Fungal Diversity (2018) 90:1–84
https://doi.org/10.1007/s13225-018-0398-4

Biodiversity of fungi on *Vitis vinifera* L. revealed by traditional and high-resolution culture-independent approaches

Ruvishika S. Jayawardena[1,2,3] · Witoon Purahong[4] · Wei Zhang[1,3] · Tesfaye Wubet[4,5] · XingHong Li[1,3] · Mei Liu[1,3] · Wensheng Zhao[6] · Kevin D. Hyde[2] · JianHua Liu[1] · Jiye Yan[1,3]

Received: 17 November 2017 / Accepted: 26 February 2018 / Published online: 14 March 2018

Abstract

This study is unique as it compares traditional and high-resolution culture-independent approaches using the same set of samples to study the saprotrophic fungi on *Vitis vinifera*. We identified the saprotrophic communities of table grape (Red Globe) and wine grape (Carbanate Gernischet) in China using both traditional and culture-independent techniques. The traditional approach used direct observations based on morphology, single spore isolation and phylogenetic analysis yielding 45 taxa which 19 were commonly detected in both cultivars. The same set of samples were then used for Illumina sequencing which analyzed ITS1 sequence data and detected 226 fungal OTUs, of which 176 and 189 belong to the cultivars Carbanate Gernischet and Red Globe, respectively. There were 139 OTUs shared between the two *V. vinifera* cultivars and 37 and 50 OTUs were specific to Carbanate Gernischet and Red Globe cultivars respectively. In the Carbanate Gernischet cultivar, Ascomycota accounted for 77% of the OTUs and in Red Globe, almost all sequenced were Ascomycota. The fungal taxa overlap at the genus and species level between the traditional and culture-independent approach was relatively low. In the traditional approach we were able to identify the taxa to species level, while in the culture-independent method we were frequently able to identify the taxa to family or genus level. This is remarkable as we used the same set of samples collected in China for both approaches. We recommend the use of traditional techniques to accurately identify taxa. Culture-independent method can be used to get a better understanding about the organisms that are present in a host in its natural environment. We identified primary and secondary plant pathogens and endophytes in the saprotrophic fungal communities, which support previous observations, that dead plant material in grape vineyards can be the primary sources of disease. Finally, based on present and previous findings, we provide a worldwide checklist of 905 fungal taxa on *Vitis* species, which includes their mode of life and distribution.

Keywords Checklist · Grapevine · Mycobiome · Next generation sequencing · Pathogens · Saprotrophs

Introduction

Vitis (family *Vitaceae*) is a plant genus that includes the economically important grapes, and thus because of its importance, its pathogens have received a considerable amount of attention during the past decade (Yan et al. 2015; Chethana et al. 2017). The importance of this fruit is associated with its multiple uses; as a source of nutrition, health and medicinal value, as well as its high economical significance (Dohadwala and Vita 2009; Bokulich et al. 2014). About 90% of cultivated grapes in the world are *V. vinifera*, which comprises wine, as well as table grapes. This genus comprises 79 accepted species of perennial woody and herbaceous vines. There are thousands of cultivars of *V. vinifera* that has been grown successfully around the globe (Terral et al. 2009). Species of *Vitis* are valued for their decorative foliage providing ornamental value for the genus. Their ability to cover walls and arches, as well as providing shade has made them important in domestic cultivation.

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s13225-018-0398-4) contains supplementary material, which is available to authorized users.

Ruvishika S. Jayawardena, Witoon Purahong and Wei Zhang have equally contributed to this study.

✉ Jiye Yan
jiyeyan@vip.163.com

Extended author information available on the last page of the article

Numerous diseases of grapes have been identified which reduce the yield and quality of this fruit crop (Úrbez-Torres et al. 2009). Among various pathogens known on grapevine, the damage caused by fungi is significant (Úrbez-Torres 2011). Most studies on fungal pathogens in grape have focused on their pathogenic phase, which relies on direct observation and isolations of fungal pathogens from infected grape material. Fungi that may live within the host tissue are known as endophytes and are considered to cause symptomless infections (Lane and Kirk 2012). Plant pathogenic fungi can survive by changing their biotrophic mode from pathogenic to saprotrophic or at least can remain dormant on the decaying plant materials and become active when suitable conditions for infection exist (Hoppe et al. 2016; Purahong et al. 2018). For example, *Botrytis cinerea* causing gray mold disease in grape is able to live as a parasite in green tissues and as a saprotroph in dead plant material (Armijo et al. 2016). Unfortunately, our knowledge on saprotrophic fungal community associated with *V. vinifera* is limited, especially those obtained by high-resolution culture-independent techniques. The percentage of potential fungal pathogens hidden in saprotrophic community is still unclear.

Saprotrophs are organisms that derive nourishment from dead or decaying organic matter (Hyde et al. 2007). Saprotrophs are heterotrophic organisms that break down the complex compounds of dead organisms (Deighton 2016). They play an important role as decomposers of dead organic matter in natural ecosystems by releasing enzymes from hyphal tips (Duarte et al. 2006; Bucher et al. 2004). Saprotrophic fungi can be either macrofungi (*Agaricus* sp., *Phallus* sp.) (García et al. 1998) or microfungi (*Aspergillus* sp., *Dothiorella* sp., *Mucor* sp., *Neomassaria* sp., *Rhizopus* sp.) (Vohník et al. 2011; Hyde et al. 2016). Hyde et al. (2007) and Purahong et al. (2018), provided evidence that some plants accommodate large numbers of saprotrophic taxa and that some might be host- or organ-specific. Other than being decomposers, saprotrophs can also provide other eco-system services, such as soil formation, defence against pathogens, as a food source and modification of pollutants (Deighton 2016). Promputtha et al. (2007, 2010) provided evidence that not only fungal pathogens, but also fungal endophytes, can switch lifestyles to saprotrophs. Thus, the study of saprotrophic fungal communities associated with *V. vinifera* can provide information on strict saprotrophism as well as potential endophytes and pathogens with saprotrophic ability.

Fungal species identification has traditionally been based on direct observation, microscope examination, culture dependent isolation and phylogenetic analysis (Cai et al. 2011; Hyde et al. 2010, 2017; Rastogi and Sani 2011; Fadrosh et al. 2014, Tibpromma et al. 2017). Such studies have investigated the microbial ecology of various environments (Rastogi and Sani 2011). However, it has been recognized that the actual number of microbes in nature, often exceed the number of microbes identified by traditional methods (Fadrosh et al. 2014). Traditional approaches rely on growing the organisms in media, but many of the microbes in the environment may not be cultivatable (Stewart 2012). Artificial medium typically allows growth of only a small fraction of, often fast growing organisms. Therefore, traditional techniques do not provide a total community resolution (Hoppe et al. 2016).

During the past decade, microbial research made a shift from phylogenetic analyses to experimental characterization of communities through the use of complex experimental designs (Kozich et al. 2013). This shift focused on relatively inexpensive next-generation sequencing approaches (NGS) and powerful bio-informatics tools to analyse the microbial ecology (Carraro et al. 2011; Rastogi and Sani 2011). High-throughput DNA sequencing allows us to understand the presence of microbes and how their communities are structured in complex ecosystems. Microbiome analysis is a culture-independent technique which requires a low quantity of sample, but with a high sequencing depth. The term microbiome refers to the entire habitat including the microorganisms, their genomes and the surrounding environment. It is characterized by the application of one or combinations of metagenomics, metabonomics, metatranscriptomics and metaproteomics (Marchesi and Ravel 2015). Analysis of the plant microbiome involves linking microbial ecology and the plants biology and functions, and at the same time viewing microorganisms as a reservoir of additional genes and functions for their host (Vandenkoornhuyse et al. 2015). Mycobiome refers to the fungal component in a habitat (Underhill and Iliev 2014). However, these techniques may also have disadvantages. For example, the conditions that we select to do the PCR can give us biased results. Sometimes it is difficult to understand whether the fungi identified by this technique actually exist in the natural system (Mitchell and Zuccaro 2006). Therefore, in order to obtain a better resolution in species identification, richness and distribution patterns of microbes, a combination of both approaches (i.e. traditional and culture-independent) are needed. However, we are aware of no studies that have been conducted using both these approaches.

There have been many studies of major pathogens from *Vitis* using both morphology and phylogeny (Úrbez-Torres et al. 2012, 2013a, b; Dissanayake et al. 2015; Jayawardena et al. 2015, 2016a; Chethana et al. 2017). Even though a number of sexual and asexual fungi have been reported on *Vitis* species, updated information of the taxa present in this genus is lacking. Only some have good illustrations and gene sequence data. Our knowledge on saprotrophic fungal communities associated with *V. vinifera* is limited and data based on high-resolution culture-independent technique is lacking. Besides the percentage of potential fungal pathogens hidden in saprotrophic community is still unknown.

In this study, we aim to (i) provide taxonomic information on the saprotrophic microfungi collected from China, Italy, Thailand and Russia, (ii) compare traditional and culture-independent approaches for characterizing the saprotrophic fungal communities associated with two cultivars of *V. vinifera* in China, (iii) quantify plant pathogens and endophytes hidden in the saprotrophic fungal community and (iv) provide a worldwide checklist for the fungi on *Vitis* species based on previous and current research.

Materials and methods

Study site, sampling and isolation of fungi

Fungal species associated with *Vitis* sp. were collected from China (Beijing, Sichuan and Yunnan Province), Italy (Province of Forlì-Cesena), Russia (Rostov Region) and Thailand (Chiang Sean) (Tables 1, 2). Shoots, leaves, inflorescences, bark and root samples of *Vitis vinifera* were used for isolation. The same set of samples from Beijing (Red Globe cultivar) and Yunnan Province (Carbanate Gernischet cultivar) were used for the mycobiome analysis to establish the fungal communities (Fig. 1). The sample sets were randomly split into two subsamples to employ the two approaches at the same time. Specimens were incubated in a moist chamber for 3–7 days at 25 °C, if they did not sporulate. Fungi were isolated by a modified single spore/conidial isolation method (Chomnunti et al. 2014) from the samples. Growth rate, colony characteristics and sexual/asexual morph morphology were determined from cultures grown on potato-dextrose agar (PDA) at 25 °C, under 12 h light/12 h dark. Fungal mycelia and spores were examined by differential interference contrast (DIC) and photographed with an axio Imager Z2 photographic Microscope (Carl Zeiss Microscopy, Germany) (Supplementary Figs. S1a–S1d, S2). Forty conidial measurements were taken for each isolate. All microscopic measurements were recorded with ZeM PRo 2012 software. Representative herbariums are deposited in the herbarium of Mae Fah Luang University, Chiang Rai, Thailand (MFU) and in Kunming, China (KIB). Representative cultures were deposited at Mae Fah Luang Culture Collection (MFLUCC), Beijing Academy of Agriculture and Forestry Sciences, China (JZB) and Kunming Culture Collection (KUMCC).

DNA extraction, PCR amplification, sequencing and phylogenetic analysis

The methods used are presented in detail in Jayawardena et al. (2018).

Culture-independent approach: mycobiome analysis

Two cultivars were selected for this analysis; Red Globe being the table grape cultivar and Carbanate Gernischet being the Wine grape cultivar. Samples of Red Globe (RG) were collected from Yanqin District of Beijing while samples of Carbanate Gernischet (CG) were collected from Yunnan Province were used for this analysis. For each cultivar, three representative grapevine plants were sampled. The root, bark, shoot, inflorescence and leaves were homogenized and sub-sampled. For culture-independent technique of fungal communities, total DNA extraction was performed using 1 g of ground specimens using 2× CTAB method. All the DNA samples were quantitated and quality checked with the NanoDrop ND-2000C spectrophotometer (ThermoFisher Scientific, Dreieich, Germany). DNA extracts were then stored at − 20 °C for further analysis. For fungal Illumina sequencing, we targeted the Internal Transcribed Spacer 1 (ITS1) region of ribosomal RNA gene cluster. ITS1 was amplified with the forward primer ITS5-1737 (GGAAGTAAAAGTCGTAACAAGG) and reverse primer ITS2-2043R (GCTCGCTTCTTCATCGATGC) (White et al. 1990). The PCR reaction was performed in a 50 ml volume that contained approximately 10 ng of DNA, ExTaq buffer, 0.2 mM of dNTPs, 0.2 mM of each primer, and 2 units of ExTaq DNA polymerase. The cycling consisted of an initial denaturing at 94 °C for 30 s, followed by 25 cycles of denaturing at 94 °C for 30 s, annealing at 54 °C for 1 min and extension at 72 °C for 2 min, and a final extension at 72 °C for 8 min. All PCR reactions were carried out with Phusion® High-Fidelity PCR Master Mix (New England Biolabs Inc. Ipswich, MA, USA). The PCR products were mixed with same volume of 1× loading buffer (contained SYB green) and then operated electrophoresis on 2% agarose gel for quality detection. Only samples with bright main strip between 400–450 bp were chosen for further experiments. The qualified PCR products were mixed in equidensity ratios. Then, mixture PCR products were purified with Qiagen Gel Extraction Kit (Qiagen, Germany) following the manufacture's protocol.

Sequencing libraries were generated using TruSeq® DNA PCR-Free Sample Preparation Kit (Illumina, San Diego, CA, USA) following manufacturer's recommendations and index codes were added. The library quality was

Table 1 Taxa identified in China, Russia, Italy and Thailand by directly observing specimens

Family	Species	Country
Amorosiaceae	*Angustimassarina populi*	Italy
Botryosphaeriaceae	*Botryosphaeria dothidea*	China, Italy
Botryosphaeriaceae	*Diplodia seriata*	Italy
Botryosphaeriaceae	*Dothiorella iberica*	Italy
Botryosphaeriaceae	*Dothiorella sarmentorum*	China, Italy
Botryosphaeriaceae	*Neofusicoccum italicum*	Italy
Botryosphaeriaceae	*Neofusicoccum parvum*	Italy
Cantharellales Incertae sedis	*Minimedusa* sp.	China
Chaetomiaceae	*Chaetomium globosum*	Italy
Chaetosphaeriaceae	*Pseudolachnea hispidula*	Italy
Cladosporiaceae	*Cladosporium cladosporioides*	China, Italy
Cladosporiaceae	*Cladosporium cucumerinum*	Italy
Diaporthaceae	*Diaporthe ampelina*	Italy
Diaporthaceae	*Diaporthe rudis*	Italy
Diaporthaceae	*Diaporthe eres*	China
Diatrypaceae	*Cryptovalsa ampelina*	Italy
Didymellaceae	*Didymella negriana*	Italy
Didymellaceae	*Didymella pomorum*	China
Didymellaceae	*Epicoccum nigrum*	Italy
Didymosphaeriaceae	*Pseudocamarosporium propinquum*	Italy
Glomerellaceae	*Colletotrichum dematium*	Russia
Glomerellaceae	*Colletotrichum godetiae*	Italy
Glomerellaceae	*Colletotrichum hebeiense*	China
Glomerellaceae	*Colletotrichum siamense*	Italy
Glomerellaceae	*Colletotrichum viniferum*	China
Glomerellaceae	*Colletotrichum truncatum*	China
Hypocreaceae	*Trichoderma atroviride*	China
Hypocreaceae	*Trichoderma lixii*	China
Hypocreaceae	*Trichoderma harzianum*	China
Hypocreales genera insertae sedis	*Alfaria cyperi-esculenti*	Italy
Hypocreales genera insertae sedis	*Alfaria vitis*	Italy
Lophiostomataceae	*Lophiostoma macrostomum*	Italy
Massariaceae	*Neomassaria fabacearum*	Italy
Mucoraceae	*Actinomucor elegans*	China
Mucoraceae	*Mucor racemosus*	China
Mucoraceae	*Mucor circinelloides*	China
Mycosphaerellaceae	*Pseudocercospora vitis*	Thailand
Peniophoraceae	*Peniophora* sp.	China
Sporocadaceae	*Neopestalotiopsis clavispora*	China
Sporocadaceae	*Neopestalotiopsis vitis*	China
Sporocadaceae	*Pestalotiopsis chamaeropis*	Italy
Sporocadaceae	*Pestalotiopsis* sp.	Italy
Sporocadaceae	*Pseudopestalotiopsis camelliae-sinensis*	Italy
Pleosporaceae	*Alternaria alternata*	China, Italy
Pleosporaceae	*Alternaria italic*	Italy
Pleosporaceae	*Alternaria vitis*	China
Pleosporaceae	*Bipolaris maydis*	China
Pythiaceae	*Pythium* sp.	China
Saccotheciaceae	*Aureobasidium pullulans*	Italy
Schizoparmaceae	*Coniella vitis*	China

Table 1 continued

Family	Species	Country
Sclerotiniaceae	*Botrytis cinerea*	China
Sporocadaceae	*Seimatosporium vitis*	Italy
Stachybotryaceae	*Albifimbria verrucaria*	China
Stachybotryaceae	*Albifimbria viridis*	China
Teichosporaceae	*Floricola viticola*	Italy
Aspergillaceae	*Aspergillus aculeatus*	China
Aspergillaceae	*Aspergillus niger*	China
Aspergillaceae	*Penicillium brevicompactum*	China
Aspergillaceae	*Penicillium citrinum*	China
Aspergillaceae	*Penicillium terrigenum*	China
Rhizopodaceae	*Rhizopus oryzae*	China
Trichocomaceae	*Talaromyces amestolkiae*	China
Trichocomaceae	*Talaromyces pinophilus*	China
Trichocomaceae	*Talaromyces purpureogenus*	China
Xylariaceae	*Neoanthostomella viticola*	Italy

assessed on the Qubit® 2.0 Fluorometer (Thermo Scientific) and Agilent Bioanalyzer 2100 system. At last, the library was sequenced on an IlluminaHiSeq2500 platform and 250 bp paired-end reads were generated.

Paired-end reads were assigned to samples based on their unique barcode and truncated by cutting off the barcode and primer sequence. Paired-end reads were merged using FLASH (V1.2.7, http://ccb.jhu.edu/software/FLASH/) (Magoč and Salzberg 2011). Quality filtering on the raw tags was performed under specific filtering conditions to obtain the high-quality clean tags (Bokulich et al. 2013) according to the QIIME (V1.7.0, http://qiime.org/index.html) quality controlled process (Caporaso et al. 2010). The tags were compared with the reference database (Unite Database, https://unite.ut.ee/) using UCHIME algorithm (UCHIME Algorithm, http://www.drive5.com/usearch/manual/uchime_algo.html) to detect chimera sequences (Edgar et al. 2011), and then the chimera sequences were removed (Haas et al. 2011). Then the Effective Tags were finally obtained. Sequences analysis was performed by Uparse software (Uparse v7.0.1001, http://drive5.com/uparse/) (Edgar 2013). Sequences with $\geq$ 97% similarity were assigned to the same OTUs. Representative sequence for each OTU was screened for further annotation. For each representative sequence, the Unite Database (https://unite.ut.ee/) (Kõljalg et al. 2013) was used to annotate taxonomic information based on Blast algorithm, which was calculated by QIIME software (Version 1.7.0) (http://qiime.org/scripts/assign_taxonomy.html). In order to study phylogenetic relationship of different OTUs, and the difference of the dominant species in different samples (groups), multiple sequence alignment were conducted using the MUSCLE software (Version 3.8.31, http://www.drive5.com/muscle/) (Edgar 2004).

All OTU abundance information was normalized using a standard of sequence number corresponding to the sample with the least sequences (45, 246 sequences). From the data set, rare OTUs (singletons), which could have potentially originated from sequencing errors (Kunin et al. 2010), were removed. We used a Mantel test based on Bray–Curtis distance measure with 999 permutations to assess the correlation between the whole matrix and a matrix excluding the rare OTUs (Hammer et al. 2001; Hoppe et al. 2016). The results indicated that the removal of rare OTUs from the fungal communities had no effect ($R_{\text{Mantel-}} = 1.000$, $P = 0.002$). Subsequent analysis of alpha diversity and community composition were all performed basing on these normalized rare OTUs removal data. The fungal ITS rDNA genes Illumina sequencing data are deposited in the NCBI under the BioProject No PRJNA437133.

Statistical analysis

Mycobiome analysis

All datasets related to fungal OTU richness were tested for normality and equality of variances using the Jarque–Bera test. To assess the coverage of the sequencing depth, individual rarefaction analysis was performed for each sample using the “diversity” function in PAST (Hammer et al. 2001). In this work we used observed fungal OTU richness and Shannon diversity index as the measures for fungal diversity. The difference in fungal OTU richness between the two deadwood species was compared using a two-sample t test in PAST. To visualize the fungal community compositions, we used non-metric multidimensional scaling (NMDS) analysis based on the Bray–Curtis dissimilarity index calculated PAST. Similarity

Table 2 Taxa identified from the two grape cultivars and their life modes using the traditional approach

Species	Family	Life Mode	References
Actinomucor elegans var. *meitauzae*	*Mucoraceae*	Saprotroph	Zheng and Liu (2005)
Albifimbria viridis	*Stachybotryaceae*	Saprotroph	Lombard et al. (2016)
Albifimbria verrucaria	*Stachybotryaceae*	Saprotroph	Lombard et al. (2016)
Alternaria alternata	*Pleosporaceae*	Pathogen, endophyte, saprotroph	French (1989), Mulenko et al. (2008), Kakalikova et al. (2009), Gonzalez and Tello (2011)
Alternaria vitis	*Pleosporaceae*	Pathogen, endophyte, saprotroph	Zhang (2003), Zhuang (2005)
Aspergillus aculeatus	*Aspergillaceae*	Secondary pathogen, saprotroph	Jarvis and Traquair (1984)
Aspergillus niger	*Aspergillaceae*	Secondary pathogen, endophyte, saprotroph	Bobev (2009), Casieri et al. (2009), Gonzalez and Tello (2011)
Bipolaris maydis	*Pleosporaceae*	Saprotroph	Manamgoda et al. (2014)
Botryosphaeria dothidea	*Botryosphaeriaceae*	Pathogen, endophyte, saprotroph	Úrbez-Torres et al. 2012, 2013a, b
Botrytis cinerea	*Sclerotiniaceae*	Pathogen	Piqueras et al. (2014), Saito et al. (2016)
Cladosporium cladosporioides	*Cladosporiaceae*	Pathogen, endophyte, saprotroph	Swett et al. (2016)
Cladosporium sp.	*Cladosporiaceae*	Pathogen, endophyte, saprotroph	Swett et al. (2016)
Clonostachys rosea	*Bionectriaceae*	Pathogen, endophyte, saprotroph	Casieri et al. (2009)
Colletotrichum hebeiense	*Glomerellaceae*	Pathogen	Yan et al. (2015)
Colletotrichum truncatum	*Glomerellaceae*	Pathogen	Pan et al. (2016)
Colletotrichum viniferum	*Glomerellaceae*	Pathogen	Peng et al. (2013)
Coniella vitis	*Schizoparmaceae*	Pathogen	Chethana et al. (2017)
Diaporthe eres	*Diaporthaceae*	Pathogen	Bastide et al. (2017)
Didymella pomorum	*Didymellaceae*	Saprotroph	Cook and Dubé (1989)
Dothiorella sarmentorum	*Botryosphaeriaceae*	Pathogen	Carlucci et al. (2015)
Epiccocum nigrum	*Didymellaceae*	Saprotroph	Casieri et al. (2009)
Exserohilum rostratum	*Pleosporaceae*	Saprotroph	Ariyawansa et al. (2015)
Fusarium oxysporum	*Nectriaceae*	Pathogen	Gonzalez and Tello (2011)
Fusarium sp.	*Nectriaceae*	Pathogen	Gonzalez and Tello (2011)
Minimedusa sp.	*Cantharellales incertae sedis*	Saprotroph	Beale and Pitt (1990)
Mucor racemosus	*Mucoraceae*	Secondary pathogen	Gonzalez and Tello (2011)
Mucor circinelloides	*Mucoraceae*	Secondary pathogen	Gonzalez and Tello (2011)
Neopestalotiopsis clavispora	*Sporocadaceae*	Saprotroph	Maharachchikumbura et al. (2015)
Neopestalotiopsis vitis	*Sporocadaceae*	Pathogen	Jayawardena et al. (2015, 2016a, b)
Paraphoma chrysanthemicola	*Pleosporales incertae sedis*	Saprotroph	Hofstetter et al. (2012)
Penicillium brevicompactum	*Aspergillaceae*	Secondary pathogen	Kim et al. (2007)
Penicillium citrinum	*Aspergillaceae*	Secondary pathogen	Kim et al. (2007)
Penicillium terrigenum	*Aspergillaceae*	Secondary pathogen	Kim et al. (2007)
Peniophora sp.	*Peniophoraceae*	Saprotroph	Torrejón (2013)
Phoma medicaginis	*Didymellaceae*	Saprotroph	Weber et al. (2004)

Table 2 (continued)

Species	Family	Life Mode	References
Pythium amasculinum	*Pythiaceae*	Pathogen	Uzuhashi et al. (2010)
Rhizopus oryzae	*Rhizopodaceae*	Secondary pathogen	Gonzalez and Tello (2011)
Septoriella allojunci	*Dothideomycetes incetae sedis*	Saprotroph	Li et al. (2015)
Stagonosporopsis sp. 1	*Didymellaceae*	Saprotroph	Hofstetter et al. (2012)
Stagonosporopsis sp.2	*Didymellaceae*	Saprotroph	Hofstetter et al. (2012)
Talaromyces pinophilus	*Trichocomaceae*	Saprotroph	Yilmaz et al. (2014)
Talaromyces purpurogenus	*Trichocomaceae*	Saprotroph	Yilmaz et al. (2014)
Talaromyces amestolkiae	*Trichocomaceae*	Saprotroph	Yilmaz et al. (2014)
Trichoderma atroviride	*Hypocreaceae*	Saprotroph	Gonzalez and Tello (2011)
Trichoderma harzianum	*Hypocreaceae*	Saprotroph	Gonzalez and Tello (2011)
Trichoderma lixii	*Hypocreaceae*	Saprotroph	Gonzalez and Tello (2011)

Percentages (SIMPER) analysis using PAST was used to obtain the identity and relative abundances of the fungal taxa that contributed to 92.92% of the observed pair-wise variation in the fungal community composition due to different *V. vinifera* cultivars. To accounting for the effect of locations when compared the fungal community compositions of the two grape cultivars which were collected from different locations, we eliminated all location specific fungal OTUs (87 OTUs). We finally retained 139 OTUs for the community composition analysis using NMDS based on the Bray–Curtis dissimilarity. The results from these reduced datasets were highly consistent compared with the total datasets (Supplementary Fig. S3a, b). Potential fungal functional groups were identified using the online Guilds application tool: FUNGuildb (Nguyen et al. 2015). The ITS1 fragments were extracted from both the Sanger sequencing (traditional) and Illumina sequencing datasets using ITS1. The output showed that both datasets have the ITS1 region except culture sequences of the genus *Neopestalotiopsis* (9 sequences). The sequence similarity based comparison was performed using the cd-hit-est-2d algorithm at 90% similarity level for a genus level comparison.

Diversity analysis

Taxa were recorded as either present or absent from each sample. Occurrence of a fungus was designated based on the presence of a particular fungus on the host samples. Percentage occurrence of a taxon on one sample was calculated using the following formula (Tsui et al. 2001; Yanna and Hyde 2002; Wang et al. 2008):

$$\text{Percent occurrence of a taxon A (\%)} = \frac{\text{Occurrence of taxon A}}{\text{Occurrence of all taxa in one sample}} \times 100$$

$$\text{Species richness} = \text{the number of different species represented in an ecological community}$$

Following diversity indices were calculated using the R software for the two cultivars and the habits.

(i) $\text{Shannon–Wiener's Index (H)} = \sum p_i \ln p_i,$

where p_i is the frequency of fungal species I occurring on a specific sample (Begon et al. 1993; Wong and Hyde 2001; Wang et al. 2008).

(ii) $\text{Sørensen's index of similarity (S)} = 2c/(a+b),$

where a is the total number of species on host A, b is the total number of species on host B and c is the number of species on both host. Similarity is expressed with values between 0 (no similarity) and 1 (absolute similarity) (Wang et al. 2008).

Compiling the checklist

The checklist is based on, articles in referred journals, Index to Saccardo's Sylloge fungorum, Petrak's Lists, Index of Fungi, graduate student theses, books, and web-based resources such as annual reports on this host and the SMML database (https://nt.ars-grin.gov/fungaldatabases/)

Fig. 1 Dead *V. vinifera* samples at collection sites

(latest accessed 14-9-2017). The mode of life, such as pathogen, endophyte or saprotroph is listed. The checklist includes species names, family, life modes, disease name if any and locality. The current name is used according to Index Fungorum (2018) and Wijayawardene et al. (2017) and the classification follows Wijayawardene et al. (2018). Genera and species are listed in alphabetical order. Identification confirmed by molecular data is marked with an asterisk (*). In some cases, the host name given in the original citation was changed to be consistent with current taxonomy. In a few cases, neither the species cited nor a proper synonym was identified and the species name was used as originally cited.

Results

Species identified from fresh collections based on morphology and phylogeny (traditional method)

Fungal saprophytic diversity and community composition of the two grape cultivars: traditional method

Examination of decaying leaves, shoots, inflorescence, berries, root and bark of two cultivars of *V. vinifera* from China yielded 461 collections for the Red Globe variety and 180 collections for Carbanate Gernischet. The Red Globe variety had higher species richness (41) than the Carbanate Gernischet variety (23), however the Shannon diversity was not significantly different (Table 3). The majority of the culturable saprotrophic fungi were ascomycetes. However, there were two species belonging to Agaricomycetes and one species belonging to *Oomycota incertae sedis*. Thirty genera and 45 taxa were identified based on morphology and phylogenetic sequence data. From the identified isolates, 32.6% were Sordariomycetes, 26.1% Dothideomycetes 19.7% Eurotiomycetes, 6.5% Mucoromycetes, 4.4% Agaricomycetes, 2.2% Leotiomycetes and 2.2% of *Oomycota incertae sedis*. There were four taxa belonging to Zygomycota *incertae sedis*, which we were unable to identify. The identified Sordariomycetes belonged to *Bionectriaceae* (6.7%), *Diaporthaceae* (6.7%), *Glomerellaceae* (20%), *Hypocreaceae* (20%), *Nectriaceae* (13.3%), *Schizoparmaceae* (6.7%), *Stachybotryaceae* (13.3%) and *Sporocadaceae* (13.3%). Dothideomycete isolates belonged to *Botryosphaeriaceae* (16.7%), *Cladosporiaceae* (16.7%), *Didymellaceae* (33.3%) and *Pleosporaceae* (33.3%). The rest of the isolates belong to *Mucoraceae* (6.5%), *Peniophoraceae* (2.2%), *Pythiaceae* (2.2%), *Rhizopodaceae* (2.2%), *Sclerotiniaceae* (2.2%) and *Trichocomaceae* (17.4%). Among those 45 taxa, we found 19 species that were common on both cultivars: *Actinomucor elegans*, *Alternaria alternata*, *Aspergillus niger*, *A. aculeatus*, *Cladosporium cladosporioides*, *Cladosporium* sp., *Clonostachys rosea*, *Coniella vitis*, *Diaporthe eres*, *Fusarium oxysporum*, *Mucor racemosus*, *Penicillium terrigenum*, *Phoma medicaginis*, *Rhizopus oryzae*, *Talaromyces amestolkiae*, *T. pinophilus*, *T. purpurogenus* and *T. harzianum*. The Sørensen's index of similarity of the two grape cultivars was 0.58. We have identified 45 taxa to species level, although in six cases the identification is only to genus level due to lack of enough molecular data. Taxa were identified using both morphology and molecular techniques. Identified species are listed in Tables 1 and 2 (Supplementary Figs. S1a–d, S2).

Fungal saprophytic diversity and community composition of the two grape cultivars: culture-independent technique

Bioinformatics processing of the sequence data sets

A total of 638,146 quality-filtered fungal ITS reads were obtained after removal of chimeric and the unique tag (3703 sequences) sequences. After normalizing all data sets to a smallest sequence read (45, 246 sequences) and removing all rare taxa, the final analyse data sets contained 226 fungal OTUs. Phylogenetic trees for the top 20 species in different samples of the two cultivars Carbanate Gernischet and Red Globe of *Vitis vinifera* are given in Fig. 2. With the high number of sequence reads per sample obtained in this study, the sample-based rarefaction curves almost reached saturation for all samples (Fig. 3a). We used the observed OTU richness and Shannon diversity directly for further analyses.

Table 3 Richness and diversity (mean ± SD, n = 3) of fungi detected in the two *Vitis vinifera* cultivars

	RG	CG
Species richness	41	23
Shannon	2.5433 ± 0.251	2.4743 ± 0.187

Fungal saprotrophic OTU diversity and distribution in the two cultivars of *Vitis vinifera*

Diverse fungi colonized the debris samples derived from Carbanate Gernischet and Red Globe cultivars. Fungal OTU richness was not significantly different between the two *V. vinifera* cultivars tested in this study, ranging from 122–137 (127.33 ± 4.84 (mean ± SD); Carbanate Gernischet) and 116–141 (126.33 ± 7.54 (mean ± SD); Red Globe) ($t = 0.11$, $P = 0.916$). Shannon diversity also showed a similar trend ranging from 1.98–2.35 (2.16 ± 0.11 (mean ± SD); Carbanate Gernischet) and 1.78–1.98 (1.86 ± 0.06 (mean ± SD); Red Globe) ($t = 2.41$, $P = 0.07$). In total we detected 226 fungal OTUs with 176 and 189 belonging to the cultivars Carbanate Gernischet and Red Globe, respectively. There were 139 Fungal OTUs shared between the two *V. vinifera* cultivars and 37 and 50 OTUs were specific to Carbanate Gernischet and Red Globe cultivars. When we took each replicate into account, we detected only moderate proportion of fungal OTUs shared across different replicates (31–44%, 51 OTUs, Fig. 3b). Distributions of fungal OTUs across replicates for the two cultivars and for each specific cultivar are shown in Fig. 3b–d.

Fungal saprophytic community composition: culture-independent technique

The NMDS ordination plot and SIMPER analysis revealed distinct fungal communities in the two cultivars of *V. vinifera* samples (Table 4 and Supplementary Fig. S3a, b). Overall, fungal community composition of the two cultivars had the overall average dissimilarity of 94.29% (based on Bray–Curtis distance measure) and 30 fungal OTUs mostly responsible for differences in fungal community composition were all together accounting for 94.41% of the overall average dissimilarity (Table 4). The difference in fungal community composition between the two cultivars of *V. vinifera* was detected across different taxonomic levels (Supplementary Figs. S4, S5).

In Carbanate Gernischet, members of Ascomycota were commonly detected accounting for 77% (46%

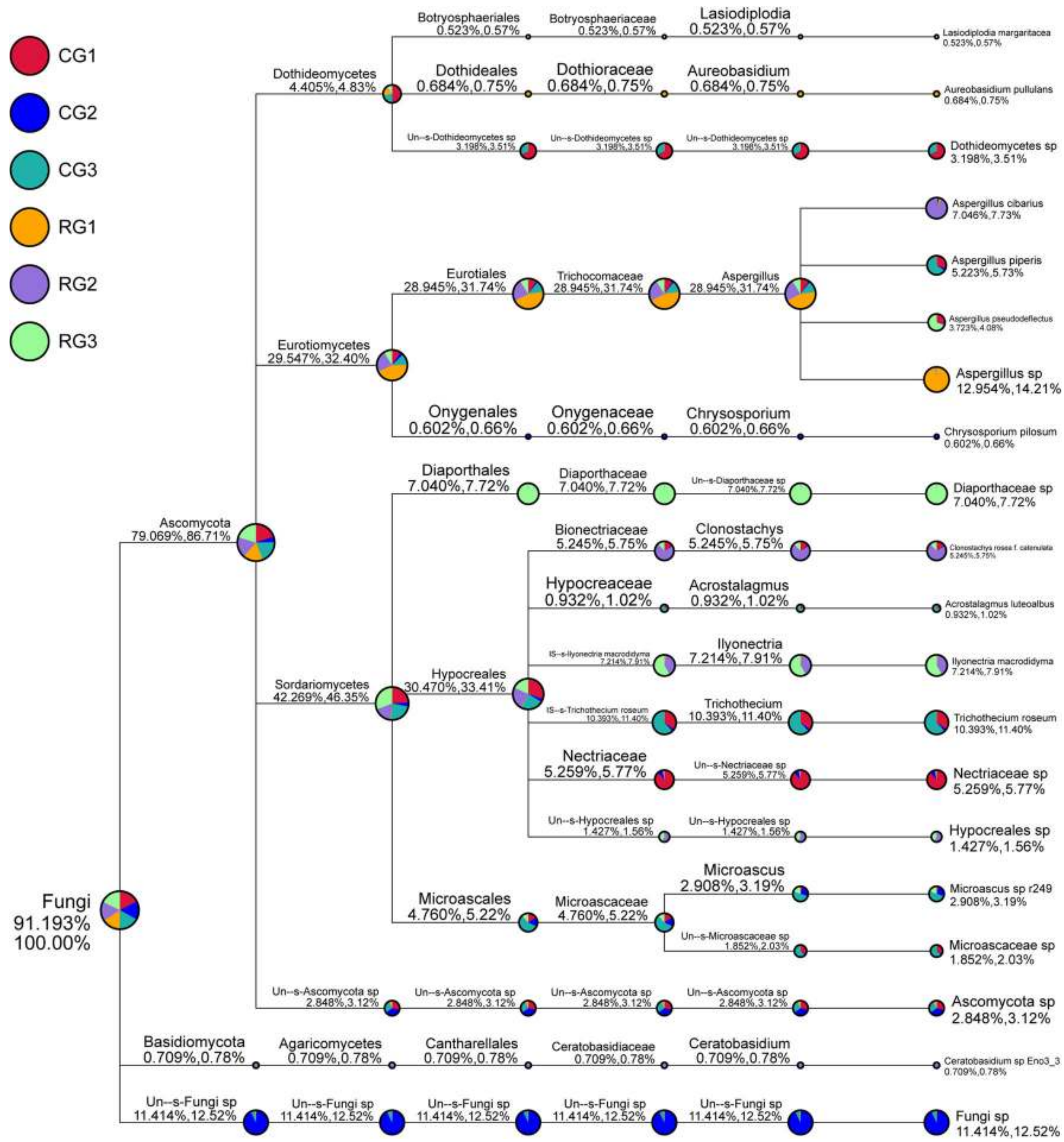

Fig. 2 Phylogenetic tree of top 20 species in different samples of the two cultivars Carbanate Gernischet and Red Globe of *Vitis vinifera*

Sordariomycetes, 19% Eurotiomycetes and 7% Dothideomycetes) of total sequences in this cultivar followed by unidentified phylum (23%; Fungal OTU-7) and Basidiomycota and Zygomycota (less than 0.1%). In Red Globe, almost all sequences were assigned to Ascomycota (97%; 51% Eurotiomycetes, 42% Sordariomycetes, and 3% Dothideomycetes) followed by Basidiomycota (3%; 1% Agaricomycetes and 1% Tremellomycetes) and unidentified phylum (Fungal OTU-7) and Zygomycota were negligible (altogether less than 0.5%). Phylogenetic tree for the abundance at genus level using the top 35 genera detected in the two cultivars are shown in Fig. 4. The difference between the fungal community composition of the two cultivars of *V. vinifera* were clearly demonstrated at OTU level: *Trichothecium roseum* OTU-1, Fungal-OTU-7, *Aspergillus piperis* OTU-5 and *Nectriaceae* OTU-3 were commonly detected (10–20%) in Carbanate Gernischet, but almost absent in Red Globe (represented by *Aspergillus* OTU-11, *Ilyonectria macrodidyma* OTU-4, *Aspergillus cibarius* OTU-2 and *Diaporthaceae* OTU-10; 11–19%; Table 4).

Using presence/absence data, we found that for both *Vitis vinifera* cultivars Ascomycota (Carbanate Gernischet = 151 OTUs and Red Globe = 162 OTUs) was the richest OTU phylum followed by unidentified phylum, Basidiomycota (11–14 OTUs) and Zygomycota (2 OTUs).

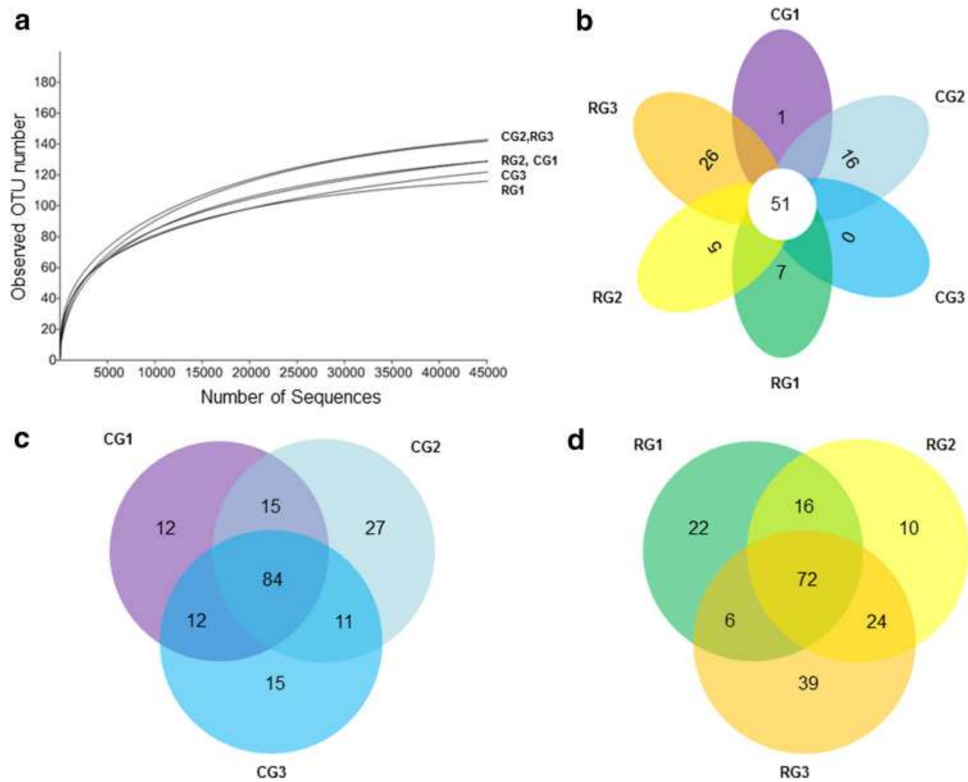

Fig. 3 Rarefaction curves (**a**), and Venn diagrams show distribution of OTUs across different samples (1–3): (**b**) in both Carbanate Gernischet (CG) and Red Globe (RG) cultivars, (**c**) only Carbanate Gernischet and (**d**) only Red Globe

Patterns of the richest OTU classes and orders were similar for both cultivars: Sordariomycetes (Hypocreales (Carbanate Gernischet = 32 OTUs and Red Globe = 39 OTUs), Sordariales (Carbanate Gernischet = 13 OTUs and Red Globe = 13 OTUs), Microascales (Carbanate Gernischet = 10 OTUs and Red Globe = 11 OTUs)], Eurotiomycetes (Eurotiales, Carbanate Gernischet = 41 OTUs and Red Globe = 38 OTUs) and Dothideomycetes (Pleosporales, Carbanate Gernischet = 7 OTUs and Red Globe = 7 OTUs).

Comparing and matching of traditional and culture-independent approaches

Several commonly detected fungal genera (*Aspergillus, Clonostachys* and *Fusarium*) were detected in both approaches. However, there are many highly or frequently detected genera in the mycobiome that were not detected in the traditional method. These include *Acrostalagmus, Aureobasidium, Ceratobasidium, Chrysosporium, Ilyonectria, Lasiodiplodia, Microascus,* and *Trichothecium* (Supplementary Table S1). Some frequently isolated fungi, especially the fast growing ones (*Rhizopus* and *Mucor*) were not detected in mycobiome analysis.

ITS sequences obtained from both traditional and culture-independent methods were compared using the query and cluster cover. This showed that the saprotrophs detected from the two approaches are consistent in most cases. However, in few cases we found inconsistent identifications which have arisen from the lower level of taxonomic assignment in the culture-independent (amplicon sequencing) as compared with traditional approaches. For example, *Diaporthe eres* and *Alternaria* identified via the traditional approach were identified as *Diaporthaceae* and *Pleosporaceae* in the culture-independent analyses. A mismatch was also found between *Albifimbria viridis* and *Myrothecium* sp., which are classified in the same order (Hypocreales). The sexual morph genus *Talaromyces* was matched with its potential asexual morph (*Penicillium*). We found that twelve taxa detected from traditional method form a cluster (91–100% similarity) with 25 fungal OTUs from the culture-independent methods (Table 5). We were able to assign 25 OTUs from NGS: 20 OTUs to genus and 5 OTUs (similarity 99–100%) to species level respectively (Table 5). We removed two OTUs as singletons (*Botryosphaeria* OTU-178 and Ascomycota OTU-213) as they were detected only once. However, in the direct matching of ITS sequences, these fungal OTUs showed 97 and 100% similarity to *Botryospaeria dothidea* and *Coniella vitis*, respectively. The other fungi that we were able to identify to the species level are *Aspergillus niger*, *Clonostachys rosea, Botrytis cinerea*, and *Albifimbria viridis*. Most of the frequently detected genera in the traditional approach (i.e. with relative abundance higher than 5%; *Alternaria, Clonostachys*, *Fusarium*) were also detected in culture-independent approach. *Rhizopus* sp. and

Table 4 Similarity percentages (SIMPER) analysis showing the top 30 fungal OTUs mostly responsible for differences in fungal community composition between Carbanate Gernischet(CG) and Red Globe (RG) cultivars; OA Dissimilarity = overall average dissimilarity

Taxon	Contrib. %	Mean abund CG	Mean abund. RG
Trichothecium roseum OTU_1	10.91	20.70	0.10
FungalOTU_7	10.82	20.60	0.22
Aspergillus OTU_11	9.99	0.07	18.90
Ilyonectria macrodidyma OTU_4	7.53	0.12	14.30
Aspergillus cibarius OTU_2	6.90	0.68	13.40
Diaporthaceae OTU_10	5.77	0.01	10.90
Aspergillus piperis OTU_5	5.42	10.30	0.12
Nectriaceae OTU_3	5.18	9.94	0.19
Clonostachys rosea OTU_9	4.37	1.76	8.73
DothideomycetesOTU_8	3.27	6.27	0.11
Aspergillus pseudodeflectus OTU_13	3.02	2.10	5.27
Microascus OTU_12	2.12	4.54	1.10
Aspergillus OTU_21	1.88	0.01	3.55
Microascaceae OTU_18	1.86	3.53	0.02
Aspergillus OTU_30	1.80	0.01	3.39
EurotialesOTU_208	1.68	1.31	2.91
Diaporthaceae OTU_16	1.64	0.08	3.11
AscomycotaOTU_14	1.45	2.76	0.04
EurotialesOTU_27	1.30	0.01	2.46
Acrostalagmus luteoalbus OTU_15	0.98	1.85	0.01
FungalOTU_19	0.95	1.81	0.02
HypocrealesOTU_17	0.80	0.02	1.54
Ceratobasidium OTU_20	0.75	0.01	1.41
Aureobasidium pullulans OTU_29	0.72	0.00	1.36
Ascomycota_OTU_23	0.63	1.21	0.02
Chrysosporium pilosum OTU_22	0.62	1.19	0.02
Hypocreales OTU_25	0.62	0.07	1.18
Ascomycota OTU_26	0.51	0.97	0.01
EurotialesOTU_6	0.48	0.91	0.01
Lasiodiplodia margaritacea OTU_32	0.47	0.08	0.96
Summary (OA Dissimilarity = 94.29)	**94.41**	**92.92**	**95.36**

Talaromyces sp. were frequently detected in the traditional approach, but exhibited low relative abundances or disappeared in the culture-independent approach.

