Phylogenetic lineages in *Pseudocercospora*

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Abstract: *Pseudocercospora* is a large cosmopolitan genus of plant pathogenic fungi that are commonly associated with leaf and fruit spots as well as blights on a wide range of plant hosts. They occur in arid as well as wet environments and in a wide range of climates including cool temperate, sub-tropical and tropical regions. *Pseudocercospora* is now treated as a genus in its own right, although formerly recognised as either an anamorphic state of *Mycosphaerella* or having *Mycosphaerella*-like teleomorphs. The aim of this study was to sequence the partial 28S nuclear ribosomal RNA gene of a selected set of isolates to resolve phylogenetic generic limits within the *Pseudocercospora* complex. From these data, 14 clades are recognised, six of which cluster in *Mycosphaerellaceae*. *Pseudocercospora s. str*. represents a distinct clade, sister to *Passalora eucalypti*, and a clade representing the genera *Scolecostigmina, Trochophora* and *Pallidocercospora* gen. nov., taxa formerly accommodated in the *Mycosphaerella heimii* complex and characterised by smooth, pale brown conidia, as well as the formation of red crystals in agar media. Other clades in *Mycosphaerellaceae* include *Sonderhenia*, *Microcyclosporella*, and *Paracercospora*. *Pseudocercosporella* resides in a large clade along with *Phloeospora*, *Miuraea*, *Cercospora* and *Septoria*. Additional clades represent *Dissoconiaceae*, *Teratosphaeriaceae*, *Cladosporiaceae*, and the genera *Xenostigmina*, *Strelitziana*, *Cyphellophora* and *Thedgonia*. The genus *Phaeomycocentrospora* is introduced to accommodate *Mycocentrospora cantuariensis*, primarily distinguished from *Pseudocercospora* based on its hyaline hyphae, broad conidiogenous loci and hila. Host specificity was considered for 146 species of *Pseudocercospora* occurring on 115 host genera from 33 countries. Partial nucleotide sequence data for three gene loci, ITS, EF-1α, and ACT suggest that the majority of these species are host specific. Species identified on the basis of host, symptomatology and general morphology, within the same geographic region, frequently differed phylogenetically, indicating that the application of European and American names to Asian taxa, and *vice versa*, was often not warranted.

Key words: *Capnodiales*, *Cercospora*, cercosporoid, *Mycosphaerella*, *Mycosphaerellaceae, Paracercospora, Pseudocercosporella,* Multi-Locus Sequence Typing (MLST), systematics.

Taxonomic novelties: New genera - *Pallidocercospora* Crous, *Phaeomycocentrospora* Crous, H.D. Shin & U. Braun; **New species -** *Cercospora eucommiae* Crous, U. Braun & H.D. Shin, *Microcyclospora quercina* Crous & Verkley, *Pseudocercospora ampelopsis* Crous, U. Braun & H.D. Shin, *Pseudocercospora cercidicola* Crous, U. Braun & C. Nakash., *Pseudocercospora crispans* G.C. Hunter & Crous, *Pseudocercospora crocea* Crous, U. Braun, G.C. Hunter & H.D. Shin, *Pseudocercospora haiweiensis* Crous & X. Zhou, *Pseudocercospora humulicola* Crous, U. Braun & H.D. Shin, *Pseudocercospora marginalis* G.C. Hunter, Crous, U. Braun & H.D. Shin, *Pseudocercospora ocimi-basilici* Crous, M.E. Palm & U. Braun, *Pseudocercospora plectranthi* G.C. Hunter, Crous, U. Braun & H.D. Shin, *Pseudocercospora proteae* Crous, *Pseudocercospora pseudostigmina-platani* Crous, U. Braun & H.D. Shin, *Pseudocercospora pyracanthigena* Crous, U. Braun & H.D. Shin, *Pseudocercospora ravenalicola* G.C. Hunter & Crous, *Pseudocercospora rhamnellae* G.C. Hunter, H.D. Shin, U. Braun & Crous, *Pseudocercospora rhododendri-indici* Crous, U. Braun & H.D. Shin, *Pseudocercospora tibouchinigena* Crous & U. Braun, *Pseudocercospora xanthocercidis* Crous, U. Braun & A. Wood, *Pseudocercosporella koreana* Crous, U. Braun & H.D. Shin; **New combinations -** *Pallidocercospora acaciigena* (Crous & M.J. Wingf.) Crous & M.J. Wingf., *Pallidocercospora crystallina* (Crous & M.J. Wingf.) Crous & M.J. Wingf., *Pallidocercospora heimii* (Crous) Crous, *Pallidocercospora heimioides* (Crous & M.J. Wingf.) Crous & M.J. Wingf., *Pallidocercospora holualoana* (Crous, Joanne E. Taylor & M.E. Palm) Crous, *Pallidocercospora konae* (Crous, Joanne E. Taylor & M.E. Palm) Crous, *Pallidoocercospora irregulariramosa* (Crous & M.J. Wingf.) Crous & M.J. Wingf., *Phaeomycocentrospora cantuariensis* (E.S. Salmon & Wormald) Crous, H.D. Shin & U. Braun, *Pseudocercospora hakeae* (U. Braun & Crous) U. Braun & Crous, *Pseudocercospora leucadendri* (Cooke) U. Braun & Crous, *Pseudocercospora snelliana* (Reichert) U. Braun, H.D. Shin, C. Nakash. & Crous, *Pseudocercosporella chaenomelis* (Y. Suto) C. Nakash., Crous, U. Braun & H.D. Shin; **Typifications: Epitypifications -** *Pseudocercospora angolensis* (T. Carvalho & O. Mendes) Crous & U. Braun, *Pseudocercospora araliae* (Henn.) Deighton, *Pseudocercospora cercidis-chinensis* H.D. Shin & U. Braun, *Pseudocercospora corylopsidis* (Togashi & Katsuki) C. Nakash. & Tak. Kobay., *Pseudocercospora dovyalidis* (Chupp & Doidge) Deighton, *Pseudocercospora fukuokaensis* (Chupp) X.J. Liu & Y.L. Guo, *Pseudocercospora humuli* (Hori) Y.L. Guo & X.J. Liu, *Pseudocercospora kiggelariae* (Syd.) Crous & U. Braun, *Pseudocercospora lyoniae* (Katsuki & Tak. Kobay.) Deighton, *Pseudocercospora lythri* H.D. Shin & U. Braun, *Pseudocercospora sambucigena* U. Braun, Crous & K. Schub., *Pseudocercospora stephanandrae* (Tak. Kobay. & H. Horie) C. Nakash. & Tak. Kobay., *Pseudocercospora viburnigena* U. Braun & Crous, *Pseudocercosporella chaenomelis* (Y. Suto) C. Nakash., Crous, U. Braun & H.D. Shin, *Xenostigmina zilleri* (A. Funk) Crous; **Lectotypification** - *Pseudocercospora ocimicola* (Petr. & Cif.) Deighton; **Neotypifications** - *Pseudocercospora kiggelariae* (Syd.) Crous & U. Braun, *Pseudocercospora lonicericola* (W. Yamam.) Deighton, *Pseudocercospora zelkovae* (Hori) X.J. Liu & Y.L. Guo.

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INTRODUCTION

Until recently, *Pseudocercospora* was treated as an anamorphic genus linked to *Mycosphaerella* (*Mycosphaerellaceae, Capnodiales*), along with approximately 30 other anamorphic genera (Crous 2009). The separation of the *Mycosphaerella* complex into families (Crous *et al*. 2007a, 2009b) and genera (Crous *et al*. 2009c) based on DNA sequence data and morphology had substantial implications for *Pseudocercospora*. *Pseudocercospora* is now recognised as a holomorphic genus in its own right, several

species of which have *Mycosphaerella*-like teleomorphs, for example, *Pseudocercospora fijiensis* and its *Mycosphaerella*-like teleomorph that cause black leaf streak of banana (Arzanlou *et al*. 2008). The name *Mycosphaerella* is restricted to species with *Ramularia* anamorphs (Verkley *et al*. 2004, Crous *et al*. 2009c, Koike *et al.* 2011), with *Ramularia* being an older name than *Mycosphaerella.* A single generic name is now used for species of *Pseudocercospora* (Hawksworth *et al*. 2011, Wingfield *et al.* 2011), in compliance with the recently accepted changes to the International Code of Nomenclature for algae, fungi and plants (ICN) adoped during the Botanical Congress in Sydney in 2011, in particular, the abolishment of Article 59 dealing with pleomorphic fungi.

Species of *Pseudocercospora* are well recognised as plant pathogens, endophytes or saprobes, with some used as biological control agents of weeds (Den Breeÿen *et al*. 2006). They occur on a large number of plants, many of which are important ornamentals or food crops including fruits, cereals and commercially propagated forest trees (Fig. 1). An early hypothesis was that the majority of *Pseudocercospora* species were strictly host specific. Later studies have reported that a few species occur on different hosts belonging to a single plant family (Deighton 1976, 1979), although DNA data or inoculation studies to support wider host ranges has often been lacking.

The classic monograph of the hyphomycete genus *Cercospora* (Chupp 1954) considered morphological features, including the structure of conidiomata as well as conidial pigmentation, septation, wall thickness, length, width, and shape as valuable features to define species within the genus. Chupp's circumscription of *Cercospora* was rather broadly defined, and the genus was later shown to be extremely heterogenous (Deighton 1976). Deighton (1976) distinguished different groups within *Cercospora* based on characters such as superficial mycelium (and the texture thereof), conidial scar type, conidiophore and conidium pigmentation, septation, and conidial catenulation. These additional features resulted in many *Cercospora* species being transferred to several alternative genera such as *Cercosporella*, *Mycocentrospora*, *Mycovellosiella*, *Phaeoramularia*, *Paracercospora*, *Passalora*, *Pseudocercospora, Ramularia*, *Stenella* and *Stigmina* (Deighton 1971, 1976, 1979, 1987, Braun 1995, 1998). A subsequent morphological treatment of names published in *Cercospora* (Crous & Braun 2003) provided some rationalisation, with the following concepts proposed for the taxonomic treatment of cercosporoid fungi: structure of conidiogenous loci (scars) and hila, as either unthickened (or almost so, but slightly darkened or refractive) or unthickened; presence or absence of pigmentation in conidiophores and conidia.

Pseudocercospora was originally introduced by Spegazzini (1910) based on the type species *Pseudocercospora vitis*, a foliar pathogen of grapevines. The majority of *Pseudocercospora* species known to date are regarded as pathogens on a wide variety of plants, predominantly in tropical and sub-tropical environments where they cause leaf spots, blights, fruit spot and fruit rot (Chupp 1954, Deighton 1976, von Arx 1983, Pons & Sutton 1988). Some important plant pathogens include the species associated with Sigatoka disease on banana (Arzanlou *et al*. 2007, 2008, 2010, Churchill 2010), angular leaf spot of bean (Crous *et al.* 2006), husk spot of macadamia (Beilharz *et al.* 2003), Cercospora leaf spot of olive (Ávila *et al.* 2005), cactus (Ayala-Escobar *et al.* 2005), avocado (Deighton 1976), and eucalypts (Braun & Dick 2002). The importance of these diseases is also reflected in quarantine regulations, *e.g.* for *Pseudocercospora angolensis* the cause of fruit and leaf spot disease on citrus (Pretorius *et al*. 2003) (Fig. 2), and *P. pini-densiflorae* the cause of brown needle blight of pine (Evans 1984, Crous *et al.* 1990).

Pseudocercospora was established to accommodate synnematal analogues of *Cercospora,* as well as species that produce pigmented conidiogenous structures and conidia with neither thickened nor darkened conidial hila (Deighton 1976, Braun 1995) (Fig. 3). It was proposed that *Pseudocercospora* be divided into several genera (Deighton 1976) based on morphological differences, a view later supported by several authors (Pons & Sutton 1988, Braun 1995, Crous & Braun 1996). Since the first study applied DNA phylogenetic analyisis to species in the *Mycosphaerella* complex (Stewart *et al.* 1999), *Pseudocercospora* has been shown to be heterogenous, accommodating hundreds of species (Crous *et al*. 2000, 2001, Crous & Braun 2003).

There are very few morphological features that are informative at the generic level within the *Pseudocercospora* complex. Deighton (1983) found it difficult to distinguish *Cercoseptoria* from *Pseudocercospora* on the basis of conidial shape, with conidia in the former genus acicular and those in the latter obclavate to cylindrical. In delimiting *Pseudocercospora* as an anamorph of *Mycosphaerella*, von Arx (1983) considered *Pseudocercospora* together in a group of related genera characterised by hyaline or subhyaline conidiogenous structures and unthickened, truncate, flat and broad conidiogenous loci. Later, Braun (1992) and Crous *et al*. (2000) argued that the arrangement of the conidiophores did not distinguish between sections within *Pseudocercospora* due to transitions from solitary to fasciculate to subsynnematal conidiophores. Crous *et al*. (2001) also regarded the slight thickening of conidial scars as a taxonomically uninformative generic character.

DNA sequence data for various gene regions have in recent years provided substantial information to support the generic circumscription of *Pseudocercospora*. Several studies have employed DNA sequence data from the Internal Transcribed Spacer (ITS) region of the rDNA operon for *Pseudocercospora* species from various hosts. Crous *et al*. (2000) examined isolates of *Pseudocercospora* from *Eucalyptus* and found that they could be separated into two clades within *Mycosphaerella.* Another clade of *Pseudocercospora* species occurred on banana, indicating that *Pseudocercospora* could be polyphyletic within the *Mycosphaerella* complex. Further evidence supporting this view emerged in subsequent studies that included many *Pseudocercospora* isolates (Crous *et al*. 2001). These phylogenetic studies have shown that several other genera are congeneric with *Pseudocercospora* and thus *Cercostigmina*, *Paracercospora*, *Phaeoisariopsis* and *Pseudophaeoramularia* were reduced to synonymy with *Pseudocercospora* (Stewart *et al*. 1999, Crous *et al*. 2001, Braun & Hill 2002, Crous *et al.* 2006). Based on these studies, the necessity arose to conserve *Pseudocercospora* over *Stigmina*, which represented an older generic name (Braun & Crous 2006).

Extensive DNA-based phylogenetic research has in recent years been conducted on *Mycosphaerella* and many of its anamorphic genera. These studies have not provided substantial resolution of *Pseudocercospora*. The aims of this study were to define phylogenetic lineages (reflecting genera) within what is perceived to be *Pseudocercospora.* An additional aim was to use the molecular data to infer host range and thus to consider the importance of host specificity in this important genus.

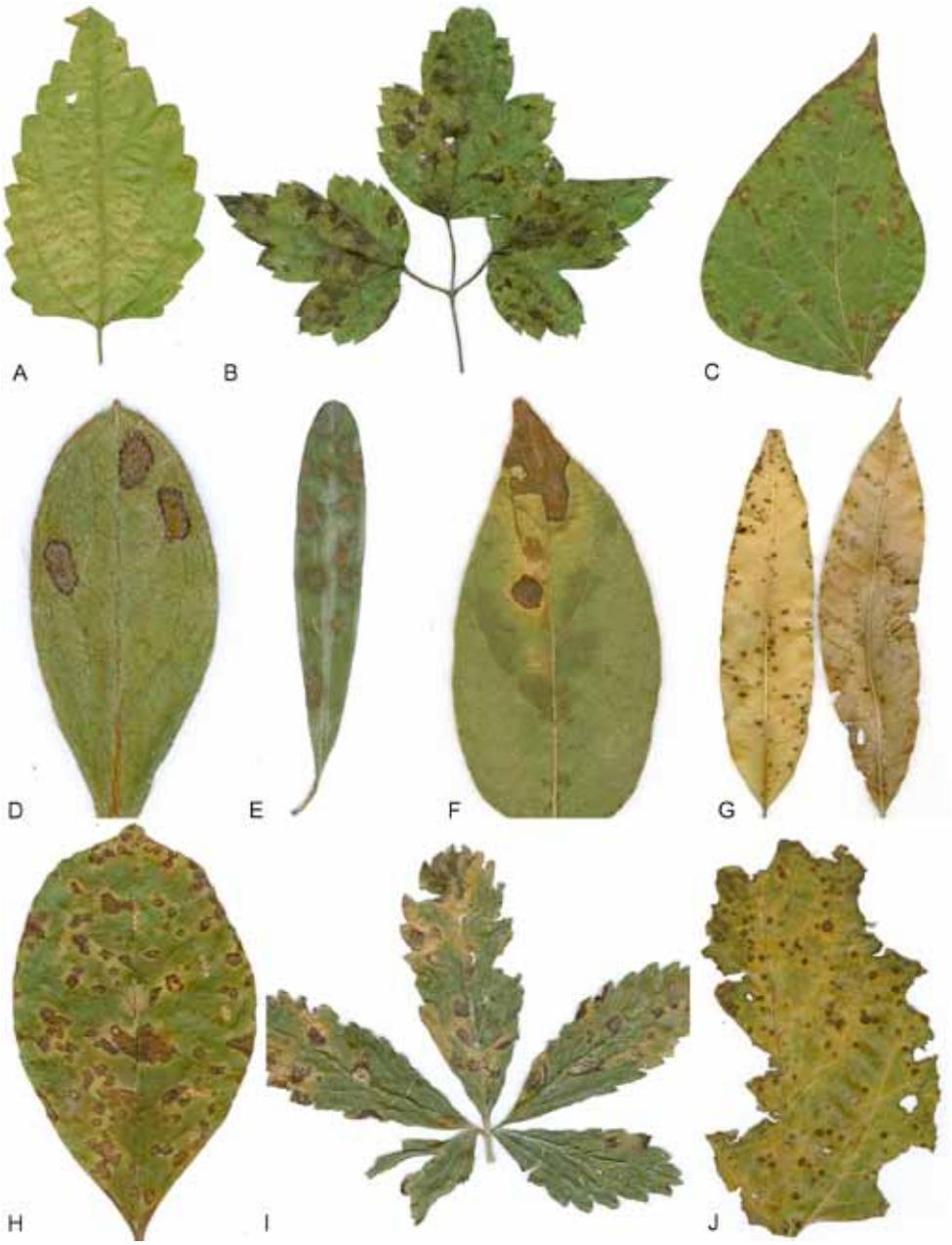

Fig. 1. Leaf spot symptoms associated with various species from the *Pseudocercospora* complex. A. *P. fatouae* on *Fatoua villosa*. B. *P. clematidis* on *Clematis apiicola*. C. *P. griseola* on *Phaseolus vulgaris*. D. *P. rhododendron-indici* on *Rhododendron indicum.* E. *P. pyracanthae* on *Pyracantha angustifolia*. F. *P. lonicericola* on *Lonicera japonica*. G. *Scolecostigmina mangiferae* on *Mangifera indica*. H. *P. fraxinites* on *Fraxinus rhynchophylla*. I. *Pseudocercosporella potentillae* on *Potentilla kleiniana*. J. *Pseudocercospora udagawana* on *Hovenia dulcis*.

