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Mycosphaerellaceae – Chaos or clarity?

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Abstract: The *Mycosphaerellaceae* represent thousands of fungal species that are associated with diseases on a wide range of plant hosts. Understanding and stabilising the taxonomy of genera and species of *Mycosphaerellaceae* is therefore of the utmost importance given their impact on agriculture, horticulture and forestry. Based on previous molecular studies, several phylogenetic and morphologically distinct genera within the *Mycosphaerellaceae* have been delimited. In this study a multigene phylogenetic analysis (LSU, ITS and *rpb2*) was performed based on 415 isolates representing 297 taxa and incorporating ex-type strains where available. The main aim of this study was to resolve the phylogenetic relationships among the genera currently recognised within the family, and to clarify the position of the cercosporoid fungi among them. Based on these results many well-known genera are shown to be paraphyletic, with several synapomorphic characters that have evolved more than once within the family. As a consequence, several old generic names including *Cercosporidium*, *Fulvia*, *Mycovellosiella*, *Phaeoramularia* and *Raghnildiana* are resurrected, and 32 additional genera are described as new. Based on phylogenetic data 120 genera are now accepted within the family, but many currently accepted cercosporoid genera still remain unresolved pending fresh collections and DNA data. The present study provides a phylogenetic framework for future taxonomic work within the *Mycosphaerellaceae*.

Key words: Multi-gene phylogeny, *Mycosphaerella*, Plant pathogen, Taxonomy.

Taxonomic novelties: New genera: *Australosphaerella* Videira & Crous, *Brunswickiella* Videira & Crous, *Catenulocercospora* C. Nakash., Videira & Crous, *Cercoramularia* Videira, H.D. Shin, C. Nakash. & Crous, *Chuppomyces* Videira & Crous, *Clarohilum* Videira & Crous, *Collarispora* Videira & Crous, *Coremiopassalora* U. Braun, C. Nakash., Videira & Crous, *Deightonomyces* Videira & Crous, *Devonomyces* Videira & Crous, *Distocercosporaster* Videira, H.D. Shin, C. Nakash. & Crous, *Distomycovellosiella* U. Braun, C. Nakash., Videira & Crous, *Exopassalora* Videira & Crous, *Exutisphaerella* Videira & Crous, *Graminopassalora* U. Braun, C. Nakash., Videira & Crous, *Hyalocercosporidium* Videira & Crous, *Hyalozasmidium* U. Braun, C. Nakash., Videira & Crous, *Madagascaromyces* U. Braun, C. Nakash., Videira & Crous, *Micronematomyces* U. Braun, C. Nakash., Videira & Crous, *Neocercosporidium* Videira & Crous, *Neophloeospora* Videira & Crous, *Nothopassalora* U. Braun, C. Nakash., Videira & Crous, *Nothopericoniella* Videira & Crous, *Nothophaeocryptopus* Videira, C. Nakash., U. Braun, Crous, *Pachyramichloridium* Videira & Crous, *Paracercosporidium* Videira & Crous, *Paramycovellosiella* Videira, H.D. Shin & Crous, *Parapallidocercospora* Videira, Crous, U. Braun, C. Nakash., *Pleopassalora* Videira & Crous, *Pleuropassalora* U. Braun, C. Nakash., Videira & Crous, *Pluripassalora* Videira & Crous, *Pseudopericoniella* Videira & Crous, *Pseudophaeophleospora* U. Braun, C. Nakash., Videira & Crous, *Pseudozasmidium* Videira & Crous, *Rhachisphaerella* Videira & Crous, *Rosisphaerella* Videira & Crous, *Sultanimyces* Videira & Crous, *Virosphaerella* Videira & Crous, *Xenosonderhenioides* Videira & Crous. **New species:** *Cercoramularia koreana* Videira, H.D. Shin, C. Nakash. & Crous, *Hyalocercosporidium desmodii* Videira & Crous, *Hyalozasmidium sideroxyli* U. Braun, C. Nakash., Videira & Crous, *Neoceratosperma legnephoricola* U. Braun, C. Nakash., Videira & Crous, *Neoceratosperma haldinae* U. Braun, C. Nakash., Videira & Crous, *Ramulispora sorghiphila* U. Braun, C. Nakash., Videira & Crous, *Zasmidium elaeocarpi* U. Braun, C. Nakash., Videira & Crous, *Zasmidium grevilleae* U. Braun, C. Nakash., Videira & Crous, *Zasmidium hakeae* U. Braun, C. Nakash., Videira & Crous, *Zasmidium eucalypticola* U. Braun, C. Nakash., Videira & Crous, *Zasmidium schini* U. Braun, C. Nakash., Videira & Crous, *Xenosonderhenioides indonesiana* C. Nakash., Videira & Crous. **New combinations:** *Amycosphaerella keniensis* (Crous & T.A. Cout.) Videira & Crous, *Australosphaerella nootherensis* (Carnegie) Videira & Crous, *Brunswickiella parsonsiae* (Crous & Summerell) Videira & Crous, *Chuppomyces handelii* (Bubák) U. Braun, C. Nakash., Videira & Crous, *Catenulocercospora fusimaculans* (G.F. Atk.) C. Nakash., Videira & Crous, *Cercosporidium californicum* (S.T. Koike & Crous) Videira & Crous, *Clarohilum henningsii* (Allesch.) Videira & Crous, *Clypeosphaerella calotropidis* (Ellis & Everh.) Videira & Crous, *Coremiopassalora eucalypti* (Crous & Alfenas) U. Braun, C. Nakash., Videira & Crous, *Coremiopassalora leptophlebae* (Crous *et al.*) U. Braun, C. Nakash., Videira & Crous, *Collarispora valgourgensis* (Crous) Videira & Crous, *Deightonomyces daleae* (Ellis & Kellerm.) Videira & Crous, *Devonomyces endophyticus* (Crous & H. Sm. Ter) Videira & Crous, *Distocercosporaster dioscoreae* (Ellis & G. Martin) Videira, H.D. Shin, C. Nakash. & Crous, *Distomycovellosiella brachycarpa* (Syd.) U. Braun, C. Nakash., Videira & Crous, *Exopassalora zambiae* (Crous & T.A. Cout.) Videira & Crous, *Exutisphaerella laricina* (R. Hartig) Videira & Crous, *Fusoidiella anethi* (Pers.) Videira & Crous, *Graminopassalora graminis* (Fuckel) U. Braun, C. Nakash., Videira & Crous, *Hyalozasmidium aerohyalinosporum* (Crous & Summerell) Videira & Crous, *Madagascaromyces intermedius* (Crous & M.J. Wingf.) Videira & Crous, *Micronematomyces caribensis* (Crous & Den Breeÿen) U. Braun, C. Nakash., Videira & Crous, *Micronematomyces chromolaenae* (Crous & Den Breeÿen) U. Braun, C. Nakash., Videira & Crous, *Neocercosporidium smilacis* (Thüm.) U. Braun, C. Nakash., Videira & Crous, *Neophloeospora maculans* (Bérenger) Videira & Crous, *Nothopassalora personata* (Berk. & M.A. Curtis) U. Braun, C. Nakash., Videira & Crous, *Nothopericoniella perseae-macranthae* (Hosag. & U. Braun) Videira & Crous, *Nothophaeocryptopus gaeumannii* (T. Rohde) Videira, C. Nakash., U. Braun, Crous, *Pachyramichloridium pini* (de Hoog & Rahman) U. Braun, C. Nakash., Videira & Crous, *Paracercosporidium microsorum* (Sacc.) U. Braun, C. Nakash., Videira & Crous, *Paracercosporidium tiliae* (Peck) U. Braun, C. Nakash., Videira & Crous, *Paramycosphaerella wachendorfiae* (Crous) Videira & Crous, *Paramycovellosiella passaloroides* (G. Winter) Videira, H.D. Shin & Crous, *Parapallidocercospora colombiensis* (Crous *et al.*) Videira & Crous, *Parapallidocercospora thailandica* (Crous *et al.*) Videira & Crous, *Phaeocercospora juniperina* (Georgescu & Badea) U. Braun, C. Nakash., Videira & Crous, *Pleopassalora perplexa* (Beilharz *et al.*) Videira & Crous, *Pleuropassalora armatae* (Crous & A.R. Wood) U. Braun, C. Nakash., Videira & Crous, *Pluripassalora bougainvilleae* (Munt.-Cvetk.) U. Braun, C. Nakash., Videira & Crous, *Pseudocercospora convoluta* (Crous & Den Breeÿen) U. Braun, C. Nakash., Videira & Crous, *Pseudocercospora nodosa* (Constant.) U. Braun, C. Nakash., Videira & Crous, *Pseudocercospora zambiensis* (Deighton) Crous & U. Braun, *Pseudopericoniella levispora* (Arzanlou, W. Gams & Crous) Videira & Crous, *Pseudophaeophleospora atkinsonii* (Syd.) U. Braun, C. Nakash., Videira & Crous, *Pseudophaeophleospora stonei* (Crous) U. Braun, C. Nakash., Videira & Crous, *Pseudozasmidium eucalypti* (Crous & Summerell) Videira & Crous, *Pseudozasmidium nabiacense* (Crous & Carnegie) Videira & Crous, *Pseudozasmidium parkii* (Crous & Alfenas) Videira & Crous, *Pseudozasmidium vietnamense* (Barber & T.I. Burgess) Videira & Crous, *Ragnhildiana ampelopsidis* (Peck) U. Braun, C. Nakash., Videira & Crous, *Ragnhildiana diffusa* (Heald & F.A. Wolf) Videira & Crous, *Ragnhildiana ferruginea* (Fuckel) U. Braun, C. Nakash., Videira & Crous, *Ragnhildiana gnaphaliaceae* (Cooke) Videira, H.D. Shin, C. Nakash. & Crous, *Ragnhildiana perfoliati* (Ellis & Everh.) U. Braun, C. Nakash., Videira & Crous, *Ragnhildiana*

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pseudotithoniae (Crous & Cheew.) U. Braun, C. Nakash., Videira & Crous, *Rhachisphaerella mozambica* (Arzanlou & Crous) Videira & Crous, *Rosisphaerella rosicola* (Pass.) U. Braun, C. Nakash., Videira & Crous, *Sultanimyces vitiphyllus* (Speschnew) Videira & Crous, *Utrechtiana roumeguerei* (Cavara) Videira & Crous, *Virosphaerella irregularis* (Cheew. *et al.*) Videira & Crous, *Virosphaerella pseudomarksii* (Cheew. *et al.*) Videira & Crous, *Zasmidium arcuatum* (Arzanlou *et al.*) Videira & Crous, *Zasmidium biverticillatum* (Arzanlou & Crous) Videira & Crous, *Zasmidium cerophilum* (Tubaki) U. Braun, C. Nakash., Videira & Crous, *Zasmidium daviesiae* (Cooke & Massee) U. Braun, C. Nakash., Videira & Crous, *Zasmidium gupoyu* (R. Kirschner) U. Braun, C. Nakash., Videira & Crous, *Zasmidium iteae* (R. Kirschner) U. Braun, C. Nakash., Videira & Crous, *Zasmidium proteacearum* (D.E. Shaw & Alcorn) U. Braun, C. Nakash. & Crous, *Zasmidium pseudotsugae* (V.A.M. Mill. & Bonar) Videira & Crous, *Zasmidium pseudovespa* (Carnegie) U. Braun, C. Nakash., Videira & Crous, *Zasmidium strelitziae* (Arzanlou *et al.*) Videira & Crous, *Zasmidium tsugae* (Dearn.) Videira & Crous, *Zasmidium velutinum* (G. Winter) Videira & Crous. **New names and their replaced synonyms:** *Exosporium livistonicola* U. Braun, Videira & Crous for *Distocercospora livistonae* U. Braun & C.F. Hill, *Pseudocercospora platanigena* Videira & Crous for *Stigmella platani* Fuckel, non *Pseudocercospora platani* (J.M. Yen) J.M. Yen 1979, *Zasmidium musae-banksii* Videira & Crous for *Ramichloridium australiense* Arzanlou & Crous, non *Zasmidium australiense* (J.L. Mulder) U. Braun & Crous 2013, *Zasmidium musigenum* Videira & Crous for *Veronaea musae* Stahel ex M.B. Ellis, non *Zasmidium musae* (Arzanlou & Crous) Crous & U. Braun 2010. **Epitypes:** *Cercospora brachycarpa* Syd., *Cercospora smilacis* Thüm., *Cercospora gomphrenicola* Speg., *Cercospora microsora* Sacc., *Cercospora tiliae* Peck, *Cladosporium bacilligerum* Mont. & Fr., *Cladosporium chaetomium* Cooke, *Cladosporium fulvum* Cooke, *Cladosporium lonicericola* Yong H. He & Z.Y. Zhang, *Cladosporium personatum* Berk. & M.A. Curtis, *Clasterosporium degenerans* Syd. & P. Syd., *Cryptosporium acicola* Thüm., *Helicoma fasciculatum* Berk. & M.A. Curtis., *Isariopsis griseola* Sacc., *Septoria martiniana* Sacc. **Neotypes:** *Cercospora cajani* Henn., *Cercospora mangiferae* Koord., *Sphaerella laricina* R. Hartig. **Lectotypes (basionyms):** *Adelopus gaeumannii* T. Rohde, *Biharia vangueriae* Thirum. & Mishra, *Cercospora desmodii* Ellis & Kellerm., *Cercospora ferruginea* Fuckel, *Cercospora gnaphaliacea* Cooke, *Cercospora rosicola* Pass., *Cercosporidium helleri* Earle, *Cercospora henningsii* Allesch., *Cladosporium fulvum* Cooke, *Cladosporium bacilligerum* Mont. & Fr., *Cercospora microsora* Sacc., *Cercospora henningsii* Allesch., *Coryneum vitiphyllum* Speschnew, *Cryptosporium acicola* Thüm., *Isariopsis griseola* Sacc., *Scolicotrichum roumeguerei* Briosi & Cavara, *Sphaerella araneosa* Rehm, *Stictosepta cupularis* Petr., *Stigmella platani* Fuckel, *Tapeinosporium viride* Bonord.

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INTRODUCTION

Fungi within the *Dothideomycetes* have a global distribution and occur in diverse habitats, ranging from marine to freshwater or terrestrial. They are mainly characterised by having bitunicate asci, often with fissitunicate dehiscence. The *Dothideomycetes* currently includes more than 25 orders, 100 families and over 1 500 genera (Schoch *et al.* 2009, Hyde *et al.* 2013, Trakunyingcharoen *et al.* 2014, Crous *et al.* 2015a, c, van Nieuwenhuijzen *et al.* 2016, Bezerra *et al.* 2017). Among them, the order *Capnodiales* includes nine families, one of which is *Mycosphaerellaceae*.

Members of *Mycosphaerellaceae* are able to colonise diverse niches and vary in lifestyle from pathogens to endophytes, saprobes, epiphytes and fungicolous species. Some important plant pathogens in this family include the species associated with Sigatoka disease on banana (Arzanlou *et al.* 2007, Churchill 2010, Chang *et al.* 2016), angular leaf spot of bean (Crous *et al.* 2006a), tomato leaf mould (de Wit 2016) and Cercospora leaf spot of olive (Ávila *et al.* 2005).

In addition, several members of *Mycosphaerellaceae* are quarantine regulated (Quaedvlieg *et al.* 2012) such as *Pseudocercospora angolensis* causing fruit and leaf spot disease on citrus (Kirk 1986, Pretorius *et al.* 2003), *Pseudocercospora pini-densiflorae* causing brown needle blight of pine (Deighton 1987, Crous *et al.* 1990), *Sphaerulina musiva* causing canker of poplar (Peace 1962, Waterman 1954, Quaedvlieg *et al.* 2013), *Mycosphaerella laricis-leptolepidis* causing needle cast of Japanese larch (Peace 1962), *Septoria malagutii* causing angular leaf spot of potato (Cline & Rossman 2006), *Lecanosticta acicula* causing brown spot needle blight on *Pinus* spp. (Quaedvlieg *et al.* 2012) and *Dothistroma* spp. causing red band disease of pine (Evans 1984, Barnes *et al.* 2004, 2016). In order to facilitate plant host invasion some species are known to produce fungal toxins such as dothistromin (Bradshaw 2004, Bradshaw & Zhang 2006) and cercosporin (Chen *et al.* 2007) or secrete proteinaceous effectors suppressing host defense responses and facilitating biotrophic growth (de Wit 2016). The potential ability of endophytic species as sources of natural products important in medicine and agriculture is known among taxa of several families (Strobel & Daisy 2003, Aly *et al.* 2012, Gond *et al.* 2014), but is thus far unknown among species within the *Mycosphaerellaceae*. No species of *Mycosphaerellaceae* has hitherto been reported as a human pathogen although, in a rare occurrence, a species of *Ramularia* (*R. plurivora*) reportedly obtained from bone marrow has shown the ability to grow above 37 °C by changing its filamentous morphology into an arthroconidial yeast (Videira *et al.* 2015a).

As initially circumscribed *Mycosphaerellaceae* was polyphyletic (Crous *et al.* 2007, 2009a, e) and was later, therefore, split into several families, namely *Schizothyriaceae* (Batzer *et al.* 2008), *Cladosporiaceae* (Schubert *et al.* 2007, Dugan *et al.* 2008, Bensch *et al.* 2012, 2015), *Dissoconiaceae* and *Teratosphaeriaceae* (Crous *et al.* 2009b, Li *et al.* 2012, Quaedvlieg *et al.* 2014). From these results, it became evident that the mycosphaerella-like morphology has evolved multiple times and a new circumscription of *Mycosphaerella* was urgently required.

Approximately 56 genera have until now been recognised in *Mycosphaerellaceae* (Wijayawardene *et al.* 2014), although the mycosphaerella-like sexual morphs are usually morphologically conserved, and hence these genera are chiefly distinguished based on the morphology of their asexual morphs (Crous *et al.* 2009e). In addition, if one includes all genera that are currently synonymised based on the similarity of morphological characters, a total of 118 generic names can be accounted for in the *Mycosphaerellaceae* (Braun 1995, 1998, Crous & Braun 2003, Seifert *et al.* 2011). *Mycosphaerella s. str.* has *Ramularia* asexual morphs, which is also the name now applied to members of this genus, while *Mycosphaerella s. lat.* represents numerous genera distributed over different families. The name *Ramularia* (1833) is older than *Mycosphaerella* (1884) and choosing *Ramularia* over *Mycosphaerella* required less name changes since most established connections already had species names in *Ramularia*. Based on the one fungus = one name initiative (Wingfield *et al.* 2012, Crous *et al.* 2015b) the name *Ramularia* was selected over *Mycosphaerella* and included in a list of protected names (Wijayawardene *et al.* 2014, Rossman *et al.* 2015, Videira *et al.* 2015a, b).

Many asexual morphs linked to mycosphaerella-like sexual morphs are cercosporoid in morphology. Cercosporoid fungi are mostly defined as dematiaceous hyphomycetes with conidiophores formed singly, in groups (fascicles), synnemata or even sporodochia, having integrated, terminal or intercalary conidiogenous cells. Conidiogenesis is holoblastic and generates amerosporous to scolecosporous conidia, which are solitary or in chains (Braun *et al.* 2013). In a broader sense, it also includes ramularioid fungi that are the hyaline counterparts of cercosporoid fungi, forming conidia singly or in chains. Species in this group are mostly asexual with a relation to mycosphaerella-like sexual morphs, which are characterised by pseudothecial ascomata, with ostiolar periphyses but without interascal tissue, hyaline or slightly pigmented ascospores that are predominantly 1-septate (Barr 1987, Crous *et al.* 2009c).

Four genera were initially recognised as true cercosporoid genera, namely *Cercospora*, *Passalora*, *Pseudocercospora*, and *Stenella* (Crous & Braun 2003). The genus *Stenella* was allocated to the *Teratosphaeriaceae* based on the phylogenetic placement of the type species, *Stenella araguata*, while the stenella-like species remaining in *Mycosphaerellaceae* were included in the genus *Zasmidium* (Arzanlou *et al.* 2007, Braun *et al.* 2010a, 2013). Currently, the recognised cercosporoid and ramularioid fungi include the latter four and a large assortment of genera that are cercospora-, passalora-, pseudocercospora-, pseudocercosporella-, ramularia- and zasmidium-like in morphology.

These fungi represent a very large heterogeneous group for which the existing monographs (Chupp 1954, Braun 1995, 1998, Crous & Braun 2003) are in urgent need of revision (e.g. Braun *et al.* 2013, 2014, 2015). With the introduction of phylogenetic analyses based on DNA sequences, the *Mycosphaerellaceae* has been more narrowly defined with names of asexual genera now being used to identify morphologically distinct monophyletic clades, e.g. *Cercospora* (Groenewald *et al.* 2013), *Pseudocercospora* (Crous *et al.* 2013a, Nakashima *et al.* 2016), *Ramularia* (Videira *et al.* 2016), and *Zymoseptoria* (Quaedvlieg *et al.* 2011). However, several genera appear to be paraphyletic, showing that some morphological characters have evolved more than once within the family (e.g. *Passalora* and *Zasmidium*). Several accepted cercosporoid genera also have an uncertain status since no suitable type, or ex-type culture, is available (e.g. *Distocercospora*, *Phaeoramularia* and *Mycovellosiella*). Understanding and stabilising the taxonomy of cercosporoid fungi, most of which are plant pathogens, is urgent, given their impact on agriculture, horticulture and forestry. In the present study, we compiled a multigene phylogenetic analysis based on LSU, ITS and *rpb2* DNA sequence data, including 415 isolates representing 297 taxa that we have managed to cultivate since this project started in the year 2000. We include ex-type strains when available. Several old generic names are resurrected based on the type species having been recollected, and new genera are described for monophyletic clades where necessary.

MATERIALS AND METHODS

Isolates

The isolates included in this study were obtained from the culture collection of the Westerdijk Fungal Biodiversity Institute, Utrecht, the Netherlands, which houses the CBS culture collection, and from the working collection of Pedro Crous (CPC), housed at the Westerdijk Institute, or were freshly isolated from a range of different plant hosts (Table 1). Single-conidial and ascospore cultures were obtained using the techniques described for species of *Mycosphaerella* and associated asexual morphs (Crous *et al.* 1991, Crous 1998). Representative cultures of the new species described in this study were deposited in the CBS culture collection.

DNA extraction, amplification and sequencing

Fungal mycelium of strains (Table 1) was harvested with a sterile scalpel and the genomic DNA was isolated using the UltraClean Microbial DNA Isolation Kit (MoBio Laboratories, Inc., Solana Beach, CA, USA) following the manufacturers' protocols. Three partial nuclear genes were targeted for PCR amplification and sequencing: 28S nrRNA gene (LSU), internal transcribed spacer regions and intervening 5.8S nrRNA gene (ITS) of the nrDNA operon, RNA polymerase II second largest subunit (*rpb2*). The primers employed are listed in Table 2, with the respective annealing temperatures used. The PCR amplifications were performed on a GeneAmp PCR System 9700 (Applied Biosystems, Foster City, CA, USA). The PCR mixtures consisted of 1 µL genomic DNA, 1× NH4 reaction buffer (Bioline, Luckenwalde, Germany), 2 mM $MgCl_2$, 40 µM of each dNTP, 0.2 µM of each primer and 0.5 U *Taq* DNA polymerase (Bioline) in a total volume of 12.5 µL. The PCR mixture for *rpb2* contained 2 µL genomic DNA. The general PCR conditions were: initial denaturation (94 °C, 3 min); 35 cycles amplification [denaturation 94 °C, 30 s; locus-specific annealing temperature (Table 2), 30 s; extension 72 °C, 45 s], and final extension (72 °C, 5 min). To obtain the partial *rpb2*, a touchdown PCR protocol was used: initial denaturation (94 °C, 3 min), 5 amplification cycles (denaturation 94 °C, 45 s; annealing 60 °C, 45 s; extension 72 °C, 1 min), 5 amplification cycles (denaturation 94 °C, 45 s; annealing 58 °C, 45 s; extension 72 °C, 1 min), 30 amplification cycles (denaturation 94 °C, 45 s; annealing 54 °C, 45 s; extension 72 °C, 1 min) and a final extension (72 °C, 8 min). The resulting fragments were sequenced in both directions using the PCR primers and the BigDye Terminator Cycle Sequencing Kit v. 3.1 (Applied Biosystems Life Technologies, Carlsbad, CA, USA). DNA sequencing amplicons were purified through Sephadex G-50 Superfine columns (Sigma-Aldrich, St. Louis, MO, USA) in MultiScreen HV plates (Millipore, Billerica, MA, USA). Purified sequence reactions were analysed on an Applied Biosystems 3730xl DNA Analyzer (Life Technologies, Carlsbad, CA, USA). The DNA sequences generated were analysed and consensus sequences were computed using the BioNumerics v. 4.61 software package (Applied Maths, St-Martens-Latem, Belgium).

Phylogenetic analysis

The generated sequences for each gene were aligned with the online version of MAFFT v. 7 (Katoh & Standley 2013). The alignments were manually checked and improved where necessary using MEGA v. 5 (Tamura *et al.* 2011) and were concatenated with Mesquite v. 2.75 (Maddison & Maddison 2011). From the strains listed in Table 1, only those with the complete dataset of genes were used in the subsequent phylogenetic analyses, with the exception of *Cercospora apii* (CBS 116455), "*Passalora vaginae*" (CBS 140.34), *Phaeoramularia capsicicola* (CBS 156.62), *Prathigada* (MUCC 1088), *Rasutoria pseudotsugae* (rapssd), *Rasutoria tsugae* (ratstk),

Table 1. Collection details and GenBank accession numbers of isolates included in this study. Cultures with a type status are indicated in **bold** text.

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
Cladosporiaceae								
Cladosporium allicinum	–	CBS 188.53 = IFO 5267	–	Japan	–	MF951115	KT600367	MF951411
C. cf. *subtilissimum*	*Fusicladium effusum*	CBS 172.52 = ATCC 11320	*Carya illinoensis*	USA	–	EF679390	EF679390	MF951412
C. cladosporioides	–	**CBS 112388**^{NT}	Air	Germany	Ch. Trautmann	KX286982	HM148003	KX288432
C. ramotenellum	*Fusicladium subsessile*	CBS 133.29 = ATCC 36970	*Populus tremuloides*	–		MF951116	MF951281	MF951413
Cladosporium sp. A	*Fusicladium carpophillum*	CBS 145.33 = ATCC 12117	*Prunus persica*	USA: Wisconsin	–	MF951117	MF951282	MF951414
Cladosporium sp. B	*Fusicladium pomi*	CBS 179.47	–	Portugal	–	MF951118	MF951283	MF951415
Dissoconiaceae								
Ramichloridium apiculatum	*Chloridium apiculatum*	**CBS 156.59**^{T} = ATCC 13211 = IMI 100716 = JCM 6972 = MUCL 15753 = MUCL 7991 = QM 7716	Forest soil	USA: Georgia	–	EU041848	EU041791	MF951416
	Rhinocladiella indica	CBS 400.76 = IMI 088021	Soil	Pakistan	–	EU041851	EU041794	KX348077
R. luteum	–	**CBS 132088**^{T} = CPC 18961 = ZXR-SD-2	*Malus domestica*	China	G.Y. Sun, Oct. 2006	JQ622099	EU329730	MF951417
Uwebraunia australiensis	*Dissoconium australiensis*	CBS 120729 = CPC 13282	*Eucalyptus platyphylla*	Australia: Queensland	P.W. Crous, 26 Aug. 2006	KF442553	KF442513	KX348105
U. dekkeri	*Mycosphaerella lateralis*	CBS 110748 = CMW 14906 = CPC 825	*Eucalyptus grandis*	South Africa: Northern Province	G. Kemp, Oct. 1994	KF442534	KF442495	MF951418
U. musae	*Dissoconium musae*	CBS 122453 = X1021	*Musa acuminata* cv. Nendran (Plantain) AAB	India	I. Buddenhagen, 28 Feb. 2005	JQ739816	EU514225	KX348107
Dothioraceae								
Cylindroseptoria ceratoniae	*Septoria ceratoniae*	**CBS 477.69**^{T} = H.A 1731	*Ceratonia siliqua*	Spain: Mallorca	H.A. van der Aa, 24 May 1969	KF251655	KF251151	MF951419
Mycosphaerellaceae								
Acervuloseptoria ziziphicola	*Acervuloseptoria ziziphicola*	**CBS 138009**^{T} = CPC 23707	*Ziziphus mucronata*	South Africa: Northern Cape	J. Roux, Sep. 2013	KJ869221	KJ869164	MF951425
Amycosphaerella africana	*Mycosphaerella africana*	**CBS 680.95**^{T} = CPC 796	*Eucalyptus viminalis*	South Africa: Western Cape	P.W. Crous, Oct. 1994	KF902048	KF901701	MF951426
	Mycosphaerella aurantia	**CBS 110500**$^{\text{T of \textit{Mycosphaerella aurantia}}}$ = CMW 14460	*Eucalyptus globulus*	Australia: Western Australia	A. Maxwell, 1 May 2000	KF901837	AY725531	MF951427
	Mycosphaerella ellipsoidea	**CBS 110843**$^{\text{T of \textit{Mycosphaerella ellipsoidea}}}$ = CPC 850	*Eucalyptus cladocalyx*	South Africa: Western Cape	P.W. Crous, 7 Nov. 1994	GQ852602	AY725545	MF951431
	Mycosphaerella buckinghamiae	**CBS 111996**$^{\text{T of \textit{Mycosphaerella buckinghamiae}}}$ = CPC 3006	*Buckinghamia* sp.	Australia: New South Wales	P.W. Crous & B. Summerell, Aug. 1999	MF951124	EU707855	MF951430

Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
	Mycosphaerella africana	**CBS 116154^{T}** = CMW 4945 = CPC 794	*Eucalyptus viminalis*	South Africa	P.W. Crous, Oct. 1994	GQ852601	KF901700	MF951429
	Mycosphaerella gregaria	**CBS 134927^{T}** $^{\text{of } \textit{Mycosphaerella gregaria}}$ = DAR 72368	*Eucalyptus grandis*	Australia: Victoria	A.J. Carnegie, 11 Nov. 1990	MF951125	MF951289	MF951432
	Mycosphaerella aurantia	CPC 12678	*Dracaena draco*	New Zealand	M. Braithwaite, 1 Mar. 2004	MF951123	MF951288	MF951428
A. keniensis	*Mycosphaerella keniensis*	**CBS 111001^{T}** = CPC 1084 = CMW 5147	*Eucalyptus grandis* litter	Kenya	M.J. Wingfield, May 1995	GQ852610	MF951290	MF951433
	Mycosphaerella mozambica	CBS 121391 = UQ 438 = X884	*Musa* sp.	Australia	–	MF951126	EU514258	MF951434
Amycosphaerella sp.	*Crinipellis perniciosa*	CBS 441.80	*Theobroma cacao*	Brazil	H.C. Evans	MF951127	MF951291	MF951435
Annellosympodiella juniperi	–	**CBS 137992^{T}** = CPC 23276	*Juniperus procera*	Ethiopia	P.W. Crous & A. Assefa, 25 Jun. 2013	KJ869204	KJ869204	MF951436
Apseudocercosporella trigonotidis	*Pseudocercosporella* sp.	**CBS 131890^{T}** = CPC 10864	*Trigonotis peduncularis*	Republic of Korea	H.-D. Shin, 12 Nov. 2003	JQ324972	GU269858	KX288414
Asperisporium caricae	–	**CBS 130298^{ET}**	*Carica papaya*	Brazil	C. Weight, 16 Apr. 2010	MF951128	NR_119970	MF951437
	Asperisporium sp.	CPC 22691	*Carica papaya*	Brazil	A.C. Alfenas, Mar. 2013	MF951129	MF951292	MF951438
A. caricicola	–	**CBS 139998^{T}** = CPC 24348 = TSU:MUMH 11477	*Carica papaya*	Republic of Fiji	C. Nakashima, 10 Sep. 2013	KR611891	KR611869	MF951439
Australosphaerella nootherensis	*Mycosphaerella nootherensis*	**CBS 130522^{T}**	*Corymbia intermedia*	Australia: Queensland	A.J. Carnegie, 11 Aug. 2008	KF901835	MF951293	MF951440
Brunneosphaerella jonkershoekensis	–	**CPC 13902^{ET}**	*Protea repens*	South Africa: Western Cape	P.W. Crous, Apr. 2007	JN712503	JN712439	MF951441
B. nitidae	–	**CBS 130595^{T}** = CPC 15231	*Protea nitida* leaf litter	South Africa: Western Cape	L. Mostert, 12 Apr. 2008	GU214396	GU214625	MF951442
B. protearum	–	**CBS 130597^{ET}** = CPC 16338	*Protea* sp.	South Africa: Western Cape	P.W. Crous, 13 Jan. 2009	GU214397	GU214626	MF951443
Brunswickiella parsonsiae	–	**CBS 137979^{T}** = CPC 22537	*Parsonsia straminea*	Australia	B.A. Summerell, 9 Mar. 2013	KJ869188	KJ869131	MF951593
Caryophylloseptoria lychnidis	–	CBS 109099	*Silene pratensis*	Austria	G. Verkley, 4 Aug. 2000	KF251791	KF251287	MF951444
	–	CBS 109102	*Silene pratensis*	Austria	G. Verkley, 4 Aug. 2000	KF251793	KF251289	MF951445
C. pseudolychnidis	–	CBS 128614 = KACC 42904 = SMKC 22691	*Lychnis cognata*	Republic of Korea	–	KF251794	KF251290	KX348049
	–	**CBS 128630^{T}** = KACC 43866 = SMKC 23519	*Lychnis cognata*	Republic of Korea	–	KF251795	KF251291	MF951446
C. silenes	*Septoria silenes*	CBS 109103	*Silene nutans*	Austria	G. Verkley, 3 Aug. 2000	KF251797	KF251293	MF951447

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Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
C. spergulae	–	**CBS 109010**^{ET}	*Spergula morisonii*	Netherlands	A. Aptroot, 13 Jun. 2000	KF251798	KF251294	MF951448
“Septoria” gladioli	–	CBS 353.29	–	Netherlands	–	KF251932	KF251428	MF951449
Catenulocercospora fusimaculans	*Passalora fusimaculans*	CPC 17277	*Agrostis* sp.	Thailand	P. Pheng, 15 Sep. 2009	KF251817	KF251313	MF951450
Cercoramularia koreana	*Phaeoramularia* sp.	**CBS 142175**^{T} = CPC 10709	*Styrax japonicus*	Republic of Korea	H.-D. Shin, 17 Sep. 2003	MF951132	MF951296	MF951453
	Phaeoramularia sp.	CPC 10639	*Styrax japonicus*	Republic of Korea	H.-D. Shin, 2003	MF951130	MF951294	MF951451
	Phaeoramularia sp.	CPC 10641	*Styrax japonicus*	Republic of Korea	H.-D. Shin, 2003	MF951131	MF951295	MF951452
Cercospora apii	–	**CBS 116455**^{ET} = CPC 11556	*Apium graveolens*	Germany	K. Schrameyer, 10 Aug. 2004	MF951133	AY840519	–
C. armoraciae	–	CBS 538.71 = IMI 161109 = CPC 5090	*Berteroa incana*	Romania	O. Constantinescu, 4 Sep. 1969	MF951134	JX143547	MF951454
C. beticola	–	CPC 18813	*Beta vulgaris*	USA: California	S.T. Koike, 1 Nov. 2010	MF951135	JX143556	MF951455
C. campi-silii	–	CBS 132625 = CPC 14585	*Impatiens noli-tangere*	Republic of Korea	H.-D. Shin, 29 Sep. 2007	KX286965	JX143561	KX288415
C. capsici	–	CBS 132622 = CPC 14520	*Capsicum annuum*	Republic of Korea	H.-D. Shin, 29 Aug. 2005	MF951136	JX143568	MF951456
C. cf. *chenopodii*	*Passalora dubia*	CBS 126.29	–	–	–	MF951139	MF951299	MF951459
	Passalora dubia	CBS 256.67	*Atriplex hortensis*	Romania	–	MF951140	MF951300	MF951460
	Passalora dubia	CBS 543.71 = BUCM 2006	*Atriplex oblongifolia*	Romania	O. Constantinescu & G. Negrean, 13 Jul. 1970	MF951141	MF951301	MF951461
	Passalora dubia	CBS 123192 = CPC 15387	*Chenopodium album*	New Zealand	C.F. Hill, 2 Mar. 2008	MF951138	MF951298	MF951458
	–	CPC 10303	*Chenopodium ficifolium*	Republic of Korea	H.-D. Shin, 3 Oct. 2002	MF951137	MF951297	MF951457
	–	CPC 12450	*Chenopodium ficifolium*	Republic of Korea	H.-D. Shin, 27 Oct. 2005	KX286967	JX143574	KX288417
C. euphorbiae-sieboldianae	–	**CBS 113306**^{T}	*Euphorbia sieboldiana*	Republic of Korea	H.-D. Shin, 8 May 2003	MF951142	JX143593	MF951462
C. fagopyri	–	**CBS 132623**^{NT} = CPC 14541	*Fagopyrum esculentum*	Republic of Korea	H.-D. Shin	MF951143	JX143594	MF951463
C. janseana	*Passalora janseana*	CBS 145.37 = IMI 303642	–	USA	–	KF251818	KF251314	MF951464
C. lactucae-sativae	–	CPC 10082	*Ixeris chinensis* subsp. *strigosa* (≡ *Ixeris strigosa)*	Republic of Korea	H.-D. Shin, 11 Oct. 2002	MF951144	JX143622	MF951465
C. senecionis-walkeri	–	CBS 132636 = CPC 19196	*Senecio walkeri*	Laos	P. Phengsintham, 20 Feb. 2010	MF951145	JX143649	MF951466
C. sojina	*Passalora personata*	CBS 220.31	–	Italy	–	KX286971	KX287279	KX288421
	–	CBS 132018 = CPC 12322	*Glycine soja*	Republic of Korea	H.-D. Shin, 20 Jul. 2004	GU214655	GU214655	MF951467
	–	**CBS 132615**^{NT} = CPC 11353	*Glycine soja*	Republic of Korea	H.-D. Shin, 20 Jul. 2004	KX286969	JX143659	KX288419

Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
	–	CPC 11422	*Glycine soja*	Republic of Korea	H.-D. Shin	KX286972	KX287280	KX288422
Cercospora sp.	*Passalora dulcamarae*	CBS 544.71 = BUCM 2008	*Solanum dulcamara*	Romania	O. Constantinescu & G. Negrean, 14 Oct. 1970	MF951146	MF951302	MF951468
C. zeina	–	**CBS 118820^{T}** = CPC 11995	*Zea mays*	South Africa: KwaZulu-Natal	P. Caldwell, 2005	MF951147	DQ185081	MF951469
Cercosporella catenulata	*Ramularia deusta* var. *alba*	**CBS 355.73^{T}**	*Phaseolus vulgaris*	Rwanda	D. Froment, 10 Jan. 1973	KX286973	KX287281	KX288424
C. dolichandrae	–	**CBS 138101^{T}** = CPC 22948	*Dolichandra unguiscati*	South Africa: KwaZulu-Natal	A. King,15 Nov. 2011	KJ869197	KJ869140	KX288423
C. virgaureae	*Cercosporella vergaweae*	CBS 113304	*Erigeron annuus*	Republic of Korea	H.-D. Shin, 21 May 2003	KF251805	GU214658	KX348051
	–	CPC 10286	*Erigeron annuus*	Republic of Korea	H.-D. Shin, 9 Oct. 2002	KX286978	KX287285	KX288428
	–	CPC 11456	*Erigeron annuus*	Republic of Korea	H.-D. Shin, 1 Jul. 2004	KX286974	MF951303	KX348050
	–	CPC 11457	*Erigeron annuus*	Republic of Korea	H.-D. Shin, 1 Jul. 2004	KX286975	KX287282	KX288425
	–	CPC 11460	*Erigeron annuus*	Republic of Korea	H.-D. Shin, 1 Jul. 2004	KX286976	KX287283	KX288426
Cercosporidium californicum	*Passalora californica*	**CBS 128857^{T}** = CPC 18389	*Asclepias fascicularis*	USA: California	S.T Koike, 19 Jul. 2010	MF951148	HQ728115	MF951470
	Passalora californica	CPC 18390	*Asclepias fascicularis*	USA: California	S.T Koike, 19 Jul. 2010	MF951149	MF951304	MF951471
C. chaetomium	*Passalora* sp.	**CBS 142177^{ET}** = CPC 18624	*Euphorbia* sp.	Canada	P.W. Crous & K. Seifert, 28 Sep. 2010	MF951151	MF951306	MF951474
C. miurae	*Passalora miurae*	CBS 142235 = CPC 14628	*Metaplexis japonica*	Republic of Korea	H.-D. Shin, 1 Oct. 2007	MF951150	MF951305	MF951472
	Passalora miurae	CPC 14643	*Metaplexis japonica*	Republic of Korea	H.-D. Shin, 22 Sep. 2007	KJ633268	KJ633264	MF951473
Chuppomyces handelii	*Mycosphaerella handelii*	CBS 113302	*Rhododendron* sp.	Netherlands	P.W. Crous & U. Braun, 2002	GU214437	EU167581	MF951475
Clarohilum henningsii	*Passalora henningsii*	CPC 17314	*Manihot esculenta*	Laos	P. Pheng, 5 May 2006	MF951152	MF951307	MF951476
Clypeosphaerella calotropidis	*Passalora calotropidis*	CBS 129.30	*Calotropis procera*	Egypt	–	MF951153	MF951308	MF951477
C. quasiparkii	*Mycosphaerella quasiparki*	**CBS 123243^{T}** = CPC 15409	*Eucalyptus* sp.	Thailand	P. Suwannawong, Jul. 2007	KF902128	KF901771	MF951478
Collarispora valgourgensis	*Passalora* sp.	CBS 125311 = CS2 OH3 gH1c	*Malus* sp.	USA: Ohio	M. Ellis, 29 Sep. 2005	MF951154	MF951309	MF951480
	Mycosphaerella valgourgensis	**CBS 129531^{T}** = CPC 18385	*Yucca* sp.	France	P.W. Crous, 15 Jul. 2010	JF951175	JF951152	MF951479
Coremiopassalora eucalypti	*Passalora eucalypti*	**CBS 111306^{T}** $^{\text{of } Mycovellosiella\ eucalypti}$ = CPC 1455 = CMW 14907	*Eucalyptus saligna*	Brazil	P.W. Crous & A.C. Alfenas, Jun. 1995	GU253860	GU269845	MF951481
	Passalora eucalypti	CBS 111318 = CPC 1457	*Eucalyptus saligna*	Brazil	P.W. Crous & A.C. Alfenas, Jun. 1995	GU253860	GU269845	MF951482

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Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
C. leptophlebae	*Passalora leptophlebiae*	**CBS 129524**^{T} = CPC 18480	*Eucalyptus leptophleba*	Brazil	P.W. Crous, A.C. Alfenas, R. Alfenas & O.L. Pereira, 23 Aug. 2010	KF901939	MF951310	MF951483
Cytostagonospora martiniana	*Septoria* sp.	**CBS 135102**^{ET} = CPC 17727	*Acacia pycnantha*	Australia: Victoria	P.W. Crous, 21 Oct. 2009	KF251657	KF251153	MF951484
Deightonomyces daleae	*Passalora daleae*	CBS 113031	*Dalea spinosa*	Mexico	L.B. Sparrius, Apr. 2003	MF951155	EU040236	MF951485
Devonomyces endophyticus	*Phaeophleospora gregaria*	CBS 110501 = CMW 14462	*Eucalyptus globulus*	Australia: Western Australia	A. Maxwell, 15 Dec. 2000	EU167580	EU167580	MF951589
	Phaeophleospora gregaria	CBS 111167 = CPC 1225	*Eucalyptus cladocalyx*	South Africa: Western Cape	A.R. Wood, 22 Sep. 1995	KF902058	KF901711	MF951588
	Mycosphaerella endophytica	**CBS 114662**$^{\mathrm{T}\ \text{of}\ \textit{Mycosphaerella endophytica}}$ = CPC 1193	*Eucalyptus* sp.	South Africa: Western Cape	P.W. Crous, Jun. 1995	KF902060	KF901713	MF951590
	Mycosphaerella pseudoellipsoidea	CBS 114709 = CMW 9099	*Eucalyptus nitens*	South Africa	–	EU167585	EU167585	MF951591
	Stenella sp.	CPC 15580	*Hakea undulata*	Australia	A.R. Wood, 2 Aug. 2008	MF951212	MF951357	MF951592
Distocercospora pachyderma	–	**CBS 138247**^{ET} = CPC 24144	*Dioscorea* sp.	Japan	C. Nakashima & K. Motohashi, 13 Sep. 2010	MF951156	MF951311	MF951486
Distocercosporaster dioscoriae	*Passalora dioscoreae*	CBS 135460 = CPC 10855	*Dioscorea tokoro*	Republic of Korea	H.-D. Shin, 16 Oct. 2003	GU214665	GU214665	MF951488
	Passalora dioscoreae	CBS 135463 = CPC 11513	*Dioscorea tenuipes*	Republic of Korea	H.-D. Shin, 2003	KF251815	KF251311	MF951489
	Passalora dioscoreae	KACC 44723	*Dioscorea* sp.	Republic of Korea	H.-D. Shin	MF951157	MF951312	MF951487
Distomycovellosiella brachycarpa	*Passalora brachycarpa*	CBS 114855	–	New Zealand	–	MF951159	MF951314	MF951491
	Passalora brachycarpa	CBS 115124	*Solanum mauritianum*	New Zealand	–	GU214664	GU214664	MF951492
	Mycovellosiella brachycarpa	**CBS 142178**^{ET} = CPC 18381	*Solanum mauritianum*	South Africa: KwaZulu-Natal	A.R. Wood, 6 Jul. 2010	MF951158	MF951313	MF951490
Dothistroma pini	–	CBS 116486	*Pinus nigra*	USA: Michigan	G. Adams, 2001	JX901823	JX901735	KX348053
	–	CBS 121005 = CMW 24852	*Pinus pallasiana*	Russia	T.S. Bulgakov, 8 Oct. 2006	KF251659	KF251155	KX348052
D. septosporum	–	CBS 128782 = CPC 16798	*Pinus mugo* 'Rostrata'	Netherlands	W. Quaedvlieg, 1 Jun. 2009	JX901829	JX901741	KX348054
	–	CBS 128783 = CPC 16799	*Pinus mugo* 'Rostrata'	Netherlands	W. Quaedvlieg, 1 Jun. 2009	JF700938	JX901742	MF951493

Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
Epicoleosporium ramularioides	–	**CBS 141103**^{T} = CPC 10672	*Coleosporium phellodendri* on leaves of *Phellodendron amurense*	Republic of Korea	H.-D. Shin, 4 Sep. 2003	GU214688	GU214688	KX288433
	–	CPC 10673	*Coleosporium phellodendri* on leaves of *Phellodendron amurense*	Republic of Korea	H.-D. Shin, 4 Sep. 2003	MF951160	KX287289	KX288434
Exosporium livistonae	*Passalora* sp.	**CBS 131313**^{T} = CPC 19357	*Livistona benthamii*	Australia: Northern Territory	P.W. Crous & B.A. Summerell, 25 Apr. 2011	JQ044446	JQ044427	MF951494
E. livistonicola	–	MUCC 190	*Livistona chinensis*	Japan	T. Kobayashi & Y. Ono, 27 Feb. 2003	MF951161	MF951315	MF951495
Exutisphaerella laricina	*Mycosphaerella laricina*	**CBS 326.52**^{NT}	*Larix decidua*	Switzerland	–	GU253693	GU269643	MF951496
Filiella pastinacae	*Pseudocercosporella pastinacae*	CBS 114116 = UPSC 2633	*Laserpitium latifolium*	Sweden	K. & L. Holm, 2 Jun. 1988	KF251832	KF251328	KX348056
Fulvia fulva	*Passalora fulva*	CBS 120.46 = VKM F-3053	*Solanum lycopersicum*	Switzerland	–	MF951162	MF951316	MF951497
	Passalora fulva	**CBS 142314**^{ET} = CPC 13652	*Solanum lycopersicum*	Cuba	B. Summerell, 2006	MF951163	MF951317	MF951498
Fusoidiella anethi	*Passalora puncta*	CBS 296.32	–	Italy	–	MF951164	MF951318	MF951499
	Passalora puncta	CBS 117584	*Foeniculum vulgare*	New Zealand	–	MF951165	MF951319	MF951500
F. depressa	*Passalora depressa*	CBS 141335 = CPC 14915	*Angelica gigas*	Republic of Korea	H.-D. Shin, 18 Oct. 2007	KF251813	KF251309	KX348055
Genus A: *"Passalora" vaginae*	*Passalora vaginae*	CBS 140.34 = DSM 1148 = IMI 303641	*Saccharum officinarum*	Taiwan	–	MF951166	MF951320	–
Graminopassalora graminis	*Passalora graminis*	CBS 113303	*Alopecurus aequalis* var. *amurensis*	Republic of Korea	H.-D. Shin, 24 May 2003	GU214666	GU214666	MF951502
	Cercosporidium graminis	MAFF 510604 = MUCC 1429	*Dactylis glomerata*	Japan	N. Nishihara, –	MF951167	MF951321	MF951501
Hyalinozasmidium aerohyalinosporum	*Zasmidium aerohyalinosporum*	**CBS 125011**^{T} $^{\text{of } Zasmidium\ aerohyalinosporum}$ = CPC 14636	*Eucalyptus tectifica*	Australia: New South Wales	B.A. Summerell, 23 Sep. 2007	KF901930	GQ852839	MF951504
H. sideroxyli	*Zasmidium* sp.	**CBS 142191**^{T} = CPC 23462	*Sideroxylon inerme*	South Africa: Eastern Cape	A.R. Wood, 8 May 2013	MF951169	MF951323	MF951505
Hyalocercosporidium desmodii	*Passalora* sp.	**CBS 142179**^{T} = CPC 19483	*Desmodium tortuosum*	Brazil: Minas Gerais	R.W. Barreto, 2 Aug. 2009	MF951168	MF951322	MF951503
Lecanosticta acicola	–	CBS 871.95 = MPFN 314	*Pinus radiata*	France	M. Morelet, Apr. 1995	GU214663	GU214663	MF951506
	–	**CBS 133791**^{ET} = WPF13.12	*Pinus strobus*	USA: New Hampshire	B. Ostrofsky, 15 Jun. 2011	KC013017	KC012999	MF951507
L. brevispora	–	**CBS 133601**^{T} = CPC 18092	*Pinus* sp.	Mexico	M. de Jesús Yáñez-Morales, 24 Oct. 2009	KF902021	JX901763	MF951508

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Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
L. longispora	–	**CBS 133602**$^{\text{ET}}$ = CPC 17940	*Pinus* sp.	Mexico	M. de Jesús Yáñez-Morales & C. Méndez-Inocencio, 24 Oct. 2009	JX901858	JX901766	MF951510
	–	CPC 17941	*Pinus* sp.	Mexico	M. de Jesús Yáñez-Morales & C. Méndez-Inocencio, 24 Oct. 2009	KF902022	JX901766	MF951509
Madagascaromyces intermedius	*Passalora intermedia*	**CBS 124154**$^{\text{T}}$ = CPC 15745	*Eucalyptus camaldulensis*	Madagascar	M.J. Wingfield, Aug. 2007	FJ790297	FJ790267	MF951511
	Stenella sp.	CPC 15719	*Eucalyptus camaldulensis*	Madagascar	M.J. Wingfield, Oct. 2007	MF951170	FJ790251	MF951512
Microcyclosporella mali	–	CBS 125651 = RH1 = OH1 34D2a	*Malus* sp.	USA: Ohio	M. Ellis, 5 Sep. 2005	FJ031989	FJ425196	KX288442
	–	CBS 125653 = RH6 = MI3 20F1a	*Malus* sp.	USA: Michigan	G. Sundin, 1 Sep. 2005	FJ031994	FJ425201	KX288440
	–	CBS 126132 = CPC 16180	*Malus domestica*	Slovenia	J. Frank, 17 Oct. 2007	MF951171	MF951324	MF951513
	–	**CBS 126136**$^{\text{T}}$ = CPC 16184	*Malus domestica*	Slovenia	J. Frank, 7 Aug. 2007	GU570547	GU570535	KX288436
Micronematomyces caribensis	*Passalora caribensis*	CBS 113374 = MJM 1545 = C481	*Chromolaena odorata*	Jamaica	M.J. Morris	MF951172	DQ676512	MF951514
	Passalora caribensis	CBS 113375 = MJM 1543 = C482	*Chromolaena odorata*	Jamaica	M.J. Morris	MF951173	DQ676513	MF951515
	Passalora caribensis	CBS 113376 = MJM 1539 = C487	*Chromolaena odorata*	Cuba	S. Neser, 28 Oct. 1997	MF951174	DQ676514	MF951516
	Passalora perfoliati	CBS 113378 = MJM 1552 = C494	*Chromolaena odorata*	Jamaica	M.J. Morris, 1 Nov. 1997	MF951178	DQ676520	MF951520
	Passalora perfoliati	CBS 113379 = MJM 1544 = C495	*Chromolaena odorata*	Jamaica	M.J. Morris, 30 Oct. 1997	MF951177	DQ676521	MF951519
	Passalora caribensis	**CBS 113380**$^{\text{T}}$ = MJM 1550 = C498	*Chromolaena odorata*	Jamaica	M.J. Morris, 31 Oct. 1997	MF951175	DQ676515	MF951517
	Passalora caribensis	CBS 113381 = MJM 1549 = C500	*Chromolaena odorata*	Jamaica	M.J. Morris, 30 Oct. 1997	MF951176	DQ676516	MF951518
M. chromolaenae	*Septoria chromolaenae*	CBS 113371 = MJM 1490 = C450	*Chromolaena odorata*	Mexico	M.J. Morris, 12 Oct. 1997	MF951179	DQ676517	MF951521
	Septoria chromolaenae	**CBS 113611**$^{\text{T}}$ = MJM 1498 = C452	*Chromolaena odorata*	Mexico	M.J. Morris, 12 Oct. 1997	MF951180	DQ676518	MF951522
Miuraea degenerans	*Miuraea degenerans*	**MAFF 239265**$^{\text{ET}}$ = MUCC 1514	*Prunus mume*	Japan	T. Kobayashi, Sep. 2003	MF951181	MF951325	MF951523
M. persica	*Miuraea persica*	CBS 131935 = CPC 10828	*Prunus armeniaca*	Republic of Korea	H.-D. Shin, 7 Oct. 2003	JQ324939	GU269844	MF951524
Mycodiella sumatrensis	*Mycosphaerella sumatrensis*	CBS 118501 = CPC 11175	*Eucalyptus* sp.	Indonesia	M.J. Wingfield, Feb. 2004	JX901872	DQ303049	MF951525
Mycosphaerelloides madeirae	*Mycosphaerella madeirae*	**CBS 112895**$^{\text{T}}$ = CPC 3745 = CMW 14458	*Eucalyptus globulus*	Portugal	S. Denman, Apr. 2000	KF902017	AY725553	KX348057

Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
	Mycosphaerella madeirae	CBS 116066	*Quercus robur*	Netherlands	–	KX286989	AY853188	KX288444
	Mycosphaerella madeirae	CBS 116068	*Quercus robur*	Netherlands	–	KX286990	AY853189	KX288445
Mycovellosiella cajani	*Passalora* sp.	CBS 113998 = CPC 5335	*Cajanus cajan*	South Africa: Mpumalanga	L. van Jaarsveld, 17 May 2002	KF251819	KF251315	MF951527
	Passalora sp.	CBS 113999 = CPC 5339	*Cajanus cajan*	South Africa: Mpumalanga	L. van Jaarsveld, 17 May 2002	KF251820	KF251316	MF951528
	Passalora sp.	CBS 114275 = CPC 5334	*Cajanus cajan*	South Africa: Mpumalanga	L. van Jaarsveld, 17 May 2002	KF251821	KF251317	MF951529
	–	**CBS 142174**^{NT} = CPC 30580 = RWB 2071	*Cajanus cajan*	Brazil	R.W. Barreto, 2016	MF951182	MF951326	MF951526
Neoceratosperma cyatheae	*Passalora* sp.	CPC 18580	*Cyathea delgadii*	Brazil: Rio de Janeiro	R.W. Barreto, 11 Jul. 2009	KT037580	KT037539	MF951530
N. eucalypti	–	**CBS 137998**^{T} = CPC 23465	*Eucalyptus* sp.	Thailand	R. Cheewangkoon, Sep. 2013	KJ869210	KJ869153	MF951531
N. haldinae	*Passalora haldinae*	**CBS 142190**^{T} = CPC 19202	*Haldina cordifolia*	Laos	P. Pheng	MF951184	MF951328	MF951533
N. legnophoricola	*Stenella* sp.	**CBS 142189**^{T} = CPC 16411	*Legnephora moorei*	Australia: New South Wales	B. Summerell, Mar. 2009	MF951183	MF951327	MF951532
N. yunnanensis	*Xenomycosphaerella yunnanensis*	**CBS 119975**^{T} = CMW 23443 = MUCC 410 = PAB 05.05 B2	*Eucalyptus urophylla*	China	B. Dell, May 2005	KF901962	KF901628	MF951534
Neocercospora ammicola	–	**CBS 136450**^{T} = CCTU 1186	*Ammi majus*	Iran	M. Arzanlou, Sep. 2012	KR232405	KR232407	KX288446
Neocercosporidium smilacis	*Passalora smilacis*	CBS 556.71	*Smilax aspera*	Italy	W. Gams, 18 May 1971	KJ633269	KJ633265	MF951535
	Passalora sp.	**CBS 122888**^{ET}	*Smilax aspera*	Portugal	G. Verkley, 23 Jan. 2008	MF951185	MF951329	MF951536
	Passalora sp.	CBS 122889	*Smilax aspera*	Portugal	G. Verkley, 23 Jan. 2008	MF951186	MF951330	MF951537
	Passalora sp.	CBS 122890	*Smilax aspera*	Portugal	G. Verkley, 23 Jan. 2008	MF951187	MF951331	MF951538
	Passalora sp.	CBS 123352	*Smilax aspera*	Portugal	G. Verkley, 23 Jan. 2008	MF951188	MF951332	MF951539
	Passalora sp.	CBS 123353	*Smilax aspera*	Portugal	G. Verkley, 23 Jan. 2008	MF951189	MF951333	MF951540
	Passalora sp.	CPC 19342	*Smilax* sp.	Italy	W. Gams, 30 Apr. 2011	MF951190	MF951334	MF951541
Neodeightoniella phragmiticola	–	**CBS 136418**^{T} = CPC 22059	*Phragmites australis*	South Africa: Free State	W.J. Swart, 31 Jan. 2013	KF777224	KF777171	MF951543

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Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
	–	CPC 22057	*Phragmites australis*	South Africa: Free State	W.J. Swart, 31 Jan. 2013	KF777223	KF777170	MF951542
	–	CPC 22061	*Phragmites australis*	South Africa: Free State	W.J. Swart, 31 Jan. 2013	KF777225	KF777172	MF951544
Neomycosphaerella pseudopentameridis	–	**CBS 136407**^{T} = CPC 21126	*Pseudopentameris macrantha*	South Africa: Western Cape	P.W. Crous, 22 Jul. 2012	KF777226	KF777173	MF951545
Neopenidiella nectandrae	*Cladosporium ferrugineum*	**CBS 734.87**^{T} of *Cladosporium ferrugineum* = ATCC 200932 = INIFAT 87/45	*Nectandra coriacea*	Cuba	R.F. Castañeda & G. Arnold, 24 Jan. 1987	KF901982	MF951335	MF951546
Neophloeospora maculans	*Phloeospora maculans*	CBS 115123	*Morus alba*	New Zealand	–	GU214670	GU214670	MF951547
Neopseudocercosporella brassicicola	*Mycosphaerella brassicicola*	CBS 163.26	–	–	–	MF951192	MF951337	MF951548
	Mycosphaerella brassicicola	CBS 228.32	*Brassica oleracea*	Denmark	–	KF251808	KF251304	KX348058
	Mycosphaerella brassicicola	CBS 267.53	*Brassica oleracea* var. *acephala* subvar. *sabelica*	Netherlands	–	KF251809	KF251305	KX348059
N. capsellae	*Pseudocercosporella capsellae*	CBS 112032 = HJS 601	*Brassica* sp.	–	–	KF251824	KF251320	KX348060
	Pseudocercosporella capsellae	CBS 112033 = HJS 600	*Brassica* sp.	–	–	KF251810	KF251306	KX348061
	Pseudocercosporella capsellae	CBS 118412	*Brassica* sp.	New Zealand	–	MF951193	MF951338	MF951549
	Pseudocercosporella capsellae	MAFF 237605 = MUCC 1254	*Brassica rapa* var. *oleifera*	Japan	K. Kishi,–	MF951194	MF951339	MF951550
Neoseptoria caricis	–	**CBS 135097**^{T} = S653	*Carex acutiformis*	Netherlands	W. Quaedvlieg, Aug. 2012	KF251663	KF251159	MF951551
Nothopassalora personata	*Mycosphaerella berkeleyii*	**CBS 222.38**^{IT} of *Mycosphaerella berkeleyii*	*Arachis hypogaea*	USA: Georgia	W.A. Jenkins, 23 Jun. 1937	MF951234	MF951373	MF951631
	Passalora sp.	**CBS 142236**^{ET} = CPC 19466	*Arachis hypogaea*	Australia: Northern Territory	P.W. Crous, 30 Apr. 2011	MF951235	MF951374	MF951632
Nothopericoniella persea-macranthae	*Periconiella persea-macranthae*	CBS 122097 = RoKi 2995	*Machilus zihoensis*	Taiwan	R. Kirschner & C.-J. Chen, 18 Mar. 2007	GU452682	MF951354	MF951583
	Periconiella persea-macranthae	CBS 122282 = RoKi 3030	Unidentified *Lauraceae*	Taiwan	R. Kirschner & C.-J. Chen, 1 Apr. 2007	GU452681	MF951355	MF951584
Nothophaeocryptopus gaeumannii	*Adelopus balsamicola* f. *douglasii*	CBS 244.38	–	Austria	–	MF951191	MF951336	GU357766
	Adelopus gaeumannii	CBS 267.37	*Pseudotsuga menziesii*	Germany	–	EF114698	EU700365	GU357770

Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
Pachyramichloridium pini	*Ramichloridium pini*	**CBS 461.82**^{T} = MUCL 28942	*Pinus contorta*	UK: Scotland	–	EU041859	EU041802	MF951552
Pallidocercospora acaciigena	*Mycosphaerella acaciigena*	**CBS 112515**^{T} = CPC 3837	*Acacia mangium*	Venezuela	M.J. Wingfield, May 2000	KF902166	KF901805	KX348062
P. crystallina	–	CBS 111045 = CPC 1179	*Eucalyptus grandis* litter	South Africa: KwaZulu-Natal	M.J. Wingfield, 22 Jun. 1995	KF442659	KF901704	KX348063
	Passalora sp.	CPC 14140	*Eucalyptus* sp.	China	X. Zhao, 1 Mar. 2007	MF951195	MF951340	MF951553
P. heimii	–	**CBS 110682**^{T} = CPC 760	*Eucalyptus* sp.	Madagascar	P.W. Crous, 16 Apr. 1994	GQ852604	KF901671	MF951554
	–	CPC 11716	–	Brazil	A.C. Alfenas, Jan. 2004	KF901937	KF901612	KX348064
P. heimioides	*Mycosphaerella heimioides*	**CBS 111190**^{T} of *Mycosphaerella heimioides* = CMW 3046 = CPC 1312	*Eucalyptus* sp.	Indonesia	M.J. Wingfield, 12 Mar. 1996	GQ852607	KF901659	MF951555
P. irregulariramosa	*Mycosphaerella irregulariramosa*	**CBS 111211**^{T} = CPC 1362	*Eucalyptus saligna*	South Africa: Northern Province	M.J. Wingfield, Mar. 1996	KF902053	KX287297	KX348065
P. konae	*Mycosphaerella konae*	**CBS 111028**^{T} = CPC 2125	*Leucadendron* cv. ‘Safari Sunset’	USA: Hawaii	P.W. Crous & M.E. Palm, 17 Nov. 1998	KF902158	KF901798	KX348066
Pantospora guazumae	–	**CBS 130299**^{ET}	*Guazuma ulmifolia*	Mexico	J. Moore, 12 Feb. 2009	MF951196	NR_119971	MF951556
Paracercospora egenula	–	CBS 485.81	–	India	–	MF951197	GU269699	MF951558
	–	CBS 132030 = CPC 12537	*Solanum melongena*	Republic of Korea	H.-D. Shin, 26 Oct. 2005	GU253738	GU269698	MF951557
Paracercosporidium microsorum	*Mycosphaerella microsora*	CBS 254.67	*Tilia tomentosa*	Romania	O. Constantinescu, 16 Jun. 1965	MF951198	MF951341	MF951559
	Mycosphaerella microsora	CBS 552.71 = BUCM 2014	*Tilia platyphyllos*	Romania	O. Constantinescu, 8 Oct. 1969	MF951199	MF951342	MF951560
	Mycosphaerella microsora	CBS 100352	*Tilia cordata*	Netherlands	H.A. van der Aa, 19 Oct. 1997	EU167599	EU167599	MF951561
	Mycosphaerella microsora	CBS 101017	*Tilia cordata*	Netherlands	H.A. van der Aa, 1 Apr. 1998	MF951200	MF951343	MF951562
	Passalora microsora	CBS 123735	*Tilia* sp.	Czech Republic	G. Verkley, 16 Sep. 2008	KJ633266	KJ633262	MF951563
	Passalora microsora	**CBS 142176**^{ET} = CPC 15550	*Tilia cordata*	Ukraine	A. Akulov, 18 Jul. 2008	MF951201	MF951344	MF951564
P. tiliae	*Passalora* sp.	**CBS 112734**^{ET} = CPC 3952	*Tilia americana*	Canada	K.A. Seifert	MF951202	MF951345	MF951565
	Passalora sp.	CBS 115526 = CPC 3953	*Tilia americana*	Canada	K.A. Seifert	MF951203	MF951346	MF951566
Paramycosphaerella brachystegiae	–	**CBS 136436**^{T} = CPC 21136	*Brachystegia* sp.	Zimbabwe	J. Roux, 2 Apr. 2012	KF777230	KF777178	MF951567

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Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
P. intermedia	–	**CBS 114356**^{T} = NZFS 301.10 = CMW 7163 = CPC 10902	*Eucalyptus saligna*	New Zealand	L. Renney, 30 Jun. 1998	KF902026	KF901681	MF951569
	–	CBS 114415 = NZFS 301.13 = CMW 7164 = CPC 10922	*Eucalyptus saligna*	New Zealand	K. Dobbie, 12 Aug. 1998	KF902027	KF901682	MF951568
P. marksii	*Pseudocercospora epispermogonia*	CBS 110750 = CPC 822	*Eucalyptus grandis*	South Africa	G. Kemp, Oct. 1994	DQ303075	DQ267596	MF951573
	–	CBS 110963 = CPC 4632 = KS cl 42	*Musa* sp.	South Africa: Northern Province	K. Surridge	KF902054	KF901707	MF951570
	–	CBS 110964 = CPC 4633 = KS 41	*Musa* sp.	South Africa	K. Surridge	KF902055	KF901708	MF951571
	Mycosphaerella marksii	CBS 110920 = CPC 935	*Eucalyptus botryoides*	Australia: Victoria	A. Carnegie, 14 Oct. 1994	GU253694	GU269644	MF951572
Paramycosphaerella sp. A	*Mycosphaerella colombiensis*	CBS 118825 = CMW 10904	*Musa* cv. Grand Naine	South Africa	K. Surridge	MF951204	MF951347	MF951574
	Mycosphaerella colombiensis	CBS 118849 = CMW 10902	*Musa* cv. Williams	South Africa	K. Surridge	MF951205	MF951348	MF951575
Paramycosphaerella sp. B	*Colletogloeum* sp.	CBS 118968 = CUF2d	*Malus* sp.	USA: Illinois	J. Batzer, Sep. 2000	MF951206	MF951349	MF951576
	Colletogloeum sp.	CBS 125300 = NY1 3.2F1c	*Malus* sp.	USA: New York	D. Rosenberger , 30 Oct. 2005	MF951207	MF951350	MF951577
P. wachendorfiae	*Mycosphaerella wachendorfiae*	**CBS 129579**^{T} = CPC 18338	*Wachendorfia thyrsifolia*	South Africa	K.L. Crous & P.W. Crous, 2 May 2010	JF951163	JF951143	MF951578
Paramycovellosiella passaloroides	*Mycovellosiella passaloroides*	CPC 10770	*Amorpha fruticosa*	Republic of Korea	H.-D. Shin, 23 Oct. 2002	MF951209	MF951352	MF951580
	Mycovellosiella passaloroides	CPC 14694	*Amorpha fruticosa*	Republic of Korea	H.-D. Shin, 30 Oct. 2007	MF951208	MF951351	MF951579
Parapallidocercospora colombiensis	*Mycosphaerella colombiensis*	**CBS 110968**^{T} = CPC 1105	*Eucalyptus urophylla*	Colombia	M.J. Wingfield, May 1995	KF901969	AY752148	MF951581
P. thailandica	*Pallidocercospora thailandica*	CBS 120723 = CPC 13478	*Eucalyptus calmadulensis*	Thailand	W. Himaman, Oct. 2006	KF442667	MF951353	MF951582
Passalora bacilligera	–	**CBS 131547**^{ET} = CPC 19944	*Alnus glutinosa*	Poland	D. Karasinski, 20 Sep. 2011	MF951210	MF951356	MF951585
Phaeocercospora colophospermi	–	**CBS 132687**^{T} = CPC 19812	*Colophospermum mopane*	South Africa: Mpumalanga	P.W. Crous, 11 Jul. 2011	JX069854	JX069870	MF951586
P. juniperina	*Passalora juniperina*	CBS 142238 = CPC 11258	*Juniperus virginiana*	USA: North Carolina	C.S. Hodges, 1 Mar. 2004	MF951211	GU214667	MF951587
Phaeophloeospora eugeniae	–	CBS 142184 = CPC 15143	*Eugenia uniflora*	Brazil	A.C. Alfenas, 1 Mar. 2008	FJ493206	FJ493188	MF951594

Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
	–	CPC 15159	*Eugenia uniflora*	Brazil	A.C. Alfenas, 1 Apr. 2008	FJ493207	FJ493189	MF951595
Phaeoramularia capsicicola	–	CBS 156.62	*Capsicum annuum*	Italy	–	KJ633267	KJ633263	–
	Passalora sp.	CBS 113382 = C460	*Chromolaena odorata*	USA	M.J. Morris	MF951213	DQ676522	MF951596
	Passalora sp.	CBS 113384 = C499	*Chromolaena odorata*	Jamaica	M.J. Morris	MF951214	DQ676524	MF951597
P. gomphrenicola	*Phaeoramularia gomphrenicola*	**CBS 142182**^{ET} = CPC 23248 = COAD 570	*Pfaffia glomerata*	Brazil	R. Barreto, 29 Oct. 2012	MF951216	MF951359	MF951599
	Phaeoramularia gomphrenicola	CPC 23249 = COAD571	*Pfaffia glomerata*	Brazil	R. Barreto	MF951215	MF951358	MF951598
Phloeospora ulmi	–	CBS 613.81	*Ulmus* sp.	Austria	H.A. van der Aa, 21 Sep. 1981	GU253842	GU269825	MF951601
	–	CBS 101564	*Ulmus* sp.	Netherlands	H.A. van der Aa, 26 Aug. 1998	KF251703	KF251200	MF951602
	–	CBS 109835	*Ulmus* sp.	Netherlands	G. Verkley, 27 Aug. 2001	KF251704	KF251201	MF951600
Pleopassalora perplexa	*Passalora perplexa*	**CBS 116363**^{T} = CPC 11147	*Acacia crassicarpa*	Indonesia	M.J. Wingfield, Feb. 2004	MF951220	AY752162	MF951606
	Passalora perplexa	CBS 116364 = CPC 11150	*Acacia crassicarpa*	Indonesia	M.J. Wingfield, Feb. 2004	GU214459	AY752163	MF951607
	Passalora acaciae	CPC 11152	*Acacia crassicarpa*	Indonesia	M.J. Wingfield, 1 Mar. 2004	MF951217	MF951360	MF951603
	Passalora perplexa	CPC 12168	*Acacia* sp.	Indonesia	M.J. Wingfield, 1 May 2005	MF951218	MF951361	MF951604
	Passalora perplexa	CPC 12170	*Acacia* sp.	Indonesia	M.J. Wingfield, 1 May 2005	MF951219	MF951362	MF951605
“Passalora” sp. 1	*Passalora loranthicola*	CBS 122466 = X138	*Citrus* sp.	USA: Florida	R. C. Ploetz	MF951221	EU514280	MF951608
Pleuropassalora armatae	*Passalora armatae*	**CBS 125420**^{T} = CPC 15419	*Dalbergia armata*	South Africa: KwaZulu-Natal	A.R Wood, 28 May 2008	GU214456	GU214640	MF951609
	Passalora sp.	CPC 15420	*Dalbergia armata*	South Africa	A.R Wood, 28 May 2008	MF951222	MF951363	MF951610
	Passalora sp.	CPC 17084	*Dalbergia obovata*	South Africa	A.R. Wood, 15 Jun. 2009	MF951223	MF951364	MF951611
Pluripassalora bougainvilleae	*Passalora* sp.	CBS 142237 = CPC 19327	*Bougainvillea* sp.	Australia: Northern Territory	P.W. Crous, 30 Apr. 2011	MF951224	MF951365	MF951612
Polyphialoseptoria tabebuiae-serratifolia	–	**CBS 112650**^{T} = CPC 3944	*Tabebuia serratifolia*	Brazil	A.C. Alfenas, 1999	KF251716	KF251213	MF951613

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Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
P. terminaliae	–	**CBS 135106**^{T} = CPC 19611	*Terminalia catappa*	Brazil	R.W. Barreto, 18 May 2010	KF251717	KF251214	MF951615
	–	CBS 135475 = CPC 19487	*Terminalia catappa*	Brazil	R.W. Barreto, 18 May 2010	KF251718	KF251215	MF951614
Pseudocercospora catappae	–	MAFF 238312 = MUCC 1109	*Terminalia catappa*	Japan	T. Kobayashi & C. Nakashima, 18 Nov. 1999	MF951225	MF951366	MF951616
P. dingleyae	*Pseudocercosporella dingleyae*	**CBS 114645**^{T}	*Haloragis erecta*	New Zealand	C.F. Hill, 21 Jan. 2001	KX286997	KX287299	KX288454
P. convoluta	*Passalora convoluta*	**CBS 113377**^{T} = MJM 1533 = C488	*Chromolaena odorata*	Costa Rica	M.J. Morris, 15 Oct. 1997	MF951226	DQ676519	MF951617
P. cratevicola	*Prathigada cratevicola*	MUCC 1088	*Crataeva falcata*	Japan	S. Uematsu & C. Nakashima, –	MF951233	MF951372	–
P. eucalyptorum	–	**CBS 114866**^{T} = CPC 11	*Eucalyptus nitens*	South Africa: Western Cape	P.W. Crous, Aug. 1988	JQ739817	KF901720	MF951618
P. flavomarginata	–	CBS 124990 = CPC 13492	*Eucalyptus camaldulensis*	Thailand	W. Himaman, Oct. 2006	GU253817	GU269799	MF951619
P. fori	–	CBS 113286 = CMW 9096 = BOT 1290	*Eucalyptus* sp.	South Africa	J. Roux	KF902068	KF901721	KX348072
P. macadamiae	–	**CBS 133432**^{ET}	*Macadamia integrifolia*	Australia: Queensland	O.A. Akinsanmi, 12 Nov. 2011	KX286998	KX287300	KX288455
P. metrosideri	*Pseudocercosporella metrosideri*	CBS 114294	*Metrosideros excelsa*	New Zealand	C.F. Hill, 17 Oct. 2003	KX286999	KX287301	KX288456
P. nodosa	*Passalora nodosa*	**CBS 554.71**^{T}	*Psoralea bituminosa*	Romania	O. Constantinescu, 23 Sep. 1966	MF951227	MF951367	MF951620
P. norchiensis	*Pseudocercospora schizolobii*	**CBS 120738**^{T} = CPC 13049	*Eucalyptus* sp.	Italy	W. Gams, Apr. 2005	GU253780	GU269753	KX348073
P. pistacina	*Pseudocercospora pistacina*	CPC 23118	*Pistacia vera*	Turkey	K. Sarpkaya, 2010	KF442674	KF442647	KX348074
P. prunicola	–	CBS 132107 = CPC 14511	*Prunus yedoensis*	Republic of Korea	H.-D. Shin, 2 Oct. 2007	GU253723	GU269676	MF951621
P. punctata	–	CBS 132116 = CPC 14734	*Syzygium* sp.	Madagascar	P.W. Crous, 1 Oct. 2007	GU253791	GU269765	MF951622
P. robusta	–	**CBS 111175**^{T} = CPC 1269 = CMW 5151	*Eucalyptus robusta*	Malaysia	M.J. Wingfield, May 1995	KF442539	DQ303081	MF951623
P. sambucigena	–	**CBS 126000**^{ET} = CPC 14397	*Sambucus nigra*	Netherlands	P.W. Crous, 29 Aug. 2007	GU253823	GU269805	MF951624
Pseudocercospora sp. A	*Passalora robiniae*	CBS 277.39	*Robinia pseudoacacia*	USA	–	MF951230	MF951369	MF951627
Pseudocercospora sp. B	*Tandonella cubensis*	CBS 500.92 = INIFAT C92/43-3	*Bauhinia cumanensis*	Cuba	R.F. Castañeda	MF951232	MF951371	MF951629
Pseudocercospora sp. C	*Passalora bolleana*	CBS 541.71 = IMI 161111	*Ficus carica*	Romania	O. Constantinescu	MF951229	MF951368	MF951626

Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
	Passalora sp.	CPC 14819	*Ficus carica*	Republic of Korea	H.-D. Shin, 14 Nov. 2007	MF951231	MF951370	MF951628
Pseudocercospora sp. D	–	CBS 113386 = MJM 1511 = C469	*Chromolaena odorata*	Guatemala	M.J. Morris	MF951228	DQ676532	MF951625
Pseudocercospora sp. E	*Cercosporella* sp.	CPC 19537	*Eichhornia azurea*	Brazil	D.J. Soares, 30 Apr. 2005	KX287003	KX287304	KX288460
P. vitis	–	CBS 132012 = CPC 11595	*Vitis vinifera*	Republic of Korea	H.-D. Shin, 30 Sep. 2004	GU214483	GU269829	KX348076
P. zambiae	*Neopseudocercospora terminaliae*	**CBS 136423**^{T} = CPC 22686	*Terminalia* sp.	Zambia	M. van der Bank, 24 Feb. 2013	KF777228	KF777175	MF951630
Pseudocercosporella bakeri	–	CBS 119488	*Ipomoea indica*	New Zealand	C.F. Hill	KX287005	KX287306	KX288462
	–	**CBS 125685**^{ET} = CPC 17570	*Ipomoea aquatica*	Laos	P. Phengsintham, 8 Sep. 2009	KX287005	KX287306	KX288462
Pseudopericoniella levispora	*Periconiella levispora*	**CBS 873.73**^{T}	*Turpinia pomifera*	Sri Lanka	W. Gams, Jan. 1973	EU041837	EU041780	MF951633
Pseudopericoniella sp.	*Mycosphaerella rosigena*	CBS 330.51	*Rosa* sp.	Netherlands	–	GU214413	GU214632	MF951634
Pseudophaeophleospora atkinsonii	*Phaeophleospora atkinsonii*	CBS 124565 = ICMP 17860	*Hebe* sp.	New Zealand	–	MF951236	GU214643	MF951635
P. stonei	*Phaeophleospora stonei*	**CBS 120830**^{T} = CPC 13330	*Eucalyptus* sp.	Australia: Queensland	P.W. Crous & J. Stone, 19 Aug. 2006	FJ493210	EF394856	MF951636
Pseudozasmidium eucalypti	*Zasmidium eucalypti*	**CBS 121101**^{T} = CPC 13302	*Eucalyptus tereticornis*	Australia: Queensland	P.W. Crous, 26 Aug. 2006	KF901931	KF901606	MF951637
P. nabiacense	*Zasmidium nabiacense*	**CBS 125010**^{T} = CPC 12748	*Eucalyptus* sp.	Australia	A.J. Carnegie, 30 Nov. 2005	KF901933	GQ852841	MF951638
P. parkii	*Zasmidium parkii*	**CBS 387.92**^{T} = CPC 353	*Eucalyptus grandis*	Brazil	M.J. Wingfield, 24 Feb. 1990	GU214448	KF901785	–
P. vietnamense	*Paramycosphaerella vietnamensis*	**CBS 119974**^{T} = CMW 23441 = MUCC 66 = VTN1	*Eucalyptus grandis*	Vietnam	T.I. Burgess, 6 Jul. 2004	JF700944	DQ632675	MF951639
Ragnhildiana ampelopsidis	*Passalora ampelopsis*	CBS 249.67 = IMI 124968	*Parthenocissus tricuspidata*	Romania	–	MF951238	AY293063	MF951641
R. diffusa	*Sirosporium diffusum*	CBS 106.14	*Carya illinoinensis*	USA: Georgia	–, 29 Aug. 1911	MF951239	MF951375	MF951642
R. ferruginea	*Passalora ferruginea*	CBS 255.67 = IMI 124973	*Artemisia vulgaris*	Romania	–	MF951241	MF951377	MF951644
	Passalora ferruginea	CBS 546.71	*Artemisia vulgaris*	Romania	–	MF951242	MF951378	MF951645
	Mycovellosiella ferruginea	CPC 10075	*Artemisia sylvatica*	Republic of Korea	H.-D. Shin, 23 Oct. 2002	MF951240	MF951376	MF951643
R. gnaphaliaceae	*Passalora gnaphaliaceae*	CBS 142181 = CPC 12517	*Gnaphalium affine*	Republic of Korea	H.-D. Shin, May 2005	MF951243	MF951379	MF951646

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Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
R. perfoliati	*Passalora* sp.	CBS 113613 = MJM 1506 = C486	*Ageratina adenophora*	Guatemala	M.J. Morris	MF951246	DQ676525	MF951650
	Passalora assamensis	CBS 115119	–	New Zealand	–	MF951244	MF951380	MF951648
	Passalora ageratinae	**CBS 125419^{T}** = CPC 15365	*Ageratina adenophora*	South Africa: KwaZulu-Natal	A.R Wood, 28 May 2008	GU214453	GU214639	MF951647
	Passalora perfoliata	CBS 142180 = CPC 17321	*Chromolaena* sp.	Laos	P. Pheng, 17 Jun. 2006	MF951245	MF951381	MF951649
	Phaeoramularia sp.	CPC 15366	*Ageratina adenophora*	South Africa: KwaZulu-Natal	A.R Wood, 28 May 2008	MF951247	MF951382	MF951651
R. pseudotithoniae	*Passalora pseudotithoniae*	**CBS 136442^{T}** = CPC 21688	*Tithonia diversifolia*	Thailand	P.W. Crous, 5 Nov. 2012	KF777231	KF777179	MF951652
Ramularia carneola	–	CBS 108975	*Scrophularia nodosa*	Netherlands	G. Verkley, 22 Jun. 2000	KX287048	KX287348	KX288507
R. cynarae	–	**CBS 128912^{T}** = CPC 18426	*Cynara cardunculus*	USA: California	S.T Koike, 10 Aug. 2010	KX287096	HQ728117	KX288554
R. endophylla	*Mycosphaerella punctiformis*	**CBS 113265^{ET}**	*Quercus robur*	Netherlands	G. Verkley, Apr. 2003	AY490776	AY490763	KP894673
R. hydrangeae-macrophyllae	–	**CBS 122273^{T}**	*Hydrangea macrophylla*	New Zealand	C.F. Hill, 2 Jul. 2007	KX287135	KX287433	KX288592
R. nyssicola	–	**CBS 127665^{ET}** = AR 4656 = DM 2	*Nyssa ogeche* × *sylvatica*	USA: Maryland	R. Olsen, 18 Jun. 2009	KJ504724	KJ504765	KJ504636
R. plurivora	–	**CBS 118743^{T}** = CPC 12207	Human bone marrow	Netherlands	–	KJ504739	KJ504780	KJ504651
R. pusilla	–	**CBS 124973^{ET}** = RoKi 3143	*Poa annua*	Germany	R. Kirschner, 25 Feb. 2008	KP894141	KP894248	KP894687
R. stellariicola	*Pseudocercosporella stellariicola*	**CBS 130592^{T}** = CPC 11297 = KACC 42363	*Stellaria aquatica*	Republic of Korea	H.-D. Shin & M.J. Park, 3 May 2006	GU214693	GU214693	KX288675
R. stellenboschensis	–	**CBS 130600^{T}** = CPC 18294	*Protea* sp.	South Africa	P.W. Crous, 6 May 2010	JN712566	JN712499	KX288676
Ramulariopsis gossypii	–	**CBS 141099^{ET}** = CPC 25909 = X30	*Gossypium* sp.	Brazil	–	KX287243	KX287540	KX288702
R. pseudoglycines	–	**CBS 141100^{T}** = CPC 18242	*Gossypium* sp.	Brazil	–, 2000	KX287246	KX287543	KX288705
	–	CPC 18241	*Gossypium* sp.	Brazil	–	KX287245	KX287542	KX288704
	–	CPC 20036	*Gossypium barbadense*	Togo	M. Piatek	KX287244	KX287541	KX288703
Ramulispora sorghi	*Cercospora sorghi*	CBS 110578 = CPC 905	*Sorghum bicolor*	South Africa: KwaZulu-Natal	D. Nowell, Mar. 1995	GQ852653	MF951383	MF951653
	Cercospora sorghi	CBS 111032 = CPC 899 = IMI 153076	*Sorghum bicolor*	South Africa: KwaZulu-Natal	D. Nowell, Mar. 1995	MF951248	MF951384	MF951654
	Cercospora sorghi	CBS 115522 = CPC 902	*Sorghum bicolor*	South Africa: KwaZulu-Natal	D. Nowell, Mar. 1995	MF951249	MF951385	MF951655
R. sorghiphila	*Ramulispora sorghi*	**CBS 255.82^{T}** = IMI 153077	–	India	–, Oct. 1969	MF951250	MF951386	MF951656

Table 1. (Continued).

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Rhachisphaerella mozambica	*Mycosphaerella mozambica*	**CBS 122464**^{T} = X34	*Musa acuminata*	Mozambique	A. Viljoen, 2003	MF951237	EU514257	MF951640
Rosisphaerella rosicola	*Passalora rosicola*	CBS 138.35 = ATCC 52313	–	USA	–	MF951252	MF951388	MF951658
	Passalora rosicola	CBS 142183 = CPC 12548	*Rosa hybrid*	USA: North Carolina	C.S. Hodges, 2005	MF951251	MF951387	MF951657
Ruptoseptoria unedonis	*Ruptoseptoria unedonis*	CBS 755.70	*Arbutus unedo*	Croatia	J.A. von Arx, Jul. 1970	KF251732	KF251229	MF951659
Scolecostigmina mangiferae	*Scolecostigmina mangiferae*	**CBS 125467**^{NT} = CPC 17351	*Mangifera indica*	Australia	P.W. Crous & R.G. Shivas, 10 Aug. 2009	GU253877	GU269870	MF951660
Septoria chrysanthemella	–	CBS 128617 = KACC 43086 = SMKC 22860	*Chrysanthemum morifolium*	Republic of Korea	–	KF251882	KF251378	MF951661
S. cucurbitacearum	–	CBS 178.77	*Cucurbita maxima*	New Zealand	–	KF251903	KF251399	MF951662
S. lycopersici	–	CBS 128654 = KACC 42519 = SMKC 22002	*Lycopersicon esculentum*	Republic of Korea	–	KF251966	KF251462	KX348091
S. protearum	–	CBS 135477 = CPC 19675	*Zantedeschia aethiopica*	South Africa: Mpumalanga	P.W. Crous, 15 Jul. 2011	KF252029	KF251524	MF951663
	–	CPC 19691	*Zantedeschia aethiopica*	South Africa	P.W. Crous, 15 Jul. 2011	KF252030	KF251525	MF951664
Septoria sp. A	–	CBS 135472 = CPC 19304	*Vigna unguiculata* subsp. *sesquipedalis*	Austria	P.W. Crous, Apr. 2011	KF252063	KF251558	MF951665
Septoria sp. B	–	CBS 135474 = CPC 19485	*Conyza canadensis*	Brazil	R.W. Barreto	KF252064	KF251559	MF951666
Septoria sp. C	–	CBS 135479 = CPC 19793	*Syzygium cordatum*	South Africa	P.W. Crous, 16 Jul. 2011	KF252066	KF251561	MF951667
S. urticae	–	**CBS 102375**^{ET}	*Urtica dioica*	Netherlands	H.A. van der Aa & G. Verkley, 14 Oct. 1999	JN940675	KF251583	MF951668
"*Sirosporium*" *celtidis*	–	CBS 158.25	*Celtis australis*	Algeria	C. Killian, Nov. 1923	MF951253	MF951389	MF951669
	–	CBS 238.48	–	Portugal	–	MF951254	MF951390	MF951670
	–	CBS 289.50	*Celtis australis*	Italy	V. Mezzetti, Aug. 1949	MF951255	MF951391	MF951671
Sonderhenia eucalypticola	–	CBS 112502 = CPC 3749	*Eucalyptus* sp.	Portugal: Madeira	–	KF902019	KF901677	MF951672
S. eucalyptorum	*Mycosphaerella swartii*	CBS 120220	*Eucalyptus coccifera*	Australia: Tasmania	C. Mohammed, Jan. 2006	DQ923536	DQ923536	MF951673
Sphaerulina aceris	*Sphaerulina aceris*	CBS 652.85	*Acer pseudoplatanus*	Netherlands	H.A. van der Aa, 23 Jul. 1985	MF951258	MF951394	MF951676
S. berberidis	*Mycosphaerella berberidis*	CBS 324.52	*Berberis vulgaris*	Switzerland	E. Müller, 2 Jun. 1951	KF252106	KF251601	KX348093
S. betulae	–	CBS 128597 = KACC 43119 = SMKC 23059	*Betula schmidtii*	Republic of Korea	–	KF252109	KF251604	KX348094
S. chaenomelis	*Pseudocercosporella chaenomelis*	CBS 131897 = CPC 14795	*Chaenomeles speciosa*	Republic of Korea	H.-D. Shin, 14 Nov. 2007	GU253834	GU269817	KX288706

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	Pseudocercosporella chaenomelis	**CBS 132131**$^{\text{ET}}$ $^{\text{of}}$ $^{\textit{Pseudocercosporella chaenomelis}}$ = MUCC 1510	*Chaenomeles sinensis*	Japan	C. Nakashima, 29 Oct 2011	MF951259	JQ793663	MF951677
S. gei	–	CBS 128632 = KACC 44051 = SMKC 23686	*Geum japonicum*	Republic of Korea	–	KF252120	KF251615	KX348095
S. koreana	*Sphaerulina viciae*	**CBS 131898**$^{\text{T}}$ $^{\text{of}}$ $^{\textit{Sphaerulina viciae}}$ = CPC 11415	*Vicia amurensis*	Republic of Korea	H.-D. Shin	KF252144	KF251639	KX348096
	Pseudocercosporella koreana	**CBS 135462**$^{\text{T}}$ $^{\text{of}}$ $^{\textit{Pseudocercosporella koreana}}$ = CPC 11414	*Vicia amurensis*	Republic of Korea	H.-D. Shin	GU214683	GU269852	KX288707
S. populicola	–	CBS 100042	*Populus trichocarpa*	USA: Washington	–	KF252131	KF251626	MF951678
S. quercicola	–	CBS 115016	*Quercus robur*	Netherlands	–	KF252133	KF251628	MF951679
S. tirolensis	–	**CBS 109018**$^{\text{T}}$	*Rubus idaeus*	Austria	G. Verkley	KF252143	KF251638	MF951680
"Mycosphaerella" grossulariae	*Mycosphaerella grossulariae*	CBS 235.37	*Ribes nigrum*	Netherlands	M.S.J. Ledeboer	MF951256	MF951392	MF951674
"Mycosphaerella" harthensis	*Mycosphaerella harthensis*	CBS 325.52	*Betula* sp.	Switzerland	–	MF951257	MF951393	MF951675
Stromatoseptoria castaneicola	–	CBS 102322	*Castanea sativa*	Netherlands	G. Verkley, 29 Aug. 1999	KF251774	KF251271	MF951681
	–	CBS 102377	*Castanea sativa*	Netherlands	G. Verkley, 9 Sep. 1999	KF251775	KF251272	MF951682
Sultanimyces vitiphyllus	*Asperisporium vitiphyllum*	CBS 206.48	*Vitis* sp.	South Africa	S.J. du Plessis, 1948	MF951260	MF951395	MF951683
Trochophora fasciculata	*Trochophora simplex*	CBS 124744 = SMKC 21713	*Daphniphyllum macropodum*	Republic of Korea	H.-D. Shin, 29 Oct. 2005	GU253880	GU269872	MF951684
Uwemyces elaeidis	–	CPUwZC-01	*Elaeis oleifera*	Colombia	G.A. Sarria, May 2013	KX228356	KX22829	KX228371
Virosphaerella irregularis	*Mycosphaerella irregulari*	**CBS 123242**$^{\text{T}}$ = CPC 15408	*Eucalyptus* sp.	Thailand	R. Cheewangkoon, Jul. 2007	KF901769	KF902126	MF951685
V. pseudomarksii	*Mycosphaerella pseudomarksii*	**CBS 123241**$^{\text{T}}$ = CPC 15410	*Eucalyptus* sp.	Thailand	R. Cheewangkoon, Jun. 2007	KF902127	KF901770	MF951686
Xenomycosphaerella elongata	–	**CBS 120735**$^{\text{T}}$ = CPC 13378	*Eucalyptus calmadulensis* × *urophylla*	Venezuela	M.J. Wingfield, Oct. 2006	JF700942	EF394833	MF951687
Xenoramularia arxii		**CBS 342.49**$^{\text{T}}$	*Acorus calamus*	Netherlands	J.A. von Arx, 5 Sep. 1949	KX287258	KX287552	KX288720
X. neerlandica	–	CBS 113615	*Sparganium ramosum*	Netherlands	–	KX287259	KX287553	KX288721
	–	**CBS 141101**$^{\text{T}}$ = CPC 18377	*Iris pseudacorus*	Netherlands	P.W. Crous, 26 Jun. 2010	KX287260	KX287554	KX288722
X. polygonicola	–	**CBS 141102**$^{\text{T}}$ = CPC 10852	*Polygonum* sp.	Republic of Korea	H.-D. Shin, 20 Sep. 2003	GU214695	GU214695	KX288723
	–	CPC 10853	*Polygonum* sp.	Republic of Korea	H.-D. Shin, 20 Sep. 2003	KX287262	KX287555	KX288724

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Xenosonderhenia eucalypti	–	**CBS 138858**^{T} = CPC 24247	*Eucalyptus urophylla*	Mozambique	M.J. Wingfield, 2 Feb. 2014	KP004485	KP004457	MF951688
Xenosonderhenioides indonesiana	*Passalora* sp.	**CBS 142239**^{T} = CPC 15066	*Eucalyptus* sp.	Indonesia	M.J. Wingfield, 26 Mar. 2008	MF951261	MF951396	MF951689
Zasmidium angulare	–	**CBS 132094**^{T} = CPC 19042 = GA2 27B1a	*Malus domestica*	USA: Georgia	M. Wheeler, Aug. 2005	JQ622096	JQ622088	MF951690
Z. anthuriicola	–	**CBS 118742**^{T}	*Anthurium* sp.	Thailand	C.F. Hill, 3 Aug. 2005	FJ839662	FJ839626	MF951691
Z. arcuatum	*Periconiella arcuata*	**CBS 113477**^{T}	*Ischyrolepsis subverticillata*	South Africa: Western Cape	S. Lee, 1 May 2001	EU041836	EU041779	MF951692
Z. aucklandicum	*Stenella aucklandica*	CPC 13569	*Geniostoma rupestre*	New Zealand	C.F. Hill, 15 Oct. 2005	MF951280	MF951409	MF951733
Z. biverticillatum	*Ramichloridium biverticillatum*	CBS 335.36	*Musa sapientum*	–	–	EU041853	EU041796	–
Z. cellare	–	**CBS 146.36**^{NT} = ATCC 36951 = IFO 4862 = IMI 044943 = LCP 52.402 = LSHB BB274 = MUCL 10089	Wall in wine cellar	–	–	EU041878	EU041821	MF951693
	–	CBS 892.85	Wall in wine cellar	Germany	M. Schlag, Aug. 1985	MF951262	MF951397	KT356875
Z. cerophillum	*Ramichloridium cerophilum*	**CBS 103.59**$^{\text{T of } \textit{Acrotheca cerophila}}$ = MUCL 10034	*Sasa* sp.	Japan	–, May 1955	GU214485	EU041798	MF951694
Z. citri-griseum	–	CBS 122455 = CPC 15289 = X126	*Citrus* sp.	USA: Florida	R.C. Ploetz, 2003	KF902151	KF901792	MF951695
	–	CPC 13467	*Eucalyptus* sp.	Thailand	W. Himaman, 2006	KF251729	KF251226	MF951697
	–	CPC 15291	*Citrus* sp.	USA: Florida	R.C. Ploetz, 2003	KF902152	KF901793	MF951696
Z. daviesiae	*Verrucisporota daviesiae*	CBS 116002 = VPRI 31767	*Daviesia latifolia*	Australia: Victoria	V. & R. Beilharz, 30 Dec. 2003	FJ839669	FJ839633	MF951698
Z. elaeocarpi	*Stenella* sp.	**CBS 142187**^{T} = CPC 16642	*Elaeocarpus kirtonii*	Australia: New South Wales	B. Summerell, 1 Mar. 2009	MF951263	MF951398	MF951699
	Stenella sp.	CPC 16640	*Elaeocarpus kirtonii*	Australia: New South Wales	B. Summerell, 1 Mar. 2009	MF951264	MF951399	MF951700
Z. eucalypticola	*Stenella* sp.	**CBS 142186**^{T} = CPC 15149	*Eucalyptus* sp.	Brazil	A.C. Alfenas, 1 Mar. 2008	MF951265	MF951400	MF951701
Z. eucalyptorum	–	**CBS 118500**^{T} = CPC 11174	*Eucalyptus urophylla*	Indonesia: Sumatra	M.J. Wingfield, Mar. 2004	MF951266	KF901652	MF951702
Z. fructicola	–	**CBS 139625**^{T} = CPC 24487 = ZJUM 80	*Citrus reticulata*	China	X.H. Wang, Jan. 2010	KP895922	KP896052	MF951703
Z. fructigenum	–	**CBS 139626**^{T} = CPC 24471 = ZJUM 36	*Citrus paradisi* × *Citrus* sp.	China	L. Zhu, Nov. 2009	KP895926	KP896056	MF951704
Z. grevilleae	*Verrucisporota grevilleae*	**CBS 124107**^{T} = CPC 14761	*Grevillea decurrens*	Australia: Northern Territory	B. Summerell, 22 Sep. 2007	FJ839670	FJ839634	MF951705

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Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
Z. gupoyu	*Parastenella gupoyu*	CBS 122099 = RoKi 3022	*Alocasia odora*	Taiwan	R. Kirschner & C.-J. Chen, 31 Mar. 2007	MF951267	MF951401	MF951706
Z. hakeae	*Stenella* sp.	**CBS 142185**^{T} = CPC 15577	*Hakea undulata*	Australia: Western Australia	A.R. Wood, 2 Aug. 2008	MF951268	MF951402	MF951707
	Stenella sp.	CPC 15583	*Hakea undulata*	Australia: Western Australia	A.R. Wood, 2 Aug. 2008	MF951269	MF951403	MF951708
	Stenella sp.	CPC 17213	Leaves in shop (Loma tea)	Australia: Queensland	P.W. Crous, 13 Jul. 2009	MF951270	MF951404	MF951709
Z. indonesianum	–	**CBS 139627**^{T} = CPC 15300	*Citrus* sp.	Indonesia	M. Arzanlou, 2004	KF902086	KF901739	MF951710
Z. iteae	*Stenella iteae*	**CBS 113094**^{T} = RoKi 1279	*Itea parvifolia*	Taiwan	R. Kirschner & C.-J. Chen, 2 Jun. 2002	MF951271	MF951405	MF951711
Z. lonicericola	–	**CBS 125008**^{ET} of *Cladosporium lonicericola* = CPC 11671	*Lonicera japonica*	Republic of Korea	H.-D. Shin, 30 Oct. 2004	KF251787	KF251283	MF951712
Z. musae	*Stenella musae*	CBS 121384 = CIRAD 41 = X877	*Musa* sp.	France: Martinique	–	MF951272	EU514292	MF951713
	Stenella musae	CBS 122476 = X47	*Musa* sp.	Netherlands Antilles: Windward Islands	E. Reid, 2003	MF951273	EU514288	MF951714
	Stenella musae	CBS 122478 = X70	*Musa* sp.	Netherlands Antilles: Windward Islands	E. Reid, 2003	MF951274	EU514290	MF951715
Z. musae-banksii	*Ramichloridium australiensis*	**CBS 121710**^{T} = X1100	*Musa banksii*	Australia: Queensland	P.W. Crous & B. Summerell, Aug. 2006	EU041852	EU041795	MF951716
Z. musicola	*Stenella musicola*	**CBS 122479**^{T} = X1019	*Musa* cv. Grand Nain	India	I.W. Buddenhagen, 23 Feb. 2005	MF951275	EU514294	MF951717
Z. musigenum	*Ramichloridium musae*	CBS 190.63 = MUCL 9557	*Musa sapientum*	–	–	EU041857	EU041800	MF951718
Z. nocoxi	–	**CBS 125009**^{T} = CPC 14044	Twig debris of unknown host	USA: Virginia	P.W. Crous, 14 May 2007	KF251788	KF251284	MF951719
Z. pitospori	*Stenella pittospori*	CBS 122274 = ICMP 17098	*Pittosporum tenuifolium*	New Zealand	C.F. Hill, 15 Jul. 2007	MF951276	MF951406	MF951720
Z. proteacearum	*Verrucisporota proteacearum*	CBS 116003 = VPRI 31812	*Grevillea* sp.	Australia: Queensland	J.L. Alcorn, 3 Feb. 2004	FJ839671	FJ839635	MF951721
Z. pseudoparkii	–	CBS 110988 = CPC 1090	*Eucalyptus grandis*	Colombia	M.J. Wingfield, May 1995	KF901975	DQ303021	MF951722
	–	**CBS 110999**^{T} = CPC 1087	*Eucalyptus* sp.	Colombia	M.J. Wingfield, 1995	JF700965	DQ303023	MF951723
Z. pseudotsugae	*Rasutoria pseudotsugae*	rapssd	*Pseudotsuga menziesii*	USA: Oregon	–	EF114704	EF114687	–
Z. pseudovespa	*Mycosphaerella pseudovespa*	**CBS 121159**^{T} = AC0466	*Eucalyptus biturbinata*	Australia: New South Wales	A.J. Carnegie, 14 Apr. 2005	KF901836	MF951407	MF951724
Z. queenslandicum	*Stenella queenslandica*	**CBS 122475**^{T} = X1084	*Musa banksii*	Australia: Queensland	P.W. Crous, 1 Aug. 2006	MF951277	EU514295	MF951725

Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
Z. scaevolicola	–	**CBS 127009**^{T} = CPC 17344	*Scaevola taccada*	Australia: Queensland	R.G. Shivas & P.W. Crous, 8 Aug. 2009	KF251789	KF251285	MF951726
Z. schini	*Stenella* sp.	**CBS 142188**^{T} = CPC 19516	*Schinus terebinthifolius*	Brazil	A.B.V. Faria, 1 Sep. 2005	MF951278	MF951408	MF951727
Zasmidium sp.	*Mycosphaerella* sp.	CBS 118494 = CPC 11004	*Eucalyptus* sp.	Colombia	M.J. Wingfield, 2004	MF951279	DQ303039	MF951728
Z. strelitziae	*Ramichloridium strelitziae*	**CBS 121711**^{T} = X1029	*Strelitzia* sp.	South Africa: KwaZulu-Natal	W. Gams & H. Glen, 5 Feb. 2005	EU041860	EU041803	MF951729
Z. syzygii	–	**CBS 133580**^{T} = CPC 19792	*Syzigium cordatum*	South Africa: Mpumalanga	P.W. Crous, M.K. Crous, M. Crous & K.L. Crous, 16 Jul. 2011	KC005798	KC005777	MF951730
Z. tsugae	*Rasutoria tsugae*	ratstk	*Tsuga heterophylla*	USA: Oregon	–	EF114705	EF114688	–
Z. velutinum	*Periconiella velutina*	**CBS 101948**^{ET} = CPC 2262	*Brabejum stellatifolium*	South Africa	J.E. Taylor, 21 Jan. 1999	EU041838	EU041781	MF951731
Z. xenoparkii	*Stenella xenoparkii*	**CBS 111185**^{T} = CPC 1300	*Eucalyptus grandis*	Indonesia	M.J. Wingfield, Mar. 1996	JF700966	DQ303028	MF951732
Zymoseptoria brevis	–	**CBS 128853**^{T} = CPC 18106	*Phalaris minor*	Iran	M. Razavi	JQ739833	JF700867	KX348109
Z. halophila	–	**CBS 128854**^{T} = CPC 18105 = IRAN1483C	*Hordeum glaucum*	Iran	M. Razavi, 25 Apr. 2007	KF252150	KF251645	KX348110
Z. passerini	–	**CBS 120382**^{ET}	*Hordeum vulgare*	USA: North Dakota	S. Goodwin	JQ739843	JF700877	KP894763
Z. tritici	–	**CBS 115943**^{ET} = IPO 323	*Triticum aestivum*	Netherlands	R. Daamen, 6 May 1981	GU214436	AF181692	KX348112
Phaeothecoidiellaceae								
Exopassalora sp.	*Passalora* sp.	CBS 118964 = GTF1a	*Malus* sp.	USA: Illinois	J. Batzer, Sep. 2000	MF951119	MF951284	MF951420
E. zambiae	*Passalora zambiae*	**CBS 112971**^{T} = CMW 14782 = CPC 1227	*Eucalyptus globulus*	Zambia	T. Coutinho, 21 Aug. 1995	EU019273	AY725523	MF951421
Houjia pomigena	–	**CBS 125224**^{T} = CPC 16109 = CMG UIF2b	*Malus* sp.	USA: Illinois	M. Gleason, Sep. 2000	MF951120	MF951285	MF951422
Phaeothecoidiella missouriensis	–	**CBS 125222**^{T} = CPC 16116 = CMG AHE7c	*Malus* sp.	USA: Missouri	M. Gleason, Sep. 2000	MF951121	MF951286	MF951423
Sporidesmajora pennsylvaniensis	–	**CBS 125229**^{T} = CPC 16112 = CMG PA1-9F1a	*Malus* sp.	USA: Pennsylvania	J.W. Travis, Sep. 2005	MF951122	MF951287	MF951424
Schizothyriaceae								
Schizothyrium pomi	*Schizothyrium pomi*	CBS 228.57	–	Italy	–	EF134947	EF134947	MF951734
	Schizothyrium pomi	CBS 486.50	*Polygonum sachalinense*	Netherlands	–	EF134948	EF134948	MF951735
Teratosphaeriaceae								
Acrodontium crateriforme	*Chloridium crateriforme*	**CBS 144.33**^{T} = ATCC 15679 = MUCL 15748 = MUCL 8978	Associated with *Tuberculina maxima*	Netherlands	–	KX286952	MF951410	KX288399
Batcheloromyces proteae	–	**CBS 110696**^{ET} = CPC 1518 = CPC 18701	*Protea cynaroides*	South Africa: Western Cape	L. Viljoen, 30 Aug. 1996	EU019247	JF746163	MF951736

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Table 1. (Continued).

Family and Current name	Previous name (if different)	Culture accession number(s)[1,2]	Substrate	Country	Collector, Collection date	LSU[3]	ITS[4]	*rpb2*[5]
B. sedgefieldii	–	**CBS 112119^T** = CPC 3026 = JT 851	*Protea repens*	South Africa: Western Cape	J.E. Taylor, 10 Aug. 1999	KF937222	EU707893	MF951737
Myrtapenidiella corymbia	*Penidiella corymbia*	**CBS 124769^T** = CPC 14640	*Corymbia foelscheana*	Australia: Northern Territory	B.A. Summerell, 22 Sep. 2007	KF901838	GQ303286	MF951738
Parapenidiella pseudotasmaniensis	–	**CBS 124991^T** = CPC 12400	*Eucalyptus globulus*	Australia: Victoria	I.W. Smith, Sep. 2005	KF901844	KF901522	KX348067
P. tasmaniensis	–	**CBS 111687^T** = CMW 14780 = CPC 1555	*Eucalyptus nitens*	Australia: Tasmania	M.J. Wingfield, 21 Nov. 1996	GU214452	KF901521	MF951739
Pseudoteratosphaeria flexuosa	*Mycosphaerella flexuosa*	CBS 110743 = CPC 673	*Eucalyptus globulus*	Colombia	M.J. Wingfield, 6 Jul. 1993	KF902098	DQ302955	MF951740
Readeriella nontingens	*Readeriella nontingens*	CPC 14444	*Eucalyptus oblonga*	Australia: New South Wales	B. Summerell, 23 Sep. 2007	GQ852663	GQ852786	MF951741
Stenella araguata	–	**CBS 105.75^T** of *Cladosporium castellanii*	Man, tinea nigra	Venezuela	–	EU019250	EU019250	MF951742
Teratosphaeria stellenboschiana	–	CBS 125215 = CPC 13764	*Eucalyptus punctata*	South Africa: Gauteng	P.W. Crous, 28 Feb. 2007	KF937247	KF901733	MF951743

[1] ATCC: American Type Culture Collection, Virginia, USA; BUCM: Mycological Herbarium of the Institute of Biology, Bucharest, Romania; CBS: Culture collection of the Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands; CCTU: Culture Collection of Tabriz University, Tabriz, East Azarbaijan, Iran; CMG: Personal collection of Mark Gleason, Department of Plant Pathology and Microbiology, Iowa State University, Ames, Iowa, USA; CMW: Culture Collection of the Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria, South Africa; COAD: Coleção Octávio de Almeida Drumond (COAD), housed at the Universidade Federal de Viçosa, Viçosa, Brazil; CPC: Culture collection of Pedro Crous, housed at the Westerdijk Institute; DAOM: Plant Research Institute, Department of Agriculture (Mycology), Ottawa, Canada; DSM: Deutsche Sammlung von Mikrorrganismen und Zellkulturen GmbH, Braunschweig, Germany; HJS: Personal culture collection of Hans-Josef Schroers, Agricultural institute of Slovenia, Ljubljana, Slovenia; ICMP = PDDCC: International Collection of Micro-organisms from Plants, Landcare Research, Private Bag 92170, Auckland, New Zealand; IFO: Institute for Fermentation, Osaka, Japan; IMI: International Mycological Institute, CABI-Bioscience, Egham, Bakeham Lane, United Kingdom; INIFAT: Alexander Humboldt Institute for Basic Research in Tropical Agriculture, Ciudad de La Habana, Cuba; JCM: Japan Collection of Microorganism, RIKEN BioResource Center, Japan; KACC: Korean Agricultural Culture Collection, National Institute of Agricultural Biotechnology, Rural Development Administration, Suwon, Republic of Korea; LCP: Laboratory of Cryptogamy, National Museum of Natural History, Paris, France; LSHB: London School of Hygiene & Tropical Medicine, London, UK; MAFF: Ministry of Agriculture, Forestry and Fisheries, Tsukuba, Ibaraki, Japan; MPFN: Culture collection at the Laboratoire de Pathologie Forestière, INRA, Centre de Recherches de Nancy, 54280 Champenoux, France; MUCC (in TSU): Culture Collection, Laboratory of Plant Pathology, Mie University, Tsu, Mie Prefecture, Japan; MUCL: Université Catholique de Louvain, Louvain-la-Neuve, Belgium; MUMH: Mycological Herbarium in TSU, Mie University, Tsu, Mie, Japan; QM: Quartermaster Research and Development Center, U.S. Army, Massachusetts, USA; RoKI: Personal culture collection of Roland Kirschner, Department of Life Sciences, National Central University, Taoyuan City, Taiwan; RWB: Personal collection of Robert Barreto, Departmento de Fitopatologia, Universidade Federal de Viçosa, Viçosa, Brazil; SMKC: Culture collection of the Division of Environmental Science and Ecological Engineering, Korea University, Republic of Korea; VKM: All-Russian Collection of Microorganisms, Russian Academy of Sciences, Institute of Biochemistry and Physiology of Microorganisms, 142292 Pushchino, Moscow Region, Russia; X: Personal collection of Mahdi Arzanlou, Tabriz University, Tabriz, East Azarbaijan, Iran; ZJUM: Culture collection at Zhejiang University, China.

[2] Status of the strains: (T) ex-type, (ET) ex-epitype, (NT) ex-neotype, (IT) ex-isotype.

[3] Genbank accession numbers for LSU: large subunit (28S) of the nrRNA gene operon.

[4] Genbank accession numbers for ITS: internal transcribed spacers and intervening 5.8S nrDNA.

[5] Genbank accession numbers for *rpb2*: partial RNA polymerase II second largest subunit gene; "–" represents a DNA sequence that was not available.

Table 2. Details of primers used for amplification and sequencing in this study.

Locus[1]	Primer Name	Primer sequence (5′→3′)	Annealing temperature (°C)	Orientation	Reference
ITS	V9G	TTA CGT CCC TGC CCT TTG TA	52	Forward	de Hoog & Gerrits van den Ende (1998)
	ITS4	TCC TCC GCT TAT TGA TAT GC	52	Reverse	White *et al.* (1990)
LSU	LSU1Fd	GRA TCA GGT AGG RAT ACC CG	52	Forward	Crous *et al.* (2009c)
	LR5	TCC TGA GGG AAA CTT CG	52	Reverse	Vilgalys & Hester (1990)
rpb2	fRPB2-5F	GAY GAY MGW GAT CAY TTY GG	60→58→54	Forward	Liu *et al.* (1999)
	RPB2-5F2	GGG GWG AYC AGA AGA AGG C	60→58→54	Forward	Sung *et al.* (2007)
	Rpb2-F1	GGT GTC AGT CAR GTG YTG AA	60→58→54	Forward	Videira *et al.* (2015a)
	Rpb2-F4	GAY YTB GCI GGI CCI YTI ATG GC	60→58→54	Forward	Videira *et al.* (2016)
	Rpb2-F5	GCN ACI GGI AAY TGG GG	60→58→54	Forward	This study
	Rpb2-F6	AAR GCI GGT GTI AGY CAR GT	60→58→54	Forward	This study
	fRPB2-7cR	CCC ATR GCT TGY TTR CCC AT	60→58→54	Reverse	Liu *et al.* (1999)
	Rpb2-R1	TCC TCN GGV GTC ATG ATR ATC AT	60→58→54	Reverse	Videira *et al.* (2015a)
	Rpb2-R3	ATC ATN GMN GGR TGR ATY TC	60→58→54	Reverse	This study

[1] ITS: internal transcribed spacers and intervening 5.8S nrDNA; LSU: large subunit (28S) of the nrRNA gene operon; *rpb2* partial RNA polymerase II second largest subunit gene.

Zasmidium biverticillatum (CBS 335.36) and *Zasmidium parki* (CBS 387.92), which were missing the *rpb2* sequence; in those cases, the missing sequences were treated as missing data in the alignments.

The phylogenetic methods used in this study included a Bayesian analysis performed with MrBayes v. 3.2 (Ronquist *et al.* 2012), a Maximum-Likelihood analysis performed with RAxML v. 7.2.6 (Stamatakis & Alachiotis 2010) and a Parsimony analysis performed with PAUP v. 4.0b10 (Swofford 2003). The phylogenetic analyses were individually applied to four datasets: dataset 1 consisted of a concatenated alignment of LSU and *rpb2* sequences from representative strains of most genera currently known to belong in the *Mycosphaerellaceae*, and from closely related families; datasets 2 to 4 were based on three major clades observed in dataset 1 and consisted of concatenated alignments of LSU, *rpb2* and ITS sequences. MrModeltest v. 2.2 (Nylander 2004) was used to determine the best nucleotide substitution model settings for each data partition in order to perform a model-optimised **Bayesian** phylogenetic reconstruction. The Markov Chain Monte Carlo (MCMC) analysis of four chains started in parallel from a random tree topology, the heat parameter was set at 0.15 and trees were saved every 200 generations until the average standard deviation of split frequencies reached 0.01 (stop value). Burn-in was set to 25 % after which the likelihood values were stationary. The **Maximum Likelihood** phylogenies performed with RAxML executed 1 000 rapid bootstrap inferences using the GAMMA model and the GTR substitution matrix and produced the best-score maximum-likelihood tree. In the **Maximum Parsimony** analysis, alignment gaps were treated as fifth character state and all characters were unordered and of unequal weight. A heuristic search option with 100 random taxon additions and tree bisection and reconnection (TBR) as the branch-swapping algorithm was used. Branches of zero length were collapsed and all multiple, equally most parsimonious trees were saved. The robustness of the trees obtained was evaluated by 1 000 bootstrap replications (Hillis & Bull 1993). Other measures calculated included tree length (TL), consistency index (CI), retention index (RI) and rescaled consistency index (RC).

All resulting trees were printed with Geneious v. 7.0.6 (http://www.geneious.com, Kearse *et al.* 2012). All new sequences generated in this study were deposited in NCBI's GenBank nucleotide database (www.ncbi.nlm.nih.gov) and the accession numbers are listed in Table 1 (GenBank accessions MF951115–MF951743). The alignments and respective phylogenetic trees were deposited in TreeBASE, study number 21537.

Taxonomy

Isolates were cultivated for 15–30 d at 21 °C in a 12 h day/night regime. Morphological observations of reproductive structures were determined using a Nikon Eclipse 80i compound microscope with differential interference contrast (DIC) illumination. Slides were prepared using the inclined coverslip method (Kawato & Shinobu 1959, revised in Nugent *et al.* 2006) and also transparent adhesive tape (Titan Ultra Clear Tape, Conglom Inc., Toronto, Canada) (Bensch *et al.* 2012). Clear lactic acid was used as mounting medium for microscopic observations of both *in vivo* and herbarium specimens. The observed isolates were cultivated in synthetic nutrient-poor agar (SNA), V8-juice agar (V8), malt extract agar (MEA) or oatmeal agar (OA) media to produce conidiogenous structures (recipes according to Crous *et al.* 2009f). The recorded conidial and ascospore measurements represent the minimum and maximum value of 30 individual measurements, for both length and width. For Scanning Electron Microscopy (SEM) observations, dried herbarium specimens were cut into small pieces and mycelial discs were incubated on MEA (Crous *et al.* 2009f). Both materials were fixed with OsO4 gas at room temperature for 12 h and then coated with gold using an ion-sputter (model E-1010, Hitachi, Tokyo, Japan). Specimens were observed with a SEM (S-4000, Hitachi) at 10–15 kV accelerating voltage. Nomenclatural novelties and descriptions were deposited in MycoBank (Crous *et al.* 2004a).

RESULTS

DNA amplification

The partial amplification of LSU and ITS was successful for all isolates (Table 1). The partial amplification of *rpb2* was difficult with the primer combination fRPB2-f5F and fRPB2-7cR (Liu *et al.* 1999), but more successful using the forward primer RPB2-5F2 (Sung *et al.* 2007). Among the used primers, the most successful combination was Rpb2-F4 (Videira *et al.* 2016) and fRPB2-7cR (Liu *et al.* 1999). The remaining primers designed in this study were used only in a small number of isolates for which the previously mentioned combinations failed to amplify the gene.

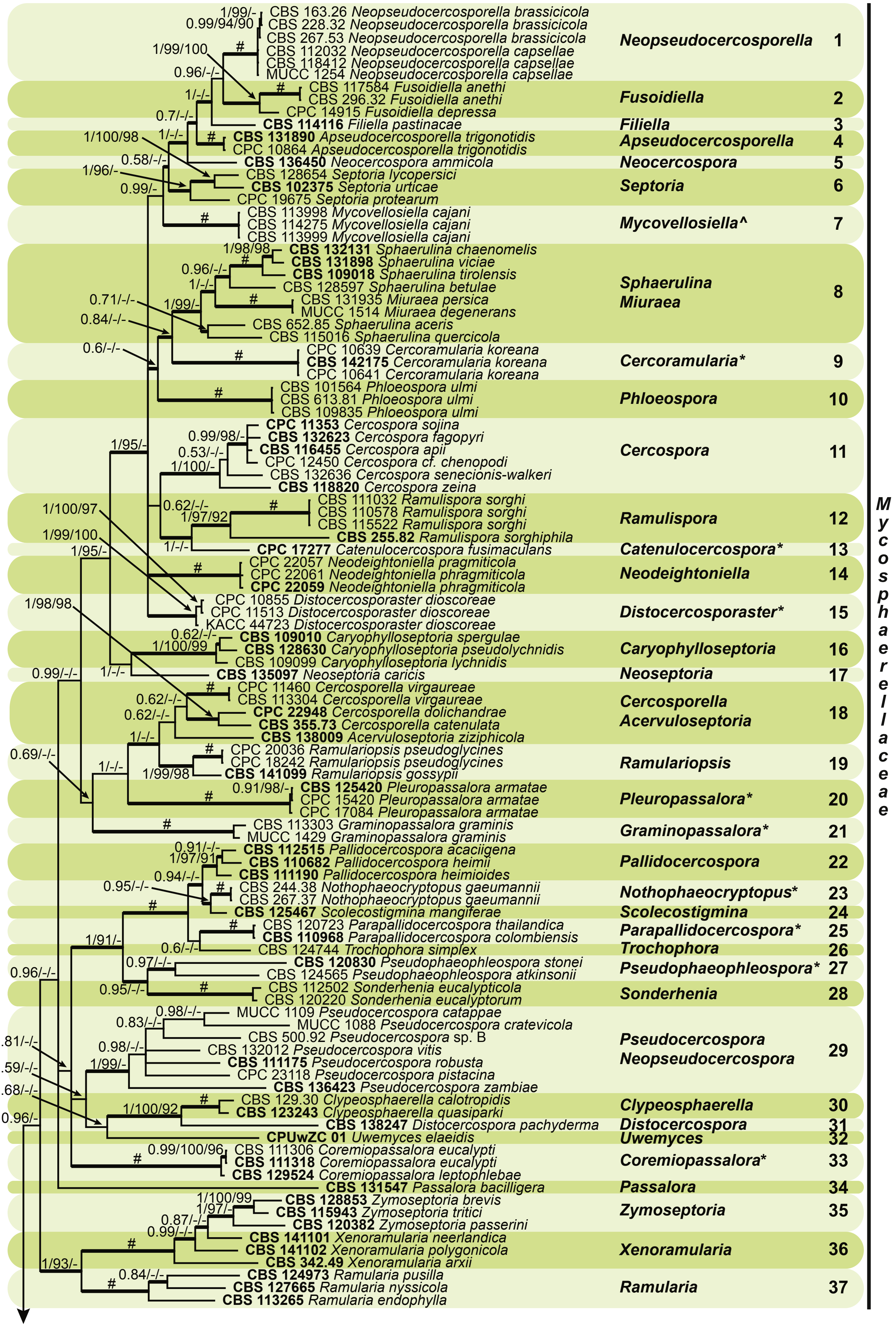
LSU & rpb2 phylogeny: **Dataset 1** consisted of a concatenated alignment of two loci (LSU, *rpb2*) that contained 262 taxa representing several genera known from culture belonging to the *Mycosphaerellaceae*. A strain of *Cylindroseptoria ceratoniae* (CBS 477.69; *Dothideaceae*) was used as outgroup. The final alignment contained a total of 1 471 characters divided in two partitions containing 750 (LSU) and 716 (*rpb2*) characters respectively, including alignment gaps. From the total alignment five characters that were artificially introduced as spacer between the genes were excluded from the phylogenetic analyses (see alignment in TreeBASE). MrModelTest determined that the Bayesian analysis for both genes (LSU, *rpb2*) should use dirichlet base frequencies and the GTR+I+G model. The **Bayesian** analyses of the concatenated two-locus alignment generated 65 562 trees from which 16 390 trees were discarded (25 % burn-in). The posterior probability values (PP) were calculated from the remaining 49 172 trees (Fig. 1; first value: PP $\leq$1 shown). The alignment contained a total of 811 unique site patterns: 291 (LSU) and 520 (*rpb2*). The **Maximum Likelihood** analysis detected 810 distinct patterns and reached a final optimization likelihood of −66911.187183. The bootstrap support values (ML-BS) from the best-scoring tree were mapped on the Bayesian tree as the second value in the tree nodes (Fig. 1; ML-BS $\geq$ 90 % shown). The **Maximum Parsimony** (MP) analyses generated the maximum of 1 000 equally most parsimonious trees and the bootstrap support values (MP-BS) were mapped on the Bayesian tree as the third value (Fig. 1; MP-BS $\geq$ 90 % shown). From the analysed characters, 691 were constant, 100 were variable and parsimony-uninformative and 675 were parsimony-informative. A parsimony consensus tree was calculated from the equally most parsimonious trees and the branches were mapped with a thicker stroke on the Bayesian tree (Fig. 1; Length = 16678, CI = 0.094, RI = 0.647, RC = 0.061, HI = 0.906). The overall parsimony phylogeny supported the same species clades as those presented in the Bayesian phylogeny (Fig. 1). Likewise, the ML analyses of dataset 1 (Fig. 1) separated the strains into the same genus clades as with Bayesian analyses.

Seven families are represented in the tree (Fig. 1): *Mycosphaerellaceae* (clades 1–94), *Dissoconiaceae* (clades 95, 96), *Phaeothecoidiellaceae* (clades 97–100), *Schizothyriaceae* (clade 101), *Teratosphaeriaceae* (clades 102–107), *Cladosporiaceae* (clade 108) and the single strain used as outgroup belonging to the *Dothideaceae*. The genera included in the *Cladosporiaceae* (*C*), *Dissoconiaceae* (*D*), *Phaeothecoidiellaceae* (*P*) and *Teratosphaeriaceae* (*T*) were used to provide an overview of the phylogenetic position of the *Mycosphaerellaceae*. In addition, some currently include genera that were once considered part of *Mycosphaerellaceae*, namely *Ramichloridium* (clade 95), currently in *Dissoconiaceae* (*D*), and *Stenella* (clade 105), presently in *Teratosphaeriaceae* (*T*).

LSU, rpb2 and ITS phylogenies (Datasets 2–4): For these analyses, DNA sequence data from LSU, *rpb2* and ITS were combined in three datasets (datasets 2–4) corresponding to three large clades from the overview tree with varying outgroup settings. Datasets 2–4 were analysed with the same three phylogenetic methods applied to Dataset 1. The results of the MrModeltest analysis indicated the same priors for the Bayesian analysis for all three partitions (LSU, *rpb2* and ITS), as for Dataset 1.

Dataset 2 consisted of clades 1–37 of Fig. 1 with additional taxa, included a total of 166 taxa and used *Schizothyrium pomi* (CBS 486.50) as outgroup. The final alignment contained a total of 2 113 characters divided in three partitions containing 749 (LSU), 766 (*rpb2*), 588 (ITS) characters respectively, including alignment gaps. From the total alignment, 10 characters previously introduced as spacers between the genes were excluded from the phylogenetic analysis. The **Bayesian** analysis generated 33 282 trees from which 8 320 trees were discarded (25 % burnin). The posterior probability values were calculated from the remaining 24 962 trees (Fig. 2; first value: PP $\leq$1 shown). The alignment contained a total of 988 unique site patterns: 173 (LSU), 496 (*rpb2*) and 343 (ITS). The **Maximum Likelihood** analysis detected 984 distinct patterns and reached a final ML optimization likelihood of −43958.897307. The bootstrap support values from the best-scoring tree were mapped on the Bayesian tree as the second value in the tree nodes (Fig. 2; ML-BS $\geq$ 90 % shown). The **Maximum Parsimony** analysis generated the maximum of 1 000 equally most parsimonious trees and the bootstrap support values were mapped on the Bayesian tree as the third value (Fig. 2; MP-BS $\geq$ 90 % shown). From the 2 103 characters, 1 147 were constant, 148 were variable and parsimony-uninformative and 809 were parsimony-informative. A parsimony consensus tree was calculated from the equally most parsimonious trees and the branches were mapped with a thicker stroke on the Bayesian tree (Fig. 2; Length = 10381, CI = 0.174, RI = 0.717, RC = 0.125, HI = 0.826).