Fungal functional groups identified using traditional and culture-independent approaches

Among the 45 identified taxa based on traditional method, 17 are well known pathogens on *V. vinifera* causing severe yield as well as economic loss to viticulture around the world (Table 2). Six species of secondary pathogens of *V. vinifera* were also identified in this study. Most of the pathogens tend to survive or overwinter on dead plant material as saprotrophs and act as the primary inoculums once the conditions are favourable (Armijo et al. 2016).

In total, 143 fungal OTUs (63% of total fungal OTUs) were successfully assigned for their functions (Supplementary Table S1). We identified six functional groups of fungi associated with dead materials of *V. vinifera*: saprotrophs, plant pathogens, endophytes, fungal parasites–

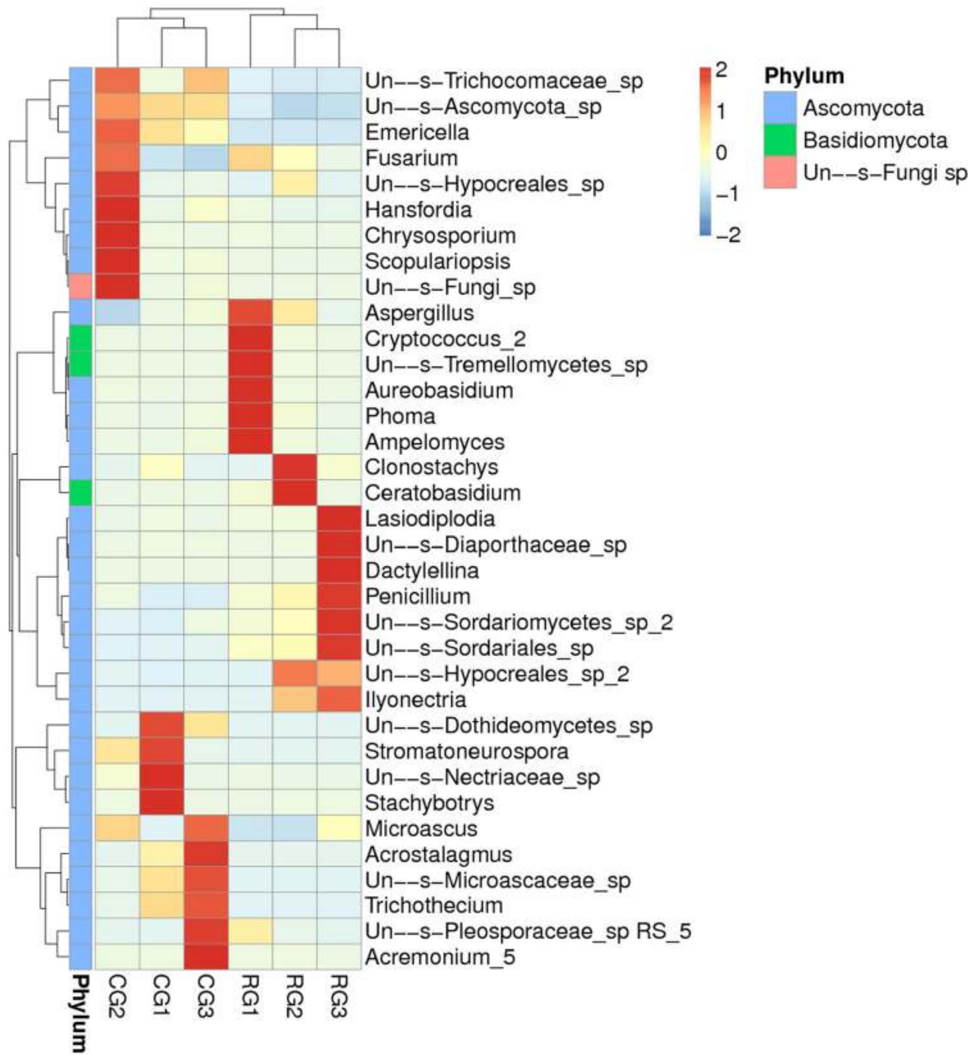

Fig. 4 Abundance phylogenetic tree at genus level (top 35 genera) in two cultivars [Carbanate Gernischet (CG1-3) and Red Globe (RG1-3)] of *Vitis vinifera*

saprotrophs (mycoparasites–saprotrophs), ectomycorrhizae and animal pathogens. The fungal community was dominated by saprotrophs (102 OTUs) and plant pathogens (22 OTUs), which accounted for 71% and 15% of the function assigned to fungal OTUs in this study. *Clonostachys*, *Lasiodiplodia* and *Trichothecium*, were the most commonly detected plant pathogen genera with relative abundances 1–10%. *Botrytis* sp., an important fungal pathogen in grape, was also detected with low relative abundance. Endophytes together with endophyte–saprotrophs and endophyte–plant pathogens (9 OTUs) contributed little and most OTUs were detected with low relative abundance, except, *Acrostalagmus luteoalbus*. All fungal OTUs with their potential functions are listed in Supplementary Table S1.

Checklist of fungi on *Vitis*

Nine-hundred and six fungal taxa have been reported on *Vitis* species and are listed in Table 6, although the actual number of fungal taxa associated with this host is likely much higher. It is not possible to reconfirm all previous reports by re-examining collections to confirm their identities. In many cases no fungarium material is linked to the reports, while examining nearly 900 specimens would be an almost impossible task. Even if it was were possible, it would most likely be futile, since molecular data would be needed to establish correct names. This is extremely difficult based on the presently available techniques and not permitted by many fungaria. Most of the 905 taxa reported from *Vitis* species do not have sequence data. Therefore, recollecting and sequencing these taxa are essential to establish and accurate species list associated with *Vitis* species.

Table 5 Matching of fungal isolates to the saprotrophic mycobiome of *Vitis vinifera*

Fungal taxon (culture)	Relative abundance in culture (%)	Fungal taxa (mycobiome)	Relative abundance in mycobiome (%)	Cluster identification (coverage) %	Number of OTUs in cluster
Albifimbria viridis	0.55	*Myrothecium*	0.010	99 (100)	1
Alternaria spp.	28.14	*Ampelomyces*, *Phoma*, *Pleosporaceae* OTU, Fungal OTU	0.636	92–100 (95–100)	4
Aspergillus niger	6.01	*Aspergillus*	3.683	99 (100)	1
Botryospaeria dothidea	0.27	*Botryospaeria*	Remove as singleton	97 (100)	1
Botrytis cinerea	2.73	*Botrytis*	0.002	100 (100)	1
Clonostachys rosea	2.19	*Clonostachys*	5.244	99 (100)	1
Coniella vitis	1.09	Ascomycota OTU	Remove as singleton	100 (100)	1
Diaporthe eres	1.37	*Diaporthaceae* OTUs	0.070	92–97 (98–100)	2
Fusarium sp.	25.41	*Fusarium*, *Nectriaceae* OTUs	5.368	93–100 (83–87)	8
Penicillum sp.	0.54	*Penicillium*	0.203	91–100 (81–100)	3
Talaromyces amestolkiae	5.46	*Penicillium*	0.001	96 (100)	1
Tricoderma atroviride	4.09	*Tricoderma*	0.008	97 (99)	1

Discussion

Before the advent of molecular data in taxonomy, studies on the fungi on *Vitis* were based on traditional methodology and have resulted in hundreds of records of fungi from this host genus (Table 6). Most recent studies have been related to pathogens that affect grape yield and production (Úrbez-Torres et al. 2012, 2013a, b; Dissanayake et al. 2015; Liang et al. 2016; Jayawardena et al. 2015, 2016a; Yan et al. 2015; Chethana et al. 2017) and have resulted in well-resolved taxonomy as they have used molecular data. However, studies on saprobes using molecular data and culture-independent techniques have not been used to identify the fungi on *Vitis* to date. In this study, we therefore provide the first work comparing saprobes on *Vitis* sp. using both traditional and culture-independent approaches, with well-resolved taxonomic identifications based on molecular analyses. The taxa derived from both approaches are compared as the same samples were used in the study. We have also established the saprotrophic communities associated with both wine and table grapevine cultivars and demonstrate cultivar specific communities for each grapevine cultivar. A checklist of fungi of *Vitis* is also provided which is an important resource for viticulture.

Microfungi collected from China, Italy, Russia and Thailand

Sixty-seven saprotrophic taxa from 46 genera were identified in this study (Table 1). Using traditional methodology and analyses of molecular data, we identified two new species, and 41 new host or distribution records for *V. vinifera*. Taxonomic details, descriptions, photographic plates and phylogenetic analyses are provided in Jayawardena et al. (2018). Some of these genera have a wide distribution. For example, botryosphaerious and *Colletotrichum* taxa have a wide distribution. These taxa are well-known pathogens and can be spread to other countries undetectable through the exportation of rootstocks. Some genera are only known from one or two countries. This may be due to the lack of data on the fungi associated with this host.

Comparisons of traditional and culture-independent approaches for characterizing the saprotrophic fungal communities associated with two cultivars of *Vitis vinifera*

Most previous studies on fungi on grapevine have relied on traditional approaches (Table 6). Some recent identification of isolated taxa have incorporated analyses of ITS sequence data (Guo et al. 2003; Promputtha et al. 2007),

Table 6 Check list of fungi on *Vitis* sp. (classification follows Wijayawardene et al. 2017, 2018)