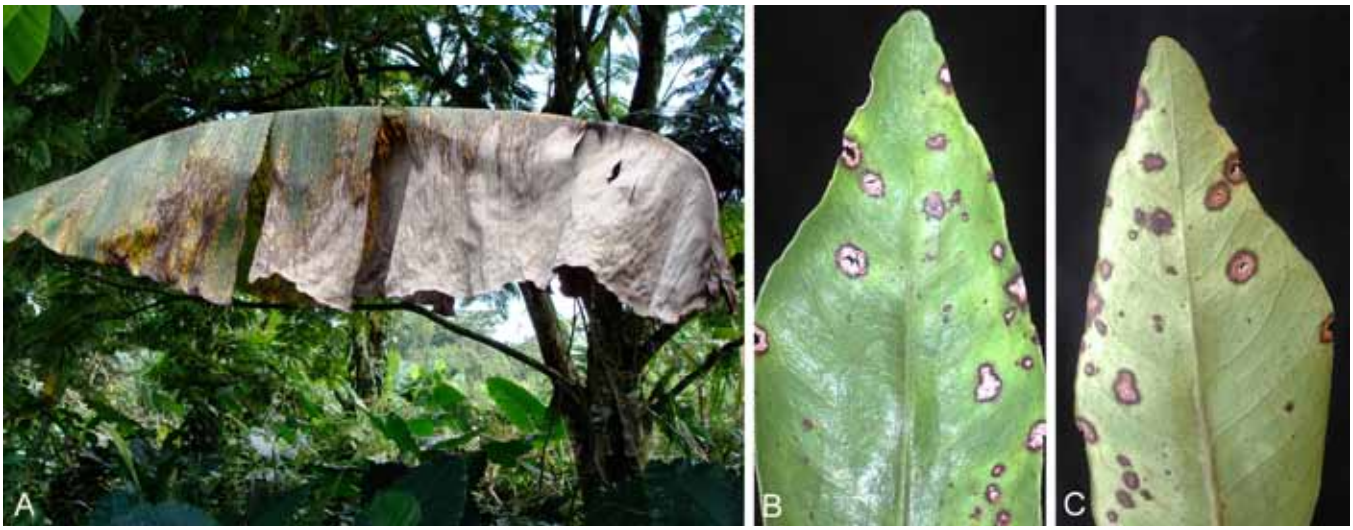

Fig. 2. *Pseudocercospora* species of quarantine importance. A. *P. fijiensis* on *Musa* (Black Leaf Streak or Black Sigatoka) (Photo G.H.J. Kema). B, C. *P. angolensis* on *Citrus* (Phaeoramularia Fruit and Leaf Spot).

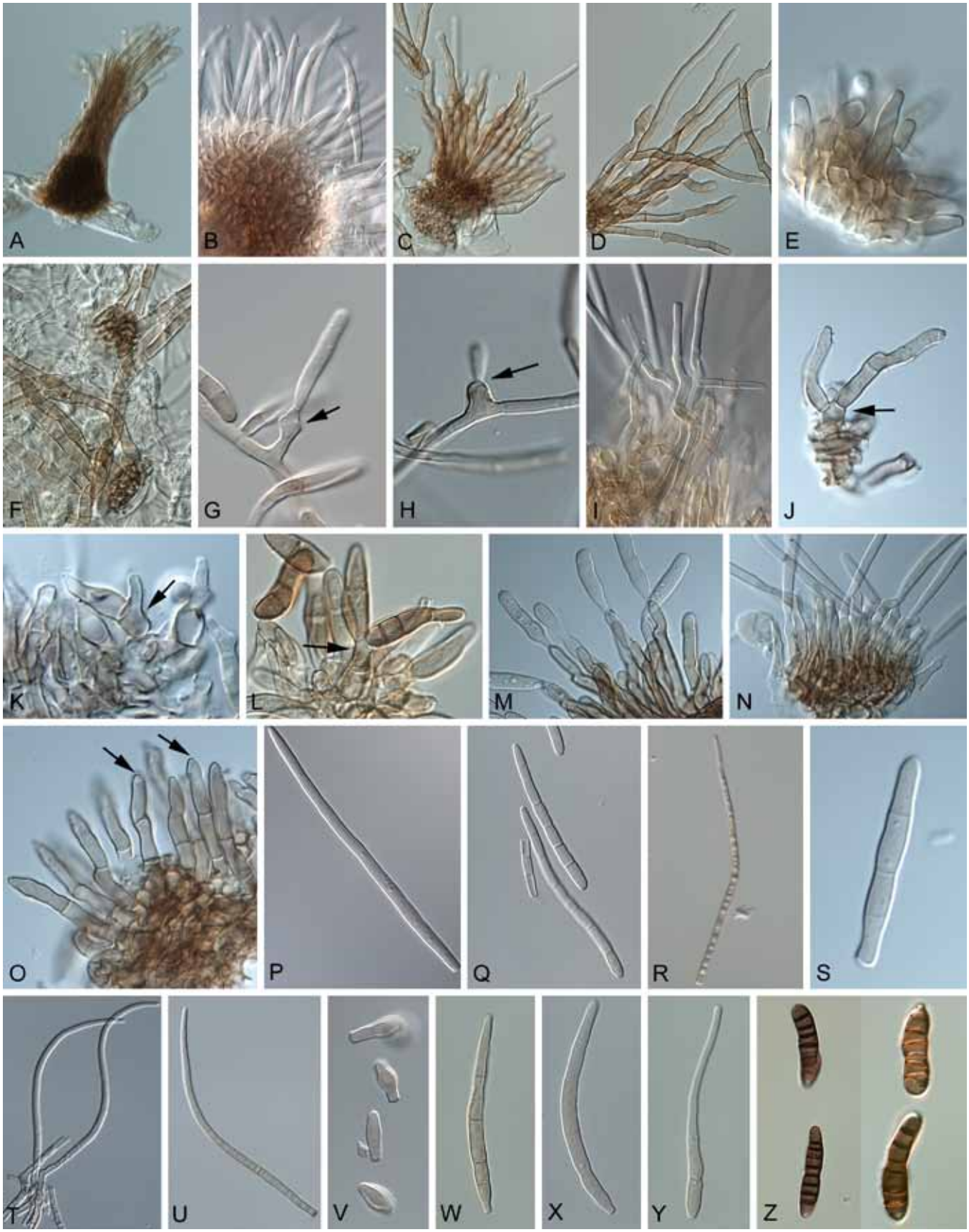

Fig. 3. Morphological structures of *Pseudocercospora* spp. A. Synnematous conidiophore. B. Densely aggregated fascicle of conidiophores with well-developed brown stroma. C, D. Loosely branched fascicles of conidiophores with moderate (C) and poorly (D) developed brown stroma. E. Fascicle reduced to conidiogenous cells. F. Conidiophore fascicles arising from stomata. G, H. Solitary conidiogenous cells on superficial hyphae. I. Geniculate conidiophore (arrow) with truncate apical locus. J, K. Conidiophores branched below (arrows). L. Conidiogenous cells with percurrent proliferations (arrows). M, N. Conidiophores with sympodial proliferation. O. Conidiophores with conidiogenous cells (note minutely thickened scars, arrows). P. Subcylindrical conidium with subacute apex and truncate base. Q. Conidia with constrictions at septa. R. Conidium with guttules. S. Cylindrical conidium with obtuse apex, and truncate base. T. Undulate conidia. U. Curved conidium. Aseptate to 1-septate conidia. V. 1-septate conidia. W, X. Obclavate conidia with obconical base. Y. Obclavate conidium with short obconical base. Z. Dark brown, muriformly euseptate conidia (thick-walled, not distoseptate).

MATERIALS AND METHODS

Isolates

Direct isolations were made from fascicles of conidiophores on leaves. Some leaves were incubated in moist chambers for up to 1 wk to enhance sporulation before single conidial colonies were established on 2 % malt extract agar (MEA) (Crous 2002). Leaf spots bearing ascomata were soaked in water for approximately 2 h, after which they were attached to the inner surface of Petri dish lids over plates containing MEA. Ascospore germination patterns were examined after 24 h, and single ascospore and conidial cultures established as described previously (Crous *et al*. 1991, Crous 1998). Colonies were sub-cultured onto synthetic nutrient-poor agar (SNA), potato-dextrose agar (PDA), oatmeal agar (OA), and MEA (Crous *et al.* 2009d), and incubated at 25 °C under continuous near-ultraviolet light to promote sporulation. Isolates were also sourced from the culture collections of the CBS-KNAW Fungal Biodiversity Centre (CBS), the working collection of Pedro Crous (CPC), Chiharu Nakashima (CNS) and the culture collection of the laboratory of plant pathology, Mie University, Japan (MUCC), and the mycological herbarium of Mie University (MUMH). Furthermore, isolates representing fungal species from genera allied to *Pseudocercospora, e.g. Cercospora*, *Cercostigmina*, *Cyphellophora*, *Davidiella*, *Dissoconium*, *Miuraea*, *Mycocentrospora*, *Passalora*, *Phaeoisariopsis*, *Phleospora*, *Septoria*, *Strelitziana*, *Stigmina, Teratosphaeria*, *Thedgonia*, *Trochophora,* and *Xenostigmina*, were included in this study (Table 1).

DNA isolation

Mycelium from actively growing fungal cultures was scraped from the surface of MEA or PDA plates using a sterile scalpel blade. Harvested mycelium was ground to a fine powder using liquid nitrogen and DNA was isolated using the CTAB extraction protocol as outlined by Crous *et al*. (2009d) or the UltraClean™ Microbial DNA Isolation Kit (MoBio Laboratories, Inc., Solana Beach, CA, USA) following the manufacturers' protocols. Isolated DNA was visualised by electrophoresis in 1 % agarose gels (w/v) stained with ethidium bromide and viewed under near ultra-violet light. DNA concentrations were determined by measuring electrophoresed DNA samples against a HyperLadder™ I molecular marker (BIOLINE) or alternatively by a NanoDrop quantification as outlined by the manufacturer.

PCR amplification

DNA isolated from fungal isolates was used as template for further Polymerase Chain Reaction (PCR) amplifications. Four nuclear gene regions were targeted for PCR amplification and subsequent sequencing. These regions included the Internal Transcribed Spacer regions ITS-1, ITS-2 and the 5.8S nrRNA gene regions (ITS), the first 900 bp of the Large Subunit (28S, LSU) (domains D1–D3) of the rDNA operon and partial gene regions of the translation elongation factor 1-alpha (EF-1α) and the actin (ACT) genes.

The ITS region was amplified using primers ITS-1 or ITS-5 and ITS-4 (White *et al*. 1990) while primers used for amplification of the LSU region were LR0R (Rehner & Samuels 1994) or LSU1Fd (Crous *et al*. 2009b) and LR5 or LR7 (Vilgalys & Hester 1990). Primers employed for the amplification of EF-1α included EF1-728F and EF1-986R (Carbone & Kohn 1999) or EF-2 (O'Donnell *et al*. 1998) while ACT-512F and ACT-783R (Carbone & Kohn 1999) were used to amplify a portion of the ACT gene. All PCR reaction mixtures and conditions followed those outlined by Hunter *et al*. (2006b). Following PCR amplification, amplicons were visualized on 1.5 % agarose gels stained with ethidium bromide and viewed under ultra-violet light and sizes of amplicons were determined against a HyperLadder™ I molecular marker (BIOLINE). The PCR amplicons for the four loci were subsequently diluted 1 to 10 times in preparation for further DNA sequencing reactions.

DNA sequencing and phylogenetic inference

PCR amplicons of the four gene regions targeted in this study served as templates for DNA sequencing reactions with the BigDye® Terminator Cycle Sequencing Kit v. 3.1 (Applied Biosystems Life Technologies, Carlsbad, CA, USA) following the protocol of the manufacturer. DNA sequencing reactions used the same primers as those for the PCR reactions. However, additional internal primers LR3R (http://www.biology.duke.edu/fungi/mycolab/primers.htm), LR16 (Moncalvo *et al*. 1993) and LR5 were used to sequence the LSU in order to obtain reliable sequences spanning the entire D1-D3 region. DNA sequencing amplicons were purified through Sephadex® G-50 Superfine columns (Sigma Aldrich, St. Louis, MO) in MultiScreen HV plates (Millipore, Billerica, MA). Purified sequence reactions were run on an ABI Prism 3730xl DNA Sequencer (Life Technologies, Carlsbad, CA, USA).

Generated DNA sequence electropherograms were analysed using MEGA (Molecular Evolutionary Genetics Analysis) v. 4.0 (Tamura *et al*. 2007), 4Peaks v. 1.7.2 (http://www.mekentosj.com/) and SeqMan v. 8.0.2. from the DNASTAR Lasergene® software package. Consensus sequences were generated and imported into MEGA for initial alignment and the construction of sequence datasets. DNA sequences representing isolates of closely allied genera, for which material could not be obtained were downloaded from the NCBI GenBank nucleotide database (www.ncbi.nlm.nih.gov) and added to the DNA sequence datasets generated in this study. Sequence datasets for the four genomic loci were aligned in MAFFT ("Multiple alignment program for amino acids or nucleotide sequences") v. 6.0 (Katoh & Toh 2006, Katoh *et al*. 2005; http://mafft.cbrc.jp/alignment/server/index.html) using the Auto alignment strategy with the 200PAM/ K=2 scoring matrix and a gap opening penalty of 1.53 with an offset value of 0.0. Resulting sequence alignments were manually evaluated and adjusted in MEGA, MacClade v.4.08 (Maddison & Maddison 2000) or Sequence Alignment Editor v. 2.0a11 (Rambaut 2002).

A phylogenetic re-construction was conducted for the aligned LSU data set to determine generic relationships using MrBayes v. 3.1.2 (Ronquist & Huelsenbeck 2003). Subsequently, a species level phylogeny was derived from the combined ITS, ACT and EF-1α alignment of *Pseudocercospora* s. str. sequences using PAUP v. 4.0b10 (Swofford 2003). For the LSU alignment, MrModeltest v. 2.2 (Nylander 2004) was used to determine the best nucleotide substitution model settings for MrBayes. Based on the results of the MrModeltest, a phylogenetic analysis was performed with MrBayes v. 3.1.2 applying a general time-reversible (GTR) substitution model with inverse gamma rates and dirichlet base frequencies and a heating parameter set at 0.3. The Markov Chain Monte Carlo (MCMC) analysis of 4 chains started in parallel from a random tree topology and had 8 000 000 generations. Trees were saved each

Table 1. *Pseudocercospora* and *Pseudocercospora*-like isolates included in the morphological and/or phylogenetic analyses.

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
Cercospora eucommiae	CPC 10047	H.D. Shin	*Eucommia ulmoides*	*Eucommiaceae*	South Korea	GU253741	GU269702	GU384418	GU320406
	CPC 10802; CBS 131932	H.D. Shin	*Eucommia ulmoides*	*Eucommiaceae*	South Korea	GU214674	GU269851/ GU214674	GU384563	GU320555
	CPC 11508; CBS 132026	H.D. Shin	*Eucommia ulmoides*	*Eucommiaceae*	South Korea	GU253742	GU269703	GU384419	GU320407
Cercospora sojina	CPC 12322; CBS 132018	H.D. Shin	*Glycine soja*	*Fabaceae*	South Korea	GU253861	GU214655	JQ324984	JQ325008
Cyphellophora eucalypti	CBS 124764; CPC 13412	P.W. Crous	*Eucalyptus* sp.	*Myrtaceae*	Australia	GQ303305	GQ303274	GU384510	JQ325009
Dissoconium dekkeri	CBS 110748; CPC 825; CMW 14906	G. Kemp	*Eucalyptus grandis*	*Myrtaceae*	South Africa	GU214422	AF173315	JQ324985	DQ147651
Microcyclospora quercina	CPC 10712; CBS 130827	G. Verkley	*Quercus* sp.	*Fagaceae*	Netherlands	GU214681	GU269789	GU384499	GU320490
Miuraea persicae	CPC 10069; CBS 132307	H.D. Shin	*Prunus persica*	*Rosaceae*	South Korea	GU253859	GU269843	GU384556	GU320546
	CPC 10828; CBS 131935	H.D. Shin	*Prunus armeniaca*	*Rosaceae*	South Korea	JQ324939	GU269844	GU384557	GU320547
"Mycosphaerella" laricina	CBS 326.52	E. Müller	*Larix decidua*	*Pinaceae*	Switzerland	GU253693	GU269643	GU384361	GU320353
"Mycosphaerella" madeirae	CBS 112895; CPC 3745	S. Denman	*Eucalyptus globulus*	*Myrtaceae*	Portugal	DQ204756	AY725553	DQ211672	DQ147641
"Mycosphaerella" marksii	CBS 110920; CPC 935; CMW 5150	A.J. Carnegie	*Eucalyptus botryoides*	*Myrtaceae*	Australia	DQ246250/ GU253694	AF309588/ GU269644	DQ235134	DQ147625
Pallidocercospora acaciigena	CBS 112516; CPC 3838	M.J. Wingfield	*Acacia mangium*	*Fabaceae*	Venezuela	GU214661/ GU253697	GU269648	GU384366	GU320356
	CBS 120740; CPC 13290	B. Summerell	*Eucalyptus* sp.	*Myrtaceae*	Australia	GU253698	EF394822/ GU269649	GU384367	GU320357
Pallidocercospora crystallina	CBS 681.95; CBS 116158; CPC 802; CMW 3033	M.J. Wingfield	*Eucalyptus bicostata*	*Myrtaceae*	South Africa	DQ204747	AY490757	DQ147636/ DQ211662	DQ147636
Pallidocercospora heimii	CBS 110682; CPC 760; CMW 4942	P.W. Crous	*Eucalyptus* sp.	*Myrtaceae*	Madagascar	DQ204751	AF309606	DQ211667	DQ147638
Pallidocercospora heimioides	CBS 111190; CPC 1312; CMW 3046	M.J. Wingfield	*Eucalyptus* sp.	*Myrtaceae*	Indonesia	DQ204753	AF309609	DQ211669	DQ147633
Pallidocercospora irregulariramosa	CBS 114774; CBS 114777; CPC 1360; CMW 4943	M.J. Wingfield	*Eucalyptus saligna*	*Myrtaceae*	South Africa	DQ204754	AF309607	DQ211670	DQ147634
Pallidocercospora konae	CBS 120748; CPC 13469	W. Himaman	*Eucalyptus camaldulensis*	*Myrtaceae*	Thailand	GU253852	EF394842	GU384549	GU320538
Paracercospora egenula	CBS 485.81	N. Ponnapa	*Solanum melongena*	*Solanaceae*	India	JQ324940	GU269699	GU384415	GU320403
	CPC 12537; CBS 132030	H.D. Shin	*Solanum melongena*	*Solanaceae*	South Korea	GU253738	GU269698	GU384414	GU320402
	MUCC 883	T. Mikami	*Solanum melongena*	*Solanaceae*	Japan	GU253739	GU269700	GU384416	GU320404
Passalora eucalypti	CBS 111318; CPC 1457	P.W. Crous	*Eucalyptus saligna*	*Myrtaceae*	Brazil	GU253860	GU269845	GU384558	GU320548
Phaeomycocentrospora cantuariensis	CPC 10157	H.D. Shin	*Humulus scandens*	*Cannabaceae*	South Korea	GU253712	GU269664	GU384381	GU320370
	CPC 10762; CBS 131928	H.D. Shin	*Luffa cylindrica*	*Cucurbitaceae*	South Korea	GU253713	GU269665	GU384382	GU320371

Table 1. (Continued).

