiguous, *Thelidium fumidum*

Nectria tatrensis Alstrup, Biológia, Bratislava 51(1): 13 (1996)

Slovakia, ambiguous, *Thelidium fumidum*

Nectria triqua Samuels, Mycol. Pap. 164: 40 (1991)

French Guiana, ambiguous, Diatrypaceae

Nectria viliuscula Samuels et al., Mem. N. Y. Bot. Gdn 59: 44 (1990)

Indonesia, colonized, *Hypoxylon* cf. *deustum*

Nectria wegeliniana (Rehm) Höhn., Verh. Zool.-Bot. Ges. Wien 55(9-10): 604 (1905)

Unknown, ambiguous, *Cucurbitaria* (Samuels et al. 1991)

Ophionectria Sacc.

Ophionectria hendrickxii Hansf., Beih. Sydowia 1: 122 (1957)

Congo, parasitized, *Englerula macarangae*

Ophionectria lloydii Mains, Lloydia 20: 226 (1958)

New Zealand, parasitized, *Cordyceps robertsii*

Pseudonectria Seaver

Pseudonectria tilachlidii W. Gams, Persoonia 8(3): 329 (1975)

New Zealand, parasitized, *Agaricus*

Niessliaceae Kirschst.

Circinoniesslia Samuels & M.E. Barr

Circinoniesslia nectriae Samuels & M.E. Barr, Can. J. Bot. 75(12): 2166 (1998)

Puerto Rico, colonized, ascomata of *Bionectria*

Monocillium S.B. Saksena

Monocillium nordinii (Bourch.) W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 162 (1971)

Worldwide, parasitized, rust fungi (Tsuneda and Hiratsuka 1980)

Valetoniella Höhn.

Valetoniella claviornata Samuels & M.E. Barr, Can. J. Bot. 75(12): 2174 (1998)

UK, ambiguous, *Nectria*

Ophiocordycipitaceae G.H. Sung, J.M. Sung, Hywel-Jones & Spatafora 2007

Elaphocordyceps G.H. Sung & Spatafora

Elaphocordyceps capitata (Holmsk.) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Clavaria capitata* Holmsk., Beata Ruris Otia FUNGIS DANICIS 1: 38, tab. 15 (1790)

≡ *Tolypocladium capitatum* (Holmsk.) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

Japan, obligate parasitized, *Elaphomyces japonicus*

Elaphocordyceps delicatistipitata (Kobayasi) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps delicatistipitata* Kobayasi, Bull. Natn. Sci. Mus., Tokyo 5(2, no. 47): 79 (1960)

≡ *Tolypocladium delicatistipitatum* (Kobayasi) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps fracta (Mains) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ Cordyceps fracta Mains, Bull. Torrey Bot. Club 84: 250 (1957)

≡ *Tolypocladium fractum* (Mains) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

USA, obligate parasitized, *Elaphomyces*

Elaphocordyceps inegoensis (Kobayasi) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps inegoensis* Kobayasi, Bull. Natn. Sci. Mus., Tokyo 6: 292 (1963)

≡ *Tolypocladium inegoense* (Kobayasi) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps intermedia (S. Imai) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps intermedia* S. Imai, Proc. Imp. Acad. Japan 10: 677 (1935)

≡ *Tolypocladium intermedium* (S. Imai) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

Japan, obligate parasitized, *Elaphomyces subvariegata*

Elaphocordyceps intermedia* f. *intermedia (S. Imai) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps intermedia* S. Imai, Proc. Imp. Acad. Japan 10: 677 (1935)

≡ *Tolypocladium intermedium* (S. Imai) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps intermedia* f. *michinokuensis (Kobayasi & Shimizu) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps intermedia* S. Imai, Proc. Imp. Acad. Japan 10: 677 (1935)

≡ *Tolypocladium intermedium* (S. Imai) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps japonica (Lloyd) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps japonica* Lloyd, Mycol. Writ. 6(Letter 62): 913 (1920)

≡ *Tolypocladium japonicum* (Lloyd) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps jezoensis (S. Imai) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps jezoensis* S. Imai, Trans. Sapporo nat. Hist. Soc. 11(1): 33 (1930)

≡ *Tolypocladium jezoense* (S. Imai) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

Japan, obligate parasitized, *Elaphomyces miyabeano* and *E. parasitans*

Elaphocordyceps longisegmentum (Ginns) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps longisegmentata* Ginns, Mycologia 80(2): 219 (1988)

≡ *Tolypocladium longisegmentatum* (Ginns) C.A. Quandt et al., IMA Fungus 5(1): 126 (2014)

USA, obligate parasitized, *Elaphomyces*

Elaphocordyceps minazukiensis (Kobayasi & Shimizu) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps minazukiensis* Kobayasi & Shimizu, Bull. Natn. Sci. Mus., Tokyo, B 8(4): 117 (1982)

≡ *Tolypocladium minazukiense* (Kobayasi & Shimizu) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps miomoteana (Kobayasi & Shimizu) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps miomoteana* Kobayasi & Shimizu, Bull. Natn. Sci. Mus., Tokyo, B 8(4): 118 (1982)

≡ *Tolypocladium miomoteanum* (Kobayasi & Shimizu) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps ophioglossoides (J.F. Gmel.) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Sphaeria ophioglossoides* J.F. Gmel., Syst. Nat., Edn 13 2(2): 1474 (1792)

≡ *Tolypocladium ophioglossoides* (J.F. Gmel.) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

Japan, obligate parasitized, *Elaphomyces gramulatus*

Elaphocordyceps ophioglossoides* f. *alba (Kobayasi & Shimizu ex Y.J. Yao) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps ophioglossoides* f. *alba* Kobayasi & Shimizu ex Y.J. Yao, Acta Mycol. Sin. 14(4): 257 (1995)

≡ *Tolypocladium ophioglossoides* (J.F. Gmel.) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps ophioglossoides* f. *cuboides (Kobayasi) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps ophioglossoides* f. *cuboides Kobayasi*, Bull. Natn. Sci. Mus., Tokyo 5(2, no. 47): 77 (1960)

≡ *Tolypocladium ophioglossoides* (J.F. Gmel.) C.A. Quandt, Kepler & Spatafora, IMA Fungus 5(1): 127 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps ophioglossoides* f. *ophioglossoides (J.F. Gmel.) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Sphaeria ophioglossoides* J.F. Gmel., Syst. Nat., Edn 13 2(2): 1474 (1792)

≡ *Tolypocladium ophioglossoides* (J.F. Gmel.) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps paradoxa (Kobayasi) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps paradoxa* Kobayasi, Bulletin of the Biogeogr. Soc. Jap. 9: 156 (1939)

≡ *Tolypocladium paradoxum* (Kobayasi) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

Japan, obligate parasitized, *Elaphomyces variegatus*

Elaphocordyceps rouxii (Cand.) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps rouxii* Cand., Mycotaxon 4(2): 544 (1976)

≡ *Tolypocladium rouxii* (Cand.) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

China, France, obligate parasitized, *Elaphomyces variegatus*

Elaphocordyceps subsessilis (Petch) G.H. Sung et al., Stud. Mycol. 57: 37 (2007)

≡ *Cordyceps subsessilis* Petch, Trans. Br. Mycol. Soc. 21(1): 39 (1937)

≡ *Tolypocladium inflatum* W. Gams, Persoonia 6(2): 185 (1971)

USA, obligate parasitized, *Elaphomyces*

Elaphocordyceps szemaoensis (M. Zang) G.H. Sung et al., Stud. Mycol. 57: 38 (2007)

≡ *Cordyceps szemaoensis* M. Zang, Acta Bot. Yunn. 23(3): 295 (2001)

≡ *Tolypocladium szemaoense* (M. Zang) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

China, obligate parasitized, *Elaphomyces granulatus*

Elaphocordyceps tenuispora (Mains) G.H. Sung et al., Stud. Mycol. 57: 38 (2007)

≡ *Cordyceps tenuispora* Mains, Bull. Torrey Bot. Club 84: 247 (1957)

≡ *Tolypocladium tenuisporum* (Mains) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

USA, obligate parasitized, *Elaphomyces*

Elaphocordyceps toriharamontana (Kobayasi) G.H. Sung, J.M. Sung & Spatafora, Stud. Mycol. 57: 38 (2007)

≡ *Cordyceps toriharamontana* Kobayasi, Bull. Natn. Sci. Mus., Tokyo 6: 305 (1963)

≡ *Tolypocladium toriharamontanum* (Kobayasi) C.A. Quandt, Kepler & Spatafora, IMA Fungus 5(1): 127 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps valliformis (Mains) G.H. Sung, J.M. Sung & Spatafora, Stud. Mycol. 57: 38 (2007)

≡ *Cordyceps valliformis* Mains, Bull. Torrey Bot. Club 84: 250 (1957)

≡ *Tolypocladium valliforme* (Mains) C.A. Quandt et al., IMA Fungus 5(1): 127 (2014)

USA, obligate parasitized, *Elaphomyces cervinus*

Elaphocordyceps valvatistipitata (Kobayasi) G.H. Sung et al., Stud. Mycol. 57: 38 (2007)

≡ *Cordyceps valvatistipitata* Kobayasi, Bull. Natn. Sci. Mus., Tokyo 5(2, no. 47): 81 (1960)

≡ *Tolypocladium valvatistipitatum* (Kobayasi) C.A. Quandt, Kepler & Spatafora, IMA Fungus 5(1): 128 (2014)

Japan, obligate parasitized, *Elaphomyces neoaspericulus*

Elaphocordyceps virens (Kobayasi) G.H. Sung, J.M. Sung & Spatafora, Stud. Mycol. 57: 38 (2007)

≡ *Cordyceps virens* Kobayasi, J. Jap. Bot. 58(7): 222 (1983)

≡ *Tolypocladium virens* (Kobayasi) C.A. Quandt, Kepler & Spatafora, IMA Fungus 5(1): 128 (2014)

Japan, obligate parasitized, *Elaphomyces*

Elaphocordyceps xjezoensoides (Kobayasi) Hiroki Sato, S. Ban, Masuya & Hosoya, Mycoscience 51(6): 390 (2010)

≡ *Cordyceps xjezoensoides* Kobayasi, Bull. Natn. Sci. Mus., Tokyo 5(2, no. 47): 79 (1960)

Japan, obligate parasitized, *Elaphomyces gramulatus*

Ophiocordyceps Petch

Ophiocordyceps petchii (Mains) G.H. Sung et al., Stud. Mycol. 57: 46 (2007)

≡ *Cordyceps petchii* Mains, Bull. Torrey Bot. Club 86: 47 (1959)

China, obligate parasitized, *Elaphomyces*

Tolypocladium W. Gams

Tolypocladium guangdongense (T.H. Li, Q.Y. Lin & B. Song) V. Papp, Index Fungorum 318: 1 (2017)

≡ *Cordyceps guangdongensis* T.H. Li et al., Mycotaxon 103: 373 (2008)

China, obligate parasitized, *Elaphomyces*

Stachybotryaceae L. Lombard & Crous

Myrothecium Tode 1790

Myrothecium inundatum Tode, Fung. Mecklenb. Sel. (Lüneburg) 1: 25 (1790)

UK, parasitized, *Russula adusta*, *R. nigricans* (Lombard 2016)

Myrothecium simplex L. Lombard & Crous, Persoonia 36: 202 (2016)

Japan, parasitized, *Russula nigricans*

Tilachlidiaceae L. Lombard & Crous

Tilachlidium Preuss

Tilachlidium setigerum Malençon, Bull. Soc. Hist. nat. Afr. N. 44: 148 (1953)

Morocco, parasitized, *Xeromphalina campanella* (Hawksworth 1981)

Hypocreales genera *incertae sedis*

Cephalosporiopsis Peyronel

Cephalosporiopsis asterinicola Bat. & Nascim., Publ. Inst. Micol. Recife 33: 4 (1956)

Brazil, colonized, *Parasterina cynophallophorae*

Cephalosporiopsis epiparasitaster Alstrup, Graphis Scripta 8(1): 25 (1997)

Norway, colonized, *Chaenothecopsis parasitaster*

Cephalosporium Corda

Cephalosporium crotocinigenum Schol-Schwarz, Trans. Br. Mycol. Soc. 48(1): 53 (1965)

Hungary, parasitized, *Trametes vericolor*

Cylindrocarpon Wollenw.

Cylindrocarpon destructans (Zinssm.) Scholten, Neth. Jl Pl. Path. 70(suppl. 2): 9 (1964)

In lab, parasitized, *Rhizoctonia solani*

Cylindrocarpon luteoviride Deighton & Piroz., Mycol. Pap. 128: 108 (1972)

UK, parasitized, *Microthelia*

Cylindrocarpon obtusisporum (Cooke & Harkn.) Wollenw., Fusaria autographica delineata 1: no. 465 (1916)

In lab, parasitized, many fungi (Rudakov1978)

Cylindrocarpon roseum A. Funk, Can. J. Bot. 51(9): 1644 (1973)

Canada, colonized, *Botryosphaeria piceae*

Cylindrocarpon ugandense Deighton & Piroz., Mycol. Pap. 128: 106 (1972)

Uganda, colonized, *Phyllachora ficuum*

Cylindrocarpon ukolayi Thaung, Trans. Br. Mycol. Soc. 67(3): 435 (1977)

Myanmar, colonized, *Meliola tabernaemontanae*

Ophiostomella Petr.

Ophiostomella cyttariarum Butin & Arx, Sydowia 27(1-6): 283 (1975)

Chile, ambiguous, *Cyttaria hariotii*

Pseudofusidium Deighton

Pseudofusidium hansfordii Deighton, Mycol. Pap. 118: 26 (1969)

≡ *Acremonium hansfordii* (Deighton) W. Gams, Cephalosporium-artige Schimmelpilze (Stuttgart): 71 (1971)

Uganda, parasitized, *Mycovellosiella*

Sarocladium W. Gams & D. Hawksw.

Sarocladium mycophilum Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 69 (1991)

Germany, parasitized, *Cortinarius subsertipes*

Scopinella Lév.

Scopinella gallicola Tsuneda & Y. Hirats., Can. J. Bot. 59(7): 1192 (1981)

Canada, parasitized, *Endocronartium harknessii*

Stilbella Lindau

Stilbella stereicola Seifert, Stud. Mycol. 27: 82 (1985)

Canada, parasitized, *Stereum hirsutum*

Trichothecium Link

Trichothecium roseum (Pers.) Link, Mag. Gesell. Naturf. Freunde, Berlin 3(1-2): 18 (1809)

In lab, parasitized, *Sclerotinia sclerotiorum* (Huang and Kokko 1993)

Lulworthiales Kohlm., Spatafora & Volkm.-Kohlm.

Lulworthiaceae Kohlm., Spatafora & Volkm.-Kohlm.

Lulworthia G.K. Sutherl.

Lulworthia bulgariae Parg.-Leduc, Annls Sci. Nat., Bot. Biol. Vég., sér. 12 8: 193 (1967)

France, colonized, *Bulgaria inquinan*

Magnaporthales Thongk., Vijaykr. & K.D. Hyde

Magnaporthaceae P.F. Cannon

Clasterosporium Schwein.

Clasterosporium domus-aliena Cif. & Bat., Atti Ist. Bot. Univ. Lab. Crittog. Pavia, sér. 5 14(1-3): 69 (1957)

Brazil, colonized, *Clypeoseptoria intricata*

Pyriculariaceae Klaubauf et al.

Deightoniella S. Hughes

Deightoniella leonensis M.B. Ellis, Mycol. Pap. 66: 10 (1957)

Sierra Leone, colonized, *Irenina tetracerae*

Microascales Luttr. ex Benny & R.K. Benj.

Ceratocystidaceae Locq. ex Réblová, W. Gams & Seifert

Ceratocystis Ellis & Halst.

Ceratocystis epigloea Guerrero, Mycologia 63(4): 921 (1971)

≡ *Sporothrix epigloea* (Guerrero) Z.W. de Beer, T.A. Duong & M.J. Wingf., Stud. Mycol. 83: 177 (2016)

Argentina, colonized, *Tremella fuciformis*

Graphiaceae De Beer

Graphium Corda

Graphium hendersonulae Chevaug., Les Maladies Cryptogamiques du Manioc en Afriqu Occidentale (Encycl. Mycol. 28): 87 (1956)

Ivory Coast, parasitized, *Hendersonula toruloidea*

Graphium irradians Petr., Sydowia 4(1-6): 577 (1950)

Ecuador, parasitized, *Bagnisiopsis*

Microascaceae Luttr. ex Malloch

Ceratopodium Corda

Ceratopodium elegans Sorokīn, Trudy Obshchestva ispytateleĭ prirody pri Imperatorskom Khar'kovskom universitê 3(3): 28 (1871)

Ukraine, colonized, *Phallus impudicus*

Echinobotryum Corda

Echinobotryum rubrum Sorokīn, Trudy Obshchestva ispytateleĭ prirody pri Imperatorskom Khar'kovskom universitê 3(3): 31 (1871)

Ukraine, colonized *Stysanus monilioides*

Scopulariopsis Bainier

Scopulariopsis brevicaulis Bainier, Bull. Soc. Mycol. Fr. 23(2): 99 (1907)

≡ *Penicillium brevicaul*e Sacc., Fungi italica autogr. del. 17-28: tab. 893 (1881)

Worldwide, parasitized, many plant pathogens

Scopulariopsis fimicola (Costantin & Matr.) Vuill., Bull. Soc. Mycol. Fr. 27(2): 143 (1911)

Worldwide, parasitized, *Agaricus bisporus*

Microascales genus *incertae sedis*

Gabarnaudia Samson & W. Gams

Gabarnaudia fimicola Samson & W. Gams, Stud. Mycol. 6: 92 (1974)

≡ *Sphaeronaemella fimicola* Marchal, Champ. Copr. Belg. 6: 12 (1891)

Germany, obligate parasitized, *Ascophanus*

Gabarnaudia tholispora Samson & W. Gams, Stud. Mycol. 6: 96 (1974)

Netherland, obligate parasitized, *Russula nigricans*

Ophiostomatales Benny & Kimbr.

Ophiostomataceae Nannf.

Ophiostoma Syd. & P. Syd.