The phylogenetic trees based on **dataset 2** (Fig. 2) that were generated with Bayesian and maximum likelihood methods, separated strains into the same generic clades. The phylogenetic trees generated using parsimony differed slightly in the clade order (data not shown, trees deposited on TreeBASE). Twenty-two genera represent stable genera since they maintain their positions in the present analysis as they displayed in previous phylogenetic studies, and most of them are based on their respective ex-type cultures: *Cercospora* (clade 1), *Ramulispora* (clade 2), *Neodeightoniella* (clade 4), *Neopseudocercosporella*


1/99/-
0.99/94/90
CBS 163.26 Neopseudocercosporella brassicicola
CBS 228.32 Neopseudocercosporella brassicicola
CBS 267.53 Neopseudocercosporella brassicicola
1/99/100
#
CBS 112032 Neopseudocercosporella capsellae
CBS 118412 Neopseudocercosporella capsellae
0.96/-/-
MUCC 1254 Neopseudocercosporella capsellae
Neopseudocercosporella 1
1/-/-
#
CBS 117584 Fusoidiella anethi
CBS 296.32 Fusoidiella anethi
0.7/-/-
CPC 14915 Fusoidiella depressa
Fusoidiella 2
CBS 114116 Filiella pastinacae
Filiella 3
1/100/98
1/-/-
#
CBS 131890 Apseudocercosporella trigonotidis
CPC 10864 Apseudocercosporella trigonotidis
Apseudocercosporella 4
0.58/-/-
CBS 136450 Neocercospora ammicola
Neocercospora 5
1/96/-
CBS 128654 Septoria lycopersici
CBS 102375 Septoria urticae
0.99/-
CPC 19675 Septoria protearum
Septoria 6
#
CBS 113998 Mycovellosiella cajani
CBS 114275 Mycovellosiella cajani
CBS 113999 Mycovellosiella cajani
Mycovellosiella^ 7
1/98/98
CBS 132131 Sphaerulina chaenomelis
#
CBS 131898 Sphaerulina viciae
0.96/-/-
CBS 109018 Sphaerulina tirolensis
1/-/-
CBS 128597 Sphaerulina betulae
0.71/-/-
1/99/-
#
CBS 131935 Miuraea persica
MUCC 1514 Miuraea degenerans
0.84/-/-
CBS 652.85 Sphaerulina aceris
CBS 115016 Sphaerulina quercicola
Sphaerulina
Miuraea 8
0.6/-/-
CPC 10639 Cercoramularia koreana
#
CBS 142175 Cercoramularia koreana
CPC 10641 Cercoramularia koreana
Cercoramularia* 9
#
CBS 101564 Phloeospora ulmi
CBS 613.81 Phloeospora ulmi
CBS 109835 Phloeospora ulmi
Phloeospora 10
CPC 11353 Cercospora sojina
0.99/98/-
CBS 132623 Cercospora fagopyri
1/95/-
0.53/-/-
CBS 116455 Cercospora apii
CPC 12450 Cercospora cf. chenopodi
1/100/-
CBS 132636 Cercospora senecionis-walkeri
CBS 118820 Cercospora zeina
Cercospora 11
1/100/97
0.62/-/-
#
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1/97/92
CBS 110578 Ramulispora sorghi
CBS 115522 Ramulispora sorghi
1/99/100
CBS 255.82 Ramulispora sorghiphila
Ramulispora 12
1/95/-
1/-/-
CPC 17277 Catenulocercospora fusimaculans
Catenulocercospora* 13
#
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Neodeightoniella 14
1/98/98
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CPC 11513 Distocercosporaster dioscoreae
KACC 44723 Distocercosporaster dioscoreae
Distocercosporaster* 15
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1/100/99
CBS 128630 Caryophylloseptoria pseudolychnidis
CBS 109099 Caryophylloseptoria lychnidis
Caryophylloseptoria 16
0.99/-/-
1/-/-
CBS 135097 Neoseptoria caricis
Neoseptoria 17
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CBS 113304 Cercosporella virgaureae
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CPC 22948 Cercosporella dolichandrae
CBS 355.73 Cercosporella catenulata
1/-/-
CBS 138009 Acervuloseptoria ziziphicola
Cercosporella
Acervuloseptoria 18
0.69/-/-
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1/-/-
CPC 18242 Ramulariopsis pseudoglycines
1/99/98
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Ramulariopsis 19
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CBS 125420 Pleuropassalora armatae
#
CPC 15420 Pleuropassalora armatae
CPC 17084 Pleuropassalora armatae
Pleuropassalora* 20
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MUCC 1429 Graminopassalora graminis
Graminopassalora* 21
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CBS 111190 Pallidocercospora heimioides
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CBS 267.37 Nothophaeocryptopus gaeumannii
Nothophaeocryptopus* 23
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Trochophora 26
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0.96/-/-
CBS 124565 Pseudophaeophleospora atkinsonii
Pseudophaeophleospora* 27
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CBS 112502 Sonderhenia eucalypticola
CBS 120220 Sonderhenia eucalyptorum
Sonderhenia 28
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0.83/-/-
MUCC 1088 Pseudocercospora cratevicola
CBS 500.92 Pseudocercospora sp. B
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0.98/-/-
CBS 132012 Pseudocercospora vitis
1/99/-
CBS 111175 Pseudocercospora robusta
0.59/-/-
CPC 23118 Pseudocercospora pistacina
CBS 136423 Pseudocercospora zambiae
Pseudocercospora
Neopseudocercospora 29
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#
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1/100/92
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Clypeosphaerella 30
0.96/-
CBS 138247 Distocercospora pachyderma
Distocercospora 31
CPUwZC 01 Uwemyces elaeidis
Uwemyces 32
0.99/100/96
CBS 111306 Coremiopassalora eucalypti
#
CBS 111318 Coremiopassalora eucalypti
CBS 129524 Coremiopassalora leptophlebae
Coremiopassalora* 33
CBS 131547 Passalora bacilligera
Passalora 34
1/100/99
CBS 128853 Zymoseptoria brevis
1/97/-
CBS 115943 Zymoseptoria tritici
0.87/-/-
CBS 120382 Zymoseptoria passerini
Zymoseptoria 35
0.99/-/-
CBS 141101 Xenoramularia neerlandica
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CBS 342.49 Xenoramularia arxii
Xenoramularia 36
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Mycosphaerellaceae
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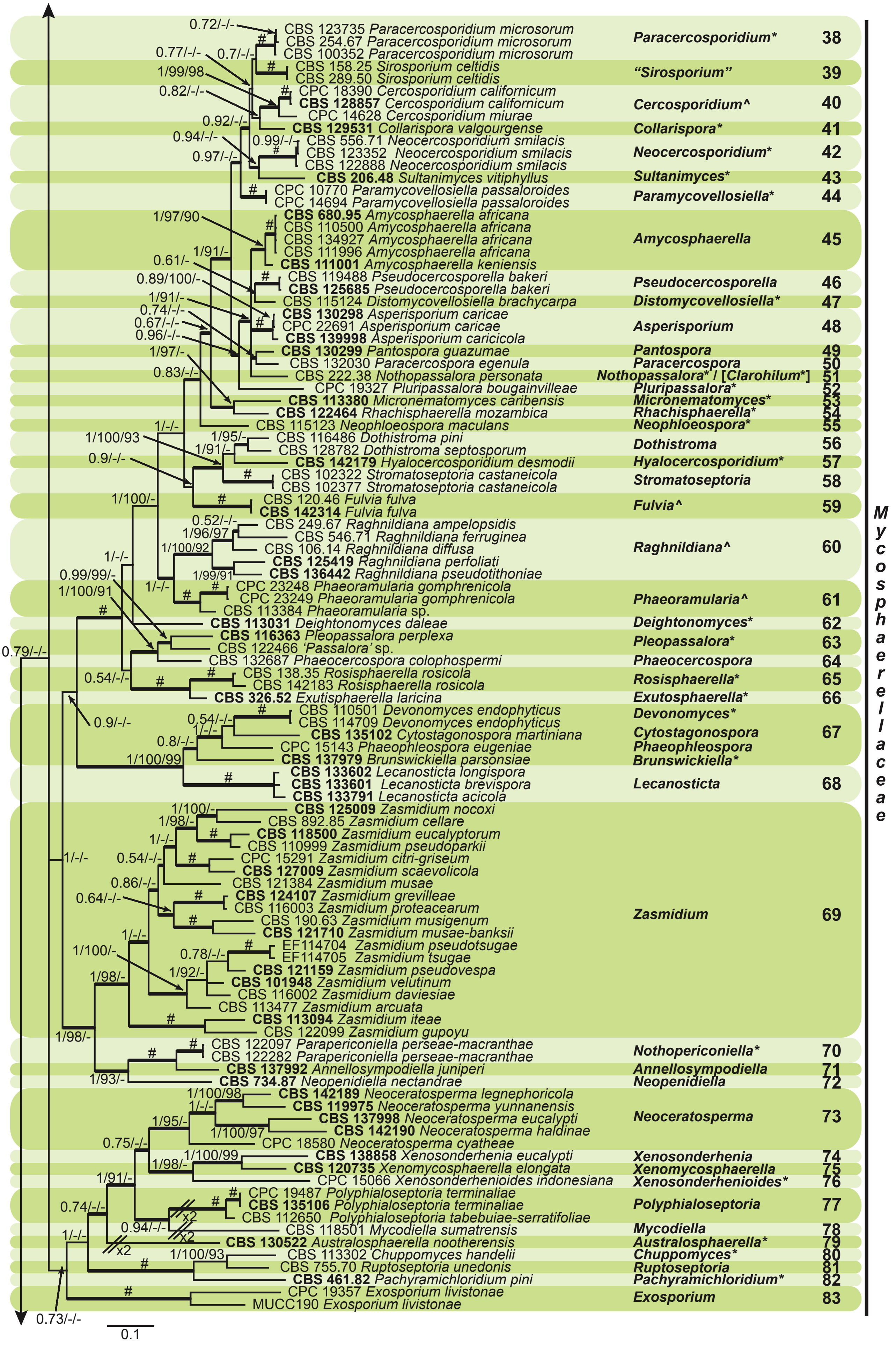


Fig. 1. (Continued).

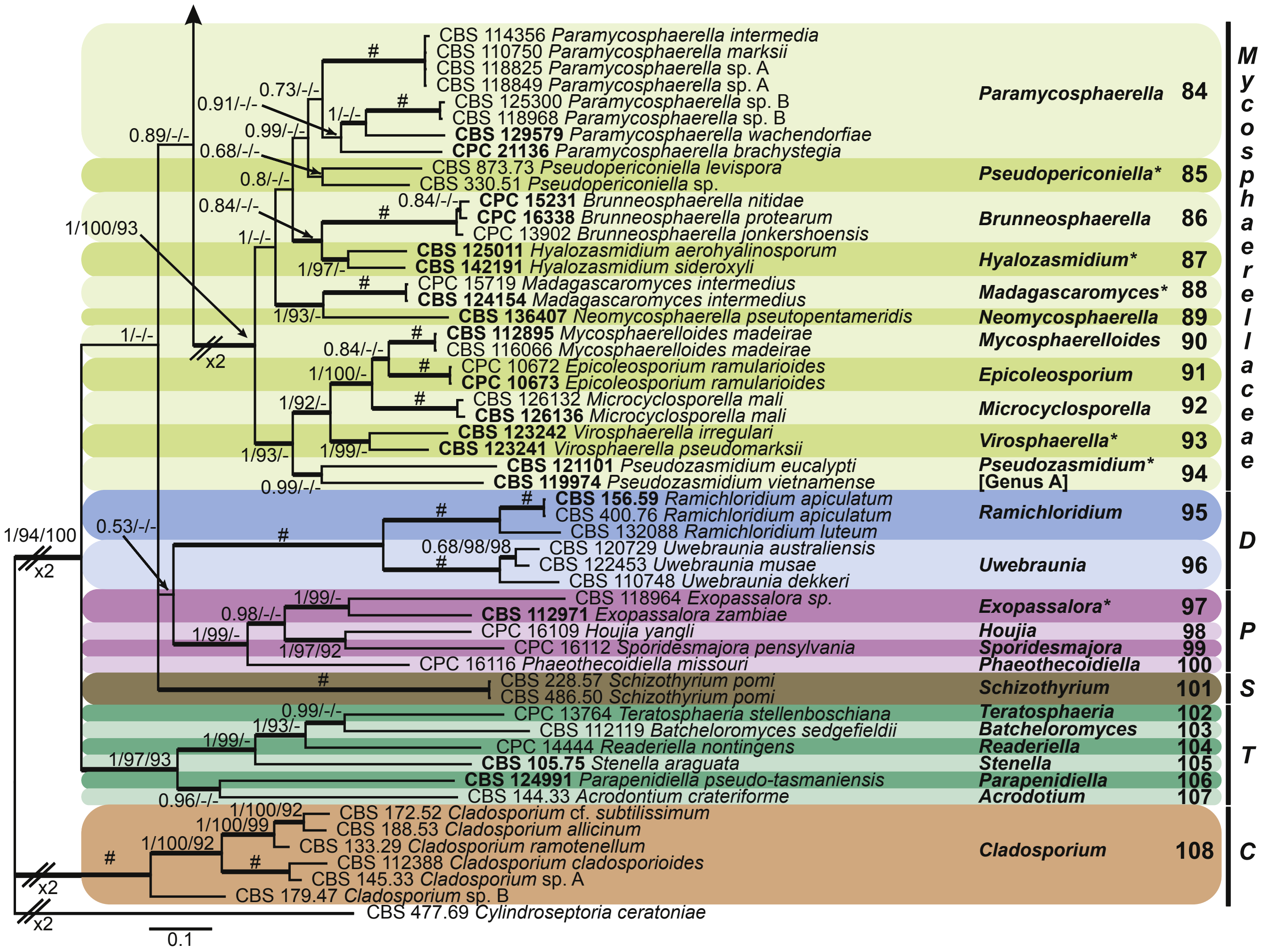
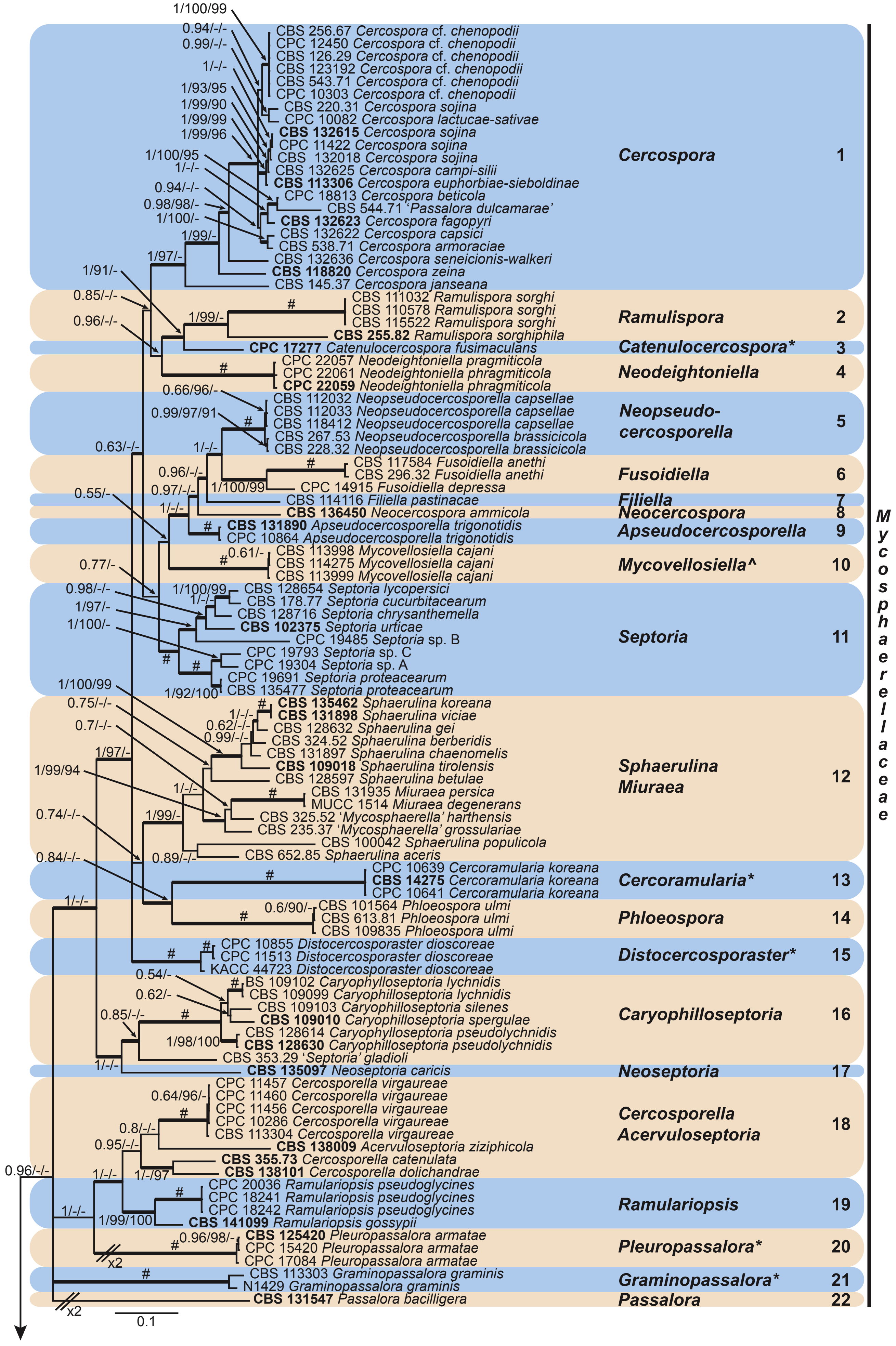


Fig. 1. (Continued).

(clade 5), *Fusoidiella* (clade 6), *Filiella* (clade 7), *Neocercospora* (clade 8), *Apseudocercosporella* (clade 9), *Septoria* (clade 11), *Phloeospora* (clade 14), *Caryophylloseptoria* (clade 16), *Neoseptoria* (clade 17), *Ramulariopsis* (clade 19), *Uwemyces* (clade 25), *Clypeosphaerella* (clade 26), *Pallidocercospora* (clade 28), *Nothophaeocryptopus* (clade 29), *Scolecostigmina* (clade 30), *Trochophora* (clade 32), *Sonderhenia* (clade 34), *Ramularia* (clade 35), *Zymoseptoria* (clade 36), and *Xenoramularia* (clade 37). Three clades have good candidates for epitypification: *Mycovellosiella* (clade 10), *Passalora* (clade 22), and *Distocercospora* (clade 27). Three clades have multiple type species and need to be addressed: *Cercosporella* and *Acervuloseptoria* (clade 18), *Sphaerulina* and *Miuraea* (clade 12), *Pseudocercospora* and *Neopseudocercospora* (clade 23). Seven distinct clades include species that are assigned to new genera: *Cercoramularia* (clade 13), *Distocercosporaster* (clade 15), *Pleuropassalora* (clade 20), *Graminopassalora* (clade 21), *Coremiopassalora* (clade 24), *Parapallidocercospora* (clade 31), *Pseudophaeophleospora* (clade 33).

Dataset 3 consisted of clades 38–66 of Fig. 1 with additional taxa, included a total of 111 taxa and used *Schizothyrium pomi* (CBS 486.50) as outgroup. In addition, a total of 7 strains representing 7 taxa from dataset 4 were used for context. The final alignment contained in all 2 067 characters divided in three partitions containing 729 (LSU), 779 (*rpb2*), 548 (ITS) characters respectively, including alignment gaps. From the complete alignment, 10 characters previously introduced as spacers between the genes were excluded from the phylogenetic analysis. The **Bayesian** analysis generated 8 242 trees of which 2 060 trees were discarded (25 % burnin). The posterior probability values were calculated from the remaining 6 182 trees (Fig. 3; first value: PP ≤1 % shown). The alignment contained a total of 824 unique site patterns: 125 (LSU), 478 (*rpb2*) and 233 (ITS). The **Maximum-Likelihood** analysis detected 821 distinct patterns and reached a final ML optimization likelihood of −23304.617065. The bootstrap support values from the best-scoring tree were mapped on the Bayesian tree as the second value in the tree nodes (Fig. 3;

Fig. 1. Phylogenetic tree (50 % majority rule consensus) resulting from a Bayesian analysis of the combined LSU and *rpb2* sequence alignment (dataset 1). Bayesian posterior probabilities (PP), maximum likelihood bootstrap support values (≥ 90 %; ML-BS) and maximum parsimony bootstrap support values (≥ 90 %; MP-BS) are indicated at the nodes (PP/ML-BS/MP-BS; a hash (#) symbol denotes fully-supported branches) and the scale bar represents the expected number of changes per site. Branches in a thicker stroke represent the branches present in the strict consensus parsimony tree. Genera clades are delimited in coloured boxes, with the genus name and clade number indicated to the right. All taxa names are written in black, ex-type strains are represented in **bold,** novel genera denoted with an asterisk (*) and resurrected genera with a circumflex (^). A vertical bar is used to the right of the coloured boxes and encompasses all genera within their respective families. The family name *Mycosphaerellaceae* is unabbreviated while the rest are abbreviated as follows: *D* = *Dissoconiaceae*, *P* = *Phaeothecoidiellaceae*, *S* = *Schizothyriaceae*, *T* = *Teratosphaeriaceae*, *C* = *Cladosporiaceae*. The tree was rooted to *Cylindroseptoria ceratoniae* (CBS 477.69).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1/100/95
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0.94/-/-
0.98/98/-
1/100/-
1/99/-
1/97/-
1/91/-
CBS 256.67 Cercospora cf. chenopodii
CPC 12450 Cercospora cf. chenopodii
CBS 126.29 Cercospora cf. chenopodii
CBS 123192 Cercospora cf. chenopodii
CBS 543.71 Cercospora cf. chenopodii
CPC 10303 Cercospora cf. chenopodii
CBS 220.31 Cercospora sojina
CPC 10082 Cercospora lactucae-sativae
CBS 132615 Cercospora sojina
CPC 11422 Cercospora sojina
CBS 132018 Cercospora sojina
CBS 132625 Cercospora campi-silii
CBS 113306 Cercospora euphorbiae-sieboldinae
CPC 18813 Cercospora beticola
CBS 544.71 'Passalora dulcamarae'
CBS 132623 Cercospora fagopyri
CBS 132622 Cercospora capsici
CBS 538.71 Cercospora armoraciae
CBS 132636 Cercospora seneicionis-walkeri
CBS 118820 Cercospora zeina
CBS 145.37 Cercospora janseana
Cercospora
1
0.85/-/-
0.96/-/-
1/99/-
#
CBS 111032 Ramulispora sorghi
CBS 110578 Ramulispora sorghi
CBS 115522 Ramulispora sorghi
CBS 255.82 Ramulispora sorghiphila
Ramulispora
2
CPC 17277 Catenulocercospora fusimaculans
Catenulocercospora*
3
#
CPC 22057 Neodeightoniella pragmiticola
CPC 22061 Neodeightoniella phragmiticola
CPC 22059 Neodeightoniella phragmiticola
Neodeightoniella
4
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0.99/97/91
#
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CBS 118412 Neopseudocercosporella capsellae
CBS 267.53 Neopseudocercosporella brassicicola
CBS 228.32 Neopseudocercosporella brassicicola
Neopseudo-cercosporella
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1/-/-
#
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0.97/-/-
1/100/99
CBS 117584 Fusoidiella anethi
CBS 296.32 Fusoidiella anethi
CPC 14915 Fusoidiella depressa
Fusoidiella
6
0.55/-
CBS 114116 Filiella pastinacae
Filiella
7
1/-/-
CBS 136450 Neocercospora ammicola
Neocercospora
8
#
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CPC 10864 Apseudocercosporella trigonotidis
Apseudocercosporella
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#
0.61/-
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CBS 114275 Mycovellosiella cajani
CBS 113999 Mycovellosiella cajani
Mycovellosiella^
10
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1/97/-
1/100/-
1/100/99
1/-/-
CBS 128654 Septoria lycopersici
CBS 178.77 Septoria cucurbitacearum
CBS 128716 Septoria chrysanthemella
CBS 102375 Septoria urticae
CPC 19485 Septoria sp. B
#
#
CPC 19793 Septoria sp. C
CPC 19304 Septoria sp. A
CPC 19691 Septoria proteacearum
1/92/100
CBS 135477 Septoria proteacearum
Septoria
11
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0.7/-/-
1/97/-
1/99/94
0.74/-/-
#
1/-/-
0.62/-/-
0.99/-/-
CBS 135462 Sphaerulina koreana
CBS 131898 Sphaerulina viciae
CBS 128632 Sphaerulina gei
CBS 324.52 Sphaerulina berberidis
CBS 131897 Sphaerulina chaenomelis
CBS 109018 Sphaerulina tirolensis
CBS 128597 Sphaerulina betulae
1/-/-
#
CBS 131935 Miuraea persica
MUCC 1514 Miuraea degenerans
1/99/-
CBS 325.52 'Mycosphaerella' harthensis
CBS 235.37 'Mycosphaerella' grossulariae
CBS 100042 Sphaerulina populicola
0.89/-/-
CBS 652.85 Sphaerulina aceris
Sphaerulina
Miuraea
12
0.84/-/-
#
CPC 10639 Cercoramularia koreana
CBS 14275 Cercoramularia koreana
CPC 10641 Cercoramularia koreana
Cercoramularia*
13
1/-/-
0.6/90/-
#
CBS 101564 Phloeospora ulmi
CBS 613.81 Phloeospora ulmi
CBS 109835 Phloeospora ulmi
Phloeospora
14
#
#
CPC 10855 Distocercosporaster dioscoreae
CPC 11513 Distocercosporaster dioscoreae
KACC 44723 Distocercosporaster dioscoreae
Distocercosporaster*
15
0.54/-
0.62/-
#
BS 109102 Caryophylloseptoria lychnidis
CBS 109099 Caryophylloseptoria lychnidis
CBS 109103 Caryophylloseptoria silenes
0.85/-/-
#
CBS 109010 Caryophylloseptoria spergulae
CBS 128614 Caryophylloseptoria pseudolychnidis
1/98/100
CBS 128630 Caryophylloseptoria pseudolychnidis
CBS 353.29 'Septoria' gladioli
Caryophylloseptoria
16
1/-/-
CBS 135097 Neoseptoria caricis
Neoseptoria
17
0.64/96/-
#
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CPC 11460 Cercosporella virgaureae
CPC 11456 Cercosporella virgaureae
CPC 10286 Cercosporella virgaureae
CBS 113304 Cercosporella virgaureae
0.8/-/-
0.95/-/-
CBS 138009 Acervuloseptoria ziziphicola
CBS 355.73 Cercosporella catenulata
1/-/97
CBS 138101 Cercosporella dolichandrae
Cercosporella
Acervuloseptoria
18
0.96/-/-
1/-/-
1/-/-
#
1/99/100
CPC 20036 Ramulariopsis pseudoglycines
CPC 18241 Ramulariopsis pseudoglycines
CPC 18242 Ramulariopsis pseudoglycines
CBS 141099 Ramulariopsis gossypii
Ramulariopsis
19
0.96/98/-
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CPC 17084 Pleuropassalora armatae
x2
Pleuropassalora*
20
#
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N1429 Graminopassalora graminis
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Passalora
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0.1
Mycosphaerellaceae

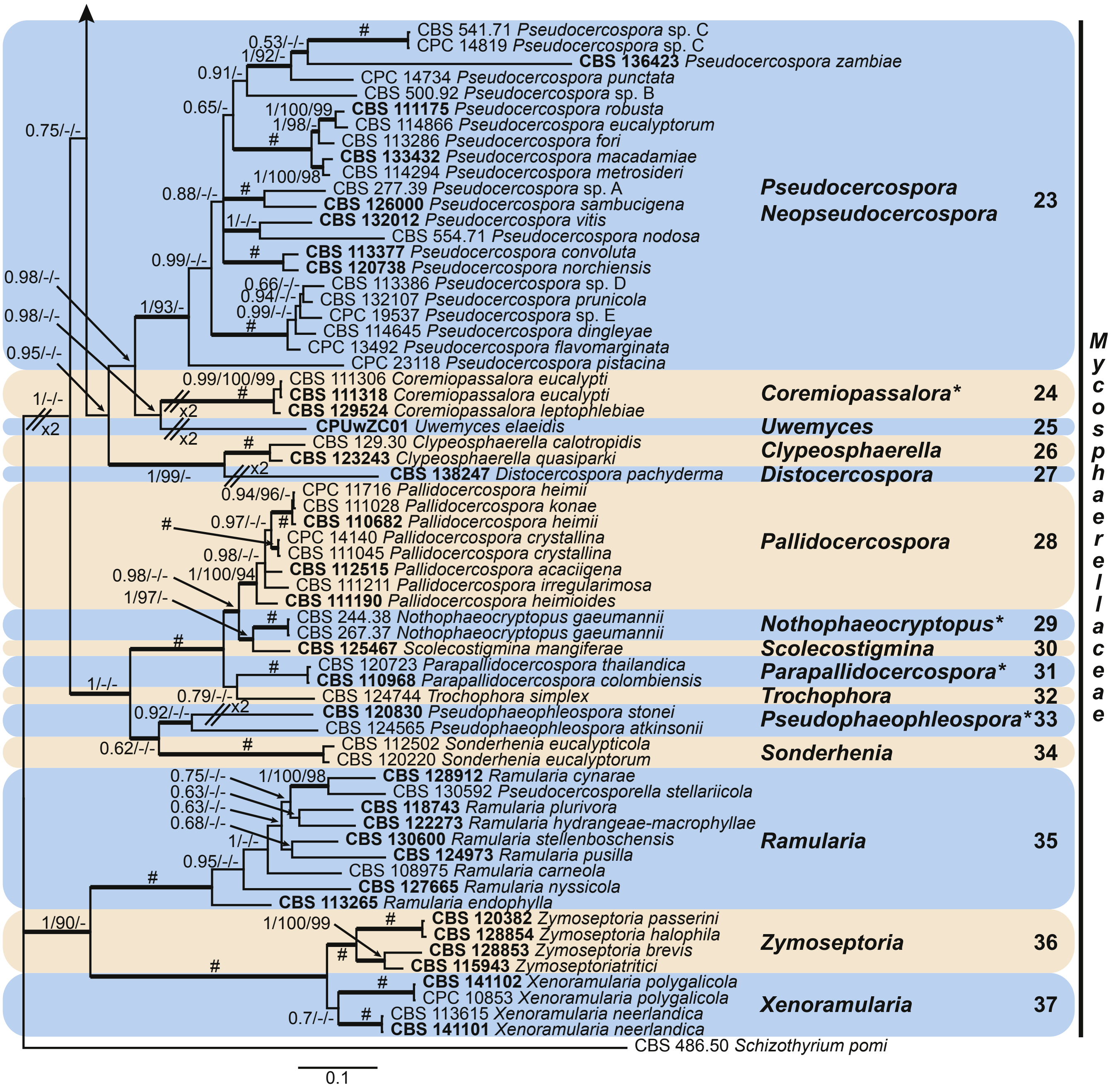

Fig. 2. (Continued).

ML-BS ≥ 90 % shown). The **Maximum Parsimony** analysis generated the maximum 1 000 equally most parsimonious trees and the bootstrap support values were mapped on the Bayesian tree as the third value (Fig. 3, MP-BS ≥ 90 % shown). From the 2 057 characters, 1 227 were constant, 175 were variable and parsimony-uninformative and 655 were parsimony-informative. A parsimony consensus tree was calculated from the equally most parsimonious trees and the branches were mapped with a thicker stroke on the Bayesian tree (Fig. 3; Length = 4806, CI = 0.309, RI = 0.734, RC = 0.227; HI = 0.691).

The phylogenetic trees based on **dataset 3** (Fig. 3) that were generated with Bayesian and maximum likelihood methods, separated strains into the same generic clades. The phylogenetic trees generated using parsimony differed slightly in the clade order (data not shown, trees deposited on TreeBASE). Eight genera represent stable genera since they maintain their positions in the present analysis as they displayed in previous phylogenetic studies, and most of them are based on their respective type strain: *Amycosphaerella* (clade 8), *Pseudocercosporella* (clade 10), *Paracercospora* (clade 11), *Pantospora* (clade 12), *Asperisporium* (clade 13), *Dothistroma* (clade 20),

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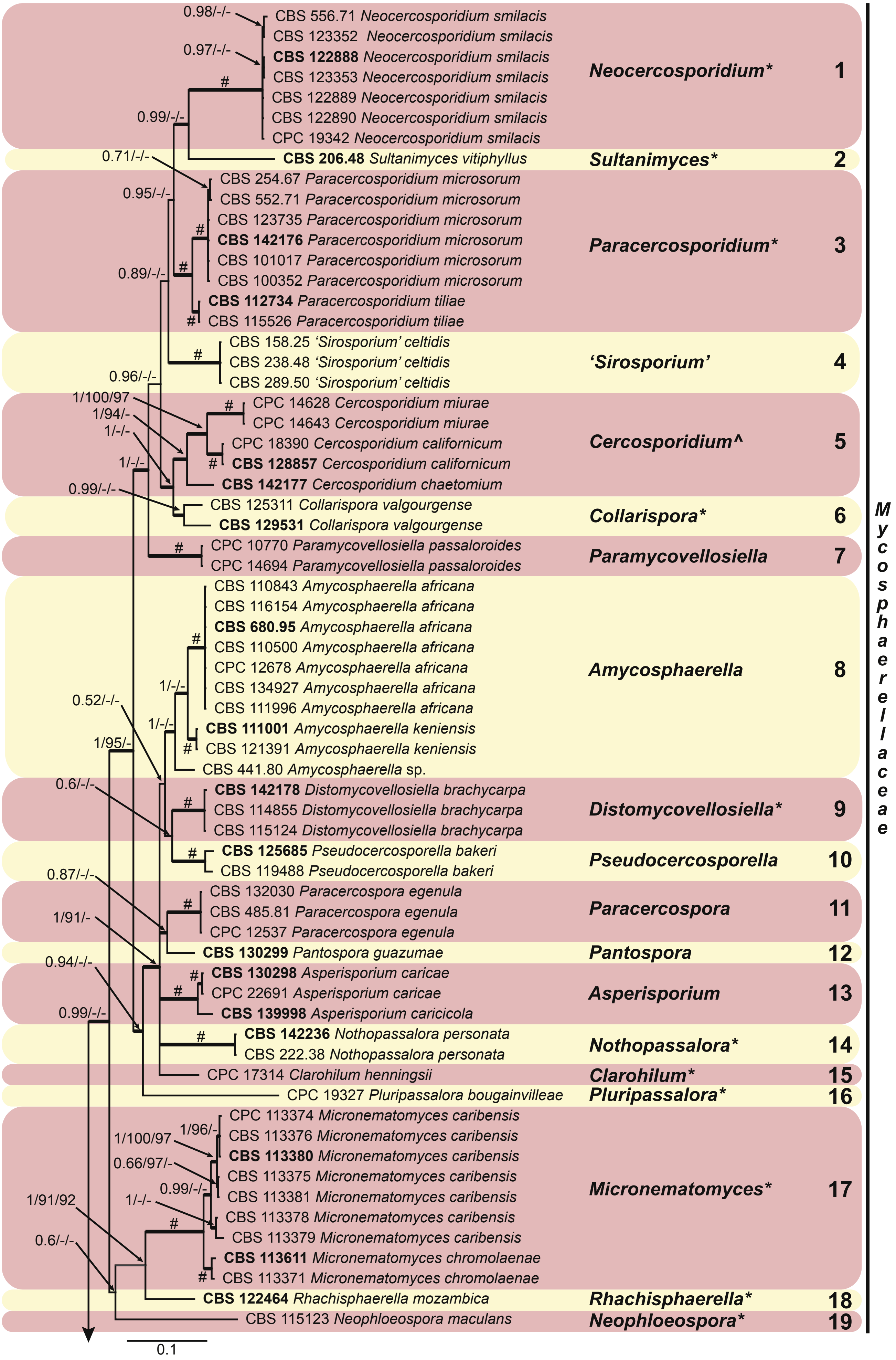
Fig. 2. Phylogenetic tree (50 % majority rule consensus) resulting from a Bayesian analysis of the combined LSU, *rpb2* and ITS sequence alignment (dataset 2; representing clades 1–37 of Fig. 1). Bayesian posterior probabilities (PP), maximum likelihood bootstrap support values (≥ 90 %; ML-BS) and maximum parsimony bootstrap support values (≥ 90 %; MP-BS) are indicated at the nodes (PP/ML-BS/MP-BS) and the scale bar represents the expected number of changes per site. Branches in a thicker stroke represent the branches present in the strict consensus parsimony tree. Genera clades are delimited in coloured boxes, with the genus name and clade number are indicated to the right. All taxa names are written in black, ex-type species strains are represented in **bold,** novel genera with an asterisk (*) and resurrected genera a circumflex (^). A vertical bar is used to the right of the coloured boxes and encompass all genera within their respective family, the *Mycosphaerellaceae*. The tree was rooted to *Schizothyrium pomi* (CBS 486.50).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#
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0.99/-/-
CBS 122890 Neocercosporidium smilacis
CPC 19342 Neocercosporidium smilacis
Neocercosporidium*
1
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Sultanimyces*
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CBS 123735 Paracercosporidium microsorum
#
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#
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0.89/-/-
CBS 100352 Paracercosporidium microsorum
CBS 112734 Paracercosporidium tiliae
#
CBS 115526 Paracercosporidium tiliae
Paracercosporidium*
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#
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'Sirosporium'
4
1/100/97
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1/-/-
CPC 18390 Cercosporidium californicum
1/-/-
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0.99/-/-
CBS 142177 Cercosporidium chaetomium
Cercosporidium^
5
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CBS 129531 Collarispora valgourgense
Collarispora*
6
#
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Paramycovellosiella
7
CBS 110843 Amycosphaerella africana
CBS 116154 Amycosphaerella africana
CBS 680.95 Amycosphaerella africana
#
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1/-/-
CBS 111001 Amycosphaerella keniensis
1/95/-
#
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Amycosphaerella
8
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#
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CBS 115124 Distomycovellosiella brachycarpa
Distomycovellosiella*
9
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CBS 119488 Pseudocercosporella bakeri
Pseudocercosporella
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0.87/-/-
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#
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1/91/-
CPC 12537 Paracercospora egenula
Paracercospora
11
CBS 130299 Pantospora guazumae
Pantospora
12
0.94/-/-
#
CBS 130298 Asperisporium caricae
#
CPC 22691 Asperisporium caricae
0.99/-/-
CBS 139998 Asperisporium caricicola
Asperisporium
13
#
CBS 142236 Nothopassalora personata
CBS 222.38 Nothopassalora personata
Nothopassalora*
14
CPC 17314 Clarohilum henningsii
Clarohilum*
15
CPC 19327 Pluripassalora bougainvilleae
Pluripassalora*
16
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1/96/-
1/100/97
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0.99/-/-
1/91/92
1/-/-
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#
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#
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Micronematomyces*
17
CBS 122464 Rhachisphaerella mozambica
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18
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0.1

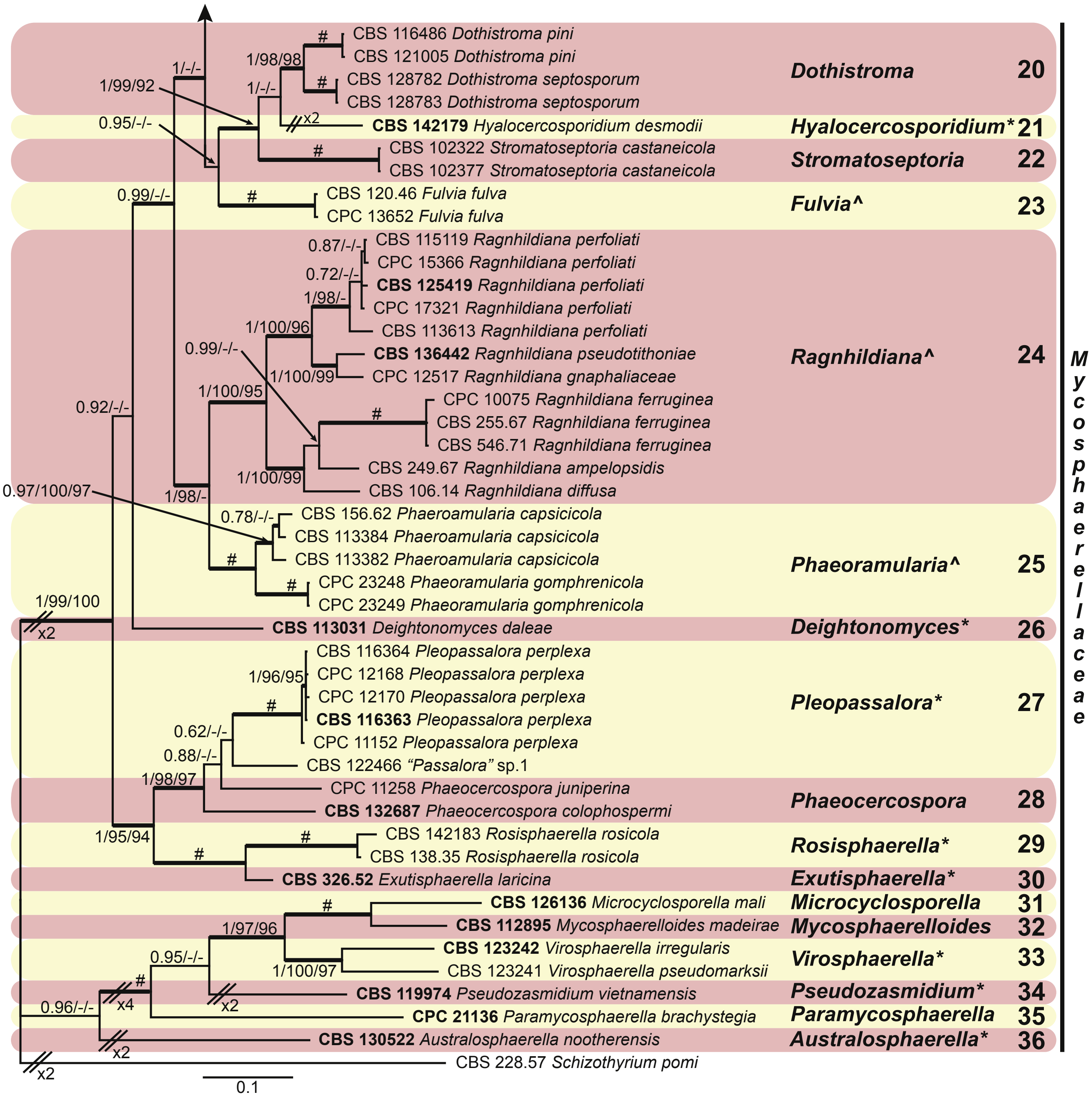
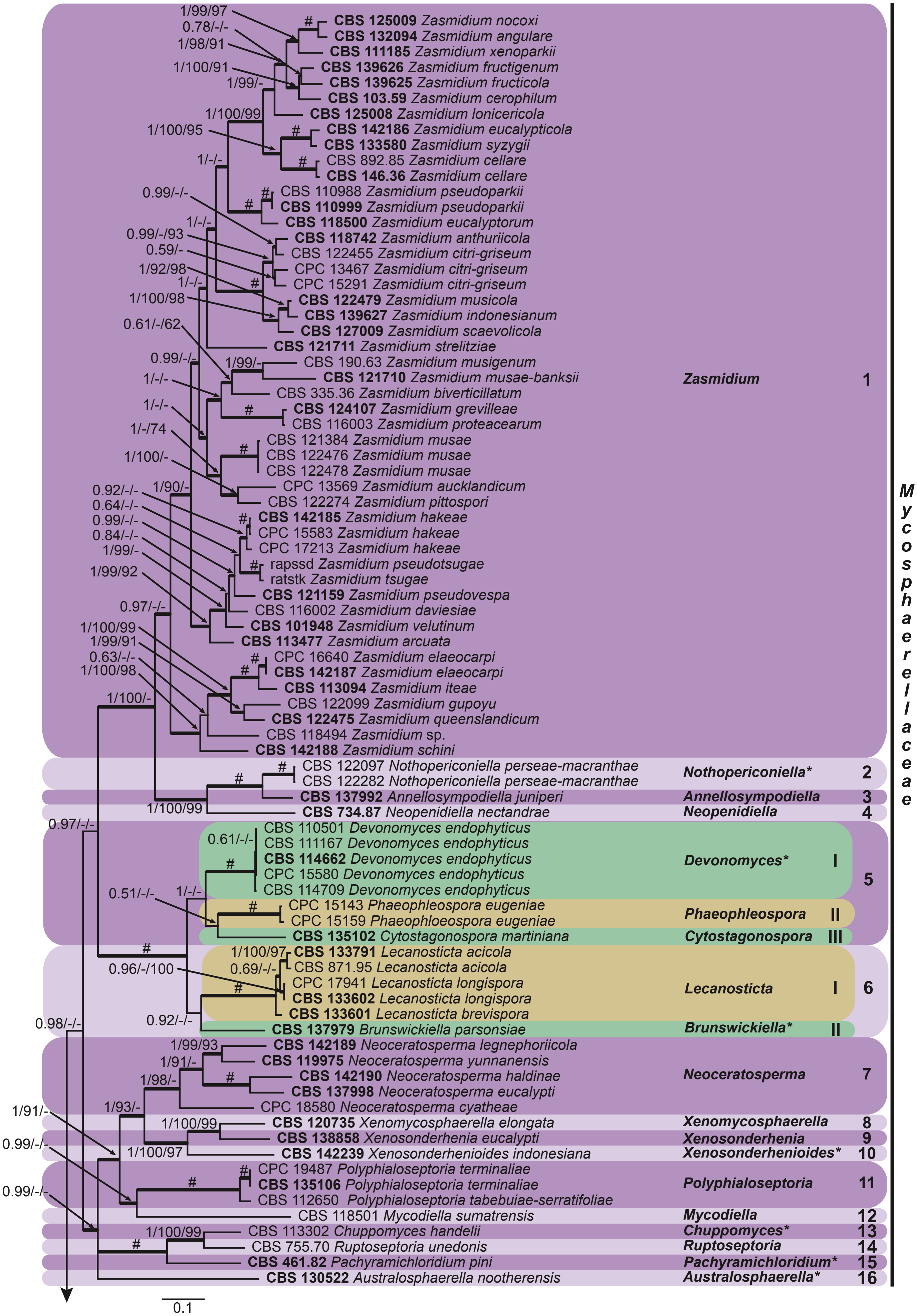


Fig. 3. (Continued).

Stromatoseptoria (clade 22), and *Phaeocercospora* (clade 28). Two clades have good candidates for epitypification: *Fulvia* (clade 23) and *Phaeoramularia* (clade 25). Eighteen clades have species belonging to *Passalora s. lat.* that are reassigned into new genera: *Neocercosporidium* (clade 1), *Sultanimyces* (clade 2), *Paracercosporidium* (clade 3), *Parasirosporium* (clade 4), *Cercosporidium* (clade 5), *Paramycovellosiella* (clade 7), *Distomycovellosiella* (clade 9), *Nothopassalora* (clade 14), *Phanerohilum* (clade 15), *Pluripassalora* (clade 16), *Micronematomyces* (clade 17), *Rhachisphaerella* (clade 18), *Neophloeospora* (clade 19), *Hyalocercosporidium* (clade 21), *Deightonomyces* (clade 26), *Pleopassalora* (clade 27), *Rosisphaerella* (clade 29), and *Exutisphaerella* (clade 30). Four clades have species belonging to *Passalora s. lat.* that are reassigned into resurrected genera: *Cercosporidium* (clade 5), *Fulvia* (clade 23), *Ragnhildiana* (clade 24), and *Phaeoramularia* (clade 25).

Dataset 4 consisted of clades 66–108 of Fig. 1, which included a total of 147 taxa and used *Cylindroseptoria ceratoniae* (CBS 477.69) as outgroup. In addition, the final alignment

Fig. 3. Phylogenetic tree (50 % majority rule consensus) resulting from a Bayesian analysis of the combined LSU, *rpb2* and ITS sequence alignment (dataset 3; representing clades 38–66, 79, 84 and 92–94 of Fig. 1). Bayesian posterior probabilities (PP), maximum likelihood bootstrap support values (≥ 90 %; ML-BS) and maximum parsimony bootstrap support values (≥ 90 %; MP-BS) are indicated at the nodes (PP/ML-BS/MP-BS) and the scale bar represents the expected number of changes per site. Branches in a thicker stroke represent the branches present in the strict consensus parsimony tree. Genera clades are delimited in coloured boxes, with the genus name and clade number indicated to the right. All taxa names are written in black, ex-type strains are represented in **bold**, novel genera with an asterisk (*) and resurrected genera with a circumflex (^). A vertical bar is used to the right of the coloured boxes and encompass all genera within their respective family, the *Mycosphaerellaceae*. The tree was rooted to *Schizothyrium pomi* (CBS 228.57).


1/99/97
0.78/-/-
1/98/91
1/100/91
1/99/-
1/100/99
1/100/95
1/-/-
0.99/-/-
1/-/-
0.99/-/93
0.59/-
1/92/98
1/-/-
1/100/98
0.61/-/62
0.99/-/-
1/99/-
1/-/-
1/-/-
1/-/74
1/100/-
0.92/-/-
1/90/-
0.64/-/-
0.99/-/-
0.84/-/-
1/99/-
1/99/92
0.97/-/-
1/100/99
1/99/91
0.63/-/-
1/100/98
1/100/-
#
CBS 125009 *Zasmidium nocoxi*
CBS 132094 *Zasmidium angulare*
CBS 111185 *Zasmidium xenoparkii*
CBS 139626 *Zasmidium fructigenum*
CBS 139625 *Zasmidium fructicola*
CBS 103.59 *Zasmidium cerophilum*
CBS 125008 *Zasmidium lonicericola*
CBS 142186 *Zasmidium eucalypticola*
CBS 133580 *Zasmidium syzygii*
CBS 892.85 *Zasmidium cellare*
CBS 146.36 *Zasmidium cellare*
CBS 110988 *Zasmidium pseudoparkii*
CBS 110999 *Zasmidium pseudoparkii*
CBS 118500 *Zasmidium eucalyptorum*
CBS 118742 *Zasmidium anthuriicola*
CBS 122455 *Zasmidium citri-griseum*
CPC 13467 *Zasmidium citri-griseum*
CPC 15291 *Zasmidium citri-griseum*
CBS 122479 *Zasmidium musicola*
CBS 139627 *Zasmidium indonesianum*
CBS 127009 *Zasmidium scaevolicola*
CBS 121711 *Zasmidium strelitziae*
CBS 190.63 *Zasmidium musigenum*
CBS 121710 *Zasmidium musae-banksii*
CBS 335.36 *Zasmidium biverticillatum*
CBS 124107 *Zasmidium grevilleae*
CBS 116003 *Zasmidium proteacearum*
CBS 121384 *Zasmidium musae*
CBS 122476 *Zasmidium musae*
CBS 122478 *Zasmidium musae*
CPC 13569 *Zasmidium aucklandicum*
CBS 122274 *Zasmidium pittospori*
CBS 142185 *Zasmidium hakeae*
CPC 15583 *Zasmidium hakeae*
CPC 17213 *Zasmidium hakeae*
rapssd *Zasmidium pseudotsugae*
ratstk *Zasmidium tsugae*
CBS 121159 *Zasmidium pseudovespa*
CBS 116002 *Zasmidium daviesiae*
CBS 101948 *Zasmidium velutinum*
CBS 113477 *Zasmidium arcuata*
CPC 16640 *Zasmidium elaeocarpi*
CBS 142187 *Zasmidium elaeocarpi*
CBS 113094 *Zasmidium iteae*
CBS 122099 *Zasmidium gupoyu*
CBS 122475 *Zasmidium queenslandicum*
CBS 118494 *Zasmidium* sp.
CBS 142188 *Zasmidium schini*
Zasmidium **1**
CBS 122097 *Nothopericoniella perseae-macranthae*
CBS 122282 *Nothopericoniella perseae-macranthae*
CBS 137992 *Annellosympodiella juniperi*
CBS 734.87 *Neopenidiella nectandrae*
1/100/99
Nothopericoniella* **2**
Annellosympodiella **3**
Neopenidiella **4**
0.97/-/-
0.61/-/-
CBS 110501 *Devonomyces endophyticus*
CBS 111167 *Devonomyces endophyticus*
CBS 114662 *Devonomyces endophyticus*
CPC 15580 *Devonomyces endophyticus*
CBS 114709 *Devonomyces endophyticus*
0.51/-/-
1/-/-
CPC 15143 *Phaeophleospora eugeniae*
CPC 15159 *Phaeophloeospora eugeniae*
CBS 135102 *Cytostagonospora martiniana*
Devonomyces* **I**
Phaeophleospora **II**
Cytostagonospora **III**
5
1/100/97
0.69/-/-
0.96/-/100
CBS 133791 *Lecanosticta acicola*
CBS 871.95 *Lecanosticta acicola*
CPC 17941 *Lecanosticta longispora*
CBS 133602 *Lecanosticta longispora*
CBS 133601 *Lecanosticta brevispora*
0.98/-/-
0.92/-/-
CBS 137979 *Brunswickiella parsonsiae*
Lecanosticta **I**
Brunswickiella* **II**
6
1/99/93
1/91/-
1/98/-
1/93/-
CBS 142189 *Neoceratosperma legnephoriicola*
CBS 119975 *Neoceratosperma yunnanensis*
CBS 142190 *Neoceratosperma haldinae*
CBS 137998 *Neoceratosperma eucalypti*
CPC 18580 *Neoceratosperma cyatheae*
Neoceratosperma **7**
1/91/-
1/100/99
CBS 120735 *Xenomycosphaerella elongata*
CBS 138858 *Xenosonderhenia eucalypti*
1/100/97
CBS 142239 *Xenosonderhenioides indonesiana*
Xenomycosphaerella **8**
Xenosonderhenia **9**
Xenosonderhenioides* **10**
0.99/-/-
CPC 19487 *Polyphialoseptoria terminaliae*
CBS 135106 *Polyphialoseptoria terminaliae*
CBS 112650 *Polyphialoseptoria tabebuiae-serratifoliae*
Polyphialoseptoria **11**
0.99/-/-
CBS 118501 *Mycodiella sumatrensis*
1/100/99
CBS 113302 *Chuppomyces handelii*
CBS 755.70 *Ruptoseptoria unedonis*
CBS 461.82 *Pachyramichloridium pini*
CBS 130522 *Australosphaerella nootherensis*
Mycodiella **12**
Chuppomyces* **13**
Ruptoseptoria **14**
Pachyramichloridium* **15**
Australosphaerella* **16**
0.1
Mycosphaerellaceae

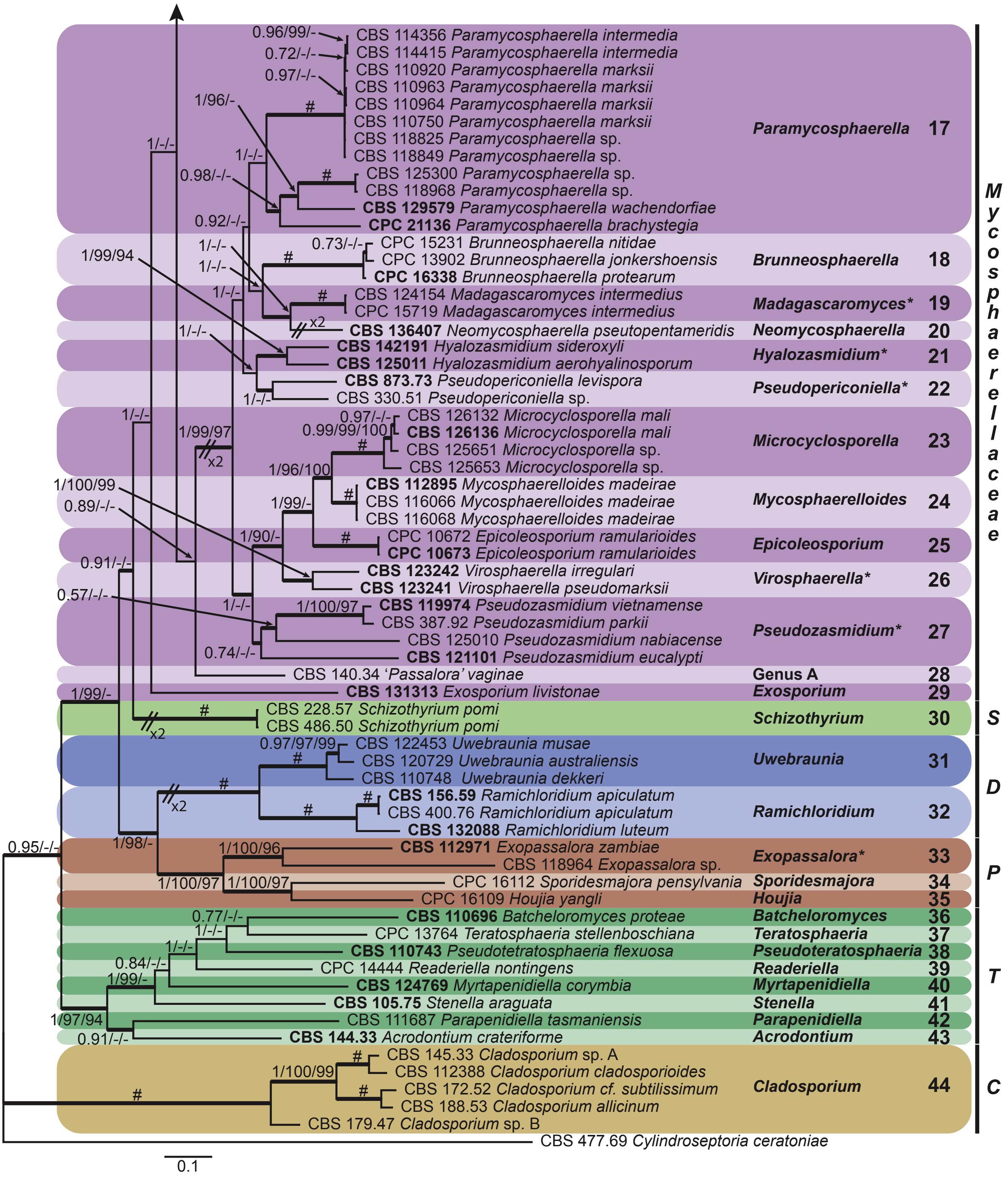
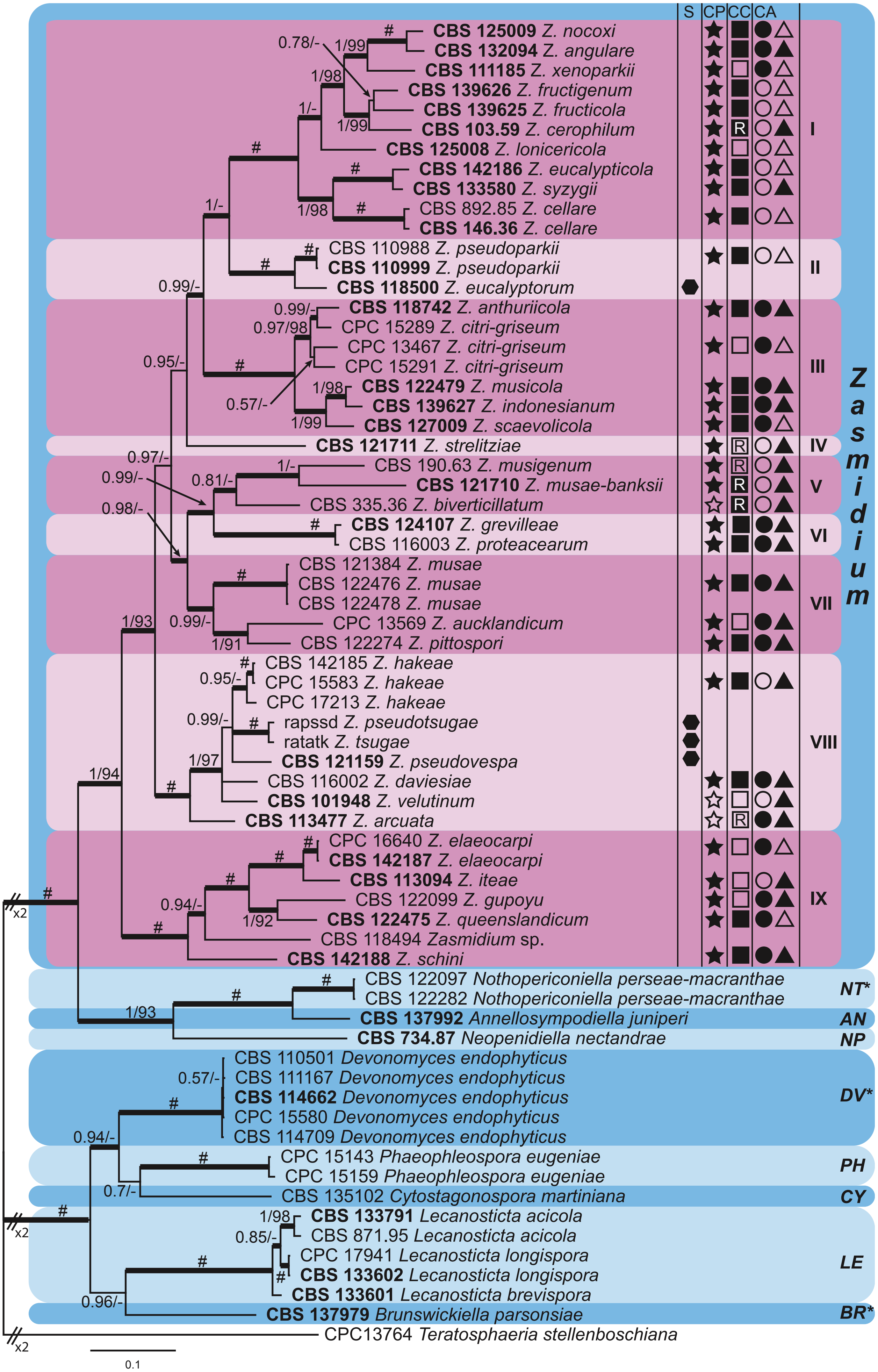


Fig. 4. (Continued).

Fig. 4. Phylogenetic tree (50 % majority rule consensus) resulting from a Bayesian analysis of the combined LSU, *rpb2* and ITS sequence alignment (dataset 4; representing clades 67−99 of Fig. 1). Bayesian posterior probabilities (PP), maximum likelihood bootstrap support values (≥ 90 %; ML-BS) and maximum parsimony bootstrap support values (≥ 90 %; MP-BS) are indicated at the nodes (PP/ML-BS/MP-BS) and the scale bar represents the expected number of changes per site. Branches in a thicker stroke represent the branches present in the strict consensus parsimony tree. Genera clades are delimited in coloured boxes, with the genus name and clade number indicated to the right. All taxa names are written in black, ex-type strains are represented in **bold,** novel genera with an asterisk (*) and resurrected genera with a circumflex (^). A vertical bar is used to the right of the coloured boxes and encompass all genera within their respective families. The family name *Mycosphaerellaceae* is unabbreviated while the rest are abbreviated as follows: *D = Dissoconiaceae*, *P = Phaeothecoidiellaceae*, *S = Schizothyriaceae*, *T = Teratosphaeriaceae*, *C = Cladosporiaceae*. The tree was rooted to *Cylindroseptoria ceratoniae* (CBS 477.69).


S
CP
CC
CA
#
0.78/-
1/99
CBS 125009 Z. nocoxi
CBS 132094 Z. angulare
1/98
CBS 111185 Z. xenoparkii
CBS 139626 Z. fructigenum
1/-
CBS 139625 Z. fructicola
1/99
CBS 103.59 Z. cerophilum
R
I
#
CBS 125008 Z. lonicericola
#
CBS 142186 Z. eucalypticola
CBS 133580 Z. syzygii
1/-
1/98
#
CBS 892.85 Z. cellare
CBS 146.36 Z. cellare
#
CBS 110988 Z. pseudoparkii
#
CBS 110999 Z. pseudoparkii
II
0.99/-
CBS 118500 Z. eucalyptorum
0.99/-
CBS 118742 Z. anthuriicola
0.97/98
CPC 15289 Z. citri-griseum
CPC 13467 Z. citri-griseum
0.95/-
#
CPC 15291 Z. citri-griseum
III
1/98
CBS 122479 Z. musicola
0.57/-
CBS 139627 Z. indonesianum
1/99
CBS 127009 Z. scaevolicola
CBS 121711 Z. strelitziae
R
IV
0.97/-
1/-
CBS 190.63 Z. musigenum
R
0.99/-
0.81/-
CBS 121710 Z. musae-banksii
R
V
0.98/-
CBS 335.36 Z. biverticillatum
R
#
CBS 124107 Z. grevilleae
VI
CBS 116003 Z. proteacearum
CBS 121384 Z. musae
#
CBS 122476 Z. musae
CBS 122478 Z. musae
VII
1/93
0.99/-
CPC 13569 Z. aucklandicum
1/91
CBS 122274 Z. pittospori
#
CBS 142185 Z. hakeae
0.95/-
CPC 15583 Z. hakeae
CPC 17213 Z. hakeae
0.99/-
#
rapssd Z. pseudotsugae
ratatk Z. tsugae
VIII
1/97
CBS 121159 Z. pseudovespa
1/94
#
CBS 116002 Z. daviesiae
CBS 101948 Z. velutinum
CBS 113477 Z. arcuata
R
#
CPC 16640 Z. elaeocarpi
#
CBS 142187 Z. elaeocarpi
#
CBS 113094 Z. iteae
0.94/-
CBS 122099 Z. gupoyu
IX
1/92
CBS 122475 Z. queenslandicum
#
x2
#
CBS 118494 Zasmidium sp.
CBS 142188 Z. schini
Zasmidium
#
CBS 122097 Nothopericoniella perseae-macranthae
#
CBS 122282 Nothopericoniella perseae-macranthae
NT*
1/93
CBS 137992 Annellosympodiella juniperi
AN
CBS 734.87 Neopenidiella nectandrae
NP
CBS 110501 Devonomyces endophyticus
0.57/-
CBS 111167 Devonomyces endophyticus
#
CBS 114662 Devonomyces endophyticus
DV*
CPC 15580 Devonomyces endophyticus
CBS 114709 Devonomyces endophyticus
0.94/-
#
CPC 15143 Phaeophleospora eugeniae
PH
CPC 15159 Phaeophleospora eugeniae
0.7/-
CBS 135102 Cytostagonospora martiniana
CY
#
1/98
CBS 133791 Lecanosticta acicola
x2
0.85/-
CBS 871.95 Lecanosticta acicola
#
CPC 17941 Lecanosticta longispora
LE
#
CBS 133602 Lecanosticta longispora
CBS 133601 Lecanosticta brevispora
0.96/-
CBS 137979 Brunswickiella parsonsiae
BR*
CPC13764 Teratosphaeria stellenboschiana
x2
0.1

contained a total of 2 121 characters divided in three partitions containing 767 (LSU), 761 (*rpb2*), 583 (ITS) characters respectively, including alignment gaps. From the total alignment 26 characters were excluded: 10 characters that were previously introduced as spacers between the genes and 16 characters from the ITS that existed only for the outgroup. The **Bayesian** analysis generated 26 202 trees from which 6 550 trees were discarded (25 % burnin). The posterior probability values were calculated from the remaining 19 652 trees (Fig. 4; first value: PP $\leq$ 1 shown). The alignment contained altogether 1 209 unique site patterns: 262 (LSU), 557 (*rpb2*) and 390 (ITS). The **Maximum-Likelihood** analysis detected 1 187 distinct patterns and reached a final ML optimization likelihood of −57749.224872. The bootstrap support values from the best-scoring tree were mapped on the Bayesian tree as the third value in the tree nodes (Fig. 4; ML-BS $\geq$ 90 % shown). The **Maximum Parsimony** analysis generated the maximum of 1 000 equally most parsimonious trees and the bootstrap support values were mapped on the Bayesian tree as the third value (Fig. 4, MP-BS $\geq$ 90 % shown). From the 2 094 characters, 936 were constant, 127 were variable and parsimony-uninformative and 1 031 were parsimony-informative. A parsimony consensus tree was calculated from the equally most parsimonious trees and the branches were mapped with a thicker stroke on the Bayesian tree (Fig. 4; Length = 14 343, CI = 0.177, RI = 0.666, RC = 0.118, HI = 0.823).

The phylogenetic trees based on **dataset 4** (Fig. 4) that were generated with Bayesian and maximum likelihood methods, separated strains into the same generic clades. The phylogenetic trees generated using parsimony differed slightly in the clade order (data not shown, trees deposited on TreeBASE). Seven families are represented in the tree: *Mycosphaerellaceae* (clades 1–29), *Schizothyriaceae* (*S*), *Dissoconiaceae* (*D*), *Phaeothecoidiellaceae* (*P*), *Teratosphaeriaceae* (*T*), *Cladosporiaceae* (*C*) and the single strain used as outgroup belonging to the *Dothideaceae*. Within the *Phaeothecoidiellaceae*, a new genus is described, namely *Exopassalora* (clade 31). Within the *Mycosphaerellaceae*, seventeen genera are stable since they maintain their positions in the present analysis as they displayed in previous phylogenetic studies, and most of them are based on their respective type strain: *Annellosympodiella* (clade 3), *Neopenidiella* (clade 4), *Phaeophleospora* (clade 5), *Lecanosticta* (clade 6), *Neoceratosperma* (clade 7), *Xenomycosphaerella* (clade 8), *Xenosonderhenia* (clade 9), *Polyphialoseptoria* (clade 11), *Mycodiella* (clade 12), *Ruptoseptoria* (clade 14), *Paramycosphaerella* (clade 17), *Brunneosphaerella* (clade 18), *Neomycosphaerella* (clade 20), *Microcyclosporella* (clade 23), *Mycosphaerelloides* (clade 24), *Epicoleosporium* (clade 25), and *Exosporium* (clade 29). The genus *Zasmidium* (clade 1) is redefined as a broader genus and includes species previously belonging to *Ramichloridium*, *Rasutoria*, and *Periconiella*. Eleven clades represent new genera: *Nothopericoniella* (clade 2), *Xenosonderhenioides* (clade 10), *Chuppomyces* (clade 13), *Pachyramichloridium* (clade 15), *Australosphaerella* (clade 16), *Madagascaromyces* (clade 19), *Hyalozasmidium* (clade 21), *Pseudopericoniella* (clade 22), *Mucosphaerella* (clade 26), *Pseudozasmidium* (clade 27), *Saccharosporium* (clade 28). The genera *Ramichloridium* (clade 30) and *Stenella* (clade 32) cluster outside *Mycosphaerellaceae*, in the families *Dissoconiaceae* (*D*) and *Teratosphaeriaceae* (*T*), respectively.

Taxonomy

The taxonomy section is organized in two parts. The first part is organised by clade number based on the tree depicted in Fig. 1 and covers in detail the genera described in the *Mycosphaerellaceae* for which cultures were available. Untreated taxa whose names are placed under inverted commas are discussed with the genus they were included in, and occur in a coloured box in the trees. The discussed species have a link to the photoplates and trees where they appear. An extra section referring to the genera with uncertain affinity associated with *Mycosphaerellaceae* can be found at the end of this section. Information about the host and origin of the type specimen is provided along with the most recent reference for a description or illustration in order to motivate the recollection of the species with phylogenetic positions still undetermined. Due to the large number of taxa discussed throughout this manuscript, the taxon names are written in full.

CLADES 1–94: *Mycosphaerellaceae*

Mycosphaerellaceae Lindau, Nat. Pflanzenfam., Teil I, 1(1): 421. 1897.

Basionym: *Sphaerellaceae* Nitschke, Verh. Naturhist. Vereins Preuss. Rheinl. 26: 74. 1869, nom. illeg. (Art. 18.3 and 57.1), non *Sphaerellaceae* (algae).

Synonyms: *Ramularieae* Sacc., Syll. Fung. 4: 188. 1886.
Septocylindrieae Sacc., Syll. Fung. 4: 188. 1886.
Cercosporaceae Nann., Repert. mic. uomo 4: 507. 1934.
Cercosporellaceae Nann., Repert. mic. uomo 4: 473. 1934.
Ramulariaceae (Sacc.) Nann., Repert. mic. uomo 4: 472. 1934.
Septocylindriaceae (Sacc.) Nann., Repert. mic. uomo 4: 188. 1934.
Septoriaceae W.B. Cooke, Revta Biol. (Lisboa) 12(12): 298. 1983.

Clade 1: *Neopseudocercosporella*

Neopseudocercosporella Videira & Crous, Stud. Mycol. 83: 80. 2016.

Description (from Videira *et al.* 2016): Phytopathogenic, causing leaf spots. *Mycelium* internal, hyaline, septate, branched,

Fig. 5. Phylogenetic tree (50 % majority rule consensus) resulting from a Bayesian analysis of the combined LSU, *rpb2* and ITS sequence alignment of the strains in the clades 1–6 from Fig. 4 (clades 67–72 of Fig. 1). Bayesian posterior probabilities (PP) and maximum parsimony bootstrap support values ($\geq$ 90 %; MP-BS) are indicated at the nodes (PP/MP-BS) and the scale bar represents the expected number of changes per site. Branches in a thicker stroke represent the branches present in the strict consensus parsimony tree. Genera clades are delimited in dark and light blue boxes, with the genus name indicated to the right. The genus name *Zasmidium* is unnabreviated while the rest are abbreviated as follows: *NT* = *Nothopericoniella*, *AN* = *Annellosimpodiella*, *NP* = *Neopenidiella*, *DV* = *Devonomyces*, *PH* = *Phaeophleospora*, *CY* = *Cytostagonospora*, *LE* = *Lecanosticta*, BR = *Brunswickiella*. All taxa names are written in black, ex-type strains are represented in **bold** and novel genera with an asterisk (*). The dark and light pink coloured boxes, numbered with roman numerals to the right, represent a possible phylogenetic division of the genus *Zasmidium* based on branch support and/or taxonomic history. Within the pink boxes, the generic name of *Zasmidium* was abbreviated (*Z.* = *Zasmidium*) and a grid representing morphological charaters respective of each taxon is displayed to the right of the taxa and should be interpreted as: S – only sexual morph described (filled hexagon); CP – conidiophores unbranched (filled star), conidiophores branched (empty star); CC – conidiogenous cell terminal (filled square), conidiogenous cell terminal forming rachis (filled square with letter R in white), conidiogenous cell terminal and intercalary (empty square), conidiogenous cell terminal and intercalary forming rachis (empty square with letter R in black); CA – conidia long (>30 µm average; full circle), conidia short (<30 µm average; empty circle), single (full triangle), catenate (empty triangle). The tree was rooted to *Teratosphaeria stellenboschiana* (CPC 13764).

stromata almost absent to well-developed. *Ascomata* pseudothecial, mycosphaerella-like, single to aggregated, black, immersed, becoming erumpent, globose, with apical ostiole; wall of medium brown *textura angularis*. *Asci* aparaphysate, fasciculate, bitunicate, subsessile, obovoid to narrowly ellipsoid. *Ascospores*, straight to fusoid-ellipsoid, hyaline, guttulate, thin-walled, with subobtuse ends, medianly 1-septate. *Conidiophores* solitary or grouped, erumpent through the cuticle or emerging through stomata, hyaline, sometimes faintly pigmented, smooth, simple, straight, slightly curved or geniculate-sinuous, usually aseptate, i.e. reduced to conidiogenous cells, thin-walled, smooth. *Conidiogenous cells* hyaline, subcylindrical to geniculate-sinuous, with inconspicuous conidiogenous loci, unthickened, neither darkened nor refractive, mostly truncate. *Conidia* solitary, hyaline or rarely slightly pigmented, thin-walled, smooth, straight to flexuous, subcylindrical to obclavate, with apex obtuse to subacute and base truncate, sometimes somewhat obconically, one- to multiseptate, hilum not thickened or darkened.

Type species: *Neopseudocercosporella capsellae* (Ellis & Everh.) Videira & Crous (≡ *Cylindrosporium capsellae* Ellis & Everh.).

Neopseudocercosporella capsellae (Ellis & Everh.) Videira & Crous, Stud. Mycol. 83: 86. 2016.
Basionym: *Cylindrosporium capsellae* Ellis & Everh., J. Mycol. 3(11): 130. 1887.
Synonyms: *Cercoseptoria capsellae* (Ellis & Everh.) H.C. Greene, Trans. Wisconsin Acad. Sci. 47: 127. 1959.
Pseudocercosporella capsellae (Ellis & Everh.) Deighton, Mycol. Pap. 133: 42. 1973.
For additional synonyms see Braun (1995) or MycoBank.

Descriptions and illustrations: Braun (1995), Videira *et al.* (2016).

Materials examined: **Japan**, Miyazaki, on *Brassica rapa* var. *oleifera*, unknown date, K. Kishi, culture MAFF 237605 = MUCC 1254. **New Zealand**, Auckland, Mt. Albert, on *Brassica* sp., unknown date and collector, isol. C.F. Hill, Jul. 2005, culture CBS 118412. **Republic of Korea**, Hongcheon, on *Capsella bursa-pastoris*, 4 Nov. 2005, H.D. Shin, culture CPC 12519; on *Draba nemorosa*, 30 Oct. 2004, H.D. Shin, culture CBS 135464 = CPC 11677; Namyangju, on *Raphanus sativus*, 22 Oct. 2007, H.D. Shin, culture CBS 131896 = CPC 14773. **Unknown country**, on *Brassica* sp., unknown date and collector, isol. R. Evans, 28 Aug. 2002, cultures CBS 112032 = HJS 601, CBS 112033 = HJS 600. **USA**, Columbia, Missouri, Boone Co., on *Capsella bursa-pastoris*, May 1887, Galloway 253 (**holotype** NY 883641, **isotype** BPI 399944).

Notes: The genus *Neopseudocercosporella* was recently established to accommodate two species that were initially placed in *Pseudocercosporella*, but were not congeneric with the type species *Pseudocercosporella bakeri* (Videira *et al.* 2016). Both *Neopseudocercosporella capsellae* and *Neopseudocercosporella brassicae* are considered important pathogens of *Brassica* spp. (e.g. broccoli, cauliflower, Brussels sprout, etc.) and have been reported worldwide. In literature, these pathogens are usually distinguished based on their disease symptoms, morphology of their ascospores, and culture characteristics (Inman *et al.* 1991). However, based on the DNA similarities of the currently available strains (Fig. 1, clade 1; Fig. 2, clade 5), these species are so similar that more research is required in order to fully understand their identity and biology (Videira *et al.* 2016).

Clade 2: *Fusoidiella*

Fusoidiella Videira & Crous, Stud. Mycol. 83: 87. 2016.

Description: Phytopathogenic, causing small yellow to olivaceous green spots on leaves. *Mycelium* internal. *Conidiophores* aggregated in dense fascicles, arising through stomata, aseptate, i.e. usually reduced to conidiogenous cells, smooth, brown, subcylindrical to clavate, straight to curved due to thickening of the wall on one side, not geniculate, one to multiple conidiogenous loci located laterally or apically, loci conspicuous, thickened and broad, areolate, darkened and refractive. *Conidia* solitary, smooth to rough, hyaline to pale brown, thin- to thick-walled, fusiform to obclavate-fusiform, straight to somewhat curved, septate, not constricted at the septa, apex obtuse and base truncate, hilum flattened, thickened, darkened and refractive.

Type species: *Fusoidiella depressa* (Berk. & Broome) Videira & Crous (≡ *Cladosporium depressum* Berk. & Broome).

Fusoidiella anethi (Pers.) Videira & Crous, **comb. nov.** MycoBank MB822818.

Basionym: *Sphaeria anethi* Pers., Observ. mycol. 1: 67. 1796.
Synonyms: *Dothidea anethi* (Pers.) Fr., Summa veg. Scand., Sectio Post. 2: 387. 1849.
Azosma punctum Lacroix, Pl. Cryptog. France, Ed. 2, Fasc. XVI, no. 757. 1860.
Mycosphaerella anethi (Pers.) Petr., Ann. Mycol. 25: 229. 1927.
Cercosporidium punctum (Lacroix) Deighton, Mycol. Pap. 112: 48. 1967.
Passalora punctum (Lacroix) Petzoldt (as "*puncta*"), Nova Hedwigia, Beih. 87: 192. 1987.
For additional synonyms see Deighton (1967) or MycoBank.

Descriptions and illustrations: Deighton (1967) and Crous & Braun (2003).

Materials examined: **Italy**, unknown host, collector and date, isol. M. Curzi, culture CBS 296.32. **New Zealand**, Auckland, St. John's, on *Foeniculum vulgare*, unknown collector and date, isol. C.F. Hill (1099-B), Dec. 2004, culture CBS 117584.

Notes: This species is the pathogenic agent responsible for cercosporoid leaf blight on *Foeniculum* (fennel), *Petroselinum* (parsley) and *Anethum* (dill) (Davis & Raid 2002). The taxonomic history of this species is complex and has been addressed by multiple authors (Deighton 1967, von Arx 1987, Srivastava 1994, Crous & Braun 2003, Nakashima *et al.* 2011). Morphologically the isolates obtained from all three hosts appear to be identical but some varieties may be present. The connection between the sexual morph *Mycosphaerella anethi* and the asexual morph *Passalora punctum* has been experimentally proven by Petzoldt (1989, 1990). The disease has a worldwide distribution (Africa, Asia, Europe, the Middle East, North America) but this is the first time an isolate was reported from New Zealand. The two strains form a well-supported clade within *Fusoidiella* represented in both phylogenetic trees (Fig. 1 clade 2; Fig. 2, clade 6).

Fusoidiella depressa (Berk. & Broome) Videira & Crous, Stud. Mycol. 83: 88. 2016.
Basionym: *Cladosporium depressum* Berk. & Broome, Ann. Mag. Nat. Hist. 7: 99, t. 5: 8. 1851.
Synonyms: *Passalora depressa* (Berk. & Broome) Sacc., Nuovo Giorn. Bot. Ital. 8(2): 187. 1876.
Cercosporidium depressum (Berk. & Broome) Deighton, Mycol. Pap. 112: 37. 1967.
For additional synonyms see Deighton (1967), Crous & Braun (2003) and MycoBank.

Descriptions and illustrations: Deighton (1967), Crous & Braun (2003) and Videira *et al.* (2016).

Material examined: **Republic of Korea**, Bonghwa, on *Angelica gigas*, 18 Oct. 2007, H.D. Shin, KUS-F23064 = CBS H-22632, culture CBS 141335 = CPC 14915.

Notes: The genus *Fusoidiella* was recently established to accommodate *Passalora depressa*, a species that is not congeneric with *Passalora s. str.* as defined by the type species *Passalora bacilligera*. The type species has fusiform conidia that are morphologically very different from the closest phylogenetic species, *Neopseudocercosporella capsellae*, and fits the description of the authentic specimen (IMI 29181, on *Angelica sylvestris*, Great Britain; Deighton 1967) (Videira *et al.* 2016). Based on the phylogenetic analysis the present strains cluster in a well-supported clade by all three phylogenetic methods employed (Fig. 1 clade 2; Fig. 2, clade 6).

Clade 3: *Filiella*

Filiella Videira & Crous, Stud. Mycol. 83: 88. 2016.

Description (from Videira *et al.* 2016): Phytopathogenic. Mycelium internal, hyphae hyaline, septate, branched, forming well-developed stromata composed of swollen hyphae. *Conidiophores* emerging in dense fascicles from stromata, through the cuticle or through stomata, subcylindrical, straight to flexuous, geniculate-sinuous, aseptate, i.e. usually reduced to conidiogenous cells, rarely 1-septate near the base, hyaline to pale yellow at the base, thin-walled, smooth, with inconspicuous conidiogenous loci, unthickened, neither darkened nor refractive. *Conidia* solitary, acicular, subcylindrical, filiform, narrowly obclavate, hyaline, discretely septate, thin-walled, smooth, apex subacute, base truncate, hila unthickened, not darkened.

Type species: *Filiella pastinacae* (P. Karst.) Videira & Crous (≡ *Cercosporella pastinacae* P. Karst.).

Filiella pastinacae (P. Karst.) Videira & Crous, Stud. Mycol. 83: 88. 2016.
Basionym: *Cercosporella pastinacae* P. Karst., Hedwigia 23: 63. 1884.
Synonyms: *Ramularia pastinacae* (P. Karst.) Lindr. & Vestergr., Acta Soc. Fauna Fl. Fenn. 22(1): 8. 1902.
Pseudocercosporella pastinacae (P. Karst.) U. Braun, Nova Hedwigia 56(3–4): 444. 1993.
For additional synonyms see Braun (1995) and MycoBank.

Description and illustration: Videira *et al.* (2016).

Materials examined: **Finland**, Mustalia, on *Pastinaca sativa*, 7 Jul. 1867, P. Karsten (**holotype** H 3921). **Germany**, Dresden, on *Pastinaca sativa*, 1866, Rabenh., Fungi Eur. Exs. 1262 (HAL, erroneously designated as “neotype” in Braun 1995). **Sweden**, Uppland, Uppsala Näs, Vreta, on *Laserpitium latifolium*, 2 Jun. 1988, K. & L. Holm, culture CBS 114116 = UPSC 2633.

Notes: This monotypic genus was recently established to accommodate *Pseudocercosporella pastinacae*, since it was not congeneric with *Pseudocercosporella s. str.* based on *Pseudocercosporella bakeri* (Videira *et al.* 2016). This genus is represented by a single-strain lineage in the phylogenetic analyses (Fig. 1, clade 3; Fig. 2, clade 7), and it is closely related to *Neopseudocercosporella* and *Fusoidiella*. Morphologically, it can be distinguished by producing acicular-filiform conidia instead of the subcylindrical conidia of *Neopseudocercosporella capsellae*, or pigmented, fusiform conidia of *Fusoidiella depressa*. Braun's (1995) designation of a neotype, based on the assumption that the holotype was not preserved, is now obsolete since holotype material of *Cercosporella pastinacae* has recently been traced at H. The holotype material has been re-examined by U. Braun and found to represent the present species.

Clade 4: *Apseudocercosporella*

Apseudocercosporella Videira & Crous, Stud. Mycol. 83: 89. 2016.

Description (from Videira *et al.* 2016): Phytopathogenic. *Mycelium* composed of hyaline, septate, branched, thin-walled, smooth hyphae. *Conidiophores* arising from hyphae, simple, and occasionally branched, straight and subcylindrical to flexuous, geniculate-sinuous, septate or aseptate, hyaline, thin-walled, smooth. *Conidiogenous cells* integrated, terminal or conidiophores often reduced to conidiogenous cells, subcylindrical to geniculate-sinuous conidiogenous loci slightly thickened and darkened. *Conidia* formed singly, filiform, or subcylindrical, hyaline, thin-walled, smooth, septate or aseptate, base more or less truncate, hilum slightly thickened and darkened.

Type species: *Apseudocercosporella trigonotidis* Videira *et al.*

Apseudocercosporella trigonotidis Videira *et al.*, Stud. Mycol. 83: 89. 2016.

Description and illustration: Videira *et al.* (2016).

Material examined: **Republic of Korea**, Jeju, on *Trigonotis peduncularis*, 12 Nov. 2003, H.D. Shin (**holotype** KUS-F 20054, isotype CBS H-22515, culture ex-isotype CBS 131890 = CPC 10864); *idem*., culture CPC 10865.

Notes: This monotypic genus was recently established to accommodate a pseudocercosporella-like species that was not congeneric with *Pseudocercosporella s. str.* based on *Pseudocercosporella bakeri*. Phylogenetically, this genus is closely related to *Filiella* and *Neopseudocercosporella* (Fig. 1, clade 4; Fig. 2, clade 9). Morphologically, it can be distinguished by the conidial hila and conidiogenous loci that are slightly thickened and darkened instead of inconspicuous.

Clade 5: *Neocercospora*

Neocercospora M. Bakhshi *et al.*, Phytotaxa 213: 28. 2015.

Description (from Bakhshi *et al.* 2015b): Foliicolous and caulicolous, phytopathogenic. *Mycelium* internal. *Stromata* substomatal, weakly to moderately developed, brown. *Caespituli* amphigenous, punctiform, brown. *Conidiophores* aggregated in loose to moderately dense fascicles, arising from the upper cells of substomatal to intraepidermal brown stromata; conidiophores aseptate, reduced to conidiogenous cells. *Conidiogenous cells* unbranched, pale brown to brown, smooth, subcylindrical to cone-shaped, wider at the base, uni- to multilocal, sympodial, subdenticulate; loci conspicuous, thickened, darkened, somewhat refractive, apical or formed on shoulders caused by geniculation. *Conidia* solitary or catenate, in unbranched chains, hyaline, smooth, guttulate or not, cylindrical, subcylindrical to obclavate-cylindrical, straight to slightly curved, septate; hilum flattened, moderately thickened, darkened and somewhat refractive.

Type species: *Neocercospora ammicola* M. Bakhshi *et al.*

Neocercospora ammicola M. Bakhshi *et al.*, Phytotaxa 213: 28. 2015.

Description and illustration: Bakhshi *et al.* (2015b).

Material examined: **Iran**, West Azerbeijan, Khoy, Firouragh, on leaves and stems of *Ammi majus*, Sep. 2012, M. Arzanlou (**holotype** IRAN 16461 F, culture ex-type CCTU 1186 = CBS 136450).

Notes: The monotypic genus *Neocercospora* was recently introduced by Bakhshi *et al.* (2015b) to accommodate a cercospora-like species that is not congeneric with *Cercospora s. str.* based on *Cercospora apii*. The most distinctive characteristics are the conidiophores reduced to conidiogenous cells and conidia that can occur in chains. Phylogenetically, this genus forms a single lineage (Fig. 1, clade 5; Fig. 2, clade 8) closely related to *Filiella* and *Neopseudocercosporella.*

Clade 6: *Septoria*

Septoria Sacc., Syll. Fung. 3: 474. 1884.

Description (from Quaedvlieg *et al.* 2013): *Mycelium in vitro* slow-growing, pale brown, septate, *in vivo* immersed. *Conidiomata* pycnidial, immersed, separate or aggregated (but not confluent), globose, papillate (or not), brown, wall of thin, pale brown *textura angularis*, inner layer of flattened, hyaline *textura angularis*, frequently somewhat darker and more thick-walled around the ostiole. *Ostiole* single, circular, central. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* holoblastic, either determinate or indeterminate, proliferating sympodially and/or percurrently, hyaline, smooth, ampulliform, doliiform or lageniform to short cylindrical, without thickened loci. *Conidia* hyaline, multiseptate, filiform, solitary, smooth, often constricted at septa. Sexual morphs are mycosphaerella-like.

Type species: *Septoria cytisi* Desm.

Septoria cytisi Desm., Ann. Sci. Nat., Bot., Sér. 3, 8: 24. 1847.

Description and illustration: Quaedvlieg *et al.* (2013).

Material examined: **Slovakia**, on leaves of *Laburnum anagyroides*, 1884, J.A. Baeumler, BPI USO 378994.

Notes: *Septoria* represents a genus of plant pathogenic fungi with a wide geographic distribution, commonly associated with leaf spots and stem cankers of a broad range of plant hosts. Following a proposal accepted by the International Code of Nomenclature for algae, fungi, and plants (ICN), the generic name *Septoria* Sacc. was conserved over the older synonym *Septaria* Fr. (original spelling). *Septoria s. str.* was circumscribed when Quaedvlieg *et al.* (2011) managed to obtain sequence data of both ITS (GenBank accession JF700932) and LSU (GenBank accession JF700954) from a *Septoria cytisi* fungarium specimen (BPI USO 378994). Phylogenetically, *Septoria* forms a well-supported clade (Fig. 1, clade 6; Fig. 2, clade 11) closely related to *Mycovellosiella* and *Neocercospora.*

Clade 7: *Mycovellosiella*

Mycovellosiella Rangel, Arch. Jard. Bot. Rio de Janeiro 2: 71. 1917.
Synonym: *Vellosiella* Rangel, Bol. Agric. (São Paulo) 16: 151. 1915, non Baill. 1887.

Description: Phytopathogenic, causing leaf spots. *Colonies* effuse, greyish olivaceous to olivaceous brown. *Stroma* absent or poorly developed. *Mycelium* pale to moderately deep olivaceous, septate, branched, smooth, stromata absent or small; superficial hyphae arising from internal hyphae or stromatic hyphal aggregations, usually emerging through stomata. *Conidiophores* macronematous, mononematous, solitary, arising from superficial hyphae or in small to medium fascicles, erect, tangled or forming loose ropes resembling synnemata, straight to flexuous, simple or branched, subcylindrical to geniculate-sinuous, thin-walled, continuous to septate, smooth, subhyaline to pigmented. *Conidiogenous cells* integrated, terminal, intercalary or pleurogenous, straight to geniculate-sinuous, polyblastic, sympodial, with conidiogenous loci thickened, darkened and often protuberant. *Conidia* solitary to catenate, sometimes in branched chains, ellipsoid-ovoid, subcylindrical-fusiform, obclavate, straight or curved, aseptate or multiseptate (euseptate), subhyaline to pigmented, smooth to slightly verruculose, ends obtuse, rounded, truncate or pointed; hila thickened and darkened; conidial secession schizolytic.

Type species: *Mycovellosiella cajani* (Henn.) Rangel ex Trotter (≡ *Cercospora cajani* Henn.).

Mycovellosiella cajani (Henn.) Rangel ex Trotter, Syll. Fung. 25: 942. 1931. Fig. 6.
Basionym: *Cercospora cajani* Henn., Hedwigia 41: 309. 1902.
Synonyms: *Vellosiella cajani* (Henn.) Rangel, Bol. Agric. (São Paulo) 16(2): 145. 1915.
Passalora cajani (Henn.) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser. 1: 93. 2003.

Description in vivo *and illustrations*: Deighton (1974), Seifert *et al.* (2011).

Description in vitro (MEA; CBS 114275): *Mycelium* hyaline to brown, irregular in width, 1.5–3 µm. *Conidiophores* hyaline to brown, smooth, simple or branched, geniculate-sinuous, irregular in width, 10–50 × 2.5–5(–7.5) µm. *Conidiogenous cells* integrated, apical, intercalary, pale brown, rarely hyaline, polyblastic, simple or branched, proliferating sympodially, integrated, sometimes reduced to hyphal loci, aseptate, with thickened, darkened and rim-like loci at the apex and shoulders, 1.5–2.5 µm diam. *Conidia* cylindrical to ellipsoidal, pale brown, solitary to catenate, in single or branched chains, conically truncate at both ends or basal end, rounded at the apex when solitary, 7–25 × 3–7.5 µm, aseptate, with darkened, thickened, and rim-like loci at the both ends or basal end, 1.5–2.5 µm diam.

Materials examined: **Brazil**, Minas Gerais, Viçosa, on *Cajanus cajan*, 2016, R.W. Barreto (**neotype** designated here CBS H-22940, MBT378566, culture ex-neotype CBS 142174 = CPC 30580 = RB 2071A); *idem*. CPC 31579 = RB 2071B. **South Africa**, Mpumalanga, Nelspruit, on *Cajanus cajan*, 17 May 2002, L. van Jaarsveld, cultures CBS 113998 = CPC 5335, CBS 113999 = CPC 5339, CBS 114275 = CPC 5334.

Notes: The type species of *Mycovellosiella*, *Mycovellosiella cajani*, was described from leaves of *Cajanus indicus* (syn. *Cajanus cajan*), on May 1901 (Puttemans 237) in Brazil (Hennings 1902), but the type material is not preserved in B and could not be located elsewhere. Deighton (1974) examined numerous specimens deposited in IMI and TAI and concluded that two varieties could be distinguished: *Mycovellosiella cajani* var. *cajani* (conidia 0–3-septate and 10–35 µm long; South America, West Indies, Mauritius and Africa) and *Mycovellosiella cajani* var. *indica* (conidia 0–9-septate 10–129 µm long; India, Pakistan, Bangladesh and Burma). In this study, we obtained a freshly collected sample of *Cajanus cajan* from Brazil and cultured this fungus. This strain is phylogenetically identical to those from South Africa (Fig. 1, clade 7, Fig. 2, clade 10) and the morphology is identical to the descriptions available in the literature (Deighton 1974, Braun 1998), and therefore the specimen is hereby designated as neotype. *Mycovellosiella cajani* is the causative agent of leaf spot disease of pigeon pea worldwide and, when

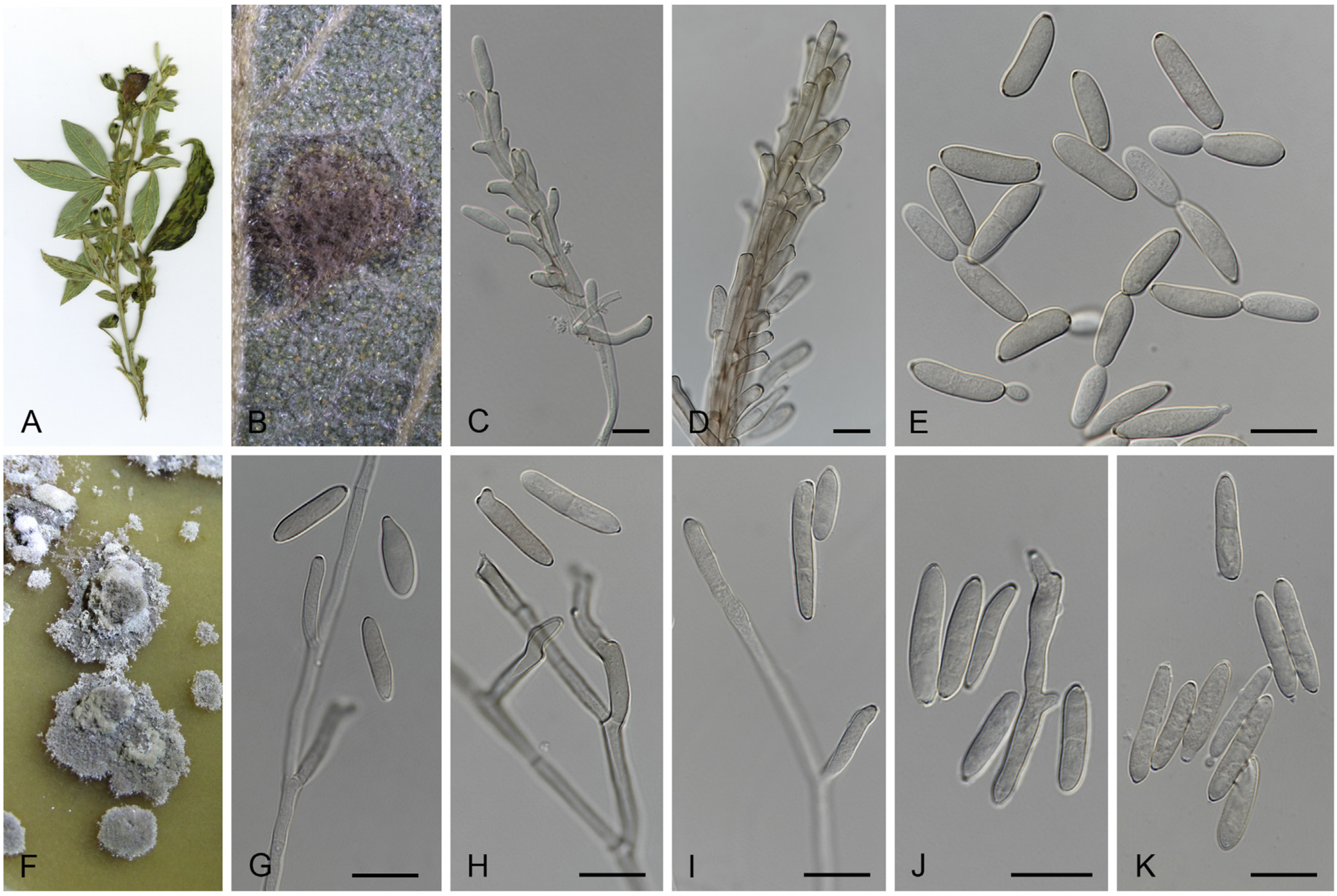


Fig. 6. *Mycovellosiella cajani* (CBS 114275). **A–E.** Observations *in vivo*. **F–K.** Observations *in vitro*. **A, B.** Leaf spot symptoms on the host. **C, D, G–I.** Conidiophores, conidiogenous cells and conidia. **E, J–K.** Catenate conidia. **F.** Culture on V8. Scale bars = 10 µm.

defoliation occurs before flowering and podding, it causes severe yield losses (up to 85 % in eastern Africa) (Reddy *et al.* 2012). *Mycovellosiella*, based on phylogenetic data, is a monotypic genus but with more collections new species may emerge. Previous morphological descriptions of *Mycovellosiella s. lat.* (Deighton 1974, Braun 1998) can no longer be applied to this genus in its current circumscription and the application of this generic name depends on the availability of corresponding phylogenetic data. *Mycovellosiella* was previously distinguished from *Passalora* and *Phaeoramularia* by the formation of superficial mycelium with solitary conidiophores formed *in vivo*, but these traits are phylogenetically and taxonomically not significant and appear unreliable. Without detailed knowledge of the phylogenetic affinity, species with mycovellosiella-like morphology should tentatively be maintained in or assigned to *Passalora s. lat*.

Clade 8: *Miuraea* and *Sphaerulina*

Miuraea Hara, Byochugai-hoten: 260 & 779. 1948, emend.
Unconfirmed synonyms: *Rhopaloconidium* Petr. (1952), *Hyalodictys* Subram. (1962).

Description (adapted from Braun 1995): Leaf spot pathogen of vascular plants. *Mycelium* hyaline to lightly pigmented, septate, branched, emerging through stomata, thin-walled. *Conidiophores* little differentiated, semi-macronematous, mononematous, short, sometimes reduced to a conidiogenous cell integrated in the hyphae, with small lateral peg-like protuberances, occasionally subfasciculate and arising from stromatic hyphal aggregations. *Conidiogenesis* holoblastic, monoblastic, determinate, occasionally polyblastic, proliferation sympodial or percurrent; conidiogenous loci more or less truncate, unthickened or slightly thickened, not darkened. *Conidia* solitary or catenate, ellipsoid-ovoid, subcylindrical-vermiform, obclavate, subclavate, sometimes somewhat asymmetrical, eu- or distoseptate, pluriseptate, septa transverse, oblique to longitudinal, hyaline to faintly pigmented, thin-walled, old conidia often slightly to moderately thick-walled, hila rounded to truncate, unthickened or slightly thickened, not darkened, conidial secession schizolytic.

Type species: *Miuraea degenerans* (Syd. & P. Syd.) Hara (≡ *Clasterosporium degenerans* Syd. & P. Syd.).

Miuraea degenerans (Syd. & P. Syd.) Hara, Byochugai-hoten: 260, 1948. Fig. 7.
Basionym: *Clasterosporium degenerans* Syd. & P. Syd., Ann. Mycol. 12(2): 164. 1914.
Description in vivo: Braun (1995).

Description in vitro (on MEA; MAFF 239265): *Mycelium* hyaline, later blackish, aggregated with white-floccose aerial hyphae. *Conidiophores* short, reduced to conidiogenous cells, hyaline to pale brown, 47–71 × 2–5 µm. *Conidiogenous cells* determinate, proliferating sympodially and/or percurrently, holoblastic, with slightly thickened loci. *Conidia* solitary or catenate, oblong to obclavate, hyaline to pale, 10–23 × 6–9 µm, 2–6-eu- or distoseptate, rounded or conically truncate, slightly thickened or unthickened at the base.

Materials examined: **Japan**, Ibaragi, on *Prunus mume*, Sep. 2003, T. Kobayashi (**epitype** designated here TSU MUMH11567, MBT376838, culture ex-type MAFF

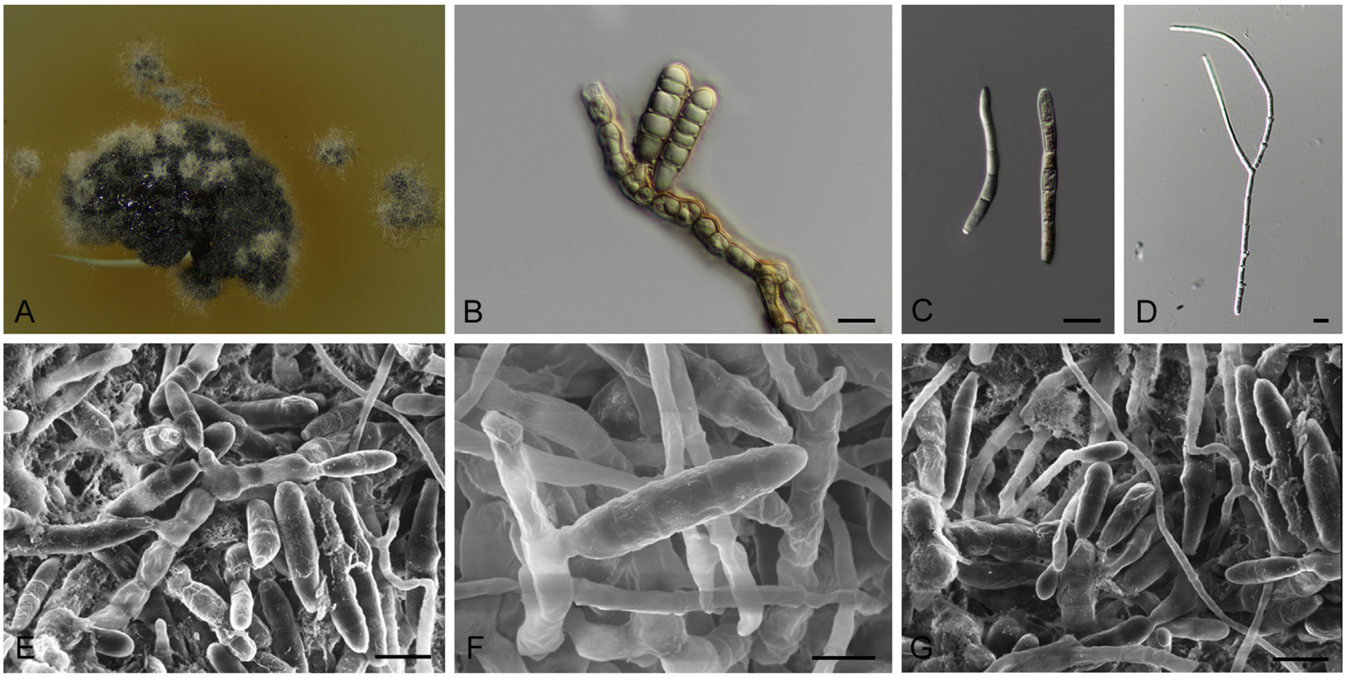


Fig. 7. *Miuraea degenerans* (MUCC 1514). **A–D.** Observations *in vitro*. **A.** Culture on MEA. **B.** Olivaceous conidia and short conidiophore. **C.** Hyaline (left) and pigmented (right) conidia. **D.** Microcyclic conidia. **E–G.** Conidiophores and conidia observed using SEM. Scale bars = 10 µm.

239265 = MUCC 1514); Mutsu (= Aomori), on *Prunus mume*, 1 Nov. 1913, M. Miura (**holotype** S F41753). **Republic of Korea**, Chuncheon, on *Prunus armeniaca*, 7 Oct. 2003, H.D. Shin, CBS H-20840, cultures CBS 131935 = CPC 10828.

Notes: *Miuraea degenerans* and *Miuraea persica* are well-known as the causal agents of white mildew or frosty mildew of *Prunus* spp. in far-east Asian countries. In the present study, the sequences of both *Miuraea persicae* (sexual morph: *Mycosphaerella pruni-persicae*) and *Miuraea degenerans* are quite similar; however, comparison of ITS sequences of several collections identified as either *Miuraea degenerans* or *Miuraea persica* show a limited number of nucleotide differences (data not shown), and pending more collections and multigene data we refrain from synonomising these two species. Subramanian's (1962) description of *Miuraea degenerans* includes *Miuraea persicae*, but Braun (1995) considers them different species based on the conidial characteristics that are generally longer, with less longitudinal septa and only occasionally constricted at septa in *Miuraea persica*, while the conidia of *Miuraea degenerans* are generally broader, with more longitudinal septa and often constricted at septa. Based on the phylogenetic analysis, *Miuraea* strains cluster among *Sphaerulina* species and none of the three phylogenetic methods applied provided strong support for their separation (Fig. 1, clade 8; Fig. 2, clade 12). The introduction of more strains of *Miuraea* species in the future may provide support to the separation of these genera into two independent clades. Morphologically *Miuraea* is considered intermediate between *Pseudocercospora* and *Pseudocercosporella* (Braun 1995), which are hyphomycete genera, while *Sphaerulina* is a coelomycete genus. *Miuraea asiminae*, was recently reallocated to *Pseudocercospora* (Braun & Crous 2008).

Sphaerulina Sacc., Michelia 1(4): 399. 1878.
Unconfirmed synonyms: *Ophiocarpella* Theiss. & Syd. (1915), *Sphaerialea* Sousa da Câmara (1926).

Description (adapted from Quaedvlieg *et al.* 2013): *Ascomata* pseudothecial, immersed, subepidermal, erumpent at the apex, single to clustered, globose, papillate. *Ostiole* central, with hyaline periphyses; wall of *textura angularis*, composed of 2–4 layers of brown cells. *Hamathecium* dissolving at maturity. *Asci* bitunicate, fissitunicate, clustered, cylindrical to obclavate, rounded at apex, with or without a shallow apical chamber, short-stipitate or sessile, with 8 bi- to triseriate ascospores. *Ascospores* subcylindrical to fusiform, rounded at ends, slightly tapered, straight or slightly curved, 1–3-septate, with a primary septum nearly median, hyaline, smooth, without sheath or appendages.

Type species: *Sphaerulina myriadea* (DC.) Sacc. (≡ *Sphaeria myriadea* DC.).

Sphaerulina myriadea (DC.) Sacc., Michelia 1(4): 399. 1878.
Basionym: *Sphaeria myriadea* DC., in de Candolle & Lamarck, Fl. franç., Edn 3 (Paris) 5/6: 145. 1815.

Description and illustration: Crous *et al.* (2011c).

Materials examined: **Germany**, Driesen, Lasch, Rabenhorst, Fungi Eur. Exs. no. 149 (L). **Japan**, Aomori, Tsugaru, Kidukuri, Bense-marsh, on leaves of *Quercus dentata*, 21 Apr. 2007, K. Tanaka 2243, HHUF 29940, single ascospore culture CBS 124646 = JCM 15565. **UK**, on leaves of *Quercus robur*, J.E. Vize, Microfungi Brit. Ex. No. 195, IMI 57186, (= K(M) 167735). **USA**, California, Sequoia National Park. alt. 2590 m, on leaves of *Castanopsis sempervirens*, 18 Jun. 1931, H.E. Parks, BPI 623686; Lake Co., Hoberg's Resort, on leaves of *Quercus kelloggii*, 15 May 1943, V. Miller, BPI 623707; Maryland, Marlboro, on leaves of *Quercus alba*, 26 Apr. 1929, C.L. Shear, BPI 623705; Texas, Houston, on leaves of *Q. alba*, 8 Apr. 1869, H.W. Ravenel, BPI 623704.

Notes: The genus *Sphaerulina* was traditionally separated from *Mycosphaerella* based on ascospore septation, a trait that was unreliable to infer phylogenetic relatedness (Crous *et al.* 2003, Crous *et al.* 2011c). The currently available strains of *Sphaerulina myriadea* were isolated from several hosts belonging to the *Fagaceae* originating from various locations. These strains were treated in a previous study where the authors proposed that *Sphaerulina myriadea* was a species complex and therefore refrained from designating an epitype pending the collection of authentic European material on *Quercus* from France (Crous

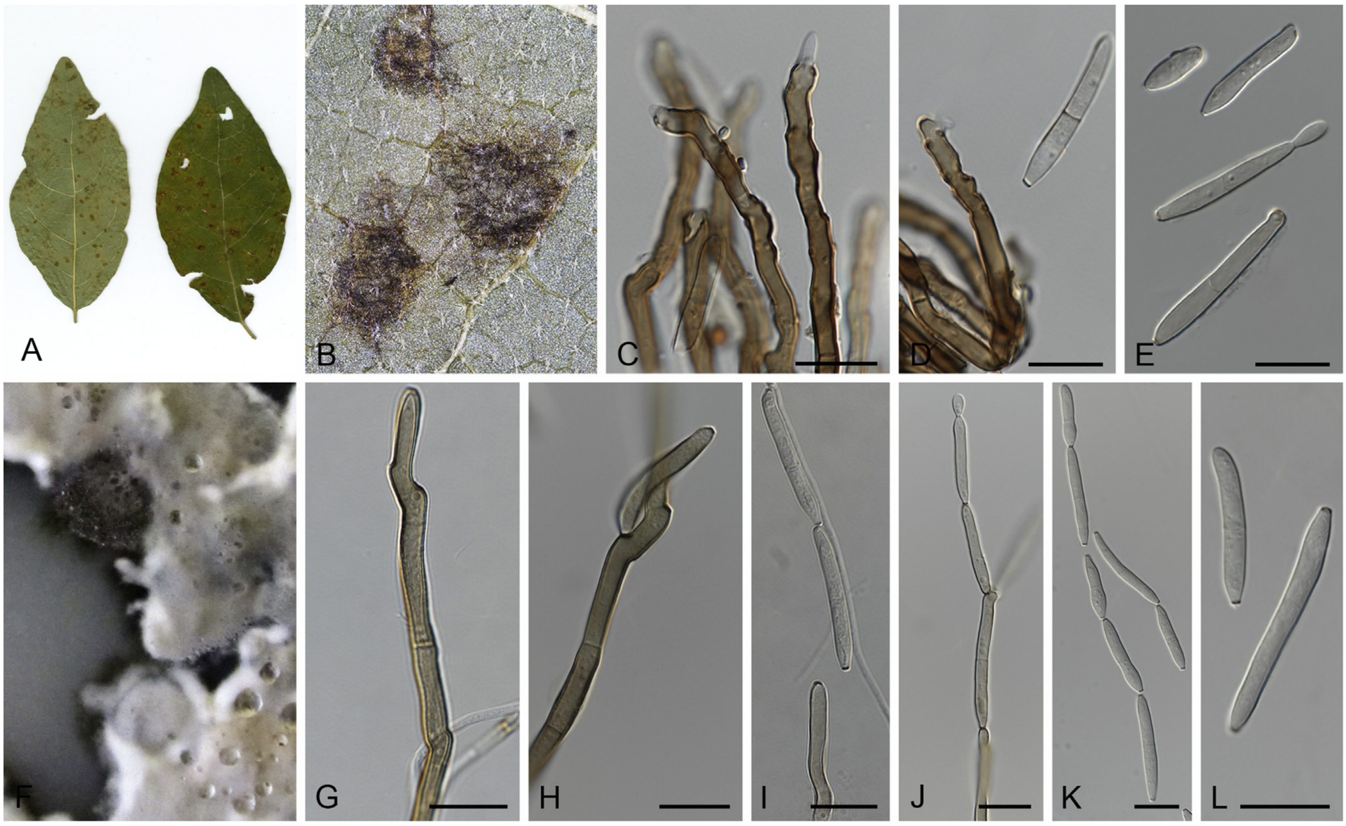


Fig. 8. *Cercoramularia koreana* (CPC 10709). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C, D.** Conidiophores, conidiogenous cells and conidia. **E.** Catenate conidia. **F–L.** Observations *in vitro*. **F.** Culture on OA. **G.** Conidiophore and conidiogenous cell. **H.** Conidiophore, conidiogenous cell and conidium. **I, J.** Conidiogenous cell and catenate conidia. **K, L.** Catenate conidia. Scale bars = 10 µm.

et al. 2011c). The genus *Sphaerulina* was previously found to be phylogenetically close to *Septoria* (Quaedvlieg *et al.* 2013, Verkley *et al.* 2013). In this work, *Sphaerulina* and *Miuraea* strains cluster together and none of the three phylogenetic methods applied provided strong support for their separation (Fig. 1, clade 8; Fig. 2, clade 12).

Species clustering in the *Sphaerulina* clade that need further material to be collected before a formal combination into *Sphaerulina* can be proposed:

Mycosphaerella grossulariae (Fr.) Lindau, in Engler & Prantl, Nat. Pflanzenfam., Teil I, 1(1): 424. 1897.

Material examined: **Netherlands**, leaf spot on *Ribes nigrum*, col. M.S.J. Ledeboer, isol. H.A. Diddens, dep. 1937, culture CBS 235.37.

Notes: The type of *Mycosphaerella grossulariae* was described from *Ribes grossularia* collected in Sweden (Aptroot 2006). Tomilin (1979) linked this species to two asexual morphs, *Phyllosticta grossulariae* and *Septoria ribis*. According to Eriksson (1992), it is morphologically indistinguishable from *Pleospora herbarum* (= *Stemphylium*). The present species is represented by a single strain in the phylogenetic analysis performed (Fig. 2, clade 12). This species needs to be recollected and its phylogenetic position resolved.

Mycosphaerella harthensis (Auersw.) Mig., Krypt.-Fl. Deutschl., Österr. Schweiz, Pilze Vol 10, Theil 3(1): 289. 1912.

Material examined: **Switzerland**, dead leaves of *Betula* sp., unknown collector and date, isol. E. Müller, 7 Jun. 1952, culture CBS 325.52.

Notes: The type of *Mycosphaerella harthensis* was described from *Betula* collected in Germany and the specimen is probably not preserved (Aptroot 2006). The culture CBS 325.52 is currently sterile. The present species is represented by a single strain in the phylogenetic analysis performed (Fig. 2, clade 12). This species needs to be recollected and neotypified.

Clade 9: *Cercoramularia*

Cercoramularia Videira, H.D. Shin, C. Nakash. & Crous, **gen. nov.** MycoBank MB822581.

Etymology: With cercosporidium-like conidiophores and ramularia-like conidia.

Description: *Mycelium* hyaline to brown. *Conidiophores* brown to pale brown, emerging from brown hyphae or swollen hyphal cells, smooth, euseptate, straight to geniculate-sinuous, simple or branched, sometimes reduced to conidiogenous cell. *Conidiogenous cells* integrated, terminal, hyaline to pale brown, monoblastic or proliferating sympodially, with thickened, darkened and refractive conidiogenous loci. *Conidia* hyaline to pale brown, euseptate, solitary or catenate, holoblastic, fusiform, rounded at the apex when solitary.

Type species: *Cercoramularia koreana* Videira *et al.*

Cercoramularia koreana Videira, H.D. Shin, C. Nakash. & Crous, **sp. nov.** MycoBank MB822710. Fig. 8.

Etymology: In honour of the country it was collected from, Republic of Korea.

Description in vivo (CBS H-22941; herb. spec. CPC 10709): *Leaf spots* small, irregular, 4–10 mm diam, brown to dark brown, distinct. *Stromata* absent to small, brown, globose. *Conidiophores* in loose fascicles of 2–12, dark brown, septate, geniculate-sinuous, 23–78 × 2.5–9 µm. *Conidiogenous cells* integrated, terminal, polyblastic, proliferating sympodially, with thickened, darkened, refractive and rim-like loci at the apex and shoulders, 1.6–2.5 µm diam. *Conidia* hyaline, solitary or catenate in branched chains, obclavate, cylindrical to filiform, 20–62 × 2.5 µm, 2–5-septate, with thickened and darkened rim-like hila, 1.6–2.5 µm diam, rounded at the apex when solitary.

Description in vitro (SNA; CPC 10639): *Mycelium* hyaline to brown, 2–2.5 µm diam, with swollen brown cells. *Conidiophores* pale brown to brown, emerging from brown hyphae or swollen hyphal cells, smooth, straight to geniculous-sinuous, simple or branched, euseptate, 12.5–100 × 2.5–3 µm. *Conidiogenous cells* integrated, terminal, hyaline to pale brown, monoblastic or polyblastic, proliferating sympodially, with thickened, darkened and refractive loci, 1.8–2.8 µm diam. *Conidia* hyaline to pale brown, solitary or in chains up to six conidia, fusiform, rounded at the apex when solitary, 1-euseptate, 27–105 × 3–3.7 µm.

Materials examined: **Republic of Korea**, Seoul, on leaves of *Styrax japonica*, 17 Sep. 2003, H.D. Shin (**holotype** CBS H-22941, ex-type culture CBS 142175 = CPC 10709); same location and host, 2003, H.D. Shin, cultures CPC 10639–10641.

Notes: This genus is represented by a single species that is phylogenetically close to *Phloeospora* and *Sphaerulina* (Fig. 1, clade 9; Fig. 2, Clade 13). *Cercoramularia koreana* causes leaf spot symptoms on *Styrax japonica*, a small tree from the *Styracaceae* family commonly planted as ornamental.

Clade 10: *Phloeospora*

Phloeospora Wallr., Fl. Crypt. Germ. 2: 176. 1833.
Synonyms: *Septoria* Fr., Syst. Orb. Veg. 1: 119. 1825.
Helicobolus Wallr., Fl. Crypt. Germ. 2: 751. 1833.
Phloeochora Höhn., Ber. Deutsch. Bot. Ges. 35: 252. 1917.

Description (from Quaedvlieg *et al.* 2013): *Mycelium* immersed, septate, hyaline. *Conidiomata* acervular, subepidermal, circular, discrete or confluent, composed of hyaline to pale brown, thin-walled *textura angularis*; dehiscence irregular. *Conidiophores* reduced to conidiogenous cells or with one or two supporting cells, branched at base or not. *Conidiogenous cells* holoblastic, annellidic, occasionally also sympodial, discrete, indeterminate hyaline, smooth, cylindrical, with several apical inconspicuous annellations, formed from the upper cells of the acervuli. *Conidia* solitary, hyaline, septate, smooth, guttulate or not, cylindrical, curved, attenuated towards the apices, apex obtuse to subobtuse, base truncate, with minute marginal frill.

Type species: *Phloeospora ulmi* (Fr.) Wallr. (≡ *Septoria ulmi* Fr.).

Phloeospora ulmi (Fr.) Wallr., Fl. Crypt. Germ. 2: 177. 1833.
Basionym: *Septoria ulmi* Fr. [as 'Septaria'], Novit. Fl. Svec. 5(cont.): 78. 1819.
Synonyms: *Septogloeum ulmi* (Fr.) Died., Krypt. Fl. Brandenburg (Leipzig) 9: 836. 1915.
Cylindrosporium ulmi (Fr.) Vassiljevsky, Fungi Imperfecti Parasitici 2: 580. 1950.
Mycosphaerella ulmi Kleb., Z. PflKrankh. 12: 257. 1902.
Sphaerella ulmi (Kleb.) Sacc. & D. Sacc., Syll. Fung. (Abellini) 17: 642. 1905.

Description and illustration: Quaedvlieg *et al.* (2013).

Materials examined: **Austria**, Innsbruck, near Hungerburg, on leaves of *Ulmus* sp., 21 Sep. 1981, H.A. van der Aa, CBS H-14740, CBS H-14861, culture CBS 613.81; Innsbruck, road to Hungerburg, on leaves of Ulmus glabra, 20 Oct. 1996, W. Gams, culture CBS 344.97. **Netherlands,** Baarn, garden of CBS, Oosterstraat 1, on leaves of *Ulmus* sp., 26 Aug. 1998, H.A. van der Aa, CBS H-14739, culture CBS 101564; community of Borsele, Schouwersweel near Lisse, on *Ulmus* sp., 27 Aug. 2001, G. Verkley, culture CBS 109835.

Notes: The generic synonymy has been discussed by Sutton (1977) and the type species described and illustrated by Sutton & Pollack (1974). *Phloeospora* is based on the type species *Phloeospora ulmi*, isolated from *Ulmus glabra* in Europe, but a type specimen could not be located. It can be morphologically distinguished from *Septoria* by the production of conidia in acervuli, whereas conidiomata in the latter genus are pycnidial. A recent phylogenetic analysis performed to delimit *Septoria* and allied genera confirmed that *Phloeospora* (based on *Phloeospora ulmi*) clusters close to, but separate from *Septoria s. str.* (Quaedvlieg *et al.* 2013). This separation is also observed in the phylogenetic analyses performed in this study (Fig. 1, clade 10; Fig. 2, clade 14). The known sexual morphs linked to *Phloeospora* resemble the concepts of *Mycosphaerella*, *Didymella* and *Sphaerulina* supporting the idea that this genus is heterogenous and in need of revision (Verkley & Priest 2000). In this study, we observed that the strain currently known as *Phloeospora maculans* is not congeneric with *Phloeospora ulmi*.

Clade 11: *Cercospora*

Cercospora Fresen. ex Fuckel, Hedwigia 2(15): 91. 1863 and Fungi Rhen. Exs., Fasc. II: no. 117. 1863, nom. cons. prop.
Unconfirmed synonyms: *Virgasporium* Cooke (1875), *Cercosporina* Speg. (1910).

Description (adapted from Braun *et al.* 2013): Mostly plant pathogenic but also saprobic, usually causing distinct lesions (leaf spots) but sometimes symptomless. *Mycelium* internal and only rarely external, hyphae usually pigmented but occasionally hyaline, branched, septate, thin-walled, smooth, rarely faintly verruculose. *Stromata* lacking to well-developed, substomatal, intra-epidermal or immersed, mostly pigmented, composed of *textura angulata* or *globosa*. *Conidiophores* mono- and macronematous, solitary or fasciculate, rarely in sporodochial conidiomata, emerging through stomata or erumpent, erect, continuous to multi-septate, hyaline (subgen. *Hyalocercospora*) to pigmented, pale olivaceous to dark brown (subgen. *Cercospora*), wall smooth to slightly rough, thin to moderately thick, sometimes reduced to conidiogenous cells. *Conidiogenous cells* integrated, terminal or intercalary, usually polyblastic but sometimes monoblastic, proliferation sympodial, rarely percurrent, conidiogenous loci (scars) conspicuous, thickened and darkened-refractive, planate with minute central pore. *Conidia* solitary, rarely in short chains, mostly scolecosporous, obclavate-cylindrical, acicular, filiform and multi-euseptate, rarely amero- to phragmosporous, broadly ellipsoid-ovoid to broadly obclavate-cylindrical, but always hyaline or subhyaline, thin-walled, smooth or almost so, hila thickened and darkened, conidial secession schizolytic.

Type species: *Cercospora apii* Fresen. (typ. cons. prop.)

Cercospora apii Fresen., Beitr. Mykol. 3: 91. 1863.

Description: Groenewald *et al.* (2005).

Materials examined: **Austria**, Wien, on *Beta vulgaris*, Jun. 1931, E.W. Schmidt, culture CBS 121.31 = CPC 5073; on *Apium* sp., 28 Aug. 2003, Institut fur Pflanzengesundheit, culture CBS 114416 = CPC 10925. **Germany**, Oestrich, garden, on *Apium graveolens*, Fuckel, Fungi Rhen. Exs. 117 (**lectotype** selected by Groenewald *et al.* 2005: HAL); Landwirtschaftsamt, Heilbron, on *Apium graveolens*, 10 Aug. 2004, K. Schrameyer (**epitype** designated by Groenewald *et al.* 2005: preserved as metabolically inactive culture CBS 116455 = CPC 11556); *idem*. CBS 116504 = CPC 11579, CBS 116507 = CPC 11582. For complete list of existing strains see Groenewald *et al.* (2013).

Notes: The genus *Cercospora* contains numerous important plant pathogenic fungi from a diverse range of hosts. The modern taxonomy of this complex began with Chupp (1954) who included all variants in a broadly circumscribed *Cercospora*. This concept was continuously revised and narrowed by several authors over the years (Deighton 1976a, 1979, von Arx 1983, Braun 1995, Crous & Braun 2003). Recent studies based on multi-gene phylogenies have helped to circumscribe *Cercospora* and to identify new species. No single locus has yet been found as an ideal DNA barcode for the genus, and species identification needs to be based on a combination of gene loci and morphological characters (Groenewald *et al.* 2013, Bakshi *et al.* 2015a, b). The type species of *Cercospora*, *Cercospora depazeoides* (= *Cercospora penicillata*) (see Braun 1995: 41), is a common, widespread cercosporoid fungus on elderberry. Re-examinations of type material and numerous other collections revealed that this species is conspecific with *Pseudocercospora sambucigena* (Braun *et al.* 2015), which is a proven species of *Pseudocercospora* (Crous *et al.* 2013a). Therefore, *Cercospora* would formally become the oldest available name for *Pseudocercospora*, which would be reduced to synonymy with *Cercospora*. This would be an unpleasant situation with enormous consequences and name changes, which should be avoided. Therefore, a proposal to conserve *Cercospora* with *Cercospora apii* as conserved type was recently published (Braun & Crous 2016), which will help to maintain the application of the name *Cercospora* in the common, generally accepted circumscription.

Cercospora janseana (Racib.) O. Constant., Cryptog. Mycol. 3: 63. 1982.
Basionym: *Napicladium janseanum* Racib., Parasitische Algen und Pilze Javas 2: 41. 1900.
Synonyms: *Passalora janseana* (Racib.) U. Braun, Schlechtendalia 5: 39. 2000.
Cercospora oryzae Miyake, Bot Mag. Tokyo 23 (267): 139. 1909.
Sphaerulina oryzina Hara, Diseases of the rice plant (Japan): 144. 1918.
Cercospora oryzae var. *rufipogonis* R.A. Singh & Pavgi, Sydowia 21: 176. "1967" 1968.

Description and illustration: Chupp (1954), Braun *et al.* (2015).

Material examined: **USA**, unknown collector and date, isol. E.C. Tullis, Aug. 1937, culture CBS 145.37 = IMI 303642.

Notes: The present species is represented by a single strain in the phylogenetic analysis performed (Fig. 2, clade 1). See Braun *et al.* (2015).

Species clustering in the *Cercospora* clade that need further material to be collected before its status as species of *Cercospora* can be confirmed:

Passalora dulcamarae (Peck) U. Braun & Crous, CBS Biodiversity Ser. 1: 167. 2003.
Basionym: *Ramularia dulcamarae* Peck, Rep. (Annual) New York State Mus. Nat. Hist. 33: 30. 1880.
Synonyms: *Cercospora dulcamarae* (Peck) Ellis & Everh., J. Mycol. 1(4): 55. 1885.
Mycovellosiella dulcamarae (Peck) U. Braun, Mycotaxon 48: 284. 1993.
Cercospora dulcamaricola Hollós, Ann. Hist. Nat. Mus. Natl. Hung. 4: 370. 1906.

Description and illustration: Chupp (1954).

Materials examined: **Romania**, Distr. Constanta, Hagieni, on *Solanum dulcamara*, 14 Oct. 1970, O. Constantinescu & G. Negrean, CBS H-9831, CBS H-9832, culture CBS 544.71 = BUCM 2008.

Notes: *Ramularia dulcamarae* was described on *Solanum dulcamara* collected in the USA (New York, Oneida, Verona) and the herbarium specimen is deposited in NYS. The present strain is currently sterile and forms a single strain lineage in the phylogenetic analyses (Fig. 2, clade 1).

Clade 12: *Ramulispora*

Ramulispora Miura, Bull. S. Manchur. Railway Co. Agr. Exp. Sta. Kunchuling 11: 43. 1920.

Description (adapted from Braun 1995): Graminicolous, causing leaf spots, necrosis, foot-rot, and seedling blight. *Mycelium* hyaline to faintly pigmented, smooth, septate, branched; stromata absent to well-developed, substomatal to intra-epidermal, hyaline to pigmented. *Conidiophores* semi-macronematous or macronematous, mononematous, solitary or fasciculate, arising from inner hyphae or stromata, erumpent through the cuticle or emerging through stomata, simple, rarely branched, continuous or sparsely septate, often reduced to conidiogenous cell, straight, subcylindrical to geniculate-sinuous, smooth, hyaline or subhyaline, rarely faintly pigmented. *Conidiogenous cells* directly arising from hyphae or stromata or integrated, terminal, subcylindrical to geniculate, monoblastic to polyblastic, sympodial, rarely percurrent, with inconspicuous, unthickened, hyaline conidiogenous loci. *Conidia* solitary, scolecosporous, acicular, subcylindrical, filiform, narrowly obclavate, sometimes with lateral branchlets (microcyclic conidiation), continuous or septate (branchlets mainly produced under humid conditions and in culture when grown on wet, poor media under lights, sometimes developing into secondary conidia which are detached), hyaline, euseptate, multi-septate, smooth, apex blunt to acute, base rounded to truncate, hilum unthickened, hyaline, conidial secession schizolytic.

Type species: *Ramulispora sorghi* (Ellis & Everh.) L.S. Olive & Lefebvre (≡ *Septorella sorghi* Ellis & Everh.).

Ramulispora sorghi (Ellis & Everh.) L.S. Olive & Lefebvre, Phytopathology 36: 198. 1946. Fig. 9.
Basionym: *Septorella sorghi* Ellis & Everh., J. Mycol. 9: 164. 1903.
Synonym: *Ramulispora andropogonis* Miura, Bull. S. Manchur. Railway Co. Agr. Exp. Sta. Kunchuling: 43. 1920.

Description in vivo *and illustrations*: Braun (1995).

Description in vitro (SNA, CBS 110578): *Mycelium* composed of hyaline, smooth, septate, branched hyphae, 1.5 µm wide. Stromata absent to small, pseudoparenchymatous, brown. Conidiophores, conidiogenous cells and conidia hyaline and smooth. *Conidiophores* solitary or in fascicles, subcylindrical-filiform, sometimes geniculate-sinuous, simple, septate, sometimes reduced to conidiogenous cell, (10–)12–13(–15) × 1.5(–2) µm. *Conidiogenous cells* terminal, monoblastic or

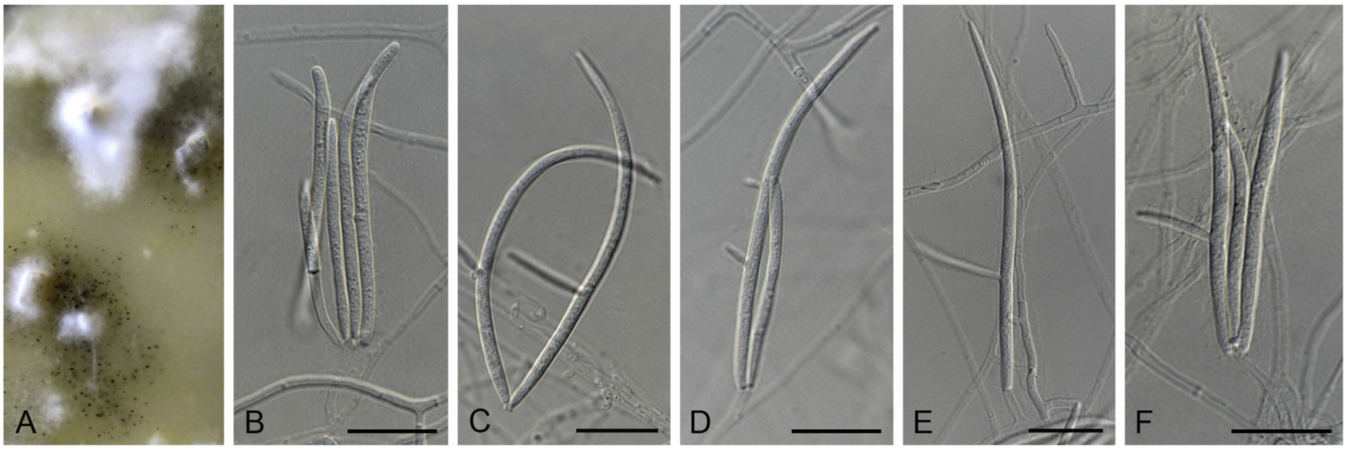


Fig. 9. *Ramulispora sorghi* (CBS 110578). **A–F.** Observations *in vitro*. **A.** Culture on OA. **B–F.** Conidiophore, conidiogenous cell and conidia. Scale bars = 10 µm.