Species	Family	Life mode	Disease caused	Locality	References
Acremonium acutatum W. Gams*	*Bionectriaceae*	P	Unknown	Korea	Oh et al. (2014)
A. alternatum Link*	*Bionectriaceae*	E		China, Greece, Spain	Pantidou (1973), Benavides et al. (2013), Dissanayake et al. (2018)
Acremonium sp.*	*Bionectriaceae*	P, E	'Hoja de malvon'	Argentina, China, Iran, Italy, South Africa, Korea, Spain	Gatica et al. (2001), Halleen et al. (2003), Luque et al. (2009), Gonzalez and Tello (2011), Mohammadi and Banihashemi (2012), Mondello et al. (2013), Oh et al. (2014), This study
Acrocalymma vagum (D.F. Farr) P.W. Crous & T. Trakunyingcharoen*	*Acrocalymmaceae*	U		Spain	Trakunyingcharoen et al. (2014)
Acrospermum viticola Ikata & Hitomi	*Acrospermaceae*	U		China, Japan, Korea	Tai (1979), Cho and Shin (2004), Kobayashi (2007)
Acrostalagmus luteoalbus (Link) Zare, W. Gams & Schroers*	*Plectosphaerellaceae*	S		China	This study
Actinomucor elegans (Eidam) C.R. Benj. & Hesselt*	*Mucoraceae*	S		China	This study, Jayawardena et al. (2018)
Agaricus viticola Schulzer	*Agaricaceae*	S		Slavonia	Saccardo (1878)
Albifimbria verrucaria (Alb. & Schwein.) L. Lombard & Crous*	*Stachybotryaceae*	S		China	This study, Jayawardena et al. (2018)
A. viridis L. Lombard & Crous*	*Stachybotryaceae*	S		China	This study, Jayawardena et al. (2018)
Alfaria cyperi-esculenti Crous, Montaño-Mata & García-Jim*	Hypocreales genera *incertae sedis*	S		Italy	This study, Jayawardena et al. (2018)
Alfaria vitis Manawasinghe, Camporesi & K.D. Hyde*	Hypocreales genera *incertae sedis*	S		Italy	This study, Jayawardena et al. (2018)
Alternaria lternate (Fr.) Keissl.*	*Pleosporaceae*	P, E, S	Fruit rot	Brunei, China, Italy, Poland, Slovakia, Spain, USA	Peregrine and Ahmad (1982), French (1987, 1989), Mulenko et al. (2008), Kakalikova et al. (2009), Gonzalez and Tello (2011), Dissanayake et al. (2018), This study, Jayawardena et al. (2018)
A. arborescens E.G. Simmons*	*Pleosporaceae*	E		Spain, Switzerland	Casieri et al. (2009), Gonzalez and Tello (2011)
A. italica J.F. Li,Camporesi & K.D. Hyde*	*Pleosporaceae*	S		Italy	This study, Jayawardena et al. (2018)
A. tenuissima (Kunze) Wiltshire	*Pleosporaceae*	E		Malawi, Spain	Wiehe (1948), Peregrine and Siddiqi (1972), Gonzalez and Tello (2011)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
A. viticola Brunaud	*Pleosporaceae*	P	Fruit rot	China	Tai (1979)
A. vitis Cavara*	*Pleosporaceae*	P, S	Leaf blight, Fruit rot	Chile, China, El Salvador, Greece, India, Italy, Romania, Russia, Thailand, Turkmenistan	Cavara (1888), Makovetz (1933), Stevenson and Wellman (1944), Mujica and Vergara (1945), Nasyrov (1964), Sarbhoy et al. (1971), Pantidou (1973), Giatgong (1980), Bechet and Sapta-Forda (1981), Zhang (2003), Zhuang (2005), This study, Jayawardena et al. (2018)
A. viniferae Yong Wang bis, Y.Y. Than, K.D. Hyde & Xing H. Li*	*Pleosporaceae*	P	On pedicels and rachis	China	Tao et al. (2014)
Alternaria sp.*	*Pleosporaceae*	P, E	On pedicels and rachis	Cuba, France, Italy, Poland, South Africa, Spain, Switzerland, USA	Preston (1945), Harvey (1955), Arnold (1986), Cook and Dubé (1989), Larignon and Dubos (1997), Halleen et al. (2003), Mulenko et al. (2008), Casieri et al. (2009), Gonzalez and Tello (2011), Mondello et al. (2013)
Amerosporium concinnum Petr.	Ascomycota genera *incertae sedis*	P	Excoriose and die back	Portugal	Phillips (2000)
Ampelomyces quisqualis Ces.	*Phaeosphaeriaceae*	M		South Africa	Doidge (1950)
Ampelomyces sp.*	*Phaeosphaeriaceae*	S		China	This study
Amphisphaeria sylvan Sacc. & Speg	*Amphisphaeriaceae*	S		Italy	Farr (1973)
A. humuli (Fautrey) Rudakov	*Amphisphaeriaceae*	M		Ukraine	Dudka et al. (2004)
Angustimassarina populi Thambug. & K.D. Hyde*	*Amorosiaceae*	S		Italy	This study, Jayawardena et al. (2018)
Aplosporella beaumontiana S. Ahmad	*Aplosporellaceae*	S		India	Rajak and Pandey (1985)
A. fabiformis (Pass. & Thüm.) Petr. & Syd.	*Aplosporellaceae*	P	On stem	Italy, Pakistan, USA	Petrak and Sydow (1927), Anonymous (1960), Ahmad (1969)
A. japonicas Ellis & Everh.	*Aplosporellaceae*	P	On stem	China	Tai (1979)
A. viticola Cooke & Massee	*Aplosporellaceae*	P	On stem	UK	Saccardo (1878)
Aplosporella sp.*	*Aplosporellaceae*	S		China	This study
Apodus sp.*	*Lasiosphaeriaceae*	S		China	This study
Arachnomyces sp.*	*Arachnomycetaceae*	S		China	This study
Armillaria limonea (G. Stev.) Boesew	*Physalacriaceae*	P	Root rot	New Zealand	Gadgil (2005)
A. luteobubalina Watling & Kile	*Physalacriaceae*	P	Root rot	Australia	Cook and Dubé (1989)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
A. mellea (Vahl) P. Kumm.	*Physalacriaceae*	P	Root rot	Australia, Greece, Italy, Japan, Scotland, USA	Anonymous (1960), Foister (1961), Simmonds (1966), French (1989), Zervakis et al. (1998), Holevas et al. (2000), Kobayashi (2007), Bobev (2009), Prodorutti et al. (2009)
A. novae-zelandiae (G. Stev.) Boesew	*Physalacriaceae*	P	Root rot	New Zealand	Gadgil (2005)
Armillaria sp.	*Physalacriaceae*	P	Root rot	Australia, New Zealand	Pennycook (1989), Shivas (1989)
Arthrobotrys sp.*	*Orbiliaceae*	S		Switzerland	Casieri et al. (2009)
Arthrographis sp.*	*Eremomycetaceae*	S		China	This study
*Arthrinium arundinis** (Corda) Dyko & B. Sutton	*Apiosporaceae*	E		Switzerland	Casieri et al. (2009)
A. phaeospermum (Corda) M.B. Ellis	*Apiosporaceae*	E		Spain	Gonzalez and Tello (2011)
A. rasikravindrae Shiv M. Singh, L.S. Yadav, P.N. Singh, Rah. Sharma & S.K. Singh*	*Apiosporaceae*	E		China	Dissanayake et al. (2018)
Arthrinium sp.	*Apiosporaceae*	U		Russia	Melnik and Popushoi (1992)
Arxiomyces vitis (Fuckel) P.F. Cannon & D. Hawksw.	*Ceratostomataceae*	U		Europe, Poland	von Arx and Mueller (1954), Mulenko et al. (2008)
Ascochyta ampelina Sacc.	*Didymellaceae*	P	On leaves	Greece, Pakistan, Romania, UK, USA	Saccardo (1878), Anonymous (1960), Pantidou (1973), Ahmad et al. (1997), Jones and Baker (2007)
Ascorhizoctonia sp.*	*Pyronemataceae*	E		China	Dissanayake et al. (2018)
Aspergillus aculeatus Iizuka*	*Aspergillaceae*	P, S	Bunch rot	Canada, China	Jarvis and Traquair (1984), This study, Jayawardena et al. (2018)
A. carbonarius (Bainier) Thom*	*Aspergillaceae*	P	Bunch rot	South Africa, USA	Setati et al. (2015), Rooney-Latham et al. (2008)
A. cibarius S.B. Hong & Samson*	*Aspergillaceae*	S		China	This study
A. flavus Link	*Aspergillaceae*	P	Bunch rot	Italy	Greuter et al. (1991)
A. glaucus (L.) Link	*Aspergillaceae*	U		Dominican Republic	Ciferri (1929, 1961)
A. aponicas Saito*	*Aspergillaceae*	E		China	Dissanayake et al. (2018)
A. niger Tiegh.*	*Aspergillaceae*	P, E, S	Bunch rot, Canker	Australia, Bulgaria, China, Cyprus, Italy, Japan, Spain, South Africa, Switzerland, USA, Zimbabwe	Georghiou and Papadopoulos (1957), Whiteside (1966), Cook and Dubé (1989), Setati et al. (2015), Michailides et al. (2002), Kobayashi (2007), Vitale et al. (2008), Bobev (2009), Casieri et al. (2009), Gonzalez and Tello (2011), Dissanayake et al. (2018), This study, Jayawardena et al. (2018)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
A. terreus Thom*	*Aspergillaceae*	E, S		Spain, China	Gonzalez and Tello (2011), This study
A. tubingensis Mosseray*	*Aspergillaceae*	P	Canker	Spain	Garcia-Benavides et al. (2013)
A. piperis Samson & Frisvad*	*Aspergillaceae*	S		China	This study
A. pseudodeflectus Samson & Mouch.*	*Aspergillaceae*	E, S		China	Dissanayake et al. (2018), This study
A. pseudoglaucus Blochwitz*	*Aspergillaceae*	E		China	Dissanayake et al. (2018)
A. ustus (Bainier) Thom & Church	*Aspergillaceae*	U		Italy	Greuter et al. (1991)
Aspergillus sp.*	*Aspergillaceae*	P, E, S	Bunch rot, canker, sour rot	China, France, Italy, Korea,South Africa, Spain, Switzerland	Larignon and Dubos (2001), Halleen et al. (2003), Casieri et al. (2009), Gonzalez and Tello (2011), Mondello et al. (2013), Oh et al. (2014), Dissanayake et al. (2018), This study
Asperisporium minutulum (Sacc.) Deighton	*Mycosphaerellaceae*	E		USA	Schubert and Braun (2005)
A. vitiphyllum (Speschnew) Deighton	*Mycosphaerellaceae*	E		China, Europe, Russia, Uzbekistan	Elenkin (1909), Gaponenko (1965), Sutton (1975), Zhuang (2005)
Athelia rolfsii (Curzi) C.C. Tu & Kimbr.	*Atheliaceae*	P, S	Sour rot	Mauritius, New Zealand, Taiwan	Orieux and Felix (1968), Anonymous (1979), Pennycook (1989)
Aureobasidium pullulans (de Bary) G. Arnaud.*	*Saccotheciaceae*	E, S		Australia, China, France, Germany, Greece, Italy, South Africa, Spain, Poland, USA	Setati et al. (2015), Morgan and Michailides (2004), Mulenko et al. (2008), Gonzalez and Tello (2011), Sanoamuang et al. (2013), Fischer et al. (2016), Dissanayake et al. (2018), This study, Jayawardena et al. (2018)
Aureobasidium sp.*	*Saccotheciaceae*	S		China	This study
Bactrodesmium pallidum M.B. Ellis	Dothideomycetes genera *incertae sedis*	S		Russia	Melnik and Popushoi (1992)
Bartalinia robillardoides Tassi	*Sporocadaceae*	S		India	Mathur (1979)
Beauveria bassiana (Bals.-Criv.) Vuill*	*Cordycipitaceae*	P, E	U	Spain	Gonzalez and Tello (2011), Garcia-Benavides et al. (2013)
Bertia vitis Schulzer	*Bertiaceae*	S		Croatia, Portugal	Schulzer (1870), Unamuno (1941)
Bionectria ochroleuca (Schwein.) Schroers & Samuels*	*Bionectriaceae*	S		Switzerland	Casieri et al. (2009)
Bipolaris maydis (Y. Nisik. & C. Miyake) Shoemaker*	*Pleosporaceae*	S		China	This study, Jayawardena et al. (2018)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
B. sorokiniana (Sacc.) Shoemaker*	*Pleosporaceae*	E		China	Dissanayake et al. (2018)
Biscogniauxia capnodes (Berk.) Y.M. Ju & J.D. Rogers	*Boliniaceae*	S		Taiwan	Ju and Rogers (1999)
B. mediterranea (De Not.) Kuntze	*Boliniaceae*	S		USA	Anonymous (1960)
Boeremia exigua var. *exigua* (Desm.) Aveskamp*	*Didymellaceae*	P	Black spot	Italy	Balmas et al. (2005)
Botryodiplodia palmarum (Cooke) Petr. & Syd.	*Botryosphaeriaceae*	P	Canker	India	Mathur (1979)
B. vitis Sousa da Câmara	*Botryosphaeriaceae*	P	Canker	Pakistan, Portugal	Sousa da Câmara (1950), Ahmad et al. (1997)
Botryodiplodia sp.	*Botryosphaeriaceae*	P	Canker	Argentina, Brazil	Mendes et al. (1998), Gatica et al. (2001)
Botryosphaeria bondarzewii L. A. Kantsch.	*Botryosphaeriaceae*	S		Russia, USA	Kantschaveli (1928), Nagorny (1930)
B. dothidea (Moug. ex Fr.) Ces. & De Not.*	*Botryosphaeriaceae*	P, E, S	Botryosphaeria die back, Macrophoma rot	Argentina, Australia, Brazil, Canda, Chile, China, France, Germany, Iran, Italy, Japan, South Africa, Portugal, Spain, USA, New Zealand, Tunisia, Turkey, Uruguay	Milholland (1994), Phillips (1998, 2000), Slippers et al. (2007a, b), Larignon and Dubos (2001), Halleen et al. (2003), van Niekerk et al. (2006), Kobayashi (2007), Luque et al. (2009), Pitt et al. (2010), Qiu et al. (2011), Úrbez-Torres (2011), Úrbez-Torres et al. (2012, 2013a, b), Abreo et al. (2012), Arzanlou et al. (2012), Baskarathevan et al. (2012), Yan et al. (2012), Akgul et al. (2014a), Chebil et al. (2014), Carlucci et al. (2015), Fischer et al. (2016), Dissanayake et al. (2018), This study, Jayawardena et al. (2018)
B. vitis Niessl	*Botryosphaeriaceae*	P	Die back	Czech Republic	Niessl (1871)
Botryosphaeria sp.*	*Botryosphaeriaceae*	P, E	Botryosphaeria die back, Macrophoma rot	Australia, China, Japan, South Africa, Spain	Fourie and Halleen (2002), Halleen et al. (2003), Gimenez-Jaime et al. (2006), Kobayashi (2007), Martin and Cobos (2007), Sosnowski et al. (2007), Dissanayake et al. (2018)
Botrytis ampelophila Speg.	*Sclerotiniaceae*	S		Argentina	Farr (1973)
B. californica S. Saito & C.L. Xiao*	*Sclerotiniaceae*	P	Botrytis bunch rot, Leaf blight	California, USA	Saito et al. (2016)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
B. cinerea Pers.*	*Sclerotiniaceae*	P, E, S	Botrytis bunch rot, Leaf blight	Australia, Brazil, Bulgaria, Chile, China, France, Greece, Germany, Hawai, Italy, Korea, Libya, New Zealand, Pakistan, Poland, Portugal, Scotland, Spain, Switzerland, USA, Zimbabwe	Foister (1961), Whiteside (1966), El-Buni and Rattan (1981), Raabe et al. (1981), Lee et al. (1991), Mendes et al. (1998), Holevas et al. (2000), Phillips (2000), Gadgil (2005), Mulenko et al. (2008), Bobev (2009), Casieri et al. (2009), Gao et al. (2009), Gonzalez and Tello (2011), Walker et al. (2011), Fournier et al. (2013), Piqueras et al. (2014), Saito et al. (2016), Dissanayake et al. (2018), Javed et al. (2017), This study, Jayawardena et al. (2018)
B. pseudocinerea A.S. Walker, A. Gautier*	*Sclerotiniaceae*	P	Botrytis bunch rot, Leaf blight	France, Germany, New Zealand, USA	Walker et al. (2011), Saito et al. (2016)
B. sinoviticola J. Zhang, Y. J. Zhou & G. Q. Li*	*Sclerotiniaceae*	P	Botrytis bunch rot, Leaf blight	China	Zhou et al. (2014)
Botrytis sp.*	*Sclerotiniaceae*	P, E, S		Chile, China, Italy, Japan, Mexico, USA	Mujica and Vergara (1945), Anonymous (1960), Alvarez (1976), Kobayashi (2007), Liu et al. (2016a), Dissanayake et al. (2018), Jayawardena et al. (2018)
Briosia ampelophaga Cavara	Ascomycota genera *incertae sedis*	P	Brown Zonate Spot of Grape/Leaf blotch	Japan, Russia, USA	Greene (1955), Anonymous (1960), Melnik and Popushoi (1992), Nakagiri et al. (1994), Kobayashi (2007)
Cadophora fastigiata Lagerb. & Melin*	*Ploettnerulaceae*	P, S	Wood pathogen	Germany, Switzerland,	Casieri et al. (2009), Fischer et al. (2016)
C. luteo-olivacea (J.F.H. Beyma) T.C. Harr. & McNew*	*Ploettnerulaceae*	P	Wood pathogen	Germany, Japan, Switzerland, Uruguay	Casieri et al. (2009), Abreo et al. (2012), Fischer et al. (2016), Nakaune et al. (2016)
C. novi-eboraci R Travadon, DP Lawrence, S Rooney-Latham, WD Gubler, PE Rolshausen & K Baumgartner*	*Ploettnerulaceae*	P	Wood pathogen	North America	Travadon et al. (2015)
C. orientoamericana R Travadon, DP Lawrence, S Rooney-Latham, WD Gubler, PE Rolshausen & K Baumgartner*	*Ploettnerulaceae*	P	Wood pathogen	North America	Travadon et al. (2015)
C. spadicis R Travadon, DP Lawrence, S Rooney-Latham, WD Gubler, PE Rolshausen & K Baumgartner*	*Ploettnerulaceae*	P	Wood pathogen	North America	Travadon et al. (2015)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
C. viticola D. Gramaje, L. Mostert & Armengol*	*Ploettnerulaceae*	P, S	Wood pathogen	Spain	Crous et al. (2015)
Cadophora sp.*	*Ploettnerulaceae*	E, S		China	Dissanayake et al. (2018), This study
Calonectria kyotensis Terash.	*Nectriaceae*	P	Black foot disease	New Zealand	Pennycook (1989)
C. macrospora Sacc. & Speg.	*Nectriaceae*	P	Black foot disease	Italy	Saccardo (1878), Farr (1973)
Calycella sarmentorum (De Not.) Boud.	*Helotiaceae*	S		Italy, Portugal	Kuntze (1898), Unamuno (1941)
Camarosporium viniferum S. Ahmad	*Camarosporiaceae*	E		Central Asia, Pakistan	Ahmad (1969), Koshkelova and Frolov (1973), Ahmad et al. (1997)
C. viticola (Cooke & Harkn.) Sacc.	*Camarosporiaceae*	E		USA	Saccardo (1878)
Camillea tinctor (Berk.) Læssøe, J.D. Rogers & Whalley	*Graphostromataceae*	S		USA	Hanlin (1963)
Campylocarpon fasciculare Schroers, Halleen & Crous*	*Nectriaceae*	P	Wood canker, Black foot disease	Brazil, Italy, South Africa, Turkey	Halleen et al. (2003), Abreo et al. (2010), Petit et al. (2011), Correia et al. (2013), Akgul et al. (2014b), Úrbez-Torres et al. (2014), Carlucci et al. (2017), Gonzalez and Chaverri (2017)
C. pseudofasciculare Halleen, Schroers & Crous*	*Nectriaceae*	P	Black foot	Brazil, South Africa, Uruguay	Abreo et al. (2010, 2012), Petit et al. (2011), Correia et al. (2013), Úrbez-Torres et al. (2014), Gonzalez and Chaverri (2017)
Capnodium citri Berk. & Desm.	*Capnodiaceae*	P	Bunch rot	Italy, Greece, Portugal, Spain	Pantidou (1973), Greuter et al. (1991), Checa (2004)
Capnodium sp.	*Capnodiaceae*	P	Bunch rot	Brazil, Venezuela	Urtiaga (1986), Mendes et al. (1998)
Cephalosporium sp.	Hypocreales *incertae sedis*	P	Black measles	Greece, Mexico, Greece, USA	Chiarappa (1959), Pantidou (1973), Alvarez (1976), Holevas et al. (2000)
Ceratobasidium cornigerum (Bourdot) D.P. Rogers	*Ceratobasidiaceae*	E		Spain	Gonzalez and Tello (2011)
Ceratobasidium sp.*	*Ceratobasidiaceae*	E, S		China, Switzerland	Casieri et al. (2009), This study
Cercospora coryneoides Savul. & Rayss	*Mycosphaerellaceae*	P	Leaf spot	Palestine	Savulescu and Rayss (1935)
C. fuckelii (Thüm.) Jacz.	*Mycosphaerellaceae*	P	Leaf spot	Asia	Chupp (1953)
C. judaica Rayss	*Mycosphaerellaceae*	P	Leaf spot	Palestine	Chupp (1953)
C. roesleri (Catt.) Sacc.*	*Mycosphaerellaceae*	P	Leaf spot	China, Cyprus, Egypt, France, Scotland	Chupp (1953), Georghiou and Papadopoulos (1957), Foister (1961), Tai (1979), Soliman et al. (2016)
C. sessilis Sorokin	*Mycosphaerellaceae*	P	Leaf spot	Russia	Pollack (1987)
C. vitiphylla (Speschnew) Barbarin	*Mycosphaerellaceae*	P	Leaf spot	Palestine	Savulescu and Rayss (1935)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
C. zebrina Pass.*	*Mycosphaerellaceae*	P	Leaf spot	Iran	Bakhshi et al. (2012)
Cercospora sp.	*Mycosphaerellaceae*	P	Leaf spot	Cuba, Hawaii, Mexico, USA	Denaree and Runner (1942), Greene (1956), Raabe (1966), Alvarez (1976), Grand (1985), Urtiaga (1986)
Chaetomium globosum Kunze ex Fr.*	*Chaetomiaceae*	E, S		China, Italy, Spain, Switzerland,	Casieri et al. (2009), Gonzalez and Tello (2011), Dissanayake et al. (2018), This study, Jayawardena et al. (2018)
C. nigricolor L.M. Ames*	*Chaetomiaceae*	E		India, Switzerland	Pande (2008), Casieri et al. (2009)
Chaetomium sp.*	*Chaetomiaceae*	E, S		Spain, Switzerland, China	Casieri et al. (2009), Gonzalez and Tello (2011), This study
Chaetothyrium javanicum (Zimm.) Boedijn	*Chaetothyriaceae*	P	Sooty mold	China, Taiwan	Tai (1979)
Chalastospora gossypii (Jacz.) U. Braun & Crous*	*Pleosporaceae*	E		USA	Crous et al. (2009)
Cheilymenia theleboloides (Alb. & Schwein.) Boud.	*Pyronemataceae*	S		Chile	Mujica and Vergara (1945)
Chrysosporium pilosum Gené, Guarro & Ulfig*	*Onygenaceae*	S		China	This study
Chrysosporium sp.*	*Onygenaceae*	S		China	This study
Cladochytrium viticola Prunet	*Cladochytriaceae*	P	Wood	Algeria, Gaul, Tunisia, USA	Saccardo (1878)
Cladosporium aggregatocicatricatum Bensch, Crous & U. Braun*	*Cladosporiaceae*	P	Fruit rot	USA	Bensch et al. (2015)
C. ampelinum Pass.	*Cladosporiaceae*	P	Leaf spot	Austria, Germany, France, Italy, Portugal	Passerini (1872)
C. asperulatum Bensch, Crous & U. Braun	*Cladosporiaceae*	P	Fruit rot	USA	Bensch et al. (2015)
C. autumnale Kübler	*Cladosporiaceae*	E		Switzerland	Dugan et al. (2004)
C. baccae Verwoerd & Dippen.	*Cladosporiaceae*	P	Fruit rot	South Africa	Braun et al. (2003), Dugan et al. (2004)
C. cladosporioides (Fresen.) G.A. de Vries*	*Cladosporiaceae*	P, E, S	Fruit rot	Chile, China, Italy, Japan, Switzerland, USA	Briceno and Latorre (2007), Kobayashi (2007), Casieri et al. (2009), Bensch et al. (2015), Swett et al. (2016), Dissanayake et al. (2018), This study, Jayawardena et al.(2018)
C. cucumerinum Ellis & Arthur*	*Cladosporiaceae*	S		Italy	This study, Jayawardena et al.(2018)
C. fasciculatum Corda	*Cladosporiaceae*			Russia, Spain, Uzbekistan	Gonzalez Fragoso (1921), Nagorny (1930)
C. herbarum (Pers.) Link	*Cladosporiaceae*	P, E	Fruit rot	Australia,Chile, Spain	Cook and Dubé (1989), Briceno and Latorre (2007), Gonzalez and Tello (2011)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
C. limoniforme Bensch, Crous & U. Braun*	*Cladosporiaceae*	P	Fruit rot	USA	Bensch et al. (2015), Swett et al. (2016)
C. longipes Sorokin	*Cladosporiaceae*	E		Caucasus	Dugan et al. (2004)
C. macrocarpum Preuss	*Cladosporiaceae*	P	Fruit rot	China	Zhang (2003)
C. oxysporum Berk. & M.A. Curtis	*Cladosporiaceae*	P	Fruit rot	India	Sarbhoy et al. (1971)
C. pestis Thüm	*Cladosporiaceae*	E		Austria	Dugan et al. (2004)
C. ramotenellum K. Schub., Zalar, Crous & U. Braun*	*Cladosporiaceae*	P	Fruit rot	China, USA	Swett et al. (2016), Dissanayake et al. (2018)
C. rectoides Bensch, H.D. Shin, Crous & U. Braun*	*Cladosporiaceae*	E		Korea	Bensch et al. (2015)
C. roesleri Catt.	*Cladosporiaceae*	E		Austria, France, Cyprus, Pakistan	Georghiou and Papadopoulos (1957), Ahmad (1969), Ahmad et al. (1997)
C. silences Crous*	*Cladosporiaceae*	P	Fruit rot	China	Dissanayake et al. (2018)
C. sphaerospermum Penz.*	*Cladosporiaceae*	P, S	Fruit rot	Switzerland	Casieri et al. (2009)
C. tenellum K. Schub., Zalar, Crous & U. Braun*	*Cladosporiaceae*	P	Fruit rot	USA	Swett et al. (2016), Dissanayake et al. (2018)
C. tenuissimum Cooke*	*Cladosporiaceae*	P, E	Fruit rot	China	Zhang (2003), Dissanayake et al. (2018)
C. uvarum McAlpine	*Cladosporiaceae*	S		Australia, China	Zhang (2003), Dugan et al. (2004)
C. viride (Fresen.) Z.Y. Zhang & T. Zhang	*Cladosporiaceae*	P	Fruit rot	China	Dugan et al. (2004)
C. vitis-frutigeni Herb.	*Cladosporiaceae*	E		USA	Dugan et al. (2004)
Cladosporium sp.*	*Cladosporiaceae*	P, E, S	Fruit rot	Chile, China, Italy, Korea, USA, Venezuela	Mujica and Vergara (1945), Anonymous (1960), Briceno and Latorre (2008), Mondello et al. (2013), Oh et al. (2014), Dissanayake et al. (2018), This study
Clathrospora turkestanica Domashova	*Pleosporaceae*	E		Central Asia	Koshkelova and Frolov (1973)
Claviceps sp.*	*Clavicipitaceae*	S		China	This study
Clonostachys rosea (Link) Schroers, Samuels, Seifert & W. Gams*	*Bionectriaceae*	P, E, S	Wood decay, Root rot	China, Switzerland	Casieri et al. (2009), This study, Jayawardena et al. (2018)
Clonostachys sp.*	*Bionectriaceae*	P, E, S	Wood decay, Root rot	China, South Africa	Halleen et al. (2003), This study
Cochliobolus geniculatus R.R. Nelson	*Pleosporaceae*	P	Leaf spot	Brunei	Peregrine and Ahmad (1982)
Colletotrichum acutatum J.H. Simmonds*	*Glomerellaceae*	P	Ripe rot	Australia, Japan, New Zealand, USA	Miller (1991), Kummuang et al. (1996), Guerber et al. (2003), Kobayashi (2007), Shivas et al. (2016)
C. aenigma B.S. Weir & P.R. Johnston*	*Glomerellaceae*	P	Ripe rot	China	Yan et al. (2015)
C. ampelinum Cavara	*Glomerellaceae*	E		China, Italy	Cavara (1889), Tai (1979)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
C. clidemia B.S. Weir & P.R. Johnston*	*Glomerellaceae*	P	Ripe rot	USA	Weir et al. (2012)
C. dematium (Pers.) Grove*	*Glomerellaceae*	E, S		Russia, South Africa	Damm et al. (2009), This study, Jayawardena et al. (2018)
C. fioriniae Marcelino & Gouli ex R.G. Shivas & Y.P. Tan*	*Glomerellaceae*	P	Ripe rot	Italy, Portugal	Faedda et al. (2011), Damm et al. (2012)
C. fructicola Prihastuti, L. Cai & K.D. Hyde*	*Glomerellaceae*	P	Ripe rot, Leaf spot, Sunken shoot and stem canker	China	Peng et al. (2013)
C. gloeosporioides (Penz.) Penz. & Sacc.*	*Glomerellaceae*	P	Ripe rot	Australia, Barbodos, Brazil, Brunei, China, Cuba, India, Japan, Korea, Mynmar, New Zealnd, South Africa, Taiwan, USA	Chandra (1974), Norse (1974), Anonymous (1979), Tai (1979), Peregrine and Ahmad (1982), Urtiaga (1986), Pennycook (1989), Mendes et al. (1998), Cho and Shin (2004), Lubbe et al. (2004), Gadgil (2005), Kobayashi (2007), Thaung (2008c), Weir et al. (2012)
C. godetiae Neerg.*	*Glomerellaceae*	P, S	Ripe rot	Italy, UK	Baroncelli et al. (2014), Zapparata et al. (2017), This study, Jayawardena et al. (2018)
C. hebeiense XH Li, Y Wang, KD Hyde. MMRS* Jayawardena, JY Yan	*Glomerellaceae*	P	Twig anthracnose, Ripe rot	China	Yan et al. (2015), This study, Jayawardena et al. (2018)
C. nymphaeae (Pass.) Aa*	*Glomerellaceae*	P	Ripe rot	China	Liu et al. (2016b)
C. siamense Prihastuti, L. Cai & K.D. Hyde*	*Glomerellaceae*	P, S	Ripe rot	Italy, USA	Weir et al. (2012), This study, Jayawardena et al. (2018)
C. truncatum (Schwein.) Andrus & W.D. Moore*	*Glomerellaceae*	P	Ripe rot	China, India, Italy, Switzerland	Farr (1973), Casieri et al. (2009), Sawant et al. (2012), Pan et al. (2016), This study, Jayawardena et al. (2018)
C. viniferum L.J. Peng, L. Cai, K.D. Hyde & Zi Y. Ying*	*Glomerellaceae*	P, S	Ripe rot	China	Peng et al. (2013), Yan et al. (2015), This study, Jayawardena et al. (2018)
Colletotrichum sp.	*Glomerellaceae*	P	Ripe rot, Wood necrosis	Cuba, Mexico, Spain	Alvarez (1976), Arnold (1986), Gonzalez and Tello (2011)
Collophorina paarla (Damm & Crous) Damm & Crous*	Leotiomycetes genera *incertae sedis*	P	Wood necrosis	Germany	Fischer et al. (2016)
C. rubra (Damm & Crous) Damm & Crous*	Leotiomycetes genera *incertae sedis*	P	Wood necrosis	Spain	Garcia-Benavides et al. (2013)
Coniella castaneicola (Ellis & Everh.) B. Sutton	*Schizoparmaceae*	P	White rot	Japan, USA	Nag Raj (1993), Kobayashi (2007)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
C. diplodiella (Speg.) Petr. & Syd.*	*Schizoparmaceae*	P	White rot	Africa, Australia, Bulgaria, China, France, Germany, Greece, India, Italy, South Africa	Sutton (1969), Pantidou (1973), Mathur (1979), Zhuang (2001), van Niekerk et al. (2004b), Bobev (2009), Chethana et al. (2017)
C. diplodiopsis (Crous & Van Niekerk) L.V. Alvarez & Crous*	*Schizoparmaceae*	P	White rot	France, Germany, Italy, South Africa, Switzerland	van Niekerk et al. (2004b), Chethana et al. (2017)
C. fragariae (Oudem.) B. Sutton	*Schizoparmaceae*	P	White rot	Germany, Japan	van Niekerk et al. (2004b), Kobayashi (2007)
C. granati (Sacc.) Petr. & Syd.*	*Schizoparmaceae*	P	White rot	Italy	van Niekerk et al. (2004b), Chethana et al. (2017)
C. petrakii B. Sutton*	*Schizoparmaceae*	P, S	White rot	France, India	Nag Raj (1993), Chethana et al. (2017)
C. vitis Chethana, Yan, Li & K. D. Hyde*	*Schizoparmaceae*	P	White rot	China	Chethana et al. (2017), This study, Jayawardena et al. (2018)
Coniella sp.*	*Schizoparmaceae*	P	Wood necrosis	India	Chethana et al. (2017)
Coniocessia sp.*	*Coniocessiaceae*	S		China	This study
Coniochaeta hoffmannii (J.F.H. Beyma) Z.U. Khan, Gené & Guarro*	*Coniochaetaceae*	P	Bunch rot	Germany, Switzerland	Casieri et al. (2009), Fischer et al. (2016)
Coniolariella sp.*	*Xylariaceae*	S		China	This study
Coniothecium viticola Cooke & Massee	Helotiales incertae sedis	S		UK	Saccardo (1878)
Coniothyrium ampelinum Cooke	*Coniothyriaceae*	E		USA	Cooke (1878)
C. berlandieri Viala & Sauv.	*Coniothyriaceae*	P	Leaf spot	Cambodia, USA	Anonymous (1960), Litzenberger et al. (1962)
C. iranicum Esfand.	*Coniothyriaceae*	E		Central Asia	Koshkelova and Frolov (1973)
C. vitivorum Miura	*Coniothyriaceae*	E		China	Tai (1979)
Cophinforma mamane (D.E. Gardner) A.J.L. Phillips & A. Alves*	*Botryosphaeriaceae*	P	Canker, Die back	Brazil	Correia et al. (2013)
Coprinellus radians (Desm.) Vilgalys, Hopple & Jacq. Johnson*	*Psathyrellaceae*	S		Switzerland	Casieri et al. (2009)
Corticium appalachiense (Burds. & M.J. Larsen) M.J. Larsen	*Corticiaceae*	P, S	Wood decay	USA	Burdsall (1976)
C. centrifugum (Weinm.) Fr.	*Corticiaceae*	P, S	Wood decay	China	Tai (1979)
Corticium sp.	*Corticiaceae*	S		USA	Anonymous (1960)
Coryneopsis microsticta (Berk. & Broome) Grove	*Discosiaceae*	P	Stem lesions	Poland, Portugal	de Sousa Dias and Lucas (1972), Mulenko et al. (2008)
Corynespora cassiicola (Berk. & M.A. Curtis) C.T. Wei	*Corynesporascaceae*	P	Leaf spot	USA	Alfieri Jr. et al. (1984, 1994)
Coryneum viticola Ellis & Everh.	*Pseudovalsaceae*	S		USA	Anonymous (1960)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Crepidotus viticola S. Imai	*Inocybaceae*	S		Japan	Petrak (1953)
Cryptocline cinerascens (Bubák) Arx	Ascomycota genera *incertae sedis*	E		Japan	Kobayashi (2007)
Cryptococcus sp.*	*Tremellaceae*	E, S		China	Dissanayake et al. (2018), This study
Cryptophaeella trematosphaeriicola Frolov	*Montagnulaceae*	E		Central Asia	Koshkelova and Frolov (1973)
Cryptosphaeria pullmanensis Glawe*	*Diatrypaceae*	P	Canker	USA	Trouillas and Gubler (2010), Trouillas et al. (2010), Úrbez-Torres et al. (2012)
Cryptosporella viticola Shear	*Valsaceae*	P	Fruit rot, Dead arm	China, Greece, Korea, USA	Hewitt (1951), Tai (1979), Holevas et al. (2000), Cho and Shin (2004)
Cryptovalsa ampelina Abbado*	*Diatrypaceae*	P	Eutypa dieback	Australia, Austria, Chile, France, Hungary, Italy, Portugal, South Africa, Spain, USA	Unamuno (1941), Petrak (1953), Mostert et al. (2004), Lardner et al. (2005), Sosnowski et al. (2007), Luque et al. (2009), Martin et al. (2009), Trouillas and Gubler (2010), Trouillas et al. (2010, 2011), Diaz et al. (2011), White et al. (2011), Úrbez-Torres et al. (2012), Pitt et al. (2013), Li et al. (2016-designated reference specimen), This study, Jayawardena et al. (2018)
C. protracta (Pers.) De Not.	*Diatrypaceae*	P	Eutypa dieback	Greece	Pantidou (1973)
C. rabenhorstii (Nitschke) Sacc.*	*Diatrypaceae*	P	Eutypa dieback	Australia	Trouillas et al. (2011), Pitt et al. (2013)
Cryptovalsa sp.*	*Diatrypaceae*	P	Eutypa dieback	New Zealand	Lardner et al. (2005)
Curvularia americana Da Cunha, Madrid, Gené & Cano*	*Pleosporaceae*	E		China	Dissanayake et al. (2018)
Curvularia sp.*	*Pleosporaceae*	E		China	Dissanayake et al. (2018)
Cylindrocarpon destructans (Zinssm.) Scholten*	*Diatrypaceae*	P, E	Black foot	Argentina, Canada, France, Iran, Italy, Portugal, Spain, Tasmania, Uruguay	Gerlach and Ershad (1970), Grasso (1984), Maluta and Larignon (1991), Rego et al. (2000), Gatica et al. (2001), Seifert et al. (2003), Casieri et al. (2009), Abreo et al. (2010), Gonzalez and Tello (2011)
C. lichenicola (C. Massal.) D. Hawksw.	*Diatrypaceae*	P	Black foot	India	Booth (1966)
C. ntricatea J.D. MacDon. & E.E. Butler*	*Diatrypaceae*	P	Black foot	Australia, Canada, France, Iran, Portugal, Spain, Switzerland, Uruguay, USA	Alaniz et al. (2007, 2009), Petit and Gubler (2007), Whitelaw-Weckert et al. (2007), Casieri et al. (2009), Luque et al. (2009), Abreo et al. (2010, 2012), Petit et al. (2011), Mohammadi et al. (2013a)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Cylindrocarpon sp.*	*Diatrypaceae*	P, S	Black foot	Canda, China, Lebanon, Portugal, South Africa, Spain, Switzerland, Tasmania, USA	Halleen et al. (2003), Gimenez-Jaime et al. (2006), Martin and Cobos (2007), Whitelaw-Weckert et al. (2007), Casieri et al. (2009), Choueiri et al. (2009), This study
Cylindrocladiella lageniformis Crous, M.J. Wingf. & Alfenas*	*Nectriaceae*	P	Black foot	South Africa, USA	Victor et al. (1998), Boesewinkel (1982), Koike et al. (2016)
C. parva (P.J. Anderson) Boesew.*	*Nectriaceae*	P	Black foot	New Zealand, South Africa, Spain	Van Coller et al. (2005), Gadgil (2005), Agusti-Brisach et al. (2012)
C. peruviana (Bat., J.L. Bezerra & M.P. Herrera) Boesew.*	*Nectriaceae*	P	Black foot	South Africa, USA	Boesewinkel (1982), Koike et al. (2016)
C. pseudoparva L. Lombard & Crous*	*Nectriaceae*	S		New Zealand	Boesewinkel (1982)
C. viticola Crous & Van Coller*	*Nectriaceae*	P	Cutting rot of grapevines, Black foot	South Africa, USA	Hirooka et al. (2013)
C. vitis Crous & Thangavel*	*Nectriaceae*	P	Black foot	New Zealand	Crous et al. (2017)
Cylindrocladiella sp.*	*Nectriaceae*	S		New Zealand	Boesewinkel (1982)
Cytospora ampelina Sacc.	*Valsaceae*	P	Canker	Pol2and	Mulenko et al. (2008)
C. chrysosperma (Pers.) Fr.*	*Valsaceae*	E		Spain	Gonzalez and Tello (2011), Garcia-Benavides et al. (2013)
C. cincta Sacc.*	*Valsaceae*	P	Canker	Iran	Fotouhifar et al. (2010)
C. leucostoma (Pers.) Sacc.*	*Valsaceae*	P	Canker	Iran	Fotouhifar et al. (2010)
C. vinacea D.P. Lawr., Travadon & Pouzoulet*	*Valsaceae*	P	Canker	USA	Lawrence et al. (2017a)
C. viticola D.P. Lawr., Travadon & Pouzoulet*	*Valsaceae*	P	Canker	Canada, USA	Lawrence et al. (2017a)
C. vitis Mont.	*Valsaceae*	P	Canker	Central Asia, Greece, Portugal, USA	Montagne (1856), Koshkelova and Frolov (1973), Pantidou (1973), Anonymous (1960), Phillips (2000)
Dacrymyces viticola	*Dacrymycetaceae*	S		USA	Saccardo (1878)
Dactylellina sp.*	*Orbiliaceae*	S		China	This study
Dactylonectria alcacerensis (A. Cabral, Oliveira & Crous)*	*Nectriaceae*	P	Black foot	Portugal, Spain	Agusti-Brisach et al. (2016), Carlucci et al. (2017)
D. estremocensis (A. Cabral, Nascimento & Crous) L. Lombard & Crous*	*Nectriaceae*	P	Black foot	Portugal	Agusti-Brisach et al. (2016), Carlucci et al. (2017)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
D. macrodidyma (Halleen, Schroers & Crous)*	*Nectriaceae*	P, S	Black foot	Australia, Brazil, Canada, New Zealand, Portugal, Slovenia, South Africa, Switzerland, USA	Casieri et al. (2009), Abreo et al. (2010), Santos et al. (2014), Úrbez-Torres et al. (2014), Agusti-Brisach et al. (2016), Carlucci et al. (2017), This study
D. novozelandica (A. Cabral & Crous) L. Lombard & Crous*	*Nectriaceae*	P	Black foot	New Zealand, South Africa, USA	Úrbez-Torres et al. (2014), Carlucci et al. (2017)
D. pauciseptata (Schroers & Crous) L. Lombard & Crous*	*Nectriaceae*	P, S	Root rot, Black foot	Brazil, Canada, New Zealand, Portugal, Slovenia, Spain, Uruguay	Abreo et al. (2010), Agusti-Brisach et al. (2011), Martin et al. (2011a), Petit et al. (2011), Úrbez-Torres et al. (2014), Santos et al. (2014)
D. pinicola L. Lombard & Crous*	*Nectriaceae*	P	Black foot	Portugal	Carlucci et al. (2017),
D. torresensis (A. Cabral, Rego & Crous) L. Lombard & Crous*	*Nectriaceae*	P	Black foot	Australia, Canada, Italy, New Zealand, Portugal, South Africa, Spain, USA	Úrbez-Torres et al. (2014), Agusti-Brisach et al. (2016), Carlucci et al. (2017), Gonzalez and Chaverri (2017)
D. vitis (A. Cabral, Rego & Crous) L. Lombard & Crous*	*Nectriaceae*	P	Black foot	Portugal	Úrbez-Torres et al. (2014), Carlucci et al. (2017)
Deconica horizontalis (Bull.) Noordel.	*Hymenogastraceae*	S		South Africa	Doidge (1950)
Dendrophoma sp.	*Chaetosphaeriaceae*	S		Japan	Kobayashi (2007)
Desarmillaria tabescens (Scop.) R. A. Koch & Aime	*Physalacriaceae*	P	Root rot	Japan	Kobayashi (2007)
Devriesia sp.*	*Teratosphaeriaceae*	S		China	This study
Desmazierella sp.	*Chorioactidaceae*	S		Pakistan	Ahmad et al. (1997)
Diaporthe ambigua Nitschke*	*Diaporthaceae*	P	Canker	USA, South Africa	van Niekerk et al. (2005), White et al. (2011), Úrbez-Torres et al. (2013a, b), Lawrence et al. (2015)
D. ampelina (Berkeley & M.A. Curtis) R.R. Gomes, C. Glienke & Crous*	*Diaporthaceae*	P, E, S	Excoriose, Dead arm, Canker	Australia, Bulgaria, China, France, India, Italy, Japan, New Zealand, Poland, South Africa, Spain, Switzerland, Turkey, USA	Phillips (2000), Zhuang (2005), Kobayashi (2007), Casieri et al. (2009), Gonzalez and Tello (2011), Garcia-Benavides et al. (2013), Gomes et al. (2013), Kepley et al. (2015), Lawrence et al. (2015), Du et al. (2016), This study, Jayawardena et al. (2018)
D. mnivore (Delacr.) Udayanga, P.W.Crous & K.D.Hyde*	*Diaporthaceae*	P	Canker	South Africa	van Niekerk et al. (2005), Udayanga et al. (2011), Gomes et al. (2013)
D. australafricana Crous & Van Niekerk*	*Diaporthaceae*	P	Canker	Australia, South Africa, USA	van Niekerk et al. (2005), Mostert et al. (2001), Udayanga et al. (2012, 2014), Gomes et al. (2013), Lawrence et al. (2015), Du et al. (2016)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
D. chamaeropis (Cooke) R.R. Gomes, C. Glienke & Crous	*Diaporthaceae*	P	Canker	USA	Lawrence et al. (2015)
D. eres Nitschke*	*Diaporthaceae*	P, S	Canker	Bulgaria, China, France, Germany, Italy, Japan, Switzerland, USA	Kobayashi (2007), Casieri et al. (2009), Stoykov (2012), Baumgartner et al. (2013), Úrbez-Torres et al. (2013a, b), Lawrence et al. (2015), Cinelli et al. (2016), Fischer et al. (2016), Bastide et al. (2017), This study, Jayawardena et al. (2018)
D. foenicula Niessl*	*Diaporthaceae*	P	Canker	South Africa, Portugal, USA	Luongo et al. (2011), Úrbez-Torres et al. (2013a, b), Udayanga et al. (2014a, b), Lawrence et al. (2015)
D. helianthi Munt.-Cvetk., Mihaljc. & M. Petrov*	*Diaporthaceae*	P	Canker	South Africa	van Niekerk et al. (2005), Udayanga et al. (2011)
D. hongkongensis R.R. Gomes, C. Glienke & Crous*	*Diaporthaceae*	P	Canker	China	Dissanayake et al. (2015)
D. kyushuensis Kajitani & Kanem.	*Diaporthaceae*	P	Canker	Japan	Kanematsu et al. (2000), Kobayashi (2007)
D. longiparaphysata (Uecker & K.C. Kuo) Udayanga & Castl.*	*Diaporthaceae*	P	Canker	Taiwan	Uecker and Kuo (1992), Udayanga et al. (2011)
D. nobilis Sacc. & Speg.*	*Diaporthaceae*	P	Canker	California	Lawrence et al. (2015)
D. novem M. Santos, Vrandecic & A.J.L. Phillips*	*Diaporthaceae*	P	Canker	California	Lawrence et al. (2015)
D. perjuncta Niessl	*Diaporthaceae*	P	Canker	Australia, Portugal, South Africa	Phillips (1999), Mostert et al. (2001)
D. perniciosa Marchal & É.J. Marchal	*Diaporthaceae*	P	Canker	Bulgaria	Stoykow and Denchev (2006)
D. phaseolorum (Cooke & Ellis) Sacc.*	*Diaporthaceae*	P	Canker	China, Switzerland	Casieri et al. (2009), Dissanayake et al. (2015)
D. rudis (Fr.) Nitschke*	*Diaporthaceae*	P, S	Canker	Australia, Germany, Italy, Portugal	Scheper et al. (2000), Úrbez-Torres et al. (2012), Gomes et al. (2013), Udayanga et al. (2014a, b), Huang et al. (2015), This study, Jayawardena et al. (2018)
D. sojae Lehman*	*Diaporthaceae*	P	Canker	China	Dissanayake et al. (2015)
D. vitimegaspora (K.C. Kuo & L.S. Leu) Rossman & Udayanga*	*Diaporthaceae*	P	Canker	Japan, Thailand, Thaiwan	Kuo and Leu (1998), van Niekerk et al. (2005), Udayanga et al. (2011)
Diaporthe sp.*	*Diaporthaceae*	P	Canker	Bulgaria, France, Italy, Japan, Portugal, South Africa, Spain Switzerland, USA	Kanematsu et al. (2000), Mostert et al. (2001), van Niekerk et al. (2005), Bobev (2009), Casieri et al. (2009), Santos et al. (2010), Luongo et al. (2011), Úrbez-Torres et al. (2013a, b)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Diatrype nigerrima Ellis & Everh.	*Diatrypaceae*	P	Eutypa dieback	USA	Ellis and Everhart (1904), Cash (1952)
D. oregonensis Wehm.) Rappaz*	*Diatrypaceae*	P	Eutypa dieback	USA	Trouillas and Gubler (2010), Trouillas et al. (2010), Úrbez-Torres et al. (2013a, b)
D. stigma (Hoffm.) Fr.*	*Diatrypaceae*	P	Eutypa dieback	Spain, USA	Unamuno (1941), Trouillas et al. (2010), Úrbez-Torres et al. (2013a, b)
D. utahensis Rehm	*Diatrypaceae*	P	Eutypa dieback	India	Pande (2008)
D. whitmanensis J.D. Rogers & Glawe*	*Diatrypaceae*	P	Eutypa dieback	USA	Trouillas and Gubler (2010), Trouillas et al. (2010), Úrbez-Torres et al. (2013a, b)
Diatrype sp.*	*Diatrypaceae*	P	Eutypa dieback	Australia, USA	Trouillas et al. (2010, 2011), Pitt et al. (2013), Úrbez-Torres et al. (2012, 2013a, b)
Diatrypella verrucaeformis (Ehrh.) Nitschke*	*Diatrypaceae*	P	Eutypa dieback	USA	Trouillas and Gubler (2010), Trouillas et al. (2010)
D. vitis Ellis & Everh.	*Diatrypaceae*	P	Eutypa dieback	China, USA	Cash (1952), Teng (1996)
D. vulgaris Trouillas, W.M. Pitt & Gubler*	*Diatrypaceae*	P	Eutypa dieback	Australia	Trouillas et al. (2011), Pitt et al. (2013)
Diatrypella sp.*	*Diatrypaceae*	P	Eutypa dieback	USA	Trouillas and Gubler (2010), Trouillas et al. (2010), Úrbez-Torres et al. (2012)
Dictyosporium elegans Corda	*Dictyosporiaceae*	P	Canker	Portugal	de Sousa Dias et al. (1987)
D. toruloides (Corda) Guég.	*Dictyosporiaceae*	P	Canker	Russia	Melnik and Popushoi (1992)
Didymella glomerata (Corda) Q. Chen & L. Cai*	*Didymellaceae*	E		Spain, Switzerland	Casieri et al. (2009), Gonzalez and Tello (2011)
D. negriana (Thümen) Q. Chen & L. Cai*	*Didymellaceae*	P, S	Black rot, Canker	Germany, Italy	Chen et al. (2015), This study, Jayawardena et al. (2018)
D. pomorum (Thümen) Q. Chen & L. Cai*	*Didymellaceae*	S		Australia,China	Cook and Dubé (1989), This study, Jayawardena et al. (2018)
Didymosphaeria bacchans Pass.	*Didymosphaeriaceae*	S		Italy	Greuter et al. (1991)
D. sarmenti (Cooke & Harkn.) Berl. & Voglino	*Didymosphaeriaceae*	P	Shoot lesions	Japan, Portugal, USA	Unamuno (1941), French (1989), Kobayashi (2007)
Dinemasporium pleurospora (Sacc.) Shkarupa	*Chaetosphaeriaceae*	S		Pakistan, Poland	Ahmad (1969), Ahmad et al. (1997), Mulenko et al. (2008)
Diplodia ampelina Cooke	*Botryosphaeriaceae*	P	Canker	Portugal, USA	Cooke (1878), Saccardo and Traverso (1903)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
D. bacchii Pass. & Thüm	*Botryosphaeriaceae*	P, S	Canker	Belgium, Italy, Portugal	Cooke (1878)
D. corticola A.J.L. Phillips, A. Alves & J. Luque*	*Botryosphaeriaceae*	P	Canker	Italy, Mexico, Spain, USA	Carlucci and Frisullo (2009), Úrbez-Torres et al. (2010a, b, c), Pintos et al. (2011), Úrbez-Torres (2011), Carlucci et al. (2015)
D. intermedia A.J.L. Phillips, J. Lopes & A. Alves*	*Botryosphaeriaceae*	P	Canker	France	Comont et al. (2016)
D. mutila (Fr.) Mont.*	*Botryosphaeriaceae*	P, E	Canker	Australia, Canada, France, Hungary, Italy, New Zealand, Portugal, Spain, USA	Phillips (1998, 2000), Taylor et al. (2005), Úrbez-Torres et al. (2006), van Niekerk et al. (2006), Martin and Cobos (2007), Baskarathevan et al. (2008, 2012), Pitt et al. (2010), Gonzalez and Tello (2011), Qiu et al. (2011), Úrbez-Torres (2011), Whitelaw-Weckert et al. (2013), Alves et al. (2014), Carlucci et al. (2015)
D. nematospora Sacc.	*Botryosphaeriaceae*	S		Eritrea	Castellani and Ciferri (1937)
D. seriata (Fr.) Mont.*	*Botryosphaeriaceae*	P, E, S	Canker	Australia, Bulgaria, Canada, Chile, China, France, Germany, Greece, Iran, Italy, Lebanon, New Zealand, Portugal, South Africa, Spain, Switzerland, Tunisia Uruguay, USA	Pantidou (1973), Castillo-Pando et al. (2001), Larignon and Dubos (2001), Halleen et al. (2003), Auger et al. (2004a), Choueiri et al. (2006), van Niekerk et al. (2006), Slippers et al. (2007a, b), Baskarathevan et al. (2008), Epstein (2008), Casieri et al. (2009), Luque et al. (2009), Úrbez-Torres (2011), Yan et al. (2011a, b), Abreo et al. (2012), Garcia-Benavides et al. (2013), Mohammadi et al. (2013b), Mondello et al. (2013), Chebil et al. (2014), Fischer et al. (2016), This study, Jayawardena et al. (2018)
Diplodia sp.*	*Botryosphaeriaceae*	P	Canker	Belgium, Bulgaria, Cuba, Mexico, South Africa	Greuter et al. (1991), van Niekerk et al. (2004a), Bobev (2009), Casieri et al. (2009)
Diplodina vitis Brunaud	*Gnomoniaceae*	P	Root stock disease	Central Asia	Koshkelova and Frolov (1973)
Discohainesia oenotherae (Cooke & Ellis) Nannf.	*Dermateaceae*	P	Leaf spot	USA	Anonymous (1960)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Discosia artocreas (Todd) Fr.	*Sporocadaceae*	P	Leaf spot	USA	Gilman (1932), Maneval (1937), Cooke (1983)
D. vitis Schulzer	*Sporocadaceae*	P	Leaf spot	Hungary	Nag Raj (1993)
Discostroma corticola (Fuckel) Brockmann	*Sporocadaceae*	P	Cane blight	New Zealand	Pennycook (1989)
Doratomyces stemonitis (Pers.) F.J. Morton & G. Sm.	*Microascaceae*	S		Argentina, Russia	Melnik and Popushoi (1992), Carmaran and Novas (2003)
Dothiorella americana Úrbez-Torres, Peduto & Gubler*	*Botryosphaeriaceae*	P	Die back, Canker	USA	Úrbez-Torres (2011), Úrbez-Torres et al. (2012)
D. iberica A.J.L. Phillips, J. Luque & A. Alves*	*Botryosphaeriaceae*	P, S	Die back, Canker	Australia, Italy, New Zealand, Spain, USA	Úrbez-Torres et al. (2007), Baskarathevan et al. (2008, 2012), Úrbez-Torres and Gubler (2009), Qiu et al. (2011), Úrbez-Torres (2011), Pitt et al. (2010), McDonald and Eskalen (2011), Carlucci et al. (2015), Martin and Cobos (2007), This study, Jayawardena et al. (2018)
D. neclivora W.M. Pitt & J.R. Úrbez-Torres*	*Botryosphaeriaceae*	P	Die back, Canker	Australia	Pitt et al. (2015)
D. mnivore B. T. Linaldeddu, A. Deidda & B. Scanu*	*Botryosphaeriaceae*	P	Die back, Canker	Australia	Linaldeddu et al. (2016)
D. reinformis (Viala & Ravaz) Petr. & Syd	*Botryosphaeriaceae*	P, S	Die back, Canker	Italy, Portugal, South Africa	Petrak and Sydow (1927), Doidge (1950), Costa and Camara (1952)
D. sarmentorum (Fr.) A.J.L. Phillips, Alves & Luque*	*Botryosphaeriaceae*	P, S	Die back, Canker	China, Italy, New Zealand, Spain	Martin and Cobos (2007), Baskarathevan et al. (2012), Carlucci et al. (2015), This study, Jayawardena et al. (2018)
D. vidmadera W.M. Pitt, J.R. Úrbez-Torres, Trouillas*	*Botryosphaeriaceae*	P	Die back, Canker	Australia	Pitt et al. (2013), Linaldeddu et al. (2016), Lawrence et al. (2017b)
D. vinea-gemmae W.M. Pitt & J.R. Úrbez-Torres*	*Botryosphaeriaceae*	P	Die back, Canker	Australia	Pitt et al. (2015)
D. viticola A.J.L. Phillips & J. Luque	*Botryosphaeriaceae*	P, S	Die back, Canker	Spain	Luque et al. (2005)
Dothiorella sp.*	*Botryosphaeriaceae*	P	Die back, Canker	Australia, Mexico, USA	Úrbez-Torres et al. (2010a, b, c), Pitt et al. (2015), Lawrence et al. (2017b)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Elsinoe ampelina Shear	*Elsinoaeceae*	P	Grape antracnose	Barbados, Brazil, Bulgaria, Cambodia,Chile,China,Cuba, Haiti, Hong Kong, India, Italy, Jamaica, Kenya, Mauritius, Mexico, Myanmar, New Zealand, Poland, South Africa, Spain, Tanzania, Trinidad and Tobago, Thailand, USA, Venezuela, Zimbabwe	Gilman and Archer (1929), Jenkins and Bitancourt (Jenkins and Bitancourt 1940–1963), Mujica and Vergara (1945), Baker and Dale (1951), Riley (1960), Nattrass (1961), Litzenberger et al. (1962), Whiteside (1966), Orieux and Felix (1968), Benjamin and Slot (1969), Dennis (1970), Norse (1974), Alvarez (1976), Tai (1979), Alfieri Jr. et al. (1984), Grand (1985), Arnold (1986), Pennycook (1989), Greuter et al. (1991), Mendes et al. (1998), Lu et al. (2000), Zhuang (2001), Mulenko et al. (2008), Thaung (2008a, b, c), Bobev (2009)
Emericella sp.*	*Aspergillaceae*	S		China	This study
Endobasidium clandestinum Speschnew	*Exobasidiaceae*	P	Root rot	Uzbekistan	Gaponenko (1965)
Endoconidioma populi Tsuneda, Hambl. & Currah*	*Dothideaceae*	P	Necrotic twigs	Iran	Mirzaei et al. (2015)
Epicoccum granulatum Penz.	*Didymellaceae*	S		USA	Shaw (1973)
E. nigrum Link*	*Didymellaceae*	E, S		China, Italy, Spain, Switzerland	Phillips (2000), Casieri et al. (2009), Gonzalez and Tello (2011), This study, Jayawardena et al. (2018)
E. plurivorum (P.R. Johnston) Q. Chen & L. Cai	*Didymellaceae*	S		New Zealand	Gadgil (2005)
Epicoccum sp.	*Didymellaceae*	S		France	Larignon and Dubos (1997), Halleen et al. (2003)
Eriocercosporella vitis-heterophyllae (Henn.) U. Braun	Ascomycota genera *incertae sedis*	P	Leaf spot	Japan	Chupp (1953), Watson (1971)
Eriosphaeria oenotria Sacc. & Speg.	*Trichosphaeriaceae*	S		Italy	Farr (1973)
Erysiphe necator Schwein.	*Erysiphaceae*	P	Powdery mildew	Australia, Belgium, Bulgaria, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Hungary, India, Ishrael, Italy, Japan, Korea, Netherlands, Peru, Poland, Romania, Russia, Spain, Sweden, Switzerland, Turkey, UK, Yugoslavia	Greuter et al. (1991), Nomura et al. (2003), Bolay (2005), Ruszkiewicz-Michalska and Michalski (2005), Amrani and Corio-Costet (2006), Paul and Thakur (2006), Rusanov and Bulgakov (2008), Voytyuk et al. (2009), Park et al. (2010), Bendezu-Euribe and Alvarez (2012)
E. tuckeri Berk.	*Erysiphaceae*	P	Powdery mildew	Spain	Unamuno (1941)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Erythricium salmonicolor (Berk. & Broome) Burds.	*Corticiaceae*	P	Sour rot	Thailand	Giatgong (1980)
Eucasphaeria capensis Crous*	*Niessliaceae*	P	Eutypa dieback	Germany	Fischer et al. (2016)
Eutypa lata (Pers.) Tul. & C. Tul.*	*Diatrypaceae*	P	Eutypa dieback	Australia, Brazil, Bulgaria, Europe, France, Germany, Greece, Italy, New Zealand, Serbia, South Africa, Spain, Switzerland, USA	Moller et al. (1974), Pennycook (1989), Shivas (1989), Carter (1991), Larignon and Dubos (1997), Mendes et al. (1998), Péros et al. (1999), Holevas et al. (2000), Rolshausen et al. (2004, 2014), Lardner et al. (2005), Sosnowski et al. (2007), Bobev (2009), Luque et al. (2009), Trouillas et al. (2010, 2011), White et al. (2011), Úrbez-Torres et al. (2012), Živkovic et al. (2012), Garcia-Benavides et al. (2013), Travadon and Baumgartner (2015), Mayorquin et al. (2016)
E. laevata (Nitschke) Sacc.*	*Diatrypaceae*	P	Eutypa dieback	Canada, USA	Rappaz (1987), Rolshausen et al. (2004, 2014)
E. ludibunda Sacc.	*Diatrypaceae*	P	Eutypa dieback	USA	Tiffany and Gilman (1965)
E. leptoplaca (Durieu & Mont.) Rappaz*	*Diatrypaceae*	P	Eutypa dieback	Spain, South Africa, USA	Luque et al. (2009), Trouillas and Gubler (2004, 2010), Úrbez-Torres et al. (2012)
Eutypa sp.*	*Diatrypaceae*	P	Eutypa dieback	Bulgaria, USA	Bobev (2009), Rolshausen et al. (2014)
Eutypella aequilinearis (Schwein.) Starbäck	*Diatrypaceae*	P	Eutypa dieback	Japan, USA	Rappaz (1987), Kobayashi (2007)
E. aulacostroma (Kunze) Berl.	*Diatrypaceae*	P	Eutypa dieback	Taiwan	Rappaz (1987)
E. citricola Speg.*	*Diatrypaceae*	P	Eutypa dieback	Australia, USA	Trouillas et al. (2011), Pitt et al. (2013), Mayorquin et al. (2016)
E. fraxinicola (Cooke & Peck) Sacc.	*Diatrypaceae*	P	Eutypa dieback	USA	Hanlin (1963)
E. leprosa (Pers.) Berl.	*Diatrypaceae*	P	Eutypa dieback	Chile, Spain, Switzerland, USA	Rappaz (1987), Diaz et al. (2011)
E. microtheca Trouillas, W.M. Pitt & Gubler*	*Diatrypaceae*	P	Eutypa dieback	Australia, Mexico, USA	Trouillas et al. (2011), Pitt et al. (2013), Paolinelli-Alfonso et al. (2016), Mayorquin et al. (2016)
E. vitis (Schwein.) Ellis & Everh.*	*Diatrypaceae*	P	Eutypa dieback	Italy, Pakistan, South Africa, Spain, Uruguay, USA	Greuter et al. (1991), Ahmad et al. (1997), Luque et al. (2009), White et al. (2011), Úrbez-Torres et al. (2012), Abreo et al. (2012), Mayorquin et al. (2016)
Eutypella sp.*	*Diatrypaceae*	P	Eutypa dieback	USA	Trouillas et al. (2010), Úrbez-Torres et al. (2012), Mayorquin et al. (2016)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Excipula viticola Schwein	*Dermateaceae*	P	On leaves	USA	Saccardo (1878)
Exosporium sultanae du Plessis	Ascomycota genera *incertae sedis*	S		South Africa	Gorter (1977)
Exophiala sp.*	*Herpotrichiellaceae*	E		China	Dissanayake et al. (2018)
Exserohilum rostratum (Drechsler) K.J. Leonard & Suggs*	*Pleosporaceae*	S		China	This study, Jayawardena et al. (2018)
Floricola viticola (Phukhamsakda, Camporesi & K.D. Hyde) Jaklitsch & Voglmayr*	*Teichosporaceae*	S		Italy	Ariyawansa et al. (2015), This study, Jayawardena et al. (2018)
Fomes fomentarius (L.) Fr.	*Polyporaceae*	P	Esca	China	Tai (1979)
F. igniarius (L.) Fr.*	*Polyporaceae*	P	Esca	France, USA	Chiarappa (1959), Cloete et al. (2015)
Fomitiporia australiensis M. Fisch., J. Edwards, Cunningt. & Pascoe*	*Hymenochaetaceae*	P	Esca	Australia	Fischer et al. (2005), Cloete et al. (2015)
F. capensis M. Fisch., M. Cloete, L. Mostert, F. Halleen*	*Hymenochaetaceae*	P	Esca	South Africa	Cloete et al. (2014)
F. mediterranea M. Fisch.*	*Hymenochaetaceae*	P	Esca	Europe, Germany, Iran, Italy, Spain, Turkey	Fischer et al. (2005), Martin and Cobos (2007), Luque et al. (2009), Mohammadi and Banihashemi (2012), Garcia-Benavides et al. (2013), Mondello et al. (2013), Akgul et al. (2015), Cloete et al. (2015)
F. polymorpha M. Fisch.*	*Hymenochaetaceae*	P	Esca	USA	Cloete et al. (2015)
F. punctata (P. Karst.) Murrill*	*Hymenochaetaceae*	P	Esca	Australia, France, Iran, Italy	Larignon and Dubos (1997), Pascoe and Cottral (2000), Karimi et al. (2001), Cloete et al. (2015)
Fomitiporia sp.*	*Hymenochaetaceae*	P	Esca	Italy, South Africa	White et al. (2011), Mondello et al. (2013)
Fusarium acuminatum Ellis & Everh.*	*Nectriaceae*	P	Wilt	Spain	Garcia-Benavides et al. (2013)
F. anthophilum (A. Braun) Wollenw.	*Nectriaceae*	P	Wilt	Brazil	Mendes et al. (1998)
F. avenaceum (Fr.) Sacc.	*Nectriaceae*	P	Wilt	China, Italy	Tai (1979), Greuter et al. (1991)
F. equiseti (Corda) Sacc.	*Nectriaceae*	P	Wilt	Brazil	Mendes et al. (1998)
F. fujikuroi Nirenberg	*Nectriaceae*	P	Wilt	Brazil	Mendes et al. (1998)
F. oxysporum Schltdl.*	*Nectriaceae*	P, E, S	Wilt	Australia, Brazil, China, South Africa, Spain	Gorter (1977), Mendes et al. (1998), Castillo-Pando et al. (2001), Gonzalez and Tello (2011), This study, Jayawardena et al. (2018)
F. poae (Peck) Wollenw.	*Nectriaceae*	P	Wilt	USA	Shaw (1973)
F. proliferatum (Matsush.) Nirenberg*	*Nectriaceae*	P, E	Wilt	China, Spain	Gonzalez and Tello (2011), Wang et al. (2015)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
F. schweinitzii Ellis & Harkn.	*Nectriaceae*	P, E	Wilt	USA	Sumstine (1949), Cash (1952)
F. solani (Mart.) Sacc.*	*Nectriaceae*	P	Wilt	Brazil, India, Switzerland	Sarbhoy and Agarwal (1990), Mendes et al. (1998), Casieri et al. (2009)
F. viticola Thüm.	*Nectriaceae*	S		USA	Saccardo (1878)
F. volutella Ellis & Everh.	*Nectriaceae*	P	Wilt	USA	Cash (1952)
Fusarium sp.*	*Nectriaceae*	P, S	Wilt	Australia, China, Germany, Italy, South Africa, Switzerland, Spain, Uruguay	Cook and Dubé (1989), O'Donnell et al. (1998), Halleen et al. (2003), Casieri et al. (2009), Luque et al. (2009), Abreo et al. (2010), Mondello et al. (2013), This study, Jayawardena et al. (2018)
Fusicladium viticis M.B. Ellis	*Sympoventuriaceae*	P	Leaf spot	China	Zhang (2003)
Geomyces pannorum (Link) Sigler & J.W. Carmich.*	*Myxotrichaceae*	E		Switzerland	Casieri et al. (2009)
Geomyces sp.	*Myxotrichaceae*	S		China	This study
Geotrichum candidum Link	*Dipodascaceae*	E		Japan	Kobayashi (2007)
Geotrichum sp.	*Dipodascaceae*	E		Spain	Gonzalez and Tello (2011)
Gloniopsis praelonga (Schwein.) Underw. & Earle	*Hysteriaceae*	S		Germany	Lotz-Winter et al. (2011)
Glonium lineare (Fr.) De Not.	*Gloniaceae*	S		Rhode Island	Goos (2010)
G. macrosporium Tracy & Earle	*Gloniaceae*	S		USA	Parris (1959)
Glonium sp.	*Gloniaceae*	S		USA	Hanlin (1963)
Golovinomyces biocellatus (Ehrenb.) V.P. Heluta	*Erysiphaceae*	P	Powdery mildew	India	Paul and Thakur (2006)
Gonatobotrys flava Bonord.	*Ceratostomataceae*	E		Poland	Mulenko et al. (2008)
Gonatobotryum sp.	Ascomycota genera *incertae sedis*	E		Spain	Gonzalez and Tello (2011)
Graphium cinerellum Speg.	*Graphiaceae*	P	Leaf spot	Italy	Farr (1973)
Greeneria uvicola (Berk. & M.A. Curtis) Punith.*	Diaporthales genera *incertae sedis*	P	Bitter rot	Australia, Bulgaria, Brazil, Cuba, India, Poland, South Africa, Taiwan, Thailand, Ukraine, Uruguay, USA	Cooke (1878), Simmonds (1966), Gorter (1977), Mathur (1979), Giatgong (1980), Reddy and Reddy (1983), Arnold (1986), Kummuang et al. (1996), Mendes et al. (1998), Castillo-Pando et al. (2001), Farr et al. (2001), Dudka et al. (2004), Longland and Sutton (2008), Mulenko et al. (2008), Bobev (2009), Navarrete et al. (2009), Abreo et al. (2012)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Grovesinia moricola (I. Hino) Redhead	*Sclerotiniaceae*	P	Bunch rot	USA	Grand (1985)
G. pyramidalis M.N. Cline, J.L. Crane & S.D. Cline	*Sclerotiniaceae*	P	Bunch rot	Japan	Kobayashi (2007)
Gymnascella sp.*	*Gymnoascaceae*	S		China	This study
Gyrothrix podosperma (Corda) Rabenh.	Ascomycota genera *incertae sedis*	S		Pakistan	Ahmad et al. (1997)
Hansfordia pulvinata (Berk. & M.A. Curtis) S. Hughes	Ascomycota genera *incertae sedis*	S		Pakistan	Ahmad et al. (1997)
H. tonduzii (Speg.) Bat. & A.F. Vital	Ascomycota genera *incertae sedis*	S		Costa Rica	Batista and Ciferri (1962)
Hansfordia sp.*	Ascomycota genera *incertae sedis*	S		China	This study
Hapalopilus rutilans (Pers.) Murrill	*Polyporaceae*	S		USA	Gilbertson et al. (1974)
Helicobasidium mompa Nobuj. Tanaka	*Helicobasidiaceae*	P	Root rot	Japan	Kobayashi (2007)
Helminthosporium decacuminatum Thüm. & Pass.	Dothideomycetes genera *incertae sedis*	P	Leaf spot	Greece, Macedonia	Konstantinia-Sulidu (1939), Pantidou (1973)
H. siliquosum Berk. & M.A. Curtis	Dothideomycetes genera *incertae sedis*	P	Twigs and leaf spot	USA	Anonymous (1960)
H. velutinum (Link) Link	Dothideomycetes genera *incertae sedis*	S		Japan	Shirouzu and Harada (2004)
Helminthosporium sp.	Dothideomycetes genera *incertae sedis*	P	Leaf spot	USA	Anonymous (1960), Alfieri Jr. et al. (1984)
Hendersonia cookeana Speg.	Ascomycota genera *incertae sedis*	S		Italy	Spegazzini (1878), Farr (1973)
H. corticalis Ellis & Everh.	Ascomycota genera *incertae sedis*	S		USA	Cash (1953)
H. sarmentorum Westend.	Ascomycota genera *incertae sedis*	P	Twig lesions	Central Asia, Greece, Italy, Pakistan, Spain, USA	Gonzalez Fragoso (1916), Anonymous (1960), Ahmad (1969), Koshkelova and Frolov (1973), Pantidou (1973), Greuter et al. (1991), Ahmad et al. (1997)
H. tenuipes McAlpine	Ascomycota genera *incertae sedis*	S		Greece	Pantidou (1973)
H. viticola S. Ahmad	Ascomycota genera *incertae sedis*	S		Greece, Pakistan	Ahmad (1969), Pantidou (1973), Ahmad et al. (1997)
Herpotrichia sp.	*Melanommataceae*	E		USA	Hanlin (1963)
Hormonema viticola F. Laich & Stchigel*	*Dothioraceae*	E		Malaysia, Spain	Crous et al. (2015)
Humicola sp*.	*Chaetomiaceae*	E, S		China, Spain	Gonzalez and Tello (2011), This study
Hydnum viticola	*Hydnaceae*	S		USA	Saccardo (1878)
Hydnum sp.*	*Hydnaceae*	S		China	This study
Hyaloceras viticola (Cavara) Died.	*Sporocadaceae*	P	Fruits	Italy	Saccardo (1878)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Hymenochaetopsis intricata (Lloyd) S.H. He & Jiao Yang	*Hymenochaetaceae*	S		Japan	Kobayashi (2007)
Hypocrella reineckeana Henn.	*Clavicipitaceae*	P	Leaf spot	Niue	Dingley et al. (1981)
Hypoderma commune (Fr.) Duby	*Rhytismataceae*	S		Portugal	Unamuno (1941)
H. rubi (Pers.) DC.	*Rhytismataceae*	S		China	Ying-Ren (2012)
Hypoxylon hypophlaeum (Berk. & Ravenel) J.H. Mill.	*Hypoxylaceae*	S		USA	Hanlin (1963)
H. lateripigmentum J. Fourn., Kuhnert & M. Stadler*	*Hypoxylaceae*	E		China	Dissanayake et al. (2018)
H. rubiginosum (Pers.) Fr.	*Hypoxylaceae*	S		USA	Hanlin (1963)
Hypoxylon sp.*	*Hypoxylaceae*	E		China	Dissanayake et al. (2018)
Hysterium pulicare (Lightf.) Pers.	*Hysteriaceae*	S		Italy	Greuter et al. (1991)
H. viticola Cooke & Peck	*Hysteriaceae*	S		USA	Saccardo (1878)
Hysterobrevium mori (Schwein.) E. Boehm & C.L. Schoch	*Hysteriaceae*	S		USA	Anonymous (1960), Barr (1990), Tibpromma et al. (2017)
Hysterographium flexuosum Maire	Pleosporomycetidae genera *incertae sedis*	P, S	Stem lesions	USA	Hanlin (1963)
H. viticola (Cooke & Peck) Rehm	Pleosporomycetidae genera *incertae sedis*	P, S	Stem lesions	USA	Wolf et al. (1938), Anonymous (1960)
H. vulvatum (Schwein.) Rehm	Pleosporomycetidae genera *incertae sedis*	P, S	Stem lesions	USA	Parris (1959), Anonymous (1960)
Ilyonectria crassa (Wollenw.) A. Cabral & Crous*	*Nectriaceae*	P	Black foot	Uruguay	Abreo et al. (2010)
I. destructans (Zinssmeister) Rossman, L. Lombard & Crous	*Nectriaceae*	P	Black foot	Argentina, Canada, France, Iran, South Africa, Spain, USA	Gerlach and Ershad (1970), Seifert and Axelrood (1998), Gatica et al. (2001), Petit and Gubler (2005), Gonzalez and Tello (2011), Petit et al. (2011)
I. europaea A. Cabral, Rego & Crous*	*Nectriaceae*	P	Black foot	Portugal	Úrbez-Torres et al. (2014), Agusti-Brisach et al. (2016), Carlucci et al. (2017)
I. liriodendri (Halleen, Rego & Crous) Chaverri & C. Salgado*	*Nectriaceae*	P	Black foot	Australia, Canada, France, Portugal, South Africa, Turkey, USA	Halleen et al. (2003), Petit et al. (2011), Whitelaw-Weckert et al. (2013), Úrbez-Torres et al. (2014), Savas et al. (2015), Agusti-Brisach et al. (2016)
I. lusitanica A. Cabral, Rego & Crous*	*Nectriaceae*	P	Black foot	Portugal	Úrbez-Torres et al. (2014), Agusti-Brisach et al. (2016), Carlucci et al. (2017)
I. pseudodestructans A. Cabral, Rego & Crous*	*Nectriaceae*	P	Black foot	Portugal	Úrbez-Torres et al. (2014), Agusti-Brisach et al. (2016), Carlucci et al. (2017)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
I. robusta (A.A. Hildebr.) A. Cabral & Crous*	*Nectriaceae*	P	Black foot	Brazil, Canada, Portugal	Santos et al. (2014), Úrbez-Torres et al. (2014)
Ilyonectria sp.*	*Nectriaceae*	P, S	Black foot	Australia, China, Portugal	Úrbez-Torres et al. (2014), Parkinson et al. (2017), This study
Inocutis jamaicensis (Murrill) A.M. Gottlieb, J.E. Wright & Moncalvo*	*Hymenochaetaceae*	P	Hoja de malvón and chlorotic leaf roll	Argentina, Uruguay	Abreo et al. (2012), Rajchenberg and Robledo (2013), Cloete et al. (2015)
Irpex lacteus (Fr.) Fr.	*Phanerochaetaceae*	E		USA	Brenckle (1918)
I. viticola	*Phanerochaetaceae*	S		USA	Saccardo (1878)
Kalmusia variispora (Verkley, Göker & Stielow) Ariyawansa & K.D. Hyde	*Didymosphaeriaceae*	P	Trunk disease	Syria	Verkley et al. (2014)
Karstenula yaline (Ellis & Everh.) M.E. Barr	*Didymosphaeriaceae*	S		USA	Cash (1954)
Kazachstania viticola Zubcova	*Saccharomycetaceae*		Fermented juice	Kazakhstan	Zubkova (1971)
Kernia sp.*	*Microascaceae*	E, S		China	Dissanayake et al. (2018), This study
Kluyveromyces marxianus (E.C. Hansen) Van der Walt	*Saccharomycetaceae*	P	Sour rot	Poland	Mulenko et al. (2008)
Kuehneola vitis (E.J. Butler) Syd. & P. Syd.	*Phragmidiaceae*	P	Rust	India	Watson (1971), Ragunathan and Ramakrishnan (1973)
Lachnella macrochaeta Speg.	*Niaceae*	S		Italy	Farr (1973)
L. myceliosa W.B. Cooke	*Niaceae*	S		France, Germany	Batista and Ciferri (1962)
L. uvicola (Speg.) W.B. Cooke	*Niaceae*	S		Argentina	Batista and Ciferri (1962)
L.viticola Gonz. Frag.	*Niaceae*	S		Portugal	Unamuno (1941)
Lachnum virgineum (Batsch) P. Karst.	*Lachnaceae*	S		Japan	Kobayashi (2007)
Lasiodiplodia brasiliense M.S.B. Netto, M.W. Marques & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Canker and die back	Brazil	Correia et al. (2016b)
L. citricola Abdollahzadeh, Javadi & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Canker and die back	Italy	Carlucci et al. (2015)
L. crassispora T. Burgess & Barber*	*Botryosphaeriaceae*	P	Canker and die back	Brazil, South Africa, USA	Úrbez-Torres et al. (2010b), van Niekerk et al. (2010), Correia et al. (2013, 2016b)
L. egyptiaca A.M. Ismail, L. Lombard & Crous*	*Botryosphaeriaceae*	P	Canker and die back	Brazil	Correia et al. (2016b)
L. euphorbicola A.R. Machado & O.L. Pereira*	*Botryosphaeriaceae*	P	Canker and die back	Brazil	Correia et al. (2016b)
L. hormozganensis Abdollahzadeh, Zare & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Canker and die back	Brazil	Correia et al. (2016b)
L. jatrophicola A.R. Machado & O.L. Pereira*	*Botryosphaeriaceae*	P	Canker and die back	Brazil	Correia et al. (2016b)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
L. iraniensis Abdollahzadeh, Zare & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Canker and die back	Italy	Correia et al. (2016b), Netto et al. (2017)
L. laeliocattleyae (Sibilia) A. Alves*	*Botryosphaeriaceae*	P	Canker and die back	Brazil	Correia et al. (2016b)
L. margaritacea Pavlic, T.I. Burgess & M.J. Wingf.*	*Botryosphaeriaceae*	S		China	This study
L. mediterranea Linaldeddu, Deidda & Berraf-Tebbal*	*Botryosphaeriaceae*	P	Canker and die back	USA	Linaldeddu et al. (2015), Cruywagen et al.(2017), Netto et al. (2017)
L. missouriana Úrbez-Torres, Peduto & Gubler*	*Botryosphaeriaceae*	P	Canker and die back	Brazil, USA	Úrbez-Torres et al. (2012), Netto et al. (2014, 2017), Linaldeddu et al. (2015), Trakunyingcharoen et al. (2015), Correia et al. (2016b), Cruywagen et al. (2017), Coutinho et al. (2017)
L. parva A.J.L. Phillips, A. Alves & Crous*	*Botryosphaeriaceae*	P	Canker and die back	Brazil	Correia et al. (2013)
L. plurivora Damm & Crous*	*Botryosphaeriaceae*	P	Canker and die back	Africa, South Africa	Damm et al. (2007), Begoude et al. (2010), Doilom et al. (2015), Coutinho et al. (2017)
L. pseudotheobromae A.J.L. Phillips, A. Alves & Crous*	*Botryosphaeriaceae*	P	Canker and die back	Brazil, China	Correia et al. (2013, 2016b), Dissanayake et al. (2015)
L. theobromae (Pat.) Griffon & Maubl.*	*Botryosphaeriaceae*	P, E	Canker and die back	Argentina, Australia, Bolivia, Brazil, China, Egypt, Florida, Iran, Italy, Iraq, Portugal, South Africa, Spain, Turkey, Uganda, USA	Alfieri Jr. et al. (1984), Úrbez-Torres et al. (2006), van Niekerk et al. (2006), Pitt et al. (2010), Qiu et al. (2011), Yan et al. (2011b), Mondello et al. (2013), Dissanayake et al. (2018)
L. viticola Úrbez-Torres, Peduto & Gubler*	*Botryosphaeriaceae*	P	Canker and die back	USA	Úrbez-Torres et al. (2012), Linaldeddu et al. (2015), Comont et al. (2016), Coutinho et al. (2017), Netto et al. (2017)
L. vitis Tao Yang & Crous*	*Botryosphaeriaceae*	P	Canker and die back	Italy	Yang et al. (2017)
Lasiodiplodia sp.*	*Botryosphaeriaceae*	P, S, E	Canker and die back	China, Italy	Mondello et al. (2013), Dissanayake et al. (2018), This study
Lecanicillium lecanii (Zimm.) Zare & W. Gams	*Cordycipitaceae*	E		Spain	Gonzalez and Tello (2011)
Lecanicillium sp.*	*Cordycipitaceae*	S		China	This study
Lecanidion atratum (Hedw.) Endl.	*Patellariaceae*	S		Italy	Greuter et al. (1991)
Lecythophora hoffmannii (J.F.H. Beyma) W. Gams & McGinnis*	*Coniochaetaceae*	E		Switzerland	Casieri et al. (2009)
Lentinus sp.*	*Polyporaceae*	S		China	This study
Lenzites betulina (L.) Fr.	*Polyporaceae*	S		Pakistan	Ahmad et al. (1997)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Leptodothiorella sp.	*Botryosphaeriaceae*	P	Black rot	Russia	Melnik and Popushoi (1992)
Leptosphaeria ampelina Curzi & Barbaini	*Leptosphaeriaceae*	E		Italy	Crane and Shearer (1991)
L. cerlettii Speg.	*Leptosphaeriaceae*	S		Italy	Farr (1973), Crane and Shearer (1991)
L. chaetostoma Sacc.	*Leptosphaeriaceae*	S		Italy	Crane and Shearer (1991)
L. cirricola Pass.	*Leptosphaeriaceae*	S		Italy	Crane and Shearer (1991)
L. gibelliana Pirotta	*Leptosphaeriaceae*	S		Italy	Crane and Shearer (1991)
L. ogilviensis (Berk. & Broome) Ces. & De Not.	*Leptosphaeriaceae*	S		Pakistan	Ahmad (1978)
L. pampini (Thüm.) Sacc.	*Leptosphaeriaceae*	S		France, Italy, Portugal	Unamuno (1941), Crane and Shearer (1991)
L. yalin Sacc.	*Leptosphaeriaceae*	S		Italy, UK	Cannon et al. (1985), Crane and Shearer (1991)
L. vagabunda Sacc.	*Leptosphaeriaceae*	S		USA	Hanlin (1963)
L. vinealis Pass.	*Leptosphaeriaceae*	S		Italy	Crane and Shearer (1991)
L. viticola Fautrey & Roum.	*Leptosphaeriaceae*	S		France	Crane and Shearer (1991)
L. vitigena Sacc.	*Leptosphaeriaceae*	S		Austria	Crane and Shearer (1991)
L. vitis (Castagne) Pirotta	*Leptosphaeriaceae*	S		Austria, France	Crane and Shearer (1991)
Leptosphaeria sp.*	*Leptosphaeriaceae*	E, S		China, Spain, Switzerland, Venezuela	Urtiaga (1986), Casieri et al. (2009), Gonzalez and Tello (2011), This study
Leptothyrium passerinii Thüm.	Ascomycota genera *incertae sedis*	E		China	Tai (1979)
Leucostoma persoonii (Nitschke) Höhn.*	*Valsaceae*	P	Canker	Germany, Italy, Spain	Greuter et al. (1991), Fischer et al. (2016)
Libertella blepharis A.L. Sm.	*Diatrypaceae*	P, E	Trunk disease	Bulgaria	Bobev (2009)
L. viticola Fautrey	*Diatrypaceae*	E		France	Fautrey and Lambotte (1896)
Libertella sp.	*Diatrypaceae*	P, E	Trunk disease	Australia, Spain	Sosnowski et al. (2007), Gonzalez and Tello (2011)
Lophidium nitidum Ellis & Everh.	*Lophiostomataceae*	S		USA	Cash (1953)
Lophiostoma caulium (Fr.) Ces. & De Not.	*Lophiostomataceae*	E		Poland	Mulenko et al. (2008)
L. elegans (Fabre) Sacc.	*Lophiostomataceae*	E		Pakistan	Ahmad (1969)
L. macrostomum (Tode) Ces. & De Not.*	*Lophiostomataceae*	E, S		Pakistan, Italy	Ahmad (1978), Ahmad et al. (1997), This study, Jayawardena et al. (2018)
L. pustulatum Ellis & Everh.	*Lophiostomataceae*	E		USA	Cash (1953)
L. rhopalosporum Ellis & Everh.	*Lophiostomataceae*	E		USA	Cash (1953)
L. scrophulariae Peck	*Lophiostomataceae*	E		Canada, USA	Barr (1992)
L. stenostomum Ellis & Everh.	*Lophiostomataceae*	E		USA	Cash (1953)
L. subcorticale Fuckel	*Lophiostomataceae*	E		Italy	Saccardo (1878)
L. thuemenianum Speg.	*Lophiostomataceae*	E		Italy	Farr (1973)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
L. vitigenum (Kaz. Tanaka & Y. Harada) K. Hirayama & Kaz. Tanaka	*Lophiostomataceae*	E		Japan	Hirayama and Tanaka (2011)
Lophiostoma sp.*	*Lophiostomataceae*	E, S		China	Dissanayake et al. (2018), This study
Lophiotrema eburnoides Kaz. Tanaka, A. Hashim. & K. Hiray.*	*Lophiotremataceae*	S		Japan	Liu et al. (2015)
L. vitigenum Kaz. Tanaka & Y. Harada	*Lophiotremataceae*	S		Japan	Tanaka and Harada (2003), Kobayashi (2007)
Loranitschkia viticola Lar.N. Vassiljeva	*Nitschkiaceae*	S		China, Kunashir Island, Russia	Vasilyeva (1990), Vasilyeva et al. (2009, 2010)
Macrophoma farlowiana (Viala & Sauv.) Tassi	*Botryosphaeriaceae*	P	Macrophoma rot	USA	Anonymous (1960), Greene (1966)
M. flaccida (Viala & Ravaz) Cavara	*Botryosphaeriaceae*	P	Macrophoma rot	Bulgaria, France, Greece, India, Italy, Portugal	Mathur (1979), Phillips and Lucas (1997), Phillips (2000), Bobev (2009)
M. longispora (I. Miyake) Hara	*Botryosphaeriaceae*	P	Macrophoma rot	USA	Anonymous (1960)
M. peckiana Dearn. & House	*Botryosphaeriaceae*	P	Macrophoma rot	USA	Anonymous (1960)
M. reniformis (Viala & Ravaz) Cavara	*Botryosphaeriaceae*	P	Macrophoma rot	Italy, USA	Anonymous (1960), Phillips and Lucas (1997)
M. rimiseda (Sacc.) Berl. & Voglino	*Botryosphaeriaceae*	P	Macrophoma rot	Greece, Morocco, Turkey	Watson (1971), Pantidou (1973)
M. sicula Scalia	*Botryosphaeriaceae*	P	Macrophoma rot	Central Asia, Italy	Koshkelova and Frolov (1973), Greuter et al. (1991)
Macrophoma sp.	*Botryosphaeriaceae*	P	Macrophoma rot	India, USA	Mathur (1979), Alfieri Jr. et al. (1984)
Macrophomina phaseolina (Tassi) Goid.	*Botryosphaeriaceae*	P, E	Charcoal rot	Australia, Hawaii, India, Malawi, South Africa, Spain,	Peregrine and Siddiqi (1972), Marais (1979), Raabe et al. (1981), Gonzalez and Tello (2011)
Macrosporium vitis (Cavara) Cavara	*Pleosporaceae*	E		Chile	Mujica and Vergara (1945)
Macrosporium sp.	*Pleosporaceae*	E		Bulgaria, Greece, South Africa	Alexopoulos (1940), Doidge (1950), Bobev (2009)
Marssonina viticola (I. Miyake) F.L. Tai	*Drepanopezizaceae*	E		China, Japan, Taiwan	Sawada (1959), Watson (1971), Tai (1979), Kobayashi (2007)
Marasmius sp.*	*Marasmiaceae*	S		China	This study
Massariella viticola Frolov	*Amphisphaeriaceae*	S		Central Asia	Koshkelova and Frolov (1973)
Massarina corticola (Fuckel) L. Holm*	*Massarinaceae*	S		Switzerland	Casieri et al. (2009)
Merismodes bresadolae (Grélet) Singer	*Niaceae*	E		Italy	Farr (1973)
Meliola vitis Hansf.	*Meliolaceae*	E		India, Uganda	Hansford (1947), Patil and Mahamulkar (1999)
Metarhizium sp.*	*Clavicipitaceae*	S		China	This study
Metasphaeria social (Sacc.) Sacc.	*Dothioraceae*	S		Italy	Greuter et al. (1991)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Metschnikowia pulcherrima Pitt & M.W. Mill.	*Metschnikowiaceae*	E		USA	Batra (1973)
M. viticola G. Péter, Tornai-Leh., M. Suzuki & Dlauch*	*Metschnikowiaceae*	E		Hungary	Peter et al. (2005)
Microascus brevicaulis S.P. Abbott*	Helotiales genera *incertae sedis*	E		China	Dissanayake et al. (2018)
Microascus sp.	Helotiales genera *incertae sedis*	S		China	This study
Microdochium bolleyi (R. Sprague) de Hoog & Herm. Nijh.*	*Microdochiaceae*	E		Switzerland	Casieri et al. (2009)
Microdochium sp.*	*Microdochiaceae*	S		China	This study
Microdiplodia microsporella (Sacc.) Allesch.	Ascomycota genera *incertae sedis*	P	Trunk disease	Poland	Mulenko et al. (2008)
M. vineae (Pass. & Beltrani) Tassi	Ascomycota genera *incertae sedis*	S		Italy	Tassi (1902), Greuter et al. (1991)
Micropera ampelina Sacc. & Fairm.	Ascomycota genera *incertae sedis*	S		USA	Anonymous (1960)
Microthyrium microscopicum Desm.	*Microthyriaceae*	S		Portugal	Unamuno (1941)
Minimedusa sp.*	Cantharellales *incertae sedis*	S		China	This study, Jayawardena et al. (2018)
Moeszia cylindroides Bubák	*Nectriaceae*	S		Japan	Tubaki (1958)
Mollisia cinerea (Batsch) P. Karst.	*Mollisiaceae*	S		USA	Hanlin (1963)
M. melaleuca (Fr.) Sacc.	*Mollisiaceae*	S		USA	Hanlin (1963)
M. pullata (W.R. Gerard) Dennis	*Mollisiaceae*	S		USA	Dennis (1964)
Monilinia fructicola (G. Winter) Honey*	*Sclerotiniaceae*	P	Brown rot	Canada, Japan, New Zealand, USA	Preston (1945), Pennycook (1989), Kobayashi (2007), Hrustic et al. (2015)
M. fructigena (Pers.) Pers.	*Sclerotiniaceae*	S		China	Tai (1979)
M. laxa (Aderh. & Ruhland) Honey	*Sclerotiniaceae*	S		New Zealand	Pennycook (1989)
Monochaetia ampelophila Speg.	Xylariomycitidae genera *insertae sedis*	E		Argentina	Guba (1961), Nag Raj (1993)
M. uniseta (Tracy & Earle) Sacc. & D. Sacc.	Xylariomycitidae genera *insertae sedis*	E		USA	Nag Raj (1993)
Monochaetinula ampelophila (Speg.) Nag Raj	Ascomycota genera *incertae sedis*	E		Argentina	Nag Raj (1993)
M. terminaliae (Bat. & J.L. Bezerra) Muthumary, Abbas & B. Sutton	Ascomycota genera *incertae sedis*	E		India	Muthumary et al. (1986)
Monodictys antiqua (Corda) S. Hughes	Dothideomycetes genera *incertae sedis*	S		Portugal	de Sousa Dias and Lucas (1972)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Mortierella hyalina (Harz) W. Gams*	*Mortierellaceae*	S		Switzerland	Casieri et al. (2009)
Mortierella sp.*	*Mortierellaceae*	E, S		China	Dissanayake et al. (2018), This study
Mucor circinelloides Tiegh.*	*Mucoraceae*	S		China, Switzerland	Casieri et al. (2009), This study, Jayawardena et al. (2018)
M. hiemalis Wehmer*	*Mucoraceae*	E, S		Spain, Switzerland	Casieri et al. (2009), Gonzalez and Tello (2011)
M. moelleri (Vuill.) Lendn.*	*Mucoraceae*	S		Switzerland	Casieri et al. (2009)
M. plumbeus Bonord.*	*Mucoraceae*	S		Switzerland	Casieri et al. (2009)
M. racemosus Fresen.*	*Mucoraceae*	E, S		China, Spain, Switzerland	Casieri et al. (2009), Gonzalez and Tello (2011), This study, Jayawardena et al. (2018)
Mucor sp.	*Mucoraceae*	E		Greece, Spain, USA	Pantidou (1973), Shaw (1973), Gonzalez and Tello (2011)
Mycosphaerella cuboniana (D. Sacc.) Tomilin	*Mycosphaerellaceae*	P	Leaf spot	Greece	Pantidou (1973)
M. graminicola (Fuckel) J. Schröt*	*Mycosphaerellaceae*	E		China	Dissanayake et al. (2018)
M. manganottiana (C. Massal.) Tomilin	*Mycosphaerellaceae*	P	Leaf spot	Greece	Pantidou (1973)
M. vitis (Fuckel) J. Schröt.	*Mycosphaerellaceae*	P	Leaf spot	Japan, Poland, Russia	Watson (1971), Kobayashi (2007), Mulenko et al. (2008)
Mycosphaerella sp.*	*Mycosphaerellaceae*	E		China, USA, Venezuela	Stevenson and Wellman (1944), Dissanayake et al. (2018)
Myrothecium sp.*	*Stachybotryaceae*	P, S	Leaf spot	China, USA	Alfieri Jr. et al. (1984), This study
Myxosporium viticola Dearn. & House	Ascomycota genera *incertae sedis*	S		USA	Anonymous (1960)
Nectria cinnabarina (Tode) Fr.	*Nectriaceae*	S		USA	Seifert (1985), Anonymous (1960), Shaw (1973)
N. ramulariae (Wollenw.) E. Müll.*	*Nectriaceae*	P, E		Spain, Switzerland	Casieri et al. (2009), Gonzalez and Tello (2011)
Nectria sp.	*Nectriaceae*	S		Korea, Mexico	Alvarez (1976), Cho and Shin (2004)
Nemania serpens (Pers.) Gray	*Xylariaceae*	E		Spain	Gonzalez and Tello (2011)
Neoanthostomella viticola Daranagama, Camporesi & K. D. Hyde*	*Xylariaceae*	S		Italy	Daranagama et al. (2016), This study, Jayawardena et al. (2018)
Neofusicoccum algeriense Berraf-Tebbal & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Canker, die back	Algeria	Berraf-Tebbal et al. (2014), Nogueira et al. (2016)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
N. australe (Slippers, Crous & M.J. Wingf.) Crous, Slippers & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Canker, die back	Algeria, Australia, Chile, Italy, Mexico, New Zealand, South Africa, Spain, Uruguay, USA	van Niekerk et al. (2004a, b, 2006), Luque et al. (2005), Phillips et al. (2005), Taylor et al. (2005), Úrbez-Torres et al. (2006), Cunnington et al. (2007), Baskarathevan et al. (2008), Úrbez-Torres (2011), Martin et al. (2011b), Sessa et al. (2016)
N. cordaticola Pavlic, Slippers & M.J. Wingf.*	*Botryosphaeriaceae*	P	Canker, die back	Italy	Sakalidis et al. (2013)
N.italicum Dissan. & K.D. Hyde*	*Botryosphaeriaceae*	S		Italy	Marin-Felix et al. (2017)
N. kwambonambiense Pavlic, Slippers & M.J. Wingf.*	*Botryosphaeriaceae*	P	Canker, die back	Uruguay	Sessa et al. (2016)
N. luteum (Pennycook & Samuels) Crous, Slippers & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Botryosphaeria die back	Australia, Germany, Italy, New Zealand, Portugal, South Africa, Spain, Tunisia, Uruguay, USA	Pennycook (1989), van Niekerk et al. (2004a, b), Luque et al. (2005, 2009), Úrbez-Torres et al. (2007), Baskarathevan et al. (2008), Abreo et al. (2012), Fischer et al. (2016)
N. macroclavatum (T.I. Burgess, Barber & G.E. Hardy) T.I. Burgess, Barber & G.E. Hardy	*Botryosphaeriaceae*	P	Canker, die back	New Zealand	Billones et al. (2010), Úrbez-Torres (2011)
N. mangiferae (Syd. & P. Syd.) Crous, Slippers & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Canker, die back	China	Dissanayake et al. (2015)
N. mediterraneum Crous, M.J. Wingf. & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Canker, die back	Algeria, Spain, USA	Úrbez-Torres et al. (2010a, b, c), Berraf-Tebbal et al. (2014)
N. occulatum Sakalidis & T.I. Burgess*	*Botryosphaeriaceae*	P	Canker, die back	Australia	Sakalidis et al. (2013)
N. parvum (Pennycook & Samuels) Crous, Slippers & A.J.L. Phillips*	*Botryosphaeriaceae*	P, E, S	Botryosphaeria die back	Australia, Italy, Brazil, Canada, Chile, China, France, New Zealand, Portugal, South Africa, Spain, Switzerland, Uruguay, USA	Phillips et al. (2002, 2005), van Niekerk et al. (2004a, b, 2006), Luque et al. (2005, 2009), Úrbez-Torres et al. (2006), Cunnington et al. (2007), Baskarathevan et al. (2008), Casieri et al. (2009), Gonzalez and Tello (2011), Abreo et al. (2012), Correia et al. (2013), Mondello et al. (2013), Sakalidis et al. (2013), Wu et al. (2015), This study, Jayawardena et al. (2018)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
N. ribis (Slippers, Crous & M.J. Wingf.) Crous, Slippers & A.J.L. Phillips	*Botryosphaeriaceae*	P	Botryosphaeria die back, Macrophoma rot	Australia, Italy, South Africa, Tanzania, Pakistan, Portugal, USA	Anonymous (1960), Ebbels and Allen (1979), Milholland (1994), Ahmad et al. (1997), Phillips (2000), Halleen et al. (2003), van Niekerk et al. (2006)
N. stellenboschiana Tao Yang & Crous*	*Botryosphaeriaceae*	P	Canker, die back	South Africa	Yang et al. (2017)
N. viticlavatum (Van Niekerk & Crous) Crous, Slippers & A.J.L. Phillips	*Botryosphaeriaceae*	P	Canker, die back	South Africa	Burgess et al. (2005), Farr et al. (2005), Luque et al. (2005), Phillips et al. (2005), van Niekerk et al. (2006)
N. vitifusiforme (Van Niekerk & Crous) Crous, Slippers & A.J.L. Phillips	*Botryosphaeriaceae*	P	Botryosphaeria die back	Italy, Mexico, South Africa, Spain, USA	van Niekerk et al. (2004a, b), Burgess et al. (2005), Luque et al. (2009), Candolfi-Arballo et al. (2010), Úrbez-Torres (2011), Mondello et al. (2013)
Neomassaria fabacearum Mapook, Camporesi & K.D. Hyde*	*Massariaceae*	S		Italy	This study, Jayawardena et al. (2018)
Neonectria candida (Ehrenb.) Rossman, L. Lombard & Crous*	*Nectriaceae*	S		Spain, Switzerland	Casieri et al. (2009), Gonzalez and Tello (2011)
N. coccinea (Pers.) Rossman & Samuels	*Nectriaceae*	S		USA	Anonymous (1960)
N. fuckeliana (C. Booth) Castl. & Rossman*	*Nectriaceae*	P, E		Canada, Spain, Switzerland	Casieri et al. (2009), Gonzalez and Tello (2011), Petit et al. (2011)
N. macrodidyma Halleen, Schroers & Crous*	*Nectriaceae*	S		Switzerland	Casieri et al. (2009)
N. microconidia J. Luo, P. Zhao & W.Y. Zhuang*	*Nectriaceae*	S		Japan	Hirooka et al. (2013)
N. obtusispora (Cooke & Harkn.) Rossman, L. Lombard & Crous	*Nectriaceae*	P	Black-foot disease	Italy, USA	Scheck et al. (1998a, b), Greuter et al. (1991)
Neopestalotiopsis asiatica (Maharachch. & K.D. Hyde) Maharachch., K.D. Hyde & Crous*	*Sporocadaceae*	P	Leaf stripe	France	Maharachchikumbura et al. (2016)
N. clavispora (G.F. Atk.) Maharachch., K.D. Hyde & Crous*	*Sporocadaceae*	S		China	This study, Jayawardena et al. (2018)
N. javaensis Maharachch., K.D. Hyde & Crous*	*Sporocadaceae*	E		France	Maharachchikumbura et al. (2016)
N. vitis Jayawardena, Maharachch., Yan, Li & Hyde*	*Sporocadaceae*	P, S	Fruit rot, trunck disease, leaf spot	China	Jayawardena et al. (2016a, b)
Neopestalotiopsis sp.*	*Sporocadaceae*	P	Leaf spot	China, France, India	Jayawardena et al. (2015), Maharachchikumbura et al. (2014, 2016)
Neoplaconema sp.*	Ascomycota genera *incertae sedis*	P		Switzerland	Casieri et al. (2009)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Neoscytalidium dimidiatum (Penz.) Crous & Slippers*	*Botryosphaeriaceae*	P	Wood canker, die back	Brazil, India, Iraq, USA,	Wangikar et al. (1969), Sarbhoy et al. (1971), Mathur (1979), Al-Saadoon et al. (2012), Rolshausen et al. (2013), Correia et al. (2016a)
Neurospora sp.*	*Sordariaceae*	S		China	This study
Nigrospora oryzae (Berk. & Broome) Petch*	Sordariomycetes genera *incertae sedis*	E		China, Spain	Gonzalez and Tello (2011), Dissanayake et al. (2018)
N. sphaerica (Sacc.) E.W. Mason*	Sordariomycetes genera *incertae sedis*	E		China	Dissanayake et al. (2018)
Nodulisporium sp.	*Xylariaceae*	E		Spain	Gonzalez and Tello (2011)
Oidiodendron sp.*	*Myxotrichaceae*	E		China	Dissanayake et al. (2018)
Ophiocordyceps sp.*	*Ophiocordycipitaceae*	S		China	This study
Ophiostoma piceae (Münch) Syd. & P. Syd.*	*Ophiostomataceae*	E		Spain, Switzerland	Casieri et al. (2009), Gonzalez and Tello (2011)
O. quercus (Georgev.) Nannf.*	*Ophiostomataceae*	E		Switzerland	Casieri et al. (2009)
O. subalpinum Ohtaka & Masuya*	*Ophiostomataceae*	E		Switzerland	Casieri et al. (2009)
Ophiostoma sp.*	*Ophiostomataceae*	E		Switzerland	Casieri et al. (2009)
Ostreichnion curtisii (Duby) M.L. Lohman	*Hysteriaceae*	S		USA	Hanlin (1963)
Ostreola viticola R. Rao & Modak	*Mytilinidiaceae*	S		India	Pande (2008)
Paecilomyces sp.	*Thermoascaceae*	P	Root stock	South Africa	Halleen et al. (2003)
Papiliotrema laurentii (Kuff.) X.Z. Liu, F.Y. Bai, M. Groenew. & Boekhout	*Tremellaceae*	P	Melting decay	USA	Morgan and Michailides (2004)
Papulospora sp.*	Sordariomycetes genera *incertae sedis*	S		China	This study
Pareutypella sulcata Y.M. Ju & J.D. Rogers	Sordariomycetes *genera incertae sedis*	S		Taiwan	Ju and Rogers (1995)
Passalora dissiliens (Duby) U. Braun & Crous	*Mycosphaerellaceae*	P	Leaf spot	Australia, Bulgaria, China, Egypt, France, Iran, India. Israel, Japan, South Africa, Pakistan, Palestine, Poland, Portugal, Yemen	Crous and Braun (2003), Guo and Liu (2003), Zhuang (2005), Kobayashi (2007), Bobev (2009), Mouchacca (2009)
P. fulva (Cooke) U. Braun & Crous*	*Mycosphaerellaceae*	P	Leaf spot	Switzerland	Casieri et al. (2009)
P. heterosporella U. Braun & Crous	*Mycosphaerellaceae*	P	Leaf spot	Israel, USA	Crous and Braun (2003)
P. vitis (M.S. Patil & Sawant) Poonam Srivast.	*Mycosphaerellaceae*	P	Leaf spot	India	Crous and Braun (2003), Kamal (2010)
P. vitis-piadezkii U. Braun & Crous	*Mycosphaerellaceae*	P	Leaf spot	China	Crous and Braun (2003), Guo and Liu (2003)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
P. vitis-ripariae (U. Braun) U. Braun & Crous	*Mycosphaerellaceae*	P	Leaf spot	USA	Crous and Braun (2003)
Patellaria atrata (Hedw.) Fr.	*Patellariaceae*	S		Central Asia	Koshkelova and Frolov (1973)
P. lantanae R. Rao	*Patellariaceae*	S		India	Pande (2008)
P. viticola Pers.	*Patellariaceae*	S		Spain	Unamuno (1941)
Paraphoma chrysanthemicola (Hollós) Gruyter, Aveskamp & Verkley*	*Phaeosphaeriaceae*	S		China	This study, Jayawardena et al. (2018)
Penicillium adametzioides S. Abe	*Aspergillaceae*	E, S		Japan	Kobayashi (2007)
P. astrolabium R. Serra & S.W. Peterson*	*Aspergillaceae*	S		Portugal	Serra and Peterson (2007)
P. aurantiogriseum Dierckx	*Aspergillaceae*	P	Fruit rot	South Africa	Gorter (1977)
P. brevicompactum Dierckx*	*Aspergillaceae*	S		China	This study, Jayawardena et al. (2018)
P. chrysogenum Thom*	*Aspergillaceae*	S		China	This study
P. citrinum Thom*	*Aspergillaceae*	S		China	This study, Jayawardena et al. (2018)
P. digitatum (Pers.) Sacc.*	*Aspergillaceae*	E		China	Dissanayake et al. (2018)
P. elongatum Dierckx	*Aspergillaceae*	P	Fruit rot	South Africa	Gorter (1977)
P. expansum Link	*Aspergillaceae*	P	Fruit rot	Bulgaria, South Africa, USA	Gorter (1977), Bobev (2009)
P. funiculosum Thom	*Aspergillaceae*	S		Cyprus	Georghiou and Papadopoulos (1957)
P. italicum Wehmer	*Aspergillaceae*	P	Fruit rot	Greece	Pantidou (1973)
P. neocrassum R. Serra & S.W. Peterson*	*Aspergillaceae*	S		Portugal	Serra and Peterson (2007)
P. olsonii Bainier & Sartory*	*Aspergillaceae*	E		Portugal	Serra and Peterson (2007)
P. rolfsii Thom	*Aspergillaceae*	E		USA	Shaw (1973)
P. sclerotigenum W. Yamam.	*Aspergillaceae*	S		Japan	Kobayashi (2007)
P. sumatraense Svilv.*	*Aspergillaceae*	P		Iran	Mahdian and Zafari (2017)
P. terrigenum Houbraken, Frisvad & Samson*	*Aspergillaceae*	S		China	This study, Jayawardena et al. (2018)
P. toxicarium I. Miyake*	*Aspergillaceae*	P, E	Fruit rot	Spain	Garcia-Benavides et al. (2013)
P. variabile Sopp	*Aspergillaceae*	S		USA	Shaw (1973)
Penicillium sp.*	*Aspergillaceae*	P, E, S	Fruit rot	Australia, Chile, China, Cuba, France, Italy, Japan, Korea, South Africa, Spain, Switzerland, USA	French (1989), Castillo-Pando et al. (2001), Fourie and Halleen (2002), Casieri et al. (2009), Gonzalez and Tello (2011), Mondello et al. (2013), Oh et al. (2014), Dissanayake et al. (2018), This study