Ophiostoma epigloeum (Guerrero) de Hoog, Stud. Mycol. 7: 45 (1974)

≡ *Ceratocystis epigloea* Guerrero, Mycologia 63(4): 921 (1971)

≡ *Sporothrix epigloea* (Guerrero) Z.W. de Beer, T.A. Duong & M.J. Wingf., Stud. Mycol. 83: 177 (2016)

Argentina, parasitized, *Tremella fuciformis* (Hausner et al. 1993)

Ophiostoma grande Samuels & E. Müll., Sydowia 31(1-6): 176 (1979

Brazil, colonized, *Diatrype* cf. *stigma*

Ophiostoma polyporicola Constant. & Ryman, Mycotaxon 34(2): 637 (1989)

≡ *Sporothrix polyporicola* (Constant. & Ryman) Z.W. de Beer, T.A. Duong & M.J. Wingf., Stud. Mycol. 83: 179 (2016)

Sweden, parasitized, *Fomitopsis pinicola*

Sporothrix Hektoen & C.F. Perkins

Sporothrix echinospora (Deighton & Piroz.) Katum., Bull. Faculty of Agriculture, Yamaguchi University 35: 108 (1987)

≡ *Calcarisporium echinosporum* Deighton & Piroz., Mycol. Pap. 128: 101 (1972)

Ghana, parasitized, *Meliola millettiae-rhodanthae*

Sporothrix fungorum de Hoog & G.A. de Vries, Antonie van Leeuwenhoek 39(3): 518 (1973)

Netherlands, parasitized, *Fomes*

Sporothrix pallida (Tubaki) Matsush., Icon. microfung. Matsush. lect. (Kobe): 143 (1975)

Japan, parasitized, *Stemonitis fusca*

Sporothrix phellini G.R.W. Arnold, Feddes Repert. Spec. Nov. Regni Veg. 98(5-6): 354 (1987)

Cuba, parasitized, *Phellinus*

Sporothrix tuberi A. Fontana & Fas.-Bonf., Allionia 17: 12 (1971)

Italy, parasitized, *Tuber*

Sordariales Chadef. ex D. Hawksw. & O.E. Erikss.

Chaetomiaceae G. Winter

Chaetomium Kunze

Chaetomium cuyabenoense Decock & Hennebert, Mycol. Res. 101(3): 309 (1997)

Ecuador, parasitized, *Ganoderma australe*

Chaetomium globosum Kunze, Mykologische Hefte (Leipzig) 1: 16 (1817)

Australia, parasitized, *Sclerotium cepivorum* (Stewart and Harrison 1989)

Chaetomium spirale Zopf, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 42(5): 275 (1881)

China, parasitized, *Rhizoctonia solani* and other plant pathogens (Gao et al. 2005)

Humicola Traaen

Humicola asteroidea Udagawa & Y. Horie, Bull. Natn. Sci. Mus., Tokyo 14(3): 528 (1971)

Papua New Guinea, parasitized, *Coriolus* (Wicklow et al. 1998)

Humicola fuscoatra Traaen, Nytt Mag. Natur. 52: 33 (1914)

USA, parasitized, *Aspergillus flavus* (Wicklow et al. 1998)

Helminthosphaeriaceae Samuels, Cand. & Magni

Diplococcium Grove

Diplococcium clarkii M.B. Ellis, More Dematiaceous Hyphomycetes (Kew): 391 (1976)

China, parasitized, *Hyphoderma praetermissum* (Kirschner & Oberwinkler 2001)

Diplococcium clavariarum (Desm.) Hol.-Jech., Folia geoBot. Phytotax. 17(3): 324 (1982)

China, Germany, parasitized, *Clavulina cristata*, *Helminthosporium clavariarum* (Kirschner & Oberwinkler 2001)

Diplococcium heterosporum L. Zeller & Tóth, Bot. Közl. 49: 108 (1961)

Hungary, parasitized, *Diatrype stigma*

Diplococcium parcum Hol.-Jech., Folia. GeoBot. Phytotax. 17(3): 315 (1982)

China, Germany, parasitized, *Clavulina cristata*, *Helminthosporium clavariarum* (Kirschner & Oberwinkler 2001)

Diplococcium varieseptatum Goh & K.D. Hyde, Fungal Divers. 1: 77 (1998)

France, parasitized, *Phanerochaete sordida*

Endophragmiella B. Sutton

Endophragmiella constricta M.T. Dunn, Mycotaxon 16(1): 152 (1982)

USA, colonized, sclerotia of *Sclerotinia minor*

Endophragmiella eboracensis B. Sutton, Naturalist, Leeds 933: 71 (1975)

Canada, colonized, *Diatrype stigma*

Endophragmiella hymenochaeticola S. Hughes, N.Z. Jl Bot. 16(3): 329 (1978)

New Zealand, colonized, *Hymencochaete mougeotii*

Endophragmiella pallescens B. Sutton, Mycol. Pap. 132: 62 (1973)

Canada, colonized, *Cytospora*

Endophragmiella verticillata S. Hughes, Fungi Canadenses, no. 325 (Ottawa): no. 130 (1978

Canada, colonized, basidiomycete

Helminthosphaeria Fuckel

Helminthosphaeria clavariarum (Desm.) Fuckel, Jb. Nassau. Ver. Naturk. 23-24: 166 (1870)

≡ *Peziza clavariarum* Desm., Annls Sci. Nat., Bot., sér. 2 8: 8 (1837)

Germany, colonized, Aphyllophorales; France, colonized, *Clavaria fuliginea*; UK, *Clavulina cristata* (Samuels et al. 1997)

Helminthosphaeria corticiorum Höhn., Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1 116: 109 (1907)

Germany, colonized, Aphyllophorales

Helminthosphaeria hyphodermae Samuels, Cand. & Magni, Mycologia 89(1): 150 (1997)

France, colonized, *Hyphoderma puberum*

Litschaueria Petr.

Litschaueria epimyces Malençon & Bertault, Acta Phytotax. Barcinon. 11: 19 (1973)

Spain, colonized, *Hyphoderma calyciferum*

Togniniales Senan., Maharachch. & K.D. Hyde

Togniniaceae Réblová, L. Mostert, W. Gams & Crous

Phaeoacremonium W. Gams, Crous & M.J. Wingf.

Phaeoacremonium sp.

USA, colonized, *Hypoxylon truncatum* (Reátegui et al. 2006)

Xylariales Nannf.

Hypoxylaceae DC.

Chlorostroma A.N. Mill., Lar.N. Vassiljeva & J.D. Rogers

Chlorostroma cyaninum Læssøe, Srikit. & J. Fourn., Srikitikulchai, Fournier, Köpcke & Stadler, Fungal Biology 114(5-6): 485 (2011)

Thailand, colonized, stromata of *Hypoxylon*

Chlorostroma subcubisporum A.N. Mill., Lar.N. Vassiljeva & J.D. Rogers, Sydowia 59(1): 142 (2007)

USA, colonized, stromata of *Hypoxylon perforatum*

Microdochiaceae Hern.-Restr. et al.

Idriella P.E. Nelson & S. Wilh.

Idriella mycophila R.F. Castañeda, Guarro & Cano, Mycotaxon 63: 170 (1997)

Cuba, parasitized, *Chalara*

Idriella rhododendri W.P. Wu, B. Sutton & Gange, Mycol. Res. 101(11): 1320 (1997)

UK, colonized, ascomata of fungi

Xylariaceae Tul. & C. Tul.

Acrostaphylus G. Arnaud

Acrostaphylus hyperparasiticus Subram., J. Indian Bot. Soc. 35: 485 (1956)

India, parasitized, *Lembosia decolorans*

Acrostaphylus hypoxyli G. Arnaud, Bull. trimest. Soc. Mycol. Fr. 69: 272 (1954)

France, colonized, *Hypoxylon*

Nodulisporium Preuss

Nodulisporium cecidiogenes Jørg. Koch, Mycol. Res. 98(11): 1266 (1994)

Denmark, parasitized, *Coniophora puteana* (Piątek and Karasiński 2008).

Nodulisporium tuberum A. Fontana & Fas.-Bonf. ex de Hoog, Stud. Mycol. 7: 66 (1974)

Italy, colonized, *Tuber*

Xylaria Hill ex Schrank

Xylaria coprinicola Y.M. Ju, H.M. Hsieh & X.S. He, Mycologia 103(2): 425 (2011)

China, colonized, *Coprinus comatus*

Sordariomycetes familie *incertae sedis*

Apiosporaceae K.D. Hyde, J. Fröhl., Joanne E. Taylor & M.E. Barr

Spegazzinia Sacc.

Spegazzinia subramanianii Bhat, Indian J. For. 17(2): 131 (1994)

India, colonized, *Helminthosporium velutinum*

Spegazzinia meliolae Zimm., Centbl. Bakt. ParasitKde, Abt. I 8: 321 (1902)

USA, colonized, *Meliola tortuosa*

Cephalothecaceae Höhn.

Albertiniella Kirschst.

Albertiniella polyporicola (Jacz.) Malloch & Cain, Can. J. Bot. 50(1): 71 (1972)

≡ *Cephalotheca polyporicola* Jacz., Mater. Mikol. Fitopat. Ross. 4(1): 15 (1922)

Europe, parasitized, *Polyporus applanatus*

Cephalotheca Fuckel

Cephalotheca splendens Udagawa & Y. Horie, J. gen. appl. Microbiol., Tokyo 17(2): 142 (1971)

Japan, parasitized, *Elfvingia applanata*

Sporidesmiaceae Fr.

Sporidesmium Link

Sporidesmium aburiense M.B. Ellis, Mycol. Pap. 70(1): 73 (1958)

Ghana, parasitized, Asterinaceae

Sporidesmium biseptatum M.B. Ellis, Mycol. Pap. 93: 25 (1963)

Nigeria, parasitized, *Echidodes*

Sporidesmium sclerotivorum Uecker, W.A. Ayers & P.B. Adams, Mycotaxon 7(2): 276 (1978)

USA, parasitized, *Sclerotinia*

Sporidesmium socium M.B. Ellis, Mycol. Pap. 70: 42 (1958)

UK, colonized, *Helminthosporium velutinum*

Sporidesmium uapacae M.B. Ellis, Mycol. Pap. 70: 77 (1958)

Sierra Leone, parasitized, Microthyriaceae

Trichosphaeriaceae G. Winter

Rizalia Syd. & P. Syd.

Rizalia glaziovii (Pat.) Piroz., Kew Bull. 31(3): 607 (1977)

Africa, colonized, Meliolales

Schweinitziella Speg.

Schweinitziella indica (Srinivas. & P.G. Sathe) A. Pande, Ascomycetes of Peninsular India (Jodhpur): 478 (2008)

≡ *Saccardomyces indicus* Srinivas. & P.G. Sathe, Botanique, Nagpur 4(2): 115 (1973)

India, parasitized, *Meliola*

Saccardomyces Henn.

Saccardomyces lembosiicola Bat. & H. Maia, Anais Soc. Biol. Pernambuco 13(2): 102 (1955)

Panama, colonized, *Lembosia byrsonimae*

Woswasiaceae H. Zhang et al.

Woswasia Jaklitsch, Réblová & Voglmayr

Woswasia atropurpurea Jaklitsch, Réblová & Voglmayr, Mycologia 105(2): 479 (2013)

Italy, parasitized, *Diaporthe oncostoma*

Sordariomycetes genera *incertae sedis*

Acrodictys M.B. Ellis

Acrodictys brooksiae M.B. Ellis, Mycol. Pap. 79: 11 (1961)

Malaysia, parasitized, *Brooksia tropicalis*

Acrodictys furcata M.B. Ellis, Mycol. Pap. 93: 24 (1963)

Uganda, parasitized, *Balladyna magnifica*

Acrodictys obliqua M.B. Ellis, Mycol. Pap. 79: 13 (1961)

Ghana, parasitized, *Calyculosphaeria*

Didymobotryum Sacc.

Didymobotryum hymenaearum Bat. & Peres, Publicações Inst. Micol. Recife 266: 5 (1960)

Brazil, ambiguous, *Meliola melanochyla*

Hyaloderma Speg.

Hyaloderma glaziovii Pat., Bull. Soc. Mycol. Fr. 14: 154 (1898)

≡ *Rizalia glaziovii* (Pat.) Piroz., Kew Bull. 31(3): 607 (1977)

Italy, parasitized, *Meliola*

Hyaloderma piliferum Pat. & Gaillard, Bull. Soc. Mycol. Fr. 4(2): 102 (1888)

≡ *Melioliphila piliferum* (Pat. & Gaillard) Piroz., Kew Bull. 31(3): 598 (1977)

Venezuela, parasitized, *Meliola*

Hyaloderma winkleriana Henn., Bot. Jb. 38: 125 (1905)

≡ *Melioliphila winkleriana* (Henn.) Rossman, Mycol. Pap. 157: 22 (1987)

Porto Rico, parasitized, *Meliola*

Phaeotrichosphaeria Sivan.

Phaeotrichosphaeria hymenochaeticola Sivan., Trans. Br. Mycol. Soc. 81(2): 320 (1983)

New Zealand, colonized, *Hymenochaete mougeotii*

Scotiosphaeria Sivan.

***Scotiosphaeria* endoxylinae** Sivan., Trans. Br. Mycol. Soc. 69(1): 120 (1977)

UK, colonized, *Endoxylina pini*

Selenosporella G. Arnaud

Selenosporella gliocladioides Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 71 (1991)

Germany, colonized, Pyrenomycete

Spadicoides S. Hughes

Spadicoides carpatica Hol.-Jech., Folia GeoBot. Phytotax. 17(3): 305 (1982)

Former Czechoslovakia, colonized, *Hymenochaete cinnamomea*

Dominica, parasitized, *Meliola swieteniae* and *M. tonkinensis* var. *ceropiae*

Pezizomycotina genera *incertae sedis*

Acremoniula G. Arnaud

Acremoniula sarcinellae (Pat. & Har.) G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 69: 268 (1954)

Africa, South America, Asia, parasitized, *Clypeolella*, *Pycnopeltis conspicua*, *Schiffnerula* (Deighton 1969)

Acremoniula suprameliola Cif., Atti Ist. Bot. Univ. Lab. crittog. Pavia, sér. 5 19: 85 (1962)

Dominica, parasitized, *Clypeolella* and *Schiffnerula* (Deighton 1969)

Subphylum *Saccharomycotina* O.E. Erikss. & Winka

Class *Saccharomycetes* G. Winter

Saccharomycetales Luerss.

Dipodascaceae Engl. & E. Gilg

Blastobotrys Klopotek

Blastobotrys peoriensis Kurtzman, Int. J. Syst. Evol. Microbiol. 57(5): 1161 (2007)

USA, parasitized, fungus

Dipodascus Lagerh.

Dipodascus ambrosiae de Hoog, M.T. Sm. & E. Guého, Stud. Mycol. 29: 47 (1986)

USA, parsitized, *Armillariella*

Dipodascus armillariae W. Gams, Sydowia 36: 50 (1983)

Netherlands, parsitized, *Armillariella*

Dipodascus macrosporus Madelin & Feest, Trans. Br. Mycol. Soc. 79(2): 331 (1982)

UK, parsitized, *Badhamia utricularis*

Dipodascus polyporicola T. Schumach. & Ryvarden, Mycotaxon 12(2): 526 (1981)

Thailand, parsitized, *Piptoporus soloniensis*

Geotrichum Link

Geotrichum cyphellae G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 68: 192 (1952)

Brazil, parsitized, *Cyphella alboviolascens*

Saprochaete Coker & Shanor

Saprochaete fungicola de Hoog & M.T. Sm., Stud. Mycol. 50(2): 512 (2004)

Russia, colonized, *Nectria cinnabarina*

Debaryomycetaceae Kurtzman & M. Suzuki

Debaryomyces Klöcker

Debaryomyces hansenii (Zopf) Lodder & Kreger-van Rij, Yeasts, a taxonomic study, 3rd Edn (Amsterdam): 130 (1984)

≡ *Saccharomyces hansenii* Zopf, Ber. dt. Bot. Ges. 7: 94 (1889)

Worldwide, obligate parasitized, *Aspergilllus* and *Penicillium* (Chalutz & Wilson1990)

Endomycetaceae J. Schröt.

Endomyces Reess

Endomyces cortinarii Redhead & Malloch, Can. J. Bot. 55(13): 1701 (1977)

Canada, parasitized, *Cortinarius*

Endomyces decipiens (Tul. & C. Tul.) Reess, Bot. Unters. Alkoholgährungspilze: 77 (1870)

Canada, parasitized, *Armillaria*

Endomyces parasiticus Fayod, Annls Sci. Nat., Bot., sér. 7 2: 28 (1885)

Canada, parasitized, Agaricales

Endomyces polyporicola (T. Schumach. & Ryvarden) de Hoog, M.T. Sm. & E. Guého, Stud. Mycol. 29: 111 (1986)

Worldwide, parasitized, Aphyllophorales

Endomyces scopularum Helfer, Pilze auf Pilzfruchtkörpern. Untersuchungen zur Ökologie, Systematik und Chemie. Libri Botanici (Eching) 1: 25 (1991)

Germany, parasitized, *Tricholoma*

Phialoascus Redhead & Malloch

Phialoascus borealis Redhead & Malloch, Can. J. Bot. 55(13): 1703 (1977)

Canada, colonized, *Cortinarius huronensis*

Torulopsis Speg.