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
	CPC 11646; CBS 132013	H.D. Shin	*Acalypha australis*	*Euphorbiaceae*	South Korea	GU253715	GU269667	GU384384	GU320373
	CPC 11694; CBS 132014	H.D. Shin	*Humulus scandens*	*Cannabaceae*	South Korea	GU253716	GU269668	GU384385	GU320374
Phloeospora ulmi	CBS 344.97	W. Gams	*Ulmus glabra*	*Ulmaceae*	Austria	GU253841	JQ324974	JQ324986	GU320528
	CBS 613.81	H.A. Van der Aa	*Ulmus* sp.	*Ulmaceae*	Austria	GU253842	GU269825	JQ324987	GU320529
Pseudocercospora abelmoschi	CPC 14478; CBS 132103	H.D. Shin	*Hibiscus syriacus*	*Malvaceae*	South Korea	GU253696	GU269647	GU384365	GU320355
Pseudocercospora acericola	CBS 122279	R. Kirschner	*Acer albopurpurascens*	*Aceraceae*	Taiwan	GU253699	GU269650	GU384368	GU320358
Pseudocercospora ampelopsis	CPC 11680; CBS 131583	H.D. Shin	*Ampelopsis brevipenduncula* var. *heterophylla*	*Vitaceae*	South Korea	GU253846	GU269830	GU384542	GU320534
Pseudocercospora angolensis	CBS 112933; CPC 4118	M.C. Pretorius	*Citrus* sp.	*Rutaceae*	Zimbabwe	GU214470	AY260063/ GU269836	GU384548	JQ325010
	CBS 149.53	T. de Carvalho & O. Mendes	*Citrus sinensis*	*Rutaceae*	Angola	JQ324941	JQ324975	JQ324988	JQ325011
Pseudocercospora araliae	CPC 10154	H.D. Shin	*Aralia elata*	*Araliaceae*	South Korea	GU253701	GU269652	GU384370	GU320360
	MUCC 873	T. Kobayashi & C. Nakashima	*Aralia elata*	*Araliaceae*	Japan	GU253702	GU269653	GU384371	GU320361
Pseudocercospora arecacearum	CBS 118406	C.F. Hill	*Rhopalostylis sapidis*	*Arecaceae*	New Zealand	GU253704	GU269655	GU384373	GU320363
	CBS 118792	C.F. Hill	*Howea forsteriana*	*Arecaceae*	New Zealand	GU253703	GU269654	GU384372	GU320362
Pseudocercospora assamensis	CBS 122467	I. Buddenhagen	*Musa cultivar*	*Musaceae*	India	GU253705	GU269656	GU384374	GU320364
Pseudocercospora atromarginalis	CBS 114640	C.F. Hill	*Solanum* sp.	*Solanaceae*	New Zealand	GU253706	GU269658	GU384376	GU320365
	CPC 11372; CBS 132010	H.D. Shin	*Solanum nigrum*	*Solanaceae*	South Korea	GU214671	GU269657	GU384375	—
Pseudocercospora balsaminae	CPC 10044; CBS 131882	H.D. Shin	*Impatiens textori*	*Balsaminaceae*	South Korea	GU253708	GU269660	GU384379	GU320367
Pseudocercospora basiramifera	CBS 111072; CPC 1266	M.J. Wingfield	*Eucalyptus pellita*	*Myrtaceae*	Thailand	GU253709	GU269661	DQ211677	GU320368
	CBS 114757; CPC 1267	M.J. Wingfield	*Eucalyptus pellita*	*Myrtaceae*	Thailand	GU253802	GU269781	GU384492	GU320484
Pseudocercospora basitruncata	CBS 114664; CPC 1202	M.J. Wingfield	*Eucalyptus grandis*	*Myrtaceae*	Colombia	GU253710/ DQ204759	DQ267600/ GU269662	DQ211675	DQ147622
Pseudocercospora callicarpae	MUCC 888	T. Kobayashi	*Callicarpa japonica*	*Verbenaceae*	Japan	GU253711	GU269663	GU384380	GU320369
Pseudocercospora catalpigena	MUCC 743	C. Nakashima & I. Araki	*Catalpa ovata*	*Bignoniaceae*	Japan	GU253731	GU269690	GU384406	GU320395
Pseudocercospora catappae	MUCC 809	C. Nakashima & T. Akashi	*Terminalia catappa*	*Combretaceae*	Japan	GU253717	GU269669	GU384386	GU320375
Pseudocercospora cercidicola	MUCC 896	T. Kobayashi & Y. Kobayashi	*Cercis chinensis*	*Fabaceae*	Japan	GU253719	GU269671	GU384388	GU320377
Pseudocercospora cercidis-chinensis	CPC 14481; CBS 132109	H.D. Shin	*Cercis chinensis*	*Fabaceae*	South Korea	GU253718	GU269670	GU384387	GU320376
Pseudocercospora cf. *cruenta*	CBS 117232	R. Kirschner	*Phaseolus vulgaris*	*Fabaceae*	Taiwan	GU253730	GU269689	GU384405	GU320394
Pseudocercospora cf. *kaki*	CPC 10636; CBS 131921	H.D. Shin	*Diospyros lotus*	*Ebenaceae*	South Korea	GU214677	GU269728	GU384441	GU320430

Table 1. (Continued).

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
Pseudocercospora chengtuensis	CPC 10696; CBS 131924	H.D. Shin	*Lycium chinense*	*Solanaceae*	South Korea	JQ324942	GU269673	GU384390	GU320379
	MUCC 828	I. Araki & M. Harada	*Lycium chinense*	*Solanaceae*	Japan	JQ324943	—	—	—
Pseudocercospora chionanthi-retusi	CPC 14683; CBS 132110	H.D. Shin	*Chionanthus retusus*	*Oleaceae*	South Korea	GU253721	GU269674	GU384391	GU320380
Pseudocercospora chrysanthemicola	CPC 10633; CBS 131888	H.D. Shin	*Chrysanthemum* sp.	*Asteraceae*	South Korea	GU253722	GU269675	GU384392	GU320381
Pseudocercospora cladosporioides	CBS 117482; CPC 10913	P.W. Crous	*Olea europaea*	*Oleaceae*	Tunisia	JQ324944	GU269678	GU384395	GU320383
"Pseudocercospora" colombiensis	CBS 110969; CPC 1106; CMW 4944	M.J. Wingfield	*Eucalyptus urophylla*	*Myrtaceae*	Colombia	DQ204744	AY752149	DQ211660	DQ147639
Pseudocercospora contraria	CPC 14714; CBS 132108	H.D. Shin	*Dioscorea quinqueloba*	*Dioscoreaceae*	South Korea	JQ324945	GU269677	GU384394	GU320385
Pseudocercospora coprosmae	CBS 114639	C. F. Hill	*Coprosma robusta*	*Rubiaceae*	New Zealand	JQ324946	GU269680	GU384397	GU320386
Pseudocercospora cordiana	CBS 114685; CPC 2552	P.W. Crous & R.L. Benchimol	*Cordia goeldiana*	*Boraginaceae*	Brazil	GU214472	AF362054/ GU269681	GU384398	GU320387
Pseudocercospora coriariae	MUCC 840	I. Araki & M. Harada	*Coriaria japonica*	*Coriariaceae*	Japan	GU253725	GU269682	GU384399	GU320388
Pseudocercospora cornicola	MUCC 909	C. Nakashima & E. Imaizumi	*Cornus alba* var. *sibirica*	*Cornaceae*	Japan	GU253726	GU269683	GU384400	GU320389
Pseudocercospora corylopsidis	MUCC 874	T. Kobayashi & C. Nakashima	*Hamamelis japonica*	*Hamamelidaceae*	Japan	GU253757	GU269721	GU384437	GU320425
	MUCC 908	C. Nakashima & E. Imaizumi	*Corylopsis spicata*	*Hamamelidaceae*	Japan	GU253727	GU269684	GU384401	GU320390
Pseudocercospora cotoneastri	MUCC 876	T. Kobayashi & C. Nakashima	*Cotoneaster salicifolius*	*Rosaceae*	Japan	GU253728	GU269685	GU384402	GU320391
Pseudocercospora crispans	CPC 14883; CBS 125999	P.W.Crous	*Eucalyptus* sp.	*Myrtaceae*	South Africa	GU253825	GU269807	GU384518	GU320510
Pseudocercospora crocea	CPC 11668; CBS 126004	H.D. Shin	*Pilea hamaoi*	*Urticaceae*	South Korea	JQ324947	GU269792	GU384502	GU320493
Pseudocercospora crousii	CBS 119487	C.F. Hill	*Eucalyptus* sp.	*Myrtaceae*	New Zealand	GU253729	GU269686	GU384403	GU320392
Pseudocercospora cruenta	CPC 10846; CBS 132021	H. Booker	*Vigna* sp.	*Fabaceae*	Trinidad	GU214673	GU269688	GU384404	JQ325012
Pseudocercospora cydoniae	CPC 10678; CBS 131923	H.D. Shin	*Chaenomeles speciosa*	*Rosaceae*	South Korea	GU253732	GU269691	GU384407	GU320396
Pseudocercospora cymbidiicola	CBS 115132	C.F. Hill	*Cymbidium* sp.	*Orchidaceae*	New Zealand	GU253733	GU269692	GU384408	GU320397
Pseudocercospora davidiicola	MUCC 296	C. Nakashima & I. Araki	*Davidia involucrata*	*Nyssaceae*	Japan	GU253734	GU269693	GU384409	GU320398
Pseudocercospora dendrobii	MUCC 596	C. Nakashima & K. Motohashi	*Dendrobium* sp.	*Orchidaceae*	Japan	GU253737	GU269696	GU384412	GU320401
Pseudocercospora destructiva	MUCC 870	S. Uematsu & C. Nakashima	*Euonymus japonicus*	*Celastraceae*	Japan	GU253735	GU269694	GU384410	GU320399
Pseudocercospora dianellae	CBS 117746	C.F. Hill	*Dianella caerulae*	*Liliaceae*	New Zealand	GU253736	GU269695	GU384411	GU320400
Pseudocercospora dodonaeae	CBS 114647	C.F. Hill	*Dodonaea viscosa*	*Sapindaceae*	New Zealand	JQ324948	GU269697	GU384413	JQ325013
Pseudocercospora dovyalidis	CPC 13771; CBS 126002	P.W. Crous	*Dovyalis zeyheri*	*Flacourtiaceae*	South Africa	GU253818	GU269800	GU384513	GU320503
Pseudocercospora elaeocarpi	MUCC 925	C. Nakashima	*Elaeocarpus* sp.	*Elaeocarpaceae*	Japan	GU253740	GU269701	GU384417	GU320405
"Pseudocercospora" epispermogonia	CBS 110750; CPC 822	G. Kemp	*Eucalyptus grandis*	*Myrtaceae*	South Africa	DQ204757	DQ267596	DQ211673	DQ147629

Table 1. (Continued).

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
Pseudocercospora eucalyptorum	CBS 110777; CPC 16; CMW 5228	P.W. Crous	*Eucalyptus nitens*	*Myrtaceae*	South Africa	DQ204762	AF309598	DQ211678	DQ147614
	CBS 114242; CPC 10390; CMW 14908	J.P. Mansilla	*Eucalyptus globulus*	*Myrtaceae*	Spain	GU214481	AY725526	DQ211681	DQ147613/ GU320465
	CBS 116359; CPC 3751	P.W. Crous	*Eucalyptus* sp.	*Myrtaceae*	Madeira	GU253829	GU269812	GU384524	GU320514
	CPC 10500; CBS 114243	P.W. Crous	*Eucalyptus nitens*	*Myrtaceae*	New Zealand	JQ324949	AY725527	GU384474	JQ325014
	CPC 10507; CBS 116371	P.W.Crous	*Eucalyptus nitens*	*Myrtaceae*	New Zealand	JQ324950	GU269687	JQ324989	GU320393
	CPC 10916	P.W. Crous	*Eucalyptus* sp.	*Myrtaceae*	South Africa	GU253788	GU269763	GU384475	GU320464
	CPC 11713; CBS 132015	P. Mansilla	*Eucalyptus globulus*	*Myrtaceae*	Spain	JQ324951	GU269811	GU384523	JQ325015
	CPC 12406; CBS 132029	I. Smith	*Eucalyptus globulus*	*Myrtaceae*	Australia	GU253811	GU269793	GU384503	GU320494
	CPC 12568; CBS 132309	C. Mohammed	*Eucalyptus nitens*	*Myrtaceae*	Australia	GU253814	GU269796	GU384506	GU320497
	CPC 12802; CBS 132032	A. Phillips	*Eucalyptus globulus*	*Myrtaceae*	Portugal	GU253789	JQ324976	JQ324990	GU320466
	CPC 12957; CBS 132033	B. Summerell	*Eucalyptus deanei*	*Myrtaceae*	Australia	GU253815	GU269797	JQ324991	JQ325016
	CPC 13455; CBS 132034	P.W. Crous	*Eucalyptus* sp.	*Myrtaceae*	Portugal	GU253816	GU269798	GU384511	GU320501
	CPC 13769; CBS 132035	P.W. Crous	*Eucalyptus punctata*	*Myrtaceae*	South Africa	GU253707	GU269659	GU384378	GU320366
	CPC 13816; CBS 132114	S. Denman	*Eucalyptus glaucescens*	*Myrtaceae*	UK	GU253819	GU269801	JQ324992	GU320504
	CPC 13926; CBS 132105	S. Denman	*Eucalyptus* sp.	*Myrtaceae*	USA	GU253820	GU269802	JQ324993	GU320505
Pseudocercospora eupatoriella	CBS 113372	M.J. Morris	*Chromolaena odorata*	*Asteraceae*	Jamaica	GU253743	GU269704	GU384420	GU320408
Pseudocercospora eustomatis	CBS 110822	G. Dal Bello	*Eustroma grandiflorum*	*Gentianaceae*	Argentina	GU253744	GU269705	GU384421	GU320409
Pseudocercospora exosporioides	MUCC 893	T. Kobayashi	*Sequoia sempervirens*	*Taxodiaceae*	Japan	GU253746	GU269707	GU384423	GU320411
Pseudocercospora fijiensis	CBS 120258; CIRAD 86	J. Carlier	*Musa* sp.	*Musaceae*	Cameroon	JQ324952	EU514248	Genome[3]	Genome[3]
	MUCC 792	T. Kobayashi & C. Nakashima	*Musa* sp.	*Musaceae*	Japan	GU253776	GU269748	JQ324994	GU320450
Pseudocercospora flavomarginata	CBS 118841; CMW 13586	M.J. Wingfield	*Eucalyptus camaldulensis*	*Myrtaceae*	Thailand	DQ153306	DQ155657	DQ156548	DQ166513
	CBS 124990; CPC 13492	W. Himaman	*Eucalyptus camaldulensis*	*Myrtaceae*	Thailand	GU253817	GU269799	GU384512	GU320502
	CPC 14142; CBS 126001	X. Zhou	*Eucalyptus* sp.	*Myrtaceae*	China	GU253822	GU269804	GU384515	GU320507
Pseudocercospora fori	CBS 113285; CMW 9095	G.C. Hunter	*Eucalyptus grandis*	*Myrtaceae*	South Africa	DQ204748	AF468869	DQ211664	DQ147618
	CPC 14880; CBS 132113	P.W. Crous	*Eucalyptus* sp.	*Myrtaceae*	South Africa	GU253824	GU269806	GU384517	GU320509
Pseudocercospora fraxinites	CPC 10743; CBS 131927	H.D. Shin	*Fontanesia phillyraeoides*	*Oleaceae*	South Korea	GU253720	GU269672	GU384389	GU320378
	MUCC 891	T. Kobayashi	*Fraxinus excelsior*	*Oleaceae*	Japan	GU253748	GU269710	GU384426	GU320414
Pseudocercospora fukuokaensis	CPC 14689; CBS 132111	H.D. Shin	*Styrax japonicus*	*Styracaceae*	South Korea	GU253750	GU269713	GU384429	GU320417
	MUCC 887	T. Kobayashi	*Styrax japonicus*	*Styracaceae*	Japan	GU253751	GU269714	GU384430	GU320418

Table 1. (Continued).

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
Pseudocercospora fuligena	CPC 12296; CBS 132017	Z. Mersha	*Lycopersicon* sp.	*Solanaceae*	Thailand	JQ324953	GU269711	GU384427	GU320415
	MUCC 533	C. Nakashima	*Lycopersicon esculentum*	*Solanaceae*	Japan	GU253749	GU269712	GU384428	GU320416
Pseudocercospora glauca	CPC 10062; CBS 131884	H.D. Shin	*Albizzia julibrissin*	*Fabaceae*	South Korea	GU253752	GU269715	GU384431	GU320419
Pseudocercospora gracilis	CBS 243.94; CPC 730	P.W. Crous	*Eucalyptus urophylla*	*Myrtaceae*	Indonesia	DQ204750	DQ267582	DQ211666	DQ147616
Pseudocercospora griseola f. *griseola*	CBS 119112; CPC 10460	F.S. Ngulu & C. Mushi	*Phaseolus vulgaris*	*Fabaceae*	Tanzania	GU253753	GU269717	GU384433	GU320421
	CBS 194.47	—	*Phaseolus vulgaris*	*Fabaceae*	Portugal	JQ324954	DQ289801	JQ324995	DQ289868
	CBS 880.72	H.A. van Kesteren	*Phaseolus vulgaris*	*Fabaceae*	Netherlands	GU214476	GU269716	GU384432	GU320420
	CPC 10462	M.M. Liebenberg	*Phaseolus vulgaris*	*Fabaceae*	South Africa	GU253865	GU269849	GU384562	GU320553
	CPC 10480; CBS 131887	M.M. Liebenberg	*Phaseolus vulgaris*	*Fabaceae*	South Africa	GU253864	GU269848	GU384561	DQ289882
	CPC 10779; CBS 131929	H.D. Shin	*Phaseolus vulgaris*	*Fabaceae*	South Korea	GU253862	GU269846	GU384559	DQ289885
	CPC 12239	G. Mahuku	*Phaseolus vulgaris*	*Fabaceae*	Colombia	GU253863	GU269847	GU384560	DQ289887
Pseudocercospora guianensis	MUCC 855	C. Nakashima & T. Akashi	*Lantana camara*	*Verbenaceae*	Japan	GU253755	GU269719	GU384435	GU320423
	MUCC 879	C. Nakashima	*Lantana camara*	*Verbenaceae*	Japan	GU253756	GU269720	GU384436	GU320424
Pseudocercospora haiweiensis	CPC 14084; CBS 131584	X. Zhou	*Eucalyptus* sp.	*Myrtaceae*	China	GU253821	GU269803	GU384514	GU320506
Pseudocercospora hakeae	CBS 112226; CPC 3145	P.W. Crous & B. Summerell	*Grevillea* sp.	*Proteaceae*	Australia	GU253805	GU269784	GU384495	JQ325017
Pseudocercospora humuli	MUCC 742	C. Nakashima & I. Araki	*Humulus lupulus* var. *lupulus*	*Cannabaceae*	Japan	GU253758	GU269725	GU384439	GU320428
Pseudocercospora humulicola	CPC 10049; CBS 131883	H.D. Shin	*Humulus scandens*	*Cannabaceae*	South Korea	JQ324955	GU269724	JQ324996	JQ325018
	CPC 11358; CBS 131585	H.D. Shin	*Humulus scandens*	*Cannabaceae*	South Korea	JQ324956	GU269723	GU384438	GU320427
Pseudocercospora indonesiana	CBS 122473	I.W. Buddenhagen	*Musa* sp.	*Musaceae*	Sumatra	GU253765	GU269735	GU384448	GU320437/ EU514340
	CBS 122474	I.W. Buddenhagen	*Musa* sp.	*Musaceae*	Indonesia	JQ324957	EU514283	JQ324997	JQ325019
Pseudocercospora ixorae	CBS 118760	R. Kirschner	*Ixora* sp.	*Rubiaceae*	Taiwan	GU253759	GU269726	GU384440	GU320429
Pseudocercospora jussiaeae	CPC 14625; CBS 132117	H.D. Shin	*Ludwigia prostrata*	*Onagraceae*	South Korea	JQ324958	JQ324977	JQ324998	JQ325020
Pseudocercospora kaki	MUCC 900	S. Uematsu & C. Nakashima	*Diospyros kaki*	*Ebenaceae*	Japan	GU253761	GU269729	GU384442	GU320431
Pseudocercospora kiggelariae	CPC 11853; CBS 132016	W. Gams	*Kiggelaria africana*	*Flacourtiaceae*	South Africa	GU253762	GU269730	GU384443	GU320432
Pseudocercospora latens	MUCC 763	C. Nakashima & T. Akashi	*Lespedeza wilfordii*	*Fabaceae*	Japan	GU253763	GU269732	GU384445	GU320434
Pseudocercospora leucadendri	CPC 1869	S. Denman & P.W. Crous	*Leucadendron* sp.	*Proteaceae*	South Africa	GU214480	GU269842	GU384555	GU320545
Pseudocercospora libertiae	CBS 114643	C.F. Hill	*Libertia ixioides*	*Iridaceae*	New Zealand	JQ324959	GU269733	GU384446	GU320435
Pseudocercospora lilacis	CPC 12767; CBS 132031	C. Hodges	*Ligustrum japonicum*	*Oleaceae*	USA	GU253767	GU269737	GU384449	GU320439

Table 1. (Continued).