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Peniophora albomarginata (Schwein.) Massee	*Peniophoraceae*	S		USA	Hanlin (1966)
P. viticola (Schwein.) Höhn. & Litsch.	*Peniophoraceae*	S		USA	Hanlin (1966)
Peniophora sp.*	*Peniophoraceae*	S		China	This study, Jayawardena et al. (2018)
Penzigomyces dissolvens (Hol.-Jech., Mercado & J. Mena) J. Mena*	Ascomycota genera *incertae sedis*	S		Cuba	Mena-Portales et al. (2000)
Perenniporia tenuis (Schwein.) Ryvarden	*Polyporaceae*	S		Greece	Kotlaba (1997), Zervakis et al. (1998)
P. unita (Pers.) Murrill	*Polyporaceae*	S		USA	Hanlin (1966)
Periconia byssoides Pers.	*Periconiaceae*	E		Argentina, USA	Grand (1985), Carmaran and Novas (2003)
P. igniaria E.W. Mason & M.B. Ellis	*Periconiaceae*	E		Spain	Gonzalez and Tello (2011)
Pestalotiopsis biciliata Maharachch., K.D. Hyde & Crous*	*Sporocadaceae*	P	Leaf stripe, defoliated shoots	France	Maharachchikumbura et al. (2016)
P. chamaeropis Maharachch., K.D. Hyde & Crous*	*Sporocadaceae*	S		Italy	This study, Jayawardena et al. (2018)
P. funerea (Desm.) Steyaert	*Sporocadaceae*	P	Leaf spot	Japan	Kobayashi (2007)
P. mangiferae (Henn.) Steyaert	*Sporocadaceae*	P	Leaf spot	Myanmar	Thaung (2008c)
P. menezesiana (Bres. & Torrend) Bissett*	*Sporocadaceae*	P	Fruit rot	Australia, China, Greece, India, Japan, Madeira Islands, USA	Mundkur and Thirumalachar (1946), Alfieri Jr. et al. (1984, Nag Raj (1993), Sergeeva et al. (2005)
P. quadriciliata (Bubák & Dearn.) Bissett	*Sporocadaceae*	P	Leaf spot	Canada	Nag Raj (1993)
P. trachicarpicola Y.M. Zhang & K.D. Hyde*	*Sporocadaceae*	P	Fruit rot, trunck disease	China	Jayawardena et al. (2015)
P. uvicola (Speg.) Bissett*	*Sporocadaceae*	P	Fruit rot	Australia, China, India, Italy, Japan, Korea, USA	Simmonds (1966), Tai (1979), Nag Raj (1988, 1993), Cho and Shin (2004), Sergeeva et al. (2005), Kobayashi (2007), Ge et al. (2009), Maharachchikumbura et al. (2011), Úrbez-Torres et al. (2012)
Pestalotiopsis sp.*	*Sporocadaceae*	P, E, S	Fruit rot	Australia, Cuba, Italy, Japan, Korea, South Africa, USA	Urtiaga (1986), Halleen et al. (2003), Castillo-Pando et al. (2001), Úrbez-Torres et al. (2012), This study

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Phaeoacremonium aleophilum W. Gams, Crous, M.J. Wingf. & Mugnai*	*Togniniaceae*	P, E	Esca	Algeria, Argentina, Austria, Australia, France, Italy, Iran, Serbia, South Africa, Spain, Turkey, Uruguay, USA, Yugoslavia	Larignon and Dubos (1997), Pascoe and Cottral (2000), Gatica et al. (2001), Lardner et al. (2005), Whiting et al. (2005), Mostert et al. (2006), Sosnowski et al. (2007), Luque et al. (2009), Berraf-Tebbal et al. (2011), Gonzalez and Tello (2011), Abreo et al. (2012), Mohammadi and Banihashemi (2012), Garcia-Benavides et al. (2013), Mohammadi et al. (2013a), Úrbez-Torres et al. (2013a, b)
P. alvesii L. Mostert, Summerb. & Crous*	*Togniniaceae*	P	Esca	South Africa, Turkey	Essakhi et al. (2008), White et al. (2011)
P. amstelodamense L. Mostert, Summerb. & Crous	*Togniniaceae*	P	Esca	Netherland	Arzanlou et al. (2014)
P. angustius W. Gams, Crous & M.J. Wingf.	*Togniniaceae*	P	Esca	France, Portugal, USA	Chicau et al. (2000), Whiting et al. (2005)
P. argentinense L. Mostert, W. Gams & Crous*	*Togniniaceae*	P	Esca	Argentina	Arzanlou et al. (2014)
P. armeniacum A.B. Graham, P.R. Johnst. & B. Weir*	*Togniniaceae*	P	Esca	New Zealand	Graham et al. (2009), Arzanlou et al. (2014), Úrbez-Torres et al. (2014)
P. australiense L. Mostert, Summerb. & Crous*	*Togniniaceae*	P	Esca	Australia, Uruguay	Mostert et al. (2006), Graham et al. (2009), Abreo et al. (2012), Arzanlou et al. (2014), Úrbez-Torres et al. (2014)
P. austroafricanum L. Mostert, W. Gams & Crous*	*Togniniaceae*	P	Esca	South Africa	Berraf-Tebbal et al. (2011), Úrbez-Torres et al. (2014)
P. canadense J.R. Úrbez-Torres, P. Haag & D.T. O'Gorman*	*Togniniaceae*	P	Esca	Canada	Úrbez-Torres et al. (2014)
P. chlamydospora (W. Gams, Crous, M.J. Wingf. & Mugnai) Crous & W. Gams*	*Togniniaceae*	P	Esca	Australia, Chile, France, Italy, Portugal, South Africa, USA	Larignon and Dubos (1997), Dupont et al. (1998), Scheck et al. (1998b), Chicau et al. (2000), Pascoe and Cottral (2000), Auger et al. (2004b), Lardner et al. (2005), Santos et al. (2006)
P. cinereum Gramaje, Mohammadi, Banihashemi, Armengol & L. Mostert*	*Togniniaceae*	P	Esca	Iran	Gramaje et al. (2009), Mohammadi and Banihashemi (2012), Mohammadi et al. (2013a), Úrbez-Torres et al. (2014), Sami et al. (2014)
P. fraxinopennsylvanicum (T.E. Hinds) D. Gramaje, L. Mostert & Crous*	*Togniniaceae*	P	Esca	Canada, Croatia, Germany, Hungary, Iran, South Africa, Spain, USA	Eskalen et al. (2005), Fischer et al. (2016)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
P. globosum A.B. Graham, P.R. Johnst. & B. Weir*	*Togniniaceae*	P	Esca	New Zealand	Graham et al. (2009), Arzanlou et al. (2014), Úrbez-Torres et al. (2014)
P. griseorubrum L. Mostert, Summerb. & Crous*	*Togniniaceae*	P	Esca	Italy	Essakhi et al. (2008), Gramaje et al. (2009), Berraf-Tebbal et al. (2011)
P. hispanicum Gramaje, Armengol & L. Mostert*	*Togniniaceae*	P	Esca	Algeria, Iran, Spain	Martin et al. (2011a), Úrbez-Torres et al. (2014)
P. hungaricum Essakhi, Mugnai, Surico & Crous*	*Togniniaceae*	P	Esca	Hungary	Essakhi et al. (2008), Berraf-Tebbal et al. (2011), Arzanlou et al. (2014), Úrbez-Torres et al. (2014),
P. inflatipes W. Gams, Crous & M.J. Wingf.*	*Togniniaceae*	P, E	Esca	Chile, Iran, Italy, Spain, USA,	Scheck et al. (1998a, b), Mugnai et al. (1999), Whiting et al. (2005), Mostert et al. (2006), Gonzalez and Tello (2011), Mohammadi and Banihashemi (2012)
P. iranianum L. Mostert, Gräfenhan, W. Gams & Crous*	*Togniniaceae*	P	Esca	Canada, Iran, Italy, South Africa, Spain	Mostert et al. (2006), Essakhi et al. (2008), Gramaje et al. (2009), White et al. (2011), Mohammadi et al. (2013a), Sami et al. (2014), Úrbez-Torres et al. (2014)
P. italicum A. Carlucci & M.L. Raimondo*	*Togniniaceae*	P	Esca	Italy	Raimondo et al. (2014)
P. krajdenii L. Mostert, Summerb. & Crous*	*Togniniaceae*	P	Esca	Canada, Europe, South Africa, Spain	Mostert et al. (2006), Gramaje et al. (2011), Úrbez-Torres et al. (2014)
P. minimum (Tul. & C. Tul.) D. Gramaje, L. Mostert & Crous*	*Togniniaceae*	P	Esca	Argentina, Austria, Australia, Brazil, Canada, Chile, France, Germany, Greece, Hungary, Iran, Israel, Italy, Mexico, South Africa, Uruguay, USA, Yugoslavia	Mostert et al. (2006), Úrbez-Torres et al. (2012, 2014), Baloyi et al. (2013), Whitelaw-Weckert et al. (2013)
P. mortoniae Crous & W. Gams*	*Togniniaceae*	P	Esca	Iran, New Zealand	Whiting et al. (2005), Mohammadi and Banihashemi (2012)
P. occidentale A.B. Graham, P.R. Johnst. & B. Weir*	*Togniniaceae*	P	Esca	New Zealand	Graham et al. (2009), Arzanlou et al. (2014), Úrbez-Torres et al. (2014)
P. parasiticum (Ajello, Georg & C.J.K. Wang) W. Gams, Crous & M.J. Wingf.*	*Togniniaceae*	P	Esca	Algeria, Argentina, Australia, Brazil, Chile, Iran, Peru, South Africa	Gatica et al. (2001), Dupont et al. (2002), Berraf-Tebbal et al. (2011)
P. roseum (J.R.) Úrb.-Torr., P. Haag & O'Gorman*	*Togniniaceae*	P	Esca	Canada	da Silva et al. (2017)
P. rubrigenum W. Gams, Crous & M.J. Wingf.*	*Togniniaceae*	P	Esca	Argentina, Chile, Croatia, France, Iran, New Zealand, South Africa, USA	Dupont et al. (2000), Kubatova et al. (2004), Essakhi et al. (2008), Sami et al. (2014)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
P. scolyti L. Mostert, Summerb. & Crous*	*Togniniaceae*	P	Esca	France, Italy, South Africa, Spain, Turkey	Essakhi et al. (2008), Gramaje et al. (2008), Ozben et al. (2012), Úrbez-Torres et al. (2014)
P. sicilianum Essakhi, Mugnai, Surico & Crous*	*Togniniaceae*	P	Esca	Italy, South Africa, Spain	Essakhi et al. (2008), White et al. (2011), Arzanlou et al. (2014), Úrbez-Torres et al. (2014), Gramaje et al. (2009)
P. subulatum L. Mostert, Summerb. & Crous*	*Togniniaceae*	P	Esca	South Africa	Mostert et al. (2006), Berraf-Tebbal et al. (2011)
P. tuscanicum Essakhi, Mugnai, Surico & Crous*	*Togniniaceae*	P	Esca	Spain	Garcia-Benavides et al. (2013)
P. venezuelense L. Mostert, Summerb. & Crous*	*Togniniaceae*	P	Esca	Algeria, South Africa	Mostert et al. (2006), Berraf-Tebbal et al. (2011)
P. viticola J. Dupont*	*Togniniaceae*	P	Esca	France, Germany, Spain	Luque et al. (2009), Úrbez-Torres et al. (2014), Fischer et al. (2016)
Phaeoacremonium sp.*	*Togniniaceae*	P, S	Esca	Argentina, China, Iran, South Africa, Spain	Gatica et al. (2001), Fourie and Halleen (2002), Halleen et al. (2003), Gramaje et al. (2009), White et al. (2011), Mohammadi and Banihashemi (2012), This study
Phaeomoniella chlamydospora (W. Gams, Crous, M.J. Wingf. & Mugnai) Crous & W. Gams*	*Phaeomoniellaceae*	P, E	Esca	Argentina, Australia, Brazil, Bulgaria, Chile, Europe, France, Iran, Italy, New Zealand, Slovakia, South Africa, Spain, Switzerland, Turkey, Uruguay, USA	Larignon and Dubos (1997), Crous and Gams (2000), Karimi et al. (2001), Cunnington (2003), Halleen et al. (2003), Whiting et al. (2005), Kakalikova et al. (2009), Bobev (2009), Casieri et al. (2009), Luque et al. (2009), Smetham et al. (2010), Gonzalez and Tello (2011), Correia et al. (2013), Garcia-Benavides et al. (2013), Mohammadi et al. (2013a), Diaz and Latorre (2014), Akgul et al. (2015)
Phaeotrichoconis crotalariae (M.A. Salam & P.N. Rao) Subram.*	Ascomycota genera *incertae sedis*	E		Brazil	Bezerra and De Lima (2012)
Phakopsora ampelopsidis Dietel & P. Syd.	*Phakopsoraceae*	P	Rust	Hong Kong, Korea, India, Taiwan, Thailand	Mundkur (1943), Sawada (1943), Lu et al. (2000), Cho and Shin (2004), Lorsuwan et al. (1984)
P. cronartiiformis Dietel	*Phakopsoraceae*	P	Rust	India	Mundkur (1943), Padwick (1946), Watson (1971), Sarbhoy and Agarwal (1990)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
P. euvitis Y. Ono	*Phakopsoraceae*	P	Rust	Bangladesh, Brazil, China, Indonesia, Jamaica, Japan, Malaysia, North Korea, Philipines, Thailand, Thaiwan, USA	Teodoro (1937), Giatgong (1980), Ono (2000), Chatasiri and Ono (2008)
P. meliosmae-myrianthae (Henn. & Shirai) Y. Ono*	*Phakopsoraceae*	P	Rust	Japan, Thaiwan	Pota et al. (2015), Ono (2016)
P. montana Y. Ono & Chatasiri*	*Phakopsoraceae*	P	Rust	Japan	Pota et al. (2015), Ono (2016)
P. uva Buriticá & J.F. Hennen*	*Phakopsoraceae*	P	Rust	Colombia, Costa rica, Cuba, Guatemala, Mexico, USA, Venezuela	Buritica and Pardo Cardona (1996), Pardo Cardona (1998), Buritica (1999), Salazar-Yepes et al. (2002)
P. vitis P. Syd.	*Phakopsoraceae*	P	Rust	Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Indonesia, Japan, Russia, Taiwan, Trinidad and Tobago, USA, Venezuela	Arthur (1918), Chardon and toro (1930), Jackson (1931), Kern et al. (1934), Baker and Dale (1951), Berndt (2004)
Phakopsora sp.	*Phakopsoraceae*	P	Rust	Costa rica	Berndt (2004)
Phanerochaete viticola (Schwein.) Parmasto	*Phanerochaetaceae*	E	Rust	USA	Burdsall (1985)
Phellinidium noxium (Corner) Bondartseva & S. Herrera	*Hymenochaetaceae*	P	Esca	Taiwan	Ann et al. (2002)
Phellinus igniarius (L.) Quél.	*Hymenochaetaceae*	P	Esca	Bulgaria	Bobev (2009)
P. resupinatus M. Fisch., M. Cloete, L. Mostert & F. Halleen*	*Hymenochaetaceae*	P	Esca	Nambia, South Africa	Cloete et al. (2016)
Phellinus sp.*	*Hymenochaetaceae*	P	Esca	Argentina, Australia, South Africa, USA	Gatica et al. (2001), Lardner et al. (2005), Sosnowski et al. (2007), White et al. (2011)
Phialophora sp.	*Herpotrichiellaceae*	E		Spain	Gonzalez and Tello (2011)
Phialosimplex sp.*	*Trichocomaceae*	E, S		China	Dissanayake et al. (2018), This study
Phoma confluens Welw. & Curr.	*Didymellaceae*	OP	Leaves and stem lesions	Central Asia	Koshkelova and Frolov (1973)
P. herbarum Westend.*	*Didymellaceae*	OP	Leaves and stem lesions	China	Dissanayake et al. (2018)
P. lenticularia Cavara	*Didymellaceae*	S		Italy	Cavara (1888)
P. medicaginis Malbr. & Roum.*	*Didymellaceae*	S		China	This study, Jayawardena et al. (2018)
P. reniformis Viala & Ravaz	*Didymellaceae*	OP	Leaves and stem lesions	China, Portugal	Phillips and Lucas (1997), Zhuang (2005)
P. vitis Bonord.	*Didymellaceae*	OP	Leaves and stem lesions	Australia, Greece, India, Italy, USA,	Pantidou (1973), Mathur (1979), French (1989), Shivas (1989), Greuter et al. (1991)
Phoma sp.*	*Didymellaceae*	P, E, S	Leaves and stem lesions	China, Italy, Spain, Switzerland	Casieri et al. (2009), Gonzalez and Tello (2011), Mondello et al. (2013), Dissanayake et al. (2018), This study