Torulopsis auriculariae Nakase, J. gen. appl. Microbiol., Tokyo 17(5): 413 (1971)

Japan, parasitized, *Auricularia auricula-judae*

Torulopsis kruisii Kock.-Krat. & Ondrush., Biológia, Bratislava 26(6): 479 (1971)

Former Czechoslovakia, parasitized, *Boletus purpureus*

Torulopsis schatavii Kock.-Krat. & Ondrush., Biológia, Bratislava 26(6): 483 (1971)

Former Czechoslovakia, parasitized, *Boletus purpureus*

Pichiaceae Zender

Pichia E.C. Hansen

Pichia megalospora Kuraishi, Sci. Rep. Tohoku Imp. Univ. 24: 111 (1958)

Japan, colonized, *Collybia radicata*

Saccharomycodaceae Kudryavtsev

Hanseniaspora Zikes

Hanseniaspora nodinigri Lachance, Can. J. Microbiol. 27(7): 652 (1981)

Canada, colonized, *Dibotryon morbosum*

Kloeckera Janke

Kloeckera taiwanica C.F. Lee, Int. J. Syst. Evol. Microbiol. 62(6): 1436 (2012)

China, colonized, *Russula*

Saccharomycopsidaceae Arx & Van der Walt

Saccharomycopsis Schiønning

Saccharomycopsis amapae (P.B. Morais et al.) Casarég. & N. Jacques, Int. J. Syst. Evol. Microbiol. 64(6): 2173 (2014)

≡ *Candida amapae* P.B. Morais, C.A. Rosa, S.A. Mey., Mend.-Hagler & Hagler, J. Industr. Microbiol. 14(6): 532 (1995)

Worldwide, parasitized, many fungi (Lachance et al. 2000)

Saccharomycopsis babjevae (G.I. Naumov & M.T. Sm.) Casarég. & N. Jacques, Int. J. Syst. Evol. Microbiol. 64: 2173 (2014)

≡ *Arthroascus babjevae* G.I. Naumov & M.T. Sm., Int. J. Syst. Evol. Microbiol. 56(8): 2002 (2006)

In lab, parasitized, many fungi

Saccharomycopsis crataegensis Kurtzman & Wick., Antonie van Leeuwenhoek 39(1): 83 (1973)

In lab, parasitized, many fungi (Lachance et al. 2000)

Saccharomycopsis fermentans (C.F. Lee et al.) Kurtzman & Robnett, Can. J. Bot. 73(Suppl. 1): S829 (1995)

≡ *Arthroascus fermentans* C.F. Lee et al., Int. J. Syst. Bacteriol. 44(2): 305 (1994)

In lab, parasitized, many fungi (Lachance et al. 2000)

Saccharomycopsis fibuligera (Lindner) Klöcker, Die Gärungsorganismen in der Theorie und Praxis der Alkoholgarungsgewerbe: 299 (1924)

≡ *Endomyces fibuliger* Lindner, Wochenschr. Brau. 23(36): 469 (1907)

In lab, parasitized, many fungi (Lachance and Pang 1997)

Saccharomycopsis fodiens Lachance, C.A. Rosa & E.J. Carvajal, Int. J. Syst. Evol. Microbiol. 62(11): 2794 (2012)

In lab, parasitized, many fungi

Saccharomycopsis guttulata (C.P. Robin) Schiønning, C. r. Trav. Laboratoire d. Carlsberg 6: 124 (1903)

≡ *Cryptococcus guttulatus* C.P. Robin, Histoire naturelle des Vegetaux Parasites (Paris): 327 (1853)

In lab, parasitized, many fungi (Begerow et al. 2017)

Saccharomycopsis guyanensis N. Jacques & Casarég., Int. J. Syst. Evol. Microbiol. 64(6): 2172 (2013)

Guyana, parasitized, many fungi (Begerow et al. 2017)

Saccharomycopsis hordei (Saito) Klöcker, Die Gärungsorganismen in der Theorie und Praxis der Alkoholgarungsgewerbe: 300 (1924)

≡ *Endomyces hordei* Saito, Report of the Central Laboratory, South Manchuria Railway Company 1: 7 (1914)

In lab, parasitized, many fungi (Begerow et al. 2017)

Saccharomycopsis javanensis (Klöcker) Kurtzman & Robnett, Can. J. Bot. 73(Suppl. 1): S829 (1995)

≡ *Endomyces javanensis* Klöcker, C. r. Lab. Carlsb., Sér. Physiol. 7: 267 (1909)

In lab, parasitized, many fungi (Lachance et al. 2000)

Saccharomycopsis lassenensis (Kurtzman) Casarég. & N. Jacques, Int. J. Syst. Evol. Microbiol. 64(6): 2173 (2014)

≡ *Candida lassenensis* Kurtzman, Mycotaxon 71: 245 (1999)

In lab, parasitized, many fungi (Begerow et al. 2017)

Saccharomycopsis lindneri (Saito) Klöcker, Die Gärungsorganismen in der Theorie und Praxis der Alkoholgarungsgewerbe: 300 (1924)

In lab, parasitized, many fungi (Begerow et al. 2017)

Saccharomycopsis lipolytica (Wick., Kurtzman & Herman) Yarrow, Antonie van Leeuwenhoek 38(3): 357 (1972)

≡ *Endomycopsis lipolytica* Wick., Kurtzman & Herman, Spectrum 1: 90 (1970)

Saccharomycopsis malanga (Dwidjos.) Kurtzman, Vesonder & M.J. Smiley, Mycologia 66(4): 581 (1974)

≡ *Hansenula malanga* Dwidjos., Mycopath. Mycol. Appl. 41(3-4): 219 (1970)

In lab, parasitized, many fungi (Lachance et al. 2000)

Saccharomycopsis microspora (L.R. Batra) Kurtzman, Mycotaxon 71: 245 (1999)

In lab, parasitized, many fungi (Lachance et al. 2000)

Saccharomycopsis olivae N. Jacques, M. Coton, E. Coton & Casarég., Int. J. Syst. Evol. Microbiol. 64(6): 2171 (2014)

In lab, parasitized, many fungi (Begerow et al. 2017)

Saccharomycopsis phaeospora (Boedijn) Arx, in von Arx et al., Stud. Mycol. 14: 9 (1977)

≡ *Endomycopsella phaeospora* Boedijn, Mycopath. Mycol. appl. 12(2): 163 (1960)

In lab, parasitized, many fungi (Begerow et al. 2017)

Saccharomycopsis pseudolipolytica Blagod., Mikrobiologiya 48(1): 106 (1979)

In lab, parasitized, many fungi (Begerow et al. 2017)

Saccharomycopsis schoenii (Nadson & Krassiln.) Kurtzman & Robnett, Can. J. Bot. 73(Suppl. 1): S829 (1995)

In lab, parasitized, many fungi (Lachance et al. 2000)

Saccharomycopsis selenospora (Nadson & Krassiln.) Kurtzman & Robnett, Can. J. Bot. 73(Suppl. 1): S829 (1995)

≡ *Guilliermondella selenospora* Nadson & Krassiln., C. r. hebd. Séanc. Acad. Sci., Paris 187: 307 (1928)

In lab, parasitized, many fungi (Lachance et al. 2000)

Saccharomycopsis synnaedendra D.B. Scott & Van der Walt, Mycopath. Mycol. Appl. 44(2): 102 (1971)

In lab, parasitized, many fungi (Lachance et al. 2000)

Trichomonascaceae Kurtzman & Robnett

Stephanoascus M.T. Sm., Van der Walt & Johannsen

Stephanoascus farinosus de Hoog, Rant.-Leht. & M.T. Sm., Antonie van Leeuwenhoek 51(1): 102 (1985)

Netherlands, colonized, *Hirneola auricula-judae*

Sympodiomyces Fell & Statzell

Sympodiomyces indianensis Kurtzman, Antonie van Leeuwenhoek 85(4): 303 (2004)

USA, ambiguous, fungus on bark

Trichomonascus H.S. Jacks.

Trichomonascus mycophagus H.S. Jacks., Mycologia 39(6): 712 (1948)

Canada, colonized, *Corticium confluens*

Saccharomycetales genus *incertae sedis*

Candida Berkhout

Candida aglyptinia S.O. Suh, N.H. Nguyen & M. Blackw., Mycol. Res. 110(12): 1388 (2006)

≡ *Teunomyces aglyptinius* (S.O. Suh, N.H. Nguyen & M. Blackw.) Kurtzman & M. Blackw., FEMS Yeast Res. 16(5): 4 (2016)

Panama, colonized, *Lycoperdon*

Candida anutae Babeva, Lisichk., Maksim., Reshetova, Terenina & Chernov, Mikrobiologiya 69(2): 277 (2000)

Russia, parsitized, Agaricaceae

Candida atbi S.O. Suh, N.H. Nguyen & M. Blackw., Mycol. Res. 110(12): 1387 (2006)

≡ *Teunomyces atbi* (S.O. Suh, N.H. Nguyen & M. Blackw.) Kurtzman & M. Blackw., FEMS Yeast Res. 16(5): 4 (2016)

Georgia, colonized, *Lactarius*

Candida barrocoloradensis S.O. Suh, N.H. Nguyen & M. Blackw., Mycol. Res. 110(12): 1387 (2006)

≡ *Teunomyces barrocoloradensis* (S.O. Suh, N.H. Nguyen & M. Blackw.) Kurtzman & M. Blackw., FEMS Yeast Res. 16(5): 4 (2016)

Panama, colonized, *Gerronema*

Candida boleticola Nakase, J. gen. appl. Microbiol., Tokyo 17(6): 473 (1971)

Japan, colonized, *Astraeus hygrometricus*

Candida fukazawae Nakase, M. Suzuki, Sugita, S.O. Suh & Komag., Mycoscience 40(6): 473 (1999)

Japan, parsitized, mushroom

Candida fungicola Nakase, M. Suzuki, Sugita, S.O. Suh & Komag., Mycoscience 40(6): 470 (1999)

Japan, colonized, mushroom

Candida lycoperdinae S.O. Suh, N.H. Nguyen & M. Blackw., Mycol. Res. 110(12): 1386 (2006)

≡ *Teunomyces lycoperdinae* (S.O. Suh, N.H. Nguyen & M. Blackw.) Kurtzman & M. Blackw., FEMS Yeast Res. 16(5): 5 (2016)

Georgia, colonized, *Lycoperdon perlatum*

Candida morakotiae Nakase, Jindam., Ninomiya, Imanishi & H. Kawas., J. gen. appl. Microbiol., Tokyo 55(2): 98 (2009)

Thailand, colonized, mushroom

Candida pallodes S.O. Suh, N.H. Nguyen & M. Blackw., Mycol. Res. 110(12): 1380 (2006)

Georgia, parsitized, *Lactarius*

Candida panamensis S.O. Suh, N.H. Nguyen & M. Blackw., Mycol. Res. 110(12): 1385 (2006)

≡ *Teunomyces panamensis* (S.O. Suh, N.H. Nguyen & M. Blackw.) Kurtzman & M. Blackw., FEMS Yeast Res. 16(5): 5 (2016)

Panama, colonized, *Geastrum*

Candida sagamina Nakase et al., Mycoscience 40(6): 471 (1999)

Japan, colonized, mushroom

Candida schatavii (Kock.-Krat. & Ondrush.) S.A. Mey. & Yarrow, Int. J. Syst. Bacteriol. 28(4): 613 (1978)

Japan, colonized, *Astraeus hygrometricus*

Candida tritomae S.O. Suh, N.H. Nguyen & M. Blackw., Mycol. Res. 110(12): 1385 (2006)

USA, colonized, *Amanita*

Subphylum *Taphrinomycotina* O.E. Erikss. & Winka
Class *Schizosaccharomycetes* O.E. Erikss. & Winka

Schizosaccharomycetales O.E. Erikss.
Schizosaccharomycetaceae Beij. ex Klöcker
Schizosaccharomyces Lindner

Schizosaccharomyces cryophilus Helston, J.A. Box, Wen Tang & Peter Baumann, FEMS Yeast Res. 10(6): 784 (2010)

Denmark, parasitized, *Schizosaccharomyces octosporus*

Class *Taphrinomycetes* O.E. Erikss. & Winka
Taphrinales *Gäum. & C.W.*
Eoterfeziaceae G.F. Atk.
Eoterfezia G.F. Atk.

Eoterfezia parasitica G.F. Atk., Bot. Gaz. 34: 40 (1902)

USA, parasitized, *Sordaria*

Eoterfezia perlucida Jeng & Cain, Mycotaxon 3(3): 388 (1976)

Venezuela, parasitized, *Podospora communis*

Ascomycota genera *incertae sedis*
Acremoniella Sacc.

Acremoniella melioliphila Cif., Sydowia 9(1-6): 323 (1955)

Dominica, parasitized, *Meliola swieteniae*, *M. tonkinensis* var. ceropiae

Acrospeira Berk. & Broome

Acrospeira balladynae Hansf., Proc. Linn. Soc. London 157: 40 (1945)

≡ *Acrodictys balladynae* (Hansf.) M.B. Ellis, Mycol. Pap. 79: 9 (1961)

Uganda, parasitized, *Balladyma leonensis*

Annellodochium Deighton

Annellodochium ramulisporum Deighton, Mycol. Pap. 118: 28 (1969)

Sierra Leone, parasitized, *Diatrype*

Annellospermosporella P.R. Johnst.

Annellospermosporella meliolinae P.R. Johnst., N.Z. Jl Bot. 37(2): 290 (1999)

≡ *Malacaria meliolinae* Hansf., Proc. Linn. Soc. London 156: 109 (1944)

New Zealand, parasitized, *Meliolina leptospermi*

Arthrobotryum Ces.

Arthrobotryum gorgoneum Cif., Mycopath. Mycol. appl. 6(1): 24 (1951)

Java, ambiguous, *Meliola*

Arthrobotryum noz-moscatae Bat. & J. Silva, Anais IV Congr. Soc. Bot. Brasil: 144 (1953)

Brazil, ambiguous, *Meliola*

Arthrobotryum parasiticum (G. Winter) Hansf., Proc. Linn. Soc. London: 64 (1943)

New Zealand, ambiguous, *Meliolina*

Arthrobotryum ugandense Hansf., Proc. Linn. Soc. London: 65 (1943)

Uganda, ambiguous, *Meliola ugandensi*

Arthrocristula Sigler, M.T. Dunn & J.W. Carmich.

Arthrocristula hyphenata Sigler, M.T. Dunn & J.W. Carmich., Mycotaxon 15: 409 (1982)

USA, colonized, sclerotium of *Sclerotinia minor*

Basididyma Cif.

Basididyma perexigua Cif., Atti Ist. Bot. Univ. Lab. crittog. Pavia, sér. 5 19: 95 (1962)

Dominica, colonized, *Oreophylla angelae-mariae*

Bhadradriomyces Sureshk., Manohar. & Kunwar

Bhadradriomyces elegans Sureshk., Manohar. & Kunwar, Journal of Mycology and Plant Pathology 39(2): 238 (2009)

India, colonized, *Graphium*

Capitorostrum Bat.

Capitorostrum asteridiellae Bat., Revta Biol., Lisb. 1(2): 140 (1957)

Australia, colonized, *Asteridella fraseriana*

Chaetophomella Speg.

Chaetophomella parasitica Petr., Sydowia 8(1-6): 25 (1954)

Malaysia, colonized, *Asterina dallasica*

Choreospora Constant. & R. Sant.

Choreospora tibellii Constant. & R. Sant., Lichenologist 19(2): 177 (1987)

Australia, colonized, *Echinoplaca*

Cornutispora Piroz.

Cornutispora limaciformis Piroz., Mycologia 65(4): 763 (1973)

Canada, colonized, *Therrya fuckelii*

Ctenosporium R. Kirschner

Ctenosporium pectinatum R. Kirschner, Mycol. Progr. 5(3): 137 (2006)

Panama, colonized, *Dischloridium*

Davisiella Petr.

Davisiella botryodiplodiae S. Ahmad, Biologia, Lahore 6(1): 2 (1961)

Pakistan, parasitized, *Botryodiplodia*

Dennisographium Rifai

Dennisographium episphaeriae Rifai, Kew Bull. 31(3): 726 (1977)

Java, colonized, *Ustulina deusta*

Dennisographium ustulinae (Pat.) Seifert, Stud. Mycol. 27: 209 (1985)

≡ *Stilbum ustulinae* Pat., Bull. Soc. Mycol. Fr. 18(2): 186 (1902)

Africa, colonized, *Ustulina*

Diploospora Grove

Diploospora fungicola R.F. Castañeda, Fungi Cubenses II (La Habana): 4 (1987)

Cuba, parasitized, *Auricularia*, China, parasitized, *Morchella*.

Diploplenodomus Died.

Diploplenodomus fungicola Bonar, Mycologia 57(3): 389 (1965)

USA, parasitized, *Aleurodiscus penicillatus*

Divinia Cif.

Divinia diatricha Cif., Sydowia 9(1-6): 327 (1955)

Dominica, colonized, *Meliola*

Domingoella Petr. & Cif.

Domingoella pycnopeltarum Bat., Anais IV Congr. Soc. Bot. Brasil: 77 (1953)

Brazil, colonized, *Pycnopeltis conspicua*

Dothiorellina Bubák

Dothiorellina quickii Bonar, Mycologia 57(3): 389 (1965)

USA, colonized, *Godronia abieticola*

Elletevera Deighton

Elletevera ochracea Katum., Bull. Faculty of Agriculture, Yamaguchi University 35: 110 (1987)

Japan, colonized, stromata of *Phyllachora shiraiana*

Elletevera parasitica (Ellis & Everh.) Deighton, Mycol. Pap. 118: 19 (1969)

USA, Zambia, colonized, *Phyllachora*

Endophragmia Duvernoy & Maire

Endophragmia dennisii M.B. Ellis, More Dematiaceous Hyphomycetes (Kew): 142 (1976)

UK, colonized, *Corticium sambuci*

Endozythia Petr.

Endozythia moravica Petr., Sydowia 13(1-6): 116 (1959)

Yugoslavia, colonized, *Leptosphaeria derasa*

Engelhardtiella A. Funk

Engelhardtiella alba A. Funk, Can. J. Bot. 51(9): 1643 (1973)

Canada, colonized, *Cytospora abietis*

Entropezites Poinar & R. Buckley

Entropezites patricii Poinar & R. Buckley, Mycol. Res. 111(4): 505 (2007)

Myanmar, parasitized, *Mycetophagites atrebora* and *Palaeoagaricites antiquus*

Epistigme Syd.

Epistigme erodens Bat. & R. Garnier, Atas Inst. Micol. Univ. Recife 3: 14 (1966)

Brazil, colonized, Meliolaceae

Epistigme parmulariicola Bat., R. Garnier & J.L. Bezerra, Publ. Inst, Micol. Univ.Pernambuco 506: 13 (1966)

Brazil, colonized, *Lembosiodothis parmularioides*

Epistigme teucrii Bat. & H. Maia, Publicações Inst. Micol. Recife 211: 29 (1962)

Jamaica, colonized, *Laeviomeliola cassiae*

Eriocercospora Deighton

Eriocercospora balladynae (Hansf.) Deighton, Mycol. Pap. 118: 6 (1969)

≡ *Helminthosporium balladynae* Hansf., Proc. Linn. Soc. London 157(1944-45): 39 (1945)

Africa, America, Asia, ambiguous, *Asterina*, *Balladyna*, *Schiffnerula*

Eriocercospora olivacea Piroz., Kavaka 2: 38 (1975)

Papua New Guinea, ambiguous, *Meliolina mollis*

Eurasina G.R.W. Arnold

Eurasina bondarzewae G.R.W. Arnold, Z. Pilzk. 35(3-4): 305 (1970)

≡ *Cladobotryum sphaerocephalum* (Berk.) Rogerson & Samuels, Mycologia 85(2): 241 (1993)

Belarus, parasitized, *Polyporus brudarzewae*

Flahaultiella Seifert

Flahaultiella microspora Seifert, Mycotaxon 110: 95 (2009)

Canada, ambiguous, *Sebacina*

Fusoma Corda

Fusoma telimenellae Schwarzman, Flora Sporovykh Rasteniĭ Kazakhstana [Cryptogamic Flora of Kazakhstan], 8, Fungi Imperfecti (Deuteromycetes), 1. Moniliales (Alma-Ata): 319 (1973)

Kazakhstan, colonized, *Telimenela gangraena*

Helminthophora Bonord.