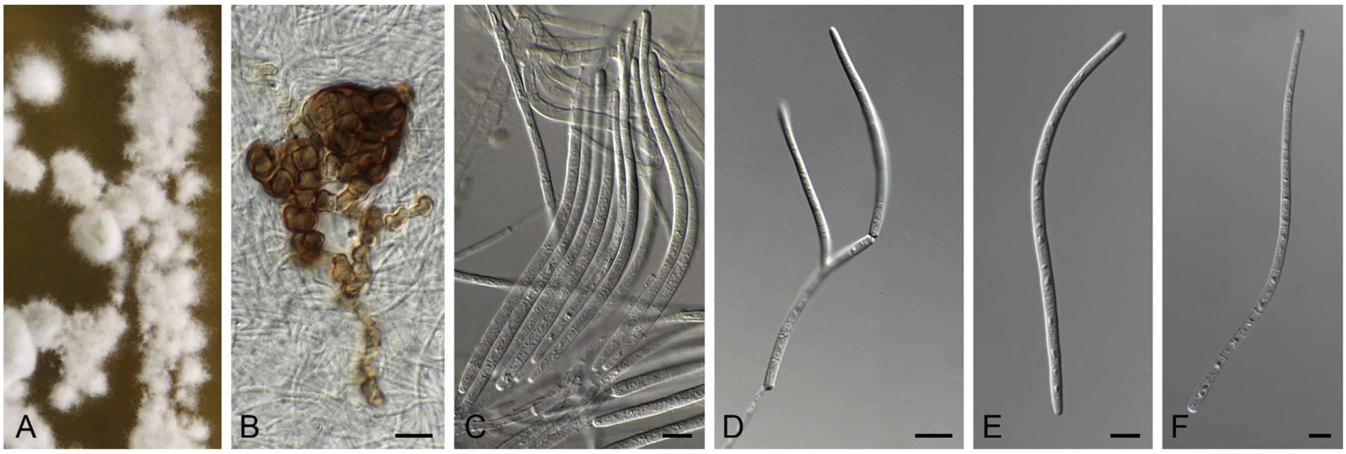


Fig. 10. *Ramulispora sorghiphila* (CBS 255.82). **A–F.** Observations *in vitro*. **A.** Culture on V8. **B.** Stromata. **C.** Conidiophore and conidia. **D–F.** Conidia. Scale bars = 10 µm.

polypblastic, with unthickened and non-refractive loci. *Conidia* formed singly, filiform, acicular, straight to curved, (11–)39–52(–79.5) × 1.5–2(–3) µm, 4–9-septate, hyaline, smooth, with subacute apex and truncate base, frequently with 1–2 lateral branches.

Materials examined: **South Africa**, KwaZulu-Natal Province, on *Sorghum bicolor*, Mar. 1995, coll. D. Nowell, cultures CBS 110578 = CPC 905, CBS 111032 = IMI 153076 = CPC 899, CBS 115522 = CPC 902.

Notes: The genus *Ramulispora* includes pathogens of gramineous plants (von Arx 1983, Braun 1995) and is typified by *Ramulispora sorghi*, the causative agent of sorghum sooty stripe disease (Crous *et al.* 2003, Crous *et al.* 2009e). It produces numerous microsclerotia on the leaf surface and forms sporodochia with hyaline, transversely euseptate, scolecosporous conidia. A total of 14 species of *Ramulispora* are known (MycoBank), but without cultures and molecular analyses, their correct phylogenetic position remains unclear. The type species of *Ramulispora*, *Ramulispora sorghi*, was described from the host *Sorghum halepense*, from Tuskeege (Alabama, USA) but a type specimen could not be located. The cultures included in this study were isolated from sorghum from the KwaZulu-Natal Province of South Africa, where the pathogen was associated with a severe outbreak of sooty leaf stripe (Mchau *et al.* 1996). In a more recent study on the disease, Brady *et al.* (2011) concluded that differences in disease severity was host genotype-dependent and not due to genetic differences in the local pathogen population. The ITS sequence fragments of *Ramulispora sorghi* obtained from Kansas (HQ400740–HQ400745) were 100 % identical to those sequences from South Africa (Mchau *et al.* 1996) which is consistent with the concept that reproduction in *Ramulispora sorghi* is asexual in the field (Brady *et al.* 2011). Phylogenetically, *Ramulispora* forms a well-supported clade (Fig. 1, clade 12; Fig. 2, clade 2), being closely related to *Neodeightoniella*.

Ramulispora sorghiphila U. Braun, C. Nakash., Videira & Crous, **sp. nov.** MycoBank MB822717. Fig. 10.

Etymology: Composed of the name of the host genus and the Greek adjectival suffix -philum (loving).

Description in vitro (on V8; CBS 255.82): *Mycelium* composed of hyaline, smooth, septate, branched hyphae, 2–2.5 µm wide. *Conidiophores* micro- to macronematous, sinuous to geniculous-sinuous, hyaline to pale brown, branched, 30–110 × 2–2.5 µm. *Conidiogenous cells* integrated, terminal, mono- or polyblastic, proliferating sympodially or percurrently, smooth to verruculose, with unthickened and non-refractive loci. *Conidia* solitary, rarely catenate, holoblastic, hyaline, filiform, 70–250 × 2–2.5 µm, unthickened and truncate at the base, 2–12 septate.

Materials examined: **India**, on *Sorghum vulgare*, Oct. 1969, unknown collector, isol. by G.S. Rawla in 1971, dep. by H.I. Nirenberg in 1982 (**holotype** IMI 153077, culture ex-type CBS 255.82).

Notes: Differs from *Ramulispora sorghi* by producing much longer conidiophores and conidia. It is similar to *Ramulispora*

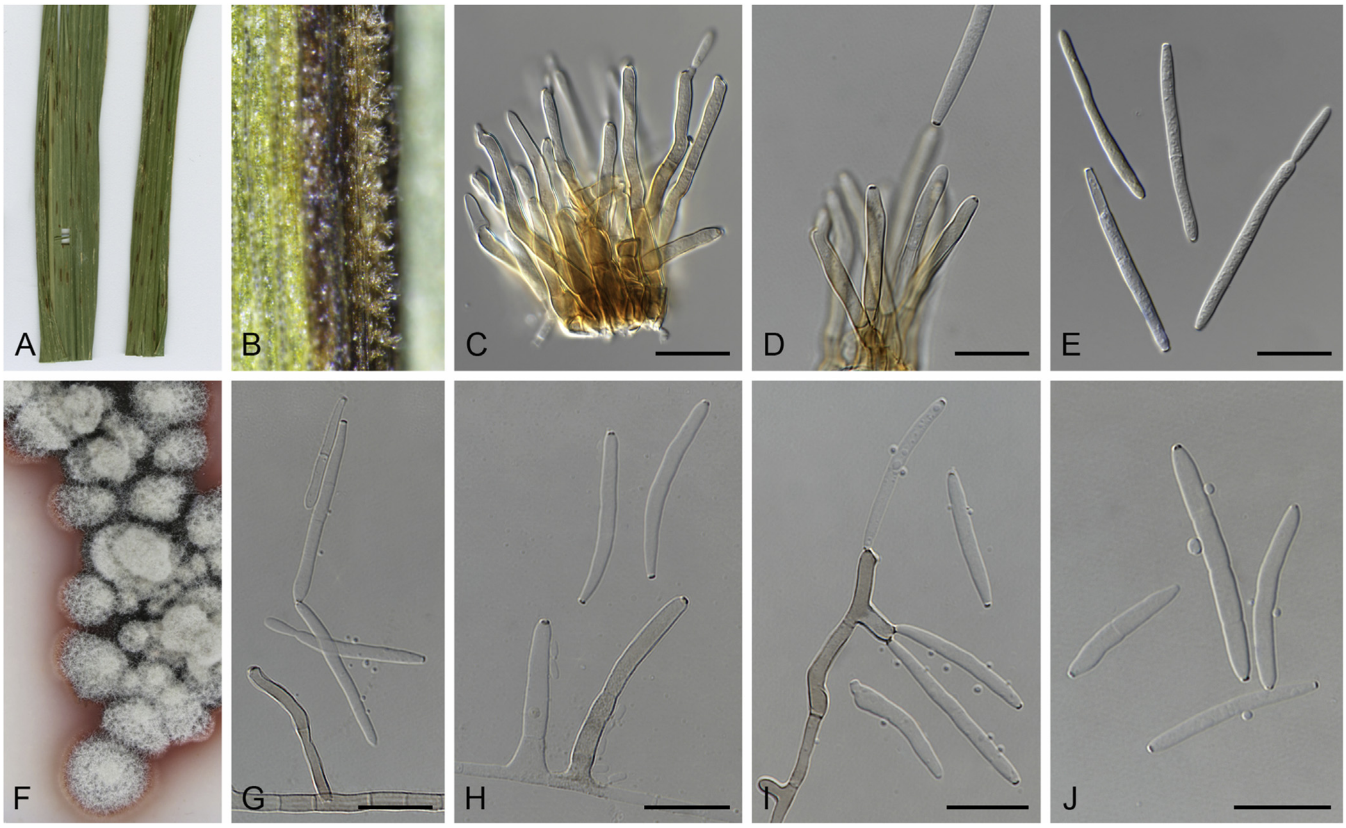


Fig. 11. *Catenulocercospora fusimaculans* (CPC 17277). **A–E.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Conidia sporulating on the lesion. **C, D.** Conidiophores, conidiogenous cells and conidia. **E.** Single and catenate conidia. **F–J.** Observations *in vitro*. **F.** Culture on OA. **G–I.** Conidiophores, conidiogenous cells and conidia. **J.** Catenate conidia. Scale bars = 10 µm.

sorghicola by producing very long conidia in culture that are commonly branched but differs by forming sclerotia in culture and not producing conidia in flesh-coloured gelatinous masses. *Ramulispora sorghiphila* forms a single strain lineage within the *Ramulispora* genus clade (Fig. 1, clade 12; Fig. 2, clade 2).

Clade 13: *Catenulocercospora*

Catenulocercospora C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822580.

Etymology: Derived from the similarities to the genus *Cercospora* and the catenulate nature of the conidia.

Description: Phytopathogenic, forming brown rectangular leaf spots. *Caespituli* amphigenous, mainly hypophyllous, hyaline. *Mycelium* internal, hyaline. *Stromata* small to developed, brown, globose. *Conidiophores* pale brown at the base and turning hyaline towards the apex, septate, straight to geniculate-sinuous. *Conidiogenous cells* integrated, mono- or polyblastic, with darkened, thickened and refractive rim-like conidiogenous loci. *Conidia* hyaline, solitary or catenate in branched chains, rounded at the apex when solitary, obclavate or cylindrical to filiform, septate, with rim-like hila that are thickened, darkened and refractive.

Type species: *Catenulocercospora fusimaculans* (G.F. Atk.) C. Nakash. *et al.* (≡ *Cercospora fusimaculans* G.F. Atk.).

Catenulocercospora fusimaculans (G.F. Atk.) C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822745. Fig. 11.
Basionym: *Cercospora fusimaculans* G.F. Atk., J. Elisha Mitchell Sci. Soc. 8(2): 50. 1892.
Synonyms: *Phaeoramularia fusimaculans* (G.F. Atk.) X.J. Liu & Y.L. Guo, Acta Phytopathol. Sin. 12 (4): 9. 1982.
Passalora fusimaculans (G.F. Atk.) U. Braun & Crous, in Crous & Braun, *Mycosphaerella* and Anam.: 192. 2003.
For additional synonyms see Crous & Braun 2003, Braun *et al.* (2015) or MycoBank.

Descriptions in vivo *and illustrations*: Ellis (1976), Hsieh & Goh (1990).

Description in vivo (CPC 17277): *Leaf spots* formed as small streaks, rectangular, 2–6 × 0.5–1 mm, pale brown to dark brown, distinct. *Caespituli* amphigenous, mainly hypophyllous, white. *Mycelium* internal, hyphae hyaline, 2.5 µm diam. *Stromata* small to developed, brown, globose, 27–71 µm diam. *Conidiophores* in loose fascicles of 2–12, hyaline to pale brown, paler towards the apex, septate, tapered towards the apex, straight to geniculate-sinuous, 23–78 × 2.5–9 µm. *Conidiogenous cells* integrated, terminal, polyblastic, proliferating sympodially, with conidiogenous loci rim-like, thickened, darkened and refractive and located at the apex and shoulders, 1.6–2.5 µm diam. *Conidia* hyaline, smooth, solitary or catenate, ocasionaly in branched chains, long-obclavate, cylindrical to filiform, 20–62 × 2.5 µm, 2–5-septate, with thickened and darkened rim-like hila, 1.6–2.5 µm diam.

Description in vitro (on V8; CPC 17277): *Mycelium* hyaline to pale brown, smooth to rough, delicate, uniform in width, 2.5 µm diam. *Conidiophores* micronematous, hyaline to pale brown, smooth to verruculose, simple, cylindrical, straight to geniculate-sinuous, 10–100 × 2.5–5 µm. *Conidiogenous cells* integrated, apical, mono- or polyblastic, proliferating sympodially, with conidiogenous loci thickened, darkened and refractive, 1.5 µm diam. *Conidia* hyaline, smooth, solitary or catenate, occasionaly in branched chains, long-obclavate, cylindrical to filiform, rounded at the apex when solitary, 17–109 × 2–3.5 µm, 1–7-septate, hila thickened, darkened and refractive, 1.5 µm diam.

Materials examined: **Thailand**, on *Agrostis* sp., 15 Sep. 2009, coll. P. Phen, culture CPC 17277. **USA**, Alabama, Lee County, Auburn, on *Panicum dichotomum*, 15 Aug. 1891, B.M. Duggar, det. G.F. Atkinson (**lectotype** designated by Braun *et al.* 2015: CUP-A-002054#1(AL); isolectotypes CUP-A-2945#2(AL), CUP-A-2945#3(AL)).

Notes: The description of the observed specimen is consistent with the one in literature for the species *Cercospora fusimaculans* (Ellis 1976). The species *Cercospora fusimaculans* was recently lectotypified and the species *Cercospora agrostidis* removed from its synonyms list and tentatively considered a different species. *Cercospora fusimaculans*, despite the catenate conidia, was tentatively maintained as a *Cercospora* species (Braun *et al.* 2015). Phylogenetically, the observed strain forms a single-strain lineage closely related to *Ramulispora* (Fig. 1, clade 13; Fig. 2, clade 3), but morphologically they are quite distinct from each other (Fig. 11). Therefore, a new genus was introduced to accommodate this species which has a worldwide distribution and affects numerous grass hosts (*Poaceae*) (Braun *et al.* 2015). Despite its distribution and host range, it appears to be a mild pathogen susceptible to timely fungicide applications (Smiley 1983).

Clade 14: *Neodeightoniella*

Neodeightoniella Crous & W.J. Swart, Persoonia 31: 211. 2013.

Description (from Crous *et al.* 2013b): Foliicolous, plant pathogenic. *Conidiophores* fasciculate, 3–6, arising from a weakly developed brown stroma composed of a few brown cells, amphigenous. *Conidiophores* erect, brown, unbranched, finely roughened, straight to slightly flexuous, subcylindrical, septate. *Conidiogenous cells* terminal and integrated, subcylindrical, brown, finely roughened; conidiogenous loci terminal and lateral on conidiogenous cells, darkened, thickened, protruding, tretic with central pore. *Conidia* solitary, pale brown, surface finely roughened, fusoid-ellipsoid, straight or gently curved, 1-septate; apical cell globose, with prominent mucoid cap; basal cell funnel-shaped, widest two thirds from basal hilum, tapering prominently to truncate hilum, thickened, darkened, with central pore.

Type species: *Neodeightoniella phragmiticola* Crous & W.J. Swart.

Neodeightoniella phragmiticola Crous & W.J. Swart, Persoonia 31: 211. 2013.

Description and illustration: Crous *et al.* (2013b).

Materials examined: **South Africa**, Free State, Bultfontein, on leaves of *Phragmites australis*, 31 Jan. 2013, W.J. Swart (**holotype** CBS H-21427, culture ex-type CBS 136418 = CPC 22059); *idem*., cultures CPC 22057, CPC 22061.

Notes: *Neodeightoniella* resembles the genus *Deightoniella* (based on *Deightoniella africana*, on *Imperata* sp., West Africa), in having pale brown, fusoid-ellipsoid, unequally 1-septate conidia arising from brown conidiophores. It is distinct in that conidiophores do not undergo percurrent rejuvenation (seen as nodal swellings in the type of *Deightoniella*), have prominent apical and lateral conidiogenous loci on the conidiogenous cells, conidia have a prominent mucoid cap, and conidiophores are arranged in fascicles. The genus *Deightoniella* presently contains a heterogeneous assemblage of taxa, but the type species, *Deightoniella africana*, probably belongs to the *Pyriculariaceae* (Klaubauf *et al.* 2014). Phylogenetically, *Neodeightoniella* belongs to the *Mycosphaerellaceae* and is closely related to *Ramulispora* (Fig. 1, clade 14; Fig. 2, clade 4).

Clade 15: *Distocercosporaster*

Distocercosporaster Videira, H.D. Shin, C. Nakash. & Crous, **gen. nov.** MycoBank MB822587.

Etymology: Name composed of the hitherto known genus *Distocercospora* + -aster (Latin substantival suffix indicating incomplete resemblance).

Description: Foliicolous, plant pathogenic. *Mycelium* internal, substomatal stromata formed of subhyaline to brown swollen hyphal cells. *Conidiophores* in small to moderately large fascicles, arising from stromata, through stomata, erect, straight, subcylindrical to geniculate-sinuous, unbranched, pale olivaceous to olivaceous brown, thin-walled, smooth, septate, sometimes reduced to conidiogenous cells. *Conidiogenous cells* integrated, terminal, with rim-like conidiogenous loci, thickened and darkened. *Conidia* hyaline to pale olivaceous, thin-walled, smooth to rough, solitary or catenate, in simple or occasionally branched chains, subcylindrical to obclavate-cylindrical, rarely subclavate, apex obtuse, subobtuse to truncate, base short obconically truncate, straight to curved, eu- or distoseptate, hila thickened and darkened.

Type species: *Distocercosporaster dioscoreae* (Ellis & G. Martin) Videira, H.D. Shin, C. Nakash. & Crous (≡ *Cercospora dioscoreae* Ellis & G. Martin).

Distocercosporaster dioscoreae (Ellis & G. Martin) Videira, H.D. Shin, C. Nakash. & Crous, **comb. nov.** MycoBank MB822755. Fig. 12.
Basionym: *Cercospora dioscoreae* Ellis & G. Martin, Amer. Naturalist 16: 1003. 1882.
Synonyms: *Phaeoramularia dioscoreae* (Ellis & G. Martin) Deighton, More Dematiaceous Hyphomycetes: 319. 1976.
Cercospora nubilosa Ellis & Everh., J. Mycol. 4 (11): 115. 1888.
Cercospora tokoroi Togashi, Bull. Imp. Coll. Agric. (Morioka): 46. 1936.
Passalora dioscoreae (Ellis & G. Martin) U. Braun & Crous, CBS Biodiversity Ser. 1: 162. 2003.

Description in vivo *and illustrations*: Ellis (1976), Pons & Sutton (1988), Guo *et al.* (2003), Braun *et al.* (2014).

Description in vitro (on SNA; CPC 11513): *Mycelium* pale brown to dark brown. *Conidiophores* micronematous to macronematous, smooth, pale to pale brown, sinuous, irregular in width, 2.5–5(–10) µm, branched. *Conidiogenous cells* apical, intercalary, polyblastic, proliferating sympodially, often branched, integrated, with thickened and darkened, rim-like conidiogenous loci, 2–2.5 µm diam. *Conidia* smooth, hyaline to pale brown, single or often catenate, in sigle or branched chains, holoblastic, long-obovoid when single, cylindrical to obclavate when catenate, conical truncate at both ends, straight to strongly sinuous, 12–120 × 3–7.5 µm, 0–5-eu- or distoseptate and occasionally constricted at septa, with hila rim-like, thickened and darkened, 2–2.5 µm diam.

Materials examined: **Republic of Korea**, on *Dioscorea tokoro*, 16 Oct. 2003, H.D. Shin, culture CBS 135460 = CPC 10855; on *Dioscorea tenuipes*, 2003, H.D. Shin, culture CBS 135463 = CPC 11513; on *Dioscorea* sp., date unknown, H.D. Shin,

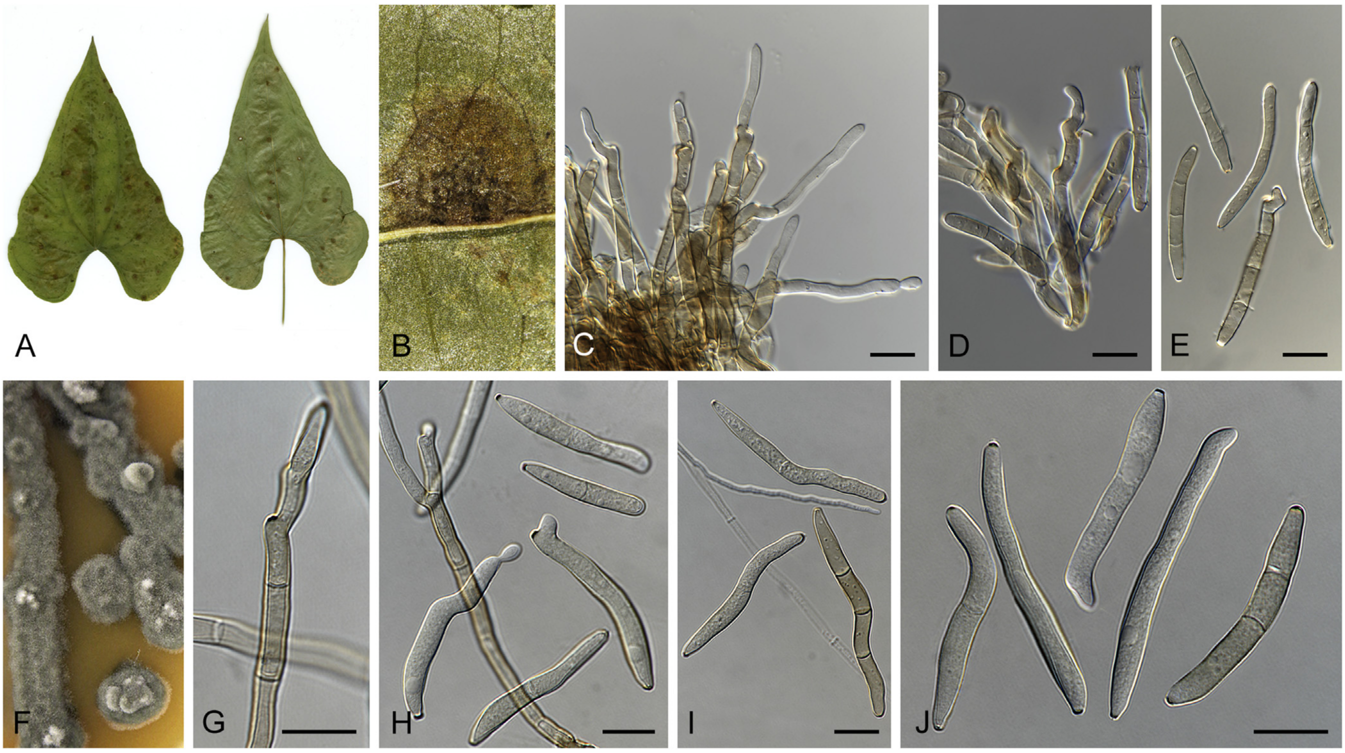


Fig. 12. *Distocercosporaster dioscoreae* (CPC 11513). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C, D.** Conidiophores, conidiogenous cells and conidia. **E.** Catenate conidia. **F–L.** Observations *in vitro*. **F.** Culture on V8. **G.** Conidiophore and conidiogenous cell. **H.** Conidiophore, conidiogenous cell, single and catenate conidia. **I, J.** Catenate conidia. Scale bars = 10 µm.

culture KACC 44723. **USA**, Pennsylvania, Delaware Co., on *Dioscorea villosa*, 1 Aug. 1882, W. Trimble (**holotype** NY 838293, isotype IMI 256891).

Notes: The genus *Distocercosporaster* is newly introduced to accommodate the species *Passalora dioscoreae* which is not congeneric with *Passalora* as defined by the type *Passalora bacilligera*. The existing strains form a well-supported clade in the phylogenetic analyses (Fig. 1 clade 15; Fig. 2, clade 15). Although the examined strains were collected in the Republic of Korea and the type material is originally from the USA, the observed morphology is consistent with the descriptions found in literature (Braun *et al.* 2014) and, therefore, these are considered good representatives of this species. Several species of cercosporoid genera have been described from hosts belonging to the plant genus *Dioscorea* (Crous & Braun 2003, Braun *et al.* 2014). The genus *Distocercosporaster* differs from the genus *Distocercospora*, *in vivo*, by forming stromata composed of subhyaline to brown swollen hyphal cells, rather short conidiophores with rim-like and distinctly thickened conidiogenous loci on terminal conidiogenous cells, and frequently catenate conidia.

Clade 16: *Caryophylloseptoria*

Caryophylloseptoria Verkley *et al.*, Stud. Mycol. 75: 233. 2013.

Description (from Verkley *et al.* 2013): *Conidiomata* pycnidial, epiphyllous or predominantly epiphyllous, globose to subglobose, or slightly depressed, with a central ostiolum; wall composed of *textura angularis* or *globulosa-angularis*. *Conidiogenous cells* hyaline, holoblastic, proliferating percurrently one to multiple times with indistinct annellations, or (in addition) proliferating sympodially. *Conidia* cylindrical, straight, curved or flexuous, multiseptate, not or somewhat constricted around the septa, hyaline, contents with several oil-droplets and granular material in each cell.

Type species: *Caryophylloseptoria lychnidis* (Desm.) Verkley *et al.* (≡ *Septoria lychnidis* Desm.).

Caryophylloseptoria lychnidis (Desm.) Verkley *et al.*, Stud. Mycol. 75: 234. 2013.
Basionym: *Septoria lychnidis* Desm., Ann. Sci. Nat., Bot., Sér. 3, 11(2): 347. 1849.
For extended synonymy see Shin & Sameva (2004).

Materials examined: **Austria**, Tirol, Inntal, S of Telfs (W of Innsbruck), along road 171, on living leaves of *Silene latifolia* subsp. *alba* (= *Melandrium album*), 4 Aug. 2000, G. Verkley, CBS H-21161, cultures CBS 109098, CBS 109102; *idem.*, G. Verkley 1048, CBS H-21162, cultures CBS 109099, CBS 109101. **Netherlands**, Hilversum, on living leaves of *Silene dioica* (= *Melandrium rubrum*), 22 Jun. 1985, H.A. van der Aa 9524, CBS H-18112.

Notes: The genus *Caryophylloseptoria* was recently established to accommodate four septoria-like species infecting hosts belonging to the *Caryophyllaceae* in Europe and the Republic of Korea (Verkley *et al.* 2013). The type species, *Caryophylloseptoria lychnidis*, was originally described from *Silene dioica* (≡ *Lychnis dioica*) from France. It has been reported from several species of *Silene* and the conidial size given by various authors differs considerably (Verkley *et al.* 2013). In this study, the *Caryophylloseptoria* strains form a well-supported clade in the phylogeny (Fig. 1, clade 16; Fig. 2 clade 16), closely related to *Neoseptoria*.

Clade 17: *Neoseptoria*

Neoseptoria Quaedvlieg *et al.*, Stud. Mycol. 75: 352. 2013.

Description (from Quaedvlieg *et al.* 2013): Foliicolous. *Conidiomata* black, immersed, subepidermal, pycnidial, subglobose with central ostiole, exuding creamy conidial mass; wall of 2–3 layers of brown *textura angularis*. *Conidiophores* 0–2-septate, subcylindrical, hyaline to pale brown at base, smooth, straight to geniculate-sinuous. *Conidiogenous cells* phialidic, hyaline, smooth, aggregated, lining the inner cavity, subcylindrical to ampulliform, straight to geniculate-sinuous; proliferating several times percurrently near apex, rarely sympodially. *Conidia* scolecosporous, hyaline, smooth, flexuous, rarely straight, granular, thin-walled, narrowly obclavate, apex subobtuse, base long obconically truncate, tapering to a truncate hilum, 3- to multi-septate.

Type species: *Neoseptoria caricis* Quaedvlieg *et al.*

Neoseptoria caricis Quaedvlieg *et al.*, Stud. Mycol. 75: 352. 2013.

Description and illustration: Quaedvlieg *et al.* (2013).

Material examined: **Netherlands**, on leaves of *Carex acutiformis*, Aug. 2012, W. Quaedvlieg (**holotype** CBS H-21293, ex-type culture CBS 135097 = S653).

Notes: *Neoseptoria* is a monotypic genus that is morphologically similar to *Septoria* but differs in having conidiogenous cells that are mono- to polyphialidic and proliferate percurrently at the apex. In the phylogenetic analyses, it is represented by a single-strain lineage closely related to *Caryophylloseptoria* (Fig. 1, clade 17; Fig. 2, clade 17).

Clade 18: *Acervuloseptoria* and *Cercosporella*

Acervuloseptoria Crous & Jol. Roux, Persoonia 32: 275. 2014.

Description (from Crous *et al.* 2014a): Plant pathogenic, foliicolous. *Conidiomata* black, amphigenous, exuding a creamy-white conidial cirrhus, subepidermal, erumpent, multilocular, with upper layer breaking open irregularly and leaving conidioma to have acervular appearance; wall of 3–6 layers of brown *textura angularis* to *textura intricata*, basal layers pale brown, roof of conidioma dark brown; in culture conidiomata acervular with elements of conidiomatal roof remaining like brown strands along the sides of conidioma. *Conidiophores* subcylindrical, straight to once geniculate, pale brown, verruculose, septate, branched or not. *Conidiogenous cells* terminal and lateral, subcylindrical, pale brown to subhyaline, verruculose to smooth, proliferating sympodially and percurrently. *Conidia* narrowly obclavate to subcylindrical, flexuous, guttulate, smooth, hyaline, apex subacutely rounded, base obconically truncate, septate.

Type species: *Acervuloseptoria ziziphicola* Crous & Jol. Roux.

Acervuloseptoria ziziphicola Crous & Jol. Roux, Persoonia 32: 275. 2014.

Description and illustration: Crous *et al.* (2014a).

Materials examined: **South Africa**, Northern Cape, Richtersveld National Park, Potjiespram Rest Camp, on leaf spots of *Ziziphus mucronata*, Sep. 2013, J. Roux (**holotype** CBS H-21723, culture ex-type CPC 23707 = CBS 138009).

Notes: *Acervuloseptoria* differs from *Septoria* and allied genera (Quaedvlieg *et al.* 2013) in the peculiar conidiomatal morphology, with black, erumpent conidiomata, from which the top layer disintegrates, leaving a conidiomatal body that appears acervular (Crous *et al.* 2014a, 2015c). The conidiophores are also slightly pigmented and verruculose in their lower part. Phylogenetically, *Acervuloseptoria* is represented by a single-strain lineage that is closely related to *Cercosporella* and *Ramulariopsis* (Fig. 1, clade 18; Fig. 2, clade 18). However, its phylogenetic position is not yet clear since it clustered near *Cercosporella* in dataset 1 (Fig. 1, clade 18) but clustered among the *Cercosporella* species when using dataset 2 (Fig. 2, clade 18). In the single-gene Bayesian trees of dataset 2 (data not shown), *Acervuloseptoria ziziphicola* clusters outside both the *Cercosporella* and the *Ramulariopsis* clade with high posterior probability value for LSU (PP = 0.94), with a low support in the case of ITS (PP = 0.54). In the single-gene Bayesian tree of *rpb2*, *Acervuloseptoria ziziphicola* sits in a highly supported polytomy (PP = 0.84) including the *Cercosporella* strains. In both the RAxML and PAUP analyses of dataset 2, *Acervuloseptoria ziziphicola* appears as a single-strain lineage sister to both *Cercosporella* and *Ramulariopsis*. The genus *Acervuloseptoria* currently includes an additional species, *Acervuloseptoria capensis* (Crous *et al.* 2015c). The differences in morphology are significant enough for retaining *Acervuloseptoria* (a coelomycete) as distinct from *Cercosporella* (a hyphomycete), pending further collections. The situation of *Acervuloseptoria ziziphicola* is reminiscent of *Pseudocercospora pistacina*, which after much debate was placed in the genus *Pseudocercospora*, although it had pycnidial conidiomata (Crous *et al.* 2013a).

Cercosporella Sacc., Michelia 2(6): 20. 1880.

Description (from Videira *et al.* 2016): Phytopathogenic, mostly causing leaf spots. *Hyphae* restricted to intercellular spaces and forming cup- or bowl-shaped appressoria, 7–17 μm diam that attach to walls of mesophyll cells. *Conidiophores* emerging through stomata or erumpent through the cuticle, straight, subcylindrical to geniculate-sinuous, hyaline, sometimes lightly pigmented near the base, more or less thin-walled and smooth. *Conidiogenous cells* integrated, terminal, polyblastic, sympodial, mostly conspicuously geniculate, conidiogenous loci conspicuous, hyaline but refractive, thickened and raised in the shape of a truncated cone (ultrastructure). *Conidia* formed singly, hyaline, subcylindrical to obclavate, sometimes fusiform, 1- to multi-septate, usually thin-walled and smooth, apex obtuse, base often rounded to truncate or obconically truncate, hilum thickened, not darkened but refractive. Description adapted from Braun (1995) and Kirschner (2009).

Type species: *Cercosporella virgaureae* (Thüm.) Allesch (≡ *Ramularia virgaureae* Thüm.).

Cercosporella virgaureae (Thüm.) Allesch., Hedwigia 34: 286. 1895.
Basionym: *Ramularia virgaureae* Thüm., Fungi Austr. Exs., Cent. 11: no. 1072. 1874.
Synonyms: *Cylindrosporium virgaureae* (Thüm.) J. Schröt., in Cohn, Krypt.-Fl. Schles. 3: 489. 1897.
Cercosporella cana (Sacc.) Sacc., Michelia 2(6): 20. 1880.
For additional synonymy see Braun (1995) or MycoBank.

Descriptions and illustrations: Braun (1995), Kirschner (2009), Videira *et al.* (2016)

Materials examined: **Austria**, Krems, on *Solidago virgaurea*, 1871 [Thüm., Fungi Austr. Exs. 1072] (**lectotype** K, designated by Deighton 1973). **Brazil**, Guimarania, Minas Gerais, on *Conyza canadensis*, unknown date, B.S. Vieira, culture CPC 19492. **Republic of Korea**, Jinju, on *Erigeron annuus*, 1 Jul. 2004, H.D. Shin, cultures CPC 11456, CPC 11457, CPC 11460, CPC 11461; Namyangju, on *Erigeron annuus*, 9 Oct. 2002, H.D. Shin, cultures CPC 10286–10288; Chuncheon, on *Erigeron annuus*, 21 May 2003, H.D. Shin, culture CBS 113304.

Notes: The taxonomic confusion between *Cercosporella* and *Ramularia* has been addressed by several authors (Braun 1995, 1998, Kirschner 2009, Videira *et al.* 2016). *Cercosporella* and *Ramularia* are phylogenetically distinct since the LSU sequences of freshly collected isolates of the type species of both genera clustered separately (Kirschner 2009). A later study using both

LSU and *rpb2* sequences corroborated these results (Videira *et al.* 2016). Morphologically, *Cercosporella* can be distinguished from *Ramularia* by forming an appressorium structure to adhere to the plant cells and by having a distinct ultrastructure of conidiogenous scars that is flat like a truncate cone. The type species, *Cercosporella virgaureae*, was described from the host *Solidago virgaureae* collected in Austria. Although the currently available strains of this species are of Brazilean and Korean origin, their morphology is identical to the descriptions available in literature (Braun 1995) and their LSU sequence is 100 % identical to that of a freshly collected isolate of *Cercosporella virgaureae* from Germany (GenBank EU710894) (Kirschner 2009). Two new species of *Cercosporella* have recently been introduced, namely *Cercosporella dolichandrae* (Crous *et al.* 2014a) and *Cercosporella catenulata* (Videira *et al.* 2016), that cluster together with *Cercosporella virgaureae* (Fig. 1, clade 18; Fig. 2, clade 18).

Clade 19: *Ramulariopsis*

Ramulariopsis Speg., Anales Mus. Nac. Buenos Aires 20(13): 421 [ser. 3, 13]. 1910.

Description (from Braun 1998): Parasitic on vascular plants, foliicolous, usually forming leaf spots. *Mycelium* internal, septate, branched, hyaline or almost so, smooth; stromata absent to well-developed, immersed, hyaline to faintly pigmented. *Caespituli* amphigenous, whitish. *Conidiophores* macronematous, mononematous, fasciculate, arising from internal hyphae or stromata, through stomata or erumpent, hyaline, septate, smooth, simple or branched. *Conidiogenous cells* integrated, terminal, intercalary as well as pleurogenous (as short nodulose protuberances or subcylindrical branchlets), polyblastic, sympodial, with cicatrized, thickened and darkened loci. *Conidia* catenate, in simple as well as branched chains, ellipsoid-ovoid, subcylindrical-fusiform, 0–1- to multi-euseptate, hyaline, with thickened and darkened hila. Conidial secession schizolytic.

Type species: *Ramulariopsis cnidoscoli* Speg.

Ramulariopsis cnidoscoli Speg., Anales Mus. Nac. Buenos Aires 20: 422. 1911.

Descriptions and illustrations: Braun (1998), Videira *et al.* (2016).

Material examined: **Argentina**, Salta, Orán, on *Cnidoscolus vitifolius* var. *cnicodendron*, Apr. 1905, C. Spegazzini (**lectotype**, designated by Deighton, 1972, LPS 12.851).

Notes: *Ramulariopsis* was described by Spegazzini (1910) and emended by Deighton (1972). *Ramulariopsis* differs from *Ramularia* by producing conidiophores that are frequently branched and conidiogenous cells that are often intercalary or pleurogenous. The type species, *Ramulariopsis cnidoscoli*, was collected on *Cnidoscolus vitifolius* in Argentina, and is thus far only known from herbarium material. Five species are currently recognised in this genus (Braun 1998) but only two are known from culture, namely *Ramulariopsis gossypii* and *Ramulariopsis pseudoglycines* (Videira *et al.* 2016). Phylogenetically, these two species cluster in a well-supported clade closely related to *Cercosporella* (Fig. 1, clade 19; Fig. 2, clade 19). Unfortunately, it is still unproven whether *Ramulariopsis gossypii* is congeneric with *Ramulariopsis cnidoscoli*. Morphologically, there are slight differences in the structure of the conidiogenous loci between the two species: the loci in *Ramulariopsis gossypii* are conspicuously thickened and darkened, whereas in *Ramulariopsis cnidoscoli* these structures are less conspicuous.

Clade 20: *Pleuropassalora*

Pleuropassalora U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822610.

Etymology: Derived from the sporulating arrangement, pleurosporous + its resembling genus, *Passalora.*

Description: Phytopathogenic. *Mycelium* internal, smooth, branched, pale brown. *Caespituli* hypophyllous, fasciculate to synnematous, arising from a pale brown stroma. *Conidiophores* subcylindrical, unbranched, flexuous, guttulate, pale to medium brown, smooth, septate. *Conidiogenous cells* terminal, subcylindrical, guttulate, pale to medium brown, finely verruculose, becoming slightly swollen, appearing clavate, with multiple conidiogenous loci, round, darkened, thickened, refractive, prominent, proliferation sympodial. *Conidia* solitary, pale to medium brown, smooth to finely verruculose, granular to guttulate, thin-walled, ellipsoidal to obovoid, obpyriform, wider basal cell and apical cell elongating into a beak, transversely multiseptate, hilum thickened, darkened and refractive.

Type species: *Pleuropassalora armatae* (Crous & A.R. Wood) U. Braun *et al.* (≡ *Passalora armatae* Crous & A.R. Wood).

Pleuropassalora armatae (Crous & A.R. Wood) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822777.
Basionym: *Passalora armatae* Crous & A.R. Wood, Stud. Mycol. 64: 35. 2009.

Description in vivo *and illustrations*: Crous *et al.* (2009c).

Description in vitro (on SNA; CBS 125420): *Mycelium* composed of hyaline to pale hyphae, uniform in width, 2–2.5 µm. *Conidiophores* semimacronematous to macronematous, pale brown to pale olivaceous brown, multiseptate, straight or mildly curved, smooth, 200–740 × 3.8–7.5 µm. *Conidiogenous cells* integrated, terminal, cylindrical, straight or slightly curved, polyblastic, proliferating sympodially without geniculation, with numerous lateral conidiogenous loci, rim-like, thickened and darkened, 2–2.5 µm. *Conidia* subhyaline to pale brown, holoblastic, solitary, acropleurogenous, obpyriform with a beak-shape at the apex, obclavate or ellipsoidal, 25–45 × 10–12.5 µm, 1-3-euseptate, not constricted at septa, with distinctly protuberant, thickened, and refractive hilum, 2–2.5 µm diam.

Materials examined: **South Africa**, KwaZulu-Natal Province, South Coast, Mpenjati Nature Reserve, between Ramsgate and Port Edward, on leaves of *Dalbergia armata*, 28 May 2008, A.R. Wood (**holotype** CBS H-20337, culture ex-type CBS 125420 = CPC 15419); *idem*. cultures CPC 15420, CPC 15421; Kloof Nature Reserve area, on *Dalbergia obovata*, 15 Jun. 2009, A. Wood, herb. 7/7/2009 (4), culture CPC 17084.

Notes: This genus is proposed in order to accommodate the species *Passalora armatae* that is not congeneric with *Passalora* as defined by the type *Passalora bacilligera*. *Pleuropassalora* is a monotypic genus that forms a well-supported clade in this study (Fig. 1, clade 20; Fig. 2, clade 20). At the time it was described (Crous *et al.* 2009c), it was observed that, when in culture, conidia remain attached to conidiogenous cells, giving conidiophores the appearance of small tufts which is very characteristic, but not observed in *Passalora s. str.*

Clade 21: *Graminopassalora*

Graminopassalora U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822591.

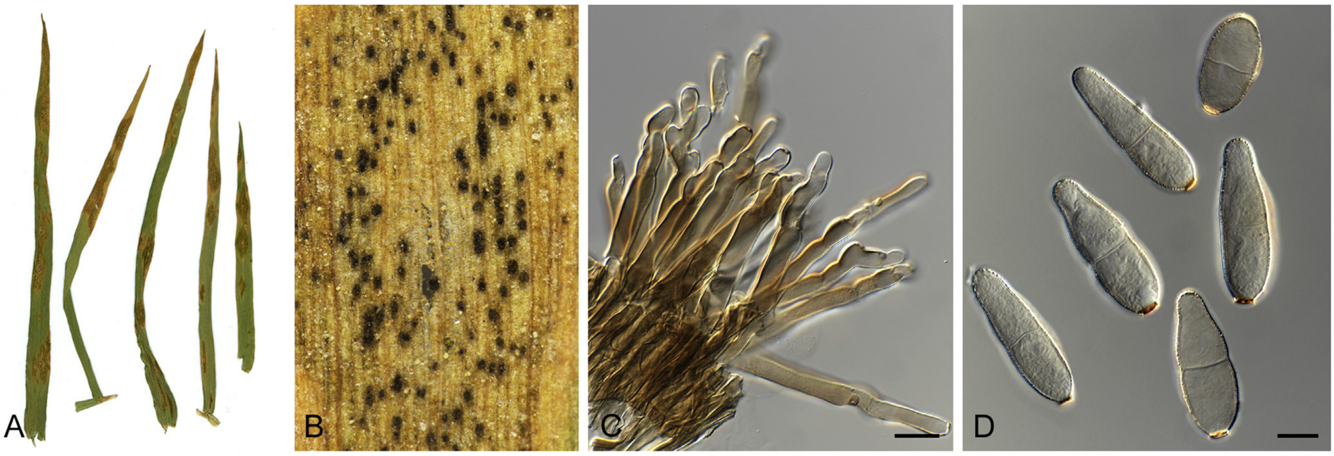


Fig. 13. *Graminopassalora graminis* (CBS 113303). **A–D.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Conidiophores. **D.** Conidia. Scale bars = 10 µm.

Etymology: Derived from the host family (*Poaceae* = *Gramineae*) and similarity to the genus *Passalora*.

Description: Plant pathogenic, causing leaf spotting symptoms. *Mycelium* internal, forming stromata of variable shape and size, usually well-developed, substomatal to immersed, brown. *Conidiophores* in small to very large fascicles, arising from stromata, through stomata or erumpent, erect, subcylindrical, straight to curved, sinuous, slightly geniculate, unbranched, septate, pale to dark brown, thin-walled, smooth to rough-walled, sometimes reduced to conidiogenous cells. *Conidiogenous cells* integrated, terminal, with a single to several conspicuous conidiogenous loci, circular in outline, thickened and darkened, usually barely protuberant. *Conidia* formed singly, ellipsoid-ovoid, obovoid, short obclavate, 0–3-septate, occasionally slightly constricted at the septa, subhyaline to pale brownish, thin-walled, smooth to rough-walled, hila rounded, thickened and darkened.

Type species: *Graminopassalora graminis* (Fuckel) U. Braun, C. Nakash., Videira & Crous (≡ *Scolicotrichum graminis* Fuckel).

Graminopassalora graminis (Fuckel) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822760. Fig. 13.
Basionym: *Scolicotrichum graminis* Fuckel, Hedwigia 2(15): 134. 1863.
Synonym: *Passalora graminis* (Fuckel) Höhn., Zentrabl. Bakteriol., 2. Abt., 60: 6. 1923.
For additional synonyms see Braun *et al.* (2015).

Description and illustrations: Braun *et al.* (2015).

Materials examined: **Germany**, Rheinland-Pfalz: Mt. Rabenkopf, on grass leaves (exact identity unclear), Fuckel, Fungi Rhen. Exs. 130 (**lectotype** designated by Braun *et al.* 2015, HAL; isolectotypes: Fuckel, Fungi Rhen. Exs. 130, e.g. FH, G). **Japan**, Chiba, on *Dactylis glomerata*, N. Nishihara, culture MAFF510604 = MUCC 1429. **Republic of Korea**, Yangyang, on *Alopecurus aequalis* var. *amurensis*, 24 May 2003, H.D. Shin, culture CBS 113303.

Notes: The genus *Graminopassalora* is newly introduced to accommodate *Passalora graminis*, which is not congeneric with the type of *Passalora* as defined by the type *Passalora bacilligera* (Fig. 1, clade 35; Fig. 2, clade 22). The lectotype of *Passalora graminis* was described from grass leaves of uncertain identity originating from Germany. *Passalora graminis* is considered a widespread pathogen able to infect a wide range of grass hosts (*Poaceae*). The existing collections on various hosts are morphologically uniform suggesting this is a single plurivorous species, but more detailed analyses including an ex-type strain are required to ascertain this hypothesis. In this study, two Asian isolates isolated from different hosts were also analysed. Their morphology is identical to the description available in literature (Braun *et al.* 2015) and they are deemed as good representatives of this species. These isolates formed a well-supported clade by all three phylogenetic methods employed (Fig. 1, clade 21; Fig. 2, clade 21).

Clade 22: *Pallidocercospora*

Pallidocercospora Crous, Stud. Mycol. 75: 73. 2013.

Description (from Crous *et al.* 2013a): Foliicolous, phytopathogenic, causing discrete leaf spots. *Ascomata* single, black, immersed, globose, glabrous; wall of 3–4 layers of medium brown *textura angularis*. *Asci* fasciculate, bitunicate, aparaphysate, subsessile, 8-spored, ellipsoid to obclavate or cylindrical, straight or curved, numerous. *Ascospores* 2- to multiseriate, oblique, overlapping, straight ellipsoidal to obovoid, hyaline, smooth, 1-septate. *Mycelium* predominantly immersed, consisting of olivaceous brown hyphae, smooth, branched, septate, 2–4 µm diam. *Conidiophores in vivo* fasciculate, or occurring singly on superficial mycelium as lateral projections, unbranched or branched, septate, cylindrical, straight to geniculate-sinuous, olivaceous brown. *Conidiogenous cells* integrated, terminal, cylindrical, straight to geniculate-sinuous, olivaceous brown, proliferating sympodially or percurrently, with unthickened loci, not darker than the surrounding conidiogenous cell. *Conidia* solitary, straight to irregularly curved, guttulate, pale olivaceous to olivaceous brown, subcylindrical to narrowly obclavate, multi-septate; hila neither thickened nor darkened.

Type species: *Pallidocercospora heimii* (Crous) Crous (≡ *Pseudocercospora heimii* Crous).

Pallidocercospora heimii (Crous) Crous, Stud. Mycol. 75: 74. 2013.
Basionym: *Pseudocercospora heimii* Crous, S. African Forest. J. 172: 4. 1995.
Synonyms: *Mycosphaerella heimii* Crous, S. African Forest. J. 172: 2. 1995.
Mycosphaerella heimii Bouriquet, Encycl. Mycol. 12: 418. 1946, nom. nud.

Description and illustration: Crous *et al.* (2013a).

Materials examined: **Brazil**, Bahia, Teixeira de Freitas, on leaves of *Eucalyptus* sp., 2004, A.C. Alfenas, culture CPC 11716. **Madagascar**, Moramanga, on leaves of *Eucalyptus* sp., 16 Apr. 1994, P.W. Crous (PREM 51749, **holotype** of sexual morph; PREM 51748, **holotype** of asexual morph, cultures ex-type CPC 760−761 = CBS 110682).

Notes: The genus *Pallidocercospora* was established to accommodate the species previously belonging to the *Mycosphaerella heimii* complex. *Pallidocercospora* species are morphologically similar to *Pseudocercospora s. str.* but can be distinguished by the pale olivaceous and smooth conidia and the red crystals they form when cultivated in agar (Crous *et al.* 2013a). The strains used in this study clustered in a well-supported clade by all three phylogenetic methods employed (Fig. 1, clade 22; Fig. 2, clade 28). At the time this genus was introduced (Crous *et al.* 2013a), the authors observed two pseudocercospora-like species clustering in the same clade, namely *Pseudocercospora thailandica* (foliar pathogen of *Acacia*; Crous *et al.* 2004c) and *Pseudocercospora colombiensis* (foliar pathogen of *Eucalyptus*; Crous 1998), also with mycosphaerella-like sexual morphs. Morphologically, *Pseudocercospora thailandica* and *Pseudocercospora colombiensis* were indistinguishable from *Pseudocercospora* species. In that study (Crous *et al.* 2013a), the multigene phylogeny strongly supported the clade that included *Pallidocercospora*, *Trochophora*, *Scolecostigmina* and the two mentioned species, but poorly supported their separation, despite their strikingly different morphologies. Based on the morphological differences and poor phylogenetic support, the authors refrained from proposing a formal combination of *Pseudocercospora thailandica* and *Pseudocercospora colombiensis* into *Pallidocercospora* at the time (Crous *et al.* 2013a). In a recent study, a formal proposal for the combination of these two species into *Pallidocercospora* was presented on the basis of a multigene phylogeny based on a LSU and ITS alignment (Hyde *et al.* 2016). In this study, with the introduction of a wider range of species sequences and the *rpb2* gene, we find good support for the separation of these two species into their own clade.

Clade 23: *Nothophaeocryptopus*

Nothophaeocryptopus Videira, C. Nakash. & Crous, **gen. nov.** MycoBank MB822698.

Etymology: From the greek notho-, meaning false, and the similarity to the genus *Phaeocryptopus*.

Description: Phytopathogenic. *Mycelium* internal and superficial, pseudothecia, internal and superficial, emerging through stomata on the lower surface of leaves, black. *Ascospores* hyaline, ellipsoidal with obtuse ends, 1-septate, slightly constricted at the septa, the basal cell slightly narrower and tapering toward its base. Germinating ascospores develop germ hyphae from polar ends of both cells.

Type species: *Nothophaeocryptopus gaeumannii* (T. Rohde) Videira *et al.* (≡ *Adelopus gaeumannii* T. Rohde).

Nothophaeocryptopus gaeumannii (T. Rohde) Videira, C. Nakash., U. Braun & Crous, **comb. nov.** MycoBank MB822768.
Basionym: *Adelopus gaeumannii* T. Rohde, Silva: 51. 1936.
Synonyms: *Adelopus balsamicola* f. *douglasii* J. Steiner, Z. Pflanzenkrankh. 47: 184. 1937.
Phaeocryptopus gaeumannii (T. Rohde) Petr., Ann. Mycol. 36(1): 22. 1938.

Description (adapted from Stone *et al.* 2008): *Ascomata* pseudothecial, internal, emerging from stomata, on the lower surface of living leaves and dead leaves, less than 0.1 mm diam, black. Superficial, radiating hyphae emerging from developing ascocarps, spreading across the needle surface and re-entering the needle through unoccupied stomata. *Ascospores* hyaline, ellipsoidal with obtuse ends, 1-septate, slightly constricted at the septa, the basal cell slightly narrower and tapering toward its base, 11−17 × 4−5 µm. Germinating ascospores develop germ hyphae from polar ends of both cells. Germinating hyphae initially hyaline, becoming pale olive brown when up to 20 µm long, then becoming dark brown to black.

Materials examined: **Austria**, unknown host, date and collector, isol. H. Steiner, dep. in 1938, culture CBS 244.38. **Germany**, on needles of *Pseudotsuga menziesii*, unknown date and collector, isol. T. Rhode, deposited in 1937 (**lectotype** designated here, MBT378568, preserved as metabolically inactive culture CBS 267.37).

Notes: The genus *Nothophaeocryptopus* is introduced to accommodate the species *Phaeocryptopus gaeumannii* which is not congeneric with the type of *Phaeocryptopus*, *Phaeocryptopus nudus* (*Dothideales*). The systematic position of *Phaeocryptopus gaeumannii* was originally determined based on a phylogeny of combined LSU and SSU sequences that placed it within the *Mycosphaerellaceae* (*Capnodiales*), followed by a phylogeny of ITS sequences that placed it in the *Mycosphaerella heimii* complex (Winton *et al.* 2007). In this study, the phylogenetic results agreed with the previous results of Winton *et al.* (2007), placing this species in a well-supported clade (Fig. 1, clade 23; Fig. 2, clade 29), closely related with *Pallidocercospora*. *Nothophaeocryptopus gaeumannii* is the causal agent of Swiss needle cast disease on *Pseudotsuga menziesii* (Douglas-fir). The disease symptoms include severe defoliation that leads to reduced height and diameter growth. Publications by Rohde (1937) and Steiner (1937) provided the first insights into the pathogen life-cycle and how it differed from *Phaeocryptopus nudus*. Although *Nothophaeocryptopus gaeumannii* grows well on artificial culture media, it behaves as an obligate parasite, reproducing only on living needles of *Pseudotsuga menziezii*, and no asexual morph has been observed thus far (Stone *et al.* 2008). Isolates of *Nothophaeocryptopus gaeumannii* also have been observed to produce diffusing red pigments in culture (Winton *et al.* 2007), which is a feature also observed in *Pallidocercospora*.

Clade 24: *Scolecostigmina*

Scolecostigmina U. Braun, New Zealand J. Bot. 37: 323. 1999.

Description (from Braun *et al.* 1999): Foliicolous, phytopathogenic, associated with leaf spots. *Mycelium* immersed, consisting of septate, branched, pigmented hyphae. *Sporodochia* immersed to erumpent; stromata subglobose to applanate, composed of brown, angular to subglobose cells. *Conidiophores* numerous, densely aggregated, arising from a stroma, subcylindrical or somewhat tapered towards the apex, occasionally ampulliform, continuous or septate, pigmented, wall somewhat thickened, usually verruculose. *Conidiogenous cells* integrated, terminal or at times conidiophores reduced to conidiogenous cells, holoblastic, proliferating percurrently via conspicuous annellations. *Conidia* solitary, scolecosporous, usually subcylindrical-obclavate, transversely pluriseptate, occasionally with few longitudinal or oblique septa, euseptate, rarely with few intermixed distosepta, thick-walled, pigmented, dark, smooth to verrucose, apex obtuse to subacute, base truncate or obconically truncate, hila unthickened, not darkened; secession schizolytic.

Type species: *Scolecostigmina mangiferae* (Koord.) U. Braun & Mouch. (≡ *Cercospora mangiferae* Koord.).

Scolecostigmina mangiferae (Koord.) U. Braun & Mouch., New Zealand J. Bot. 37: 323. 1999.
Basionym: *Cercospora mangiferae* Koord., Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Tweede Sect. 13(4): 236. 1907.
Synonyms: *Stigmina mangiferae* (Koord.) M.B. Ellis, Mycol. Pap. 72: 49. 1959.
Sciniatosporium mangiferae (Koord.) Morgan-Jones, Canad. J. Bot. 49: 999. 1971.

Descriptions and illustrations: Ellis (1959), Crous *et al.* (2013a).

Materials examined: **Australia**, Queensland, Mareeba, S16°58′75.5″ E145°20′60.8″ on leaves of *Mangifera indica*, 10 Aug. 2009, P.W. Crous & R.G. Shivas (**neotype** designated here CBS H-20846, MBT378567, ex-neotype culture CBS 125467 = CPC 17351); *idem*. CPC 17352. **New Caledonia**, Port Laguerre (Ec. Agr.), on *Mangifera indica*, 20 Nov. 1959, Bugnicourt, NC 59.061 a, b (PC).

Notes: The genus *Scolecostigmina* was introduced by Braun *et al.* (1999) to accommodate foliicolous stigmina-like hyphomycetes such as the type species *Scolecostigmina mangiferae*, characterised by producing sporodochial conidiomata with firm stromata, verruculose conidiophores and conidiogenous cells with conspicuous coarse annellations and scolecosporous, pluriseptate, thick-walled conidia. The type material of *Cercospora mangiferae* could not be traced (Indonesia, Java, on leaves of *Mangifera indica*, 21 Sep. 1905; Koorders 1907), but various other collections have been examined (Braun *et al.* 1999). Therefore, we propose the specimen CBS H-20846 as neotype and the strain CBS 125467 = CPC 17351 as ex-neotype culture. In this study, *Scolecostigmina* is represented by a single-strain lineage in the phylogenetic analysis (Fig. 1, clade 24; Fig. 2, clade 30) and is closely related to *Trochophora* and *Pallidocercospora*. Numerous other morphologically similar species assigned to *Scolecostigmina* are hitherto not known in culture and the affinity of the species concerned to *Scolecostigmina mangiferae* remains to be proven. Therefore, they are currently only tentatively retained in *Scolecostigmina.*

Clade 25: *Parapallidocercospora*

Parapallidocercospora Videira, Crous, U. Braun, C. Nakash., **gen. nov.** MycoBank MB822604.

Etymology: Similar to the genus *Pallidocercospora*.

Description: Plant pathogenic. *Leaf spots* amphigenous, irregular to subcircular. *Ascomata* pseudothecial, predominantly hypophyllous, black, subglobose to globose, with apical ostiole, walls of 2–3 layers of medium brown *textura angularis*. *Asci* fasciculate, bitunicate, subsessile, cylindrical to narrowly ellipsoidal, straight or slightly incurved. *Ascospores* bi- to multiseriate, overlapping, hyaline, guttulate, thin-walled, straight to slightly curved, fusoid-ellipsoidal, obovoid, medianly 1-septate, not constricted at septum or only slightly constricted, tapering toward both ends but more prominently toward the base. *Spermogonia* intermixed with the ascomata or with the asexual morph, hyaline and rod-shaped. *Mycelium* internal and external, hyphae light brown, septate, branched, smooth. *Conidiophores* arising from superficial mycelium, from the upper cells of a brown stroma; conidiophores light brown, smooth, aseptate or septate, subcylindrical, straight to variously curved, unbranched. *Conidiogenous cells* terminal, unbranched, light brown, smooth, tapering to flat-tipped apical loci, proliferating sympodially, rarely percurrently near apex. *Conidia* solitary, light brown, smooth to finely verruculose, septate, guttulate, narrowly obclavate or subcylindrical, tapering towards the base, straight to curved.

Type species: *Parapallidocercospora colombiensis* (Crous *et al.*) Videira & Crous (≡ *Pseudocercospora colombiensis* Crous & M.J. Wingf.).

Parapallidocercospora colombiensis (Crous & M.J. Wingf.) Videira & Crous, ***comb. nov.*** MycoBank MB822774.
Basionym: *Pseudocercospora colombiensis* Crous & M.J. Wingf., Mycol. Mem. 21: 42. 1998.
Synonym: *Mycosphaerella colombiensis* Crous & M.J. Wingf., Mycol. Mem. 21: 41. 1998.

Description and illustration: Crous (1998).

Materials examined: **Colombia**, Pinal Farm, on leaves of *Eucalyptus urophylla*, May 1995, M.J. Wingfield (**holotype** PREM 54397, ex-type culture CBS 110968 = CPC 1105).

Notes: The genus *Parapallidocercospora* is hereby introduced in order to accommodate two species, *Pseudocercospora colombiensis* (foliar pathogen of *Eucalyptus*; Crous 1998), and *Pseudocercospora thailandica* (foliar pathogen of *Acacia*; Crous *et al.* 2004c). Morphologically, these taxa appear typical members of *Pseudocercospora s. str.* and are difficult to identify without the use of DNA sequence data. In this study both species clustered in a well-supported clade in the phylogenetic analyses (Fig. 1, clade 25; Fig. 2, clade 31) and are closely related to *Pallidocercospora*, *Scolecostigmina* and *Trochophora*.

Parapallidocercospora thailandica (Crous, Himaman & M.J. Wingfield) Videira & Crous, **comb. nov.** MycoBank MB822775.
Basionym: *Mycosphaerella thailandica* Crous *et al.*, Stud. Mycol. 50: 465. 2004.
Synonyms: *Pseudocercospora thailandica* Crous *et al.*, Stud. Mycol. 50: 465. 2004.
Pallidocercospora thailandica (Crous *et al.*) Phook. *et al.*, Fungal Diversity 80: 21. 2016.

Descriptions and illustrations: Crous *et al.* (2004c), Hyde *et al.* (2016).

Materials examined: **Thailand**, Chachoengsao Prov., Sanamchaikhet, on leaves of *Acacia mangium*, 28 May 2003, K. Pongpanich (**holotype** CBS H-9875, of both *M. thailandica* and *P. thailandica*, cultures ex-type CBS 116367 = CPC10547–10549); Thatakiab District, on living leaves of *Eucalyptus camaldulensis*, Oct. 2006, W. Himaman, culture CBS 120723 = CPC 13478.

Note: See notes on *Parapallidocercospora colombiensis* and *Pallidocercospora*.

Clade 26: *Trochophora*

Trochophora R.T. Moore, Mycologia 47: 90. 1955.

Description (from Crous *et al.* 2013a): Foliicolous, but pathogenicity unproven. *Colonies* hypophyllous, medium to dark brown, consisting of fasciculate conidiophores or numerous synnemata. *Stroma* absent, but with a superficial network of hyphae linking the various synnemata. *Conidiophores* fasciculate to synnematous, mostly unbranched and straight, or with 1–2 short branches, straight or curved, cylindrical, individual conidiophores tightly aggregated, but separating near the apex, pale to medium brown, smooth. *Conidiogenous cells* polyblastic, integrated, terminal, determinate to sympodial, with visible unthickened loci, clavate. *Conidia* solitary, terminal or lateral on conidiogenous cells, prominently curved to helicoid, pale to medium brown, smooth, transversely euseptate with a darkened, thickened band at the septa.

Type species: *Trochophora fasciculata* (Berk. & M.A. Curtis) Goos (≡ *Helicoma fasciculatum* Berk. & M.A. Curtis).

Trochophora fasciculata (Berk. & M.A. Curtis) Goos, Mycologia 78: 759. 1986.
Basionym: *Helicoma fasciculatum* Berk. & M.A. Curtis, Proc. Amer. Acad. Arts Sci. 4: 127. 1858.
Synonyms: *Helicosporium fasciculatum* (Berk. & M.A. Curtis) Sacc., Syll. Fung. 4: 560. 1886.
Helicomyces fasciculatus (Berk. & M.A. Curtis) Pound & Clem., Minn. Bot. Stud. 9: 658. 1896.
Helicostilbe simplex Petch, Ann. Royal Bot. Gard. Peradeniya 7: 321. 1922.
Trochophora simplex (Petch) R.T. Moore, Mycologia 47: 90. 1955.

Description and illustrations: Ellis (1971), Zhao *et al.* (2007), Crous *et al.* (2013a).

Materials examined: **India**, Sri Lanka, on *Daphniphyllum glaucescens*, collector unknown, Apr. 1917 (**holotype** of *Helicostilbe simplex*, IMI 87262). **Japan**, under side of dead leaves, date unknown, C. Wright 142 (**holotype** of *Helicoma fasciculatum*, NY 00945981); Shimane, Matsue, on *Daphniphyllum macropodum*, 26 Apr. 2008, C. Nakashima & I. Araki (**epitype** designated here TSU MUMH11134, MBT377074, ex-epitype culture MUCC 952). **Republic of Korea**, Jeju, Halla arboretum, on leaves of *Daphniphyllum macropodum*, 29 Oct. 2005, H.D. Shin, KACC 42362 = CBS H-20847, culture CBS 124744 = SMKC 21713; Pusan, on leaves of *Daphniphyllum macropodum*, 13 Nov. 2002, H.D. Shin, KUS-F19414, cultures CPC 10280–10282.

Notes: The genus *Trochophora* is currently monotypic based on *Trochophora fasciculata*, a pathogen of *Daphniphyllum* shrubs and trees in several Asian countries (Zhao *et al.* 2007). Based on the LSU sequence, the phylogenetic position has been shown to be closely related to *Pallidocercospora* and *Scolecostigmina* (Crous *et al.* 2013a). The phylogenetic results in this study, with the addition of *rpb2* and ITS sequences, agreed with the previous observations (Fig. 1, clade 26; Fig. 2, clade 32). Despite the low support, the distinctive morphology observed in *Trochophora* justifies that it is retained as separate, pending more collections to be added to this clade.

Clade 27: *Pseudophaeophleospora*

Pseudophaeophleospora C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822700.

Etymology: Composed of 'pseudo' (resembling but not equalling) + the similar genus, *Phaeophleospora*.

Description (adapted from Crous *et al.* 2007c and Wu *et al.* 1996): Phytopathogenic. *Conidiomata* amphigenous, globose, wall with up to four layers of dark brown *textura angularis*, subepidermal, scattered, rarely aggregated, with a central ostiole from where conidia exude in a cirrhus. *Conidiophores* absent or reduced to only two cells. *Conidiogenous cells* pale brown, smooth to finely verruculose, ampulliform to doliiform, subcylindrical, proliferating percurrently near apex. *Conidia* formed singly, pale to dark brown, smooth to slightly verruculose, guttulate, subcylindrical to narrowly obclavate, slightly fusiform, straight, multiseptate, with apical cell tapering into an obtuse apex, widest at basal septum and tapering to a subtruncate base, hilum flattened with minute marginal frill.

Type species: *Pseudophaeophleospora stonei* (Crous) C. Nakash. *et al.* (≡ *Phaeophleospora stonei* Crous).

Pseudophaeophleospora atkinsonii (Syd.) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822781.
Basionym: *Scoleciasis atkinsonii* Syd., Annls. Mycol. 22(3–6): 312. 1924.
Synonyms: *Phaeophleospora atkinsonii* (Syd.) Pennycook & McKenzie, Mycotaxon 82: 145. 2002.
Septoria exotica sensu Grove, Brit. Leaf-fung. 1: 415. 1935.
Kirramyces hebes W.P. Wu, B. Sutton & Gange, Mycol. Res. 100: 1208. 1996.
Phaeophleospora hebes (W.P. Wu, B. Sutton & Gange) Crous, F.A. Ferreira & B. Sutton, S. Afr. J. Bot. 63: 113. 1997.

Description and illustration: Wu *et al.* (1996).

Materials examined: **New Zealand**, Wellington, York Bay, on *Hebe stricta* var. *atkinsonii*, Oct. 1920, E.H. Atkinson (**holotype** PDD 968); St Johns, Morrin Road, Auckland University Campus, on *Hebe* sp., unkown date and collector, isol. C.F. Hill, 27 Jan. 2009, PDD 95173, cultures ICMP 17860 = CBS 124565; Grey Lynn, Western Springs Park, Jan. 2007, C.F. Hill, PDD 95176, culture ICMP 17862 = CBS 124566.

Notes: Despite the repeated attempts to induce the available cultures to sporulate on different types of agar medium, no reproductive structures characteristic of this species were formed. This species is transferred to *Pseudophaeophleospora* based on phylogenetic inference (Fig. 1, clade 27; Fig. 2, clade 33). According to Wu *et al.* (1996), the conidiophores are reduced to conidiogenous cells that are pale brown, and the conidia are obclavate to cylindrical, which correlate with the type species of *Pseudophaeophleospora.*

Pseudophaeophleospora stonei (Crous) C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822782.
Basionym: *Phaeophleospora stonei* Crous, Fungal Diversity 26: 169. 2007.

Description and illustration: Crous *et al.* (2007c).

Description in vitro (on V8; CBS 13330): *Mycelium* composed of hyaline to pale blackish brown hyphae, uniform in width, 2–2.5 µm diam. *Conidiomata* absent. *Conidiophores* micronematous to macronematous, emerging from hyphae, sometimes reduced to conidiogenous cells, pale blackish brown, 10–25 × 2.5–3.8 µm. *Conidiogenous* cells apical, intercalary, integrated, sometimes reduced to hyphae, proliferating percurrently, with unthickened loci, 2–2.5 µm diam. *Conidia* solitary, pale blackish brown, smooth, holoblastic, schizolytic, cylindrical to short obclavate, rounded at the apex, 15–32.5 × 3.5–7.5 µm, 1–4-septate, with unthickened and truncate hilum at the base.

Materials examined: **Australia**, Queensland, Cairns, Kuranda, Karoomba River Walk, S 16° 49′ 08.8″, E 145° 38′ 24.7″, on leaves of *Eucalyptus* sp., 19 Aug. 2006, P.W. Crous & J. Stone (**holotype** CBS H-19835, culture ex-type CBS 120830 = CPC 13330); *idem*. CPC 13331, CPC 13332.

Notes: The genus *Phaeophloeospora*, based on the ITS sequence of its type species *Phaeophloeospora eugeniae*, belongs to *Mycosphaerellaceae* (Crous *et al.* 2001a, b). Since the ITS sequence of *Phaeophloeospora stonei* did not cluster with the type of *Phaeophleospora*, the genus was considered polyphyletic (Crous *et al.* 2007c). In the present study, the phylogenetic analysis performed based on the sequences of LSU, *rpb2* and ITS agrees with the previous work and the strain of

Pseudophaeophleospora stonei forms a single strain lineage (Fig. 1, clade 27; Fig. 2, clade 33) that is closely related to *Pseudophaeophleospora atkinsonii*. The species *Phaeophloeospora concentrica* (not included in this study), a pathogen of *Protea* spp., clusters close to *Brunneosphaerella* (Crous *et al.* 2009c). Morphologically, *Pseudophaeophleospora* is very similar to *Phaeophleospora*, and the two genera can only safely be distinguished by means of DNA data.

Clade 28: *Sonderhenia*

Sonderhenia H.J. Swart & J. Walker, Trans. Brit. Mycol. Soc. 90: 640. 1988.

Description (from Crous 1998): Foliicolous, phytopathogenic, causing discrete leaf spots. *Leaf spots* amphigenous, round to confluent and irregular, surrounded by a purple border when young, which becomes dark red to brown and raised with age. *Ascomata* pseudothecial, amphigenous, on one side of each lesion, often 1–3, intermingled with conidiomata, immersed, black, punctiform, globose to subglobose; apical ostiole substomatal; wall olive brown, of 3–4 layers of *textura angularis*, subhymenium of 1–2 layers of hyaline cells. *Asci* fasciculate, bitunicate, subsessile, 8-spored, ovoid to obclavate, straight to incurved. *Ascospores* 2–3-seriate, hyaline, guttulate, straight or slightly curved, fusiform, 1-septate, widest just above median septum, slightly constricted at septum. *Conidiomata* pycnidial, amphigenous, subepidermal with central non-projecting ostiole, scattered, black, globose; wall of 2–3 layers of brown cells. *Conidiogenous cells* minute, olivaceous, proliferating enteroblastically and percurrently, lining the inner pycnidial wall layer. *Conidia* ellipsoidal to cylindrical or ovoid, straight or bent, brown, 3-distoseptate, not constricted, verruculose, apex obtuse, base truncate with marginal frill.

Type species: *Sonderhenia eucalyptorum* (Hansf.) H.J. Swart & J. Walker (≡ *Hendersonia eucalyptorum* Hansf.).

Sonderhenia eucalyptorum (Hansf.) H.J. Swart & J. Walker, Trans. Brit. Mycol. Soc. 90: 640. 1988.
Basionym: *Hendersonia eucalyptorum* Hansf., Proc. Linn. Soc. N.S.W. 79(3-4): 135. 1954.
Synonym (sexual morph): *Mycosphaerella swartii* R.F. Park & Keane, Trans. Brit. Mycol. Soc. 83: 99. 1984.

Descriptions and illustrations: Swart & Walker (1988), Crous (1998).

Materials examined: **Australia**, Mt. Gambier, on leaves of *Eucalyptus leucoxylon*, 9 Dec. 1982, R.F. Park (**holotype** of *Mycosphaerella swartii* DAR 45719, **isotype** IMI 280474, sexual morph); Clare, on leaves of *E. leucoxylon*, Aug. 1922, T. Osborne (**holotype** of *Hendersonia eucalyptorum*, K(M) 137253, WARI 2007, asexual morph); Tasmania, on leaves of *Eucalyptus coccifera*, Jan. 2006, C. Mohammed, cultures CBS 120220 = CPC 12553, CPC 12554–12555.

Notes: *Sonderhenia* includes taxa with mycosphaerella-like sexual morphs and pycnidial asexual morphs. The brown conidiogenous cells proliferate percurrently and give rise to brown conidia that are transversely distoseptate. Only two species, *Sonderhenia eucalypticola* and *Sonderhenia eucalyptorum* are presently known (Crous *et al.* 2013a), and they cluster together in a well-supported clade (Fig. 1, clade 28; Fig. 2, clade 34) closely related to *Pseudophaeophleospora*.

Clade 29: *Pseudocercospora*, *Neopseudocercospora* and pseudocercospora-like

Pseudocercospora Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires, Ser. 3, 20: 437. 1910.
Synonym: *Neopseudocercospora* Crous, Persoonia 31: 219. 2013.
Additional synonyms: See Crous & Braun (2003), Braun *et al.* (2013), Crous *et al.* (2013a).

Description (from Crous *et al.* 2013a): Foliicolous, chiefly phytopathogenic, but also endophytic; commonly associated with leaf spots, but also occurring on fruits. *Mycelium* internal and external, consisting of smooth, septate, subhyaline to brown branched hyphae. *Stroma* absent to well-developed. *Conidiophores in vivo* arranged in loose to dense fascicles, sometimes forming distinct synnemata or sporodochia, emerging through stomata or erumpent through the cuticle, often arising from substomatal or subcuticular to intraepidermal stromata, or occurring singly on superficial hyphae, short to long, septate or continuous, i.e. conidiophores may be reduced to conidiogenous cells, simple to branched and straight to geniculate-sinuous, subhyaline, pale to dark olivaceous to brown, smooth to finely verruculose. *Conidiogenous cells* integrated, terminal, occasionally intercalary, polyblastic, sympodial, or monoblastic, proliferating percurrently via inconspicuous or darkened, irregular annellations, subhyaline, olivaceous, pale to dark brown, with inconspicous, or only thickened along the rim, or flat, and unthickened or almost so but refractive or even slightly darkened-refractive loci, but never pronounced. *Conidia* solitary, rarely in simple chains or disarticulating, subhyaline, olivaceous, pale to dark brown, usually scolecosporous, i.e. obclavate-cylindrical, filiform, acicular, and transversely multi-euseptate, occasionally also with oblique to longitudinal septa, conidia rarely amero- to phragmosporous, short subcylindrical or ellipsoidal-ovoid, aseptate or only with few septa, apex subacute to obtuse, base obconically truncate to truncate, or bluntly rounded, with or without a minute marginal frill, straight to curved, rarely sigmoid, smooth to finely verruculose; hila usually unthickened, not darkened, at most somewhat refractive, occasionally slightly thickened along the rim, or rarely flat, unthickened or almost so, but slightly refractive or even slightly darkened-refractive, but never pronounced.

Type species: *Pseudocercospora vitis* (Lév.) Speg. (≡ *Septonema vitis* Lév.).

***Pseudocercospora** dingleyae* U. Braun & C.F. Hill (as '*dingleyii*'), Mycol. Progress 1(1): 23. 2002.
Replaced synonym: *Cercospora haloragis* Dingley, New Zealand J. Agric. Res. 8(4): 913. 1965, non *Pseudocercospora haloragidis* (Hansf.) U. Braun 1995.

Materials examined: **New Zealand**, Auckland, Piha, White's Stream, on *Haloragis erecta* 31 Jan. 1954, J.M. Dingley (**holotype** PDD 20086); Auckland, Grey Lynn, Western Springs, on *Haloragis erecta*, 21 Jan. 2001, C.F. Hill 367, HAL 3239 F, PDD 73036, culture CBS 114645.

Note: The present name was introduced by Braun & Hill (2002) for the species *Cercospora haloragidis* which had unthickened and undarkened conidiogenous loci and hila, a characteristic of *Pseudocercospora*.

Pseudocercospora convoluta (Crous & Den Breeÿen) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822778.
Basionym: *Passalora convoluta* Crous & Den Breeÿen, Fungal Diversity 23: 96. 2006.

Description and illustrations: Den Breeÿen *et al.* (2006).

Materials examined: **Costa Rica**, San Isidro between San José and Golfito, on leaves of *Chromolaena odorata*, 15 Oct. 1997, M.J. Morris (**holotype** CBS H-19752, ex-type culture CBS 113377 = MJM 1533 = C488).

Notes: The phylogenetic analysis in this study showed that this species clustered within the *Pseudocercospora* clade (Fig. 1, clade 29; Fig. 2, clade 23). Although in the original description of the species the loci and hila were described as 'darkened, thickened and refractive' (Den Breeÿen *et al.* 2006), observation of the type specimen and culture led to the conclusion that these are within the acceptable range of this genus.

Pseudocercospora metrosideri U. Braun, Fungal Diversity 8: 44. 2001.

Material examined: **New Zealand**, Auckland, on *Metrosideros excelsa*, 17 Oct. 2003, C.F. Hill 929, culture CBS 114294.

Note: The present strain was introduced by Braun & Hill (2004) and, although the conidia were shorter and narrower than average, they were still within the range from the original description by Braun (2001).

Pseudocercospora nodosa (Constant.) U. Braun, C. Nakash., Videira & Crous, **comb. nov**. MycoBank MB822779.
Basionym: *Cercospora nodosa* Constant., Mycotaxon 3: 122. 1975.
Synonym: *Passalora nodosa* (Constant.) L.G. Br. & Morgan-Jones, Mycotaxon 4: 303. 1976.

Description and illustration: Brown & Morgan-Jones (1976).

Materials examined: **Romania**, Bucuresti, on *Psoralea bituminosa*, 23 Sep. 1966, O. Constantinescu (**holotype** BUCM 41472, ex-type culture CBS 554.71, wrongly cited as "555.71" in protologue).

Notes: Based on the phylogenetic analyses in this study, this species clustered within *Pseudocercospora* (Fig. 1, clade 29; Fig. 2, clade 23). Although we did not study the holotype specimen, we examined the ex-type culture. When Constantinescu (1975) proposed this species, his detailed line drawings illustrated "thin", discrete conidial scars (loci)". In addition, Brown & Morgan-Jones (1976), who observed the holotype, mentioned that the thin scars, swollen conidiophore apices and basal conidial cells were indicative of its placement in *Passalora*. However, these characters are also typical characters of *Pseudocercospora*.

Pseudocercospora vitis (Lév.) Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 20(13): 438. 1910.
Basionym: *Septonema vitis* Lév., Ann. Sci. Nat., Bot., Sér. 3, 9: 261. 1848.
For additional synonyms see MycoBank.

Description and illustrations: Deighton (1976a).

Materials examined: **Republic of Korea**, Namyangju, on *Vitis vinifera*, 30 Sep. 2004, H.D. Shin, CBS H-20848, CBS 132012 = CPC 11595; on *V. vinifera*, 1 Oct. 2007, H.D. Shin, cultures CBS 132112 = CPC 14661.

Notes: Type material of *Septonema vitis* is not preserved, as already noted by Harvey & Wenham (1972), and the designation of a neotype is required, but fresh collections from the type host and location are necessary (France, Bordeaux, on *Vitis vinifera*). *Pseudocercospora* is a large cosmopolitan genus of plant pathogenic fungi that is commonly associated with leaf spots and blights on a wide range of plant hosts. Species occur in arid as well as wet environments and in a wide range of climates. The phylogenetic placement of *Pseudocercospora* has previously been determined and many new species have since been described (Crous *et al.* 2013a). In this study, the *Pseudocercospora* clade is well-supported by the phylogenetic analysis (Fig. 1, clade 29; Fig. 2, clade 23) and *Pseudocercospora pistacina* is basal to the clade. In addition, the type species of *Neocercospora*, *Neocercospora zambiae*, is observed to cluster within the *Pseudocercospora* clade and, therefore, Sutton's reallocation of *Sporidesmium zambiense* to *Pseudocercospora* is resurrected as current name.

Pseudocercospora zambiensis (Deighton) B. Sutton, Mycopathologia 125: 61. 1994.
Basionym: *Sporidesmium zambiense* Deighton, Mycol. Pap. 117: 27. 1969.
Synonyms: *Repetophragma zambiense* (Deighton) Subram., Proc. Indian Acad. Sci., B, 58: 185. 1992.
Neopseudocercospora terminaliae Crous, Persoonia 31: 219. 2013.
Neopseudocercospora zambiensis (Deighton) Crous & U. Braun, IMA Fungus 5: 204. 2014.

Descriptions and illustrations: Crous *et al.* (2013a), Braun *et al.* (2014).

Materials examined: **Zambia**, on *Terminalia* sp., 24 Feb. 2013, M. van der Bank (**holotype** of *Neopseudocercospora terminaliae* CBS H-21431, culture ex-type CBS 136423 = CPC 22686); *idem*., culture CPC 22685.

Notes: When *Neopseudocercospora* was described (Crous *et al.* 2013a) the phylogenetic analysis performed placed it close to zasmidium-like species based on LSU and ITS sequences. In the present study, when the *rpb2* gene is introduced in the phylogenetic analysis, *Neopseudocercospora* clusters within the genus *Pseudocercospora* (Fig. 1, clade 29; Fig. 2, clade 23). Conidiogenous cells and conidia of *Neopseudocercospora* are similar to those of *Pseudocercospora* in being unthickened and non-pigmented. However, unlike most *Pseudocercospora* species, it produces solitary conidiophores with conidiogenous cells that proliferate percurrently and conidia with longitudinal septa (sporidesmium-like) (Crous *et al.* 2013a, Braun *et al.* 2014).

Species clustering in the *Pseudocercospora* clade that need further material to be collected before a formal combination into *Pseudocercospora* can be proposed:

Passalora bolleana (Thüm.) U. Braun, Mycotaxon 55: 228. 1995.
Basionym: *Septosporium bolleanum* Thüm., Oesterr. Bot. Z. 27 (1): 12.1877.
Synonyms: *Cercospora bolleana* (Thüm.) Speg., Michelia 1(5): 475. 1879.
Pseudocercospora bolleana (Thüm.) Sivan., The Bitunicate Ascomycetes and their anamorphs: 206. 1984.
For additional synonyms see MycoBank.

Descriptions and illustrations: Ellis (1976), Sivanesan (1984).

Materials examined: **Romania**, on *Ficus carica*, 21 Oct. 1970, O. Constantinescu, culture CBS 541.71. **Republic of Korea**, on *F. carica*, 14 Nov. 2007, H.D. Shin, culture CPC 14819.

Notes: "*Passalora bolleana*" is widely distributed throughout the world and is known as a typical species of *Passalora s. lat*. The conidial loci of "*Passalora bolleana*" are conspicuous, almost unthickened to slightly thickened and somewhat darkened. The present strains, since they cluster in the *Pseudocercospora* clade, will be treated as *Pseudocercospora* sp. until more information is available (Table 1).

Passalora robiniae (Shear) S. Hughes, Canad. J. Bot. 31: 572. 1953.
Basionym: *Fusicladium robiniae* Shear, Bull. Torrey Bot. Club 29: 452. 1902.
Synonyms: *Camptomeris robiniae* (Shear) Cif., Mycopathol. Mycol. Appl. 6: 25. 1951.
Phaeoisariopsis robiniae (Shear) Deighton, in Ellis, More Dematiaceous Hyphomycetes: 234. 1976.
For additional synonyms see MycoBank.

Description and illustration: Hughes (1953), Ellis (1976).

Material examined: **USA**, on *Robinia pseudoacacia*, unknown date and collector, isol. and dep. R.W. Davidson, deposited in 1939, culture CBS 277.39.

Notes: The type specimen of *Fusicladium robiniae* can be found in BPI, together with several isotypes. The specimen from which the culture CBS 277.39 was isolated is likely BPI 424556, based on the specimen metadata agreeing with the culture metadata (USA, Tennessee, Gatlinburg, Great Smoky Mountains National Park, *Robinia pseudoacacia*, 21 Aug. 1939, R.W. Davidson). Unfortunately, we were unable to study any of the previously mentioned specimens and the examined strain refused to sporulate on various media. Hughes (1953) re-described *Passalora robiniae*, which typically forms 1(−2)-septate conidia, the lower cell being wider than the upper one. The present strain, since it clusters in the *Pseudocercospora* clade, will be treated as *Pseudocercospora* sp. until more information is available (Table 1).

Clade 30: *Clypeosphaerella*

Clypeosphaerella Guatimosim *et al.*, Persoonia 37: 121. 2016, emend.

Description: Phytopathogenic. *Ascomata* pseudothecial, epiphyllous, solitary, subcuticular to erumpent, globose, walls of 2−3 layers of brown to dark brown *textura angularis*, ostiole central. *Asci* bitunicate, aparaphysate, fasciculate, subsessile, 8-spored, obpyriform to ovoid, hyaline, smooth. *Ascospores* inordinate, overlapping, fusoid, straight, 1-septate, slightly constricted at the septum, biguttulate, hyaline, thin-walled, smooth; germinating at both ends, remaining hyaline, germ tubes following the main axis of the spore. *Conidiophores* fasciculate, pale olivaceous, septate, usually curved, rarely branched, geniculate at the apex, conidiogenous cells with *conidiogenous loci* (scars) thickened and darkened. *Conidia* solitary, pale brown to olivaceous brown, cylindrical to obclavate, obconic base, bluntly rounded tip, septate, sometimes constricted at the septa, hilum at the base thickened and darkened.

Type species: *Clypeosphaerella sticheri* Guatimosim *et al.*

Clypeosphaerella calotropidis (Ellis & Everh.) Videira & Crous, **comb. nov.** MycoBank MB822749.
Basionym: *Cercospora calotropidis* Ellis & Everh., Rep. (Annual) Missouri Bot. Gard.: 120. 1898.
Synonyms: *Phaeoramularia calotropidis* (Ellis & Everh.) Kamal, A.S. Moses & R. Chaudhary, Mycol. Res. 94: 716. 1990.
Pseudocercospora calotropidis (Ellis & Everh.) Haldar & J.B. Ray, J. Mycopathol. Res. 39(1): 43. 2001.
Passalora calotropidis (Ellis & Everh.) U. Braun, Schlechtendalia 5: 60. 2000.
For additional synonyms see Crous & Braun (2003) and MycoBank.

Descriptions and illustrations: Chupp (1954), Ellis (1976), Wilkinson *et al.* (2005).

Material examined: **Egypt**, on *Calotropis procera*, unknown date and collector, culture CBS 129.30.

Notes: Braun (2000) transferred *Cercospora calotropidis* to the genus *Passalora* based on the observation of numerous specimens, including the type specimen (Bahamas, Fortune Island (Long Cay), on *Calotropis procera*, Nov. 1890, A.S. Hitchcock, BPI 433953, 433956, NY, IMI 7752, slide). The isolate of *Cercospora calotropidis* used in our study was sterile and the specimen was unfortunately not preserved. The strain used in the present study has an ITS sequence that is 99 % similar to GenBank AY303969, a *Passalora calotropidis* strain used by Wilkinson *et al.* (2005). In Wilkinson *et al.* (2005), the isolate's morphology has similar diagnostic characters to those of *Passalora calotropidis* (Braun 2000) and the phylogenetic analysis based on ITS placed the species in a single-strain lineage closely related to *Pseudocercospora*. In the present study, based on a multigene analysis, the strain CBS 129.30 clusters in *Clypeosphaerella* (Fig. 1, clade 30; Fig. 2, clade 26), which is closely related to *Pseudocercospora*. Based on a BLAST comparison against the alignment, the present species shares 97 % (425/438) similarity based on ITS and 96 % (733/763) similarity based on *rpb2* with *Clypeosphaerella quasiparkii* CBS 123243. Similar values of percentage similarity can be observed, for example, between *Zymoseptoria brevis* and *Zymoseptoria tritici*. Therefore, proposing a new genus to include this species would be unreasonable. The main issue is that the previously described species in this genus, *Clypeosphaerella sticheri* and *Clypeosphaerella quasiparki*, are only known by their sexual morph and *Passalora calotropidis* is only known from its asexual morph. Nevertheless, based on the molecular similarities, we propose a tentative combination of the present species in *Clypeosphaerella* until further morphological studies can be performed.

Clypeosphaerella quasiparkii (Cheew. *et al.*) Guatimosim *et al.*, Persoonia 37: 121. 2016.
Basionym: *Mycosphaerella quasiparkii* Cheew. *et al.*, Persoonia 21: 85. 2008.

Description and illustration: Cheew. *et al.* (2008).

Material examined: **Thailand**, Burirum, on leaves of *Eucalyptus* sp., Jul. 2007, P. Suwannawong (**holotype** CBS H-20132, culture ex-type CBS 123243 = CPC 15409); *idem*., cultures CPC 15433, CPC 15434.

Note: *Clypeosphaerella sticheri* is similar to *Clypeosphaerella quasiparki* but produces smaller ascospores that germinate in a type D pattern (Crous 1998, Guatimosim *et al.* 2016).

Clypeosphaerella sticheri Guatimosim *et al.*, Persoonia 37: 121. 2016.

Description and illustration: Guatimosim *et al.* (2016).

Materials examined: **Brazil**, Rio de Janeiro, Nova Friburgo, Fazenda Barreto II, Riograndina, ruderal, on fronds of *Sticherus bifidus*, 11 Feb. 2014, R.W. Barreto (**holotype** CBS H-22088, **isotype** VIC 42607, culture ex-type CPC 24705); Minas Gerais, Araponga, Parque Estadual da Serra do Bri- gadeiro, path to Pico do Pato, Atlantic rainforest, on fronds of S. bifidus, 21 Feb. 2014, E. Guatimosim, CBS H-22089, VIC 42516, culture CPC 24733.

Notes: Morphologically, the genus *Clypeosphaerella* is reminiscent of *Mycosphaerella s. lat.* (sexual morph) but differs by having the thicker upper wall of the ascomata resembling a pseudoclypeus. The phylogenetic analyses in this study places

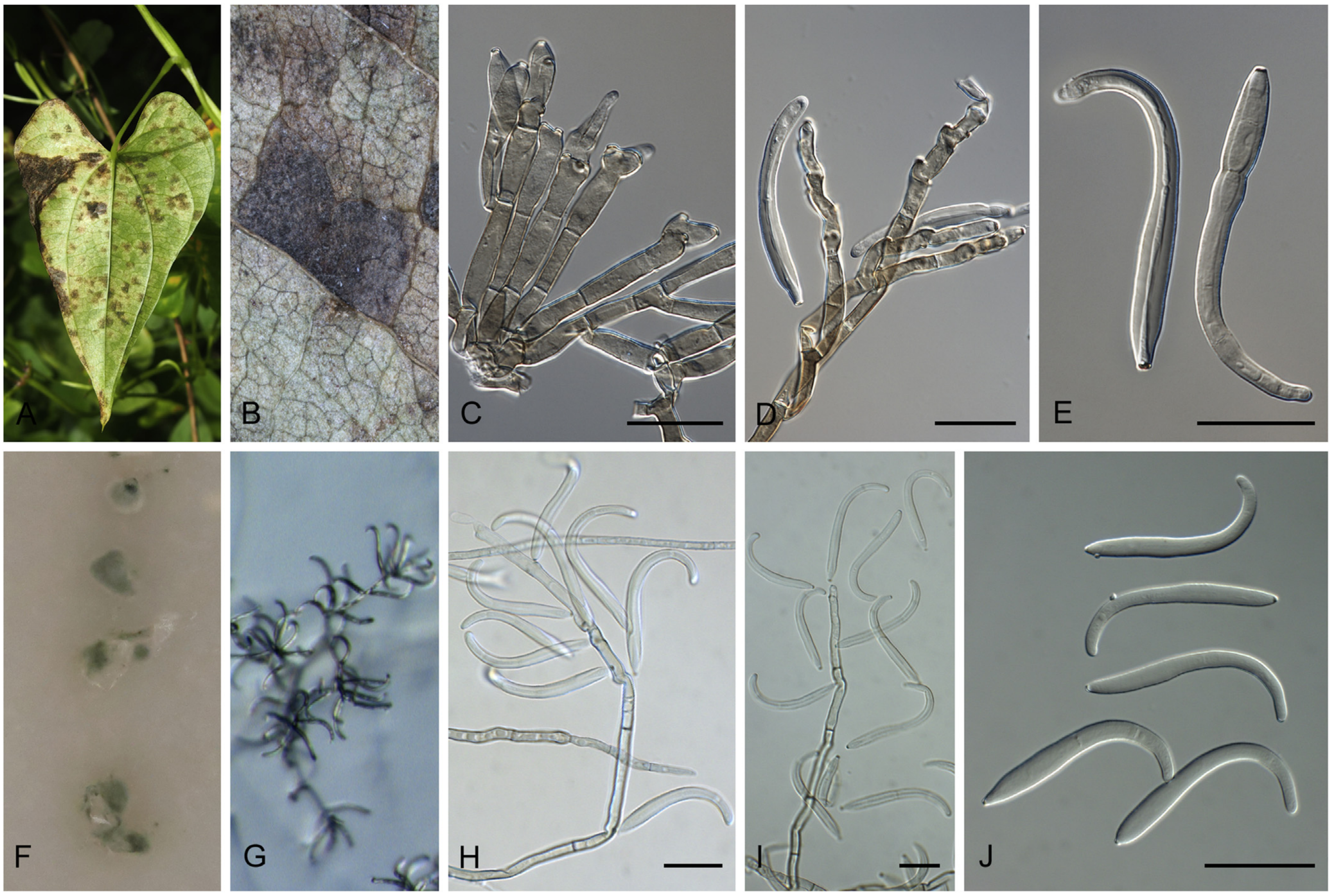


Fig. 14. *Distocercospora pachyderma* (CBS 138247). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Conidiophores and conidiogenous cells. **D.** Conidiophores, conidiogenous cells and conidia. **E.** Conidia. **F–J.** Observations *in vitro*. **F.** Culture on OA. **G.** Conidiophores erect and emerging from hyphae. **H–I.** Conidiophore, conidiogenous cell and conidia. **J.** Conidia. Scale bars = 10 µm.

Clypeosphaerella in a well-supported clade (Fig. 1, clade 30; Fig. 2, clade 26) closely related to *Distocercospora*.

Clade 31: *Distocercospora*

Distocercospora N. Pons & B. Sutton, Mycol. Pap. 160: 60. 1988.

Description (from Braun *et al.* 2013): Foliicolous, plant pathogenic, leaf spotting hyphomycetes (asexual morphs), sexual morphs unknown. *Mycelium in vivo* internal; hyphae branched, septate, subhyaline to pigmented, thin-walled, smooth. *Stromata* lacking to well-developed, pigmented, *textura angulata* to *textura globosa*. *Conidiophores* macronematous, mononematous, simple to branched, often strongly branched, septate, pigmented, thin-walled, smooth to rough-walled. *Conidiogenous cells* integrated, terminal, occasionally intercalary, proliferation sympodial, conidiogenous loci conspicuous, almost unthickened to somewhat thickened and darkened. *Conidia* formed singly, rarely in short chains, scolecosporous, mostly obclavate to cylindrical, with a single to several transverse distosepta or a mixture of eu- and distosepta, subhyaline to pigmented, wall smooth to rough, hila somewhat thickened and darkened, conidial secession schizolytic.

Type species: *Distocercospora pachyderma* (Syd. & P. Syd.) N. Pons & B. Sutton (≡ *Cercospora pachyderma* Syd. & P. Syd.).

Distocercospora pachyderma (Syd. & P. Syd.) N. Pons & B. Sutton, Mycol. Pap. 160: 60. 1988. Fig. 14.

Basionym: *Cercospora pachyderma* Syd. & P. Syd., Ann. Mycol. 12: 203. 1914.

Synonyms: *Cercosporina pachyderma* (Syd. & P. Syd.) Sacc., Syll. Fung. 25: 900. 1931.
Cercospora dioscoreae-bulbiferae J.M. Yen & Gilles, Cah. Maboké 9: 105. 1973.

Description and illustration: Braun *et al.* (2014).

Description in vivo (on V8; CPC 24144): *Mycelia* composed of hyaline to pale olivaceous, uniform in width, 2.5–3.8 µm, often forming large brown swollen cells, up to 10 µm in size. *Conidiophores* micro- or macronematous, pale olivaceous, arising from hyphae or swelling cells, smooth, septate, irregular in width, 2.5–7 µm, straight or geniculate, 50–165 × 2.5–7.5 µm. *Conidiogenous cells* integrated, apical, polyblastic, proliferating percurrently following sympodial sporulation, with darkened, rim-like and thickened loci, 1.25–2.5 µm diam. *Conidia* solitary, rarely catenate, hyaline to pale olivaceous brown, cylindrical to obclavate, straight, apex rounded and often elongated (beak-like), base long obconically truncate, 28–55 × 2.5–7.5 µm, 2–3-eu- or distoseptate, hila thickened, darkened and refractive.

Materials examined: **Japan**, Iwate, Morioka, Koma, on *Dioscorea* sp., 13 Sep. 2010, C. Nakashima & K. Motohashi (**epitype** designated by Braun *et al.* 2014, TSU MUMH11476, **isotype** CBS H-21733, ex-epitype culture CBS 138247 = CPC 24144); Ibaragi, on *Dioscorea* sp., T. Kobayashi, slide specimen MUCC-PL-185. **Fiji**, Taveuni, Tabakau, on *Dioscorea bulbifera*, 22 Dec. 2002, E.H.C. McKenzie, PDD 77375. **Philippines**, Prov. Laguna, Luzon, Morong Valley, on *Dioscorea alata*, 9 Nov. 1913, M. B. Raimundo, C.F. Baker 2051 (**neotype** S F37683); Luzon, Los Baños, on *Dioscorea alata*, Nov. 1913, C.F. Baker 522 (**topotypes**: B; BPI 439183, BPI 439184; IMI 256649, S F37682).

Notes: Morphologically, *Distocercospora* is similar to *Passalora* with almost unthickened to somewhat thickened, darkened loci and hila and pigmented conidia, but differs in having conidia with a mixture of eu- and distosepta (Fig. 14). The formation of distoseptate conidia occasionally occurs in other genera (e.g. in *Pseudocercospora cryptomeriicola*) (Nakashima *et al.* 2007), and may have gone undetected among other cercosporoid fungi due to the difficulty in observing such septa in taxa with thin walls (Braun *et al.* 2013). The meaning of distoseptation (= pseudoseptation) as character at generic level within the cercosporoid fungi is still unclear (Braun *et al.* 2015). Morphologically, the genus *Distocercospora* was evidently characterised by the mode of proliferation of its conidiophores, which are composed of two distinct layers. During proliferation of its conidiogenous cells, first the outer layer of conidiophore is broken by the percurrent proliferation of the inner layer, and secondly, many conidia are formed sympodially. At this point, septa of conidiophores and most of the conidia of *Distocercospora pachyderma* show the pseudoseptation. The cultures and molecular data based on the type species of *Distocercospora* (*Distocercospora pachyderma*) used in this study showed that this species clusters within the *Mycosphaerellaceae* in a separate clade supported by all the phylogenetic analyses performed (Fig. 1, clade 31; Fig. 2, clade 27). These results support *Distocercospora* as a separate genus, distinguished from *Passalora s. str.*

Clade 32: *Uwemyces*

Uwemyces Hern.-Restr., G.A. Sarria & Crous, Persoonia 36: 455. 2016.

Description (from Crous *et al.* 2016b): *Mycelium* immersed and superficial, hyphae branched, septate, hyaline and brown, smooth-walled. *Conidiophores* fasciculate, simple, dark brown at the base and subhyaline at the apex. *Conidiogenous cells* cylindrical, sympodial, polytretic, with dark conidiogenous loci, terminal and intercalary, brown. *Conidia* solitary, straight or curved, cylindrical to obclavate, pale brown to brown, apex subhyaline, verruculose-walled, with a thick, dark brown, truncate scar at the base, septate. Sexual morph unknown.

Type species: *Uwemyces elaeidis* (Steyaert) M. Hern.-Restr. *et al.* (≡ *Cercospora elaeidis* Steyaert).

Uwemyces elaeidis (Steyaert) M. Hern.-Restr. *et al.* Persoonia 36: 455. 2016.
Basionym: *Cercospora elaeidis* Steyaert, Bull. Soc. R. Bot. Belg., 80: 35. 1948; as "*elaedis*".
Synonym: *Pseudospiropes elaeidis* (Steyaert) Deighton, Trans. Brit. Mycol. Soc. 85: 739. 1985.

Descriptions and illustrations: Ellis (1976), Deighton (1985), Braun *et al.* (2014), Crous *et al.* (2016b).

Material examined: **Colombia**, Barrancabermeja, CENIPALMA, on leaves of *Elaeis oleifera*, May 2013, coll. G.A. Sarria, culture CPUwZC-01.

Notes: The taxonomic position of *Cercospora elaedis* was recently discussed by Braun *et al.* (2014). This species has a wide distribution and seems to be restricted to *Elaeis guineensis*, (*Arecaceae*). Phylogenetically, this species is represented by a single-strain lineage closely related to *Distocercospora* (Fig. 1, clade 31) or to *Coremiopassalora* (Fig. 2, clade 24). The type material of *Cercospora elaeidis* (Democratic Republic of the Congo, on *Elaeis guineensis*) could not be traced and the species needs to be neotypified (Braun *et al.* 2014). The present strain is unsuitable for neotypification due to its geographical origin (Crous *et al.* 2016b).

Clade 33: *Coremiopassalora*

Coremiopassalora U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822585.

Etymology: Derived from the arrangement of conidiophores, coremium + resembling the genus *Passalora.*

Differs from the genus *Passalora* by synnematous conidiophores and catenate, hyaline to pale olivaceous conidia with distinct, slightly thickened and not darkened loci.

Type species: *Coremiopassalora eucalypti* (Crous & Alfenas) U. Braun *et al.* (≡ *Mycovellosiella eucalypti* Crous & Alfenas).

Coremiopassalora eucalypti (Crous & Alfenas) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822750
Basionym: *Mycovellosiella eucalypti* Crous & Alfenas, Mycol. Mem. 21: 105. 1998.
Synonym: *Passalora eucalypti* (Crous & Alfenas) Crous & U. Braun, in Crous & Braun, CBS Biodiversity Ser. 1: 452. 2003.

Description and illustration: Crous (1998).

Description in vitro (on V8; CBS 111318): *Mycelium* composed of hyaline to pale brown, delicate hyphae, uniform in width, 2.5 µm, often showing a synnematous or cushion-shaped arrangement. *Conidiophores* straight to sinuous or geniculate, solitary to tightly fasciculate, sometimes appearing as synnemata, simple, 10–33 × 2–2.5 µm. *Conidiogenous cells* integrated, terminal, polyblastic, proliferating sympodially, conidiogenous loci at the apex and shoulders, protruding and conically truncate, slightly thickened and refractive, 1–2 µm diam. *Conidia* catenate, occurring in unbranched or branched chains, hyaline, cylindrical, sometimes obclavate, obconically truncate at both ends, 8–40 × 2–2.5 µm, 0–1-septate, sometimes constricted at the centre, hila thickened but not darkened, 1–2 µm diam.

Materials examined: **Brazil,** São Paulo, on leaves of *Eucalyptus saligna*, Jun. 1995, P.W. Crous & A.C. Alfenas (**holotype** PREM 55302, culture ex-type CBS 111306 = CPC 1455); *idem*., CBS 111318 = CPC 1457; Suzano, on leaves of *Eucalyptus saligna*, 8 Aug. 1996, P.W. Crous, culture CBS 111306 = CPC 1455.

Notes: The genus *Coremiopassalora* (Fig. 1 clade 33; Fig. 2, clade 24) includes two species that morphologically can be characterised as *Passalora s. lat.*, but phyllogenetically are not congeneric with the type *Passalora bacilligera* (Fig. 1 clade 34; Fig. 2, clade 22).

Coremiopassalora leptophlebae (Crous *et al.*) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822751.
Basionym: *Passalora leptophlebae* Crous *et al.* (as "*leptophlebiae*"), Persoonia 26: 131. 2011.

Description and illustrations: Crous *et al.* (2011a).

Material examined: **Brazil**, Minas Gerais, Viçosa, University Forestry Nursery, on leaves of *Eucalyptus leptophleba*, 23 Aug. 2010, P.W. Crous, A.C. Alfenas, R. Alfenas & O.L. Pereira (**holotype** CBS H-20585, culture ex-type CBS 129524 = CPC 18480).

Notes: *Coremiopassalora leptophlebae* is the second species in this genus (Fig. 1, clade 33; Fig. 2, clade 24). The host range and geographic distribution of this taxon are thus far restricted to the type collection.

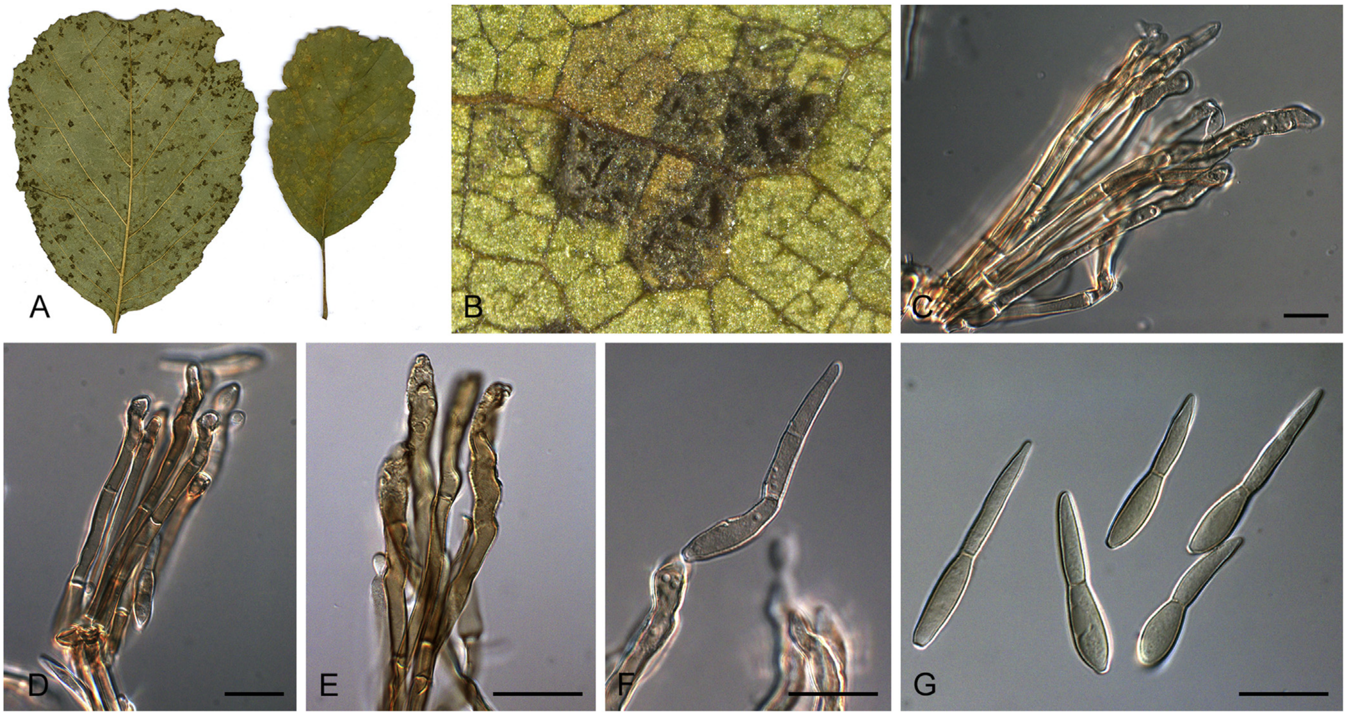


Fig. 15. *Passalora bacilligera* (CBS 131547). **A–G.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C–E.** Conidiophores and conidiogenous cells. **F.** Conidiogenous cell and conidium. **G.** Single conidia. Scale bars = 10 µm.

Clade 34: *Passalora*

Passalora Fr., Summa Veg. Scand. 2: 500. 1849, emend.

Description: Hyphomycetous, phytopathogenic. *Mycelium* internal, consisting of hyaline, branched, septate hyphae. *Stromata* absent or small. *Conidiophores* emerging through stomata, in fascicles, unbranched or branched, straight to flexuous, at times with a single basal septum, usually up to 3-septate, medium brown, somewhat swollen in the conidiogenous region. *Conidiogenous cells* integrated, terminal, with flat, somewhat thickened and darkened loci. *Conidia* solitary, olivaceous to pale brown, thin-walled, smooth, straight or gently curved, mostly didymosporous, constricted at septum, with somewhat thickened, darkened and refractive hila.

Type species: *Passalora bacilligera* (Mont. & Fr.) Mont. & Fr. (≡ *Cladosporium bacilligerum* Mont. & Fr.).

Passalora bacilligera (Mont. & Fr.) Mont. & Fr., in Montagne, Sylloge generum specierumque cryptogamarum: 305. 1856. Fig. 15.
Basionym: *Cladosporium bacilligerum* Mont. & Fr., in Montagne, Ann. Sci. Nat., Bot., Sér. 2, 6: 31. 1836.

Description in vivo (CBS H-20777): *Leaf spots* absent or yellowish green, angular, 1–2 mm diam, delimited by leaf veins. *Caespituli* hypophyllous, olivaceous to pale brown. *Mycelium* internal, consisting of hyaline, branched, septate, 1–2 µm diam hyphae. *Stromata* absent or only formed as small aggregations of a few swollen substomatal hyphal cells. *Conidiophores* medium brown, arising from stomata, in fascicles of up to 12, unbranched or occasionally branched, straight to flexuous, usually up to 3-septate, occasionally with a single basal septum, 40–180 × 3–3.5 µm, geniculate at the apex. *Conidiogenous cells* integrated, terminal, somewhat swollen, 3–6.5 µm in width, polyblastic, proliferating sympodially, with conidiogenous loci flat, somewhat thickened and darkened, 1–2 µm diam. *Conidia* solitary, olivaceous to pale brown, thin-walled, smooth, straight or gently curved, basal cell ellipsoid-doliiform and obconical truncate without protruding, apical cell narrowly long-ellipsoid to subcylindrical, 21–68 × 4.5–8.5 µm, (0–)1(–3)-euseptate, constricted at basal septum, with hilum somewhat thickened, darkened and refractive, 1.5–2 µm diam.

Description in vitro (on V8; CBS 131547): *Mycelium* composed of hyaline to pale olivaceous brown, delicate hyphae, 2–2.5 µm width. *Conidiophores* macronematous, pale olivaceous brown to brown, simple or branched, straight to sinuous, smooth, paler towards the apex, 25–300 × 2.5–3.3 µm. *Conidiogenous cells* integrated, terminal, proliferating sympodially, polyblastic, conidiogenous loci located on the shoulders and the apex, slightly thickened and darkened, 2.5 µm diam. *Conidia* solitary, pale olivaceous brown to brown, cylindrical to obclavate, obconical truncate at the base, rounded or pointed at the apex, 13–37.5 × 2.5–5 µm, (0–)1-euseptate, constricted at the septum, hilum slightly thickened, darkened and refractive, 2.5 µm diam.

Material examined: **Poland**, Hwozna Protected Area, Bialowieza National Park, on *Alnus glutinosa*, 20 Sep. 2011, D. Karasinski (**epitype** designated here CBS H-20777, MBT378570, ex-epitype culture CBS 131547). **France**, Lyon, on *Alnus glutinosa*, 1828, Montagne 568 (**lectotype** designated here, Montagne 568, Ann. Sci. Nat., Bot., Sér. 2, 6: pl. 12, fig. 5. 1836, original illustration, MycoBank, MBT378569).

Notes: *Passalora* was the first genus introduced for cercosporoid hyphomycetes (Fries 1849) and a review of the taxonomical history of the genus has recently been published by Braun *et al.* (2013). In one of the most comprehensive examinations on this generic complex, Crous & Braun (2003) concluded that various genera (e.g. *Mycovellosiella*, *Phaeoramularia*, *Fulvia*) should be merged under the oldest name *Passalora*. After this revision *Passalora* included cercosporoid species with solitary, fasciculate to synnematous conidiophores and conidia formed singly or in chains, but in all cases with conspicuous (thickened and darkened) conidiogenous loci (scars) and mostly non-scolecosporous, pigmented conidia. This new concept was also supported by first molecular sequence analyses (Crous *et al.* 2000, 2001b). However, with the addition of more species and more phylogenetic markers, *Passalora s. lat.* has proven to be para- or polyphyletic (Thomma *et al.* 2005, Crous *et al.* 2009b, d, 2013a). In addition, the type species has not been subjected to DNA sequence analyses before, and the passalora-like clades distributed throughout the *Mycosphaerellaceae* are not clearly connected with morphological groups within *Passalora* (e.g. mycovellosiella-like). In this study, we propose a good candidate for the epitypification of the type species of *Passalora* (CBS 131547). Phylogenetically, this strain forms a single species clade in all phylogenetic analyses performed (Fig. 1, clade 34; Fig. 2, clade 22), but without a strong link to other genera. With the additional epitypification of the type species of *Fulvia* (*Fulvia fulva*; Fig. 1, clade 59), *Mycovellosiella* (*Mycovellosiella cajani*; Fig. 1, clade 7) and *Phaeoramularia* (*Phaeoramularia gomphrenicola*; Fig. 1, clade 61), these names are resurrected and applied to different monophyletic clades and are no longer regarded as synonyms of *Passalora s. str.* The value of features such as mycelium internal and/or external, conidia solitary or in chains, remains doubtful and barely applicable for the discrimination of cercosporoid genera. Morphologically, *Passalora s. str.* is rather different from common passalora-like species (Fig. 15), in having sparsely septate, flexuous conidiophores, and predominantly smooth, olivaceous, 1–2-septate conidia constricted at the basal septum, with somewhat to distinctly thickened, darkened, and refractive loci. The placement of the hundreds of passalora-like species that are not known from their DNA is not yet possible, and these would for the interim have to be retained in *Passalora s. lat.* as a wide, morphologically circumscribed genus, pending cultures and results of DNA sequence analyses.

Clade 35: *Zymoseptoria*

Zymoseptoria Quaedvlieg & Crous, Persoonia 26: 64. 2011.

Description (from Quaedvlieg *et al.* 2011): *Conidiomata* pycnidial, semi-immersed to erumpent, dark brown to black, subglobose, with central ostiole; wall of 3–4 layers of brown *textura angularis*. *Conidiophores* hyaline, smooth, 1–2-septate, or reduced to conidiogenous cells, lining the inner cavity. *Conidiogenous cells* tightly aggregated, ampulliform to doliiform or subcylindrical, phialidic with periclinal thickening, or with 2–3 inconspicuous, percurrent proliferations at apex. *Type I conidia* solitary, hyaline, smooth, guttulate, narrowly cylindrical to subulate, tapering towards acutely rounded apex, with bluntly rounded to truncate base, transversely euseptate, with unthickened and colourless hila. On OA and PDA aerial hyphae disarticulate into phragmospores (*Type II conidia*), that again give rise to Type I conidia via microcyclic conidiation; yeast-like growth and microcyclic conidiation (*Type III conidia*) common on agar media.

Type species: *Zymoseptoria tritici* (Desm.) Quaedvlieg & Crous (≡ *Septoria tritici* Desm.).

Zymoseptoria tritici (Desm.) Quaedvlieg & Crous, Persoonia 26: 67. 2011.
Basionym: *Septoria tritici* Desm., Ann. Sci. Nat., Bot., Sér. 2, 17: 107. 1842.

Description and illustration: Quaedvlieg *et al.* (2011).

Materials examined: **France**, on *Triticum* sp. (**holotype** of *Septoria tritici*; PC). **Germany**, Oestrich, on *Triticum repens*, Fuckel, Fungi Rhen. Exs. no. 1578 (**isotype** of *Mycosphaerella graminicola*, L). **Netherlands**, Brabant West, on *Triticum aestivum*, coll. R. Daamen, 6 May 1981, isol. as single conidium, W. Veenbaas, 810507/1, 7 May 1981 (**epitype** designated by Quaedvlieg *et al.* 2011, CBS H-20545, including sexual morph material on *Triticum* leaf of heterothallic mating IPO 323 (MAT 1-1) × IPO 94269 (MAT 1-2), culture ex-epitype IPO 323 = CBS 115943).

Notes: *Zymoseptoria* was introduced to include septoria-like species from graminicolous hosts that did not cluster with the type of *Septoria s. str.* in the phylogenetic analysis (Quaedvlieg *et al.* 2011). In addition, *Zymoseptoria* is morphologically distinct from *Septoria* by its yeast-like growth in culture, and by producing up to three different conidial types (Type I—pycnidial conidia; Type II—phragmospores on aerial hyphae; Type III—yeast-like growth proliferating via microcyclic conidiation). In the phylogenetic analyses in the present study, *Zymoseptoria* species cluster within the *Mycosphaerellaceae* (Fig. 1, clade 35; Fig. 2, clade 36) and close to *Ramularia*, as observed in previous studies (Quaedvlieg *et al.* 2013, Stukenbrock *et al.* 2012, Videira *et al.* 2016). *Zymoseptoria* currently comprises seven species including *Zymoseptoria tritici*, the causal agent of septoria tritici blotch on wheat, and *Zymoseptoria passerinii*, the causal agent of septoria speckled leaf blotch of barley, which are important crop pathogens responsible for severe yield losses (Stukenbrock *et al.* 2012).

Clade 36: *Xenoramularia*

Xenoramularia Videira *et al.*, Stud. Mycol. 83: 96. 2016.

Description (from Videira *et al.* 2016): Phytopathogenic, causing leaf spots. *Mycelium* composed of hyaline, septate, branched hyphae. *Conidiophores* hyaline to pigmented, solitary, simple, straight or slightly curved, often reduced to conidiogenous cells, thin-walled, smooth. *Conidiogenous cells* hyaline, integrated in the mycelium or terminal in the conidiophores, subcylindrical to geniculate-sinuous, with one or multiple thickened but not darkened conidiogenous loci. *Conidia* hyaline, thin-walled, smooth, formed singly or catenate, aseptate or 1-septate, subcylindrical, apex obtuse to subacute, base truncate; hila thickened but not darkened.

Type species: *Xenoramularia polygonicola* Videira *et al.*

Xenoramularia polygonicola Videira *et al.*, Stud. Mycol. 83: 98. 2016.

Description and illustration: Videira *et al.* (2016).

Materials examined: **Republic of Korea**, Pyeongchang, on *Polygonum* sp., 20 Sep. 2003, H.D. Shin (**holotype** KUS F19688, **isotype** CBS H-22541, culture ex-type CBS 141102 = CPC 10852); *idem*., cultures CPC 10853, CPC 10854.

Notes: The genus *Xenoramularia* was recently introduced in the *Mycosphaerellaceae* to accommodate a group of species that was phyllogenetically closely related to *Zymoseptoria* and *Ramularia* (Videira *et al.* 2016) but morphologically distinct. The phylogeny in the present work agrees with the previous results (Fig. 1, clade 36; Fig. 2, clade 37). *Xenoramularia* can be morphologically distinguished from *Ramularia* by having conidiogenous loci that are thickened, but not darkened and refractive and differs from *Zymoseptoria* by not forming acervular conidiomata and producing only one type of conidia.

Clade 37: *Ramularia*

Ramularia Unger, Exanth. Pflanzen (Wien): 169. 1833. emend. U. Braun (nom. cons.).
Synonyms: Didymaria Corda, Icon. fung. (Prague) 5: 9. 1842.
Phacellium Bonord., in Rabenh., Fungi Eur. Exs., Edn. 2, Ser. 2: no. 288. 1860.
Acrotheca Fuckel, Jahrb. Vereins Naturk. Herzogth. Nassau 15: 43. 1860.
Septocylindrium Bonord. ex Sacc., Michelia 2: 15. 1880.
Ovularia Sacc., Michelia 2: 17. 1880.
Mycosphaerella Johanson, Öfvers. Kongl Vetensk-Akad. Förh,. 41(9): 163. 1884, *s. str.*
Ophiocladium Cav., Z. Pflanzenkrankh. 3: 26. 1893.
Pseudovularia Speg., Anales Mus. Nac. Buenos Aires, Ser. 3, 20: 418. 1910.
For additional synonyms see Braun (1998) or Videira *et al.* (2016).

Description (from Videira *et al.* 2016): Mostly phytopathogenic (leaf spots, chlorosis or necrosis), sometimes saprobic or mycophylic. Conidiophores individual or synnematous, sometimes forming small to sporodochial caespituli, emerging through stomata or through the cuticle, straight, subcylindrical to geniculate-sinuous, continuous or septate, hyaline or in some species with a faintly reddish tinge, occasionally branched, thin-walled, usually smooth but rarely rough. Conidiogenous cells integrated, terminal, polyblastic, sympodially elongating, straight to geniculate-sinuous, conidiogenous loci conspicuously thickened, darkened and refractive, coronate (cladosporoid). Conidia consistently solitary or in simple or branched chains, solitary conidia 0–1-septate, catenate conidia aseptate to multiseptate (mostly 1–4 eusepta), hyaline, in a few species with a faintly reddish tinge, usually ellipsoid-ovoid, cylindrical-fusiform, rarely filiform, occasionally constricted at the septa, thin-walled, smooth to verruculose-echinulate, hila distinct, slightly to conspicuously thickened, darkened, refractive; conidial secession schizolytic.

Type species: *Ramularia pusilla* Unger.

Ramularia pusilla Unger, Exanth. Pflanzen: 169. 1833.
Synonyms: *Caeoma pusilla* (Unger) Bonord., Handb. Mykol.: 41. 1851.
Ovularia pusilla (Unger) Sacc., Syll. Fung. 4: 140. 1886.
Ramularia pulchella Ces., Bot. Zeitung (Berlin) 11: 238. 1853.
For additional synonyms see Braun (1998), Braun *et al.* (2015) or MycoBank.

Descriptions and illustrations: Braun (1998), Kirschner (2009), Braun *et al.* (2015), Videira *et al.* (2016).

Materials examined: **Austria**, on *Poa nemoralis*, Unger, Exanth. Pfl., Pl. II, fig. 12, (**lectotype** [iconotype] see Braun 1998). **Germany**, Frankfurt am Main, Botanical Garden, on leaves of *Poa annua*, 25 Feb. 2008, R. Kirschner (**epitype** designated by Videira *et al.* 2016, CBS H-22527, culture ex-epitype CBS 124973 = RoKi 3143).

Notes: Species of *Ramularia* are phytopathogenic and mostly cause leaf spots but they can also be endophytic, saprophytic and mycophylic. There are about 325 species accepted in this genus (Braun 1998) of which only six have thus far been experimentally linked to a *Mycosphaerella* sexual morph (Videira *et al.* 2015b). Currently *Ramularia* is accepted as being a host-specific genus of phytopathogenic fungi (Braun 1998), although some exceptions are known (e.g. *Ramularia vizellae*, Videira *et al.* 2015b). *Ramularia pusilla* is the type species of the genus *Ramularia* and has a broad host range within the family *Poaceae* and a worldwide distribution (Braun 1998). Phylogenetically, species of *Ramularia s. str.* cluster in a well-supported clade (Fig. 1, clade 37; Fig. 2, clade 35) as observed in a previous study (Videira *et al.* 2016).

Clade 38: *Paracercosporidium*

ParacercosporidiumVideira & Crous, **gen. nov.** MycoBank MB822601.

Etymology: Morphologically similar to *Cercosporidium*.

Description: Phytopatogenic. *Mycelium* internal, hyaline, smooth. *Stromata* small, composed of few dark brown cells, or medium in size, mainly hypophyllous, substomatal, dark brown. *Conidiophores* loosely fasciculate, emerging from stromata, pale to dark brown, paler towards the apex, thin- to thick-walled, cylindrical, mildly to strongly geniculate, simple or branched. *Conidiogenous cells* integrated, terminal or intercalary, polyblastic, proliferating sympodially, with rim-like conidiogenous loci, thickened and darkened, located at the shoulders and apex. *Conidia* solitary, hyaline to pale olivaceous brown, thick-walled, cylindrical to obclavate, rounded at the apex, usually tapering towards the base, sometimes swollen at the base or truncate, hila rim-like, darkened and refractive.

Type species: *Paracercosporidium microsorum* (Sacc.) U. Braun *et al.* (≡ *Cercospora microsora* Sacc.).

Paracercosporidium microsorum (Sacc.) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822819. Fig. 16.
Basionym: *Cercospora microsora* Sacc., Michelia 2(6): 128. 1880.
Synonyms: *Passalora microsora* (Sacc.) U. Braun, Mycotaxon 55: 233. 1995.
Cercospora microsora var. *tiliae-platyphyllae* Roum., Rev. Mycol. 16: 109. 1894.
Cercospora exitiosa Syd. & P. Syd., Ann. Mycol. 4(6): 485. 1907.
Cercospora zahariadii Săvul. & Sandu, Hedwigia 75: 226. 1935.
Mycosphaerella microsora Syd. & P. Syd., Ann. Mycol. 38: 465. 1940.
Sphaerella microsora (Syd. & P. Syd.) Sandu, Ciuperci Pyrenomycetes-Sphaeriales din România: 135. 1971.

Description in vivo: *Leaf spots* scattered, amphigenous, dark brown, later bown with dark brown border, irregular to angular, vein-limited, 1–3 mm in size. *Caespituli* amphigenous, pale brown, effuse. *Mycelium* internal, hyphae hyaline, smooth. *Stromata* small, composed of few dark brown cells, or medium in size and up to 40 μm diam, amphigenous, mainly hypophyllous, substomatal, dark brown. *Conidiophores* loosely fasciculate, emerging from upper part of stromata, dark brown to pale, paler towards the apex, thick-walled, cylindrical, well-geniculate due to sympodial proliferation, 20–98 × 5–6.5 μm. *Conidiogenous cells* integrated, terminal or intercalary, polyblastic, proliferating sympodially, with conidiogenous loci rim-like, darkened and thickened, located at the shoulders and apex, 1.5–2.5 μm diam. *Conidia* solitary, hyaline to pale olivaceous brown, thick-walled, cylindrical to obclavate, obconicaly truncate and thickened at the base, rounded at the apex, 24–66 × 5–7.5 μm, 1–5-septate, hila thickened and darkened, 1.5–2.5 μm diam.

Description in vitro (on SNA; CPC 15550): *Mycelium* composed of hyaline to pale brown hyphae, uniform in width, smooth, 1.5–2 μm. *Conidiophores* macronematous, pale to pale brown,

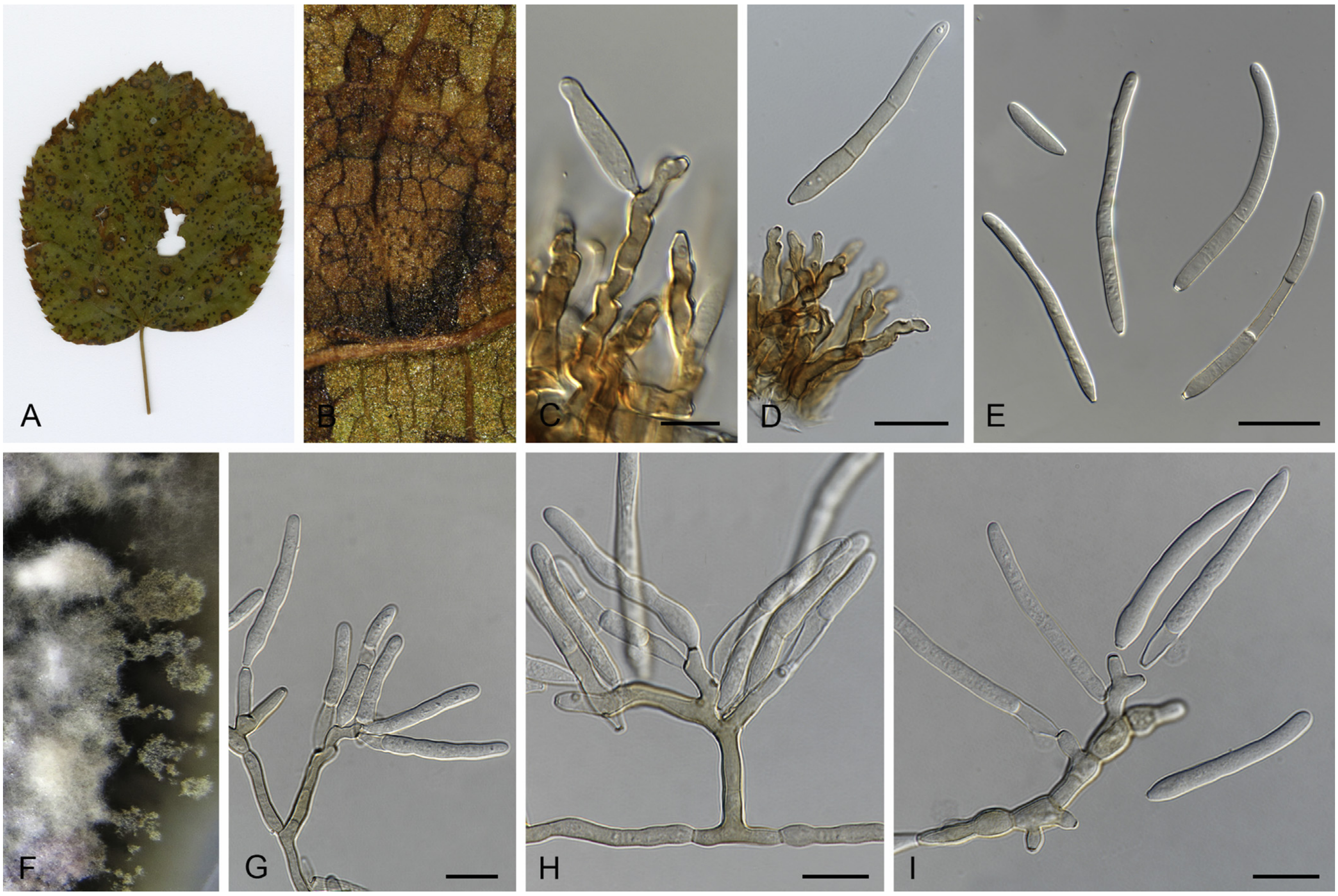


Fig. 16. *Paracercosporidium microsorum* (CPC 15550). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C, D.** Conidiophores, conidiogenous cells and conidia. **E.** Conidia. **F–I.** Observations *in vitro*. **F.** Culture on OA. **G, H.** Conidiophore, conidiogenous cells and conidia. **I.** Conidiogenous cells and conidia. Scale bars = 10 µm.

smooth, straight to well-geniculate due to sympodial proliferation, simple or branched, 25–90 × 3–5 µm. *Conidiogenous cells* integrated, terminal or intercalary, proliferating sympodially, mono- or polyblastic, with rim-like conidiogenous loci, thickened, darkened and refractive, located on the shoulders and the apex, 2–2.5 µm diam. *Conidia* solitary, hyaline to pale brown, cylindrical to obclavate, obconically truncate at the base, rounded at the apex, 1–53 × 3–5 µm, indistinctly 1–6-euseptate, hilum slightly thickened, darkened and refractive, 2–2.5 µm diam.