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
Pseudocercospora longispora	CBS 122470	D.R. Jones	*Musa* sp.	*Musaceae*	Malaysia	GU253764	GU269734	GU384447	GU320436/ EU514342
Pseudocercospora lonicericola	MUCC 889	T. Kobayashi	*Lonicera gracilipes* var. *glabra*	*Caprifoliaceae*	Japan	GU253766	GU269736	JQ324999	GU320438
Pseudocercospora luzardii	CPC 2556	A.C. Alfenas	*Hancornia speciosa*	*Apocynaceae*	Brazil	GU214477	AF362057/ GU269738	GU384450	GU320440
Pseudocercospora lyoniae	MUCC 910	C. Nakashima & E. Imaizumi	*Lyonia ovalifolia* var. *elliptica*	*Ericaceae*	Japan	GU253768	GU269739	GU384451	GU320441
Pseudocercospora lythracearum	CPC 10707; CBS 131925	H.D. Shin	*Lagerstroemia indica*	*Lythraceae*	South Korea	GU253769	GU269740	GU384452	GU320442
	MUCC 890	T. Kobayashi	*Lagerstroemia indica*	*Lythraceae*	Japan	GU253770	GU269741	GU384453	GU320443
Pseudocercospora lythri	CPC 14588; CBS 132115	H.D. Shin	*Lythrum salicaria*	*Lythraceae*	South Korea	GU253771	GU269742	GU384454	GU320444
	MUCC 865	I. Araki & M. Harada	*Lythrum salicaria*	*Lythraceae*	Japan	GU253772	GU269743	GU384455	GU320445
Pseudocercospora macrospora	CBS 114696; CPC 2553	P.W. Crous & R.L. Benchimol	*Bertholletia excelsa*	*Lecythidaceae*	Brazil	GU214478	AF362055/ GU269745	GU384457	GU320447
Pseudocercospora mali	MUCC 886	T. Kobayashi	*Malus sieboldii*	*Rosaceae*	Japan	GU253773	GU269744	GU384456	GU320446
Pseudocercospora marginalis	CPC 12497; CBS 131582	H.D. Shin	*Fraxinus rhynchophylla*	*Oleaceae*	South Korea	GU253812	GU269794	GU384504	GU320495
Pseudocercospora melicyti	CBS 115023	M. Fletcher	*Melicytus macrophyllus*	*Violaceae*	New Zealand	JQ324968	GU269769	GU384481	GU320472
Pseudocercospora metrosideri	CBS 118795	C.F. Hill	*Metrosideros collina*	*Myrtaceae*	New Zealand	GU253774	GU269746	GU384458	GU320448
Pseudocercospora musae	CBS 116634	J. Carlier	*Musa* sp.	*Musaceae*	Cuba	GU253775	GU269747	GU384459	GU320449
Pseudocercospora myrticola	MUCC 632	C. Nakashima & K. Motohashi	*Myrtus communis*	*Myrtaceae*	Japan	GU253777	GU269749	GU384460	GU320451
Pseudocercospora nandinae	CBS 117745	C.F. Hill	*Nandina domestica*	*Berberidaceae*	New Zealand	GU253778	GU269750	GU384461	GU320452
Pseudocercospora natalensis	CBS 111069; CPC 1263	T. Coutinho	*Eucalyptus nitens*	*Myrtaceae*	South Africa	DQ267576	DQ303077	JQ325000	DQ147620
	CBS 111071; CPC 1265	T. Coutinho	*Eucalyptus nitens*	*Myrtaceae*	South Africa	GU253801	GU269780	GU384491	GU320483
Pseudocercospora nephrolepidis	CBS 119121	R. Kirschner	*Nephrolepis auriculata*	*Oleandraceae*	Taiwan	GU253779	GU269751	GU384462	GU320453
Pseudocercospora nogalesii	CBS 115022	C.F. Hill	*Chamaecytisus proliferus*	*Fabaceae*	New Zealand	JQ324960	GU269752	GU384463	GU320454
Pseudocercospora norchiensis	CBS 114641	C.F. Hill	*Rubus* sp.	*Rosaceae*	New Zealand	GU253794	GU269772	GU384484	GU320475
	CBS 120738; CPC 13049	W. Gams	*Eucalyptus* sp.	*Myrtaceae*	Italy	GU253780	EF394859/ GU269753	GU384464	GU320455
Pseudocercospora ocimi-basilici	CPC 10283	M.E. Palm	*Ocimum basilicum*	*Lamiaceae*	Mexico	GU214678	GU269754	GU384465	GU320456
Pseudocercospora oenotherae	CPC 10290; CBS 131885	H.D. Shin	*Oenothera odorata*	*Onagraceae*	South Korea	JQ324961	GU269856	GU384567	GU320559
	CPC 10630; CBS 131920	H.D. Shin	*Oenothera odorata*	*Onagraceae*	South Korea	GU253781	GU269755	GU384466	GU320457
Pseudocercospora paederiae	CPC 10007	H.D. Shin	*Paederia foetida*	*Rubiaceae*	South Korea	GU253783	GU269757	GU384468	—
Pseudocercospora palleobrunnea	CBS 124771; CPC 13387	P.W. Crous	*Syzygium* sp.	*Myrtaceae*	Australia	GQ303319	GQ303288	GU384509	GU320500

Table 1. (Continued).

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
Pseudocercospora pallida	CPC 10776; CBS 131889	H.D. Shin	*Campsis grandiflora*	*Bignoniaceae*	South Korea	GU214680	GU269758	GU384469	GU320459
Pseudocercospora pancratii	CBS 137.94	R.F. Castaneda	—	—	Cuba	GU253784	GU269759	GU384470	GU320460
Pseudocercospora paraguayensis	CBS 111286; CPC 1459	P.W. Crous	*Eucalyptus nitens*	*Myrtaceae*	Brazil	GU214479/ DQ204764	DQ267602	DQ211680	DQ147606
	CBS 111317; CPC 1458	P.W. Crous	*Eucalyptus nitens*	*Myrtaceae*	Brazil	GQ852634	JQ324978	GU384522	JQ325021
Pseudocercospora pini-densiflorae	MUCC 534	Y. Tokushige	*Pinus thunbergii*	*Pinaceae*	Japan	GU253785	GU269760	GU384471	GU320461
Pseudocercospora plecthranthi	CPC 11462; CBS 131586	H.D. Shin	*Plectranthus* sp.	*Lamiaceae*	South Korea	JQ324962	GU269791	GU384501	GU320492
Pseudocercospora pouzolziae	CBS 122280	R. Kirschner	*Gonostegia hirta*	*Urticaceae*	Taiwan	GU253786	GU269761	GU384472	GU320462
Pseudocercospora profusa	CPC 10042	H.D. Shin	*Acalypha australis*	*Euphorbiaceae*	South Korea	GU253808	GU269787	GU384497	GU320488
	CPC 10055; CBS 132306	H.D. Shin	*Acalypha australis*	*Euphorbiaceae*	South Korea	GU253787	GU269762	GU384473	GU320463
Pseudocercospora proteae	CPC 15217; CBS 131587	F. Roets	*Protea mundii*	*Proteaceae*	South Africa	GU253826	GU269808	GU384519	GU320511
Pseudocercospora prunicula	CPC 14511; CBS 132107	H.D. Shin	*Prunus x yedoensis*	*Rosaceae*	South Korea	GU253723	GU269676	GU384393	GU320382
Pseudocercospora pseudostigmina-platani	CPC 11726; CBS 131588	H.D. Shin	*Platanus occidentalis*	*Platanaceae*	South Korea	JQ324963	GU269857	GU384568	GU320560
Pseudocercospora puderi	MUCC 906	S. Maruyama	*Rosa* sp.	*Rosaceae*	Japan	GU253790	GU269764	GU384476	GU320467
Pseudocercospora punctata	CPC 14734; CBS 132116	P.W. Crous	*Syzygium* sp.	*Myrtaceae*	Madagascar	GU253791	GU269765	GU384477	GU320468
Pseudocercospora purpurea	CBS 114163; CPC 1664	P.W. Crous	*Persea americana*	*Lauraceae*	Mexico	GU253804	GU269783	GU384494	GU320486
Pseudocercospora pyracanthae	MUCC 892	T. Kobayashi & C. Nakashima	*Pyracantha angustifolia*	*Rosaceae*	Japan	GU253792	GU269767	GU384479	GU320470
Pseudocercospora pyracanthigena	CPC 10808; CBS 131589	H.D. Shin	*Pyracantha angustifolia*	*Rosaceae*	South Korea	—	GU269766	GU384478	GU320469
Pseudocercospora ranjita	CPC 11141; CBS 126005	M.J. Wingfield	*Gmelina* sp.	*Verbenaceae*	Indonesia	GU253810	GU269790	GU384500	GU320491
Pseudocercospora ravenalicola	CBS 122468	M. Arzanlou & W. Gams	*Ravenala madagascariensis*	*Strelitziaceae*	India	GU253828	GU269810	GU384521	GU320513
Pseudocercospora rhabdothamni	CBS 114872	M. Fletcher	*Rhabdothamnus solandri*	*Gesneriaceae*	New Zealand	JQ324964	GU269768	GU384480	GU320471
Pseudocercospora rhamnellae	CPC 12500; CBS 131590	H.D. Shin	*Rhamnella frangulioides*	*Rhamnaceae*	South Korea	GU253813	GU269795	GU384505	GU320496
Pseudocercospora rhapisicola	CBS 282.66	K. Tubaki	*Rhapis flabellifornis*	*Arecaceae*	Japan	GU253793	GU269770	GU384482	GU320473
Pseudocercospora rhododendri-indici	CPC 10822; CBS 131591	H.D. Shin	*Rhododendron indicum*	*Ericaceae*	South Korea	JQ324965	GU269722	—	GU320426
Pseudocercospora rhoina	CPC 11464; CBS 131891	H.D. Shin	*Rhus chinensis*	*Anacardiaceae*	South Korea	JQ324966	GU269771	GU384483	GU320474
Pseudocercospora robusta	CBS 111175; CPC 1269; CMW 5151	M.J. Wingfield	*Eucalyptus robur*	*Myrtaceae*	Malaysia	DQ204767	AY309597	DQ211683	DQ147617
Pseudocercospora rubi	MUCC 875	T. Kobayashi & C. Nakashima	*Rubus allegheniensis*	*Rosaceae*	Japan	GU253795	GU269773	GU384485	GU320476
Pseudocercospora rumohrae	CBS 117747	C.F. Hill	*Marattia salicina*	*Marattiaceae*	New Zealand	GU253796	GU269774	GU384486	GU320477
Pseudocercospora sambucigena	CPC 10292; CBS 131886	H.D. Shin	*Sambucus williamsii*	*Caprifoliaceae*	South Korea	GU253809	GU269788	GU384498	GU320489

Table 1. (Continued).

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
	CPC 14397; CBS 126000	P.W. Crous	*Sambucus nigra*	*Caprifoliaceae*	Netherlands	GU253823	GU269805	GU384516	GU320508
Pseudocercospora sawadae	CBS 115024	C.F. Hill	*Psidium guajava*	*Myrtaceae*	New Zealand	JQ324967	GU269775	—	GU320478
Pseudocercospora securinegae	CPC 10793; CBS 131930	H.D. Shin	*Flueggea suffruticosa*	*Euphorbiaceae*	South Korea	GU253797	GU269776	GU384487	GU320479
Pseudocercospora snelliana	CPC 11654; CBS 131592	H.D. Shin	*Morus bombycis*	*Moraceae*	South Korea	—	GU269731	GU384444	GU320433
Pseudocercospora sordida	MUCC 913	C. Nakashima & E. Imaizumi	*Campsis radicans*	*Bignoniaceae*	Japan	GU253798	GU269777	GU384488	GU320480
Pseudocercospora sp.	CBS 110993; CPC 1057	M.J. Wingfield	*Populus* sp.	*Salicaceae*	South Africa	GU253800	GU269779	GU384490	GU320482
	CBS 110998; CPC 1054	M.J. Wingfield	*Eucalyptus grandis*	*Myrtaceae*	South Africa	GU253799	GU269778	GU384489	GU320481
	CBS 111373; CPC 1493	M.J. Wingfield	*Eucalyptus globulus*	*Myrtaceae*	Uruguay	GU253803	GU269782	GU384493	GU320485
	CBS 112725; CPC 3961	K.A. Seifert	*Melilotus alba*	*Fabaceae*	Canada	GU253806	GU269785	—	—
	CBS 113387	A. den Breeyen	*Lantana camara*	*Verbenaceae*	Jamaica	GU253754	GU269718	GU384434	GU320422
	CPC 10058	H.D. Shin	*Potentilla kleiniana*	*Rosaceae*	South Korea	—	JQ324979	JQ325001	JQ325022
	CPC 10645; CBS 131922	P.W. Crous	—	—	Brazil	GU253700	GU269651	GU384369	GU320359
	CPC 14711; CBS 132102	H.D. Shin	*Pyracantha angustifolia*	*Rosaceae*	South Korea	—	JQ324980	JQ325002	JQ325023
	CPC 15116; NC1 37A1a	J. Batzer	*Malus* sp. cv. *Golden Delicious*	*Rosaceae*	USA: North Carolina	JQ324969	JQ324981	JQ325003	JQ325024
Pseudocercospora stahlii	CBS 117549	R. Kirschner	*Passiflora foetida*	*Passifloraceae*	Taiwan	GU253830	GU269813	GU384525	GU320515
Pseudocercospora stephanandrae	MUCC 914	C. Nakashima & E. Imaizumi	*Stephanandra incisa*	*Rosaceae*	Japan	GU253831	GU269814	GU384526	GU320516
Pseudocercospora subsessilis	CBS 136.94	R.F. Castaneda	—	—	Cuba	GU253832	GU269815	GU384527	GU320517
Pseudocercospora subtorulosa	CBS 117230	R. Kirschner	*Melicope* sp.	*Rutaceae*	Taiwan	GU253833	GU269816	GU384528	GU320518
Pseudocercospora subulata	CBS 118489; CPC 10849	M. Dick	*Eucalyptus botryoides*	*Myrtaceae*	New Zealand	JQ324970	DQ303090	JQ325004	GU320519
Pseudocercospora tereticornis	CBS 124996; CPC 12960	A.J. Carnegie	*Eucalyptus nitens*	*Myrtaceae*	Australia	GQ852647	JQ324982	GU384377	JQ325025
	CPC 13299; CBS 125214	P.W. Crous	*Eucalyptus tereticornis*	*Myrtaceae*	Australia	GQ852649	GQ852770	GU384508	GU320499
"Pseudocercospora" thailandica	CBS 116367; CPC 10547	K. Pongpanich	*Acacia mangium*	*Fabaceae*	Thailand	GU253837	—	DQ835102/ GU384533	GU320523/ AY752217
	CPC 10548; CBS 116367	K. Pongpanich	*Acacia mangium*	*Fabaceae*	Thailand	GU253853	AY752157	AY840477	GU320539
Pseudocercospora theae	CBS 128.30	M. Curzi	*Camelia sinensis*	*Theaceae*	Italy	GU253838	GU269821	GU384534	GU320524
"Pseudocercospora" tibouchinigena	CBS 116462	C.F. Hill	*Tibouchina* sp.	*Melastomataceae*	New Zealand	GU253839	GU269822	GU384535	GU320525
Pseudocercospora timorensis	MUCC 819	C. Nakashima & T. Akashi	*Ipomoea indica*	*Convolvulaceae*	Japan	GU253840	GU269823	GU384536	GU320526
Pseudocercospora udagawana	CPC 10799; CBS 131931	H.D. Shin	*Hovenia dulcis*	*Rhamnaceae*	South Korea	—	GU269824	GU384537	GU320527

Table 1. (Continued).