Helminthophora uniseptata R.F. Castañeda, Fungi Cubense (La Habana): 9 (1986)

Cuba, colonized, *Stereum*

Leucopenicillifer G.R.W. Arnold

Leucopenicillifer gracilis G.R.W. Arnold, Nov. sist. Niz. Rast. 8: 135 (1971)

Russia, colonized, *Fuligo septica*

Hansfordia S. Hughes

Hansfordia alba J.A. Mey., Publ. Inst. nat. Étude agron. Congo belge, Sér. sci. 75: 93 (1959)

Congo, colonized, *Lasiodiplodia theobromae*

Hansfordia parasitica (H.L. Barnett) de Hoog, Stud. Mycol. 7: 73 (1974)

USA, colonized, *Botryosphaeria*, *Coniothyrium*, culture of *Dothiorella quercina*, *Physalospora*

Irpicomyces Deighton

Irpicomyces schiffnerulae Deighton, Mycol. Pap. 118: 24 (1969)

Malaysia, parasitized, *Schiffnerula solani*

Isariella Henn.

Isariella candida Seifert, Mem. N. Y. Bot. Gdn 49: 204 (1989)

Dominica, colonized, perithecial ascomycete (Seifert 1989)

Laterispora Uecker, W.A. Ayers & P.B. Adams

Laterispora brevirama Uecker, W.A. Ayers & P.B. Adams, Mycotaxon 14(2): 492 (1982)

Australia, Canada, Finland, Japan, USA, obligate parasitized, *Sclerotinia minor*

Lysotheca Cif.

Lysotheca suprastromatica Cif., Atti Ist. Bot. Univ. Lab. crittog. Pavia, sér. 5 19: 112 (1962)

USA, colonized, *Balladynella amazonica*

Mycopara Bat. & J.L. Bezerra

Mycopara shawii Bat. & J.L. Bezerra, Publicações Inst. Micol. Recife 286: 17 (1960)

USA, parasitized, *Cytospora prunorum* and *Dimerosporiopsis macrospora*

Mycosticta Höhn.

Mycosticta cytosporicola Frolov, Nov. sist. Niz. Rast., 1968 5: 179 (1968)

Turkmenistan, parasitized, *Gloeosporium*

Nematogonum Desm.

Nematogonum mycophilum (Sacc.) Rogerson & W. Gams, Trans. Br. Mycol. Soc. 77(2): 306 (1981)

Africa, parasitized, *Monilia*

Nematogonum niveum W. Gams, Revue Mycol., Paris 39(4): 273 (1976)

France, parasitized, *Eleutheromyces subulatus*

Olpitrichum G.F. Atk.

Olpitrichum tenellum (Berk. & M.A. Curtis) Hol.-Jech., Folia GeoBot. Phytotax. 9(4): 431 (1975)

≡ *Harzia tenella* (Berk. & M.A. Curtis) D.W. Li & N.P. Schultes, Fungal Biol. 121(10): 900 (2017)

China, obligate parasitized, plant pathogen (Li and Shen 1996)

Parachionomyces Thaung

Parachionomyces acroconidiellinae Thaung, Trans. Br. Mycol. Soc. 72(2): 333 (1979)

Myanmar, colonized, *Acroconidiellina acecae*

Paraphaeoisaria de Hoog & Morgan-Jones

Paraphaeoisaria alabamensis de Hoog & Morgan-Jones, Mycotaxon 7(1): 134 (1978)

USA, colonized, *Cronartium quercuum*

Pleurodesmospora Samson, W. Gams & H.C. Evans

Pleurodesmospora coccorum (Petch) Samson, W. Gams & H.C. Evans, Persoonia 11(1): 68 (1979)

Uganda, colonized, *Meliola*

Podosporium Schwein.

Podosporium insulare Cif., Sydowia 9(1-6): 310 (1955)

Dominica, colonized, *Meliola*

Polydesmus Mont.

Polydesmus oncospermatis Subram., Kavaka 22/23: 70 (1996)

Singapore, colonized, dematiaceous fungus

Protostegiomyces Bat. & A.F. Vital

Protostegiomyces asterinarum Bat. & M.L. Farr, Saccardoa 1: 12 (1960)

Dominica, colonized, *Asterina*

Protostegiomyces lembosiae Bat. & A.F. Vital, Anais Soc. Biol. Pernambuco 13(2): 94 (1955)

Europe, colonized, *Lembosia byrsonimae*

Pseudodiplodia (P. Karst.) Sacc.

Pseudodiplodia cenangiicola Nevod. ex Minter, Karstenia 19(1): 30 (1979)

Russia, colonized, *Cenangium ferruginosum*

Pseudohansfordia G.R.W. Arnold

Pseudohansfordia irregularis G.R.W. Arnold, Z. Pilzk. 35(3-4): 308 (1970)

Russia, colonized, *Coriolus versicolor*

Redbia Deighton & Piroz.

Redbia annulata Seixas & R.W. Barreto, University of Hawai'i at Manoa, Technical Report 133: 12 (2005)

Brazil, parasitized, *Coccodiella miconiae*

Redbia pucciniicola Deighton & Piroz., Mycol. Pap. 128: 83 (1972)

Tanzania, parasitized, *Puccinia holosericea*

Rhinotrichella G. Arnaud

Rhinotrichella globulifera G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 69: 272 (1954)

≡ *Rhinotrichella globulifera* G. Arnaud ex de Hoog, Stud. Mycol. 15: 87 (1977)

Japan, parasitized, *Gamoderma*

Refractohilum mycophilum R.F. Castañeda, W.B. Kendr. & Guarro, Mycotaxon 68: 30 (1998)

Cuba, colonized, ascomata of *Xylaria*

Rhinotrichum Corda

Rhinotrichum hemileiae Chevaug., Revue Mycol., Paris 21(Suppl. Colon. no. 2): 76 (1956)

Ivory Coast, parasitized, *Hemileia vastatrix*

Sitochora H.B.P. Upadhyay

Sitochora ellipsospora H.B.P. Upadhyay, Public. Inst. Micol. Univ. Recife & Inst. Nac. Pesq. 414: 5 (1964)

Brazil, colonized, *Phyllachora vaginata*

Spermosporella Deighton

Spermosporella aggregata Deighton, Mycol. Pap. 118: 21 (1969)

Sierra Leone, colonized, *Meliola geniculate*

Spermosporella elegans B. Sutton, Mycol. Pap. 132: 105 (1973)

Canada, colonized, *Haplographium delicatum*

Spermosporella flagelliformis K. Matsush. & Matsush., Matsush. Mycol. Mem. 8: 51 (1995)

Japan, colonized, *Pleurothecium recurvatum*

Spermosporella pulvinata Deighton & Piroz., Mycol. Pap. 128: 85 (1972)

Sierra Leone, colonized, *Meliola clerodendri*, *M. deinbolliae*

Sphaerulomyces Marvanová

Sphaerulomyces coralloides Marvanová, Trans. Br. Mycol. Soc. 68(3): 485 (1977)

Former Czechoslovakia, ambiguous, *Anguillospora crassa*

Spiropes Cif.

Spiropes armatellae M.B. Ellis, Mycol. Pap. 125: 15 (1971)

Sri Lanka, parasitized, *Amatella cinnamomcola*

Spiropes armatellicola Hosag., C.K. Biju, T.K. Abraham & D.K. Agarwal, J. Econ. Taxon. Bot. 26(3): 603 (2002)

India, parasitized, *Armatella*

Spiropes asterinae M.B. Ellis, Mycol. Pap. 131: 15 (1972)

Trinidad-Tobago, parasitized, *Asterina pulchella*

Spiropes bakeri M.B. Ellis, Mycol. Pap. 114: 32 (1968)

Trinidad-Tobago, parasitized, *Halbaniella*

Spiropes balladynae M.B. Ellis, Mycol. Pap. 114: 35 (1968)

Indonesia, parasitized, *Ballodyma velutina*

Spiropes caribensis Hol.-Jech. Česká Mykol. 38(2): 113 (1984)

Cuba, parasitized, *Meliola*

Spiropes deightonii M.B. Ellis, Mycol. Pap. 114: 18 (1968)

Sierra Leone, parasitized, *Meliola borneensis*

Spiropes dictyosporus Seifert & S. Hughes, N.Z. Jl Bot. 38(3): 489 (2000)

New Zealand, parasitized, *Euantennaria mucronata*

Spiropes echidnodis M.B. Ellis, Mycol. Pap. 114: 31 (1968)

USA, parasitized, *Echidodes quercina*

Spiropes lembosiae M.B. Ellis, Mycol. Pap. 114: 33 (1968)

Brazil, parasitized, *Lembosia decolorans*

Spiropes leonensis M.B. Ellis, Mycol. Pap. 114: 15 (1968)

Sierra Leone, parasitized, *Meliola gariniae*

Spiropes limoniformis Katum., Bull. Faculty of Agriculture, Yamaguchi University 35: 114 (1987)

Japan, parasitized, *Armatella litseae*

Spiropes pirozynskii M.B. Ellis, Mycol. Pap. 114: 19 (1968)

Tanzania, parasitized, *Irenopsis*

Spiropes shoreae M.B. Ellis, Mycol. Pap. 114: 38 (1968)

India, parasitized, Microthyriaceae

Stellospora Alcorn & B. Sutton

Stellospora appendiculellae Alcorn & B. Sutton, Mycotaxon 19: 45 (1984)

Australia, parasitized, *Appendiculella calostroma*

Stenospora Deighton

Stenospora uredinicola Deighton, Mycol. Pap. 118: 23 (1969)

Sierra Leone, parasitized, *Puccinia kraussiana*

Sympodiophora G.R.W. Arnold

Sympodiophora didyma Deighton & Piroz., Mycol. Pap. 128: 63 (1972)

Sierra Leone, colonized, *Dothidella derridis*

Sympodiophora meliolae (F. Stevens) Deighton & Piroz., Mycol. Pap. 128: 73 (1972)

≡ *Acremonium meliola* F. Stevens, Bot. Gaz. 65(3): 234 (1918)

USA, colonized, *Meliola*

Sympodiophora mycophila (Tubaki) Deighton & Piroz., Mycol. Pap. 128: 72 (1972)

Japan, colonized, *Hirneola polytricha*

Sympodiophora polyporicola Rogerson & S.T. Carey, Bull. Torrey Bot. Club 108(1): 13 (1981)

≡ *Cladobotryum clavisporum* (D.J. Gray & Morgan-Jones) Rogerson & Samuels, Mycologia 85(2): 252 (1993)

USA, parasitized, Polyporaceae

Sympodiophora pulchella Deighton & Piroz., Mycol. Pap. 128: 64 (1972)

Sierra Leone, colonized, *Dothidella derridis*

Sympodiophora stereicola G.R.W. Arnold, Nova Hedwigia 19(1-2): 302 (1970)

≡ *Cladobotryum stereicola* (G.R.W. Arnold) Rogerson & Samuels, Mycologia 85(2): 268 (1993)

Russia, colonized, *Stereum hirsutum*

Sympodiophora tenuis (Syd.) Deighton & Piroz., Mycol. Pap. 128: 70 (1972)

≡ *Eriomycopsis tenuis* Syd., Annls Mycol. 25(1/2): 137 (1927)

USA, colonized, *Parodiopsidis stevensii*

Sympodiophora varanasiensis Deighton & Piroz., Mycol. Pap. 128: 68 (1972)

India, colonized, *Cercospora vestita*

Sympodiophora viridigrisea G.R.W. Arnold, G.P. White & Illman, Mycotaxon 32(1): 371 (1988)

Canada, colonized, *Phellinus punctatus*

Teratosperma Syd. & P. Syd.

Teratosperma meliolae Hansf., Proc. Linn. Soc. London 159: 41 (1947)

≡ *Hansfordiella meliolae* (Hansf.) S. Hughes, Mycol. Pap. 47: 14 (1951)

Uganda, parasitized, *Meilola conopharyngiae*

Teratosperma microsporum P.M. Kirk, Mycotaxon 23: 345 (1985)

Kenya, parasitized, *Microthyrium*

Teratosperma oligocladum Uecker, W.A. Ayers & P.B. Adams, Mycotaxon 10(2): 422 (1980)

Canada, parasitized, *Botrytis cinerea*, *Sclerotium cepivorum*, *S. sclerotiorum*, *S. minor*, and *S. trifoliorum* in lab

Tetraposporium S. Hughes

Tetraposporium asterinearum S. Hughes, Mycol. Pap. 46: 25 (1951)

Ghana, colonized, *Asterina funtumiae*

Tiarosporellivora Punith.

Tiarosporellivora caricina Punith., Nova Hedwigia 35(1): 28 (1981)

Germany, ambiguous, *Neottiospora arenaria*

Trichoconis Clem.

Trichoconis antillana R.F. Castañeda, W.B. Kendr. & Guarro, Mycotaxon 65: 103 (1997)

Cuba, colonized, *Beltrania rhombica*

Trichoconis appendiculata Deighton & Piroz., Mycol. Pap. 128: 17 (1972)

Uganda, colonized, *Asterinella tecleae*

Trichoconis caudata (Appel & Strunk) Clem., Gen. fung. (Minneapolis): 176 (1909)

Sierra Leone, colonized, *Botryodiplodia theobromae*

Trichoconis hibernica Deighton & Piroz., Mycol. Pap. 128: 29 (1972)

Ireland, colonized, *Appendiculella calostroma*

Trichoconis pedicephora R.F. Castañeda & W.B. Kendr., Univ. Waterloo Biol. Ser. 35: 118 (1991)

Cuba, colonized, *Beltrania rhombica*

Trichoconis sigmoidea Deighton & Piroz., Mycol. Pap. 128: 30 (1972)

Sierra Leone, colonized, *Meliola kawandensis*

Trichoconis viridula Deighton & Piroz., Mycol. Pap. 128: 19 (1972)

Ghana, colonized, *Clypeolella ricini*

Tuberculispora Deighton & Piroz.

Tuberculispora jamaicensis Deighton & Piroz., Mycol. Pap. 128: 92 (1972)

Jamaica, colonized, *Irenopsis aciculosa*

Tympanosporium W. Gams

Tympanosporium parasiticum W. Gams, Antonie van Leeuwenhoek 40(3): 478 (1974)

Netherlands, colonized, *Tubercularia vulgari*

Veracruzomyces Mercado, Guarro, Heredia & J. Mena

Veracruzomyces obclavatus Mercado, Guarro, Heredia & J. Mena, Nova Hedwigia 75(3-4): 534 (2002)

Mexico, colonized, *Helminthosporium velutinum*

Veronaea Cif. & Montemart.

Veronaea filicina Dingley, N.Z. Jl Bot. 10(1): 81 (1972)

New Zealand, parasitized, *Rhagadolobium bakerianum*

Zakatoshia B. Sutton

Zakatoshia erikssonii W. Gams, Windahlia 16: 59 (1986)

Austria, colonized, *Sistotrema brinkmannii*

Zakatoshia hirschiopori B. Sutton, Mycol. Pap. 132: 129 (1973)

Canada, colonized, *Hirschioporus abietinus*

BASIDIOMYCOTA R.T. Moore

Subphylum *AGARICOMYCOTINA* Doweld

Class *Agaricomycetes* Doweld

Agaricales Underw.

Agaricaceae Chevall.

Coprinus Pers.

Coprinus mycophilus Bogart, The Genus *Coprinus* in Washington and Adjacent Western States [Ph.D. dissertation] (Seattle): 136 (1975)

USA, parasitized *Laetiporus sulphureus*

Entolomataceae Kotl. & Pouzar

Clitopilus (Fr. ex Rabenh.) P. Kumm.

Clitopilus daamsii Noordel., Persoonia 12(2): 161 (1984)

Netherlands, parasitized, fungus on wood

Entoloma P. Kumm.