Materials examined: **Czech Republic**, Moravia, Veltice, Forest of Rendez Vous, leaf spot on *Tilia* sp., 16 Sep. 2008, G. Verkley, culture CBS 123735. **Netherlands**, Z. Flevoland, Zeewolde, Hulkesteynse bos, old leaves of *Tilia cordata* (after hibernation), 1 Apr. 1998, H.A. van der Aa No. 12451, culture CBS 101017; same location, leaf spot of *Tilia cordata*, 19 Oct. 1997, H.A. van der Aa No. 12409, culture CBS 100352. **Romania,** Bucuresti, on *Tilia tomentosa*, isol. O. Constantinescu, 16 Jun. 1965, culture CBS 254.67; Bucuresti, Mogosoaia, on *Tilia platyphyllos*, 8 Oct. 1969, O. Constantinescu, CBS H-9853, culture CBS 552.71 = BUCM 2014. **Ukraine**, Donetsk, Svjatie Gory, vicinities of Svjatogorsk, National Nature Park, flood-plain forest on the left bank of Seversky Donets river, on *Tilia cordata*, 18 Jul. 2008, A. Akulov (**epitype** designated here CBS H-22942, MBT378695, ex-epitype culture CBS 142176 = CPC 15550); [**lectotype** designated here, MycoBank, MBT378694, PAD, Letendre sin. num.; see notes below].

Notes: The genus *Paracercosporidium* is hereby introduced to accommodate two species from the host *Tilia* that, due to the obclavate-like morphology of their conidia, were previously placed in *Passalora* but cluster apart from the type species *Passalora bacilligera* in a well-supported clade (Fig. 1, clade 38; Fig. 3, clade 3). In literature, only two species of passalora-like fungi have been described from the host *Tilia*, namely *Passalora microsora* and *Passalora tiliae* (Y.L. Guo & X.J. Liu) U. Braun & Crous (≡ *Tandonella tiliae* Y.L. Guo & X.J. Liu). While the latter is only known from China, the first has a worldwide distribution (Crous & Braun 2003). In the description of *Passalora microsora*, the size of the conidiophores, 10–40 × 2–3.5(–5) µm, and conidia (20–60 × 2.5–4 µm, rarely 80 × 5 µm, as large as 100 × 6 µm) of observed specimens can vary significantly (Chupp 1954). Based on the phylogenetic analyses, two clades representing two species can be observed, one including strains from Europe and the other with strains from Canada, for which the name *Cercospora tiliae*, based on type material on *Tilia americana* collected in Vermont, USA, is available. Morphologically, these two species are quite similar, but differ *in vivo* as in *Paracercosporidium microsorum* (Fig. 16) conidiophores are shorter and once abruptly geniculate, while *Paracercosporidium tiliae* (Fig. 17) has longer conidiophores which are strongly geniculate. The DNA sequences representative of each species clade differ one base pair on LSU, three base pairs on ITS and 21 base pairs on *rpb2*. According to Klebahn (1918), *Passalora microsora* is the asexual morph of *Mycosphaerella millegrana*. However, Sydow (1940) stated that this species is not the asexual morph of *Mycosphaerella millegrana* and described the true sexual morph as *Mycosphaerella microsora* (Tomilin 1979). The epitypification requires the citation of the type. However, the typification needs a detailed discussion and clarification. Chupp (1954: 565) mentioned: “No definite type given. Saccardo states it is common on *Tilia europaea* and *Tilia americana* in Europe and America.” This is not correct and, although not mentioned by Chupp (l.c.), undoubtedly refers to Saccardo (1886). Saccardo (1880) described this species in a paper dealing with specimens collected by P. Brunaud, Abb. Letendre, A. Malbranche, and J. Therry in Roumeguère's “Mycotheca Gallica” under no.

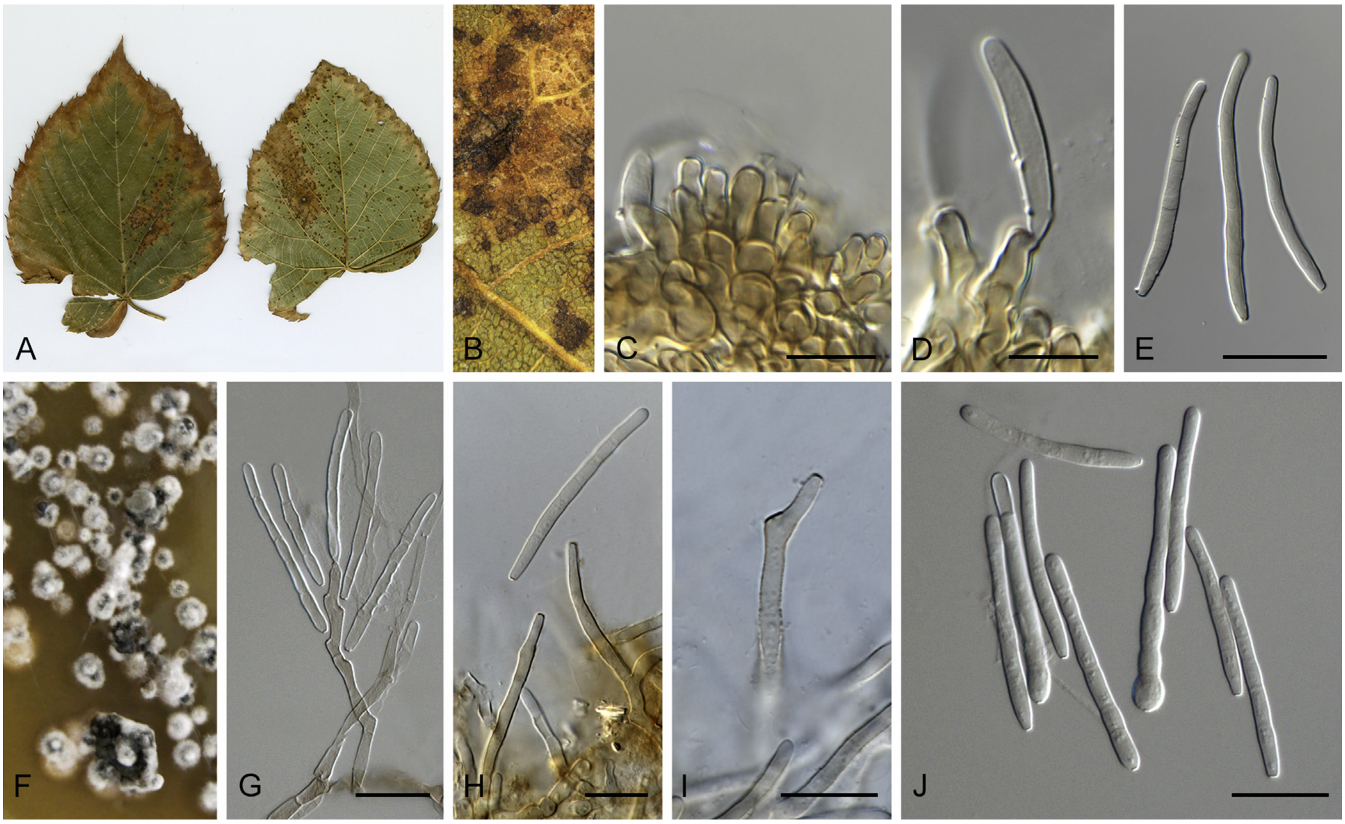


Fig. 17. *Paracercosporidium tiliae* (CBS 112734). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Conidiophores. **D.** Conidiophores, conidiogenous cells and conidia. **E.** Conidia. **F–J.** Observations *in vitro*. **F.** Culture on V8. **G, H.** Conidiophore, conidiogenous cell and conidia. **I.** Conidiophore. **J.** Conidia. Scale bars = 10 µm.

1041, so that specimens collected in France by the persons concerned represent potential syntypes. However, the number cited in Saccardo (1880) does not refer to “Roum., Fungi Sel. Gall. Exs. 1041” which is a collection of *Torula herbarum* f. *solani-pseudocapsici*. A collection of *Cercospora microsora* was issued as “Roum., Fungi Sel. Gall. Exs. 2062” [**France**, Parc du Grand-Quévilly (Seine-Inf.), on *Tilia* × *europaea*, Automne 1881, Rev. Abb. Letendre (e.g. BPI, FH, PC, PAD)] containing a copy of Saccardo's original description, but this gathering cannot be considered original material since it had been collected in 1881, i.e. one year after Saccardo's original publication. However, there is a sample in Saccardo's herbarium collected by Letendre that can be designated as lectotype.

Paracercosporidium tiliae (Peck) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822772. Fig. 17.
Basionym: *Cercospora tiliae* Peck, Bot. Gaz. 6(10): 277. 1881.

Description in vivo: *Leaf spots* scattered, amphigenous, dark brown, irregular to angular, vein-limited, 1–3 mm in size. *Caespituli* amphigenous, pale brown, effuse. *Mycelium* internal, hyaline, smooth. *Stromata* composed of a few dark brown cells, up to 30 µm diam, amphigenous, mainly hypophyllous, substomatal. *Conidiophores* emerging from upper part of stromata in dense fascicles, pale brown, thick-walled, cylindrical, straight or slightly curved, 35–85 × 3–4 µm. *Conidiogenous cells* integrated, polyblastic, terminal, proliferating sympodially, with rim-like conidiogenous loci, thickened and darkened, located at the shoulders and apex, 1.5–2.6 µm diam. *Conidia* single, hyaline to pale olivaceous, cylindrical to obclavate, obconicaly truncate at the base, rounded at the apex, thick-walled, 15.5–54 × 2–4 µm, 1–5-septate, 1.5–2 µm diam.

Description in vitro (on SNA; CPC 112734): *Mycelium* hyaline, hyphae uniform in width, smooth, 1.5–2 µm. *Conidiophores* macronematous, pale to pale brown, smooth, straight to well-geniculate due to sympodial proliferation, 35–87 × 2.5–3.5 µm. *Conidiogenous cells* integrated, terminal or intercalary, proliferating sympodially, mono- or polyblastic, with rim-like conidiogenous loci, thickened, darkened and refractive, located on the shoulders and the apex, 2–2.5 µm diam. *Conidia* solitary, hyaline to pale, cylindrical to obclavate, 15–40 × 2–3 µm, indistinctly 1–6-euseptate, obconically truncate at the base, with slightly thickened and refractive hilum, 1.5–2 µm diam.

Materials examined: **Canada**, Ottawa, on *Tilia americana*, 30 Aug. 2000, K.A. Seifert (**epitype** designated here CBS H-22943, MBT378600, ex-epitype culture CBS 112734 = CPC 3952); *idem*. culture CBS 115526 = CPC 3953. **USA**, Vermont, Charlotte, on *Tilia americana*, June 1881, C.G. Pringle (**holotype** NYS-F-3187).

Note: See notes under *Paracercosporidium microsora*.

Clade 39: *“Sirosporium”*

Sirosporium celtidis (Biv.) M.B. Ellis, Mycol. Pap. 87: 4. 1963.
Basionym: *Monilia celtidis* Biv., Stirp. Rar. Sicilia 3: 18. 1815.
Synonyms: *Gyrocerus celtis* (Biv.) Mont. & Ces., Syll. Gen. Sp. Crypt.: 308. 1856.
Helicoceras celtidis (Biv.) Linder, Ann. Missouri Bot. Gard. 18: 3. 1931.
For additional synonyms see MycoBank.

Descriptions and illustrations: Chupp (1954), Ellis (1971).

Materials examined: **Algeria**, on *Celtis australis*, Nov. 1923, C. Killian, dep. 1925, culture CBS 158.25. **Italy**, Rome, on *C. australis*, Aug. 1949, V. Mezzetti, dep. 1950, culture CBS 289.50. **Portugal**, unknown host, date and collector, dep. Estação Agronómica Nacional (Sacavém), 1948, culture CBS 238.48.

Notes: The species *Sirosporium celtidis* is based on *Monilia celtidis*, which was described from the host *Celtis australis*, probably from Sicily (Italy), although it is not clearly stated in the original publication, and the herbarium specimen could not be located. The species has previously been reported from Algeria, India, Israel, Italy, Japan, Morocco, Portugal, Taiwan and Turkey (Crous & Braun 2003). The cultures observed in this study are presently sterile, but at the time they were collected, the strains CBS 158.25 and CBS 289.50, were subjected to a thorough morphological characterisation (Killian 1925, Mezzetti 1950). The morphological description agrees with more recent treatments of the genus *Sirosporium* (Chupp 1954, Ellis 1971). *Sirosporium celtidis* differs from the type of *Sirosporium*, *Sirosporium antenniforme*, by producing conidiophores with thin walls and producing longer and narrower conidia that only rarely show 1–2 longitudinal septa (Ellis 1971). Since there are no cultures available of *Sirosporium antenniforme*, the precise phylogenetic position of the genus remains unresolved. The present strains cluster in a well supported clade in the pylogenetic analyses (Fig. 1, clade 39; Fig. 3, clade 4).

Clade 40: *Cercosporidium*

Cercosporidium Earle, Muhlenbergia 1: 16. 1901, emend.

Description: *Foliicolous. Mycelium* internal, hyaline to pale olivaceous brown, or dark brown. *Stromata* small to developed, olivaceous brown to brown. *Conidiophores* solitary or in fascicles, micro- to macronematous, sometimes irregular in width, very pale to olivaceous brown, smooth to rough, simple or branched, straight to geniculate-sinuous, sometimes reduced to conidiogenous cells. *Conidiogenous cells* terminal, proliferation sympodial or percurrent, mono- or polyblastic, with conidiogenous loci slightly to distinctly thickened and darkened. *Conidia* solitary *in vivo*, rarely catenate *in vitro*, hyaline to pale olivaceous, smooth to verruculose, thick-walled, cylindrical, ovoid, obovoid or obclavate, straight or slightly curved, slightly thickened, truncate or short obconical truncate at the base, broadly rounded or beak-like at the apex, euseptate, hilum thickened, darkened and refractive.

Type species: *Scolicotrichum euphorbiae* Tracy & Earle (= *Cercosporidium chaetomium* (Cooke) Deighton; ≡ *Cladosporium chaetomium* Cooke).

Cercosporidium californicum (S.T. Koike & Crous) Videira & Crous, **comb. nov.** MycoBank MB822747. Fig. 18.
Basionym: *Passalora californica* S.T. Koike & Crous, IMA Fungus 2: 8. 2011.

Description (adapted from Koike *et al.* 2011): Phytopathogenic, causing black and irregular leaf spots. *Stroma* amphigenous, globose, brown, 10–30 µm long and 30–100 µm wide. *Conidiophores* arising from stroma in dense sporodochia, brown, verruculose, subcylindrical, mostly straight, at times geniculate-sinuous, 15–25 × 3–8 µm, occasionally up to 100 µm long and 4–5 µm wide, frequently reduced to conidiogenous cells. *Conidiogenous cells* terminal, integrated, brown, verruculose, subcylindrical, straight or geniculate-sinuous, usually 10–15 × 4–6 µm, occasionally 15–35 × 4–5 µm, conidiogenous loci apical and lateral, thickened, darkened and refractive, 1–1.5 µm diam. *Conidia* solitary, brown, verruculose, guttulate, obclavate to subcylindrical, apex obtusely rounded, base obconically truncate, (32–)55–95(–180) × (4–)5–6 µm, (1–)3–5(–9)-septate, hilum darkened, thickened and refractive, 2 µm diam.

Materials examined: **USA**, California, Santa Clara County, on leaves of *Asclepias fascicularis*, 19 Jul. 2010, S.T. Koike (**holotype** CBS H-20512, ex-type cultures CBS 128857 = CPC 18389); *idem*. cultures CPC 18390, CPC 18391.

Notes: Including *Cercosporidium californicum* (Fig. 18), several passalora-like species are known from the host genus *Asclepias*, namely *Passalora clavata* var. *clavata*, *Passalora clavata* var. *hansenii*, *Passalora venturioides* and *Passalora elaeochroma* (Braun & Mel'nik 1997, Koike *et al.* 2011). Unfortunately, no cultures of the previous species were available for this study and their phylogenetic position will remain unknown until they are recollected and their DNA analysed. In a phylogenetic analysis based on LSU data, *Cercosporidium californicum* was described (as *Passalora californica*) as closely related to *Passalora arachidis* (as *Mycosphaerella arachidis*) (Koike *et al.* 2011). In this study, the phylogenetic analyses place *Cercosporidium californicum* strains in a well-supported clade closely related to *Cercosporidium miurae* (Fig. 1, clade 40; Fig. 3, clade 5).

Cercosporidium chaetomium (Cooke) Deighton, Mycol. Pap. 112: 27. 1967. Fig. 19.
Basionym: *Cladosporium chaetomium* Cooke, Grevillea 17(83): 66. 1889.
Synonyms: *Scolicotrichum euphorbiae* Tracy & Earle, Bull. Torrey Bot. Club 23(5): 209. 1896.
Pyricularia euphorbiae (Tracy & Earle) G.F. Atk., Bull. Cornell Univ. (Science) 3(1): 40. 1897.
Passalora chaetomium (Cooke) Arx, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 86(1): 44. 1983.
For additional synonyms see MycoBank.

Description in vivo (CBS H-22944): Phytopathogenic, causing small leaf spots, brown to reddish brown with purplish brown border, circular to subcircular, 2–3 mm diam. *Caespituli* amphigenous, olivaceous, effuse. *Mycelium* internal, hyaline, pale to pale olivaceous brown, or dark brown. *Stromata* amphigenous, substomatal, epidermal, olivaceous brown to brown, small to well developed, 15–90 µm diam. *Conidiophores* erumpent through the cuticule, or emerging from stomata, solitary or in dense fascicles, smooth, thick-walled, very pale to olivaceous brown, paler towards the apex, simple, cylindrical, straight, sinuous to geniculate, irregular in width, 17–45 × 3.5–8 µm, sometimes reduced to conidiogenous cells. *Conidiogenous cells* terminal, proliferating sympodially or percurrently, polyblastic, with rim-like conidiogenous loci, slightly thickened and darkened, located on the shoulders and apex, 2–3 µm diam. *Conidia* solitary, hyaline to pale olivaceous, smooth to verruculose, thick-walled, ovoid, cylindrical, straight or slightly curved, base obconically truncate, apex broadly rounded or beak-shaped, 26–48 × 3.5–5 µm, 0–3-euseptate, hila slightly thickened and darkened, 2–3 µm diam.

Description in vitro (on V8; CPC 18624): *Mycelium* hyaline to pale olivaceous brown, smooth to rough, uniform to variable in width, 2–3 µm, sometimes constricted at septa. *Conidiophores* micro- or macronematous, straight or mildly sinuous, simple or branched, pale to pale olivaceous brown, 2.5–250 × 2.5–5 µm. *Conidiogenous cells* integrated, terminal and intercalary, proliferating sympodially, mono- or polyblastic, with conidiogenous loci slightly thickened and darkened, 2–2.5 µm diam. *Conidia* solitary or catenate, hyaline to pale olivaceous brown, smooth to

Fig. 18. *Cercosporidium californicum* (CBS 128857). **A–D.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Conidiophores, conidiogenous cells and conidia. **C.** Conidiophores and conidiogenous cells. **D.** Conidia. **E–J.** Observations *in vitro*. **E.** Culture on V8. **F.** Mycelium producing red pigment inside the cells and outside. **G, I.** Conidiophore, conidiogenous cell and conidia. **H, J.** Conidia. Scale bars = 10 µm.

rough, cylindrical to obclavate, long-obconically truncate at the base, rounded or beak-like at the apex, 10–75 × 2.5–5 µm, indistinctly 0–5-euseptate, slightly constricted at septa, hila slightly thickened and darkened, 2–2.5 µm diam.

Materials examined: **Canada**, Ontario, Guelph, on *Euphorbia* sp., 28 Sep. 2010, P.W. Crous & K.A. Seifert (**epitype** designated here CBS H-22944, MBT378571, ex-epitype culture CBS 142177 = CPC 18624). **USA**, New Jersey, Newfield, on leaves of *Euphorbia* sp., J.B. Ellis No. 2289 (**holotype** K; isotype IMI 118400).

Notes: Several researchers have discussed the taxonomic position of the genus *Cercosporidium* to date (Deighton 1967, Ellis 1971, von Arx 1983, Braun 1995, Baker *et al.* 2000, Crous & Braun 2003, Braun *et al.* 2013). The genus was described by Earle (1901: 16) who designated *Scoletotrichum euphorbiae* as type of the genus [“As the type of this genus I take the species published as *Scoletotrichum* (?) *euphorbiae* Tracy & Earle, Bull. Torr. Bot. Club, 23: 209, also as *Piricularia euphorbiae* (T. & E.) Atkinson, Bull. Cornell univ. 3: 40”]). Deighton (1967) stated that although Earle (1901) designated *Scoletotrichum euphorbiae* as the type species of *Cercosporidium*, he did not validly publish the combination in the genus. Deighton (1967) published a revised description of the genus and introduced a combination of the older name *Cladosporium chaetomium* into *Cercosporidium*. Subsequent authors followed this treatment (Baker *et al.* 2000, Crous & Braun 2003). However, Braun *et al.* (2013) cited *Cercosporidium helleri* Earle (Fig. 20), described on *Sphenoclea zeylanica* from Puerto Rico [**lectotype** (designated here), MBT378572, Puerto Rico, near Añasco, 6 Feb. 1900, A.A. Heller, Plants of Porto Rico 4537 (NY00945749); isolectotypes e.g. in BPI, CHRB, CUP, F, FH, MSC, NEB, NY, UC], as type species of *Cercosporidium*. *Cercosporidium helleri* was described as a new species on the same page as the genus was introduced (Earle 1901) and represents the only species in the original publication with description and with a name affiliated with *Cercosporidium*, which was the source of the error in the type citation in Braun *et al.* (2013). The status of the genus *Cercosporidium* was extensively debated over the years with some authors defending *Cercosporidium* as a synonym of *Passalora* (von Arx 1983, Castañeda & Braun 1989, Braun 1995), while other authors (Pons & Sutton 1996, Baker *et al.* 2000) defended *Cercosporidium* as a recognisably distinct genus (for extensive arguments see Baker *et al.* 2000). From the results of exhaustive phylogenetic analyses and morphological observations of passalora-like fungi in this study, the genus *Cercosporidium* is resurrected here (Fig 1, clade 40; Fig. 3, clade 5), typified by *Scolicotrichum euphorbiae* (= *Cercosporidium chaetomium*), with a well-developed stroma, and geniculate-sinuous conidiophores with rim-like conidial loci, conidia solitary, subcylindrical to obclavate, pale coloured, relatively thick-walled, smooth to verruculose surface, and darkened hila (Fig. 19).

Cercosporidium miurae (Syd. & P. Syd.) X.J. Liu & Y.L. Guo, Acta Mycol. Sinica 1(2): 98. 1982. Fig. 21.

Basionym: *Cercospora miurae* Syd. & P. Syd., Ann. Mycol. 11: 117. 1913.

Synonyms: *Cercosporiopsis miurae* (Syd. & P. Syd.) Miura, Flora of Manchuria and East Mongolia. Part III. Cryptogams, fungi 3: 533. 1928.

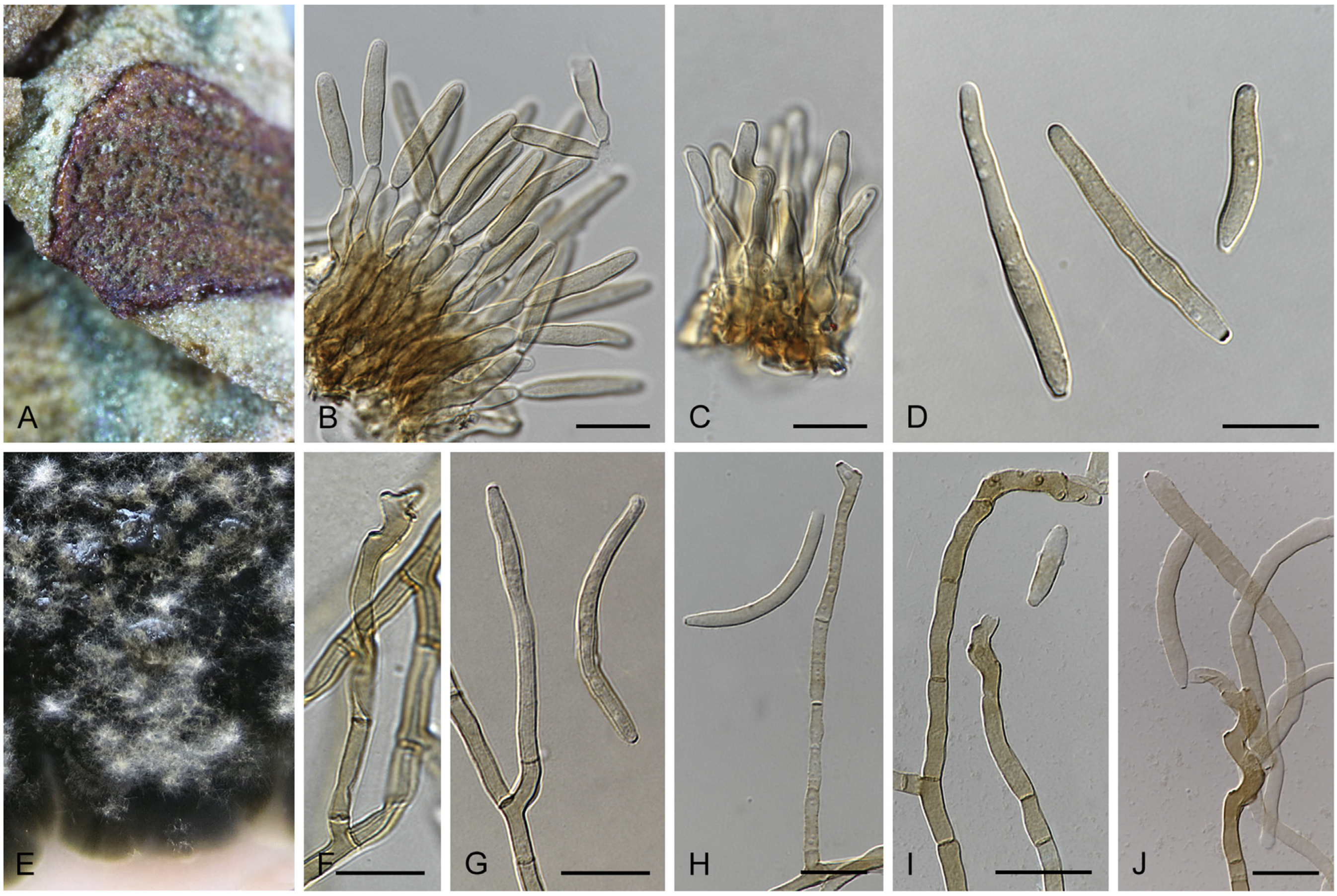


Fig. 19. *Cercosporidium chaetomium* (CBS 142177). **A–D.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Conidiophores, conidiogenous cells and conidia. **C.** Conidiophores and conidiogenous cells. **D.** Single conidia. **E–J.** Observations *in vitro*. **E.** Culture on OA. **F.** Conidiophore and conidiogenous cell. **G–J.** Conidiophore, conidiogenous cell and conidia. Scale bars = 10 µm.

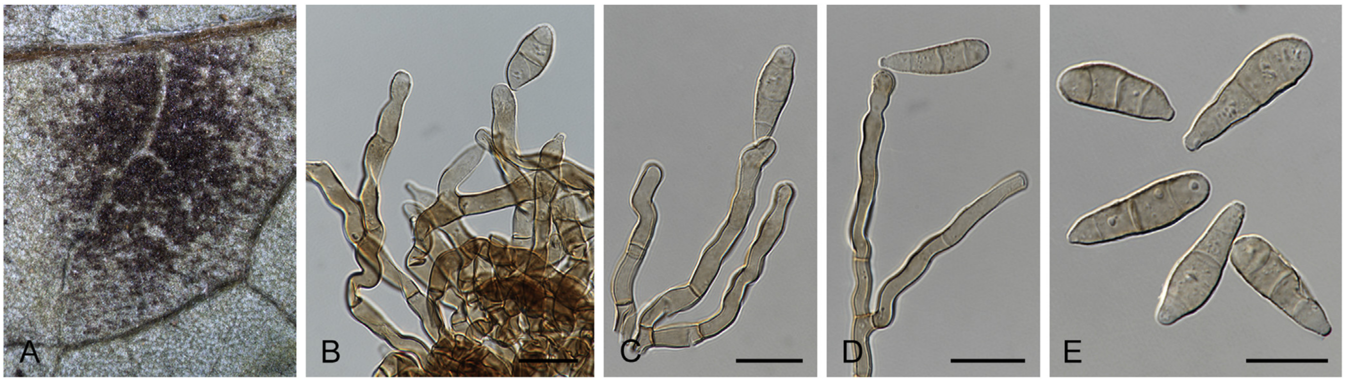


Fig. 20. *Cercosporidium helleri* (NY00945740). **A–E.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B, D.** Conidiophores, conidiogenous cells and conidia. **C.** Partial conidiophore, conidiogenous cell and conidia. **E.** Conidia. Scale bars = 10 µm.

Passalora miurae (Syd. & P. Syd.) U. Braun & H.D. Shin, Mycotaxon 49: 354. 1993.
Passalora miurae (Syd. & P. Syd.) Poonam Srivast., J. Living World 1(2): 117. 1994.

Description in vivo: *Leaf spots* indistinct, yellowish brown, 1–5 mm. *Mycelium* internal, hyaline to pale brown, smooth. *Caespituli* hypophyllous, effuse. *Stromata* lacking or small, composed of few brown cells, stomatal. *Conidiophores* emerging through the stroma, brown, thick-walled, smooth to rough, often rugged by the forming of numerous loci, straight, flexuous or geniculate, branched, 15–250 × 5 µm. *Conidiogenous cells* intercalary and terminal, proliferating sympodially, polyblastic, with rim-like conidiogenous loci, thickened and darkened, located on the apex or shoulders, 2–2.5 µm diam. *Conidia* solitary, pale brown, thick-walled, smooth to rough, obovoid, obclavate, cylindrical, straight to sharply curved, base obconicaly truncate, apex rounded or beak-like, 15–60 × 5–10 µm, 1–3-septate, hilum slightly thickened and darkened, 2–2.5 µm diam.

Description in vivo (on OA; CPC 14628): *Mycelium* hyaline to brown, uniform in width, 2.5 µm diam. *Conidiophores* micro- or macronematous, pale brown to pale olivaceous brown, smooth to rough, septate, straight, geniculate-sinuous, 25–180 × 2.5–3.8 µm. *Conidiogenous cells* integrated, apical and intercalary, mono- or polyblastic, proliferating sympodially, with conidiogenous loci

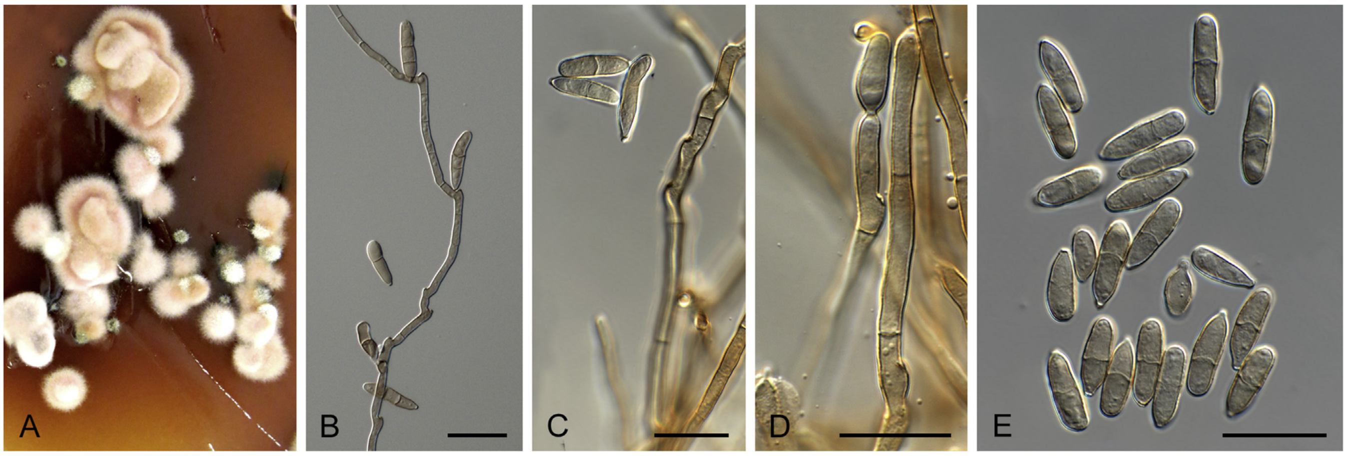


Fig. 21. *Cercosporidium miurae* (CPC 14628). **A–E.** Observations *in vitro*. **A.** Culture on V8. **B–D.** Conidiophore, conidiogenous cell and conidia. **E.** Single conidia. Scale bars = 10 µm.

slightly thickened and darkened, 1–2.5 µm diam. *Conidia* solitary, pale brown to pale olivaceous brown, finely verruculose, ovoid, cylindrical, apex broadly rounded, base obconically truncate, 20–28 × 3.8–10 µm, 1–3-euseptate, occasionally constricted at septa, hilum slightly thickened loci and darkened, 1–2.5 µm diam.

Materials examined: **Japan**, Hokkaido, Sapporo, Yamahana, on *Cynanchum caudatum*, 15 Sep. 1907, M. Miura (**holotype** S F37417; isotype NIAES C-268); Iwate, on *Cynanchum caudatum*, 25 Sep. 1926, K. Togashi, CNS 426. **Republic of Korea**, on *Metaplexis japonica*, 1 Oct. 2007, H.D. Shin, CBS H-22945, culture CBS 142235 = CPC 14628; on *Metaplexis japonica*, 22 Sep. 2007, H.D. Shin, culture CPC 14643.

Notes: The type species of *Cercosporidium miurae* was described from *Cynanchum caudatum* collected in Japan. The morphology of observed specimens and cultures (Fig. 21), originating from *Metaplexis japonica*, are in agreement with the description available in literature (Chupp 1954), and in line with the *Cercosporidium* generic description. Both host genera belong to the family *Asclepiadaceae*. In the phylogenetic analyses, the two available strains cluster in a clade well-supported by all three phylogenetic methods employed (Fig. 1, clade 40; Fig. 3, clade 5).

Clade 41: *Collarispora*

Collarispora Videira & Crous, **gen. nov.** MycoBank MB822584.

Etymology: Producing conidia with marginal frill.

Description: Phytopathogenic, causing leaf spots. *Ascostromata* amphigenous, black, erumpent through epidermis, thick-walled, composed of several layers of *textura angularis*, ostiole central, periphysate. *Asci* fasciculate, ellipsoid, straight to incurved, bitunicate, 8-spored, with apical chamber. *Ascospores* hyaline, smooth, fusoid-ellipsoidal, medianly 1-septate, guttulate, slightly incurved, widest just above septum, tapering towards both acutely rounded ends, thick-walled; ascospores germinate from both ends, germ tubes parallel to the long axis of the spore, lateral branches also developing, becoming constricted at median septum, but remaining hyaline. *Mycelium* consisting of hyaline, smooth, septate and branched hyphae. *Conidiogenous* cells terminal on hyphae, hyaline, subcylindrical, smooth, conidiogenous loci not thickened nor darkened. *Conidia* solitary, subcylindrical to narrowly obclavate, straight to flexuous, apex obtuse, base truncate, multiseptate, hila not thickened nor darkened, with visible marginal frill; with age conidia tend to become pale olivaceous and finely verruculose.

Type species: *Collarispora valgourgensis* (Crous) Videira & Crous (≡ *Mycosphaerella valgourgensis* Crous).

Collarispora valgourgensis (Crous) Videira & Crous, **comb. nov.** MycoBank MB822752.
Basionym: *Mycosphaerella valgourgensis* Crous, Persoonia 26: 151. 2011.

Description and illustration: Crous *et al.* (2011a).

Materials examined: **France**, Ardeche, Valgourge, Domaine Le Fraysse, N44°35.469′ E004°07.710′, on leaves of *Yucca* sp., 15 Jul. 2010, P.W. Crous (**holotype** CBS H-20593, culture ex-type CBS 129531 = CPC 18385). **USA**, Ohio, Columbus, on *Malus* sp., 29 Sep. 2005, M. Ellis, culture CBS 125311.

Notes: *Collarispora valgourgensis* was described based on both the sexual morph, which is mycosphaerella-like, and the asexual morph, which is pseudocercospora-like (Crous *et al.* 2011a, as *Mycosphaerella valgourgensis*). However, the asexual morph differed from *Pseudocercospora* by producing subcylindrical to narrowly obclavate conidia that are initially hyaline but later become pale brown and verruculose, with a basal marginal frill. The phylogenetic analyses place this strain in a well-supported clade (Fig. 1, clade 41; Fig. 3, clade 6) that is closely related to *Cercosporidium* as presently defined. According to Deighton (1967) and the morphological review presented in this study, the conidia in *Cercosporidium* can be narrowly obclavate and verruculose, but a basal marginal frill has not been observed. In a supplementary phylogenetic analysis performed using a smaller dataset (sequences in dataset 3 corresponding to Fig. 3, clades 1–15), this clade separates from the *Cercospordium* clade. Based on a BLAST comparison against the alignment, *Collarispora valgourgensis* CBS 129531 is 100 % (473/473) identical to *Amycosphaerella* sp. CBS 111001 based on ITS and 92 % (718/780) identical to *Cercosporidium chaetomium* CPC 18624 based on *rpb2*. The morphological differences and the instability of the phylogenetic position of these strains indicate that it is rather better to introduce this species into a new genus than combine it into *Cercosporidium*.

Clade 42: *Neocercosporidium*

Neocercosporidium Videira & Crous, **gen. nov.** MycoBank MB822596.

Description: Phytopathogenic. *Caespituli* amphigenous, punctiform, scattered to dense, dark brown to blackish. *Mycelium* both internal and external, hyphae branched, septate, subhyaline to

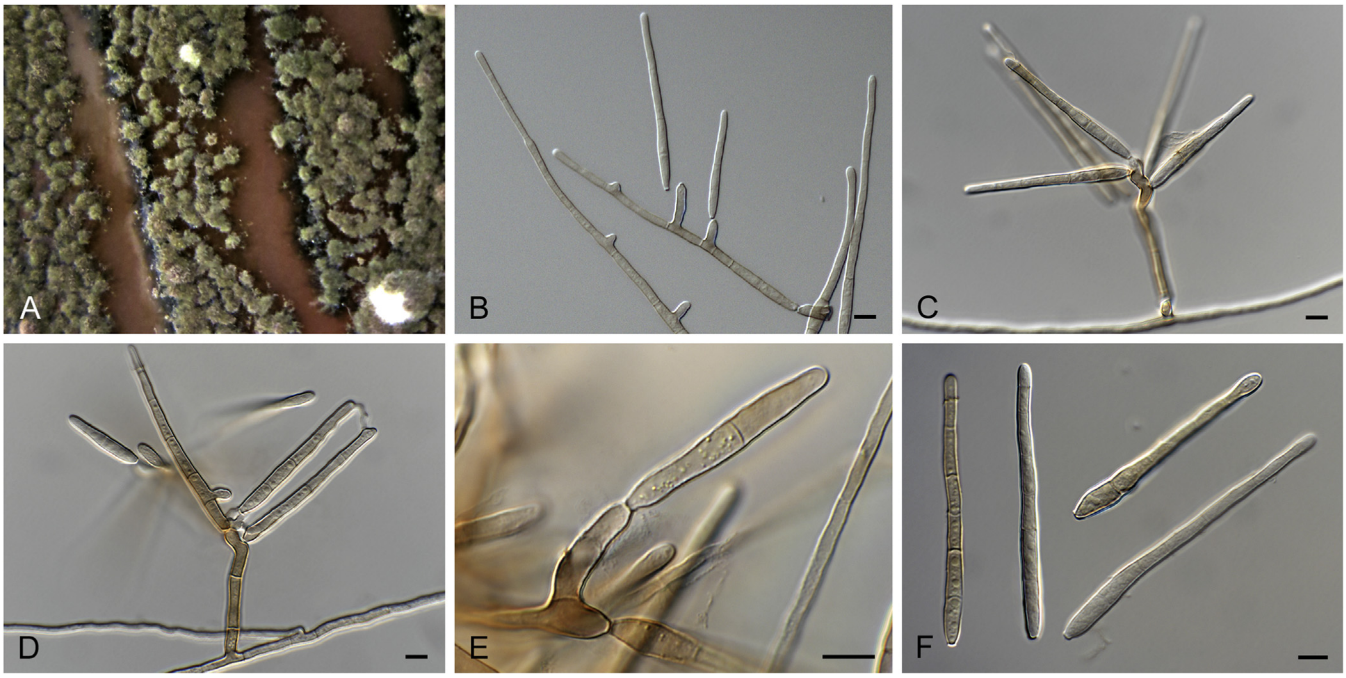


Fig. 22. *Neocercosporidium smilacis* (CPC 19342). **A–F.** Observations *in vitro*. **A.** Culture on V8. **B–D.** Conidiophore, conidiogenous cell and conidia. **E.** Conidiogenous cell and conidia. **F.** Single conidia. Scale bars = 10 µm.

medium olivaceous brown, thin-walled, smooth. *Stromata* well-developed, substomatal to intraepidermal, immersed, brown to dark brown. *Conidiophores* arising from stromata, occasionally from superficial hyphae, in small to large and loose to dense fascicles, when dense almost coremioid, rarely solitary, smooth, olivaceous to dark olivaceous brown throughout or paler at the tips, thin-walled, erect, straight, subcylindrical to strongly geniculate-sinuous, simple or occasionally branched, sometimes reduced to conidiogenous cells. *Conidiogenous cells* integrated, terminal, proliferating sympodially, occasionally percurrently, conidiogenous loci minute but slightly thickened, darkened and refractive, front view resembling minute circles. *Conidia* solitary, subhyaline to pale olivaceous or brownish, smooth, thin-walled, multi-septate, obclavate-cylindrical, apex obtuse to subobtuse, base rounded to short obconically truncate, hila slightly thickened, darkened and refractive.

Type species: *Neocercosporidium smilacis* (Thüm.) U. Braun *et al.*

Neocercosporidium smilacis (Thüm.) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822765. Fig. 22.
Basionym: *Cercospora smilacis* Thüm., Contrib. Fl. Mycol. Lusit. 2: 14. 1879.
Synonyms: *Passalora smilacis* (Thüm.) U. Braun, Arnoldia 14: 30. 1997.
Cercospora smilacina Sacc., Michelia 2(7): 364. 1881.
Cercospora smilacis var. *asperae* Gonz. Frag., Trab. Mus. Nac. Ci. Nat., Ser. Bot. 9: 66. 1916.

Descriptions and illustrations: Ellis (1976), Braun *et al.* (2014).

Description in vitro (on SNA; CPC 19342): *Mycelium* hyaline to pale brown, 2.5–3 µm diam. *Conidiophores* emerging from hyphae or bunching large brown cells, micro- or macronematous, pale to pale olivaceous brown, multiseptate, cylindrical, straight to slightly curved, geniculate-sinuous at the apex, often bearing microcyclic conidia, 7.5–125 × 3.5–5 µm. *Conidiogenous cells* integrated, terminal, intercalary, mono- or polyblastic, proliferating sympodially, apex conically truncate, with conidiogenous loci thickened, darkened and protruding, 1.5–2.5 µm diam. *Conidia* solitary, subhyaline to pale olivaceous brown, often undergoing microcyclic sporulation, obclavate to long cylindrical, base obconically truncate, apex rounded and long-beak shaped, 32–120 × 3.5–5 µm, 7–10-euseptate, hilum thickened, darkened and refractive, 1.5–2.5 µm diam.

Materials examined: **Italy**, Sardinia, Monte Ferru, on *Smilax aspera*, 18 May 1971, W. Gams, CBS H-9864, culture CBS 556.71; Lazio, Viterbo, Selva del Lamone, Il sentiero dei Briganti, on *Smilax* sp., 30 Apr. 2011, W. Gams, culture CPC 19342. **Portugal**, Algarve, Carvoeiro, leaf spot on *Smilax aspera*, 23 Jan. 2008, G. Verkley (**epitype** designated here MBT378573, CBS 122888, preserved as metabolically inactive); *idem*. cultures CBS 122889, CBS 122890, CBS 123352, CBS 123353); Coimbra, on *Smilax aspera* [mauritanica], May 1879, F. Moller, (**lectotype** designated by Braun *et al.* 2014, BPI 441368; **topotypes** [Thüm., Mycoth. Univ. 1670] BPI 441367, 441368, CUP 41239, HAL, LEP).

Notes: Braun *et al.* (2014) enumerated the cercosporoid species on *Smilaceae* hosts and provided an identification key for those genera. *Cercospora smilacis* was allocated to *Passalora s. lat.* due to its cylindrical-obclavate pigmented conidia and conspicuous conidiogenous loci that look like minute circles in front view (Fig. 22). *Passalora s. str.* has more prominently obclavate conidia that are single and 1-septate (Fig. 15). The strains used in this study cluster apart from the *Passalora* type species in a clade well-supported by all the phylogenetic analyses (Fig. 1, clade 42; Fig. 3, clade 1). Based on a BLAST comparison against the alignment, *Neocercosporidium smilacis* CPC 19342 shares 96 % (455/476) similarity with *Paramycovellosiella passaloroides* CPC 14694 based on ITS and 91 % (706/780) similarity with *Paracercosporidium tiliae* CBS 115526 based on *rpb2*.

Clade 43: *Sultanimyces*

Sultanimyces Videira & Crous, **gen. nov.** MycoBank MB822704.

Etymology: Based on "Sultana" (a race of white wine grape) and -myces (fungus).

Description: Phytopathogenic. *Caespituli* hypophyllous, punctiform, dark brown. *Mycelium* internal, hyphae almost hyaline. *Stroma* substomatal, composed of densely packed pale olivaceous hyphae. *Conidiophores* in fascicles, emerging from stromata, pale to deep olivaceous, straight, smooth. *Conidiogenous cells* polyblastic, integrated, terminal, more or less clavate, usually continuous above basal septum but sometimes septate and swollen at the base, conidiogenous loci conspicuous and slightly protruding. *Conidia* solitary, pale to moderate olivaceous, ellipsoid, fusiform, subcylindrical or obclavate, straight, smooth to verruculose, aseptate but usually septate, median septum usually thicker, sometimes slightly constricted at median septum, with conspicuous and slightly protruding hila.

Type species: *Sultanimyces vitiphyllus* (Speschnew) Videira & Crous (≡ *Coryneum vitiphyllum* Speschnew).

Sultanimyces vitiphyllus (Speschnew) Videira & Crous, **comb. nov.** MycoBank MB822802.
Basionym: *Coryneum vitiphyllum* Speschnew, Trudy Tiflissk. Bot. Sada 5: 177. 1901.
Synonyms: *Cercospora roesleri* f. *vitiphylla* (Speschnew) Elenkin, Bolez. Rast.: 68. 1909.
Scolicotrichum vitiphyllum (Speschnew) Karak. & Vassiljevsky, Fungi imperfecti Parasitici. I. Hyphomycetes: 215. 1937.
Cercospora vitiphylla (Speschnew) Barbarin, Ezeg. Sved o Boleznj. Povrezden. Kul't. Dikorast. Polezn. Rast. VII–VIII: 351. 1911–1912.
Asperisporium vitiphyllum (Speschnew) Deighton, Mycol. Pap. 138: 184. 1975.
Exosporium sultanae du Plessis, Ann. Univ. Stellenbosch, Reeks A, 24: 19. 1946.
Stigmina esfandiarii Petr., Sydowia 4(1-6): 35. 1950.

Description in vivo (adapted from Sutton 1975 and Ellis 1976): *Caespituli* hypophyllous, punctiform, dark brown, spread over light brown lesion. *Mycelium* internal, hyphae almost hyaline, 2.5–3.5 µm. *Stroma* substomatal, 40–50 µm high, composed of densely packed, pale olivaceous hyphae about 4 µm wide. *Conidiophores* in dense fascicles, emerging from stromata, pale to deep olivaceous, straight, smooth, up to 30 × 5–7 µm. *Conidiogenous cells* polyblastic, integrated, terminal, more or less clavate, usually continuous above basal septum but sometimes 1–3-septate and swollen at the base (up to 9 µm), conidiogenous loci conspicuous and slightly protruding, about 2 µm. *Conidia* pale to moderate olivaceous, ellipsoid, fusiform, subcylindrical or obclavate, straight, smooth to verruculose, 13–34 × 5.5–8 µm (Sutton 1975) or 15–28 × 7–10 µm (Ellis 1976), mostly 1–3-septate, rarely 5-septate, median septum usually thicker, sometimes slightly constricted at median septum, with hila conspicuous and slightly protruding.

Materials examined: **Uzbekistan**, Samarkand (Buaki, Fusayne), on living leaves of *Vitis vinifera*, unknown collector and date (**lectotype** [iconotype] designated here MBT378577, tab. 2, figs 20–26 in Speschnew 1901). **South Africa**, Northern Cape Province, Kenhardt district, on *Vitis* sp. (Sultana vines), 1948, isol. and dep. S.J. du Plessis, culture CBS 206.48.

Notes: *Coryneum vitiphyllum* was transferred to the genus *Asperisporium* based on the polyblastic conidiogenous cells with conspicuous scars and euseptate, verrucose conidia with conspicuous hila. A culture of *Exosporium sultanae* isolated by du Plessis, who described the species (Du Plessis 1946), was analysed and found to be sterile. The strain CBS 206.48 (Fig. 1, clade 43; Fig. 3, clade 2) is not congeneric with the type species of the genus *Asperisporium*, *Asperisporium caricae* (Fig. 1, clade 43; Fig. 3, clade 13). Conidiophores of *Asperisporium caricae* also emerge from dark stromata, are densely arranged and have polyblastic conidiogenous cells, but conidia are shorter and wider (14–22 × 8–13 µm), mostly ellipsoid and typically 1-septate (Minnis *et al.* 2011). The phylogenetic position of *Asperisporium vitiphyllum*, among cercosporidium-like species with which it shares few characters (e.g. multiseptate conidia), and apart from *Asperisporium caricae*, is suggestive that this type of morphology emerged more than once within the *Mycosphaerellaceae*. Based on a BLAST comparison against the alignment, *Sultanimyces vitiphyllus* CBS 206.48 shares 95 % (448/474) similarity based on ITS and 91 % (711/780) similarity based on *rpb2* with with *Paracercosporidium tiliae* CBS 115526. Therefore, based on phylogenetic differences and distinctive morphological characters, the new monotypic genus *Sultanimyces* is hereby introduced to accommodate this species.

Clade 44: *Paramycovellosiella*

Paramycovellosiella Videira, H.D. Shin & Crous, **gen. nov.** MycoBank MB822603.

Etymology: Derived from “Para” (similar to) + resembling the genus *Mycovellosiella*.

Description: Phytopathogenic. *Caespituli* hypophyllous, occasionally epiphyllous. *Mycelium* internal and external, olivaceous brown to olivaceous, septate, branched. *Stromata* lacking or rudimentary, composed only of a few brown swollen hyphal cells. *Conidiophores* in loose fascicles, emerging through stomata or as lateral branches of external hyphae, pale olivaceous brown throughout or paler at the apex, continuous or septate, straight to geniculate. *Conidiogenous cells* integrated, terminal or intercalary, pale olivaceous brown, smooth, mono- or polyblastic, determinated or proliferating sympodially, conidiogenous loci small, thickened and darkened, located on apex or shoulders. *Conidia* solitary or catenate, cylindrical, clavate, obclavate, straight to mildly curved, subhyaline to pale olivaceous brown, aseptate to multiseptate, non-constricted at the septa, hila small, thickened, darkened and slightly protuberant, basal (terminal conidia) or at both ends (intercalary conidia and ramoconidia).

Type species: *Paramycovellosiella passaloroides* (G. Winter) Videira, H.D. Shin & Crous (≡ *Cercospora passaloroides* G. Winter).

Paramycovellosiella passaloroides (G. Winter) Videira, H.D. Shin & Crous, **comb. nov.** MycoBank MB822820. Fig. 23.
Basionym: *Cercospora passaloroides* G. Winter, Hedwigia 22: 71. 1883.
Synonyms: *Cylindrosporium passaloroides* (G. Winter) J.C. Gilman & W.A. Archer, Iowa St. Coll. J. Sci. 3: 334. 1929.
Mycovellosiella passaloroides (G. Winter) J.K. Bai & M.Y. Cheng, Acta Mycol. Sin. 11: 120. 1992.
Passalora passaloroides (G. Winter) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser.: 309. 2003.

Descriptions and illustrations: Chupp (1954), Shin & Kim (2001).

Description in vitro (on V8; CPC 14694): *Mycelium* hyaline to pale, hyphae smooth, uniform in width, (1–)2(–3) µm diam. *Conidiophores* micronematous, erect, simple, straight, pale olivaceous, (30–)79–110(–230) × (2.5–)3–4(–5) µm. *Conidiogenous cells* integrated, terminal or intercalary, pale olivaceous, smooth, determinate or proliferating sympodially,

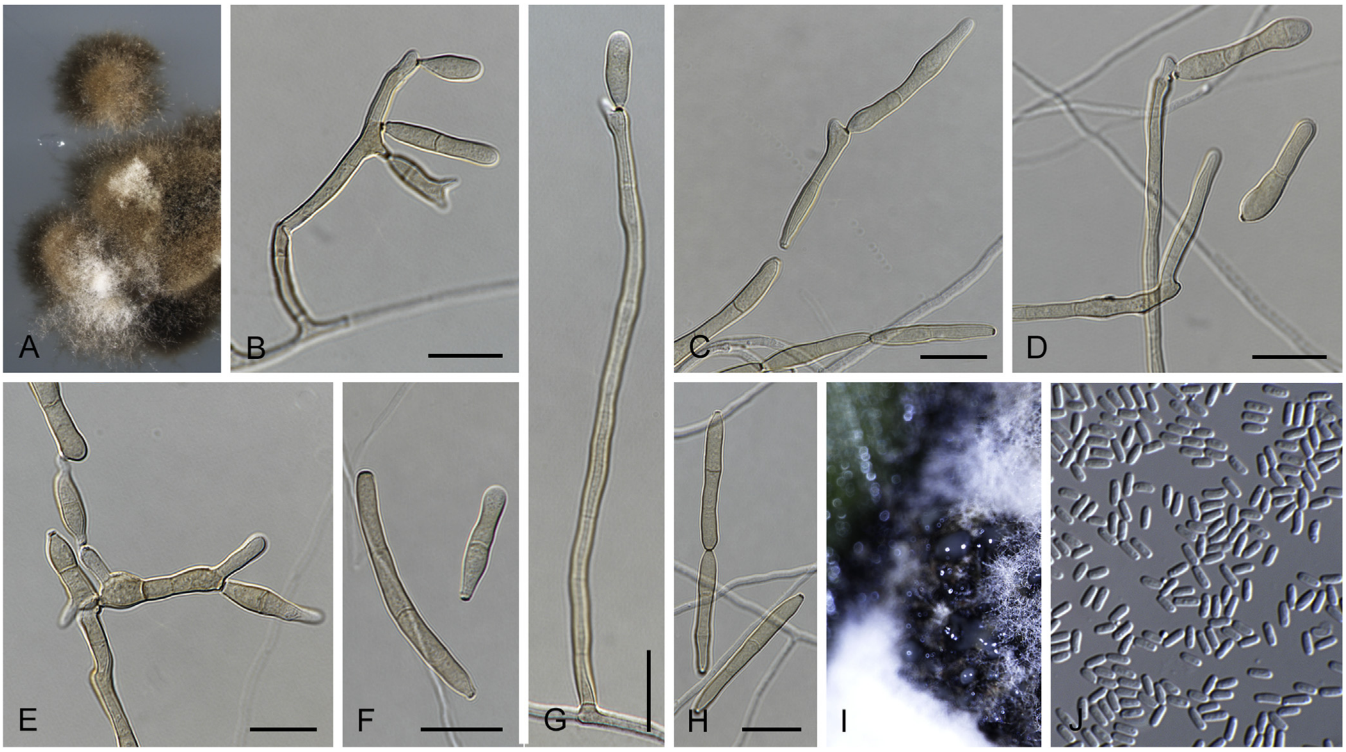


Fig. 23. *Paramycovellosiella passaloroides* (CPC 14694). **A–J.** Observations *in vitro*. **A.** Culture on SNA. **B, G.** Conidiophore, conidiogenous cell and conidia. **C, D, E.** Conidiogenous cell and conidia. **F, H.** Single and catenate conidia. **I.** Culture on V8 supplemented with banana leaf promoted the development of black spermogonia and spermatia whitish in mass. **J.** Hyaline spermatia. Scale bars = 10 µm.

mono- or polyblastic, with conidiogenous loci small, thickened, darkened and protruding, 1–1.5 µm diam. *Conidia* catenate (*in vivo* usually solitary), in single or double chains, pale olivaceous, smooth to verruculose, cylindrical to obclavate, straight to slightly curved, base rounded or obconically truncate, sometimes swollen, apex rounded, sometimes beak-like or swollen, variable in width, (11.5–)20–27(–43.5) × (3.5–)4.5–5(–6) µm, 1–2(–4)-septate, with hila small, thickened, darkened and refractive. *Spermogonia* formed on the surface of sterilized banana leaf placed on the medium surface, pycnidial, globose, apical ostiole, black. *Spermatia* hyaline, whitish in mass, smooth-walled, ellipsoid to subcylindrical, with rounded ends, aseptate, 2–4 × 2 µm.

Materials examined: **Republic of Korea**, Pyeongchang, on *Amorpha fructicosa*, 29 Sep. 2003, H.D. Shin, culture CPC 10770; on *Amorpha fructicosa*, 30 Oct. 2007, H.D. Shin, culture CPC 14694.

Notes: The genus *Paramycovellosiella* is established to accommodate a mycovellosiella-like species that is not congeneric (Fig. 1, clade 44; Fig. 3, clade 7) with the type of *Mycovellosiella*, *Mycovellosiella cajani*, as it is circumscribed in this study (Fig. 1, clade 7; Fig. 2, clade 10). Morphologically it is almost indistinguishable from *Mycovellosiella*. It can be distinguished from the most closely related genera, *Cercosporidium*, *Paracercosporidium* and *Neocercosporidium*, by forming catenate conidia (Fig. 23). The type specimen of *Cercospora passaloroides* (USA, Illinois, on *Amorpha canescens*, A.B. Seymour) could not be located and is likely not preserved (Chupp 1954).

Clade 45: *Amycosphaerella*

Amycosphaerella Quaedvlieg & Crous, Persoonia 33: 22. 2014.

Description (from Quaedvlieg *et al.* 2014): Foliicolous, plant pathogenic. *Ascomata* pseudothecial, amphigenous, solitary, black, subepidermal, globose, with central apical ostioles, becoming papillate; walls of 2–3 layers of medium brown *textura angularis*, subhymenium of 1–2 layers of hyaline cells. *Asci* obovoid to broadly ellipsoidal, straight or incurved, 8-spored. *Ascospores* bi- to triseriate, overlapping, hyaline, guttulate, straight, fusoid-ellipsoidal with obtuse ends, widest in middle of apical cells, medianly 1-septate, tapering toward both ends, but more prominently toward base.

Type species: *Amycosphaerella africana* (Crous & M.J. Wingf.) Quaedvlieg & Crous (≡ *Mycosphaerella africana* Crous & M.J. Wingf.).

Amycosphaerella africana (Crous & M.J. Wingf.) Quaedvlieg & Crous, Persoonia 33: 23. 2014.
Basionym: *Mycosphaerella africana* Crous & M.J. Wingf., Mycologia 88: 450. 1996.
Synonyms: *Teratosphaeria africana* (Crous & M.J. Wingf.) Crous & U. Braun, Stud. Mycol. 58: 8. 2007.
Mycosphaerella aurantia A. Maxwell, Mycol. Res. 107: 353. 2003.
Mycosphaerella ellipsoidea Crous & M.J. Wingf., Mycologia 88: 452. 1996.
Mycosphaerella aggregata Carnegie & Keane, Mycol. Res. 98: 415. 1994, nom. illegit (Art. 53.1). (non *Mycosphaerella aggregata* (Schwein.) J.A. Stev. 1918).
Mycosphaerella gregaria Carnegie & Keane, Mycol. Res. 101: 843. 1997, nom. inval. (Art. 41.5).
Phaeophleospora gregaria (Carnegie & Keane) Quaedvlieg & Crous, Persoonia 33: 23. 2014, nom. inval. (Art. 41.4).
Mycosphaerella buckinghamiae Crous & Summerell, Australas. Pl. Pathol. 29(4): 272. 2000.

Description and illustration: Crous (1998).

Materials examined: **Australia**, New South Wales, Mangrove Mountain, on leaves of *Buckinghamia* sp., Aug. 1999, P.W. Crous & B. Summerell (JT 902, DAR 74865, **holotype** of *Mycosphaerella buckinghamiae*, cultures ex-type CBS

111996 = CPC 3006, CPC 3007); Victoria, Nowa Nowa, on leaves of *Eucalyptus grandis*, 11 Nov. 1990, A.J. Carnegie (**holotype** of *Mycosphaerella gregaria* IMI 353729b, **isotype** VPRI 20739a, cultures ex-type CBS 134927 = DAR 72368); Western Australia, Bunbury, Summerlea plantation of Western Australian Chip and Pulp (WACAP), E115°37′, S33°40′, on *Eucalyptus globulus*, 1 May 2000, A. Maxwell (**holotype** of *M. aurantia*, PERTH 05849543, isotype MURU0001, culture ex-type CBS 110500 = CMW 14460). **Colombia**, Sinai, on leaves of *Eucalyptus grandis*, 1995, M.J. Wingfield, PREM 54978. **New Zealand**, on *Dracaena draco*, 1 Mar. 2004, M. Braithwaite, culture CPC 12678. **Portugal**, on leaves of *Eucalyptus globulus*, Jun. 1995, S. McRae, PREM 54974, cultures CPC 1196–1198. **South Africa**, Western Cape Province, Stellenbosch, Stellenbosch Mountain, leaves of *Eucalyptus viminalis*, Oct. 1994, P.W. Crous (**holotype** of *M. africana*, PREM 51917, cultures ex-type CPC 794–796 = CBS 116154, 116155, 680.95); on leaves of *Eucalyptus deanei*, Oct. 1994, P.W. Crous, PREM 51918, culture CPC 816; Rust and Vrede Farm, leaves of *Eucalyptus radiata*, Nov. 1994, P.W. Crous, cultures CPC 896–898; Darling, Pampoenvlei, leaves of *E. globulus*, Nov. 1994, P.W. Crous, PREM 51919, cultures CPC 838–840; leaves of *E. grandis*, Nov. 1994, P.W. Crous, PREM 51920, cultures CPC 833–837; Darling, Pampoenvlei, on leaves of *Eucalyptus cladocalyx*, 7 Nov. 1994, P.W. Crous (**holotype** of *M. ellipsoidea*, PREM 51924, cultures ex-type CPC 849–851, 850 = CBS 110843); Kwazula-Natal Province, Richmond, leaves of *Eucalyptus smithii*, Nov. 1994, G. Kemp, PREM 51921, cultures CPC 819–821. **Zambia**, on leaves of *E. globulus*, Aug. 1995, T. Coutinho, PREM 54973, cultures CPC 1229–1231.

Notes: Only the mycosphaerella-like sexual morph is known for this genus that until now included only one species (Quaedvlieg *et al.* 2014). Morphologically, *Amycosphaerella africana* ascospores germinate from both cells and become distorted (though this character was found to vary among different collections, e.g. see *Mycosphaerella gregaria*). Phylogenetically, *Amycosphaerella* clusters close to *Asperisporium* in a clade well-supported by all three phylogenetic analyses (Fig. 1, clade 45; Fig. 3, clade 8). Based on the phylogenetic analyses, the ex-type strain of *Mycosphaerella buckinghamiae* is identical to *Amycosphaerella africana* and is therefore considered as a synonym.

Amycosphaerella keniensis (Crous & T.A. Cout.) Videira & Crous, **comb. nov.** MycoBank MB822738.
Basionym: *Mycosphaerella keniensis* Crous & T.A. Cout., Mycol. Mem. 21: 74. 1998.

Description and illustration: Crous (1998).

Materials examined: **Australia**, on *Musa* sp., unkown collector and date, culture CBS 121391. **Kenya**, on leaf litter of *Eucalyptus grandis*, May 1995, M.J. Wingfield (**holotype** PREM 54402, cultures ex-type CBS 111001 = CPC 1084 = CMW 5147) *idem*., cultures CPC 1085, CPC 1086.

Notes: The morphological characteristics and phylogenetic position of *Mycosphaerella keniensis* agree with those of the genus *Amycosphaerella*, and a new combination is hereby proposed as *Amycosphaerella keniensis*. Phylogenetically, this species is represented by two strains that cluster in a clade well-supported by all three phylogenetic methods (Fig. 1, clade 45; Fig. 3, clade 8). The strain CBS 121391 was previously classified as *Mycosphaerella mozambica* based on phylogenetic similarity to the ex-type strain CBS 122464, since it was sterile in culture (Arzanlou *et al.* 2008). When comparing the type culture of *Mycosphaerella mozambica* CBS 122464 and strain CBS 121391 using BLAST, they are nearly identical on ITS, but significantly different on *actA* and *his3*: on ITS 99 % (496/497) similarity between GenBank EU514257 and GenBank EU514258; on *actA* 86 % (154/179) similarity and 2 % (5/179) gaps between GenBank EU514318 and GenBank EU514319; on *his3* 95 % (378/396) similarity and 2 % (8/396) gaps between GenBank EU514371 and GenBank EU514372. The partial *rpb2* sequences generated in this study for the same strains showed only 85 % (659/779) similarity. In addition, when comparing the partial *rpb2*, between the type of *Mycosphaerella keniensis* CBS 111001 and strain CBS 121391, they are 100 % identical, and the strain is therefore renamed as *Amycosphaerella keniensis*.

***Amycosphaerella* sp.**

Materials examined: **Brazil**, Pará, Tomé Acu, on *Theobroma cacao*, unknown date, H.C. Evans, dep. in 1980, culture CBS 441.80.

Notes: This strain was initially identified as *Crinipellis perniciosa*, an agaric responsible for the destructive Witches Broom disease on Cocoa (*Theobroma cacao*). The present strain clusters in the *Amycosphaerella* clade (Fig. 3, clade 8), therefore it is not a basidiomycete, and is sterile in culture. There is only a single *Mycosphaerella* species known to infect *Theobroma cacao*, namely *Mycosphaerella theobromae*, but it was described from Africa and the whereabouts of the specimen is unkown (Aptroot 2006). Cacao tree pathogens and endophytes have been studied recently (Mejía *et al.* 2008), but no mycosphaerella-like fungi have been detected so far. Another mycosphaerella-like pathogen known from cacao is *Ceratosperma theobromae*, but little is known about this pathogen (see section Genera of *Mycosphaerellaceae* below).

Clade 46: *Pseudocercosporella*

Pseudocercosporella Deighton, Mycol. Pap. 133: 38. 1973.

Description (from Frank *et al.* 2010): Colonies *in vivo*. *Mycelium* consisting of primary internal and secondary external hyphae, hyaline to pale brown, septate, branched, smooth; stromata lacking or weakly to well-developed, substomatal to intraepidermal. *Conidiophores* solitary to fasciculate, emerging through stomata or erumpent through the cuticle, arising from inner hyphae or from stromata, sometimes formed as lateral branches of superficial hyphae, or forming crustose to subglobose sporodochia; conidiophores rarely branched, straight and subcylindrical to geniculate-sinuous, hyaline, occasionally faintly pigmented, reduced to conidiogenous cells, or septate. *Conidiogenous cells* integrated, terminal, mono- to polyblastic, sympodial; conidiogenous loci inconspicuous, unthickened, hyaline. *Conidia* formed singly, rarely in simple or branched chains, subcylindrical, filiform, somewhat obclavate, euseptate, 1–multiseptate, hyaline, thin-walled, apex obtuse to subacute, subtruncate in catenate conidia, base truncate or subtruncate, hilum unthickened, not darkened, nor refractive.

Type species: *Pseudocercosporella bakeri* (Syd. & P. Syd.) Deighton (≡ *Cylindrosporium bakeri* Syd. & P. Syd.).

Pseudocercosporella bakeri (Syd. & P. Syd.) Deighton, Mycol. Pap. 133: 41. 1973.
Basionym: *Cylindrosporium bakeri* Syd. & P. Syd., Ann. Mycol. 14(5): 372. 1916.
Synonyms: *Ramularia ipomoeae* F. Stevens, Bull. Bern. Bishop Mus. 19: 150. 1925.
Cercosporella ipomoeae Sawada, Rep. Gov. Agric. Res. Inst. Formosa 86: 161. 1943.
Cercosporella ipomoeicola Sawada, Special Publ. Coll. Agric. Natl. Taiwan Univ. 8: 192. 1959.
Pseudocercosporella ipomoeae Deighton, Mycol. Pap. 133: 38. 1973.

Descriptions and illustrations: Braun (1995), Frank *et al.* (2010).

Materials examined: **Laos**, Vientiane Capital, Xaythany District, Xay Villiage, on *Ipomoea* sp., 8 Sep. 2009, P. Phengsintham (**epitype** designated by Frank *et al.*

2010, CBS H-20409, ex-epitype culture CBS 125685 = CPC 17570). **New Zealand**, Auckland, St. Johns, Morrin Road, Univ. Campus, on leaf spots on *Ipomoea indica*, unknown date, C.F. Hill, culture CBS 119488 = Lynfield 1252. **Philippines**, Los Baños, on *Ipomoea* sp., Dec. 1915, Baker 4029 (**lectotype** of *Cylindrosporium bakeri*, S F40429; isolectotype S F42032, see Braun 1995). **Taiwan**, Taipei, on *Ipomoea indica*, 14 Feb. 1913, Y. Fujikuro (**isotype** of *P. ipomoeae* TNS-F-220454).

Notes: Based on examination of type materials and additional collections of *Pseudocercosporella bakeri* and *Pseudocercosporella ipomoeae*, Braun (1995) concluded that they represented a single taxon. Frank *et al.* (2010) supported the conclusion of Braun (1995) and designated an epitype for *Pseudocercosporella bakeri*. *Pseudocercosporella*, based on *Pseudocercosporella bakeri*, clusters in a well-supported clade (Fig. 1, clade 46; Fig. 3, clade 10) close to *Asperisporium* and *Amycosphaerella*. Based on the single-gene trees of dataset 3 (not shown, in TreeBASE), *Pseudocercosporella* is reliably distinguished from other genera based on *rpb2* sequences while it is less distinct based on LSU and ITS data. Several species that were pseudocercosporella-like in morphology but are phylogenetically not congeneric with the genus type species have been recently assigned to new genera (Videira *et al.* 2016). As in other cercosporoid genera, morphology alone is insufficient for allocations of new species to the phylogenetically delineated genera.

Clade 47: *Distomycovellosiella*

Distomycovellosiella U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822588.

Etymology: Derived from “Disto-” (referring to distoseptation) + resembling the genus *Mycovellosiella*.

Description: Phytopathogenic. *Caespituli* hypophyllous, pale brown or olivaceous, floccose. *Mycelium* internal composed of hyaline hyphae, external mycelium composed of pale brown to brown hyphae that arise from internal hyphae. *Stromata* lacking or small, composed of few brown cells. *Conidiophores* emerging through stomata in loose to dense coremioid fascicles, or arising solitary from external hyphae, brown, straight to geniculate, simple, sometimes branched. *Conidiogenous cells* integrated, terminal or intercalary, polyblastic, proliferating sympodially, with conidiogenous loci thickened and darkened, flat or protruding. *Conidia* catenate in unbranched or branched chains, pale brown to pale olivaceous, smooth to verruculose, ovoid, obovoid, obclavate, clavate, cylindrical, fusiform, straight or slightly curved, aseptate, euseptate or distoseptate, hila thickened, darkened and refractive. Differs from the genus *Mycovellosiella* by forming distoseptate conidia with slightly thickened and refractive loci.

Type species: *Distomycovellosiella brachycarpa* (Syd.) U. Braun *et al.* (≡ *Cercospora brachycarpa* Syd.).

Distomycovellosiella brachycarpa (Syd.) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MB822756. Fig. 24.
Basionym: *Cercospora brachycarpa* Syd., Ann. Mycol. 28: 207. 1930.
Synonyms: *Mycovellosiella solanicola* (Viégas) Munt.-Cvetk., Lilloa 30: 178. 1960.
Mycovellosiella brachycarpa (Syd.) Deighton, Mycol. Pap. 137: 8. 1974.
Passalora brachycarpa (Syd.) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser.: 87. 2003.
For additional synonyms see MycoBank.

Description in vivo (CBS H-22948): *Leaf spots* circular to subcircular, yellow to pale brown on the upper surface, brown on the lower surface, with indistinct margin, 3–7 mm diam. *Caespituli* hypophyllous, pale brown or olivaceous, floccose. *Mycelium* internal composed of hyaline hyphae, external mycelium composed of pale brown to brown hyphae that arise from internal hyphae creeping on the lower leaf surface. *Stromata* lacking or small, composed of few brown cells. *Conidiophores* emerging from internal hyphae, bearing through the stomata in loose to dense coremioid fascicles of 4–10 conidiophores, or solitary arising from external hyphae, brown, smooth, branched, straight to geniculate, 11–138 × 2.5–5 µm. *Conidiogenous cells* integrated, terminal and intercalary, polyblastic, proliferating sympodially, with conidiogenous loci thickened, darkened and somewhat protruding, 1.5–2 µm diam. *Conidia* catenate in single or branched chains, pale brown to pale olivaceous brown, smooth to verruculose, variable in shape, ovoid, obovoid, obclavate, cylindrical, fusiform, 10–40 × 3–7 µm, 0–3-eu- or distoseptate, hila thickened and darkened, 1.5–2 µm diam.

Description in vitro (on V8; CPC 18381): *Mycelium* hyaline to pale olivaceous, smooth, uniform in width, 2–2.5 µm. *Conidiophores* arising from hyphae, macronematous, hyaline to pale brown, smooth, straight, simple or branched, 7.5–215 × 2.5–3 µm. *Conidiogenous cells* integrated, terminal and intercalary, hyaline to pale brown, smooth, mono- or polyblastic, determinated or proliferating sympodially, conidiogenous loci darkened and thickened, 1–2.5 µm diam. *Conidia* catenate, in single or branched chains, hyaline to pale olivaceous, smooth to verruculose, guttulate, obovoid, clavate, cylindrical to obclavate, 12.5–55 × 2.5–5 µm, 0–3 indistinctly eu- or distoseptate, hila slightly thickened and darkened.

Materials examined: **New Zealand**, Coromandel, Thames, on *Solanum mauritianum*, unknown collector and date, isol. C.F. Hill, Feb. 2004, 1001, MAF, Auckland, culture CBS 115124; same country, unkown host, collector and date, isol. E. McKenzie, 29 Mar. 2003, dep. B.F. Brandwagt, culture CBS 114855. **South Africa**, KuwaZulu Natal, on *Solanum mauritianum*, 6 Jul. 2010, A.R. Wood (**epitype** designated here CBS H-22948, MBT378601, ex-epitype culture CBS 142178 = CPC 18381). **Venezuela**, D.F., Puerto La Cruz, on *Solanum hirtum* (= *S. obtusifrons*), 24 Dec. 1927, H. Sydow 90 (**holotype** S F23388; isotype IMI 8500).

Notes: *Distomycovellosiella* is a monotypic genus that is morphologically similar to *Mycovellosiella* but is not congeneric with its type, *Mycovellosiella cajani*. Morphologically, *Distomycovellosiella* differs from *Mycovellosiella* by forming distoseptate conidia with slightly thickened and refractive loci (Fig. 24). *Distomycovellosiella* forms a clade well-supported by all three phylogenetic methods (Fig. 1, clade 47; Fig. 3, clade 9) and that is closely related to *Pseudocercosporella* as defined by its type, *Pseudocercosporella bakeri*. Based on a BLAST comparison against the alignment, *Distomycovellosiella brachycarpa* CPC 18381 shares 99 % (470/474) similarity based on ITS with *Clarohilum henningsi* CPC 17314 and 93 % (723/778) similarity based on *rpb2* with *Amycosphaerella keniensis* CBS 111001. Cultures of collections from South America in general and Venezuela in particular are not yet available, but the collections from New Zealand and South Africa agree with type material of this species and descriptions in literature so that we have decided to fix the application of this species by epitypification.

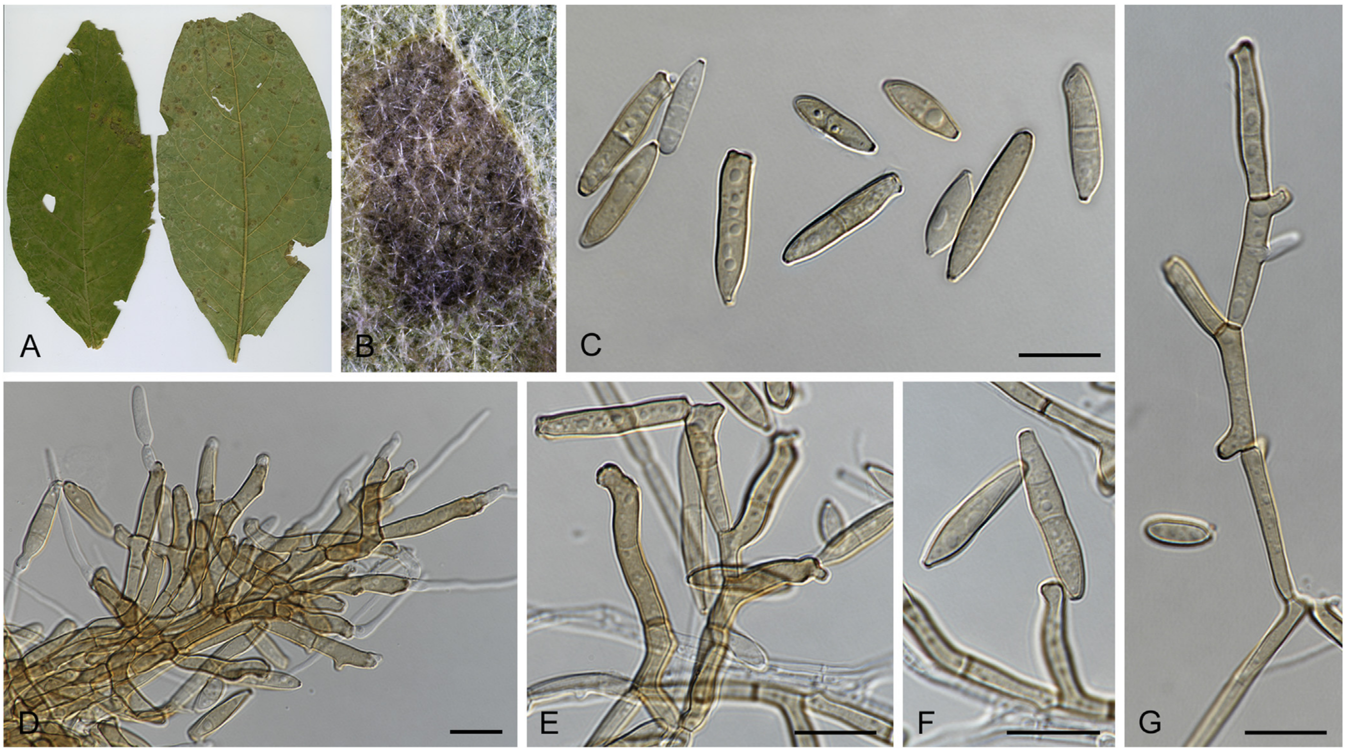


Fig. 24. *Distomycovellosiella brachycarpa* (CPC 18381). **A–D.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Catenate and single conidia. **D.** Conidiophores synnematous-like, conidiogenous cells and conidia. **E–G.** Observations *in vitro*. **E–G.** Conidiophores, conidiogenous cells and conidia. Scale bars = 10 µm.

Clade 48: *Asperisporium*

Asperisporium Maubl., Bull. Trimestriel Soc. Mycol. France 29: 357. 1913.

Description (from Braun *et al.* 2014): Usually foliicolous, leaf-spotting hyphomycetes. *Mycelium in vivo* internal; hyphae branched, septate, hyaline to pigmented, thin-walled, smooth or almost so. *Stromata* usually well-developed, substomatal to intraepidermal, often somewhat erumpent, pigmented. *Conidiophores* macronematous, usually densely fasciculate, forming sporodochial conidiomata, continuous to septate, pigmented, wall thin to slightly thickened, smooth or almost so. *Conidiogenous cells* integrated, terminal or conidiophores reduced to conidiogenous cells, usually polyblastic, sympodial, but mostly not strongly geniculate, conidiogenous loci conspicuous, thickened and darkened. *Conidia* solitary, amero- to phragmosporous (non-scolecosporous), mostly ellipsoid-ovoid, obovoid, fusiform to short cylindrical or obclavate, mostly with 0–3 eusepta, sometimes with a single or several oblique or longitudinal septa, pigmented, distinctly verruculose to coarsely verrucose, basal hilum thickened and darkened, conidial secession schizolytic.

Type species: *Asperisporium caricae* (Speg.) Maubl (≡ *Cercospora caricae* Speg.).

Asperisporium caricae (Speg.) Maubl., Bull. Trimestriel Soc. Mycol. France 29: 358. 1913.
Basionym: *Cercospora caricae* Speg., Anales Soc. Ci. Argent. 22 (4): 215. 1886.
Synonyms: *Fusicladium caricae* (Speg.) Sacc., Atti Congr. Bot. Palermo: 58. 1902.
Pucciniopsis caricae (Speg.) Höhn., Centralbl. Bakteriol., Abt. II, 60: 5. 1926, nom. illeg (Art. 53.1), non Earle 1902.

Description and illustrations: Minnis *et al.* (2011).

Materials examined: **Brazil**, intercepted at USA, Washington, Seattle, entering from Brazil, on fruit of *Carica papaya*, 16 Apr. 2010, coll. C. Weight, isol. by J.F. Bischoff from BPI 880773 (**epitype** designated by Minnis *et al.* 2011, is a dried culture on SDA (BPI 881135), ex-epitype culture CBS 130298); on fruit of *Carica papaya*, Mar. 2013, A.C. Alfenas, culture CPC 22691. **Paraguay**, Guarapi, on leaves of *Carica papaya*, Feb. 1881, B. Balansa, no. 2739 (**lectotype** designated by Chupp 1954, LPS).

Notes: Morphologically, *Asperisporium* is passalora-like but with verrucose conidia (Crous & Braun 2003). The phylogenetic position of *Asperisporium* within the *Mycosphaerellaceae* has been resolved by Minnis *et al.* (2011), based on the ITS and LSU of the type species *Asperisporium caricae*. *Asperisporium* clusters in a well-supported clade (Fig. 1, clade 48; Fig. 3, clade 13) and is closely related to *Amycosphaerella* and *Paramycovellosiella*. Other species assigned to *Asperisporum* must be individually reassessed.

Asperisporium caricicola Crous & C. Nakash., Sydowia 67: 87. 2015.

Description and illustration: Crous *et al.* (2015c).

Materials examined: **Republic of Fiji**, Viti Levu, Navua, on leaves of *Carica papaya*, 10 Sep. 2013, leg. C. Nakashima (**holotype** CBS H-22252, isotype TSU: MUMH 11477, cultures ex-holotype CPC 24348 = CBS 139998); *idem*., culture CPC 24349.

Notes: *Asperisporium caricicola* is represented by a single strain in the phylogenetic analyses (Fig. 1, clade 48; Fig. 3, clade 13). At the time it was described, *Asperisporium caricicola* was found to be morphologically very similar to *Asperisporium caricae*, but phylogenetically distinct based on the partial sequences of LSU and ITS (Crous *et al.* 2015c). The ITS sequence of *Asperisporium caricicola* is 97 % (463/477) similar to *Asperisporium caricae* (GenBank JN190955). The partial sequence of *rpb2*, however, shares 99 % (778/780) similarity with *Asperisporium caricae* (GenBank JN190955). More isolates of both species should be analysed in order to determine whether these

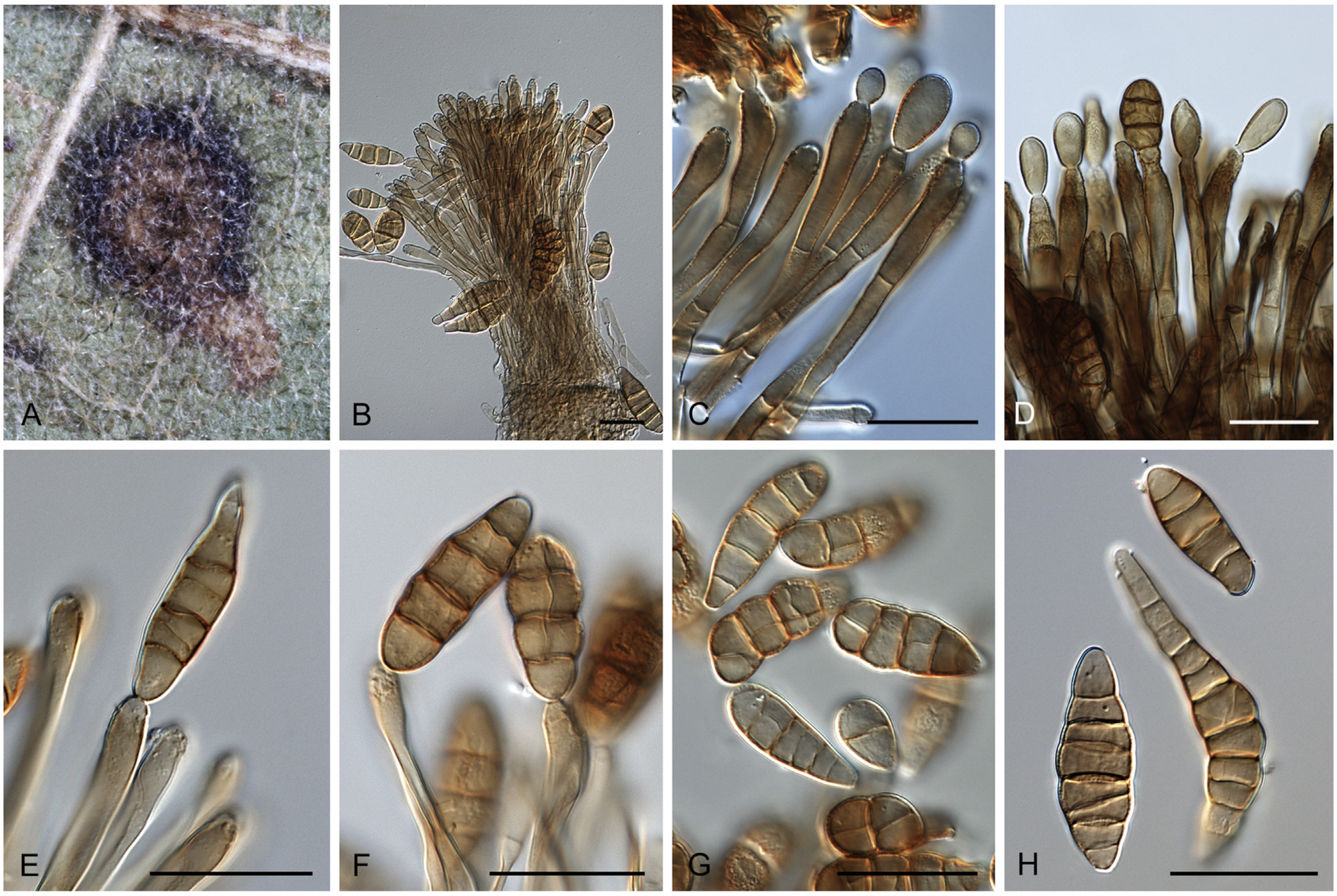


Fig. 25. *Pantospora guazumae* (IMI 59269). **A–H.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Conidiophores and conidia. **C–F.** Partial conidiophore, conidiogenous cells and conidia. **G–H.** Conidia. Scale bars = 10 µm.

represent two distinct species or whether they are conspecific with some intraspecific variation.

Clade 49: *Pantospora*

Pantospora Cif., Ann. Mycol. 36: 242. 1938.
Unconfirmed synonym: *Dictyocephala* A.G. Medeiros (Medeiros 1962).

Description (from Braun *et al.* 2013): Foliicolous hyphomycetes, associated with leaf spots. *Mycelium* internal; hyphae hyaline or almost so. *Stromata* developed, pigmented. *Conidiophores* macronematous, in dense coremioid fascicles or synnemata, septate, pigmented, thin-walled, smooth. *Conidiogenous cells* integrated, terminal, proliferation sympodial and percurrent, with planate to slightly convex, neither thickened nor darkened loci (pseudocercospora-like). *Conidia* formed singly, shape variable, ellipsoid-ovoid, fusiform, clavate to obclavate, didymo- to scolecosporous, with 1–11 transverse eusepta and often a single or few oblique to longitudinal septa, hila neither thickened nor darkened.

Type species: *Pantospora guazumae* Cif.

Pantospora guazumae Cif., Ann. Mycol. 36: 242. 1938. Fig. 25.
Synonyms: *Cercospora ulmifoliae* Obreg.-Bot., Caldasia 1: 51. 1941.
Dictyocephala ulmifoliae (Obreg.-Bot.) A.G. Medeiros, Publ. Inst. Micol. Recife 372: 15. 1962.
Pseudocercospora ulmifoliae (Obreg.-Bot.) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser.: 415. 2003.

Description and illustration: Minnis *et al.* (2011), present study (Fig. 25).

Materials examined: **Cuba**, Bayamo, on *Guazuma ulmifolia* (= *G. tomentosa*), 16 Feb. 1966, R. Urtiaga-Martinez, IMI 117605. **Dominican Republic**, Valle del Cibao, prov. Santiago, Hato del Yaque, on leaves of *Guazuma ulmifolia*, 20 Apr. 1930, coll. R. Ciferri & A.M. Borgna Ciferri, Batey no. 1, Mycoflora Domingensis Exsiccata 210 (**lectotypus** of *Pantospora guazumae* designated by Deighton 1976a: (IMI 59269). **Mexico**, intercepted at USA, Arizona, Nogales, entering from Mexico, on leaf of *Guazuma ulmifolia*, 12 Feb. 2009, coll. J. Moore (**epitype** designated by Minnis *et al.* 2011: BPI 880778, culture ex-epitype CBS 130299).

Notes: *Pantospora* is a monotypic genus with no known sexual morph that is reminiscent of *Pseudocercospora* but with synnematous conidiomata, percurrent and sympodial conidiogenous cells and frequently dictyosporous conidia (Crous & Braun 2003). Since the formation of dictyosporous conidia also occurred in the type of *Pseudocercospora* (*Pseudocercospora vitis*), Crous & Braun (2003) reduced *Pantospora* to synonymy with *Pseudocercospora*. The phylogenetic position of *Pantospora* within the *Mycosphaerellaceae* has been established by Minnis *et al.* (2011), based on the ITS and LSU sequences of the epitype culture of the type species *Pantospora guazumae*. In the present study *Pantospora* is represented by a single strain lineage (Fig. 1, clade 49; Fig. 3, clade 12) closely related to *Paracercospora*.

Clade 50: *Paracercospora*

Paracercospora Deighton, Mycol. Pap. 144: 47. 1979.

Description (from Braun *et al.* 2013): *Mycelium in vivo* internal. *Conidiophores* macronematous, fasciculate, pigmented.

Conidiogenous cells integrated, terminal or conidiophores reduced to conidiogenous cells, conidiogenous loci subconspicous by being circular with very slightly thickened and darkened-refractive rim. *Conidia* solitary, scolecosporous, subhyaline to very pale olivaceous, hila very slightly thickened and darkened-refractive along the rim.

Type species: *Paracercospora egenula* (Syd.) Deighton (≡ *Cercoseptoria egenula* Syd.).

Paracercospora egenula (Syd.) Deighton, Mycol. Pap. 144: 48. 1979.
Basionym: *Cercoseptoria egenula* Syd., Ann. Mycol. 33(3–4): 235. 1935.
Synonyms: *Cercospora egenula* (Syd.) Chupp & Doidge, Bothalia 4: 885. 1948.
Pseudocercospora egenula (Syd.) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser.: 171. 2003.
Cercospora solani-melongenae Chupp, Bothalia 4: 892. 1948.

Descriptions and illustrations: Chupp (1954), Deighton (1979), Crous *et al.* (2013a).

Materials examined: **India**, on *Solanum melongena*, N. Ponnapa, No. 109/1981, culture CBS 485.81. **Japan**, Shimane, on leaves of *Solanum melongena*, 5 Aug. 1998, T. Mikami, CNS-415, cultures MUCC 883 = MAFF 237766. **Republic of Korea**, Hongcheon, on leaves of *S. melongena*, 26 Oct. 2005, H.D. Shin, CBS H-20836, culture CBS 132030 = CPC 12537. **South Africa**, Gauteng Province, Barberton, on *Solanum panduriforme*, May 1931, L. Liebenberg No. 25999 (**holotype** PREM 25999, **isotype** IMI 89597).

Notes: *Paracercospora* was introduced by Deighton (1979) in order to accommodate *Paracercospora egenula*, a pseudocercospora-like species with distinct circular conidiogenous loci (scars) with a slightly thickened dark rim. This type of scar, however, is also present is some species of *Pseudocercospora* and with further support from earlier phylogenetic works (Stewart *et al.* 1999, Crous *et al.* 2000, 2001b), *Paracercospora* was synonymised with *Pseudocercospora* (Crous & Braun 2003). When representatives of the type species, *Paracercospora egenula*, were recollected, their partial LSU DNA sequences placed them apart from *Pseudocercospora* (Crous *et al.* 2013a, Vaghefi *et al.* 2016). *Paracercospora* is maintained as a separate genus based on the combination of its phylogenetic position (Fig. 1, clade 50, Fig. 3; clade 11), minimal marginal thickening of the conidiogenous loci and subhyaline conidia. Closely related species to *Paracercospora egenula* include *Passalora brachycarpa* (pale olivaceous, catenate conidia, prominent, thickened, darkened scars), and *Pseudocercospora tibouchinigena* (subhyaline conidia, unthickened hila and scars) (Crous *et al.* 2013a). In the present study, with the addition of the ITS and partial *rpb2* sequences to the phylogenetic analysis, the strains of *Passalora brachycarpa* (now *Distomycovellosiella brachycarpa*) cluster in a separate clade from *Paracercospora egenula*. Unfortunately, the phylogenetic position of *Pseudocercospora tibouchinigena* was not reassessed in this study and it may eventually be shown to represent a distinct genus since phylogenetically, it clusters apart from *Pseudocercospora* and, morphologically it is neither a species of *Pseudocercospora s. str.* (subhyaline conidia), nor *Paracercospora* (lacking any scar thickening). In a recently published paper (Ou *et al.* 2015), with the description of a new species of *Paracercospora*, *Paracercospora dictamnicola*, all three species '*Pseudocercospora tibouchinigena*', *Paracercospora egenula* and *Paracercospora dictamnicola* cluster together in a phylogeny based on LSU and ITS. However, *Paracercospora dictamnicola* is described as having conidiogenous loci unthickened and not darkened (pseudocercospora-like) and conidia solitary, subhyaline to pale olivaceous (paracercospora-like). Thus, the case of *Paracercospora dictamnicola* adds to the morphological vs. phylogenetic placement of cercosporoid species dilemma.

Clade 51: *Nothopassalora* [and *Clarohilum*]

Nothopassalora U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822696.

Etymology: From the greek notho-, meaning false, and resembling the genus *Passalora*.

Description: Hyphomycetous, phytopathogenic. *Mycelium* internal, hyaline to pale brown, branched, septate hyphae. *Stromata* dark, epidermal, substomatal, subglobose. *Conidiophores* emerging in fascicles from stromata, through stomata, pale to medium brown, smooth to verruculose, simple, straight to flexuous, geniculate-sinuous at the apex, multiseptate, but sometimes with a single basal septum or reduced to conidiogenous cell. *Conidiogenous cells* integrated, terminal, proliferating sympodially, mono- or polyblastic, conidiogenous loci rim-like, darkened, thickened and refractive. *Conidia* solitary, pale brown to olivaceous, smooth, thin-walled, cylindrical to long-obclavate, straight or gently curved, apex rounded and sometimes narrowing into a beak, base rounded or obconically truncate, multiseptate, hila thickened, darkened and refractive, sometimes protruding.

Type species: *Nothopassalora personata* (Berk. & M.A. Curtis) U. Braun *et al.* (≡ *Cladosporium personatum* Berk. & M.A. Curtis).

Nothopassalora personata (Berk. & M.A. Curtis) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822766. Fig. 26.
Basionym: *Cladosporium personatum* Berk. & M.A. Curtis, Grevillea 3(27): 106. 1875.
Synonyms: *Cercospora personata* (Berk. & M.A. Curtis) Ellis & Everh., J. Mycol. 1: 63. 1885.
Cercosporiopsis personata (Berk. & M.A. Curtis) Miura, Flora of Manchuria and East Mongolia. Part III. Cryptogams, fungi 3: 529. 1928.
Passalora personata (Berk. & M.A. Curtis) S.A. Khan & M. Kamal, Pakistan J. Sci. Res. 13: 188. 1961.
Cercosporidium personatum (Berk. & M.A. Curtis) Deighton, Mycol. Pap. 112: 71. 1967.
Mycosphaerella berkeleyi Jenkins, J. Agr. Res. 56: 325. 1938.
For additional synonyms see Crous & Braun (2003) or MycoBank.

Description in vivo (CBS H-22946): *Leaf spots* amphigenous, blackish brown, circular to subcircular, with yellow halo, 5–12 mm diam. *Mycelium* internal, composed of hyaline to pale brown hyphae, smooth, septate, branching. *Stromata* amphigenous, mainly hypophyllous, well-developed, 42–165 µm diam, brown to dark brown, epidermal, substomatal, subglobose and composed of *textura angularis*. *Conidiophores* emerging from upper part of stromata, densely fasciculate, pale brown to brown olivaceous, smooth to verruculose, erect, simple, straight to sinuous, geniculate-sinuous or conically truncate at the apex, irregular in width, 28–63 × 5–7.3 µm, sometimes only 1-septate. *Conidiogenous cells* integrated, terminal, mono- or polyblastic, proliferating sympodially, with rim-like conidiogenous loci

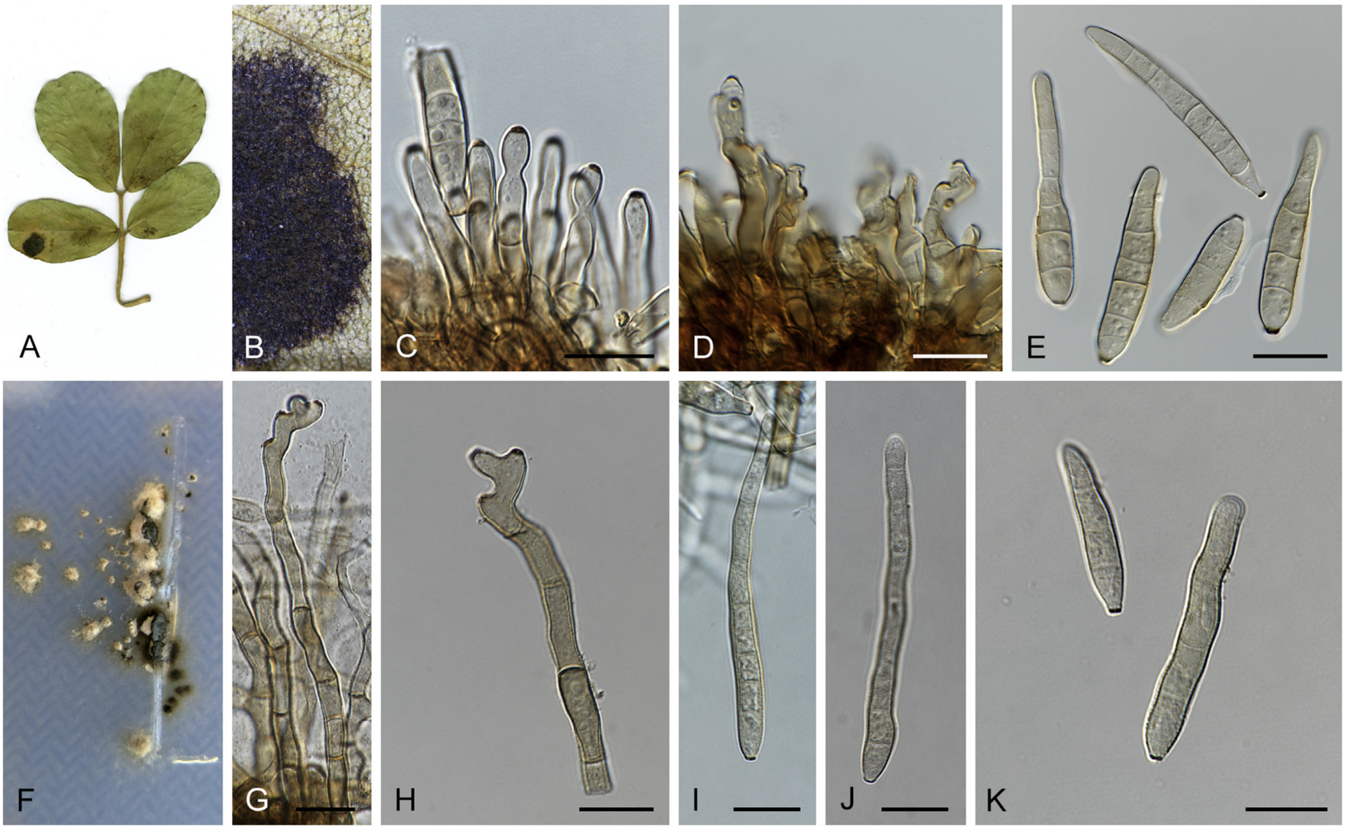


Fig. 26. *Nothopassalora personata* (CPC 19466). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C, D.** Conidiophores and conidiogenous cells. **E.** Single conidia. **F–K.** Observations *in vitro*. **F.** Culture on SNA. **G.** Conidiophore and conidiogenous cell. **H.** Partial conidiophore and conidiogenous cell. **I–K.** Single conidia. Scale bars = 10 µm.

distinctly thickened, darkened and refractive, located on the shoulders and the apex, 3–4 µm diam. *Conidia* solitary, pale to pale olivaceous brown, thick-walled, cylindrical to long-obclavate, straight or gently curved, apex rounded and sometimes narrowing into a beak, base rounded or obconicaly truncate, 38–85 × 5–8 µm, 2–7-euseptate, hila thickened, darkened and refractive, 3–4 µm diam.

Description in vitro (on V8; CPC 19466): *Mycelium* composed of hyaline to olivaceous hyphae, smooth to finely verruculose, septate, branching, uniform in width, 2.5 µm. *Conidiophores* pale brown to brown, micro- to macronematous, darker at the middle part, and paler towards apex, smooth to rough, cylindrical, geniculate-sinuous at the apex, simple, 50–100 × 3–5 µm. *Conidiogenous cells* integrated, terminal, mono- or polyblastic, proliferating sympodially, with conidiogenous loci rim-like, thickened, darkened and refractive, located at the shoulders and apex, 2.5 µm diam. *Conidia* solitary, pale to pale brown, cylindrical to long-obclavate, rounded at the apex and obconicaly truncate at the base, 45–110 × 5–7 µm, 2–10-euseptate, hila thickened, darkened and refractive, 2.5 µm diam.

Materials examined: **Australia,** Northern Territory, Darwin, on *Arachis hypogaea*, 30 Apr. 2011, P.W. Crous (**epitype** designated here, CBS H-22946, MBT378602, ex-epitype culture CBS 142236 = CPC 19466). **USA**, Georgia, Spalding Co., Georgia Experiment Station, on *Arachis hypogaea*, 23 Jun. 1937, W.A. Jenkins (CUP-027308, **isotype** of *Mycosphaerella berkeleyii*, ex-isotype culture CBS 222.38); South Carolina, Santee River, on *Arachis hypogaea*, Ravenel 1612 (**holotype** K, isotype IMI 104552).

Notes: The two major foliar diseases occurring on peanut, Early leaf spot and Late leaf spot, are respectively caused by *Cercospora arachidicola* (= *Mycosphaerella arachidis*) and *Passalora personata* (= *Mycosphaerella berkeleyi*) (Jenkins 1938, Kokalis-Burelle *et al.* 1997). Both diseases occur wherever peanut is grown but is usually manageable with timely fungicide applications (Kokalis-Burelle *et al.* 1997). The strains used in this study are identical based on their DNA sequences (Fig. 1, clade 51; Fig. 3, clade 14) and closely related with *Asperisporium*, despite their morphological differences (Fig. 26).

Clarohilum Videira & Crous, **gen. nov.** MycoBank MB822583.

Etymology: from the greek phaner- that means visible and protruding + hilum.

Description (adapted from Little 1987): Phytopathogenic, causing leaf spots. *Ascomata* globose, subepidermal, mostly epiphyllous, brown or dark brown, ostiolate, thin wall composed of pseudoparenchymatous cells. *Asci* cylindrical, tapering towards the base, bitunicate, thick-walled, 8-spored. *Ascospores* hyaline, tapering at both ends, two-celled with the upper cell slightly broader than the lower. *Conidiophores* mononematous, pale olivaceous brown, not branched, with slight geniculations, septate. *Conidiogenous cells* terminal, elongating sympodially, polyblastic, with conidiogenous loci thickened and darkened, located both apical and laterally. *Conidia* single, pale olivaceous, smooth, obovoid, obclavate, cylindrical to long-obclavate, slightly curved, apex obtuse, base rounded or short obconicaly truncate, septate, hila thickened, darkened and usually protruding.

Type species: *Clarohilum henningsii* (Allesch.) Videira & Crous Crous (≡ *Cercospora henningsii* Allesch.).

Clarohilum henningsii (Allesch.) Videira & Crous, **comb. nov.** MycoBank MB822748. Fig. 27.
Basionym: *Cercospora henningsii* Allesch., Die Pflanzenwelt Ost-Afrikas und der Nachbargebiete. Teil C: 35. 1895.

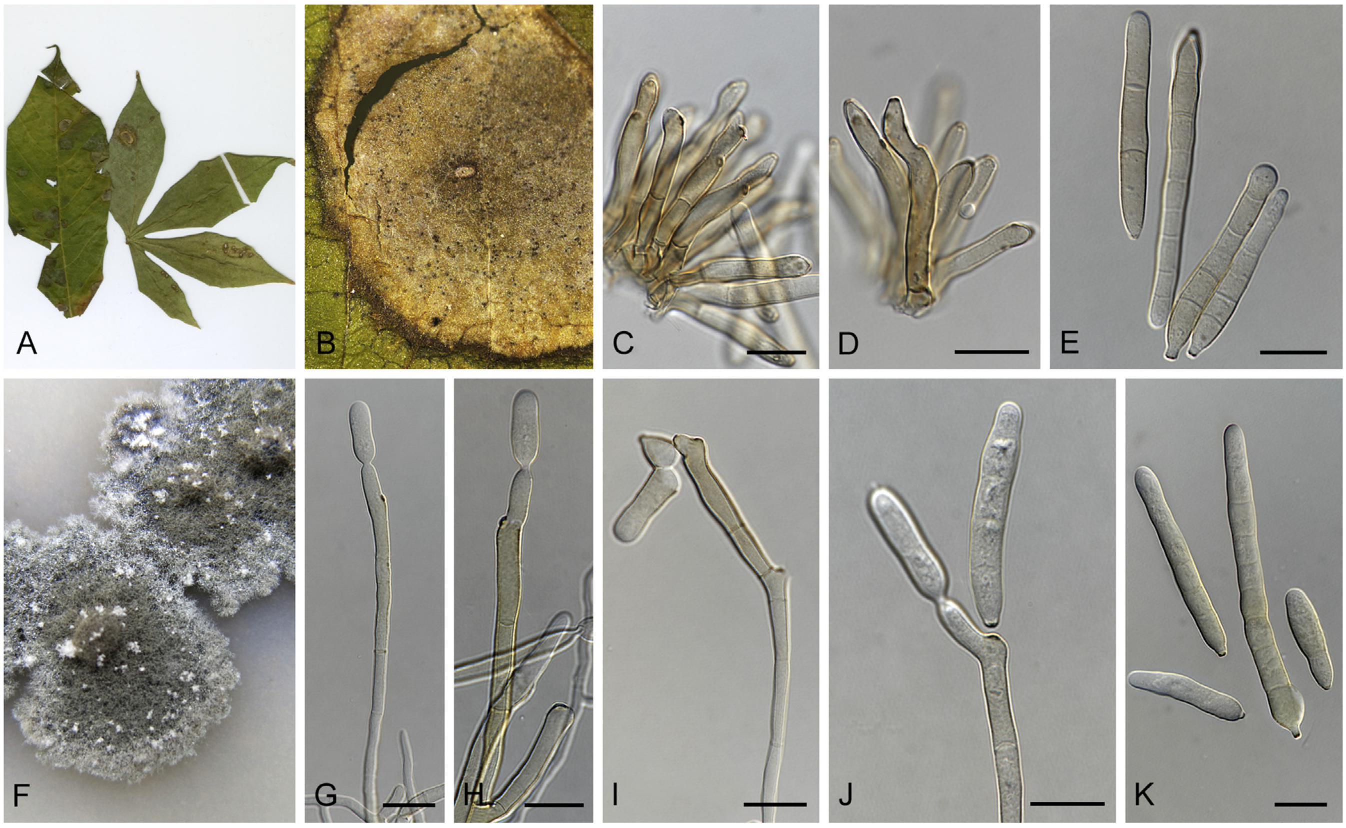


Fig. 27. *Clarohilum henningsii* (CPC 17314). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C, D.** Conidiophores and conidiogenous cells. **E.** Single conidia. **F–K.** Observations *in vitro*. **F.** Culture on OA. **G–J.** Partial conidiophore, conidiogenous cell and conidia. **K.** Single conidia. Scale bars = 10 μm.

Synonyms: *Cercosporidium henningsii* (Allesch.) Deighton, More dematiaceous Hyphomycetes: 295. 1976.
Passalora henningsii (Allesch.) Poonam Srivast., J. Living World 1(2): 116. 1994, nom. inval. (Art. 41.1).
Passalora henningsii (Allesch.) R. F. Castañeda & U. Braun, Cryptog. Bot. 1: 46. 1989.
Cercospora cassavae Ellis & Everh., Bull. Torrey Bot. Club 22: 438. 1895.
Cercospora manihotis Henn., Hedwigia 41: 18. 1902.
Mycosphaerella henningsii Sivan., Trans. Brit. Mycol. Soc. 84: 552. 1985.
For additional synonyms see MycoBank.

Descriptions and illustrations: Ellis (1976), Little (1987).

Description in vitro (on V8; CPC 17314): *Mycelium* hyaline to olivaceous brown, smooth to rough, septate, branching, uniform in width, 2.5–7.5 µm. *Conidiophores* micro- and macronematous, pale brown to olivaceous brown, paler at the apex, smooth, straight, simple or occasionally branched, cylindrical, geniculate sinuous at the apex, 75–170 × 5–7.5 µm. *Conidiogenous cells* integrated, terminal, proliferating sympodially, mono- or polyblastic, with conidiogenous loci thickened, darkened and protruding, 2.5 µm diam. *Conidia* solitary, hyaline to pale brown, smooth, obovoid, cylindrical, obclavate, base rounded or obconically truncate, sometimes sligltly swollen, apex rounded, 30–75 × 5–7 µm, 0–8-euseptate, sometimes slightly constricted at the septa, hila rim-like, thickened, darkened and refractive, sometimes protruding, 2.5 µm diam.

Material examined: **Laos**, on *Manihot esculenta*, 5 May 2006, P. Pheng, NOUL 26, culture CPC 17314. **Tanzania**, Usambara (Amboni), on *Manihot esculenta* (= *M. utilissima*), Holst No. 2899 (**lectotype** of *C. henningsii* designated here, MBT378578, S F37294; isolectotype S F37295).

Notes: *Passalora henningsii* is widely distributed in tropical to subtropical regions along with its host plant, *Manihot esculenta*. Morphologically, the description of the observed strain is similar to that available in literature (Chupp 1954, Castañeda & Braun 1989). In this study, caespituli of this species are paler than that of the other species of *Passalora s. lat.* and has conidia with distinctly protruding hila (Fig. 27). The phylogenetic analyses place this strain in a single-strain lineage (Fig. 3, clade 15) that is closely related to *Nothopassalora* (Fig. 1, clade 51; Fig. 3, clade 14). Morphologically, a few conidia of *Passalora henningsii* showed less protruding hila that tapered towards the base like some of the conidia of *Nothopassalora personata* (Fig. 26). In a supplementary phylogenetic analysis performed using a smaller dataset (sequences in dataset 3 corresponding to Fig. 3, clades 1–16), this single-strain lineage remains apart from the *Nothopassalora* clade. Based on a BLAST comparison against the alignment, the present strain shares only 95 % (447/473) similarity on ITS and 91 % (686/750) similarity on *rpb2* with *Nothopassalora personata.* The morphological differences and the instability of the phylogenetic position of these strains indicate that it is better to introduce this species into a new genus than combine it into *Nothopassalora*. Type material of *Cercospora manihotis* Henn. 1902 (Brazil, Pará, on *Manihot esculenta*, May 1901, J. Huber 42) is not preserved at B and could not be traced in other herbaria. Syntype material of the illegitimate name *Cercospora manihotis* Henn., in de Wildemann, Ann. Mus Congo, 5 Sér., Vol. II, Fasc. II: 104. 1907 [non *Cercospora manihotis* Henn. 1902] is presenved in B and S (Congo, Kwango, Kisantu, May 1906, H. Vanderyst 179). Syntypes of *Cercospora cassava* are housed in several herbaria, including BPI 434310, 437138, FH 01012118, and S F278433 (USA, Florida, Lake County, Eustis, on Cassava leaves (*Manihot* sp.), 28 May 1895, Geo. V. Nash).

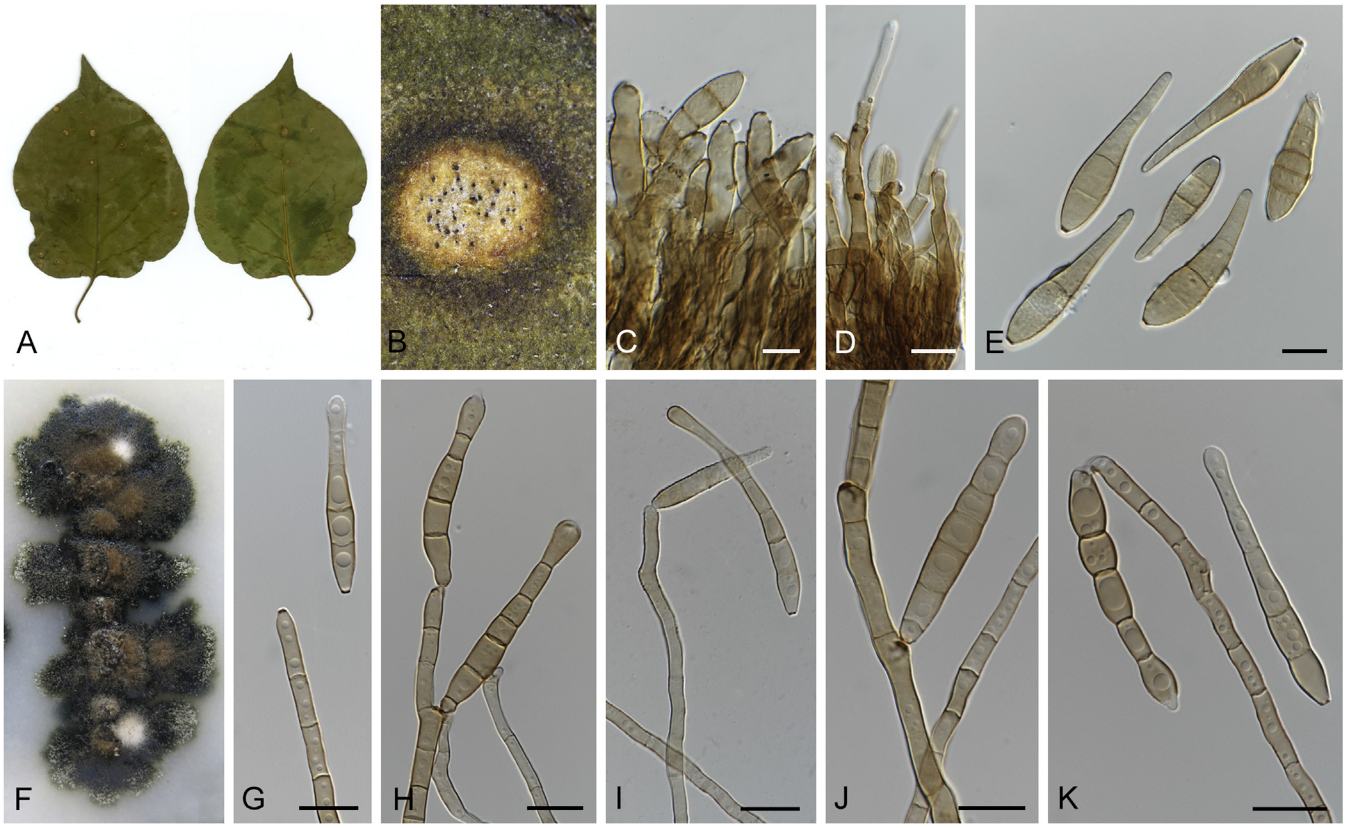


Fig. 28. *Pluripassalora bougainvilleae* (CPC 19327). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C, D.** Conidiophores, conidiogenous cells and conidia. **E.** Single conidia. **F–K.** Observations *in vitro*. **F.** Culture on OA. **G–K.** Partial conidiophore, conidiogenous cell and conidia. Scale bars = 10 µm.

Clade 52: *Pluripassalora*

Pluripassalora Videira & Crous, **gen. nov.** MycoBank MB822611.

Etymology: The name is a combination of pluri- (many) which refers to the multiseptate conidia + passalora, due to the similarity to the *Passalora* genus.

Description: Phytopathogenic, forming leaf spots. *Mycelium* internal, septate, smooth, hyaline to pale brown. *Stromata* amphigenous, mainly hypophyllous, well-developed, epidermal, substomatal, subglobose. *Conidiophores* emerging from upper part of stromata in dense fascicles, or emerging singly from internal hyphae, pale brown to brown, simple, sinuous, sometimes geniculate, irregular in width, smooth to verruculose, aseptate or septate. *Conidiogenous cells* integrated, terminal or intercalary, proliferating sympodially, mono- or polyblastic, conidiogenous loci rim-like, thickened, darkened and refractive. *Conidia* solitary, pale to pale olivaceous brown, paler towards the apex, smooth, thick-walled, mostly obclavate (in host), cylindrical-obclavate (in culture), euseptate, multiseptate, sometimes constricted at the septa (in culture), rounded at the base, beak-like and rounded at the apex, hila thickened, darkened and refractive.

Type species: *Pluripassalora bougainvilleae* (Munt.-Cvetk.) U. Braun *et al.* (≡ *Cercospora bougainvilleae* Munt.-Cvetk.).

Pluripassalora bougainvilleae (Munt.-Cvetk.) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822822. Fig. 28.
Basionym: *Cercospora bougainvilleae* Munt.-Cvetk., Revista Argent. Agron. 24: 84. 1957.
Synonyms: *Cercosporidium bougainvilleae* (Munt.-Cvetk.) Sobers & C.P. Seym., Proc. Florida State Hort. Soc.: 398. 1969.
Passalora bougainvilleae (Munt.-Cvetk.) R.F. Castañeda & U. Braun, Cryptog. Bot. 2: 291. 1991.

Description and illustration: Ellis (1976), present study (Fig. 28).

Description in vivo (CBS H-22947): *Leaf spots* amphigenous, brown to whitish brown, circular to subcircular, with a dark brown concentric ring, 2–5 mm diam. *Mycelium* internal, hyaline to pale brown. *Stromata* amphigenous, mainly hypophyllous, well-developed, 25–50 µm diam, brown, epidermal, substomatal, subglobose. *Conidiophores* emerging from upper part of stromata in dense fascicles, or emerging singly from internal hyphae, pale brown to brown, smooth, simple, straight to geniculate-sinuous, irregular in width, 24–62 × 5–6 µm, septate. *Conidiogenous cells* integrated, terminal and intercalary, mono-or polyblastic, proliferating sympodially, with rim-like conidiogenous loci thickened, darkened and refractive, located on on the shoulders and apex, 2–3 µm diam. *Conidia* solitary, smooth, pale to pale olivaceous brown, paler towards the apex, thick-walled, mostly obclavate or long-obclavate, base rounded, apex rounded and beak-like, 40–116 × 7–10 µm, 3–10-euseptate, sometimes constricted at the septa, hila distinctly thickened, darkened and refractive, 2–3 µm diam.

Description in vitro (on MEA; CPC 19327): *Mycelium* composed of hyphae uniform in width, hyaline and 1–2 µm diam when young, pale brown and 3.8–5 µm diam when mature, septate and branching. *Conidiophores* emerging from large brown aggregated cells 7.5–12.5 µm diam, micro- or macronematous, pale brown, septate, straight to curved in segments, occasionally geniculate-sinuous, uniform in width, 100–150 × 5 µm. *Conidiogenous cells* integrated, terminal and intercalary, pale brown, straight to mildly geniculate, mono- or polyblastic, conidiogenous loci thickened, darkened and refractive, 2–2.5 µm diam. *Conidia* solitary, pale brown, smooth, cylindrical-obclavate, long-obclavate, base obconically truncate, apex rounded, beak-like, sometimes swollen, 45–75 × 5–7.5 µm, 3–7-euseptate, slightly to strongly constricted at the septa, hila thickened, darkened and refractive, 2–2.5 µm diam.

Material examined: **Australia**, Northern Territory, Darwin, on *Bougainvillea* sp., 30 Apr. 2011, P.W. Crous, CBS H-22947, culture CBS 142237 = CPC 19327.

Notes: The present species was initially described as *Cercospora bougainvilleae* and was described on the host *Bougainvillea stipitata* from Argentina (Muntañola-Cvetkovic 1957) but no original material could be traced. The designation of a neotype is necessary, but the present strain is from a different geographical location. In the phylogenetic analyses, this species is represented by a single-strain lineage (Fig. 1, clade 52; Fig. 3, clade 16) closely related to *Nothopassalora*. Based on a BLAST comparison, *Pluripassalora* shares 90 % (418/463) similarity on ITS and 87 % (679/780) similarity on *rpb2*, with *Nothopassalora personata* CPC 19466. Morphologically, *Pluripassalora* can be distinguished from *Nothopassalora* by its obclavate and multiseptate conidia and also differs from *Passalora s. str.* by its multiseptate conidia.

Clade 53: *Micronematomyces*

Micronematomyces U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822595.

Etymology: Derived from the micronematous conidiophores (micronemato-) and fungus (-myces).

Differs from *Passalora* in forming short and micronematous to submicronematous conidiophores, and solitary and cylindrical, long-obclavate to filiform conidia.

Type species: *Micronematomyces caribensis* (Crous & Den Breeÿen) U. Braun, C. Nakash., Videira & Crous (≡ *Passalora caribensis* Crous & Den Breeÿen).

Micronematomyces caribensis (Crous & Den Breeÿen) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822763.
Basionym: *Passalora caribensis* Crous & Den Breeÿen, Fungal Diversity 23: 98. 2006.

Description and illustration: Den Breeÿën *et al.* (2006).

Materials examined: **Cuba**, near Havana, *Chromolaena. odorata*, 28 Oct. 1997, S. Neser, culture CBS 113376 = MJM 1539 = C487. **Jamaica**, Central Jamaica, between Guinea corm and John's Hall, on *C. odorata*, 31 Oct. 1997, M.J. Morris (**holotype** CBS H-19754, culture ex-type CBS 113380 = MJM 1550 = C498); Kingston, road to Strawberry Hill off Blue Mountain road, on *C. odorata*, M.J. Morris, 30 Oct. 1997, cultures CBS 113374 = MJM 1545 = C481, CBS 113375 = MJM 1543 = C482; between Maypen and Chapleton, on *C. odorata*, 30 Oct. 1997, M.J. Morris, culture CBS 113381 = MJM 1549 = C500; on highway to Kingston, between Moneague and Edwarton, on *Chromolaena odorata*, 1 Nov. 1997, M.J. Morris, culture CBS 113378 = MJM 1552 = C494; Strawberry Hill, on *C. odorata*, 30 Oct. 1997, M.J. Morris, culture CBS 113379 = MJM 1544 = C495.

Notes: The genus *Micronematomyces* is phylogenetically and morphologically distinct from *Passalora* as circumscribed in this study. It encompasses two species, *Micronematomyces caribensis* and *Micronematomyces chromolaenae*, that cluster together in a well-supported clade in the phylogenetic analyses performed in this study (Fig. 1, clade 53; Fig. 3, clade 17). Morphologically, species in the genus *Micronematomyces* differ from *Passalora s.str.* in forming short conidiophores, and multiseptate conidia that are cylindrical, long-obclavate to filiform. *Micronematomyces caribensis* can be distinguished from *Micronematomyces chromolaenae* by its shorter and slightly wider conidia. The strains CBS 113378 and CBS 113379 were identified as *Passalora perfoliati* based on morphological characters (Den Breeÿen *et al.* 2006) using the descriptions available in literature (Ellis 1971, Braun 1998). Unfortunately, when the cultures were observed in this study they did not sporulate and the fungarium material was depauperate. Based on a BLAST against the entire alignments, these two strains share 99 % (779/780) similarity on *rpb2* and 98 % (465/474) similarity on ITS with *Micronematomyces caribensis*. The type of *Passalora perfoliati* was isolated from *Eupatorium perfoliatum* from Wisconsin, USA (Ellis & Everhart 1889; syntypes NY, WIS-F-0003831) while the aforementioned two strains were obtained from a different host (*Chromolaena odorata*) and from a different location (Jamaica). Therefore, these two strains will henceforth be treated as *Micronematomyces caribensis*.

Micronematomyces chromolaenae (Crous & Den Breeÿen) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822764.
Basionym: *Passalora chromolaenae* Crous & Den Breeÿen, Fungal Diversity 23: 98. 2006.

Description and illustration: Den Breeÿën *et al.* (2006).

Materials examined: **Mexico**, Veracruz Province, Catemaco Lake, on *Chromolaena odorata*, 12 Oct. 1997, M.J. Morris (**holotype** CBS H-19753, culture ex-type CBS 113611 = MJM 1498 = C452); Entrada Corretera, on *C. odorata*, 12 Oct. 1997, M.J. Morris, culture CBS 113371 = MJM 1490 = C450.

Notes: The host *Chromolaena odorata* (≡ *Eupatorium odoratum*) is considered to be the one of the most problematic invasive species within protected rainforests in Africa (Struhsaker *et al.* 2005). Among plant pathogens those considered to be host-specific are considered to be potentially good as biological control agents (Barreto & Evans 1994). *Micronematomyces chromolaenae* is distinguished from other species occurring on this host by its conidial dimensions (up to 200 µm long and 4 µm wide) and shape that is never curled (Den Breeÿen *et al.* 2006). The representative strains of this species cluster in a clade well-supported by all three phylogenetic methods employed in this study (Fig. 3, clade 17). They were, unfortunately, sterile in culture at the time this study was performed and the herbarium specimens were depauperate.

Clade 54: *Rhachisphaerella*

Rhachisphaerella U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822702.

Etymology: Derived from the conidiogenous cells forming a rachis and the mycosphaerella-like sexual morph.

Description (adapted from Arzanlou *et al.* 2008): Phytopathogenic. *Ascomata* amphigenous, dark brown, subepidermal, becoming erumpent, globose; wall composed of layers of medium brown *textura angularis*. *Asci* aparaphysate, fasciculate, bitunicate, subsessile, obovoid to broadly ellipsoid, straight to slightly curved, 8-spored. *Ascospores* bi- to tri-seriate, overlapping, hyaline, thin-walled, straight to curved, fusoid-ellipsoidal with obtuse ends, widest in middle of apical cell, medianly 1-septate, not to slightly constricted at the septum, tapering towards both ends but more prominently towards the lower end; ascospores becoming distorted upon germination, becoming constricted at the septum, with irregular, wavy germ tubes, growing 90° to the long axis, and not arising from the polar ends of the spore. (*In vitro*) *Mycelium* submerged and superficial; submerged hyphae hyaline to subhyaline, thin-walled, smooth or slightly rough; aerial hyphae pale olivaceous, smooth or finely verruculose. *Conidiophores* arising from hyphae, occasionally reduced to conidiogenous cells, hyaline, subcylindrical. *Conidiogenous cells* integrated, terminal, proliferating sympodially, polyblastic, conidiogenous loci aggregated, flat, not protuberant (not denticle-like), unthickened, but somewhat darkened. *Conidia* solitary, hyaline, thin-walled, smooth, obovoid, ellipsoidal, obclavate, aseptate or multiseptate, hilum truncate, flat, broad, unthickened, slightly darkened.

Type species: *Rhachisphaerella mozambica* (Arzanlou & Crous) Videira & Crous (≡ *Mycosphaerella mozambica* Arzanlou & Crous).

Rhachisphaerella mozambica (Arzanlou & Crous) Videira & Crous, **comb. nov.** MycoBank MB822798.
Basionym: *Mycosphaerella mozambica* Arzanlou & Crous, Persoonia 20: 26. 2008.

Description and illustration: Arzanlou *et al.* (2008).

Materials examined: **Mozambique**, Chimoio, Bairro, on leaf of *Musa* cv., 2003, A. Viljoen (**holotype** CBS H-20039, culture ex-type CBS 122464); *idem*. CBS H-20040, CBS H-20041, CBS H-20042.