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
Pseudocercospora variicolor	MUCC 746	C. Nakashima & I. Araki	*Paeonia lactiflora* var. *trichocarpa*	*Paeoniaceae*	Japan	GU253843	GU269826	GU384538	GU320530
Pseudocercospora viburnigena	CPC 15249; CBS 125998	M.L. Crous	*Viburnum davidii*	*Caprifoliaceae*	Netherlands	GU253827	GU269809	GU384520	GU320512
Pseudocercospora viticicola	MUCC 777	C. Nakashima	*Vitex trifolia*	*Verbenaceae*	Japan	GU253845	GU269828	GU384540	GU320532
Pseudocercospora vitis	CPC 11595; CBS 132012	H.D. Shin	*Vitis vinifera*	*Vitaceae*	South Korea	GU214483	DQ289829/ GU269829	GU384541	GU320533
	CPC 14661; CBS 132112	H.D. Shin	*Vitis vinifera*	*Vitaceae*	South Korea	GU253844	GU269827	GU384539	GU320531
Pseudocercospora weigelae	MUCC 899	T. Kobayashi & Y. Kobayashi	*Weigela coraeensis*	*Caprifoliaceae*	Japan	GU253847	GU269831	GU384543	GU320535
Pseudocercospora xanthocercidis	CPC 11665; CBS 131593	A.R. Wood	*Xanthocercis zambesiaca*	*Fabaceae*	South Africa	JQ324971	JQ324983	JQ325005	JQ325026
Pseudocercospora xanthoxyli	CPC 10065	H.D. Shin	*Xanthoxylum ailanthoides*	*Rutaceae*	South Korea	GU253848	GU269832	GU384544	GU320536
Pseudocercospora zelkovae	CPC 14484; CBS 132106	H.D. Shin	*Zelkova serrata*	*Ulmaceae*	South Korea	GU253849	GU269833	GU384545	JQ325027
	CPC 14717; CBS 132118	H.D. Shin	*Zelkova serrata*	*Ulmaceae*	South Korea	GU253850	GU269834	GU384546	JQ325028
	MUCC 872	T. Kobayashi & C. Nakashima	*Zelkova serrata*	*Ulmaceae*	Japan	GU253851	GU269835	GU384547	GU320537
Pseudocercosporella arcuata	CPC 10050	H.D. Shin	*Rubus oldhamii*	*Rosaceae*	South Korea	GU214685	GU269850	JQ325006	GU320554
Pseudocercosporella capsellae	CPC 14773; CBS 131896	H.D. Shin	*Raphanus sativus*	*Brassicaceae*	South Korea	GU253714	GU269666	GU384383	GU320372
Pseudocercosporella chaenomelis	CPC 14795; CBS 131897	H.D. Shin	*Chaenomeles speciosa*	*Rosaceae*	South Korea	GU253834	GU269817	GU384530	GU320520
	MUCC 1510; CBS 132131	C. Nakashima	*Chaenomeles sinensis*	*Rosaceae*	Japan	—	JQ793663	—	JQ793664
Pseudocercosporella fraxini	CPC 11509	H.D. Shin	*Fraxinus rhynchophylla*	*Oleaceae*	South Korea	GU214682	GU269709	GU384425	GU320413
Pseudocercosporella koreana	CPC 11414	H.D. Shin	*Vicia amurensis*	*Fabaceae*	South Korea	GU214683	GU269852	GU384564	GU320556
Pseudocercosporella oxalidis	CBS 118758	R. Kirschner	*Oxalis debilis*	*Oxalidaceae*	Taiwan	GU253782	GU269756	GU384467	GU320458
Pseudocercosporella sp.	CPC 10864; CBS 131890	H.D. Shin	*Trigonotis peduncularis*	*Boraginaceae*	South Korea	JQ324972	GU269858	GU384569	JQ325029
Pseudocercosporella zelkovae	CPC 11592; CBS 132011	H.D. Shin	*Zelkova serrata*	*Ulmaceae*	South Korea	GU214482	GU269853	—	GU320557
Scolecostigmina mangiferae	CBS 125467; CPC 17351	P.W. Crous	*Mangifera indica*	*Anacardiaceae*	Australia	GU253877	GU269870	GU384578	GU320566
	CPC 17352; CBS 125467	P.W. Crous	*Mangifera indica*	*Anacardiaceae*	Australia	GU253878	GU269871	GU384579	GU320567
Septoria cerastii	CPC 12343; CBS 132028	H.D. Shin	*Cerastium holosteoides* var. *hallasanense*	*Caryophyllaceae*	South Korea	GU253869	GU269859	GU384570	JQ325030
Septoria chelidonii	CPC 12337; CBS 132027	H.D. Shin	*Chelidonium majus* var. *asiaticum*	*Papaveraceae*	South Korea	GU253870	GU269860	GU384571	GU320561
Septoria crepidis	CPC 12539; CBS 131895	H.D. Shin	*Crepis japonica*	*Asteraceae*	South Korea	GU253871	GU269861	GU384572	GU320562
Septoria dysentericae	CPC 12328; CBS 131892	H.D. Shin	*Inula britannica* var. *chinensis*	*Asteraceae*	South Korea	GU253866	GU269854	GU384565	GU320558
Septoria erigerontis	CPC 12340; CBS 131893	H.D. Shin	*Erigeron annuus*	*Asteraceae*	South Korea	GU253872	GU269862	GU384573	JQ325031

Table 1. (Continued).

Species	Culture accession numbers[1]	Collector	Host	Family	Country	GenBank accession numbers[2]			
						LSU	ITS	EF-1α	ACT
Septoria eucalyptorum	CPC 11282; CBS 118505	W. Gams	*Eucalyptus* sp.	*Myrtaceae*	India	GU253873	GU269863	GU384574	GU320563
Septoria justiciae	CPC 12509; CBS 131894	H.D. Shin	*Justicia procumbens*	*Acanthaceae*	South Korea	GU253874	GU269864	GU384575	GU320564
Septoria quercicola	CBS 663.94	H.A. van der Aa	*Quercus robur*	*Fagaceae*	Netherlands	GU253867	GU269855	GU384566	JQ325032
Septoria rubi	CPC 12331; CBS 132022	H.D. Shin	*Rubus crataegifolius*	*Rosaceae*	South Korea	GU253875	GU269865	GU384576	—
Stigmina platani	CBS 336.33	R.M. Nattrass	*Platanus orientalis*	*Platanaceae*	India	GU253868	—	JQ325007	—
Strelitziana australiensis	CBS 124778; CPC 13421	P.W. Crous	*Eucalyptus* sp.	*Myrtaceae*	Australia	GQ303326	GQ303295	GU384362	—
	CPC 13556; CBS 132310	P.W. Crous	*Eucalyptus* sp.	*Myrtaceae*	Australia	GU253695	GU269645	GU384363	GU320354
Teratosphaeria alcornii	CBS 313.76; CPC 3632	J.L. Alcorn	*Eucalyptus tessellaris*	*Myrtaceae*	Australia	GU253876	GU269866	GU384577	GU320565
Teratosphaeria dimorpha	CPC 14132; CBS 124051	B.A. Summerell	*Eucalyptus caesia*	*Myrtaceae*	Australia	FJ493215	FJ023537	—	—
Teratosphaeria stellenboschiana	CBS 124989; CPC 13767	P.W. Crous	*Eucalyptus punctata*	*Myrtaceae*	South Africa	GQ852715	GQ852823	—	—
Thedgonia ligustrina	CPC 10019	H.D. Shin	*Ligustrum ovalifolium*	*Oleaceae*	South Korea	GU253854	GU269837	GU384550	GU320540
	CPC 10530; CBS 132130	P.W.Crous	*Ligustrum* sp.	*Oleaceae*	Netherlands	GU253855	GU269838	GU384551	GU320541
	CPC 10861; CBS 132025	H.D. Shin	*Ligustrum ovalifolium*	*Oleaceae*	South Korea	GU253856	GU269839	GU384552	GU320542
Trochophora fasciculata	CPC 10282	H.D. Shin	*Daphniphyllum macropodum*	*Daphniphyllaceae*	South Korea	FJ839668	FJ839632	—	—
Trochophora simplex	CBS 124744	H.D. Shin	*Daphniphyllum macropodum*	*Daphniphyllaceae*	South Korea	GU253880	GU269872	GU384580	GU320568
	MUCC 952	C. Nakashima & I. Araki	*Daphniphyllum teijsmannii*	*Daphniphyllaceae*	Japan	GU253879	—	—	—
Xenostigmina zilleri	CBS 115685	K.A. Seifert	*Acer* sp.	*Aceraceae*	Canada	GU253857	GU269840	GU384553	GU320543
	CBS 115686	K.A. Seifert	*Acer* sp.	*Aceraceae*	Canada	FJ839676/ GU253858	GU269841	GU384554	GU320544
Zasmidium nabiacense	CBS 125010; CPC 12748	A.J. Carnegie	*Eucalyptus* sp.	*Myrtaceae*	Australia	GQ852734	GQ852841	GU384507	GU320498

[1]CBS: CBS-KNAW Fungal Biodiversity Centre, Utrecht, The Netherlands; CIRAD: Centre de Coopération Internationale en Recherche Agronomique pour le Développement, UMR-BGPI, Montpellier, France; CMW: Culture Collection of the Forestry and Agricultural Biotechnology Institute (FABI) of the University of Pretoria, Pretoria, South Africa; CPC: Culture collection of Pedro Crous, housed at CBS; MUCC: Culture Collection, Laboratory of Plant Pathology, Mie University, Tsu, Mie Prefecture, Japan.

[2]LSU: partial 28S nrRNA gene; ITS: internal transcribed spacer regions 1 & 2 including 5.8S nrRNA gene; EF-1α: partial translation elongation factor 1-alpha gene; ACT: partial actin gene.

[3]Sequence for this locus obtained from: http://genome.jgi-psf.org/Mycfi1/Mycfi1.home.html

1 000 generations, resulting in 8 001 saved trees in each of the two tree files. Burn-in was set at 2 000 000 generations after which the likelihood values were stationary. For parsimony analysis of the combined ITS, ACT and EF-1α alignment, alignment gaps were treated as a fifth character state and all characters were unordered and of equal weight. Maximum parsimony analysis was performed in PAUP using the heuristic search option with 100 random taxon additions and tree bisection and reconnection (TBR) as the branch-swapping algorithm. Branches of zero length were collapsed and all multiple, equally most parsimonious trees were saved. The robustness of the trees was evaluated by 1 000 bootstrap replicates (Hillis & Bull 1993). Tree length (TL), consistency index (CI), retention index (RI) and rescaled consistency index (RC) were calculated and the resulting trees were printed with Geneious v. 5.5.4 (Drummond *et al*. 2011). Sequences derived in this study were deposited in GenBank (Table 1), the alignments in TreeBASE (www.treebase.org/treebase/index.html), and taxonomic novelties in MycoBank (www.MycoBank.org; Crous *et al*. 2004b).

Taxonomy

All taxonomic descriptions were based on structures on herbarium material. Diseased leaf tissue was viewed under a Nikon® SMZ1500 stereoscopic zoom microscope and relevant morphological structures were lifted from lesions with a sterile dissecting needle and mounted on glass slides in clear lactic acid. For measurements, 30–50 replicates of all relevant morphological features were made at ×1 000 magnification using a Carl Zeiss® Axioskop 2 plus light microscope. High-resolution photographic images of diseased material, leaf lesions and microscopic fungal structures were captured with a Nikon® digital sight DS-fi1 high definition colour camera mounted on the light microscope or a Nikon® digital sight DS-5M camera mounted on a stereoscopic zoom microscope. Images of morphological structures were captured, and measurements taken, using the Nikon® software NIS-Elements v. 2.34 while Adobe Photoshop was used for the final editing of acquired images and photographic preparations. Novel *Pseudocercospora* taxa were plated onto MEA and incubated at 24 °C for 2–4 wk in the dark in duplicate. The mycological colour charts of Rayner (1970) were used to define colours of the fungal colonies.

RESULTS

DNA sequencing and phylogenetic analyses

Large Subunit (LSU) phylogeny: The final aligned LSU dataset contained 316 ingroup taxa with a total of 1305 characters and *Saccharomyces cerevisiae* (GenBank Accession: Z73326) served as the outgroup taxon. From this alignment 827 characters were used for the Bayesian analysis; the consensus trees and posterior probabilities were calculated (Fig. 4) from the 12 002 trees left after discarding those used for burn-in. The resulting LSU phylogeny resolved several clades (Clades 1–14) grouping species of *Pseudocercospora* and allied genera (Fig. 4). Clade 1 (Posterior Probability (PP) value of 1.0) including *Cyphellophora* and *Strelitziana* represented by one of the two basal lineages. *Thedgonia ligustrina* (100 %) represented the second basal clade (PP = 1.0). In the Pleosporales, Clade 3 included *Xenostigmina zilleri* (PP = 1.0) and Clade 4 *Pseudocercospora cantuariensis* (PP = 1.0), the latter being described below as *Phaeomycocentrospora cantuariensis*. Clade 5 contained *Cladosporium* species belonging to the teleomorph genus *Davidiella* (PP = 1.0). Clade 6 (PP = 1.0) represented species belonging to *Teratosphaeria* and including the recently established genus *Microcyclospora*. Clade 7 (PP = 1.0) accommodated species of *Dissoconium*. Clade 8 (PP = 1.0) including species representing *Mycosphaerella*, *Pseudocercospora* and *Zasmidium*, as well as the recently established genus *Microcyclosporella*. Clade 9 (PP = 1.0) included *Pseudocercospora tibouchinigena*, *Pseudocercospora egenula* described below as *Paracercospora egenula* and the *Mycosphaerella ellipsoidea* complex. Clade 10 (PP = 1.0) accommodated species of other genera namely *Pseudocercosporella*, *Mycosphaerella ulmi* (*Phleospora*), *Muiraea*, *Cercospora* and *Septoria*. Clade 11 (PP = 1.0) included *Mycosphaerella* species with *Sonderhenia* anamorphs. Clade 12 (PP = 1.0) is sister to Clade 11 and included species representing taxa of *Mycosphaerella* and their associated *Pseudocercospora*-like anamorphs, appeared to represent a novel genus. Other genera in this clade included *Scolecostigmina* and *Trochophora*. The isolates representing *Trochophora* are accommodated at a basal position in this clade with no PP support. The three isolates of *Scolecostigmina mangiferae* resided in a well-supported sub-clade (PP = 1.0) close to isolates regarded as part of the *Mycosphaerella heimii* complex (*P. acaciigena*, *M. irregulariramosa*, *M. colombiensis*, *P. thailandica*, *M. heimii*, *M. heimioides*, *M. konae*), described below in *Pallidocercospora*. Clade 13 (PP = 1.0) accommodated *Passalora eucalypti*. The remainder of the phylogeny encompassed Clade 14 (PP = 1.0), representing *Pseudocercospora s. str.*, and accommodated the majority of *Pseudocercospora* species from many different hosts. The type species of *Pseudocercospora*, *P. vitis* was included in this clade. Interestingly, *P. vitis* was basal in this clade with the majority of *Pseudocercospora* species radiating out from the basal *Pseudocercospora* isolates. The LSU phylogeny provided a well-supported sub-clade (PP = 1.0) representing the second half of the *sensu stricto* clade (Clade 14). Several isolates representing species from genera morphologically allied to *Pseudocercospora* were also grouped in Clade 14. These included *Stigmina platani*, *Cercostigmina protearum* var. *leucadendri* (as *Pseudocercospora leucadendri*, see below), *Cercostigmina protearum* var. *hakeae* (as *Pseudocercospora hakea*, see below), *Phaeoisariopsis griseola* f. *griseola* (as *Pseudocercospora griseola* f. *griseola*, see Crous *et al.* 2006) and *Pseudophaeoramularia angolensis* (as *Pseudocercospora angolensis*, see below), which supports previous proposals to include these genera in *Pseudocercospora s. str.*

Pseudocercospora s. str. phylogeny: A further analysis was conducted on Clade 14 (Fig. 4), representing *Pseudocercospora s. str.* For this analysis, DNA sequence data from the ITS, ACT and EF-1α gene regions were combined in the parsimony analysis. For this dataset, there was a total of 194 taxa, each representing 1 029 characters. *Passalora eucalypti* (CBS 111318) served as the outgroup taxon for this analysis. From the combined alignment of 1 029 characters, 414 were constant, 124 were variable and 491 characters were parsimony uninformative. Only the first 1 000 equally most parsimonious trees were saved, the first of which is shown (Fig. 5) (TL = 4315, CI = 0.312, RI = 0.819, RC = 0.256).

The phylogeny resulting from the combined sequence data was more structured towards the terminal nodes than the LSU phylogeny. Similar to the LSU phylogeny, a split was observed within *Pseudocercospora s. str.*, with at least two main clades being evident. Although present in the strict consensus tree, this

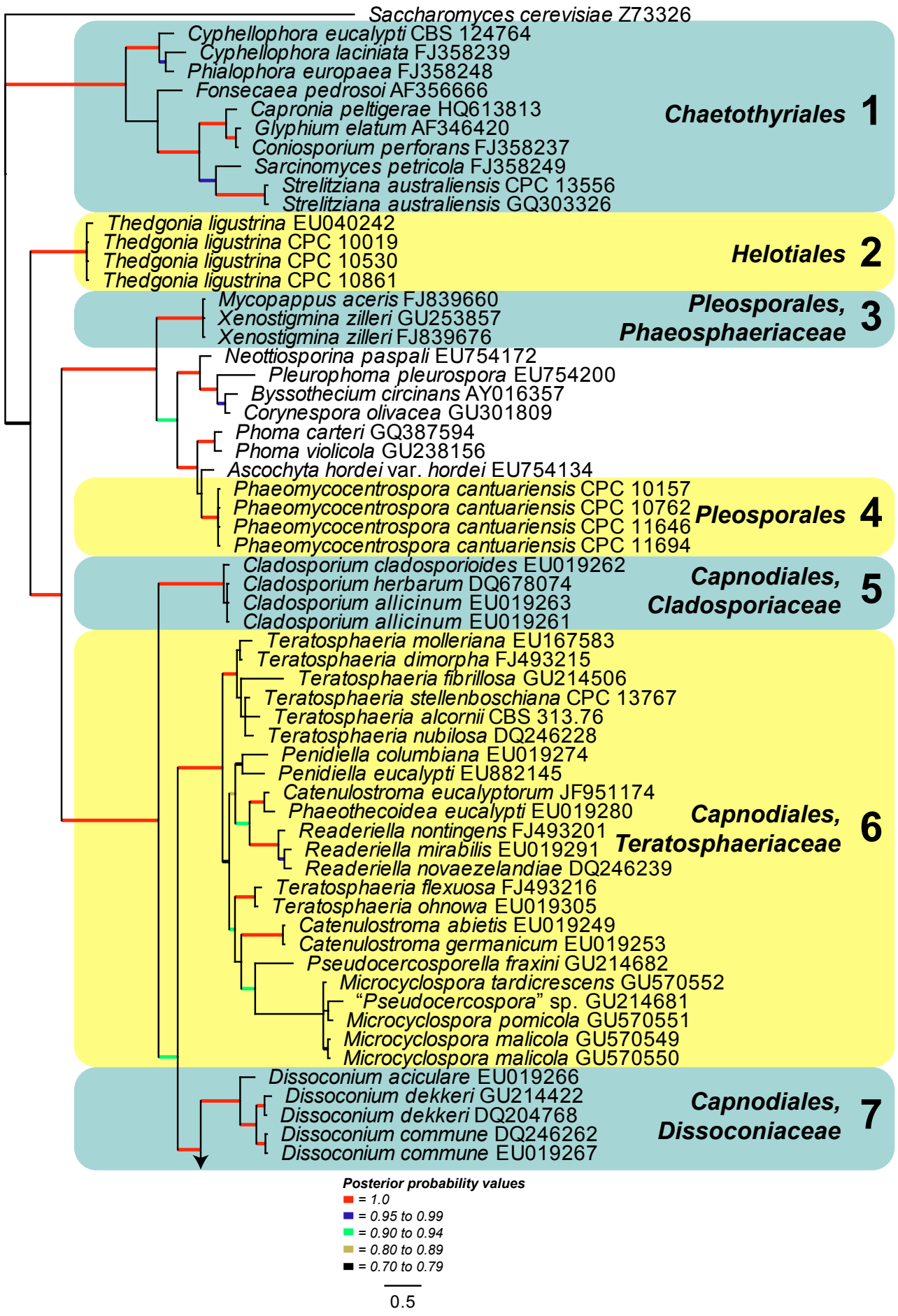

Fig. 4. Consensus phylogram (50 % majority rule) of 12 002 trees resulting from a Bayesian analysis of the LSU sequence alignment using MrBayes v. 3.1.2. Bayesian posterior probabilities are indicated with colour-coded branches (see legend) and the scale bar represents the expected changes per site. Important clades are indicated in coloured blocks and numbered. The tree was rooted to *Saccharomyces cerevisiae* (GenBank Z73326).