Entoloma aberrans E. Horak, Beih. Nova Hedwigia 43: 24 (1973)

New Zealand, parasitized, *Armillaria tabescens*

Entoloma byssisedum (Pers.) Donk, Bull. Bot. Gdns Buitenz. 18: 158 (1949)

≡ *Agaricus byssisedus* Pers., Icon. Desc. Fung. Min. Cognit. (Leipzig) 2: 56 (1800)

Switzerland, parasitized, Gasteromycetes, truffles (Danell 1999)

Entoloma parasiticum (Quél.) Kreisel, Feddes Repert. Spec. Nov. Regni Veg. 95(9-10): 699 (1984)

≡ *Leptonia parasitica* Quél., Bull. Soc. Bot. Fr. 25(4): 287 (1879)

USA, parasitized, *Cantharellus cibarius*, *Coltricia perennis*, *Craterellus cornucopioides* (Helfer 1991; Noordeloos 1992; Jeffries and Young 1994)

Entoloma pseudocoelestinum Arnolds, Biblthca Mycol. 90: 341 (1982)

Netherlands, parasitized, *Agaricus coelestinus* (Danell 1999)

Entoloma pseudoparasiticum Noordel., Beih. Nova Hedwigia 91: 98 (1987)

Sweden, parasitized, *Cantharellus cibarius* and *Craterellus lutescens*

Entoloma nigrum (Murrill) Blanco-Dios, Tarrelos 19: 29 (2017)

≡ *Leptoniella nigra* Murrill, N. Amer. Fl. (New York) 10(2): 94 (1917)

China, parasitized, *Cordyceps* (Zhu and Zhuang 2013)

Lyophyllaceae Jülich

Asterophora Ditmar

Asterophora agaricoides Fr., Symb. Gasteromyc. (Lund) 1: 8 (1817)

≡ *Asterophora lycoperdoides* (Bull.) Ditmar, J. Bot. (Schrader) 3: 56 (1809)

Germany, obligate parasitized, *Agaricus*

Asterophora canaliculata (Pers.) Kuntze, Revis. gen. pl. (Leipzig) 3(2): 445 (1898)

≡ *Merulius canaliculatus* Pers., Icon. Desc. Fung. Min. Cognit. (Leipzig) 2: 57 (1800)

Germany, obligate parasitized, *Terram nudam*

Asterophora lycoperdoide*s* (Bull.) Ditmar, J. Bot. (Schrader) 3: 56 (1809)

Germany, obligate parasitized, *Agaricus*, *Russula*

Asterophora microphylla (Corda) Kuntze, Revis. gen. pl. (Leipzig) 3(2): 488 (1898)

≡ *Nyctalis microphylla* Corda, Icon. Fung. (Prague) 4 (1840)

The Czech Republic, obligate parasitized, *Russula*

Asterophora physaroides Fr., Symb. Gasteromyc. (Lund) 1: 8 (1817)

Germany, obligate parasitized, *Agaricus*

Asterophora salvaterrensis Blanco-Dios, Mycotaxon 118: 84 (2011)

Spain, obligate parasitized, *Russula nigricans*

Asterophora tritbioides Fr., Icon. Desc. Fung. Min. Cognit. (Leipzig) 2: 368 (1818)

Germany, obligate parasitized, *Agaricus*

Asterophora vopisca (Fr.) Kuntze, Revis. Gen. Plant (Leipzig) 3(2): 445 (1898)

≡ *Nyctalis vopiscus* Fr., Epicr. Syst. Mycol. (Upsaliae): 372 (1838)

Poland, obligate parasitized, *Clitocyba odorea*

Clavaria P. Micheli

Clavaria parasitica Willd., Fl. Berol. Prodr.: 405 (1787)

≡ *Tolypocladium ophioglossoides* (J.F. Gmel.) C.A. Quandt, Kepler & Spatafora, IMA Fungus 5(1): 127 (2014)

Brazil, parasitized, *Catacauma*

Nyctalis Fr.

Nyctalis asterophora f. *major* J.E. Lange, Dansk Bot. Ark. 8(no. 3): 42 (1933)

≡ *Asterophora lycoperdoides* (Bull.) Ditmar, J. Bot. (Schrader) 3: 56 (1809)

Denmark, parasitized, *Russula densifolia*

Niaceae Jülich

Peyronelina G. Arnaud

Peyronelina glomerulata G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 68: 213 (1952)

France, parasitized, *Lasiosphaeria*

Pluteaceae Kotl. & Pouzar

Volvariella Speg.

Volvariella surrecta (Knapp) Singer, Lilloa 22: 401 (1951)

≡ *Agaricus surrectus* Knapp, Journ. Natural., edn 1 (London): 363 (1829)

China, parasitized, *Clitocybe*

Physalacriaceae Corner

Armillaria (Fr.) Staude

Armillaria mellea (Vahl) P. Kumm., Führ. Pilzk. (Zerbst): 134 (1871)

USA, parasitized, *Entoloma abortivum*

Cylindrobasidium Jülich

Cylindrobasidium parasiticum D.A. Reid, Trans. Br. Mycol. Soc. 91(1): 168 (1988)

UK, parasitized, *Typhula incarnate*

Dendrocollybia R.H. Petersen & Redhead

Dendrocollybia racemosa (Pers.) R.H. Petersen & Redhead, Mycol. Res. 105(2): 169 (2001)

≡ *Agaricus racemosus* Pers., Tent. Disp. Meth. Fung. (Lipsiae): 15 (1797)

USA, parasitized, *Russula crassotunicata* (Machnicki et al. 2006)

Psathyrella (Fr.)

Psathyrella epimyce*s* (Peck) A.H. Sm., Mem. N. Y. Bot. Gdn 24: 60 (1972)

≡ *Agaricus epimyces* Peck, Ann. Rep. N.Y. St. Mus. nat. Hist. 35: 133 (1884)

Tricholomataceae R. Heim

Clitocybe (Fr.) Staude

Clitocybe sclerotoidea (Morse) H.E. Bigelow, Mycologia 50(1): 46 (1958)

USA, parasitized, *Helvella lacunose*

Collybia (Fr.) Staude

Collybia cookei (Bres.) J.D. Arnold, Mycologia 27(4): 413 (1935)

Europe, colonized, unknown basidiomycete

Collybia racemosa (Pers.) Quél., Mém. Soc. Émul. Montbéliard, Sér. 2 5: 342 (1873)

Europe, colonized, unknown basidiomycete

Collybia tuberosa (Bull.) P. Kumm., Führ. Pilzk. (Zerbst): 119 (1871)

Europe, colonized, unknown basidiomycete

Squamanita Imbach

Squamanita contortipes (A.H. Sm. & D.E. Stuntz) Heinem. & Thoen, Bull. Trimest. Soc. Mycol. Fr. 89: 30 (1973)

≡ *Cystoderma contortipes* A.H. Sm. & D.E. Stuntz, Beih. Sydowia 1: 46 (1957)

USA, obligate parasitized, *Agaricus*

Squamanita paradoxa (A.H. Sm. & Singer) Bas, Persoonia 3(3): 348 (1965)

UK, obligate parasitized, *Cystoderma amianthinum*

Typhulaceae Jülich

Typhula (Pers.) Fr.

Typhula mycophaga Berthier & Redhead, Can. J. Bot. 60(8): 1428 (1982)

UK, parasitized, *Lycoperdon pyriforme*

Auriculariales Bromhead
Auriculariaceae Fr.
Exidiopsis Vuill.
Exidiopsis fungicola (Hauerslev) Wojewoda, Mała Flora Grzybów, 2 Basidiomycetes (Podstawczaki) Tremellales (Trzesakowe) Auriculariales (Uszakowe) (Warszawa): 107 (1981)
≡ *Sebacina fungicola* Hauerslev, Friesia 11(2): 107 (1977)
Denmark, parasitized, *Mollisa cinerea* Redhead et al. (1994)
Exidiopsis invasa Hauerslev, Mycotaxon 49: 221 (1993)
Denmark, parasitized, *Trechispora microspore* Redhead et al. (1994)
Exidiopsis opalea (Bourdot & Galzin) D.A. Reid, Trans. Br. Mycol. Soc. 55(3): 431 (1970)
≡ *Sebacina opalea* Bourdot & Galzin, Bull. Soc. Mycol. Fr. 39(4): 262 (1924)
Worldwide, parasitized, old polypores Redhead et al. (1994)

Boletales E.-J. Gilbert
Boletaceae Chevall.
Buchwaldoboletus Pilát
Buchwaldoboletus lignicola (Kallenb.) Pilát, Friesia 9(1-2): 217 (1969)
Germany, parasitized, *Phaeolus schweinitzii*
Chalciporus Bataille
Chalciporus piperatus (Bull.) Bataille, Bull. Soc. Hist. nat. Doubs 15: 39 (1908)
≡ *Boletus piperatus* Bull., Herb. Fr. (Paris) 10: 451 (1790)
Germany, parasitized, *Phaeolus schweinitzii*
Pseudoboletus Šutara
Pseudoboletus astraeicola (Imazeki) Šutara, Czech Mycol. 57(1-2): 42 (2005)
≡ *Xerocomus astraeicola* Imazeki, Nagaoa 2: 35 (1952)
Japan, obligate parasitized, *Astraeus hygrometricus*
Pseudoboletus parasiticus (Bull.) Šutara, Česká Mykol. 45(1-2): 2 (1991)
≡ *Boletus parasiticus* Bull., Herb. Fr. (Paris) 10: 451 (1790)
USA, UK, obligate parasitized, *Scleroderma citrinum* (Nuhn et al. 2013)
Xerocomus Quél.
Xerocomus astraeicola Imazeki, Nagaoa 2: 35 (1952)
Japan, obligate parasitized, *Astraeus hygrometricus*
Xerocomus astraeicolopsis J.Z. Ying & M.Q. Wang, Acta Bot. Yunn. 3(4): 439 (1981)
China, obligate parasitized, *Astraeus hygrometricus*

Gomphidiaceae Maire ex Jülich
Gomphidius Fr.
Gomphidius roseus (Fr.) Fr., Epicr. Syst. Mycol. (Upsaliae): 319 (1838)
Worldwide, parasitized, *Suillus bovinus* (Binder 2006)

Hygrophoropsidaceae Kühner
Hygrophoropsis (J. Schröt.) Maire ex Martin-Sans
Hygrophoropsis aurantiaca* var. *robusta Antonín, Fungi Non Delineati, Raro vel Haud Perspecte et Explorate Descripti aut Definite Picti 11: 22 (2000)
Former Czechoslovakia, ambiguous, decaying *Grifola frondosa*

Cantharellales Gäum.
Botryobasidiaceae Jülich
Acladium Link
Acladium ellipticum Bat., Publicações Inst. Micol. Recife 33: 3 (1956)
Brazil, parasitized, *Colletotrichum*
Acladium fimbriatum Rudakov, Mikofil'nye Griby Ikh Biologiya i Prakticheskoe Znachenie, Moscow (Moscow): 79 (1981)
Russia, parasitized, *Erysiphe graminis*

Tulasnellaceae Juel
Gloeotulasnella Höhn. & Litsch.
Gloeotulasnella inclusa M.P. Christ., Dansk Bot. Ark. 19(no. 2): 41 (1959)
Denmark, parasitized, *Sistotrema brinkmannii*
Tulasnella J. Schröt.
***Tulasnella* sp.**
Europe, colonized, Corticioid fungi (Jülich 1983)

Polyporales Gäum.
Fomitopsidaceae Jülich
Sporotrichum Link
Sporotrichum fungicola (Corda) Sacc., Syll. fung. (Abellini) 4: 106 (1886)
Germany, parasitized, *Clavaria ardenia*
Spongiporus Murrill
Spongiporus rhodophilus Spirin & Zmitr., Mycotaxon 97: 78 (2006)
Russia, parasitized, *Rhodofomes roseus*

Meruliaceae P. Karst.
Gloeoporus Mont.
Gloeoporus amorphus (Fr.) Killerm., Denkschr. Bayer. Botan. Ges. Regensb. 6: 202 (1928)
≡ *Polyporus amorphus* Fr., Observ. Mycol. (Havniae) 1: 125 (1815)
Europe, parasitized, *Lenzites tricolor*
Merulius Fr.
Merulius irpicoides Corner, Gdns' Bull., Singapore 25: 367 (1971)
Malaysia, parasitized, *Poria*
Steccherinum Gray

Steccherinum tenuispinum Spirin, Zmitr. & Malysheva, Ann. Bot. fenn. 44(4): 298 (2007)
Russia, parasitized, *Fomitopsis pinicola*

Phanerochaetaceae Jülich
Antrodiella Ryvarden & I. Johans.
Antrodiella citrinella Niemelä & Ryvarden, Karstenia 23(1): 26 (1983)
Norway, colonized, *Fomitopsis pinicola*
Antrodiella hoehnelii (Bres.) Niemelä, Karstenia 22(1): 11 (1982)
Australia, colonized, unknown Polyporales
Antrodiella niemelaei Vampola & Vlasák, Czech Mycol. 63(2): 197 (2011)
Finland, colonized, *Hymenochaete tabacina*
Antrodiella parasitica Vampola, Česká Mykol. 45(1-2): 10 (1991)
Former Czechoslovakia, parasitized, *Trichaptum abietinum*
Ceriporia Donk
Ceriporia citrina M. Mata & Ryvarden, Syn. Fung. (Oslo) 27: 60 (2010)
Costa Rica, colonized, *Coriolopsis* cf. *byrsina*
Phlebiopsis Jülich
Phlebiopsis galochroa (Bres.) Hjortstam & Ryvarden, Mycotaxon 10(2): 285 (1980)
≡ *Peniophora galochroa* Bres., Hedwigia 35(5): 290 (1896)
Europe, parasitized, *Heterobasidion annosum*
Polyporaceae Fr. ex Corda
Perenniporia Murrill
Perenniporia xantha Decock & Ryvarden, Mycol. Res. 103(9): 1139 (1999)
French Guiana, colonized, *Hymenochaete*
Skeletocutis Kotl. & Pouzar
Skeletocutis brevispora Niemelä, Acta Bot. Fenn. 161: 10 (1998)
Finland, colonized, *Phellinidium ferrugineofuscum*
Skeletocutis polyporicola Ryvarden & Iturr., Syn. Fung. (Oslo) 29: 75 (2011)
Venezuela, colonized, *Fomitella supina*

Xenasmataceae Oberw.
Xenasma Donk
Xenasma aculeatum C.E. Gómez, Boln Soc. argent. Bot. 14(4): 273 (1972)
Argentina, colonized, *Hypoxylon*

Russulales Kreisel ex P.M. Kirk, P.F. Cannon & J.C. David
Lachnocladiaceae D.A. Reid
Dichostereum Pilát
Dichostereum orientale Boidin & Lanq., Bull. Trimest. Soc. Mycol. Fr. 96(4): 396 (1981)
Kenya, colonized, Polyporales
Sebacinales M. Weiss, Selosse, Rexer, A. Urb. & Oberw.

Sebacinaceae K. Wells & Oberw.
Flahaultia G. Arnaud
Flahaultia hyalina G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 67: 195 (1951)
France, colonized, *Sebacina*
Sebacina Tul. & C. Tul.
Sebacina allantoidea R. Kirschner & Oberw., Cryptog. Mycol. 23(2): 130 (2002)
Germany, parasitized, Diaporthales
Sebacina fungicola Hauerslev, Friesia 11(2): 107 (1977)
Denmark, parasitized, *Mollisia cinerea*
Sebacina penetrans Hauerslev, Friesia 11(5): 272 (1987)
Denmark, parasitized, *Dacrymyces stillatus*
Sebacina polyporophaga Hauerslev, Friesia 11(2): 106 (1977)
Denmark, parasitized, *Tyromyces caesius*

Thelephorales Corner ex Oberw.
Thelephoraceae Chevall.
Hypochnus Fr.
Hypochnus capnophilus G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 67: 194 (1951)
France, parasitized, *Capnodium*
Tomentella Pers.
Tomentella badiofusca* f. *diatrypicola Svrček, Česká Mykol. 12(2): 73 (1958)
Former Czechoslovakia, parasitized, *Diatrype stigma*

Agaricomycetes genera *incertae sedis*
Chaetoporus P. Karst.
Chaetoporus pseudozilingianus Parmasto, Eesti NSV Tead. Akad. Toim., Biol. seer 8: 113 (1959)
UK, parasitized, *Phellinus tremulae*
Geotrichopsis Tzean & Estey
Geotrichopsis mycoparasitica Tzean & Estey, Mycol. Res. 95(12): 1351 (1991)
Canada, parasitized, *Arthrobotrys oligospora*
Glutinoagger Sivan. & Watling
Glutinoagger fibulatus Sivan. & Watling, Trans. Br. Mycol. Soc. 74(2): 424 (1980)
India, parasitized, *Trabutia cocoicola*
Jacobia G. Arnaud
Jacobia conspicua G. Arnaud, Bull. Ttrimest. Soc. Mycol. Fr. 68: 195 (1952)
France, parasitized, *Lasiosphaeria ovina*
Titaeella G. Arnaud
Titaeella capnophila G. Arnaud, Bull. Trimest. Soc. Mycol. Fr. 67: 196 (1951)
France, parasitized, *Capnodium*

Class *Tremellomycetes* Doweld

Cystofilobasidiales Fell, Roeijmans & Boekhout
Cystofilobasidiaceae K. Wells & Bandoni
Itersonilia Derx
Itersonilia perplexans Derx, Bull. Bot. Gdns Buitenz. 17(4): 471 (1948)
UK, parasitized, *Dacrymyces stillatus*

Tremellales Fr.
Asterotremellaceae Prillinger, Lopandić & Sugita
Asterotremella Prillinger
Asterotremella albida (C. Ramírez) Prillinger, Lopandić & Sugita, J. Gen. Appl. Microbiol., Tokyo 53(3): 173 (2007)
France, parasitized, *Asterophora lycoperdoides*

Bulleribasidiaceae Xin Zhan Liu, F.Y. Bai, M. Groenew. & Boekhout
Bulleribasidium J.P. Samp., M. Weiss & R. Bauer
Bulleribasidium oberjochense J.P. Samp. et al., Mycologia 94(5): 875 (2002)
Germany, parasitized, *Tulasnella helicospora*

Carcinomycetaceae Oberw. & Bandoni
Christiansenia Hauerslev
Christiansenia pallida Hauerslev, Friesia 9(1-2): 43 (1969)
Denmark, parasitized, *Peniophora cremea*

Cuniculitremaceae J.P. Samp., R. Kirschner & M. Weiss
Cuniculitrema J.P. Samp. & R. Kirschner
Cuniculitrema polymorpha R. Kirschner & J.P. Samp., Antonie van Leeuwenhoek 80(2): 156 (2001)
Germany, Switzerland, parasitized, uknown fungi
Fellomyces Y. Yamada & I. Banno
Fellomyces horovitziae Spaaij, G. Weber & Oberw., Antonie van Leeuwenhoek 59(4): 295 (1991)
Germany, parasitized, *Xenasmatella*
Syzygospora G.W. Martin
Syzygospora alba G.W. Martin, J. Wash. Acad. Sci. 27: 112 (1937)
Panama, parasitized *Zygoconidia* (Oberwinkler and Lowy 1981)
Syzygospora lapponica Miettinen & Kotir., Acta Mycologica, Warszawa 41(1): 22 (2006)
Finland, parasitized, *Antrodia infirma*
Syzygospora marasmoidea Ginns, Mycologia 78(4): 628 (1986)
Canada, parasitized, *Marasmius pallidocephalus*
Syzygospora mycophaga (M.P. Christ.) Hauerslev, Nordic Jl Bot. 16(2): 216 (1996)
≡ *Ceratobasidium mycophagum* M.P. Christ., Dansk Bot. Ark. 19(no. 2): 45 (1959)
Denmark, parasitized, *Peniophora molllis*
Syzygospora norvegica Ginns, Mycologia 78(4): 630 (1986)
Norway, parasitized, *Collybia butyracea*

Hyaloriaceae Lindau
Myxarium Wallr.
Myxarium nucleatum* f. *ampulligerum Hauerslev, Mycotaxon 49: 248 (1993)
Denmark, parasitized, Pyrenomycetes
Myxarium subgilvum Hauerslev, Mycotaxon 49: 251 (1993)
Denmark, parasitized, Pyrenomycetes

Sirobasidiaceae Lindau
Sirobasidium Lagerh. & Pat.
Sirobasidium sandwicense Gilb. & Adask., Mycotaxon 49: 390 (1993)
USA, parasitized, *Diatrypella favacea* (Hemmes and Desjardin 2001)

Tremellaceae Fr.
Auriculibuller J.P. Samp. & Fonseca
Auriculibuller fuscus J.P. Samp., J. Inácio, Fonseca & Fell, Int. J. Syst. Evol. Microbiol. 54(3): 989 (2004)
Worldwide, parasitized, many fungi (Wang et al. 2015)
Bandoniozyma Boekhout et al.
Bandoniozyma fermentans C.F. Lee, PLoS ONE 7(10): e46060, 9 (2012)
China, parasitized, Agaricales
Bulleromyces Boekhout & Á. Fonseca
Bulleromyces albus Boekhout & Á. Fonseca, Antonie van Leeuwenhoek 59(2): 91 (1991)
Worldwide, parasitized, many fungi (Wang et al. 2015)
Cryptococcus Kütz.
Cryptococcus allantoinivorans Middelhoven, Antonie van Leeuwenhoek 87(2): 103 (2004)
Netherlands, parasitized, *Hericium erinaceus*
Cryptococcus yarrowii Á. Fonseca & Uden, Antonie van Leeuwenhoek 59(3): 177 (1991)
Portugal, parasitized, mushroom
Filobasidiella Kwon-Chung
Filobasidiella lutea P. Roberts, Mycotaxon 63: 198 (1997)
UK, parasitized, *Hypochnicium vellereum*
Filobasidiella xianghuijun M. Zang, Edible Fungi of China 18(2): 43 (1999)
China, parasitized, *Tremella fuciformis*
Hormomyces Bonord.
Hormomyces peniophorae P. Roberts, Mycotaxon 63: 214 (1997)
UK, parasitized, *Peniophora lycii*
Papiliotrema J.P. Samp et al.
Papiliotrema flavescens (Saito) Xin Zhan Liu, F.Y. Bai, M. Groenew. & Boekhout, Stud. Mycol. 81: 126 (2015)

China, parasitized, *Fomitopsis*

Sirotrema Bandoni

Sirotrema parvula Bandoni, Can. J. Bot. 64(3): 671 (1986)

UK, USA, parasitized, *Lophodermium pinastri*

Sirotrema pusilla Bandoni, Can. J. Bot. 64(3): 668 (1986)

UK, USA, parasitized, *Hypoderma pacificensis*

Tremella Dill.