Notes: *Mycosphaerella mozambica* is a common pathogen occurring on banana in Mozambique (Arzanlou *et al.* 2008). The sympodially proliferating conidiogenous cells are reminiscent of *Ramichloridium*, but the type species of that genus, *Ramichloridium apiculatum*, has been found to cluster within *Dissoconiaceae* (Arzanlou *et al.* 2007). As other ramichloridium-like species within *Mycosphaerellaceae*, *M. mozambica* needed to be reassigned into a new genus. Phylogenetically, the representative strain of this species forms a single species lineage closely related to *Micronematomyces* (Fig. 1, clade 54; Fig. 3, clade 18). Morphologically, *Rhachisphaerella mozambica* is quite distinct from species of *Micronematomyces*, since its conidiogenous cells form a rachis with unthickened conidiogenous loci and the conidia are generally obovoid, 0–1-septate with unthickened hila.

Clade 55: *Neophloeospora*

Neophloeospora U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822598.

Etymology: Derived from the similarity to the genus *Phloeospora* (neo- = new).

Description (adapted from Punithalingam 1990): Phytopathogenic, causing leaf spots. *Pseudothecia* on overwintered, fallen leaves, initially immersed, later erumpent, epiphyllous, dark brown, spherical, with short necks and circular ostioles, wall composed of several cell layers of *textura angularis*, the outer cells dark brown, the inner cells hyaline. *Asci* fasciculate, cylindrical to clavate, hyaline, 8-spored, bitunicate. *Ascospores* biseriate or irregularly biseriate, ellipsoid, medianly or slightly unequally 1-septate, upper cell slightly wider than the lower cell, guttulate. *Conidiomata* epiphyllous, acervular, subepidermal, separate or confluent, composed of *textura angularis*; dehiscence irregular. *Conidiogenous cells* terminal, hyaline, cylindrical, proliferating percurrently with inconspicuous annellations or sympodially. *Conidia* hyaline or subhyaline, smooth, cylindrical to obclavate, straight or curved, septate, guttulate, with age becoming darker, constricted at the septa and slightly verruculose.

Type species: *Neophloeospora maculans* (Bérenger) Videira & Crous (≡ *Fusarium maculans* Bérenger).

Neophloeospora maculans (Bérenger) Videira & Crous, **comb. nov.** MycoBank MB822823. Fig. 29.
Basionym: *Fusarium maculans* Bérenger, Atti Riunione Sci. Ital. (Milano) 6: 474. 1845 (1844).
Synonyms: *Phloeospora maculans* (Bérenger) Allesch., in Rabenh., Krypt.-Fl., Edn 2, 1(6): 935. 1900 (1899).
Phloeosporella maculans (Bérenger) Höhn., Mitt. Bot. Lab. T. H. Wien 4(2): 77. 1927.
Cercosporella maculans (Bérenger) F.A. Wolf, J. Elisha Mitchell Sci. Soc. 51: 165.1935.
Septoria mori Lév., Ann. Sci. Nat., Bot., Sér. 3, 5: 279. 1846.
Cheilaria mori (Lév.) Desm., Ann. Sci. Nat., Bot., Sér. 3, 8: 27. 1847.
Phloeospora mori (Lév.) Sacc., Michelia 1(2): 175. 1878.
Septogloeum mori (Lév.) Briosi & Cavara, Fung. Paras. Piante Colt. Util., Fasc. 1: no. 21. 1888.
Cylindrosporium mori (Lév.) Berl., Riv. Patol. Veg., Pavia 5: 205. 1896.
Sphaerella mori Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24: 106. 1870 (1869–1870).
Mycosphaerella mori (Fuckel) F.A. Wolf, J. Elisha Mitchell Sci. Soc. 51: 165. 1935.
Sphaerella morifolia Pass., Erb. Critt. Ital., Ser. 2, Fasc. 30: no. 1464. 1885.
Mycosphaerella morifolia (Pass.) Cruchet, Bull. Soc. Vaud. Sci. Nat. 55: 43. 1923.
Sphaeria mori Nitschke, Fungi Rhen. Exs.: no. 1784. 1866.
Cercospora pulvinulata f. *angulosa* Savul. & Sandu, Herb. Mycol. Rom.: no. 188. 1931.

Description and illustration: Punithalingam (1990).

Description in vitro (on OA; CBS 115123): *Mycelium* hyaline to subhyaline, uniform in width, 2.5–3 µm diam. *Conidiophores* micronematous, hyaline, smooth, 5–10 × 1–2 µm. *Conidiogenous cells* terminal, indistinct. *Conidia* solitary, smooth, hyaline to pale brown, cylindrical to obclavate, subtruncate to truncate at the base, rounded to beak-like at the apex, straight to mildly sinuous, 38–70 × 3–5 µm, 3–10-euseptate, not or only slightly constricted at the septa, with age becoming darker, slightly verruculose, strongly constricted at the septa and wider (5–10 µm).

Material examined: **New Zealand**, Auckland, Mt. Albert, on *Morus alba*, isol. CF Hill (996), MAF, Mar. 2004, herbarium material U. Braun, Fungi Sel. Exs. 101, e.g. HAL, PDD 93510, culture CBS 115123.

Notes: This genus is introduced to accommodate the species *Phloeospora maculans* that is not congeneric with the type of *Phloeospora*, *Phloeospora ulmi*, and clusters in a single strain lineage in the phylogenetic analyses performed in this study (Fig. 1, clade 55; Fig. 2, clade 19). Morphologically, *Neophloeospora* can be distinguished from *Phloeospora* by the subhyaline to pale brown conidia constricted at the septum (Fig. 29). *Neophloeospora maculans* is a pathogen causing leaf spot on mulberry (*Morus alba*), a native tree to China that is commonly used to feed silkworms and is now cultivated worldwide for its berries (Punithalingam 1990, Hong *et al.* 2011). The ITS sequence generated here matches those of Hong *et al.* (2011).

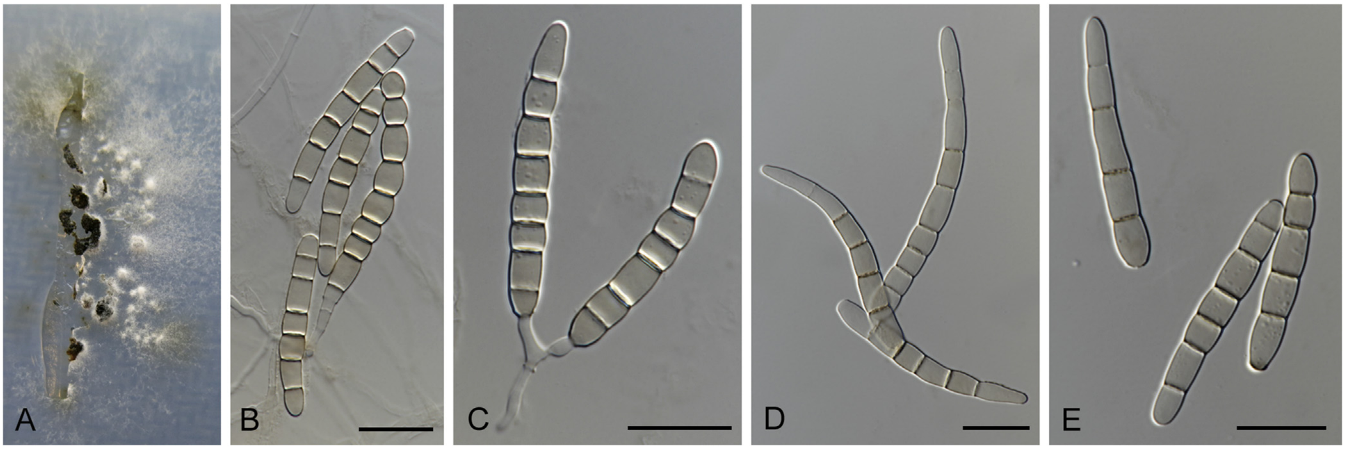


Fig. 29. *Neophloeospora maculans* (CBS 115123). **A–E.** Observations *in vitro*. **F.** Culture on SNA. **B, C.** Conidiophore and conidia. **D, E.** Conidia. Scale bars = 10 µm.

Clade 56: *Dothistroma*

Dothistroma Hulbary, Bull. Illinois Nat. Hist. Surv. 21: 235. 1941

Description (from Sutton 1980): *Mycelium* immersed, branched, septate, pale brown to hyaline. *Conidiomata* sometimes acervular, initially subepidermal later erumpent, composed of pale brown, thin-walled *textura angularis*, sometimes eustromatic, multilocular and of darker brown, thick-walled tissue. Dehiscence irregular, stromata strongly erumpent and finally pulvinate. *Conidiophores* absent. *Conidiogenous cells* holoblastic, discrete, determinate, ampulliform, hyaline, smooth, non-proliferating, formed from the upper cells of stroma or from inner cells of the locular walls. *Conidia* acrogenous, solitary, hyaline, straight or curved, filiform, 1–5-euseptate, continuous, thin-walled, smooth.

Type species: *Dothistroma pini* Hulbary.

Dothistroma pini Hulbary, Bull. Illinois Nat. Hist. Surv. 21: 235. 1941.

Descriptions and illustrations: Barnes *et al.* (2004, 2016).

Materials examined: **Russia**, Rostov oblast, Kamensky district, Kamensky timber enterprise, Kamenskoye forestry, 3 km to the east of Staraya Stanitsa village, pine planting, on *Pinus pallasiana*, 8 Oct. 2006, T.S. Bulgakov, culture CBS 121005 = CMW 24852. **USA**, Illinois, De Kalb County, on *P. nigra* subsp. *austriaca*, 29 Nov. 1938, J. Cedric Carter (**holotype** ILLS 27093, **isotype** CBS H-12211); Michigan, Massaukee County, McBain, Riverside Township, on *Pinus nigra*, Aug. 2001, G. Adams, CBS H-12203, culture CBS 116483 = CMW 14905; Michigan, Montcalm County, Stanton, Evergreen Township, on *P. nigra*, 2001, G. Adams (**epitype** designated by Barnes *et al.* 2016, CBS H-12211, culture ex-epitype CBS 116487 = CMW 10951); *idem*., culture CBS 116486.

Notes: Dothistroma needle blight is one of the most important diseases of *Pinus* spp., both in natural forest ecosystems and particularly in plantations of non-native pines. The causal agent of the disease has been narrowed down to two species, *Dothistroma septosporum* (worldwide) and *Dothistroma pini* (USA) (Barnes *et al.* 2004, Groenewald *et al.* 2007). The type of *Dothistroma pini* was originaly isolated from *Pinus nigra* in the USA and an epitype has recently been designated (Barnes *et al.* 2016). *Dothistroma* clusters in a clade well-supported by all three phylogenetic methods employed in this study (Fig. 1, clade 56; Fig. 3, clade 20) and is closely related to *Stromatoseptoria*.

Dothistroma septosporum (Dorog.) M. Morelet, Bull. Soc. Sci. Nat. Archéol. Toulon & Var 177: 9. 1968.

Basionym: *Cytosporina septospora* Dorog., Bull. Bull. Trimestriel Soc. Mycol. France 27: 106. 1911.
Synonyms: *Septoriella septospora* (Dorog.) Sacc., Syll. Fung. 25: 480. 1931.
For additional synonyms see MycoBank.

Description and illustrations: Barnes *et al.* (2004, 2016).

Materials examined: **Brazil**, São Paulo, Santo Antonio do Pinhal, on needles of *Pinus pinaster*, 1974, T. Namekata, culture CBS 543.74. **Ecuador**, on needles of *Pinus radiata*, culture CBS 112498 = CPC 3779. **France**, Meurthe et Moselle, Arboretum d'Amance, on needles of *Pinus coulteri*, 27 Feb. 1970, culture CBS 383.74. **Netherlands**, Lunteren, Pinetum Dennenhorst, on needles of *Pinus mugo* 'Rostrata', 1 June 2009, W. Quaedvlieg, cultures CBS 128782 = CPC 16798, CBS 128783 = CPC 16799. **Russia**, St. Petersburg, Park Sosnovka, from *Pinus sylvestris*, 14 Nov. 2013, R. Drenkhan & D.L. Musolin (**neotype** designated by Barnes *et al.* 2016, CBS H-22299, culture ex-neotype CMW 44656 = CBS 140339 = TAAM 168554A). **Poland**, Miechów Forest District, Goszcza Forest Unit, on *Pinus nigra*, Jun. 2003, T. Kowalski, CBS H-12209, cultures CBS 116488 = CMW 13004, CMW 13010. **South Africa**, Tzaneen, on *P. radiata*, 2002, M.J. Wingfield, CBS H-12210, culture CBS 116489 = CMW 11372.

Notes: *Dothistroma septosporum* is one of the causal agents of Dothistroma needle blight (Red band disease of pine) and used to be listed as a species of quarantine importance to Europe (Quaedvlieg *et al.* 2012, EPPO 2012). This disease occurs wherever *Pinus* and *Larix* species are grown (Groenewald *et al.* 2007) and can cause varying degrees of damage depending on humidity and temperature (Evans 1984, Barnes *et al.* 2004). In the phylogenetic analyses, the strains clustered in a well supported clade (Fig. 1, clade 56; Fig. 3, clade 20). The herbarium material of the holotype was lost and a neotype was recently designated (Barnes *et al.* 2016).

Clade 57: *Hyalocercosporidium*

Hyalocercosporidium Videira & Crous, **gen. nov.** MycoBank MB822592.

Etymology: Similar to *Cercosporidium* but with hyaline conidia.

Description: Phytopathogenic. *Mycelium* internal, composed of hyaline to pale brown hyphae. *Conidiophores* solitary, simple, pale to brown, straight or mildly sinuous, geniculate. *Conidiogenous cells* terminal and intercalary, geniculate-sinuous, determinate or proliferating sympodially, monoblastic, with conidiogenous loci slightly thickened, darkened and refractive, located on the shoulders and apex. *Conidia* solitary, hyaline, smooth, obovoid, long-obclavate, straight or slightly curved, base

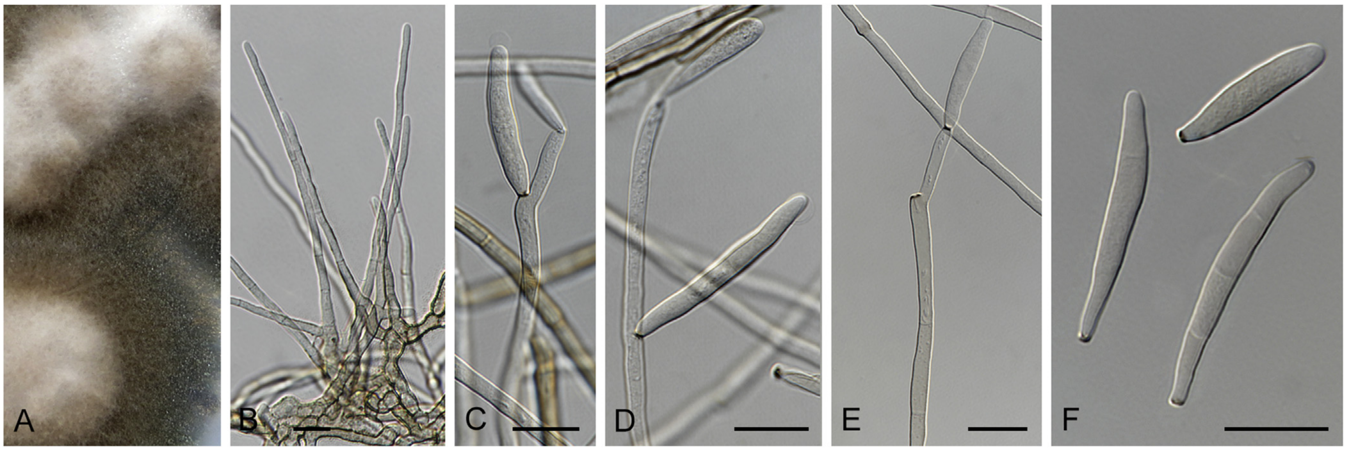


Fig. 30. *Hyalocercosporidium desmodii* (CPC 19483). **A–F.** Observations *in vitro*. **A.** Culture on OA. **B.** Mycelium. **C–E.** Partial conidiophore, conidiogenous cell and conidia. **F.** Conidia. Scale bars = 10 µm.

obconical truncate or short obconical truncate, apex rounded, aseptate or euseptate, hila slightly thickened, darkened and refractive.

Type species: *Hyalocercosporidium desmodii* Videira & Crous.

Hyalocercosporidium desmodii Videira & Crous, **sp. nov.** MycoBank MB822712. Fig. 30.

Etymology: Named after the genus of the host it was isolated from, *Desmodium.*

Description in vitro (on MEA; CPC 19483): *Mycelium* composed of hyaline to pale brown hyphae, smooth to verruculose, septate, branching, 2–3.5 µm diam. *Conidiophores* pale brown, smooth to lightly verruculose, simple, straight or mildly sinuous, up to 3-geniculate, (52.5–)98–126(–167) × (2.5–)3(–4) µm. *Conidiogenous cells* integrated, terminal and intercalary, monoblastic, determinate or proliferating sympodially, monoblastic, with conidiogenous loci slightly thickened, darkened and refractive, 1.5 µm diam. *Conidia* solitary, hyaline, smooth, obovoid, cylindrical to long obclavate, truncate to long-obconically truncate at the base, rounded at the apex, (14.5–)24–30(–40) × (3–)4(–6) µm, aseptate to 3-septate, septa indistinct, hila slightly thickened, darkened and refractive, 1.5 µm diam.

Material examined: **Brazil**, Minas Gerais, Vale da Lua, Alto Paraiso de Goias, on *Desmodium tortuosum*, 2 Aug. 2009, R.W. Barreto (**holotype** CBS H-22949, ex-type culture CBS 142179 = CPC 19483).

Notes: Two *Passalora* species (*s. lat.*) are known from *Desmodium* in literature, namely *Passalora desmodii* and *Passalora atropunctata*. From these two species, only the last one has been previously reported from the host *Desmodium tortuosum* in Brazil (Crous & Braun 2003). *Passalora atropunctata* produces very pale brown and wider conidia (25–50 × 7–8 µm; Ellis 1976) compared with *Hyalocercosporidium desmodii*, and *Passalora desmodii* has multilocal conidiogenous cells with 1–5 minute apical to lateral conidiogenous loci which are unthickened or almost so, only somewhat darkened or refractive and in front view visible as a minute circle [based on comparision with North American material of *Passalora desmodii*, including Petr., Mycoth. Gen.1220, GZU (**lectotype** of *Cercospora desmodii* Ellis & Kellerm., designated here, MBT378579: **USA**, Kansas, Manhattan, on *Desmodium acuminatum*, 30 Jul. 1884, W.A. Kellerman 585, BPI 435642; isolectotypes, MU 10493, NY 270695); syntypes: CUP 39659 (only July), NY 838298 (1 July, Kellerman s.n., marked as "type"); topotype collections distributed as Ellis & Everh., N. Amer. Fungi 1501] (Chupp 1954). The original specimen of *Hyalocercosporidium desmodii* was, unfortunately, not available for morphological examination and a dried culture specimen was prepared. The representative ex-type strain of *Hyalocercosporidium desmodii* formed a single-strain lineage in the phylogenetic analyses (Fig. 1, clade 57; Fig. 3, clade 21) and is closely related to *Dothistroma* and *Stromatoseptoria*. Morphologically, *Hyalocercosporidium desmodii* cannot be accommodated in *Dothistroma* or in *Stromatoseptoria*, since these genera have conidiogenous cells that proliferate percurrently and produce pigmented conidia (Quaedvlieg *et al.* 2013, Barnes *et al.* 2004).

Clade 58: *Stromatoseptoria*

Stromatoseptoria Quaedvlieg *et al.*, Stud. Mycol. 75: 353. 2013.

Description (from Quaedvlieg *et al.* 2013): Foliicolous, plant pathogenic. *Conidiomata* pycnidial, hypophyllous, subglobose to lenticular, very pale brown to dark brown, immersed to erumpent, exuding conidia in white cirrhus; ostiolum central, circular, surrounding cells concolorous; conidiomatal wall composed of a homogenous tissue of hyaline to very pale brown, angular to irregular cells. *Conidiophores* subcylindrical, branched, hyaline, septate. *Conidiogenous cells* hyaline, discrete or integrated, cylindrical or narrowly ampulliform, holoblastic, often also proliferating percurrently. *Conidia* solitary, cylindrical, slightly to distinctly curved, broadly rounded apex, attenuated towards a truncate base, transversely euseptate, mostly constricted at septa.

Type species: *Stromatoseptoria castaneicola* (Desm.) Quaedvlieg *et al.* (≡ *Septoria castaneicola* Desm.).

Stromatoseptoria castaneicola (Desm.) Quaedvlieg, Verkley & Crous, Stud. Mycol. 75: 353. 2013.
Basionym: *Septoria castaneicola* Desm., Ann. Sci. Nat., Bot., Sér. 3, 8: 26. 1847.

Description and illustration: Quaedvlieg *et al.* (2013).

Material examined: **France**, on leaves of *Castanea sativa*, Aug. and Sep. 1843, M. Roberge, 'Coll. Desmazières 1863, no. 8' (**holotype** PC 0084574). **Netherlands**, Utrecht, Baarn, near Lage Vuursche, on *Castanea sativa*, 29 Aug. 1999, G. Verkley, CBS H-21200, culture CBS 102322; Mook en Middelaar, St. Jansberg, on on *Castanea sativa*, 9 Sep. 1999, G. Verkley, No. 932, culture CBS 102377.

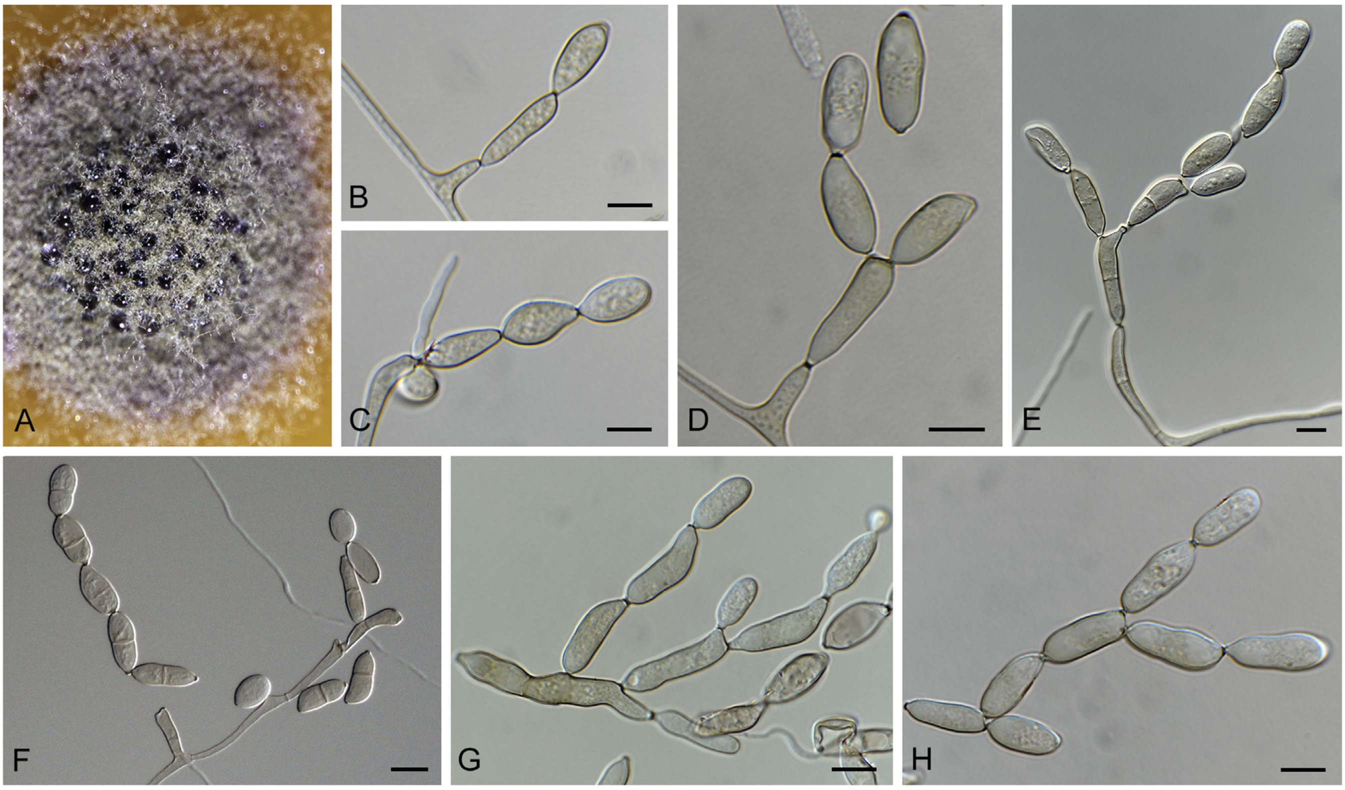


Fig. 31. *Fulvia fulva* (CPC 13652). **A–H.** Observations *in vitro*. **A.** Culture on V8. **B, D.** Conidiophore reduced to conidiogenous cell and catenate conidia. **C.** Conidiogenous cell and catenate conidia. **E, F.** Conidiophore and catenate conidia. **G, H.** Catenate conidia. Scale bars = 10 µm.

Notes: *Stromatoseptoria* is a monotypic genus that differs from *Septoria s. str.* by forming a stroma that gives rise to the conidiophores, by producing conidia that are olivaceous in mass and, although hyaline and smooth at first, become olivaceous and verruculose with age (Quaedvlieg *et al.* 2013). Phylogenetically, *Stromatoseptoria* clusters within the *Mycosphaerellaceae* in a clade well-supported by all three phylogenetic methods employed (Fig. 1, clade 58; Fig. 3, clade 22) and is closely related to *Dothistroma*.

Clade 59: *Fulvia*

Fulvia Cif., Atti Ist. Bot. Univ. Lab. Crittog. Pavia 10: 246. 1954.

Description (from Ellis 1971): *Colonies* effuse, velvety, buff to brown or purplish. *Stroma* present, pale, substomatal. *Conidiophores* macronematous, mononematous, caespitose, emerging through stomata, unbranched or occasionally branched, straight or flexuous, narrow at the base, thickening towards the apex, with unilateral nodose swellings which may proliferate as short lateral branchlets, very pale to mid pale brown or olivaceous brown, smooth. *Conidiogenous cells* mono- or polyblastic, integrated, terminal becoming intercalary, sympodial, clavate or cylindrical, cicatrized. *Conidia* catenate, chains frequently branched, acropleurogenous, simple, cylindrical with rounded ends or ellipsoidal, very pale to mid pale brown or olivaceous brown, smooth, 0–3-septate, hilum sometimes slightly protuberant.

Type species: *Fulvia fulva* (Cooke) Cif. (≡ *Cladosporium fulvum* Cooke).

Fulvia fulva (Cooke) Cif., Atti Ist. Bot. Univ. Lab. Crittog. Pavia 10: 245. 1954. Fig. 31.
Basionym: *Cladosporium fulvum* Cooke, Grevillea 12(61): 32. 1883.
Synonyms: *Mycovellosiella fulva* (Cooke) Arx, Proc. Kon. Ned. Akad. Wetensch., C86(1): 48. 1983.
Passalora fulva (Cooke) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser. 1: 453. 2003.

Description and illustrations: Ellis (1971).

Description in vitro (on SNA; CPC 13652): *Mycelium* composed of hyaline to pale brown hyphae, uniform in width, 2 µm diam. *Conidiophores* arising from hyphae, pale brown, smooth to rough, micro- or macronematous, multi-septate, simple or short branched, straight or sinuous, often strongly curved at the tip, 20–160 µm × 2.5–10 µm, variable in width, sometimes reduced to conidiogenous cell. *Conidiogenous cells* integrated, terminal and intercalary, proliferating sympodially, polyblastic, with rim-like conidiogenous loci that are darkened and thickened, 1–2.5 µm. *Conidia* catenate, often forming branched chains, ovoid, obovoid, ellipsoidal, sphaerical, cylindrical, straight or strongly curved, 10–30 × 5–10 µm, 1-4-septate, hila thickened and darkened, 1–2.5 µm diam.

Materials examined: **Cuba**, on leaves of *Solanum lycopersicum*, 2006, B. Summerell (**epitype** designated here: CBS H-22950, MBT378581, culture ex-epitype CBS 142314 = CPC 13652). **Netherlands**, unknown host, and collector, 1946, isol. CBS Practicum, culture CBS 119.46. **Switzerland**, fruit of *S. lycopersicum*, unknown collector, dep. L. Zobrist, 1946, culture CBS 120.46 = VKM F-3053. **USA**, South Carolina, Aiken, on *S. lycopersicum*, H.W. Ravenel, Fungi Amer. Exs. 599 (**lectotype,** designated here: BPI 426698, MBT378580; isolectotypes, Ravenel, Fungi Amer. Exs. 599, e.g. B, CUP, K, NEB).

Notes: The genus *Fulvia* is no longer considered a synonym of *Passalora* as a result of analysis of the type species, *Fulvia fulva* (≡ *Cladosporium fulvum* ≡ *Passalora fulva*), which was recollected and epitypified in this study. *Fulvia fulva* clusters close to *Stromatoseptoria* in the phylogenetic analyses (Fig. 1, clade 59; Fig. 3, clade 23). The single-gene trees indicate that both LSU

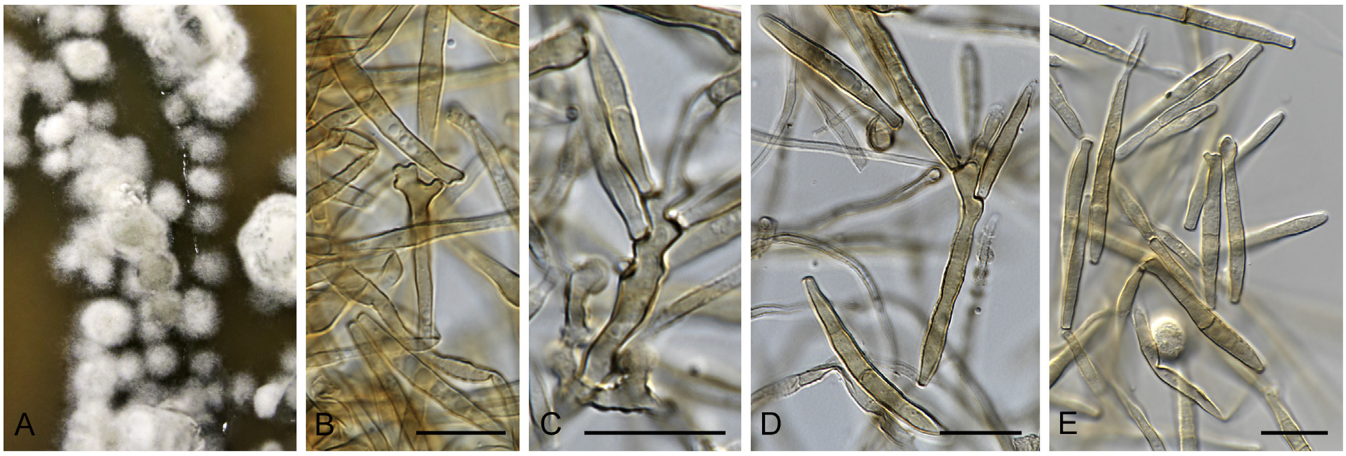


Fig. 32. *Ragnhildiana ampelopsidis* (CBS 249.67). **A–E.** Observations *in vitro*. **A.** Culture on V8. **B.** Partial conidiophore, conidiogenous cell and catenate conidia. **C.** Conidiogenous cell and conidia. **D, E.** Catenate conidia. Scale bars = 10 µm.

and ITS are able to distinguish this species but *rpb2* is more reliable. *Fulvia fulva* is the causal agent of tomato leaf mould, a disease that affects mostly the leaves of tomato but occasionally also stems, blossoms, petioles and fruit (Butler & Jones 1949, de Wit 1977, 1992, Jones *et al.* 1997). The interaction between *Fulvia fulva* and tomato is governed by a gene-for-gene relationship, a characteristic that made this organism an interesting model to study plant-pathogen interactions (de Wit 1981, 1992). The resistance of tomato against *Fulvia fulva* was genetically determined by the presence of *Cf* (*Cladosporium fulvum*) resistance genes of which now five have been cloned. Cf proteins mediate the recognition of effector proteins secreted by *Fulvia fulva* of which all encoding genes have been cloned (de Wit 2016). *Fulvia fulva* was once a devastating pathogen of tomato that required treatment with agrochemicals, but since various *Cf* genes from different wild *Solanum* species were introduced in commercial tomato cultivars by breeders the pathogen is now under control. Commercially grown tomato cultivars contain up to five different *Cf* genes (*Cf-2*, *Cf-4*, *Cf-4E*, *Cf-5* or *Cf-9*) (Thomma *et al.* 2005).

Clade 60: *Ragnhildiana*

Ragnhildiana Solheim, Mycologia 23: 402. 1931.

Description: Hyphomycetous, phytopathogenic. *Mycelium* internal and external, composed of hyaline to pigmented hyphae, branched, septate. *Stromata* lacking or developed, composed of brown pseudoparenchymatal cells. *Conidiophores* formed in fascicles, sometimes coremioid, emerging through stomata, through the epidermis, or single and arising from external hyphae, olivaceous to brown, septate, simple or branched, straight or geniculate-flexuous, sometimes reduced to conidiogenous cells. *Conidiogenous cells* integrated, terminal, mono- or polyblastic, with conidiogenous loci somewhat thickened and darkened. *Conidia* solitary or catenate, chains simple or branched, subhyaline to brown, ellipsoid-ovoid, subcylindrical-fusoid, or obclavate, aseptate to multi-septate, hila somewhat thickened and darkened.

Type species: *Ragnhildiana agerati* (F. Stevens) F. Stevens & Solheim (≡ *Cercospora agerati* F. Stevens) = *Ragnhildiana perfoliati* (Ellis & Everh.) U. Braun, C. Nakash., Videira & Crous

Ragnhildiana ampelopsidis (Peck) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822787. Fig. 32.

Basionym: *Cercospora ampelopsidis* Peck, Rep. (Annual) New York State Mus. Nat. Hist. 30: 55. 1877.
Synonyms: *Passalora ampelopsidis* (Peck) U. Braun, Trudy Bot. Inst. im. V.L. Komarova 20: 38. 1997.
Cercospora pustula Cooke, Grevillea 12: 30. 1883.
Cercospora psedericola Tehon, Mycologia 16: 139. 1924.

Descriptions and illustrations: Chupp (1954), Braun & Mel'nik (1997).

Description in vitro (on V8; CBS 249.67): *Mycelium* composed of hyaline to pale brown hyphae, smooth to verruculose, uniform in width, 1.5–2.5 µm. *Conidiophores* micro- or macronematous, pale olivaceous brown, smooth to verruculose, simple or branched, strongly geniculated at the apex, 70–160 × 2.5–4 µm. *Conidiogenous cells* terminal, subhyaline to pale olivaceous brown, smooth, strongly geniculated at the apex, proliferating sympodially, polyblastic, with conidiogenous loci thickened, darkened and protruding, 2 µm diam. *Conidia* solitary or catenate, in simple or branching chains, subhyaline to pale olivaceous brown, smooth, obovoid, clavate to obclavate, cylindrical, straight or slightly curved, (16–)27–33(–48) × (2.5–)3(–4) µm, 1–4-euseptate, hila thickened, darkened and protruding, 1.5–2 µm diam.

Materials examined: **Romania**, Simeria, on *Parthenocissus tricuspidata*, 6 May 1965, unkown collector, isol. O. Constantinescu, culture CBS 249.67 = IMI 124968. **USA,** New York, Albany, Bethlehem, on *Ampelopsis quinquefolia*, July, C.H. Peck (**holotype** NYS-F-000244).

Notes: Braun & Melnik (1997) examined the holotype specimen of *Cercospora ampelopsidis*, and noted that the conidiophores can occasionally form synnema-like fascicles [20–130 × 3.5–5(–7) µm], and the conidia are formed singly [(20–)30–60(–140) × 4–8 µm]. In culture (CBS 249.67), synnema-like conidiophores were not observed and conidia were catenate and smaller (Fig. 32). Phylogenetically, *Ragnhildiana ampelopsidis* clusters in the *Ragnhildiana* clade (Fig. 1, clade 60; Fig. 3, clade 24) as a single-strain lineage.

Ragnhildiana diffusa (Heald & F.A. Wolf) Videira & Crous, **comb. nov.** MycoBank MB822788.
Basionym: *Clasterosporium diffusum* Heald & F.A. Wolf, Mycologia 3: 21. 1911.
Synonym: *Cercospora fusca* F.V. Rand, J. Agric. Res. 1: 318. 1914, nom. nov., non *C. diffusa* Ellis & Everh., 1888.

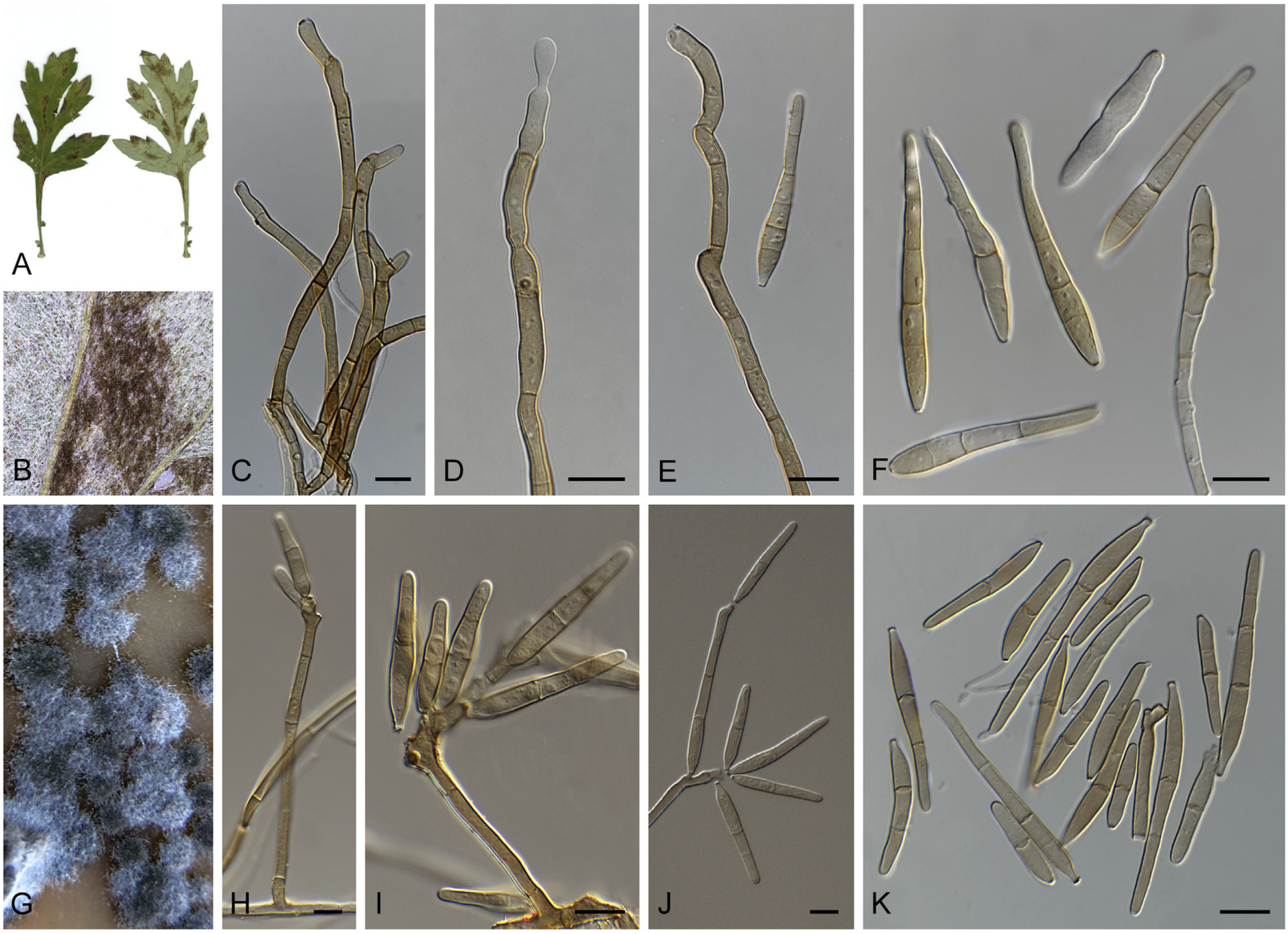


Fig. 33. *Ragnhildiana ferruginea* (CPC 10075). **A–F.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Conidiophores. **D, E.** Partial conidiophore, conidiogenous cell and conidium. **F.** Conidia. **G–K.** Observations *in vitro*. **G.** Culture on V8. **H, I.** Conidiophore, conidiogenous cell and conidia. **J.** Partial conidiogenous cell with single and catenate conidia. **K.** Single conidia. Scale bars = 10 µm.

Sirosporium diffusum (Heald & F.A. Wolf) Deighton, in Ellis, More Dematiaceous Hyphomycetes: 299. 1976.

Descriptions and illustrations: Chupp (1954), Ellis (1976), Poletto *et al.* (2017).

Material examined: **USA**, Georgia, Baconton, on *Carya illlinoinensis*, 29 Aug. 1911, dep. F.V. Rand, culture CBS 106.14; Texas, Gonzales, on *Carya illinoinensis*, 10 Sep. 1909, F.D. Heald & F.F. Wolf 2695 (**holotype** of *Clasterosporium diffusum* [≡ *Cercospora fusca*], BPI 436535; isotypes CUP 3946, NEB 47510).

Notes: This pathogen is reported to cause reddish brown angular to round spots on leaves of *Carya* spp. in Cuba, Malawi, Mexico, Mozambique, South Africa, USA, and Venezuela (Ellis 1976, Crous & Braun 2003). It has recently been reported from Brazil (Poletto *et al.* 2017) where it was freshly collected from the same host and examined morphologically and genetically. Both the ITS and *tef1-α* sequences were identical to the respective sequences of *Sirosporium diffusum* (CBS 106.14). This culture is an authentic representative of *Cercospora fusca*, isolated in pure culture by F.V. Rand, on 29 Aug. 1911, from *Carya illinoinensis* in Baconton, Georgia, USA (Rand 1914). Although this isolate was never observed sporulating in culture, the specimen it was isolated from was compared to the type of *Clasterosporium diffusum* (basionym to the current name *Ragnhildiana diffusa*) and considered identical (Rand 1914). Morphologically, the description based on the Brazilian isolate fits well with the published description. Phylogenetically, this strain clusters among *Ragnhildiana* isolates (Fig. 1, clade 60; Fig. 3, clade 24) that produce catenate conidia, while *Sirosporium diffusum* produces solitary conidia that are very long and sometimes slightly constricted at the septa. The phylogenetic position of the type species of *Sirosporium*, *Sirosporium antenniforme*, is still undetermined (see section Genera of the *Mycosphaerellaceae* below).

Ragnhildiana ferruginea (Fuckel) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822791. Fig. 33.

Basionym: *Cercospora ferruginea* Fuckel, Hedwigia 2(15): 134. 1863 and Fuckel, Fungi Rhen. Exs., Fasc. II: no. 120. 1863.

Synonyms: *Mycovellosiella ferruginea* (Fuckel) Deighton, Mycol. Pap. 144: 14. 1979.

Passalora ferruginea (Fuckel) U. Braun & Crous, CBS Biodiversity Ser.: 183. 2003.

Cercospora olivacea G.H. Otth, Mitth. Naturf. Ges. Bern 654-683 (1868): 65. 1869.

Helminthosporium absinthii Peck, Rep. (Annual) New York State Mus. Nat. Hist. 30: 54. 1878.

Cercospora absinthii (Peck) Sacc., Syll. Fung. 4: 444. 1886.

Ramularia absinthii Laubert, Centralbl. Bacteriol., 2. Abt., 52: 242. 1920.

Cercosporidium artemisiae Sawada, Rep. Gov. Agric. Res. Inst. Taiwan 86: 164. 1943 (*nom. inval.*).

Descriptions and illustrations: Deighton (1979), Shin & Kim (2001).

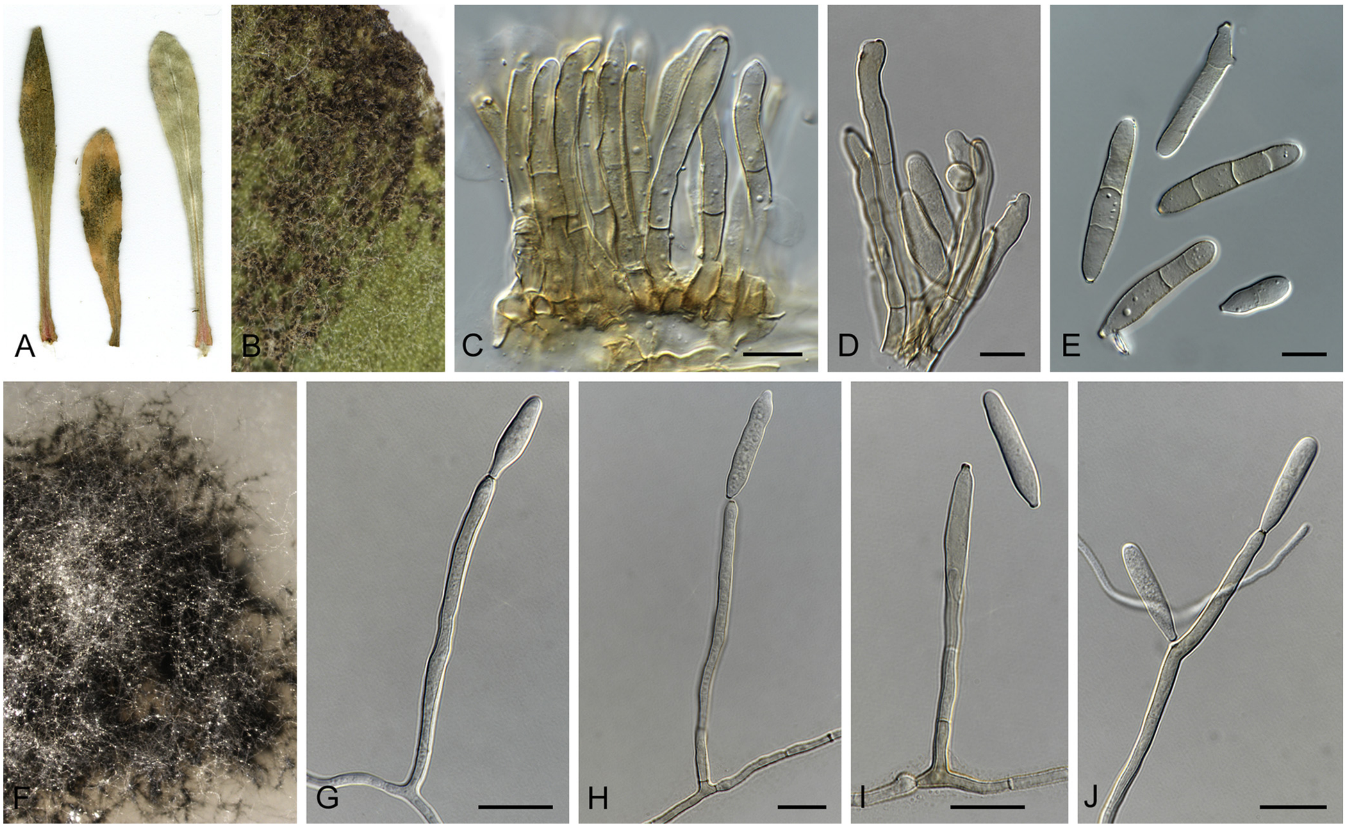


Fig. 34. *Ragnhildiana gnaphaliacea* (CPC 12517). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Conidiophores. **D.** Conidiophores, conidiogenous cells and conidia. **E.** Catenate conidia and single conidia. **F–J.** Observations *in vitro*. **F.** Culture on OA. **G–I.** Conidiophore, conidiogenous cell and conidia. **J.** Partial conidiophore, conidiogenous cell and conidia. Scale bars = 10 µm.

Description in vitro (on V8; CBS 546.71): *Mycelium* composed of hyaline to brown hyphae, smooth to rough, uniform in width, 2–3 µm. *Conidiophores* micro- or macronematous, pale brown to brown, smooth to faintly verruculose, simple or branched, straight to sinuous, sometimes geniculate-sinuous at the apex, 5–200 × 2.5–5 µm. *Conidiogenous cells* terminal or intercalary, subhyaline to brown, smooth, geniculate to geniculate-sinuous, proliferating sympodially, polyblastic, with conidiogenous loci thickened, darkened and protruding, 1.5–2 µm diam. *Conidia* solitary, ocasionally catenate in simple chains, subhyaline to brown, smooth, obovoid, long-obclavate, cylindrical, base long-obconically truncate, apex rounded, straight to mildly curved, 20–75 × 2.5–5 µm, 0–5-euseptate, hila thickened, darkened and protruding, 1.5–2 µm diam.

Materials examined: **Germany**, Altersand vs. Hostrichiam (Nassau, Oestrich), on *Artemisia vulgaris*, 1863, Fuckel, Fungi Rhen. Exs. 120 (**lectotype**, designated here, MBT378582, HAL; isolectotypes, Fuckel, Fungi Rhen. Exs. 120, e.g. BPI 436287, F-C0003573F, FH-01012187, G, S F199142, 267462). **Romania**, Bucuresti, on *Artemisia vulgaris*, unknown collector, isol. O. Constantinescu, 6 Apr. 1965, CBS H-9838, culture CBS 255.67 = IMI 124973; unknown host and collector, isol. O. Constantinescu, 20 Jul. 1970, CBS H-9839, culture CBS 546.71. **Republic of Korea**, Pochon, on *Artemisia sylvatica*, 23 Oct. 2002, H.D. Shin, cultures CPC 10014, CPC 10075.

Notes: *Ragnhildiana ferruginea* has a worldwide distribution on hosts from the genera *Ambrosia* and *Artemisia* (*Asteraceae*) (Crous & Braun 2003). It produces mostly single conidia and only rarely catenate conidia in short unbranched chains (Fig. 33) (Shin & Kim 2001). Based on the phylogenetic analyses, *Ragnhildiana ferruginea* clusters among *Ragnhildiana* species (Fig. 1, clade 60; Fig. 3, clade 24) in a well-supported clade. Based on a BLAST comparison against the alignment, *Ragnhildiana ferruginea* CBS 546.71 shared 93 % (441/474) similarity based on ITS and 90 % (674/750) similarity based on *rpb2* with *Ragnhildiana ampelopsidis* CBS 249.67. In addition, it shared only 85 % (664/780) similarity with *Ragnhildiana perfoliati* CBS 125419 based on *rpb2*.

Ragnhildiana gnaphaliacea (Cooke) Videira, H.D. Shin, C. Nakash. & Crous, **comb. nov.** MB822795. Fig. 34.
Basionym: *Cercospora gnaphaliacea* Cooke, J. Linn. Soc., Bot. 17: 142. 1880.
Synonyms: *Phaeoisariopsis gnaphaliacea* (Cooke) Morgan-Jones, Canad. J. Bot. 52: 2635. 1974.
Passalora gnaphaliacea (Cooke) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser.: 201. 2003.
Cercospora gnaphalii Harkn., Bull. Calif. Acad. Sci. Bull. 1: 38. 1884.

Description in vivo (CBS H-22952): *Leaf spots* yellowish to brownish, without definite margin, subcircular to irregular, 3–20 mm. *Mycelium* internal and external, composed of pale brown to brown hyphae that are septate and smooth to verruculose. *Stromata* hypophyllous epidermal, submerged, stomatal or erumpent from epidermal cells, small composed of few brown cells to well-developed, pale to dark brown, up to 180 µm diam. *Conidiophores* solitary to densely fasciculate, emerging from stromata, brown to pale brown, paler towards apex, smooth to verruculose, straight to sinuous-geniculate, simple or branched, 46–75(–240) × 4–6.5 µm. *Conidiogenous cells* terminal and intercalary, polyblastic, proliferating sympodially, with rim-like conidiogenous loci, thickened and darkened, 2–2.5 µm diam. *Conidia* solitary or rarely catenate, hyaline to pale olivaceous brown, obovoid, cylindrical, straight or mildly curved, base obconicaly truncate, apex rounded, 18–70 × 6–10 µm, 0–4-

euseptate, occasionally constricted at the septa, hila thickened and darkened.

Description in vitro (on SNA; CPC 12517): *Mycelium* hyaline to olivaceous brown, smooth to verruculose. *Conidiophores* macronematous, hyaline to pale brown, simple, septate, cylindrical, straight to slightly curved, 30–88 × 2.5–3 µm. *Conidiogenous cells* integrated, terminal or intercalary, monoblastic, cylindrical, conically truncate at the apex or geniculate-sinuous, determinate or proliferating sympodially, with conidiogenous locus thickened and darkened, located on the shoulder or at the apex, 1.5–2.5 µm diam. *Conidia* solitary, hyaline to pale brown, smooth to verruculose, long-obovoid, cylindrical to long-obclavate, base obconically truncate, apex rounded, straight to slightly curved, 20–75 × 2.5–5 µm, 0–5-euseptate, sometimes mildly constricted at septa, hila thickened and darkened, 1.5–2.5 µm diam.

Materials examined: **Republic of Korea**, Jeju, on *Gnaphalium affine*, May 2005, H.D. Shin, CBS H-22952, culture CBS 142181 = CPC 12517; *idem*., cultures CPC 10882, CPC 10883. **USA**, Texas, Houston, *Gnaphalium* sp., 17 Apr. 1869, H.W. Ravenel 283 (**lectotype** designated here BPI 436721, MycoBank MBT378599).

Notes: This is the first report of *Ragnhildiana gnaphaliacea* in Korea (based on Crous & Braun 2003, Shin & Kim 2001 and https://nt.ars-grin.gov/fungaldatabases/). Morphologically, the observed isolate description *in vivo* varies slightly from the one available in literature by producing longer conidiophores (60–90 × 4–5 µm; Morgan-Jones 1974) and shorter conidia [40–65 × 4–5 µm, (2–)3(–5)-septate; Morgan-Jones 1974] (Fig. 34). Phylogenetically, it clusters in the *Ragnhildiana* clade (Fig. 1, clade 60; Fig. 3, clade 24).

Ragnhildiana perfoliati (Ellis & Everh.) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822824.
Basionym: *Cercospora perfoliati* Ellis & Everh., J. Mycol. 5: 71. 1889.
Synonyms: *Cercospora agerati* F. Stevens, Bull. Bern. Bishop Mus. 19: 154. 1925.
Ragnhildiana agerati (F. Stevens) F. Stevens & Solheim, Mycologia 23: 402. 1931.
Cercospora assamensis S. Chowdhury, Lloydia 20(2): 134. 1957.
Passalora perfoliati (Ellis & Everh.) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser. 1: 314. 2003.
Passalora assamensis (S. Chowdhury) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser. 1: 69. 2003.
Passalora ageratinae Crous & A.R. Wood, Stud. Mycol. 64: 34. 2009.

Description and illustrations: Crous *et al.* (2009c).

Description in vitro (on V8; CBS 125419): *Mycelium* hyaline to brown, smooth, uniform in width, 2.5–3 µm diam. *Conidiophores* micro- to macronematous, cylindrical, subhyaline to brown, smooth, uniform in width, straight to slightly curved, simple, 25–150 × 2.5–5 µm. *Conidiogenous cells* integrated, apical, mostly monoblastic but sometimes polyblastic, usually determinate but occasionally proliferating sympodially, conically truncate at the apex, with conidiogenous loci slightly but clearly thickened loci at the apex, 2–2.5 µm diam. *Conidia* catenate, in simple chains, rarely in branched chains, hyaline to brown, smooth to verruculose, variable in shape, long-obovoid, cylindrical to long-obclavate, straight to curved, base and apex short- to medium-obconically truncate in intermediate conidia, apex rounded in terminal conidia, 20–80 × 2.5–5 µm, 0–5-euseptate, ocasionally constricted at septa, hila thickened, darkened and refractive, 2–2.5 µm diam. Strain CPC 15366 on V8 agar produces *conidiophores* that often form synnematous fascicles and are longer, 10–300 × 2.2–6 µm. Strain CPC 17321 on V8 agar produces conidiophores that are finely verruculose, longer and wider, 20–275 × 2.5–7.5 µm, and wider conidia 26–70 × 3–7.5 µm.

Materials examined: **Guatemala**, on *Ageratina adenophora*, unknown date, M.J. Morris, MJM 1506, dep. A. den Breeÿen, culture CBS 113613 = MJM 1506 = C486. **Laos**, Luang Prabang, on *Chromolaena odorata*, 17 Jun. 2006, P. Pheng, NOUL P101, culture CBS 142180 = CPC 17321. **New Zealand**, Cmoromandel, Thames, on *Ageratina adenophora*, unknown collector and date, isol. CF Hill, MAFF, Auckland, Feb. 2004, culture CBS 115119. **South Africa**, KwaZulu-Natal Province, Hilton, on leaves of *Ageratina adenophora*, 28 May 2008, A.R. Wood (**holotype** of *Passalora ageratinae* CBS H-20336, ex-type culture CBS 125419 = CPC 15365); *idem*. CPC 15366, CPC 15367.

Notes: *Ragnhildiana* was reduced to synonymy with *Mycovellosiella* by Muntañola (1960), and later both genera were placed in synonymy with *Passalora* by Crous & Braun (2003). With the recollection of the type species of *Passalora*, *Passalora bacilligera*, these three genera were found to be phylogenetically distinct, and hence the name *Ragnhildiana* is resurrected for this clade of passalora-like fungi. The type of *Ragnhildiana*, *Ragnhildiana agerati* was described from *Ageratum conyzoides* in Hawaii (syntype: ILL00010589, lectotype: ILL00010590). *Passalora ageratinae* was described from the host *Ageratina adenophora* from Mexico, and was transported into Hawaii, Australia and South Africa in association with a stem galling fly that was introduced as biocontrol agent for the invasive weed *Ageratina adenophora* (Dodd 1961, Morris 1989, Wang *et al.* 1997, Zhu *et al.* 2007, Muniappan *et al.* 2009). *Passalora ageratinae*, is similar to "*Passalora*" *assamensis*, except for the amphigenous nature of the colonies, the absence of external mycelium and the production of shorter conidiophores. Type material of "*Passalora*" *assamensis* was not available for re-examination but other specimens from the same location and host (India, Nepal, *Ageratina adenophora*) were examined and found to be compatible with the description (Crous & Braun 2003). Based on the phylogenetic analyses, the available strains cluster together in a clade that has a well supported basal branch (Fig. 3, clade 24) and is included in the *Ragnhildiana* clade (Fig. 1, clade 60). In addition, using a BLAST comparison against the alignment, "*Passalora*" *assamensis* CBS 115119 shares 99 % (469/475) similarity on ITS and 99 % (656/657) similarity on *rpb2* with "*Passalora*" *ageratinae* CBS 125419. The morphological description of "*Passalora*" *perfoliati* is also similar to that of "*Passalora*" *ageratinae* and, based on a BLAST comparison against the alignment, "*Passalora*" *perfoliati* CPC 17321 shares 99 % (468/475) similarity on ITS and 100 % (780/780) similarity on *rpb2* with "*Passalora*" *ageratinae* CBS 125419. Therefore, we consider them all to be synonyms.

Ragnhildiana pseudotithoniae (Crous & Cheew.) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822797.
Basionym: *Passalora pseudotithoniae* Crous & Cheew., Persoonia 31: 261. 2013.

Description and illustration: Crous *et al.* (2013b).

Description (from Crous *et al.* 2013b): *Leaf spots* amphigenous, brown, angular, confined by leaf veins, 2–5 mm diam. *Conidiophores* amphigenous, fasciculate, 40–100 µm tall, 3–4 µm wide, straight to geniculate-sinuous, mostly unbranched, subcylindrical, 1–3-septate, brown, smooth to finely verruculose, arising from a weakly developed brown stroma, up to 50 µm wide and 60 µm tall. *Conidiogenous cells* integrated, brown, smooth to finely verruculose, terminal, subcylindrical to once geniculate, 15–35 × 3–4.5 µm, with thickened and darkened loci, 2 µm diam, mostly solitary and terminal, but also lateral on conidiogenous cells. *Conidia* occurring in long branched chains, brown, granular, smooth, subcylindrical to narrowly obclavate, (30–)40–65(–130) × (4–)5(–5.5) µm, 1–6-septate, apex obtuse to truncate, base obconically truncate, thickened and darkened, 2 µm diam.

Materials examined: **Thailand**, N18°09′24.8″ E98°23′19.6″, Royal Project, on leaves of *Tithonia diversifolia* (*Asteraceae*), 5 Nov. 2012, P.W. Crous (**holotype** CBS H-21453, ex-type culture CBS 136442 = CPC 21688).

Notes: Phylogenetically, *Ragnhildiana pseudotithonia* clusters in the *Ragnhildiana* clade (Fig. 1, clade 60; Fig. 3, clade 24) in a single-strain lineage. One other species has been recently described from the same host but originary from Brazil, *Passalora stromatica* (Fernandes *et al.* 2013). Based on a BLAST comparison against the alignment, the ITS sequence of *Passalora stromatica* GenBank KF275128 was closest to *Ragnhildiana pseudotithonia* CBS 136442, with which it shared 96 % (467/484) similarity, including 2 % (10/484) gaps. Based on the morphological and DNA differences, these are not the same species.

Clade 61: *Phaeoramularia*

Phaeoramularia Munt.-Cvetk., Lilloa 30: 182. 1960.

Description (from Braun 1998): Phytopathogenic, usually forming leaf spots, occasionally almost symptomless. *Mycelium* internal, composed of subhyaline to pigmented hyphae, septate, branched, smooth to rough. *Stromata* almost absent to well-developed, pigmented. *Conidiophores* macronematous, mononematous, in small to large fascicles, rarely solitary, arising from internal hyphae or stromata, emerging through stomata or erumpent through the cuticle, erect, straight, subcylindrical to flexuous, geniculate-sinuous, simple, rarely branched, continuous to septate, pale yellowish green, olivaceous to brown, smooth to rough, thin-walled. *Conidiogenous cells* integrated, terminal, occasionally intercalary, sometimes conidiophores reduced to a single conidiogenous cell, polyblastic, proliferation sympodial, rarely percurrent, conidiogenous loci thickened and darkened. *Conidia* catenate, sometimes in branched chains, ellipsoid-ovoid, subcylindrical, fusiform, continuous to euseptate, subhyaline to pigmented, smooth to rough, ends obtuse, truncate or subacute; hila thickened and darkened; conidial secession schizolytic.

Type species: *Phaeoramularia gomphrenicola* (Speg.) Munt.-Cvetk. (≡ *Cercospora gomphrenicola* Speg.).

Phaeoramularia capsicicola (Vassiljevsky) Deighton, More Dematiaceous Hyphomycetes: 323. 1976.
Basionym: *Cercospora capsicicola* Vassiljevsky, Fungi imperfecti Parasitici. I. Hyphomycetes: 344. 1937.
Synonyms: *Cercospora capsici* É.J. Marchal & Steyaert, Bull. Soc. Roy. Bot. Belgique 61: 167. 1929.
Cladosporium capsici Kovatsch., Z. Pflanzenkrankh. Pflanzenschutz 48(7): 335. 1938.
Cercospora unamunoi Castell., Rivista Agric. Subtrop. Trop. 42: 20. 1948.
Passalora capsicicola (Vassiljevsky) U. Braun & F.O. Freire, Cryptog. Mycol. 23: 299. 2002.
For additional synonyms see Crous & Braun (2003).

Descriptions and illustrations: Kovachevsky (1939), Muntañola (1954), Ellis (1976), Deighton (1976b).

Materials examined: **Italy**, on *Capsicum annuum*, unknown collector and date, dep. A. Matta, 1962, culture CBS 156.62. **Jamaica**, on *Chromolaena odorata*, 2006?, coll. M.J. Morris, dep. A. den Breeÿen, culture CBS 113384 = C499. **USA**, on *C. odorata*, 2006?, coll. M.J. Morris, dep. A. den Breeÿen, culture CBS 113382 = C460.

Notes: In August 2011, the occurrence of *Passalora capsicicola*, the causal agent of a foliar disease on sweet pepper, was reported for the first time in Austria but unfortunately no DNA was extracted (Bedlan *et al.* 2012). The species *Passalora capsicicola* is reported to infect hosts of *Capsicum* sp. (*Solanaceae*) in tropical and subtropical countries including the USA, Brazil, Romania, Tanzania, China and many others (Crous & Braun 2003). The strains CBS 113384 and CBS 113382 were not described due to the cultures being sterile and the herbarium specimens not being preserved (Den Breeÿen *et al.* 2006). There is no previous report of *Passalora capsicicola* being isolated from the host *Chromolaena odorata* (*Asteraceae*) (Farr & Rossman, retrieved June 22, 2017, from https://nt.ars-grin.gov/fungaldatabases/). The strain CBS 156.62, identified as *Passalora capsicicola*, was also sterile in culture and the herbarium specimen could not be traced. Based on the phylogenetic analysis, *Passalora capsicicola* clusters in the *Phaeoramularia* clade (Fig. 1, clade 61; Fig. 3, clade 25) in a well supported clade. In addition, based on a BLAST comparison against the alignment, CBS 148.38 shared 99 % (465/472) similarity on ITS and 92 % (587/639) similarity on *rpb2* with *Phaeoramularia gomphrenicola* CPC 23248.

Phaeoramularia gomphrenicola (Speg.) Munt.-Cvetk., Lilloa 30: 209. 1960. Fig. 35.
Basionym: *Cercospora gomphrenicola* Speg., An. Soc. Cient. Argent. 13(1): 29. 1882.

Description in vivo (CBS H-22954): *Mycelium* internal, composed of hyaline to pale brown hyphae, smooth to finely verruculose. *Stromata* hypophyllous, epidermal, stomatal, brown to reddish brown, small to well-developed, 20–50 µm diam. *Conidiophores* emerging from upper part of stromata in dense fascicles, pale brown to brown, smooth to finely verruculose, straight to sinuous, simple or occasionally branched, 25–125(–200) × 5–7.5 µm. *Conidiogenous cells* integrated, terminal or intercalary, pale brown, smooth to finely verruculose, mono- or polyblastic, proliferating sympodially, with rim-like conidiogenous loci that are thickened and darkened, 2–2.5 µm diam. *Conidia* catenate, in simple or branched chains, with microcyclic conidiation, pale brown, smooth to finely verruculose, obclavate to cylindrical, base obconically truncate, apex conically truncated in intercalary conidia and rounded in terminal conidia, 20–75 × 5–7.5 µm, (0–)1–3(–4)-septate, hila thickened and darkened, 2–2.5 µm diam.

Description in vitro (on V8; CPC 23248): *Mycelium* composed of hyaline to olivaceous brown hyphae, smooth to finely verruculose, often constricted at septa, irregular in width, 2.5–7.5 µm. *Conidiophores* micro- or macronematous, pale brown to pale olivaceous brown, smooth to finely verruculose, constricted at septa, simple or branched, straight or mildly sinuous, 50–250 × 2.5–7.5 µm. *Conidiogenous cells* integrated, terminal or intercalary, smooth to finely verruculose, mono- or polyblastic, proliferating sympodially, conically truncate at the apex or geniculate-sinuous, with rim-like conidiogenous loci that are slightly thickened and darkened, 2–2.5 µm diam. *Conidia* catenate in simple chains, rarely in branched chains, pale to pale olivaceous brown, smooth to finely verruculose, obovate, allantoid, cylindrical, base obconically truncate, apex conically truncate in intermediate

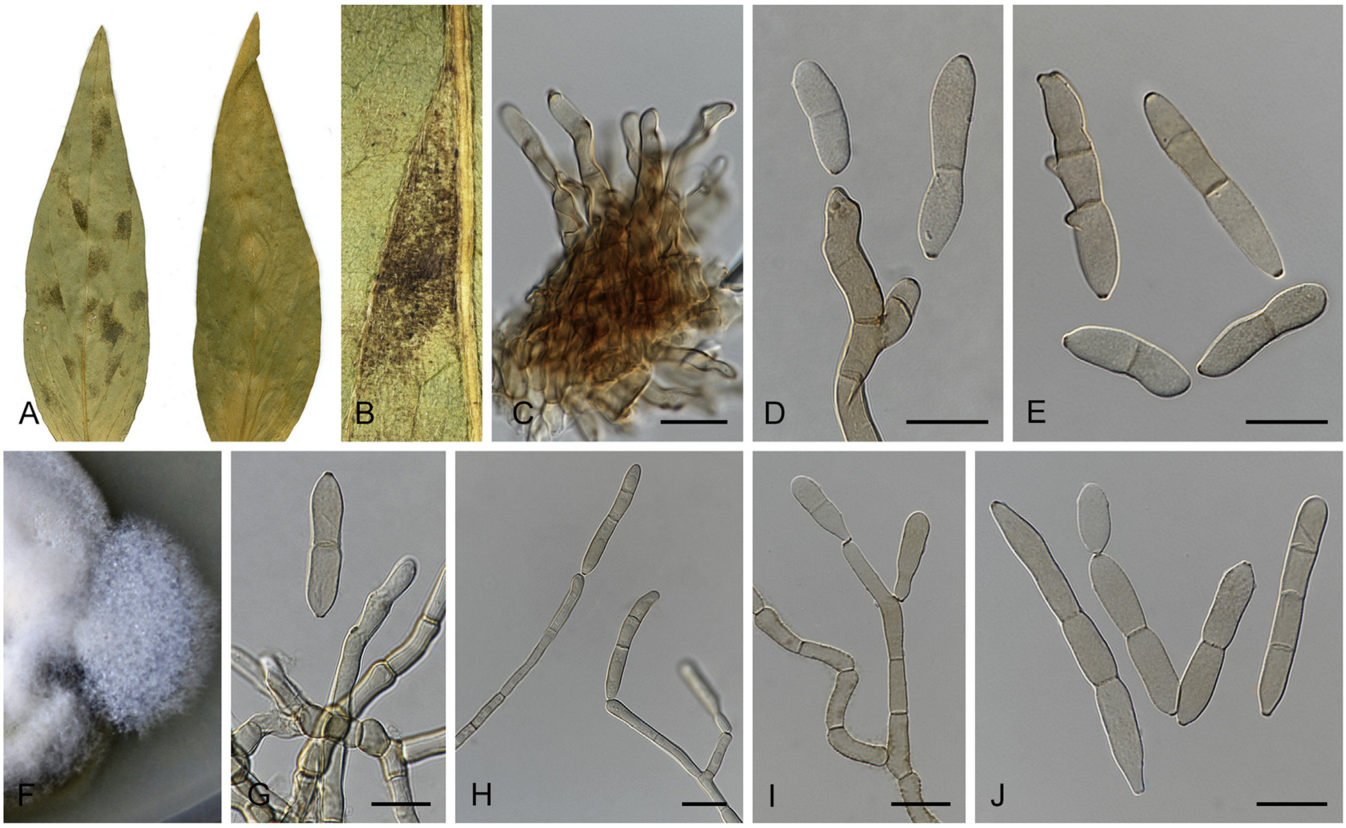


Fig. 35. *Phaeoramularia gomphrenicola* (CPC 23248). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Conidiophores. **D.** Partial conidiophore, conidiogenous cells and conidia. **E.** Catenate conidia. **F–J.** Observations *in vitro*. **F.** Culture on OA. **G–I.** Partial conidiophore, conidiogenous cell and conidia. **J.** Single and catenate conidia. Scale bars = 10 µm.

conidia and rounded in terminal conidia, irregular in width, 18–125 × 3.5–5 µm, 0–4-septate, occasionally constricted at septa, hila slightly thickened and darkened, 2–2.5 µm diam.

Material examined: **Argentina**, Buenos Aires, Palermo, on *Pfaffia glomerata* (as *Gomphrena glauca*), Feb. 1881, C. Spegazzini (**holotype** LPS 914; **isotypes** Speg., Hongos Sud-Amer., Dec. Mycol. Argent. 45, e.g. BPI 436740, 722393, FH, PAD, PDD 25866; IMI 7706, slide ex holotype). **Brazil,** Minas Gerais, Viçosa, on *P. glomerata*, 29 Oct. 2012, R.W. Barreto (**epitype** designated here: CBS H-22954, MBT378603, ex-epitype culture CBS 142182 = CPC 23248 = COAD570); *idem*., culture CPC 23249 = COAD571.

Notes: *Phaeoramularia* resembles *Ramularia* by producing catenate conidia but differs by producing pigmented conidiophores and conidia (Braun 1998). In addition, the conidiogenous loci are thickened and rim-like and not coronate. This genus is no longer considered a synonym of *Passalora* since the type, *Phaeoramularia gomphrenicola* (Fig. 1, clade 61), clusters apart from the type of *Passalora*, *Passalora bacilligera* (Fig. 1, clade 34). Phylogenetically, *Phaeoramularia* clusters in a clade well-supported by all three phylogenetic methods (Fig. 1, clade 61, Fig. 3, clade 25) and is closely related to *Ragnhildiana*. Morphologically, it can be distinguished from *Ragnhildiana* by forming broader conidiophores and conidia, and its conidia can generate new conidia from any segment (Fig. 35). The single-gene trees indicate that both LSU and ITS can distinguish this genus but *rpb2* is more reliable. The previously applied phaeoramularioid habit, i.e. internal mycelium *in vivo*, fasciculate conidiophores and catenate conidia, is not diagnostic any longer since species with this morphology belong to different clades within the *Mycosphaerellaceae*. Therefore, phylogenetically unproven species should tentatively be maintained in *Passalora s. lat.*

Clade 62: *Deightonomyces*

Deightonomyces Videira & Crous, **gen. nov.** MycoBank MB822586.

Etymology: Name composed of Deighton (F.C. Deighton, British mycologist and pioneer of modern taxonomy of cercosporoid fungi) and -myces (fungus).

Description: *Mycelium* immersed, hyphae pigmented. *Stromata* immersed, composed of brown, thick-walled hyphal cells. *Conidiophores* in dense fascicles, arising from stromata, olivaceous brown, smooth, simple, straight, subcylindrical, slightly geniculate-sinuous. *Conidiogenous cells* terminal, subhyaline to pale olivaceous, smooth, proliferating sympodially, conidiogenous loci conspicuous, slightly thickened and darkened. *Conidia* solitary, ellipsoid-ovoid, obclavate-fusiform, subcylindrical, aseptate or septate, subhyaline to pale olivaceous, smooth to verruculose, apex obtuse or subacute, base obconically truncate, hila hardly thickened and somewhat darkened.

Type species: *Deightonomyces daleae* (Ellis & Kellerm.) Videira & Crous (≡ *Cercospora daleae* Ellis & Kellerm.).

Deightonomyces daleae (Ellis & Kellerm.) Videira & Crous, **comb. nov.** MycoBank MB822753.
Basionym: *Cercospora daleae* Ellis & Kellerm., J. Mycol. 4: 6. 1888.
Synonym: *Passalora daleae* (Ellis & Kellerm.) U. Braun, Sydowia 48: 208. 1996.

Description and illustration: Braun (1996).

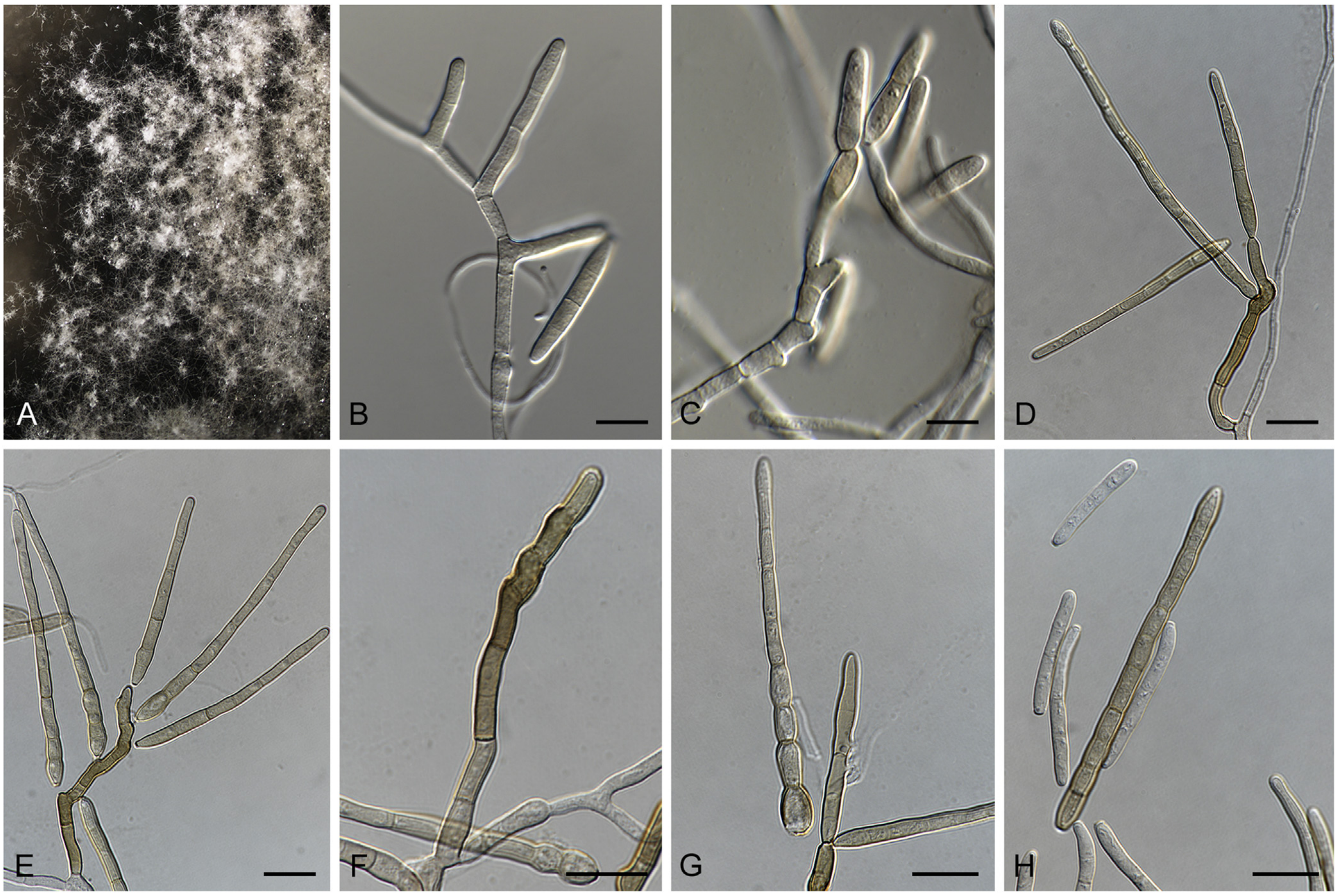


Fig. 36. *Pleopassalora perplexa* (CPC 12168). **A–H.** Observations *in vitro*. **A.** Culture on OA. **B, C.** Conidiophore and conidia type II. **D, E.** Conidiophore and conidia type I. **F.** Conidiophore type I. **G.** Conidia type I, slightly constricted at the septa and swollen cells at the base, and type II, smaller and narrower. **H.** Conidia type I and type II. Scale bars = 10 µm.

Materials examined: **Mexico**, Baja California Norte, Catarina, on bark of *Dalea spinosa*, Apr. 2003, L.B. Sparrius, isol. Aptroot, 2003, culture CBS 113031. **USA**, Kansas, on stems of *Dalea enneandra* (= *Dalea laxiflora*), 10 Dec. 1887, Kellerman 954 (**holotype** NY00838299).

Notes: The strain of *Passalora daleae* used in this study forms a single-strain lineage in the phylogenetic analyses (Fig. 1, clade 62; Fig. 4, clade 26). Both morphologically and phylogenetically, this species is not a true *Passalora* as circumscribed in this study, and therefore a new genus is introduced to accommodate it. When blasted against the individual gene alignments, *Deightonomyces daleae* CBS 113301 shares 98 % (465/474) similarity with *Dothistroma pini* CBS 116486 on ITS, 99 % (724/726) similarity with *Dothistroma septosporum* CBS 128282 on LSU, and only 81 % (633/784) similarity with *Phaeoramularia* sp. CBS 113382 on *rpb2*.

Clade 63: *Pleopassalora*

Pleopassalora Videira & Crous, **gen. nov.** MycoBank MB822608.

Etymology: Named after its pleomorphic morphology (Greek pleon = more), and its resemblance to *Passalora*.

Description (adapted from Beilharz *et al.* 2004): Pleoanamorphic, phytopathogenic, causing leaf spots. *Mycelium* internal, hyphae smooth, branched, septate, brown. *Stromata* medium brown, erumpent, protuberant and pulvinate, composed of *textura angularis*. *Conidiomata* amphigenous, eustromatic, bearing Type 1 conidiophores and conidia, Type 2 conidiophores and conidia, or both. Type 1 synasexual morph: *Conidiophores* occasionally solitary, usually in fascicles arising from stromata, pale to medium brown, smooth to rugose, subcylindrical, branched or unbranched, walls slightly thickened, straight to variously curved or geniculate-sinuous, septate. *Conidiogenous cells* terminal, verruculose or rugose, unbranched, subcylindrical, tapering to rounded apices proliferating sympodially, conidiogenous loci slightly thickened and darkened, refractive, flat or sometimes protuberant. *Conidia* solitary, pale olivaceous, dry, smooth, rarely finely verruculose, straight or curved, narrowly obclavate to subcylindrical, tapering gradually to an obtuse apex and to a rounded base, often constricted at one or more septa, hila slightly but distinctly thickened, darkened and refractive. Type 2 synasexual morph: *Conidiophores* reduced, hyaline to sub-hyaline, aseptate or 1-septate, lining a stroma. *Conidia* hyaline to pale olivaceous, cylindrical, rounded at the apex, truncate at the base, smooth, aseptate to 3-septate, occasionally constricted at septa, hila broad, truncate to slightly convex, not darkened, unthickened, non-refractive. Type 3 synasexual morph: Type 2 conidia develop thick-walled hyphal swellings (reminiscent of chlamydospores), ellipsoid and hyaline, aseptate to 1-septate, that burst free from the cells of the Type 2 conidia, frequently carrying remnants of the conidial wall attached to their hyaline walls.

Type species: *Pleopassalora perplexa* (Beilharz *et al.*) Videira & Crous (≡ *Passalora perplexa* Beilharz *et al.*).

Pleopassalora perplexa (Beilharz *et al.*) Videira & Crous, **comb. nov.** MycoBank MB822776. Fig. 36.

Basionym: *Passalora perplexa* Beilharz *et al.*, Stud. Mycol. 50: 473. 2004.

Description and illustrations: Beilharz *et al.* (2004).

Materials examined: **Indonesia,** South Sumatra, Kerinci, on *Acacia crassicarpa*, Feb. 2004, M.J. Wingfield (**holotype** CBS H-9907, culture ex-type CBS 116363 = CPC 11147–11149); *idem*. CBS H-9908, CBS H-9909, CBS H-9911, cultures derived from CBS H-9911, CBS 116364 = CPC 11150–11151; *idem*., 1 Mar. 2004, M.J. Wingfield, culture CPC 11152; *idem*., *Acacia* sp., 1 May 2005, M.J. Wingfield, cultures CPC 12168, CPC 12170.

Notes: *Passalora perplexa* is the causal agent of leaf blight in *Acacia crassicarpa* both in Australia where it is native and also in plantations in Indonesia to where it spread. It is one of few pleoanamorphic cercosporoid fungi described with one morph characterised as a hyphomycete, a second morph described as a coelomycete, and a third morph representing a resting spore form on natural substrates and artificial media (Beilharz *et al.* 2004). The available strains of *Passalora perplexa* cluster together in a well-supported clade in the phylogenetic analyses (Fig. 1, clade 63; Fig. 3, clade 27). The phylogenetic analyses supports a clade including strains from *Passalora perplexa*, *Passalora* sp. 1, *Passalora juniperina and Phaeocercospora colophospermi*, but these species vary too significantly in their morphology to be assigned to the same genus.

"*Passalora*" sp. 1

Description in vitro (V8; CBS 122466): *Mycelium* composed of hyaline to pale brown hyphae, smooth, uniform in width, 2–2.5 µm. *Conidiophores* micro- or macronematous, pale to pale brown, simple, rough, straight to mildly sinuous, long to medium conically truncate at the apex, 10–40 × 2.5 µm. *Conidiogenous cells* integrated, apical, polyblastic, proliferating sympodially, with slightly protruding conidiogenous loci that are somewhat thickened and darkened, 2 µm in diam. *Conidia* solitary, hyaline to pale brown, finely verruculose, cylindrical to obclavate, base obconically truncate, rounded at the apex, 25–40 × 2–2.5 µm, multi-euseptate, septa indistinct, hila somewhat thickened and darkened, 2 µm diam.

Material examined: **USA**, Florida, on *Citrus* sp., unknown date, R.C. Ploetz, culture CBS 122466.

Notes: Phyllogenetically, the present species forms a single strain lineage closely related to *Pleopassalora* (Fig. 1, clade 63; Fig. 3, clade 27). The present strain was initially identified as *Passalora loranthi* (Arzanlou *et al.* 2008) since its DNA was identical to a sequence of *Passalora loranthi* available on GenBank (GenBank AY348311). Although there is no publication associated with that accession number, many subsequent authors followed this identification (Crous *et al.* 2004b, Beilharz *et al.*, 2004, Arzanlou *et al.* 2008, Douanla-Meli *et al.* 2013, Huang *et al.* 2015). A description based on the observation of strain CBS 122466 in culture is presented. Unfortunately, the culture became sterile and thus fresh material needs to be collected to fully clarify the taxonomy of this species, which appears to have a wide host range.

Clade 64: *Phaeocercospora*

Phaeocercospora Crous, Persoonia 28: 171. 2012.

Description (from Crous *et al.* 2012b): Foliicolous, associated with leaf spots. *Caespituli* amphigenous, subepidermal, arising from subepidermal, globular fruiting bodies (immature structures with undefined white contents); wall of 2–3 layers of *textura angularis*, bursting through epidermis, forming grey sporodochia with densely aggregated conidiophores. *Conidiophores* subcylindrical to ampulliform, brown, finely verruculose, aggregated, 0–2-septate. *Conidiogenous cells* terminal, brown, finely verruculose, ampulliform, tapering to a truncate apex, proliferating several times percurrently at apex (proliferations irregular, rough), or sympodially. *Conidia* solitary, brown, finely verruculose, guttulate, subcylindrical to narrowly obclavate, straight to mildly curved, apex subobtuse, base truncate with marginal frill, transversely septate; hila and scars not thickened, nor darkened or refractive.

Type species: *Phaeocercospora colophospermi* Crous.

Phaeocercospora colophospermi Crous, Persoonia 28: 171. 2012.

Descriptions and illustrations: Crous *et al.* (2012b).

Material examined: **South Africa**, Mpumalanga, Kruger Game Reserve, Satara rest camp, on leaves of *Colophospermum mopane*, 11 Jul. 2011, P.W. Crous & K.L. Crous (**holotype** CBS H-20966, culture ex-type CBS 132687 = CPC 19812).

Note: *Phaeocercospora* is a recently introduced genus that was established to accommodate *Phaeocercospora colophospermi* (Crous *et al.* 2012b). In the present phylogenetic analyses, *Phaeocercospora colophospermi* is represented by a single-strain lineage (Fig. 1, clade 64; Fig. 3, clade 28) closely related to *Pleopassalora*.

Phaeocercospora juniperina (Georgescu & Badea) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822825. Fig. 37.

Basionym: *Cercospora juniperina* Georgescu & Badea, Analele Inst. Cercet. Exp. Forest. Bucharest I: 37. 1937.

Synonyms: *Stigmina juniperina* (Georgescu & Badea) M.B. Ellis, Mycol. Pap. 72: 67. 1959.

Sciniatosporium juniperinum (Georgescu & Badea) Morgan-Jones, Canad. J. Bot. 49: 998. 1971.

Asperisporium juniperinum (Georgescu & Badea) B. Sutton & Hodges, Mycologia 82: 317. 1990.

Passalora juniperina (Georgescu & Badea) H. Solheim, Agarica 34: 110. 2014.

Camarosporium juniperinum Georgescu & Badea, Rev. Padurilor, Bucharest: 1. 1935.

Description in vivo (CBS H-22955): *Mycelium* internal, composed of brown hyphae, septate, branched. *Stromata* well-developed, brown to dark brown, often with a cavity filled with spermatia, single or aggregate, wall composed of *textura angularis*, 80–340 µm diam. *Conidiophores* sporodochial, densely fasciculate, pale brown to brown, smooth, aseptate or septate, cylindrical to geniculate, 16–50 × 4–9 µm, often reduced to conidiogenous cells. *Conidiogenous cells* integrated, terminal, polyblastic, proliferating percurrently or sympodially, with conidiogenous loci not thickened and not darkened, apical or lateral at the apex, 2–2.5 µm diam. *Conidia* solitary, pale to pale olivaceous brown, smooth to thinly verruculose, cylindrical to long-obclavate, straight to slightly curved, base obconically truncate, apex rounded, 18–56 × 2.5–3.5 µm, 1–4-septate, hila not thickened and not darkened at the base, 2–2.5 µm diam.

Description in vitro (on SNA; CPC 11258): *Mycelium* composed of pale brown hyphae, smooth, septate, branched. *Stromata* absent. *Conidiophores* emerging from hyphae, pale brown, smooth, erect, cylindrical to geniculate, septate, 11–55 × 3–6

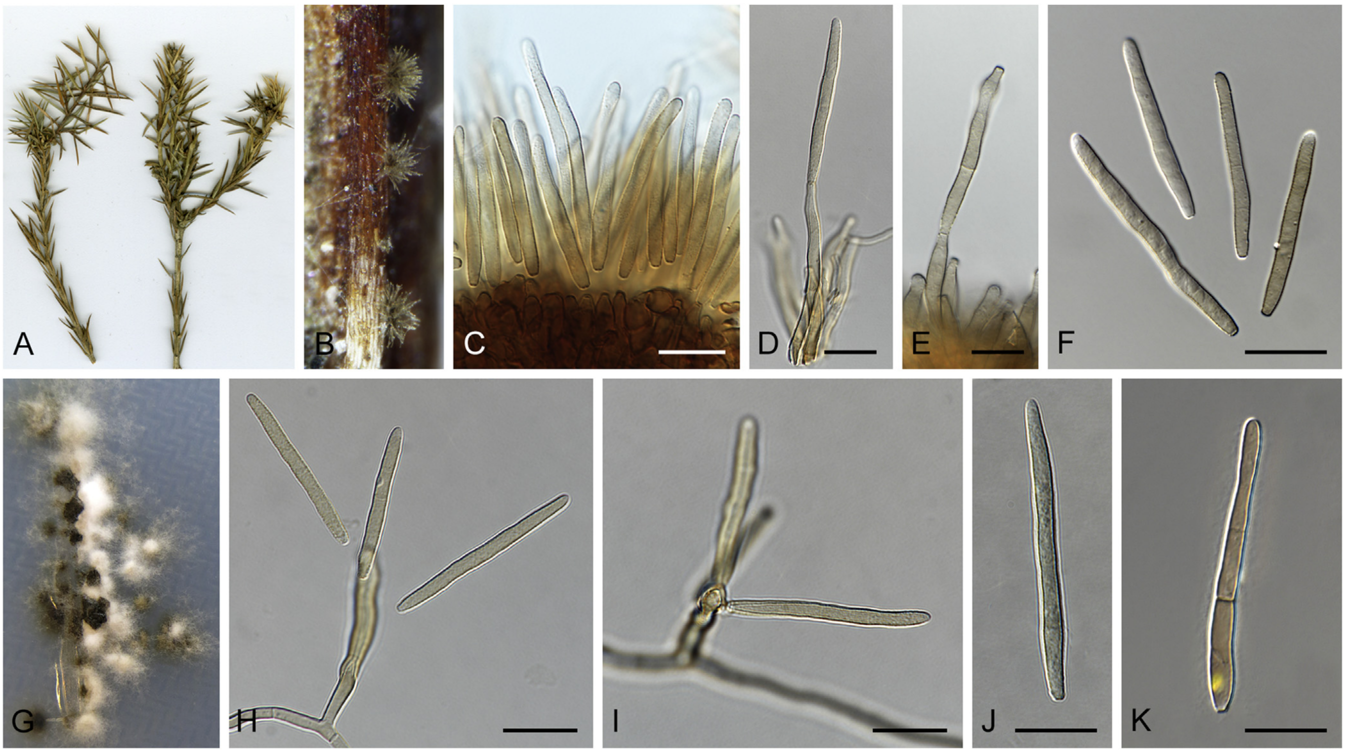


Fig. 37. *Phaeocercospora juniperina* (CPC 11258). **A–F.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Conidiophores and conidia on the lesions. **C, E.** Conidiogenous cells and conidia. **D.** Conidiophores and conidia. **F.** Conidia. **G–K.** Observations *in vitro*. **G.** Culture on SNA. **H, I.** Conidiophore and conidia. **J, K.** Conidia. Scale bars = 10 μm.

μm. *Conidiogenous cells* integrated, terminal, polyblastic, proliferating sympodially, conically truncate or geniculate at the apex, with conidiogenous loci not thickened or darkened, apical or lateral at the apex, 2 μm diam. *Conidia* solitary, pale brown, smooth to thinly verruculose, cylindrical to long-obclavate, straight to slightly curved, base obconically truncate, apex rounded, 25–54 × 2.5–4 μm, 1–4-septate, hila not thickened and not darkened, 2–2.5 μm diam.

Material examined: **USA**, North Carolina, on *Juniperus virginiana*, 1 Mar. 2004, C.S. Hodges, CBS H-22955, culture CBS 142238 = CPC 11258.

Notes: Both specimen and culture materials were examined and this fungus has conidiogenous cells proliferating both percurrently with annellations and sympodially with rim-like loci (Fig. 37). Phylogenetically, this strain forms a single-strain lineage closely related to *Phaeocercospora colophospermi* (Fig. 1, clade 64; Fig. 3, clade 28). Given the phylogenetical proximity and morphological similarities, a combination is proposed in *Phaeocercospora* until further evidence becomes available.

Clade 65: *Rosisphaerella*

Rosisphaerella Videira & Crous, **gen. nov.** MycoBank MB822703.

Etymology: Mycosphaerella-like species from the host genus *Rosa*.

Description: Phytopathogenic, foliicolous. *Mycelium* internal, composed of subhyaline to brown hyphae, smooth, septate, branching. *Stromata* lacking or small, epidermal, substomatal, brown to dark brown. *Conidiophores* emerging from stromata or few brown cells, solitary to fasciculate, often synnematous, dark olivaceous brown near base and paler toward the tip, smooth, simple, multiseptate, straight to sinuous, usually geniculate-sinuous. *Conidiogenous cells* integrated, terminal and intercalary, proliferating sympodially, rarely proliferating percurrently, with rim-like conidiogenous loci, somewhat thickened, darkened and protuberant. *Conidia* solitary, pale to medium olivaceous brown, smooth to finely verruculose, cylindrical to obclavate, straight to mildly curved, septate, obconically truncate at base and rounded at apex, hila somewhat thickened and darkened.

Type species: *Rosisphaerella rosicola* (Pass.) U. Braun, *et al.* (≡ *Cercospora rosicola* Pass.).

Rosisphaerella rosicola (Pass.) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822800. Fig. 38.
Basionym: *Cercospora rosicola* Pass., in Thüm., Herb. Mycol. Oecon., Fasc. VII: no. 333. 1875.
Synonyms: *Passalora rosicola* (Pass.) U. Braun, Mycotaxon 55: 234. 1995.
Cercospora rosicola var. *undosa* Davis, Trans. Wisconsin Acad. Sci. 20: 405. 1921.
Cercospora rosae J.M. Hook, Proc. Indiana Acad. Sci. 38: 131. 1929.
Cercospora rosae-indianensis J.M. Hook, Proc. Indiana Acad. Sci. 39: 82. 1930.
Mycosphaerella rosicola B.H. Davis, Mycologia 30: 296. 1938.

Description in vivo (CBS H-22956): *Leaf spots* scattered, circular or irregular when coalescing, singly 1–4 mm diam, uniformly purplish or reddish brown, or greysh white to pale brown at the centre, indistinct on lower leaf surface. *Mycelium* internal, composed of hyaline and pale brown to brown hyphae, septate, branching, 3–4 μm diam. *Stromata* lacking or small, epidermal, substomatal, brown to dark brown, 25–52 μm diam. *Conidiophores* emerging from stromata or agglomerates of a few brown cells, solitary or in fascicles, fascicles loose or dense, often synnematous, dark olivaceous brown near base,

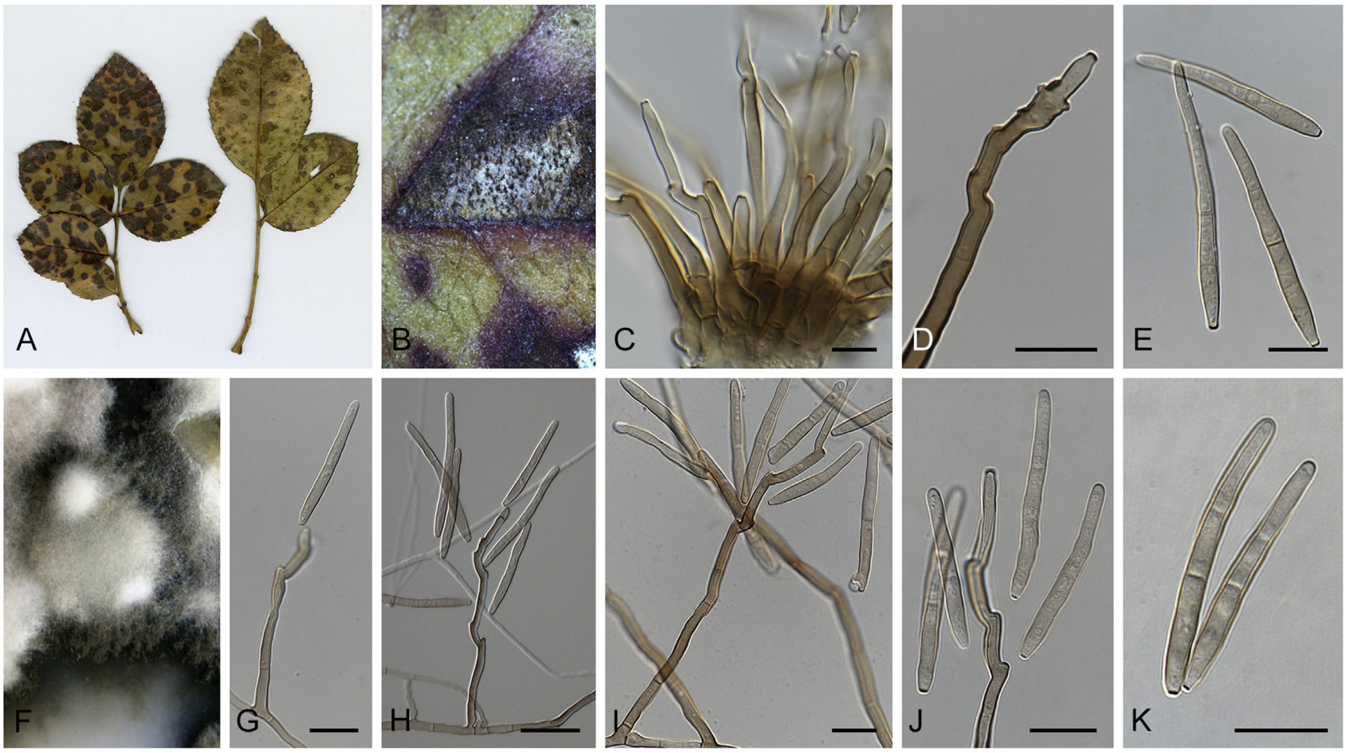


Fig. 38. *Rosisphaerella rosicola* (CPC 12548). **A–E.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C, D.** Conidiophores and conidiogenous cells. **E.** Single conidia. **F–K.** Observations *in vitro*. **F.** Culture on OA. **G–I.** Conidiophore, conidiogenous cells and conidia. **J.** Partial conidiophore, conidiogenous cells and conidia. **K.** Conidia. Scale bars = 10 µm.

paler towards the tip, smooth, simple, multiseptate, straight or sinuous, usually geniculate-sinuous, 20–156 × 3–6 µm. *Conidiogenous cells* integrated, terminal and intercalary, proliferating sympodially, rarely proliferating percurrently, with rim-like conidiogenous loci, somewhat thickened and darkened, 2–4 µm diam. *Conidia* solitary, pale to medium olivaceous brown, smooth to finely verruculose, cylindrical to obclavate, straight to mildly curved, base long-obconically truncate, apex rounded, 20–98 × 3–5 µm, 1–6-septate, hila somewhat thickened and darkened, 2–4 µm diam.

Description in vitro (on SNA; CPC 12548): *Mycelium* composed of pale brown to brown hyphae, uniform in width, 2–3 µm. *Conidiophores* micro- or macronematous, pale brown to brown, paler at the apex, smooth, erect, simple, septate, geniculate-sinuous, 10–280 × 2.5–5 µm. *Conidiogenous cells* integrated, terminal and intercalary, pale brown to brown, smooth, mono- or polyblastic, proliferating sympodially, conically truncate at the apex or geniculate-sinuous, with conidiogenous loci thickened and darkened, located protruding at the apex and shoulders, 2–2.5 µm diam. *Conidia* solitary, subhyaline to pale brown, smooth to finely verruculose, cylindrical to long obclavate, straight or mildly curved, base short obconically truncate, apex rounded, 1–4-euseptate, 20–63 × 2.5–5 µm, hila refractive and slightly thickened and darkened.

Materials examined: **Italy,** Parma, on *Rosa* sp. cult., 1874, G. Passerini, Thümen, Herb. Mycol. Oecon. 333 (**lectotype** designated here, BPI 440506, MBT378584; isolectotypes Thümen, Herb. Mycol. Oecon. 333, e.g. B, K, S). **USA**, North Carolina, on *Rosa* sp. hybrid, 2005, C.S. Hodges, CBS H-22956, culture CBS 142183 = CPC 12548; unknown state/city, host, collector and date, dep. LM Massey, 1935, culture CBS 138.35 = ATCC 52313.

Notes: *Passalora rosicola* is known to cause leaf spot disease on rose worldwide (Davis 1938). Morphologically, the specimens examined (Fig. 38) fit the description available in the literature (Braun 1995). Morphologically, the strain CBS 142183 is a good representative of the species and was isolated from the same host as the type specimen. However, since it was isolated from a different continent, we refrain from proposing an epitype. Phylogenetically, the observed strains cluster in a well-supported clade (Fig. 1, clade 65; Fig. 3 clade 29) closely related to *Phaeocercospora* and *Pleopassalora*. When single gene sequences are BLASTed against the alignment, CPC 12548 shares 80 % (623/778) similarity on *rpb2* with CPC 11258 *Phaeocercospora juniperina*, 91 % (438/479) similarity on ITS and 96 % (700/727) similarity on LSU. In *Passalora rosicola* we did not observe pleomorphic asexual states as in *Pleopassalora*, nor percurrent conidiation as in *Phaeocercospora*. Given both the morphological and phylogenetic differences from the closest related genera, we introduce the genus *Rosisphaerella* to accommodate this species.

Clade 66: *Exutisphaerella*

Exutisphaerella Videira & Crous, **gen. nov.** MycoBank MB822590.

Etymology: exutus- meaning “cast off” or “shed” like the disease symptom + *sphaerella* because of the globose ascomata.

Description: *Ascomata* pseudothecial, globose to slightly elongated or elliptical, emerging through the epidermis, solitary or gregarious, ostiole apical. *Asci* club-shaped, stipitate, 8-spored. *Ascospores* hyaline, oblong, fusiform-elliptical, straight or slightly curved, 1-septate, not constricted at septa, with cells of equal size. Asexual morph acervular-like. *Conidiophores* ampulliform, in compact bunches. *Conidia* hyaline, bacillar to allantoid, rounded at the tip, truncate at the base, straight to slightly curved, aseptate to multiseptate. *Spermagonia* in stromata, barely erumpent to completely exposed, globose to oval or pyriform, apical ostiole. *Spermatia* bacillar to pyriform.

Type species: *Exutisphaerella laricina* Videira & Crous (≡ *Sphaerella laricina* R. Hartig)

Exutisphaerella laricina (R. Hartig) Videira & Crous, **comb. nov.** MycoBank MB822758.
Basionym: *Sphaerella laricina* R. Hartig, Forstl.-Naturwiss. Z. 4: 445. 1895.
Synonym: *Mycosphaerella laricina* (R. Hartig) Mig., Krypt.-Fl. Deutschl. Österr. Schweiz. 3(1): 301. 1912.

Descriptions and illustrations: Hartig (1895), Patton *et al.* (1983).

Description in vivo (adapted from Hartig 1895 and Patton 1983): *Ascomata* pseudothecial, globose to slightly elongated or elliptical, emerging through the epidermis, solitary or gregarious, 100–150 µm diam, ostiole apical. *Asci* club-shaped, stipitate, 40–60 µm long, 8-spored. *Ascospores* hyaline, oblong, fusiform-elliptical, straight or slightly curved, 1-septate, not constricted at septa, with cells of equal size, 11–17 × 2.5–3 µm. *Asexual morph* acervulum-like. *Conidiophores* ampulliform, in compact bunches. *Conidia* hyaline, bacillar to allantoid, rounded at the tip, truncate at the base, straight to slightly curved, 25–46 × 2–4 µm, (0–)1–4-septate. *Spermagonia* in stromata, barely erumpent to completely exposed, globose to oval or pyriform, occasionally two spermagonial cavities occur in a single stroma, apical ostiole. *Spermatia* bacillar to pyriform, 1–3 × 0.5 µm.

Material examined: **Switzerland**, Kt. Zurich, Horgenberg, on *Larix decidua*, unknown date and collector, isol. E. Müller, 27 May 1952 (**neotype** designated here as metabolically inactive culture CBS 326.52, MBT378624).

Notes: *Mycosphaerella laricina* was first observed infecting the host *Larix europaea* (*Pinaceae*) in Germany, and is the causative agent of needle cast disease of European larch wherever it is cultivated. Unfortunately, the type could not be located in any fungaria and a neotype is necessary (Aptroot 2006). The asexual morph is reported as a *Cercoseptoria* (fide D.F. Farr *et al.* 1989, Corlett 1991), currently treated as synonym of *Pseudocercospora* (needs confirmation based on DNA), or a *Leptostroma* (fide Tomilin 1979). The asexual morph is characterised by acervular conidiomata, lined with ampulliform conidiophores with truncate apices, producing hyaline and bacillar conidia, 1–4-septate (Patton 1983). The strain used in this study was unfortunately sterile and morphological comparison was impossible. Phylogenetically, this strain forms a single-strain lineage closely related to *Rosisphaerella* (Fig. 1, clade 66; Fig. 3 clade 30). When the single genes are BLASTed against the alignment, CBS 326.52 shares 90 % (700/774) similarity on *rpb2* and 99 % (717/726) similarity on LSU with CPC 12548 *Rosiphaerella rosicola*, and 98 % (470/480) similarity on ITS with CBS 122466 (*Passalora* sp.1). Based on the phylogenetic results and the morphological differences in comparison to the closest related species *Rosisphaerella rosicola*, we introduce this new genus to accommodate the present species.

Clade 67: *Brunswickiella*, *Cytostagonospora*, *Devonomyces* and *Phaeophleospora*

Brunswickiella Videira & Crous **gen. nov.** MycoBank MB822694.

Etymology: Named after the nature reserve it was collected from.

Description: Phytopathogenic. *Conidiomata* pycnidial, epiphyllous, immersed, black and with central ostiole, outer layer with irregular, brown, verruculose hyphae; basal stroma brown, verruculose, giving rise to conidiophores; basal cells brown, verruculose, upper cells hyaline, smooth, septate, subcylindrical, branched below. *Conidiogenous cells* hyaline, smooth, subcylindrical, terminal and lateral, proliferating percurrently at apex, or with periclinal thickening, intermixed among paraphyses that are branched, similar in length and at times become fertile. *Conidia* solitary, hyaline, smooth, guttulate, subcylindrical to narrowly fusoid-ellipsoidal, straight to slightly curved, widest in the middle, tapering to subobtuse apex and truncate hilum.

Type species: *Brunswickiella parsonsiae* (Crous & Summerell) Videira & Crous.

Brunswickiella parsonsiae (Crous & Summerell) Videira & Crous **comb. nov.** MycoBank MB822740.
Basionym: Phaeophleospora parsonsiae Crous & Summerell (as "*parsoniae*"), Persoonia 32: 217. 2014.

Description and illustration: Crous *et al.* (2014a).

Material examined: **Australia**, New South Wales, Brunswick Heads Nature Reserve, S28°31′90.8″ E153°32′57.0″, on *Parsonsia straminea* leaves, 9 Mar. 2013, B.A. Summerell (**holotype** CBS H-21691, culture ex-type CBS 137979 = CPC 22537).

Notes: *Brunswickiella parsonsiae* forms pycnidial conidiomata with hyaline conidiogenous cells that proliferate percurrently and produce hyaline fusoid-ellipsoid aseptate conidia. At the time it was described, Crous *et al.* (2014a) assumed it represented a microconidial state of *Phaeophleospora*. The phylogenetic position of the present strain is outside the *Phaeopleospora* clade, sitting in a single-strain lineage (Fig. 4, clade 6-II) sister to the clade of *Lecanosticta*. Based on the morphological differences between this strain and the closest genera and its phylogenetic position we place it in a new genus.

Cytostagonospora Bubák, Ann. Mycol. 14: 150. 1916.

Description (from Sutton 1980): *Mycelium* immersed, dark brown, branched, septate. *Conidiomata* pycnidial, amphigenous, separate, globose, dark brown to black, immersed, unilocular, thick-walled, clypeate; walls of dark brown, thick-walled *textura angularis* to *textura globulosa*, becoming hyaline towards the conidiogenous region, extending in the upper part to become a circular clypeus of similar thickness to the wall. *Ostiole* central, circular, papillate to short rostrate, depressed, situated immersed within the clypeus. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* holoblastic, determinate, discrete, lageniform, hyaline, smooth, formed from the inner cells of the pycnidial wall. *Conidia* hyaline, 0–2-euseptate, not constricted at septa, base truncate, apex obtuse, thin-walled, eguttulate, smooth, filiform, often curved.

Type species: *Cytostagonospora photiniicola* Bubák.

Cytostagonospora martiniana (Sacc.) B. Sutton & H.J. Swart, Trans. Br. mycol. Soc. 87: 99. 1986.
Basionym: *Septoria martiniana* Sacc., Syll. Fung. (Abellini) 10: 351. 1892.
Synonym: *Septoria phyllodiorum* Cooke & Massee, Grevillea 19: 47. 1890, non *S. phyllodiorum* Sacc., Hedwigia 29: 156. 1890.

Description and illlustration: Sutton & Swart (1986), Quaedvlieg *et al.* (2013).

Materials examined: **Australia**, Victoria, Warneet close to Melbourne, S38º13′37.8″ E145º18′25.4″, on leaves of *Acacia pycnantha*, 21 Oct. 2009, P.W. Crous (**epitype** designated here CBS H-21297, MBT378691, culture CBS 135102 = CPC 17727); Victoria, on phyllodes of *Acacia longifolia*, Mrs. Martin 432 (**holotype** K, slide as IMI 299337).

Notes: According to the phylogenetic analyses in the present study, the strain of *Cytostagonospora martiniana* forms a single strain lineage (Fig. 1, clade 66; Fig. 4, clade 5-III) closely related to *Phaeopleospora* species. *Cytostagonospora martiniana* forms pycnidial to acervular conidiomata, hyaline conidiogenous cells that are polyphialidic with periclinal thickening, proliferate percurrently and produce hyaline, 1–3-septate, scolecosporous conidia (Quaedvlieg *et al.* 2014). These morphological characters are distinct from the typical generic characters of *Phaeophleospora*.

Cytostagonospora photiniicola Bubák, Ann. Mycol. 14(3–4): 150. 1916.
Synonym: *Cytostaganis photiniicola* (Bubák) Clem. & Shear, The genera of Fungi: 367. 1931.

Description and illustration: Quaedvlieg *et al.* (2013).

Notes: The phylogenetic position of *Cytostagonospora* (Bubák 1916) is still unclear since material representing the type species, *Cytostagonospora photiniicola*, has not yet been sequenced. The only *Cytostagonospora* species of which a strain is available is *Cytostagonospora martiniana*, which forms a single strain lineage in the phylogenetic analysis (Fig. 4, clade 5-III).

Devonomyces Videira & Crous, **gen. nov.** MycoBank MB822695.

Etymology: Named after Devon Valley, Stellenbosch, where this taxon was first collected.

Description: Phytopathogenic, foliicolous. *Ascomata* pseudothecial, amphigenous, subepidermal, becoming erumpent, subglobose to globose, with apical, papillate ostiole; walls of 2–3 layers of medium brown *textura angularis*, subhymenium of 1–2 layers of hyaline cells. Asci fasciculate, bitunicate, cylindrical to narrowly obovoid, straight or slightly incurved, 8-spored. Ascospores bi- to triseriate, overlapping, hyaline, guttulate, thin-walled, straight, fusoid-ellipsoidal with obtuse ends, medianly 1-septate. Mycelium internal, consisting of septate, branched, hyaline to brown, smooth to verruculose hyphae. *Caespituli* sporodochial, situated on a brown stroma consisting of verruculose, brown, globose cells and hyphal elements. *Conidiophores* rarely pigmented and verruculose in lower part, mostly hyaline and smooth throughout, thick-walled, cylindrical, straight to irregularly curved, septate. *Conidiogenous cells* terminal, hyaline, smooth, unbranched, straight or slightly curved, proliferating sympodially. *Conidia* solitary, hyaline, smooth, narrowly obclavate, septate, irregularly curved, rarely straight, apex obtuse, base long obconic-truncate, lateral branches common, secondary conidia forming on most mature primary conidia; conidia aggregated in slimy masses.

Type species: *Devonomyces endophyticus* (Crous & H. Sm. ter) Videira & Crous

Devonomyces endophyticus (Crous & H. Sm. ter) Videira & Crous, **comb. nov.** MycoBank MB822754.
Basionym: *Mycosphaerella endophytica* Crous & H. Sm. ter, Mycol. Mem. 21: 54. 1998.
Synonym: *Pseudocercosporella endophytica* Crous & H. Sm. ter, Mycol. Mem. 21: 55. 1998.

Descriptions and illustrations: Crous (1998).

Materials examined: **Australia**, Western Australia, Esperance, Chips Plantation (ITC), on *Eucalyptus globulus*, 15 Dec. 2000, A. Maxwell, MURU0011, culture CBS 110501 = CMW 14462; Pemberton, Steward Road, *Banksia* woodland, on *Hakea undulata*, 2 Aug. 2008, A.R. Wood, culture CPC 15580. **South Africa**, Western Cape Province, De Hoop Nature Reserve, *Eucalyptus cladocalyx*, 22 Sep. 1995, A.R. Wood, culture CBS 111167 = CPC 1225; Stellenbosch, Devon Valley, on leaves of *Eucalyptus* sp., Jun. 1995, P.W. Crous (**holotype** of *Mycosphaerella endophytica* PREM 54398, culture ex-type CBS 114662 = CPC 1193); Kwazulu-Natal, on *Eucalyptus nitens*, unknown collector and date, isol. G.C. Hunter, Jun. 2000, culture CBS 114709 = CMW 9099.

Notes: Based on the phylogenetic analyses *Devonomyces endophyticus* (Fig. 4, clade 5-I) is closely related to *Phaeophleospora eugeniae*, as observed in a previous study (Quaedvlieg *et al.* 2014). The pseudocercosporella-like morph of *Devonomyces endophyticus* is however morphologically distinct from *Phaeophleospora* (Crous 1998), and thus has to be accommodated in a different genus. The strain CBS 114709 was originally named as *Mycosphaerella pseudoellipsoidea* but no details of the species description could be found. The strain is currently sterile and is included in *Devonomyces endophyticus* based on molecular data. The strain CPC 15580 was isolated from the same herbarium material as *Periconiella hakeae* (CPC 15577), which indicates they may be co-existing in the same lesions.

Phaeophleospora Rangel, Arq. Mus. Nac., Rio de Janeiro 18: 162. 1916.

Description: Foliicolous, plant pathogenic. *Conidiomata* pycnidial, aggregated or separate, becoming erumpent, lifting the epidermis, pycnidia black, subglobose, unilocular, wall of brown *textura epidermoidea* in surface view, and of *textura angularis* to *textura intricata* in vertical section, base of 2–3 layers, ostiole irregular, central. *Conidiophores* mostly reduced to conidiogenous cells. *Conidiogenous cells* terminal, discrete, brown, verruculose, subcylindrical or doliiform, proliferating percurrently, with inconspicuous percurrent proliferations, or at times proliferating sympodially. *Conidia* solitary, exuded in cirrhus, hyaline to medium brown, smooth to verruculose, granular, thick-walled, subcylindrical to obclavate, straight to irregularly curved, base obconically truncate, apex obtuse, euseptate, hila with a minute marginal frill. *Spermatogenous cells* developing in conidiomata before the development of conidia, hyaline, ampulliform. *Spermatia* hyaline, smooth, rod-shaped.

Type species: *Phaeophleospora eugeniae* Rangel.

Phaeophleospora eugeniae Rangel, Decheniana 18: 162. 1916.

Description and illustration: Crous *et al.* (1997).

Description in vitro (on V8; CPC 15143): *Mycelium* hyaline, smooth, uniform in width, 2.5 µm diam. *Conidiomata* pycnidial, aggregated on mycelial colonies, pale brown, forming 1-layered conidiomatal wall composed of large brown cells (*textura intricata*), 100–300 µm diam. *Conidiogenous cells* lining the inner cavity, hyaline to pale brown, ampulliform, monoblastic, determinate or proliferating percurrently, 5–20 × 2.5–3.8 µm, without distinguished loci. *Conidia* solitary, pale brown to pale olivaceous brown, darker in the center and paler towards both ends, scolecosporous, obclavate, straight or sinuous, base long-obconical, apex pointed, 30–150 × 5–8 µm, 6–25-euseptate, with frill-like hila.

Materials examined: **Brazil**, Minas Gerais, Viçosa University campus, living leaves of *Eugenia uniflora*, 8 Jul. 1996, F.A. Ferreira (**neotype** IMI 372655, designated in Crous *et al.* 1997; isoneotype PREM 55275, cultures ex-type CPC 1453, CPC 1454); same location and host, 15 Jun. 1990, F.A. Ferreira, PREM 55276; same location and host, 20 Jun. 1989, F.A. Ferreira, PREM 55277; Viçosa, Paraiso, on *Eugenia uniflora*, 1 Mar. 2008, A.C. Alfenas, CBS H-22957, culture CBS 142184 = CPC 15143; Guaiba, on *Eugenia uniflora*, 1 Apr. 2008, A.C. Alfenas, culture CPC 15159.

Notes: The genus *Phaeophleospora*, based on *Phaeophleospora eugeniae* (on *Eugenia uniflora*, Brazil), includes species that form pycnidia lined with percurrently proliferating brown conidiogenous cells that give rise to brown, multiseptate, scolecosporous conidia (Crous *et al.* 1997, 2007a). Based on phylogenetic analyses, *Phaeophleospora* belongs to the *Mycosphaerellaceae* (Crous *et al.* 1997, 2009b; present study Fig. 1, clade 67), and clusters in a well supported clade by the Bayesian analyses (Fig. 4, clade 5-II), being closely related to *Lecanosticta*. The genus *Kirramyces*, initially considered a synonym of *Phaeophleospora* (Crous *et al.* 1997), is currently considered the asexual morph of *Teratosphaeria*. The taxa *Phaeophleospora scytalidii* and *Phaeophleospora stramenti* were allocated to *Phaeophleospora* based on phylogenetic inference since only the sexual morph is known (Quaedvlieg *et al.* 2014). Recently described species in the genus are morphologically variable [e.g. *Phaeophleospora pteridivora* has a sporodochial hyphomycete asexual morph (Guatimosim *et al.* 2016); *Phaeophleospora hymenocallidis* and *Phaeophleospora hymenocallidicola* produce hyaline conidia (Crous *et al.* 2015d)], suggesting that this genus needs to be revised.

Clade 68: *Lecanosticta*

Lecanosticta Syd., Ann. Mycol. 20: 211. 1922.

Description (from Sutton 1980): *Mycelium* immersed, branched, septate, pale brown. *Conidiomata* acervular, subepidermal, separate, formed of brown, thin- or thick-walled *textura angularis*. Dehiscence by pushing back a flap of epidermis that remains attached. *Conidiophores* hyaline to pale brown, branched, septate, smooth, formed from the upper cells of the pseudoparenchyma. *Conidiogenous cells* holoblastic, integrated or discrete, indeterminate, cylindrical, hyaline, with 1–2 often widely spaced percurrent proliferations. *Conidia* acrogenous, straight or curved, fusiform, tapered to the rounded apex and truncate base, I–3-euseptate, continuous, pale brown, verrucose.

Type species: *Lecanosticta acicola* (Thüm.) Syd. (≡ *Cryptosporium acicola* Thüm.).

Lecanosticta acicola (Thüm.) Syd., Ann. Mycol. 22: 400. 1924.
Basionym: *Cryptosporium acicola* Thüm., Flora (Regensburg) 61: 178. 1878.
Synonyms: *Septoria acicola* (Thüm.) Sacc., Syll. Fung. 3: 507. 1884.
Dothistroma acicola (Thüm.) Schischkina & Tzanava, Novosti Sist. Nizsh. Rast. 1967: 277. 1967.
Lecanosticta pini Syd., Ann. Mycol. 20: 211. 1922.
Oligostroma acicola Dearn., Mycologia 18: 251. 1926.
Scirrhia acicola (Dearn.) Sigg., Phytopathology 29: 1076. 1939.
Systremma acicola (Dearn.) F.A. Wolf & Barbour, Phytopathology 31: 70. 1941.
Mycosphaerella dearnessii M.E. Barr, Contr. Univ. Michigan Herb. 9: 587. 1972.

Description and illustration: Quaedvlieg *et al.* (2012).

Materials examined: **France**, Gironde, Le Teich, on needles of *Pinus radiata*, Apr. 1995, M. Morelet, CBS H-21114, culture CBS 871.95. **Lithuania**, on needles of *Pinus mugo*, 2009, S. Markovskaja, A. Kačergius & A. Treigienė, CBS H-21109, cultures LA773A & LA773B = CBS 133790. **Mexico**, on needles of a *Pinus* sp., 30 Nov. 2009, M. de Jesús Yáñez-Morales, CBS H-21112, culture CPC 17822 = CBS 133789. **USA**, South Carolina, Aiken, needles of *Pinus caribaea*, 1876, H.W. Ravenel (**lectotype** designated here IMI 91340, MBT378589, isotype of *Cryptosporium acicula* ex Padova No. 1484); Arkansas, Pike City, alt. 700 ft, needles of *Pinus* (*palustris* or *taeda*), 24 Apr. 1918, coll. J.A. Hughes, det. Sydow (**syntypes** of *Lecanostricta pini*, BPI 393329, BPI 393331); Florida, Silver Spring, needles of *P. palustris*, 27 Feb. 1919, coll. Geo G. Hedgcock, det. J. Dearness (**syntype** of *Oligostroma acicola*, BPI 643015); Maine, Bethel, on needles of *Pinus strobus*, 14 Jun. 2011, coll. B. Ostrofsky, det. K. Broders, WPF4.12; *idem*., on needles of *P. strobus*, 15 Jun. 2011, coll. B. Ostrofsky, det. K. Broders, WPF13.12; New Hampshire, Blackwater, on needles of *P. strobus*, 15 Jun. 2011, coll. B. Ostrofsky, det. K. Broders (**epitype** of *Cryptosporium acicola* designated here: CBS H-21113, MBT378591, culture ex-epitype CBS 133791).

Notes: The genus *Lecanosticta* is closely related to *Phaeophleospora* based on phylogenetic analyses (Crous *et al.* 2009c). The phylogenetic analyses in the present study corroborated the previous findings, placing *Lecanosticta* species in a well-supported clade (Fig. 1, clade 68; Fig. 4, clade 6-I) sister to *Phaeophleospora*. Species of *Lecanosticta* have typical phaeophleospora-like conidia, but form acervular conidiomata instead of pycnidial conidiomata. *Lecanosticta acicola* is the causal agent of brown spot needle blight on *Pinus* spp. worldwide, a serious disease that leads to defoliation, dieback and finally tree death. For this reason, it is included on the European quarantine list. *Lecanosticta acicola* was shown to represent a species complex, including *Lecanosticta brevispora* and *Lecanosticta guatemalensis* (Quaedvlieg *et al.* 2012). The epitypification presented by Quaedvlieg *et al.* was not compliant with the code (Art. 9.8) and a new epitypification is therefore proposed.

Lecanosticta brevispora Quaedvlieg & Crous, Persoonia 29: 109. 2012.

Descriptions and illustrations: Quaedvlieg *et al.* (2012).

Materials examined: **Mexico**, on needles of a *Pinus* sp., 24 Oct. 2009, M. de Jesús Yáñez-Morales (**holotype** CBS H-21110, cultures ex-type CBS 133601 = CPC 18092).

Notes: *Lecanosticta brevispora* produces smaller conidia than *Lecanosticta acicula* (Quaedvlieg *et al.* 2012). Based on the phylogenetic analyses, *Lecanosticta brevispora* clusters in the *Lecanosticta* clade (Fig. 1, clade 68; Fig. 4, clade 6-I) as observed in a previous phylogenetic study (Quaedvlieg *et al.* 2012).

Lecanosticta longispora Marm., Mycotaxon 76: 395. 2000.

Description and illustration: Quaedvlieg *et al.* (2012).

Materials examined: **Mexico**, Nuevo León, Galeana, Cerro del Potosí, on *Pinus culminicola*, 6 Jun. 1993, J.G. Marmolejo (**holotype** CFNL); Michoacán State, Zinapecuaro area, on needles of a *Pinus* sp., 24 Oct. 2009, M. de Jesús Yáñez-Morales & C. Méndez-Inocencio (**epitype** designated by Quaedvlieg *et al.* 2012 : CBS H-21111, cultures ex-epitype CBS 133602 = CPC 17940); *idem*., culture CPC 17941.

Notes: *Lecanosticta longispora* produces conidia of the same size as *Lecanosticta acicola* but conidia have only 1–3 septa (Marmolejo 2000). Phylogenetically, *Lecanosticta longispora* clusters in the *Lecanosticta* clade (Fig. 1, clade 68; Fig. 4, clade 6-I) as observed in a previous phylogenetic study (Quaedvlieg *et al.* 2012).

Clade 69: *Zasmidium complex* (*Periconiella*, ramichloridium-like, rasutoria-like, stenella-like, *Verrucisporota*, *Zasmidium*)

Zasmidium Fr., Summa Veg. Scand. 2: 407. 1849.
Synonyms: *Periconiella* Sacc., Atti Ist. Veneto Sci. Lett. Arti 3: 727. 1885 (*type species*: *Periconiella velutina* (G. Winter) Sacc. 1885).

Biharia Thirum. & Mishra, Sydowia 7: 79. 1953 (*type species*: *Biharia vangueriae* Thirum. & Mishra 1953).
Stenellopsis B. Huguenin, Bull. Trimestriel Soc. Mycol. France 81: 695. 1966 (*type species*: *Stenellopsis fagraeae* B. Huguenin 1966).
Verrucisporota D.E. Shaw & Alcorn, Austral. Syst. Bot. 6: 273. 1993 (*type species*: *Verrucisporota proteacearum* (D.E. Shaw & Alcorn) D.E. Shaw & Alcorn 1993).
Verrucispora D.E. Shaw & Alcorn, Proc. Linn. Soc. New South Wales 92: 171. 1967, nom. illeg. (Art. 53.1).

Description (from Braun *et al.* 2013): Hyphomycetous (asexual morphs or asexual holomorphs) or *Zasmidium* with mycosphaerella-like sexual morphs; saprobic or mostly biotrophic, usually foliicolous, symptomless or causing various lesions, ranging from yellowish discolorations to distinct leaf spots. In plant pathogenic species, mycelium mostly immersed as well as superficial, rarely only immersed; hyphae branched, septate, hyaline or almost so to pigmented, pale olivaceous to brown, wall thin to somewhat thickened, immersed hyphae smooth or almost so to faintly rough, external hyphae distinctly verruculose to verrucose (in culture immersed hyphae usually smooth or almost so, aerial hyphae verruculose). *Stromata* lacking to well-developed, pigmented. *Conidiophores* solitary, arising from superficial hyphae, lateral, occasionally terminal, *in vivo* (in plant pathogenic taxa) sometimes also fasciculate, arising from internal hyphae or stromata, semimacronematous to macronematous, in culture occasionally micronematous, cylindrical, filiform, subuliform, straight to strongly geniculate-sinuous, mostly unbranched, aseptate, i.e. reduced to conidiogenous cells, to pluriseptate, subhyaline to pigmented, pale olivaceous to medium dark brown, wall thin to somewhat thickened, smooth to verruculose; *conidiogenous cells* integrated, terminal, occasionally intercalary, rarely pleurogenous, or conidiophores reduced to conidiogenous cells, mostly polyblastic, sympodial, with conspicuous, somewhat thickened and darkened-refractive, planate loci. *Conidia* solitary or catenate, in simple or branched acropetal chains, shape and size variable, ranging from amero- to scolecosporous, aseptate to transversely plurieuseptate, subhyaline to pigmented, pale olivaceous to brown, wall thin to somewhat thickened, smooth or almost so to usually distinctly verruculose (in plant pathogenic species without superficial mycelium always verruculose), hila somewhat thickened and darkened-refractive, planate, conidial secession schizolytic.

Type species: *Zasmidium cellare* (Pers.) Fr. (≡ *Racodium cellare* Pers.).

Zasmidium angulare Batzer & Crous, Persoonia 28: 123. 2012.

Description and illustration: Li *et al.* (2012).

Materials examined: **USA**, Georgia, on fruit surface of *Malus domestica*, Aug. 2005, M. Wheeler (**holotype** CBS H-20931, ex-type culture CBS 132094 = CPC 19042 = GA227B1a).

Notes: *Zasmidium angulare* was the first *Zasmidium* species described in association with sooty blotch and flyspeck symptoms on apple. Phylogenetically, it is closely related to *Zasmidium nocoxi* (Fig. 4, clade 1, Fig. 5, clade I) but can morphologically be distinguished in having shorter conidiophores (Li *et al.* 2012).

Zasmidium anthuriicola (U. Braun & C.F. Hill) Crous & U. Braun, Persoonia 23: 104. 2009.
Basionym: *Stenella anthuriicola* U. Braun & C.F. Hill, Fungal Diversity 22: 33. 2006.

Description and illustration: Braun *et al.* (2006).

Materials examined: **Thailand**, (intercepted at Auckland International Airport, New Zealand), on *Anthurium* sp., 3 Aug. 2005, C.F. Hill 1235 (**holotype** HAL 1870 F, ex-type culture CBS 118742).

Note: In the present study *Zasmidium anthuriicola* is phylogenetically close to *Zasmidium citri-griseum* (Fig. 4, clade 1; Fig. 5, clade III).

Zasmidium arcuatum (Arzanlou *et al.*) Videira & Crous, **comb. nov.** MycoBank MB822807.
Basionym: *Periconiella arcuata* Arzanlou *et al.*, Stud. Mycol. 58: 65. 2007.

Description and illustration: Arzanlou *et al.* (2007).

Materials examined: **South Africa**, Western Cape Province, Kogelberg, on dead culms of *Ischyrolepis subverticillata*, May 2001, S. Lee (**holotype** CBS H-19927, culture ex-type CBS 113477).

Notes: The present species was previously known as *Periconiella arcuata*, but the type of *Periconiella*, *Periconiella velutina*, is combined into *Zasmidium* in the present study based on morphology and phylogenetic data (see notes under *Zasmidium cellare*). Based on the phylogenetic analysis, the present species is represented by a single-strain lineage (Fig. 4, clade 1, Fig. 5, clade VIII). It is unique in producing large obclavate conidia that are pale olive, coarsely verrucose and straight to curved (Arzanlou *et al.* 2007).