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Phyllosticta ampelicida (Engelm.) Aa*	*Phyllostictaceae*	P, S	Black rot	All over the world	Larter and Martyn (1943), Mujica and Oehrens (1967), Alvarez (1976), Mendes et al. (1998), Dudka et al. (2004), Kobayashi (2007), Slippers et al. (2007a, b), Goos (2010), Wicht et al. (2012)
P. ampelophila Politis	*Phyllostictaceae*	P	Black rot	Greece	Pantidou (1973)
P. badamii (Cooke)	*Phyllostictaceae*	P	Black rot	UK, Ukraine	Watson (1971), Dudka et al. (2004)
P. microspila Pass.	*Phyllostictaceae*	P	Black rot	Italy	Watson (1971)
P. muscadinii (Luttr.) Wulandari	*Phyllostictaceae*	P	Black rot	USA	Hanlin (1963), Alfieri Jr. et al. (1984, Kummuang et al. (1996)
P. pilispora Speschnew	*Phyllostictaceae*	P	Black rot	China, Japan, Ukraine, Uzbekistan	Gaponenko (1965), Tai (1979), Kobayashi (2007), Dudka et al. (2004)
P. spermoides Peck	*Phyllostictaceae*	P	Black rot	China, USA	Anonymous (1960), French (1987, 1989), Bai (2000)
P. turmalis Ellis & Everh.	*Phyllostictaceae*	P	Black rot	USA	Cash (1953)
*P. vitis-rotundifoliae N. Zhou & L. Cai**	*Phyllostictaceae*	P	Black rot	USA	Zhou et al. (2015)
Phytophthora cactorum (Lebert & Cohn) J. Schröt.	*Peronosporaceae*	P	Root rot	South Africaa	Oudemans and Coffey (1991), Erwin and Ribeiro (1996)
P. cambivora (Petri) Buisman	*Peronosporaceae*	P	Root rot	South Africa	Oudemans and Coffey (1991)
P. cinnamomi Rands*	*Peronosporaceae*	P	Root rot	Australia, New Zealand, South Africa	Gorter (1977), Marais (1980), Pennycook (1989), Shivas (1989), Oudemans and Coffey (1991), Erwin and Ribeiro (1996), Gadgil (2005), Blair et al. (2008), Langrell et al. (2011)
P. citricola Sawada	*Peronosporaceae*	P	Root rot	New Zealand	Pennycook (1989), Erwin and Ribeiro (1996), Gadgil (2005)
P. cryptogea Pethybr. & Laff.*	*Peronosporaceae*	P	Root rot	South Africa	Mills et al. (1991), Erwin and Ribeiro (1996), Martin et al. (2014)
P. drechsleri Tucker	*Peronosporaceae*	P	Root rot	Korea	Cho and Shin (2004)
P. megasperma Drechsler	*Peronosporaceae*	P	Root rot	Australia, USA	Shivas (1989), Forster and Coffey (1993)
P. nicotianae Breda de Haan	*Peronosporaceae*	P	Root rot	India, South Africa	Erwin and Ribeiro (1996)
P. niederhauseri Z.G. Abad & J.A. Abad*	*Peronosporaceae*	P	Root rot	South Africa	Abad et al. (2014)
Phytophthora sp.*	*Peronosporaceae*	P	Root rot	Australia, Chili, Mexico, USA	Mujica and Oehrens (1967), Alvarez (1976), French (1989), Castillo-Pando et al. (2001), Brasier et al. (2003)
Pilidium concavum (Desm.) Höhn.	*Chaetomellaceae*	P	Excoriose and cane blight	Portugal	Phillips (2000)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
P. lythri (Desm.) Rossman	*Chaetomellaceae*	P	Excoriose and cane blight	USA	Greene (1963)
Pionnotes biasolettiana (Corda) Sacc.	*Nectriaceae*	E		Japan	Kobayashi (2007)
Plagiostoma devexum (Desm.) Fuckel*	*Gnomoniaceae*	E		Europe, USA	Sogonov et al. (2008)
Plasmopara viticola (Berk. & M.A. Curtis) Berl. & De Toni	*Peronosporaceae*	P	Downey mildew	All over the world	Doidge (1950), Riley (1960), Whiteside (1966), Dennis (1970), Stevenson (1975), Gorter (1977), Giatgong (1980), Simonyan (1981), Mendes et al. (1998), McKirdy et al. (1999), Dudka et al. (2004), Voglmayr et al. (2004), Gadgil (2005), Garcia-Blazquez et al. (2006), Mulenko et al. (2008), Thaung (2008b), Bobev (2009)
Pleospora herbarum (Pers.) Rabenh.	*Pleosporaceae*	E		Chile, Libya, Pakistan	Mujica and Oehrens (1967), El-Buni and Rattan (1981), Ahmad et al. (1997)
P. penicillus Fuckel	*Pleosporaceae*	S		Portugal, Spain	Checa (2004)
P. phaeocomoides (Sacc.) G. Winter	*Pleosporaceae*	S		USA	Hanlin (1963)
P. vitis Catt.	*Pleosporaceae*	E		Central Asia, Greece, Italy, Spain	Unamuno (1941), Koshkelova and Frolov (1973), Pantidou (1973), Shoemaker (1992)
P. vitis-viniferae Frolov	*Pleosporaceae*	E		Central Asia, Russia	Koshkelova and Frolov (1973), Shoemaker (1992)
P. vulgaris Niessl	*Pleosporaceae*	E		Central Asia	Koshkelova and Frolov (1973)
Pleospora sp.	*Pleosporaceae*	E		Portugal	Phillips (2000)
Pleurophoma sp.	*Lentitheciaceae*	P	Excoriose and cane blight	Portugal	Phillips (2000)
Pleurostoma richardsiae (Nannfeldt) Réblová & Jaklitsch*	*Pleurostomataceae*	P	Trunk disease	Italy, South Africa, Spain	White et al. (2011), Carlucci et al. (2015), Pintos Varela et al. (2016)
Pleurotus ostreatus (Jacq.) P. Kumm.	*Pleurotaceae*	P	Wood rot	USA	Vail et al. (1995)
Preussia africana Arenal, Platas & Peláez*	*Sporormiaceae*	S		Spain	Garcia-Benavides et al. (2013)
P. intermedia (Auersw.) S. Ahmad	*Sporormiaceae*	E		Spain	Gonzalez and Tello (2011)
Pseudallescheria sp.*	*Microascaceae*	S		China	This study
Pseudocamarosporium propinquum (Sacc.) Wijayaw., Camporesi & K.D. Hyde*	*Didymospharaceae*	S		Italy	This study, Jayawardena et al. (2018)
P. brachypus (Ellis & Everh.) X.J. Liu & Y.L. Guo	*Mycosphaerellaceae*	P	Leaf spot	USA	Alfieri Jr. et al. (1984
P. daspurensis (A.K. Kar & M. Manda)	*Mycosphaerellaceae*	P	Leaf spot	India	Sarbhoy et al. (1971)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Pseudocercospora riachueli (Speg.) Deighton	*Mycosphaerellaceae*	P	Leaf spot	India, Thailand	Kamal (2010), Phengsintham et al. (2013)
P. vitis (Lév.) Speg.*	*Mycosphaerellaceae*	P	Leaf spot	Australia, Barbados, Brazil, Bulgaria, China, France, Hungary, India, Iowa, Iran, Italy, Japan, Korea, Mauritius, Myanmar, Pakistan, Poland, South Africa, South Korea, Taiwan, Tanzania, Thailand, USA, Zimbabwe	Gilman and Archer (1929), Wiehe (1948), Riley (1960), Vasudeva (1963), Whiteside (1966), Norse (1974), Deighton (1976), Gorter (1977), Giatgong (1980), Thaung (1984), Pons and Sutton (1988), Cook and Dubé (1989), Hsieh and Goh (1990), Ahmad et al. (1997), Roux et al. (1997), Kim and Shin (1998), Liu and Guo (1998), Mendes et al. (1998), Zhuang (2001), Dugan et al. (2004), Kobayashi (2007), Mulenko et al. (2008), Bobev (2009), Kamal (2010), Sultan et al. (2011), Pirnia et al. (2012), Liang et al. (2016), This study, Jayawardena et al. (2018)
Pseudogymnoascus pannorum (Link) Minnis & D.L. Lindner*	*Myxotrichaceae*	S		Switzerland	Casieri et al. (2009)
Pseudolachnea hispidula (Schrad.) B. Sutton*	*Chaetosphaeriaceae*	S		Italy	This study, Jayawardena et al. (2018)
Pseudopestalotiopsis camelliae-sinensis F. Liu & L. Cai*	*Sporocadaceae*	S		Italy	This study, Jayawardena et al. (2018)
Pseudopezicula tetraspora Korf, R.C. Pearson & W.Y. Zhuang	*Drepanopezizaceae*	P	Angular leaf scorch	USA	Pearson et al. (1988)
P. tracheiphila (Müll.-Thurg.) Korf & W.Y. Zhuang)	*Drepanopezizaceae*	P	Angular leaf scorch	Australia, France, Germany, Hungary, Jordan, Moldova, Romania, Switzerland, Tunisia, Turkey, Ukraine, Yugoslavia	Korf et al. (1986)
Psiloglonium clavisporum (Seaver) E. Boehm, C.L. Schoch & Spatafora	*Hysteriaceae*	S		USA	Hanlin (1963)
Punctulariopsis cremeoalbida (M.J. Larsen & Nakasone) Ghobad-Nejhad	*Punctulariaceae*	S		USA	Larsen and Nakasone (1984)
Pyrenochaeta sp.*	*Cucurbitariaceae*	E		China	Dissanayake et al. (2018)
Pyrenophora phaeocomes (Rebent.) Fr.	*Pleosporaceae*	E		Portugal	Unamuno (1941)
P. phaeocomoides (Berk. & Broome) Sacc.	*Pleosporaceae*	E		France, Portugal	Unamuno (1941), Shoemaker (1992)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Pyrigemmula aurantiaca D. Magyar & R. Shoemaker*	*Chaetosphaeriaceae*	E, S		Hungary	Magyar et al. (2011)
Pythium acanthicum Drechsler*	*Pythiaceae*	P	Root rot	Australia, South Africa	Shivas (1989), McLeod et al. (2009)
P. amasculinum Y.N. Yu*	*Pythiaceae*	S		China	This study
P. aphanidermatum (Edson) Fitzp.	*Pythiaceae*	P	Root rot	Australia, South Africa	Cook and Dubé (1989)
P. coloratum Vaartaja*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. cryptoirregulare Garzón, Yánez & G.W. Moorman*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. debaryanum R. Hesse	*Pythiaceae*	P	Root rot	Chile, India	Mujica and Vergara (1945)
P. echinulatum V.D. Matthews*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. helicoides Drechsler*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. heterothallicum W.A. Campb. & F.F. Hendrix*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. irregulare Buisman*	*Pythiaceae*	P	Root rot	Asutralia, South Africa	Cook and Dubé (1989), Shivas (1989), McLeod et al. (2009)
P. kunmingense Y.N. Yu*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. mamillatum Meurs*	*Pythiaceae*	P	Root rot	Australia, South Africa	Shivas (1989), McLeod et al. (2009)
P. parasiticum S. Rajagop. & K. Ramakr.	*Pythiaceae*	P	Root rot	South Africa	Gorter (1977)
P. paroecandrum Drechsler*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. periilum Drechsler*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. perplexum H. Kouyeas & Theoh*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. pyrilobum Vaartaja*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. recalcitrans Belbahri & E. Moralejo*	*Pythiaceae*	P	Root rot	South Africa	Moralejo et al. (2008)
P. rostratifingens De Cock & Lévesque*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. rostratum E.J. Butler	*Pythiaceae*	P	Root rot	Australia	Cook and Dubé (1989)
P. spinosum Sawada*	*Pythiaceae*	P	Root rot	Australia, South Africa	Shivas (1989), McLeod et al. (2009)
P. splendens Hans Braun	*Pythiaceae*	P	Root rot	Malaysia	Liu (1977)
P. sylvaticum W.A. Campb. & F.F. Hendrix	*Pythiaceae*	P	Root rot	South Africa	Gorter (1977)
P. torulosum Coker & P. Patt.*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
P. ultimum Trow	*Pythiaceae*	P	Root rot	Australia, New Zealand, South Africa	Cook and Dubé (1989), Shivas (1989), Gadgil (2005)
P. vanterpoolii V. Kouyeas & H. Kouyeas*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
P. vexans de Bary	*Pythiaceae*	P	Root rot	Malaysia	Liu (1977)
P. viola Chesters & Hickman*	*Pythiaceae*	P	Root rot	South Africa	McLeod et al. (2009)
Pythium sp.*	*Pythiaceae*	P, S	Root rot	Australia, China, USA	Alfieri Jr. et al. (1984, French (1989), Castillo-Pando et al. (2001), This study
Ramularia khandalensis Patw. & A.K. Pande	*Mycosphaerellaceae*	P, E	Leaf spot	India	Sarbhoy et al. (1971)
R. mali Videira & Crous*	*Mycosphaerellaceae*	P, E	Leaf spot	Iran	Bakhshii and Arzanlou (2017)
R. vitis (Richon) U. Braun	*Mycosphaerellaceae*	P, E	Leaf spot	Armenia, Australia, Caucasus, Europe, France	Braun (1998)
Rhabdospora ampelina (Thüm.) Sacc.	Dothideomycetes genera *incertae sedis*	P	Stem, leaf spot	Japan	Kobayashi (2007)
R. labruscae Gonz. Frag.	Dothideomycetes genera *incertae sedis*	P	Stem, leaf spot	Spain	Gonzalez Fragoso (1917)
R. mueggenburgii (Pirotta) Sacc.	Dothideomycetes genera *incertae sedis*	P	Stem, leaf spot	Poland	Mulenko et al. (2008)
R. vitis Koshk. & Frolov	Dothideomycetes genera *incertae sedis*	P	Stem, leaf spot	Central Asia	Koshkelova and Frolov (1973)
Rhinocladiella atrovirens Nannf.	*Herpotrichiellaceae*	E		Spain	Gonzalez and Tello (2011)
Rhizoctonia solani J.G. Kühn	*Ceratobasidiaceae*	P, E	Root rot	South Africa, Spain, USA	Marais (1979), Alfieri Jr. et al. (1984, Halleen et al. (2003), Gonzalez and Tello (2011)
Rhizoctonia sp.*	*Ceratobasidiaceae*	P, E	Root rot	Australia, Chili, Mexico, Switerzland	Mujica and Vergara (1945), Alvarez (1976), Castillo-Pando et al. (2001), Casieri et al. (2009)
Rhizopus arrhizus A. Fisch.	*Rhizopodaceae*	P, E	Bunch rot	USA	French (1987, 1989)
R. oryzae Went & Prins. Geerl.*	*Rhizopodaceae*	S		China	This study, Jayawardena et al. (2018)
R. stolonifer (Ehrenb.) Vuill.*	*Rhizopodaceae*	P, E	Bunch rot	Australia, Cuba, Japan, SouthAfrica, Spain, Switzerland	Gorter (1977), Urtiaga (1986), Cook and Dubé (1989), Witbooi et al. (2000), Kobayashi (2007), Casieri et al. (2009), Gonzalez and Tello (2011)
Rhizopus sp.*	*Rhizopodaceae*	P, E	Bunch rot	France, Italy, Switzerland	Castillo-Pando et al. (2001), Casieri et al. (2009), Mondello et al. (2013)
Rhodosporidium sp.*	Sporidiobolales *genera incertae sedis*	S		China	This study
Rhodotorula sp.*	Sporidiobolales *genera incertae sedis*	S		China	This study
Robillarda vitis Prill. & Delacr.	*Sporocadaceae*	E		France	Nag Raj (1993)
Roesleria pallida (Pers.) Sacc.	*Roesleriaceae*	P	Root rot	Japan	Kobayashi (2007)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
R. subterranea (Weinm.) Redhead*	*Roesleriaceae*	P	Root rot	Italy, USA	Kepley et al. (2015)
Rosellinia akulovii L.E. Petrini	*Xylariaceae*	S		France	Petrini (2013)
R. amblystoma Berl. & F. Sacc.	*Xylariaceae*	S		Portugal	Unamuno (1941)
R. aquila (Fr.) De Not.	*Xylariaceae*	S		France	Petrini (1992)
R. necatrix Berl. ex Prill.	*Xylariaceae*	P	White root rot	Bulgaria, France, Greece, Italy, Japan, Mexico, Ukraine	Alvarez (1976), Greuter et al. (1991), Holevas et al. (2000), Dudka et al. (2004), Kobayashi (2007), Bobev (2009), Petrini (2013)
R. rosarum Niessl	*Xylariaceae*	S		Poland	Mulenko et al. (2008)
Sarocladium strictum (W. Gams) Summerb.	Hypocreales genera *incertae sedis*	E		Spain	Gonzalez and Tello (2011)
Schizophyllum commune Fr.	*Schizothyriaceae*	P	White rot on already dead parts of grapevine trunks	Greece	Zervakis et al. (1998)
Schizothyrium pomi (Mont.) Arx,	*Schizothyriaceae*	P	White rot on already dead parts of grapevine trunks	Japan, USA	Anonymous (1960), Kobayashi (2007)
Sclerostagonospora sp.	*Phaeosphaeriaceae*	P	Excoriose and cane blight	Portugal	Phillips (2000)
Sclerotinia sclerotiorum (Lib.) de Bary*	*Sclerotiniaceae*	P, E	Shoot blight	Australia, Chile, Greece, Japan, Mexico, New Zealand, Spain, Switzerland, USA	French (1989), Shivas (1989), Latorre and Guerrero (2001), Casieri et al. (2009), Gonzalez and Tello (2011), Ferrada et al. (2014)
Sclerotium echinatum Fuckel	*Sclerotiniaceae*	P	Shoot blight	Poland	Mulenko et al. (2008)
S. rolfsii Sacc.	*Sclerotiniaceae*	P	Shoot blight	Japan, USA	French (1987, 1989), Kobayashi (2007)
Sclerotium sp.	*Sclerotiniaceae*	P	Shoot blight	Thailand	Giatgong (1980)
Scolicotrichum vitiphyllum (Speschnew) Karak. & Vassiljevsky	Ascomycota genera *incertae sedis*	P	Shoot blight	Central Asia	Koshkelova and Frolov (1973)
Scopulariopsis sp.*	*Microascaceae*	S		China	This study
Scytinostroma alutum Lanq.	*Lachnocladiaceae*	P, S	Root rot	France	Boidin and Lanquetin (1987)
Seimatosporium botan Sat. Hatak. & Y. Harada*	*Sporocadaceae*	P	Trunk disease	Chile	Diaz et al. (2012)
S. hysterioides (Fuckel) Brockmann*	*Sporocadaceae*	P	Trunk disease	Australia, England, France, Greece, Germany, Italy	Nag Raj (1993), Sergeeva et al. (2005)
S. lichenicola (Corda) Shoemaker & E. Müll.	*Sporocadaceae*	P	Trunk disease	Australia	Cook and Dubé (1989), Shivas (1989)
S. lonicerae (Cooke) Shoemaker	*Sporocadaceae*	P	Trunk disease	Australia	Shivas (1989)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
S. parasiticum (Dearn. & House) Shoemaker	*Sporocadaceae*	P	Trunk disease	Germany, Pakistan	Sutton (1980), Ahmad et al. (1997)
S. vitis P. Xiao, Camporesi & K.D. Hyde*	*Sporocadaceae*	P, S	Trunk disease	Hungary, Italy	Senanayake et al. (2015), Váczy (2017), This study, Jayawardena et al. (2018)
Seiridium cupressi (Guba) Boesew.	*Sporocadaceae*	P	Trunk disease	China	Teng (1996)
Selenophoma sp.	*Saccotheciaceae*	E		Spain	Gonzalez and Tello (2011)
Septobasidium tanakae (Miyabe) Boedijn & B.A. Steinm.	*Septobasidiaceae*	P		Japan	Kobayashi (2007)
Septoria ampelina Berk. & M.A. Curtis	*Mycosphaerellaceae*	P	Leaf spot	Bulgaria, Italy, Mexico, Romania, Ukraine	Radulescu et al. (1973), Alvarez (1976), Greuter et al. (1991), Vanev et al. (1997), Dudka et al. (2004), Bobev (2009)
S. badhamii Berk. & Broome	*Mycosphaerellaceae*	P	Leaf spot	Japan, Romania, UK	Watson (1971), Radulescu et al. (1973), Kobayashi (2007)
S. melanopsis Pat.	*Mycosphaerellaceae*	P	Leaf spot	Brazil, Italy, Kenya, Tunisia, UK	Nattrass (1961), Watson (1971)
S. vitis Schulzer	*Mycosphaerellaceae*	P	Leaf spot	Australia	Priest (2006)
S. vineae Pass.	*Mycosphaerellaceae*	S		Romania	Watson (1971), Radulescu et al. (1973)
Septoriella allojunci W.J. Li, Camporesi, D.J. Bhat & K.D. Hyde*	*Phaeosphaeriaceae*	S		China	This study, Jayawardena et al. (2018)
Simplicillium sp.*	*Cordycipitaceae*	S		China	This study
Sordaria fimicola (Roberge ex Desm.) Ces. & De Not.*	*Sordariaceae*	S		Switzerland	Casieri et al. (2009)
Sordaria sp.	*Sordariaceae*	E		Spain	Gonzalez and Tello (2011)
Spencermartinsia plurivora Abdollahz., Javadi & A.J.L. Phillips*	*Botryosphaeriaceae*	P	Canker/die back	Australia, Spain	Pitt et al. (2015)
S. viticola (A.J.L. Phillips & J. Luque) A.J.L. Phillips, A. Alves & Crous*	*Botryosphaeriaceae*	P	Canker/die back	Australia, France, South Africa, Spain, USA	Luque et al. (2005), Úrbez-Torres et al. (2007), de Wet et al. (2009), Qiu et al. (2011), Úrbez-Torres (2011), Diaz et al. (2013), Pitt et al. (2013, 2015), Li et al. (2014), Carlucci et al. (2015), Pavlic-Zupanc et al. (2015), Valencia et al. (2015), Comont et al. (2016), Coutinho et al. (2017), Lawrence et al. (2017b)
S. westrale W.M. Pitt, J.R. Úrbez-Torres & Trouillas*	*Botryosphaeriaceae*	P	Canker/die back	Australia	Pitt et al. (2015)
Spencermartinsia sp.	*Botryosphaeriaceae*	P	Canker/die back	Spain	Gonzalez and Tello (2011)
Sphaeropsis ampelos (Schwein.) Cooke	*Botryosphaeriaceae*	P	Canker/die back	China	Teng (1996)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
S. peckiana Thüm.	*Botryosphaeriaceae*	P	Canker/die back	Italy	Greuter et al. (1991)
S. porosa (Van Niekerk & Crous) A.J.L. Phillips & A. Alves	*Botryosphaeriaceae*	P	Canker/die back	South Africa	van Niekerk et al. (2004a, b, 2006), Phillips et al. (2005), Luque et al. (2005), de Wet et al. (2009), Úrbez-Torres (2011)
Sphaeropsis sp.	*Botryosphaeriaceae*	P	Canker/die back	Greece	Holevas et al. (2000)
Spiromastix sp.*	*Spiromastigaceae*	S		China	This study
Spiromyces sp.*	*Kickxellaceae*	S		China	This study
Sporoschisma ampullula Sacc.	*Chaetosphaeriaceae*	S		Yugoslavia	Nag Raj and Kendrick (1975)
Sporocadus rhododendri (Schwein.) M. Morelet*	*Amphisphaeriaceae*	P	Cane lesions	Australia	Sergeeva et al. (2005)
Stagonospora bulgarica Vanev	*Phaeosphaeriaceae*	P	Leaf spot	Bulgaria	Vanev et al. (1997)
Stachybotrys sp.*	*Stachybotryaceae*	S		China	This study
Stemphylium viticola Pass.	*Pleosporaceae*	E		Poland	Mulenko et al. (2008)
Stemphylium sp.	*Pleosporaceae*	E		Spain	Gonzalez and Tello (2011)
Stereum hirsutum (Willd.) Pers.*	*Stereaceae*	P	Esca	Bulgaria, France, Greece, Spain	Larignon and Dubos (1997), Zervakis et al. (1998), Bobev (2009), Luque et al. (2009), Cloete et al. (2015)
Stereum sp.	*Stereaceae*	P	Esca	USA	French (1989)
Stigmina esfandiarii Petr.	*Mycosphaerellaceae*	P	Leaf spot	Iran, Pakistan	Esfandiari and Petrak (1950), Khan and Kamal (1974)
Strickeria sylvana (Sacc. & Speg.) Cooke	*Sporocadaceae*	S		Poland	Mulenko et al. (2008)
S. trabicola (Fuckel) G. Winter	*Sporocadaceae*	S		Central Asia	Koshkelova and Frolov (1973)
Stromatoneurospora sp.*	Xylariales genera *incertae sedis*	S		China	This study
Talaromyces amestolkiae N. Yilmaz, Houbraken, Frisvad & Samson*	*Trichocomaceae*	S		China	This study, Jayawardena et al. (2018)
T. pinophilus (Hedgc.) Samson, N. Yilmaz, Frisvad & Seifert*	*Trichocomaceae*	S		China	This study, Jayawardena et al. (2018)
T. purpureogenum Stoll*	*Trichocomaceae*	S		China	This study, Jayawardena et al. (2018)
Talaromyces sp.*	*Trichocomaceae*	S		China	This study, Jayawardena et al. (2018)
Terana coerulea (Lam.) Kuntze	*Phanerochaetaceae*	P	Wood decay	USA	Campbell et al. (1950), Hanlin (1966)
Tetracoccosporium sp.	Ascomycota genera *incertae sedis*	P	Root stock disease	South Africa	Halleen et al. (2003)
Thanatephorus cucumeris (A.B. Frank) Donk	*Ceratobasidiaceae*	S		China	Tai (1979)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
Thaxteriella pezizula (Berk. & M.A. Curtis) Petr.	*Tubeufiaceae*	S		USA	Hanlin (1963)
Thelonectria olida (Wollenw.) P. Chaverri & Salgado	*Nectriaceae*	P	Black foot disease	Uruguay	Abreo et al. (2012)
Thielavia sp.	*Chaetomiaceae*	S		China	This study
Tilletiopsis minor Nyland*	Exobasidiomycetidae *incertae sedis*	S		British Colombia, Canada	Urquhart et al. (1997)
T. washingtonensis Nyland	Exobasidiomycetidae *incertae sedis*	S		Japan	Urquhart et al. (1997)
Tomentella atramentaria Rostr.	*Thelephoraceae*	S		Spain	Hernandez (2004)
T. bryophila (Pers.) M.J. Larsen	*Thelephoraceae*	S		Spain	Hernandez (2004)
Tomentella sp.*	*Thelephoraceae*	E		China	Dissanayake et al. (2018)
Torula viticola Allesch.	*Torulaceae*	E		USA	Saccardo (1878)
Torula sp.	*Torulaceae*	E		Spain	Gonzalez and Tello (2011)
Toxicocladosporium sp.*	*Cladosporiaceae*	E		China	Dissanayake et al. (2018)
Trametes zonata (Nees) Pilát	*Polyporaceae*	S		New Zealand	Cunningham (1965)
Trichocladium asperum Harz*	*Chaetomiaceae*	E, S		Russia, Switzerland	Melnik and Popushoi (1992), Casieri et al. (2009)
Trichoderma atroviride P. Karst.*	*Hypocreaceae*	S		China	This study, Jayawardena et al. (2018)
T. aureoviride Rifai	*Hypocreaceae*	E		Spain	Gonzalez and Tello (2011)
T. koningii Oudem.	*Hypocreaceae*	S		Russia	Melnik and Popushoi (1992)
T. harzianum Rifai*	*Hypocreaceae*	E, S		China, Spain	Gonzalez and Tello (2011), This study, Jayawardena et al. (2018)
T. lixii (Pat.) P. Chaverri*	*Hypocreaceae*	S		China	This study, Jayawardena et al. (2018)
T. parapiluliferum (B.S. Lu, Druzhin. & Samuels) Jaklitsch & Voglmayr*	*Hypocreaceae*	S		Switzerland	Casieri et al. (2009)
Trichoderma sp.*	*Hypocreaceae*	E		South Africa, Spain, Switzerland	Fourie and Halleen (2002), Casieri et al. (2009), Gonzalez and Tello (2011)
Trichothecium roseum (Pers.) Link*	Hypocreales genera *incertae sedis*	P	Berry rot	Australia, China, Greece, India, Japan, Korea	Alexopoulos (1940), Tai (1979), Shivas (1989), Sharma and Agarwal (1997), Kobayashi (2007), Oh et al. (2014), This study
Trullula melanochlora (Desm.) Höhn.	Leotiomycetes genera *incertae sedis*	P		France, Portugal	Phillips (2000)
Truncatella angustata (Pers.) S. Hughes*	*Sporocadaceae*	P, E		France, Iran, Portugal, Spain, Switzerland	Nag Raj (1993), Casieri et al. (2009), Gonzalez and Tello (2011), Arzanlou et al. (2013), Maharachchikumbura et al. (2016)

Table 6 (continued)

Species	Family	Life mode	Disease caused	Locality	References
T. pitospora (M.E.A. Costa & Sousa da Câmara) Bissett	*Sporocadaceae*	P		Portugal	Nag Raj (1993)
Typhula viticola (Peck) Berthier	*Typhulaceae*	S		USA	Berthier (1976)
Ulocladium sp.	*Pleosporaceae*	E		South Africa, Spain	Halleen et al. (2003), Gonzalez and Tello (2011)
Umbelopsis isabellina (Oudem.) W. Gams*	*Mucoraceae*	S		Switzerland	Casieri et al. (2009)
Valsaria insitiva (Tode) Ces. & De Not.	*Valsariaceae*	P		Portugal, Spain	Phillips (2000), Unamuno (1941)
Verticillium ahlia Kleb.*	*Plectosphaerellaceae*	P		China, Japan, USA	French (1989), Kobayashi (2007), Zhang et al. (2009)
Verticillium sp.	*Plectosphaerellaceae*	P		Mexico	Alvarez (1976)
Verpa bohemica (Krombh.) J. Schröt*	*Morchellaceae*	E		Switzerland	Casieri et al. (2009)
Volutella sp.*	*Nectriaceae*	S		China	This study
Xeromyces bisporus L.R. Fraser*	*Aspergillaceae*	S		Australia	Pettersson et al. (2011)
Xerotus viticola Berk. & M.A. Curtis	*Polyporaceae*	S		USA	Berkeley (1872)
Xylaria arbuscula Sacc.	*Xylariaceae*	S		Taiwan	Ju and Rogers (1999)
Xylaria hypoxylon (L.) Grev.	*Xylariaceae*	E		Spain	Gonzalez and Tello (2011)
Xylaria sp.*	*Xylariaceae*	S		China	This study
Zetiasplozna thuemenii (Speg.) Nag Raj	*Sporocadaceae*	S		Italy	Nag Raj (1993)

Life mode—*P* pathogen, *E* endophyte, *S* saprotroph, *M* mycoparasitic on powdery mildew fungi, *OP* opportunisitic pathogen and *U* unknown

*Identification is confirmed by molecular data in the studies. The records are taken from the literatures and thus may not be correct and the same taxon could be listed more than once. It would be necessary to re -examine all collections if available to confirm their identities. Even the molecular data may be needed to establish their correct names

but this was shown not to be accurate (Ko et al. 2011). The most recent studies on fungal pathogens of grapevine have incorporated multigene analysis to accurately resolve taxa (Dissanayake et al. 2015; Jayawardena et al. 2015; Yan et al. 2015; Chethana et al. 2017).

Most previous studies did not address the total community of fungi on *Vitis vinifera*. Pancher et al. (2012) carried out an extensive study on endophytes on this host, showing that how various anthropic and nonanthropic factors shape microbial communities. There have been extensive studies on the disease causing agents with more than 150 taxa known to cause various diseases of grapevine. For example, *Colletotrichum* species cause grape ripe rot of *Vitis vinifera* worldwide (Jayawardena et al. 2016b). There have however, been no investigation on the saprobes of grapevines using molecular identification and there has been no study using mycobiome analysis to reveal saprotrophic communities. The study of saprotrophs is important, as they not only decay dead leaves and branches, thus beneficial recyclers, but they may also become pathogens when conditions are suitable.

This study therefore fills this void by establishing the saprotrophic fungi on *Vitis vinifera* using both traditional and culture-independent approaches. In this study we did not obtain similar results from the two methods. In the traditional method, 45 species belonging to 30 genera were identified (Table 2), while in culture-independent method 226 OTUs' and 72 genera were identified. Even though we isolated directly from the fruiting bodies, some fungi were not able to grow on media. Several single spore isolations were unsuccessful. This may be due to the availability of nutrient content, pH, temperature, and presence of inhibitors and the time of incubation. The number of isolates obtained was less than the actual fungal community and can be misinterpreted (Hugenholtz et al. 1998). These conditions make it difficult to accurately identify and document the vast number of unrecognized taxa (Lücking and Moncada 2017). For example, in this study the total identified taxa from the traditional method were 45. Therefore, to overcome the constraints of traditional methods, culture-independent techniques are proposed as an alternative technique (Hoppe et al. 2016).

The aim of environmental sequence nomenclature is to place names of species of fungi that would otherwise be left undescribed (Lücking and Moncada 2017). These techniques can provide sequence reads almost 1000 times more than the traditional DNA sequencing methods (Lücking and Moncada 2017). Lücking and Moncada (2017) showed that a formally recognized unnamed lichenicolous basidiomycete can be considered as a new genus, with seven new species, although there is no physical type specimens are available. These authors also suggested that this would allow the recognition of thousands of species of voucher less taxa detected through environmental sequencing techniques. However, there are several constrains to NGS methods. DNA may not be recovered from all genotypes and the results of NGS can be biased towards the most abundant organisms at the time of sampling (Ward et al. 1990). The reason for this is that the relative abundance (Fig. 5) of microbial species in a natural habitat is rarely equal. Usually, with a few species being predominant among a larger group of common species makes it difficult to identify the species that are actually present. NGS are mainly based on analysis of ITS regions (Schoch et al. 2012). However, due to the high variability of ITS regions (ITS1 and ITS2), reliable sequence alignments are difficult to obtain for some fungal taxa. Therefore, this method is not reliable for species level identification. The identification levels are usually reported at the genus level or even higher taxonomic levels, such as family or order (Purahong et al. 2018). Another constraint of NGS is that the correspondence of OTU with species can be unreliable. OTUs are defined based on the similarity threshold, usually with a 97% (Sneath and Sokal 1973). However, some species have genes that are 97% similar, which will result in merged OTUs containing multiple species. In the same way, a single species may have paralogs that are < 97% similar, causing the species to be split across two or more species. Some identified clusters, even when a majority, may be false, due to the artifacts including reading errors and chimeras (Sneath and Sokal 1973). Assessing species richness and diversity of a microbial community using culture-independent method (rarefaction curves), suggests that OTUs are observations of organisms with 'negligible error'. Also, it suggests that the number of reads correlates well with the total number of individuals present in the community. However, if the majority of OTUs are experimental artifacts, the traditional species richness estimations cannot be applied. The measures between sample variations will tend to reflect differences in artifact frequencies rather than biological differences (Sokal and Sneath 1963).

Artifacts can be occurred due to several reasons. PCR amplification steps can be affected by preferentially/differentially that can hinder the detection of some genotypes when analysing bulk DNA extracts from a substrate (Kanagawa 2003). Primer mismatches, a lower rate of primer hybridization, occurrence of heteroduplexes and chimeric amplicons can generate additional signals that do not correspond to the genotypes in the same samples (Suzuki and Giovannoni 1996; Kanagawa 2003). Also, the

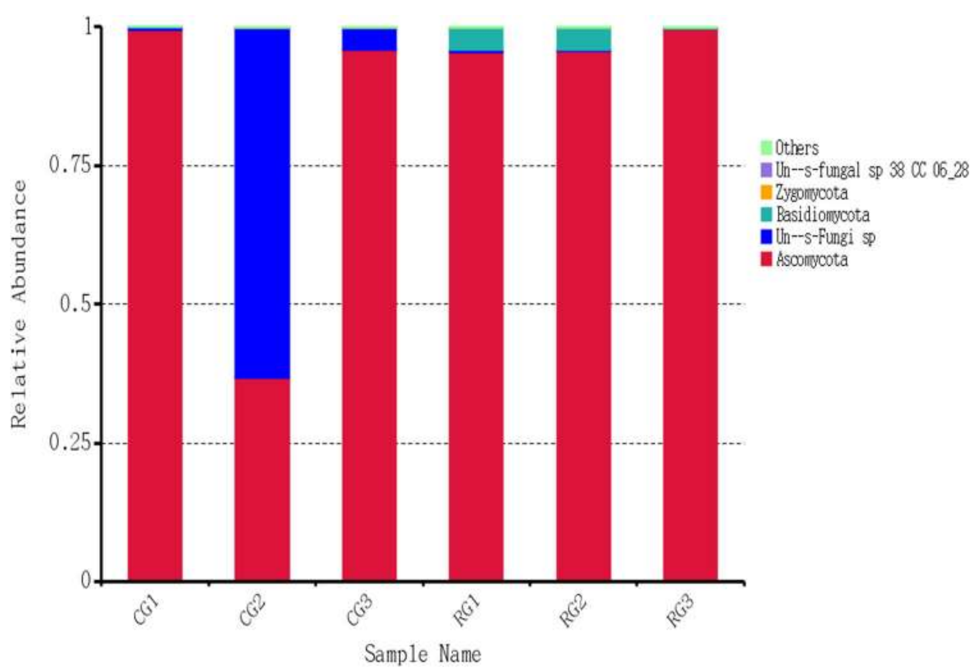

Fig. 5 Relative abundance of the top 10% phylum from different samples of the cultivars Carbanate Gernischet and Red Globe of *Vitis vinifera*

analysis of fungal rRNA genes limits identification to the genus or family level (Anderson and Cairney 2004).

Dissanayake et al. (2018) in her study using paired-end Illumina sequencing with 55, 822 high quality sequences per endophyte sample (saturated rarefaction curves for all samples) revealed 59 OTUs (the majority containing genera level identification) that were similar to genera revealed by the traditional method (28 species).

Traditional versus culture-independent methods: can matching of these two approaches enable us to identify correct fungal taxonomic information at genus and species levels?

In this study, taxa (OTUs) of *Aspergillus*, *Botrytis*, *Cladosporium*, *Clonostachys*, *Fusarium*, *Penicillium*, *Phoma* and *Talaromyces* were identified using both traditional and culture-independent approaches. Some fast growing fungi may be dominant in the culture plates, even though in the natural habitat they may be minorities. Many hyphomycetes tend to grow faster than the other groups of fungi. So, they may suppress the growth of other important, dominant fungi. The fast growing fungi (hyphomycetes) identified in the traditional method such as *Mucor* and *Rhizopus* were not recognized in the culture-independent method. The majority of the genera identified in the traditional method are phytopathogens, while in the culture-independent method the majority are saprotrophs. In the traditional method using both morphological and molecular approaches, we were able to identify many taxa to species level, although in six cases the identification is only up to the genus level due to lack of data. We have generated a phytogenetic tree for the genus *Colletotrichum* using the strains identified in the traditional approach as well as the OTU identified in the culture-independent method. OTU-234, was identified as *Glomerellaceae* sp. in the culture-independent approach. The blastn result of OTU-234 in NCBI shows 100% similarity to many strains of *C. gloeosporioides*. Two-hundred and fifteen basepairs of OTU-234 were used in the alignment (Supplementary Fig. S6). In the phylogenetic tree constructed using the ex-type strains of gloeosporioides complex and the truncatum complex, OTU-234 cluster within the truncatum complex, closely to *C. curcumae* (Supplementary Fig. S7). This example also provides evidence that the NGS sequences is not reliable to identify an organism to the species level. However, in the culture-independent technique we were able to identify 90 out of 226 OTUs to species level, and the rest were identified to genera or family level. These may not be correctly identified as in general NGS fungal taxa identification may be only accurate to the genus level (Purahong et al. 2018), which suggests that the sequence data from the culture-independent approach is inadequate to accurately identify species. The overlap between the two methods in identifying the taxa to the species level is negligible.

Matching between the traditional and culture-independent data allows us to have a better understanding concerning the functional information of the fungal OTUs resulting from culture-independent methods. Next generation sequencing often results in sequences that are associated with taxa, which have not been reported in previous studies (Tejesvi et al. 2010; Ko et al. 2011; Taylor et al. 2016). However, as most of these OTUs are identified to genus or family level, it makes it difficult to relate whether these are actually correctly identified and whether the use of this method is important. In the preparation of the checklist of fungi on *Vitis* species, the authors had to eliminate most of the taxa that were identified using NGS, as those data can be unreliable. In our study, we compared the sequence similarity between the two cultivars using a 90% similarity of ITS1 sequence data, followed by a manual BLAST based identification of the respective OTUs. We considered the ITS similarity at 98–99% as the same species (Garnica et al. 2016; Jeewon and Hyde 2016). In this criterion, identification of genera can be bias/difficult as some of the data in databases have mistakes or they may be inaccurate. The increase of the ITS similarity to 99–100% can give us better and reliable identification of the species. However, ITS sequence data alone will not be able to identify the complexes genera such as *Colletotrichum* and *Diaporthe* to their species level. For a better resolution of these genera protein coding gene regions are required.

Can direct matching between traditional and culture-independent methods help to identify the rare taxa?

Our results show that some singletons, which were usually removed as artifacts or errors of the NGS may actually be real OTUs. In this study, we found two OTUs (*Botryospaeria* OTU-178 and Ascomycota OTU-213) as singletons and removed them from the analysis. However, with direct matching, we found that these OTUs are *Botryospaeria dothidea* and *Coniella vitis*. Therefore, we can assume that not all the singletons are artifacts and matching between traditional and culture-independent methods can help to identify the real rare taxa in the fungal community.

Potential effect of grape cultivars (table grape (Red Globe) and wine grape (Carbanate Gernischet) on fungal saprotrophic community composition and richness

Another aspect of this study was to study whether there is any difference in the fungal communities based on cultivars. In the present study, traditional and culture-independent approaches allows the identification of potential roles of the saprotrophs in the two grapevine cultivars. In this study we identified more than 10 main and important fungal pathogens of grapevine using both methods. With the evaluation of both community composition and community diversity we were able to identify that the fungal communities of the two grape cultivars appear to be different. *Alternaria vitis*, *Albifrimbria viridis*, *Bipolaris maydis*, *Botryosphaeria dothidea*, *Botrytis cinerea*, *Colletotrichum hebeinse*, *C. truncatum*, *C. viniferum*, *Didymella pomorum*, *Dothiorella sarmentorum*, *Epiccocum nigrum*, *Fusarium* sp., *Mucor circinelloides*, *Paraphoma chrysanthemicola*, *Neopestalotiopsis clavispora*, *Stagonosporopsis* sp.1, *Minimedusa* sp., *Peniophora* sp., *Penicillium brevicompactum* and *P. citrinum* were recorded only from Red Globe cultivar while *Albifimbria verrucaria*, *Neopestalotiopsis vitis*, *Pythium amasculinum*, *Stagonosporopsis* sp.2, *Trichoderma lixii* and *Septoriella allojunci* were recorded from Carbanate Gernischet cultivar in the traditional method. In the culture-independent approach, *Acremonium chrysogenum* (OTU-195), *Apodus* sp. (OTU-235), Ascomycota (OTU-80, 99, 182, 222, 253), *Aspergillus* sp. (OTU-116, 199), *Candida mucifera* (OTU-227), *Cylindrocarpon* sp. (OTU-171), *Dactylellina phymatopaga* (OTU-58), *Davidiella tassiana* (OTU-86), *Deroxomyces* sp. (OTU-225), Fungal (OTU-245, 254), *Fusarium* cf. *dimerum* (OTU-162), Helotiales (OTU-91), Hypocreales (OTU-65), *Kernia nitida* (OTU-184), *Kernia pachypleura* (OTU-211), *Lecanicilium dimorphum* (OTU-101), *Lentinus squarrosulus* (OTU-249), *Lophiostoma* sp. (OTU-142), Microascales (OTU-138), *Metarhizium pinghaense* (OTU-210), *Myceliophthora fergusii* (OTU-198), *Myrothecium* sp. (OTU-238), *Nectriaceae* (OTU-97, 194), *Papulospora equi* (OTU-148), *Phialosimplex caninus* (OTU-187), *Psathyrellaceae* (OTU-145), *Pseudallescheria angusta* (OTU-183), *Pyronemataceae* (OTU-237), *Remersonia* sp. (OTU 108), Sordariomycetes (OTU-128), Sordariales (OTU-196, 200, 214), *Xylaria* sp. (OTU-159) were found only in association with the Red Globe cultivar while *Acremonium* sp. (OTU-188), *Apllosporella yalgorensis* (OTU-85), *Arachnomyces kanei* (OTU-170), *Aspergillus melleus* (OTU-143), *Aspergillus wentii* (OTU-175), *Cadophora luteo-olivaceae* (OTU-146), *Ceratobasidiaceae* (OTU-219), *Chaetomium carinthiacum* (OTU-177), *Chysisporium lobatum* (OTU-150), *Cladosporium grevilleae* (OTU-121), Dothideomycetes (OTU-140), Eurotiales (OTU-76), Fungal (OTU-82, 104, 165), *Gymnascella aurantiaca* (OTU-151), *Hansfodia* sp. (OTU-232), Hypocreales (OTU-49, 92, 202), *Lasiophaeriaceae* (OTU-189), *Leptosphaeria* sp. (OTU-205), *Magnoporthaceae* (OTU- 141, 149), Microascales (OTU-114), *Microascus* sp. (OTU-185), *Microdochium* sp. (OTU-225), *Nectriaceae* (OTU-218), *Penicillium ilerdanum* (OTU-163), *Penicillium neocrassum* (OTU-168), *Podospora communis* (OTU-190), *Scopulariopsis* sp. (OTU-164), Sordariales (OTU-133), *Spiromastix princeps* (OTU-139), *Thielavia basicola* (OTU-155), *Trichomaceae* (OTU-156, 166) were recorded on from Carbanate Gernischet cultivar.

The difference of the two fungal communities can be due to the geographic variation of the cultivars. This can be a result from the interactions with specific *V. vinifera* varieties and its soil and climatic conditions (Bokulich et al. 2014). Red Globe cultivar was collected in Beijing, which is a region in North of China and Carbanate Gernischet cultivar was collected from Yunnan which is in the southern part of the country. The difference between the fungal communities in regions may be a function of a neutral process, where these different communities established by chance and lack of species dispersal allows these communities to persist (Martiny et al. 2006). This difference can also be due to the Baas Becking hypothesis, which states that there is no limit to the range of species but that selection sorts these species and defines community composition and diversity in any one area (Hanson et al. 2012). Climate can also co-relates with differences in fungal communities in China, as one moves North up in China, the climate becomes increasingly cold and dry so the pattern of lower fungal species richness in the northern most regions hints that selection might have a role in determining these patterns.

Plant pathogens and endophytes in the saprotrophic fungal community

Species richness and distribution patterns of saprotrophic fungi in a vineyard can provide important insights into the roles of each fungal group for the stability and functioning of its respective ecosystem (Kubartova et al. 2012). However, knowledge of saprotrophic fungi associated with grapevine is very much limited. In this study, we identified 17 primary and six species of secondary pathogens of grapevine as saprobes using the traditional method, while 27 OTUs were identified as both primary and secondary pathogens from dead material of *Vitis vinifera* in the culture-independent method.

Species of *Alternaria* are responsible in causing berry rots, raisin molds and rots as well as pedicel and rachis diseases (Barbe and Hewitt 1965; Gonzalez and Tello 2011; Tao et al. 2014, Ariyawansa et al. 2015) and also considered as wound and secondary invaders. *Alternaria alternata* and *A. vitis* were isolated in this study. *Aspergillus* is a causal agent of berry rots as well as a wound and secondary invader (Hewitt 2015). In our study *A. aculeatus* and *A. niger* were recorded using the traditional method, while *A. aculeatus* was also recorded from culture-independent method. Botryosphaerious taxa are well-known to be associated with grapevine canker and die back (Úrbez-Torres et al. 2012, 2013a, b). In our study we identified *Botryosphaeria dothidea* and *Dothiorella sarmentorum* as saprotrophs using traditional methodology. *Lasiodiplodia* was recorded in the culture-independent method.

Botrytis is another genus that we obtained in both traditional and independent approaches. *Botrytis cinerea* is a pathogen of grapevine causing Botrytis bunch rot and blight all over the world (Fournier et al. 2013; Hyde et al. 2014; Javed et al. 2017). *Cladosporium* was also recorded in both approaches. Species of this genus cause minor foliage diseases of grapevine, as well as bunch rots (Bensch et al. 2015). *Clonostachys* is another genus recorded in both approaches. *Clonostachys rosea* is known to cause root rot of grapevine in Switzerland (Casieri et al. 2009). *Colletotrichum hebeiense*, *C. truncatum* and *C. viniferum* were recorded in the traditional method. Species of this genus cause grape ripe rot affecting the quality and production of grapevine (Yan et al. 2015). *Diaporthe eres* is another pathogen of grapevine causing die back (Lawrence et al. 2015; Baumgartner et al. 2013; Cinelli et al. 2016; Fischer et al. 2016; Bastide et al. 2017), which was recorded via the traditional methodology as well as via the culture-independent approach.

Species of *Fusarium* cause wilt disease of grapevine (Castillo-Pando et al. 2001; Gonzalez and Tello 2011). This genus was recorded in both approaches. *Neopestalotiopsis vitis* recorded from traditional method is a pathogen causing fruit rot, die back and leaf spots of grapevine (Jayawardena et al. 2015, 2016a). *Coniella vitis* is a pathogen causing white rot of grapes, identified using traditional methods (Chethana et al. 2017). Species of *Penicillium* are wound and secondary pathogens of grapevines causing bunch rot (Kim et al. 2007). *Rhizopus oryzae* is another wound and secondary pathogen causing bunch rots of grapevines (Hewitt 2015).

Several genera were identified only in the culture-independent method. *Aplosporella* is known to cause lesions on grapevine stems in China (Tai 1979). *Claviceps* is known to be a pathogen on grasses and cereals, but has not been recorded as a pathogen of grapevine (Mey et al. 2002). Therefore, this study provides the first record of this genus on *V. vinifera*. *Cylindrocarpon* species are known to cause the black foot disease of grapevine (Abreo et al. 2010, 2012; Mohammadi et al. 2013a, b). *Devriesia* is a facultative pathogen, but there are no records of this species on *V. vinifera* (Seifert et al. 2004). Therefore, this study provides the first record of this genus on *V. vinifera*. Species of *Leptosphaeria* has been reported as endophytes and saprotrophs of grapevine (Crane and Shearer 1991). However, some species of this genus can be pathogenic to some economically important crops (Fitt et al. 2006). *Monographella* is a known leaf pathogen on rice, barley, maize and wheat (Daamen et al. 1991; Hock et al. 1992; Tatagiba et al. 2015). However, there are no records of species of this genus associated with grapevine. Therefore, this study provides the first record of *Monographella* associated with grapevine. Species of *Phaeoacremonium* are causal agents of Esca disease around the world (Garcia-Benavides et al. 2013). Species of *Trichothecium* are known to cause berry rot of grapevine, but this is not considered as a major pathogen on grapevine (Oh et al. 2014).

Even though genus *Volutella* is a facultative pathogen causing leaf spot and cankers (Henricot et al. 2000; Shi and Hsiang 2014), there is no record of this genus occurring on grapevine. Therefore, this study provides the first record of *Volutella* associated with *V. vinifera* as a saprotroph.

Among the 45 identified saprotrophic taxa, 17 are well known pathogens of *Vitis vinifera* causing severe yield as well as economic losses to viticulture worldwide (Table 2). Six secondary pathogens of were also identified in this study. Most of the pathogens tend to survive or overwinter on dead plant material as saprotrophs and act as the primary inoculums once the conditions are favourable (Armijo et al. 2016).

Many studies have shown that most pathogenic fungi can survive unsuitable conditions, such as cold during the winter, by changing their life mode to saprotrophs, and become active pathogens again once the conditions are suitable. Therefore, dead plant materials are the potential primary inocula for plant pathogens in vineyards. In order to avoid this problem, vineyards must be kept clean. If there are any dead grapevines they must be removed and if possible should be burned. This will reduce the pathogenic fungi from year to year.