Tremella aurantia Schwein., Schr. Naturf. Ges. Leipzig 1: 114 (1822)

UK, parasitized, *Stereum hirsutum*

Tremella aurantialba Bandoni & M. Zang, Mycologia 82(2): 270 (1990)

China, parasitized, *Stereum hirsutum*

Tremella aurantialba Bandoni & M. Zang, Mycologia 82(2): 270 (1990)

UK, parasitized, *Aleurodiscus norvegicus*

Tremella caloceraticola Hauerslev, Mycotaxon 72: 476 (1999)

Denmark, parasitized, *Calocera cornea*

Tremella candelariellae Diederich & Etayo, Biblthca Lichenol. 61: 52 (1996)

Germany, parasitized, *Candelariella vitelline*

Tremella coccocarpiae Diederich, Biblthca Lichenol. 61: 69 (1996)

Philippines, parasitized, *Coccocarpia rottleri*

Tremella dactylobasidia J.C. Zamora, Boln Soc. Micol. Madrid 33: 51 (2009)

Spain, parasitized, *Dendrothele macrospora*

Tremella discicola Van de Put, Sterbeeckia 24: 12 (2004)

Germany, parasitized, *Mollisia*

Tremella episphaerica Rick, Iheringia, Sér. Bot. 2: 46 (1958)

Brazil, parasitized, *Diatrype*

Tremella flava Chee J. Chen, Biblthca Mycol. 174: 57 (1998)

China, parasitized, *Hypoxylon*

Tremella fuciformis Berk., Hooker's J. Bot. Kew Gard. Misc. 8: 277 (1856)

China, parasitized, Pyrenomycete

Tremella hymenophaga M. Dueñas, Nova Hedwigia 72(3-4): 448 (2001)

Spain, parasitized, *Scytinostroma odoratum*

Tremella invasa (Hauerslev) Hauerslev, Nordic Jl Bot. 16(2): 218 (1996)

Denmark, parasitized, *Trechispora microspora*

Tremella menglunensis Y.B. Peng, Acta Mycol. Sin. 3(3): 154 (1984)

China, parasitized, *Hypoxylon chalybaeum*

Tremella nivalis Chee J. Chen, Biblthca Mycol. 174: 101 (1998)

China, parasitized, *Diatrype*

Tremella occultifuroidea Chee J. Chen & Oberw., Mycoscience 40(2): 137 (1999)

China, parasitized, *Dacrymyces*

Tremella penetrans (Hauerslev) Jülich, Int. J. Mycol. Lichenol. 1(2): 196 (1983)

Denmark, parasitized, *Dacrymyces stillatus*

Tremella rhytidhysterii J.L. Bezerra & Kimbr., Can. J. Bot. 56(24): 3023 (1978)

USA, parasitized, *Rhytidhysterium rufulum*

Tremella resupinata Chee J. Chen, Biblthca Mycol. 174: 77 (1998)

China, parasitized, *Hypoxylon*

Tremella sarniensis P. Roberts, Mycologist 15(4): 147 (2001)

UK, parasitized, *Phanerochaete sordida*

Tremella silvae-dravedae Hauerslev, Mycotaxon 72: 484 (1999)

Japan, parasitized, unknown fungus

Tremella simplex H.S. Jacks. & G.W. Martin, Mycologia 32(6): 687 (1940)

Canada, parasitized, *Aleurodiscus amorphous*

Tremella spicifera Van Ryck., Van de Put & P. Roberts, Mycotaxon 81: 185 (2002)

Germany, parasitized, *Massarina arundinacea*

Tremella subencephala Bandoni & Ginns, Trans. Mycol. Soc. Japan 34(1): 30 (1993)

Japan, parasitized, *Acanthophysium lividocoeruleum*

Tremella telleriae M. Dueñas, Nova Hedwigia 72(3-4): 453 (2001)

Spain, parasitized, *Oligoporus leucomallellus*

Tremella versicolor Berk., Ann. Mag. nat. Hist., Ser. 2 13: 406 (1854)

UK, parasitized, *Cortucium nudum*

Trichosphaeriaceae G. Winter

Brachysporium Sacc.

Brachysporium minutum Bat. & H. Maia, Publ. Inst. Micol. Recife 446: 4 (1965)

Brazil, parasitized, *Meliola sapindacearum*

Tremellales genera *incertae sedis*

Tremellina Bandoni, Windahlia

Tremellina pyrenophila Bandoni, Windahlia 16: 54 (1986)

USA, parasitized, *Ceratocystis*

Xenolachne D.P. Rogers

Xenolachne flagellifera D.P. Rogers, Mycologia 39(5): 562 (1947)

USA, parasitized, *Hyaloscypha atomaria*

Xenolachne longicornis Hauerslev, Friesia 11(2): 108 (1977)

Denmark, parasitized, *Cudoniella* and *Disciniella*

Trichosporonales Boekhout & Fell
Trichosporonaceae Nann.
Hyalodendron Diddens
Hyalodendron oudemansiellicola R.F. Castañeda, W.B. Kendr. & Guarro, Mycotaxon 65: 98 (1997)
Cuba, parasitized, *Oudemansiella canarii*

Tremellomycetes genera *incertae sedis*
Anastomyces W.P. Wu, B. Sutton & Gange
Anastomyces microsporus W.P. Wu et al., Mycol. Res. 101(11): 1318 (1997)
China, parasitized, *Apiospora*
Heteromycophaga P. Roberts
Heteromycophaga glandulosae P. Roberts, Mycotaxon 63: 211 (1997)
UK, parasitized, *Exidia glandulosa*
Heteromycophaga tremellicola P. Roberts, Kew Bull. 53(3): 646 (1998)
Brunei, parasitized, *Tremella philippinensis*
Tubulicrinopsis Hjortstam & Kotir.
Tubulicrinopsis cystidiata Kotir. & Miettinen, Ann. Bot. Fenn. 44(2): 131 (2007)
Finland, parasitized, *Botryobasidium ellipsosporum*

Subphylum *PUCCINIOMYCOTINA* R. Bauer et al.
Class *Agaricostilbomycetes* R. Bauer, Begerow, J.P. Samp., M. Weiss & Oberw.

Agaricostilbales Oberw. & R. Bauer

Agaricostilbaceae Oberw. & R. Bauer
Agaricostilbum J.E. Wright
Agaricostilbum palmicola J.E. Wright, Mycologia 62(4): 680 (1970)
Argentina, parasitized, *Anthostoma*
Bensingtonia Ingold
Bensingtonia ciliata Ingold, Trans. Br. Mycol. Soc. 86(2): 325 (1986)
UK, parasitized, *Auricularia auricula-judae*
Sterigmatomyces Fell
Sterigmatomyces hyphaenes (Har. & Pat.) F.Y. Bai, Q.M. Wang, M. Groenew. & Boekhout, Stud. Mycol. 81: 159 (2015)
Worldwide, parasitized, many fungi (Oberwinkler 2017)
Sterigmatomyces novozelandicus (W.B. Kendr. & X.D. Gong) F.Y. Bai, Q.M. Wang, M. Groenew. & Boekhout, Stud. Mycol. 81: 159 (2015)
≡ *Agaricostilbum novozelandicum* W.B. Kendr. & X.D. Gong, Mycotaxon 54: 21 (1995)
Worldwide, parasitized, many fungi (Oberwinkler 2017)
Sterigmatomyces pulcherrimus (Berk. & Broome) F.Y. Bai, Q.M. Wang, M. Groenew. & Boekhout, Stud. Mycol. 81: 159 (2015)
≡ *Isaria pulcherrima* Berk. & Broome, J. Linn. Soc., Bot. 14(no. 74): 96 (1873)
Worldwide, parasitized, many fungi (Oberwinkler 2017)

Chionosphaeraceae Oberw. & Bandoni
Chionosphaera D.E. Cox
Chionosphaera phylaciicola (Seifert & Bandoni) R. Kirschner & Oberw., Mycol. Res. 105(11): 1406 (2001)
Fibulostilbum Seifert & Oberw.
Fibulostilbum phylaciicola Seifert & Bandoni, Boln Soc. argent. Bot. 28(1-4): 215 (1992)
Brazil, parasitized, *Phylacia poculiformis*
Kurtzmanomyces Y. Yamada, Itoh, H. Kawas., I. Banno & Nakase
Kurtzmanomyces insolitus J.P. Samp. & Fell, Syst. Appl. Microbiol. 22(4): 622 (1999)
Greece, Portugal, parasitized, *Botrytis*, and *Exidiopsis*
Kondoa Y. Yamada, Nakagawa & I. Banno
Kondoa phyllada (Y. Yamada, Nakagawa & Van der Walt) Q.M. Wang, M. Groenew., F.Y. Bai & Boekhout, Stud. Mycol. 81: 171 (2015)
Worldwide, parasitized, ascomycete (Oberwinkler 2017)

Agaricostilbales genera *incertae sedis*
Mycogloea L.S. Olive
Mycogloea nipponica Bandoni, Mycoscience 39(1): 32 (1998)
Japan, parasitized, *Hypoxylon*

Class *Atractiellomycetes* R. Bauer, Begerow, J.P. Samp., M. Weiss & Oberw.

Atractiellales Oberw. & Bandoni
Atractogloeaceae Oberw. & R. Bauer
Atractogloea Oberw. & Bandoni
Atractogloea stillata Oberw. & Bandoni, Mycologia 74(4): 636 (1982)
USA, parasitized, many fungi

Phleogenaceae Gäum.
Exobasidiellum Donk
Exobasidiellum sp.
In lab, parasitized, plant fungal pathogen Vakili (1992)
Helicogloea Pat.
Helicogloea parasitica L.S. Olive, Mycologia 43(6): 677 (1952)
USA, parasitized, *Exidia glandulosa*

Class *Classiculomycetes* R. Bauer et al.

Classiculales R. Bauer et al.
Classiculaceae R. Bauer et al.
Classicula R. Bauer et al.
Classicula fluitans R. Bauer et al., Mycologia 95(4): 757 (2003)
Worldwide, parasitized, *Rhizoctonia* (Bauer et al. 2006)
Jaculispora H.J. Huds. & Ingold

Jaculispora submersa H.J. Huds. & Ingold, Trans. Br. Mycol. Soc. 43(3): 475 (1960)

Worldwide, parasitized, *Rhizoctonia* (Bauer et al. 2006)

Class ***Cryptomycocolacomycetes*** R. Bauer et al.

Cryptomycocolacales Oberw. & R. Bauer
Cryptomycocolacaceae Oberw. & R. Bauer
Colacosiphon R. Kirschner, R. Bauer & Oberw.

Colacosiphon filiformis R. Kirschner et al., Mycologia 93(4): 643 (2001)

Worldwide, parasitized, *Rhizoctonia*

Cryptomycocolax Oberw. & R. Bauer

Cryptomycocolax abnormis Oberw. & R. Bauer, Mycologia 82(6): 672 (1990)

Worldwide, parasitized, *Rhizoctonia*

Class ***Cystobasidiomycetes*** R. Bauer et al.

Cystobasidiales R. Bauer et al.
Cystobasidiaceae Gäum.
Cystobasidium (Lagerh.) Neuhoff

Cystobasidium fimetarium (Schumach.) P. Roberts, Mycologist 13(4): 171 (1999)

France, parasitized, *Tremella*

Cystobasidium lasioboli (Lagerh.) Neuhoff, Bot. Arch. 8: 273 (1924)

Europe, parasitized, *Lasiobolus pilosus*

Occultifur Oberw.

Occultifur corticiorum P. Roberts, Mycotaxon 63: 202 (1997)

UK, parasitized, *Hyphoderma praetermissum*

Occultifur externus J.P. Samp., R. Bauer & Oberw., Mycologia 91(6): 1095 (1999)

Portugal, parasitized, fungus on plant litter

Occultifur internus (L.S. Olive) Oberw., Rep. Tottori Mycol. Inst. 28: 120 (1990)

UK, parasitized, *Dacrymyces minor*

Occultifur internus* f. *minor Van de Put, Sterbeeckia 20: 4 (2001)

Belgium, parasitized, *Dacrymyces minor*

Occultifur rivoirei Trichiès, Bull. Mens. Soc. linn. Lyon 86(1-2): 20 (2017)

France, parasitized, *Hyphodontia arguta*

Naohideales R. Bauer, Begerow, J.P. Samp., M. Weiss & Oberw.
Naohideaceae Denchev
Naohidea Oberw.

Naohidea sebacea (Berk. & Broome) Oberw., Rep. Tottori Mycol. Inst. 28: 114 (1990)

Worldwide, parasitized, *Botryosphaeria* and *Botryodiplodia* (Piątek 2002)

Class ***Exobasidiomycetes*** Begerow, M. Stoll & R. Bauer

Georgefischeriales R. Bauer, Begerow & Oberw.
Gjaerumiaceae R. Bauer, M. Lutz & Oberw.
Gjaerumia R. Bauer, M. Lutz & Oberw.

Gjaerumia minor (Nyland) Q.M. Wang et al., Stud. Mycol. 81: 80 (2015)

China, parasitized, *Sphaerotheca fuliginea*

Robbauerales Boekhout et al.
Robbaueraceae Boekhout et al.
Robbauera Boekhout et al.

Robbauera albescens (Gokhale) Boekhout et al., Stud. Mycol. 81: 79 (2015)

In lab, parasitized, *Sphaerotheca fuliginea*

Tilletiariaceae R.T. Moore
Phragmotaenium R. Bauer et al.

Phragmotaenium flavum (Tubaki) Q.M. Wang, Begerow, F.Y. Bai & Boekhout, Stud. Mycol. 81: 81 (2015)

Tilletiopsis Derx

Tilletiopsis pallescens Gokhale, Nova Hedwigia 23(4): 803 (1973)

Japan, Canada, parasitized, *Sirobasidium* and *Sphaerotheca fuliginea*

Class *Microbotryomycetes* R. Bauer, Begerow, J.P. Samp., M. Weiss & Oberw.

Class ***Microbotryomycetes*** R. Bauer et al.

Heterogastridiales Oberw. & R. Bauer
Heterogastridiaceae Oberw. & R. Bauer
Krieglsteinera Pouzar

Krieglsteinera lasiosphaeriae Pouzar, Beitr. Kenntn. Pilze Mitteleur. 3: 404 (1987)

Former Czechoslovakia, parasitized, *Lasiosphaeria ovina*

Camptobasidium Marvanová & Suberkr.

Camptobasidium hydrophilum Marvanová & Suberkr., Mycologia 82(2): 209 (1990)

Worldwide, parasitized, aquatic hyphomycetes (Bauer et al. 2003)

Colacogloea Oberw. & Bandoni

Colacogloea allantospora Ginns & Bandoni, Czech Mycol. 54(1-2): 32 (2002)

Canada, parasitized, *Tubulicrinis calothrix*

Colacogloea bispora (Hauerslev) Oberw. & R. Bauer, Kew Bull. 54(3): 764 (1999)

Denmark, parasitized, *Tubulicrinis angustus*

Colacogloea peniophorae (Bourdot & Galzin) Oberw., R. Bauer & Bandoni, Can. J. Bot. 68(12): 2532 (1991)

Europe, parasitized, *Peniophora*

Leucosporidiales J.P. Samp., M. Weiss & R. Bauer
Leucosporidiaceae Jülich
Leucosporidium Fell, Statzell, I.L. Hunter & Phaff

Leucosporidium fasciculatum Babeva & Lisichk., Mikrobiologiya 69(6): 801 (2000)

Russia, parasitized, *Gyromitra esculenta*

Sporidiobolales Doweld
Sporobolomycetaceae Derx
Sporidiobolus Nyland

Sporidiobolus johnsonii Nyland, Mycologia 41(6): 687 (1950)

Japan, parasitized, *Phragmidium rubi-idaei*

Sporobolomyces Kluyver & C.B.