Zasmidium aucklandicum (U. Braun & C.F. Hill) U. Braun, Polish Bot. J. 55: 289. 2010.
Basionym: *Stenella aucklandica* U. Braun & C.F. Hill, Australas. Pl. Pathol. 32: 96. 2003.

Description and illustration: Braun *et al.* (2003b).

Materials examined: **New Zealand**, on *Geniostoma rupestre*, 15 Oct. 2005, C.F. Hill 6000, culture CPC 13569; Auckland, Grey Lynn, Western Springs Park, on *Geniostoma rupestre*, 14 Apr. 2001, C.F. Hill 402-A (**holotype** HAL 1726 F).

Note: Based on the phylogenetic analyses, *Zasmidium aucklandicum* is closely related to *Zasmidium pittospori* (Fig. 4, clade 1; Fig. 5, clade VII), which is also found in New Zealand but on a different host (*Pittosporum tenuifolium*; *Pittosporaceae*).

Zasmidium biverticillatum (Arzanlou & Crous) Videira & Crous, **comb. nov.** MycoBank MB822827.
Basionym: *Ramichloridium biverticillatum* Arzanlou & Crous, Stud. Mycol. 58: 72. 2007.
Synonyms: *Ramichloridium musae* Stahel, Trop. Agric., Trinidad 14: 43. 1937, nom. inval., Art. 36.
Periconiella musae Stahel ex M.B. Ellis, Mycol. Pap. 111: 5. 1967, non *Zasmidium musae* (Arzanlou & Crous) Crous & U. Braun, 2010.
Ramichloridium musae (Stahel ex M.B. Ellis) de Hoog, Stud. Mycol. 15: 62. 1977.

Description and illustration: Arzanlou *et al.* (2007).

Materials examined: **Surinam**, on *Musa sapientum*, isol. and dep. G. Stahel, Aug. 1936, culture CBS 335.36.

Notes: The genus *Ramichloridium*, based on the type *Ramichloridium apiculatum*, belongs to the *Dissoconiaceae* (Fig. 1, clade 95; Fig. 4, clade 31). Based on the phylogenetic analyses, the current species belongs to the genus *Zasmidium* (Fig. 4, clade 1; Fig. 5, clade V). *Zasmidium biverticillatum* is closely related to *Zasmidium musigenum* (= *Ramichloridium musae*), but produces profusely branched conidiophores and smaller conidia (Arzanlou *et al.* 2007).

Zasmidium cellare (Pers.) Fr., Summa Veg. Scand. 2: 407. 1849.
Basionym: *Racodium cellare* Pers., Neues Mag. Bot. 1: 123. 1794.
Synonyms: *Antennaria cellaris* (Pers.) Fr., Syst. Mycol. 3: 229. 1829.
Cladosporium cellare (Pers.) Schanderl, Arch. Hyg. Bakteriol.: 117. 1936.
Rhinocladiella cellaris (Pers.) M.B. Ellis, Dematiaceous Hyphomycetes: 248. 1971.
Rhinocladiella ellisii D. Hawksw., Taxon 26: 208. 1977.

Description and illustration: Arzanlou *et al.* (2007).

Materials examined: **Europe**, on wall in wine cellar, unknown collector and date, isol. and dep. H. Schanderl, Jun. 1936 (**neotype** designated here, preserved as metabolically inactive, CBS 146.36, MBT378698) duplicate cultures are ATCC 36951 = IFO 4862 = IMI 44943 = LCP 52.402 = LSHB BB274 = MUCL 10089, MBT378698; **Germany**, Lorch am Rhein, on wall in wine cellar, Aug. 1985, M. Schlag, CBS H-3980, culture CBS 892.85.

Notes: *Zasmidium* was introduced for the stenella-like fungi belonging to the *Mycosphaerellaceae*, since the type species of *Stenella* (*Stenella araguata*) clustered in the *Teratosphaeriaceae* (Arzanlou *et al.* 2007, Braun *et al.* 2010a, b, Kamal 2010, present study Fig. 1, clade 98; Fig. 4, clade 33). The type specimen of *Zasmidium cellare* (based on *Racodium cellare*, from wine cellars in Europe and America) could not be located and the species needed to be neotypified. Morphologically, *Stenella* and *Zasmidium* species are very similar and are usually distinguished by the shape of the conidiogenous loci, which is planate in *Zasmidium* and more pileate in *Stenella* (Braun *et al.* 2013).

Based on the phylogenetic analyses of dataset 4, several terminal branches are highly supported but the backbone is usually poorly supported except for a very basal branch that includes various other genera like *Verrucisporota*, *Ramichloridium*, *Rasutoria*, *Stenella* and *Periconiella* (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clades I–IX). In order to improve the tree resolution, supplementary phylogenetic analyses were performed including these zasmidium-like and closest related species in dataset 4 (Fig. 4, clades 1–7), using both Bayesian and parsimony methods (PBS), and including three genes (LSU, ITS and *rpb2*). Based on these analysis, there is strong support from both Bayesian and parsimony methods for keeping these species together (Fig. 5, clades I-IX). Based on the parsimony analysis these clades (Fig. 5, clades I–VIII) cluster in a basal polytomy, with one clade being excluded but closely related (Fig. 5, clade IX). Morphologically, there was also not a clear pattern that could be observed based on the most strongly supported terminal branches that justified the division of this generic complex in multiple genera. Species with a simple conidiophore are more common than with branched conidiophores, a characteristic only found in Fig. 5, clades V (e.g. *Zasmidium biverticillatum*) and VIII (e.g. *Zasmidium velutinum*). Conidiogenous cells terminal and forming rachis can be found in Fig. 5, clades I (e.g. *Zasmidium cerophilum*) and V (e.g. *Zasmidium musae-banksii*) while conidiogenous cells both terminal and intercalary forming rachis can be found in Fig. 5, clades IV (e.g. *Z. strelitziae*), V (e.g. *Z. musigenum*) and VIII (e.g. *Zasmidium arcuata*). Species with short and catenate conidia are only found on Fig. 5, clades I (e.g. *Zasmidium fructicola*) and II (e.g. *Zasmidium pseudoparkii*) while species with shorter but single conidia can be found in Fig. 5, clades I (e.g. *Zasmidium syzygii*), IV (e.g. *Zasmidium strelitziae*), V (e.g. *Zasmidium musigenum*), VIII (e.g. *Zasmidium hakeae*) and IX (e.g. *Zasmidium iteae*). Species with single and long-obclavate conidia are less common in Fig. 5, clade I (e.g. *Zasmidium angulare*) but appear often in Fig. 5, clades III (e.g. *Zasmidium citri-griseum*), VI (*Zasmidium grevilleae*), VII (e.g. *Zasmidium pittospori*), VIII (e.g. *Zasmidium daviesiae*) and IX (e.g. *Zasmidium queenslandicum*).

Species of the genus *Verrucisporota* (Shaw & Alcorn 1993, Beilharz & Pascoe 2002) are barely distinguishable from *Zasmidium* based on morphological traits and phylogenetically cluster with *Zasmidium* strains (Crous *et al.* 2009a; present study, Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade VI, clade VIII). Although the exact phylogenetic position of the type species, *Verrucisporota proteacearum*, is unknown, the fact that a representative strain clustered among *Zasmidium* species led previous authors to consider the genus *Verrucisporota* as a synonym of *Zasmidium* (Braun *et al.* 2013). Therefore, we propose the combination of these names into *Zasmidium*.

The genus *Ramichloridium* was phylogenetically delimited with the sequencing of the type species (*Ramichloridium apiculatum*) that clustered in *Dissoconiaceae* (Arzanlou *et al.* 2007; this study Fig. 1, clade 95; Fig. 4, clade 31). New combinations are proposed for the *Ramichloridium* species that cluster within the *Zasmidium* clade, among which are included two species involved in the banana speckle disease, namely *Ramichloridium musae* and *Ramichloridium biverticillatum* (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade V).

The genus *Periconiella* is based on *Periconiella velutina*, isolated from *Brabejum stellatifolium* (South Africa), and is known to be a polyphyletic genus (Arzanlou *et al.* 2007; present study Fig. 1, clade 69, 70, 85; Fig. 4, clade 1, 2, 21; Fig. 5, clades VIII, X). Morphologically, *Periconiella* species are zasmidium-like with pigmented conidiophores and conidia, smooth to verruculose, with conidiogenous cells polyblastic and with planate scars and were usually distinguished by producing conidiophores that are prominently branched in the upper part (Arzanlou *et al.* 2007). Based on the phylogenetic position of the type species *Periconiella velutina* and the morphological characters of the genus, we propose to reduce *Periconiella* to synonymy under *Zasmidium*, which is the older name.

Rasutoria was established by Barr (1987), based on *Rasutoria abietis* (on *Abies amabilis*, USA), to accommodate species with hyaline to brown ascospores occurring on *Gymnospermae*. The genus currently accommodates four species that are only known from their sexual morph. *Rasutoria tsugae* and *Rasutoria pseudotsugae*, which are important pathogens of Douglas-fir (Winton *et al.* 2007), have hyaline ascospores, while *Rasutoria abietis* and *Rasutoria terrieri* have pale brown to brown ascospores. Hyaline ascospores is a typical morphological characteristic in the *Mycosphaerellaceae* (Aptroot 2006). Only *Rasutoria pseudotsugae* and *Rasutoria tsugae* have cultures and DNA sequences available that place them among *Zasmidium* species (Fig. 1, clade 69; Fig. 4, clade 1, Fig. 5, clade VIII), and closely related to *Zasmidium pseudovespa* (= *Mycosphaerella pseudovespa*), which also produces hyaline ascospores (Carnegie *et al.* 2007). Therefore, these two species are placed in the genus *Zasmidium*, while *Rasutoria abietis* and *Rasutoria terrieri* need to be recollected in order to determine their correct phylogenetic position, as well as the position of the genus *Rasutoria*.

The clade at the bottom of the *Zasmidium* complex (Fig. 5, clade IX) includes species that are mostly ramichloridium-like, with a straight conidiophore and polyblastic intercalary and terminal conidiogenous cells producing single or short catenate obovoid conidia. However, the species *Zasmidium queenslandicum* in this clade has a typical *Zasmidium* morphology, similar to *Zasmidium musicola* (Fig. 5, clade III) and *Zasmidium musae* (Fig. 5, clade VIII). Therefore, based on phylogenetic support and morphological similarities these species are considered part of the genus *Zasmidium*.

Zasmidium cerophilum (Tubaki) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822808.
Basionym: *Acrotheca cerophila* Tubaki, J. Hattori Bot. Lab. 20: 143. 1958.
Synonyms: *Cladosporium cerophilum* (Tubaki) Matsush., Icones Microfungorum a Matsushima lectorum: 34. 1975.
Ramichloridium cerophilum (Tubaki) de Hoog, Stud. Mycol. 15: 74. 1977.

Description and illustration: Arzanlou *et al.* (2007).

Material examined: **Japan**, on *Sasa* sp., May 1955, K. Tubaki (**holotype** preserved in Nagao Institute, culture ex-type of *Acrotheca cerophila* CBS 103.59 = MUCL 10034).

Notes: The present species is phylogenetically placed within the *Zasmidium* clade (Fig. 4, clade 1; Fig. 5, clade I) among typical *Zasmidium* species. *Zasmidium cerophilum* is closely related to *Zasmidium fructigenum*, but is more similar morphologically to *Zasmidium eucalypticola* by producing terminal and short rachis-like conidiogenous cells and secondary conidia (Arzanlou *et al.* 2007). *Zasmidium cerophilum* can be morphologically distinguished from *Z. musigenum*, *Zasmidium musae-banksii* and *Zasmidium biverticillatum* by the production of secondary conidia and its distinct conidial hila.

Zasmidium citri-griseum (F.E. Fisher) U. Braun & Crous, IMA Fungus 5: 337. 2014.
Basionym: *Cercospora citri-grisea* F.E. Fisher, Phytopathology 51: 300. 1961.
Synonyms: *Stenella citri-grisea* (F.E. Fisher) Sivan., Bitunicate Ascomycetes and their Anamorphs: 226. 1984.
?*Mycosphaerella citri* Whiteside, Phytopathology 62: 263. 1972.
?*Zasmidium citri* (Whiteside) Crous, Persoonia 23: 105. 2009.

Descriptions and illustrations: Braun *et al.* (2014), Huang *et al.* (2015).

Materials examined: **China**, Yunnan prov., Mengdian, on leaves with yellow spot of *Citrus limon*, Jul. 2011, L. Zhu, cultures ZJUM 103 = CPC 24500, ZJUM 104 = CPC 24501; on leaf with yellow spot of *Citrus aurantifolia*, Jul. 2011, L. Zhu, culture ZJUM 105 = CPC 24502; Zhejiang prov., Cangnan, on leaf with yellow spot of *Citrus grandis*, Dec. 2009, L. Zhu, culture ZJUM 5 = CPC 24464; Changshan, on leaves of *Citrus paradisi* × *Citrus* sp., May 2009, L. Zhu, culture ZJUM 25 = CPC 24468, ZJUM 27 = CPC 24469; Nov. 2011, L. Zhu, culture ZJUM 54 = CPC 24474; Huangyan, on leaf with big round spot of *Citrus reticulata*, Apr. 2010, L. Zhu, culture ZJUM 81 = CPC 24488; Yuhuan, on leaf with greasy spot of *C. grandis*, Nov. 2011, L. Zhu, culture ZJUM 97 = CPC 24497; Jiangshan, on leaf with brown small round spot of *C. paradisi* × *Citrus* sp., Apr. 2013, F. Huang, culture ZJUM 127 = CPC 24504. **Thailand**, on living leaves of *Eucalyptus* sp., 2006, W. Himaman, culture CPC 13467; Chonburi, on living leaves of seedlings of *Acacia mangium*, 19 Nov. 2002, M.J. Wingfield, culture CPC 10522 = CBS 116366. **USA**, Florida, Polk County, Babson Park, on *C. limon*, 15 Jan. 1958, F.E. Fisher (presumably lost); single ascospore isolates, associated with citrus greasy leaf spot disease symptoms, *Citrus* sp. 2003, R.C. Ploetz, cultures CPC 15289, CPC 15290 = CBS 122455, CPC 15294, CPC 15285, CPC 15291, CPC 15293; on leaves of *Musa* sp., 2003, J. Cavaletto, culture CBS 116426; Florida, Lake Alfred & Haines City, on *Citrus* sp., May 1970, F.E. Fisher (**neotype** designated by Braun *et al.* 2014: IMI 148810); single ascospore isolates, associated with citrus greasy leaf spot disease symptoms, *Citrus* sp., 2003, S.N. Mondal (**epitype** designated by Huang *et al.* 2015: CBS H-22176, culture ex-epitype CBS 139467 = CPC 15296).

Notes: See Braun *et al.* (2014) for the detailed description of the neotype and Huang *et al.* (2015) for the epitype details. Based on the phylogenetic analyses, *Zasmidium citri-griseum* clusters within the *Zasmidium* clade (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade III) and is closely related to *Zasmidium anthuricola*.

Zasmidium daviesiae (Cooke & Massee) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822828.
Basionym: *Cercospora daviesiae* Cooke & Massee, Grevillea 18: 7. 1889.
Synonyms: *Verrucisporota daviesiae* (Cooke & Massee) Beilharz & Pascoe, Mycotaxon 82: 360. 2002.
Mycosphaerella daviesiicola Beilharz & Pascoe, Mycotaxon 82: 364. 2002.

Description and illustration: Chupp (1954), Beilharz & Pascoe (2002).

Materials examined: **Australia**, Victoria, on road from Merimbah to Circuit road, 3.4 km short of Mt. Stirling, on *Daviesia mimosoides* (= *D. cormybosa* var. *mimosoides*), 30 Dec. 2003, V. & R. Beilharz, culture VPRI 31767 = CBS 116002.

Notes: The type of *Zasmidium daviesiae*, based on *Cercospora daviesiae*, was isolated from leaves of *Daviesia latifolia* (Victoria, Australia, K) which is a different host from the examined strain. Phylogenetically, the present specimen clusters among *Zasmidium* species (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade VIII), as defined in the present study, and is closely related to *Zasmidium velutinum* (= *Periconiella velutinae*), but the latter species produces branched conidiophores with terminal polyblastic conidiogenous cells and shorter conidia (Arzanlou *et al.* 2007). Morphologically, the examined material is similar to *Zasmidium* spp. by producing polyblastic, intercalary and terminal conidiogenous cells with conidiogenous loci darkened and planate, which give rise to long-obclavate, multiseptate, verruculose conidia (Beilharz & Pascoe 2002).

Zasmidium elaeocarpi U. Braun, C. Nakash., Videira & Crous, **sp. nov.** MycoBank MB822718. Fig. 39.

Etymology: Derived from the host genus on which it occurs, *Elaeocarpus*.

Description in vitro (on SNA): *Mycelium* composed of hyaline and pale brown to dark blackish brown hyphae, verruculose, septate, branching, uniform in width, 2.5 μm. *Conidiophores* arising from hyphae, micro- to macronematous, pale olivaceous brown to pale blackish brown, finely verruculose, straight or slightly curved, frequently geniculate, rugged or rugose at the upper part, 25–450 × 3.5–5 μm. *Conidiogenous cells* integrated, apical or intercalary, polyblastic, proliferating sympodially, with numerous rim-like conidiogenous loci, thickened and darkened, dispersed through the entire cells, forming a single or multicelled rachis (ramichloridium-like), 1–1.5 μm diam. *Conidia* solitary, occasionally catenate, pale blackish brown to pale olivaceous brown, verruculose, ellipsoidal, cylindrical to obclavate, base obconically truncate and apex rounded, straight or curved, 10–75 × 2.5–4 μm, 0-7-euseptate, sometimes constricted at septa, with hila thickened and darkened, 1–1.5 μm diam.

Materials examined: **Australia**, New South Wales, north-west of Grafton, North Washpool State Forest, on *Elaeocarpus kirtonii*, 1 Mar. 2009, B. Summerell (**holotype** CBS H-22960, ex-type culture CBS 142187 = CPC 16642); *idem*. culture CPC 16640.

Fig. 39. *Zasmidium elaeocarpi* (CPC 16640). **A–F.** Observations *in vitro*. **A.** Culture on OA. **B, C.** Conidiophore, conidiogenous cells and conidia. **D, E.** Partial conidiophore, conidiogenous cells and conidia. **F.** Conidia. Scale bars = 10 µm.

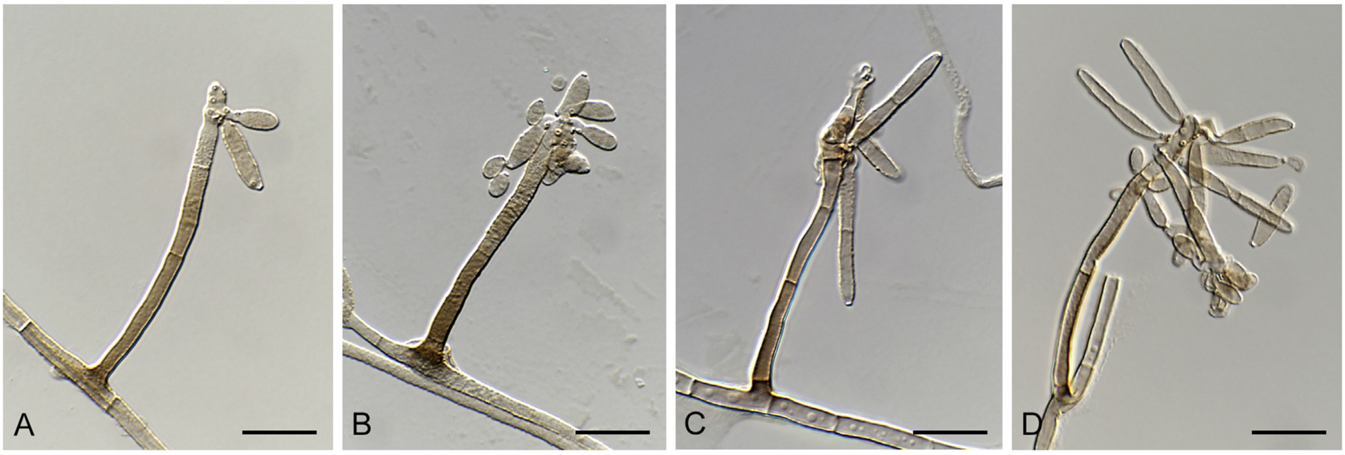


Fig. 40. *Zasmidium eucalypticola* (CPC 15149). **A–D.** Conidiophores and conidia observed *in vivo*. Scale bars = 10 µm.

Notes: *Zasmidium elaeocarpi* is morphologically similar to *Zasmidium iteae* by producing ramichloridium-like polyblastic conidiogenous cells on a short rachis with thickened and darkened scars, and verruculose conidia that are solitary or catenate. *Zasmidium elaeocarpi* can be distinguished by producing longer conidiophores and longer and wider conidia than *Zasmidium iteae* (Kirschner *et al.* 2004). Based on the phylogenetic analysis, these two species are closely related and cluster in the same clade within the *Zasmidium* complex (Fig. 4, clade 1; Fig. 5, clade IX).

Zasmidium eucalypticola U. Braun, C. Nakash., Videira & Crous, **sp. nov.** MycoBank MB822724. Fig. 40.

Etymology: Composed of *Eucalyptus* (host genus) and -cola (dweller).

Description in vitro (on SNA; CPC 15149): *Mycelium* composed of hyaline, subhyaline, or pale olivaceous brown hyphae, smooth to rough, uniform in width 2–2.5 µm. *Conidiophores* micro- to macronematous, arising from hyphae, pale olivaceous brown to olivaceous brown, somewhat paler towards the apex, verruculose, simple, septate, straight to slightly curved, uniform in width, rugged or geniculate at the apex, 38–63 × 3–3.5 µm. *Conidiogenous cells* integrated, apical, polyblastic, proliferating sympodially, with rim-like conidiogenous loci, thickened and darkened, located apically and lateraly as in a short rachis (ramichloridium-like), 1.5–2 µm diam. *Conidia* solitary, sometimes bearing conidia by microcyclic conidiation, pale olivaceous brown, verruculose, ovoid to cylindrical, base obconically truncate and apex rounded, 7.5–20 × 2.5–4 µm, 0–1-septate, hila thickened and darkened.

Material examined: **Brazil**, Minas Gerais, Viçosa, Paraíso, on *Eucalyptus* sp., 1 Mar. 2008, coll. A.C. Alfenas, isol. P.W. Crous (**holotype** CBS H-22959, ex-type culture CBS 142186 = CPC 15149).

Notes: Phylogenetically, the present species is closely related to *Zasmidium syzygii* (Fig. 4 clade 1; Fig. 5, clade I) but they are morphologically distinct. *Zasmidium eucalypticola* produces conidiogenous cells that are rachis-like with broader scars and smaller ovoid conidia. *Zasmidium syzygii* produces conidiogenous cells with smaller scars and multiseptate conidia that are longer and narrowly obclavate (Crous *et al.* 2012a). Based on a BLAST comparison against the alignment, *Zasmidium eucalypticola* shares 99 % (481/486) similarity on ITS and 97 % (714/737) similarity on *rpb2* with *Zasmidium syzygii*.

Zasmidium eucalyptorum (Crous & M.J. Wingf.) Quaedvlieg & Crous, Persoonia 33: 24. 2014.
Basionym: *Mycosphaerella eucalyptorum* Crous & M.J. Wingf., Stud. Mycol. 55: 112. 2006.

Description and illustration: Crous *et al.* (2006b).

Material examined: **Indonesia**, on leaves of *Eucalyptus urophylla*, Mar. 2004, M.J. Wingfield (**holotype** CBS H-19689, ex-type culture CBS 118500 = CPC 11174).

Notes: The present species is only known from its sexual morph that is mycosphaerella-like and produces ascospores (12–17 × 3.5–4.5 µm) that germinate in a Type B germination pattern (Crous *et al.* 2006b). Based on the phylogenetic analyses *Zasmidium eucalyptorum* is closely related to *Zasmidium pseudoparkii* (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade II), which is also a pathogen of *Eucalyptus* but was originally described from Colombia.

Zasmidium fructicola Crous *et al.*, Mycologia 107: 1165. 2015.

Description and illustration: Huang *et al.* (2015).

Materials examined: **China**, Zhejiang Prov., Huangyan, on fruit of *Citrus reticulata*, Jan. 2010, X.H. Wang, **holotype** CBS H-22177, culture ex-type ZJUM 80 = CPC 24487 = CBS 139625; Huangyan, on fruit with citrus black spot of *Citrus unshiu*, Jan. 2010, X.H. Wang, culture ZJUM 84 = CPC 24489; Cangnan, on fruit with greasy spot of *Citrus grandis*, Oct. 2010, L. Zhu, culture ZJUM 9 = CPC 24465; Changshan, on fruit with yellow spot of *Citrus paradisi* × *Citrus* sp., Nov. 2010, L. Zhu, cultures ZJUM 48 = CPC 24472, ZJUM 50 = CPC 24473; on fruit with black dot of *C. paradisi* × *Citrus* sp., Dec. 2010, L. Zhu, culture ZJUM 55 = CPC 24475; Linhai, on fruit with black dot of *C. sinensis*, Nov. 2010, G.Q. Chen, culture ZJUM 89 = CPC 24494); Fujian Prov., on fruit with greasy spot of *C. grandis*, Nov. 2010, L. Zhu, culture ZJUM 58 = CPC 24477; Nanjing, on fruit with greasy spot of *C. grandis*, Nov. 2009, L. Zhu, culture ZJUM 90 = CPC 24495; Guangdong Prov., Pingyuan, on fruit with citrus black spot of *Citrus sinensis*, Nov. 2009, X.H. Wang, culture ZJUM 68 = CPC 24479; Hunan Prov., Jishou, on fruits of *C. reticulata*, Nov. 2011, X.H. Wang, cultures ZJUM 77 = CPC 24484, ZJUM 78 = CPC 24485, ZJUM 79 = CPC 24486.

Notes: Based on the phylogenetic analyses, *Zasmidium fructicola* is closely related to *Zasmidium fructigenum* (Fig. 4, clade 1; Fig. 5, clade I) which agrees with the original assessment by Huang *et al.* (2015). These two species are morphologically similar, but *Zasmidium fructicola* produces darker and wider conidia than *Zasmidium fructigenum* (conidia pale brown, 5–15 × 2 µm; Huang *et al.* 2015).

Zasmidium fructigenum Crous *et al.*, Mycologia 107: 1165. 2015.

Description and illustration: Huang *et al.* (2015).

Materials examined: **China**, Zhejiang Prov., Changshan, on fruit with greasy spot of *Citrus paradisi* × *Citrus* sp., Nov. 2009, L. Zhu (**holotype** CBS H-22178, culture ex-type ZJUM 36 = CPC 24471 = CBS 139626); Yuhuan, on fruits with greasy spot of *Citrus grandis*, Nov. 2010, L. Zhu, cultures ZJUM 99 = CPC 24498, ZJUM 100 = CPC 24499; Linhai, on fruit with black dot of *Citrus reticulata* (= *Citrus unshiu*), Nov. 2010, G.Q. Chen, culture ZJUM 88 = CPC 24493; Jiangxi Prov., on fruit with citrus black spot of *Citrus reticulata*, Nov. 2010, X.H. Wang, cultures ZJUM 86 = CPC 24491, ZJUM 87 = CPC 24492.

Note: See notes on *Zasmidium fructicola*.

Zasmidium grevilleae Crous & Summerell, **sp. nov.** MycoBank MB822721.
Basionym: *Verrucisporota grevilleae* Crous & Summerell, Persoonia 22: 155. 2009, nom. inval. (Art. 40.6).

Etymology: Derived from the host genus on which it occurs, *Grevillea*.

Description and illustration: Crous *et al.* (2009a).

Materials examined: **Australia**, Northern Territory, Emerald Springs, on leaves of *Grevillea decurrens*, 22 Sep. 2007, B. Summerell (**holotype** CBS H-20205, ex-type culture CBS 124107 = CPC 14761); *idem*. cultures CPC 14762, CPC 14763.

Notes: Crous *et al.* (2009a) proposed the new species *Verrucisporota grevilleae* but did not designate the type specimen at the time, making it an invalid name according to Art. 40.6 (Melbourne). Herewith we designate the original specimen as the holotype for *Zasmidium grevilleae*. *Verrucisporota* is currently considered a synonym of *Zasmidium* based on morphological and phylogenetical evidence (Braun *et al.* 2013). The present species clusters within the genus *Zasmidium* (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade VI) as circumscribed in the present study. *Zasmidium grevilleae* can be distinguished from its closest relative, *Verrucisporota proteacearum*, by producing shorter conidiophores and narrower and longer conidia (Shaw & Alcorn 1967; Crous *et al.* 2009a).

Zasmidium gupoyu (R. Kirschner) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822809.
Basionym: *Parastenella gupoyu* R. Kirschner, Fungal Diversity 40: 42. 2010.

Description and illustration: Kirschner & Chen (2010).

Material examined: **Taiwan**, Nantou County, Chitou, ca. 1200 m, on senescent lower leaf of *Alocasia odora*, 19 Mar. 2007, R. Kirschner & S.-H. Wu, 2990-B (**holotype** TNM, **isotypes** BPI 878812, FR); Taipei County, Wulai, 300 m, on senescent lower leaf of *Alocasia odora*, 22 Feb. 2005, R. Kirschner & C.-J. Chen 2279, 3022 (TNM), culture CBS 122099 = RoKi 3022.

Notes: The present species was originally described in the genus *Parastenella*. However, judging from the SEM photographs (Kirschner & Chen 2010), its loci were distinctly thickened, which is not a character typical of the generic description of *Parastenella*. *Parastenella gupoyu* produces erect, unbranched conidiophores and verruculose hyphae and conidia, characters typical of *Zasmidium s. lat.* The genus *Parastenella* is based on *Parastenella magnolia* (on leaves of *Magnolia grandiflora*, USA) and its current phylogenetic position is unknown because there are no sequence data available. Based on the phylogenetic analyses, the present species clusters in *Zasmidium* (Fig. 1, clade 63; Fig. 4 clade 1; Fig. 5, clade IX) and is closely related to *Zasmidium elaeocarpi*. Morphologically, *Zasmidium gupoyo* can be distinguished from *Zasmidium elaeocarpi* by producing the conidia in short shoulders mostly in the apical area of the conidiogenous cells and by producing long and single conidia.

Zasmidium hakeae U. Braun, C. Nakash., Videira & Crous, **sp. nov.** MycoBank MB822723. Fig. 41.

Etymology: Derived from the host genus on which it occurs, *Hakea*.

Description in vitro (on SNA; CPC 15577): *Mycelium* composed of hyaline to subhyaline hyphae, smooth to rough, septate, branching. *Conidiophores* emerging from hyphae, micro- to macronematous, brown to olivaceous brown, paler towards the apex, verruculose, rugose, straight to slightly curved, simple, strongly geniculate at the apex, 200–250 × 2.5–3.8 µm. *Conidiogenous cells* integrated, apical, polyblastic, proliferating sympodially, sometimes also percurrently, with rim-like conidiogenous loci, thickened and darkened, located apically and laterally in a short rachis, 1.5–2 µm diam. *Conidia* solitary, pale to pale olivaceous brown, verruculose, ellipsoid to obclavate, straight to mildly sinuous, obconically truncate at the base, rounded at the apex, 8–32.5 × 2.5–5 µm, 1–9-septate, hila thickened and darkened, 1.5–2 µm diam.

Materials examined: **Australia**, Western Australia, Pemberton, Steward Road, *Banksia* woodland, on *Hakea undulata*, 2 Aug. 2008, A.R. Wood (**holotype** CBS H-22958, ex-type culture CBS 142185 = CPC 15577); *idem*., culture CPC 15583;

Fig. 41. *Zasmidium hakeae* (CPC 15577). **A–F.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Partial conidiophore and conidiogenous cells. **D–F.** Conidia. **G–L.** Observations *in vitro*. **G.** Culture on V8. **H–J.** Partial conidiophore, conidiogenous cells and conidia. **K, L.** Conidia. Scale bars = 10 µm.

Queensland, Norta Nature Reserve, leaves in shop (Loma tea), 13 Jul. 2009, P.W. Crous, culture CPC 17213.

Notes: Based on the phylogenetic analyses, the present species clusters in *Zasmidium* (Fig. 4, clade 1; Fig. 5, clade VIII), and is closely related to *Zasmidium daviesiae*. Morphologically, *Zasmidium hakeae* produces longer and narrower conidiophores and shorter and narrower conidia with more septa than *Zasmidium daviesiae* (conidiophores 16–65 × 5–7 µm, conidia 18–56 × 4.5–7 µm, 0–6-septate; Beilharz & Pascoe 2002). There were two different species isolated from the same herbarium specimen in this study, *Zasmidium hakeae* (CPC 15577) and *Devonomyces endophyticus* (CPC 15580) which indicates they may be co-existing in the same lesions.

Zasmidium indonesianum Crous *et al.*, Mycologia 107: 1166. 2015.

Description and illustration: Huang *et al.* (2015).

Materials examined: **Indonesia**, on leaf spots of *Citrus* sp., 2004, M. Arzanlou (**holotype** CBS H-22179, culture ex-type CBS 139627 = CPC 15300); *idem*., cultures CPC 15301, CPC 15302.

Notes: Based on the phylogenetic analyses, *Zasmidium indonesianum* clusters in the *Zasmidium* clade (Fig. 4, clade 1; Fig. 5, clade III), which is in agreement with the original observations by Huang *et al.* (2015), and is closely related to *Zasmidium musicola*, a pathogen of *Musa* sp. *Zasmidium indonesianum* is a pathogen of *Citrus* sp. and differs from *Zasmidium citri-griseum* by producing shorter and narrower conidiophores and conidia (Braun *et al.* 2014, Huang *et al.* 2015).

Zasmidium iteae **(**R. Kirschner**)** U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822810.
Basionym: *Stenella iteae* R. Kirschner, Fungal Diversity 17: 58. 2004.

Description and illustration: Kirschner *et al.* (2004).

Materials examined: **Taiwan**, Pingtung, Nanrenshan, on leaves of *Itea parviflora*, 2 Jun. 2002, R. Kirschner & C.-J. Chen (**holotype** TNM, culture ex-type CBS 113094 = RoKi 1279).

Notes: The present species was originally described in the genus *Stenella* (Kirschner *et al.* 2004), which is currently accommodated in *Teratosphaeriaceae* (Fig. 1, clade 98). As a consequence of the circumscription of the genus *Stenella* based on its type, several stenella-like species in the *Mycosphaerellaceae* were assigned to the genus *Zasmidium* (Braun *et al.* 2010a). Based on the phylogenetic analysis, the present species clusters in *Zasmidium* (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade IX), and is closely related to *Zasmidium elaeocarpi*. Morphologically, *Zasmidium iteae* can be distinguished from *Zasmidium elaeocarpi* by producing shorter conidiophores and shorter and narrower conidia (Kirschner *et al.* 2004).

Zasmidium lonicericola (Y.H. He & Z.Y. Zhang) Crous & U. Braun, Persoonia 23: 140. 2009.
Basionym: *Cladosporium lonicericola* Yong H. He & Z.Y. Zhang, Mycosystema 20: 469. 2001.
Synonyms: *Stenella lonicericola* (Yong H. He & Z.Y. Zhang) K. Schub. *et al.*, Fungal Diversity 20: 204. 2005.
Cladosporium lonicerae Sawada, Rep. Gov. Res. Inst. Formosa 86: 163. 1943, nom. inval. (Art. 39.1).

Description and illustrations: See Crous *et al.* (2009d).

Materials examined: **Republic of Korea,** Yangpyong, on leaves of *Lonicera japonica*, 23 Jul. 2004, H.D. Shin, herb. HAL 3240 F; Hongchon, on leaves of *Lonicera japonica*, 30 Oct. 2004, H.D. Shin [**epitype** of *Cladosporium lonicericola* designated here: CBS H-20271, MBT378604, (holotype MHYAU 03533), culture ex-epitype CBS 125008 = CPC 11671]; *idem*., cultures CPC 11672, CPC11673. **Taiwan**, Taipei, on leaves of *Lonicera japonica* var. *sempervillosa*, 20 Dec. 1914, K. Sawada (authentic material of *Cladosporium lonicerae*, BPI 427243).

Notes: The taxonomic history of the present species was addressed by several authors (Zhang *et al.* 2003, Schubert & Braun 2005, Crous *et al.* 2009d). The epitypification of *Cladosporium lonicericola* by Crous *et al.* (2009d) was not compliant with the code (Art. 9.8) since the holotype was not cited. Based on the phylogenetic analyses this species clusters in *Zasmidium* (Fig. 4, clade 1; Fig. 5, clade I), and is closely related to *Zasmidium cerophilum*. The morphological characteristics and scar type (planate instead of pileate), of this species confirms its placement in *Zasmidium*.

Zasmidium musae (Arzanlou & Crous) Crous & U. Braun, Schlechtendalia 20: 102. 2010.
Basionym: *Stenella musae* Arzanlou & Crous, Persoonia 20: 31. 2008.

Description and illustration: Arzanlou *et al.* (2008).

Materials examined: **France**, Martinique, on *Musa* sp., unknown collector and date, culture CBS 121384 = CIRAD 41 = X877. **Tonga**, Aciar Plot, Tongatapu, on *Musa* cv. TU8 AAAA, Mar. 1990, R.A. Fullerton (**holotype** of *Stenella musae*, CBS H-20047, ex-type culture X745 = CBS 122477). **Netherlands Antilles**, Windward Islands, St Lucia, on *Musa* cv., 2003, E. Reid, culture X47 = CBS 122476; St. Lucia, on *Musa* cv., 2003, E. Reid, culture CBS 122478 = X70.

Note: Based on the phylogenetic analyses *Zasmidium musae* clusters in the *Zasmidium* clade (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade VII), and is closely related to *Zasmidium aucklandicum*, which agrees with previous observations by Arzanlou *et al.* (2008).

Zasmidium musae-banksii Videira & Crous, **nom. nov.** MycoBank MB822830.
Replaced synonym: Ramichloridium australiense Arzanlou & Crous, Stud. Mycol. 58: 69. 2007, non *Zasmidium australiense* (J.L. Mulder) U. Braun & Crous 2010.

Description and illustration: Arzanlou *et al.* (2007).

Material examined: **Australia**, Queensland, Mount Lewis, Mount Lewis Road, 16°34′47.2″ S, 145°19′7″ E, 538 m alt., on *Musa banksii* leaf, Aug. 2006, P.W. Crous & B. Summerell (**holotype** CBS H-19928, culture ex-type CBS 121710).

Notes: Based on the phylogenetic analyses and morphological characters, the present species belongs to the genus *Zasmidium* (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade V). The phylogenetic position of *Ramichloridium* is defined by the type, *Ramichloridium apiculatum*, in *Dissoconiaceae* (Fig. 1, clade 83; Fig. 4, clade 28).

Zasmidium musicola (Arzanlou & Crous) Crous & U. Braun, Schlechtendalia 20: 102. 2010.
Basionym: *Stenella musicola* Arzanlou & Crous, Persoonia 20: 33. 2008.

Description and illustration: Arzanlou *et al.* (2008).

Material examined: **India**, Tamil Nadu, Tiruchirapally, on leaf of *Musa* cv. Grand Nain AAA (Cav.), 23 Feb. 2005, I. Buddenhagen (**holotype** CBS H-20046, culture ex-type CBS 122479 = X1019).

Notes: *Zasmidium musicola* (as *Stenella musicola*) was described from *Musa* sp. and found to be both phylogenetically and morphologically close to *Zasmidium citri-griseum* (Arzanlou *et al.* 2008). These results are corroborated by the phylogenetic analyses in the present study (Fig. 4, clade 1; Fig. 5, clade III).

Zasmidium musigenum Videira & Crous, **nom. nov.** MycoBank MB822831.
Replaced synonym: *Veronaea musae* Stahel ex M.B. Ellis, in Ellis, More Dematiaceous Hyphomycetes: 209. 1976, non *Zasmidium musae* (Arzanlou & Crous) Crous & U. Braun 2010.
Synonyms: *Chloridium musae* Stahel, Trop. Agric., Trinidad 14: 43. 1937, *nom. inval.* (Art. 39.1).
Ramichloridium musae (Stahel ex M.B. Ellis) de Hoog, Stud. Mycol. 15: 62. 1977.
Misapplied name: *Chloridium indicum* Subram., sensu Batista & Vital, Anais Soc. Biol. Pernambuco 15: 379. 1957.

Description and illustration: Arzanlou *et al.* (2007).

Materials examined: **Cameroon**, from *Musa sapientum*, J.E. Heron, culture CBS 169.61 = ATCC 15681 = IMI 079492 = DAOM 84655 = MUCL 2689. **Suriname**, Paramaribo, from *Musa sapientum* leaf, G. Stahel (authentic material of *Chloridium musae*, CBS H-19933, culture CBS 365.36 = JCM 6973 = MUCL 9556). **Unknown**, from *Musa sapientum*, J. Brun, culture CBS 190.63 = MUCL 9557.

Notes: The type specimen of *Zasmidium musigenum*, based on *Veronaea musae*, was isolated from *Musa sapientum* from Jamaica (type IMI 23006), which is a different location from the examined strains. Based on the phylogenetic analysis, *Zasmidium musigenum* belongs to *Zasmidium* as circumscribed in the present study (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade V), and is closely related to *Zasmidium musae-banksii*. *Zasmidium musigenum* and *Zasmidium musae-banksii* are both pathogens of *Musa* sp. and are morphologically similar, but *Zasmidium musigenum* produces shorter conidiophores and conidia (Arzanlou *et al.* 2007).

Zasmidium nocoxi Crous, Persoonia 23: 141. 2009.

Description and illustration: See Crous *et al.* (2009d).

Material examined: **USA**, Virginia, Front Royal, on twig debris, 14 May 2007, P.W. Crous (**holotype** CBS H-20272, cultures ex-type CBS 125009 = CPC 14044).

Notes: *Zasmidium nocoxi* (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade I) produces a synasexual morph similar to *Hyalozasmidium aerohyalinosporium* (Fig. 4, clade 21), revealing this synasexual morph to not be exclusive to the genus *Zasmidium*.

Zasmidium pittospori (U. Braun) U. Braun, Schlechtendalia 20: 102. 2010.
Basionym: *Stenella pittospori* U. Braun, Fungal Diversity 26: 68. 2007.

Description and illustration: See Braun & Crous (2007).

Material examined: **New Zealand,** Auckland, Mt. Albert, on *Pittosporum tenuifolium*, 15 Jul. 2007, C.F. Hill, culture CBS 122274 = ICMP 17098. **China**, Sichuan, Dujiangyan, on *Pittosporum podocarpum*, 20 Sep. 2006, S. Both (**holotype** HAL 1945 F).

Notes: Based on the phylogenetic analyses *Zasmidium pittospori* is closely related to *Zasmidium aucklandicum* and *Zasmidium musae* (Fig. 4, clade 1; Fig. 5, clade VII). Morphologically, it can be distinguished from *Zasmidium musae* by producing longer conidiophores, and longer and wider verruculose conidia (Braun & Crous 2007, Arzanlou 2008).

Zasmidium proteacearum (D.E. Shaw & Alcorn) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822812.
Basionym: *Verrucispora proteacearum* D.E. Shaw & Alcorn, Proc. Linn. Soc. New South Wales. 92: 171. 1967.
Synonym: *Verrucisporota proteacearum* (D.E. Shaw & Alcorn) D.E. Shaw & Alcorn, Austral. Syst. Bot. 6: 273. 1993.

Description and illustrations: Crous *et al.* (2009a).

Material examined: **Australia**, Queensland, Indooroopilly, on *Grevillea* sp., 3 Feb. 2004, J.L. Alcorn, dep. V. Beilharz, culture CBS 116003 = VPRI 31812.

Notes: The type of *Verrucisporota*, *Verrucisporota proteacearum*, was described from the host *Finschia chloroxantha* from Papua New Guinea (holotype IMI 77905, fide Shaw & Alcorn 1967). The present strain was isolated from a different host and originates from a different country. In addition, it produced wider conidia than those in the original description (Crous *et al.* 2009a). Therefore, this may be a different species and the precise phylogenetic position of the type of *Verrucisporota* remains unresolved. Nevertheless, given the morphological similarities with *Zasmidium* and phylogenetic placement of the existing strains (Fig. 4, clade 1; Fig. 5, clade VI), *Verrucisporota* was tentatively synonymised with *Zasmidium* (Braun *et al.* 2013).

Zasmidium pseudoparkii (Crous & M.J. Wingf.) Crous & U. Braun, Schlechtendalia 20: 102. 2010.
Basionym: *Stenella pseudoparkii* Crous & M.J. Wingf., Stud. Mycol. 55: 128. 2006.

Description and illustrations: Crous *et al.* (2006b).

Materials examined: **Colombia**, Sinai, on leaves of *Eucalyptus grandis*, May 1995, M.J. Wingfield, culture CBS 110988 = CPC 1090; on leaves of *Eucalyptus* sp., 1995, M.J. Wingfield (**holotype** CBS H-19702, culture ex-holotype CBS 110999 = CPC 1087).

Notes: Phylogenetically, *Zasmidium pseudoparkii* is closely related to *Zasmidium eucalyptorum* (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade II). *Zasmidium eucalyptorum* is only known from its sexual morph and produces ascospores that germinate in a Type C pattern (Crous 1998), while ascospores of *Zasmidium pseudoparkii* germinate with a Type D pattern (Crous *et al.* 2006b). The asexual morph of *Zasmidium pseudoparkii* is morphologically similar to *Pseudozasmidium parkii* (Fig. 1, clade 94; Fig. 4, clade 27).

Zasmidium pseudotsugae (V.A.M. Mill. & Bonar) Videira & Crous, **comb. nov.** MycoBank MB822813.
Basionym: *Dimeriella pseudotsugae* V.A.M. Mill. & Bonar, Univ. Calif. Publ. Bot. 19: 405. 1941.
Synonyms: *Epipolaeum pseudotsugae* (V.A.M. Mill. & Bonar) Shoemaker, Canad. J. Bot. 43: 637. 1965.
Rasutoria pseudotsugae (V.A.M. Mill. & Bonar) M.E. Barr, Mycotaxon 29: 502. 1987.

Description and illustration: Farr (1963), Shoemaker (1965).

Description in vivo (adapted from Shoemaker 1965): *Perithecia* clustered on hypophyllous superficial mycelium, spherical, 60–80 µm diam, setose; beak rarely perceptible, usually a paler coloured circular area, 10–15 µm diam, composed of 5–8 × 3 µm convergent yellow hyphae; wall 10–15 µm wide, of 2 layers of polygonal cells, 9 × 12 µm. *Asci* in a basal cluster, bitunicate, saccate to cylindrical, aparaphysate, 30–40 × 6–10 µm, with 8 biseriate ascospores. *Ascospores* hyaline, smooth, without sheath, 1-septate at middle, wider at upper cell, both cells uninucleate, 9–12(–15) × 2.5–3.5 µm.

Notes: The type specimen of *Zasmidium pseudotsugae*, based on *Dimeriella pseudotsugae*, was isolated from *Pseudotsuga menziesii* from California, USA (holotype UC498795, isotypes in CUP, F, NY, BPI, GAM, ILL, MICH, TENN and WIS). The DNA sequences of *Rasutoria pseudotsugae* used in this study were available on GenBank (Table 1) (Winton *et al.* 2007) and no new sequences were generated. See notes on *Zasmidium cellare*.

Zasmidium pseudovespa (Carnegie) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822814.
Basionym: *Mycosphaerella pseudovespa* Carnegie, Mycologia 99: 468. 2007.

Description and illustration: Carnegie *et al.* (2007).

Materials examined: **Australia**, New South Wales, Urbenville, Reid Plantation, native regeneration within plantation boundary, on living leaves of *Eucalyptus biturbinata*, 14 Apr. 2005, A.J. Carnegie (**holotype** DAR 77432, culture ex-type AC0466 = CBS 121159).

Notes: The species *Mycosphaerella pseudovespa* is commonly associated with wasp galls or leaf spots in *Eucalyptus* (Carnegie *et al.* 2007). It was described based solely on the sexual morph which is mycosphaerella-like and produces hyaline ascospores that germinate in a type I pattern (Crous *et al.* 2008). The phylogenetic analyses showed that it is closely related to *Zasmidium velutinum* (Fig. 1, clade 69; Fig. 4, clade 1; Fig. 5, clade VIII). See notes on *Zasmidium cellare*.

Zasmidium queenslandicum (Arzanlou & Crous) Crous & U. Braun, Schlechtendalia 20: 103. 2010.
Basionym: *Stenella queenslandica* Arzanlou & Crous, Persoonia 20: 34. 2008.

Description and illustration: Arzanlou *et al.* (2008).

Material examined: **Australia**, Queensland, Mount Lewis, Mount Lewis Road, 16° 34′ 47.2″ S, 145° 19′ 7″ E, 538 m alt., on leaf of *Musa banksii*, Aug. 2006, P.W. Crous, W. Gams & B. Summerell (**holotype** CBS H-20050, culture ex-type CBS 122475 = X1084).

Notes: Based on the phylogenetic analyses, the present species clusters among ramichloridium-like species in the *Zasmidium* clade (Fig. 4, clade 1; Fig. 5, clade IX) but it is morphologically more similar to *Zasmidium musae* (Fig. 5, clade VII) and *Zasmidium musicola* (Fig. 5, clade III). It is characterised by short conidiophores with an apical conidiogenous cell, short geniculate, with darkened and thickened conidiogenous loci, producing single cylindrical-oblong conidia (Arzanlou *et al.* 2008). Based on a BLAST comparison, *Zasmidium queenslandicum* shares 97 % (475/491) similarity on ITS with *Zasmidium elaeocarpi* (CPC 16642) and 89 % (656/735) similarity on *rpb2* with *Zasmidium gupoyu* (CBS 122099).

Zasmidium scaevolicola R.G. Shivas *et al.*, Persoonia 24: 133. 2010.

Description and illustration: Shivas *et al.* (2010).

Materials examined: **Australia**, Queensland, Cape Tribulation, 16°04′02″ S 145°27′50.9″ E, on *Scaevola taccada*, 8 Aug. 2009, R.G. Shivas & P.W. Crous (**holotype** BRIP 52795, **isotype** CBS H-20455, culture ex-type CBS 127009 = CPC 17344); Thornton's Beach, 2 Sep. 1977, J.H. Simmonds, BRIP 12368; same loc., 1 Oct. 1979, J.H. Simmonds, BRIP 13098; Cape Tribulation, 30 Sep. 1979, J.H. Simmonds, BRIP 13097; Potters Creek, Wongaling Beach, Sep. 1993, H.Y. Yip, BRIP 21434; same loc., 27 Nov. 1993, H.Y. Yip, BRIP 21479; same loc., 17 Apr. 1994, H.Y. Yip, BRIP 22037; Cape Tribulation, 18 Dec. 2009, R.G. Shivas & A.R. McTaggart, BRIP 50073.

Notes: *Zasmidium scaevolicola* is morphologically and phylogenetically a *Zasmidium* species (Fig. 4, clade 1; Fig. 5, clade III) as previously observed by Shivas *et al.* (2010). In the present phylogenetic analyses, *Zasmidium scaevolicola* is closely related to *Zasmidium indonesianum*, a recently described species that infects the host *Citrus* sp. (Huang *et al.* 2015). Morphologically, both species produce conidia solitary or catenate, very similar in size and pigmentation, but *Zasmidium scaevolicola* produces longer conidiophores (Shivas *et al.* 2010, Huang *et al.* 2015).

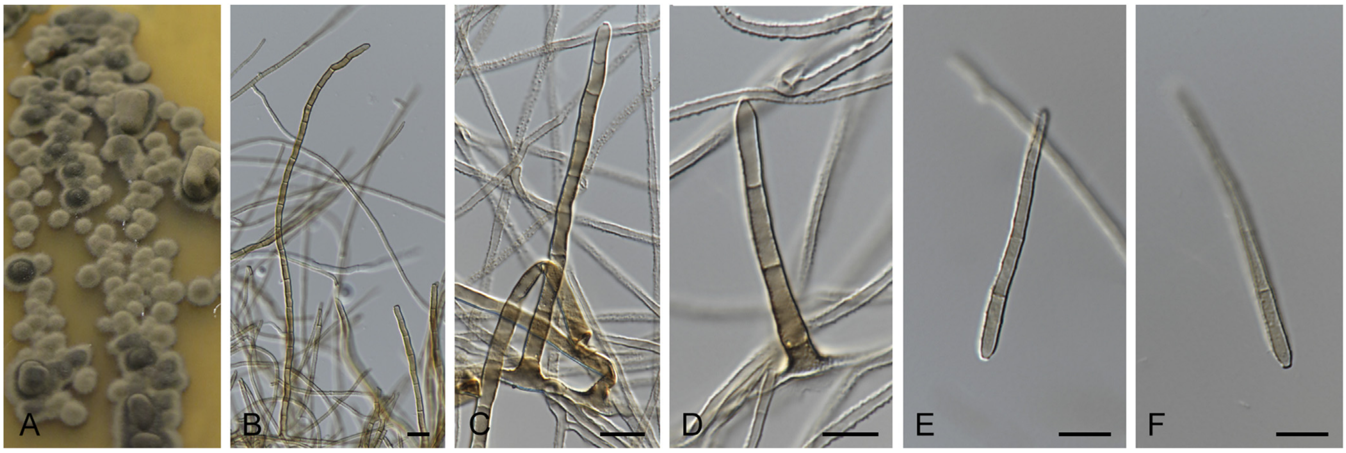


Fig. 42. *Zasmidium schini* (CPC 19516). **A–F.** Observations *in vitro*. **A**. Culture on V8. **B–D.** Conidiophore. **E, F.** Conidia. Scale bars = 10 µm.

Zasmidium schini U. Braun, C. Nakash., Videira & Crous, **sp. nov.** MycoBank MB822726. Fig. 42.

Etymology: Named after the host genus on which it occurs, *Schinus.*

Description in vitro (on V8; CPC 19516): *Mycelium* composed of hyaline, pale olivaceous or pale brown hyphae, rough and uniform in width, 2.5 µm. *Conidiophores* micro- to macronematous, pale brown to brown, paler towards the apex, rough, straight to mildly sinuous, simple, 45–325 × 2.5–5 µm. *Conidiogenous cells* integrated, apical, polyblastic, proliferating percurrently and sympodially, with rim-like conidiogenous loci, thickened and somewhat darkened, 2–2.5 µm diam. *Conidia* solitary, hyaline to pale brown, rough, cylindrical to obclavate, base short-obconically truncate and apex rounded, straight, 17.5–50 × 2.5–4 µm, 0–5-septate, hila darkened and thickened.

Material examined: **Brazil**, Minas Gerais, Viçosa, Mata da Prefeitura, on *Schinus terebinthifolia*, 1 Sep. 2005, A.B.V. Faria (**holotype** CBS H-22961, ex-type culture CBS 142188 = CPC 19516).

Notes: Thus far, only one cercosporoid species was known from this host genus, namely *Pseudocercospora schini* from *Schinus polygama* (Argentina) (Braun *et al.* 2016). The phylogenetic analyses placed the present species in a basal branch to the clade *Zasmidium* (Fig. 4, clade 1; Fig. 5, clade IX). Based on a BLAST comparison, *Zasmidium schini* shares 94 % (463/494) similarity, including 2 % (14/494) gaps, on ITS with *Zasmidium queenslandicum* (CBS 122475) and 84 % (594/708) similarity on *rpb2* with *Zasmidium iteae* (CBS 113094). Morphologically, *Zasmidium schini* can be distinguished from *Zasmidium elaeocarpi*, by producing only apical, polyblastic conidiogenous cells and single conidia that are shorter and paler.

***Zasmidium* sp.**

Material examined: **Colombia**, on *Eucalyptus* sp., 2004, M.J. Wingfield, culture CBS 118494 = CPC 11004.

Notes: The culture observed was sterile and the fungarium material could not be located. Based on the results of the phylogenetic analyses, it is tentatively assigned to the genus *Zasmidium* (Fig. 1, clade 63; Fig. 4, clade 2; Fig. 5, clade IX) until it is recollected and morphologically described.

Zasmidium strelitziae (Arzanlou *et al.*) Videira & Crous, **comb. nov.** MycoBank MB822815.

Basionym: *Ramichloridium strelitziae* Arzanlou *et al.*, Stud. Mycol. 58: 74. 2007.

Description and illustrations: Arzanlou *et al.* (2007).

Materials examined: **South Africa**, KwaZulu-Natal, Durban, near Réunion, on leaves of *Strelitzia nicolai*, 5 Feb. 2005, W. Gams & H. Glen (**holotype** CBS H-19776, ex-type culture CBS 121711 = X1029).

Notes: *Zasmidium strelitziae* is the only zasmidium-like species described from the host *Strelitzia*, an important plant cultivated for its flowers. Phylogenetically, it clusters within the *Zasmidium* clade (Fig. 4, clade 1; Fig. 5, clade IV) as circumscribed in the present study, and is closely related to *Z. musigenum*.

Zasmidium syzygii Crous, Persoonia 29: 173. 2012.

Description and illustration: Crous *et al.* (2012a).

Material examined: **South Africa**, Mpumalanga, Nelspruit, Lowveld Botanical Garden, on leaves of *Syzygium cordatum*, 16 Jul. 2011, P.W. Crous, M.K. Crous, M. Crous & K.L. Crous (**holotype** CBS H-21082, culture ex-type CBS 133580 = CPC 19792).

Notes: Phylogenetically and morphologically the present species belongs to the genus *Zasmidium* (Fig. 4, clade 1; Fig. 5, clade I). It is closely related to *Zasmidium eucalypticola*, isolated from the host *Eucalyptus* sp. (*Myrtaceae*), but is morphologically distinct (see notes on *Zasmidium eucalypticola*).

Zasmidium tsugae (Dearn.) Videira & Crous, **comb. nov.** MycoBank MB822833.
Basionym: *Dimerosporium tsugae* Dearn., Mycologia 16(4): 153. 1924.
Synonyms: *Dimeriella tsugae* (Dearn.) Petr., Ber. Schweiz. Bot. Ges. 57: 171. 1947.
Epipolaeum tsugae (Dearn.) Shoemaker, Canad. J. Bot. 43: 635. 1965.
Eudimeriolum tsugae (Dearn.) M.L. Farr, Mycologia 76: 801. 1984.
Rasutoria tsugae (Dearn.) M.E. Barr, Mycotaxon 29: 502. 1987.

Description and illustration: Dearness (1924).

Description in vivo (adapted from Dearness 1924): *Mycelium* hypophyllous, growing on the surface of the leaf giving it a smoky cast, branched, 3–4 µm thick. *Perithecia* dark brown, globose, 75–90 µm, gregarious, unappendaged, sometimes with 2 to 3 short rigid mycelioid branches, cells of the wall quadrate, 6–8 µm diam. *Asci* very variable in shape, clavate to cylindrical, 36–60 × 12–25 µm wide. *Ascospores* biseriate to conglobate, hyaline, uniseptate, sometimes nucleate in one or both cells, 13–21 × 3.5–5 µm, upper cell usually larger.

Notes: The type specimen of *Zasmidium tsugae*, based on *Dimerosporium tsugae*, could not be located (**USA**, Washington, Pierce Co., on leaves of *Tsuga heterophylla*, 25 July 1921, J.S. Boyce 832, fide Dearness 1924). The DNA sequences of *Rasutoria tsugae* used in this study were available on GenBank (Table 1) (Winton *et al.* 2007, Schoch *et al.* 2009) and no new sequences were generated. See notes on *Zasmidium cellare*.

Zasmidium velutinum (G. Winter) Videira & Crous, **comb. nov.** MycoBank MB822816.
Basionym: *Periconia velutina* G. Winter, Hedwigia 23: 174. 1884.
Synonym: *Periconiella velutina* (G. Winter) Sacc., in Saccardo & Berlese, Atti Reale Ist. Veneto Sci. Lett. Arti, Sér. 6, 3: 727. 1885.

Description and illustrations: Arzanlou *et al.* (2007).

Materials examined: **South Africa**, Cape Town, on *Brabejum stellatifolium* (*B. stellatum*), P. MacOwan, G. Winter herbarium (**lectotype** selected by Arzanlou *et al.* 2007: B; isolectotypes PAD, S F42165, S F462166); Stellenbosch, Jonkershoek Nature Reserve, on *Brabejum stellatifolium*, 21 Jan. 1999, J.E. Taylor (**epitype** designated by Arzanlou *et al.* 2007: CBS H-15612, cultures ex-epitype CBS 101948–101950 = CPC 2262–2264).

Note: See notes under *Zasmidium cellare*.

Zasmidium xenoparkii (Crous & M.J. Wingf.) Crous & U. Braun, Schlechtendalia 20: 103. 2010.
Basionym: *Stenella xenoparkii* Crous & M.J. Wingf., Stud. Mycol. 55: 129. 2006.

Description and illustration: Crous *et al.* (2006b).

Materials examined: **Indonesia**, on leaves of *Eucalyptus grandis*, Mar. 1996, M.J. Wingfield (**holotype** PREM 54968, isotype CBS H-19703, culture ex-type CBS 111185 = CPC 1300); *idem*. Cultures CPC 1299, CPC 1301.

Notes: *Zasmidium xenoparkii* belongs to the genus *Zasmidium* both morphologically and phylogenetically (Fig. 4, clade 1; Fig. 5, clade I). In the present phylogenetic analyses, it is closely related to *Zasmidium angulare*, but morphologically it is more similar to *Zasmidium pseudoparkii*, which differs by producing longer and wider conidia (Crous *et al.* 2006b). *Zasmidium xenoparkii* has a mycosphaerella-like sexual morph and produces hyaline ascospores that germinate in a type D pattern (Crous 1998).

Clade 70: *Nothopericoniella*

Nothopericoniella Videira & Crous, **gen. nov.** MycoBank MB822697.

Etymology: From the greek notho-, meaning false, and similarity to the genus *Periconiella*.

Description: Phytopathogenic. *Mycelium* mainly superficial, composed of brown and verrucose hyphae, internal mycelium sparsely developed, intracellular, composed of hyaline to brown hyphae, finely verruculose, septate, branched. *Conidiophores* solitary, arising from superficial hyphae, erect, straight, septate, brown olivaceous, paler at the apex, smooth to verruculose, composed of a main axis with a dichotomously branched apical head, branches terminal, partly lateral, proliferating percurrently and sympodially. *Conidiogenous cells* integrated, terminal and pleurogenous, polyblastic, sympodial, geniculate or subdenticulate, conidiogenous loci slightly thickened and darkened, truncate, without marginal rim or papillae. *Conidia* solitary, rarely in short chains, ellipsoid-ovoid, subcylindrical, verruculose, pale olivaceous, apex rounded, base obconically truncate, hila slightly thickened and darkened.

Type species: *Nothopericoniella perseae-macranthae* (Hosag. & U. Braun) Videira & Crous (≡ *Periconiella perseae-macranthae* Hosag. & U. Braun).

Nothopericoniella perseae-macranthae (Hosag. & U. Braun) Videira & Crous, **comb. nov.** MycoBank MB822767.
Basionym: *Periconiella perseae-macranthae* Hosag. & U. Braun, Indian Phytopathol. 48: 260. 1996 (1995).

Descriptions and illustrations: Hosagoudar & Braun (1995), Kirschner & Chen (2010).

Description (adapted from Hosagoudar & Braun 1996 and Kirschner & Chen 2010): Phytopathogenic, producing diffuse leaf spots, colonies hypophyllous, sometimes large and confluent. *Mycelium* mainly external, composed of superficial brown and verrucose hyphae, internal mycelium sparsely developed, intracellular, hyaline to brown, finely verruculose. *Hyphae* creeping, septate, branched, occasionally anastomosing, (1–)1.5–2.5(–3.5) µm wide, somewhat darker and wider around the conidiophores. *Conidiophores* solitary, arising from creeping hyphae, brown olivaceous, paler at the apex, almost smooth to verruculose, septate, erect, straight or slightly curved, 250–800 × 3–5 µm, composed of a very long main axis (about 200–700 µm long) with a 1–3 dichotomously branched apical head, branches terminal, partly lateral, proliferating percurrently and sympodially. *Conidiogenous cells* integrated, terminal and pleurogenous, often somewhat swollen, polyblastic, sympodial, somewhat geniculate or subdenticulate, conidiogenous loci slightly thickened and darkened, truncate, without marginal rim or papillae. *Conidia* solitary, rarely in short chains, pale olivaceous to olivaceous brown, verruculose, ellipsoid-ovoid, subcylindrical, base slightly obconically truncate and apex rounded, (8–)10–32 × 3–6 µm, (1–)2–3(–4)-septate, hila slightly thickened and darkened.

Materials examined: **India**, Tamil Nadu, Coimbatore, Anamalai, Koomati, on leaves of *Persea macrantha*, 13 Mar. 1994, V.B. Hosagoudar (**holotype** HAL 1627 F). **Taiwan**, Taichung County, Dongshi Forest Park, ca. 500 m, on living leaves of *Machilus zuihoensis*, 18 Mar. 2007, R. Kirschner & C.-J. Chen 2995 (TNM), culture CBS 122097 = RoKi 2995; Taipei County, Wulai, 300 m, 1 Apr. 2007, on living leaves of unidentified *Lauraceae*, R. Kirschner & C.-J. Chen 3030 (TNM), culture CBS 122282 = RoKi 2995.

Notes: Phylogenetically, *Nothopericoniella perseae-macranthae* is more closely related to the type of *Annellosympodiella* (Fig. 1, clade 71; Fig. 4, clade 3) than to the type of *Periconiella*, *Periconiella velutina* (Fig. 4, clade 1), the genus in which it was originally described. Morphologically, it is similar to *Annellosympodiella* by displaying both percurrent and sympodial proliferation, verrucose conidiophores and conidia and conidiogenous scars without marginal rim or papillae but slightly thickened and darkened. *Nothopericoniella perseae-macranthae* differs from *Annellosympodiella nectandrae* by forming longer conidiophores (250–800 × 3–5 µm) that rise singly from the external mycelium and are branched at the top instead of forming straight conidiophores (25–50 × 4–7 µm) rising from stromata in densely aggregated bunches. The conidia of *Nothopericoniella persea-macranthae* are also shorter and narrower (8–32 × 3–6 µm) than those of *Annellosympodiella nectandrae* (30–70 × 5–7 µm) (Hosagoudar & Braun 1996, Crous *et al.* 2014a).

Clade 71: *Annellosympodiella*

Annellosympodiella Crous & Assefa, Persoonia 32: 245. 2014.

Description (from Crous *et al.* 2014a): *Conidiomata* sporodochial on leaflets, arising from an erumpent brown stroma, consisting of brown, subcylindrical cells. *Conidiophores* densely aggregated, subcylindrical, brown, verruculose to warty, rejuvenating percurrently, septate. *Conidiogenous cells* integrated, terminal, brown, verruculose, proliferating percurrently with irregular annellations, and long, brown, tubular collarettes. *Loci* formed by sympodial proliferation are also visible on the tubular collarette, circular, thickened, darkened and refractive. *Conidia* solitary, brown, verruculose to warty, guttulate, subcylindrical to narrowly obclavate, straight to curved, euseptate; hilum truncate, thickened and slightly darkened.

Type species: *Annellosympodiella juniperi* Crous & Assefa.

Annellosympodiella juniperi Crous & Assefa, Persoonia 32: 245. 2014.

Description and illustration: Crous *et al.* (2014a).

Materials examined: **Ethiopia**, Addis Ababa, Mangadishu Forest, on needles of *Juniperus procera*, 25 Jun. 2013, PW. Crous & A. Assefa (**holotype** CBS H-21706, ex-type culture CBS 137992 = CPC 23276).

Notes: *Annellosympodiella* is a monotypic genus similar to *Annellophragmia* (Ellis 1971) and *Annellosympodia* (McTaggart *et al.* 2007) based on their strange mode of percurrent and sympodial proliferation with darkened, thickened scars (Crous *et al.* 2014a). In the phylogenetic analyses, *Annellosympodiella* is a single-strain lineage closely related to *Neopenidiella* and *Neopericoniella* (Fig. 1, clade 71; Fig. 4, clade 3).

Clade 72: *Neopenidiella*

Neopenidiella Quaedvlieg & Crous, Persoonia 33: 22. 2014.

Description (from Quaedvlieg *et al.* 2014): Foliicolous. *Conidiophores* erect, straight, filiform, pluriseptate throughout, brown, darker below and paler above, thin-walled, smooth, apex penicillate, terminal cell of the conidiophore with short denticle-like loci giving rise to sets of conidiogenous cells or ramoconidia that then form a sequence of new sets of ramoconidia on different levels. *Conidiogenous loci* terminal or subterminal, usually 1–3(–4), subdenticulate, conical, apically truncate, unthickened or almost so, not to somewhat darkened-refractive. *Ramoconidia* with truncate base, barely or distinctly attenuated at the truncate base, aseptate, at the apex with 2–3(–4) subdenticulate hila, subcylindrical, very pale olivaceous, olivaceous brown to brown, thin-walled, smooth to faintly verruculose. *Conidia* in long acropetal chains, narrowly ellipsoid-ovoid, fusiform to cylindrical aseptate, very pale olivaceous, olivaceous brown to brown, thin-walled, smooth to very faintly rough-walled; hila unthickened or almost so, at most slightly darkened-refractive.

Type species: *Neopenidiella nectandrae* (Crous *et al.*) Quaedvlieg & Crous (≡ *Penidiella nectandrae* Crous *et al.*).

Neopenidiella nectandrae (Crous *et al.*) Quaedvlieg & Crous, Persoonia 33: 22. 2014.
Basionym: *Penidiella nectandrae* Crous *et al.*, Stud. Mycol. 58: 20. 2007.
Synonym: *Cladosporium ferrugineum* R.F. Castañeda, Fungi Cubenses II: 4. 1987, *nom. illeg.* (Art. 53.1).

Description and illustrations: Crous *et al.* (2007a).

Material examined: **Cuba**, Matanzas, San Miguel de los Baños, on living leaves of *Nectandrea coriacea*, 24 Jan. 1987, R.F. Castañeda & G. Arnold (**holotype** of *Cladosporium ferrugineum* INIFAT C87/45, culture ex-type CBS 734.87 = ATCC 200932 = INIFAT 87/45; isotype HAL 2018 F).

Notes: *Neopenidiella* is currently a monotypic genus that was established to accommodate *Neopenidiella nectandrae* since it was not congeneric with the type of *Penidiella*, *P. columbiana* (*Teratosphaeriaceae*) (Quaedvlieg *et al.* 2014). *Neopenidiella* differs from *Penidiella* by forming conidiophores that are long and filiform, with a subdenticulate apical cell where long and narrow penicillate ramoconidia are formed. In the phylogenetic analyses performed in this study it forms a single-strain lineage closely related to *Annellosympodiella* (Fig. 1, clade 72; Fig. 4 clade 4).

Clade 73: *Neoceratosperma*

Neoceratosperma Crous, Persoonia 32: 257. 2014.

Description (from Crous *et al.* 2014a): *Mycelium* consisting of branched, septate, brown, verruculose hyphae turning warty with age. *Conidiophores* reduced to conidiogenous cells, or septate, erect, brown, verruculose, unbranched, subcylindrical, dark brown and smooth at the base. *Conidiogenous cells* subcylindrical, brown, verruculose, but conidiogenous apical area smooth, forming a short rachis that proliferates sympodially, with somewhat thickened and darkened loci. *Conidia* solitary, rarely in unbranched chains, subcylindrical, medium brown, becoming dark brown, verruculose, becoming warty, distoseptate, less obvious when older (dark brown, warty), straight to irregularly curved; apex obtuse, base truncate, but hila somewhat thickened and darkened.

Type species: *Neoceratosperma eucalypti* Crous & Cheew.

Neoceratosperma cyatheae Guatimosim *et al.*, Persoonia 37: 122. 2016.

Description and illustration: Guatimosim *et al.* (2016).

Materials examined: **Brazil**, Rio de Janeiro, Fazenda Barreto II, Rio grandina, on fronds of *Cyathea delgadii*, 11 Feb. 2014, R.W. Barreto (**holotype** CBS H-22074; **isotype** VIC 42605, culture ex-type CPC 24704; Rio de Janeiro, Nova Friburgo, Macaé de Cima, on fronds of *C. delgadii*, 11 Jul. 2009, R.W. Barreto, CBS H-22078, VIC 42533, cultures CPC 18580 = COAD573.

Notes: *Neoceratosperma cyatheae* was recently described from a fern host, *Cyathea delgadii*, originating from Brazil. Only its asexual morph is known, which can easily be distinguished from *Neoceratosperma eucalypti* by producing smooth conidiophores reduced to conidiogenous cells and solitary conidia (Guatimosim *et al.* 2016). Based on the phylogenetic analyses it forms a single-strain lineage within the *Neoceratosperma* clade (Fig. 1, clade 73; Fig. 4, clade 7).

Neoceratosperma eucalypti Crous & Cheew., Persoonia 32: 257. 2014.

Description and illustration: Crous *et al.* (2014a).

Materials examined: **Thailand**, Chiang Mai, on living leaves of *Eucalyptus* sp., Sep. 2013, R. Cheewangkoon (**holotype** CBS H-21712, culture ex-type CBS 137998 = CPC 23465).

Notes: *Neoceratosperma* has a zasmidium-like morphology except it produces distoseptate conidia. *Neoceratosperma* differs from *Ceratosperma* by forming strongly verruculose conidiophores and conidia, producing conidia in a short sympodial rachis, solitary or in chains and with slightly thickened, darkened hila and scars (Crous *et al.* 2014a). Phylogenetically, *Neoceratospoerma* strains cluster in a well-supported clade by both

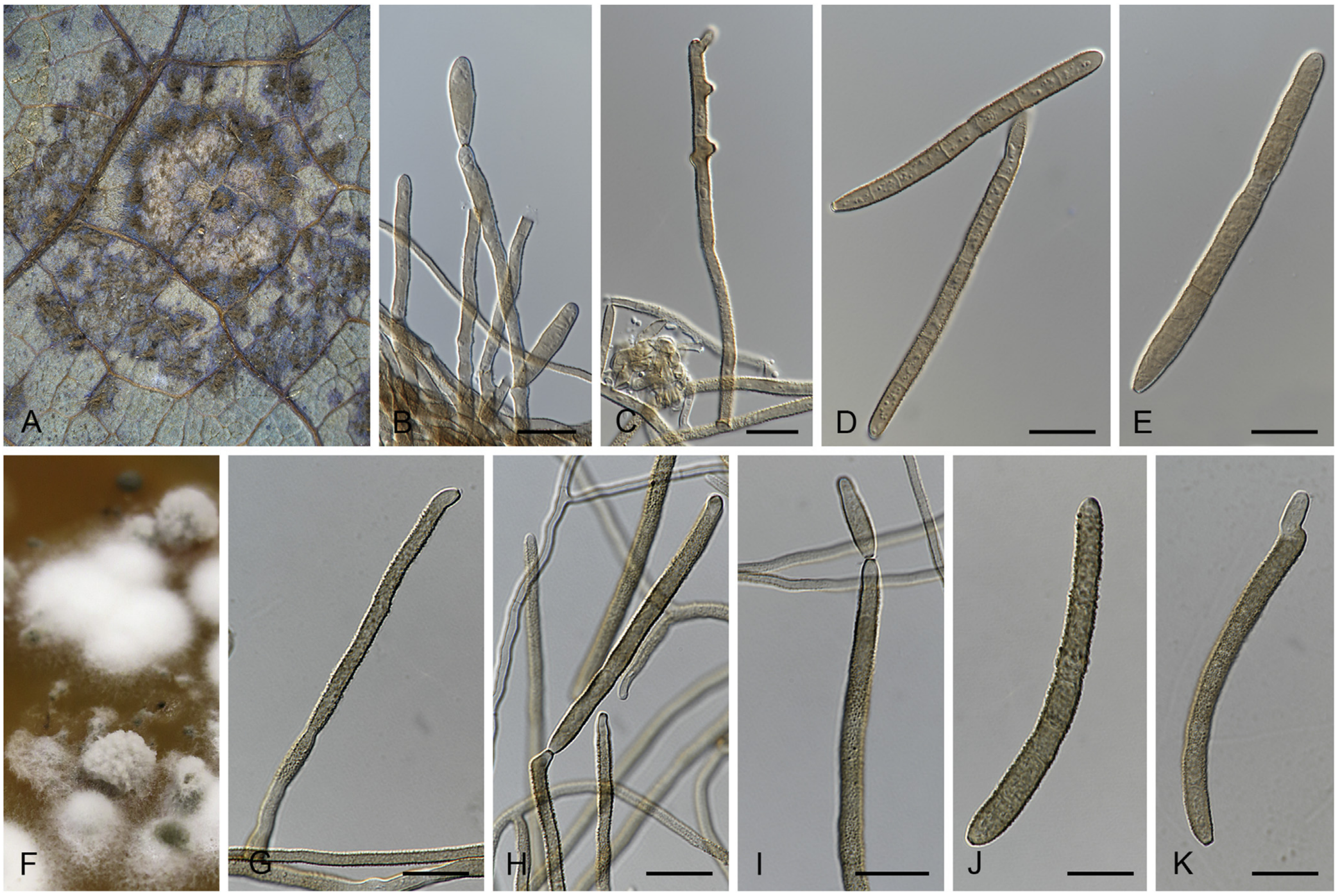


Fig. 43. *Neoceratosperma legnephoricola* (CPC 16411). **A–E.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Partial conidiophore, conidiogenous cells and conidia. **C.** Conidiophore and conidiogenous cells. **D, E.** Conidia. **F–K.** Observations *in vitro*. **F.** Culture on V8. **G.** Conidiophore and conidiogenous cell. **H, I.** Conidiogenous cell and conidia. **J, K.** Conidia. Scale bars = 10 µm.

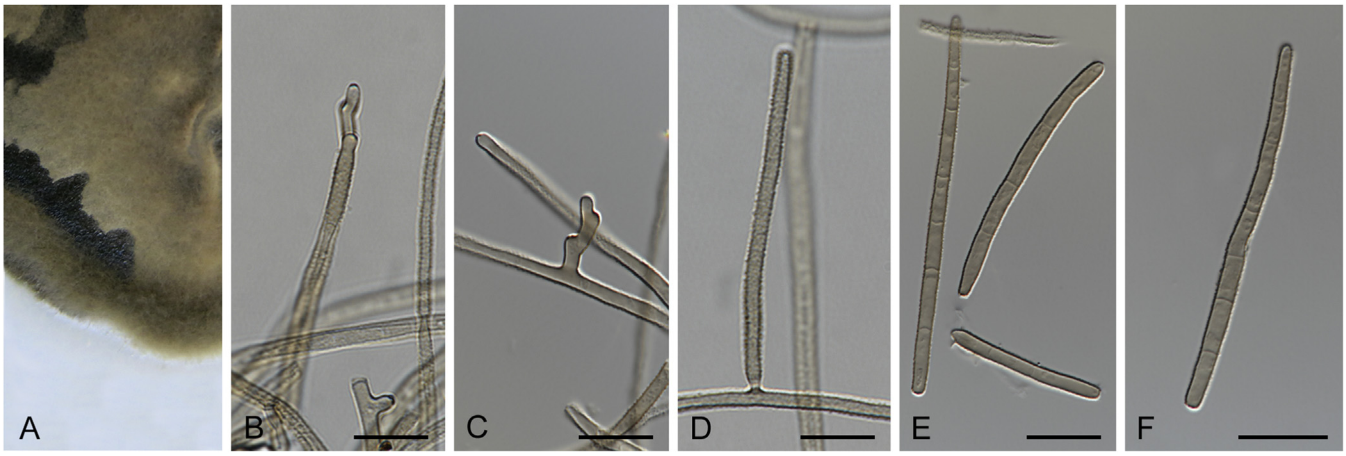


Fig. 44. *Neoceratosperma haldinae* (CPC 19202). **A–F.** Observations *in vitro*. **A.** Culture on OA. **B, C.** Conidiophore and conidiogenous cell. **D–F.** Conidia. Scale bars = 10 µm.

Bayesian and maximum likelihood analyses (Fig. 1, clade 73; Fig. 4, clade 7) and is closely related to *Xenomycosphaerella*. *Neoceratosperma* was monotypic, but several species have been recently added by Guatimosim *et al.* (2016).

Neoceratosperma legnephoricola U. Braun, C. Nakash., Videira & Crous, **sp. nov.** MycoBank MB822715. Fig. 43.

Etymology: Derived from the host genus on which it occurs, *Legnephora*.

Description in vivo (CBS H-22962): *Leaf spots* small, brown to dark brown, angular, 2–3 mm diam, later enlarged, circular to subcircular, with 2–3 dark brown concentric ring, 5–10 mm diam. *Mycelium* internal and external, composed of pale brown to brown hyphae, smooth to verruculose. *Caespituli* hypophyllous, well-developed, visible in concentric rings, yellowish brown. *Stromata* hypophyllous, epidermal, substomatal, 20–54 µm diam. *Conidiophores* often reduced to conidiogenous cells, emerging from stromata and internal/external hyphae, solitary or fasciculate, more than 20, pale brown to brown, verruculose, straight to sinuous, simple, 25–380 × 2–6 µm. *Conidiogenous cells* terminal or intercalary, pale brown to brown, verruculose, polyblastic, proliferating sympodially, with rim-like conidiogenous loci slightly thickened and darkened, 2–3 µm diam. *Conidia* solitary, pale brown to brown, verruculose, cylindrical, obclavate to filiform, straight to curved, obconically truncate at the base and apex rounded, 34–260 × 5–11 µm, 0–23-distoseptate, hila slightly thickened and darkened, 2–3 µm diam.

Description in vitro (on SNA; CPC 16411): *Mycelium* composed of pale brown to olicaveous brown hyphae, smooth to verruculose. *Conidiophores* single, pale brown to olicaveous brown verruculose, erect, straight, simple, often reduced to conidiogenous cells, 3–120 × 4–5 µm. *Conidiogenous cells* terminal in conidiophores or integrated in the mycelium, pale brown to olivaceous brown, verruculose, single or polyblastic, proliferating sympodially, with rim-like conidiogenous loci, slightly thickened and darkened. *Conidia* solitary, occasionally catenate in a single chain, pale brown to olivaceous brown, verruculose, cylindrical, straight or curved, (16–)44–66(–128) × (3.5–)4–5(–5.5) µm, 0–10-distoseptate, obconically truncate at the base and conically truncate at the apex when intercalary, obconically truncate at the base and apex rounded when terminal, hila slightly thickened and darkened, 2–3 µm diam.

Material examined: **Australia**, New South Wales, North Washpool State Forest, on *Legnephora moorei* (≡ *Cocculus moorei*), Mar. 2009, B. Summerell (**holotype** CBS H-22962, ex-type culture CBS 142189 = CPC 16411).

Notes: This is the first time that a fungus has been described in association with the host *Legnephora moorei*, an endemic plant of the Australian rainforest. In the phylogenetic analyses it is closely related to *Neoceratosperma yunnanensis* (Fig. 1, clade 73; Fig. 4, clade 7), but can be morphologically distinguished by producing longer conidiophores and shorter conidia.

Neoceratosperma haldinae U. Braun, C. Nakash., Videira & Crous, **sp. nov.** MycoBank MB822716. Fig. 44.

Etymology: Derived from the host genus on which it occurs, *Haldina.*

Description in vitro (on SNA, CPC 19202): *Mycelium* composed of pale olivaceous hyphae, verruculose, 2 µm wide. *Conidiophores* pale olivaceous, finely verruculose, straight, simple, geniculate-sinuous at the apex, (25–)43–53(–76) × 1.5–2 µm, often reduced to conidiogenous cells. *Conidiogenous cells* pale olivaceous, finely veruculose, proliferating sympodially at the apex, polyblastic, with conidiogenous loci slightly thickened and darkened, 1 µm diam. *Conidia* solitary, pale olivaceous, finely verruculose, filiform, cylindrical to long obclavate, base short-obconically truncate and apex rounded, (5.5–)17–22.5(–30) × (1.5–)2(–3) µm, 1–5-euseptate, with hila slightly thickened but hardly darkened, 1 µm diam.

Materials examined: **Laos**, Vientiane, Xanthany, Dong Makkai, on *Haldina cordifolia*, unknown date, P. Pheng, LC 0408, NUOL P53 (**holotype** CBS H-22963, culture ex-type CBS 142190 = CPC 19202).

Notes: *Neoceratosperma haldinae* needs to be compared with *Passalora haldinae*, which was described from *Haldina cordifolia* collected in Thailand (Nakashima *et al.* 2007). The strain CBS 142190 (previously identified as *Passalora haldinae*), sporulated in culture, and proved to be distinct from *Passalora haldinae*, which has wider conidiophores (15–63 × 2.8–3.6 µm) that are occasionally branched, and conidia that are smooth, longer and wider (24–80 × 2.7–5 µm, 1–7-septate; Nakashima *et al.* 2007). Based on the phylogenetic analyses it forms a single-strain lineage within the *Neoceratosperma* clade (Fig. 1, clade 73; Fig. 4, clade 7).

Neoceratosperma yunnanensis (Barber & T.I. Burgess) Guatimosim *et al.*, Persoonia 37: 123. 2016.
Basionym: *Mycosphaerella yunnanensis* Barber & T.I. Burgess, Fungal Diversity 24: 150. 2007.
Synonym: *Xenomycosphaerella yunnanensis* (Barber & T.I. Burgess) Quaedvlieg & Crous, Persoonia 33: 24. 2014.

Description and illustration (sexual morph): Burgess *et al.* (2007).

Description in vitro (on V8; CBS 119975): *Mycelium* composed of hyaline to pale olivaceous hyphae, verruculose, 2.5 µm wide. *Conidiophores* short, reduced to conidiogenous cells, hyaline to pale olivaceous, verruculose, simple, 2.5–5 × 3–4 µm. *Conidiogenous cells* polyblastic, determinate, rarely proliferating sympodially, with rim-like conidiogenous loci that are slightly thickened and darkened, 1–1.5 µm diam. *Conidia* solitary, rarely catenate in a single chain, pale to pale olivaceous, verruculose, cylindrical to long obclavate, filiform, base short-obconical truncate and apex rounded, 30–210 × 3–4 µm, 0–6-eu- or distoseptate, hila slightly thickened and darkened, 1–1.5 µm diam.

Materials examined: **China**, Yunnan, Lancang, on leaves of *Eucalyptus urophylla*, May 2005, B. Dell (**holotype** MURU 407, ex-type culture CBS 119975 = CMW 23443 = MUCC 410 = PAB 05.05 B2).

Notes: Until now, *Mycosphaerella yunnanensis* was only known from its sexual morph, but in this study, we observed the asexual morph in culture using V8 medium with sterilised banana leaves. The morphological features of the asexual morph included short conidiophores reduced to conidiogenous cells and distoseptate scolecospores, which are in agreement with the description of the genus *Neoceratosperma*. Based on the genes used in this study and the phylogenetic methods employed, *Mycosphaerella yunnanensis* is included in *Neoceratosperma* (Fig. 1, clade 73; Fig. 2, clade 7).

Clade 74: *Xenosonderhenia*

Xenosonderhenia Crous, Persoonia 28: 175. 2012.

Description (from Crous *et al.* 2012b): Foliicolous, associated with leaf spots. *Conidiomata* pycnidial, black, globose, substomatal, erumpent, predominantly epiphyllous, with central ostiole, lined with periphyses; wall of 2–3 layers of brown *textura angularis*. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* lining the inner cavity, subcylindrical to doliiform; finely verruculose, pale brown, proliferating apically with several percurrent proliferations. *Conidia* subcylindrical, brown, finely verruculose, apex obtuse, base truncate with visible scar-like hilum, (1–)3-euseptate, but septa with visible central pore. Conidia of synasexual morph intermingled in same conidioma, but conidiogenous cells proliferating percurrently or sympodially; conidia hyaline to subhyaline, narrowly obclavate, apex subobtuse, base truncate, straight to curved, transversely multi-septate. *Synasexual morph* also hyphomycetous, developing in aerial mycelium; conidiophores subcylindrical, straight to curved, 0–2-septate, hyaline to subhyaline, proliferating sympodially at apex. Conidiophores solitary or fasciculate or forming on a reduced stroma.

Type species: *Xenosonderhenia syzygii* Crous.

Xenosonderhenia eucalypti Crous & M.J. Wingf., Persoonia 33: 241. 2014.

Description and illustration: Crous *et al.* (2014b).

Material examined: **Mozambique**, Forestas de Niassa, leaf spots of *Eucalyptus urophylla*, 2 Feb. 2014, M.J. Wingfield (**holotype** CBS H-21991, culture ex-type CPC 24247 = CBS 138858).

Notes: *Xenosonderhenia eucalypti* was recently described based on the morphological characteristics of the sexual morph. It was placed in *Xenosonderhenia* due to being phylogenetically closest to *Xenosonderhenia syzygii* (Crous *et al.* 2014b). In this study, *Xenosonderhenia eucalypti* formed a single-strain lineage in the phylogenetic analyses (Fig. 1, clade 74; Fig. 4, clade 9) that is closely related to *Xenomycosphaerella elongata* with which it shares 98 % (728/740) similarity on LSU, 94 % (449/477) similarity on ITS, and only 84 % (622/737) similarity on *rpb2*.

Xenosonderhenia syzygii Crous, Persoonia 28: 175. 2012.

Description and illustration: Crous *et al.* (2012b).

Material examined: **South Africa,** Mpumalanga, Nelspruit, Lowveld Botanical Garden, on leaves of *Syzygium cordatum*, 17 Aug. 2011, P.W. Crous, M.K. Crous, M. Crous & K.L. Crous (**holotype** CBS H-20968, ex-type culture CBS 132688 = CPC 19790).

Notes: *Xenosonderhenia* currently accommodates two species, *Xenosonderhenia syzygii* and *Xenosonderhenia eucalypti*. *Xenosonderhenia syzygii* is phylogenetically close to *Xenomycosphaerella elongata* but is unique in being morphologically dimorphic (Crous *et al.* 2012b). *Xenosonderhenia syzygii* is easily distinguished from *Sonderhenia* since species in the latter genus produce distoseptate conidia and form a distinct clade in the *Mycosphaerellaceae* (Fig. 1, clade 28; Fig. 2, clade 34). It can also be separated from *Phaeophleospora* since species in the latter genus produce scolecosporous conidia and form a unique clade in the *Mycosphaerellaceae* (Fig. 1, clade 67; Fig. 4, clade 5). Unfortunately, an *rpb2* sequence was not generated for this strain and it was not included in the phylogenetic trees in this study.

Clade 75: *Xenomycosphaerella* Quaedvlieg & Crous, Persoonia 33: 24. 2014.

Description (from Quaedvlieg *et al.* 2014): Foliicolous, plant pathogenic. *Ascomata* pseudothecial, dark brown, subepidermal to erumpent, globose, with an apical ostiole; wall of 2–3 layers of medium brown *textura angularis*. *Asci* aparaphysate, fasciculate, bitunicate, subsessile, obovoid to broadly ellipsoidal, straight to slightly curved, 8-spored. *Ascospores* bi- to multiseriate, overlapping, hyaline, thin- or thick- walled, straight to slightly curved, fusoid-ellipsoidal with obtuse ends, widest in middle of the apical cell, medianly or unequally 1-septate, tapering towards both ends, but more prominently towards the lower end.

Type species: *Xenomycosphaerella elongata* (Crous & M.J. Wingf.) Quaedvlieg & Crous (≡ *Mycosphaerella elongata* Crous & M.J. Wingf.).

Xenomycosphaerella elongata (Crous & M.J. Wingf.) Quaedvlieg & Crous, Persoonia 33: 24. 2014.

Basionym: *Mycosphaerella elongata* Crous & M.J. Wingf., Fungal Diversity 26: 163. 2007.

Description and illustrations: Crous *et al.* (2007c).

Material examined: **Venezuela**, El Piñal Lotes farm near Acarigua, on leaves of *Eucalyptus calmadulensis* × *urophylla*, Oct. 2006, M.J. Wingfield (**holotype** CBS H-19824, ex-type culture CBS 120735 = CPC 13378).

Notes: The genus *Xenomycosphaerella* was introduced to accommodate *Mycosphaerella elongata* and *Mycosphaerella yunnanensis*, both species only known from their mycosphaerella-like sexual morph but that were not congeneric with *Ramularia* (Quaedvlieg *et al.* 2014). Based on a large phylogenetic analysis based on several genes, *Xenomycosphaerella yunnanensis* was later combined into *Neoceratosperma* (Guatimosim *et al.* 2016). In the present phylogenetic analyses, the genus is represented by its type, *Xenomycosphaerella elongata*, in a single-strain lineage (Fig. 1, clade 75; Fig. 4, clade 8) that is closely related to *Xenosonderhenia*. The genera *Xenosonderhenia* and *Xenomycosphaerella* are very close phylogenetically, but due to lacking information related to their morphology and the existing differences observed based on the DNA sequences, they should remain separate until more isolates are available for further analysis. The type of *Xenosonderhenia*, *Xenosonderhenia syzygii*, is only known by its dimorphic asexual morph while the type of *Xenomycosphaerella*, *Xenomycosphaerella elongata*, is only known from its sexual morph. The other known species of *Xenosonderhenia*, *Xenosonderhenia eucalypti*, is only known from its sexual morph which can be distinguished from *Xenomycosphaerella elongata* by forming ascospores not constricted at the septa and widest at one third of the apex of the apical cell (ascospores constricted at the septum and tapering towards both ends but more prominently towards the lower end in *Xenomycosphaerella elongata*).

Clade 76: *Xenosonderhenioides*

Xenosonderhenioides Videira & Crous, **gen. nov.** MycoBank MB822706.

Etymology: *Xenos*- from the Greek strange + *sonderhenioides* for the phylogenetic proximity to the genus *Sonderhenia.*

Description: *Mycelium* composed of hyaline to pale brown hyphae, smooth, septate, branching. *Conidiophores* micro- to macronematous, subhyaline to pale brown, smooth to rough, simple, sometimes branched, straight to sinuous. *Conidiogenous cells* integrated, terminal or intercalary, hyaline to pale brown, proliferating sympodially, polyblastic, with rim-like conidiogenous loci, slightly thickened and darkened. *Conidia* solitary, rarely catenate in a single chain, hyaline to subhyaline, smooth, oblong, cylindrical to obclavate, straight, base medium-long obconically truncate, apex rounded, aseptate or eu- or distoseptate hila thickened and darkened and protruding at the base or at both ends when catenate.

Type species: *Xenosonderhenioides indonesiana* C. Nakash., Videira & Crous.

Xenosonderhenioides indonesiana C. Nakash., Videira & Crous, **sp. nov.** MycoBank MB822728. Fig. 45.

Etymology: Derived from the country where it was collected from, Indonesia.

Fig. 45. *Xenosonderhenioides indonesiana* (CPC 15066). **A–E.** Observations *in vitro*. **A.** Culture on OA. **B, C.** Conidiophore and conidiogenous cell. **D.** Conidiogenous cell and conidia. **E.** Conidia. Scale bars = 10 µm.

Description in vitro (on SNA; CPC 15066): *Mycelium* composed of hyaline to pale brown hyphae, smooth, septate, branched, uniform in width, 2–2.5 µm diam. *Conidiophores* micro- to macronematous, subhyaline to pale brown, smooth to finely verruculose, simple, straight to sinuous, sometimes geniculate-sinuous at the apex, 20–75 × 2.5–7.5 µm. *Conidiogenous cells* integrated, terminal and intercalary, hyaline to pale brown, smooth, proliferating sympodially, conical at the apex, mono- or polyblastic, with rim-like conidiogenous loci slightly thickened and darkened, located at the apex or shoulder, sometimes in large number and disperse through the cell, 1.5–2 µm in diam. *Conidia* solitary, rarely catenate in a single chain, hyaline to subhyaline, smooth, oblong, cylindrical to long-obclavate, base medium-long obconically truncate, apex rounded, 15–50 × 5–6 µm, 0–4-septate, eu- or distosepta, sometimes slightly constricted at the septa, hila slightly thickened and darkened.

Material examined: **Indonesia,** on *Eucalyptus* sp., 26 Mar. 2008, M.J. Wingfield (**holotype** CBS H-19824, ex-type culture CBS 142239 = CPC 15066).

Notes: Phylogenetically, the genus *Xenosonderhenioides* is represented by a single-strain lineage (Fig. 1, clade 76; Fig. 4, clade 10) that is closely related to *Xenosonderhenia*. Morphologically, *Xenosonderhenioides indonesiana* can easily be distinguished from *Xenosonderhenia syzygii*, which has dimorphic conidia in culture. Due to phylogenetic and morphological differences, we consider that this should represent a unique genus.

Clade 77: *Polyphialoseptoria*

Polyphialoseptoria Quaedvlieg *et al.*, Stud. Mycol. 75: 355. 2013.

Description (from Quaedvlieg *et al.* 2013): Foliicolous, plant pathogenic. *Conidiomata* brown, erumpent, pycnidial (acervular in culture), globose, brown; wall of 3–6 layers of pale brown *textura angularis*. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* hyaline, smooth, subcylindrical to ampulliform, proliferating sympodially at apex, forming polyphialides with minute periclinal thickening, or as solitary loci on superficial mycelium in culture. *Conidia* hyaline, smooth, granular to guttulate, scolecosporous, irregularly curved, apex subobtuse, base long obconically truncate, transversely multi- euseptate, in older cultures disarticulating at septa; microcyclic conidiation also common in older cultures.

Type species: *Polyphialoseptoria terminaliae* Quaedvlieg *et al.*

Polyphialoseptoria terminaliae Quaedvlieg *et al.*, Stud. Mycol. 75: 356. 2013.

Description and illustration: Quaedvlieg *et al.* (2013).

Materials examined: **Brazil**, Minas Gerais, Viçosa, on leaves of *Terminalia catappa*, 18 May 2010, R.W. Barreto (**holotype** CBS H-21298, culture ex-type CBS 135106 = CPC 19611); *idem*. cultures CBS 135475 = CPC 19487.

Notes: *Polyphialoseptoria* currently includes two species, *Polyphialoseptoria terminaliae* and *Polyphialoseptoria tabebuiae-serratifoliae*, both collected from Brazil. It differs from *Septoria* and *Neoseptoria* based on the presence of polyphialides. The phylogenetic analyses performed in this study strongly supported the *Polyphialoseptoria* clade (Fig. 1, clade 77; Fig. 4, clade 11).

Clade 78: *Mycodiella*

Mycodiella Crous, Persoonia 37: 337. 2016.

Description (from Crous *et al.* 2016a): *Ascomata* pseudothecial, brown, erumpent, globose; wall consisting of 2–3 layers of medium brown *textura angularis*. *Asci* aparaphysate, fasciculate, bitunicate, subsessile, obovoid, straight to slightly curved, 8-spored. *Ascospores* multiseriate, overlapping, hyaline, guttulate, thin-walled, straight to slightly curved, fusoid-ellipsoidal with obtuse ends, widest in middle of apical cell, medianly 1-septate.

Type species: *Mycodiella eucalypti* Crous.

Mycodiella eucalypti Crous, Persoonia 37: 337. 2016.

Description and illustration: Crous *et al.* (2016a).

Materials examined: **Australia**, Western Australia, Porongurup, Porongurup National Park, S34°41′18.6″ E117°55′56″, on leaves of *Eucalyptus diversicolor*, 24 Sep. 2015, P.W. Crous (**holotype** CBS H-22885, culture ex-type CBS 142097 = CPC 29226); Western Australia, Denmark, Mount Lindesay Walk Trail, Southern Cross, on leaves of *Xanthosia rotundifolia*, 19 Sep. 2015, P.W. Crous, cultures CBS 142099 = CPC 29525.

Notes: *Mycodiella* was recently introduced to accommodate *Mycodiella eucalypti*, a pathogen on *Eucalyptus* that clustered together with "*Mycosphaerella*" *sumatrensis* on *Eucalyptus* and "*Mycosphaerella*" *laricis-leptolepidis* on *Larix*. All three species are only known from their asexual morph and cluster together in a well-supported clade based on LSU, which supported the combination of all three species into the same genus (Crous *et al.* 2016a). In this study only a representative of *Mycodiella sumatrensis* was used and it forms a single-strain lineage closely related to *Polyphialoseptoria* (Fig. 1, clade 78; Fig. 4, clade 12).

Mycodiella sumatrensis (Crous & M.J. Wingf.) Crous, Persoonia 37: 337. 2016.
Basionym: Mycosphaerella sumatrensis Crous & M.J. Wingf., Stud. Mycol. 55: 124. 2006.

Description and illustration: Crous *et al.* (2006b).

Material examined: **Indonesia**, Northern Sumatra, on leaves of *Eucalyptus* sp., Feb. 2004, M.J. Wingfield (**holotype** CBS H-19704, cultures ex-type CBS 118499 = CPC 11171); *idem*. cultures CBS 118501 = CPC 11175, CBS 118502 = CPC 11178.

Note: See *Mycodiella eucalypti*.

Clade 79: *Australosphaerella*

Australosphaerella Videira & Crous, **gen. nov.** MycoBank MB822579.

Etymology: Derived from the country of origin Australia and mycosphaerella-like sexual morph.

Description: *Ascomata* pseudothecial, black, slightly erumpent, globose. *Asci* aparaphysate, fasciculate, bitunicate, subsessile, obclavate to ellipsoidal, straight to incurved, 8-spored. *Ascospores* multiseriate, overlapping, hyaline, straight to rarely curved, fusoid-ellipsoidal with obtuse ends, medianly 1-septate, widest in middle of apical cell, not constricted at septum or only slightly so.

Type species: *Australosphaerella nootherensis* (Carnegie) Videira & Crous.

Australosphaerella nootherensis (Carnegie) Videira & Crous, **comb. nov.** MycoBank MB822739.
Basionym: *Mycosphaerella nootherensis* Carnegie, Austral. Pl. Pathol. 40: 377. 2011.

Description and illustration: Carnegie *et al.* (2011).

Materials examined: **Australia**, Queensland, Noosa Heads, on living leaves of *Corymbia intermedia*, 11 Aug. 2008, A.J. Carnegie (**holotype** BRIP 52584a, ex-type culture CBS 130522).

Notes: This genus is represented by a single-strain lineage in the phylogenetic analyses (Fig. 1, clade 79; Fig. 4, clade 16), closely related to *Mycodiella*, but not strongly supported by any of the phylogenetic methods employed, which indicates that it is quite different even from the closest related species. Based on a BLAST search against the alignment, CBS 130522 shares 89 % (428/483) similarity on ITS, including 2 % (10/483) gaps, with *Xenosonderhenioides indonesiana* CPC 15066 and 76 % (535/704) similarity on *rpb2*, including 1 % (12/704) gaps, with *Polyphialoseptoria terminaliae* CBS 135106. Therefore, a new genus is introduced to accommodate this species. Morphologically it is only known from its mycosphaerella-like sexual morph but the ascospores have a distinctive germination pattern with multiple germ tubes growing at various angles from both ends of the ascospore (Carnegie *et al.* 2011).

Clade 80: *Chuppomyces*

Chuppomyces Videira & Crous, **gen. nov.** MycoBank MB822582.

Etymology: In honour of the mycologist Charles Chupp, who produced an extensive work on cercosporoid fungi.

Description: *Mycelium* composed of hyaline to pale olivaceous brown hyphae, smooth to rough. *Conidiophores* macronematous, pale olivaceous brown, rough, straight or strongly geniculate, simple. *Conidiogenous cells* integrated, terminal or intercalary, thickened and darkened, proliferating sympodially, polyblastic, apex short-conically truncate, with rim-like conidiogenous loci, thickened and darkened, located on the apex and shoulders. *Conidia* solitary, hyaline, smooth, cylindrical to obclavate, septate.

Type species: *Chuppomyces handelii* (Bubák) U. Braun *et al.* (≡ *Cercospora handelii* Bubák).

Chuppomyces handelii (Bubák) U. Braun, C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822741. Fig. 46.
Basionym: *Cercospora handelii* Bubák, Ann. Naturhist. Mus. Wien 23: 106. 1909.
Synonyms: *Cercoseptoria handelii* (Bubák) Deighton, Mycol. Pap. 140: 166. 1976.
Cercospora rhododendri Ferraris, Fl. Ital. Cryptog. I: Fungi, Hyphales: 895. 1910.
Cercospora rhododendri Marchal & Verpl., Bull. Soc. Roy. Bot. Belgique 59: 24. 1927 (1926-1927), *nom. illeg.* (Art. 53.1).
Pseudocercospora handelii (Bubák) Deighton, Trans. Brit. Mycol. Soc. 88(3): 390. 1987.
Mycosphaerella handelii Crous & U. Braun, CBS Biodiversity Ser. 1: 211. 2003.

Description and illustrations: Chupp (1954), Ellis (1976), Deighton (1976a), Crous & Braun (2003), present study (Fig. 46).

Description in vitro (on V8; CBS 113302): *Mycelium* composed of hyaline to pale olivaceous brown hyphae, smooth to rough, uniform in width, 2.5–3 µm. *Conidiophores* macronematous, pale olivaceous brown, rough, straight or geniculate-sinuous, simple, 30–80 × 3–6 µm. *Conidiogenous cells* integrated, terminal or intercalary, proliferating sympodially, polyblastic, apex short-conically truncate or geniculate-sinuous, with rim-like conidiogenous loci, thickened and darkened, located on the apex and shoulders, 2–2.5 µm. *Conidia* solitary, hyaline, smooth, cylindrical to obclavate, base medium-long obconically truncate and apex rounded, straight, 25–125 × 3–5 µm, 1–5-septate, hila thickened and darkened.

Materials examined: **Netherlands**, Utrecht, Bilthoven, 28 Evert Comelislaan, on *Rhododendron* sp., 10 Mar. 2003, M. Crous & P.W. Crous (**holotype** of *Mycosphaerella handelii* CBS H-6594, culture ex-type CBS 112681); Utrecht, on *Rhododendron* sp., 2002, P.W. Crous & U. Braun, culture CBS 113302. **Turkey**, Trabzon District, Fol Koei, on *Rhododendron ponticum*, 14 Jul. 1907, Handel-Mazzetti (**holotype** of *Cercospora handelii*, BPI 437020).

Notes: The culture CBS 113302 was deposited as "*Mycosphaerella*" *handelii* (= *Pseudocercospora handelii*). However, the morphological characters on the V-8 medium are different from that of the genus *Pseudocercospora*. In the phylogenetic analyses, the present species is closely related to *Ruptoseptoria unedonis* and *Neoamichloridium pini*, but morphologically is quite distinct from both (Fig. 1, clade 80; Fig. 4, clade 13). *Chuppomyces handelii* (Fig. 1, clade 80; Fig. 4, clade 13) forms sympodially proliferating conidiophores and conidia which are hyaline, solitary, cylindrical and multiseptate. *Ruptoseptoria unedonis* (Fig. 1, clade 81; Fig. 4, clade 14) has convoluted conidiomata that open by irregular rupture and frequently form

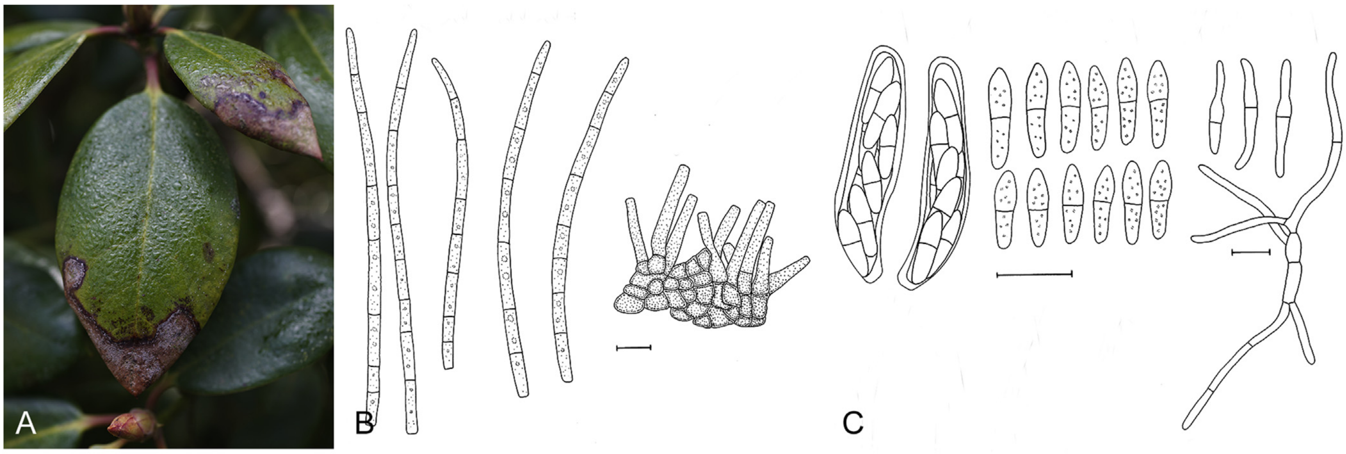


Fig. 46. *Chuppomyces handelii* (CBS 113302). **A.** Disease symptoms on the host leaves. **B.** Drawings of the asexual morph (from Crous & Braun 2003). **C.** Drawings of the sexual morph (from Crous & Braun 2003).

phialidic conidiogenous cells. *Pachyramichloridium pini* (Fig. 1, clade 82; Fig. 4, clade 15) has simple conidiophores, plurigenous conidiogenous cells with flat to prominent conidiogenous scars, producing conidia hyaline, obovoid, aseptate with darkened hila. *Chuppomyces handelii* shares 98 % (729/747) similarity with *Ruptoseptoria unedonis* and 96 % (712/744) similarity with *Pachyramichloridium pini*, based on LSU; 95 % (450/475) similarity with *Ruptoseptoria unedonis* and 91 % (431/476) similarity with *Pachyramichloridium pini*, based on ITS; 87 % (639/731) similarity with *Ruptoseptoria unedonis* and 80 % (593/737) similarity with *Pachyramichloridium pini*, based on *rpb2*. Despite the strong support on the branch that connects these three strains together based on all three phylogenetic methods employed in this study, the morphological characters are too different to consider joining them in the same genus and, therefore, two new genera are introduced to accommodate them.

Clade 81: *Ruptoseptoria*

Ruptoseptoria Quaedvlieg *et al.*, Stud. Mycol. 75: 356. 2013.

Description (from Quaedvlieg *et al.* 2013): Foliicolous, plant pathogenic. *Conidiomata* black, appressed, elongated, pycnidial, but opening via irregular rupture, convulated; exuding a creamy white conidial mass; outer wall dark brown, crusty, consisting of 6–8 layers of dark brown *textura angularis*; giving rise to 2–3 inner layers of pale brown to hyaline *textura angularis*. *Conidiophores* lining the inner cavity, hyaline, smooth or pale brown, verruculose at base, branched below, septate, subcylindrical. *Conidiogenous cells* integrated, terminal, subcylindrical, smooth; proliferating sympodially at apex, or apex phialidic with minute periclinal thickening. *Conidia* solitary, hyaline, smooth, guttulate, subcylindrical to narrowly obclavate, gently to irregularly curved, apex subobtuse, base truncate to narrowly obovoid, transversely septate.

Type species: *Ruptoseptoria unedonis* (Roberge ex Desm.) Quaedvlieg *et al.* (≡ *Septoria unedonis* Roberge ex Desm.).

Ruptoseptoria unedonis (Roberge ex Desm.) Quaedvlieg, Verkley & Crous, Stud. Mycol. 75: 357. 2013.
Basionym: *Septoria unedonis* Roberge ex Desm., Ann. Sci. Nat., Bot., Sér. 3, 8: 20. 1847.
Synonym: *Sphaerella arbuticola* Peck, Bull. Torrey Bot. Club 10(7): 75. 1883.
For additional synonyms see MycoBank.

Description and illustration: Quaedvlieg *et al.* (2013).

Materials examined: **Croatia**, Rab, city park, leaf spots on *Arbutus unedo*, Jul. 1970, J.A. von Arx, CBS H-18192, culture CBS 755.70. **France**, on leaves of *Arbutus unedo*, Aug. 1986, H.A. van der Aa, CBS H-14645, culture CBS 355.86.

Notes: Morphologically, *Ruptoseptoria* is very similar to *Septoria* but differs from the later genus in forming convoluted conidiomata that open by irregular rupture and frequently form phialidic conidiogenous cells. The type species *Ruptoseptoria unedonis* was described from *Arbutus unedo* from France, but the type specimen could not be located. The link between the asexual morph *Septoria unedonis* (CBS 755.70) and the sexual morph *Mycosphaerella arbuticola* (CBS 355.86) was established based on phylogenetic data (Quaedvlieg *et al.* 2013). In this study, based on the phylogenetic analyses, *Ruptoseptoria* forms a single-strain lineage (Fig. 1, clade 81; Fig. 4, clade 14). See also notes on *Chuppomyces handelii*.

Clade 82: *Pachyramichloridium*

Pachyramichloridium Videira & Crous, **gen. nov.** MycoBank MB822600.

Etymology: When noting the differences between *Ramichloridium apiculatum* and *Ramichloridium pini*, De Hoog *et al.* (1983) stated it had: “darker, shorter and stout conidiophores”. The name is formed by the Greek prefix pachy- (stout), and *-ramichloridium* for its morphological resemblance to the genus.

Description: *Mycelium* composed by dimorphic hyphae, hyaline to pale olivaceous, or olivaceous to dark brown and thick-walled, verrucose often with irregular clumps of pale olivaceous, capsular material. *Conidiophores* simple, erect, emerging from hyphae, wall thick and smooth, dark olivaceous brown, aseptate or septate, slightly tapering towards the apex. *Conidiogenous cells* terminal, subhyaline to brown, with scattered conidiogenous loci, flat or slightly protuberant, slightly darkened. *Conidia* solitary, pale olivaceous, thin-walled, smooth, obovate to obconical, hila slightly darkened.

Type species: *Pachyramichloridium pini* (de Hoog & Rahman) C. Nakash., Videira & Crous.

Pachyramichloridium pini (de Hoog & Rahman) C. Nakash., Videira & Crous, **comb. nov.** MycoBank MB822769.
Basionym: *Ramichloridium pini* de Hoog & Rahman, Trans. Brit. Mycol. Soc. 81: 485. 1983.

Description in vitro (adapted from De Hoog *et al.* 1983): *Hyphae* dimorphic, hyaline to pale olivaceous 0.5–3 µm wide, olivaceous to dark brown, thick-walled, 2–4 µm wide, verrucose, often with irregular clumps of pale olivaceous, capsular material. *Conidiophores* simple, erect, emerging from hyphae, wall thick and smooth, dark olivaceous brown, 60 × 2–3 µm, slightly tapering towards the rounded apex, aseptate or up to 5-septate. *Conidiogenous cells* terminal on conidiophore, with scattered conidiogenous loci, flat or slightly protuberant, subhyaline to brown, up to 1 µm wide. *Conidia* solitary, pale olivaceous, thin wall, mostly smooth, obovate to obconical, 3–8 × 2–3 µm, truncate base, hila slightly darkened.

Material examined: **UK**, Scotland, Old Aberdeen, branch of *Pinus contorta*, unknown date and coll., isol. M.A. Rahman, dep. 1982 (**holotype** CBS 461.82 = MUCL 28942).

Notes: The type species of *Ramichloridium*, *Ramichloridium apiculatum*, clusters in a sister clade to *Dissoconium* (*Dissoconiaceae*) (Arzanlou *et al.* 2007; present study Fig. 1, clade 95; Fig.4, clade 31). Other ramichloridium-like species cluster within the *Zasmidium* complex (Fig. 1, clade 69; Fig. 4, clade 1). The present species forms a single-strain lineage closely related to *Ruptoseptoria* (Fig. 1, clade 81; Fig. 4, clade 14). Morphological evaluation of the strain CBS 461.82 is impossible since it was sterile (Arzanlou *et al.* 2007; this study). According to the original description (De Hoog *et al.* 1983), this species has simple conidiophores, plurigenous conidiogenous cells with flat to prominent conidiogenous scars, producing hyaline obovoid, aseptate conidia. See also notes on *Chuppomyces handelii*.

Clade 83: *Exosporium*

Exosporium Link, Mag. Ges. Naturf. Freunde, Berlin 3(1–2): 9. 1809.
Synonyms: *Cephaloedium* Kunze, Consp. Regni Veget. (Leipzig): 4. 1828.
Cuspidosporium Cif., Sydowia 9: 303. 1955.

Description (from Ellis 1961): *Colonies* discrete and punctiform or effuse, hairy, brown to black. *Mycelium* immersed. *Stroma* usually present, often very well-developed. *Setae* and hyphopodia absent. *Conidiophores* macronematous, mononematous, often caespitose, straight or flexuous, unbranched, or very rarely branched, mid to dark brown or olivaceous brown, smooth or verruculose. *Conidiogenous cells* polytretic, integrated, terminal, becoming intercalary, sympodial, cylindrical, or clavate, cicatrized, conidiogenous loci (scars) often dark and prominent. *Conidia* usually solitary, short catenate in one species, acropleurogenous, simple, mostly obclavate, pale to dark brown or olivaceous brown, smooth, verrucose or echinulate, distoseptate, generally with a thick, dark hilum at the base.

Type species: *Exosporium tiliae* Link.

Exosporium livistonae Crous & Summerell, Persoonia 27: 145. 2011.

Description and illustration: Crous *et al.* (2011a).

Materials examined: **Australia**, Northern Territory, Litchfield National Park, on leaves of *Livistona benthamii*, 25 Apr. 2011, P.W. Crous & B.A. Summerell (**holotype** CBS H-20763, ex-type culture CBS 131313 = CPC 19357).

Note: See notes under *Exosporium livistonicola*.

Exosporium livistonicola U. Braun, Videira & Crous, **nom. nov.** MB822834.

Replaced synonym: *Distocercospora livistonae* U. Braun & C.F. Hill, Fungal Diversity 22: 23. 2006.

Description and illustration: Braun *et al.* (2006).

Materials examined: **Japan,** Yonagunijima Is., *Livistona chinensis*, 27 Feb. 2003, T. Kobayashi & Y. Ono, culture MUCC 190; Hahajima Is., on *Livistona chinensis* var. *boninensis*, 17 Mar. 2003, T. Kobayashi & Y. Ono, culture MUCC 194. **New Zealand,** Auckland, Manurewa, Auckland Regional Botanic Gardens, Hill Road, on *Livistona chinensis*, 10 Sep. 2005, C.F. Hill 1247 (**holotype** of *Distocercospora livistonae*, HAL 1875 F).

Notes: In this study, the type species of the genus *Distocercospora*, *Distocercospora pachyderma*, formed an independent clade within *Mycosphaerellaceae* (Fig. 1, clade 31; Fig. 2, clade 27). Sequences retrieved from cultures of *Distocercospora livistonae*, isolated from *Livistona chinensis* and originating from Japan, clustered together with the sequences obtained from the ex-type culture of *Exosporium livistonae* (Fig. 1, clade 72; Fig. 4, clade 29). The type species of *Distocercospora livistonae* was described from a different country (New Zealand) but the same host (*Livistona chinensis*) as the studied material from Japan, which was found to be a good representative of the species. The morphological characters observed for both species, *Exosporium livistonae* and *Distocercospora livistonae*, were similar, though the two species differ in conidial width, and this is also to be seen in the phylogeny, where the two taxa are shown to be congeneric, but not conspecific. A further paper on *Exosporium* species (Nakashima, in prep.) will provide further detail on the genus.

Based on the phylogenetic analyses, the position of *Exosporium* varies as there is no strong backbone support (Fig. 1, clade 83; Fig. 4, clade 29). Although it sits in the *Mycosphaerellaceae* in the displayed trees, this position may change when more species are introduced as the current genus occasionally clustered between *Schizothyriaceae* and *Dissononiaceae* in different analyses (data not shown). Furthermore, sequences based on the type species of *Exosporium*, *Exosporium tiliae*, are not yet available. Therefore, the inclusion of *Exosporium livistonae* in *Exosporium* is only tentative until the application of the latter genus based on the phylogeny of its type species will be resolved.

Clade 84: *Paramycosphaerella*

Paramycosphaerella Crous & Jol. Roux, Persoonia 31: 245. 2013.

Description (from Crous *et al.* 2013b): Foliicolous, plant pathogenic. *Ascomata* erumpent, amphigenous, brown, globose, with central ostiole; wall of 2–3 layers of brown *textura angularis. Asci* fasciculate, bitunicate with apical chamber, 8-spored, subcylindrical to narrowly ellipsoid. *Ascospores* tri- to multiseriate, thin-walled, guttulate, not to very slightly constricted at septum, obovoid, remaining hyaline.

Type species: *Paramycosphaerella brachystegiae* Crous & Jol. Roux.

Paramycosphaerella brachystegiae Crous & Jol. Roux (‘*brachystegia*’), Persoonia 31: 245. 2013.

Description and illustration: Crous *et al.* (2013b).

Materials examined: **Zimbabwe**, Mtau forest reserve, near Mvuma, on leaves of *Brachystegia* sp., 2 Apr. 2012, J. Roux (**holotype** CBS H-21445, ex-type cultures CBS 136436 = CPC 21136); *idem*. culture CPC 21137.

Notes: *Paramycosphaerella* is morphologically mycosphaerella-like, but since *Mycosphaerella* is restricted to *Ramularia* asexual morphs, a new genus was established to accommodate the type species *Paramycosphaerella brachystegiae* (Crous *et al.* 2013b). Two more species, *Paramycosphaerella intermedia* (Dick & Dobbie 2001, as *Mycosphaerella intermedia*) and *Paramycosphaerella marksii* (Carnegie & Keane 1994, as *Mycosphaerella marksii*), were later placed in this genus based on phylogenetic inference (Quaedvlieg *et al.* 2014). In a recent publication (Guatimosim *et al.* 2016), a large group of species was introduced in this genus, mostly based on phylogenetic inference, including *Paramycosphaerella aerohyalinosporum* (Crous *et al.* 2009d, as *Zasmidium aerohyalinosporium*), *Paramycosphaerella blechni* (Guatimosim *et al.* 2016), *Paramycosphaerella cyatheae* (Guatimosim *et al.* 2016), *Paramycosphaerella dicranopteridis* (Kirschner & Liu 2014, as *Zasmidium dicranopteridis*), *Paramycosphaerella dicranopteridis-flexuosae* (Guatimosim *et al.* 2016), *Paramycosphaerella gleicheniae* (Kirschner & Liu 2014, as *Mycosphaerella gleicheniae*), *Paramycosphaerella irregularis* (Cheewangkoon *et al.* 2008, as *Mycosphaerella irregularis*), *Paramycosphaerella madeirensis* (Crous *et al.* 2004b, as *Mycosphaerella madeirae*), *Paramycosphaerella nabiacense* (Crous *et al.* 2009d, as *Zasmidium nabiacense*), *Paramycosphaerella parkii* (Crous *et al.* 1993, Crous & Alfenas 1995, as *Zasmidium parkii*), *Paramycosphaerella pseudomarksii* (Cheewangkoon *et al.* 2008, as *Mycosphaerella pseudomarksii*), *Paramycosphaerella sticheri* (Guatimosim *et al.* 2016) and *Paramycosphaerella vietnamensis* (Burgess *et al.* 2007, as *Mycosphaerella vietnamensis*). Morphologically, the majority of these species are only known from their mycosphaerella-like sexual morphs (*Mycosphaerella gleicheniae*, *Mycosphaerella marksii*, *Mycosphaerella intermedia*, *Mycosphaerella pseudomarksii*, *Paramycosphaerella blechni*, *Paramycosphaerella cyatheae*, *Paramycosphaerella dicranopteridis-flexuosae*, *Paramycosphaerella sticheri*). Most of the remaining species produce a zasmidium-like asexual morph (*Zasmidium aerohyalinosporium*, *Zasmidium dicranopteridis*, *Zasmidium nabiacense*, *Zasmidium parkii*). In two cases, both sexual and asexual morphs are known, namely with "*Mycosphaerella*" *madeirensis* and "*Mycosphaerella*" *vietnamensis*, which have a presumed pseudocercospora-like asexual morph. In a later study (Videira *et al.* 2016), a new phylogenetic analysis based on LSU and *rpb2* placed the strains of *Paramycosphaerella madeirensis* in a sister clade to *Microcyclosporella* and, based on their phylogenetic positon and morphological differences, the genus *Mycosphaerelloides* was erected to accommodate them. In the present study, with the addition of more genera belonging to the *Mycosphaerellaceae*, we observe the previously defined *Paramycosphaerella* clade becoming paraphyletic (Fig. 1, clades 84, 87, 93, 94; Fig. 4, clades 17, 21, 22, 26, 27). Consequently, the phylogenetic position of the species *Paramycosphaerella blechni*, *Paramycosphaerella cyatheae* and *Paramycosphaerella diacranopteridis*, that clustered closely related to *Mycosphaerelloides* (Guatimosim *et al.* 2016, as *Paramycosphaerella madeirensis*) need to be re-evaluated based on the *rpb2* gene. Based on the phylogenetic analyses, *Paramycosphaerella* clusters close to *Brunneosphaerella* in a very heterogeneous clade (Fig. 1, clade 84; Fig. 4, clade 17) suggesting that further analysis is necessary to resolve this group of species.

Paramycosphaerella intermedia (M.A. Dick & K. Dobbie) Quaedvlieg & Crous, Persoonia 33: 23. 2014.
Basionym: *Mycosphaerella intermedia* M.A. Dick & K. Dobbie, New Zealand J. Bot. 39(2): 272. 2001.

Description and illustration: Dick & Dobbie (2001).

Materials examined: **New Zealand**, Bay of Plenty, Rotoehu Forest, Kohekohe Road, on living leaves of *Eucalyptus saligna*, 30 Jun. 1998, L. Renney (**holotype** NZFRI-M 3831, ex-type cultures NZFS 301.10 = CBS 114356 = CMW 7163 = CPC 10902); Waimana Forest, 12 Aug. 1998, K. Dobbie, culture NZFS 301.13 = CBS 114415 = CMW 7164 = CPC 10922.

Note: See notes on *Paramycosphaerella brachystegiae.*

Paramycosphaerella marksii (Carnegie & Keane) Quaedvlieg & Crous, Persoonia 33: 23. 2014.
Basionym: *Mycosphaerella marksii* Carnegie & Keane, Mycol. Res. 98: 414. 1994.

Description and illustration: Carnegie & Keane (1994).

Materials examined: **Australia**, Victoria, Briagolong, on leaves of *Eucalyptus globulus*, 14 Oct. 1994, A. Carnegie, culture CBS 110920 = CPC 935. **South Africa**, Northern Province, Magoebaskloof, Eucalyptus grandis × saligna, Oct. 1994, G. Kemp, cultures CBS 110693 = CPC 823, CBS 110750 = CPC 822 = CMW 14778. **Tanzania**, *Eucalyptus* sp., May 1995, M.J. Wingfield, cultures CBS 110981 = CPC 1073.

Notes: The type species of *Paramycosphaerella marksii*, based on *Mycosphaerella marksii*, was isolated from *Eucalyptus botryoides* from Australia (holotype (IMI 353731). See notes on *Paramycosphaerella brachystegiae* an also Quaedvlieg *et al.* (2014).

Paramycosphaerella wachendorfiae (Crous) Videira & Crous, **comb. nov.** MycoBank MB822773.
Basionym: *Mycosphaerella wachendorfiae* Crous, Persoonia 26: 129. 2011.

Description and illustration: Crous *et al.* (2011a).

Materials examined: **South Africa**, Western Cape Province, Hermanus, Fernkloof Nature Reserve, S 34°23′38″ E 19°16′9.7″, on leaves of *Wachendorfia thyrsifolia*, 2 May 2010, K.L. Crous & P.W. Crous (**holotype** CBS H-20584, cultures ex-type CBS 129579 = CPC 18338).

Notes: The present strain is phylogenetically closest to the type of *Paramycosphaerella*, *Paramycosphaerella brachystegiae* (Fig. 1, clade 84; Fig. 4, clade 17). The morphological characteristics of the sexual morph are compatible with the genus.

***Paramycosphaerella* sp. A**

Materials examined: **South Africa**, Mpumalanga, on *Musa* cv. Williams, 27 Jul. 2000, K. Surridge, culture CBS 118825 = CMW 10904; *idem*. on *Musa* cv. Grande Naine, 27 Jul. 2000, K. Surridge, culture CBS 118849 = CMW 10902.

Notes: The present strains were originally identified as *Mycosphaerella colombiensis* based on their ITS sequences originally deposited in GenBank (AY217106 and AY217108, respectively). However, *Mycosphaerella colombiensis* was described from *Eucalyptus* in Colombia and is currently a synonym of *Parapallidocercospora colombiensis* (Fig. 1, clade 25; Fig. 2, clade 31). Phylogenetically, both the present strains cluster in *Paramycosphaerella* (Fig. 1, clade 84; Fig. 4, clade 17) and were sterile in culture. It is possible that the wrong cultures were deposited in the CBS culture collection. Therefore, they should be treated as *Paramycosphaerella* sp. until more information becomes available.

Paramycosphaerella sp. B

Materials examined: **USA**, Illinois, Rockford, apple fruit, Sep. 2000, J. Batzer, culture CBS 118968 = CUF2d; New York, Geneva, on apple fruit, 30 Oct. 2005, D. Rosenberger, culture CBS 125300 = NY1 3.2F1c.

Notes: The present strains were initially identified based on morphological characters as *Colletogloeum* sp. and, based on an LSU neighbour-joining phylogeny, they clustered closest to *Mycosphaerella marksii*. They formed a dense, fuliginous mycelial mat with no sclerotium-like bodies, had thick-walled, ovoid to allantoid blastospores that were highly vacuolate, subhyaline, and truncate at the base, measuring 6–19 × 2.5–4.5 µm (strain FG 2.1) or 7–11 × 1–2 µm (strain FG 2.3) on CLA culture media (Batzer *et al.* 2005). This description is very broad and the present strains are now sterile which makes it impossible to draw further conclusions. The correct phylogenetic placement of the genus *Colletogloeum*, based on the type *Colletogloeum dalbergiae* (Pakistan), is unknown, although DNA extracted from a herbarium specimen of *Colletogloeum sissoo* (IMI 119162) (= *Colletogloeum dalbergiae*) suggests *Colletogloeum* to cluster in a sister clade to *Pseudocercospora* (Crous *et al.* 2009e). Based on the phylogenetic analysis in the present study, these present strains cluster within the *Paramycosphaerella* clade (Fig. 1, clade 84; Fig. 4, clade 17), and should be treated as *Paramycosphaerella* sp. until more information is available.

Clade 85: *Pseudopericoniella*

Pseudopericoniella Videira & Crous, **gen. nov.** MycoBank MB822699.

Etymology: From pseudo-, that means resembling but not equalling, and the similarity to the genus *Periconiella*.

Description: *Mycelium* composed of submerged hyaline hyphae, smooth and thin-walled, and aerial hyphae subhyaline, later becoming dark brown, smooth and thick-walled. *Conidiophores* arising from creeping aerial hyphae, erect, dark brown at the base, paler towards the apex, thick-walled, septate, branched in the upper part. *Conidiogenous cells* integrated, terminal and intercalary, subhyaline, later becoming pale brown, cylindrical, proliferating sympodially, forming a short rachis with conidiogenous loci darkened, slightly thickened and protruding. *Conidia* solitary, pale olivaceous, smooth, obovoid, ellipsoidal, pyriform to clavate, cylindrical, base long obconicaly truncate and rounded apex, straight to mildly curved, aseptate or septate, sometimes constricted at the septa, with a hilum slightly thickened and darkened.

Type species: *Pseudopericoniella levispora* (Arzanlou *et al.*) Videira & Crous (≡ *Periconiella levispora* Arzanlou *et al.*).