Checklist of fungi on *Vitis*

Nine-hundred and five micro- and macro- fungal taxa reported on *Vitis* species are listed in this study. This is an updated worldwide checklist of fungi on *Vitis*. These taxa are distributed in 156 families and 343 genera. For each species, family, life mode, diseases caused and the known locality as well as references are provided.

Acknowledgements This work was financially supported by Beijing Talent Programm for Jiye Yan, CARS-29 and JNKYT201605.

References

Abad ZG, Abad JA, Cacciola SO, Pane A, Faedda R, Moralejo E, Perez-Sierra A, Abad-Campos P, Alvarez-Bernaola LA, Bakonyi J, Jozsa A, Herrero ML, Burgess TI, Cunnington JH, Smith IW, Balci Y, Blomquist C, Henricot B, Denton G, Spies C, McLeod

A, Belbahri L, Cooke D, Kageyama K, Uematsu S, Kurbetli I, Degirmenci K (2014) *Phytophthora niederhauserii* sp. nov., a polyphagous species associated with ornamentals, fruit trees and native plants in 13 countries. Mycologia 106:431–447

Abreo E, Martinez S, Bettucci L, Lupo S (2010) Morphological and molecular characterization of *Campylocarpon* and *Cylindrocarpon* spp. associated with black foot disease of grapevines in Uruguay. Australas Plant Pathol 39:446–452

Abreo E, Lupo S, Bettucci L (2012) Fungal community of grapevine trunk diseases: a continuum of symptoms? Sydowia 64:1–12

Agusti-Brisach C, Pérez-Sierra A, García-Figueres F, Montón C, Armengol J (2011) First report of dampingoff caused by *Cylindrocarpon pauciseptatum* on *Pinus radiata* in Spain. Plant Dis 95:874

Agusti-Brisach C, Alaniz S, Gramaje D, Perez-Sierra A, Armengol J (2012) First report of *Cylindrocladiella parva* and *Cylindrocladiella peruviana* associated with black-foot disease of grapevine in Spain. Plant Dis 96:1381

Agusti-Brisach C, Cabral A, Gonzalez-Dominguez E, Perez-Sierra A, Leon M, Abad-Campos P, Garcia-Jimenez J, Oliveira H, Armengol J (2016) Characterization of *Cylindrodendrum*, *Dactylonectria* and *Ilyonectria* isolates associated with loquat decline in Spain, with description of *Cylindrodendrum alicantinum sp. nov*. Eur J Plant Pathol 145:103–118

Ahmad S (1969) Fungi of West Pakistan. Biol Soc Pak Monogr 5(Suppl. 1):1–110

Ahmad S (1978) Ascomycetes of Pakistan, Part II. Biol Soc Pak Monogr 8:1–144

Ahmad S, Iqbal SH, Khalid AN (1997) Fungi of Pakistan. Sultan Ahmad Mycological Society of Pakistan, Lahore

Akgul DS, Savas NG, Eskalen A (2014a) First report of wood canker caused by *Botryosphaeria dothidea*, *Diplodia seriata*, *Neofusicoccum parvum*, and *Lasiodiplodia theobromae* on grapevine in Turkey. Plant Dis 98:568

Akgul DS, Savas NG, Onder S, Ozben S, Kaymak S (2014b) First report of *Campylocarpon fasciculare* causing black foot disease of grapevine in Turkey. Plant Dis 98:1277

Akgul DS, Gungor Savas N, Teker T, Keykubat B, Mayorquin JS, Eskalen A (2015) Fungal trunk pathogens of Sultana seedless vineyards in Aegean region of Turkey. Phytopathol Mediterr 54:380–393

Alaniz S, Leon M, Vicent A, Garcia-Jimenez J, Abad-Campos P, Armengol J (2007) Characterization of *Cylindrocarpon* species associated with black foot disease of grapevine in Spain. Plant Dis 91:1187–1193

Alaniz S, Armengol J, Leon M, Garcia-Jimenez J, Abad-Campos P (2009) Analysis of genetic and virulence diversity of *Cylindrocarpon liriodendra* and *C. macrodidymum* associated with black foot disease of grapevine. Mycol Res 113:16–23

Alexopoulos CJ (1940) Some fungi from Greece. Mycologia 32:336–358

Alfieri Jr SA, Langdon KR, Wehlburg C, Kimbrough JW (1984) Index of plant diseases in Florida (revised). Florida Department of Agriculture and Consumer Services, Division of *Plant* Industry Bulletin, vol 11, pp 1–389

Alfieri SA Jr, Langdon KR, Kimbrough JW, El-Gholl NE, Wehlburg C (1994) Diseases and disorders of plants in Florida. Florida Department of Agriculture and Consumer Services, Tallahassee

Al-Saadoon AH, Ameen MKM, Hameed MA, Al-Badran A, Ali Z (2012) First report of grapevine dieback caused by *Lasiodiplodia theobromae* and *Neoscytalidium dimidiatum* in Basrah, Southern Iraq. Afr J Biotechnol 11:16165–16171

Alvarez MG (1976) Primer catalogo de enfermedades de plantas Mexicanas. Fitofilo 71:1–169

Alves A, Linaldeddu BT, Deidda A, Scanu B, Phillips AJL (2014) The complex of *Diplodia* species associated with *Fraxinus* and some other woody hosts in Italy and Portugal. Fungal Divers 67:143–156

Amrani L, Corio-Costet M-F (2006) A single nucleotide polymorphism in the ß-tubulin gene distinguishing two genotypes of *Erysiphe necator* expressing different symptoms on grapevine. Plant Pathol 55:505–512

Anderson IC, Cairney JW (2004) Diversity and ecology of soil fungal communities: increased understanding through the application of molecular techniques. Environ microbiol 6:769–779

Ann PJ, Chang T-T, Ko W-H (2002) *Phellinus noxius* brown root rot of fruit and ornamental trees in Taiwan. Plant Dis 86:820–826

Anonymous (1960) Index of plant diseases in the United States. U.S.D.A. Agricultural Handbook 165:1–531

Anonymous (1979) List of plant diseases in Taiwan. The Plant Protection Society of The Republic of China, Taichung

Ariyawansa HA, Thambugala KM, Manamgoda DS, Jayawardena R, Camporesi E, Boonmee S, Wanasinghe DN, Phookamsak R, Hongsanan S, Singtripop C, Chukeatirote E (2015) Towards a natural classification and backbone tree for *Pleosporaceae*. Fungal Divers 71:85–139

Armijo G, Schlechter R, Agurto M, Muñoz D, Nuñez C, Arce-Johnson P (2016) Grapevine pathogenic microorganisms: understanding infection strategies and host response scenarios. Front Plant Sci 7:382

Arnold GRW (1986) Lista de Hongos Fitopatogenos de Cuba. Ministerio de Cultura Editorial Cientifico-Tecnica, Habana

Arthur JC (1918) Uredinales of Guatemala based on collections by E.W.D. Holway. I. Introduction. Coleosporiaceae and Uredinaceae. Am J Bot 5:325–336

Arzanlou M, Moshari S, Bakhshi M, Khodaie S (2012) *Botryosphaeria dothidea* associated with grapevine decline disease in Iran. Australas Plant Dis Notes 7:197–200

Arzanlou M, Narmani A, Moshari S, Khodaei S, Babai-Ahari A (2013) *Truncatella angustata* associated with grapevine trunk disease in Northern Iran. Arch Phytopathol Pflanzenschutz 46:1168–1181

Arzanlou M, Narmani A, Khodaei S, Moshari S (2014) Pome and stone fruit trees as possible resevoir hosts for *Phaeoacremonium* spp., the causal agents of grapevine esca disease, in Iran. Arch Phytopathol Pflanzenschutz 47:717–727

Auger J, Esterio M, Ricke G, Perez I (2004a) Black dead arm and basal canker of *Vitis vinifera* cv. red globe cause by *Botryosphaeria obtuse* in Chile. Plant Dis 88:1286

Auger J, Esterio M, Perez I, Gubler WD, Eskalen A (2004b) First report of *Phaeomoniella chlamydospora* on *Vitis vinifera* and French American hybrids in Chile. Plant Dis 88:1285

Bai J-K (ed) (2000) Flora Fungorum Sinicorum. Sphaeropsidales, *Phoma*, *Phyllosticta*, vol 15. Science Press, Beijing

Baker RED, Dale WT (1951) Fungi of Trinidad and Tobago. Mycol Pap 33:1–123

Bakhshi M, Arzanlou M (2017) Multigene phylogeny reveals a new species and novel records and hosts in the genus *Ramularia* from Iran. Mycol Progr 16:703–712

Bakhshi M, Arzanlou M, Babai-Ahari A (2012) Comprehensive check list of Cercosporoid fungi from Iran. Plant Pathol Quar 2:44–55

Balmas V, Scherm B, Ghignone S, Salem AOM, Cacciola SO, Migheli Q (2005) Characterisation of *Phoma tracheiphila* by RAPD-PCR, microsatellite-primed PCR and ITS rDNA sequencing and development of specific primers for in planta PCR detection. Eur J Plant Pathol 111:235–247

Baloyi MA, Halleen F, Mostert L, Eskalen A (2013) First report of *Togninia minima* perithecia on esca- and Petri-diseased grapevines in South Africa. Plant Dis 97:1247

Barbe GD, Hewitt WB (1965) Principal fungus in summer bunch rot of grapes. Phytopathology 55:815

Baroncelli R, Sreenivasaprasad S, Lane CR, Thon MR, Sukno SA (2014) First report of *Colletotrichum acutatum* sensu lato (*Colletotrichum godetiae*) causing anthracnose on grapevine (*Vitis vinifera*) in the United Kingdom. New Dis Rep 29:26

Barr ME (1990) Some dictyosporous genera and species of Pleosporales in North America. N Y Bot Gard 62:1–92

Barr ME (1992) Notes on the *Lophiostomataceae* (Pleosporales). Mycotaxon 45:191–221

Baskarathevan J, Jaspers MV, Jones EE, Ridgway HJ (2008) Distribution of *Botryosphaeria* species causing grapevine dieback and decline in New Zealand vineyards. NZ Plant Protect 61:392

Baskarathevan J, Jaspers MV, Ridgway HJ, Eirian JE (2012) Incidence and distribution of Botryosphaeriaceous species in New Zealand vineyards. Eur J Plant Pathol 132:549–560

Bastide F, Serandat I, Gombert J, Laurent E, Morel E, Kolopp J, Guillermin PL, Hamon B, Simoneau P, Berruyer R, Poupard P (2017) Characterization of fungal pathogens (*Diaporthe angelicae* and *D. eres*) responsible for umbel browning and stem necrosis on carrot in France. Plant Pathol 66:239–253

Batista AC, Ciferri R (1962) The Chaetothyriales. Sydowia 3:1–129

Batra LR (1973) *Nematosporaceae* (Hemiascomycetidae): taxonomy, pathogenicity, distribution, and vector relationships. U.S.D.A. Agric Res Serv Tech Bull 1469:1–71

Baumgartner K, Fujiyoshia PT, Travadon R, Castlebury LA, Wilcox WF, Rolshausen PE (2013) Characterization of species of *Diaporthe* from wood cankers of grape in eastern North American vineyards. Plant Dis 97:912–920

Beale RE, Pitt D (1990) Biological and integrated control of Fusarium basal rot of *Narcissus* using *Minimedusa polyspora* and other micro-organisms. Plant Pathol 39:477–488

Bechet M, Sapta-Forda A (1981) Investigation on the growth, development and control of *Alternaria vitis* Cav., the pathogen of alternariosis of grapevine. Romania Univ'ersitatea Babes-Bloya, pp 147–156

Begon M, Harper JL, Townsend CR (1993) Ecology: Individuals, Population and Communities, 3rd edn. Blackwell Science, Boston

Begoude AD, Slippers B, Wingfeld MJ, Roux J (2010) *Botryosphaeriaceae* associated with *Terminalia catappa* in Cameroon, South Africa and Madagascar. Mycol Progr 9:101–123

Benavides PG, Zamorano PM, Ocete CA, Maistrello L, Ocete R (2013) Biodiversity of pathogenic wood fungi isolated from *Xylotrechus arvicola* (Olivier) galleries in vine shoots. OENO One 47:73–81

Bendezu-Euribe MV, Alvarez LA (2012) The perfect stage of powdery mildew of grapevine caused by *Erysiphe necator* found in Peru. Plant Dis 96:768

Benjamin CR, Slot A (1969) Fungi of Haiti. Sydowia 23:125–163

Bensch K, Groenewald JZ, Braun U, Dijksterhuis J, de Jesús Y-MM, Crous PW (2015) Common but different: the expanding realm of *Cladosporium*. Stud Mycol 82:23–74

Berkeley MJ (1872) Notices of North American fungi. Grevillea 1:33–39

Berndt R (2004) A checklist of Costa Rican rust fungi. In: Agerer R, Piepenbring M, Blanz P (eds) Frontiers in Basidiomycete Mycology. IHW-Verlag, Berlin

Berraf-Tebbal A, Bouznad Z, Santos JM, Coelho MA, Peros J-P, Phillips AJL (2011) *Phaeoacremonium* species associated with Eutypa dieback and esca of grapevines in Algeria. Phytopathol Mediterr 50:S86–S97

Berraf-Tebbal A, Guereiro MA, Phillips AJL (2014) Phylogeny of *Neofusicoccum* species associated with grapevine trunk disease in Algeria, with decription of *Neofusicoccum algeriense sp. nov*. Phytopathol Mediterr 53:416–427

Berthier J (1976) Monographie des *Typhula*, *Pistillaria* et des genres voisins. Bull Soc Linn Lyon 45:1–213

Bezerra JL, De Lima TEF (2012) *Phaeotrichoconis crotalariae*, endophytic on *Vitis labrusca*, in Brazil. Mycotaxon 120:291–294

Billones RG, Ridgway HJ, Jones EE, Jaspers MV (2010) First report of *Neofusicoccum macroclavatum* as a canker pathogen of grapevine in New Zealand. Plant Dis 94:1504

Blair JE, Coffey MD, Park SY, Geiser DM, Kang S (2008) A multilocus phylogeny for *Phytophthora* utilizing markers derived from complete genome sequences. Fungal Genet Biol 45:266–277

Bobev S (2009) Reference guide for the diseases of cultivated plants. http://nt.ars-grin.gov/fungaldatabases

Boesewinkel HJ (1982) A list of 142 new plant disease recordings from New Zealand and short notes on three diseases. Australas Plant Pathol 11:40–43

Boidin J, Lanquetin P (1987) Le genre *Scytinostroma* Donk (basidiomycetes, *Lachnocladiaceae*). Biblioth Mycol 114:1–130

Bokulich NA, Subramanian S, Faith JJ, Gevers D, Gordon JI, Knight R, Mills DA, Caporaso JG (2013) Quality-filtering vastly improves diversity estimates from Illumina amplicon sequencing. Nat Methods 10:57–59

Bokulich NA, Thorngate JH, Richardson PM, Millis DA (2014) Microbial biogeography of wine grapes is conditioned by cultivar, vintage and climate. Proc Natl Acad Sci 111:E139–E148

Bolay A (2005) Powdery mildews of Switzerland (*Erysiphaceae*). Cryptogr Helv 20:1–176

Booth C (1966) The genus *Cylindrocarpon*. Mycol Pap 104:1–56

Brasier CM, Sanchez-Hernandez E, Kirk SA (2003) *Phytophthora inundata sp. nov*., a part heterothallic pathogen of trees and shrubs in wet or flooded soils. Mycol Res 107:477–484

Braun U (1998) A monograph of *Cercosporella*, *Ramularia* and allied genera (Phytopathogenic Hyphomycetes), vol 2. IHW-Verlag, Eching, p 337

Braun U, Crous PW, Dugan F, Groenewald JE, De Hoog GS (2003) Phylogeny and taxonomy of Cladosporium-like hyphomycetes, including *Davidiella* gen. nov., the teleomorph of *Cladosporium* s. str. Mycol Prog 2:3–18

Brenckle JF (1918) North Dakota fungi—II. Mycologia 10:199–221

Briceno EX, Latorre BA (2007) Outbreaks of *Cladosporium* rot associated with delayed harvest wine grapes in Chile. Plant Dis 91:1060

Briceno EX, Latorre BA (2008) Characterization of Cladosporium rot in grapevines, a problem of growing importance in Chile. Plant Dis 92:1635–1642

Bucher VVC, Hyde KD, Pointing SB, Reddy CA (2004) Production of wood decay enzymes, mass loss and lignin solubilization in wood by marine ascomycetes and their anamorphs. Fungal Divers 15:1–14

Burdsall HH Jr (1976) A new species of *Laeticorticium* (Aphyllophorales, *Corticiaceae*) from the southern Appalachians. J Elisha Mitchell Sci Soc 91:243–245

Burdsall HH Jr (1985) A contribution to the taxonomy of the genus *Phanerochaete*. Mycol Mem 10:1–165

Burgess TI, Barber PA, Hardy J (2005) *Bothryosphaeria* spp. associated with Eucalyptus in Western Australia including description of *Fusicoccum macroclavatum sp. nov*. Australas Plant Pathol 34:557–567

Buritica P (1999) La familia *Phakopsoraceae* en el neotropico III, generos: *Batistopsora* y *Phakopsora*. Rev Acad Colomb Cienc 23:271–305

Buritica P, Pardo Cardona VM (1996) Flora Uredineana Colombiana. Rev Acad Colomb Cienc 20:183–236

Cai L, Udayanga D, Manamgoda DS, Maharachchikumbura SSN, McKenzie EHC, Guo LD, Liu XZ, Bahkali A, Hyde KD (2011)

The need to carry out re-inventory of plant pathogenic fungi. Trop Plant Pathol 36:205–213
Campbell WA, Miller JH, Thompson GE (1950) Notes on some wood-decaying fungi of Georgia. Plant Dis Rep 34:128–134
Candolfi-Arballo O, Valenzuela-Solano C, Gubler WD, Hernández-Martínez R (2010) *Botryosphaeriaceae* species associated with grapevine decline in Mexico. Phytopathol Mediterr 49:105–106
Cannon PF, Hawksworth DL, Sherwood-Pike MA (1985) The British ascomycotina: An annotated checklist. Commonwealth Mycological Institute, Kew, Surrey
Caporaso JG, Kuczynski J, Stombaugh J, Bittinger K, Bushman FD, Costello EK, Fierer N, Peña AG, Goodrich JK, Gordon JI, Huttley GA (2010) QIIME allows analysis of high-throughput community sequencing data. Nat Methods 7:335–336
Carlucci A, Frisullo S (2009) First report of *Diplodia corticola* on grapevine in Italy. J Plant Pathol 91:231–240
Carlucci A, Cibelli F, Lops F, Raimondo ML (2015) Characterization of *Botryosphaeriaceae* species as causal agents of trunk disease on Grapevines. Plant Dis 99:1678–1688
Carlucci A, Lops F, Mostert L, Halleen F, Raimondo ML (2017) Occurrence fungi causing black foot on young grapevines and nursery rootstock plants in Italy. Phytopathol Mediterr 56:10–39
Carmaran CC, Novas MV (2003) A review of spegazzini taxa of *Periconia* and *Sporocybe* after over 115 years. Fungal Divers 14:67–76
Carraro L, Maifreni M, Bartolomeoli I, Martino ME, Novelli E, Frigo F, Marino M, Cardazzo B (2011) Comparison of culture-dependent and -independent methods for bacterial community monitoring during Montasio cheese manufacturing. Res Microbiol 162:231–239
Carter MV (1991) The status of *Eutypa lata* as a pathogen. Phytopathol Pap 32:1–59
Cash EK (1952) A record of the fungi named by J.B. Ellis (Part 1). U.S.D.A. Spec Publ 2:1–165
Cash EK (1953) A record of the fungi named by J.B. Ellis (Part 2). U.S.D.A. Spec Publ 2:167–345
Cash EK (1954) A record of the fungi named by J.B. Ellis (Part 3). U.S.D.A. Spec Publ 2:347–518
Casieri L, Hofstetter V, Viret O, Gindro K (2009) Fungal communities living in the wood of different cultivars of young *Vitis vinifera* plants. Phytopathol Mediterr 48:73–83
Castellani E, Ciferri R (1937) Prodromus Mycoflorae Africae Orientalis Italicae. Istituto Agricolo Coloniale Italiano, Firenze
Castillo-Pando M, Somers A, Green CD, Priest M, Sriskathades M (2001) Fungi associated with dieback of Semillon grapevines in the Hunter Valley of New South Wales. Australas Plant Pathol 30:59–63
Cavara F (1888) Intorno al disseccamento dei grappoli della vite. Atti dell'Istituto Botanico della Università e Laboratorio Crittogamico di Pavia 1:293–324
Cavara F (1889) I Funghi Parassiti delle Piante Coltivate ed Utili Essicati, Delineati e Descriti: 21
Chandra S (1974) Some new leaf-spot diseases from Allahabad (India). Nova Hedwig 47:35–102
Chardon CE, Toro RA (1930) Mycological explorations of Colombia. J Dept Agric Porto Rico 14:195–369
Chatasiri S, Ono Y (2008) Phylogeny and taxonomy of the Asian grapevine leaf rust fungus, *Phakopsora euvitis*, and its allies (Uredinales). Mycoscience 49:66–74
Chebil S, Fersi R, Yakoub A, Chenenaoui S, Chattaoui M, Melki I, Zemni H, Rhouma A, Durante G, Zacchi E, Mliki A (2014) First report of *Botryosphaeria dothidea*, *Diplodia seriata*, and *Neofusicoccum luteum* associated with canker and dieback of grapevines in Tunisia. Plant Dis 98:420
Checa J (2004) Dictyosporic Dothideales. Flora Mycol Iber 6:1–162
Chen Q, Jiang JR, Zhang GZ, Cai L, Crous PW (2015) Resolving the *Phoma enigma*. Stud Mycol 82:137–217
Chethana KWT, Zhou Y, Zhang W, Liu M, Xing QK, Li XH, Yan JY (2017) *Coniella vitis* sp. nov. is the common pathogen of white rot in Chinese vineyards. Plant Dis 101:2123–2136
Chiarappa L (1959) Wood decay of the grapevine and its relationship with black measles disease. Phytopathology 49:510–519
Chicau G, Aboim-Inglez M, Cabral S, Cabral JPS (2000) *Phaeoacremonium chlamydosporum* and *Phaeoacremonium angustius* associated with esca and grapevine decline in Vinho Verde grapevines in northwest Portugal. Phytopathol Mediterr 39:80–86
Cho WD, Shin HD (eds) (2004) List of plant diseases in Korea, 4th edn. Korean Society of Plant Pathology, Suwon
Chomnunti P, Hongsanan S, Aguirre-Hudson B, Tian Q, Peršoh D, Dhami MK, Alias AS, Xu J-C, Liu X-Z, Stadler M, Hyde KD (2014) The sooty moulds. Fungal Divers 66:1–36
Choueiri E, Jreijiri F, Chlela P, Louvet G, Lecomte P (2006) Occurrence of grapevine decline and first report of black dead arm associated with *Botryosphaeria obtusa* in Lebanon. Plant Dis 90:115
Choueiri E, Jreijiri F, El Amil R, Chlela P, Bugaret Y, Liminana JM, Mayet V, Lecomte P (2009) First report of black foot disease associated with *Cylindrocarpon* sp. in Lebanon. J Plant Pathol 91:231–240
Chupp C (1953) Monograph of the fungus genus *Cercospora*. Author, Ithaca
Ciferri R (1929) Micoflora Domingensis. Lista de los hongos hasta la fecha indicados en Santo Domingo. Publ Estac Estac Agron Moca Ser B Bot 14:1–260
Ciferri R (1961) Mycoflora Domingensis Integrata. Quaderno 19:1539
Cinelli T, Mondello V, Marchi G, Burruano S, Alves A, Mugnai L (2016) First report of *Diaporthe eres* associated with cane blight of grapevine (*Vitis vinifera*) in Italy. Plant Dis 100:532
Cloete M, Fischer M, Mostert L, Halleen F (2014) A novel *Fomitiporia* species associated with esca on grapevine in South Africa. Mycol Prog 13:303–311
Cloete M, Fischer M, Mostert L, Halleen F (2015) Hymenochaetales associated with esca-related wood rots on grapevine with a special emphasis on the status of esca in South African vineyards. Phytopathol Mediterr 54:299–312
Cloete M, Fischer M, Du Plessis IL, Mostert L, Halleen F (2016) A new species of *Phellinus* sensu stricto associated with esca on grapevine in South Africa. Mycol Prog 15:25
Comont G, Mayet V, Corio-Costet MF (2016) First report of *Lasiodiplodia viticola*, *Spencermartinsia viticola* and *Diplodia intermedia* associated with *Vitis vinifera* grapevine decline in French vineyards. Plant Dis 100:2328
Cook RP, Dubé AJ (1989) Host–pathogen index of plant diseases in South Australia. South Australian Department of Agriculture, Adelaide
Cooke MC (1878) Ravenel's American fungi. Grevillea 6:129–146
Cooke WB (1983) The 1979 Oklahoma foray. Mycologia 75:752–755
Correia KC, Camara MPS, Barbosa MAG, Sales R, Agusti-Brisach C, Gramaje D, Leon M, Garcia-Jimenez J, Abad-Campos P, Armengol J, Michereff SJ (2013) Fungal trunk pathogens associated with table grape decline in Northeastern Brazil. Phytopathol Mediterr 52:380–387
Correia KC, Silva MA, Netto MSB, Vieira WAS, Camara MPS, Michereff SJ (2016a) First report of grapevine dieback caused by *Neoscytalidium hyalinum* in Brazil. Plant Dis 100:213
Correia KC, Silva MA, de Morais Jr MA, Armengol J, Phillips AJL, Camara MPS, Michereff SJ (2016b) Phylogeny, distribution and pathogenicity of *Lasiodiplodia* species associated with dieback

of table grape in the main Brazilian exporting region. Plant Pathol 65:92–103
Costa MEA, Camara MS (1952) Species Aliquae Mycologicae Lusitaniae. Portugaliae Acta Biol Ser A 3:294–307
Coutinho IBL, Freire FCO, Lima CS, Lima JS, Goncalves FJT, Machado AR, Silva AMS, Cardoso JE (2017) Diversity of genus *Lasiodiplodia* associated with perennial tropical fruit plants in northeastern Brazil. Plant Pathol 66:90–104
Crane JL, Shearer CA (1991) A nomenclator of *Leptosphaeria* V. Cesati & G. DeNotaris. Ill Nat Hist Surv Biol Notes 34:1–355
Crous PW, Braun U (2003) *Mycosphaerella* and its anamorphs: 1. Names published in *Cercospora* and *Passalora*. Centraalbureau voor Schimmelcultures, Utrecht
Crous PW, Gams W (2000) *Phaeomoniella chlamydospora* gen. et comb. nov., a causal organism of Petri grapevine decline and esca. Phytopathol Mediterr 39:112–118
Crous PW, Braun U, Wingfield MJ, Wood AR, Shin HD, Summerell BA, Alfenas AC, Cumagun CJR, Groenewald JZ (2009) Phylogeny and taxonomy of obscure genera of microfungi. Persoonia 22:139–161
Crous PW, Wingfield MJ, Guarro J, Hernandez-Restrepo M, Sutton DA, Acharya K, Barber PA, Boekhout T, Dimitrov RA, Duenas M, Dutta AK, Gene J, Gouliamova DE, Groenewald M, Lombard L, Morozova OV, Sarkar J, Smith MTh, Stchigel AM, Wiederhold NP, Alexandrova AV, Antelmi I, Armengol J, Barnes I, Cano-Lira JF, Castaneda-Ruiz RF, Contu M, PrR Courtecuisse, da Silveira AL, Decock CA, de Goes A, Edathodu J, Ercole E (2015) Fungal Planet description sheets: 320–370. Persoonia 34:167–266
Crous PW, Wingfield MJ, Burgess TI, St J Hardy GE, Barber PA, Alvarado P, Barnes CW, Buchanan PK, Heykoop M, Moreno G, Thangavel R, van der Spuy S, Barili A, Barrett S, Cacciola SO, Cano-Lira JF, Crane C, Decock C, Gilbertoni TB, Guarro J, Guevara-Suarez M, Hubka V, Kolarik M, Lira CRS, Ordonez ME, Padamsee M, Ryvarden L, Soares AM, Stchigel AM, Sutton DA, Vizzini A, Weir BS, Acharya K, Aloi F (2017) Fungal Planet description sheets: 558–624. Persoonia 38:240–384
Cruywagen EM, Slippers B, Roux J, Wingfield MJ (2017) Phylogenetic species recognition and hybridisation in *Lasiodiplodia*: a case study on species from baobabs. Fungal Biol 121:420–436
Cunningham GH (1965) *Polyporaceae* of New Zealand. Bull N Z Dept Ind Res 164:1–304
Cunnington J (2003) Pathogenic fungi on introduced plants in Victoria. A host list and literature guide for their identification. Department of Primary Industries, Victoria
Cunnington JH, Priest MJ, Powney RA, Cother NJ (2007) Diversity of *Botryosphaeria* species on horticultural plants in Victoria and New South Wales. Australas Plant Pathol 36:157–159
da Silva MA, Correia KC, Barbosa MAG, Camara MPS, Gramaje D, Michereff SJ (2017) Characterization of *Phaeoacremonium* isolates associated with petri disease of table grape in Northeastern Brazil, with description of *Phaeoacremonium nordesticola* sp. nov. Eur J Plant Pathol 149:695–709
Daamen RA, Langerak CJ, Stol W (1991) Surveys of cereal diseases and pests in the Netherlands 3. *Monographella nivalis* and *Fusarium* spp. in winter wheat fields and seed lots. Neth J Plant Pathol 97:105–114
Damm U, Crous PW, Fourie PH (2007) *Botryosphaeriaceae* as potential pathogens of *Prunus* species in South Africa, with descriptions of *Diplodia africana* and *Lasiodiplodia plurivora* sp. nov. Mycologia 99:664–680
Damm U, Woudenberg JHC, Cannon PF, Crous PW (2009) *Colletotrichum* species with curved conidia from herbaceous hosts. Fungal Divers 39:45–87
Damm U, Cannon PF, Woudenberg JHC, Crous PW (2012) The *Colletotrichum acutatum* species complex. Stud Mycol 73:37–113
Daranagama DA, Camporesi E, Jeewon R, Liu XZ, Stadler M, Lumyong S, Hyde KD (2016) Taxonomic rearrangement of *Anthostomella* (*Xylariaceae*) based on a multigene phylogeny and morphology. Cryptogam Mycol 37:509–538
de Sousa Dias MR, Lucas MT (1972) Fungi Lusitaniae XXIII. Agron. Lusit 33:173–184
de Sousa Dias MR, Lucas MT, Lopes MC (1987) Fungi Lusitaniae XXX. Agron Lusit 42:179–188
de Wet J, Slippers B, Preisig O, Wingfield BD, Tsopelas P, Wingfield MJ (2009) Molecular and morphological characterization of *Dothiorella casuarinae* sp. nov. and other *Botryosphaeriaceae* with diplodia-like conidia. Mycologia 101:503–511
Deighton FC (1976) Studies on *Cercospora* and allied genera. VI. Pseudocercospora Speg., *Pantospora* Cif. and *Cercoseptoria* Petr. Mycol Pap 140:1–168
Deighton J (2016) Fungi in ecosystem processes, vol 31. CRC Press, Boca Raton
Denaree JB, Runner GA (1942) Control of grape diseases and insects in Eastern United States. Diseases principally of Amaerican bunch grapes. US Dept Agr Farm Bull 1893:1–28
Dennis RWG (1964) Remarks on the genus *Hymenoscyphus* S.F. Gray, with observations on sundry species referred by Saccardo and others to the genera *Helotium Pezizella* or *Phialea*. Persoonia 3:29–80
Dennis RWG (1970) Kew Bulletin Additional Series III. Fungus flora of Venezuela and adjacent countries. Verlag von J Cramer, Weinheim
Diaz GA, Latorre BA (2014) Infection caused by *Phaeomoniella chlamydospora* associated with esca-like symptoms in grapevine in Chile. Plant Dis 98:351–360
Diaz GA, Prehn D, Latorre BA (2011) First report of *Cryptovalsa ampelina* and *Eutypella leprosa* associated with grapevine trunk diseases in Chile. Plant Dis 95:490
Diaz GA, Elfar K, Latorre BA (2012) First report of *Seimatosporium botan* associated with trunk disease of grapevine (*Vitis vinifera*) in Chile. Plant Dis 96:1696
Diaz G, Auger J, Besoain X, Bordeu E, Latorre BA (2013) Prevalence and pathogenicity of fungi associated with grapevine trunk diseases in Chilean vineyards. Cien Inv Agr 40:327–339
Dingley JM, Fullerton RA, McKenzie EHC (1981) Survey of agricultural pests and diseases. Technical Report, vol 2. Records of fungi, bacteria, algae, and angiosperms pathogenic on Plants in Cook Islands, Fiji, Kiribati, Niue, Tonga, Tuvalu, and Western Samoa. F.A.O., Rome
Dissanayake AJ, Zhang W, Mei L, Chukeatirote E, Yan JY, Li XH, Hyde KD (2015) *Lasiodiplodia pseudotheobromae* causes pedicel and peduncle discolouration of grapes in China. Australas Plant Pathol 10:21
Dissanayake AJ, Purahong W, Wubet T, Hyde KD, Wei Z, Xu HY, Zhang GJ, Yuan FC, Liu M, Xing Q, Li XH, Yan JY (2018) Direct comparison of culture dependent and cultire independent molecular approaches reveal the diversity of fungal endophytic communities in stems of grapevine (*Vitis vinifera*). Fungal Divers (Under review)
Dohadwala MM, Vita JA (2009) Grapes and Cardiovascular Disease. J Nutr 139:1788S–1793S
Doidge EM (1950) The South African fungi and lichens to the end of (1945). Bothalia 5:1–1094
Doilom MW, Shuttleworth LA, Roux J, Chukeatirote E, Hyde KD (2015) *Botryosphaeriaceae* associated with *Tectona grandis* (teak) in northern Thailand. Phytotaxa 233:1–26

Du Z, Fan X-L, Hyde KD, Yang Q, Liang Y-M, Tian C-M (2016) Phylogeny and morphology reveal two new species of *Diaporthe* form *Betula* spp. in China. Phytotaxa 269:090–102

Duarte S, Pascoal C, Cássio F, Bärlocher F (2006) Aquatic hyphomycete diversity and identity affect leaf litter decomposition in microcosms. Oecologia 147:658–666

Dudka IO, Heluta VP, Tykhonenko YY, Andrianova TV, Hayova VP, Prydiuk MP, Dzhagan VV, Isikov VP (2004) Fungi of the Crimean Peninsula. M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Kiev

Dugan FM, Schubert K, Braun U (2004) Check-list of *Cladosporium* names. Schlechtendalia 11:1–103

Dupont J, Laloui W, Roquebert MF (1998) Partial ribosomal DNA sequences show an important divergence between *Phaeoacremonium* species isolated from *Vitis vinifera*. Mycol Res 102:631–637

Dupont J, Laloui W, Magnin S, Larignon P, Roquebert M-F (2000) *Phaeoacremonium viticola*, a new species associated with Esca disease of grapevine in France. Mycologia 92:499–504

Dupont J, Magnin S, Cesari C, Gatica M (2002) ITS and β-tubulin markers help delineate *Phaeoacremonium* species, and the occurrence of *P. parasiticum* in grapevine disease in Argentina. Mycol Res 106:1143–1150

Ebbels DL, Allen DJ (1979) A supplementary and annotated list of plant diseases, pathogens and associated fungi in Tanzania. Phytopathol Pap 22:1–89

Edgar RC (2004) Muscle: a multiple sequence alignment method with reduced time and space complexity. BMC Bioinformatics 5:113

Edgar RC (2013) UPARSE: highly accurate OTU sequences from microbial amplicon reads. Nat Methods 10:996–998

Edgar RC, Haas BJ, Clemente JC, Quince C, Knight R (2011) UCHIME improves sensitivity and speed of chimera detection. Bioinformatics 27:2194–2200

El-Buni AM, Rattan SS (1981) Check list of Libyan Fungi. Al Faateh University, Fac Sci, Dept. Bot, Tripoli

Elenkin AA (1909) Title unknown. Bolezni Rast 4:68

Ellis JB, Everhart BM (1904) New species of fungi from various localities. J Mycol 10:167–170

Epstein L (2008) Botryosphaeria-related dieback and control investigated in noncoastal California grapevines. Calif Agric 62:161–166

Erwin DC, Ribeiro OK (1996) Phytophthora diseases worldwide. APS Press, St. Paul

Esfandiari E, Petrak F (1950) Pilze aus Iran. Sydowia 4:11–38

Eskalen A, Rooney-Latham S, Gubler WD (2005) First report of perithecia of *Phaeoacremonium viticola* on grapevine (*Vitis vinifera*) and ash tree (*Fraxinus latifolia*) in California. Plant Dis 89:686–686

Essakhi S, Mugnai L, Crous PW, Groenewald JZ, Surico G (2008) Molecular and phenotypic characterisation of novel *Phaeoacremonium* species isolated from esca diseased grapevines. Persoonia 21:119–134

Fadrosh DW, Ma B, Gajer P, Sengamalay N, Ott S, Brotman RM, Ravel J (2014) An improved dual-indexing approach for multiplexed 16S rRNA gene sequencing on the Illumina MiSeq platform. Microbiome 2:6

Faedda R, Agosteo GE, Schena L, Mosca S, Frisullo S, di San Magnano, Lio G, Cacciola SO (2011) *Colletotrichum clavatum sp. nov*. identified as the causal agent of olive anthracnose in Italy. Phytopathol Mediterr 50:283–302

Farr ML (1973) An annotated list of Spegazzini's fungus taxa, Vol. 1. Biblioth Mycol 35:1–823

Farr DF, Castlebury LA, Rossman AY, Erincik O (2001) *Greeneria uvicola*, cause of bitter rot of grapes, belongs in the Diaporthales. Sydowia 53:185–199

Farr DF, Elliott M, Rossman AY, Edmonds RL (2005) *Fusicoccum arbuti sp. nov*. causing cankers on Pacific madrone in western North America with notes on *Fusicoccum dimidiatum*, the correct name for *Scytalidium dimidiatum* and *Nattrassia mangiferae*. Mycologia 97:730–741

Fautrey F, Lambotte JBE (1896) Espèces nouvelles ou rares de la Côte d'Or. Revue Mycologique Toulouse. 18:68–71

Ferrada EE, Diaz GA, Zoffoli JP, Latorre BA (2014) First report of blossom blight caused by *Sclerotinia sclerotiorum* on Japanese plum, nectarine, and sweet cherry orchards in Chile. Plant Dis 98:695

Fischer M, Edwards J, Cunnington JH, Pascoe IG (2005) Basidiomycetous pathogens on grapevine: a new species from Australia—*Fomitiporia australiensis*. Mycotaxon 92:85–96

Fischer M, Schneider P, Kraus C, Molnar M, Dubois C, D'Aguiar D, Haag N (2016) Grapevine trunk disease in German viticulture: occurence of lesser known fungi and first report of *Phaeoacremonium viticola* and *P. fraxinopennsylvanicum*. Vitis 55:145–156

Fitt BD, Brun H, Barbetti MJ, Rimmer SR (2006) World-wide importance of phoma stem canker (*Leptosphaeria maculans* and *L. biglobosa*) on oilseed rape (*Brassica napus*). In: Fitt BDL, Evans N, Howlett BJ, Cooke BM (eds) Sustainable strategies for managing *Brassica napus* (oilseed rape) resistance to *Leptosphaeria maculans* (phoma stem canker). Springer, Dordrecht, pp 3–15

Foister CE (1961) The economic plant diseases of Scotland. Techn Bull Dept Agric Fish Scotland 1:1–210

Forster H, Coffey MD (1993) Molecular taxonomy of Phytophthora megasperma based on mitochondrial and nuclear DNA polymorphisms. Mycol Res 97:1101–1112

Fotouhifar K-B, Hedjaroude G-A, Leuchtmann A (2010) ITS rDNA phylogeny of Iranian strains of *Cytospora* and associated teleomorphs. Mycologia 102:1369–1382

Fourie PH, Halleen F (2002) Investigation on the occurence of *Phaeomoniella chlamydospora* in canes of rootstock mother vines. Australas Plant Pathol 31:425–426

Fournier E, Gladieux P, Giraud T (2013) The 'Dr Jekyll and Mr Hyde fungus': noble rot versus gray mold symptoms of *Botrytis cinerea* on grapes. Evol Applic 6:960–969

French AM (1987) California plant disease host index. Part 1: fruit and nuts. California Department of Food Agriculture, Sacramento

French AM (1989) California plant disease host index. California Department of Food Agriculture, Sacramento

Gadgil PD (2005) Fungi on trees and shrubs in New Zealand. In: Fungi of New Zealand, vol 4. Fungal Diversity Press, Hong Kong

Gao Z-M, Li Y-M, Li X-L, Zhang Z-H, Yiny J-F (2009) Comparison of the biological characteristics of *Botrytis cinerea* isolates from different hosts. Mycosystema 28:370–377

Gaponenko NI (1965) Survey of the fungi of Bukhara. Akad Sa Uzbekh

García B, López L, Velázquez M, Pérez-Moreno J (1998) Mycorrhizal and saprotrophic macrofungi in declining sacred-fir stands. Micol Neotrop Apl 11:9–21

Garcia-Benavides P, Martin Zamorano P, Ocete Perez CA, Maistrello L, Ocete Rubio R (2013) Biodiversity of pathogenic wood fungi isolated from *Xylotrechus arvicola* (Olivier) galleries in vine shoots. J Int Sci Vigne Vin 47:73–81

Garcia-Blazquez G, Constantinescu O, Telleria MT, Martin MP (2006) Preliminary checklist of Albuginales and Peronosporales (Chromista) reported from the Iberian Peninsula and Balearic Islands. Mycotaxon 98:185–188

Garnica S, Riess K, Schön ME, Oberwinkler F, Setaro SD (2016) Divergence times and phylogenetic patterns of Sebacinales, a

highly diverse and widespread fungal lineage. PLoS ONE 11:e0149531
Gatica M, Cesari C, Magnin S, Dupont J (2001) *Phaeoacremonium* species and *Phaeomoniella chlamydospora* in vines showing “hoja de malvon” and young vine decline symptoms in Argentina. Phytopathol Mediterr 40:S317–S324
Ge Q, Chen Y, Xu T (2009) Flora Fungorum Sinicorum. *Pestalotiopsis*, vol 38. Science Press, Beijing, p 235
Georghiou GP, Papadopoulos C (1957) A second list of Cyprus fungi. Government of Cyprus, Department of Agriculture, Nicosia
Gerlach W, Ershad D (1970) Beitrag zur Kenntnis der *Fusarium* und Cylindrocarpon-Arten in Iran. Nova Hedwig 20:725–784
Giatgong P (1980) Host index of plant diseases in Thailand, 2nd edn. Mycology Branch, Plant Pathology and Microbiology Division, Department of Agriculture and Cooperatives, Bangkok
Gilbertson RL, Martin KJ, Lindsey JP (1974) Annotated check list and host index for Arizona wood-rotting fungi. Univ Arizona Agric Exp Sta Techn Bull 209:1–48
Gilman JC (1932) First supplementary list of parasitic fungi from Iowa. Iowa State Coll J Sci 6:357–365
Gilman JC, Archer WA (1929) The Fungi of Iowa Parasitic on Plants. Iowa State Coll J Sci 3:299–507
Gimenez-Jaime A, Aroca A, Raposo R, Garcia-Jimenez J, Armengol J (2006) Occurrence of fungal pathogens associated with grapevine nurseries and the decline of young vines in Spain. J Phytopathol 154:598–602
Gomes RR, Glienke C, Videira SIR, Lombard L, Groenewald JZ, Crous PW (2013) *Diaporthe*: a genus of endophytic, saprobic and plant pathogenic fungi. Persoonia 31:1–41
Gonzalez CD, Chaverri P (2017) *Corinectria*, a new genus to accommodate *Neonectria fuckeliana* and *C. constricta* sp. nov. from *Pinus radiata* in Chile. Mycol Prog 16(11–12):1015–1027
Gonzalez Fragoso R (1916) Bosquejo de una Florula Hispalense de Micromicetos. Trab Mus Nac Ci Nat Ser Bot 10:1–221
Gonzalez Fragoso R (1917) Fungi novi vel minus cognitarum horti botanici matritense. Trab Mus Nac Ci Nat Ser Bot 12:1–99
Gonzalez Fragoso R (1921) Algunos Demaciaceos de la Flora espanola. Bol Real Soc Esp Hist Nat 21:93–99
Gonzalez V, Tello ML (2011) The endophytic mycota associated with *Vitis vinifera* in central Spain. Fungal Diver 47:29–42
Goos RD (2010) The Mycota of Rhode Island: a checklist of the fungi recorded in Rhode Island (including lichens and myxomycetes). R I Nat Hist Surv 4:222
Gorter GJMA (1977) Index of plant pathogens and the diseases they cause in cultivated plants in South Africa. Republic South Africa Dept Agric Techn Serv. Pl Protect Res Inst Sci Bull 392:1–177
Graham AB, Johnston PR, Weir BS (2009) Three new *Phaeoacremonium* species on grapevines in New Zealand. Australas Plant Pathol 38:505–513
Gramaje D, Alaniz S, Perez Sierra A, Abad-Campos P, Garcia-Jimenez J, Armengol J (2008) First report of *Phaeoacremonium scolyti* causing petri disease of grapevine in spain. Plant Dis 92:836
Gramaje D, Armengol J, Mohammadi H, Banihashemi Z, Mostert L (2009) Novel *Phaeoacremonium* species associated with petri disease and esca of grapevine in Iran and Spain. Mycologia 101:920–929
Gramaje D, Aguilar MI, Armengol J (2011) First report of *Phaeoacremonium krajdenii* causing petri disease of grapevine in Spain. Plant Dis 95:615
Grand LF (ed) (1985) North Carolina Plant Disease Index. North Carolina Agric Res Serv Techn Bull 240:1–157
Grasso S (1984) Infezioni di *Fusarium oxysporum* e di *Cylindrocarpon destructans* associate a una moria di giovani piante di vite in Sicilia. Inf Fitopatol 1:59–63
Greene HC (1955) Notes on Wisconsin parasitic fungi. XXI. Trans. Wisconsin Acad Sci 44:29–43
Greene HC (1956) Notes on Wisconsin parasitic fungi. XXII. Trans. Wisconsin Acad Sci 45:177–191
Greene HC (1963) Notes on Wisconsin parasitic fungi. XXIX. Trans Wisconsin Acad Sci 52:229–253
Greene HC (1966) Notes on Wisconsin parasitic fungi. XXXII. Trans Wisconsin Acad Sci 55:147–166
Greuter W, Poelt J, Raimondo FM (1991) A checklist of Sicillian fungi. Bocconea 2:222
Guba EF (1961) Monograph of *Monochaetia* and *Pestalotia*. Harvard University Press, Cambridge
Guerber JC, Liu B, Correll JC, Johnston PR (2003) Characterization of diversity in *Colletotrichum acutatum* sensu lato by sequence analysis of two gene introns, mtDNA and intron RFLPs, and mating compatibility. Mycologia 95:872–895
Guo Y-L, Liu X-J (eds) (2003) Flora Fungorum Sinicorum. *Mycovellosiella*, *Passalora*, *Phaeoramularia*, vol. 20 Science Press, Beijing
Guo LD, Huang GR, Wang Y, He WH, Zheng WH, Hyde KD (2003) Molecular identification of white morphotype strains of endophytic fungi from *Pinus tabulaeformis*. Mycol Res 107:680–688
Haas BJ, Gevers D, Earl AM, Feldgarden M, Ward DV, Giannoukos G, Ciulla D, Tabbaa D, Highlander SK, Sodergren E, Methé B (2011) Chimeric 16S rRNA sequence formation and detection in Sanger and 454-pyrosequenced PCR amplicons. Genome Res 21:494–504
Halleen F, Crous PW, Petrini O (2003) Fungi associated with healthy grapevine cuttings in nurseries, with special reference to pathogens involved in the decline of young vines. Australas Plant Pathol 32:47–52
Hammer Ø, Harper DAT, Ryan PD (2001) PAST: paleontological statistics software package for education and data analysis. Palaeontol Electron 4:1–9
Hanlin RT (1963) A revision of the Ascomycetes of Georgia. Georgia Agric Exp Sta Mimeo Ser ns 175:1–65
Hanlin RT (1966) Host index to the Basidiomycetes of Georgia. Georgia Agric Exp Sta Mimeo Ser ns 260:1–30
Hansford CG (1947) New or interesting tropical fungi—I. Proc Linn Soc London 158:28–50
Hanson CA, Fuhrman JA, Horner-Devine MC, Martiny JBH (2012) Beyond biogeographic patterns:processes shaping the microbial landscape. Nat RevMicrobiol 10:497–506
Harvey JM (1955) A method of forecasting decay in California storage grapes. Phytopathology 45:229–232
Henricot B, Pérez Sierra A, Prior C (2000) A new blight disease on *Buxus* in the UK caused by the fungus *Cylindrocladium*. Plant Pathol 49:805–805
Hernandez JC (2004) Bases Corologicas de Flora Micologica Iberica. Adiciones y numeros 2179–2238. Cuad Trab Fl Micol Iber 20:1–94
Hewitt WB (1951) Grape dead-arm control. Plant Dis Rep 35:142–143
Hewitt WB (2015) Miscellaneous berry rots and raisin molds. In: Gubler WD, Uyemoto JK (eds) Compendium of grape diseases, disorders and pests (Wilcox WF. American phytopathological society, USA, pp 22–24
Hirayama K, Tanaka K (2011) Taxonomic revision of *Lophiostoma* and *Lophiotrema* based on reevaluation of morphological characters and molecular analyses. Mycoscience 52:401–412
Hirooka Y, Rossman AY, Zhuang W-Y, Salgado-Salazar C, Chaverri P (2013) Species delimitation for *Neonectria coccinea* group including the causal agents of beech bark disease in Asia, Europe, and North America. Mycosystema 32:485–517