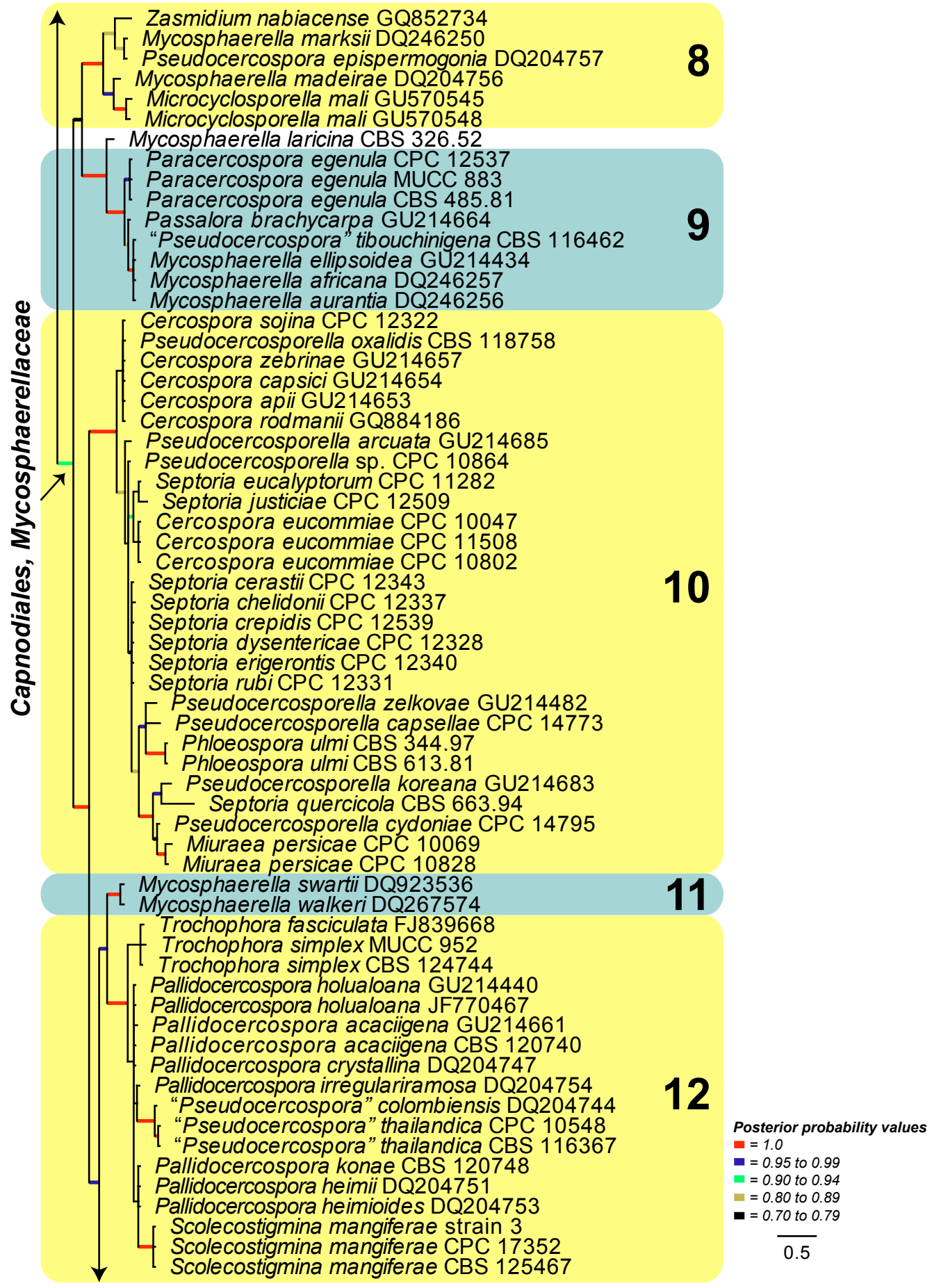

Fig. 4. (Continued).

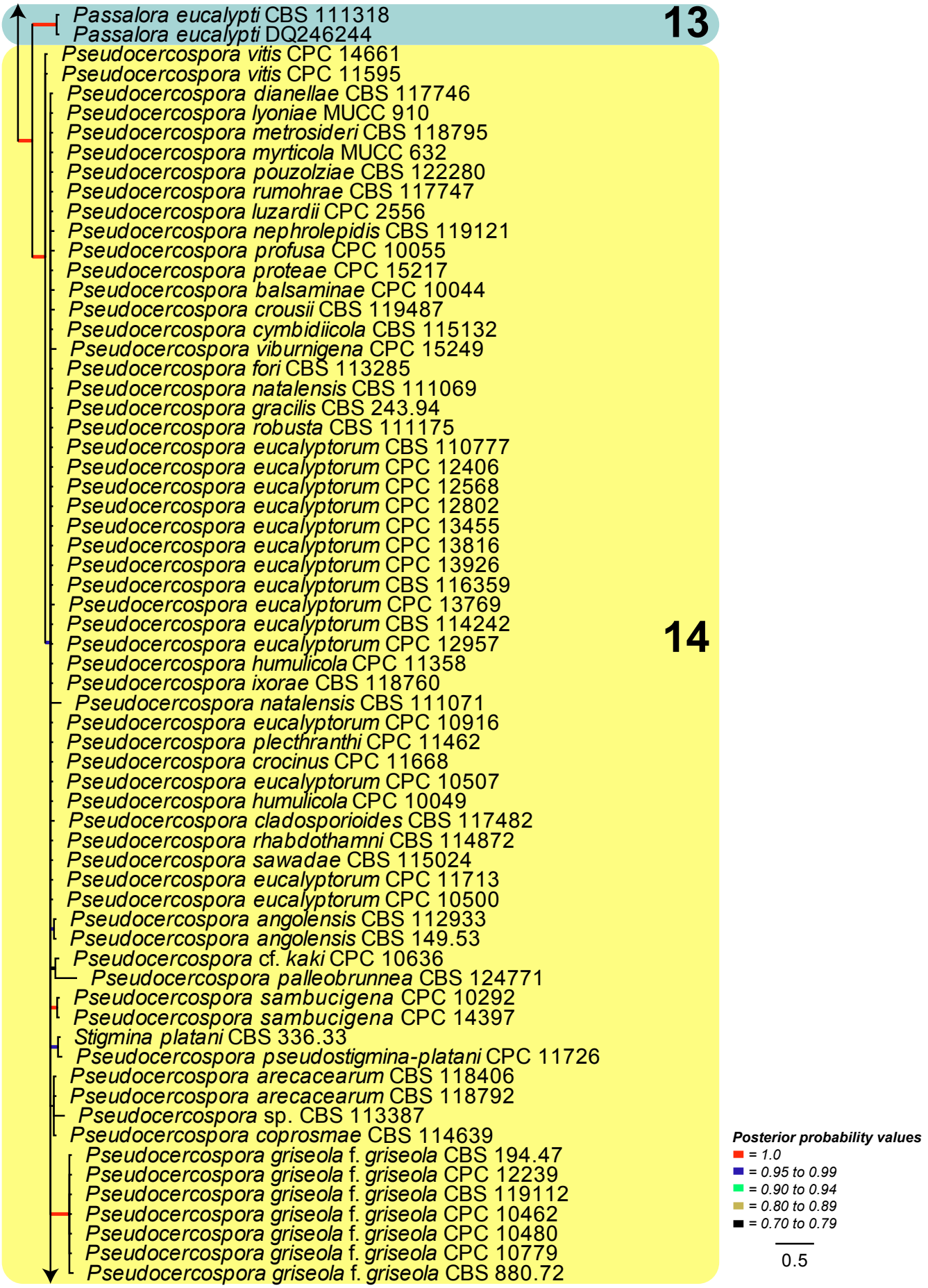

Fig. 4. (Continued).

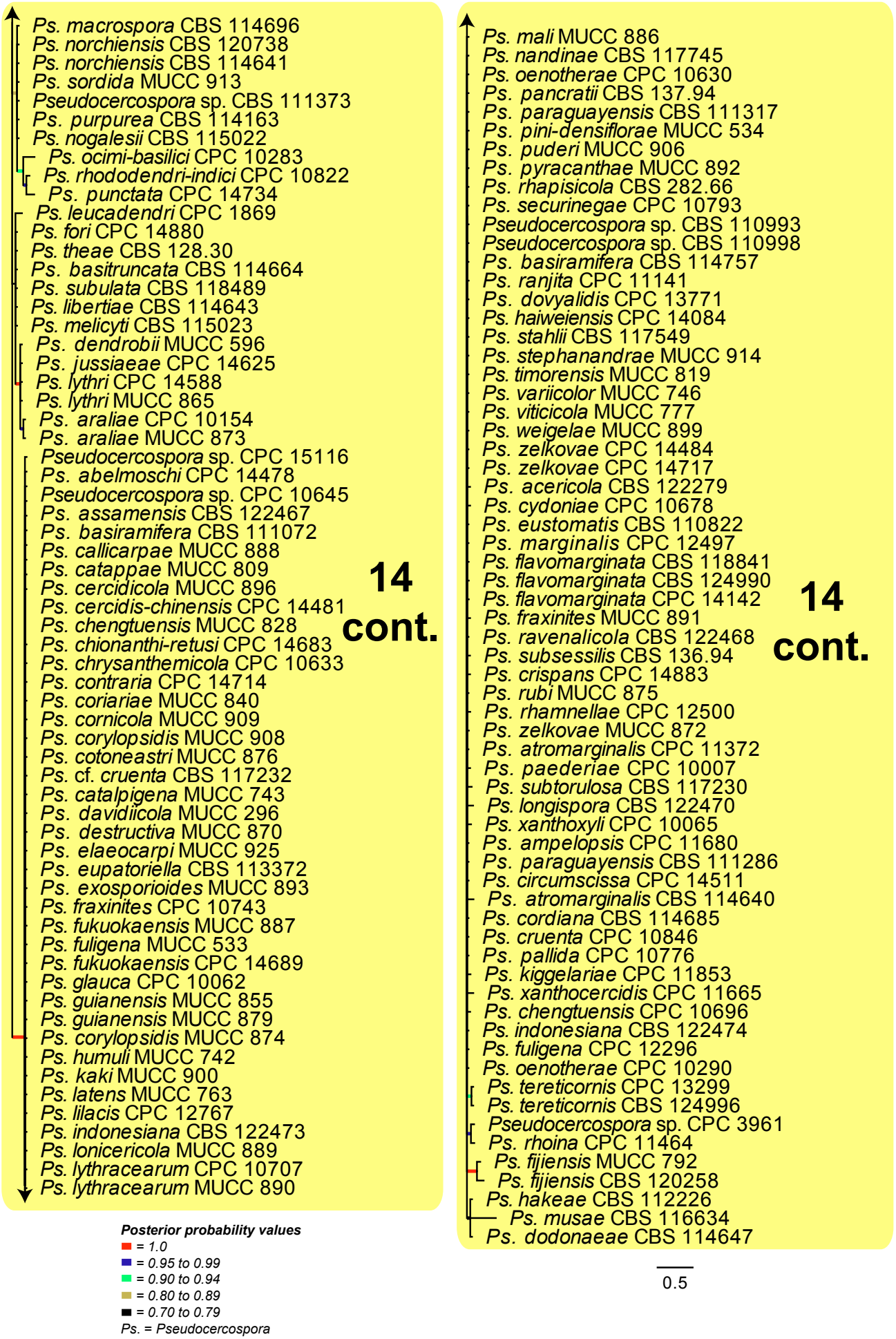

Fig. 4. (Continued).

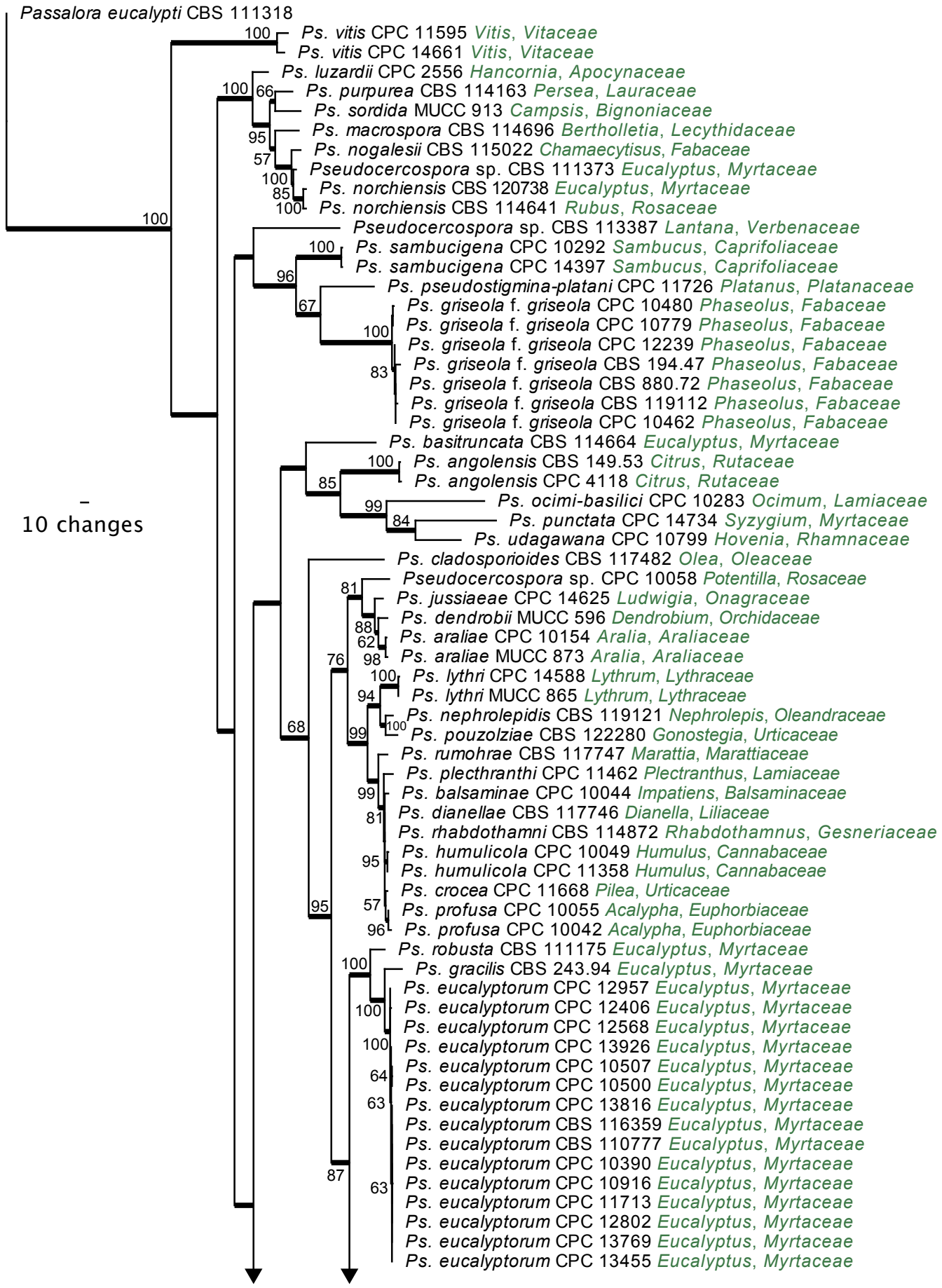

Fig. 5. The first of 1 000 equally most parsimonious trees obtained from a heuristic search with 100 random taxon additions of the combined ITS, ACT and EF-1α sequence alignment using PAUP v. 4.0b10. The scale bar shows 10 changes, and bootstrap support values from 1 000 replicates are shown at the nodes. Thickened lines indicate those branches present in the strict consensus tree and the tree was rooted to *Passalora eucalypti* strain CBS 111318 (GenBank GU269845, GU320548 and GU384558, respectively).

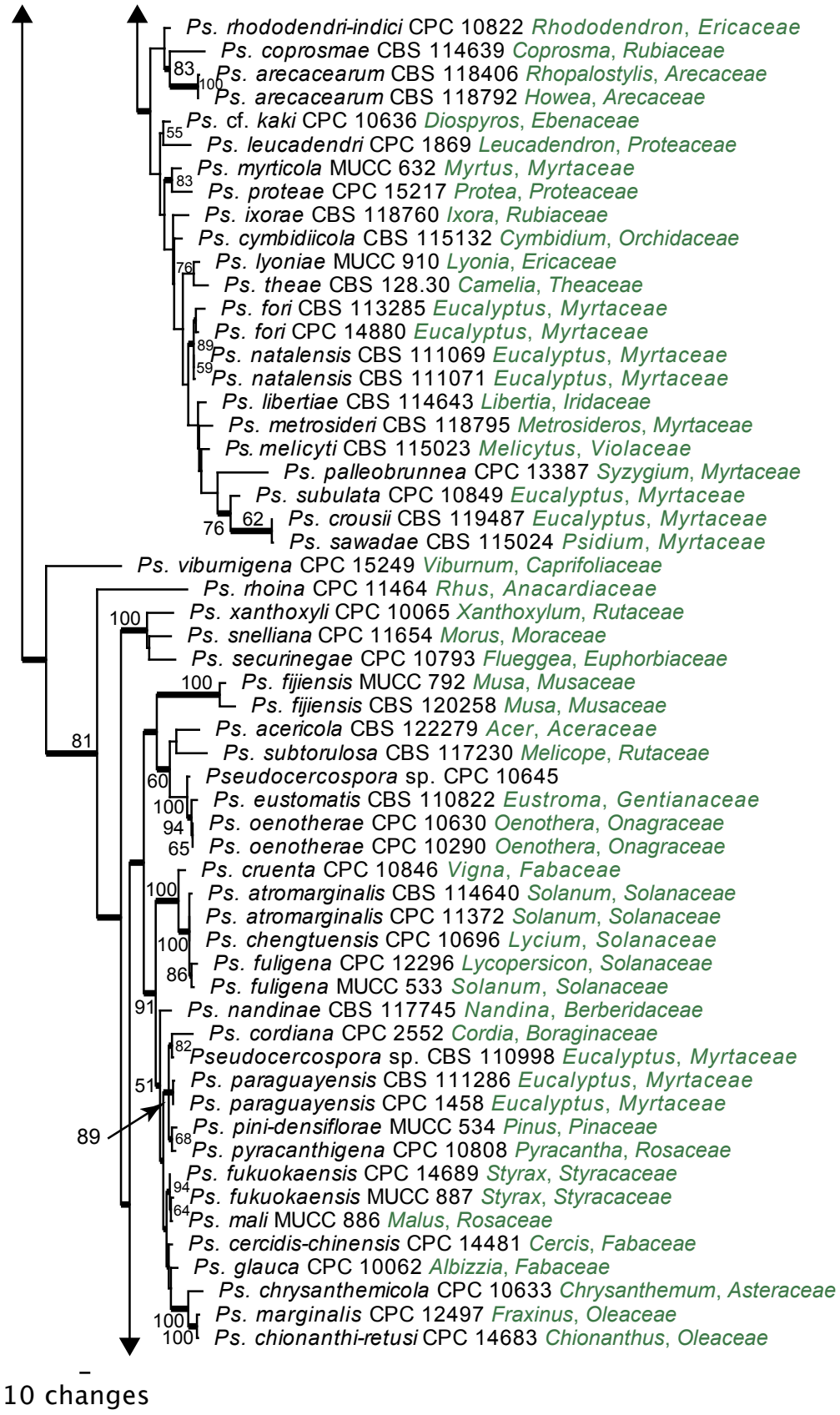

Fig. 5. (Continued).

split was not well-supported in the phylogeny. Deeper nodes of the backbone were poorly supported. There were high levels of support for several of the smaller sub-clades in this tree, which are discussed in the Taxonomy section below.

Taxonomy

Isolates representing 146 species of *Pseudocercospora* were subjected to DNA analysis and morphological comparison. Phylogenetic analyses based on the LSU gene resolved a total of 14 clades in the *Pseudocercospora* complex.