Pseudopericoniella levispora (Arzanlou *et al.*) Videira & Crous, **comb. nov.** MycoBank MB822780.
Basionym: Periconiella levispora Arzanlou *et al.*, Stud. Mycol. 58: 68. 2007.

Description and illustration: Arzanlou *et al.* (2007).

Materials examined: **Sri Lanka**, Hakgala Botanic Gardens, on dead leaves of *Turpinia pomifera*, Jan. 1973, W. Gams (**holotype** CBS H-15611, culture ex-type CBS 873.73).

Notes: Morphologically, *Pseudopericoniella levispora* is similar to *Periconiella velutina* but can be distinguished by producing darker and longer conidia [(7–)8–9(–11) × (2.5–)3(–4) µm, in *Periconiella velutina*; Arzanlou *et al.* 2007]. Based on the phylogenetic analyses in the present study, the type of *Periconiella*, *Periconiella velutina*, clusters within the *Zasmidium* complex (Fig. 1, clade 69; Fig. 4, clade 1), while *Pseudopericoniella levispora* clusters in a unique position (Fig. 1, clade 85; Fig. 4 clade 22) closely related to *Hyalozasmidium*.

Pseudopericoniella sp.

Material examined: **Netherlands**, Aalsmeer, leaf spot on *Rosa* sp., isol. & dep. J.A. von Arx, 1951, culture CBS 330.51.

Notes: The present strain was previously identified as *Mycosphaerella rosigena*. It is currently sterile and no fungarium material has been preserved. The type specimen of *Mycosphaerella rosigena* (from *Rosa* sp., Louisiana, USA, holotype NY) was examined by Aptroot (2006) and combined into *Davidiella* (currently a synonym of *Cladosporium*) based on morphological characters. Based on the phylogenetic analysis, the present strain clusters close to *Pseudopericoniella levispora* (Fig. 1, clade 85; Fig. 4, clade 22), and should be treated as *Pseudopericoniella* sp. until more information becomes available.

Clade 86: *Brunneosphaerella*

Brunneosphaerella Crous, Stud. Mycol. 64: 31. 2009.

Description (from Crous *et al.* 2009c): *Ascomata* amphigenous, immersed to semi-immersed, black, single, gregarious, substomatal, pyriform or globose with a papillate, periphysate ostiole; peridium consisting of three strata of slightly compressed *textura angularis*, an outer stratum of dark brown, thick-walled cells, becoming paler in the central stratum, and hyaline, thin-walled in the inner stratum. *Asci* clavate to cylindro-clavate, often curved, tapering to a pedicel, narrowing slightly to a rounded apex with an indistinct ocular chamber, 8-spored, bitunicate with fissitunicate dehiscence. *Pseudoparaphyses* absent. *Ascospores* biseriate, fusiform, broader at the apical end, initially hyaline and 1-septate, becoming yellow-brown and 3-septate at maturity, slightly constricted at median to supra-median septum.

Type species: *Brunneosphaerella protearum* (Syd. & P. Syd.) Crous (≡ *Leptosphaeria protearum* Syd. & P. Syd.).

Brunneosphaerella protearum (Syd. & P. Syd.) Crous, Stud. Mycol. 64: 31. 2009.
Basionym: *Leptosphaeria protearum* Syd. & P. Syd., Ann. Mycol. 10: 441. 1912.

Description and illustration: Crous *et al.* (2009c).

Material examined: **South Africa**, Western Cape Province, Wellington, on leaves of *Protea lepidocarpodendron* (as *P. melaleuca*), 22 Feb. 1912, E.M. Doidge (**holotype** PREM 2061); Cape town, Kirstenbosch Botanical Garden, on *Protea* sp., 13 Jan. 2009, P.W. Crous, (**epitype** designated by Crous *et al.* 2011b: CBS H-20335, ex-epitype culture CBS 130597 = CPC 16338); Kirstenbosch Botanical Garden, on leaves of *P. coronata*, 8 May 2010, P.W. Crous, CBS H-20673, culture CPC 18308 = CBS 130598; Harold Porter Botanical Garden, Betties Bay, on leaves of *P. mundii*, 4 May 2010, P.W. Crous, CBS H-20683, culture CPC 18328; Bettys' Bay, leaf litter of *Protea magnifica*, 11 Jul. 2000, S. Marincowitz, PREM 59448; Helderberg Nature Reserve, leaf litter of *Protea laurifolia*, 14 Aug. 2000, S. Marincowitz, PREM 59482; Helderberg Nature Reserve, leaf litter of *Protea obtusifolia*, 14 Aug. 2000, S. Marincowitz, PREM 59495; Jonkershoek Nature Reserve, leaf litter of *Protea nitida*, 6 Jun. 2000, S. Marincowitz, PREM 59442; Jonkershoek Nature Reserve, leaf litter of *Protea repens*, 6 Jun. 2000, S. Marincowitz, PREM 59450; Jonkershoek Nature Reserve, S33°59′11.2″ E18°57′14.7″ leaves of *Protea* sp., 1 Apr. 2007, P.W. Crous, CBS H-20330, cultures CPC 13914–13916; Jonkershoek Nature Reserve, S33°59′26.1″ E18°57′59.5″ leaves of *P. repens*, 1 Apr. 2007, P.W. Crous, CBS H-20331, cultures CPC 13911–13913; Jonkershoek Nature Reserve, leaves of *Protea* sp., 1 Apr. 2007, P.W. Crous, CBS H-20332, cultures CPC 13908–13910;

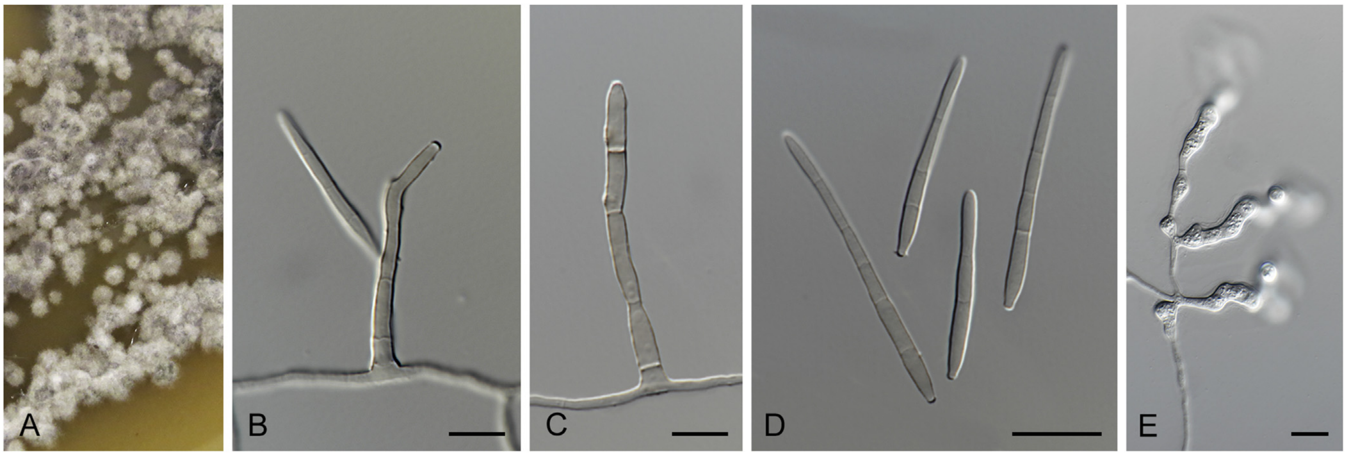


Fig. 47. *Hyalozasmidium sideroxyli* (CPC 23462). **A– E.** Observations *in vitro*. **A.** Culture on V8. **B, C.** Conidiophores and conidiogenous cells. **D.** Conidia. **E.** Irregular swollen conidia synanamorph. Scale bars = 10 µm.

Jonkershoek Nature Reserve, "Tweede Waterval", leaves of *Protea* sp., 1 Apr. 2007, P.W. Crous, CBS H-20333, cultures CPC 13902–13907; Jonkershoek Nature Reserve, leaves of *P. nitida*, 12 Apr. 2008, L. Mostert, CBS H-20334, cultures CPC 15231–15233; Stellenbosch, J.S. Marais Garden, S33°55′59.3″ E18°52′22.5″, on living leaves of *P. magnifica*, 1 Apr. 1998, J.E. Taylor, culture CPC 16849.

Notes: The genus *Brunneosphaerella* was established to accommodate species belonging to the *Leptosphaeria protearum* complex (*Pleosporales*) that clustered within the *Mycosphaerellaceae* (Crous *et al.* 2009c, 2011b). These species were characterised by having bitunicate asci without pseudoparaphyses, brown, 3-septate ascospores, and a coniothyrium-like asexual morph. *Brunneosphaerella protearum* is a major leaf spot and blight pathogen of *Protea* spp. causing severe losses in plantations of South African *Protea* spp. wherever they are cultivated (Crous *et al.* 2009c, 2011b). Morphologically *Brunneosphaerella* is distinct from *Leptosphaeria* in that its ascospores are always brown at maturity and similar to *Phaeophleospora* in that conidiogenous cells are brown and proliferate percurrently. The genus *Brunneosphaerella* currently contains three species that cluster in a well-supported clade (Fig. 1, clade 86; Fig. 4, clade 18) that is closely related to *Neomycosphaerella*.

Clade 87: *Hyalozasmidium*

Hyalozasmidium U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822593.

Etymology: Derived from the hyaline conidia + resembling the genus *Zasmidium.*

Description: *Mycelium* composed of subhyaline to pale brown hyphae, smooth, branched and septate, producing large swollen propagules that occur terminaly or lateraly on hyphal strands. *Conidiophores* medium to dark brown, unbranched, smooth to verruculose, becoming constricted at septa, eventually disarticulating, with each conidiophore giving rise to a single conidium. *Conidiogenous cells* apical and intercalary, mono- or polyblastic, straight, proliferating sympodially, with conidiogenous loci unthickened or slightly thickened, located at shoulders and apex. *Conidia* hyaline, thick-walled, subcylindrical, with multiple transverse septa, developing irregular swellings which can form branches with obtuse ends, body granular, basal cell tapering prominently towards the conidiophore. Differs from the genus *Zasmidium*, by bearing hyaline conidia.

Type species: *Hyalozasmidium aerohyalinosporum* (Crous & Summerell) Videira & Crous (≡ *Zasmidium aerohyalinosporum* Crous & Summerell).

Hyalozasmidium aerohyalinosporum (Crous & Summerell) Videira & Crous, **comb. nov.** MycoBank MB822761.
Basionym: *Zasmidium aerohyalinosporum* Crous & Summerell, Persoonia 23: 144. 2009.
Synonym: *Paramycosphaerella aerohyalinosporum* (Crous & Summerell) Guatimosim *et al.* Persoonia 37: 124. 2016.

Description and illustration: Crous *et al.* (2009d).

Materials examined: **Australia**, New South Wales, Road to Robin Falls, 13°31′01.3″S, 131°16′22.5″E, 126 m, on leaves of *Eucalyptus tectifica*, 23 Sep. 2007, coll. B.A. Summerell, isol. P.W. Crous (**holotype** of *Zasmidium aerohyalinosporium* CBS H-20274, culture ex-type CBS 125011 = CPC 14636); *idem*., culture CPC 14637.

Notes: In the phylogenetic analyses, the present species is closely related to *Neomycosphaerella* (Fig. 1, clade 87; Fig. 4, clade 21). See notes in Crous *et al.* (2009d) and also notes on *Paramycosphaerella brachystegiae.*

Hyalozasmidium sideroxyli U. Braun, C. Nakash., Videira & Crous, **sp. nov.** MycoBank MB822713. Fig. 47.

Etymology: Named after the host genus on which it occurs, *Sideroxylon.*

Description in vitro (on SNA; CPC 23462): *Mycelium* composed of hyaline to subhyaline hyphae, smooth, branched and septate, producing large swollen propagules that occur terminally or laterally on hyphal strands, 1.5–3 µm diam. *Conidiophores* micro- or macronematous, hyaline to subhyaline, simple or branched, septate, straight to slightly curved, 12.5–60 × 2.5–5 µm. *Conidiogenous cells* apical and intercalary, mono- or polyblastic, proliferating sympodially, with conidiogenous loci slightly thickened and darkened, located at shoulders and apex, 1.5–2 µm diam. *Conidia* solitary, sometimes bearing conidia by microcyclic conidiation, hyaline, smooth to rough, cylindrical to obclavate, straight, base obconically truncate and apex rounded, 20–50 × 2–2.5 µm, 0–4-septate, hila slightly thickened and darkened.

Material examined: **South Africa**, Eastern Cape, Cape St. Francis, on *Sideroxylon inerme*, 8 May 2013, A.R. Wood (**holotype** CBS H-22965, ex-type culture CBS 142191 = CPC 23462).

Notes: Based on the phylogenetic analyses, the present strain clusters within the *Hyalozasmidium* clade (Fig. 1, clade 87; Fig. 4, clade 21). Morphologically, its characteristics are in accordance with the genus description (Fig. 47) and it can be distinguished from *Hyalozasmidium aerohyalinosporium* by having conidiogenous cells that are polyblastic, and longer, less septate conidia.

Clade 88: *Madagascaromyces*

Madagascaromyces U. Braun, C. Nakash., Videira & Crous, **gen. nov.** MycoBank MB822594.

Etymology: Named after the island where the type species was collected, Madagascar.

Description: *Mycelium* composed of pale to medium brown hyphae, septate, branched, smooth, 2–3 µm. *Conidiophores* solitary, medium brown, smooth, subcylindrical, simple or branched, straight to variously curved or geniculate-sinuous. *Conidiogenous cells* terminal and intercalary, proliferating sympodially, with one or multiple conidiogenous loci that are thickened and darkened. *Conidia* solitary, pale brown, smooth, guttulate, subcylindrical when small, narrowly obclavate when larger, apex subobtuse, base long obconically subtruncate, straight to slightly curved, 1- or multiseptate, with hila thickened and darkened, microcyclic conidiation observed in culture. *Spermatogonia* forming on OA. *Spermatia* cylindrical with obtuse ends, smooth, hyaline.

Type species: *Madagascaromyces intermedius* (Crous & M.J. Wingf.) Videira & Crous (≡ *Passalora intermedia* Crous & M.J. Wingf.).

Madagascaromyces intermedius (Crous & M.J. Wingf.) Videira & Crous, **comb. nov.** MycoBank MB822762.
Basionym: *Passalora intermedia* Crous & M.J. Wingf., Persoonia 22: 88. 2009.

Description and illustrations: Crous *et al.* (2009g).

Materials examined: **Madagascar**, Morondavo, on leaf of *Eucalyptus calmadulensis*, Aug. 2007, M.J. Wingfield (**holotype** CBS H-20197, ex-type culture CBS 124154 = CPC 15745); on *E. calmadulensis*, 1 Oct. 2007, M.J. Wingfield, culture CPC 15719.

Notes: The genus *Madagascaromyces* is monotypic and based on *Madagascaromyces intermedius* (syn. *Passalora intermedia*). Morphologically, *Madagascaromyces intermedius* can be considered intermediate between *Pseudocercospora* and *Passalora*, based on the narrowly obclavate conidia with hila that are somewhat thickened and darkened, but not prominently refractive (Crous *et al.* 2009g). Phylogenetically, strains of the present species cluster in a well-supported clade (Fig. 1, clade 88; Fig. 4, clade 19) that is closely related to *Neomycosphaerella*. Since the species *Madagascaromyces intermedius* is only known from its asexual morph, and the species *Neomycosphaerella pseudopentameridis* is only known by its sexual morph, a direct comparison between both is not possible. Based on a BLAST comparison against the ITS alignment, *Madagascaromyces intermedius* CPC 15745 shares 92 % (450/489) similarity, including 2 % (13/489) gaps, with *Hyalozasmidium sideroxyli* CBS 125011 and 90 % (439/488) similarity, including 3 % (16/488) gaps, with *Neomycosphaerella pseudopentameridis* CBS 136407. Based on a BLAST comparison against the *rpb2* alignment, *Mad. intermedius* CPC 15745 shares 81 % (571/703) similarity with *Pseudopericoniella* sp. CBS 330.51 using megablast search, and 82 % (589/722) with *Neomycosphaerella pseudopentameridis* CBS 136407 using a blastn search. Based on the molecular and morphological differences, we decided to keep the present two taxa in single species genera until more information becomes available.

Clade 89: *Neomycosphaerella*

Neomycosphaerella Crous, Persoonia 31: 195. 2013.

Description (from Crous *et al.* 2013b): Foliicolous, phytopathogenic. *Ascomata* immersed, subepidermal, frequently in a brown stroma, unilocular, in rows of 2–4, globose, with central ostiole; wall of 2–4 layers of brown *textura angularis. Asci* fasciculate, stipitate, 8-spored, with minute ocular chamber, obovoid, straight to slightly curved, hyaline. *Ascospores* tri- to multiseriate, hyaline, smooth, granular, medianly 1-septate; ascospores becoming brown and verruculose with age.

Type species: *Neomycosphaerella pseudopentameridis* Crous.

Neomycosphaerella pseudopentameridis Crous, Persoonia 31: 195. 2013.

Description and illustration: Crous *et al.* (2013b).

Material examined: **South Africa**, Western Cape Province, Cape Town, Green Point Park, on leaves of *Pseudopentameris macrantha*, 22 Jul. 2012, P.W. Crous (**holotype** CBS H-21416, ex-type cultures CBS 136407 = CPC 21126); *idem*., culture CPC 21127.

Notes: *Neomycosphaerella* represents a single-strain lineage in the phylogenetic analyses and is closely related to *Brunneosphaerella* (Fig. 1, clade 89; Fig. 4, clade 20). Morphologically, *Neomycosphaerella* is only known by its sexual morph, which is mycosphaerella-like. *Brunneosphaerella* differs from *Neomycosphaerella* by producing pigmented ascospores, 3-septate, and with mucoid caps (Crous *et al.* 2013b).

Clade 90: *Mycosphaerelloides*

Mycosphaerelloides Videira & Crous, Stud. Mycol. 83: 99. 2016.

Description (from Videira *et al.* 2016): *Leaf spots* amphigenous, subcircular, 2–15 mm diam, medium brown, surrounded by a slightly raised, red-purple border. *Ascomata* pseudothecial, predominantly epiphyllous, single, black, immersed, becoming erumpent, globose, up to 120 µm diam; apical ostiole 10–15 µm diam; wall of 2–3 layers of medium brown *textura angularis*. *Asci* aparaphysate, fasciculate, bitunicate, subsessile, obovoid to narrowly ellipsoid, straight or slightly incurved, 8-spored, 30–50 × 8–12 µm. *Ascospores* 3- to multiseriate, overlapping, hyaline, guttulate, thin-walled, straight to slightly curved, fusoid-ellipsoid with subobtuse ends, apex frequently acutely rounded, medianly 1-septate, widest in the middle of the apical cell, not constricted at the septum, tapering towards both ends, but more prominently towards the lower end, (9–)10–13(–15) × 2.5–3(–3.5) µm *in vivo*. *Mycelium* internal and external, consisting of smooth, branched, septate, pale to medium brown, 3–6 µm wide hyphae; external mycelium extensive on abaxial leaf surface. *Conidiomata* fasciculate, hypophyllous, medium brown, up to 90 µm wide and 150 µm high. *Conidiophores* arising from superficial mycelium, or aggregated in loose fascicles arising from the upper cells of a brown stroma up to 80 µm wide and 90 µm high; conidiophores pale to medium brown, smooth, unbranched or branched, 1–5-septate, subcylindrical, straight to variously curved, 15–45 × 2.5–4 µm; conidiogenous cells terminal or lateral, unbranched, subcylindrical, pale brown, smooth, proliferating sympodially, or 1–4 times percurrently near apex, 7–15 × 2.5–3 µm; conidiogenous loci inconspicuous. *Conidia* solitary, pale brown, smooth, subcylindrical, but tapering from a subtruncate base towards a subobtuse apex, 3–6- or multiseptate, 35–85 × 2.5–4 µm, hila neither thickened nor darkened-refractive.

Type species: *Mycosphaerelloides madeirae* (Crous & Denman) Videira & Crous (≡ *Mycosphaerella madeirae*).

Mycosphaerelloides madeirae (Crous & Denman) Videira & Crous, Stud. Mycol. 83: 100. 2016.
Basionym: *Mycosphaerella madeirae* Crous & Denman, Stud. Mycol. 50: 204. 2004.
Synonym: *Paramycosphaerella madeirae* (Crous & Denman) Guatimosim *et al.*, Persoonia 37: 127. 2016, as '*madeirensis*'.

Description and illustrations: Crous *et al.* (2004b).

Materials examined: **Portugal**, Madeira, Party Farm, on leaves of *Eucalyptus globulus*, Apr. 2000, S. Denman (**holotype** CBS H-9898, culture ex-type CBS 112895 = CPC 3745 = CMW 14458); *idem*., culture CBS 112301 = CPC 3747. **Netherlands**, Utrecht, Soest, endophytic on green leaves of *Quercus robur*, 2002, G. Verkley, cultures CBS 115936, CBS 116068, CBS 116066.

Notes: *Mycosphaerelloides* is currently a monotypic genus based on *Mycosphaerelloides madeirae*, which has a mycosphaerella-like sexual morph and a presumed pseudocercospora-like asexual morph (Crous *et al.* 2004b, Videira *et al.* 2016). Phylogenetically, the strains of *Mycosphaerelloides madeirae* cluster in a well-supported clade (Fig. 1, clade 90; Fig. 4, clade 24) that is closely related to *Microcyclosporella*. Based on a BLAST comparison against the alignment, *Mycosphaerelloides madeirae* CBS 112895 shares 96 % (467/485) similarity with *Microcyclosporella mali* CBS 126136 based on ITS and shares 88 % (594/674) similarity with *Epicoleosporium ramularioides* CPC 10672 based on *rpb2*.

Clade 91: *Epicoleosporium*

Epicoleosporium Videira & Crous, Stud. Mycol. 83: 100. 2016.

Description (from Videira *et al.* 2016): *Colonies* growing on uredinia of *Coleosporium*, mycophylic. *Mycelium* superficial, consisting of hyaline, septate, thin-walled, smooth hyphae. *Conidiophores* hyaline, loose, straight, subcylindrical, unbranched, septate, thin-walled, smooth. *Conidiogenous cells* hyaline, terminal in the conidiophore, cylindrical-oblong, proliferation sympodial, with conspicuous conidiogenous loci, thickened, darkened and refractive. *Conidia* hyaline, smooth, solitary or in short chains, cylindrical-oblong, clavate, obovate, aseptate, thin-walled, smooth, with hila thickened, darkened and refractive.

Type species: *Epicoleosporium ramularioides* Videira *et al.*

Epicoleosporium ramularioides Videira *et al.*, Stud. Mycol. 83: 100. 2016.
Description and illustrations: Videira *et al.* (2016).

Materials examined: **Republic of Korea**, Pyeongchang, on *Coleosporium phellodendri* on leaves of *Phellodendron amurense*, 4 Sep. 2003, H.D. Shin (**holotype** KUS F19603, **isotype** CBS H-22542, culture ex-type CBS 141103 = CPC 10672); *idem*., culture CPC 10673.

Notes: The genus *Epicoleosporium* is presently monotypic and is based on *Epicoleosporium ramularioides*, which has a ramularia-like morphology, but is not congeneric with *Ramularia* as currently circumscribed (Videira *et al.* 2016). Based on the phylogenetic analyses in the present study, the representative strains cluster in a well-supported clade (Fig. 1, clade 91; Fig. 4, clade 25) and are closely related to the genus *Mycosphaerelloides*.

Clade 92: *Microcyclosporella*

Microcyclosporella J. Frank *et al.*, Persoonia 24: 101. 2010.

Description (from Frank *et al.* 2010): Hyphomycetous. *Mycelium* consisting of pale brown, smooth to finely verruculose, branched, septate, 2–3.5 µm wide hyphae, at times covered by a mucoid layer, with integrated, lateral, truncate conidiogenous loci. *Conidiophores* mostly reduced to conidiogenous cells. *Conidiogenous cells* integrated, intercalary on hyphae, rarely terminal, cylindrical to doliiform, pale brown, but hyaline if occurring in yeast-like sectors of colonies, smooth, mono- or polyblastic, proliferating sympodially, with inconspicuous, truncate, unthickened, not darkened, pale brown to hyaline loci. *Conidia* solitary, hyaline, smooth, subcylindrical to narrowly obclavate or narrowly fusoid with acutely rounded apex and obconically truncate base, guttulate, 0–6 times transversely septate; microcyclic conidiation common.

Type species: *Microcyclosporella mali* J. Frank *et al.*

Microcyclosporella mali J. Frank *et al.*, Persoonia 24: 101. 2010.

Description and illustration: Frank *et al.* (2010).

Materials examined: **Slovenia**, Senozeti, Dolsko, on fruit surface *Malus domestica*, 7 Aug. 2007, J. Frank (**holotype** CBS H-20413, culture ex-type 300-07 = CBS 126136 = CPC 16184); Mirna, on *M. domestica* fruit surface, 17 Oct. 2007, J. Frank, culture 174-07 = CPC 16180 = CBS 126132. **USA**, Michigan, Fennville, on *Malus* sp., 1 Sep. 2005, G. Sundin, culture CBS 125653 = RH6 = MI3 20F1a; Ohio, Wooster, on *Malus* sp., 5 Sep. 2005, M. Ellis, culture CBS 125651 = RH1 = OH1 34D2a.

Notes: The genus *Microcyclosporella* is presently monotypic and is based on *Microcyclosporella mali*, a species that is associated with sooty blotch and flyspeck (SBFS) lesions on apples. It has a pseudocercosporella-like morphology but is not congeneric with the type of *Pseudocercosporella*, *Pseudocercosporella bakeri* (Frank *et al.* 2010, Videira *et al.* 2016). Phylogenetically, the present strains clusters in a well-supported clade (Fig. 1, clade 92; Fig. 4, clade 23) that is closely related to *Epicoleosporium ramularioides* and *Mycosphaerella madeirae*.

Clade 93: *Virosphaerella*

Virosphaerella Videira & Crous, **gen. nov.** MycoBank MB822705.

Etymology: The prefix virus- (= slime) for the germinating ascospores enveloped in a slime sheath + *sphaerella* (referring to *Mycosphaerella*).

Description: Phytopathogenic, producing leaf spots or not. *Ascomata* amphigenous or epiphyllous, black, subepidermal to erumpent, ovoid, globose or subglobose, apical ostiole, wall consisting of 2–3 layers of medium brown *textura angularis*. *Asci* aparaphysate, fasciculate, subsessile, subcylindrical to narrowly obovoid, straight to slightly curved, 8-spored. *Ascospores* bi- to tri-seriate, overlapping, hyaline, guttulate, thin-walled, straight to slightly curved, fusoid, fusoid-ellipsoidal with obtuse ends, medianly 1-septate or slightly longer in the basal cell, slightly constricted at septum, widest just above the septum, or in the middle of the apical cell, tapering toward both ends, but with more prominent taper towards lower end, mucilaginous sheath visible around spore. *Ascospore germination* from both ends in two patterns (remaining hyaline): Type I (Crous 1998), growing parallel to the long axis of the spore, with lateral branches parallel or perpendicular to the long axis of spore, irregular in width, constricted at the median septum of the spore, slightly distorting; Type B (Crous 1998), germ tube growing parallel to the long axis of the spore, regular in width, not distorting or becoming constricted at septum. *Spermatogonia*, when present, amphigenous, dark brown, subepidermal to erumpent, globose to subglobose. *Spermatia* hyaline, smooth, rod-shaped, with obtuse ends.

Type species: *Virosphaerella pseudomarksii* (Cheewangkoon *et al.*) Videira & Crous (≡ *Mycosphaerella irregularis* Cheewangkoon *et al.*).

Virosphaerella irregularis (Cheewangkoon *et al.*) Videira & Crous, **comb. nov.** MycoBank MB822803.
Basionym: *Mycosphaerella irregularis* Cheewangkoon *et al.* (as '*irregulari*'), Persoonia 21: 83. 2008.
Synonyms: *Paramycosphaerella irregularis* (Cheewangkoon *et al.*) Guatimosim *et al.*, Persoonia 37: 127. 2016.

Description and illustration: Cheewangkoon *et al.* (2008).

Materials examined: **Thailand,** Udonthani, on living leaves of *Eucalyptus* sp., Jul. 2007, R. Cheewangkoon (**holotype** CBS H-20135, culture ex-type CBS 123242 = CPC 15408); *idem*., cultures CPC 15431, CPC 15432.

Notes: Ascospores of *Virosphaerella irregularis* are similar to *Amycosphaerella africana*, but differ by producing a mucilaginous sheath around the ascospore and by the irregular germ tubes and germination pattern (Cheewangkoon *et al.* 2008). Phylogenetically, the present species clusters in a well-supported clade with *Virosphaerella pseudomarksii* (Fig. 1, clade 93; Fig. 4, clade 26), as previously observed by Cheewangkoon *et al.* (2008) in a phylogeny based only on LSU sequences. Based on a BLAST against the alignment, *Virosphaerella irregularis* CBS 123242 shares 95 % (472/495) similarity on ITS, including 1 % (7/495) gaps, and 85 % (623/734) similarity on *rpb2*, with *Virosphaerella pseudomarksii* CBS 123241.

Virosphaerella pseudomarksii (Cheewangkoon *et al.*) Videira & Crous, **comb. nov.** MycoBank MB822806.
Basionym: *Mycosphaerella pseudomarksii* Cheewangkoon *et al.*, Persoonia 21: 83. 2008.
Synonym: *Paramycosphaerella pseudomarksii* (Cheewangkoon *et al.*) Guatimosim *et al.*, Persoonia 37: 127. 2016.

Description and illustration: Cheewangkoon *et al.* (2008).

Materials examined: **Thailand**, Chiang Mai, Mae Tang, on living leaves of *Eucalyptus* sp., Jun. 2007, R. Cheewangkoon (**holotype** CBS H-20134, ex-type culture CBS 123241 = CPC 15410); *idem*., cultures CPC 15435, CPC 15436.

Notes: *Virosphaerella pseudomarksii* ascospore morphology and ascospore germination patterns are similar to *Paramycosphaerella marksii* (Carnegie & Keane 1994, as *Mycosphaerella marksii*) but differ by producing a visible mucilaginous sheath around the ascospore (Cheewangkoon *et al.* 2008). Phylogenetically, the present species clusters in a well-supported clade based on all three phylogenetic methods employed (Fig. 1, clade 93; Fig. 4, clade 26), and is closely related to *Virosphaerella irregularis*.

Clade 94: *Pseudozasmidium* [and Genus A]

Pseudozasmidium Videira & Crous, **gen. nov.** MycoBank MB822701.

Etymology: Derived from pseudo-, that means resembling but not equalling, and the similar genus, *Zasmidium*.

Description: Phytopathogenic, causing leaf spots. *Pseudothecia* amphigenous, aggregated, black, immersed and becoming erumpent, wall of 2–3 layers of medium brown *textura angularis. Asci* aparaphysate, fasciculate, bitunicate, subsessile, narrowly ellipsoid or obclavate to cylindrical, straight or slightly incurved, 8-spored. *Ascospores* bi-seriate to triseriate, overlapping, hyaline, straight to slightly curved, ellipsoid or fusoid-ellipsoid, with obtuse ends, medianly 1-septate, not constricted to slightly constricted at the septum, symmetrical cells or widest at the middle of the apical cell, tapering towards both ends or more prominently towards lower end. *Ascospore* germination parallel to perpendicular to the long axis of the spore. *Mycelium* internal and external, internal hyphae branched, septate, smooth and hyaline, external hyphae verruculose and pale to medium brown, terminal hyphal ends may develop clusters of globose, multi-celled chlamydospore-like structures. *Conidiophores* pale to medium brown, smooth to verruculose, erect, subcylindrical, straight or curved, branched or unbranched, repeatedly geniculate, septate, sometimes reduced to conidiogenous cells. *Conidiogenous cells* terminal, smooth to verruculose, pale brown to brown, proliferating sympodially, sometimes repeatedly geniculate, with conidiogenous loci thickened and darkened-refractive. *Conidia* single, pale brown to olivaceous brown, smooth to verruculose, obclavate, narrowly obclavate to subcylindrical, obtuse apex and obconically truncate base, straight or curved, 1- to multiseptate, hila thickened and darkened-refractive.

Type species: *Pseudozasmidium parkii* (Crous & Alfenas) Videira & Crous (≡ *Stenella parkii* Crous & Alfenas).

Pseudozasmidium eucalypti (Crous & Summerell) Videira & Crous **comb. nov.** MycoBank MB822783.
Basionym: *Stenella eucalypti* Crous & Summerell, Fungal Diversity 26: 177. 2007.
Synonym: *Zasmidium eucalypti* (Crous & Summerell) Crous & U. Braun, Schlechtendalia 20: 101. 2010.

Description and illustrations: Crous *et al.* (2007c).

Description in vitro (on V8; CPC 13302): *Mycelium* composed of hyaline to subhyaline hyphae, uniform in width, 2–2.5 µm, smooth. *Conidiophores* macronematous, first cell arising from hypha (foot cell) hyaline, following cells pale brown to dark brown, paler towards the apex, cylindrical, simple, rarely branched, straight to geniculate, 20–80 × 5–7.5 µm. *Conidiogenous cells* integrated, terminal, polyblastic, proliferating sympodially, occasionally proliferating percurrently, with rim-like conidiogenous loci, somewhat thickened, darkened and protruding, 2–2.5 µm diam. *Conidia* solitary, hyaline to pale brown, cylindrical to obclavate, obconical truncate at the base and rounded at the apex, 12.5–120 × 3–5 µm, 0–8-septate, hila thickened and darkened, 2–2.5 µm diam.

Materials examined: **Australia**, Queensland, Cairns, Eureka Creek, 48 km from Mareeba, S17°11′13.2″, E145°02′27.4″, 468 m, on leaves of *Eucalyptus* *tereticornis*, 26 Aug. 2006, P.W. Crous (**holotype** CBS H-19830, ex-type culture CBS 121101 = CPC 13302).

Notes: The present species was initially described in *Stenella* (Crous *et al.* 2007c), but was later reallocated to *Zasmidium* (Braun *et al.* 2010a). Its asexual morph is zasmidium-like, with brown and verruculose conidiophores and conidia, with hila thickened, darkened and refractive. However, based on the phylogenetic analysis, it is not part of *Zasmidium* as circumscribed in the present study, but clusters in a poorly resolved clade (Fig. 1, clade 94; Fig. 4, clade 27) that is closely related to *Virosphaerella*. All three phylogenetic methods support the smaller clade including *Pseudozasmidium vietnamense* and *Pseudozasmidium parkii*, but the support for the species *Pseudozasmidium eucalypti* and *Pseudozasmidium nabiacense* is very low. Based on the parsimony analysis, *Pseudozasmidium eucalypti* and *Pseudozasmidium nabiacense* form a basal polytomy closely related to *Pseudozasmidium vietnamense* and *Pseudozasmidium parkii*. Since their morphology is also zasmidium-like, we decided to retain them in the same genus for now. *Pseudozasmidium eucalypti* is unique among other *Pseudozasmidium* species in its ability to produce clusters of globose chlamydospore-like structures, frequently surrounded by a mucus sheath, at the terminal ends of hyphae.

Pseudozasmidium nabiacense (Crous & Carnegie) Videira & Crous, **comb. nov.** MycoBank MB822784.
Basionym: *Zasmidium nabiacense* Crous & Carnegie, Persoonia 23: 142. 2009.
Synonym: *Paramycosphaerella nabiacensis* (Crous & Carnegie) Guatimosim *et al.*, Persoonia 37: 127. 2016.

Description and illustrations: Crous *et al.* (2009d).

Description in vitro (on V8; CPC 12748): *Mycelium* composed of hyaline to pale olivaceous brown hyphae, verruculose, uniform in width, 2–3 µm. *Conidiophores* micro- to macronematous, pale olivaceous brown, verruculose, simple, straight to geniculate, 25–58 × 3–4 µm. *Conidiogenous cells* integrated, terminal, polyblastic, proliferating sympodially, long-conically truncate at the apex and shoulders, with conidiogenous loci somewhat thickened, darkened and protruding, 1.5–2.5 µm diam. *Conidia* solitary, pale olivaceous brown, verruculose, straight, cylindrical to obclavate, obconically truncate at the base and rounded at the apex, 18–32 × 3–3.5 µm, 0–3-septate, with hila thickened and darkened, 1.5–2.5 µm diam.

Materials examined: **Australia**, New South Wales, Nabiac, on leaves of *Eucalyptus* sp. (red gum), 30 Nov. 2005, A.J. Carnegie (**holotype** CBS H-20273, cultures ex-type CBS 125010 = CPC 12748–CPC 12750).

Notes: *Pseudozasmidium nabiacense* is only known from its asexual morph, which is zasmidium-like. The phylogenetic analyses in the present study showed *Pseudozasmidium nabiacense* clustering in a poorly resolved clade (Fig. 1, clade 94; Fig. 4, clade 27) that is closely related to *Pseudozasmidium parkii*, which agrees with the findings of Crous *et al.* (2009d). See notes on *Pseudozasmidium eucalypti*.

Pseudozasmidium parkii (Crous & Alfenas) Videira & Crous, **comb. nov.** MycoBank MB822785.
Basionym: *Stenella parkii* Crous & Alfenas, Mycologia 87: 121. 1995.
Synonyms: *Zasmidium parkii* (Crous & Alfenas) Crous & U. Braun, Schlechtendalia 20: 102. 2010.
Paramycosphaerella parkii (Crous & Alfenas) Guatimosim *et al.*, Persoonia 37: 127. 2016.
Mycosphaerella parkii Crous *et al.*, Mycol. Res. 97: 582. 1993.

Description and illustrations: Crous *et al.* (1993), Crous & Alfenas (1995).

Materials examined: **Brazil**, Aracruz, Florestal nursery, on living leaves of *Eucalyptus grandis*, 24 Feb. 1990, M.J. Wingfield (**holotype** of *Mycosphaerella parkii*, PREM 50668, ex-type culture CBS 387.92); Rio Grande do Sul, on *Eucalyptus globulus*, 7 Jul. 1993, F.A. Ferreira, PREM 51714, culture CPC 651; São Paulo, on *Eucalyptus saligna*, Apr. 1993, P.W. Crous (**holotype** of *Stenella parkii*, PREM 51713). **Indonesia**, North of Sumatra, on *E. grandis*, 22 Nov. 1993, F.A. Alfenas, PREM 51715.

Notes: *Pseudozasmidium parkii* produces a mycosphaerella-like sexual morph and a zasmidium-like asexual morph, with verruculose hyphae, conidiophores and conidia verruculose and conidiogenous cells with conspicuous, darkened and refractive conidiogenous loci (Crous *et al.* 1993, Crous & Alfenas 1995). Based on the phylogenetic analyses, however, *Pseudozasmidium* clusters apart from the *Zasmidium* clade, as presently defined by the type species *Z. cellare*, in a poorly resolved clade including *Pseudozasmidium vietnamense*, *Pseudozasmidium nabiacense* and *Pseudozasmidium eucalypti* (Fig. 1, clade 94; Fig. 4, clade 27). Based on a BLAST search against the alignment, *Pseudozasmidium parkii* CBS 387.92 shares 99 % (479/485) similarity on ITS with *Pseudozasmidium vietnamense* CBS 119974. Unfortunately, the *rpb2* sequence of *Pseudozasmidium parkii* failed to amplify and is coded as missing data in the alignments, but the next closest strain on ITS is *Virosphaerella irregularis* CBS with only 92 % (455/496) similarity and including 3 % (17/496) gaps. See also notes on *Pseudozasmidium vietnamense* and *Paramycosphaerella brachystegiae.*

Pseudozasmidium vietnamense (Barber & T.I. Burgess) Videira & Crous, **comb. nov.** MycoBank MB822786.
Basionym: *Mycosphaerella vietnamensis* Barber & T. I. Burgess, Fungal Diversity 24: 148. 2007.
Synonym: *Paramycosphaerella vietnamensis* (Barber & T.I. Burgess) Guatimosim *et al.*, Persoonia 37: 128. 2016.

Description and illustration: Burgess *et al.* (2007).

Material examined: **Vietnam**, South East Forestry Institute nursery, on leaves of *Eucalyptus grandis* hybrid, 6 Jul. 2004, coll. T.I. Burgess, isol. P.A. Barber (**holotype** MURU 411, ex-type culture CBS 119974 = CMW 23441 = MUCC 66 = VTN1).

Notes: *Pseudozasmidium vietnamense* was described based on the mycosphaerella-like sexual morph and a presumed pseudocercospora-like asexual morph (Burgess *et al.* 2007). In previous phylogenetic studies, it always clustered close to *Pseudozasmidium parkii* (as *Mycosphaerella parkii*, Burgess *et al.* 2007, Crous *et al.* 2009d). The phylogenetic analyses in the present study agrees with the previous works and this species clusters in a poorly resolved clade of zasmidium-like species (Fig. 1, clade 94; Fig. 4, clade 27). Therefore, the presumed pseudocercospora-like asexual morph should not be considered correct. See also notes on *Pseudozasmidium parkii* and *Paramycosphaerella brachystegiae.*

Genus A

Passalora vaginae (W. Krüger) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser.: 417. 2003.

Basionym: *Cercospora vaginae* W. Krüger, Ber. Versuchsstat. Zuckerrohr W.-Java, Kagok-Tegal 1: 64. 1890.
Synonyms: *Mycovellosiella vaginae* (W. Krüger) Deighton, Mycol. Pap. 144: 26. 1979.
Passalora vaginae (W. Krüger) U. Braun & Crous, in Crous & Braun, CBS Biodiversity Ser.: 417. 2003.

Description in vivo (from Braun 2015): *Spots* mainly on sheaths, sometimes also formed as leaf spots, at first small, subcircular to elliptical, red, margin conspicuous, spots later confluent or increasing to about 15 mm diam, on leaves dark reddish above, indistinct below. *Caespituli* amphigenous, effuse, dark greyish brown, velvety, mostly in the centre of the lesion. *Mycelium* internal and external; superficial hyphae sparingly branched, septate, pale, thin-walled, smooth. *Stromata* sometimes well-developed, substomatal, 10–75 µm diam, dark brown, but without conidiophore fascicles. *Conidiophores* solitary, arising from superficial hyphae, lateral, at the top of mother cells, occasionally terminal, i.e. at the end of procumbent hyphae, erect to ascending, straight to curved, subcylindrical, conical to geniculate-sinuous, simple or sometimes branched, occasionally entangled, 20–200 × 3–5 µm, 1–5-septate, pale olivaceous brown to darker brown, paler towards the tip, thin-walled, smooth; *conidiogenous cells* integrated, terminal, with conspicuous conidiogenous loci, about 1–1.5 µm diam. *Conidia* solitary, cylindrical or obclavate-cylindrical, straight to somewhat curved, 15–55 × 3–6.5 µm, 0–5-septate, occasionally slightly constricted at the septa, hyaline to olivaceous, thin-walled, smooth, apex obtuse, base short obconically truncate, 1–2 µm wide, somewhat thickened and darkened.

Materials examined: **Taiwan**, on *Saccharum officinarum*, unknown collector and date, dep. T. Miyake, 1934, culture CBS 140.34 = DSM 1148 = IMI 303641.

Notes: *Passalora vaginae* causes a foliar disease of sugarcane (*Sacharum officinarum*) and sorghum (*Sorghum vulgare*) (*Poaceae*) and has a worldwide distribution (Crous & Braun 2003). The strain is presently sterile but clusters as a single-strain lineage in the phylogenetic analysis (Fig. 4, clade 28) that represents a potential new genus. The holotype specimen, on *Saccharum officinarum*, which originates from Java, Indonesia, could not be located, and presently no suitable specimen is available for neotypification (Braun *et al.* 2015). Therefore, the proposal of a new genus is postponed until suitable material is collected and examined.

CLADES 95–96: *Dissoconiaceae*

Dissoconiaceae Crous & de Hoog, Stud. Mycol. 64: 36. 2009.

Clade 95: *Ramichloridium*

Ramichloridium Stahel ex de Hoog, Stud. Mycol.15: 59. 1977.

Note: See Arzanlou *et al.* (2007).

Clade 96: *Uwebraunia*

Uwebraunia Crous & M.J. Wingf., Mycologia 88: 446. 1996.

Note: See Crous & Wingfield (1996), Crous *et al.* (1999) and Li *et al.* (2012).

CLADES 97–100: *Phaeothecoidiellaceae*

Phaeothecoidiellaceae K.D. Hyde & Hongsanan, Mycosphere 8: 140. 2017.

Clade 97: *Exopassalora*

Exopassalora Videira & Crous, **gen. nov.** MycoBank MB822589.

Etymology: Exo- meaning outside, as in outside the family *Mycosphaerellaceae*, where the genus *Passalora* is included.

Description: Foliicolous, phytopathogenic. *Mycelium* composed of brown hyphae, smooth to rough, irregularly branched, septate, with dark brown chlamydospore-like hyphal swellings. *Conidiophores* arising from the mycelium, medium brown, smooth, simple or branched, straight to curved. *Conidiogenous cells* terminal and intercalary, subcylindrical, pale to medium brown, smooth, proliferating sympodially, conidiogenous loci conspicuous, darkened, refractive. *Conidia* catenate, in simple or branched chains, medium brown, smooth, narrowly ellipsoidal, tapering to subtruncate, straight or slightly curved, hila slightly thickened and darkened.

Type species: *Exopassalora zambiae* (Crous & T.A. Cout.) Videira & Crous.

Exopassalora zambiae (Crous & T.A. Cout.) Videira & Crous, **comb. nov.** MycoBank MB822757.
Basionym: *Passalora zambiae* Crous & T.A. Cout., Stud. Mycol. 50: 209. 2004.

Description and illustration: Crous *et al.* (2004b).

Material examined: **Zambia**, on leaves of *Eucalyptus globulus*, 21 Aug. 1995, T. Coutinho (**holotype** CBS H-9895, culture ex-type CBS 112971 = CMW 14782 = CPC 1227); *idem*., cultures CBS 112970 = CPC 1228).

Notes: This species is phylogenetically distant from other *Mycosphaerella* spp. known from *Eucalyptus* (Crous *et al.* 2004b) and clusters in a well-supported clade (Fig. 1, clade 96; Fig. 4, clade 32) within the recently introduced *Phaeothecoidiellaceae* family (Hongsanan *et al*., 2017).

***Exopassalora* sp.**

Material examined: **USA**, Illinois, Chester, on apple fruits, culture CBS 118964 = GTF1a.

Notes: Based on the phylogenetic analyses this strain is closest to *Exopassalora* (Fig. 1, clade 96; Fig. 4, clade 32). The present strain shares 97 % (711/736) similarity on LSU, 88 % (288/326) similarity on ITS and 77 % (537/701) similarity on *rpb2* with *Exopassalora zambiae*. Based on the differences observed between the sequences of the partial genes studied, this can be a new genus. Morphological characters from this strain include mycelium on PDA blackish, brown and convoluted, conidia on CLA dark, catenate, with flattened ends (Batzer *et al.* 2005). Unfortunately, the culture is presently sterile and is tentatively placed in *Exopassalora* until the morphological characters can be observed and properly described.

Clade 98: *Houjia*

Houjia G.Y. Sun & Crous, Persoonia 24: 33. 2010.

Note: See Yang *et al.* (2010).

Clade 99: *Sporidesmajora*

Sporidesmajora Batzer & Crous, Persoonia 24: 35. 2010.

Note: See Yang *et al.* (2010).

Clade 100: *Phaeothecoidiella*

Phaeothecoidiella Batzer & Crous, Persoonia 24: 30. 2010.

Note: See Yang *et al.* (2010).

CLADE 101: *Schizothyriaceae*

Schizothyriaceae Höhn. ex Trotter, Sacc., D. Sacc. & Traverso as "*Schizothyrieae*", in Saccardo, *Syll. fung.* (Abellini) 24(2): 1254. 1928.
Synonym: *Schizothyrieen* Höhn., Ber. Deutsch. Bot. Ges. 35: 417. 1917, nom. inval. (Art. 32.1(b), Art. 18.4).

Clade 101: *Schizothyrium*

Schizothyrium Desm., Ann. Sci. Nat., Bot., Sér. 3, 11: 360. 1849.

Note: See Batzer *et al.* (2008), Schoch *et al.* (2009) and Crous *et al.* (2009c).

CLADES 102–107: *Teratosphaeriaceae*

Teratosphaeriaceae Crous & U. Braun, Stud. Mycol. 58: 8. 2007.

Clade 102: *Teratosphaeria*

Teratosphaeria Syd. & P. Syd., Ann. Mycol. 10: 39. 1912.

Note: See Crous *et al.* (2009d) and Quaedvlieg *et al.* (2014).

Clade 103: *Batcheloromyces*

Batcheloromyces Marasas, P.S. van Wyk & Knox-Dav., S. African J. Bot. 41(1): 41. 1975.

Note: See Crous *et al.* (2007a), Crous *et al.* (2008).

Clade 104: *Readeriella*

Readeriella Syd. & P. Syd., Ann. Mycol. 6: 484. 1908.

Note: See Crous *et al.* (2009d).

Clade 105: *Stenella*

Stenella Syd., Ann. Mycol. 28(1–2): 205. 1930.

Note: See Quaedvlieg *et al.* (2014).

Clade 106: *Parapenidiella*

Parapenidiella Crous & Summerell, Persoonia 29: 185. 2012.

Note: See Crous *et al.* (2012a).

Clade 107: *Acrodontium*

Acrodontium de Hoog, Stud. Mycol. 1: 23. 1972.

Note: See Videira *et al.* (2016).

CLADE 108: *Cladosporiaceae*

Cladosporiaceae Castell. & R.G. Archibald, Yearbook of Tropical Medicine and Hygiene: 25. 1915.
Synonyms: *Cladosporieae* Mathieu, Flore Générale de Belgique: 2. 1854.
Cladosporieae Sacc., Sylloge Fungorum 4: 341. 1886.
Cladosporiaceae Nann., Repertorio sistematico dei miceti dell' uomo e degli animali 4: 404. 1934.

Clade 108: *Cladosporium*

Cladosporium Link, Mag. Ges. Naturf. Freunde Berlin 7: 37. 1816 ['1815'].

Note: See Bensch *et al.* (2015).

Genera of *Mycosphaerellaceae*

Acervuloseptoria Crous & Jol. Roux, Persoonia 32: 275. 2014.

Note: See treatment in text.

Acrodesmis Syd., Ann. Mycol. 24(5–6): 424. 1926.

Description (adapted from Sydow 1926 and Ellis 1961): *Mycelium* composed of pale brown to olivaceous brown hyphae, branching and anastomosing, smooth, septate. *Stromata* composed of dense and irregular dark brown hyphal cells, semiglobose. *Conidiophores* single or in group, emerging from stromata or from hyphae, erect, straight or flexuous, cylindrical, septate, dark brown, paler towards the tips, densely branched at the apex. *Conidiogenous cells* terminal, hyaline to pale olivaceous brown, polyblastic, with multiple conidiogenous cells. *Conidia* single or in short chains, sometimes branched chains, acropleurogenous, pale olivaceous brown, smooth, cylindrical, elliptical or fusiform, aseptate, with minute hila at the base.

Type species: *Acrodesmis cestri* Syd. [**Costa Rica**, La Caja, pr. San. Jose, on leaves of *Cestrum macrophyllum*, 13 Feb. l925, H. Sydow, Fungi Exot. Exs. 650 (**syntypes** S F12601, S F189761)].

Description and illustration: Ellis (1967, 1971, as *Periconiella cestri*).

Notes: Unconfirmed synonym of *Periconiella.* Two species, *Acrodesmis cestri* and *Acrodesmis secunda*. No cultures available, and its phylogenetic position remains unresolved.

Acrocladium Petr., Sydowia 3(1–6): 263. 1949.

Description (adapted from Petrak 1949): *Mycelium* superficial, composed of olivaceous brown hyphae, branched, septate. *Conidiophores* sparse, brown, long, erect, densely branched at the apex (diverging as in penicillium-like species). *Conidia* greyish to olivaceous brown, aseptate, acrosporogenous, oblong to ellipsoid.

Type species: *Acrocladium andinum* Petr.

Description and illustration: Petrak (1949).

Notes: Unconfirmed synonym of *Periconiella.* Two species, *Acrocladium andinum* and *Acrocladium fragile*. No cultures available, and its phylogenetic position remains unresolved.

Achorodothis Syd., Ann. Mycol. 24: 380. 1926.

Description (adapted from Sydow 1926): *Stromata* mainly intraepidermal, pseudoparenchymatous, dark brown, forming continuous to loose crusts with loculi. *Asci* sparingly developed, clavate to almost ellipsoid, sessile or with short knob-like stalk, wall firm, apically thickened, 8-spored, immersed in a hyaline, viscous, little differentiated to slightly filamentous, paraphysoid mass. *Ascospores* 2- to 3-seriate, hyaline, ellipsoid-ovoid, straight or rarely slightly asymmetric, aseptate, slightly attenuated towards the base, both ends rounded, at the base with a colourless bluntly conoid to capped appendage.

Type species: *Achorodothis poasensis* Syd. [**Costa Rica**, on *Ocotea mollicella* (≡ *Phoebe mollicella*), 15 Jan. 1925 (**syntype** IMI 18604)].

Description (*no illustration*): Sydow (1926).

Note: *Achorodothis* is not known from culture, and its phylogenetic position remains unresolved.

Acrotheca Fuckel, Jahrb. Nassauischen Vereins Naturk.15: 42. 1860.

Type species: *Acrotheca gei* Fuckel [**Austria**, Rhenogovia, on *Geum urbanum*, Fuckel, Fungi Rhen. Exs. 2229, e.g. HAL] = ***Ramularia gei*** (A.G. Eliasson) Lindr.

Description and illustration: Hughes 1951, Braun (1998, as *Ramularia gei*).

Note: *Acrotheca gei* is presently regarded as a species of *Ramularia*, but this conclusion has not been confirmed based on DNA data.

Allantophomoides S.L. Wei & T.Y. Zhang, Mycosystema 22: 9. 2003.

Description (adapted from Wei & Zhang 2003): *Conidiomata* pycnidial, immersed, globose to subglobose, unilocular, sometimes slightly papillate, thin-walled, wall composed by 1-3 cells with pale brown to brown *textura angularis*. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* ampulliform to doliiform, hyaline, smooth, covering the entire inside wall, enteroblastic, phialidic with minute collarette. *Conidia* hyaline, guttulate, allantoid to elongate-ellipsoidal, aseptate or septate.

Type species: *Allantophomoides carotae* S.L. Wei & T.Y. Zhang [**China**, Gansu Province, Zhangye, on *Daucus carota* var. *sativa*, 10 Oct. 1995 (**holotype** HSAUP 960001, **isotype** IMI)].

Description and illustration: Wei & Zhang (2003).

Notes: The most closely related genera are *Phoma*, *Coleophoma* and *Allantophomopsis*. Without molecular data the phylogenetic position of this septoria-like genus remains unresolved.

Amycosphaerella Quaedvlieg & Crous, Persoonia 33: 22. 2014.

Note: See treatment in text.

Anematidium Gronchi, Boll. Ist. Sieroterap. Milan. 10: 242. 1931.

Description (adapted from Gronchi 1931): *Mycelium* olivaceous, septate, branching. *Conidiophores* absent. *Conidia* catenate, in branched chains, integrated in the mycelium, cylindrical. In solid agar media, colonies olivaceous, coalescent, round, convex, with wrinkled and irregular surface, margin dark. *Hyphae* densely aggregated, olivaceous, branched and septate. In liquid acidic media, *hyphae* within the liquid media, lax, with very long branches, septate, subhyaline to olivaceous. *Conidia* catenate, in branched chains, integrated in the mycelium, cylindrical, branching.

Type species: *Anematidium oxiphilum* Gronchi [**Italy**, Firenze, growing in a N/10 HCL solution in a laboratory].

Description and illustration: Gronchi (1931).

Notes: This genus is insufficiently known, and its status remains unresolved. The author named the genus *Anematidium* after the absence of conidiophores and the type species *Anematidium oxiphilum* after the fungus affinity to the acidic substrate from which it was isolated, a laboratory solution of N/10 HCL (Gronchi 1931).

Anguillosporella U. Braun, A monograph of *Cercosporella*, *Ramularia* and allied genera (Phytopathogenic Hyphomycetes) 1: 233. 1995.

Description (adapted from Braun 1995): *Mycelium* internal, composed of hyaline hyphae, septate and branched. *Stromata* subcuticular to intraepidermal, often erumpent. *Conidiophores* hyaline, smooth, arising from stromata, macronematous, single or in fascicles, loose or densely aggregated, simple, continuous or septate, straight, subcylindrical to flexuous. *Conidiogenous cells* integrated, terminal, monoblastic, determinate, with conidiogenous loci (scars) more or less truncate, unthickened and not darkened, conidial secession schizolytic. *Conidia* solitary, hyaline, multi-euseptate, scolecosporous, wih apex subacute and base usually with a short appendage.

Type species: *Anguillosporella vermiformis* (Davis) U. Braun [**USA**, Wisconsin, on *Alnus incana* (**lectotype** BPI 442755, see Braun 1995)].

Descriptions and illustrations: Braun (1995), Seifert *et al.* (2011).

Note: The phylogenetic position of *Anguillosporella* remains unresolved.

Annellophora S. Hughes, Trans. Brit. Mycol. Soc. 34: 544. 1952.

Description (adapted from Ellis 1971): *Mycelium* superficial or immersed, composed of subhyaline, brown or olivaceous brown hyphae. *Conidiophores* macronematous, single or in fascicles, brown or dark brown, simple, septate. *Conidiogenous cells* integrated, terminal, monoblastic, proliferating percurrently. *Primary conidia* terminal, cylindrical, obclavate or fusiform, subhyaline to brown, smooth, transversely septate or pseudoseptate. *Secondary conidia* germinating from the apex of primary conidia, one at a time, proliferating percurrently, smaller.

Type species: *Annellophora solani* (Syd.) S. Hughes (≡ *Chaetotrichum solani* Syd. 1927).

Description and illustration: Ellis (1971), Seifert *et al.* (2011); present study (Fig. 48).

Material examined: **Costa Rica**, Los Angeles de San Ramon, on *Solanum erythrotrichum*, 30 Jan. 1925 (**holotype** of *Chaetotrichum solani*, E 00417817).

Notes: The phylogenetic position of *Annellophora* is unknown, and its 11 species are only known by their hyphomycetous sporidesmium-like asexual morph (Seifert *et al.* 2011). Cultures and sequence data are necessary to determine its phylogenetic position.

Annellophragmia Subram., Proc. Indian Acad. Sci., Sect. B, 58: 349. 1963.

Description (adapted from Ellis 1971): *Mycelium* superficial and immersed. *Stroma* erumpent, brown and pseudoparenchymatous. *Conidiophores* macronematous, synnematous, brown, smooth, straight, with each individual stipe unbranched, gathered tightly for most of the length and spreading like a hand fan at the apex. *Conidiogenous cells* integrated, terminal and intercalary, cylindrical, proliferating sympodially, polyblastic, conidiogenous loci (scars) large, apical and lateral. *Conidia* solitary, acropleurogenous, pale to dark brown or golden brown, smooth, fusiform to obclavate, truncate at the base, pseudoseptate.

Type species: *Annellophragmia coonoorensis* (Subram.) Subram. (≡ *Arthrobotryum coonoorense* Subram.).

Descriptions and illustrations: Ellis (1971), Seifert *et al.* (2011); present study (Fig. 49).

Materials examined: **India**, Madras, Nilgiris, Coonoor, Simm, on leaves of *Thysanolaena maxima*, 8 Dec. 1953, T.S.S. & C.V. Subramanian (**holotype** of *Arthrobotryum coonoorense* (K(M) 180920); Madhya Pradesh, Balaghat, on *Thysanolaena maxima*, Jan. 1980, S.M. Singh, IMI 245197.

Notes: The phylogenetic position of *Annelophragmia* is unknown and the genus is only known from its hyphomycetous type

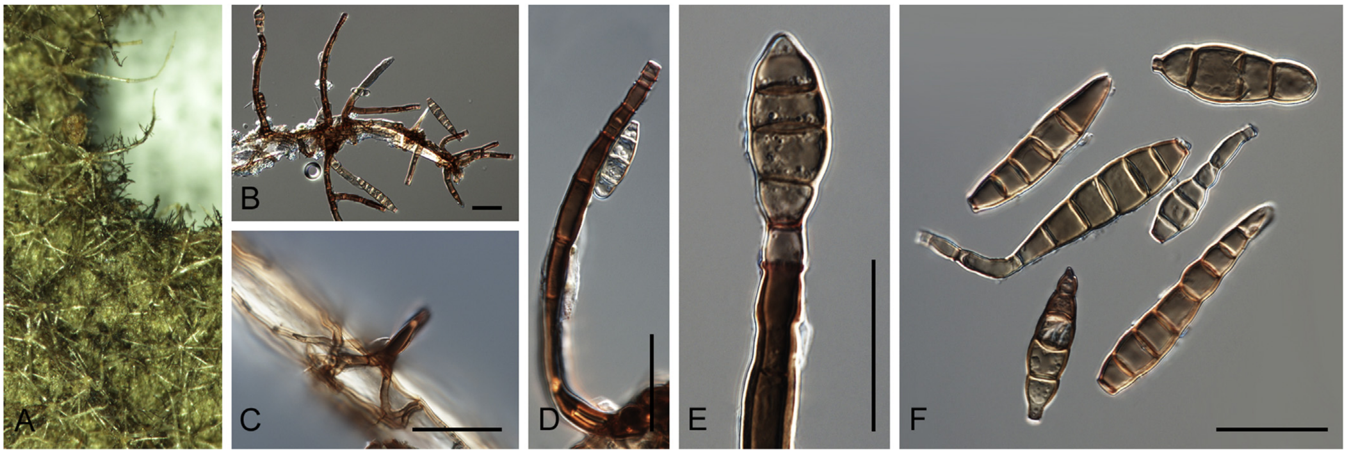


Fig. 48. *Annelophora solani* (E00417817). **A–F.** Observations *in vivo*. **A.** Symptoms on host. **B, C.** Conidiophores erect and developing on the host surface. **D.** Attachment of the conidiophore to a leaf trichome. **E.** Conidiogenous cell and conidium. **F.** Conidia. Scale bars = 10 µm.

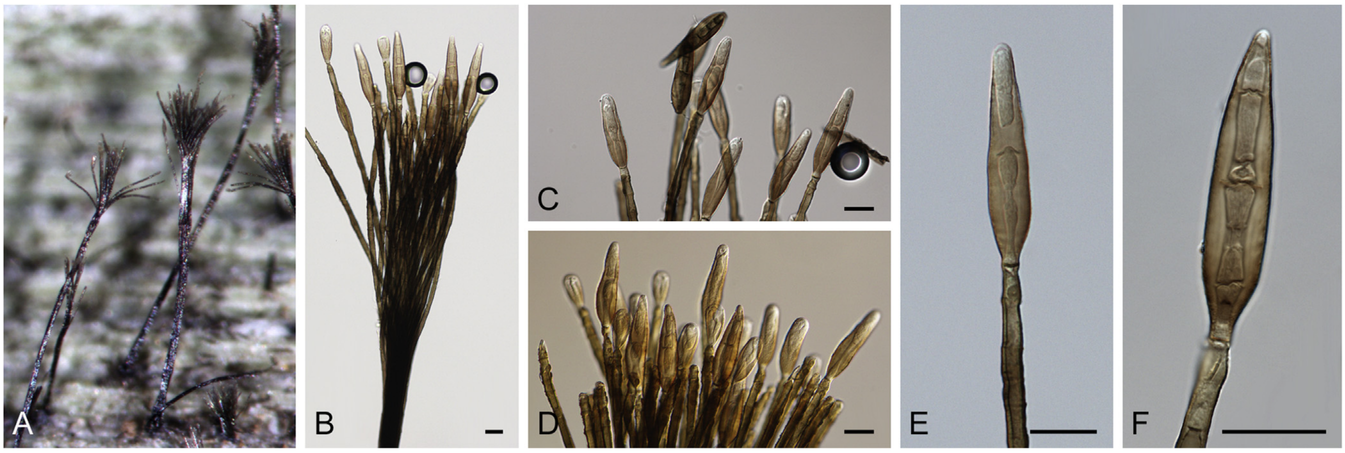


Fig. 49. *Annelophragmia coonoorensis* (IMI 245197). **A–F.** Observations *in vivo*. **A.** Conidiophores in compact fascicles, erect and emerging from the host. **B.** Apical area of the conidiophores, with conidiogenous cells and conidia. **C, D.** Conidiogenous cells and conidia. **E, F.** Conidiogenous cell and conidium. Scale bars = 10 µm.

species, *Annelophragmia coonoorensis* (Kirk *et al.* 2013; genus accepted). Sequence data are necessary to determine its phylogenetic position.

Annellosympodia McTaggart *et al.*, Australas. Pl. Path. 36: 574. 2007.

Description (adapted from McTaggart *et al.* 2007): *Mycelium* immersed. Conidiophores reduced to conidiogenous cells. *Conidiogenous cells* on minute pulvinate sporodochia, macronematous, dark brown, aseptate, verrucose, thick-walled, ampulliform, doliiform or obovoid, mono- or polyblastic, proliferating sympodially (rectilinear), conidiogenous loci ring-like with a central pore, slightly thickened and darkened, apical at first and later displaced laterally. *Conidia* solitary, brown, coarsely verrucose, cylindrical to ellipsoidal, apex rounded, base truncate with a marginal frill and a dark conspicuous hilum, aseptate or septate, sometimes constricted at the septum; secession rhexolytic.

Type species: *Annellosympodia orbiculata* McTaggart *et al.* [**Australia**, Western Australia, on phyllodes of *Acacia* sp. (**holotype** PERTH 03270173)].

Description and illustration: McTaggart *et al.* (2007).

Note: *Annellosympodia* is not known from culture, and hence its phylogenetic position remains unresolved.

Annellosympodiella Crous & Assefa

Note: See treatment in text.

Apseudocercosporella Videira & Crous

Note: See treatment in text.

Asperisporium Maubl.

Note: See treatment in text.

Asteromidium Speg., Ann. Soc. Cient. Argent. 26(1): 66. 1888.

Description (from Quaedvlieg *et al.* 2013, adapted from Sutton 1980): *Mycelium* immersed, branched, septate, hyaline. *Conidiomata* acervular, subcuticular, separate or confluent, pulvinate to doliiform, at the base, composed of hyaline to pale brown, thin-walled *textura angularis* which extends laterally, finally with separate cells dispersed in a mucilaginous matrix to form the overlaying wall; cuticle discoloured and occasionally pseudoparenchymatous, walls adjacent to the upper epidermal wall also discoloured; dehiscence irregular. *Conidiogenous cells* holoblastic, discrete, indeterminate, ± cylindrical, hyaline, smooth, with 1–2 sympodial proliferations, scars unthickened, flat, formed from the basal and lateral walls. *Conidia* cylindrical to fusoid, gently tapered at each end, apex obtuse, base truncate, thin-walled, guttulate to granular, hyaline, 3-septate.

Type species: *Asteromidium imperspicuum* Speg. [**Paraguay**, on leaves of *Sapindaceae*, 1883, ex B. Balansa Pl. du Paraguay No. 4085 (**syntype** K(M) 180228)].

Description and illustration: Quaedvlieg *et al.* (2013).

Note: See Quaedvlieg *et al.* (2013).

Berteromyces Cif., Sydowia 8: 267. 1954.

Description (from Ciferri 1954): Biotrophic, external mycelium lacking, internal mycelium with branched hyphae, hyaline, sparingly developed. *Conidiophores* hyaline or subhyaline, erumpent, with a dense basal stroma, fasciculate, unbranched, erect, distinct. *Conidia* apical, solitary, hyaline, ovoid, at first continuous, later 1-septate.

Type species: *Berteromyces aeneus* Cif. [**Uganda**, Kawanda, on *Senna bicapsularis* (≡ *Cassia bicapsularis*), Jul. 1940, Hansford 2751 (**neotype** designated by Crous & Braun (2003), IMI 8180)] ≡ ***Passalora aenea*** (Cif.) U. Braun & Crous.

Description and illustrations: Ciferri (1954), Deighton (1967, as *Cercosporidium cassiae*).

Notes: This genus is seen as part of the *Passalora* complex, with its type species treated as *Passalora aenea* (Cif.) U. Braun & Crous. The neotype was selected by Crous & Braun (2003) but as no material is available from which DNA can be extracted, its phylogenetic position remains unresolved.

Australosphaerella Videira & Crous

Note: See treatment in text.

Biharia Thirum. & Mishra, Sydowia 7: 79. 1953.

Description (adapted from Thirumalachar & Mishra 1953): *Mycelium* yellowish brown, emerging through stoma and developing a stroma, from which conidiophores arise. *Conidiophores* yellowish brown, smooth, septate, geniculate. *Conidiogenous cell* terminal, polyblastic, proliferating sympodially. *Conidia* single, yellowish brown, obclavate or cylindrical, echinulate or rugose, septate, simple or with protrusions at the region of septa.

Type species: *Biharia vangueriae* Thirum. & Mishra [**India**, Bihar, on *Vangueria spinosa* (**lectotype** designated here IMI 51482, MBT378592)].

Description and illustration: Thirumalachar & Mishra (1953).

Notes: The type species was combined into *Stenella* by Deighton (1979) and later into *Zasmidium* by Kamal (2010). It is regarded as part of the *Zasmidium* complex until sequence data of its type species is available and its phylogenetic position is resolved.

Brunneosphaerella Crous

Note: See treatment in text.

Bryopelta Döbbeler & Poelt, in Döbbeler, Mitt. Bot. Staatssamml. München 14: 126. 1978.

Description (adapted from Döbbeler 1978 and Li *et al.* 2014): *Mycelium* composed of hyaline hyphae, septate, branched within the host cells. *Ascomata* solitary, glabrous, semi-immersed or immersed, globose to subglobose, black, thick-walled, ostiole central, papillate, filled with hyaline to dark brown periphyses. *Peridium* composed of thick-walled hyaline to dark brown cells of *textura angularis* to *textura porrecta*. *Hamathecium* composed of dense, filamentous, hyaline, septate, unbranched, anastomosing pseudoparaphyses. *Asci* 8-spored, bitunicate, fissitunicate, cylindrical to fusiform, obtuse at the tip, slightly widened at base or sometimes with short pedicel, slightly curved. *Ascospores* multiseriate, crowded, ellipsoidal, generally 1-septate, asymmetrical, sometimes 1–3-septate, constricted at septa, with a smooth or rough epispore. *Mycelium* producing black synnemata, with conidiophores directly arising from the basal layers, brown. *Conidia* hyaline, narrow ellipsoid.

Type species: *Bryopelta variabilis* Döbbeler & Poelt [Sweden, on *Mylia anomala* (**holotype** GZU 000302175)].

Description and illustration: Li *et al.* (2014).

Notes: The taxonomic history of *Bryopelta* has been discussed in detail by Li *et al.* (2014). *Bryopelta variabilis* is a lichenicolous species with uncertain phylogenetic position due to the lack of sequence data.

Camptomeris Syd., Ann. Mycol. 25: 14. 1927.

Description (adapted from Ellis 1971): *Sporodochia* mostly hypophyllous, pulvinate, punctiform, dark olivaceous brown to black. *Mycelium* immersed. *Stroma* present with one or several swollen cells bearing conidiophores. *Conidiophores* macronematous, often curved inwards, simple, smooth, pale brown to brown. *Conidiogenous cells* integrated, terminal, cylindrical, proliferating sympodially, polyblastic, with prominent conidiogenous loci (scars). *Conidia* solitary, acropleurogenous, pale olivaceous brown or brown, usually verruculose but sometimes smooth, obclavate or oblong, rounded at the ends, aseptate or septate.

Type species: *Camptomeris calliandrae* Syd. [**Costa Rica**, on leaves of *Calliandra houstoniana* var. *calothyrsus* (= *Calliandra similis*), 30 Dec. 1924 (slide ex **type** IMI 7687; fide Hughes 1952)].

Descriptions and illustrations: Ellis (1971), Seifert *et al.* (2011); present study (Fig. 50).

Notes: The phylogenetic position of the genus *Camptomeris* is currently undetermined due to the lack of DNA sequence data from its type species. The cercosporoid nature of the type species suggests an affinity to *Mycosphaerellaceae*. No species of this genus are presently known from culture.

Camptomeriphila Crous & M.J. Wingf., Persoonia 37: 335. 2016.

Description (from Crous *et al.* 2016a): *Mycelium* consisting of branched, septate, smooth, pale brown hyphae, forming thick-walled, brown, verruculose, intercalary chlamydospores. *Conidiophores* in loose fascicles, erect, branched, flexuous, multiseptate, pale brown, smooth. *Conidiogenous cells* integrated, terminal and lateral, subcylindrical, pale brown, smooth; scars thickened, darkened, refractive. *Conidia* solitary, fusoid-ellipsoid, becoming obclavate when mature, subhyaline to pale brown, smooth, apex subobtuse, *hilum* protruding, truncate, thickened, darkened, refractive.

Type species: *Camptomeriphila leucaenae* Crous & M.J. Wingf.

Description and illustration: Crous *et al.* (2016a).

Materials examined: **Malaysia**, Sabah, growing on *Camptomeris leucaenae*, on leaves of *Leucaena leucocephala*, 29 May 2015, M.J. Wingfield (**holotype** CBS H-22884, culture ex-type CBS 142135 = CPC 27608).

Notes: The present species was observed growing in close association with sporodochia of *Camptomeris leucaenae* (Fig. 50), which causes a leaf spot disease on *Leucaena leucocephala*. Morphologically, it is a passalora-like mycophylic fungus,

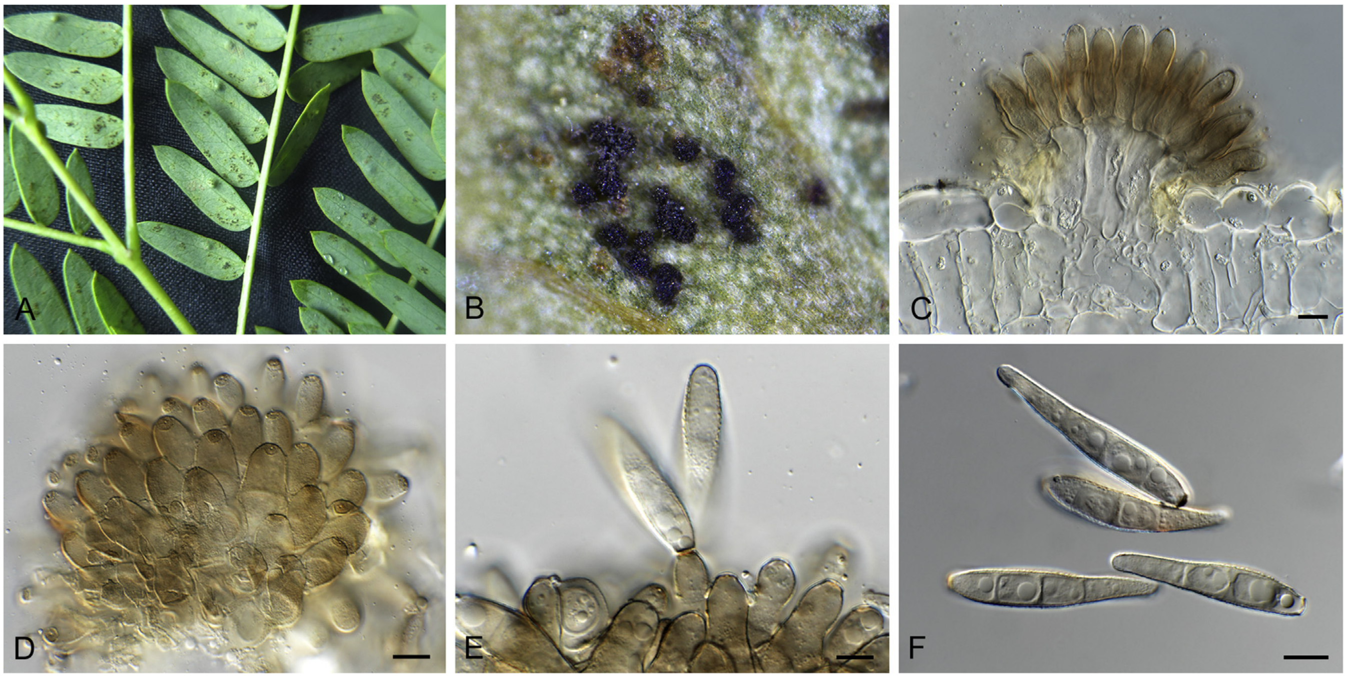


Fig. 50. *Camptomeris leucaenae* (CBS H-22884). **A–F.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Conidiophores emerging from the leaf host with conidiogenous cells. **D.** Apex of the conidiogenous cells with the conidiogenous scar. **E.** Conidiogenous cells and conidia. **F.** Conidia. Scale bars = 10 µm.

phylogenetically, it is closely related to species of *Dothistroma* or *Pseudophaeophleospora*, based on LSU (Crous *et al.* 2016a). This strain was not included in the present study.

Caryophylloseptoria Verkley, Quaedvlieg & Crous

Note: See treatment in text.

Catenulocercospora C. Nakash., Videira & Crous

Note: See treatment in text.

Ceratosperma Speg., Physis (Buenos Aires) 4(17): 284. 1918.

Description (adapted from Saccardo & Trotter 1913): *Ascomata* pseudothecial, globose. *Asci* subglobose, 8-spored, stipitate, aparaphysate. *Ascospores* oblong, 2–6-septate, constricted at septa, hyaline to olivaceous, smooth.

Type species: *Ceratosperma theobromae* (Faber) Speg. (≡ *Ceratocarpia theobromae* Faber) [**Cameroon**, on *Theobroma cacao*].

Notes: Very little is known from this genus besides its description. Authentic specimens could not be located and no illustration or recent publication are known. The species needs to be recollected to resolve its phylogenetic position.

Cercocladospora G.P. Agarwal & S.M. Singh, Proc. Natn. Acad. Sci. India, Sect. B, Biol. Sci. 42(4): 439. 1974.

Type species: *Cercocladospora adinae* G.P. Agarwal & S.M. Singh [**India**, on leaves of *Haldina cordifolia* (≡ *Adina cordifolia*) (IMI 148087), fide Deighton 1976a] = ***Pseudocercospora adinicola*** (A.K. Kar & M. Mandal) Deighton.

Note: Both the generic name, *Cercocladospora*, and the name of the type species, *Cercocladospora adinae*, were not validly published (Art. 40.1, Art. 40.3, Art. 39.1, Melbourne). Since it was morphologicaly identical to *Cercospora adinicola*, Deighton (1976a) synonymised both under *Pseudocercospora adinicola* using the validly published name *Cercospora adinicola* as the basionym. Although *Cercocladospora* is treated as a synonym of *Pseudocercospora*, this conclusion has not been confirmed based on DNA data.

Cercodeuterospora Curzi, Boll. Staz. Patol. Veg. Roma, Ser. 2, 12: 149. 1932.

Type species: *Cercodeuterospora trichophila* Curzi [**Somalia**, on *Cajanus indicus*] = ***Mycovellosiella cajani*** (Henn.) Rangel ex Trotter.

Notes: Although no culture is available, *Cercodeuterospora* is regard as a synonym of *Mycovellosiella cajani* based on morphology. The latter species also occurs on *Cajanus* spp. in Africa. Deighton (1974) did not observe the type material when he proposed the combination *Mycovellosiella cajani* var. *trichophila* for *Cercodeuterospora trichophila*, but a specimen from Kenya (IMI 68281) which he deemed very similar to the material illustrated and described by Curzi. We were unable to trace the location of the Curzi specimen.

Cercoramularia Videira, H.D. Shin, C. Nakash. & Crous

Note: See treatment in text.

Cercoseptoria Petr., Ann. Mycol. 23: 69.1925.

Type species: *Cercoseptoria chamaesyces* (F. Stevens & Dalbey) Petr. (= *Septoriopsis chamaesyces* F. Stevens & Dalbey) [**Puerto Rico**, Rio Piedras, on *Chamaesyce hypericifolia*, F.L. Stevens No. 9445 (**holotype** ILL00011697)] = ***Pseudocercospora chamaesyces*** (F. Stevens & Dalbey) Deighton.

Description and illustration: Stevens & Dalbey (1919, as *Septoriopsis chamaesyces*); Deighton (1976a, as *Cercoseptoria chamaesyces*).

Note: Although *Cercoseptoria* is treated as a synonym of *Pseudocercospora*, this conclusion has not been confirmed based on DNA data.

Cercosphaerella Kleb., Haupt- und Nebenfruchtformen der Askomyzeten: 132. 1918.

Description (based on Klebahn 1918): "*Cercosphaerella*. Konidienform *Cercospora*. Arten: *C. millegrana*; *cerasella*" [*Cercosphaerella*. Conidial form *Cercospora*. Species: *C. millegrana*; *cerasella*].

Type species: *Cercosphaerella millegrana* (Cooke) Kleb. [**Austria**, on leaf litter of *Carpinus betulus* (**holotype** K(M) 56297)].

Description: Saccardo (1882, as *Sphaerella millegrana*), Klebahn (1918).

Notes: Klebahn (1918) introduced *Cercosphaerella* as new genus for *Mycosphaerella* species with asexual morphs belonging to *Cercospora s. lat.* and linked *Cercospora microsora* (≡ *Passalora microsora*) to *Mycosphaerella millegrana*, although Sydow (1940) disagreed, and described the sexual morph of *Passalora microsora* as *Mycosphaerella microsora*. The name *Sphaerella millegrana*, based on a *Mycosphaerella* on leaf litter of *Carpinus betulus*, was misapplied in Klebahn (1918). Klebahn (1918: 132) placed two species in *Cercosphaerella*, viz. *Cercosphaerella millegrana* and *Cercosphaerella cerasella* (Aderh.) Kleb. (≡ *Mycosphaerella cerasella* Aderh.). Clements & Shear (1931) cited *Cercosphaerella* as a subgenus of *Mycosphaerella* and *Mycosphaerella millegrana* as lectotype. However, Klebahn (1918: 131) clearly emphasized that *Septosphaerella*, *Ramularisphaerella*, and *Cercosphaerella* were introduced as separate genera. Therefore, it is concluded that the phylogenetic position of *Cercosphaerella* based on its lectotype species *Cercosphaerella millegrana* remains unresolved pending the availability of phylogenetic analyses, and an epitypification of the latter species. *Cercosphaerella* may be available for some unnamed mycosphaerella-like clades.

Cercosperma G. Arnaud ex B. Sutton & Hodges, Nova Hedwigia 35: 798. 1983 [1981].

Description (from Sutton & Hodges 1981): *Mycelium* mostly superficial, composed of thick-walled, branched, brown, anastomosing, smooth hyphae; hyphopodia and setae absent. *Conidiophores* micro- to semi-macronematous, mononematous, erect, pale brown, ofen with a single short lateral branch at base. *Conidiogenous cells* holoblastic, determinate, integrated or discrete, terminal on the main axes or lateral branches, pale brown, smooth, with flattened apex. *Conidia* solitary, dry, acrogenous, straight to curved, tapered towards apex, truncate at base, distoseptate, alternate septa thickened, lumina reduced, smooth, pale brown.

Type species: *Cercosperma arnaudii* B. Sutton & Hodges [**Brazil**, Pará, Monte Dourado, on *Eucalyptus* leaf litter, 20 Jun. 1974, C.S. Hodges, **holotype** IMI 186982i].

Note: When Sutton & Hodges (1983) validated *Cercosperma*, they also pointed out its similarity to *Ceratophorum*, which is another genus that remains phylogenetically unresolved.

Cercospora Fresen. ex Fuckel.

Note: See treatment in text.

Cercosporella Sacc.

Note: See treatment in text.

Cercosporidium Earle

Note: See treatment in text.

Cercosporina Speg., Anal. Mus. Nac. B. Aires, Ser. 3, 13: 424. 1911.

Type species: *Cercosporina asparagicola* Speg. [**Argentina**, La Plata, on *Asparagus officinalis*, Maj. 1906, holotype LPS 4966; isotype IMI 247001 (slide)] = ***Cercospora asparagi*** Sacc.

Description and illustration: Chupp (1954, as *Cercospora aparagi*).

Note: *Cercosporina* is currently treated as a synonym of *Cercospora*.

Cercosporiopsis Miura, Flora of Manchuria and East Mongolia. Part III. Cryptogams, fungi: 527. 1928.

Type species: *Cercosporiopsis menispermi* (Ellis & Holw.) Miura (≡ *Cercospora menispermi* Ellis & Holw.) [**USA**, Iowa, Decorah, on *Menispermum canadense*, Jun. 1886 (**holotype** FH-01012294)] = ***Passalora menispermi*** (Ellis & Holw.) U. Braun & Crous.

Description and illustration: Chupp (1954, as *Cercospora menispermi*), Ellis (1976, as *Phaeoisariopsis menispermi*).

Note: The placement of *Cercosporiopsis menispermi* in *Passalora* needs to be confirmed based on DNA data, as this generic name may be available for some of the unnamed passalora-like clades.

Cercostigmina U. Braun, Cryptog. Bot. 4: 107. 1993.

Type species: *Cercostigmina concentrica* (Cooke & Ellis) U. Braun (≡ *Cercospora concentrica* Cooke & Ellis) [**USA**, New Jersey, Gloucester, on *Yucca filamentosa*, 1 Jun. 1874, W.A. Kellerman, no. 2150 (**holotype** NY 00838826; **isotype**: NY 01102862)] = ***Pseudocercospora concentrica*** (Cooke & Ellis) U. Braun & Crous.

Description and illustrations: Braun (1993, as *Cercostigmina concentrica*).

Note: The placement of *Cercostigmina concentrica* in *Pseudocercospora* needs to be confirmed based on DNA data.

Chuppomyces Videira & Crous

Note: See treatment in text.

Ciferriella Petr., Ann. Mycol. 28(5–6): 409. 1930.

Type species: *Ciferriella domingensis* Petr. & Cif. [**Dominican Republic**, on *Vitex umbrosa*, 26 May 1929, coll. R. Ciferri, det. F. Petrak (**holotype** NY 01048475)] = ***Pseudocercospora domingensis*** (Petr. & Cif.) Quaedvl., Verkley & Crous.

Description and illustrations: Quaedvlieg *et al.* (2013).

Note: *Ciferriella* is currently considered a synonym of *Pseudocercospora*, see Quaedvlieg *et al.* (2013).

Cladosporiella Deighton, Mycol. Pap. 101: 34. 1965.

Description (from Braun *et al.* 2013): Morphologically close to *Cladosporium* and mycovellosiella-like *Passalora* species (with superficial hyphae, conidiophores fasciculate or solitary, arising from superficial hyphae, conidiogenous loci conspicuous, thickened and darkened, conidia catenate, pigmented), but the loci and hila are not cladosporium-like (not coronate) and all species assigned to this genus are hyperparasitic.

Type species: *Cladosporiella cercosporicola* Deighton.

Description and illustrations: Braun *et al.* (2013); present study (Fig. 51).

Materials examined: **Malaysia**, Sabah, Tawau, Quoin Hill, on *Passalora koepkei* on *Saccharum officinarum*, 9 May 1964, T.H. Williams (**holotype** IMI 107538b).

Notes: The hyperparasitic habit is the only character to discriminate this genus from *Passalora.* However, as the latter is now a generic complex, we tentatively prefer to maintain *Cladosporiella* as separate genus.

Clarohilum Videira & Crous

Note: See treatment in text.

Clypeispora A.W. Ramaley, Mycotaxon 40: 13. 1991.

Description (from Ramaley 1991): Coelomycetous, phytopathogenic. *Mycelium* immersed, consisting of branched, septate, hyaline hyphae. *Conidiomata* pycnidial, immersed, black to subhyaline, substomatal, unilocular, thin-walled, ostiolate, papillate, exuding translucent conidial cirrhus; wall of hyaline to golden brown cells. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* holoblastic, discrete, hyaline, golden-brown at base, thin-walled, with thin, thread-like projection giving rise to conidia. *Conidia* hyaline, allantoid, smooth, aseptate, bluntly rounded at both ends, often with irregular apical, and/or basal appendage.

Type species: *Clypeispora angustifoliorum* A.W. Ramaley [**USA**, Colorado, La Plata county, Haflin Creek Trail, on leaves of *Populus angustifolia*, Sep. 1987, A.W. Ramaley, **holotype** BPI 1102631)] = *Mycosphaerella angustifoliorum* A.W. Ramaley [**USA**, Colorado, La Plata county, Durango, Roosa Avenue, on leaves of *Populus angustifolia*, Oct. 1988, A.W. Ramaley (**holotype** BPI 1102629).

Description and illustration: Ramaley (1991).

Note: This species needs to be recollected and its phylogenetic position determined.

Clypeosphaerella Guatimosim, R.W. Barreto & Crous

Note: See treatment in text.

Collarispora Videira & Crous

Note: See treatment in text.

Colletogloeum Petr., Sydowia 7: 368. 1953.

Description (from Sutton 1980): *Mycelium* immersed, branched, septate, hyaline to pale brown. *Conidiomata* acervular, epidermal to subepidermal, separate, occasionally confluent, composed of pale brown to hyaline, thin-walled *textura angularis*. Dehiscence irregular. *Conidiophores* hyaline or very pale brown, sparsely branched, septate, smooth, cylindrical or slightly irregular, formed from the upper cells of the acervulus. *Conidiogenous cells* holoblastic, annellidic, integrated or discrete, indeterminate, cylindrical or doliiform, with several percurrent proliferations. *Conidia* hyaline or pale brown, 0- to multiseptate, straight, curved or irregular, truncate at the base, obtuse at the apex, usually thin-walled, smooth, guttulate or eguttulate.

Type species: *Colletogloeum dalbergiae* (S. Ahmad) Petr. (≡ *Septogloeum dalbergiae* S. Ahmad); = ***Colletogloeum sissoo*** (Syd.) B. Sutton (= *Cercospora sissoo* Syd.) [**Pakistan**, on pods of *Dalbergia sissoo* (presumed slide ex **type** collection IMI 8196; authentic for the name *C. sissoo* IMI 90825, *fide* Sutton 1964)].

Notes: *Colletogloeum* was first described by Petrak (1953) based on *Septogloeum dalbergiae* published earlier in that year. However, *Cercospora sissoo* Syd. (Sydow & Mitter 1933) provides an earlier epithet for the type and a combination was proposed by Sutton (1964) together with an amendment of the genus description to include only fungi with annellate conidiophores. *Colletogloeum* differs from *Ahmadia* only in having epidermal to subepidermal conidiomata as opposed to subcuticular conidiomata. The correct phylogenetic placement of the genus *Colletogloeum* is unknown, though DNA extracted from a fungarium specimen representative of the type species, *C. sissoo* (IMI 119162), showed *Colletogloeum* to be closely related to *Pseudocercospora* (Crous *et al.* 2009e), which fits with its morphology.

Coremiopassalora U. Braun, C. Nakash., Videira & Crous

Note: See treatment in text.

Cucurbitariopsis C. Massal., Mém. Accad. Agricolt. Arti Commerc. Verona, Ser. 3, 65: 133. 1889.

Type species: *Cucurbitariopsis leptospora* C. Massal. [**Italy**, Veneto, Monte Zevola, Passo Ristele, stem of '*Clematidis*? v. *Astragenes*?' (sic. Saccardo, Syll. fung. 10: 396. 1892)] = ***Rhabdospora leptospora*** (C. Massal.) Sacc.

Note: Insufficiently known, seen as synonym of *Rhabdospora* (Saccardo 1892). The type specimen could not be located.

Cyclodothis Syd. & P. Syd., Ann. Mycol. 11: 266. 1913.

Description (adapted from Sydow & Sydow 1913): *Stromata* erumpent through the epidermis, characteristically annular, with numerous densely arranged small perithecioid loculi, wall distinct, dark brown, composed of small cells, ostiolate. *Asci* clavate, 8-spored, ascospores 3- to 4-stichous, indistinctly paraphysate. *Ascospores* oblong cylindrical, colourless, straight, slightly inequilateral, ends obtuse, with a single medial septum.

Type species: *Cyclodothis pulchella* Syd. & P. Syd. [**Philippines**, Mindanao, Todaya, Mt. Apo, on leaf spots of *Piper celtidiforme*, Jul. 1909, A.D.E. Elmer, no. 11163 (**syntypes** BPI 642231, BPI 642230, S F207022, S F207023)].

Notes: The genus has in recent years been treated as synonym of *Mycosphaerella* [*Mycosphaerella pulchella* (Syd. & P. Syd.) Arx]. However, *Cyclodothis* is insufficiently known, and Aptroot (2006) observed the type specimen to only contain a coelomycete.

Cytostagonospora Bubák, Ann. Mycol. 14: 150. 1916.
Synonym: *Cytostaganis* Clem. & Shear, Gen. fung., Edn 2 (Minneapolis): 367. 1931.

Description (from Quaedvlieg *et al.* 2012, adapted from Sutton 1980): *Mycelium* immersed, dark brown, branched, septate. *Conidiomata* pycnidial, amphigenous, separate, globose, dark brown to black, immersed, unilocular, thick-walled, clypeate; walls

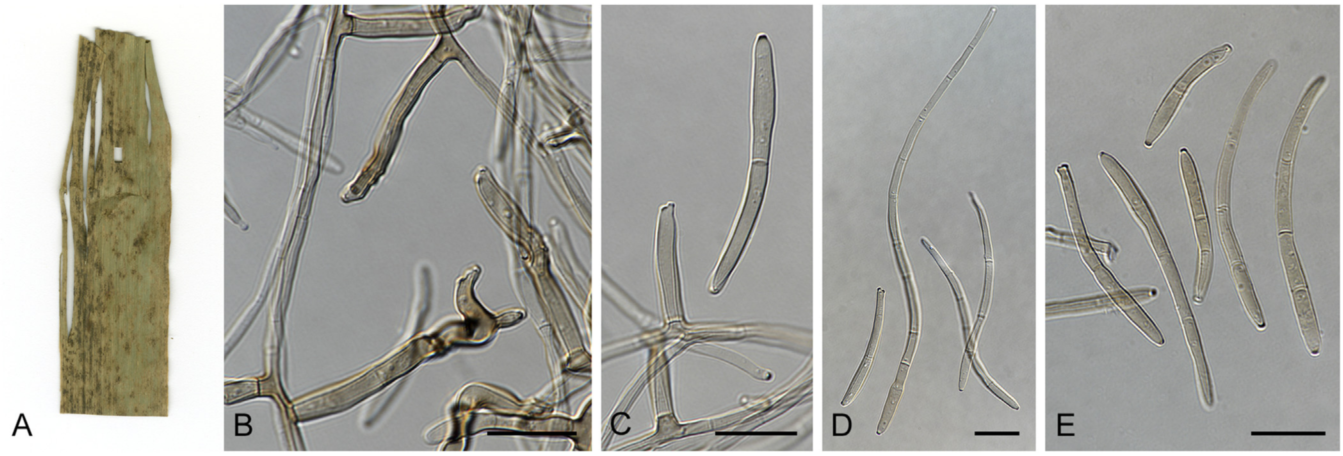


Fig. 51. *Cladosporiella cercosporicola* (IMI 107538). **A–E.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Conidiophores and conidiogenous cells. **C.** Conidiophores, conidiogenous cells and conidium. **D, E.** Catenate and single conidia. Scale bars = 10 µm.

of dark brown, thick-walled *textura angularis* to *textura globulosa*, becoming hyaline towards the conidiogenous region, extending in the upper part to become a circular clypeus of similar thickness to the wall. Ostiole central, circular, papillate to short rostrate, depressed, situated immersed within the clypeus. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* holoblastic, determinate, discrete, lageniform, hyaline, smooth, formed from the inner cells of the pycnidial wall. *Conidia* hyaline, 0–2-euseptate, not constricted at septa, base truncate, apex obtuse, thin-walled, eguttulate, smooth, filiform, often curved.

Type species: *Cytostagonospora photiniicola* Bubák, [**Italy**, Bozen, Oswald, on *Photinia serrulata*).

Description and illustration: Quaedvlieg *et al.* (2013).

Notes: Von Arx (1983) treated *Cytostagonospora* as a synonym of *Septoria*, while Sutton (1980) retained it as a separate genus. The genus *Cytostaganis* Clem. & Shear 1931 is based on the same species as *Cytostagonospora*, and is thus a homotypic synonym. The type specimen could not be located.

Davisoniella H.J. Swart, Trans. Brit. Mycol. Soc. 90: 289. 1988.

Description (from Swart 1988): *Conidiomata* in necrotic spots in living leaves, abaxial, single or a few clustered together, stromatic, subepidermal, lifting the epidermis at maturity. *Conidiogenous cells* holoblastic, percurrent, arising from the inner wall of the locules, flask shaped. *Conidia* oval, brown, verruculose, apex rounded, base truncate with a marginal frill.

Type species: *Davisoniella eucalypti* H.J. Swart [**Australia**, Western Australia, Darling Ranges, Mundlimup Block, on leaves of *Eucalyptus marginata*, 24 Nov. 1981, F. Tay (**holotype** DAR 58999)].

Notes: Although Crous *et al.* (2006b) described a sexual morph on the type material as *Mycosphaerella davisoniellae*, the link was never confirmed in culture. However, the morphology of both the sexual and asexual morphs suggests that this taxon would be better accommodated in *Teratosphaeriaceae* (*Teratosphaeria*) than *Mycosphaerellaceae*.

Dearnessia Bubák, Hedwigia 58: 25. 1916.

Description (from Quaedvlieg *et al.* 2013, adapted from Sutton 1980): *Mycelium* hyaline to brown, branched, septate. *Conidiomata* pycnidial, amphigenous, separate, globose, immersed, brown; wall of thin-walled *textura angularis*. *Ostiole* central, circular, papillate. *Setae* ostiolar, approximately straight, unbranched, tapered towards apex, dark brown, smooth, thin-walled, septate. *Conidiogenous cells* holoblastic, determinate, discrete, doliiform to ampulliform, hyaline, smooth and formed from the inner layer of the pycnidial wall. *Conidia* cylindrical to irregular, hyaline, 1–multi-transversely euseptate, rarely with 1–2 longitudinal eusepta, continuous or constricted, often tapered at the apex, base truncate, thin-walled, smooth, guttulate or not.

Type species: *Dearnessia apocyni* Bubák [**Canada**, Ontario, London, on leaves of *Apocynum androsaemifolium*, 11 Aug. 1910, J. Dearness (holotype F43227)].

Description and illustration: Quaedvlieg *et al.* (2013).

Notes: The type species needs to be recollected in order to determine the phylogenetic position of this genus. See Quaedvlieg *et al.* (2013).

Deightoniella S. Hughes, Mycol. Pap. 48: 27. 1952.

Description (adapted from Hughes 1952): *Colonies* effuse, grey, brown or black. *Mycelium* immersed, occasionally superficial. *Stroma* absent. *Setae* and *hyphopodia* absent. *Conidiophores* macronematous, mononematous, torsive or flexuous, unbranched brown, smooth, with characteristic swellings along length of conidiophore, due to percurrent rejuvenation, and elongation of conidiophore, producing conidia at higher levels. *Conidiogenous cells* monoblastic, integrated, terminal, percurrent, cylindrical. *Conidia* solitary, acrogenous, obclavate to obpyriform, medium brown, verruculose, transversely 1-septate above the median, with apical cell showing prominent taper towards subobtuse apex; basal scar somewhat darkened and thickened.

Type species: *Deightoniella africana* S. Hughes.

Description and illustrations: Hughes (1952); present study (Fig. 52).

Materials examined: **Ghana**, Hohae (Togoland), on leaves of *Imperata cylindrica* var. *africana*, 28 May, 1949, S.J. Hughes 913 (**holotype** IMI 39675a)]; **Sierra Leone**, Newton (?) colony, on leaves of *Imperata cylindrica* var. *africana*,17 Jan. 1950, T.C. Deighton, M3478A, IMI 41188.

Note: See notes under *Utrechtiana*.

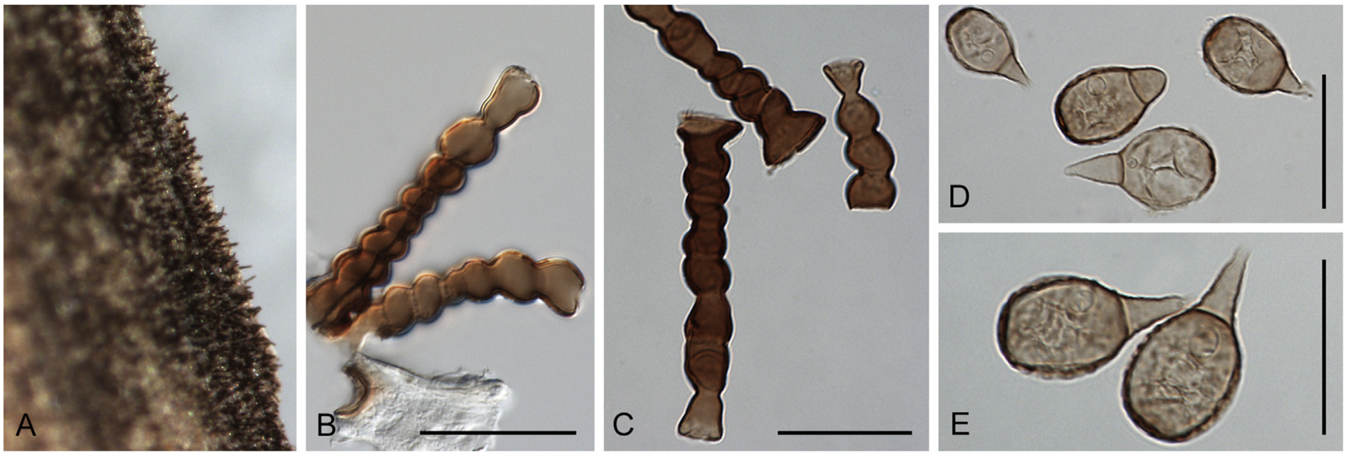


Fig. 52. *Deightoniella africana* (IMI 39675a). **A–E.** Observations *in vivo*. **A.** Conidiophores emerging on the leaf surface. **B, C.** Conidiophores. **D, E.** Single conidia. Scale bars = 10 µm.

Deightonomyces Videira & Crous

Note: See treatment in text.

Denticularia Deighton, Trans. Brit. Mycol. Soc. 59: 421. 1972.

Description (from Deighton 1972): Parasitic fungi, causing leaf spots. *Mycelium* immersed. *Conidiophores* arising from stromata, densely crowded, brown, mostly simple, smooth, thin-walled, continuous or few septate, sympodial, polyblastic, denticulate, not cicatrized, the denticles short and subcylindrical with a truncate unthickened apex. *Conidia* pale brown, more or less fusiform, catenulate, with the hila and scars unthickened, thin-walled, smooth or very minutely rough-walled, continuous or 1-septate.

Type species: *Denticularia modesta* (Syd.) Deighton (≡ *Cladosporium modestum* Syd.). [**Sierra Leone**, Kenema (Nougowa), on leaves of *Anthostema senegalense*, 5 Dec. 1938, F.C. Deighton M1681 (**holotype** IMI 7520)].

Description and illustration: Deighton (1972), Ellis (1976); present study (Fig. 53).

Material examined: **Sierra Leone**, Kenema (Nougowa), on *Anthostema senegalense*, 9 Feb. 1956, C.T. Pyne M6473, IMI 62524.

Notes: Cultures of the type species of this genus and results of molecular analyses are necessary to resolve its phylogenetic position and clarify its relation to *Pseudocercospora*. It is still unclear and unproven whether this genus belongs in the *Mycosphaerellaceae*.

Dictyocephala A.G. Medeiros, Publ. Inst. Micol. Recife 372: 13. 1962.

Type species: *Dictyocephala ulmifoliae* (Obreg.-Bot.) A.G. Medeiros (≡ *Cercospora ulmifoliae* Obreg.-Bot.) [**Colombia**, Quipile, on *Guazuma ulmifolia*, 16 Apr. 1940, R. Obregón-Botero & G.J. Quintana, No. 901] ≡ ***Pseudocercospora ulmifoliae*** (Obreg.-Bot.) U. Braun & Crous.

Descriptions and illustrations: Chupp (1954); Deighton (1976a).

Note: The synonymy with *Pseudocercospora* is based on morphology, and needs to be confirmed based on DNA data. The type specimen could not be located.

Dictyodesmium S. Hughes, Mycol. Pap. 36: 29. 1951.

Description (from Ellis 1971): *Sporodochia* epiphyllous, erumpent, pulvinate, olivaceous brown. *Mycelium* immersed forming hyphal cushions at the point of origin of the conidiophores but no definite stroma. *Setae* and *hyphopodia* absent. *Conidiophores* mono- and macronematous, caespitose, crowded, straight or flexuous, unbranched, pale brown, smooth. *Conidiogenous cells* monoblastic, integrated, terminal, determinate, cylindrical. *Conidia* solitary, acrogenous, simple, fusiform to obclavate, rostrate, truncate at the base, rather pale olivaceous brown, palest at the ends, smooth, with transverse septa throughout and longitudinal and oblique septa in the central 6–9 cells.

Type species: *Dictyodesmium ulmicola* (Ellis & Kellerm.) S. Hughes (≡ *Ceratophorum ulmicola* Ellis & Kellerm.).

Descriptions and illustrations: Ellis (1971), Seifert *et al.* (2011); present study (Fig. 54).

Materials examined: **USA**, Kansas, on leaves of *Ulmus fulva*, Oct. 1987, W.A. Kellerman 1112 (**holotype** NY 00838655).

Notes: The phylogenetic position of *Dictyodesmium* is unknown and its four species are only known by their hyphomycetous asexual morph (Seifert *et al.* 2011). Sequence data are necessary to determine its phylogenetic position.

Didymaria Corda, Icon. fung. 5: 9. 1842.

Type species: *Didymaria ungeri* Corda [**Switzerland**, on *Ranunculus nemorosus*] = ***Ramularia didyma*** Unger.

Description and illustration: Braun (1998).

Note: See Braun (1998).

Didymellina Höhn., Ann. Mycol. 16: 66. 1918.

Description: *Leaf spots* ellipsoid-lenticular, pale brown with dark brown border. *Ascomata* pseudothecial, black, scattered, subepidermal to erumpent, wall of 2–3 layers of brown *textura angularis*. *Asci* aparaphysate, fasciculate, bitunicate, subsessile, obovoid, straight to slightly curved, 8-spored, with visible apical apiculus. *Ascospores* 3- to multiseriate, hyaline, non-guttulate, thin-walled, straight to slightly curved, fusoid-ellipsoid with obtuse ends, medianly 1-septate, widest in middle of apical cell, not constricted at the septum (but slightly so with age), tapering towards both ends, but slightly more to lower end; ascospores germinating while in ascomata, hyaline, slightly constricted at

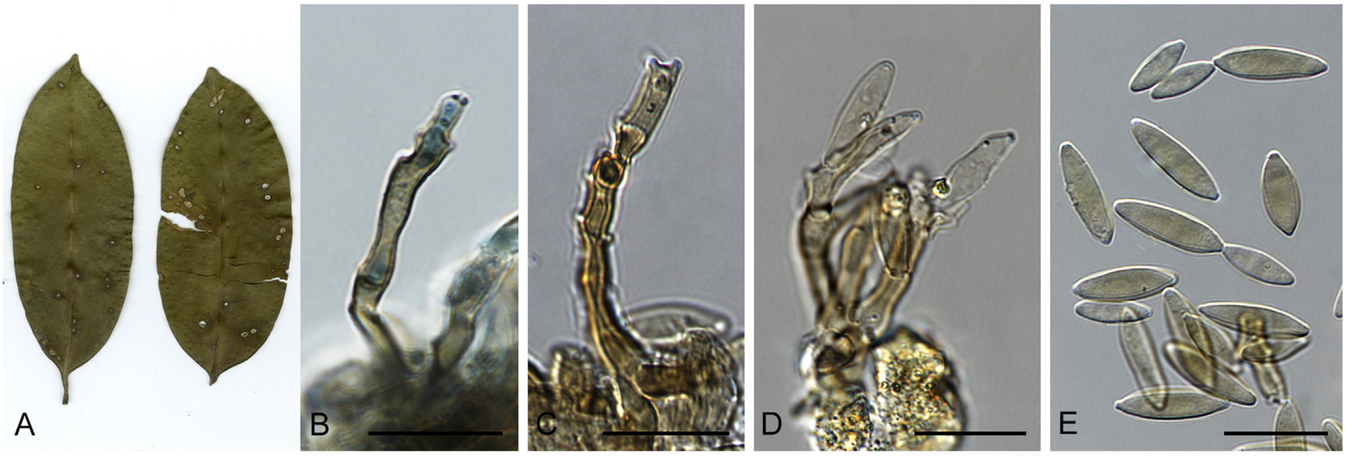


Fig. 53. *Denticularia modesta* (IMI 62524). **A–E.** Observations in vivo. **A.** Leaf spot symptoms on the host. **B, C.** Conidiophores and conidiogenous cells. **D.** Conidiophores, conidiogenous cells and conidia. **E.** Catenate and single conidia. Scale bars = 10 µm.

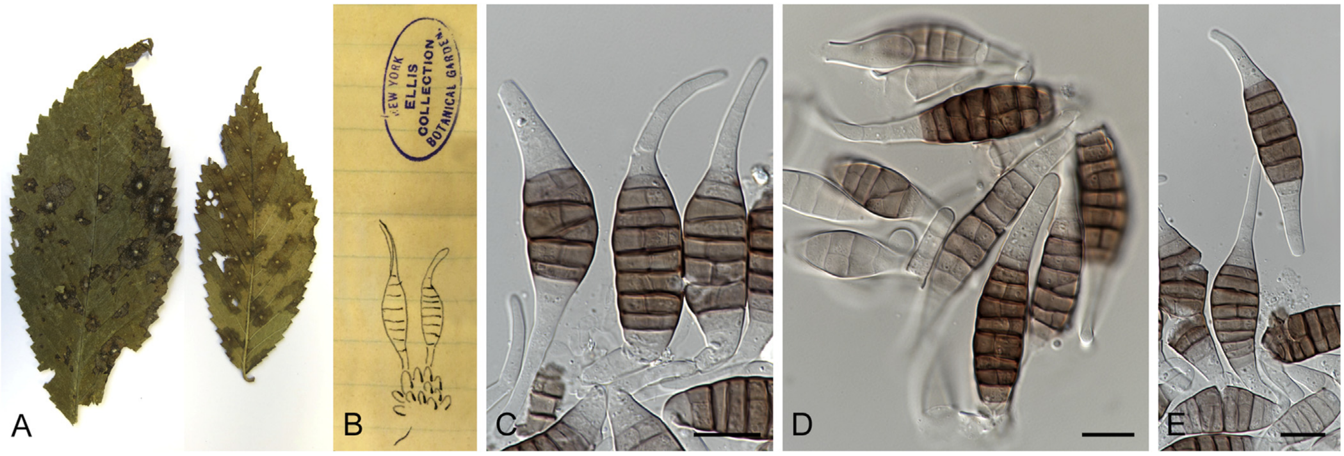


Fig. 54. *Dictyodesmium ulmicola* (NY 00838655). **A, C–E.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Conidiophores and conidia drawing on the specimen envelope. **C–E.** Conidia. Scale bars = 10 µm.

septum, germinating from both ends with germ tubes parallel to the long axis of the spore, in some cases germinating ascospores becoming 3-septate.

Type species: *Didymellina iridis* (Desm.) Höhn. (≡ *Dothidea iridis* Desm.) [**France**, Trouve a Hermanville, on leaves and capsules of *Iris pseudacorus*, 1847, M. Roberge (**holotype**, PC)].

Notes: *Didymellina iridis* is the type species of the genus *Didymellina*, which Müller & von Arx (1962) treated as synonym of *Mycosphaerella*. A short overview of the taxonomic history of this species was presented by (Braun *et al.* 2003a). Ascospores observed in asci were 1-septate, but 3-septate ascospores were observed at the onset of germination. Based on its morphology, it is considered that this represents a separate genus. However, the taxonomic position of this fungus can only be resolved when fresh material has been obtained.

Didymochora Höhn. Hedwigia 60: 172. 1918.

Description (adapted from von Höhnel 1918): *Stromata* small, flat, subcuticular, pseudoparenchymatous, carbonaceous, with a vertically arranged successive structure, with a single locus, cover one-layered, irregularly splitting, basal layer pseudoparenchymatous below and palisade-like above. *Conidia* pigmented, 2-celled, solitary, separated from the tips of the internal palisade-like cell layer by a horizontal septum.

Type species: *Didymochora betulina* Höhn. (described as asexual morph of *Euryachroa betulina* (Fr. : Fr.) J. Schröt. ≡ *Atopospora betulina* (Fr. : Fr.) Petr., without any further details, and placed in the *Leptostromaceae*.

Notes: The phylogenetic position of *Didymochora* is unknown and its two species are only known by their stromatic asexual morph. It is currently considered a genus of *incertae sedis* belonging to the *Dothideomycetes* (Wijayawardene *et al.* 2014). Sequence data are necessary to determine its phylogenetic position.

Distocercospora N. Pons & B. Sutton

Note: See treatment in text.

Distocercosporaster Videira, H.D. Shin, C. Nakash. & Crous

Note: See treatment in text.

Distomycovellosiella U. Braun, C. Nakash., Videira & Crous

Note: See treatment in text.

Dothistroma Hulbary

Note: See treatment in text.

Elletevera Deighton, Mycol. Pap. 118: 17. 1969.

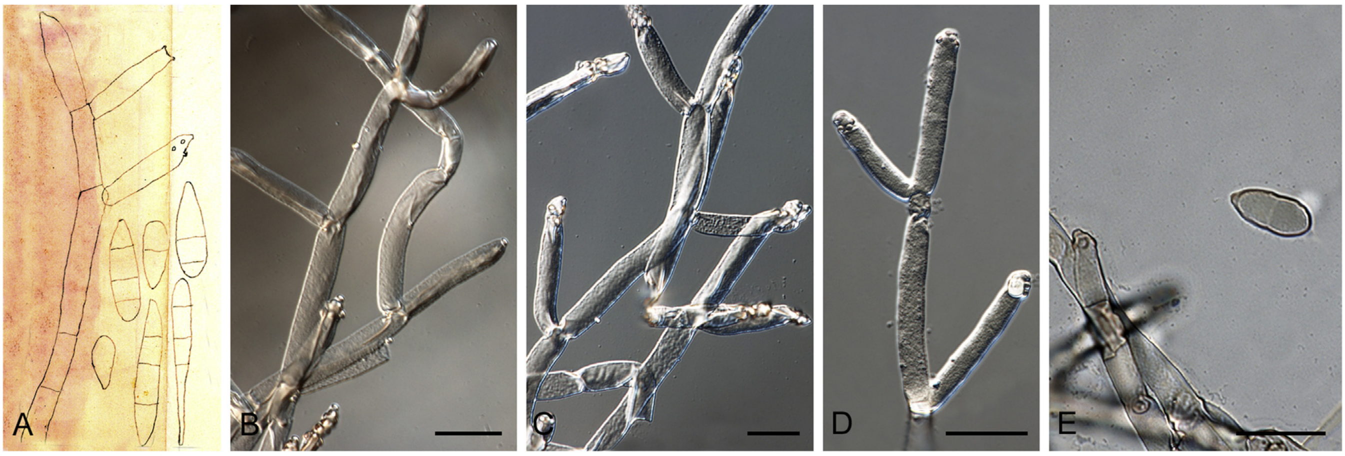


Fig. 55. *Elletevera parasitica* (IMI 127995). **A.** Drawing in the specimen envelope. **B–E.** Observations *in vivo*. **B–D.** Conidiophores and conidiogenous cells. **E.** Conidiogenous cells and conidium. Scale bars = 10 µm.

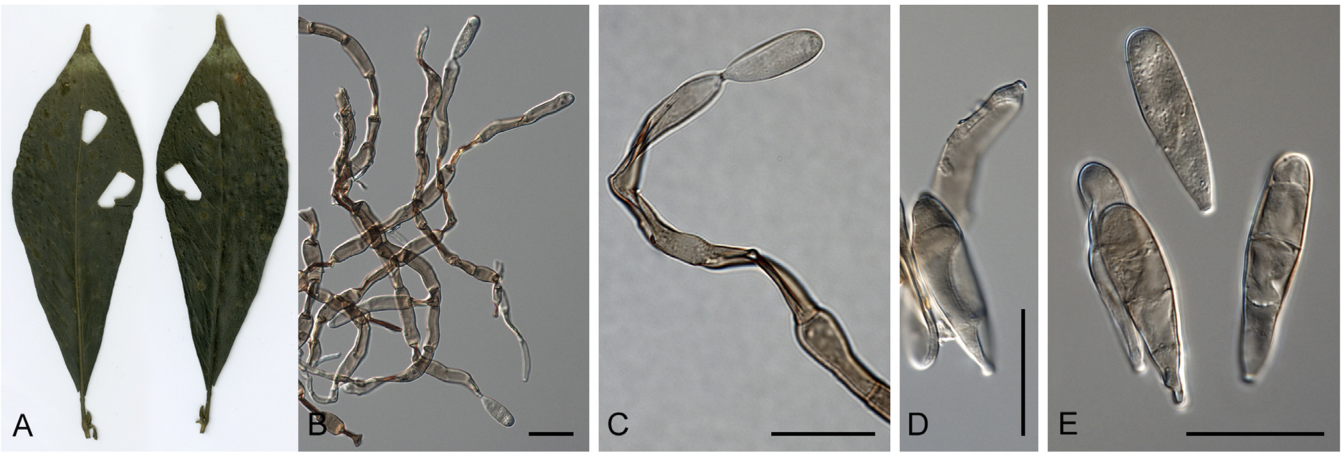


Fig. 56. *Eriocercospora balladynae* (IMI 5293c). **A–E.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Conidiophores, conidiogenous cells and conidia. **C.** Partial conidiophore, conidiogenous cells and conidium. **D, E.** Single conidia. Scale bars = 10 µm.

Description (from Deighton 1969): *Mycelium* immersed in the host fungus. *Conidiophores* dilute brown, smooth, branched, well developed, fasciculate, thin-walled: conidial scars conspicuous, slightly but distinctly thickened, prominent, aggregated towards the apices of the branchlets of the conidiophores. *Conidia* concolorous with the conidiophores, smooth, thin-walled, mostly cylindric-clavate and 3-septate, sometimes 0–2-septate, the shorter ones very rarely catenulate, sometimes fusoid, rostrate and pluriseptate, with a conspicuous and slightly but distinctly thickened hilum.

Type species: *Elletevera parasitica* (Ellis & Everh.) Deighton (≡ *Pyricularia parasitica* Ellis & Everh.).

Description and illustration: Deighton (1969), Braun *et al.* (2013); present study (Fig. 55).

Material examined: **USA**, Wisconsin, Kenosha Co., on *Phyllachora graminis* on *Elymus virginicus*, 13 Aug. 1893, J.J. Davis 9311, (**holotype** NY 00928212, isotype BPI 420251, slide ex type collection IMI 129275).

Notes: The present genus was introduced by Deighton (1969) to accomodate hyperparasitic cercosporoid hyphomycetes with distinct conidiogenous loci. Upon re-examination of several specimens, Braun *et al.* (2013) considered the conidiogenous loci description to be misleading and observed that the denticle-like loci are unthickened and undarkened. Due to the morphological characters this genus may be related to *Pseudocercospora* but cultures and sequence data are necessary to determine its phylogenetic position.

Epicoleosporium Videira & Crous

Note: See treatment in text.

Eriocercospora Deighton, Mycol. Pap. 118: 5. 1969.

Description (from Deighton 1969): Hyperparasitic hyphomycetes. *Mycelium* superficial, composed of pale brown, branched, septate, smooth, repent hyphae which bear conidiophores terminally and as lateral branches. *Conidiophores* pale brown, erect simple or branched, smooth, septate, not geniculate at the old conidial scars. *Conidial scars* slightly thickened, slightly prominent, the old ones lying more or less flat against the side of the conidiophore. *Conidia* pale brown, smooth, clavate, fusiform, subcylindric or obclavate, pluriseptate.

Type species: *Eriocercospora balladynae* (Hansf.) Deighton (≡ *Helminthosporium balladynae* Hansf.)

Description and illustration: Deighton (1969), Braun (1995); present study (Fig. 56).

Materials examined: **Uganda**, Entebbe Road, on *Balladynocallia glabra* on *Grumilea succulenta*, Nov. 1943, C.G. Hansford 3264 (**holotype** of *Helminthosporium balladynae*, IMI 562a); Entebbe Road (mile 13), on *Balladyna* sp. on leaves of *Pavetta* sp., Mar. 1940, C.G. Hansford 2609 (**holotype** of *Cercospora*

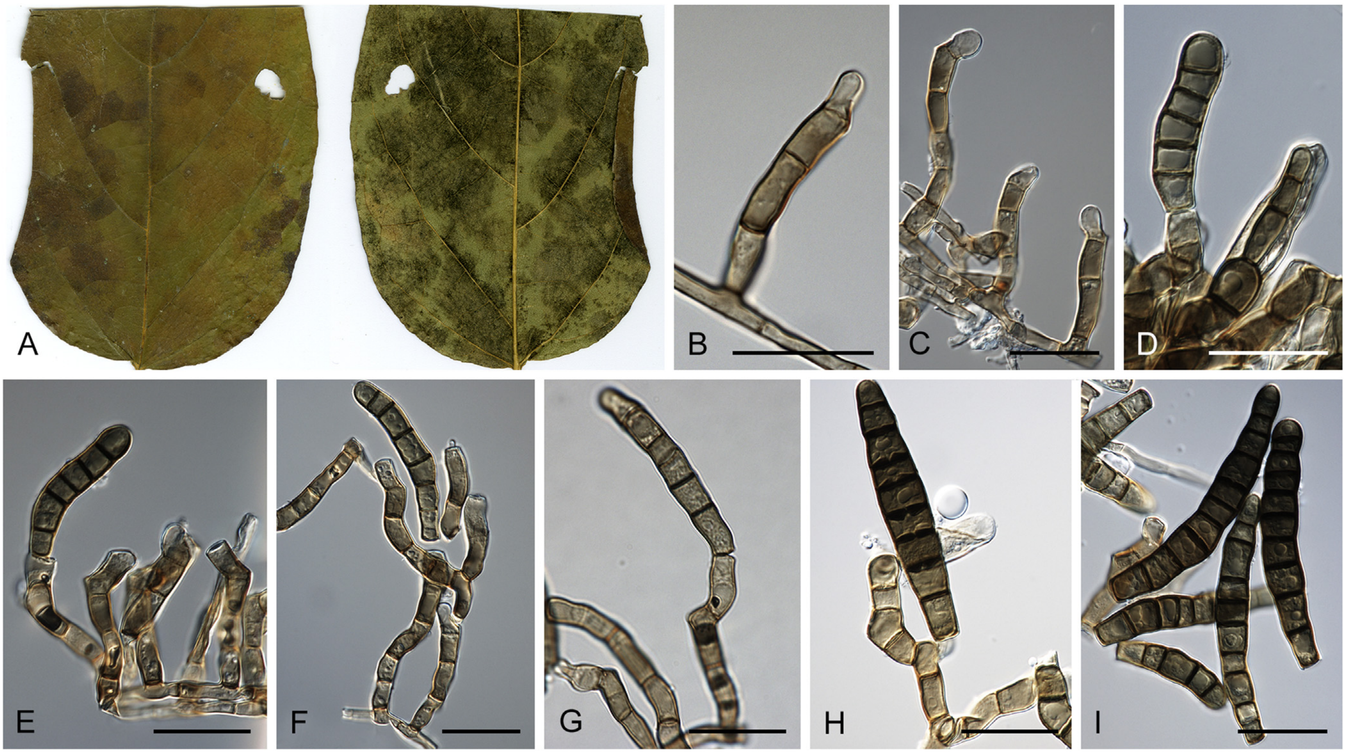


Fig. 57. *Eriocercosporella indica* (IMI 302747). **A–I.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B, C.** Conidiophores. **D.** Conidiogenous cells proliferating percurrently and conidia. **E–H.** Conidiophores and conidia. **I.** Conidia. Scale bars = 10 µm.

balladynae, IMI 4706c); Entebbe, on *Balladynocallia glabra* on *Pavetta* sp., Dec. 1945, C.E. Hansford 3726, (IMI 5293).

Notes: The present genus was introduced by Deighton (1969) who described the conidiogenous loci as mycovellosiella-like. Upon re-examination of several specimens Crous & Braun (2003) considered the conidiogenous loci description to be misleading and observed that the denticle-like loci are neither thickened nor conspicuously darkened. Due to morphological characters this genus may be related to *Pseudocercospora* but sequence data are necessary to determine its phylogenetic position.

Eriocercosporella Rak. Kumar, A.N. Rai & Kamal ex U. Braun, A monograph of *Cercosporella*, *Ramularia* and allied genera (Phytopathogenic Hyphomycetes) 2: 398. 1998.

Description (from Braun *et al.* 2013): Foliicolous hyphomycetes, associated with leaf spots. *Mycelium* internal and external, superficial hyphae emerging through stomata, branched, pigmented, septate, thin-walled, smooth. *Stromata* lacking. *Conidiophores* macronematous, mononematous, *in vivo* solitary, arising from superficial hyphae, lateral, simple, occasionally branched, pigmented, septate, thick-walled, smooth; *conidiogenous cells* integrated, terminal, uni- to multilocal, sympodially or occasionally percurrently proliferating, loci truncate, flat, broad, neither thickened nor darkened, conidiogenesis thalloblastic, i.e. at first blastic, then thallic (base of conidia ± agreeing in width with the diameter of the broad conidiogenous loci). *Conidia* solitary, cylindrical to subclavate, occasionally disarticulating, plurieuseptate, occasionally with 1–2 additional distosepta, thick-walled, brown, smooth, not attenuated at the base, *hila* truncate, broad, width ± agreeing with the diameter of the conidiogenous loci, neither thickened nor darkened, conidial secession schizolytic.

Type species: *Eriocercosporella indica* R. Kumar, A.N. Rai & Kamal ex U. Braun

Description and illustration: Braun (1998), Braun *et al.* (2013); present study (Fig. 57).

Materials examined: **India**, Uttar Pradesh, Pithoragarh, on *Marsdenia roylei*, 1985, Kumar (**holotype** IMI 302747).

Note: Due to its morphological characters this genus may be related to either *Pseudocercospora* or *Sporidesmium*, but sequence data are necessary to determine its phylogenetic position.

Euryachora Fuckel, Jahrb. Nassauischen Vereins Naturk. 23–24: 220. 1870 (1869–1870).

Description (from Fuckel 1869): *Ascomata* pseudothecial. *Asci* obovoid, sessile, 8-spored. *Ascospores* obovoid, hyaline, 1-septate.

Type species: *Euryachora sedi* (Link) Fuckel [as '*sebi*'] (≡ *Leptostroma sedi* Link) (**Austria**, on *Sedum maximum*).

Note: The present genus is based on *Euryachora sedi* which is only known by the mycosphaerella-like sexual morph. It is currently considered to belong to *Mycosphaerellaceae* (Lumbsch & Huhndorf 2010) but the type specimen could not be located and no DNA sequence data are available to determine its phylogenetic position.

Exopassalora Videira & Crous

Note: See treatment in text.

Exosporium Link

Note: See treatment in text.

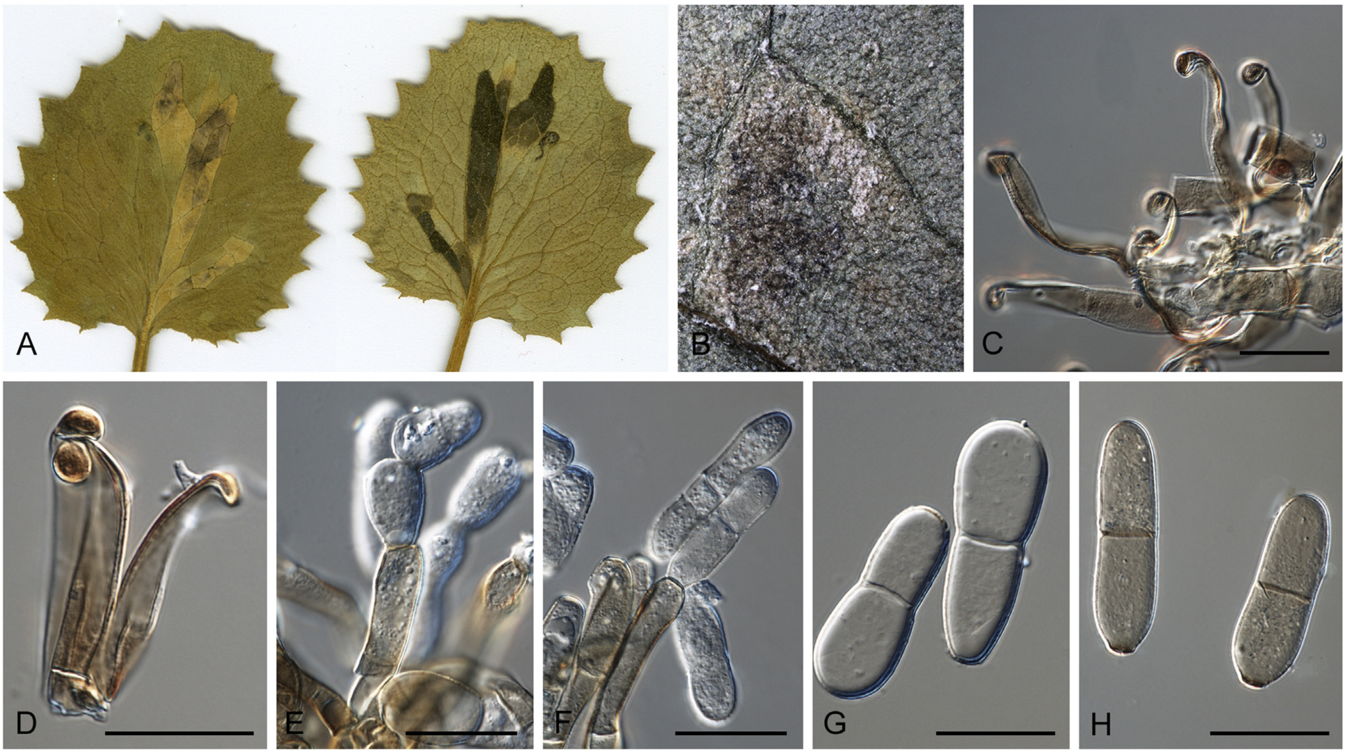


Fig. 58. *Fusicladiella aronici* (IMI 371583). **A–H.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C.** Conidiophores. **D.** Partial conidiophore and conidiogenous cell. **E, F.** Conidiogenous cells and conidia. **G, H.** Conidia. Scale bars = 10 µm.

Exutisphaerella Videira & Crous

Note: See treatment in text.

Filiella Videira & Crous

Note: See treatment in text.

Fulvia Cif.

Note: See treatment in text.

Fusicladiella Höhn., Ber. Deutsch. Bot. Ges. 37: 155. 1919.

Description (from Ellis 1971): *Colonies* suborbicular or angular. *Mycelium* immersed. *Stroma* sometimes present in the host cuticle. *Setae* and *hyphopodia* absent. *Conidiophores* macronematous, mononematous, crowded, unbranched, at first erect, straight or slightly curved, cylindrical, almost colourless, later strongly curved, brown or olivaceous brown, pale and thin-walled on one side, dark and thick-walled on the other, the curvature always taking place towards the thin-walled side, smooth or sometimes finely verruculose near the apex. *Conidiogenous cells* monoblastic, integrated, terminal, determinate, cylindrical, cicatrized, the single apical scar broad and flat. *Conidia solitary*, dry, aerogenous, straight or slightly curved, often cylindrical, rounded at the apex, truncate with a thin scar at the base, but sometimes clavate, ellipsoidal or obclavate, colourless to pale olive, smooth to finely verruculose, almost always 1-septate, rarely 2-septate.