Sporobolomyces coralliformis Tubaki, Bot. Mag., Tokyo 71: 133 (1958)

Japan, parasitized, *Exidia*

Sporobolomyces odoratus J.P. Samp., Á. Fonseca & E. Valério, FEMS Yeast Res. 2(1): 15 (2002)

Portugal, parasitized, *Myxarium nucleatum*

Sporidiobolales genera *incertae sedis*
Rhodotorula F.C. Harrison

Rhodotorula buffonii (C. Ramírez) Roeijmans, Yeast 38(1): 2 (1989)

France, parasitized, *Boletus edulis*

Class ***Pucciniomycetes*** R. Bauer et al.

Helicobasidiales Boekhout et al.
Helicobasidiaceae P.M. Kirk
Tuberculina Tode ex Sacc.

Tuberculina phyllachoricola Bat. & J.L. Bezerra, Publicações Inst. Micol. Recife 343: 20 (1962)

Brazil, parasitized, *Phyllachora whetzelii* var. *macrospora*

Platygloeales R.T. Moore
Platygloeaceae Racib.
Achroomyces Bonord.

Achroomyces arachidosporus Trichiès, Bull. Soc. Mycol. Fr. 122(1): 48 (2007)

France, parasitized, *Basidiodendron eyrei*

Achroomyces chlamydosporus P. Roberts, Polish Bot. J. 47(2): 110 (2002)

Norway, parasitized, *Helicogloea caroliniana*

Achroomyces dennisii P. Roberts, Mycotaxon 96: 100 (2006)

Jamaica, parasitized, *Hyphodontia sambuci*

Achroomyces henricii P. Roberts, Mycotaxon 63: 200 (1997)

USA, parasitized, *Diatrype disciformis*

Achroomyces insignis Hauerslev, Mycotaxon 49: 218 (1993)

Denmark, parasitized, *Myxarium subhyalinum*

Achroomyces lotharingus Trichiès, Bull. Soc. Mycol. Fr. 118(4): 370 (2003)

France, parasitized, *Aphanobasidium allantosporum*

Achroomyces lumbricifer P. Roberts, Sydowia 53(1): 152 (2001)

UK, parasitized, *Hyphodontia subalutacea*

Achroomyces lunaticonidiatus Van de Put, Sterbeeckia 19: 6 (2000)

Belgium, parasitized, *Hyphodontia sambuci*

Achroomyces soranus Hauerslev, Mycotaxon 72: 467 (1999)

Denmark, parasitized, *Dacrymyces stillatus*

Platygloea J. Schröt.

Platygloea abdita Bandoni, Mycologia 51(1): 94 (1961)

USA, parasitized, *Exidiopsis sublilacina*

Platygloea arrhytidiae L.S. Olive, Bull. Torrey Bot. Club 78: 103 (1951)

USA, parasitized, *Arrhytidia enata*

Platygloea basidiodendri M. Dueñas, Nova Hedwigia 72(3-4): 446 (2001)

Spain, parasitized, *Basidiodendron caesiocinereum*

Platygloea fungicola L.S. Olive, Bull. Torrey Bot. Club 85: 11 (1958)

France, parasitized, *Polyporus*

Platygloea fungicola var. *simplex* L.S. Olive, Bull. Torrey Bot. Club 85: 11 (1958)

France, parasitized, *Dacrymyces deliquescens*

Platygloea jacksonii Bandoni & J.C. Krug, Mycoscience 41(4): 371 (2000)

USA, parasitized, *Peniophora sambuci*

Platygloea mycophila Burds. & Gilb., Mycologia 66(4): 703 (1974)

USA, parasitized, *Peniophora tamaricicola*

Platygloea peniophorae* var. *interna L.S. Olive, Bull. Torrey Bot. Club 81: 331 (1954)

USA, parasitized, *Peniophora*

Platygloea peniophorae* var. *peniophorae Bourdot & Galzin, Bull. Soc. Mcol. Fr. 25(1): 17 (1909)

USA, parasitized, *Peniophora* (Bandoni 959)

Platygloea subabdita Hauerslev, Friesia 11(5): 329 (1987)

Denmark, parasitized, *Myxarium podlachicum*

Pucciniomycetes genera *incertae sedis*
Yunzhangia Q.M. Wang et al.

Yunzhangia auriculariae (Nakase) Q.M. Wang, F.Y. Bai, M. Groenew. & Boekhout, Stud. Mycol. 81: 187 (2015)

Japan, parasitized, *Auricularia auricula-judae*

Zygogloea P. Roberts

Zygogloea gemellipara P. Roberts, Mycotaxon 52(1): 243 (1994)

UK, parasitized, *Myxarium nucleatum*

Class ***Spiculogloeomycetes*** Q.M. Wang, F.Y. Bai, M. Groenew. & Boekhout

Spiculogloeales R. Bauer, Begerow, J.P. Samp., M. Weiss & Oberw.
Spiculogloeaceae Denchev
Spiculogloea P. Roberts
Spiculogloea limonispora Trichiès, Bull. Soc. Mycol. Fr. 122(1): 43 (2007)
France, parasitized, *Hyphoderma argillaceum* (Spirin et al. 2016)
Spiculogloea minuta P. Roberts, Mycotaxon 63: 204 (1997)
UK, parasitized, *Tulasnella violea*
Spiculogloea occulta P. Roberts, Mycotaxon 60: 113 (1996)
Spain, parasitized, *Hyphoderma argillaceum*
Spiculogloea subminuta Hauerslev, Mycotaxon 72: 474 (1999)
Denmark, parasitized, *Botryobasidium subcoronatum*

Class *Tritirachiomycetes* Aime & Schell

Tritirachiales Aime & Schell
Tritirachiaceae Aime & Schell
Tritirachium Limber
Tritirachium dependens Limber, Mycologia 32(1): 26 (1940)
Germany, parasitizd, *Penicillium rugulosum* (Beguin 2010)
Tritirachium egenum Beguin, FEMS Microbiology Ecology 74(1): 169 (2010)
Belgium, parasitizd, *Penicillium rugulosum* (Beguin 2010)
Tritirachium fungicola Schwarzman Fungi Imperfecti (Deuteromycetes), 1. Moniliales (Alma-Ata): 264 (1973)
Kazakhstan, parasitizd, *Fomitopsis pinicola*

Tritirachiomycete genera *incertae sedis*
Kryptastrina Oberw.
Kryptastrina inclusa Oberw., Rep. Tottori Mycol. Inst. 28: 118 (1990)
Colombia, parasitized, corticioid fungus

Subphylum *USTILAGINOMYCOTINA* Doweld
Class *Ustilaginomycetes* R. Bauer, Oberw. & Vánky

Ustilaginales G. Winter 1880
Ustilaginaceae Tul. & C. Tul.
Pseudozyma Bandoni
Pseudozyma aphidis (Henninger & Windisch) Boekhout, J. Gen. Appl. Microbiol., Tokyo 41(4): 364 (1995)
Israel, parasitized, *Podosphaera xanthii*

Basidiomycota genera *incertae sedis*
Cystogloea P. Roberts
Cystogloea oelandica P. Roberts, Acta Mycologica, Warszawa 41(1): 26 (2006)
Sweden, parasitized, *Amphiporthe leiphaemia*, *Pseudotrichia minor*
Mycetophagites Poinar & R. Buckley
Mycetophagites atrebora Poinar & R. Buckley, Mycol. Res. 111(4): 505 (2007)
Myanmar, parasitized, *Palaeoagaricites antiquus*

Subphylum *BLASTOCLADIOMYCOTA* T.Y. James
Class *Blastocladiomycetes* Doweld

Blastocladiales H.E. Petersen
Catenariaceae Couch
Catenaria Sorokīn
Catenaria allomycis Couch, Mycologia 37(2): 171 (1945)
USA, obligate parasitized, *Allomyces* and *Blastocladiella simplex* (1980)
Catenaria anguillulae Sorokīn, Annls Sci. Nat., Bot., sér. 6 4: 67 (1876)
In lab, parasitized, many fungi (Whipps 1997)

Subphylum *CHYTRIDIOMYCOTA* Doweld
Class *Chytridiomycetes* Caval.-Sm.

Chytridiales Cohn
Chytridiaceae Bek.
Chytridium A. Braun
Chytridium hyperparasiticum Kobayasi & K. Konno, Bull. Natn. Sci. Mus., Tokyo 14(1): 14 (1971)
Denmark, obligate parasitized, *Rhizophlyctis rosea*
Chytridium parasiticum Willoughby, Trans. Br. Mycol. Soc. 39(1): 135 (1956)
Australia, obligate parasitized, *Chytridium suburceolatum*, *Rhizidium richmondense*,
Septosperma rhizophydii, *Rhizidium richmondense*
Chytridium suburceolatum Willoughby, Trans. Br. Mycol. Soc. 39(1): 132 (1956)
Australia, obligate parasitized, *Rhizidium richmondense*

Chytriomycetaceae Letcher
Chytriomyces Karling
Chytriomyces annulatus Dogma, Nova Hedwigia 18: 349 (1969)
USA, obligate parasitized, *Sparrowia subcruciformis*
Chytriomyces mortierellae Persiel, Arch. Mikrobiol. 36: 295 (1960)
Austria, obligate parasitized, *Mortierella* (Letcher and Powell 2002)
Chytriomyces poculatus Willoughby & Townley, Trans. Br. Mycol. Soc. 44(2): 183 (1961)
Canada, obligate parasitized, *Sparrowia subcruciformis* (Letcher and Powell 2002)
Chytriomyces reticulatus Persiel, Arch. Mikrobiol. 36: 297 (1960)
Germany, obligate parasitized, *Pythium proliferum*

Chytriomyces reticulosporus Dogma, Kalikasan 12(3): 395 (1983)

Philippines, obligate parasitized, *Phlyctochytrium punctatum* (Letcher and Powell 2002)

Chytriomyces rhizidiomycetis Dogma, Kalikasan 12(3): 386 (1983)

Japan, Philippines, obligate parasitized, *Rhizidiomyces bivellatus* (Letcher and Powell 2002)

Chytriomyces verrucosus Karling, Bull. Torrey Bot. Club 87: 327 (1960)

USA, obligate parasitized, *Karlingia rosea* (Letcher and Powell 2002)

Phlyctochytriaceae Doweld
Phlyctochytrium J. Schröt.

Phlyctochytrium parasitans Sparrow & Dogma, Arch. Mikrobiol. 89(3): 185 (1973)

Dominica, obligate parasitized, *Achlya flagellata*

Phlyctochytrium plurigibbosum D.J.S. Barr, Can. J. Bot. 47: 993 (1969)

Canada, obligate parasitized, *Glomus macrocarpum*

Phlyctochytrium synchytrii Er. Köhler, Arb. Biol. Reichsanst. Land-u. Forstw. 13: 382 (1924)

Germany, obligate parasitized, *Synchytrium pilificum*

Chytridiomycetes family *incertae sedis*
Sparrowiaceae Doweld
Blyttiomyces A.F. Bartsch

Blyttiomyces harderi Sparrow & Dogma, Arch. Mikrobiol. 89(3): 187 (1973)

Dominica, obligate parasitized, *Rhizophlyctis rosea*

Blyttiomyces rhizophlyctidis Dogma, Mycologia 61(6): 1150 (1970)

USA, obligate parasitized, *Rhizophlyctis rosea*

Dictyomorpha Mullins

Dictyomorpha dioica Couch ex Mullins, Am. J. Bot. 48: 378 (1961)

In lab, obligate parasitized, *Achlya flagellata* (Mullins and Barksdale 1965)

Sparrowia Willoughby

Sparrowia parasitica Willoughby, Nova Hedwigia 5: 337 (1963)

UK, obligate parasitized, *Pythium*

Sparrowia subcruciformis Dogma, Nova Hedwigia 19(3-4): 503 (1971)

USA, Denmark, obligate parasitized, *Chytriomyces poculatus*, *C. rosea*, *Rhizophylum coronum*

Chytridiomycetes genera *incertae sedis*
Septosperma Whiffen

Septosperma rhizophydii Whiffen, Mycologia 34(5): 552 (1942)

USA, obligate parasitized, *Rhizophydium macrosporum*

Solutoparies Whiffen

Solutoparies pythii Whiffen, Mycologia 34(5): 543 (1942)

USA, obligate parasitized, *Pythium*

Class *Rhizophydiomycetes* Tedersoo et al.

Rhizophlyctidales Letcher
Rhizophlyctidaceae H.E. Petersen
Rhizophlyctis A. Fisch.

Rhizophlyctis rosea (de Bary & Woronin) A. Fisch., Rabenh. Krypt.-Fl., Edn 2 (Leipzig) 1(4): 122 (1892)

≡ *Chytridium rosea* de Bary & Woronin, Verh. Naturf. Ges. Freiburg 3(2): 52 (1863)

UK, obligate parasitized, *Endochytrium operculatum*

Rhizophlyctis sp.

UK, parasitized, *Dacrymyces stillatus*

Rhizophydiales Letcher
Rhizophydiaceae Werderm. 1954
Phlyctidium Wallr.

Phlyctidium mycetophagum Karling, Am. J. Bot. 33: 756 (1946)

UK, USA, obligate parasitized, *Asterophlyctis sacroptoides*, *Karlingia rosea*, *Polychytrium aggregatum*, *Rhizidiomyces hirsutus*, *Rhizophydium*, *Septochytrium*, *Siphonaria variabilis*, *Traustotheca clavata*, *Zoophagus insidians*

Rhizophydium Schenk

Rhizophydium aphanomycis Karling, Nova Hedwigia 27(3-4): 750 (1976)

Tanzania, obligate parasitized, *Aphanomyces*

Rhizophydium blastocladianum S.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 13 (1990)

India, parasitized, *Blastocladia*

Rhizophydium blyttiomycerum S.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 21 (1990)

India, obligate parasitized, *Blyttiomyces spinosus*, *Spirogyra*

Rhizophydium carpophilum Zopf, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 47: 200 (1885)

Brazil, obligate parasitized, *Synchytrium fulgens, S. linariae*, *S. macrosporum*

Rhizophydium coralloidum Karling, Mycologia 68(6): 1245 (1977)

USA, obligate parasitized, *Karkingia rosea*

Rhizophydium gonapodyanum S.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 20 (1990)

India, obligate parasitized, *Gonapodya polymorpha*

Rhizophydium hyperparasiticum Karling, Am. J. Bot. 33: 329 (1946)

Brazil, obligate parasitized, *Karlingia granulata*, *K. rosea*, *Septochytrium macrosporum*, *S. plurlobulum*

Rhizophydium lagenaria S.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 17 (1990)

India, parasitized, *Blastocladia*

Rhizophydium mycetophagum Karling, Am. J. Bot. 33(5): 329 (1946)

Brazil, parasitized, *Choanephora*

Rhizophydium parasiticum S.C. Shen & Siang, Sci. Rep. Natl. Tsing Hua Univ., Ser. B, Biol. Sci. 3: 181 (1948)

UK, obligate parasitized, *Chytridiomyces verrucocsa*, *Rhizophlyctis rosea*

Rhizophydium rarotonganense Karling, Arch. Mikrobiol. 61: 114 (1968)

USA, parasitized, *Nowakowshiella profusa*

Rhizophydium reflexum S.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 15 (1990)

India, parasitized, *Blastocladia*

Rhizophydium rhizinum **S**.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 14 (1990)

India, parasitized, *Blastocladia*

Rhizophydium rotundum S.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 23 (1990

India, parasitized, *Cedogonium*, *Closterium*, *Zygnema*

Rhizophydium spinosum Willoughby, Arch. Mikrobiol. 52: 108 (1965)

India, parasitized, *Cedogonium*, *Closterium*, *Zygnema*

Rhizophydium stellatum S.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 20 (1990)

India, parasitized, *Gonapodya polymorph*

Rhizophydium urceolatum S.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 16 (1990)

India, parasitized, *Blastocladia*

Spizellomycetales D.J.S. Barr

Caulochytriaceae Subram.

Caulochytrium Voos & L.S. Olive

Caulochytrium gloeosporii Voos & L.S. Olive, Mycologia 60(3): 731 (1968)

USA, parasitized, *Rhizidium richmondense*

Caulochytrium protostelioides L.S. Olive, Am. J. Bot. 67(4): 569 (1980)

USA, parasitized, *Cladosporium*

Caulochytrium protostelioides **var.** ***vulgare*** L.S. Olive, Mycologia 75(5): 923 (1983)

≡ *Caulochytrium protostelioides* L.S. Olive, Am. J. Bot. 67(4): 569 (1980)

USA, parasitized, *Sordaria fimicola*

Globicultrix M. Krings, Dotzler & T.N. Taylor

Globicultrix nugax M. Krings, Dotzler & T.N. Taylor, Zitteliana, Reihe A: Mitteilungen der Bayerischen Staatssammlung für Paläontologie und Geologie (München) 48/49: 166 (2009)

UK, parasitized Glomeroycota

Subphylum *ENTOMOPHTHOROMYCOTA* Humber

Class *Entomophthoromycetes* Humber

Entomophthorales G. Winter

Ancylistaceae Pfitzer

Conidiobolus Bref.

Conidiobolus mycophagus Sriniv. & Thirum., Sydowia 19(1-6): 88 (1966)

India, parasitized, Agaricales

Conidiobolus mycophilus Sriniv. & Thirum., Sydowia 19(1-6): 86 (1966)

India, parasitized, Agaricales

Subphylum *GLOMEROMYCOTA* C. Walker & A. Schüßler

Kryphiomyces M. Krings, Dotzler, Longcore & T.N. Taylor

Kryphiomyces catenulatus M. Krings, Dotzler, Longcore & T.N. Taylor, Palaeontology 53(4): 754 (2010)

UK, ambiguous, Glomeromycota

Subphylum *KICKXELLOMYCOTA* Tedersoo et al.

Class *Dimargaritomycetes* Tedersoo et al.

Dimargaritales R.K. Benj.

Dimargaritaceae R.K. Benj.

Dimargaris Tiegh.