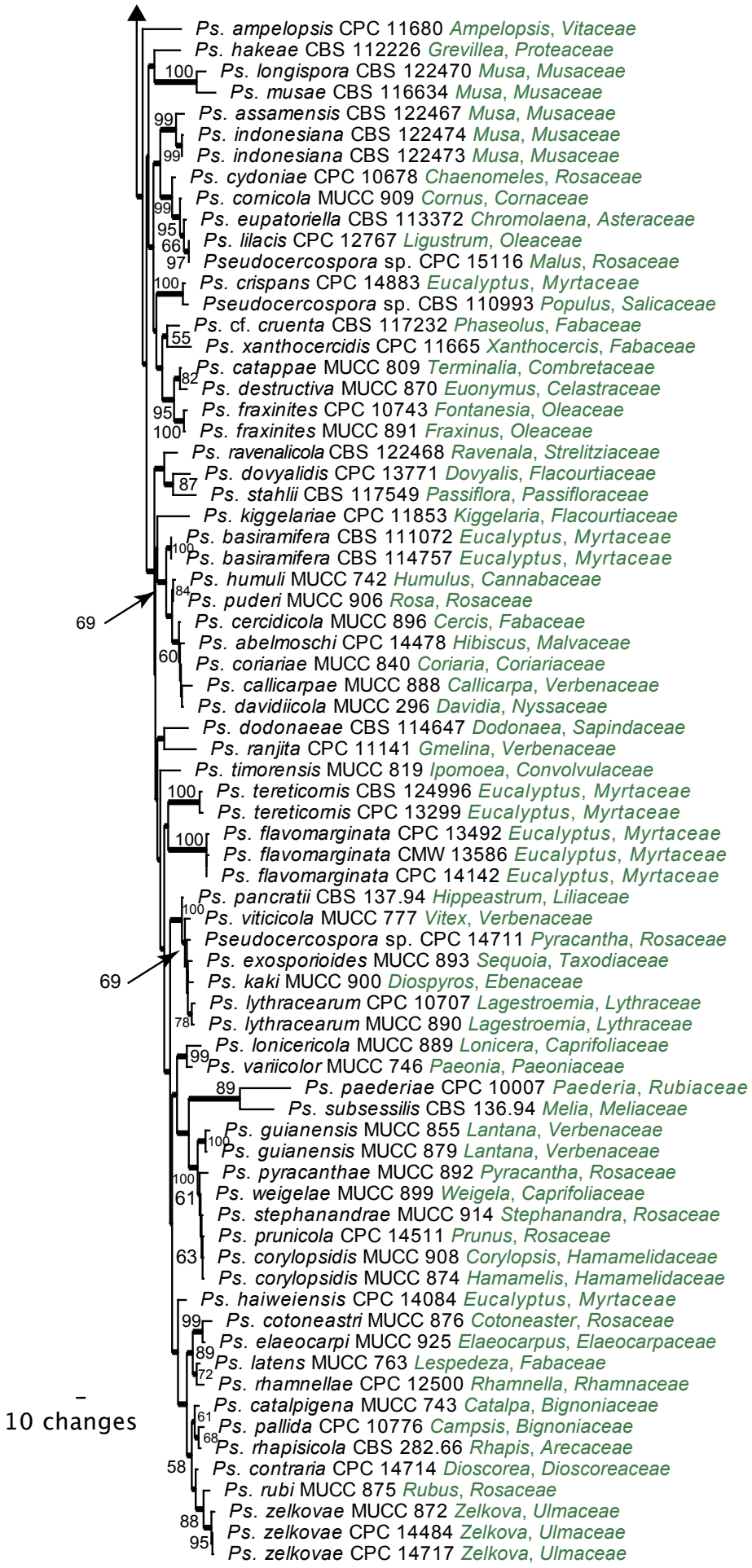

Fig. 5. (Continued).

Clade 1 represented *Strelitziana* (*Pseudocercospora*-like but with a separating cell between conidia and conidiogenous cells) and *Cyphellophora* (*Pseudocercospora*-like but phialides with flaring collarettes, situated directly on hyphae). *Thedgonia ligustrina* (*Pseudocercosporella*-like, but conidia in chains) represented Clade 2. Clade 3 included several isolates of *Pseudocercospora cantuariensis*, which represents a novel genus, distinguished from *Pseudocercospora* based on its broad conidial hila and scars, as well hyaline mycelium, and the presence of hyphopodia-like structures. *Xenostigmina zilleri*, characterised as being *Stigmina*-like, but also having sympodial proliferation of the conidiogenous cells, clustered in Clade 4, which was basal to *Cladosporium* (*Cladosporiaceae*; Clade 5). Clade 6 represented several members of *Teratosphaeriaceae*, known to have a wide range of anamorphs, including *Microcyclospora*. Clade 7 represented species of *Dissoconium* (*Dissoconiaceae*), distinct due to their dimorphic conidia that are actively discharged. Clade 8 remains unresolved, and was represented by disjunct elements appearing *Zasmidium*- and *Pseudocercospora*-like in morphology, including *Microcyclosporella*. Clade 9 was represented by several *Mycosphaerella* species such as *M. laricina* (anamorph *Pseudocercospora* sp.), and *Paracercospora egenula*. *Paracercospora* was separated from *Pseudocercospora* based on a combination of characters, including pale olivaceous conidia, and a minute thickening along the rim of its conidial hila and scars. Clade 10 included a diverse assemblage of genera. Two genera that differ mainly based on their conidiomatal structure, *Pseudocercosporella* and *Septoria*, clustered in this clade. *Miuraea*, a genus intermediate between *Cercospora* and *Pseudocercospora*, also resided within this clade. Clade 11 was represented by two coelomycetous species of *Sonderhenia* that clustered basal to Clade 12. The latter included a new genus with *Pseudocercospora*-like anamorphs, mostly distinguished from *Pseudocercospora s. str*. by having species with smooth, pale brown conidia, and the frequent production of red crystals in agar (previously referred to in literature as the *Mycosphaerella heimii* complex). *Scolecostigmina* (based on *S. mangiferae*), which is characterised by verruculose conidia and percurrently proliferating conidiogenous cells, clustered alongside to *Trochophora*, characterised by brown sickle-shaped conidia with three thick, dark septa. *Passalora eucalypti* formed a separate lineage in Clade 13 that was adjacent to *Pseudocercospora s. str*. in Clade 14. This clade included the type species, *P. vitis* that is basal in this cluster. Although there was structure within the clade, we regard it as representing a single genus, including *Stigmina platani*, the type of *Stigmina*, *Phaeoisariopsis* (*P. griseola*), and *Pseudophaeoramularia* (*P. angolensis*). Several isolates identified from different countries as representing the same species based on host, disease symptoms and general morphology, clustered apart from one another. These collections were found to represent novel cryptic species.

DISCUSSION

Several novel taxa were identified in this study on the basis of phylogenetic analyses of the various gene regions together with morphological examination of the specimens and isolates. Recognised clades, as well as novel species and genera, are described and discussed below. Where descriptions of known taxa are freely available online in MycoBank or journals, they are not repeated here, other than their generic circumscriptions.

Clade 1: *Strelitziana* and *Cyphellophora*

Strelitziana M. Arzanlou & Crous, Fungal Planet No. 8: 2006.

Conidiophores erect, solitary, arising from aerial and submerged mycelium, subcylindrical, straight to geniculate-sinuous, pale brown. *Conidiogenous cells* terminal, integrated, rejuvenating percurrently, proliferating apically via several short, conspicuous denticles; *conidiogenesis* holoblastic with rhexolytic conidial secession. *Conidia* solitary, pale brown, smooth, long obclavate, multi-euseptate; microcyclic conidiation present in culture.

Type species: *Strelitziana africana* M. Arzanlou & Crous, Fungal Planet No. 8. 2006.

Notes: The genus *Strelitziana* presently accommodates four species that are primarily distinguished based on their conidial dimensions. These include *S. africana*, *S. australiensis, S. eucalypti* and *S. mali* (Arzanlou & Crous 2006, Cheewangkoon *et al*. 2009, Zhang *et al.* 2009, Crous *et al.* 2010).

Cyphellophora G.A. de Vries, Mycopathol. Mycol. Appl. 16: 47. 1962.

Colonies (on OA) with moderate to rapid growth, velvety to lanose, in various shades of grey; reverse black. *Fertile hyphae* pale brown, sometimes with constrictions at the septa. *Conidiogenous cells* phialidic, intercalary, sometimes on short side branches, each with a short, lateral or terminal collarette. *Conidia* sickle-shaped, brown, smooth-walled, transversely septate, adhering in small bundles (from de Vries 1962).

Type species: *Cyphellophora laciniata* G.A. de Vries, Mycopathol. Mycol. Appl. 16: 47. 1962.

Notes: The genus *Cyphellophora*, which is based on *C. laciniata* (isolated from human skin; De Vries *et al.* 1986), appears to be heterogeneous (Decock *et al*. 2003, Crous *et al*. 2007a, 2009a, Cheewangkoon *et al*. 2009) and requires further study.

Clade 2: *Thedgonia*

Thedgonia B. Sutton, Trans. Brit. Mycol. Soc. 61: 426. 1973.

Foliicolous, phytopathogenic, causing discrete leaf spots. *Conidiomata* fasciculate, punctiform. *Mycelium* internal, hyphae subhyaline, septate, branched, forming substomatal stromata, hyaline to pale brown. *Conidiophores* fasciculate, arising from stromata, simple, rarely branched, subcylindrical, straight to geniculate-sinuous, continuous to septate, smooth, hyaline to pale yellowish green. *Conidiogenous cells* integrated, terminal,

occasionally conidiophores reduced to conidiogenous cells, holoblastic-thalloblastic, sympodial, conidiogenous loci more or less planate, unthickened, non-pigmented. *Conidia* in disarticulating chains, rarely in branched chains, subcylindrical to obclavate, with one to several transverse eusepta, hyaline or almost so, apex rounded to truncate, base truncate, hila flat, unthickened, hyaline (Crous *et al*. 2009a).

Type species: *Thedgonia ligustrina* B. Sutton, Trans. Brit. Mycol. Soc. 61: 426. 1973.

Thedgonia ligustrina (Boerema) B. Sutton, Trans. Brit. Mycol. Soc. 61: 428. 1973.
Basionym: *Cercospora ligustrina* Boerema, Tijdschr. Plantenziekten 68: 117. 1962.

≡ *Cercoseptoria ligustrina* (Boerema) Arx, Genera of Fungi Sporulating in Pure Culture, ed. 3: 306, Lehre 1981.

Specimens examined: **Asia**, on *Ligustrum* sp., H. Evans, CPC 4296 = W2072, CPC 4297 = W 2073, CPC 4298 = W 1877. **Netherlands**, Eefde, on *Ligustrum ovalifolium*, 23 Mar. 1959, G.H. Boerema, **holotype** L, ex-type culture CBS 148.59; Bilthoven, on *L. ovalifolium*, 2003, P.W. Crous, CPC 10530 = CBS 124332, CPC 10532, 10533. **South Korea**, Namyangju, on *L. ovalifolium*, 9 Oct. 2002, leg. H.D. Shin, isol. P.W. Crous, CBS H-20204, CPC 10019, 10861–10863; Suwon, on *L. obtusifolium*, 2 Oct. 2007, leg. H.D. Shin, isol. P.W. Crous, CBS H-20207, CPC 14754–14756.

Notes: Contrary to the earlier hypothesis that *Thedgonia* belonged to the *Mycosphaerellaceae* (Kaiser & Crous 1998), Crous *et al*. (2009a) showed that it resides in *Helotiales*. Consequently, *Thedgonia*-like anamorphs that occur in the *Mycosphaerellaceae* must be accommodated elsewhere.

Clade 3: *Xenostigmina*

Xenostigmina Crous, Mycol. Mem. 21: 154. 1998.

Foliicolous, phytopathogenic, causing discrete leaf spots. *Mycelium* internal, consisting of hyaline to pale brown, septate, branched, smooth hyphae. *Conidiomata* sporodochial, brown to black. *Conidiophores* densely aggregated, arising from the upper cells of a pale brown stroma, finely verruculose, hyaline to pale brown, multiseptate, subcylindrical, straight to variously curved, branched. *Conidiogenous cells* terminal and intercalary, hyaline to pale brown, finely verruculose, doliiform to subcylindrical, tapering to flat tipped loci, mono- to polyblastic, proliferating sympodially and percurrent; loci not thickened or conspicuous. *Conidia* solitary, pale to medium brown, with pale brown apical and basal regions, finely verruculose, mostly straight, ellipsoidal, apex subobtuse, frequently extending into a beak; base truncate at dehiscence, inner part extending later to form a short, subobtuse basal appendage; septation muriform; basal marginal frill present (Crous *et al*. 2009a).

Type species: *Xenostigmina zilleri* (A. Funk) Crous, Mycol. Mem. 21: 155. 1998.

Specimens examined: **Canada**, British Columbia, 15 km east of Sardis, on living leaves of *Acer macrophyllum*, 22 Oct. 1985, A. Funk & C.E. Dorworth, **holotype** DAVFP 23272; British Columbia, on living leaves of *Acer* sp., 2002, leg. K.A. Seifert, isol. P.W. Crous, CBS 115686 = CPC 4010, CBS 115685 = CPC 4011; Victoria BC, 48°30'25.63"N, 123°30'46.99"W, 115 m, fallen leaves of *A. macrophyllum*, 6 Sep. 2007, leg. B. Callan, isol. P.W. Crous, **epitype designated here** CBS H-20208, cultures ex-epitype CPC 14376 = CBS 124108, CPC 14377, 14378 (*Xenostigmina zilleri*), CPC 14379 = CBS 124109, CPC 14380, 14381 (*Mycopappus aceris*).

Notes: *Xenostigmina* with its *Mycopappus* synanamorph is distinct from *Stigmina s. str*., which is a synonym of *Pseudocercospora s. str.* (Crous *et al*. 2006, Braun & Crous 2006, 2007). The genus *Xenostigmina* (Crous 1998) appears related to *Seifertia* (Seifert *et al*. 2007) in the *Dothideomycetes* (Crous *et al*. 2009b).

Clade 4: *Phaeomycocentrospora*

Phaeomycocentrospora Crous, H.D. Shin & U. Braun, **gen. nov.** MycoBank MB564813.

Etymology: Name reflects the pale brown appearance of conidia and the superficial similarity to *Mycocentrospora.*

Foliicolous, phytopathogenic, causing discrete leaf spots. *Mycelium* internal and external, consisting of hyaline, septate, branched, smooth, 3–5 µm diam hyphae; hyphopodium-like structures present. *Caespituli* amphigenous. *Conidiophores* in loose fascicles, arising from a poorly developed stroma, or from superficial hyphae emerging from stomata, or erumpent through the cuticle; erect on superficial hyphae, olivaceous-brown, straight to slightly curved, unbranched, not geniculate, obconically truncate at apex; *conidiogenous cells* integrated, terminal or conidiophores reduced to conidiogenous cells, mono- to polyblastic, proliferating sympodially, transversely septate; conidiogenous loci broad, more or less planate, neither thickened nor darkened. *Conidia* solitary, filiform to cylindrical, straight to moderately curved, subhyaline to pale olivaceous, transversely euseptate, usually not constricted at septa, tapering somewhat towards an obtuse apex, truncate at base; hilum unthickened, not darkened, broad.

Type species: *Phaeomycocentrospora cantuariensis* (E.S. Salmon & Wormald) Crous, H.D. Shin & U. Braun, comb. nov.

Notes: *Phaeomycocentrospora* is similar to *Pseudocercospora* in that its conidia and conidiophores appear to be pigmented and its conidiogenous loci are unthickened and not darkened. It is distinct from *Pseudocercospora* in that its mycelium is hyaline, hyphopodia-like structures are present, and conidia are hyaline with a pale brown inner wall layer, giving the impression of pigmented conidia. This fungus also has extremely broad conidial loci and scars that are untypical of *Pseudocercospora*. Chupp (1954) commented that *Cercospora cantuariensis* represented an unusual species that should be transferred to a genus of its own. Based on its unique phylogenetic placement (Fig. 4) and morphology, *Phaeomycocentrospora* gen. nov. is established for this taxon. Deighton (1971, 1972) assigned this species to *Mycocentrospora*, but the type species *M. acerina* is phylogenetically distinct from other genera morphologically similar to it and differs in having conidia with filiform appendages and often with strongly swollen intercalary cells.

Phaeomycocentrospora cantuariensis (E.S. Salmon & Wormald) Crous, H.D. Shin & U. Braun, **comb. nov.** MycoBank MB564814. Fig. 6.
Basionym: *Cercospora cantuariensis* E.S. Salmon & Wormald, J. Bot. (London) 61: 134. 1923.

≡ *Centrospora cantuariensis* (E.S. Salmon & Wormald) Deighton, Mycol. Pap. 124: 8. 1971.

≡ *Mycocentrospora cantuariensis* (E.S. Salmon & Wormald) Deighton, Taxon 21: 716. 1972.

≡ *Pseudocercospora cantuariensis* (E.S. Salmon & Wormald) U. Braun, Mycotaxon 48: 281. 1993.

Fig. 6. *Phaeomycocentrospora cantuariensis* (CPC 11691–11693). A. Leaf spots on upper and lower leaf surface. B, C. Sporulation of leaf surface. D–I. Conidiophores and conidiogenous cells. J–M. Conidia. Scale bars = 10 µm.

Leaf spots amphigenous, scattered, often confluent, subcircular to irregular, 1–5 mm diam, becoming up to 10 mm diam when confluent, greyish to white, centre reddish brown with yellowish brown zone on upper surface; greyish brown to grey on lower surface. *Caespituli* amphigenous, but predominantly hypophyllous. *Mycelium* internal and external; internal hyphae hyaline, septate, branched, smooth, 3–4 µm diam; external hyphae plagiotropous, branched, septate, smooth, hyaline, 3–5 µm diam. *Conidiophores* in loose fascicles, arising from a poorly developed stroma, or from superficial hyphae emerging from stomata, or erumpent through the cuticle; erect on superficial hyphae, olivaceous-brown, straight to slightly curved, unbranched, not geniculate, obconically truncate at apex, proliferating sympodially, 0–3-septate, 30–140 × 7–20 µm. *Conidiogenous cells* terminal, unbranched, pale brown, smooth, tapering to flat-tipped apical loci, with scars neither thickened nor darkened, 4–7 µm diam; at times proliferating percurrently, with 1–3 percurrent proliferations at apex, 12–45 × 5–8 µm. *Conidia* solitary, filiform to cylindrical, straight to moderately curved, subhyaline to pale olivaceous, smooth, 3–15(–21)-septate, usually not constricted at septa, tapering somewhat towards obtuse apex, truncate at base, or long obconically subtruncate, (100–)140–200(–500) × (5–)7–12(–20) µm; hilum unthickened, not darkened, 4–7 µm diam; conidia appear to have an inner wall layer that is pale brown when studied in culture (adapted from Shin & Kim 2001).

Specimens examined: **South Korea**, Hoengseong, on *Humulus scandens* (= *H. japonicus*), 4 Sep. 2005, H.D. Shin, CBS H-20830; Suwon, *Acalypha australis*, 5 Nov. 2004, H.D. Shin, cultures CPC 11691–11693; Suwon, *H. scandens* , 5 Nov. 2004, H.D. Shin, CBS H-20831, cultures CPC 11694–11696; Hoengseong, on *H.*

scandens, 11 Oct. 2004, H.D. Shin, CBS H-20832, cultures CPC 11646, 11647; Wonju, on *H. scandens*, 18 Oct. 2002, H.D. Shin, CBS H-20833, cultures 10157, 10158; Namyangju, on *Luffa aegyptica* (= *L. cylindrica*), 22 Oct. 2003, H.D. Shin, CBS H-20834, cultures CPC 10762–10766.

Clade 5: *Cladosporium* (*Cladosporiaceae*)

Cladosporium Link, Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 7: 37. 1816.
Teleomorph: *Davidiella* Crous & U. Braun, Mycol. Progr. 2: 8. 2003.