Type species: *Fusicladiella aronici* (Sacc.) Höhn. (≡ *Fusicladium aronici* Sacc.) = ***Fusicladiella melaena*** (Fuckel) S. Hughes) [**syntypes**, **Italy**, Vette di Feltre, on *Doronicum grandiflorum* (= *Aronicum scorpioides*), Aug. 1879, G. Bizzozero (BPI 423776, PAD); Mt. Baldo, Valle delle Pietre, on *D. glaciale* (= *Aronicum doronicum*), V. de Cesati, Rabenh., Fungi Eur. 2339 (numerous fungaria including HAL)].

Descriptions and illustrations: Hughes (1952), Deighton & Pirozynski (1965), Ellis (1971), von Arx (1983); present study (Fig. 58).

Materials examined: **Switzerland**, Graubünden, Fimbertal, Silvretta, on leaf of *Doronicum grandiflorum*, 5 Aug. 1967, J. Poelt & M. Steiner, Reliquiae Petrakianae no. 2565 (IMI 371583). **Russia**, Moskovsky, St Petersburg, on leaves of *Carduus crispus*, 2007, V. Melnik. Exsicc. Mycoth. Petropol. 90, UPS:BOT:F-144284.

Notes: *Fusicladiella* is based on *Fusicladiella aronici*, which is only known by its hyphomycetous asexual morph. The phylogenetic position of this genus remains obscure due to absence of DNA data.

Fusoidiella Videira & Crous

Note: See treatment in text.

Gillotia Sacc. & Trotter, Syll. Fung. 22: 253. 1913.

Description (Saccardo & Trotter 1913): *Ascomata* erumpent to superficial, subglobose. *Asci* saccate, subclavate, aparaphysate, stipitate, 8-spored. *Ascospores* oblong, 3-septate, straight to slightly curved, hyaline, becoming olivaceous brown.

Type species: *Gillotia orbicularis* (Syd. & P. Syd.) Sacc. & Trotter (≡ *Diplotheca orbicularis* Syd. & P. Syd.) [**Brazil**, São Paulo, Campinas, on *Cactus* sp., Oct. 1896, F. Noack (**holotype** S F9063).

Notes: *Gillotia* is based on *Gillotia orbicularis*, which is mostly known by its sexual morph. The presence of an asteromella-like asexual morph is indicated by Hyde *et al.* (2010). The fact that this species produces 3-septate ascospores that become olivaceous brown is suggesting it should not belong in the *Mycosphaerellaceae*. However, DNA is not available and hence its phylogenetic position remains obscure.

Gloeocercospora D.C. Bain & Edgerton ex Deighton, Trans. Brit. Mycol. Soc. 57: 358. 1971.

Description (from Deighton 1971): *Mycelium* internal, composed of septate, branched hyphae. *Stroma* small or absent. *Conidiomata* sporodochial, suprastomatal, originating from hyphae which emerge through stomata, pulvinate, composed of more or less hyaline, repeatedly branched hyphae with short cells of which the terminal cells act as conidiogenous cells; conidiogenous loci terminal, minute, unthickened. *Conidia* hyaline, filiform, straight to curved, multi-septate, smooth, in mucoid mass.

Type species: *Gloeocercospora sorghi* D.C. Bain & Edgerton ex Deighton [**USA**, Louisiana, on *Sorghum vulgaris*, Aug. 1943, D.C. Bain (**holotype** BPI 433333)].

Notes: *Gloeocercospora* was considered a synonym of *Microdochium* based on morphological characters (Braun 1995). The ITS sequence of CBS 131812 (unpublished, India, on *Sorghum vulgare*, Nov. 1971, G.S. Rawla, culture CBS 131812 = IMI 165194) is identical to that of *Gloeocercospora sorghi* NBRC 7430, currently available in GenBank (ITS and partial LSU: accession LC063852). More data are necessary to resolve the phylogenetic position of this pathogen.

Gomphinaria Preuss, Linnaea 24: 130. 1851.

Description (adapted from Preuss 1851 and Saccardo 1886, as *Acrotheca amoena*): *Caespituli* effuse, brown. *Conidiophores* erect, subulate, simple, below densely septate and brown, above subhyaline, transparent and aseptate. *Conidia* terminal, subapically formed, oblong, hyaline, aseptate, base acute or subapiculate, hila hyaline.

Type species: *Gomphinaria amoena* Preuss [**Germany**, on *Alnus glutinosa* (holotype in B)].

Description and illustration: Preuss (1851).

Note: Arzanlou *et al.* (2007) examined the holotype of *Gomphinaria amoena* Preuss (B), and concluded that without fresh collections, it would not be possible to ascertain the phylogenetic position of this ramichloridium-like hyphomycete.

Graminopassalora U. Braun, C. Nakash., Videira & Crous

Note: See treatment in text.

Haplodothis Höhn., Sitzungsber. Akad. Wiss. Wien, Math.-Naturwiss. Kl., Abt. 1 120: 423 (45 repr.). 1911.

Type species: *Haplodothis singularis* (Henn.) Höhn. (≡ *Lizonia singularis* Henn.) [**Australia**, Western Australia, on *Leucopogon hispidus*, L. Diels, No. 3055] = ***Mycosphaerella singularis*** (Henn.) Arx.

Notes: The genus *Haplodothis* is based on *Haplodothis singularis*, which is currently considered a synonym of *Mycosphaerella singularis*. The type specimen could not be located. Fresh collections and DNA sequence data are necessary to determine if *Haplodothis* is a real synonym of *Mycosphaerella*, which is now treated as *Ramularia* (Videira *et al.* 2015a, b, 2016).

Haplographium Berk. & Broome, Ann. Mag. Nat. Hist., Ser. 3, 3: 360 (1859).

Type species: Haplographium delicatum Berk. & Broome = ***Dematioscypha dematiicola*** (Berk. & Broome) Svrček 1977

Description and illustration: Ellis (1971), Seifert *et al.* (2011).

Notes: The genus *Haplographium* is based on *H. delicatum*, a hyphomycetous species with a link to the sexual morph *Hyaloscypha dematiicola* (Berk. & Broome) Nannf. (Ellis 1971), which is a current synonym of *Dematioscypha dematiicola* (Berk. & Broome) Svrček. The recent work of Han *et al.* (2014) places a representative strain of *Dematioscypha dematiicola* (TNS-F17834) in the *Leotiomycetes* (*Helotiales*). The work of Crous *et al.* (2009a) summarizes the taxonomic history of *Lauriomyces* and *Haplographium* and shows that the available strains of *Haplographium catenulatum* (CBS 196.73, CBS 482.67, CBS 739.68) cluster in *Hyaloscyphaceae* (*Leotiomycetes*) and apart from the available strains of *Lauriomyces bellulus* (CBS 517.93) and *Lauriomyces heliocephalus* (CBS 112054), which are considered to be *incertae sedis*.

Hawksworthiana U. Braun, Int. J. Mycol. Lichenol. 3: 276. 1988.

Description (from Videira *et al.* 2016): Lichenicolous, forming gall-like deformations. *Mycelium* consisting of hyaline, septate, sparsely branched, thin-walled hyphae. *Conidiophores* reduced to the conidiogenous cells, erumpent, usually ampulliform but sometimes subcylindrical, aseptate, hyaline, thin-walled, mono- or polyblastic, sympodial, conidiogenous loci conspicuous, thickened and darkened. *Conidia* formed singly, acrogenous, oblong-clavate to subcylindrical, hyaline, thin-walled, smooth, aseptate or 1-septate, hilum conspicuous, thickened and darkened.

Type species: *Hawksworthiana peltigericola* (D. Hawksw.) U. Braun (≡ *Ramularia peltigericola* D. Hawskw.) [**UK**, Scotland, Isle of Mull, Killiemore, on thallus of *Peltigera polydactylon*, 16 Jun. 1979, Clark (**holotype** IMI 239715a).

Description and illustration: Braun *et al.* (1998), Videira *et al.* (2016).

Notes: *Hawksworthiana* differs from *Ramularia* by its lichenicolous habit and some morphological features. Although fresh material has been available, all attempts to grow this fungus in culture have thus far been unsuccessful and no sequence data are available.

Helicomina L.S. Olive, Mycologia 40: 16. 1948.

Type species: *Helicomina caperoniae* L.S. Olive [**USA**, Louisiana, Baton Rouge, on *Caperonia castaneifolia*, 2 Oct. 1946, Q.L. Holdman (**holotype** BPI 447607)] = ***Pseudocercospora caperoniae*** (L.S. Olive) Deighton.

Descriptions and illustrations: Olive (1948), Ellis (1971), Deighton (1976a).

Notes: This genus is currently considered a synonym of *Pseudocercospora* based on its morphological characters (Crous *et al.* 2013a). However, the type species needs to be recollected to confirm the generic synonymy based on DNA data.

Hoornsmania Crous, Fungal Planet 11: 1. 2007.

Description (from Crous 2007): Hyphomycetes. *Conidiophores* solitary, brown, arising from superficial hyphae, septate. *Conidiogenous cells* brown, smooth to finely verruculose, elongate-ellipsoid to fusoid, with 1–2 truncate loci, somewhat thickened and darkened, but not prominently refractive. *Conidia* brown, smooth to finely verruculose, broadly ellipsoidal to somewhat fusoidal, occurring in branched, acropetal chains;

scars somewhat darkened, thickened, but not refractive; hyperparasitic on *Neonectria ditissima*.

Type species: *Hoornsmania pyrina* Crous [**Netherlands**, Utrecht Prov., Bilthoven, on perithecia of *Neonectria ditissima* on twigs of *Pyrus malus*, Jan. 2005, P.W. Crous (**holotype** CBS H-19769)].

Description and illustration: Crous (2007).

Note: All attempts to cultivate this species, or isolate DNA from freshly collected material, have thus far been unsuccessful.

Hyalodictys Subram., Proc. Indian Acad. Sci., Pl. Sci.: 8. 1962.

Type species: *Hyalodictys degenerans* (Syd. & P. Syd.) Subram. (≡ *Clasterosporium degenerans* Syd. & P. Syd.) = ***Miuraea degenerans*** (Syd. & P. Syd.) Hara.

Description and illustration: Braun (1995, as *Miuraea degenerans*).

Notes: The genus *Hyalodyctis*, based on *Hyalodyctis degenerans*, is currently considered a synonym of *Miuraea* based on morphological characters. See treatment of *Miuraea* in text and Braun (1995).

Hyalocercosporidium Videira & Crous

Note: See treatment in text.

Hyalodothis Pat. & Har., Bull. Soc. Mycol. France 9: 210. 1893.

Description (adapted from Saccardo 1895): Glumicolous. *Stromata* superficial, encrusting ovaria and fruits, black, effuse-pulvinate, coriaceous-horny or subcarbonaceous, sclerotiform, with numerous immersed little loci. *Asci* 8-spored. *Ascospores* oblong, aseptate, hyaline.

Type species: *Hyalodothis clavus* Pat. & Har. [**Democratic Republic of the Congo**, on culms of *Poaceae*].

Descriptions and illustrations: Arnold (1967), Patouillard & Hariot (1893).

Notes: Arnold (1967) found that the type specimen contained two distinct species of fungi that were used to generate the description of *Hyalodothis*, and thus recommended that the genus be considered a *nomen confusum*, which is currently not part of the ICN. Hence, a lectotypification confining this name to one of the included elements is necessary to clarify the identity of this genus. According to Arnold (1967) the type specimen is part of Patouillard collection (no.597) in FH, but it could not be traced using the online catalog.

Hyalozasmidium U. Braun, C. Nakash., Videira & Crous

Note: See treatment in text.

Isariella Henn., Hedwigia 48: 19. 1908.

Description (adapted from Hennings 1908): "*Sporodochia*" (fascicles/coremia) parasitic, superficial, fasciculate-fasciate, waxy, composed of hyaline, septate, loosely united, converging "hyphae" (conidiophores). *Conidia* ellipsoid, aseptate, hyaline.

Type species: *Isariella auerswaldiae* Henn. [**Brazil**, São Paulo, Horto Botanico, on stromata of *Auerswaldia puttemansia* on leaves of *Lauraceae*, 1902, Puttemans, No. 571 (**holotype** S F40445)]

Description and illustrations: Hennings (1908), Seifert *et al.* (2011).

Notes: The phylogenetic position of *Isariella* is unknown and its two species are only known by their hyphomycetous asexual morph (Seifert *et al.* 2011). Sequence data are necessary to determine its phylogenetic position.

Isariopsella Höhn., in Weese, Mitt. Bot. Inst. Tech. Hochsch. Wien 6: 68. 1929.

Type species: *Isariopsella vossiana* (Thüm.) Höhn. (≡ *Ramularia vossiana* Thüm.) [**Slovenia**, Ljubljana (Laibach), on *Cirsium oleraceum*, Oct. 1879, W. Voss, Thüm., Mycoth. Univ. 1769 (**lectotype** HAL)] = ***Phacellium vossianum*** (Thüm.) U. Braun.

Description and illustration: Braun (1998, as *Phacellium vossianum*).

Notes: *Isariopsella* is currently considered a synonym of *Phacellium*. If *Phacellium* is synonymous with *Ramularia* as is expected, the older name *Ramularia vossiana* will be used for this species. Sequence data are necessary to confirm this hypothesis.

Isariopsis Fresen., Beitr. Mykol. 3: 87. 1863.

Type species: *Isariopsis pusilla* Fresen. [**Germany**, on *Cerastium holosteoides*] = ***Phacellium alborosellum*** (Desm.) U. Braun.

Description and illustration: Braun (1998, as *Phacellium alborosellum*).

Notes: *Isariopsis* is currently considered a synonym of *Phacellium*. If *Phacellium* is synonymous with *Ramularia* as is expected, the name *Ramularia alborosella* (Desm.) Gjaerum would be available for the type species of *Isariopsis* as well as *Phacellium* (see Braun 1998). Sequence data are necessary to confirm this hypothesis.

Jaczewskiella Murashk., Mater. Mikol. Fitopatol. Rossii 5(2): 5. 1926.

Description (adopted from Shkarupa 1992 and Mel'nik & Popushoj 1992): Saprobic. *Conidiomata* stromatic, cupulate, with a more or less well developed stalk, sometimes sessile, large, scattered, composed of light brown to brown prismatic or oblong cells, darker and thick-walled towards the periphery. *Conidiophores* lacking. *Conidiogenous cells* lining the whole inner surface of the conidiomata, holoblastic, annellidic, indeterminate, discrete, cylindrical, thin-walled, smooth, light brown, with a single percurrent proliferation, margin uneven, fimbriate. *Conidia* solitary, clavate, obclavate, broad ellipsoid, smooth, with transverse and oblique to vertical septa, constricted at transverse septa, light brown, transparent.

Type species: *Jaczewskiella altajensis* Murashk. [**Russia**, Altai, valley of the river Dzhelo, 2200 m alt, on dead branches of *Comarum salessowianum*, 19 July 1925, S. Antonov (**holotype** LEP)].

Description and illustration: Shkarupa (1992).

Notes: *Jaczewskiella* is a coelomycetous genus that was considered a synonym of *Stigmina* by Sutton (1977). Shkarupa (1992) and Braun & Mel'nik (1996) considered *Jaczewskiella* to be an independent genus based on cupulate conidiomata and brown phragmo- to dictyoconidia. This genus is insufficiently known, and will have to be recollected and sequenced in order to determine it's true status.

Fig. 59. *Laocoön paradoxus* (IMI 375866). **A–D.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B–D.** Conidiophores, conidiogenous cells and conidia. Scale bars = 10 µm.

Janetia M.B. Ellis, More Dematiaceous Hyphomycetes (Kew): 33. 1976.

Description (from Ellis 1976): *Colonies* effuse, thin, dark blackish brown. *Mycelium* superficial composed of a network of branched and anastomosing septate, olivaceous or dark brown, smooth hyphae. *Stroma* none; *setae* and *hyphopodia* absent. Conidiophores micronematous, mononematous. *Conidiogenous cells* integrated, mostly intercalary, polyblastic, denticulate; denticles large, flat-topped. *Conidia* solitary, dry, obclavate, multiseptate, brown, smooth.

Type species: *Janetia euphorbiae* M.B. Ellis [**Tanzania**, Ukiriguru Hill, on *Euphorbia tirucalli*, 13 Nov. 1972, D.L. Ebbels (**holotype** IMI 163941)].

Description and illustration: Ellis (1976), Seifert *et al.* (2011).

Notes: The genus *Janetia* is characterised by the production of polyblastic, pigmented and denticulate conidiogenous cells that give rise to phragmosporous, disto- or eu-septate conidia. The LSU sequences of two recently described species, *Janetia wilsonii* and *Janetia dimorphandrae-mollis*, place the genus in the *Mycosphaerellaceae*, in close association with species of the *Zasmidium* complex (Da Silva *et al.* 2016). However, until sequences from the type species *Janetia euphorbia* are obtained, the phylogenetic placement of this genus in the *Mycosphaerelaceae* is only tentative.

Jahniella Petr., Ann Mycol. 18(4/6): 123. 1921. 1920.

Description (from Quaedvlieg *et al.* 2013, adapted from Sutton 1980): *Mycelium* branched, immersed, septate, brown. *Conidiomata* pycnidial, superficial on epidermis, immersed, separate, globose, papillate, dark brown, thick-walled, sclerenchymatic; wall consisting of an outer layer of dark brown, thick-walled *textura angularis*, a middle layer of 8 cells thick, of hyaline to pale brown, thickwalled cells, and an inner layer of thin-walled, hyaline, irregular cells. *Ostiole* single, circular, with a distinct channel and hyaline periphysoid cells. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous* cells holoblastic, determinate, discrete, hyaline, ampulliform, lining the wall of the pycnidium. *Conidia* straight or slightly curved, hyaline, thin-walled, smooth, 3–4-euseptate, eguttulate, truncate at the base, slightly tapered to the apex.

Type species: *Jahniella bohemica* Petr., [**Czech Republic**, Bohemia, on stems of S*crophularia nodosa*, 18 Mar. 1916, J. Jahn (**isotype** K(M) 180917 (slides) ex BPI).

Description and illustration: Quaedvlieg *et al.* (2013).

Notes: The type species needs to be recollected in order to determine the phylogenetic position of the genus. See Quaedvlieg *et al.* (2013).

Laocoön J.C. David, Mycol. Pap. 172: 116. 1997.

Description (from David 1997): Hyphomycetous, phytopathogenic. *Mycelium* superficial, hyphae creeping, septate, branched, pigmented, smooth. *Conidiophores* arising from creeping hyphae, macronematous, mononematous, simple, rarely branched, straight to flexuous, septate, densely verruculose, not spirally twisted. *Conidiogenous cells* integrated, terminal, multilocal, sympodial; conidiogenous loci broad, aggregated, cercospora-like, thickened and darkened, flattened with a rough surface, raised at the edge and with a conspicuous central dome. *Conidia* solitary, consisting of only one filament, transversely euseptate, pustulate, not proliferating, thin-walled, pigmented; conidial secession schizolytic.

Type species: *Laocoön paradoxus* (Syd. & P. Syd.) J.C. David (≡ *Heterosporium paradoxum* Syd. & P. Syd.).

Descriptions and illustrations: David (1997), Braun (1998), Seifert *et al.* (2011); present work (Fig. 59).

Materials examined: **Colombia**, Antioquia, Guaca, on *Calea glomerata*, 12 Sep. 1910, E. Mayor 346 (**holotype** S F40564, isotype IMI 375866).

Note: *Laocoön* is a hyphomycetous genus that includes a single species thus far only known from the type locality (Seifert *et al.* 2011). Sequence data are necessary to determine its phylogenetic position.

Lecanosticta Syd.

Notes: See treatment in text.

Lecanostictopsis B. Sutton & Crous, Mycol. Res. 101: 215. 1997.

Description (from Sutton & Crous 1997): *Mycelium* immersed, intercellular, branched, septate, dark to reddish brown. *Conidiomata* epidermal to subepidermal, erumpent, eustromatic, acervular to sporodochial, composed of thick-walled, dark to reddish brown *textura angularis. Conidiophores* dark to reddish brown, coarsely verrucose, cylindrical, unbranched, septate, formed from the upper cells of the conidiomata. *Conidiogenous cells* integrated, dark to reddish brown, coarsely verrucose to tuberculate, cylindrical, with several percurrent enteroblastic proliferations. *Conidia* holoblastic, dark to reddish brown, coarsely verrucose to tuberculate, with 0- to several eusepta, straight to curved, obtuse or acute at apex, truncate at base, cylindrical to fusiform. *Conidiogenesis*: a succession of conidia is formed by holoblastic conidial ontogeny, delimitation by a transverse septum, schizolytic secession, replacement wall building apex leading to enteroblastic percurrent conidiogenous cell proliferation followed by holoblastic conidial ontogeny, with successive conidia seceding at progressively higher levels.

Type species: *Lecanostictopsis kamatii* (Ullasa) B. Sutton & Crous (≡ *Stigmina kamatii* Ullasa) [**India**, Mysore State, Bettigeri, on leaves of *Syzygium aromaticum* (**type** IMI 147817)].

Descriptions and illustrations: Sutton & Crous (1997), Seifert *et al.* (2011).

Notes: All attempts to culture species of *Lecanostictopsis* have thus far proven unsuccessful, even from freshly collected material, therefore its phylogenetic position remains unknown. The taxonomic history of this genus is detailed by Sutton & Crous (1997).

Lembosiopsis Theiss., Ann. Mycol. 15: 422. 1918.

Description (from Hongsanan *et al.* 2014): *Ascomata* solitary to clustered, subcuticular, circular, slightly irregular from above, black, shiny, with a central rounded ostiole. *Hamathecium* lacking pseudoparaphyses. *Asci* 8-spored, bitunicate, obclavate, tapering towards the apex, apedicellate or with short pedicel, apically rounded with a small ocular chamber. *Ascospores* 2–3-seriate in the ascus, narrowly ovoid, tapering from the apex to the base, 1-septate slightly above the centre, slightly constricted at the septum, hyaline, surrounded by thin gelatinous sheath, smooth-walled.

Type species: *Lembosiopsis andromedae* (Tracy & Earle) Theiss. (= *Lembosia andromedae* Tracy & Earle) [**USA**, Mississippi, Biloxi, on leaves of *Andromeda nitida*, 26 May 1895, S.M. Tracy and F.S Earle 4005 (**holotype** BPI 647155]

Description and illustration: Hongsanan *et al.* (2014).

Notes: Based on the literature, Lumbsch & Huhndorf (2010) place *Lembosiopsis* in *Asterinaceae*, but in a recent review of *Asterinales* Hongsanan *et al.* (2014) transferred the genus to the *Mycosphaerellaceae* based on morphological characters (subcuticular ascomata with a rounded central ostiole, without pseudoparaphyses, and procuding obclavate asci). The phylogenetic placement of this genus is uncertain as DNA sequence data are not available.

Lophiosphaerella Hara, Byogaichu-Hoten (Manual of Pests and Diseases): 778. 1948.

Description (from Li *et al.* 2014): Parasitic on terrestrial plants, forming conspicuous small, rounded, pale grey leaf spots on both sides of the leaf. *Ascomata* solitary, scattered, gregarious or confluent, globose or subglobose, semi-immersed or immersed, ostiolate. *Ostiole* centrally located. *Peridium* composed of brown to black, thick-walled cells arranged as *textura angularis*. *Pseudoparaphyses* absent. *Asci* 8-spored, bitunicate, fissitunicate, clavate, oblong or elongate, with an ocular chamber. *Ascospores* multi-seriate or crowded, irregularly arranged in the asci, oblong to fusiform or clavate, 1-septate, slightly constricted at the septum, hyaline, smooth-walled.

Type species: *Lophiosphaerella euryae* (Syd. & P. Syd.) Hara (≡ *Aulographum euryae* Syd. & P. Syd.) [**Japan**, Tokyo, on *Eurya chinensis*, Jun. 1899, M. Shirai (**syntypes** S F12246, S F171544)].

Description and illustration: Li *et al.* (2014).

Notes: *Lophiosphaerella* was considered *incertae sedis* by Lumbsch & Huhndorf (2010) but was transferred to *Mycosphaerellaceae* by Li *et al.* (2014) based on morphological characters. This genus is insufficiently known, and the type species needs to be recollected and subjected to molecular analysis.

Marcosia Syd. & P. Syd., Ann. Mycol.14: 96. 1916.

Type species: *Marcosia ulei* Syd. & P. Syd. [**Brazil**, Brazilia, on leaves of *Cynometra bauhiniifolia*] ≡ *Stigmina ulei* (Syd. & P. Syd.) B. Sutton.

Description: Sydow & Sydow (1916).

Notes: *Marcosia* is based on *Marcosia ulei* and is considered a synonym of *Stigmina ulei.* The genus *Stigmina* is currently considered a synonym of *Pseudocercospora* (Crous *et al.* 2013a). However, since no molecular data are available for this species, the current name remains in *Stigmina*.

Madagascaromyces U. Braun, C. Nakash., Videira & Crous

Note: See treatment in text.

Megaloseptoria Naumov, Bolêz. Rast. 14: 144. 1925.

Description (from Quaedvlieg *et al.* 2013, adapted from Sutton 1980): *Mycelium* immersed, branched, septate, brown. *Conidiomata* pycnidial, separate, globose, slightly papillate, dark brown to black, superficial, sessile, often aggregated in groups, unilocular, thick-walled; wall of several cell layers of brown *textura angularis*, more darkly pigmented on the outside. *Ostiole* single, circular. *Conidiophores* hyaline, branched, septate (mainly at the base), smooth, straight or irregular, formed from the inner cells of the pycnidial wall. *Conidiogenous cells* enteroblastic, determinate, discrete or integrated, doliiform, ampulliform or irregularly cylindrical, hyaline, smooth, collarette evident, channel wide, periclinal thickening present. *Conidia* hyaline to pale brown with several transverse eusepta, continuous, tapered near the obtuse apex and truncate base, thin-walled, smooth, cylindrical, straight or slightly curved, often with 2 guttules in each cell.

Type species: *Megaloseptoria mirabilis* Naumov [**Russia**, on *Picea pungens*].

Description and illustration: Quaedvlieg *et al.* (2013)

Notes: A specimen of *Megaloseptoria mirabilis* collected by Naomov in Russia was located in BPI (BPI 389179), but was not observed. See also Quaedvlieg *et al.* (2013).

Melanodothis R.H. Arnold, Canad. J. Bot. 49: 2188. 1972 (1971).

Description (adapted from Arnold 1971): *Ascostromata* arising from a hypostroma formed within the ovary and perigynum, black, subglobose, multilocular, wall composed of a *textura angularis* with pseudoparenchymatic cells. *Locules* in a single layer beneath the surface of the stroma, each with an ostiole. *Microconidial locules* are formed in the early stages of ascostromata. *Microconidia* (spermatia) narrowly oblong, hyaline, formed on short projections on the hyaline cells lining the microconidial cavity. *Asci* oblong to rarely oblong-pyriform, aparaphysate, sessile, 8 spored, arising from a basal cushion of pseudoparenchymatic cells. *Ascospores* hyaline, one celled, thick-walled, narrowly ellipsoidal, with ends sometimes narrowly and abruptly tapered. *Conidiophores* indeterminate. *Conidiogenous* cells holoblastic. *Macroconidia* ramularia-like, hyaline, smooth, catenulate, branched or unbranched, cylindrical, aseptate or 1 septate, with a disc-like hilum at each end. *Blastoconidia* formed singly at the apex of hyphae in the periphery of the colony or on the long cylindrical conidia as secondary conidia, one celled, hyaline, smooth, ovoid.

Type species: *Melanodothis caricis* R.H. Arnold [**Canada**, on flowers of *Carex aquatilis* var. *dives* (= *C. sitchensis*), (**holotype** DAOM 116433, ex-type culture CBS 860.72 = ATCC 24309)].

Description and illustration: Arnold (1971).

Notes: The ex-type culture of *Melanodothis caricis* clusters in *Cladosporiaceae*, suggesting that *Melanodothis* is an older name for *Davidiella*. However, the name presently being used for this genus is that of the asexual morph, *Cladosporium* (Bensch *et al.* 2012). Arnold (1971) reported the presence of an ascostroma with pseudothecial locules and this could be consistent with the variation observed in *Davidiella* (see Schubert *et al.* 2007). Furthermore, he also reported ramularia-like conidia, which could be *Cladosporium*, which at times mutates, and produces hyaline conidia with darkened hila only. Furthermore, the relation of this species to the North American *Ramularia caricis* U. Braun (Braun 1998) has to be proven.

Microcyclosporella Jana Frank, Schroers & Crous

Note: See treatment in text.

Microcyclus Sacc. *et al.*, Ann. Mycol. 2: 165. 1904.

Description (from Monkai *et al.* 2013): Biotrophic on leaves and stems. *Ascostromata* pulvinate, irregularly shaped, developing from central basal hypostroma, superficial, multilocular, composed of *textura angularis*, thick-walled, reddish brown. *Ostiole* papillate, periphysate. *Asci* 8-spored, thick-walled, bitunicate, fissitunicate, cylindrical to clavate, with an ocular chamber, with a long pedicel. *Ascospores* 1–3-seriate, 1-septate, obovoid, upper cell shorter and wider than lower, not or slightly constricted at the septum, smooth wall, granular, hyaline.

Type species: *Microcyclus angolensis* Sacc. *et al.* [**Angola**, on living leaves of *Millettia thonningii*, Welwitsch (**holotype** S F8592, isotype S F8593)].

Notes: Monkai *et al.* (2013) placed the genus in *Mycosphaerellaceae*, and even though molecular data are lacking, this assumption seems likely. The genus *Microcyclus* includes an important pathogen on *Hevea*, *Microcyclus ulei*, that was recently recollected and transferred to *Pseudocercospora* based on morphological and molecular data (Da Hora Júnior *et al.* 2014).

Micronectriella Höhn., Sitzungsber. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Cl., Abt. 1, 115: 1194. 1906.

Type species: *Micronectriella pterocarpi* (Racib.) Höhn. (≡ *Micronectria pterocarpi* Racib.) [**Indonesia**, Java, on leaves of *Pterocarpus indicus*] = ***Sphaerulina pterocarpi*** (Racib.) Arx & E. Müll.

Description and illustration: Von Arx & Müller (1975).

Notes: The genus *Sphaerulina* was recently shown to be distinct from others in the *Mycosphaerellaceae* (Quaedvlieg *et al.* 2013), but fresh collections are required to determine the phylogenetic position of *Micronectriella*. The type specimen could not be located.

Micronematomyces U. Braun, C. Nakash., Videira & Crous

Note: See treatment in text.

Miuraea Hara

Note: See treatment in text.

Mycodiella Crous

Note: See treatment in text.

Mycoporis Clem., The Genera of Fungi: 50, 173. 1909.

Description (from Thambugala *et al.* 2014): Parasitic on leaves. *Ascomata* appearing as black spots on the host surface, gregarious, scattered, superficial, very easily removed from the host surface, globose, uniloculate, ostiolate. *Peridium* one-layered, composed of dark to brown cells of *textura angularis*. *Haemathecium* lacking pseudoparaphyses. *Asci* eight-spored, bitunicate, broadly cylindrical to fusiform, sessile, with a large ocular chamber. *Ascospores* overlapping, uniseriate at the apex to tri-seriate near the base, hyaline, 5-septate, strongly constricted at the primary septum, broadly fusiform to cylindrical with broadly rounded ends.

Type species: *Mycoporis perexigua* (Müll. Arg.) Clem. (≡ *Mycoporellum perexiguum* Müll. Arg.) [**Australia**, Queensland, Brisbane, Bailey, on bark (**holotype** G 00110864)].

Description and illustration: Thambugala *et al.* (2014).

Notes: Thambugala *et al.* (2014) allocated the genus to *Mycosphaerellaceae* based on its ascomatal morphology. Since there are no available DNA sequences the phylogenetic position of *Mycoporis* remains unresolved.

Mycosphaerelloides Videira & Crous

Note: See treatment in text.

Mycovellosiella Rangel

Note: See treatment in text.

Neoceratosperma Crous & Cheew.

Note: See treatment in text.

Neocercospora M. Bakhshi, Arzanlou, Babai-ahari & Crous

Note: See treatment in text.

Neocercosporidium Videira & Crous

Note: See treatment in text.

Neodeightoniella Crous & W.J. Swart

Note: See treatment in text.

Neomycosphaerella Crous

Note: See treatment in text.

Neoovularia U. Braun, Nova Hedwigia 54: 473. 1992.

Description (from Videira *et al.* 2016, adapted from Braun 1998): Phytopathogenic, causing leaf spots. *Caespituli* amphigenous, whitish to pink or ochraceous. *Mycelium* consisting of hyaline to faintly pigmented, septate, branched, thin-walled hyphae forming well-developed stromata. *Conidiophores* arising from stromata, emerging through stomata or erumpent through the cuticle, often forming sporodochia, subcylindrical, subclavate, simple, thin-walled, smooth, hyaline or lightly pigmented, continuous or septate. *Conidiogenous cells* integrated, terminal, straight to moderately geniculate-sinuous, polyblastic and sympodial, conidiogenous loci numerous, conspicuous, bulging, papilla-like, but not thickened and darkened, at most slightly refractive. *Conidia* formed singly, subglobose, obovoid, ellipsoid, aseptate, hyaline to faintly pigmented, thin-walled, smooth to verruculose, basal *hilum* not thickened or darkened; conidial secession schizolytic.

Type species: *Neoovularia nomuriana* (Sacc.) U. Braun (≡ *Tuberculina nomuriana* Sacc.) [**Japan**, Kikotaro, on *Astragalus sinicus*, 1903, Nomura (**holotype** PAD)].

Descriptions and illustrations: Braun (1998), Videira *et al.* (2016).

Notes: The phylogenetic position of *Neoovularia* remains unresolved since no DNA from the type species is available. See treatment in Braun (1998) and Videira *et al.* (2016).

Neopenidiella Quaedvlieg & Crous

Note: See treatment in text.

Neophloeospora Videira & Crous

Note: See treatment in text.

Neopseudocercospora Crous

Note: See treatment in text.

Neopseudocercosporella Videira & Crous

Note: See treatment in text and Videira *et al.* (2016).

Neoramularia U. Braun, Nova Hedwigia 53: 291. 1991.

Description (from Videira *et al.* 2016, adapted from Braun 1998): Phytopathogenic, causing leaf spots. *Mycelium* consisting of hyaline or subhyaline, septate, branched, thin-walled hyphae forming stromata or not. *Conidiophores* macronematous, usually in large fascicles, sometimes forming sporodochial and basistromatic conidiomata, emerging through stomata or erumpent through the cuticle, straight, subcylindrical to geniculate-sinuous, simple, hyaline or faintly pigmented, continuous or septate, thin-walled, smooth or occasionally rough. *Conidiogenous cells* integrated, terminal, polyblastic, percurrent and sympodial, conidiogenous loci inconspicuous, not thickened or darkened. *Conidia* solitary or catenate, ellipsoid-ovoid, subcylindrical or fusoid, hyaline or slightly pigmented, aseptate to 3- septate, thin-walled, smooth or almost so, *hila* unthickened and hyaline, conidial secession schizolytic.

Type species: *Neoramularia eurotiae* (Gamalizk.) U. Braun (≡ *Ramularia eurotiae* Gamalizk.) [**Kyrgyzstan**, Central Tien-Shan, on *Krascheninnikovia ceratoides*, 5 Jun. 1958, Gamalitzkaya (**holotype** LE 41968] = ***Neoramularia kochiae*** (Woron.) U. Braun (Azerbeijan, on *Kochia* sp.).

Description and illustration: Braun (1991), Videira *et al.* (2016).

Notes: *Neoramularia* is ramularia-like but differs in having unthickened and not darkened conidiogenous loci and conidial hila, i.e. characteristic *Ramularia* loci and hila are lacking. Cultures from fresh specimens must be obtained in order to determine the phylogenetic position of this genus based on DNA sequences. See treatment in Videira *et al.* (2016).

Neoseptoria Quaedvlieg, Verkley & Crous

Note: See treatment in text.

Nothopassalora U. Braun, C. Nakash., Videira & Crous

Note: See treatment in text.

Nothopericoniella Videira & Crous

Note: See treatment in text.

Nothophaeocryptopus Videira, C. Nakash., U. Braun, Crous

Note: See treatment in text.

Oedothea Syd., Ann. Mycol. 28: 202. 1930.

Description (adapted from Sydow 1930): *Stromata* on leaf veins, forming small gall-like swellings, subepidermal, erumpent through longitudinal fissures, exposed surface dull black-brown, finely pulverulent to floccose by abundant superficial conidia, intramatrical stromata composed of brown hypertrophic cells of the host tissue, interrupted by small to larger cavities, and sparingly developed filamentous, hyaline hyphae. *Conidia* in small to larger aggregations, broad ovate, ellipsoid to subglobose, with a single median septum, barely constricted, dark brown but transparent.

Type species: *Oedothea vismiae* Syd.

Description and illustrations: Sydow (1930), Seifert *et al.* (2011); present study (Fig. 60).

Materials examined: **Venezuela**, Los Naranjos pr. Puerto la Cruz, on leaves of *Vismia hamanii*, 7 Jan. 1928, H. Sydow 183 (**holotype** S F42267).

Notes: The phylogenetic position of *Oedothea* is unknown and only its hyphomycetous asexual morph is known (Seifert *et al.* 2011). Sequence data are necessary to determine its phylogenetic position.

Ophiocarpella Theiss. & Syd., Ann. Mycol. 13: 644. 1915.

Description (adapted from Theiss & Sydow 1915): Like *Montagnella*, but paraphyses lacking, ascospores colourless, filiform, septate. *Stromata* hypophyllous, black, irregular, with dense protuberant loculi, half immersed in the host tissue, connected by vertical hyphal strands, apex free, protuberant through the epidermis. *Hyphae* greyish brown, with swollen cells, several layers around the loculi forming a kind of wall, dense between loculi, sparingly developed below, loculi globose, non-ostiolate. *Asci* fasciculate, paraphyses lacking, 8-spored. *Ascospores* polystichous, colourless, filiform, with a distinct median septum, possibly with several septa when mature.

Type species: *Ophiocarpella tarda* (Harkn.) Theiss. & Syd. (≡ *Ophiodothis tarda* Harkn.) (**USA**, California, San Francisco, on fruit of *Rhus diversiloba*, H.W. Harkness (**holotype** BPI 798419)]) ≡ *Sphaerulina tarda* (Harkn.) M.E. Barr.

Description (*no illustration*): Theissen & Sydow (1915).

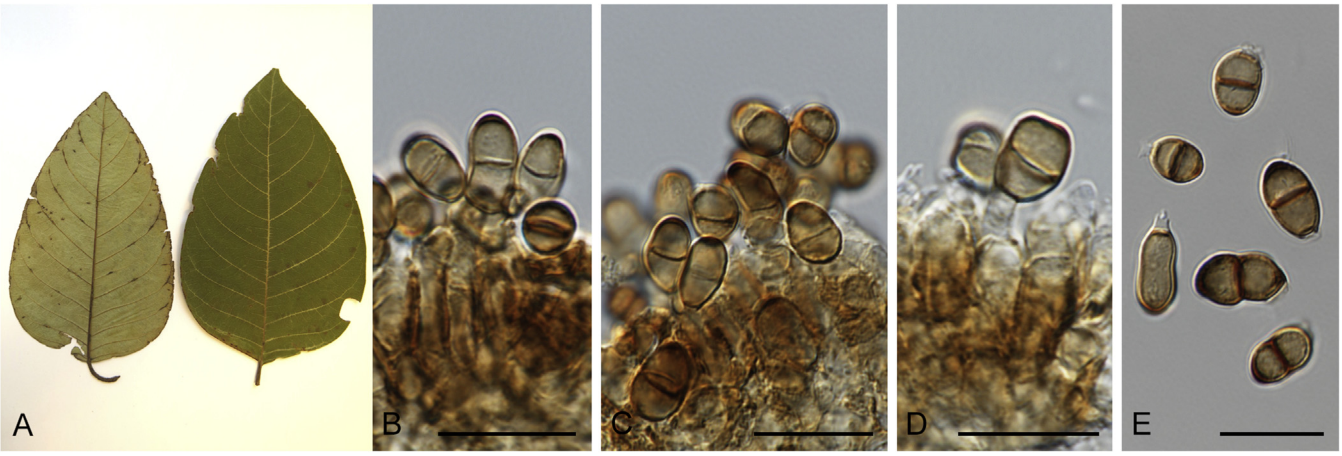


Fig. 60. *Oedothea vismiae* (NY 00945740). **A–E.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B–D.** Conidiophores and conidia. **E.** Conidia. Scale bars = 10 µm.

Notes: Based on morphology, *Ophiocarpella* was considered as a synonym of *Sphaerulina*. Fresh collections are required to determine the phylogenetic position of *Ophiocarpella tarda.*

Ophiocladium Cavara, Z. Pflanzenkrankh. 3: 26. 1893.

Type species: *Ophiocladium hordei* Cavara [Cavara, Z. Pflanzenkrankh. 3: Plate (Tab.) I, Fig. 9, 1893 (**lectotype** designated by Braun 2017)] [**Austria**, Reichersberg am Inn, on *Hordeum vulgare* (**epitype** designated by Braun 2017, CBS H-22641, culture ex-epitype CBS 101180)] ≡ ***Ramularia collo-cygni*** B. Sutton & J.M. Waller.

Description and illustration: See Braun (1998, as *Ramularia collo-cygni*).

Notes: See treatment in Videira *et al.* (2016) as *Ramularia collo-cygni*. The typification of the type species has recently been clarified by Braun (2017).

Oreophylla Cif., Sydowia 8: 253. 1954.

Description (adapted from Ciferi 1954): Biotrophic. *Mycelium* internal, superficial hyphae lacking. *Conidiophores* in fascicles, arising from an immersed pseudostromatic base, erect, brown, unbranched, straight to tortuose, septate. *Conidia* solitary, acrogenous, cylindrical-attenuated, transversely pluriseptate, straight to curved, hyaline.

Type species: *Oreophylla angelae-mariae* Cif. (as '*angelaemariae*') [**Dominican Republic**, Hato del Yaque, on leaves of *Gliricidia sepium*] = *Passalora gliricidiasis* (Gonz. Frag. & Cif.) R.F. Castañeda & U. Braun.

Descriptions and illustrations: Ciferri (1954), Ellis (1976, as *Cercosporidium gliricidiasis*).

Notes: Deighton (in Ellis 1976) considered *Oreophylla angelae-mariae* a synonym of *Sirosporium gliricidiae* (Syd.) Deighton (≡ *Passalora gliricidiae* (Syd.) U. Braun & Crous), but Braun *et al.* (1999) stated that this species has to be reduced to synonymy with *Passalora gliricidiasis*. *Oreophylla* was treated as synonym of *Passalora s. lat.* by Crous & Braun (2003), but as DNA of *Passalora gliricidiasis* (= *Oreophylla angelae-mariae*) is not available , the phylogenetic position of *Oreophylla* remains unresolved.

Ormathodium Syd., Ann. Mycol. 26: 138. 1928.

Description (adapted from Sydow 1928): *Leaf spots* lacking. *Caespituli* hypophyllous, regularly spread, loose to dense, mostly on tips of stellate hairs, rarely on the epidermis. *Conidiomata* superficial, 30–130 µm diam, globose to hemispherical, more rarely irregular, with a basal dense plectenchymatous stroma composed of yellow to olivaceous brown hyphae, equipped with short protuberant free ends [conidiophores] giving rise to simple or dichotomously branched conidial chains. *Conidia* oblong, often almost cylindrical, more rarely fusiform, olivaceous brown, transversely 1–2-septate, not or only slightly constricted at the septa.

Type species: *Ormathodium styracis* Syd. [**Costa Rica**, San José, Rio Torres, on leaves of *Styrax argenteus*].

Description (no illustration): Sydow (1928).

Notes: The genus *Ormathodium* was considered a synonym of *Mycovellosiella* by Muntañola (1960), and subsequently placed in synonymy of *Passalora* by Crous & Braun (2003). Unfortunatelly, the type material of this genus has not been preserved (Crous & Braun 2003), and this synonymy remains unconfirmed.

Ovosphaerella Laib., Centralbl. Bakteriol., 2. Abth., 55: 293. 1922.

Description (based on Laibach 1922): Introduced for a mycosphaerella-like sexual morph with an *Ovularia* asexual morph.

Type species: *Ovosphaerella lapathi* Laib. [**Germany**, on *Rumex* sp.) ≡ ***Mycosphaerella lapathi*** (Laib.) Petr.

Description: Von Arx (1983, as *Mycosphaerella lapathi*).

Notes: Laibach (1922) introduced *Ovosphaerella* as genus for the mycosphaerella-like sexual stage of *Ovularia obliqua* (current name *Ramularia rubella*, see Braun 1998). *Ramularia obovata*, another synonym of *Ramularia rubella*, was linked to *Mycosphaerella lapathi* by von Arx (1983). The type material of *Ovosphaerella lapathi* is probably missing (Aptroot 2006). Fresh collections are required to confirm this relationship, and clarify the phylogenetic position of *Ovosphaerella*. In case that the connection between these sexual and asexual morphs on *Rumex* were correct, *Ovosphaerella* would be a synonym of *Ramularia*.

Ovularia Sacc., Michelia 2(no. 6): 17. 1880.

Type species: *Ovularia obovata* (Fuckel) Sacc. (≡ *Ramularia obovata* Fuckel) [**Germany**, Erbach, on *Rumex crispus*, Fuckel, Fungi Rhen. Exs. 1635 (**lectotype** HAL)] = ***Ramularia rubella*** (Bonord.) Nannf.

Description: Braun (1998, as *Ramularia rubella*).

Note: See Videira *et al.* (2016) for neotypification details of *Ramularia rubella*.

Pachyramichloridium Videira & Crous

Note: See treatment in text.

Pallidocercospora Crous

Note: See treatment in text.

Pantospora Cif.

Note: See treatment in text.

Paracercospora Deighton

Note: See treatment in text.

Paracercosporidium Videira & Crous

Note: See treatment in text.

Paramycosphaerella Crous & Jol. Roux

Note: See treatment in text.

Paramycovellosiella Videira, H.D. Shin & Crous

Note: See treatment in text.

Parapallidocercospora Videira, Crous, U. Braun, C. Nakash.

Note: See treatment in text.

Parastenella J.C. David, Mycol. Res. 95: 124. 1991.

Description (from Braun *et al.* 2013): Dematiaceous hyphomycete genus resembling *Zasmidium* (*in vivo* with superficial mycelium, hyphae, conidiophores and solitary conidia pigmented, distinctly verruculose to verrucose), but the conidiogenous cells are terminal and intercalary, denticulate, with lateral short peglike protuberances, conidiogenous loci inconspicuous, neither thickened nor darkened.

Type species: *Parastenella magnoliae* (Weedon) J.C. David (≡ *Heterosporium magnolia* Weedon) [**USA**, Florida, St. Petersburg, on leaves of *Magnolia grandiflora*, 15 Feb. 1923, A.J. Weedon (**holotype** ILL 6019, isotypes BPI 443255, 443261, 443270, 443274, K(M), MICH 15715)].

Illustration: Braun *et al.* (1995).

Notes: The phylogenetic position of this genus is unknown; it should be recollected to resolve this uncertainty. See also notes under *Zasmidium gupoyu* in text.

Passalora Fr.

Note: See treatment in text.

Periconia Tode, Fung mecklenb. sel. (Lüneburg) 2: 2. 1791.

Description (adapted from Ellis 1971): *Colonies* effuse, occasionally small and compact, grey, brown, olivaceous brown or black, hairy. *Mycelium* mostly immersed but sometimes partly superficial. *Stroma* frequently present, mid to dark brown, pseudoparenchymatous. *Setae* and *hyphopodia* absent. *Conidiophores* micro- and macronematous, mononematous, with a stipe and spherical head, branches present or absent, stipe straight or flexuous, rarely torsive, pale to dark brown or black, smooth or rarely verrucose, apex sometimes sterile and setiform. *Conidiogenous* cells mono- or polyblastic, discrete on stipe and branches, determinate, ellipsoidal, spherical or subspherical. *Conidia* catenate, often in branched chains, usually spherical or subspherical, occasionally ellipsoidal, oblong or broadly cylindrical, pale to dark brown, verruculose or echinulate, aseptate.

Type species: *Periconia lichenoides* Tode.

Descriptions and illustrations: Mason & Ellis (1953), Ellis (1971), Seifert *et al.* (2011).

Notes: *Periconia* is currently the type genus of the *Periconiaceae* (Tanaka *et al.* 2015). The type species is not known from any recent collections and the original material is presumably lost (Ellis 1971, Tanaka *et al.* 2015). The type species needs to be recollected to determine the phylogenetic position.

Periconiella Sacc.

Note: See treatment in text.

Phacellium Bonord.

Note: See treatment in text.

Phaeocercospora Crous

Note: See treatment in text.

Phaeoisariopsis Ferraris, Ann. Mycol. 7: 280. 1909.

Type species: *Phaeoisariopsis griseola* (Sacc.) Ferraris (≡ *Isariopsis griseola* Sacc.) [**Italy**, Selva, on *Phaseolus vulgaris*, Aug. 1877, Saccardo, Mycotheca Veneta 1247 (**lectotype** designated here, HAL, MBT378593] ≡ ***Pseudocercospora griseola*** (Sacc.) Crous & U. Braun [**Tanzania**, on *Phaseolus vulgaris*, F.S. Ngulu & C. Mushi (**epitype** designated here CBS H-19683, MBT378594, culture ex-epitype CBS 119906 = CPC 10468)].

Description and illustration: Crous *et al.* (2006a), Seifert *et al.* (2011).

Notes: The present genus has been determined as a synonym of *Pseudocercospora* by the phylogenetic placement of the type species *Phaeoisariopsis griseola* (Crous *et al.* 2006a). The epitype designated by Crous *et al.* (2006a) did not cite a lectotype, and thus this matter is addressed here.

Phaeophleospora Rangel

Note: See treatment in text.

Phaeophloeosporella Crous & B. Sutton, S. Afr. J. Bot. 63: 281. 1997.

Description (from Crous & Sutton 1997): Associatted with leaf spots. *Mycelium* immersed, consisting of smooth, hyaline to olivaceous, branched, septate hyphae. *Conidiomata* amphigenous, separate, palle yellow to light brown, acervular, subepidermal, base consisting of olivaceous cells of *textura angularis*. *Conidiophores* pale olivaceous, smooth, simple or branched at the base, septate, cylindrical, erect, formed from the upper cells of the conidioma. *Conidiogenous cells* integrated, terminal, smooth, pale olivaceous, cylindrical, straight to geniculate-sinuous with a subtruncate apex, proliferating sympodially and holoblastically. *Conidia* holoblastic, pale olivaceous, smooth, subcylindrical, straight to gently curved, obtuse at apex, and subtruncate at base, guttulate, euseptate, with inconspicuous hila.

Type species: *Phaeophloeosporella ekebergiae* (Syd. & P. Syd.) Crous & B. Sutton (≡ *Cercosporella ekebergiae* Syd. & P. Syd.) [**South Africa**, KwaZulu-Natal, Verulam, on leaves of *Ekebergia* sp., 1913, J.B. Pole Evans 6799 (**holotype** S F37999)].

Description and illustration: Crous & Sutton (1997).

Note: This species needs to be recollected to resolve its phylogenetic position.

Phaeoramularia Munt.-Cvetk.

Note: See treatment in text.

Pharcidia Körb., Parerga lichenol. (Breslau) 5: 469. 1865.

Type species: *Pharcidia congesta* Körb. [**Europe**, on thallus of *Lecanora subfusca*, (**holotype** in L, fide Santesson (1960)] ≡ ***Stigmidium congestum*** (Koerb.) Triebel.

Note: See Triebel *et al.* (1991).

Phloeospora Wallr.

Note: See treatment in text.

Phlyctaeniella Petr., Ann. Mycol. 20(5/6): 323. 1922.

Description (from Quaedvlieg *et al.* 2013): *Mycelium* immersed, branched, septate, hyaline. *Conidiomata* eustromatic, separate, immersed, pale brown, globose, unilocular, scarcely erumpent; side wall and base of several cell layers of hyaline, thin-walled *textura angularis*, above of larger pale brown tissue. *Ostiole* indistinct, and dehiscence by rupture of the upper wall. *Conidiophores* hyaline, smooth, septate, irregularly branched, especially at the base, formed from the inner cells of the stroma wall. *Conidiogenous cells* phialidic, integrated or discrete, determinate, hyaline, markedly tapered at the apices, smooth, with apical or lateral apertures, collarette minute, with periclinal thickening; only rarely becoming percurrent. *Conidia* hyaline, smooth, thinwalled, irregularly guttulate, filiform, straight, curved or irregular, multiseptate (Sutton 1980).

Type species: *Phlyctaeniella polonica* Petr. [**Austria**, on *Aruncus dioicus* (= *A. silvestris*)].

Description and illustration: Quaedvlieg *et al.* (2013).

Notes: The type specimen of the present species could not be traced. The phylogenetic position of this genus remains unresolved until fresh specimens are collected.

Placocrea Syd., Ann. Mycol. 37: 380. 1939.

Description (from Sydow 1939): *Ascomata* aggregated in stroma, immersed, globose to ovoid, with papillate ostiole. *Asci* clavate to cylindrical-clavate, 8-spored. *Ascospores* biseriate, oblong-clavate to fusoid, medianly 1-septate, constricted at septum, hyaline, pseudoparaphyses present.

Type species: *Placocrea pulchella* Syd. [**Equador**, Prov. Pichincha, Mindo, on leaves of *Sarcorhachis sydowii*, 1937, H. Sydow 252 and 284 (syntypes, NY 01102921, NY 01102922, RMS0017369, S F44505; S F44506; BPI 631051 and Syd., Fungi Exot. Exs. 1200, e.g. S F8589].

Notes: This genus is insufficiently known, and needs to be recollected to resolve its phylogenetic position. Lumbsch & Huhndorf (2010) tentatively place this genus in *Mycosphaerellaceae* based on its morphological characters.

Pleopassalora Videira & Crous

Note: See treatment in text.

Pleuropassalora U. Braun, C. Nakash., Videira & Crous

Note: See treatment in text.

Pleurovularia R. Kirschner & U. Braun, Mycoscience 43: 16. 2002.

Description (from Kirschner *et al.* 2002): Phytoparasitic, conidiophores macronematous, mononematous, hyaline, simple or sparsely branched, verruculose at least in the distal part, emerging mainly through the outer wall of epidermal cells of the host, conidiogenous cells intercalary and terminal with slightly thickened, pigmented scars, mono- or polyblastic, producing hyaline conidia with vacuole.

Type species: *Pleurovularia polliniae* (Henn.) R. Kirschner & U. Braun (≡ *Ovularia polliniae* Henn.).

Description and illustration: Kirschner *et al.* (2002), Seifert *et al.* (2011), present study (Fig. 61).

Materials examined: **Japan**, Prov. Tosa, Katakasa-mura, on *Pollinia imberbis*, Jun. 1901, T. Yoshinaga No. 25 (**holotype** S F43065).

Notes: The phylogenetic position of *Pleurovularia* is unknown and only the hyphomycetous asexual morph is known. It is necessary to recollect the type species and obtain cultures to determine the phylogenetic position of *Pleurovularia*.

Pluripassalora Videira & Crous

Note: See treatment in text.

Polyphialoseptoria Quaedvlieg, R.W. Barreto, Verkley & Crous

Note: See treatment in text.

Polysporella Woron., Izv. Kavkazsk. Muz. 10: 7. 1916.

Description: *Ascomata* pseudothecial, scattered, immersed, later erumpent through the epidermis, flattened, 120–150 µm diam, 75–90 µm high, parenchyma composed of polygonal cells, 12–15 µm diam. *Asci* oval, apex thickened, sessile, 60–67 × 30–32 µm, aparaphysate, 24–27(–32?)-spored. *Ascospores* 1-celled, at first hyaline, late slightly brown, oblong-ovate, aggregated, 20–22 × 7–8 µm.

Type species: *Polysporella woronowii* Woron. [**Turkey** (locality historically situated in Russia), eastern Anatolia, Province Kars, Kağızman (‘district Kaghyzman, Novo-Nikolaevka’), on stems of *Dianthus crinitus*, 7 Jun. 1913, G. Woronow (**type** TBIP)].

Description and illustration: Woronichin (1916: 7, fig. 3).

Notes: This genus is insufficiently known, and needs to be recollected to resolve its phylogenetic position. The allocation of *Polysporella* to *Mycosphaerelaceae* dates back to Lumbsch & Huhndorf (2007: 79, no 4542), with reference to ‘O. Eriksson, in litt.’ However, the position of this genus and its assignment to

Fig. 61. *Pleurovularia polliniae* (S F43065). **A–E.** Observations *in vivo.* **A.** Leaf spot symptoms on the host. **B.** Conidiophores, conidiogenous cells and conidium. **C, D.** Conidiophores and conidiogenous cells. **E.** Conidia. Scale bars = 10 µm.

Mycosphaerelaceae are quite unclear and unproven, which was also confirmed by T. Lumbsch and O. Eriksson (pers. comm.). The locality of the holotype was historically located in the Russian Province Kars (Karsskaya Oblast), district Kagizman (Kaghyzman), which nowadays belongs to Turkey (southeast Anatolia, Province Kars, Kağızman). The continued existence and possible current Turkish name of the settlement 'Novo-Nikolaevka' could not be clarified.

Polythrincium Kunze, in Kunze & Schmidt, Mykologische Hefte (Leipzig) 1: 13. 1817.
Synonym: *Cymadothea* F.A. Wolf, Mycologia 27: 71. 1935.

Description (from Ellis 1971): Colonies punctiform or effuse, olivaceous brown. *Mycelium* immersed. *Stroma* pseudoparenchymatous, brown to black. *Setae* and *hyphopodia* absent. *Conidiophores* macronematous, mononematous, caespitose, unbranched or with several branches arising at one point, the upper part curved and often thickened on the side away from the curvature, undulate, often torsive, mid pale brown, smooth. *Conidiogenous cells* polyblastic, integrated, terminal, sympodial, cylindrical, undulate, cicatrized; scars large, flat, unilateral. *Conidia* solitary, acropleurogenous, simple, cuneiform or pyriform, hyaline to pale brown, smooth or verruculose, 1-septate.

Type species: *Polythrincium trifolii* Kunze [**Germany**, on leaves of *Trifolium pratense*].

Descriptions and illustrations: Sivanesan (1984), Ellis (1971), Simon *et al.* (2009).

Notes: This species is an obligate biotroph, and does not grow in culture. The phylogenetic link between the sexual morph, *Cymadothea trifolii*, and *Polythrincium trifolii* was confirmed by Simon *et al.* (2009). In addition, Simon *et al.* (2009) determined the phylogenetic position of the genus as belonging in *Mycosphaerellaceae* by extracting DNA directly from lesion caused by the pathogen on *Trifolium repens* collected in Germany (CBS H-20110).

Prathigada Subram., J. Madras Univ. 26: 366. 1956.

Type species: *Prathigada cratevae* (Syd.) Subram. (≡ *Napicladium cratevae* Syd.) ≡ ***Pseudocercospora cratevicola*** C. Nakash. & U. Braun.

Description and illustration: Braun *et al.* (2013), present study (Fig. 62).

Materials examined: **India**, Madras, Coimbatore, Government Farm, on *Crateva religiosa*, 5 Feb. 1912, W. McRae 9 (**holotype** S F42112); Calcuta, on *Crateva nurvala*, 30 May 1978, J.B. Ray PCC2700 Dep. Botany Presidency College (IMI 234117). Tutkon, on *Crateva religiosa*, 20 Nov. 1973, Mya Tharng (IMI 182578). **Japan**, on *Crataeva falcata*, 18 Sep. 1998, S. Uematsu & C. Nakashima, culture MUCC 1088.

Notes: Braun *et al.* (2013) examined type material of this species and compared it with conspecific Japanese collections on *Crateva formosensis*. The morphological characteristics are quite uniform among the observed specimens (Fig. 62). Sequences retrieved from Japanese cultures (MUCC 1088, Table 1, Fig. 1) clusted within the big *Pseudocercospora* clade close to *Pseudocercospora fijiensis*. Thus, *Prathigada* was reduced to synonymy with *Pseudocercospora* (Braun *et al.* 2013).

Protostegia Cooke, Grevillea 9(49): 19. 1880.

Description (from Crous *et al.* 2015a): *Conidiomata* immersed, becoming somewhat erumpent, solitary, exuding a mucoid conidial cirrhus, pale brown, splitting the leaf surface, with central ostiole; wall of brown *textura intricata*. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* hyaline, smooth, lining the inner cavity, lageniform to subcylindrical, proliferating percurrently at apex. *Conidia* hyaline, smooth, scolecosporous, euseptate.

Type species: *Protostegia eucleae* Kalchbr. & Cooke [**South Africa**, on *Euclea undulata*, (**epitype** designated by Crous *et al.* 2015a: PREM 60879, culture ex-epitype CPC 23549 = CBS 137232)].

Description and illustration: Crous *et al.* (2015a).

Notes: *Protostegia* is a coelomycetous genus only known from its asexual morph and was recently epitypified (Crous *et al.* 2015a). Based on the epitype, the phylogenetic position of this genus is close to *Cytostagonospora martiniana* (Crous *et al.* 2015a).

Pseudocercospora Speg.

Note: See treatment in text.

Pseudocercosporella Deighton

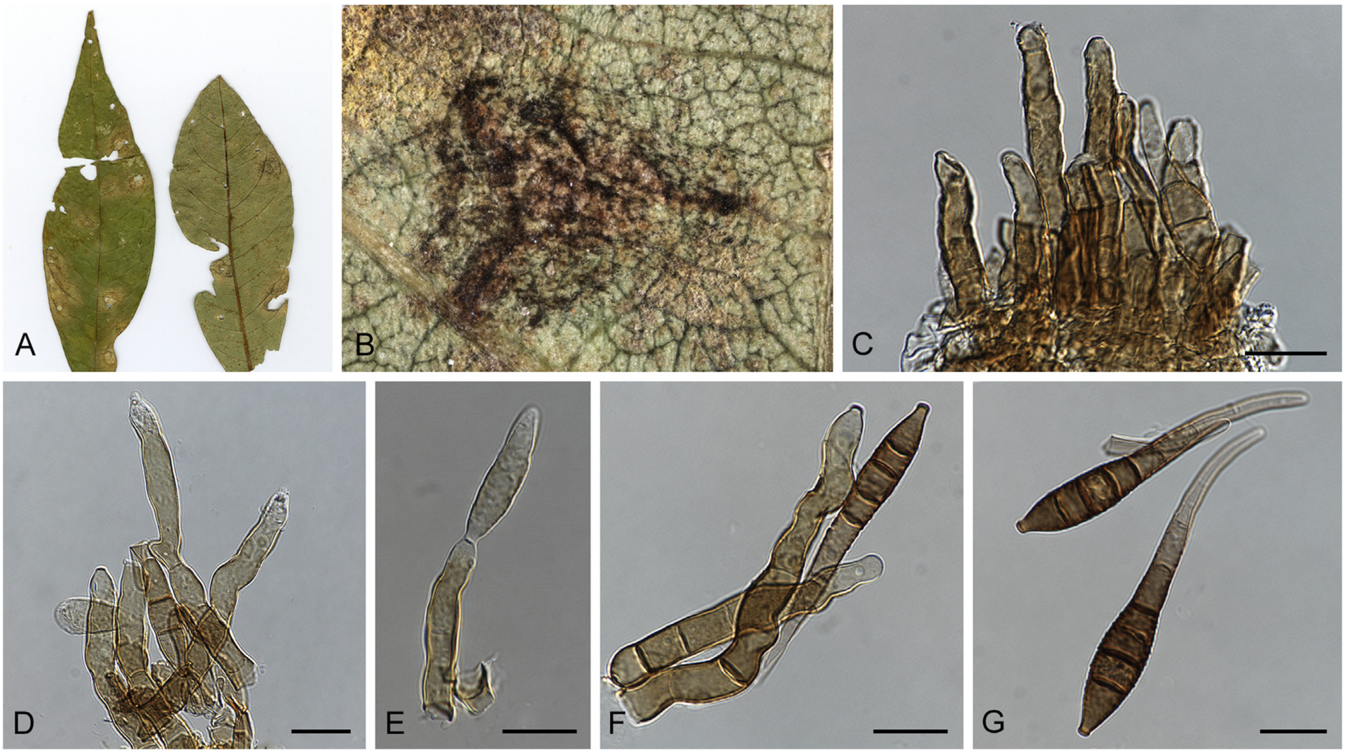


Fig. 62. *Prathigada crataevae* (IMI 234117 and IMI 182578). **A–G.** Observations *in vivo*. **A, B.** Leaf spot symptoms on the host. **C, D, F.** Conidiophores, conidiogenous cells and conidia. **E.** Conidiogenous cell and conidium. **G.** Conidia. Scale bars = 10 µm.

Note: See treatment in text.

Pseudocercosporidium Deighton

Description (from Braun *et al.* 2013): Foliicolous, plant pathogenic, leaf spotting hyphomycetes, teleomorph unknown. *Mycelium* internal. *Stromata* lacking. *Conidiophores in vivo* solitary or in small loose fascicles (groups) emerging through stomata, laxly erect, macronematous, frequently branched, septate, pigmented (very pale brown), thin-walled, smooth; *conidiogenous cells* integrated, terminal, intercalary or pleurogenous (as lateral branchlets), sympodial, polyblastic, conidiogenous loci conspicuous, protruding, convex (papilla-like), but wall of the loci neither thickened nor darkened, only somewhat refractive. *Conidia* solitary, didymo- to scolecosporous, pigmented (deeper in pigmentation than the conidiophores), thin-walled, smooth or almost so, hila neither thickened nor darkened.

Type species: *Pseudocercosporidium venezuelanum* (Syd.) Deighton.

Description and illustration: Ellis (1971), Crous & Braun (2003), Seifert *et al.* (2011), Braun *et al.* (2013), present study (Fig. 63).

Material examined: **Venezuela**, Aragua, between La Victoria and Guacamaya, on *Cordia heterophylla*, 3 Jan. 1928, H. Sydow No. 381 (**holotype** S F38692).

Notes: The phylogenetic position of *Pseudocercosporidium venezuelanum* is unknown due to the absence of DNA sequence data. Morphologically, *Pseudocercosporidium* resembles *Passalora*, but differs in the structure of the conidiogenous loci that are not thickened or darkened (Braun 2013).

Pseudodidymaria U. Braun, Cryptog. Bot. 4: 110. 1993.

Description (from Videira *et al.* 2016, adapted from Braun 1998): Phytopathogenic, causing leaf spots. *Mycelium* consisting of hyaline or faintly pigmented, septate, thin-walled and branched hyphae, forming well developed stromata. *Conidiomata* basistromatic and sporodochial. *Conidiophores* arranged in palisade-like fascicles, subcylindrical, subclavate, straight to flexuous, sinuous, rarely septate, hyaline to faintly pigmented, thin-walled, smooth, sometimes reduced to conidiogenous cells. *Conidiogenous cells* integrated, terminal, polyblastic, sympodial, conidiogenous loci bulging, unthickened or with a thickened rim, not darkened but refractive. *Conidia* formed singly, ellipsoid-obovoid, subclavate, aseptate to 2-septate, base rounded to broadly truncate, hyaline to faintly pigmented, thin-walled, smooth to verruculose, hilum unthickened, not darkened but refractive, conidial secession schizolytic.

Type species: *Pseudodidymaria wyethiae* (Ellis & Everh.) U. Braun (≡ *Marssonina wyethiae* Ellis & Everh.) [**USA**, California, Sonoma, on *Wyethia glabra*, 25 May 1894, Blasdale (**lectotype** NY 01087025; isolectotypes Ellis & Everh., Fungi Columb. 589 and Ellis & Everh., N. Amer. Fungi 3184)].

Descriptions and illustrations: Braun (1998), Videira *et al.* (2016).

Notes: *Pseudodidymaria* is tentatively maintained as a separate genus. Molecular data are required to fully resolve its phylogenetic position.

Pseudophaeoramularia U. Braun, Trudy Bot. Inst. im. V.L. Komarova 20: 18. 1997.

Type species: *Pseudophaeoramularia geranii* (W.B. Cooke & C.G. Shaw) U. Braun (≡ *Cercosporella geranii* W.B. Cooke & C.G. Shaw) [**USA**, Washington State, Whiteman Co., on *Geranium viscossissimum*, 20 Jul. 1948, Shaw & Coheen (**holotype** WSP 19945)] ≡ ***Pseudocercospora geranii*** (W.B. Cooke & C.G. Shaw) U. Braun.

Description and illustration: Braun & Mel'nik (1997).

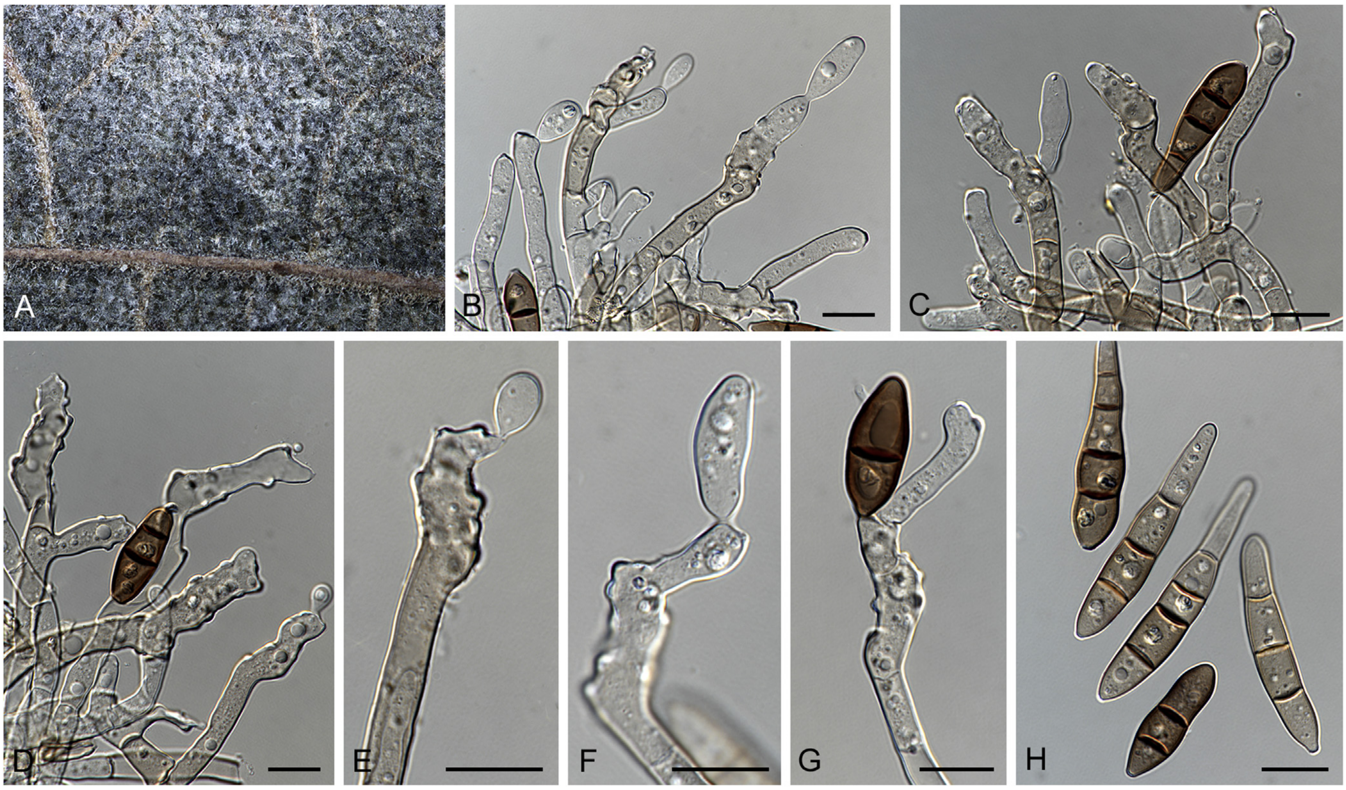


Fig. 63. *Pseudocercosporidium venezuelanum* (S F38692). **A–H.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B–D.** Conidiophores, conidiogenous cells and conidia. **E–G.** Conidiogenous cells and conidia. **H.** Conidia. Scale bars = 10 µm.

Notes: Braun & Mel'nik (1997) introduced *Pseudophaeoramularia* as intermediate between *Pseudocercospora* and *Phaeoramularia*. Although the genus has since been treated as synonymous with *Pseudocercospora* (Crous *et al.* 2001b, Crous *et al.* 2013a), phylogenetic proof from the type species is still lacking to confirm this synonymy.

Pseudopericoniella Videira & Crous

Note: See treatment in text.

Pseudophaeophleospora U. Braun, C. Nakash., Videira & Crous

Note: See treatment in text.

Pseudopuccinia Höhn., Mitt. Bot. Inst. Techn. Hochsch. Wien 2: 41. 1925.

Description (adapted from Ellis 1976): *Stromata* present. *Conidiophores* with anellations. *Conidia* pale to brown, verrucose, ellipsoid-obovoid with 1–2 transverse septa and occasionally an oblique septum.

Type species: *Pseudopuccinia thermopsidis* (Harkn.) Höhn. [as '*thermopsis*'] (≡ *Stigmina thermopsidis* Harkn.) [**USA**, California, on *Thermopsis californica*].

Description and illustration: Ellis (1976, as *Stigmina thermopsidis*).

Notes: *Pseudopuccinia* was considered to be a synonym of *Stigmina* (Seifert *et al.* 2011). Based on DNA sequence comparisons, the genus *Stigmina* was treated as synonym of *Pseudocercospora* (Braun & Crous 2006, Crous *et al.* 2013a). However, the phylogenetic position of *Pseudopuccinia*, a stigmina-like genus, is unknown, pending fresh collections and molecular analyses.

Pseudostigmidium Etayo, Biblioth. Lichenol. 98: 193. 2008.

Description (Etayo & Sancho 2008): Lichenicolous. *Ascomata* perithecioid, black, subconical or subglobose, immersed to semiimmersed, protruding, periphyses abundant, paraphyses lacking, gelatinous hymenial mass I+, KI+ red to violaceous. *Asci* bitunicate, fissitunicate, clavate, broad obovoid to saccate, apically thickened, with an ocular chamber, wall I+, KI+ red to violaceous, 8-spored. *Ascospores* ellipsoid, ellipsoid-ovoid, fusiform, (0–)1–3-septate, colourless, sometimes becoming somewhat pigmented with age.

Type species: *Pseudostigmidium nephromiarium* (Linds.) Etayo. (≡ *Microthelia nephromiaria* Linds.) [**Chile**, Cape Horn, Hermit Island, on thalus and apothecia of *Nephromium cellulosum*, Antartic expedition 1839-43, Dr. Hooker.]

Description and illustrations: Etayo & Sancho (2008).

Notes: *Pseudostigmidium* includes lichenicolous species that are only known by their sexual morph. Hyde *et al.* (2013) accepted this genus in *Mycosphaerellaceae*, but it needs to be recollected before its phylogenetic position can be resolved.

Pseudovularia Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires, Ser. 3, 13: 418. 1911.

Type species: *Pseudovularia trifolii* Speg. [**Argentina**, Lezama, on *Trifolium pratense*, 2 Nov. 1904, Spegazzini (**holotype** LPS 12946)] = ***Ramularia sphaeroidea*** Sacc. [**Germany**, Berlin, Spandau, on *Lotus uliginosus*, Jul. 1875, Magnus (**type** PAD)].

Descriptions and illustrations: Spegazzini (1910), Deighton (1972).

Notes: *Pseudovularia* is considered a synonym of *Ramularia* based on morphological characteristics and *Pseudovularia trifolii* is currently a synonym of *Ramularia sphaeroidea* (Braun 1998, Videira *et al.* 2016). However, no material originating from the type of *Pseudovularia trifolii* has thus far been obtained for further DNA studies.

Pseudozasmidium Videira & Crous

Note: See treatment in text.

Quasiphloeospora B. Sutton *et al.*, Mycol. Res. 100: 979. 1996.

Description (from Sutton *et al.* 1996): Foliicolous, associated with lesions. *Mycelium* internal, brown, branched, septate. *Conidiomata* separate, acervular to sporodochial, epidermal to subepidermal, composed of brown *textura angularis* at the base, and *textura prismatica* above. *Conidiophores* brown, verruculose, irregularly branched at the base, septate, cylindrical, formed from the upper cells of the conidiomata. *Conidiogenous cells* integrated, terminal or lateral, smooth or verruculose, brown, cylindrical, straight, proliferating percurrently and enteroblastically to form annellations or sympodially and holoblastically; conidiogenous loci dark and thickened. *Conidia* holoblastic, pale brown, smooth, cylindrical, septate, obtuse at the apex and truncate at the base; basal scar dark and thickened.

Type species: *Quasiphloeospora saximontanensis* (Deighton) B. Sutton *et al.* (≡ *Cercospora saximontanensis* Deighton) [**USA**, Wyoming, Grand Tehon National Park, on leaves of *Ribes viscosissimum*, 16 Aug. 1937, W.G. & R. Solheim & H.F. House 5369, Solh., Mycofl. Saximon. Exs. 1191 (**holotype** IMI 98069, isotypes Solh., Mycofl. Saximon. Exs. 1191, e.g. BPI 762561, PUL 25574).

Descriptions and illustrations: Sutton *et al.* (1996), Seifert *et al.* (2011).

Notes: *Quasiphloeospora* is a cercosporoid genus with intricate morphology and complex morphological relations to several other genera, including *Cercospora*, *Passalora* and *Pseudocercospora* (Crous & Braun 2003), but due to very pale, almost hyaline structures, it is also similar to *Pseudocercosporella*. Sutton *et al.* (1996) classified the conidiomata as acervuli, although they may better be referred to as sporodochia. The particular characters of *Quasiphloeospora saximontanensis*, above all the structure of the conidiogenous loci, are intermediate between the three similar genera cited above. A clear affiliation to one of these genera, just based on morphology, is not possible. It is also possible that this species is unrelated to any of the cercosporoid genera. Affinity and position of *Quasiphloeospora* can only be proven by means of results of molecular sequence analyses, which are, however, not yet available.

Ragnhildiana Solheim

Note: See treatment in text.

Ramularia Unger

Note: See treatment in text.

Ramichloridium Stahel ex de Hoog

Note: See treatment in text under *Zasmidium*.

Ramulariopsis Speg.

Note: See treatment in text.

Ramularisphaerella Kleb., Haupt- und Nebenfruchtformen der Ascomyzeten (Leipzig) 1: 131. 1918.

Description (from Klebahn 1918): "*Ramularisphaerella*. Konidienform *Ramularia*. Arten: *R. hieracii*, *fragariae*, *punctiformis*, *maculiformis*, *tussilaginis*" [*Ramularisphaerella*. Conidial form *Ramularia*. Species: *R. hieracii*, *fragariae*, *punctiformis*, *maculiformis*, *tussilaginis*].

Type species: *Ramularisphaerella hieracii* (Sacc. & Briard) Kleb. (≡ *Sphaerella nebulosa* var. *hieracii* Sacc. & Briard, ≡ *Mycosphaerella hieracii* (Sacc. & Briard) Jaap) [**France**, on *Hieracium* sp.].

Description and illustration: Sivanesan (1984, as *Mycosphaerella hieracii* and *Ramularia hieracii*), Braun (1998, as *Ramularia hieracii*).

Notes: Klebahn (1918) introduced *Ramularisphaerella* as new genus for a mycosphaerella-like sexual morph on *Hieracium* that he considered to be linked to *Ramularia* on hawkweed. The type specimen could not be located (Aptroot 2006), and the status of this genus remains unclear due to the absence of DNA sequence data. Jaap (1908) considered this species to be the sexual morph of *Ramularia hieracii* (Bäumler) Jaap. Klebahn (1918) has proved the connection between the ascus and conidial state. In case that this connection was correct, *Ramularisphaerella* would be a synonym of *Ramularia*.

Ramulispora Miura

Note: See treatment in text.

Rasutoria M.E. Barr, Mycotaxon 29: 501. 1987.

Description (from Barr 1987): *Ascomata* pseudothecial, globose, superficial, densely clustered on mycelium on the undersides of leaves, dark brown, with numerous hyphal appendages, brown, obtuse, septate ot not. *Asci* saccate, bitunicate, oblong, paraphysate. *Ascospores* hyaline to pale brown, obovoid, 1-septate.

Type species: *Rasutoria abietis* (Dearn.) M.E. Barr (≡ *Dimerosporium abietis* Dearn.) [**USA**, Washington, on needles of *Abies amabilis* (**holotype** BPI 691065)].

Illustration: Farr (1963).

Notes: A very similar description was also presented by Dearness (1926), as *Dimerosporium abietis*. See treatment in text under *Zasmidium cellare*.

Rhabdospora (Durieu & Mont.) Sacc., Syll. fung. (Abellini) 3: 578. 1884.

Description (adapted from Saccardo 1884): *Pycnidia* (perithecia) subcuticular-erumpent, globose-depressed, papillate, solid, soon subhysterioid, black or brown, usually neither on spots nor on leaves. *Spores* [conidia] bacilliform or filiform, pluriguttulate or pluriseptate, hyaline. 'Basidia' diverse or lacking. Differs from *Septoria* like *Phoma* from *Phyllosticta*.

Type species: *Rhabdospora oleandri* (Durieu & Mont.) Sacc. (≡ *Septoria oleandri* Durieu & Mont.) [**Algeria**, on *Nerium oleander*].

Description and illustration: Bory de St.-Vincent & Durieu de Maisonneuve (1849).

Notes: *Rhabdospora* is a poorly known genus from which many species are currently placed in *Septoria*. The type species needs to be recollected in order to resolve its phyllogenetic position (Quaedvlieg *et al.* 2013). The type specimen could not be located.

Rhachisphaerella Videira & Crous

Note: See treatment in text.

Rhopaloconidium Petr., Sydowia 6: 300. 1952.

Type species: *Rhopaloconidium asiminae* (Ellis & Morgan) Petr. (≡ *Phloeospora asiminae* Ellis & Morgan) [**USA**, Ohio, Preston, on *Asimina triloba*, H.P. Morgan 463 (**holotype** NY 01097272)] ≡ ***Pseudocercospora asiminae*** (Ellis & Morgan) U. Braun & Crous.

Description and illustration: Braun (1995, as *Miuraea asiminae*).

Notes: Braun & Crous (2008) proposed the combination of *Phloeospora asiminae* into *Pseudocercospora*. Sequence data authentic for the type species of this genus are necessary to confirm the synonymy of *Rhopaloconidium* and *Pseudocercospora.*

Rosisphaerella Videira & Crous

Note: See treatment in text.

Rosenscheldiella Theiss. & Syd., Ann. Mycol. 13: 645. 1915.

Description (adapted from Sultan *et al.* 2011): *Ascomata* globose, dark-walled. *Pseudothecia* develop on stromatic pads of globose cells with thick, dark walls that form amongst thick-walled, multi-lobed hairs on lower surface of leaves. *Hamathecium* lacking. *Asci* fissitunicate, cylindrical, 8-spored. *Ascospores* cylindrical, tapering slightly to rounded ends, 1 median septum, slightly constricted at septum, hyaline.

Type species: *Rosenscheldiella styracis* (Henn.) Theiss. & Syd. (≡ *Naemacyclus styracis* Henn.) [**Brazil**, São Paulo, Morro pelado, on *Styrax* sp.].

Descriptions and illustrations: Sultan *et al.* (2011).

Notes: The type species *Rosenscheldiella styracis* is only known from its sexual morph. The genus *Rosenscheldiella* is currently accepted in the *Mycosphaerellaceae* (Wijayawardene *et al.* 2014) but recollection of the type species is necessary to determine its true phylogenetic position. Two species for which there are cultures available, *Rosenscheldiella brachyglottidis* and *Rosenscheldiella korthalsellae*, cluster in the *Mycosphaerellaceae* and are closely related to *Pseudocercospora* and *Amycosphaerella*, respectively (Sultan *et al.* 2011).

Ruptoseptoria Quaedvlieg, Verkley & Crous

Note: See treatment in text.

Scirrhia Nitschke ex Fuckel, Jahrb. Nassauischen Vereins Naturk. 23–24: 220. 1870 (1869–1870).

Description (from Sivanesan 1984): *Stromata* subepidermal to erumpent, elongated, depressed globose, rounded, unilocular or with locules in many rows, opening by an apical pore. The stromatic wall is composed of vertically-orientated rows of brown to reddish brown cells *of textura globosa* or *angularis* and *textura prismatica* between locules; the outermost layers composed of black to dark brown cells and the cells of the inner layers brown to hyaline. *Asci* oblong or clavate, 8-spored, stalked, arising from compressed hyaline tissue at the base of the locule. *Ascospores* biseriate overlapping in the ascus, hyaline or yellowish, elliptic or obovoid, septate near the middle, not or slightly constricted at the septum, straight or often inequilateral, smooth, sometimes guttulate. *Interthecial tissue* compressed between asci and intact over the asci.

Type species: *Scirrhia rimosa* (Alb. & Schwein.) Fuckel (≡ *Sphaeria rimosa* Alb. & Schwein.) [**Germany**, Lusatia (Lausitz), on stems of *Phragmites australis*].

Notes: *Scirrhia rimosa* is presently not known from available collections. *Scirrhia aspidiorum* (CBS 204.66) clusters in the *Didymellaceae*, while *Scirrhia brasiliensis* (CBS 128762) clusters in *Mycosphaerellaceae* (Crous *et al.* 2011d). The status of purported synonyms of *Scirrhia*, namely *Scirrhodothis*, *Scirrhophragma* and *Metameris* also remains unresolved.

Scolecostigmina U. Braun

Note: See treatment in text.

Semipseudocercospora J.M. Yen, Mycotaxon 17: 361. 1983.

Description (from Braun *et al.* 2013): Morphologically close to *Pseudocercospora* (leaf spotting hyphomycetes with unthickened, not darkened conidiogenous loci and hila), but the conidiogenous cells are not geniculate, i.e. not distinctly sympodially proliferating, the conidiogenous loci are distinctly denticle-like, and the solitary conidia are didymo- to phragmosporous, i.e. not scolecosporous.

Type species: *Semipseudocercospora peristrophes-acuminatae* (J.M. Yen) J.M. Yen (≡ *Cercospora peristrophes-acuminatae* J.M. Yen).

Description and illustrations: Yen (1983), Seifert *et al.* (2011), present study (Fig. 64).

Materials examined: **Singapore**, Katung, on *Peristropha acuminata*, 20 Apr. 1964, Sun No. 20 (**holotype** PC; isotype IMI 122324).

Notes: The phylogenetic position of the type species of this genus and its relation to the *Mycosphaerellaceae* as well as to the genus *Pseudocercospora* are still unknown and unproven. Therefore, *Semipseudocercospora* is tentatively maintained as a separate cercosporoid genus.

Septocylindrium Bonord. ex Sacc., Michelia 2: 15. 1880.

Type species: *Septocylindrium bonordenii* Sacc., *nom. illegit.*, Art. 52.1 [**Italy**, Padova, on *Galanthus nivalis*, Apr. 1876, Sacc., Mycoth. Ven. 1050 (**neotype** HAL)] = ***Ramularia septata*** (Bonord.) Bubák.

Description and illustration: Braun (1998, as *Ramularia septata*).

Notes: *Septocylindrium* is currently accepted as a synonym of *Ramularia* (Braun 1998, Videira *et al.* 2016). However, no DNA

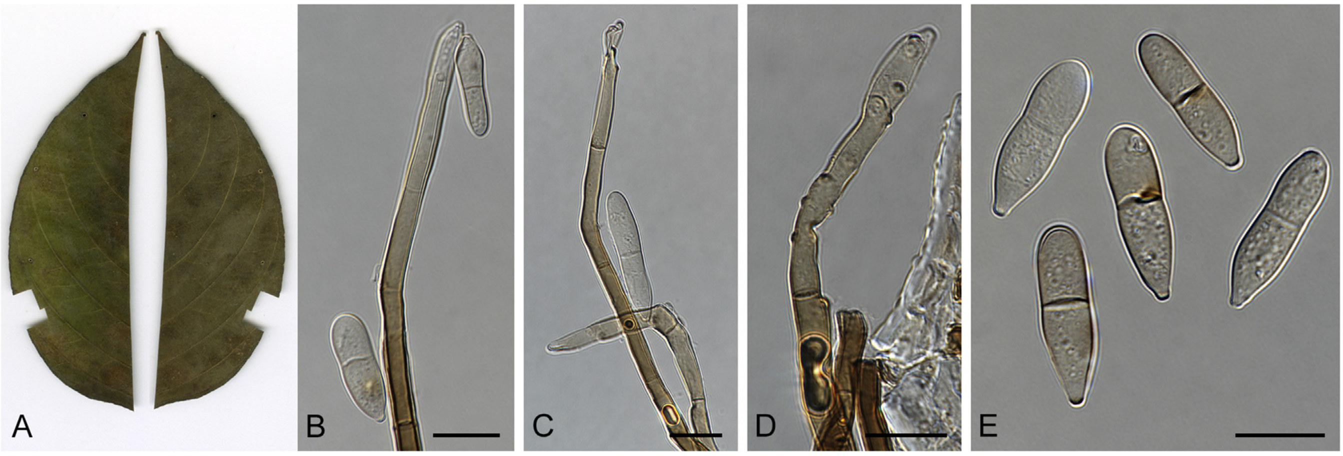


Fig. 64. *Semipseudocercospora peristrophes-acuminatae* (IMI 122324). **A–E.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B–D.** Partial conidiophore, conidiogenous cells and conidia. **E.** Single conidia. Scale bars = 10 µm.

sequences are available of the type species and that assumption, therefore needs to be re-evaluated.

Septocyta Petr., Ann. Mycol. 25(3/4): 330. 1927.

Description (from Quaedvlieg *et al.* 2013, adapted from Sutton 1980): *Mycelium* immersed, branched, septate, hyaline to pale brown. *Conidiomata* eustromatic, immersed, separate, erumpent, dark brown to black, finally opening widely, unilocular, multilocular or convoluted, thick-walled; wall of pale brown, thin-walled *textura angularis* except in the dehiscent region which is darker brown and more thick-walled. *Ostiole* absent, dehiscence by breakdown of the upper wall. *Conidiogenous cells* are holoblastic, sympodial with 1–3 apical, scarcely protruding, unthickened denticles, indeterminate, discrete, ampulliform to lageniform, hyaline, smooth, formed from the inner cells of the locular walls. *Conidia* hyaline, 1–3 euseptate, smooth, straight or slightly curved, acicular, apex obtuse, base truncate, often with minute guttules associated with septa.

Type species: *Septocyta ramealis* (Roberge ex Desm.) Petr. (≡ *Septoria ramealis* Roberge ex Desm.) [**Europe**, on stems of *Rubus* spp.]

Description and illustration: Quaedvlieg *et al.* (2013).

Notes: The type specimen could not be traced. See Quaedvlieg *et al.* (2013).

Septopatella Petr., Ann. Mycol. 23(1/2): 128. 1925.

Description (from Quaedvlieg *et al.* 2013, adapted from Dyko & Sutton 1979 and Sutton 1980): *Mycelium* immersed, branched, septate, hyaline to subhyaline. *Conidiomata* superficial, often subtended by a superficial, pale brown, septate, branched mycelium, pulvinate, separate to occasionally aggregated, dark brown to black, finally opening widely, cupulate; basal wall of small-celled, brown, thin-walled *textura angularis*, becoming *textura porrecta* as it merges into the periclinal walls; a hypostroma attaches the conidioma to the substrate; *Ostiole* absent. *Conidiophores hyaline*, septate, branched at the base, thin-walled, cylindrical, formed from the gelatinized basal wall of the conidioma. *Conidiogenous cells* holoblastic, sympodial, integrated, indeterminate, cylindrical, hyaline, smooth, produced as 2–3 branches from the apex of the conidiophores. *Conidia hyaline*, 3–4-euseptate, thin-walled, smooth, minutely guttulate, straight or curved, occasionally irregularly filiform (Dyko & Sutton 1979, Sutton 1980).

Type species: *Septopatella septata* (Jaap) Petr. (≡ *Pseudocenangium septatum* Jaap) [**Austria**, *Pinus montana*, 31 Jul. 1907, O. Jaap (**holotype** BPI 393484; **isotype** IMI 225733, slide)].

Description and illustration: Quaedvlieg *et al.* (2013)

Notes: The present species needs to be recollected and its phylogenetic position determined. The holotype specimen could not be traced. See Quaedvlieg *et al.* (2013).

Septoria Sacc.

Note: See treatment in text.

Septoriopsis Gonz. Frag. & M.J. Paúl, Bol. Real Soc. Esp. Hist. Nat. 15: 127. 1915.

Description (adapted from Saccardo *et al.* 1931): *Pycnidia* on leaf spots, superficial, membraneous-carbonaceous, usually caespitose, globose to conoid. *Spores* [conidia] bacilliform, hyaline, usually 1-septate, formed at the apex of filiform conidiophores.

Type species: *Septoriopsis citri* Gonz. Frag. [**Spain**, Sevilla, Huevar, on *Citrus vulgaris*, M. de Paul].

Description and illustration: González Fragoso (1915).

Note: Seen as synonym of *Septoria*, though fresh collections are required to resolve its phylogenetic position.

Septorisphaerella Kleb., Haupt- und Nebenfruchtformen der Ascomyzeten (Leipzig) 1: 131. 1918.

Description (from Klebahn 1918): "*Septorisphaerella*. Konidienform *Septoria* oder *Phloeospora*. Arten: *S. hippocastani*, *populi*, *ribis*, *sentina*, *ulmi*, *aegopodii*, *exitialis*, *jaczewskii*, *lathyri*, *nigerristigma*" [*Ramularisphaerella*. Conidial form *Septoria* or *Phloeospora*. Species: *S. hippocastani*, *populi*, *ribis*, *sentina*, *ulmi*, *aegopodii*, *exitialis*, *jaczewskii*, *lathyri*, *nigerristigma*].

Type species: *Septorisphaerella hippocastani* (Jaap) Kleb. (≡ *Sphaerella maculiformis* var. *hippocastani* Jaap), [**Germany**, Brandenburg, Prignitz, Triglitz, on *Aesculus hippocastanum*, Mar. 1910, O. Jaap, Fungi Sel. Exs. 423 (**syntypes** Jaap, Fungi Sel. Exs. 423, e.g. B, HAL, L)] = *Mycosphaerella hippocastani* Jaap.

Description and illustration: Klebahn (1918).

Notes: Klebahn (1918) introduced *Septorisphaerella* as genus for sexual mycosphaerella-like morphs associated with septoria-like asexual morphs. *Septorisphaerella hippocastani*, the type species, was linked to a *Septoria* on *Aesculus* which was nomenclaturally discussed in detail, with the conclusion to refer to it as '*Septoria aesculicola* (Fr.) Fuckel' (including *Septorisphaerella hippocastani* Berk. & Broome, see Klebahn 1918: 45). Fresh material of the type species needs to be recollected to resolve the phylogenetic position of this genus, above all since *Septoria s. lat.* has recently been split into several genera (see Verkeley *et al.* 2013).

Sirosporium Bubák & Serebrian., Hedwigia 52: 273. 1912.

Description (from Braun *et al.* 2013): Leaf spotting dematiaceous hyphomycetes with internal and external mycelium, superficial hyphae giving rise to solitary conidiophores, lateral and terminal, conidiophores may also be formed in fascicles, conspicuous conidiogenous loci and hila, thickened and darkened, conidia solitary, size, shape and septation variable, but the conidia are relatively thick-walled and at least partly dictyosporous.

Type species: *Sirosporium antenniforme* (Berk. & M.A. Curtis) Bubák & Serebrian.

Descriptions and illustrations: Ellis (1971), Seifert *et al.* (2011); present study (Fig. 65).

Materials examined: **USA**, Alabama, on leaves of *Celtis* (microscope slide **ex-type** of *Macrosporium antenniforme*, IMI 1253).

Notes: The genus *Sirosporium* is passalora-like in morphology, but until the type species *S. antenniforme* has been recollected and its phylogenetic position resolved, its status remains unresolved. *Sirosporium* has been tentatively treated as a separate genus confined to species with thick-walled dictyosporous conidia (Braun 1995, Crous & Braun 2003, Braun *et al.* 2013). The two *Sirosporium* species included in this study cluster within the *Mycosphaerellaceae* but in separate clades, *Sirosporium celtidis* (Fig. 1, clade 39; Fig. 3, clade 4) and *Sirosporium diffusum* (Fig. 1; clade 60; Fig. 3, clade 24, as *Ragnhildiana diffusa*).

Sonderhenia H.J. Swart & J. Walker

Note: See treatment in text.

Sphaerellothecium Zopf, Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 70: 184. 1897.

Description (adapted from Roux & Triebel 1994 and Knudsen *et al.* 2009): Lichenicolous, usually distinguished by the formation of a superficial reticulum of dark hyphae occurring on the thallus and apothecia of the host. *Ascomata* perithecioid, black, immersed to superficial, ostiolate, wall pigmented, hamathecium of unbranched periphyses, but often rudimentary, with colourless interascal filaments (paraphysoids). *Asci* bitunicate, fissitunicate, 8-spored, clavate, ellipsoid-ovoid, obpyriform, saccate to irregular, with distinct ocular chamber. *Ascospores* hyaline, sometimes turning brown when mature, 1–3(–5)-septate, smooth-walled.

Type species: *Sphaerellothecium araneosum* (Rehm) Zopf (≡ *Sphaerella araneosa* Rehm) [**Austria**, Tirol, oberhalb der Waldrast (Mattrei), on *Ochrolechia tartarea*, Aug. 1872, Arnold, ex Herb. Rehm. Ascomyc. nr. 133 (syntype S F45258, designated here as **lectotype** MBT378595)].

Description: Vouaux (1913, as *Discothecium araneosum*).

Note: The type species is lichenicholous and, in the absence of DNA, its phylogenetic position remains obscure.

Sphaerulina Sacc.

Note: See treatment in text.

Spilosphaeria Rabenh., Klotzschii Herb. Viv. Mycol., Ed. Nov., Ser. Prima, Cent. 6: no. 559. 1857.

Type species: Not indicated (Rabenhorst assigned eight species to the new genus *Spilosphaeria* in Cent. 6 of this exsiccatum).

Notes: This genus is insufficiently known, but regarded as synonym of *Septoria* based on morphology. The status of *Spilosphaeria* needs to be clarified by lectotypification of the genus and recollection of a lectotype species to determine the phylogenetic position of the genus.

Stenella Syd., Ann. Mycol. 28(1–2): 205. 1930.

Type species: *Stenella araguata* Syd. [**Venezuela**, Aragua, La Victoria, on leaves of *Pithecellobium lanceolatum*, Jan. 1928, H. Sydow (**lectotype**, designated in Crous *et al.* 2007b, IMI 15728a; isolectotypes BPI 443420, 443422, S F64888; syntypes Syd., Fungi Exot. Exs. 883, e.g. CUP, MICH 13093, S F64890, Petr., Mycoth. Gen. 1399, e.g. S F64889)].

Description and illustration: Crous *et al.* (2007b).

Note: Currently assigned to *Teratosphaeriaceae* (Crous *et al.* 2007b, Arzanlou *et al.* 2008, Crous *et al.* 2009d).

Stenospora Deighton, Mycol. Pap. 118: 22. 1969.

Description (from Deighton 1969): *Mycelium* hyperparasitic: hyphae colourless, septate. *Conidiophores* arising as lateral branches of the mycelial hyphae, short, smooth, simple or branched, septate, with conidial scars very slightly but distinctly thickened and refractive and slightly prominent. *Conidia* colourless, acicular, much resembling those of *Cercospora*, smooth, pluriseptate, with a very slightly but distinctly thickened and refractive truncate hilum.

Type species: *Stenospora uredinicola* Deighton [**Sierra Leone**, Bundulai (Loko Masama), on *Puccinia kraussiana* on *Smilax anceps* (= *S. kraussiana*), 26 Nov. 1951, F.C. Deighton M4515 (**holotype** IMI 48655b)].

Description and illustration: Deighton (1969).

Note: *Stenospora* is very similar to *Eriocercospora* but mucedinaceous (hyaline).

Stenellopsis B. Huguenin, Bull. Trimestriel Soc. Mycol. France 81: 695. 1966.

Description (from Ellis 1971): *Colonies* effuse, greyish olive, hairy. *Mycelium* immersed. *Stroma* rudimentary or prosenchymatous, immersed. *Setae* and *hyphopodia* absent. *Conidiophores* macronematous, mononematous, caespitose, unbranched, usually rather short, straight or flexuous, olivaceous, smooth or verruculose. *Conidiogenous cells* polyblastic, integrated, terminal, sympodial, cylindrical, cicatrized; scars broad, flat. *Conidia* solitary, dry, acropleurogenous, simple, cylindrical to obclavate, rounded at the apex, truncate at the base, pale olivaceous brown, verrucose, multiseptate.

Fig. 65. *Sirosporium antenniforme* (IMI 1253). **A–F.** Observations *in vivo*. **A, B.** Conidiophores emerging from the host leaf. **C–F.** Conidia. Scale bars = 10 µm.

Type species: *Stenellopsis fagraeae* Huguenin.

Descriptions and illustrations: Ellis (1971), Seifert *et al.* (2011); present study (Fig. 66).

Materials examined: **Cook Islands**, Rarotonga, Takitumu Conservation Area, on *Fagraea berteroana*, 14 Jul. 2002, E.H.C. McKenzie EHCM 284 (PDD 75945); Rarotonga, Totokoitu Valley, 19 Oct. 1975, J.M. Dingley (PDD 35381). **New Caledonia**, Rivière de Thi (St. Louis), on *Fagraea berteroana* (= *F. schlechteri*), 24 Nov. 1963, Huguenin, NC 63219 (**holotype** PC).

Notes: *Stenellopsis* is morphologically similar to *Zasmidium*. It has single, conspicuously verrucose conidia with hila that are barely to slightly thickened and somewhat darkened-refractive, but lacks verruculose superficial hyphae (Crous & Braun 2003). The type species needs to be recollected to resolve the phylogenetic position of the genus.

Stictosepta Petr., Sydowia 17: 230. 1964 (1963).

Description (from Quaedvlieg *et al.* 2013, adapted from Sutton 1980): *Mycelium* immersed, branched, septate, hyaline. *Conidiomata* eustromatic, immersed, globose to collabent, papillate, unilocular, often convoluted, hyaline; walls thick, of hyaline, thin-walled *textura intricata*. *Ostiole* central and circular, single, furfuraceous. *Conidiophores* hyaline, septate, branched, anastomosing, formed from the inner cells of the locular wall. *Conidiogenous cells* sympodial or synchronous, integrated, indeterminate, hyaline, thin-walled, with usually two small, unthickened, apical, slightly protuberant conidiogenous loci. *Conidia* solitary, hyaline, thin-walled, smooth, multiseptate, slightly constricted at the septa, each cell medianly guttulate, straight or curved, base truncate, apex obtuse.

Type species: *Stictosepta cupularis* Petr. [**Czech Republic**, Hranice, Ribar, *Fraxinus*, 30 Mar. 1927, F. Petrak (syntype BPI 668877, designated here as **lectotype** MBT378596; syntype IMI 204093 [slide])].

Illustration: Quaedvlieg *et al.* (2013).

Note: This species needs to be recollected to resolve its phylogenetic position.

Stigmidium Trevis., Conspect. Verruc.: 17. 1860.

Description (adapted from Roux & Triebel 1994): *Vegetative hyphae* absent. *Ascomata* perithecioid, black, globose to subglobose, ostiolate, usually half-immersed to sessile. *Ascomatal wall* dark brownish black in upper part, paler brown in middle or lower part. *Periphysoids* originating from the upper wall of the ascomatal cavity, hyaline, branched or not. *Interascal filaments* lacking. *Asci* originating from the lower wall of the ascomatal cavity, fissitunicate, saccate, 8-spored, with ascospores irregularly arranged. *Ascospores* 1-septate, hyaline, but occasionally turning brown when overmature.

Type species: *Stigmidium schaereri* (A. Massal.) Trevis. (≡ *Sphaeria schaereri* A. Massal.) [**Italy**, on thalli of *Solorina* spp.].

Description and illustration: Roux & Triebel (1994).

Notes: The genus *Stigmidium* is distinguished by ascomata with punctiform ostioles with a hamathecium of periphyses, with periphysoids, and hyaline 1-septate ascospores (rarely turning brown in a few species). The type species is lichenicolous and until DNA data have been generated, the phylogenetic position of the genus remains unresolved.

Stigmina Sacc., Michelia 2: 22. 1880.

Type species: *Stigmina platani* (Fuckel) Sacc. (≡ *Stigmella platani* Fuckel) [**Greece**, Attikis, Kifisia, on *Platanus orientalis*, 7 Nov. 1869, Th. de Heldreich (syntype BPI 428005, designated here as **lectotype,** MBT378597] ≡ ***Pseudocercospora platanigena*** Videira & Crous, **nom. nov.** MycoBank MB822835. *Replaced synonym*: *Stigmella platani* Fuckel, in Thümen, Bot. Zeitung (Berlin). 29: 27. 1871, non *Pseudocercospora platani* (J.M. Yen) J.M. Yen, 1979.

Description and illustration: Ellis (1971).

Note: *Stigmina* is a synonym of *Pseudocercospora* (Braun & Crous 2006, Crous *et al.* 2006a) and a new name is herewith introduced for *Stigmina platani*.

Stromatoseptoria Quaedvlieg, Verkley & Crous

Note: See treatment in text.

Sultanimyces Videira & Crous

Note: See treatment in text.

Tandonella S.S. Prasad & R.A.B. Verma, Indian Phytopathol. 23: 112. 1970.

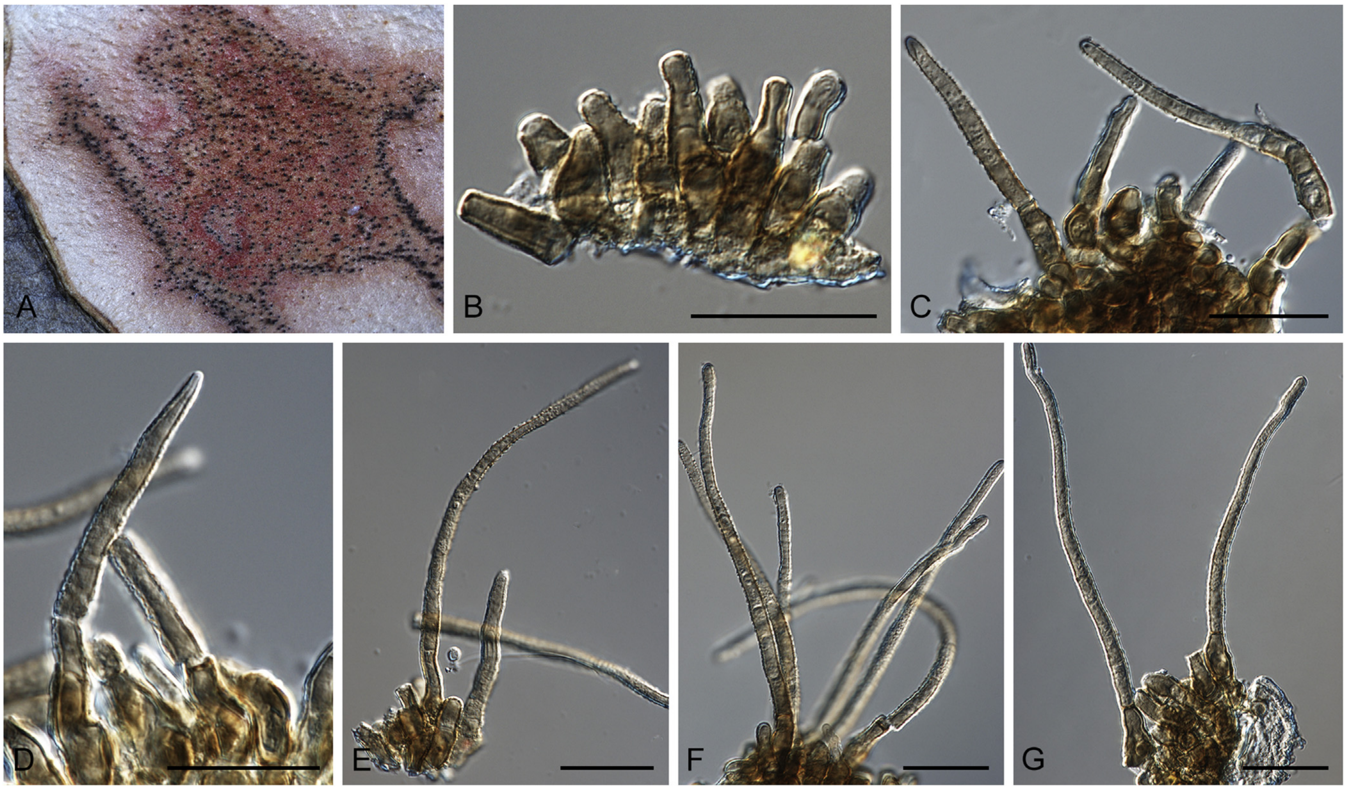


Fig. 66. *Stenellopsis fragariae* (PDD 75945). **A–G.** Observations *in vivo*. **A.** Leaf spot symptoms on the host. **B.** Conidiophores. **C–G.** Conidiophores, conidiogenous cells and conidia. Scale bars = 10 µm.

Description (from Sutton & Pascoe 1987): *Mycelium in vivo* immersed and superficial, subhyaline to pigmented, branched, septate, thin-walled. *Stromata* superficial, small, brown, pseudoparenchymatic. *Conidiomata* synnematous, synnemata composed of parallel threads, determinate, solitary or grouped, erect, brown, apically lax, splaying out. *Individual conidiophores* filiform, usualy unbranched, septate, pigmented, smooth to rough-walled; *conidiogenous* cells integrated, terminal or intercalary (conidiogenous region terminal, rarely lateral or extending down the synnemata), proliferation sympodial, geniculate, cicatrized, conidiogenous loci conspicuous, slightly thickened, darkened-refractive, often protuberant. *Conidia* holoblastically formed, catenate, in short simple or branched chains, ellipsoid-ovoid, fusiform, cylindrical, aseptate to euseptate, pigmented, rough-walled, hila somewhat thickened and darkened-refractive.

Type species: *Tandonella ziziphi* S.S. Prasad & R.A.B. Verma [**India**, Bihar, on leaves of *Ziziphus jujuba* (**holotype** IMI 112255c as *Cercospora ziziphi*)] ≡ *Passalora ziziphi* (S.S. Prasad & R.A.B. Verma) U. Braun & Crous.

Description and illustration: Sutton & Pascoe (1987).

Notes: *Tandonella* has currently been treated as a synonym of *Passalora* (Crous & Braun 2003, Braun *et al.* 2013), but the type species *Tandonella ziziphi* is not known from DNA data. Sutton & Pascoe (1987) added *Tandonella oleariae*, re-examined and illustrated holotype material of *Tandonella ziziphi* [IMI 112255c], and published an emended description of the genus *Tandonella*, which is characterised by a combination of synnematous conidiomata and conspicuous conidiogenous loci (thickened and darkened) giving rise to catenate, pigmented conidia (phaeoramularioid). The species *Tandonella cubensis* was described by Castañeda & Kendrick (1990) and the holotype was collected from *Bauhinia divaricata* in Cuba [INIFAT C88/58 (13.IV.1988)]. The strain in this study was collected by the same author from *Bauhinia cuyabensis* in Cuba and was deposited at the CBS [CBS 500.92, INIFAT C92/43-3 (Nov. 1992), CBS H-18755). The morphology of *Tandonella cubensis* varied from *Tandonella ziziphi* mainly in the falcate, lunate or irregular and smooth conidia instead of cylindrical to fusiform and verrucose conidia. Morphologically, *Tandonella cubensis* (CBS 500.92) differs significantly from *Pseudocercospora* spp. by the formation of long synnematous fascicles, dark brown at the base and brown above, brown, polyblastic conidiogenous cells and brown, falcate conidia developing in chains. In all phylogenetic analyses performed in this study, this strain clustered within *Pseudocercospora*.

Tapeinosporium Bonord., Bot. Zeitung (Berlin) 11: 285. 1853.

Description (from Bonorden 1853): Conidial chains multiseptate, arising from aseptate, simple or sometimes branched “stalks” [*conidiophores*]. *Spores* [conidia] ovate, 3-septate, greenish, caespitose conidial chains olivaceous or later black.

Type species: *Tapeinosporium viride* Bonord. [**Germany**, on *Solanum tuberosum* (**lectotype** [iconotype] designated here, MBT378598, Bonorden, Bot. Zeitung (Berlin) 11: Pl. (Tafel) VII, Fig. 6. 1853)] ≡ *Septocylindrium tapeinosporum* (Bonord.) Sacc.

Description and illustration: Bonorden (1853).

Notes: Saccardo (1886) considered *Tapeinosporium* a synonym of *Septocylindrium*, which in turn is considered a synonym of *Ramularia* (Braun 1998, Videira *et al.* 2016), but as emphasized in Braun (1998: 13) *Tapeinosporium*, described from potato tubers, is a doubtful genus of quite unclear affinity. Type material is not preserved, but Bornorden added an illustration to the original description, which is part of the protologue and has to be used for lectotypification. This illustration does not agree with genuine

Ramularia species and could rather pertain to *Cladosporium* or similar saprobic hyphomycetous genera. New collections from potato tubers are necessary for an epitypification of *Tapeinosporium viride* and corresponding sequence data for a clarification of its phylogenetic affinity.

Trochophora R.T. Moore

Note: See treatment in text.

Utrechtiana Crous & Quaedvlieg, Persoonia 26: 153. 2011.

Description (from Crous *et al.* 2011a): Hyphomycetous, associated with leaf spots. *Mycelium* internal, consisting of septate, smooth, hyaline, branched hyphae. *Conidiophores* solitary, erect, bursting through epidermis, with circular scar where base of conidiophore is attached to immersed hyphal network; conidiophores dark brown, erect, base subglobose, giving rise to a subcylindrical, brown conidiogenous cell that ends in a clavate, bluntly rounded apex, with truncate, flattened scar; sometimes thickened, not darkened, nor refractive. *Conidia* solitary, pale brown, ellipsoid, guttulate to granular, smooth to finely verruculose, 1-septate slightly above the conidial median, thin-walled, apex bluntly to acutely rounded, base obtusely rounded with a flattened, darkened and thickened hilum that has a central pore.

Type species: *Utrechtiana cibiessia* Crous & Quaedvlieg [**Netherlands**, Utrecht, on leaves of *Phragmites australis*, 14 Dec. 2010, W. Quaedvlieg (**holotype** CBS H-20594, cultures ex-type CPC 18917, 18916 = CBS 128780)] = *Utrechtiana roumeguerei* (Cavara) Videira & Crous [**France**, Toulouse, on *Phragmites australis*, undated, coll. C. Roumeguère, Biosi & Cavara, **syntypes** of *Scolicotrichum roumeguerei* Briosi & Cavara, Funghi Parass. Piante Colt. Util. Ess. 112 (**lectotype** in HAL here designated, MBT378701)].

Utrechtiana roumeguerei (Cavara) Videira & Crous, **comb. nov.** MycoBank MB822836.
Basionym: *Scolicotrichum roumeguerei* Cavara (as '*roumegueri*'), in Briosi & Cavara, Funghi Parass. Piante Colt. Util. Ess., Fasc. 5: no. 112. 1890.
Synonyms: *Deightoniella roumeguerei* (Cavara) Constant., Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 86(2): 137. 1983.
Utrechtiana cibiessia Crous & Quaedvl., Persoonia 26: 153. 2011.

Notes: The genus *Utrechtiana* was regarded as synonymous with *Deightoniella* by Seifert *et al.* (2011) based on morphology. The type species, *Utrechtiana cibiessia*, is synonymous with *Deightoniella roumeguerei*, which Klaubauf *et al.* (2014) showed to belong to *Pyriculariaceae*, a family containing numerous cryptic fungal genera on *Poaceae*. An examination of the type species of *Deightoniella*, *Deightoniella africana*, has shown, however, that *Deightoniella* is also a generic complex in *Pyriculariaceae*, meaning that the generic circumscription provided by Ellis (1976) needs to be emended. *Deightoniella torulosa*, a foliar pathogen of *Musa*, has been shown to be a species of *Corynespora* (Crous *et al.* 2013b). A similar fungus occurring on leaf spots of *Phragmites* in South Africa, was shown to represent a distinct genus, *Neodeightoniella*, which lacks conidiophores with percurrent rejuvenation, has well-developed apical and intercalary conidiogenous loci, and conidia with mucoid caps (Crous *et al.* 2013b). The genus *Deightoniella* (based on *Deightoniella africana*), is distinct from *Utrechtiana*, as the latter lacks torsive to flexuous conidiophores with percurrent rejuvenation and prominent conidiophore swellings. Conidia of *Utrechtiana* are also very pale brown, smooth to finely roughened, with prominent thickened, darkened scars, while those of *Deightoniella* are medium brown, verruculose, and obpyriform with prominent apical taper. Fresh material of *Deightoniella africana* needs to be recollected to facilitate epitypification, and to clarify its phylogenetic relationships.

Uwemyces Hern.-Restr., G.A. Sarria & Crous

Note: See treatment in text.

Verrucisporota D.E. Shaw & Alcorn

Note: See treatment in text under *Zasmidium*.

Virgasporium Cooke, Grevillea 3(28): 182. 1875.

Type species: *Virgasporium maculatum* Cooke [**Jersey** (UK), on leaves of *Reseda* sp.] = ***Cercospora resedae*** Fuckel [**Germany**, on leaves of *Reseda odorata*, Fuckel, Fungi Rhen. Exs. nr. 1632 (**syntype** S F267614)

Description and illustration: Cooke (1875).

Note: *Virgasporium* is currently considered a synonym of *Cercospora* based on morphological characteristics (Braun *et al.* 2013). The type specimen of *Virgasporium maculatum* could not be traced and the species needs to be recollected in order to confirm its phylogenetic position. A tentative clade of *Cercospora* cf. *resedae* is considered in a recent phylogenetic study by Groenewald *et al.* (2013).

Virosphaerella Videira & Crous

Note: See treatment in text.

Walkeromyces Thaung, Trans. Brit. Mycol. Soc. 66: 213. 1976.

Description (from Thaung 1976): Hyphomycetous, foliicolous, phytopathogenic. *Stroma*, setae and hyphopodia absent. *Mycelium* superficial, consisting of brown, branched, septate, creeping hyphae. *Conidiophores* simple or branched, medium brown, arising from superficial mycelium, straight to flexuous, with intergrated terminal conidiogenous cells. *Conidiogenous cells* polyblastic, terminal, sympodial, with thickened, darkened scars. *Conidia* dry, solitary, acropleurogenous, straight or curved, obclavate or fusiform or short navicular, septate, smooth, brown, with thickened, darkened hilum.

Type species: *Walkeromyces grewiae* Thaung [**Myanmar**, Maymyo, Kyaukchaw, on *Grewia* cf. *macrophylla*, 26 Sep. 1974, M.M. Thaung (**holotype** IMI 188948)].

Description and illustration: Thaung (1976).

Notes: *Walkeromyces* is mycovellosiella-like in morphology, and has been treated as synonym of *Passalora* in the past (Crous & Braun 2003). However, until the type species has been recollected and subjected to molecular comparison, its phylogenetic position remains unknown.

Xenomycosphaerella Quaedvlieg & Crous

Note: See treatment in text.

Xenoramularia Videira, H.D. Shin & Crous

Note: See treatment in text.

Xenosonderhenia Crous

Note: See treatment in text.

Xenosonderhenioides Videira & Crous.

Note: See treatment in text.

Zasmidium Fr.

Note: See treatment in text.

Zymoseptoria Quaedvlieg & Crous

Note: See treatment in text.

DISCUSSION

The *Mycosphaerellaceae* Lindau (1897), based on *Mycosphaerella* Johanson (1884) has an intricate taxonomic history spread over many years and numerous publications. From the traditional morphological approaches, to the more recent phylogenetic and genomics studies, species of *Mycosphaerellaceae* remain as popular among mycologists, due to their morphological diversity, and as infamous among phytopathologists due to the destructive impact some species have on crops that we depend on for food, feed and fuel.

Traditional identification relies on morphological characters in association with the host. The morphology of the sexual morph of *Mycosphaerellaceae* is extremely uniform and descriptions are mainly based on ascospores size, shape and position of the septa (Aptroot 2006). Believing most species to be host-specific, numerous species were described multiple times under different names only based on the hosts they were isolated from, or their countries of origin. Von Arx (1949) was the first to compare these morphological descriptions and synonymise many species in the genus, a task later continued by Tomilin (1979). Barr (1972) introduced a system of sections to treat the species which was partially followed and improved upon by Aptroot (2006), who provided the most recent revision of *Mycosphaerella* species based on the study of type material. Many of these specimens contained only immature or over mature material with no ascospores, rendering many species doubtful. As a consequence, only 3000 taxa were estimated to exist in *Mycosphaerella* out of the total 10000 names (Aptroot 2006), excluding names of thousands of asexual species. The germination pattern of the ascospores was introduced as new character by Park & Keane (1982a, b), and was followed by other authors as a diagnostic feature in species recognition (Crous 1998). The morphology of the asexual morphs, on the other hand, is quite distinctive and variable, and many species in the family are also polymorphic.

Two informal asexual taxonomic groups are recognized in *Mycosphaerellaceae*, namely the hyphomycetes, which produce solitary conidiophores, fascicles or sporodochia, and the coelomycetes, which produce acervuli or pycnidial conidiomata. The coelomycete genera were largely treated by Sutton (1980) and, to a lesser degree, by Nag Raj (1993). The hyphomycetes, however, have been the subject of several monographs. Chupp (1954) and Pollack (1987) took a wide approach and described all cercosporoid fungi in the genus *Cercospora*. Deighton (1967, 1974, 1976a, 1979) recognised several genera amid the large *Cercospora* concept, and was succeeded by Crous & Braun (2003) who narrowed down the true cercosporoid fungi to *Cercospora*, *Pseudocercospora*, *Stenella* and *Passalora*. The hyaline counterparts of *Cercospora*, including *Ramularia* and allied genera, were treated by Braun (1995, 1998). The separation of these genera relied on the presence or absence of pigmentation in the conidiogenous structures, arrangement and branching of conidiophores, the conidiogenous cell placement, proliferation and scar type (conidiogenous loci), and conidial formation, shape and septation. Particular emphasis was placed on the nature of the conidiogenous loci and mode of conidiogenesis. However, many difficulties surrounded the definition of these genera based on these characters including intermediate characters, and species that exhibited more than one mode of conidiogenesis (Crous & Braun 2003). Due to the impact of many of these species on agriculture and forestry, many revisions of cercosporoid species have been published based on country or geographical region, e.g. Japan (Katsuki 1965), Taiwan (Hsieh & Goh 1990), China (Guo & Hsieh 1995), South Africa (Crous & Braun, 1996), Russia (Braun & Mel'nik, 1997), Korea (Shin & Kim 2001), India (Kamal 2010), etc. However, the circumscription of genera was not questioned at the time and authors mainly followed the works of Chupp (1954), Deighton (1967, 1974, 1976a, 1979), Braun (1995, 1998) and Crous & Braun (2003).

Since the first DNA phylogeny paper published on the family (Stewart *et al.* 1999), the concept of *Mycosphaerellaceae* and the genera it contains has been significantly revised (Crous *et al.* 2007a, b, 2009a, c, d, e, 2013a, Quaedvlieg *et al.* 2011, 2013, 2014, Verkley *et al.* 2013, Groenewald *et al.* 2013, Videira *et al.* 2015a, b, 2016). The most significant fact was the realisation that *Mycosphaerellaceae* was poly- and paraphyletic in the *Dothideomycetes*, and that the same variation also applied to the genera and species. The second milestone was the proof that *Mycosphaerella* was not the sexual morph of 40 odd genera as formerly believed (Crous 2009), but that these were in fact distinct genera within the *Dothideomycetes*, for which the names of the asexual genera were available for use.

The widespread use of DNA sequences as an identification tool fuelled an idea that was simmering for a long time among mycologists and plant pathologists alike, namely that dual nomenclature in fungi is superfluous. In its wake came the one fungus = one name initiative, which culminated in the termination of the dual nomenclature system (Hawksworth *et al.* 2011, Hawksworth 2012, Wingfield *et al.* 2012, Crous *et al.* 2015b). Based on the newly revised International Code of Nomenclature for algae, fungi, and plants (ICN), the asexual morph *Ramularia* was chosen over that of *Mycosphaerella* (Wijayawardene *et al.* 2014, Rossman *et al.* 2015, Videira *et al.* 2015b, 2016), and the remaining taxa assigned to existing genera or newly described genera. The ITS was introduced as the official barcode for fungi due to its ease of amplification and its ability to distinguish species across the kingdom (Schoch *et al.* 2012). Frequently, in *Mycosphaerellaceae*, the ITS is insufficient to distinguish closely related species and a combination of ITS and a secondary barcode (Stielow *et al.* 2015) has been proposed for each genus, such as *tef1*-α or *tub2* for *Septoria* and allied genera (Verkley *et al.* 2013), *rpb2* or *actA* for *Ramularia* and allied genera (Videira *et al.* 2016), *cal* and *his3* for *Cercospora* (Groenewald *et al.* 2013), *actA* and/or *tef1*-α (Crous *et al.* 2013a) or *rpb2* (Nakashima *et al.* 2016) for *Pseudocercospora*, and *rpb2* (present study) for many genera in the *Mycosphaerellaceae*. The *rpb2* gene is used to resolve higher levels of classification due to the ease of alignment as the sequence has no introns, and also to discriminate at species level due to the high variability of the sequence data. The main disadvantage of *rpb2* is that it is not always easy to amplify. In this regard, the primer RPB2-F4 was revealed to be very effective among numerous genera. Although the coding genes frequently have a higher discriminatory power between species, there are usually less available data in the public databases to compare them to (Quaedvlieg *et al.* 2013). However, this is slowly being overcome with the increasing amount of newly generated sequence data.

The present study aimed to clarify the phylogenetic position of the genera currently accepted to belong to *Mycosphaerellaceae*, and thus provides a broad framework and phylogeny for the family, laying a foundation for additional genera and species to be recognised and described. Recent studies have already clearly defined several genera (e.g. *Cercospora*, *Pseudocercospora*, *Pseudocercosporella*, *Ramularia*, *Septoria* and *Zymoseptoria*) but it was clear that genera such as *Passalora*, *Zasmidium*, *Stenella* and *Ramichloridium* remained para- and polyphyletic (Arzanlou *et al.* 2007, 2008, Crous *et al.* 2009c). The sequencing of the type species of *Ramichloridium* and *Stenella* revealed them to belong to *Teratosphaeriaceae*, and the taxa remaining in *Mycosphaerellaceae* were therefore combined into existing genera (e.g. *Zasmidium*), or new genera (e.g. *Pachyramichloridium*).

The genera *Phaeoramularia*, *Fulvia* and *Mycovellosiella* were previously considered synonyms of *Passalora* (Crous & Braun 2003) since the morphological characters appeared to overlap among them. In the present study, based on the phylogenetic placement of good representative material, these four genera are revived and distinguished from one another. Previous generic definitions can no longer be applied to these genera in their current circumscription, and the description of new species is strongly reliant on the availability of DNA sequence data. *Mycovellosiella*, based on the present phylogeny is a monotypic genus, but with more collections new species may emerge. *Mycovellosiella* was previously distinguished from *Passalora* and *Phaeoramularia* by the formation of superficial mycelium with solitary conidiophores formed *in vivo*, but these traits are phylogenetically and taxonomically not significant and deemed unreliable. Other non-type species with mycovellosiella-like morphology cluster in the present trees at quite different positions (e.g. *Paramycovellosiella* and *Distomycovellosiella*). The formation of conidia in chains or singly, previously used to differentiate between *Passalora* (incl. *Cercosporidium*) and *Phaeoramularia*, is still somewhat reliable considering the species included in the present phylogeny, since the type of *Passalora* and species of *Cercosporidium* produce single conidia, whereas *Phaeoramularia* and *Ragnhildiana* produce catenate conidia. With the inclusion of more species this distinguishing character may, however, become less reliable. The genus *Passalora* is now restricted to species with pale brown conidiophores with apical conidiogenous cell with multiple rim-like conidiogenous loci, thickened and darkened, and single obclavate 1–2-septate conidia with a thickened and darkened hilum. New passalora-like species to be described cannot be assigned without molecular data and, if molecular data are not available, should tentatively be assigned to *Passalora s. lat*. This interim solution will be necessary considering the large number of species involved globally.

The particularly problematic situation pertaining to the genera *Zasmidium*, *Periconiella*, *Verrucisporota* and *Ramichloridium*, previously observed by Arzanlou *et al.* (2008) and Crous *et al.* (2009a, 2012), was addressed in the present study by taking a broad approach to the generic definition of *Zasmidium*, due to strong phylogenetic support of the basal branches and morphological similarity of the species involved.

The genus *Phaeophleospora* appeared to be polyphyletic, as previously observed by Crous *et al.* (2009b), and the two species that were not congeneric with the type, *Phaeophleospora atkinsonii* and *Phaeophleospora stonei*, were reassigned to the new genus *Pseudophaeophleospora*. The conundrum surrounding *Phaeophleospora* and *Lecanosticta* was discussed by Crous *et al.* (2009c). The genus *Lecanosticta* produces phaeophleospora-like conidia in acervular conidiomata, in contrast to the pycnidial conidiomata in *Phaeophleospora*. In the present phylogeny, these two genera cluster in sister clades with a strong basal support to both genera, low support for the *Phaeophleospora* basal branch, but strong support for the *Lecanosticta* basal branch. Surprisingly, the species *Cytostagonospora martiniana* clustered in the *Phaeophleospora* clade, and *Phaeophleospora parsonsiae* seemed to have some affinity to *Lecanosticta*. Until more species and further data are available to clarify this situation, however, we refrain from proposing any new combinations, since our phylogenies will always suffer from undersampling, given the many thousands of taxa included in the family.

One of the major challenges encountered in the present study was that several isolates were sterile (e.g. *Sirosporium celtidis* and *Passalora daleae*) irrespective of all the attempts with changing culture media, incubation conditions, and adding plant substrates. This was either due to the age of the isolate, or isolates requiring their respective hosts to sporulate. Fortunately, some isolates could be linked to their original works and respective morphological descriptions (e.g. *Asperisporium vitiphyllum*). In addition, despite the large number of taxa in the family, many have been described without the deposit of a culture in a public collection, and will therefore need to be recollected in order to resolve their phylogenetic position, which will require an enormous effort. This problem extends in retrospective to many old and obscure genera, and therefore a review of the genera associated with *Mycosphaerellaceae* has been included in the present study in order to motivate the recollection of these obscure fungi, which will enable us to resolve their phylogenetic relationships.

The present study addresses several problematic taxa in *Mycosphaerellaceae* in the light of phylogenetic analysis and morphological characterisation. Although the type species of several genera have been reliably identified and typified, many genera remain unresolved or are in need of a more in-depth study (e.g. *Paramycosphaerella*). The reference cultures used in this paper have, however, been deposited in a public culture collection in order to promote further research on this important family of plant pathogenic fungi. What was known as *Mycosphaerella sensu* Aptroot (2006), now represents a great number of different genera accommodated in different families within *Dothideomycetes*. As more cultures become available, new patterns of coevolution with different fungal genera and their associated host families will emerge, which we hope will eventually lead to more clarity.

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