Dimargaris arida R.K. Benj., Aliso 6(1): 3 (1965)

USA, obligate parasitized, *Cokeromyces recurvatus*

Dimargaris bacillispora R.K. Benj., Aliso 4(2): 376 (1959)

USA, obligate parasitized, *Cokeromyces recurvatus*

Dimargaris oblongispora B.S. Mehrotra & Baijal, Can. J. Bot. 41: 500 (1963)

India, obligate parasitized, *Mortierella*

Dimargaris simplex B.S. Mehrotra & Baijal, Zentbl. Bakt. ParasitKde, Abt. II 118: 174 (1964

India, obligate parasitized, *Mortierella* or *Mucor*

Dimargaris verticillata R.K. Benj., Aliso 4(2): 374 (1959)

USA, obligate parasitized, *Cokeromyces recurvatus* in lab

Dimargaris xerosporica (B.S. Mehrotra & Baijal) R.K. Benj., Aliso 6(1): 3 (1965)

USA, obligate parasitized, *Cokeromyces recurvatus* in lab

Dispira Tiegh.

Dispira americana Thaxt., Bot. Gaz. 20: 517 (1895)

USA, obligate parasitized, *Mucor*

Dispira cornuta Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 160 (1875)

USA, obligate parasitized, *Cokeromyces recurvatus*

Dispira implicata P.C. Misra & Lata, Mycotaxon 8(2): 372 (1979)

USA, obligate parasitized, *Chaetomium bostruchodea*

Dispira parvispora R.K. Benj., Aliso 5(3): 281 (1963)

USA, obligate parasitized, *Cokeromyces recurvatus*

Dispira simplex R.K. Benj., Aliso 4(2): 387 (1959)
Japan, obligate parasitized, *Mocur* sp. *and Circinella* sp. USA, obligate parasitized, *Chaetomium*
Tieghemiomyces R.K. Benj.
Tieghemiomyces californicus R.K. Benj., Aliso 4(2): 390 (1959)
USA, obligate parasitized, *Cokeromyces recurvatus* in lab
Tieghemiomyces parasiticus R.K. Benj., Aliso 5(1): 11 (1961)
USA, obligate parasitized, *Cokeromyces recurvatus* in lab

Dimargaritales genus *incertae sedis*
Spinalia Vuill.
Spinalia radians Vuill., Bull. Soc. Mycol. Fr. 20: 32 (1904)
France, obligate parasitized, Mucoraceae

Subphylum *MORTIERELLOMYCOTA* Tedersoo et al.
Class *Mortierellomycetes* Doweld

Mortierellales Caval.-Sm.
Mortierellaceae Luerss. 1877
Mortierella Coem.
Mortierella alpina Peyronel, I germi astmosferici dei fungi con micelio, Diss. (Padova): 17 (1913)
India, obligate parasitized, *Agaricus bisporus* (Sharma et al. 2008)
Mortierella armillariicola W. Gams, Persoonia 9(1): 128 (1976)
Netherlands, obligate parasitized, *Armillaria mellea*
Mortierella amoeboidea W. Gams, Persoonia 9(1): 116 (1976)
Germany, obligate parasitized, *Chromelosporium*
Mortierella bainieri Costantin, Bull. Soc. Mycol. Fr. 4(3): 152 (1889)
India, obligate parasitized, *Agaricus bisporus* (Gams 1977)
Mortierella crystallina Harz, Bull. Soc. Imp. Nat. Moscou 44(1): 145 (1871)
Germany, obligate parasitized, *Trametes suaveolens* (Gams 1977)
Mortierella diffluens Sorokīn, (1873)
France, Russia, obligate parasitized, *Mucor* (Gams 1977)
Mortierella nigrescens Tiegh., Annls Sci. Nat., Bot., sér. 6 4(4): 380 (1878)
France, obligate parasitized, fleshy mold (Gams 1977)
Mortierella polycephala Coem., Bull. Soc. R. Bot. Belg., sér. 2 16: 536 (1863)
France, obligate parasitized, *Polyporus perennis* (Gams 1977)
Mortierella zonata Linnem., Flora, Regensburg 130: 210 (1936)
Germany, obligate parasitized, *Gomphidius glutinosus*

Subphylum *MUCOROMYCOTA* Doweld
Class *Mucoromycetes* Doweld

Mucorales Fr.
Backusellaceae K. Voigt & P.M. Kirk
Backusella Hesselt. & J.J. Ellis
Backusella oblongielliptica (H. Nagan., Hirahara & Seshita ex Pidopl. & Milko) Walther & de Hoog, Persoonia 30: 41 (2013)
≡ *Mucor oblongiellipticus* H. Nagan., Hirahara & Seshita ex Pidopl. & Milko, Atlas Mukor. Grib. (Kiev): 81 (1971)
Japan, parasitized, basidiomycetes
Backusella circina J.J. Ellis & Hesselt., Mycologia 61: 865 (1969)
Japan, parasitized, basidiomycetes

Cunninghamellaceae Naumov ex R.K. Benj.
Absidia Tiegh.
Absidia cylindrospora Hagem, Skr. VidenskSelsk. Christiania, Kl. I, Math.-Natur.(no. 7): 45 (1908)
Italy, parasitized, *Tuber excavatum*
Absidia parricida Renner & Muskat, Planta 51: 796 (1958)
Tunisia, parasitized, *Absidia tuneta* (Hesseltine and Eills 1964)

Lentamycetaceae K. Voigt & P.M. Kirk
Lentamyces Kerst. Hoffm. & K. Voigt
Lentamyces parricidus (Renner & Muskat ex Hesselt. & J.J. Ellis) Kerst. Hoffm. & K. Voigt, Pl. Biol. 11(4): 15 (2008)
In lab, parasitized, *Mucor*
Lentamyces zychae (Hesselt. & J.J. Ellis) Kerst. Hoffm. & K. Voigt, Pl. Biol. 11(4): 15 (2008)
In lab, parasitized, *Mucor* and *Parasitella parasitica*

Mucoraceae Fr.
Chaetocladium Fresen.
Chaetocladium jonesiae (Berk. & Broome) Fresen., Beitr. Mykol. 3: 97 (1863)
Poland, parasitized, Mucorales
Dicranophora J. Schröt.
Dicranophora fulva J. Schröt., Jber. schles. Ges. vaterl. Kultur 64: 184 (1886)
Germany, parasitized, *Paxillus involutus*
Dicranophora paradoxa (Berk. & M.A. Curtis) Naumov, Opred. Mukor., Edn 2: 88 (1935)
USA, parasitized, *Boletus*
Mucor Fresen.

Mucor capitatoramosus Schwein., Trans. Am. phil. Soc., New Series 4(2): 285 (1832)
USA, parasitized, *Boletus*
Mucor circinelloides Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 94 (1875)
In Lab, parasitized, *Rhizopus nigricans*
Mucor fusiger Link, Sp. Pl., Edn 4 6(1): 93 (1824)
USA, parasitized, *Agaricus*
Mucor luteus Linnem., Flora, Regensburg 130: 195 (1936)
China, parasitized, *Amanita muscaria*, Agaricaceae
Mucor paradoxus Berk. & M.A. Curtis, Grevillea 3(no. 28): 148 (1875)
USA, parasitized, *Boletus*
Mucor ramosus Bull., Hist. Champ. Fr. (Paris) 1: 116 (1791)
USA, parasitized, *Agaricus*
Parasitella Bainier
Parasitella parasitica (Bainier) Syd., Annls Mycol. 1(4): 371 (1903)
≡ *Mucor parasiticus* Bainier, Annls Sci. Nat., Bot., sér. 6 19: 212 (1884)
Worldwide, obligate parasitized, zygomycetes
Parasitella simplex Bainier, Bull. Soc.Mycol. Fr. 19(2): 153 (1903)
Worldwide, obligate parasitized, zygomycetes

Rhizopodaceae K. Schum.
Rhizopus Ehrenb.
Rhizopus nigricans Ehrenb., Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 10: 198 (1821)
Worldwide, many fungi (Rudakov 1978)
Sporodinia Link
Sporodinia pholiotae Moruzi & Ciocan, Revue Mycol., Paris 28: 310 (1963)
Romania, parasitized, *Pholiota destruens*
Syzygites Ehrenb.
Syzygites megalocarpus Ehrenb., Sylv. Mycol. berol. (Berlin): 25 (1818)
North America, obligate parasitized, *Agaricus bisporus* Beyer et al. (2013)

Phycomycetaceae Arx
Spinellus Tiegh.
Spinellus arvernensis L. Ling, Rev. gén. Bot. 42: 738 (1930)
France, parasitized, *Mycena epipterygia*
Spinellus chalybeus (Dozy & Molk.) Vuill., Annls Mycol. 2(1): 61 (1904)
Europe, parasitized, Agarics Rudakov et al (1978)
Spinellus fusiger (Link) Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 66 (1875)
USA, parasitized, *Mycena*
Spinellus gigasporus Cooke & Massee, Grevillea 18(no. 86): 26 (1889)
France, parasitized, Agarics
Spinellus rhombosporus (Ehrenb.) Pound, Minn. Bot. Stud. 9: 96 (1894)
USA, parasitized, Agarics

Mucoromycota genus *incertae sedis*
Nothadelphia Degawa & W. Gams
Nothadelphia mortierellicola Degawa & W. Gams, Stud. Mycol. 50(2): 569 (2004)
Japan, parasitized, *Mortierella hypsicladia*

Subphylum *OLPIDIOMYCOTA* Doweld
Class *Olpidiomycetes* Doweld

Olpidiales Caval.-Sm.
Olpidiaceae J. Schröt.
Cibdelia Juel
Cibdelia infestans Juel, Ark. Bot. 19(no. 20): 9 (1925)
France, Sweden, obligate parasitized, *Volutella buxi*
Olpidiella Lagerh.
Olpidiella uredinis Lagerh., J. Bot., Paris 2: 438 (1888)
Germany, parasitized, rust fungi
Olpidium (A. Braun) Rabenh.
Olpidium indicum Turner, K. svenska Vetensk-Akad. Handl., ny följd 25(no. 5): 164 (1892)
Malaysia, obligate parasitized, *Phylctorhiza variablili*, *Rhizophlyctis fuscus*
Olpidium pseudoeuglenae S.N. Dasgupta & R. John, Bull. Bot. Surv. India 30(1-4): 5 (1990)
India, obligate parasitized, Chytrid
Olpidium synchytrii Karling, Mycologia 50(6): 944 (1959)
USA, obligate parasitized, *Synchytrium namatis*

Subphylum *ROZELLOMYCOTA* T. James & Berbee

Class *Rozellopsidales* M.W. Dick
Rozellopsidaceae M.W. Dick
Rozella Cornu
Rozella allomycis Foust, J., Elisha Mitchell Scient. Soc. 53: 197 (1937)
USA, obligate parasitized, *Allomyces arbusculus*
Rozella cladochytrii Karling, Torreya 41: 105 (1941)
USA, obligate parasitized, *Cladochytrium replicatum*
Rozella endochytrii Karling, Torreya 41: 106 (1941)
USA, obligate parasitized, *Endochytrium operculatum*
Rozella marina (Sparrow) Sparrow, Mycologia 30(4): 377 (1938)
USA, obligate parasitized, *Chytridium polysiphoniae*
Rozella parva Canter, J. Linn. Soc., Bot. 62: 275 (1969)
USA, obligate parasitized, *Zygorhizidium affluens*
Rozella polyphagi (Sparrow) Sparrow, Mycologia 30(4): 377 (1938)

USA, obligate parasitized, *Polyphagus euglenae*, *P. laevis*

Rozella rhizophlyctidis Karling, Am. J. Bot. 29: 32 (1942)

USA, obligate parasitized, *Rhizophlyctis rosea*, *Rhizophydium globosu*

Subphylum *ZOOPAGOMYCOTA* Gryganskyi et al.
Class *Zoopagomycetes* Doweld

Zoopagales Bessey ex R.K. Benj.
Piptocephalidaceae J. Schröt.
Kuzuhaea R.K. Benj.

Kuzuhaea moniliformis R.K. Benj., J. Linn. Soc., Bot. 91(1-2): 122 (1985)

Japan, obligate parasitized, *Mucor*

Piptocephalis de Bary

Piptocephalis arrhiza Tiegh. & G. Le Monn., Annls Sci. Nat., Bot., sér. 5 17: 366 (1873)

UK, obligate parasitized, Ascomycota, *Mucor* (Jeffer and Kirk 1976)

Piptocephalis benjaminii (Embree) R.K. Benj., Aliso 5(3): 284 (1963)

USA, obligate parasitized, *Mucor* in lab

Piptocephalis corymbifera Vuill., Bull. Soc. Mycol. Fr. 3: 111 (1887)

France, obligate parasitized, *Mucor rubentem* (Benny and Benjamin 1976)

Piptocephalis cruciata Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 149 (1875)

Unknown, obligate parasitized, *Mucor* (Benny and Benjamin 1976)

Piptocephalis cylindrospora Bainier, Étud. Mucor., (Thèse, Paris) (Paris): 92 (1882)

France, obligate parasitized, fungi

Piptocephalis fimbriata M.J. Richardson & Leadb., Trans. Br. Mycol. Soc. 58(2): 206 (1972)

Europe, obligate parasitized, *Mycotypha microspore* in lab

Piptocephalis formosana H.M. Ho & P.M. Kirk, Bot. Studies (Taipei) 50(1): 69 (2009)

China, obligate parasitized, *Mucor*

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France, Germany, parasitized, *Mucor* (Benny and Benjamin 1976)

Piptocephalis fusispora Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 146 (1875)

France, Germany, obligate parasitized, *Mucor* (Benny and Benjamin 1976)

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France, obligate parasitized, *Mucor* (Benny and Benjamin 1976)

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Germany, obligate parasitized, *Mucor racemous* (McDaniel and Hindal 1979)

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Pakistan, obligate parasitized, *Absidia*

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Netherlands, obligate parasitized, *Absidia ramose* and *Mucor racemosus*

Piptocephalis microcephala Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 147 (1875)

In lab, obligate parasitized, *Mucor* (Benjamin 1985)

Piptocephalis repens Tiegh. & G. Le Monn., Annls Sci. Nat., Bot., sér. 5 17: 364 (1873)

In lab, obligate parasitized, *Mortierella* (Benjamin 1985)

Piptocephalis sphaerospora Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 150 (1875)

In lab, obligate parasitized, *Chaetocladium* and *Mucor*

Piptocephalis tieghemiana Matr., Bull. Soc. Mycol. Fr. 16: 58 (1900)

Netherlands, obligate parasitized, *Mucor racemosus* (Jeffries and Young 1976)

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Mexico, obligate parasitized, *Cokeromyces recurvatus* in lab

Piptocephalis virginiana Leadb. & Mercer, Trans. Br. Mycol. Soc. 40(4): 461 (1957)

USA, obligate parasitized, *Choanephora cucurbitarum*, *Mucor hiemalis*, *Phascolomyces articulosus* in lab

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UK, obligate parasitized, *Penicillium waksmani*

Syncephalis Tiegh. & G. Le Monn.

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India, parasitized, *Thamnostylum*

Syncephalis californica W.E. Hunter & E.E. Butler, Mycologia 67(4): 863 (1975)

USA, parasitized, *Blakeslea*, *Choanephora*, *Gilbertella*, *Mucor*, *Rhizopus*, *Thamnostylum*, *Thamnidium* and *Zygorhynchus*

Syncephalis clavata H.M. Ho & Benny, Bot. Studies (Taipei) 48(3): 319 (2007)

China, parasitized, *Thamnostylum piriforme*

Syncephalis heteriformis Pasricha & Mukerji, Nova Hedwigia 44(3-4): 523 (1987)

India, parasitized, *Circinella muscae* and *C. umbellata*

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India, parasitized, *Mucor*

Syncephalis leadbeateri Bawcutt, Trans. Br. Mycol. Soc. 80(2): 220 (1983)

UK, parasitized, *Absidia coerulea*

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France, parasitized, *Mocur* (Hunter and Butler 1975)

Syncephalis nana Dade, Trans. Br. Mycol. Soc. 21(1): 21 (1937)

Africa, parasitized, *Absidia* (Hunter and Butler 1975)

Syncephalis nigricans Tiegh., Annls Sci. Nat., Bot., sér. 6 4(4): 387 (1878)

Europe, parasitized, *Mucor* (Hunter and Butler 1975)

Syncephalis obconica Indoh, Sci. Rep. Tokyo Kyoiku Daig., Sect. B 11(no. 160): 17 (1962)

Japan, parasitized, *Cunninghamella echinulata* and *Mucor*

Syncephalis pendula Tiegh., Annls Sci. Nat., Bot., sér. 6 4(4): 388 (1878)

Europe, parasitized, *Absidia repens* (Hunter and Butler 1975)

Syncephalis penicillata Indoh, Sci. Rep. Tokyo Kyoiku Daig., Sect. B 11(no. 160): 8 (1962)

Japan, parasitized, *Cunninghamella echinulata* and *Mucor* (Melo et al. 2016)

Syncephalis pygmae M.S. Patil & B.J. Patil, Indian Phytopath. 47(3): 222 (1994)

India, parasitized, *Thamnostylum piriforme*

Syncephalis rapacea Indoh, Sci. Rep. Tokyo Kyoiku Daig., Sect. B 11(no. 160): 6 (1962)

Japan, parasitized, *Absidia*, *Mucor*, *Zygorhynchus*

Syncephalis reflexa Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 134 (1875)

Japan, parasitized, *Mucor*

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India, parasitized, *Mucor hiemalis*

Syncephalis sphaerica Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 125 (1875)

USA, parasitized, ascomycete

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China, parasitized, *Mucor*

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India, parasitized, *Thamnostylum piriforme*

Syncephalis tetrathela Tiegh., Annls Sci. Nat., Bot., sér. 6 1: 134 (1875)

Unknown, parasitized, *Mucor* (Benny et al. 2016)

Syncephalis trispora B.S. Mehrotra & R. Prasad, Sydowia 21(1-6): 125 (1968)

India, parasitized, *Mortierella ambigua* (Patil and Patil 1994)

Syncephalis truncata Boedijn, Sydowia 12(1-6): 353 (1959)

Java, Indonesia, parasitized, *Pilobolus* (Benny et al. (2016)

Syncephalis ubatubensis Viégas & Teixeira, Bragantia 3: 243 (1943)

Brazil, parasitized, entomogenous fungus (Benny et al. (2016)

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India, parasitized, *Cunninghamella*

Sigmoideomycetaceae Benny, R.K. Benj. & P.M. Kirk

Reticulocephalis Benny, R.K. Benj. & P.M. Kirk

Reticulocephalis clathroides (Bayl. Ell.) Benny, R.K. Benj. & P.M. Kirk, Mycologia 84(5): 638 (1992)

USA, parasitized, coprophilic fungi

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China, parasitized, *Basidiobolus ranarum*

Zoophagus Sommerst.

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