Hock J, Dittrich U, Renfro BL, Kranz J (1992) Sequential development of pathogens in the maize tarspot disease complex. Mycopathologia 117:157–161

Hofstetter V, Buyck B, Croll D, Viret O, Couloux A, Gindro K (2012) What if esca disease of grapevine were not a fungal disease? Fungal Divers 54:51–67

Holevas CD, Chitzanidis A, Pappas AC, Tzamos EC, Elena K, Psallidas PG, Alivizatos AS, Panagopoulos CG, Kyriakopoulou PE, Bem FP, Lazscaris DN (2000) Disease agents of cultivated plants observed in Greece from 1981 to 1990. Benaki Phytopathol Inst Kiphissia Athens 19:1–96

Hoppe B, Purahong W, Wubet T, Kahl T, Bauhus J, Arnstadt T, Hofrichter M, Buscot F, Krüger D (2016) Linking molecular deadwood-inhabiting fungal diversity and community dynamics to ecosystem functions and processes in Central European forests. Fungal Divers 77:367–379

Hrustic J, Delibasic G, Stankovic I, Grahovac M, Krstic B, Bulajic A, Tanovic B (2015) *Monilinia* spp. causing brown rot of stone fruit in Serbia. Plant Dis 99:709–717

Hsieh W-H, Goh T-K (1990) *Cercospora* and similar fungi from Taiwan. Maw Chang Book, Taipei

Huang F, Udayanga D, Wang X, Hou X, Mei X, Fu Y, Hyde KD, Li H (2015) Endophytic *Diaporthe* associated with Citrus: a phylogenetic reassessment with seven new species from China. Fungal Biol 119:331–347

Hugenholtz P, Goebel BM, Pace NR (1998) Impact of culture-independent studies on the 23 emerging phylogenetic view of bacterial diversity. J Bacteriol 180:4765–4774

Hyde KD, Bussaban B, Paulus B, Crous PW, Lee S, Mckenzie EH, Photita W, Lumyong S (2007) Diversity of saprobic microfungi. Biodivers Conserv 16:7–35

Hyde Kevin D, Abd-Elsalam Kamel, Cai Lei (2010) Morphology: still essential in a molecular world. Mycotaxon 114:439–451

Hyde KD, Nilsson RH, Alias SA, Ariyawansa HA, Blair JE, Cai L, de Cock AWAM, Dissanayake AJ, Glockling SL, Goonasekara ID, Gorczak M, Hahn M, Jayawardena RS, van Kan JAL, Laurence MH, Lévesque CA, Li XH, Liu JK, Maharachchikumbura SSN, Manamgoda DS, Martin FN, McKenzie EHC, McTaggart AR, Mortimer PE, Nair PVR, Pawłowska J, Rintoul TL, Shivas RG, Spies CFJ, Summerell BA, Taylor PWJ, Terhem RB, Udayanga D, Vaghefi N, Walther G, Wilk M, Wrzosek M, Xu JC, Yan JY, Zhou N (2014) One stop shop: backbones trees for important phytopathogenic genera: I. Fungal Divers 67:21–125

Hyde KD, Hongsanan S, Jeewon R, Bhat DJ, McKenzie EHC, Jones EBG, Phookamsak R, Ariyawansa HA, Boonmee S, Zhao Q, Abdel-Aziz FA, Abdel-Wahab MA, Banmai S, Chomnunti P, Cui BK, Daranagama DA, Das K, Dayarathne MC, de Silva NI, Dissanayake AJ, Doilom M, Ekanayaka AH, Gibertoni TB, Góes-Neto A, Huang SK, Jayasiri SC, Jayawardena RS, Konta S, Lee HB, Li WJ, Lin CG, Liu JK, Lu YZ, Luo ZL, Manawasinghe IS, Manimohan P, Mapook A, Niskanen T, Norphanphoun C, Papizadeh M, Perera RH, Phukhamsakda C, Richter C, de Santiago ALCMA, Drechsler-Santos ER, Senanayake IC, Tanaka K, Tennakoon TMDS, Thambugala KM, Tian Q, Tibpromma S, Thongbai B, Vizzini A, Wanasinghe DN, Wijayawardene NN, Wu HX, Yang J, Zeng XY, Zhang H, Zhang JF, Bulgakov TS, Camporesi E, Bahkali AH, Amoozegar AM, Araujo-Neta LS, Ammirati JF, Baghela A, Bhatt RP, Bojantchev S, Buyck B, da Silva GA, de Lima CLF, de Oliveira RJV, de Souza CAF, Dai YC, Dima B, Duong TT, Ercole E, Mafalda-Freire F, Ghosh A, Hashimoto A, Kamolhan S, Kang JC, Karunarathna SC, Kirk PM, Kytövuori I, Lantieri A, Liimatainen K, Liu ZY, Liu XZ, Lücking R, Medardi G, Mortimer PE, Nguyen TTT, Promputtha I, Raj KNA, Reck MA, Lumyong S, Shahzadeh-Fazeli SA, Stadler M, Soudi MR, Su HY, Takahashi T, Tangthirasunun N, Uniyal P, Wang Y, Wen TC, Xu JC, Zhang ZK, Zhao YC, Zhou JZ, Zhu L (2016) Fungal diversity notes 367–490: taxonomic and phylogenetic contributions to fungal taxa. Fungal Divers 80:1–270

Hyde KD, Norphanphoun C, Abreu VP, Bazzicalupo A, Chethana KT, Clericuzio M, Dayarathne MC, Dissanayake AJ, Ekanayaka AH, He MQ, Hongsanan S, Huang SK, Jayasiri SC, Jayawardena RS, Karunarathna A, Konta S, Kušan I, Lee H, Li J, Lin CG, Liu NG, Lu YZ, Luo ZL, Manawasinghe IS, Mapook A, Perera RH, Phookamsak R, Phukhamsakda C, Siedlecki I, Soares AM, Tennakoon D, Tian Q, Tibpromma S, Wanasinghe DN, Xiao YP, Yang J, Zeng XY, Abdel-Aziz FA, Li WJ, Senanayake IC, Shang QJ, Daranagama DA, de Silva NI, Thambugala KM, Abdel-Wahab MA, Bahkali AH, Berbee ML, Boonmee S, Bhat DJ, Bulgakov TS, Buyck B, Camporesi E, Castañeda-Ruiz RF, Chomnunti P, Doilom M, Dovana F, Gibertoni TB, Jadan M, Jeewon R, Jones EBG, Kang JC, Karunarathna SC, Lim YW, Liu JK, Liu ZY, Plautz HL Jr, Lumyong S, Maharachchikumbura SSN, Matočec N, McKenzie EHC, MeŠić A, Miller D, Pawlowska J, Pereira OL, Promputtha I, Romero AI, Ryvarden L, Su HY, Suetrong S, Tkalčec Z, Vizzini A, Wen TC, Wisitrassameewong K, Wrzosek M, Xu JC, Zhao Q, Zhao RL, Mortimer P (2017) Fungal diversity notes 603–708: taxonomic and phylogenetic notes on genera and species. Fungal Divers 87:1–235

Index Fungorum (2018) http://www.indexfungorum.org/names/names.asp

Jackson HS (1931) The rusts of South America based on the Holway collections—V. Mycologia 23:463–503

Jarvis WR, Traquair JA (1984) Bunch rot of grapes caused by *Aspergillus aculeatus*. Plant Dis 68:718–719

Javed S, Javaid A, Anwar W, Majeed RA, Akhtar R, Naqvi SF (2017) First Report of Botrytis Bunch Rot of Grapes Caused by *Botrytis cinerea* in Pakistan. Plant Dis 101:1036

Jayawardena RS, Zhang W, Liu M, Maharachchikumbura SSN, Zhou Y, Huang J-B, Nilthong S, Wang Z-Y, Li XH, Yan JY, Hyde KD (2015) Identification and characterization of Pestalotiopsis-like fungi related to grapevine diseases in China. Fungal Biol 119:348–361

Jayawardena RS, Liu M, Maharachchikumbura SS, Zhang W, Xing Q, Hyde KD, Nilthong S, Li X, Yan J (2016a) *Neopestalotiopsis vitis* sp. nov. causing grapevine leaf spot in China. Phytotaxa 258:63–74

Jayawardena RS, Hyde KD, Damm U, Cai L, Liu M, Li XH, Zhang W, Zhao WS, Yan JY (2016b) Notes on currently accepted species of *Colletotrichum*. Mycosphere 7:1192–1260

Jayawardena RS, Hyde KD, Chethana KWT, Daranagama DA, Dissanayake AJ, Goonasekara ID, Manawasinghe IS, Mapook A, Jayasiri SC, Karunarathne A, Li C-G, Phukhamsakda C, Senanayake IC, Wanasinghe DN, Camporesi E, Bulgakov TS, Li XH, Liu M, Zhang W, Yan JY (2018) Mycosphere Notes 102–168: saprotrophic fungi on *Vitis* in China, Italy, Russia and Thailand. Mycosphere 9:1–114

Jeewon R, Hyde KD (2016) Establishing species boundaries and new taxa among fungi: recommendations to resolve taxonomic ambiguities. Mycosphere 7:1669–1677

Jenkins AE, Bitancourt AA (1940–1963) Myrangiales Selecti Exsiccati. Nos. 1–550. Exsiccati set

Jones DR, Baker RH (2007) Introductions of non-native plant pathogens into Great Britain, (1970–2004). Plant Pathol 56:891–910

Ju Y-M, Rogers JD (1995) *Pareutypella* gen. nov. for two long-ostiolate pyrenomycetes from Taiwan. Mycologia 87:891–895

Ju Y-M, Rogers JD (1999) The *Xylariaceae* of Taiwan (excluding *Anthostomella*). Mycotaxon 73:343–440

Kakalikova L, Jankura E, Srobarova A (2009) First report of *Alternaria* bunch rot of grapevines in Slovakia. Australas Plant Pathol 4:68–69

Kamal (2010) Cercosporoid fungi of India. Bishen Singh Mahendra Pal Singh, Dehra Dun, p 351

Kanagawa T (2003) Bias and artifacts in multitemplate polymerase chain reaction (PCR). J Biosci Bioengin 96:317–323

Kanematsu S, Minaka N, Kobayashi T, Kudo A, Ohtsu Y (2000) Molecular phylogenetic analysis of Ribosomal DNA internal transcribed spacer regions and comparison of fertility in *Phomopsis* isolates from fruit trees. J Gen Plant Pathol 66:191–201

Kantschaveli LA (1928) New species of fungi from Georgia. Bolezni Rastenij 17:81–94

Karimi MR, Mahmoodi B, Kazemiyan M (2001) First report of esca of grapevine in Iran. Phytopathol Mediterr 40:S481

Kepley JB, Reeves FB, Jacobi WR, Adams GC (2015) Species associated with Cytospora canker on *Populus tremuloides*. Mycotaxon 130:783–805

Kern FD, Thurston HW Jr, Whetzel HH (1934) Uredinales. Monogr Univ Puerto Rico B 2:262–303

Khan S, Kamal M (1974) Additions to the parasitic fungi of West Pakistan—III. Mycopathol Mycol Appl 52:29–43

Kim J-D, Shin HD (1998) Taxonomic studies on *Cercospora* and allied genera in Korea (I). Korean J Mycol 26:327–341

Kim WK, Sang HK, Woo SK, Park MS, Paul NC, Yu SH (2007) Six species of *Penicillium* associated with blue mold of grape. Mycobiology 35:180–185

Ko TWK, Stephenson SL, Bahkali AH, Hyde KD (2011) From morphology to molecular biology: can we use sequence data to identify fungal endophytes? Fungal Divers 50:113

Kobayashi T (2007) Index of fungi inhabiting woody plants in Japan. Host, distribution and literature. Zenkoku-Noson-Kyoiku Kyokai Publishing, Tokyo

Koike ST, Bettiga LJ, Nguyen TT, Gubler WD (2016) First report of *Cylindrocladiella lageniformis* and *C. peruviana* as grapevine pathogens in California. Plant Dis 100:1783–1784

Kõljalg U, Nilsson RH, Abarenkov K, Tedersoo L, Taylor AF, Bahram M, Bates ST, Bruns TD, Bengtsson-Palme J, Callaghan TM, Douglas B (2013) Towards a unified paradigm for sequence-based identification of fungi. Mol Ecol 22:5271–5277

Konstantinia-Sulidu A (1939) Parasitische Pilze Mazedoniens. Hedwig 78:284–298

Korf RP, Pearson RC, Zhuang WY, Dubos B (1986) *Pseudopezicula* (Helotiales, Peziculoideae), a new discomycete genus for pathogens causing an angular leaf scorch of grapes ("Rotbrenner"). Mycotaxon 26:457–471

Koshkelova EN, Frolov IP (1973) Microflora of Kopet-Dag lowland and Central Karakum (micromycetes). Ylym, Ashkhabad

Kotlaba F (1997) Some uncommon or rare polypores (Polyporales s.l.) collected on uncommon hosts. Czech Mycol 50:133–142

Kozich JJ, Westcott SL, Baxter NT, Highlander SK (2013) Schloss PD: development of a dual-index sequencing strategy and curation pipeline for analyzing amplicon sequence data on the MiSeq Illumina sequencing platform. Appl Environ Microbiol 79:5112–5120

Kubatova A, Kolarik M, Pazoutova S (2004) Phaeoacremonium rubrigenum-Hyphomycete associated with bark beetles found in Czechia. Folia Microbiol 49:99–104

Kubartova A, Ottosson E, Dahlberg A, Stenlid J (2012) Patterns of fungal communities among and within decaying logs, revealed by 454sequencing. Mol Ecol 21:4514–4532

Kummuang N, Smith BJ, Diehl SV, Graves CH Jr (1996) Muscadine grape berry rot diseases in Mississippi: disease identification and incidence. Plant Dis 80:238–243

Kunin V, Engelbrektson A, Ochman H, Hugenholtz P (2010) Wrinkles in the rare biosphere: pyrosequencing errors can lead to artificial inflation of diversity estimates. Environ Microbiol 12:118–123

Kuntze O (1898) Revisio generum plantarum: vascularium omnium atque cellularium multarum secundum leges nomeclaturae internationales cum enumeratione plantarum exoticarum in itinere mundi collectarum. A. Felix 3:1–576

Kuo K-C, Leu L-S (1998) *Phomopsis vitimegaspora*: a new pathogenic *Phomopsis* from vines. Mycotaxon 66:497–499

Lane C, Kirk P (2012) Introduction to fungal plant pathogens. CAB International, Cambridge, pp 1–6

Langrell SRH, Morel O, Robin C (2011) Touchdown nested multiplex PCR detection of *Phytophthora cinnamomi* and *P. cambivora* from French and English chestnut grove soils. Fungal Biol 115:672–682

Lardner R, Stummer BE, Sosnowski MR, Scott ES (2005) Molecular identification and detection of *Eutypa lata* in grapevine. Mycol Res 109:799–808

Larignon P, Dubos B (1997) Fungi associated with esca disease in grapevine. Eur J Plant Pathol 103:147–157

Larignon P, Dubos B (2001) The villainy of black dead arm. Wines Vines 82:86–89

Larsen MJ, Nakasone KK (1984) Additional new taxa of *Laeticorticium* (Aphyllophorales, *Corticiaceae*). Mycologia 76:528–532

Larter LNH, Martyn EB (1943) A preliminary list of plant diseases in Jamaica. Mycol Pap 8:1–16

Latorre BA, Guerrero MJ (2001) First report of shoot blight of grapevine caused by *Sclerotinia sclerotiorum* in Chile. Plant Dis 85:1122

Lawrence DP, Travadon R, Baumgartner K (2015) Diversity of *Diaporthe* species associated with wood cankers of fruit and nut crops in northern California. Mycologia 107:926–940

Lawrence DP, Travadon R, Pouzoulet J, Rolshausen PE, Wilcox WF, Baumgartner K (2017a) Characterization of *Cytospora* isolates from wood cankers of declining grapevine in North America, with the descriptions of two new *Cytospora* species. Plant Pathol 66:713–725

Lawrence DP, Peduto Hand F, Gubler WD, Trouillas FP (2017b) *Botryosphaeriaceae* species associated with dieback and canker disease of bay laurel in northern California with the description of *Dothiorella californica sp. nov*. Fungal Biol 121:347–360

Lee Y-H, Cho W-D, Kim WK, Jin K-S, Lee E-J (1991) Report on host-unrecorded diseases identified from economical crops in Korea. Res Rep Rural Developm Admin 33:15–19

Li W, Liu J, Bhat DJ, Camporesi E, Xu J, Hyde KD (2014) Introducing the novel species, *Dothiorella symphoricarposicola*, snowberry in Italy. Cryptog Mycol 35:257–270

Li GJ, Hyde KD, Zhao RN, Hongsanan S, Abdel-Aziz FA, AbdelWahab MA, Alvarado P, Alves-Silva G, Ammirati JF, Ariyawansa HA, Baghela A, Bahkali AH, Beug M, Bhat DJ, Bojantchev D, Boonpratuang T, Bulgakov TS, Camporesi E, Boro MC, Ceska O, Chakraborty D, Chen JJ, Chethana KWT, Chomnunti P, Consiglio G, Cui BK, Dai DQ, Dai YC, Daranagama DA, Das K, Dayarathne MC, Crop ED, De Oliveira RJV, de Souza CAF, de Souza JI, Dentinger BTM, Dissanayake AJ, Doilom M, Drechsler-Santos ER, Ghobad-Nejhad M, Gilmore SP, Góes-Neto A, Gorczak M, Haitjema GH, Hapuarachchi KK, Hashimoto A, He MQ, Henske JK, Hirayama K, Iribarren MJ, Jayasiri SC, Jayawardena RS, Jeon SJ, Jerónimo GH, Jesus AL, Jones EBG, Kang JC, Karunarathna SC, Kirk PM, Konta S, Kuhnert E, Langer E, Lee HS, Lee HB, Li WJ, Li XH, Liimatainen K, Lima DX, Lin CG, Liu JK, Liu XZ, Liu ZY, Luangsa-ard JJ, Lücking R, Lumbsch HT, Lumyong S, Leaño EM, Marano AV, Matsumura M, McKenzie EHC, Mongkolsamrit S, Mortimer PE, Nguyen TTT, Niskanen T, Norphanphoun C, O'Malley MA, Parnmen S, Pawłowska J, Perera RH, Phookamsak R, Phukhamsakda C, Pires-Zottarelli CLA, Raspé O, Reck MA, Rocha SCO, de Santiago ALCMA, Senanayake IC, Setti L, Shang QJ, Singh SK, Sir EB, Solomon KV, Song J, Srikitikulchai P, Stadler M, Suetrong S, Takahashi H, Takahashi T, Tanaka K, Tang LP, Thambugala KM, Thanakitpipattana D, Theodorou MK, Thongbai B, Thummarukcharoen T, Tian Q, Tibpromma S, Verbeken A, Vizzini A, Vlasák J, Voigt K, Wanasinghe DN, Wang Y, Weerakoon G, Wen HA, Wen TC, Wijayawardene NN, Wongkanoun S, Wrzosek M, Xiao YP, Xu JC, Yan JY, Yang J, Yang SD, Hu Y, Zhang JF, Zhao J, Zhou LW, Peršoh D, Phillips AJL, Maharachchikumbura SSN (2016) Fungal divers notes 253–366: taxonomic and phylogenetic contributions to fungal taxa. Fungal Divers 78:1–237

Li WJ, Bhat DJ, Camporesi E, Tian Q, Wijayawardene NN, Dai DQ, Phookamsak R, Chomnunti P, Bahkali AH, Hyde KD (2015) New asexual morph taxa in *Phaeosphaeriaceae*. Mycosphere 6:681–708

Liang C, Jayawardena RS, Zhang W, Wang X, Liu M, Liu L, Zang C, Xu X, Hyde KD, Yan J, Li X, Zhao K (2016) Identification and characterization of *Pseudocercospora* species causing grapevine leaf spot in China. J Phytopathol 164:75–85

Linaldeddu BT, Deidda A, Scanu B, Franceschini A, Serra S, Berraf-Tebbal A, Zouaoui Boutiti M, Ben Jamaa ML, Philips AJL (2015) Diversity of *Botryosphaeriaceae* species associated with grapevine and other woody hosts in Italy, Algeria and Tunisia, with descriptions of *Lasiodiplodia exigua* and *Lasiodiplodia mediterranea sp. nov*. Fungal Divers 71:201–214

Linaldeddu BT, Deidda A, Scanu B, Franceschini A, Alves A, Abdollahzadeh J, Phillips AJL (2016) Phylogeny, morphology and pathogenicity of *Botryosphaeriaceae*, *Diatrypaceae* and *Gnomoniaceae* associated with branch diseases of hazelnut in Sardinia (Italy). Eur J Plant Pathol 146:259–279

Litzenberger SC, Farr ML, Lip HT (1962) A preliminary list of Cambodian plant diseases. Div Agric Nat Res, USAID Minist Agric Phnom-Penh, Cambodia

Liu PSW (1977) A supplement to a host list of plant diseases in Sabah, Malaysia. Phytopathol Pap 21:1–49

Liu X-J, Guo Y-L (eds) (1998) Flora Fungorum Sinicorum. *Pseudocercospora*, vol 9. Science Press, Beijing

Liu JK, Hyde KD, Jones EBG, Ariyawansa HA, Bhat DJ, Boonmee S, Maharachchikumbura S, McKenzie EHC, Phookamsak R, Phukhamsakda C, Shenoy BD, Abdel-Wahab MA, Buyck B, Chen J, Chethana KWT, Singtripop C, Dai DQ, Dai YC, Daranagama DA, Dissanayake AJ, Doliom M, D'souza MJ, Fan XL, Goonasekara ID, Hirayama K, Hongsanan S, Jayasiri SC, Jayawardena RS, Karunarathna SC, Li WJ, Mapook A, Norphanphoun C, Pang KL, Perera RH, Peršoh D, Pinruan U, Senanayake IC, Somrithipol S, Suetrong S, Tanaka K, Thambugala KM, Tian Q, Tibpromma S, Udayanga D, Wijayawardena NN, Wanasinghe D, Wisitrassameewong K, Abdel-Aziz FA, Adamčík S, Bahkali AH, Boonyuen N, Bulgakov T, Callac P, Chomnunti P, Greiner K, Hashimoto A, Hofstetter V, Kang JC, Lewis D, Li XH, Liu XX, Liu ZY, Matumura M, Mortimer PE, Rambold G, Randrianjohany E, Sato G, Sri-Indrasutdhi V, Tian CM, Verbeken A, von Brackel W, Wang Y, Wen TC, Xu JC, Yan JY, Zhao RL, Camporesi E (2015) Fungal diversity notes 1–110: taxonomic and phylogenetic contributions to fungal species. Fungal Divers 72:1–197

Liu QL, Li GQ, Li JQ, Chen SF (2016a) *Botrytis eucalypti*, a novel species isolated from diseased *Eucalyptus* seedlings in South China. Mycol Progr 15:1057–1079

Liu M, Zhang W, Zhou Y, Liu Y, Yan JY, Li XH, Jayawardena RS, Hyde KD (2016b) First report of twig anthracnose on grapevine caused by *Colletotrichum nymphaeae* in China. Plant Dis 100:2530

Lombard L, Houbraken J, Decock C, Samson RA, Meijer M, Réblová M, Groenewald JZ, Crous PW (2016) Generic hyper-diversity in *Stachybotriaceae*. Persoonia 36:156

Longland JM, Sutton TB (2008) Factors affecting the infection of fruit of *Vitis vinifera* by the bitter rot pathogen *Greeneria uvicola*. Phytopathology 98:580–584

Lorsuwan C, Tontyaporn S, Visarathanonth N, Manoch L, Kakishima M (1984) Materials for the rust flora in Thailand I. Trans Mycol Soc Jpn 25:57–65

Lotz-Winter H, Hofmann T, Kirschner R, Kursawe M, Trampe T, Piepenbring M (2011) Fungi in the Botanical Garden of the University of Frankfurt. Z Mykol 77:89–122

Lu B, Hyde KD, Ho WH, Tsui KM, Taylor JE, Wong KM, Yanna, Zhou D (2000) Checklist of Hong Kong Fungi. Fungal Diversity Press, Hong Kong

Lubbe CM, Denman S, Cannon PF, Groenewald JZ, Lamprecht SC, Crous PW (2004) Characterization of *Colletotrichum* species associated with diseases of *Proteaceae*. Mycologia 96:1268–1279

Lücking R, Moncada B (2017) Dismantling *Marchandiomphalina* into *Agonimia* (*Verrucariaceae*) and *Lawreymyces* gen. nov. (*Corticiaceae*): setting a precedent to the formal recognition of thousands of voucherless fungi based on type sequences. Fungal Divers 84:119–138

Luongo L, Santori A, Riccioni L, Belisario A (2011) *Phomopsis* sp. associated with post-harvest fruit rot of kiwifruit in Italy. J Plant Pathol 93:205–209

Luque J, Martos S, Phillips AJL (2005) *Botryosphaeria viticola sp. nov*. on grapevines: a new species with a *Dothiorella* anamorph. Mycologia 97:1111–1121

Luque J, Martos S, Aroca A, Raposo R, Garcia-Figueres F (2009) Symptoms and fungi associated with declining mature grapevine plants in northeast Spain. J Plant Pathol 91:381–390

Magoč T, Salzberg SL (2011) FLASH: fast length adjustment of short reads to improve genome assemblies. Bioinformatics 27:2957–2963

Magyar D, Shoemaker RA, Bobvos J, Crous PW, Groenewald JZ (2011) *Pyrigemmula*, a novel hyphomycete genus on grapevine and tree bark. Mycol Progr 10:307–314

Maharachchikumbura SSN, Guo LD, Chukeatirote E, Bahkali AH, Hyde KD (2011) *Pestalotiopsis*—morpholgy, phylogeny, biochemsitry and diversity. Fungal Divers 50:167–187

Maharachchikumbura SSN, Crous PW, Groenewald JZ, Xu J, Hyde KD (2014) *Pestalotiopsis* revisited. Stud Mycol 79:121–186

Maharachchikumbura SN, Hyde KD, Jones EBG, McKenzie EHC, Huang SK, Abdel-Wahab MA, Daranagama DA, Dayarathne M, D'souza MJ, Goonasekara ID, Hongsanan S, Jayawardena RS, Kirk PM, Konta S, Liu JK, Liu Z-Y, Norphanphoun C, Pang KL, Perera RH, Senanayake IC, Shang Q, Shenoy BD, Xiao Y, Bahkali AH, Kang J, Somrothipol S, Suetrong S, Wen T, Xu J (2015) Towards a natural classification and backbone tree for Sordariomycetes. Fungal Divers 72:199

Maharachchikumbura SSN, Larigon P, Hyde KD, Al-Sadi AM, Liu Z (2016) Characteriztion of *Neopestalotiopsis*, *Pestalotiopsis* and *Truncatella* species associated with grapevine trunk disease in France. Phytopathol Mediterr 55:380–390

Mahdian S, Zafari D (2017) First report of table grape blue mold caused by *Penicillium sumatrense* in Iran. Plant Dis 101:244

Makovetz S (1933) Contributions to the mycoflora of the Ukraine. Bull Jard Bot Kieff 16:71–87

Maluta D-R, Larignon P (1991) Pied-noir: mieux vaut prévenir. Viticulture 11:71–72

Manamgoda DS, Rossman AY, Castlebury LA, Crous PW, Madrid H, Chukeatirote E, Hyde KD (2014) The genus *Bipolaris*. Stud Mycol 79:221–288

Maneval WE (1937) A list of the Missouri Fungi; with special reference to plant pathogens and wood-destroying species. Univ Missouri Stud Sci Ser 12:1–150

Marais PG (1979) Fungi associated with root rot in vineyards in the Western Cape. Phytophylactica 11:65–68

Marais PG (1980) Fungi associated with decline and death of nursery grapevines in the Western Cape. Phytophylactica 12:9–13

Marchesi JR, Ravel J (2015) The vocabulary of microbiome research: a proposal. Microbiome 3:31

Marin-Felix Y, Groenewald JZ, Cai L, Chen Q, Marincowitz S, Barnes I, Bensch K, Braun U, Camporesi E, Damm U, de Beer ZW, Dissanayake A, Edwards J, Giraldo A, Hernández-Restrepo M, Hyde KD, Jayawardena RS, Lombard L, Luangsa-ard J, McTaggart AR, Rossman AY, Sandoval-Denis M, Shen M, Shivas RG, Tan YP, van der Linde EJ, Wingfield MJ, Wood AR, Zhang JQ, Zhang Y, Crous PW (2017) Genera of phytopathogenic fungi: GOPHY 1. Stud Mycol 86:99–216

Martin MT, Cobos R (2007) Identification of fungi associated with grapevine decline in Castilla y Leon (Spain). Phytopathol Mediterr 46:18–25

Martin MT, Martin L, de-Francisco MT, Cobos R (2009) First report of *Lasiodiplodia theobromae* and *Cryptovalsa ampelina* associated with grapevine decline from Castilla y Leon, Spain. Plant Dis 93:545

Martin MT, Martin L, Cuesta MJ, Garcia-Benavides P (2011a) First report of *Cylindrocarpon pauciseptatum* associated with grapevine decline from Castilla y Leon, Spain. Plant Dis 95:361

Martin MT, Martin L, Cuesta MJ (2011b) First report of *Neofusicoccum mediterraneum* and *N. austral* causing decay in *Vitis vinifera* in Castilla y Leon, Spain. Plant Dis 95:876

Martin FN, Blair JE, Coffey MD (2014) A combined mitochondrial and nuclear multilocus phylogeny of the genus *Phytophthora*. Fungal Genet Biol 66:19–32

Martiny JBH, Bohannan BJM, Brown JH, Colwell RK, Fuhrman JA, Green JL, Horner-Devine MC, Kane M, Krumins JA, Kuske CR, Morin PJ, Naeem S, Ovreås L, Reysenbach AL, Smith VH, Staley JT (2006) Microbial biogeography: putting microorganisms on the map. Nat Rev Microbiol 4:102–112

Mathur RS (1979) The Coelomycetes of India. Bishen Singh Mahendra Pal Singh, Delhi

Mayorquin JS, Wang DH, Twizeyimana M, Eskalen A (2016) Identification, distribution, and pathogenicity of *Diatrypaceae* and *Botryosphaeriaceae* associated with citrus branch canker in the Southern California desert. Plant Dis 100:2402–2413

McDonald V, Eskalen A (2011) *Botrysphaeriaceae* species associated with avacado branch cankers in California. Plant Dis 95:1465–1473

McKirdy SJ, Riley IT, Cameron IJ (1999) First report of grapevine downy mildew (*Plasmopara viticola*) in commercial viticulture in Western Australia. Plant Dis 83:301

McLeod A, Botha WJ, Meitz JC, Spies CFJ, Tewoldemedhin YT, Mostert L (2009) Morphological and phylogenetic analyses of *Pythium* species in South Africa. Mycol Res 113:933–951

Melnik VA, Popushoi IS (1992) Imperfect fungi on species of trees and shrubs (U.S.S.R.). Unknown journal or publisher

Mena-Portales J, Delgado-Rodriguez G, Heredia-Abarca G (2000) New combinations for species of *Sporidesmium* s.l. Bol Soc Micol Madrid 25:265–269

Mendes MAS, da Silva VL, Dianese JC, Ferreira M, Santos CD, Gomes NE, Urben A, Castro C (1998) Fungos em Plantas no Brasil. Embrapa-SPI/Embrapa-Cenargen, Brasilia

Mey G, Oeser B, Lebrun MH, Tudzynski P (2002) The biotrophic, non-appressorium-forming grass pathogen *Claviceps purpurea* needs a Fus3/Pmk1 homologous mitogen-activated protein kinase for colonization of rye ovarian tissue. Mol Plant Microbe Interact 15:303–312

Michailides TJ, Peacock W, Christensen P, Morgan DP, Felts D (2002) First report of Aspergillus vine canker of table grapes caused by *Aspergillus niger*. Plant Dis 86:75

Milholland RD (1994) Macrophoma rot. In: Pearson RC, Goheen AC (eds) Compendium of grape diseases. APS Press, St Paul

Miller JW (1991) Bureau of Plant Pathology. Tri-ol Tech Rep Div Pl Ind Florida 30:2–4

Mills SD, Foerster H, Coffey MD (1991) Taxonomic structure of *Phytophthora cryptogea* and *P. drechsleri* based on isozyme and mitochondrial DNA analyses. Mycol Res 95:31–48

Mirzaei S, Nahvi MJ, Khaledi E, Abdollahzadeh J, Amini J, Abrinbana M (2015) Molecular and morphological characterization of *Endoconidioma populi* from Kurdistan province, Iran. Mycol Iran 2:127–133

Mitchell JI, Zuccaro A (2006) Sequences, the environment and fungi. Mycologist 20:62–74

Mohammadi H, Banihashemi Z (2012) First report of *Phaeoacremonium inflatipes* and *Phaeoacremonium mortoniae* associated with grapevine Petri disease in Iran. J Agric Sci Technol 14:1405–1414

Mohammadi H, Banihashemi Z, Gramaje D, Armengol J (2013a) Fungal pathogens associated with grapevine trunk diseases in Iran. J Agric Sci Technol 15:137–150

Mohammadi H, Gramaje D, Banihashemi Z, Armengol J (2013b) Characterization of *Diplodia seriata* and *Neofusicoccum parvum* associated with grapevine decline in Iran. J Agric Sci Technol 15:603–616

Moller WJ, Kasimatis AN, Kissler JJ (1974) A dying arm disease of grape in California. Plant Dis Rep 58:869–871

Mondello V, Lo Piccolo S, Conigliaro G, Alfonzo A, Torta L, Burruano S (2013) First report of *Neofusicoccum vitifusiforme* and presence of the *Botryosphaeriaceae* species associated with Botryosphaeria dieback of grapevine in Sicily (Italy). Phytopathol Mediterr 52:388–396

Montagne JFC (1856) Sylloge generum specierumque plantarum cryptogamarum, vol 1. J. B. Bailliere, Paris, pp. 1–498

Moralejo E, Clemente A, Descals E, Belbahri L, Calmin G, Lefort F, Spies CFJ, McLeod A (2008) *Pythium recalcitrans* sp. nov. revealed by multigene phylogenetic analysis. Mycologia 100:310–319

Morgan DP, Michailides TJ (2004) First report of melting decay of 'Red Globe' grapes in California. Plant Dis 88:1047

Mostert L, Crous PW, Kang JC, Phillips AJL (2001) Species of *Phomopsis* and a *Libertella* sp. occurring on grapevines with specific reference to South Africa: morphological, cultural, molecular and pathological characterization. Mycologia 93:146–167

Mostert L, Halleen F, Creaser ML, Crous PW (2004) *Cryptovalsa ampelina*, a forgotten shoot and cane pathogen of grapevines. Australas Plant Pathol 33:295–299

Mostert L, Halleen F, Fourie P, Crous PW (2006) A review of *Phaeoacremonium* species involved in Petri disease and esca of grapevines. Phytopathol Mediterr 45:12–29

Mouchacca J (2009) Novel fungal taxa from the arid Middle East introduced prior to the year 1940. II. Anamorphic fungi: hypomycetes. Cryptog Mycol 30:199–222

Mugnai L, Graniti A, Surico G (1999) Esca (black measles) and brown wood-streaking: two old and elusive diseases of grapevines. Plant Dis 83:404–418

Mujica F, Oehrens B (1967) Segunda addenda a flora fungosa Chilena. Boletin Tecnico 27:1–78

Mujica F, Vergara C (1945) Flora fungosa Chilena. Indice preliminar de los huespedes de los hongos chilenos y sus referencias bibliograficas. Imprenta Stanley

Mulenko W, Majewski T, Ruszkiewicz-Michalska M (2008) A preliminary checklist of micromycetes in Poland, vol 9. W. Szafer Institute of Botany, Polish Academy of Sciences, p 752

Mundkur BB (1943) Indian species of *Phakopsora* and *Bubakia*. Mycologia 35:538–545

Mundkur BB, Thirumalachar MJ (1946) Revisions of and additions to Indian fungi. I. Mycol Pap 16:1–27

Muthumary J, Qaiser AS, Sutton BC (1986) Reassessment of *Monochaetia terminaliae*. Trans Br Mycol Soc 87:103–108

Nag Raj TR (1988) Redisposals and redescriptions in the *Monochaetia-Seiridium*, *Pestalotia-Pestalotiopsis* complexes. VIII. On the status of *Monochaetia camelliae*, *M. osyridella* and *Pestalotia gaurae*. Mycotaxon 32:121–132

Nag Raj TR (1993) Coelomycetous anamorphs with appendage-bearing conidia. Mycologue Publications, Waterloo, pp 1–1101

Nag Raj TR, Kendrick B (1975) A monograph of Chalara and allied genera. Wilfrid Laurier University Press, Ontario

Nagorny P (1930) Die pilsflora der Kaukasischen Weinreve. Trav Jard Bot Tiflis Ser II 5:1–201

Nakagiri A, Tadayoshi ITO, Hatamoto M (1994) Brown zonate spot of grape caused by *Briosia ampelophaga*. Jpn J Phytopathol 60:608–612

Nakaune R, Tatsuki M, Matsumoto H, Ikoma Y (2016) First report of a new postharvest disease of grape caused by *Cadophora luteo-olivacea*. J Gen Plant Pathol 82:116–119

Nasyrov O (1964) Some species of fungi Imperfecti, new for Turkmenistan in the valley of the middle Ama-Darya. Akad Nauk Turkmen SSR Iav Ser Biol Nauk 3:1–116

Nattrass RM (1961) Host lists of Kenya fungi and bacteria. Mycol Pap 81:1–46

Navarrete F, Abreo E, Bettucci L, Martinez S, Lupo S (2009) First report of *Greeneria uvicola* as cause of grapevine dead-arm dieback in Uruguay. Australas Plant Dis Notes 4:117–119

Netto MSB, Assuncao IP, Lima GSA, Marques MW, Lima WG, Monteiro JHA, Michereff SJ, Phillips AJL, Camara MPS, de Queiroz Balbino V (2014) Species of *Lasiodiplodia* associated with papaya stem-end rot in Brazil. Fungal Divers 67:127–141

Netto MSB, Lima WG, Correia KC, Da Silva CFB, Thon M, Martins RB, Miller RNG, Michereff SJ, Camara MPS (2017) Analysis of phylogeny, distribution, and pathogenicity of *Botryosphaeriaceae* species associated with gummosis of *Anacardium* in Brazil, with a new species of *Lasiodiplodia*. Fungal Biol 121:437–451

Nguyen NH, Song Z, Bates ST, Branco S, Tedersoo L, Menke J, Schilling JS, Kennedy PG (2015) FUNGuild: an open annotation tool for parsing fungal community datasets by ecological guild. Fungal Ecol 20:241–248

Niessl G (1871) Beiträge zur Kenntniss der Pilze. Beschreibung neuer und wenig bekannter Pilze. Verhandlungen des Naturforschenden Vereines in Brünn 10:153–217

Nogueira AF Jr, Fischer IH, Braganca CAD, Massola NS Jr, Amorim L (2016) Identification of *Botryosphaeriaceae* species that cause stylar-end rot of guavas and characterisation of the disease monocycle. Eur J Plant Pathol 144:271–287

Nomura Y, Takamatsu S, Fujioka K (2003) Teleomorph of *Erysiphe necator* var. *necator* on *Vitis vinifera* and *Ampelopsis brevipedunculata* var. *heterophylla* (*Vitaceae*) newly found in Japan. Mycoscience 44:157–158

Norse D (1974) Plant diseases in Barbados. Phytopathol Pap 18:1–38

O'Donnell K, Cigelnik E, Nirenberg HI (1998) Molecular systematics and phylogeography of the *Gibberella fujikuroi* species complex. Mycologia 90:465–493

Oh S-Y, Nam K-W, Yoon D-H (2014) Identification of *Acremonium acutatum* and *Trichothecium roseum* isolated from grape with white stain symptom in Korea. Mycobiology 42:269–273

Ono Y (2000) Taxonomy of the *Phakopsora ampelopsidis* species complex on vitaceous hosts in Asia includes a new species, *P. euvitis*. Mycologia 92:154–173

Ono Y (2016) Mixed infections of grapevine leaf rusts *Phakopsora meliosmae-myrianthae* and *P. montana* in Japan. J Gen Plant Pathol 82:149–153

Orieux L, Felix S (1968) List of plant diseases in Mauritius. Phytopathol Pap 7:1–48

Oudemans P, Coffey MD (1991) Isozyme comparison within and among worldwide sources of three morphologically distinct species of *Phytophthora*. Mycol Res 95:19–30

Ozben S, Demirci F, Degirmenci K, Uzunok S (2012) First report of *Cylindrocarpon macrodidymum* associated with black foot diseases of Grapevine in Turkey. Plant Dis 96:762

Padwick GW (1946) Notes on Indian fungi. IV. Mycol Pap 17:1–12

Pan FY, Huang Y, Lin L, Zhou YM, Wei RF, Guo WF, Yin L, Lu J (2016) First report of *Colletotrichum capsici* causing grape ripe rot in Guangxi, China. Plant Dis 100:2531

Pancher M, Ceol M, Corneo PE, Longa CMO, Yousaf S, Pertot I, Campisano A (2012) Fungal endophytic communities in grapevines (*Vitis vinifera* L.) respond to crop management. Appl Environ Microbiol 78:4308–4317

Pande A (2008) Ascomycetes of Peninsular India. Scientific Publishers (India), Jodhpur

Pantidou ME (1973) Fungus–host index for Greece. Benaki Phytopathological Institute, Kiphissia, Athens

Paolinelli-Alfonso M, Villalobos-Escobedo JM, Rolshausen P, Herrera-Estrella A, Galindo-Sánchez C, López-Hernández JF, Hernandez-Martinez R (2016) Global transcriptional analysis suggests *Lasiodiplodia theobromae* pathogenicity factors involved in modulation of grapevine defensive response. BMC Genomics 17:615

Pardo Cardona VM (1998) Distribucion de las especies colombianas de Uredinales segun los grupos taxonomicos de sus hospederos. Rev Fac Nal Agr Medellin 51:285–319

Park M-J, Choi Y-J, Hong S-B, Shin H-D (2010) Genetic variability and mycohost association of *Ampelomyces quisqualis* isolates inferred from phylogenetic analyses of ITS rDNA and actin gene sequences. Fungal Biol 114:235–247

Parkinson LE, Shivas RG, Dann EK (2017) Pathogenicity of Nectriaceous fungi on avocado in Australia. Phytopathology 107:1479–1485

Parris GK (1959) A revised host index of Mississippi plant diseases. Miss State Univ Bot Dept Misc Publ 1:1–146

Pascoe I, Cottral E (2000) Developments in grapevine trunk diseases research in Australia. Phytopathol Mediterr 39:68–75

Passerini (1872) Erb Critt Ital Ser 2:595

Patil MS, Mahamulkar SH (1999) Studies on *Meliolaceae* of India IV. Indian Phytopathol 52:245–253

Paul YS, Thakur VK (2006) Indian *Erysiphaceae*. Scientific Publishers (India), Jodhpur

Pavlic-Zupanc D, Piskur B, Slippers B, Wingfield MJ, Jurc D (2015) Molecular and morphological characterization of *Dothiorella* species associated with dieback of *Ostrya carpinifolia* in Slovenia and Italy. Phytopathol Mediterr 54:222–231

Pearson RC, Smith FD, Dubos B (1988) Angular leaf scorch, a new disease of grapevines in North America caused by *Pseudopezicula tetraspora*. Plant Dis 72:796–800

Peng L-J, Sun T, Yang Y-L, Cai L, Hyde KD, Bahkali AH, Liu Z-Y (2013) *Colletotrichum* species on grape in Guizhou and Yunnan provinces, China. Mycoscience 54:29–41

Pennycook SR (1989) Plant diseases recorded in New Zealand, vols 1–3. Plant Diseases Division, DSIR, Auckland

Peregrine WTH, Ahmad KB (1982) Brunei: a first annotated list of plant diseases and associated organisms. Phytopathol Pap 27:1–87

Peregrine WTH, Siddiqi MA (1972) A revised and annotated list of plant diseases in Malawi. Phytopathol Pap 16:1–51

Péros JP, Jamaux-Despréaux I, Berger G, Gerba D (1999) The potential importance of diversity in *Eutypa lata* and co-colonising fungi in explaining variation in development of grapevine dieback. Mycol Res 103:1385–1390

Peter G, Tornai-Lehoczki J, Suzuki M, Dlauchy D (2005) *Metschnikowia viticola* sp. nov., a new yeast species from grape. Antonie van Leeuwenhoek Suppl 87:155–160

Petit E, Gubler WD (2005) Characterization of *Cylindrocarpon* species, the cause of black foot disease of grapevine in California. Plant Dis 89:1051–1059

Petit E, Gubler WD (2007) First report of *Cylindrocarpon liriodendri* causing black foot disease of grapevine in California. Plant Dis 91:1060

Petit E, Barriault E, Baumgartner K, Wilcox WF, Rolshausen PE (2011) *Cylindrocarpon* species associated with black-foot of grapevine in northeastern United States and southeastern Canada. Am J Enol Vitic 62:177–183

Petrak F (1953) Ein Beitrag zur Pilzflora Floridas. Sydowia 7:103–116

Petrak F, Sydow H (1927) Die Gattungen der Pyrenomyzeten, Sphaeropsideen und Melanconieen. 1. Die phaeosporen Sphaeropsideen und die Gattung *Macrophoma*. Repert Spec Nov Regni Veg 42:1–551

Petrini LE (1992) *Rosellinia* species of the temperate zones. Sydowia 44:169–281

Petrini LE (2013) *Rosellinia*—a world monograph. Biblioth Mycol 205:410

Pettersson OV, Leong SL, Lantz H, Rice T, Dijksterhuis J, Houbraken J, Samson RA, Schnurer J (2011) Phylogeny and intraspecific variation of the extreme xerophile, *Xeromyces bisporus*. Fungal Biol 115:1100–1111

Phengsintham P, Braun U, McKenzie EHC, Chukeatirote E, Cai L, Hyde KD (2013) Monograph of Cercosporoid fungi from Thailand. Plant Pathol Q 3:67–138

Phillips AJL (1998) *Botryosphaeria dothidea* and other fungi associated with excoriose and dieback of grapevines in Portugal. J Phytopathol 146:327–332

Phillips AJL (1999) The relationship between *Diaporthe perjuncta* and *Phomopsis viticola* on grapevines. Mycologia 91:1001–1007

Phillips AJL (2000) Excoriose, cane blight and related diseases of grapevines: a taxonomic review of the pathogens. Phytopathol Mediterr 39:341–356

Phillips AJL, Lucas MT (1997) The taxonomic status of *Macrophoma flaccid* and *Macrophoma reniformis* and their relationship to *Botryosphaeria dothidea*. Sydowia 49:150–159

Phillips AJL, Fonseca F, Povoa V, Castilho R, Nolasco G (2002) A reassessement of the anamorphic fungus *Fusicoccum luteum* and description of its teleomorph *Botryosphaeria lutea* sp. nov. Sydowia 54:59–77

Phillips A, Alves A, Correia A, Luque J (2005) Two new species of *Botryosphaeria* with brown, 1-septate ascospores and *Dothiorella* anamorphs. Mycologia 97:513–529

Pintos Varela C, Redondo Fernandez V, Aguin Casal O, Ferreiroa Martinez V, Mansilla Vazquez JP (2016) First report of *Pleurostoma richardsiae* causing grapevine trunk disease in Spain. Plant Dis 100:2168

Pintos VC, Redondo Fernandez V, Aguin Casal O, Mansilla Vazuez JP (2011) First report of cankers and dieback caused by *Neofusicoccum mediterraneum* and *Diplodia corticola* on Grapevine in Spain. Plant Dis 95:1315

Piqueras CM, Herrera D, Latorre BA (2014) First report of high boscalid resistance in *Botrytis cinerea* associated with the H272L mutation in grapevine in Chile. Plant Dis 98:1441

Pirnia M, Zare R, Zamanizadeh HR, Khodaparast A (2012) New records of cercosporoid hyphomycetes from Iran. Mycotaxon 120:157–169

Pitt WM, Huang R, Steel CC, Savocchia S (2010) Identification, distribution and current taxonomy of *Botryosphaeriaceae* species associated with grapevine decline in New South Wales and South Australia. Aust J Grape Wine Res 16:258–271

Pitt WM, Úrbez-Torres JR, Trouillas FP (2013) *Dothiorella vidmadera*, a novel species from grapevines in Australia and notes on *Spencermartinsia*. Fungal Divers 61:209–219

Pitt WM, Úrbez-Torres JR, Trouillas FP (2015) *Dothiorella* and *Spencermartinsia*, new species and records from grapevines in Australia. Australas Plant Pathol 44:43–56

Pollack FG (1987) An annotated compilation of *Cercospora* names. Mycol Mem 12:1–212

Pons N, Sutton BC (1988) *Cercospora* and similar fungi on yams (*Dioscorea* species). Mycol Pap 160:1–78

Pota S, Chatasiri S, Unartngam J, Yamaoka Y, Hosaka K, Ono Y (2015) Taxonomic identity of a *Phakopsora* fungus causing the grapevine leaf rust disease in Southeast Asia and Australasia. Mycoscience 56:198–204

Preston DA (1945) Host index of Oklahoma plant diseases. Oklahoma Agric Coll Agric Exp Sta Techn Bull T 21:1–168

Priest MJ (2006) Fungi of Australia: *Septoria*. ABRS/CSIRO Publishing, Canberra/Melbourne

Prodorutti D, De Luca F, Michelon L, Pertot I (2009) Susceptibility to *Armillaria mellea* root rot in grapevine rootstocks commonly grafted onto Teroldego Rotaliano. Phytopathol Mediterr 48:285–290

Promputtha I, Lumyong S, Dhanasekaran V, McKenzie EHC, Hyde KD, Jeewon R (2007) A phylogenetic evaluation of whether endophytes become saprotrophs at host senescence. Microb Ecol 53:579–590

Promputtha I, Hyde KD, McKenzie EH, Peberdy JF, Lumyong S (2010) Can leaf degrading enzymes provide evidence that endophytic fungi becoming saprobes? Fungal Divers 41:89–99

Purahong W, Wubet T, Krüger D, Buscot F (2018) Molecular evidence strongly supports deadwood-inhabiting fungi exhibiting unexpected tree species preferences in temperate forests. ISME J 12:article 289

Qiu Y, Steel CC, Ash GJ, Savocchia S (2011) Survey of *Botryosphaeriaceae* associated with grapevine decline in the Hunter Valley and Mudgee grape growing regions of New South Wales. Australas Plant Pathol 40:1–11

Raabe RD (1966) Check list of plant diseases previously unreported in Hawaii. Plant Dis Rep 50:411–414

Raabe RD, Conners IL, Martinez AP (1981) Checklist of plant diseases in Hawaii. College of Tropical Agriculture and Human Resources, University of Hawaii. Information Text Series No. 22. Hawaii Inst Trop Agric Human Resources

Radulescu E, Negru A, Docea E (1973) Septoriozele din Romania. Ed Acad Rep Soc Romania Bucarest

Ragunathan AN, Ramakrishnan K (1973) Rust fungi of Madras State. VII. *Kuehneola, Hamaspora, Phragmotelium, Phragmidium, Diorchidium, Ravenelia, Hapalophragmium* and *Nyssopsora*. Mysore J Agric Sci 7:73–86

Raimondo ML, Lops F, Carlucci A (2014) *Phaeoacremonium italicum* sp. nov., associated with esca of grapevine in southern Italy. Mycologia 106:1119–1126

Rajak RC, Pandey AK (1985) Fungi from Jabalpur-II. Indian J Mycol Plant Pathol 15:186–194

Rajchenberg M, Robledo G (2013) Pathogenic polypores in Argentina. For Pathol 43:171–184

Rappaz F (1987) Taxonomy and nomenclature of the octosporous *Diatrypaceae*. Mycol Helv 2:285–648

Rastogi G, Sani RK (2011) Molecular techniques to assess microbial community structure, function, and dynamics in the environment. In: Microbes and microbial technology, Springer, New York, pp29–57

Reddy MS, Reddy KRC (1983) Greeneria fruit rot—an endemic disease of grape in India. Indian Phytopathol 36:110–114

Rego C, Oliveira H, Carvalho A, Phillips A (2000) Involvement of *Phaeoacremonium* spp. and *Cylindrocarpon destructans* with grapevine decline in Portugal. Phytopathol Mediterr 39:76–79

Riley EA (1960) A revised list of plant diseases in Tanganyika Territory. Mycol Pap 75:1–42

Rolshausen PE, Trouillas F, Gubler WD (2004) Identification of *Eutypa lata* by PCR-RFLP. Plant Dis 88:925–929

Rolshausen PE, Akgul DS, Perez R, Eskalen A, Gispert C (2013) First report of wood canker caused by *Neoscytalidium dimidiatum* on grapevine in California. Plant Dis 97:1511

Rolshausen PE, Baumgartner K, Travadon R, Pouzoulet J, Fujiyoshi P, Wilcox WF (2014) Identification of *Eutypa* spp. causing Eutypa dieback of grapvine in Eastern North America. Plant Dis 98:483–491

Rooney-Latham S, Janousek CN, Eskalen A, Gubler WD (2008) First report of *Aspergillus carbonarius* causing Sour rot of table grapes (*Vitis vinifera*) in California. Plant Dis 92:651

Roux J, Wingfield MJ, Morris MJ (1997) *Botryosphaeria dothidea*, a pathogen of *Acacia mearnsii* in South Africa. S Afr J Sci 93:xii

Rusanov VA, Bulgakov TS (2008) Powdery mildew fungi of Rostov region. Mikol Fitopatol 42:314–322

Ruszkiewicz-Michalska M, Michalski M (2005) Phytopathogenic micromycetes in central Poland. I. Peronosporales and Erysiphales. Acta Mycol 40:223–250

Saccardo PA (1878) Fungi Veneti novi vel critici vel mycologiae Venetae addendi. Ser VII Michelia 1:133–221

Saccardo P, Traverso G (1903) Contribuzione alla flora micologica della Sardegna. Ann Myc 1:427–444

Saito S, Margosan D, Michailides TJ, Xiao CL (2016) *Botrytis californica*, a new cryptic species in the *B. cinerea* species complex causing gray mold in blueberries and table grapes. Mycologia 108:330–343

Sakalidis ML, Slippers B, Wingfield BD, St J Hardy GE, Burgess TI (2013) The challenge of understanding the origin, pathways and extent of fungal invasions: global populations of the *Neofusicoccum parvum*—*N. ribis* species complex. Div Distrib 19:873–883

Salazar-Yepes M, Buritica P, Cadena-Gomez G (2002) Implicaciones de los estudios sobre biodiversidad de los Uredinales (Royas) en la region cafetera colombiana. Cenicafe 53:219–238

Sami S, Mohammadi H, Heydarnejad J (2014) *Phaeoacremonium* species associated with necrotic wood of pome fruit trees in Iran. J Plant Pathol 96:487–495

Sanoamuang N, Jitjak W, Rodtong S, Whalley AJS (2013) *Gelatinomyces siamensis gen. sp. nov*. (Ascomycota, Leotiomycetes, incertae sedis) on bamboo in Thailand. IMA Fungus 4:71–87

Santos C, Fragoeiro S, Valentim H, Phillips A (2006) Phenotypic characterisation of *Phaeoacremonium* and *Phaeomoniella* strains isolated from grapevines: enzyme production and virulence of extra-cellular filtrate on grapevine calluses. Sci Horti 107:123–130

Santos JM, Correia VG, Phillips AJL (2010) Primers for mating-type diagnosis in *Diaporthe* and *Phomopsis*: their use in teleomorph induction in vitro and biological species definition. Fungal Biol 114:255–270

Santos R, Blume E, Muniz M, Harakawa R, Garrido R, Rego C (2014) Characterization of *Campylocarpon pseudofasciculare* associated with black foot of grapevine in southern Brazil. Phytopathol Mediterr 53:06–415

Sarbhoy AK, Agarwal DK (1990) Descriptions of tropical plant pathogenic fungi. Set 1 to 10. Malhotra Publ. House, New Delhi

Sarbhoy AK, Lal G, Varshney JL (1971) Fungi of India (1967–71). Navyug Traders, New Delhi

Savas NG, Akgul DS, Albaz EA (2015) First report of *Ilyonectria liriodendra* associated with black foot disease of grapevine in Turkey. Plant Dis 99:1855

Savulescu T, Rayss T (1935) The species of *Cercospora* parasitic on Vine leaves in Palestine. Rev Pathol Veg 22:3

Sawada K (1943) Descriptive catalogue of the Formosan fungi. Part IX. Rep Dept Agric Govt Res Inst Formosa 86:1–178

Sawada K (1959) Descriptive catalogue of Taiwan (Formosan) fungi. XI. Spec Publ Coll Agric Natl Taiwan Univ 8:1–268

Sawant IS, Narkar SP, Shetty DS, Upadhyay A, Sawant SD (2012) First report of *Colletotrichum capsici* causing anthracnose on grapes in Maharashtra, India. New Dis Rep 25:2

Scheck HJ, Vasquez SJ, Gubler WD (1998a) First report of black-foot disease, caused by *Cylindroncarpon obtusisporum*, of grapevine in California. Plant Dis 82:448

Scheck HJ, Vasquez SJ, Fogle D, Gubler WD (1998b) Grape growers report losses to black-foot and grapevine decline. Calif Agric 52:19–23

Scheper RWA, Crane DC, Whisson DL, Scott ES (2000) The *Diaporthe* teleomorph of *Phomopsis* taxon 1 on grapevine. Mycol Res 104:226–231

Schoch CL, Seifert KA, Huhndorf S, Robert V, Spouge JL, Levesque CA, Chen W (2012) Nuclear ribosomal internal transcribed spacer (ITS) region as a universal DNA barcode marker for Fungi. Proc Natl Acad Sci USA 109:6241–6246

Schubert K, Braun U (2005) Taxonomic revision of the genus *Cladosporium* s.l. 4. Species reallocated to *Asperisporium*, *Dischloridium*, *Fusicladium*, *Passalora*, *Pseudoasperisporum* and *Stenella*. Fungal Divers 20:187–208

Schulzer S (1870) Mykologische Beiträge. Verhandlungen der Zoologisch-Botanischen Gesellschaft Wien 20:635–658

Seifert KA (1985) A monograph of *Stilbella* and some allied Hyphomycetes. Stud Mycol 27:1–234

Seifert KA, Axelrood PE (1998) *Cylindrocarpon destructans* var. *destructans*. Can J Plant Pathol 20:115–117

Seifert KA, McMullen CR, Yee D, Reeleder RD, Dobinson KF (2003) Molecular differentiation and detection of ginseng-adapted isolates of the root rot fungus *Cylindrocarpon destructans*. Phytopathology 93:1533–1542

Seifert KA, Nickerson NL, Corlett M, Jackson ED, Louis-Seize G, Davies RJ (2004) *Devriesia*, a new hyphomycete genus to accommodate heat-resistant, Cladosporium-like fungi. Can J Bot 82:914–926

Senanayake IC, Maharachchikumbura SS, Hyde KD, Bhat JD, Jones EG, McKenzie EH, Dai DQ, Daranagama DA, Dayarathne MC, Goonasekara ID, Konta S, Li WJ, Shang QJ, Stadler M, Wijayawardene NN, Xiao YP, Norphanphoun C, Li Q, Liu XZ, Bahkali AH, Kang JC, Wang Y, Wen TC, Wendt L, Xu JC, Camporesi E (2015) Towards unraveling relationships in Xylariomycetidae (Sordariomycetes). Fungal Divers 73:73–144

Sergeeva V, Priest M, Nair NG (2005) Preliminary studies on *Pestalotiopsis* species from southern hemisphere conifers in Australasia and South Africa. Australas Plant Pathol 34:255–258

Serra R, Peterson SW (2007) *Penicillium astrolabium* and *Penicillium neocrassum*, two new species isolated from grapes and their phylogenetic placement in the *P. olsonii* and *P. brevicompactum* clade. Mycologia 99:78–87

Sessa L, Abreo E, Bettucci L, Lupo S (2016) *Botryosphaeriaceae* species associated with wood diseases of stone and pome fruits

trees: symptoms and virulence across different hosts in Uruguay. Eur J Plant Pathol 146:519–530
Setati ME, Jacobson D, Bauer FF (2015) Sequence-based analysis of the *Vitis vinifera* L. cv Cabernet Sauvignon grape must mycobiome in three South African vineyards employing distinct agronomic systems. Front microbial 6:article1358
Sharma HC, Agarwal DK (1997) A new anthracnose diseae of grape vine (*Vitis vinifera*) in India. Indian Phytopathol 50:150
Shaw CG (1973) Host fungus index for the Pacific Northwest—I. Hosts. Wash State Univ Agric Exp Sta Bull 765:1–121
Shi F, Hsiang T (2014) First Report of *Pseudonectria buxi* causing Volutella Blight on Boxwood (*Buxus* sp.) in Beijing, China. Plant Dis 98:1282–1282
Shirouzu T, Harada Y (2004) Notes on species of *Helminthosporium* and its allied genera in Japan. Mycoscience 45:17–23
Shivas RG (1989) Fungal and bacterial diseases of plants in Western Australia. J R Soc West Australia 72:1–62
Shivas RG, Tan YP, Edwards J, Dinh Q, Maxwell A, Andjic V, Liberato JR, Anderson C, Beasley DR, Bransgrove K, Coates LM, Cowan K, Daniel R, Dean JR, Lomavatu MF, Mercado-Escueta D, Mitchell RW, Thangavel R, Tran-Nguyen LTT, Weir BS (2016) *Colletotrichum* species in Australia. Australas Plant Pathol 45:447–464
Shoemaker RA (1992) Catalogue of *Pleospora* names and types 1. Alphabetically in hard copy and diskette 2. Sortable Data Base on Diskette (available from the author or herb. BPI). Unknown journal or publisher
Simmonds JH (1966) Host index of plant diseases in Queensland. Queensland Department of Primary Industries, Brisbane
Simonyan SA (1981) Mycoflora of Botanical Gardens and Arboreta in Armenia. Hayka
Slippers B, Smit WA, Crous PW, Coutinho TA, Wingfield BD, Wingfield MJ (2007) Taxonomy, phylogeny and identification of *Botryosphaeriaceae* associated with pome and stone fruit trees in South Africa and other regions of the world. Plant Pathol 56:128–139
Smetham GM, Ades PK, Peros J-P, Ford R (2010) Genetic structure of the grapevine fungal pathogen *Phaeomoniella chlamydospora* in southeastern Australia and southern France. Plant Pathol 59:736–744
Sneath PH, Sokal RR (1973) Numerical taxonomy. The principles and practice of numerical classification. Freeman WH, San Francisco
Sogonov MV, Castlebury LA, Rossman AY, Mejia LC, White JF (2008) Leaf-inhabiting genera of the *Gnomoniaceae*, Diaporthales. Stud Mycol 62:1–79
Soliman EA, Abdel-Azeem AM, Salem FM, Nafady NA, Mehesien MT, Ahmed AIS, Ibrahem ME, Abdel-Azeem MA, Hassan SS (2016) A taxonomic analysis of fungi collected and described from Egypt up to (1931). Stud Fungi 1:11–33
Sokal RR, Sneath PH (1963) Principles of numerical taxonomy. San Francisco, p 359
Sosnowski MR, Lardner R, WicksTJ Scott ES (2007) The influence of grapevine cultivar and isolate of *Eutypa lata* on wood and foliar symptoms. Plant Dis 91:924–931
Sousa da Câmara M (1950) Catalogus Fungorum Juresi (Serra do Gerês) ad Mycofloram Lusitanicam. Agron Lusit 12:89–122
Spegazzini (1878) Riv Viticolt Enolog Conegliano 2:727
Stevenson JA (1975) Fungi of Puerto Rico and the American Virgin Islands. Contr Reed Herb 23:743
Stevenson JA, Wellman FL (1944) A preliminary account of the plant diseases of El Salvador. J Wash Acad Sci 34:259–268
Stewart EJ (2012) Growing unculturable bacteria. J Bacteriol 194:4151–4160
Stoykov DY (2012) Diaporthales. Fungi Bulga 8:319
Stoykow DY, Denchev CM (2006) Current knowledge of Diaporthales (Ascomycota) in Bulgaria. Mycol Balcan 3:179–185
Sultan A, Johnston PR, Park D, Robertson AW (2011) Two new pathogenic ascomycetes in *Guignardia* and *Rosenscheldiella* on New Zealand's pygmy mistletoes (*Korthalsella*: *Viscaceae*). Stud Mycol 68:237–247
Sumstine DR (1949) The Albert Commons collection of fungi in the herbarium of the Academy of Natural Sciences in Philadelphia. Mycologia 41:11–23
Sutton BC (1969) Type studies of *Coniella*, *Anthasthoopa*, and *Cyclodomella*. Can J Bot 47:603–608
Sutton BC (1975) Coelomycetes. V. Coryneum. Mycol Pap 138:1–224
Sutton BC (1980) The Coelomycetes. Fungi Imperfecti with Pycnidia, Acervuli and Stromata. Commonwealth Mycological Institute, Kew, Surrey
Suzuki MT, Giovannoni SJ (1996) Bias caused by template annealing in the amplification of mixtures of 16S rRNA genes by PCR. Appl Environ Microbiol 62:625–630
Swett CL, Bourret T, Gubler WD (2016) Characterizing the brown spot pathosystem in late-harvest table grapes (*Vitis vinifera* L.) in the California Central Valley. Plant Dis 100:2204–2210
Tai FL (1979) Sylloge Fungorum Sinicorum. Sci Press, Acad Sin Peking, pp1527
Tanaka K, Harada Y (2003) Pleosporales in Japan (2): the genus *Lophiotrema*. Mycoscience 44:115–121
Tao WC, Zhang W, Yan JY, Hyde KD, McKenzie EH, Li XH, Wang Y (2014) A new *Alternaria* species from grapevine in China. Mycol Prog 13:999
Tassi F (1902) I generi *Phyllosticta* Pers., *Phoma* Fr., *Macrophoma* (Sacc.) Berl. & Voglino e i loro generi analoghi, giusta la legge d'analogia. Bollettino del Laboratorio de Orto Botanico Reale Universita Siena 5:1–76
Tatagiba SD, DaMatta FM, Rodrigues FÁ (2015) Leaf gas exchange and chlorophyll a fluorescence imaging of rice leaves infected with *Monographella albescens*. Phytopathology 105:180–188
Taylor A, St J Hardy GE, Wood P, Burgess T (2005) Identification and pathogenicity of *Botryosphaeria* species associated with grapevine decline in Western Australia. Australas Plant Pathol 34:187–195
Taylor DL, Walters WA, Lennon NJ, Bochicchio J, Krohn A, Caporaso JG, Pennanen T (2016) Accurate estimation of fungal diversity and abundance through improved lineage-specific primers optimized for Illumina amplicon sequencing. Appl Environ Microbiol 82:7217–7226
Tejesvi MV, Ruotsalainen AL, Markkola AM, Pirttilä AM (2010) Root endophytes along a primary succession gradient in northern Finland. Fungal Divers 41:125–134
Teng SC (1996) Fungi of China. Mycotaxon Ltd, Ithaca
Teodoro NG (1937) An Enumeration of Philippine Fungi. Tech Bull Dept Agric Comm Manila 4:1–585
Terral JF, Tabard E, Bouby L, Ivorra S, Pastor T, Figueiral I, Picq S, Chevance JB, Jung C, Fabre L, Tardy C (2009) Evolution and history of grapevine (*Vitis vinifera*) under domestication: new morphometric perspectives to understand seed domestication syndrome and reveal origins of ancient European cultivars. Ann Bot 105:443–455
Thaung MM (1984) Some fungi of *Cercospora* complex from Burma. Mycotaxon 19:425–452
Thaung MM (2008a) Pathologic and taxonomic analysis of leaf spot and tar spot diseases in a tropical dry to wet monsoon ecosystem of lowland Burma. Australas Plant Pathol 37:180–197
Thaung MM (2008b) Report: some noteworthy fungi of Burma. Australas Mycol 27:111–116
Thaung MM (2008c) Biodiversity survey of coelomycetes in Burma. Australas Mycol 27:74–110
Tibpromma S, Hyde KD, Jeewon R, Maharachchikumbura SSN, Liu JK, Bhat DJ, Jones EBG, McKenzie EHC, Camporesi E,

Bulgakov TS, Doilom M, ALCMA Santiago, Das K, Manimohan P, Gibertoni TB, Lim YW, Ekanayaka AH, Thongbai B, Lee HB, Yang JB, Kirk PM, Sysouphanthong P, Singh SK, Boonmee S, Dong W, Raj KNA, Latha KPD, Phookamsak R, Phukhamsakda C, Konta S, Jayasiri SC, Norphanphoun C, Tennakoon DS, Li J, Dayarathne MC, Perera RH, Xiao Y, Wanasinghe DN, Senanayake IC, Goonasekara ID, de Silva NI, Mapook A, Jayawardena RS, Dissanayake AJ, Manawasinghe IS, Chethana KWT, Luo ZL, Hapuarachchi KK, Baghela A, Soares AM, Vizzini A, Meiras-Ottoni A, Mešić A, Dutta AK, de Souza CAF, Richter C, Lin CG, Chakrabarty D, Daranagama DA, Lima DX, Chakraborty D, Ercole E, Wu F, Simonini G, Vasquez G, da Silva GA, Plautz Jr. HL, Ariyawansa HA, Lee H, Kušan I, Song J, Sun J, Karmakar J, Hu K, Semwal KC, Thambugala KM, Voigt K, Acharya K, Rajeshkumar KC, Ryvarden L, Jadan M, Hosen MI, Mikšík M, Samarakoon MC, Wijayawardene NN, Kim NM, Matočec N, Singh PN, Tian Q, Bhatt RP, de Oliveira RJV, Tulloss RE, Aamir S, Kaewchai S, Marathe SD, Khan S, Hongsanan S, Adhikari S, Mehmood T, Bandyopadhyay TK, Svetasheva TY, Nguyen TTT, Antonín V, Li WJ, Wang Y, Indoliya Y, Tkalčec Z, Elgorban AM, Bahkali AH, Tang AMC, Su HY, Zhang H, Promputtha I, Luangsa-ard J, Xu J, Yan JY, Ji-Chuan Y, Stadler M, Mortimer PE, Chomnunti P, Zhao Q, Phillips AJL, Nontachaiyapoom S, Wen TC, Karunarathna SC (2017) Fungal diversity notes 491–602: taxonomic and phylogenetic contributions to fungal taxa. Fungal Divers 83:1–261

Tiffany LH, Gilman JC (1965) Iowa Ascomycetes IV. *Diatrypaceae*. Iowa State Coll J Sci 40:121–161

Torrejón M (2013) Fungi of *Cyprus*: new data on micro-and macrofungi. Acta Mycol 48:207–218

Trakunyingcharoen T, Lombard L, Groenewald JZ, Cheewangkoon R, Toanun C, Alfenas AC, Crous PW (2014) Mycoparasitic species of *Sphaerellopsis*, and allied lichenicolous and other genera. IMA Fungus 5:391–414

Trakunyingcharoen T, Lombard L, Groenewald JZ, Cheewangkoon R, To-anun C, Crous PW (2015) Caulicolous Botryosphaeriales from Thailand. Persoonia 34:87–99

Travadon R, Baumgartner K (2015) Molecular polymorphism and phenotypic diversity in the eutypa dieback pathogen *Eutypa lata*. Phytopathology 105:255–264

Travadon R, Lawrence PD, Rooney-Latham S, Gubler WD, Wilcox WF, Rolshausen PE, Baumgartner K (2015) *Cadophora* species associated with wood-decay of grapevine in North America. Fungal Biol 119:53–66

Trouillas F, Gubler WD (2004) Identification and characterization of *Eutypa leptoplaca*, a new pathogen of grapevine in Northern California. Mycol Res 108:1195–1204

Trouillas FP, Gubler WD (2010) Pathogenicity of *Diatrypaceae* species in grapevines in California. Plant Dis 94:867–872

Trouillas FP, Úrbez-Torres JR, Gubler WD (2010) Diversity of diatrypaceous fungi associated with grapevine canker diseases in California. Mycologia 102:319–336

Trouillas FP, Pitt WM, Sosnowski MR, Huang R, Peduto F, Loschiavo A, Savocchia S, Scott ES (2011) Taxonomy and DNA phylogeny of *Diatrypaceae* associated with *Vitis vinifera* and other woody plants in Australia. Fungal Divers 49:203–223

Tsui CKM, Hyde KD, Hodgkiss IJ (2001) Colonization patterns of wood-inhabiting fungi on baits in Hong Kong rivers, with reference to the effects of organic pollution. Antonie Van Leeuwenhoek J Microb 79:33–38

Tubaki K (1958) Studies on the Japanese Hyphomycetes. V J Hattori Bot Lab 20:142–244

Udayanga D, Liu X, McKenzie EHC, Chukeatirote E, Bahkali AHA, Hyde KD (2011) The genus *Phomopsis*: biology, applications, species concepts and names of common phytopathogens. Fungal Divers 50:189–225

Udayanga D, Liu X-Z, Crous PW, McKenzie EHC, Chukeatirote E, Hyde KD (2012) A multi-locus phylogenetic evaluation of *Diaporthe* (*Phomopsis*). Fungal Divers 56:157–171

Udayanga D, Castlebury LA, Rossman AY, Chukeatirote E, Hyde KD (2014a) Insights into the genus *Diaporthe*: phylogenetic species delimitation in the *D. eres* species complex. Fungal Divers 67:203–229

Udayanga D, Castlebury LA, Rossman AY, Hyde KD (2014b) Species limits in *Diaporthe*: molecular re-assessment of *D. citri*, *D. cytosporella*, *D. foeniculina* and *D. rudis*. Persoonia 32:83–101

Uecker FA, Kuo K-C (1992) A new *Phomopsis* with long paraphyses. Mycotaxon 44:425–433

Unamuno PLM (1941) Enumeracion y distribucion geografica de los ascomicetos de la Peninsula Iberica y de las Islas Baleares. Mem Real Acad Ci Exact Madrid 8:1–403

Underhill DM, Iliev ID (2014) The mycobiota: interactions between commensal fungi and the host immune system. Nat Rev Immunol 14:405–416

Úrbez-Torres JR (2011) The status of *Botryosphaeriaceae* species infecting grapevines. Phytopathol Mediterr 50:5–45

Úrbez-Torres JR, Gubler WD (2009) Pathogenicity of *Botryosphaeriaceae* species isolated from grapevine cankers in California. Plant Dis 93:584–592

Úrbez-Torres JR, Leavitt GM, Voegel TM, Gubler WD (2006) Identification and distribution of *Botryosphaeria* spp. associated with grapevine cankers in California. Plant Dis 90:1490–1503

Úrbez-Torres JR, Gubler WD, Luque J (2007) First report of *Botryosphaeria iberica* and *B. viticola* associated with grapevine decline in California. Plant Dis 91:772

Úrbez-Torres JR, Battany M, Bettiga LJ, Gispert C, McGourty G, Roncoroni J, Smith RJ, Verdegaal P, Gubler WD (2010a) *Botryosphaeriaceae* species spore-trapping studies in California vineyards. Plant Dis 94:717–724

Úrbez-Torres JR, Peduto F, Gubler WD (2010b) First report of grapevine cankers caused by *Lasiodiplodia crassispora* and *Neofusicoccum mediterraneum* in California. Plant Dis 94:785

Úrbez-Torres JR, Peduto F, Rooney-Latham S, Gubler WD (2010c) First report of *Diplodia corticola* causing grapevine (*Vitis vinifera*) cankers and trunk cankers and dieback of canyon live oak (*Quercus chrysolepis*) in California. Plant Dis 94:785

Úrbez-Torres JR, Peduto F, Striegler RK, Urrea-Romero KE, Rupe JC, Cartwright RD, Gubler WD (2012) Characterization of fungal pathogens associated with grapevine trunk diseases in Arkansas and Missouri. Fungal Divers 52:169–189

Úrbez-Torres JR, Peduto F, Vossen PM, Krueger WH, Gubler WD (2013a) Olive twig and branch dieback: etiology, incidence, and distribution in California. Plant Dis 97:231–244

Úrbez-Torres JR, Peduto F, Smith RJ, Gubler WD (2013b) Phomopsis dieback: a grapevine trunk disease caused by *Phomopsis viticola* in California. Plant Dis 97:1571–1579

Úrbez-Torres JR, Haag P, Bowen P, O'Gorman DT (2014) Grapevine trunk diseases in British Columbia: incidence and characterization of the fungal pathogens associated with black foot disease of Grapevine. Plant Dis 98:456–468

Úrbez-Torres JR, Adams P, Kamas J, Gubler WD (2009) Identification, incidence, and pathogenicity of fungal species associated with grapevine dieback in Texas. Am J Enol Vitic 60:497–507

Urquhart EJ, Sun LJ, Punja ZK (1997) Identification of species of *Tilletiopsis* using random amplified polymorphic DNA analysis. Can J Plant Pathol 19:380–389

Urtiaga R (1986) Indice de enfermedades en plantas de Venezuela y Cuba. Impresos en Impresos Nuevo Siglo. S.R.L., Barquisimeto, Venezuela

Uzuhashi S, Tojo M, Kakishima M (2010) Phylogeny of the genus *Pythium* and description of new genera. Mycoscience 51:337–365
Váczy KZ (2017) First report of *Seimatosporium vitis* associated with grapevine trunk disease symptoms in Hungary. Plant Dis 101:253
Vail ME, Gubler WD, Adaskaveg JE (1995) First report of *Pleurotus ostreatus* causing a wood rot of grapevines in California vineyards. Plant Dis 79:1187
Valencia D, Torres C, Camps R, López E, Celis-Diez JL, Besoain X (2015) Dissemination of *Botryosphaeriaceae* conidia in vineyards in the semiarid Mediterranean climate of the Valparaíso Region of Chile. Phytopathol Mediterr 54:394
Van Coller GJ, Denman S, Groenewald JZ, Lamprecht SC, Crous PW (2005) Characterisation and pathogenicity of *Cylindrocladiella* spp. associated with root and cutting rot symptoms of grapevines in nurseries. Australas Plant Pathol 34:489–498
Van Niekerk JM, Crous PW, Groenewald JZ, Fourie PH, Halleen F (2004a) DNA phylogeny, morphology and pathogenicity of *Botryosphaeria* species on grapevines. Mycologia 96:781–798
Van Niekerk JM, Groenewald JZ, Verkley GJM, Fourie PH, Wingfeld MJ, Crous PW (2004b) Systematic reappraisal of *Coniella* and *Pilidiella*, with specific reference to species ocurring on *Eucalyptus* and *Vitis* in South Africa. Mycol Res 108:283–303
Van Niekerk JM, Groenewald JZ, Farr DF, Fourie PH, Halleen F, Crous PW (2005) Reassessment of *Phomopsis* species on grapevines. Australas Plant Pathol 34:27–39
Van Niekerk JM, Fourie PH, Halleen F, Crous PW (2006) *Botryosphaeria* spp. as grapevine trunk disease pathogens. Phytopathol Mediterr 45:S43–S54
Van Niekerk JM, Bester W, Halleen F, Crous PW, Fourie PH (2010) First report of *Lasiodiplodia crassispora* as a pathogen of grapevine trunks in South Africa. Plant Dis 94:1063
Vandenkoornhuyse P, Quaiser A, Duhamel M, Le Van A, Dufresne A (2015) The importance of the microbiome of the plant holobiont. New Phytol 206:1196–1206
Vanev SG, Sameva EF, Bakalova GG (1997) Order Sphaeropsidales. Fungi Bulga 3:1–335
Vasilyeva LN (1990) New pyrenomycetous species from Kunashir. Mikol Fitopatol 24:207–210
Vasilyeva L, Li Y, Stephenson S (2009) Some pyrenomycetous fungi new to China. Mycotaxon 109:415–428
Vasilyeva L, Chernyshev A, Stephenson SL (2010) Pyrenomycetes of the Russian Far East 4: Family *Nitschkiaceae* (Coronophorales, Ascomycota). Mycologia 102:233–247
Vasudeva RS (1963) Indian Cercosporae. Indian Council of Agricultural Research, New Delhi
Verkley GJM, Dukik K, Renfurm R, Goker M, Stielow JB (2014) Novel genera and species of coniothyrium-like fungi in *Montagnulaceae* (Ascomycota). Persoonia 32:25–51
Victor D, Crous PW, Janse BJH, Van Zyl WH, Wingfield MJ, Alfenas AC (1998) Systematic appraisal of species complexes within *Cylindrocladiella*. Mycol Res 102:273–279
Vitale A, Castello I, Polizzi G (2008) First report of *Aspergillus* vine canker on table grapes caused by *Aspergillus niger* in Europe. Plant Dis 92:1471
Voglmayr H, Riethmuller A, Goker M, Weiss MJ, Oberwinkler F (2004) Phylogenetic relationships of *Plasmopara*, *Bremia* and other genera of downy mildew pathogens with pyriform haustoria based on Bayesian analysis of partial LSU rDNA sequence data. Mycol Res 108:1011–1024
Vohník M, Burdíková Z, Vyhnal A, Koukol O (2011) Interactions between testate amoebae and saprotrophic microfungi in a Scots pine litter microcosm. Microb Ecol 61:660–668
von Arx JA, Mueller E (1954) Die Gattungen der amerosporen Pyrenomyceten. Beitr Kryptogamenfl Schweiz 11:1–434
Voytyuk SO, Heluta VP, Wasser SP, Nevo E, Takamatsu S, Volz PA (2009) Biodiversity of the Powdery Mildew Fungi (Erysiphales, Ascomycota) of Israel: biodiversity of cyanoprocaryotes, algae and fungi of Israel, vol 7. Koeltz Scientific Books, Königstein
Walker A-S, Gautier A, Confais J, Martinho D, Viaud M, Le Pecheur P, Dupont J, Fournier E (2011) *Botrytis pseudocinerea*, a new cryptic species causing gray mold in French vineyards in sympatry with *Botrytis cinerea*. Phytopathology 101:1433–1445
Wang HK, Hyde KD, Soytong K, Lin FC (2008) Fungal diversity on fallen leaves of *Ficus* in northern Thailand. J Zhejiang Univ Sci B 9:835–841
Wang Y, Wang CW, Gao L (2015) First report of *Fusarium proliferatum* causing fruit rot on grape (*Vitis vinifera*) in China. Plant Dis 99:1180
Wangikar PD, Raut JG, Gopalkrishna N (1969) Drying of grape vines caused by *Hendersonula toruloidea*. Indian Phytopathol 22:403–404
Ward DM, Weller R, Bateson MM (1990) 16S rRNA sequences reveal numerous uncultured microorganisms in a natural community. Nature 345:63–65
Watson AJ (1971) Foreign bacterial and fungus diseases of food, forage, and fiber crops. U.S.D.A. Agricultural Research Service, Washington DC
Weber RW, Stenger E, Meffert A, Matthias HAHN (2004) Brefeldin A production by *Phoma medicaginis* in dead pre-colonized plant tissue: a strategy for habitat conquest? Mycol Res 108:662–671
Weir BS, Johnston PR, Damm U (2012) The *Colletotrichum gloeosporioides* species complex. Stud Mycol 73:115–180
White TJ, Bruns T, Lee S, Taylor JW (1990) Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In: Innis MA, Gelfand DH, Sninsky JJ, White TJ (eds) PCR protocols: a guide to methods and applications. Academic, New York, pp 315–322
White C-L, Halleen F, Fischer M, Mostert L (2011) Characterisation of the fungi associated with esca diseased grapevines in South Africa. Phytopathol Mediterr 50:204–223
Whitelaw-Weckert MA, Nair NG, Lamont R, Alonso M, Priest MJ, Huang R (2007) Root infection of *Vitis vinifera* by *Cylindrocarpon liriodendra* in Australia. Australas Plant Pathol 36:403–406
Whitelaw-Weckert MA, Rahman L, Appleby LM, Hall A, Clark AC, Waite H, Hardie WJ (2013) Co-infection by Botryosphaeriaceae and Ilyonectria spp. fungi during propagation causes decline of young grafted grapevines. Pl Pathol 62:1226–1237
Whiteside JO (1966) A revised list of plant diseases in Rhodesia. Kirkia 5:87–196
Whiting E, Cunha MG, Gubler WD (2005) *Phaeomoniella chlamydospora* and *Phaeoacremonium* species distinguished through cultural characters and ribosomal DNA sequence analysis. Mycotaxon 92:351–360
Wicht B, Petrini O, Jermini M, Gessler C, Broggini GAL (2012) Molecular, proteomic and morphological characterization of the ascomycete *Guignardia bidwellii*, agent of grape black rot: a polyphasic approach to fungal identification. Mycologia 104:1036–1045
Wiehe PO (1948) The plant diseases and fungi recorded from Mauritius. Mycol Pap 24:1–39
Wijayawardene NN, Hyde KD, Rajeshkumar KC, Hawksworth DL, Madrid H, Kirk PM, Braun U, Singh RV, Crous PW, Kukwa M, Lücking R, Kurtzman CP, Yurkov A, Haelewaters D, Aptroot A, Lumbsch HT, Timdal E, Ertz D, Etayo J, Phillips AJL, Groenewald JZ, Papizadeh M, Selbmann L, Dayarathne MC, Weerakoon G, Jones EBG, Suetrong S, Tian Q, Castañeda-Ruiz RF, Bahkali AH, Pang K-L, Tanaka K, Dai DQ, Sakayaroj J, Hujslová M, Lombard L, Shenoy BD, Suija A, Maharachchikumbura SSN, Thambugala KM, Wanasinghe DN,

Sharma BO, Gaikwad S, Pandit G, Zucconi L, Onofri S, Egidi E, Raja HA, Kodsueb R, Cáceres MES, Pérez-Ortega S, Fiuza PO, Monteiro JS, Vasilyeva LN, Shivas RG, Prieto M, Wedin M, Olariaga I, Lateef AA, Agrawal Y, Fazeli SAS, Amoozegar MA, Zhao GZ, Pfliegler WP, Sharma G, Oset M, Abdel-Wahab MA, Takamatsu S, Bensch K, de Silva NI, De Kesel A, Karunarathna A, Boonmee S, Pfister DH, Lu Y-Z, Luo Z-L, Boonyuen N, Daranagama DA, Senanayake IC, Jayasiri SC, Samarakoon MC, Zeng X-Y, Doilom M, Quijada L, Rampadarath S, Heredia G, Dissanayake AJ, Jayawardena RS, Perera RH, Tang L-Z, Phukhamsakda C, Hernández-Restrepo M, Ma X, Tibpromma S, Gusmao LFP, Weerahewa D, Karunarathna SC (2017) Notes for genera: Ascomycota. Fungal Divers 86:1–594

Wijayawardene NN, Hyde KD, Divakar PK, Rajeshkumar KC, Weerahewa D, Delgado G, Wang Y, Fu L (2018) Notes for genera update—Ascomycota: 6616–6821. Mycosphere 9:115–140

Witbooi WR, Taylor MA, Fourie JF (2000) In vitro studies on the effect of harvest maturity, relative humidity, wetness period and cold-storage temperature, on the infection potential of *Aspergillus niger* and *Rhizopus stolonifer* on Thompson Seedless table grapes. Decid Fruit Grower 50:S1–S14

Wolf FA, Garren KH, Miller JK (1938) Fungi of the Duke Forest and their relation to forest pathology. Bull School For Duke Univ 2:1–122

Wong MKM, Hyde KD (2001) Diversity of fungi on six species of Gramineae and one species of *Cyperaceae* in Hong Kong. Mycol Res 105:1485–1491

Wu DD, Fu G, Hu FY, Ye YF, Mou HF, Qin LL, Jiang N (2015) First report of *Neofusicoccum parvum* causing panicle blight and leaf spot on *Vitis heyneana* in China. Plant Dis 99:417

Yan J-Y, Peng Y-L, Xie Y, Li X-H, Yao S-W, Tang M-L, Wang Z-Y (2011a) First report of grapevine trunk disease caused by *Botryosphaeria obtusa* in China. Plant Dis 95:616

Yan J-Y, Li X-H, Kong FF, Wang Z-Y, Gong L-Z, He H-P (2011b) Occurrence of grapevine trunk disease caused by *Botryosphaeria rhodina* in China. Plant Dis 95:219

Yan J, Xie Y, Yao S-W, Wang Z, Li X (2012) Characterization of *Botryosphaeria dothidea*, the casual agent of grapevine canker in China. Australas Plant Pathol 41:351–357

Yan J-Y, Jayawardena MMRS, Goonasekara ID, Wang Y, Zhang W, Liu M, Huang J-B, Wang Z-Y, Shang J-J, Peng Y-L, Bahkali A, Hyde KD, Li X-H (2015) Diverse species of *Colletotrichum* associated with grapevine anthracnose in China. Fungal Divers 71:233–246

Yang T, Groenewald JZ, Cheewangkoon R, Jami F, Abdollahzadeh J, Lombard L, Crous PW (2017) Families, genera, and species of Botryosphaeriales. Fungal Biol 121:322–346

Yanna Ho WHH, Hyde KD (2002) Fungal succession on fronds of *Phoenix hanceana* in Hong Kong. Fungal Divers 10:185–211

Yilmaz N, Visagie CM, Houbraken J, Frisvad JC, Samson RA (2014) Polyphasic taxonomy of the genus *Talaromyces*. Stud in Mycol 78:175–341

Ying-Ren L (2012) Flora Fungorum Sinicorum: Rhytismatales, vol 40. Science Press, Beijing

Zapparata A, Da Lio D, Sarrocco S, Vannacci G, Baroncelli R (2017) First report of *Colletotrichum godetiae* causing grape (*Vitis vinifera*) berry rot in Italy. Plant Dis 101:1051–1052

Zervakis G, Dimou D, Balis C (1998) A check-list of the Greek macrofungi including hosts and biogeographic distribution: I. Basidiomycotina. Mycotaxon 66:273–336

Zhang TY (2003) Flora Fungorum Sinicorum. *Alternaria*, vol 16. Science Press, Beijing

Zhang L, Zhang GL, Qian X, Li GY (2009) First report of verticillium wilt of grapevine (*Vitis vinifera*) caused by *Verticillium dahlia* in China. Plant Dis 93:841

Zheng RY, Liu XY (2005) *Actinomucor elegans* var. *meitauzae*, the correct name for *A. taiwanensis* and *Mucor meitauzae* (Mucorales, Zygomycota). Nova Hedwig 80:419–432

Zhou YJ, Zhang J, Wang XD, Yang L, Jiang DH, Li GQ, Hsiang T, Zhuang WY (2014) Morphological and phylogenetic identification of *Botrytis sinoviticola*, a novel cryptic species causing gray mold disease of table grapes (*Vitis vinifera*) in China. Mycologia 106:43–56

Zhou N, Chen Q, Carroll G, Zhang N, Shivas RG,Cai L (2015) Polyphasic characterization of four new plant pathogenic *Phyllosticta* species from China, Japan, and the United States. Fung Biol 119:433–446

Zhuang W-Y (ed) (2001) Higher fungi of Tropical China. Mycotaxon Ltd, Ithaca

Zhuang W-Y (ed) (2005) Fungi of northwestern China. Mycotaxon Ltd, Ithaca

Živkovič S, Vasič T, Anđelković S, Jevremovič D, Trkulja V (2012) Identification and characterization of *Eutypa lata* on grapevine in Serbia. Plant Dis 96:913–913

Zubkova RD (1971) Genus novum *Saccharomycetacearum* e Kazachstania. Botanicheskie Materialy Gerbariga Instituta Botaniki Akademii Nauk Kazakh. SSR 7:53–56

Affiliations

Ruvishika S. Jayawardena[1,2,3] · Witoon Purahong[4] · Wei Zhang[1,3] · Tesfaye Wubet[4,5] · XingHong Li[1,3] · Mei Liu[1,3] · Wensheng Zhao[6] · Kevin D. Hyde[2] · JianHua Liu[1] · Jiye Yan[1,3]

[1] Institute of Plant and Environment Protection, Beijing Academy of Agriculture and Forestry Sciences, Beijing 100097, People's Republic of China

[2] Centre of Excellence in Fungal Research, Mae Fah Luang University, Chiang Rai 57100, Thailand

[3] Beijing Key Laboratory of Environment Friendly Management on Fruit Diseases and Pests in North China, Beijing 100097, People's Republic of China

[4] Department of Soil Ecology, UFZ-Helmholtz Centre for Environmental Research, Theodor-Lieser-Str. 4, 06120 Halle (Saale), Germany

[5] German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, Leipzig, Germany

[6] College of Agricultural and Biotechnology, China Agricultural University, Beijing 100193, People's Republic of China