Saprobic or phytopathogenic. *Ascomata* pseudothecial, black to red-brown, globose, inconspicuous and immersed beneath stomata to superficial, situated on a reduced stroma, with 1(–3) short, periphysate ostiolar necks; periphysoids frequently growing down into cavity; wall consisting of 3–6 layers of *textura angularis*. *Asci* fasciculate, short-stalked or not, bitunicate, subsessile, obovoid to broadly ellipsoid or subcylindrical, straight to slightly curved, 8-spored. *Pseudoparaphyses* frequently present in mature ascomata, hyaline, septate, subcylindrical. *Ascospores* bi- to multiseriate, hyaline, obovoid to ellipsoid-fusiform, with irregular luminar inclusions, mostly thick-walled, straight to slightly curved; frequently becoming brown and verruculose in asci; at times covered in mucoid sheath (from Schubert *et al.* 2007). *Mycelium* superficial, loosely branched, septate, sometimes constricted at septa, hyaline, subhyaline to pale brown, smooth or almost so to verruculose or irregularly rough-walled, sometimes appearing irregular in outline due to small swellings and constrictions, walls unthickened to somewhat thickened. *Conidiophores* both macro- and micronematous, arising laterally from plagiotropous hyphae or terminally from ascending hyphae. *Macronematous conidiophores* erect, straight to flexuous, somewhat geniculate-sinuous, nodulose or not, unbranched or occasionally branched, pluriseptate, pale to medium brown, older ones almost dark brown, walls thickened, sometimes even two-layered. *Conidiogenous cells* integrated, terminal or intercalary, mono- to usually polyblastic, nodulose to nodose or not, proliferation sympodial, with several conidiogenous loci, mostly situated on small lateral shoulders, more or less protuberant, characteristically coronate (SEM), *i.e.* with a convex central dome surrounded by a low to distinctly raised rim, appearing to be thickened and somewhat darkened-refractive. *Micronematous conidiophores* hardly distinguishable from hyphae, sometimes only as short lateral outgrowth with a single apical scar, short, conical to almost filiform or narrowly cylindrical, pluriseptate, usually short, subhyaline to pale brown, almost smooth to minutely verruculose or irregularly rough-walled, 0–3-septate. *Conidiogenous cells* integrated, terminal or conidiophores reduced to conidiogenous cells, narrowly cylindrical or filiform, with a single or two loci. *Conidia* solitary (in *Heterosporium*-like species) to usually catenate, in unbranched or loosely branched chains, straight to slightly curved; small terminal conidia without distal hilum, obovoid to ellipsoid to subcylindrical, aseptate, subhyaline to pale brown; intercalary conidia with a single or sometimes up to three distal hila, limoniform, ellipsoid to subcylindrical, 0–1-septate; *secondary ramoconidia* with up to four distal hila, ellipsoid to cylindrical-oblong, 0–1(–2)-septate, pale greyish brown or brown to medium brown, smooth to minutely verruculose to verrucose, walls slightly to distinctly thickened, apex obtuse or slightly truncate, towards the base sometimes distinctly attenuated with hila situated on short stalk-like prolongations, hila slightly to distinctly protuberant, coronate structure as in conidiogenous loci, somewhat thickened and darkened-refractive; microcyclic conidiogenesis occurring; *primary ramoconidia* similar to secondary ramoconidia, except base truncate, uniform with conidiogenous cell, and more subcylindrical in shape (adapted from Schubert *et al.* 2007).

Type species: *Cladosporium herbarum* (Pers. : Fr.) Link, Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. 7: 37. 1816.

Notes: *Cladosporium* is well-defined by having *Davidiella* teleomorphs and conidiophores that give rise to conidial chains with unique coronate scars (David 1997, Braun *et al*. 2003a, Schubert *et al.* 2007, Bensch *et al.* 2010, 2012), which easily distinguish it from a range of other morphologically similar genera (Crous *et al*. 2007a, b; Braun & Crous, in Seifert *et al*. 2011).

Clade 6: *Teratosphaeriaceae*

Teratosphaeria Syd. & P. Syd., Ann. Mycol. 10: 39. 1912.

Phytopathogenic, commonly associated with leaf spots, but also on fruit, or causing cankers on stems. *Ascomata* pseudothecial, superficial to immersed, frequently situated in a stroma of brown pseudoparenchymatal cells, globose, unilocular, papillate, ostiolate, canal periphysate, with periphysoids frequently present; wall consisting of several layers of brown *textura angularis*; inner layer of flattened, hyaline cells. *Pseudoparaphyses* frequently present, subcylindrical, branched, septate, anastomosing. *Asci* fasciculate, 8-spored, bitunicate, frequently with multi-layered endotunica. *Ascospores* ellipsoid-fusoid to obovoid, 1-septate, hyaline, but becoming pale brown and verruculose, frequently covered in mucoid sheath (from Crous *et al*. 2007a).

Type species: *Teratosphaeria fibrillosa* Syd. & P. Syd., Ann. Mycol. 10: 40. 1912.

Notes: *Teratosphaeria* accommodates a group of plant pathogenic fungi that can cause serious leaf spot, blotch and canker diseases of a range of hosts (Crous 2009, Crous *et al*. 2007a, 2009b, Hunter *et al*. 2009, 2011). The *Teratosphaeriaceae* remains to be clearly resolved, and several different genera are presently recognised in the family. Some are plant-associated such as *Batcheloromyces*, *Baudoinea, Capnobotryella, Catenulostroma, Davisoniella, Devriesia, Hortea*, *Penidiella, Phaeothecoidea, Pseudotaeniolina*, *Readeriella, Staninwardia,* and *Stenella s. str.* (Crous *et al*. 2007a, 2009a, 2011b), and others including *Cystocoleus, Racodium, Friedmanniomyces, Elasticomyces*, *Recurvomyces* (Selbmann *et al*. 2008) and *Xanthoriicola* (Ruibal *et al*. 2011) are lichenicolous or rock inhabiting.

Microcyclospora Jana Frank, Schroers & Crous, Persoonia 24: 99. 2010.

Epiphytic and endophytic, occurring on leaves and fruit. *Mycelium* consisting of branched, septate, pale brown, smooth, 2–3 µm wide hyphae. *Conidiophores* reduced to conidiogenous cells, integrated in hyphae, giving rise to peg-like lateral protuberances, 1 µm wide, 1–2 µm tall, mono- to polyblastic. *Conidia* scolecosporous, cylindrical, straight to variously curved, flexuous, apex obtuse, base truncate, 1–multi-septate, somewhat constricted at septa, smooth, pale brown, guttulate, aggregated in mucoid masses; hila not thickened or darkened; microcyclic conidiation observed in culture.

Type species: *Microcyclospora pomicola* Jana Frank, B. Oertel, Schroers & Crous, Persoonia 24: 100. 2010.

Notes: *Microcyclospora* was recently introduced in *Teratosphaeriaceae* for three taxa associated with sooty blotch of apple (Frank *et al*. 2010). The species described here resembles others presently known in *Microcyclospora* by having pigmented structures and undergoing microcyclic condiation. Other than having distinct conidial dimensions, it differs from other genera in that its conidiogenous cells are annellidic (not mono- to polyblastic), and its conidia are darker brown and verruculose to warty, not pale brown and smooth.

Microcyclospora quercina Crous & Verkley, **sp. nov.** MycoBank MB564815. Figs 7, 8.

Etymology: Name reflects its host, *Quercus.*

Foliicolous, endophytic. *Mycelium* consisting of branched, septate, brown, 1.5–3 µm diam hyphae, guttulate, smooth to verruculose or warty, with or without mucoid sheath. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* lateral on hyphae, brown, solitary, not aggregated, 1.5–2 µm diam, with 1–4 percurrent proliferations and flaring collarettes. *Conidia* solitary, subcylindrical (rarely obclavate), gently curved, apex obtuse (rarely subobtuse), base truncate or long obconically truncate, with slight basal taper to hilum that is 2 µm diam, unthickened, nor darkened, frequently with small marginal frill, brown, guttulate to granular, smooth, appearing warty or roughened due to external mucoid layer which is sometimes present, transversely (1–)3–4(–11)-euseptate, becoming constricted at septa with age, (12–)30–45(–70) × (2–)2.5–3 µm; microcyclic conidiation commonly observed.

Culture characteristics: Colonies after 2 wk in the dark up to 15 mm diam, with sparse aerial mycelium, folded surface and uneven to somewhat feathery, lobate margins, exuding copious amounts of slime on PDA, but less so on MEA and OA; colonies olivaceous-black on all media.

Specimen examined: **Netherlands**, endophytic in leaves of *Quercus robur*, Sep. 2003, G.J.M. Verkley, **holotype** CBS H-20835, culture ex-type CPC 10712 = CBS 130827.

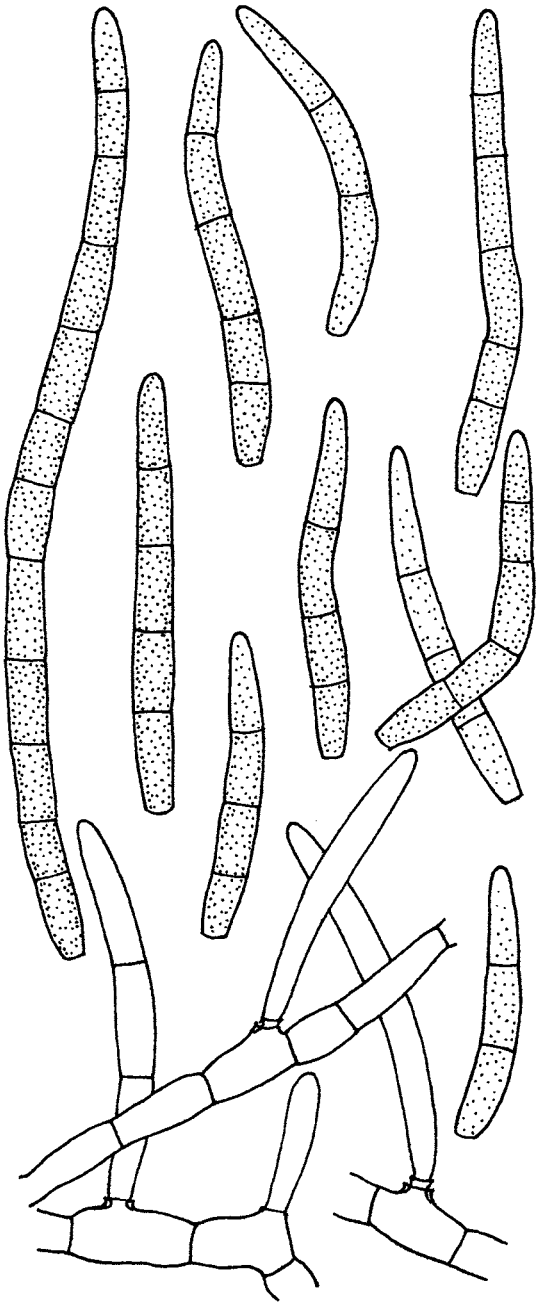

Fig. 7. *Microcyclospora quercina* (CPC 10712). Line drawing showing conidiogenous cells and conidia formed in culture. Scale bar = 10 µm.

Clade 7: *Dissoconium* (*Dissoconiaceae*)

Dissoconium de Hoog, Oorschot & Hijwegen, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 86(2): 198. 1983.

Hyperparasitic, but also reported to be phytopathogenic. *Ascomata* pseudothecial, immersed, globose, unilocular, papillate, ostiolate, canal periphysate; wall consisting of 3–4 layers of brown *textura angularis*; inner layer of flattened, hyaline cells. *Pseudoparaphyses* absent. *Asci* fasciculate, 8-spored, bitunicate. *Ascospores* ellipsoid-fusoid, 1-septate, hyaline, with or without mucoid sheath. *Mycelium* internal and external, consisting of branched, septate, smooth, hyaline to pale brown hyphae. *Conidiophores* separate, arising from hyphae, subcylindrical, subulate or lageniform to cylindrical, tapering to a bluntly rounded or truncate apex, straight to once geniculate, smooth, medium brown, 0–multi-septate; *conidiogenous cells* polyblastic, with terminal and lateral conidiogenous loci, visible as slightly thickened, darkened scars on a rachis. *Conidia* solitary, pale olivaceous-brown, smooth, ellipsoid to obclavate or globose, 0–1-septate; hila somewhat darkened. *Secondary conidia* present or absent; developing adjacent to primary conidia, pale olivaceous to subhyaline, aseptate, pyriform; conidium discharge active or passive (from Crous *et al.* 2009b).

Type species: *Dissoconium aciculare* de Hoog, Oorschot & Hijwegen, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 86(2): 198. 1983.

Notes: *Dissoconium* has *Mycosphaerella*-like teleomorphs (Crous 1998, Crous *et al.* 2004c) and was recently shown to represent a distinct family, *Dissoconiaceae* (Crous *et al.* 2009b). Species are different from other taxa in *Capnodiales* in that they form primary and secondary conidia that are actively discharged and anastomose on the agar surface shortly after germination (De Hoog *et al.* 1991).

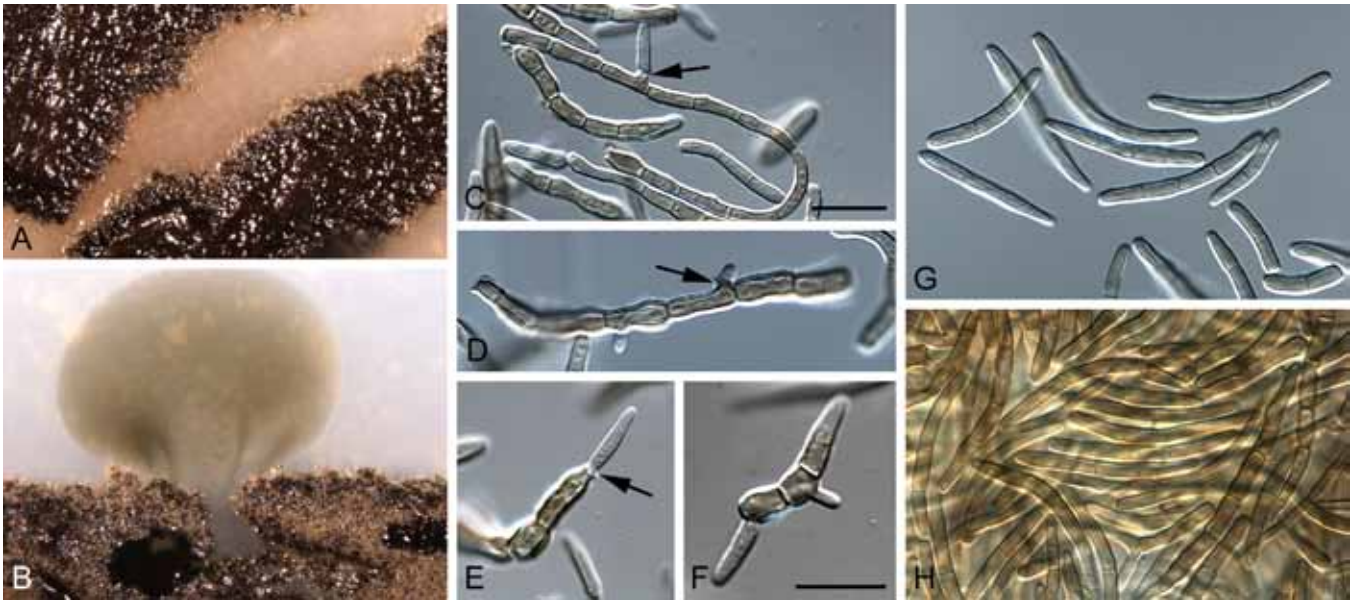

Fig. 8. *Microcyclospora quercina* (CPC 10712). A, B. Colony on oatmeal and potato-dextrose agar, respectively. C–E. Conidiogenous cells giving rise to conidia (arrows). F. Microcyclic conidiation. G, H. Conidia. Scale bars = 10 µm.

Clade 8: *Microcyclosporella* and *Zasmidium*-like

Microcyclosporella Jana Frank, Schroers & Crous, Persoonia 24: 101. 2010.

Epiphytic on leaves and fruit. *Mycelium* consisting of pale brown, smooth to finely verruculose, branched, septate, 2–3.5 µm wide hyphae, at times covered in 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; loci inconspicuous, truncate, unthickened, not darkened, pale brown to hyaline. *Conidia* hyaline, smooth, subcylindrical to narrowly obclavate or narrowly fusoid with acutely rounded apex and obconically truncate base, guttulate, transversely 0–6-septate; microcyclic conidiation common.

Type species: *Microcyclosporella mali* Jana Frank, Schroers & Crous, Persoonia 24: 101. 2010.

Notes: *Microcyclosporella* was treated as part of the *Pseudocercosporella* generic complex (Batzer *et al.* 2005), but has since been shown to be polyphyletic within *Mycosphaerellaceae* (Crous 2009, Crous *et al*. 2003, 2009b, c, Frank *et al.* 2010). The clade accommodating *Microcyclosporella* contains many disjunct elements that vary in morphology from *Microcyclosporella s. str.* (hyaline structures) to pigmented structures, namely *Zasmidium*-like (verrucuclose conidia) to *Pseudocercospora*-like (smooth conidia) (see Crous *et al.* 2009b). We suspect that these groups may eventually be recognised as distinct genera, but more taxa need to be examined to resolve this issue.

Clade 9: *Paracercospora* and *Pseudocercospora*-like

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

Foliicolous, phytopathogenic, causing leaf spots. *Mycelium* internal, hyaline to pale olivaceous. Stromata absent to poorly developed. *Conidiophores* fasciculate, smooth, subhyaline to pale olivaceous. *Conidiogenous cells* integrated, terminal, mono- to usually polyblastic, proliferating sympodially; conidiogenous loci moderately conspicuous, with narrow thickening along the rim. *Conidia* solitary, subcylindrical to obclavate-cylindrical, smooth, subhyaline to pale olivaceous, with a narrow thickening along the rim of the hilum.

Type species: *Paracercospora egenula* (Syd.) Deighton, Mycol. Pap. 144: 48. 1979.

Specimens examined: **Japan**, Shimane, on leaves of *Solanum melongena*, 5 Aug. 1998, T. Mikami, CNS-415, cultures MUCC 883, MAFF 237766. **South Korea**, Hongcheon, on leaves of *S. melongena*, 26 Oct. 2005, H.D. Shin, CBS H-20836, culture CPC 12537.

Notes: Stewart *et al.* (1999) conducted the first phylogenetic analysis of the *Mycosphaerellaceae* and concluded that the marginal thickening that occurs along the rims of conidial scars and hila, originally thought to be the main character to distinguish *Paracercospora* from *Pseudocercospora*, was not taxonomically significant and suggested that *Paracercospora* be reduced to synonymy with *Pseudocercospora*. The current study provides new evidence that *Paracercospora* is not a synonym of *Pseudocercospora*, but no consistent morphological characters that distinguish it from *Pseudocercospora s. str.* have been identified. Conidia of *Paracercospora egenula* are subhyaline to pale olivaceous with minimal marginal thickening of the conidiogenous loci (Fig. 9). Conidial scars and hila of *Ps. fijiensis* (Arzanlou *et al*. 2008) and *Ps. basiramifera* (Crous 1998) are marginally thickened. Both of the latter species, which belong to *Pseudocercospora s. str*., have pale to medium brown conidia. At present *Paracercospora* may be defined by a combination of the minimal marginal thickening of the conidiogenous loci and its subhyaline conidia.

The taxonomic placement of *Paracercospora* is complicated by two other taxa that resolve in the clade together with it. These are *Passalora brachycarpa* (pale olivaceous, catenate conidia, and

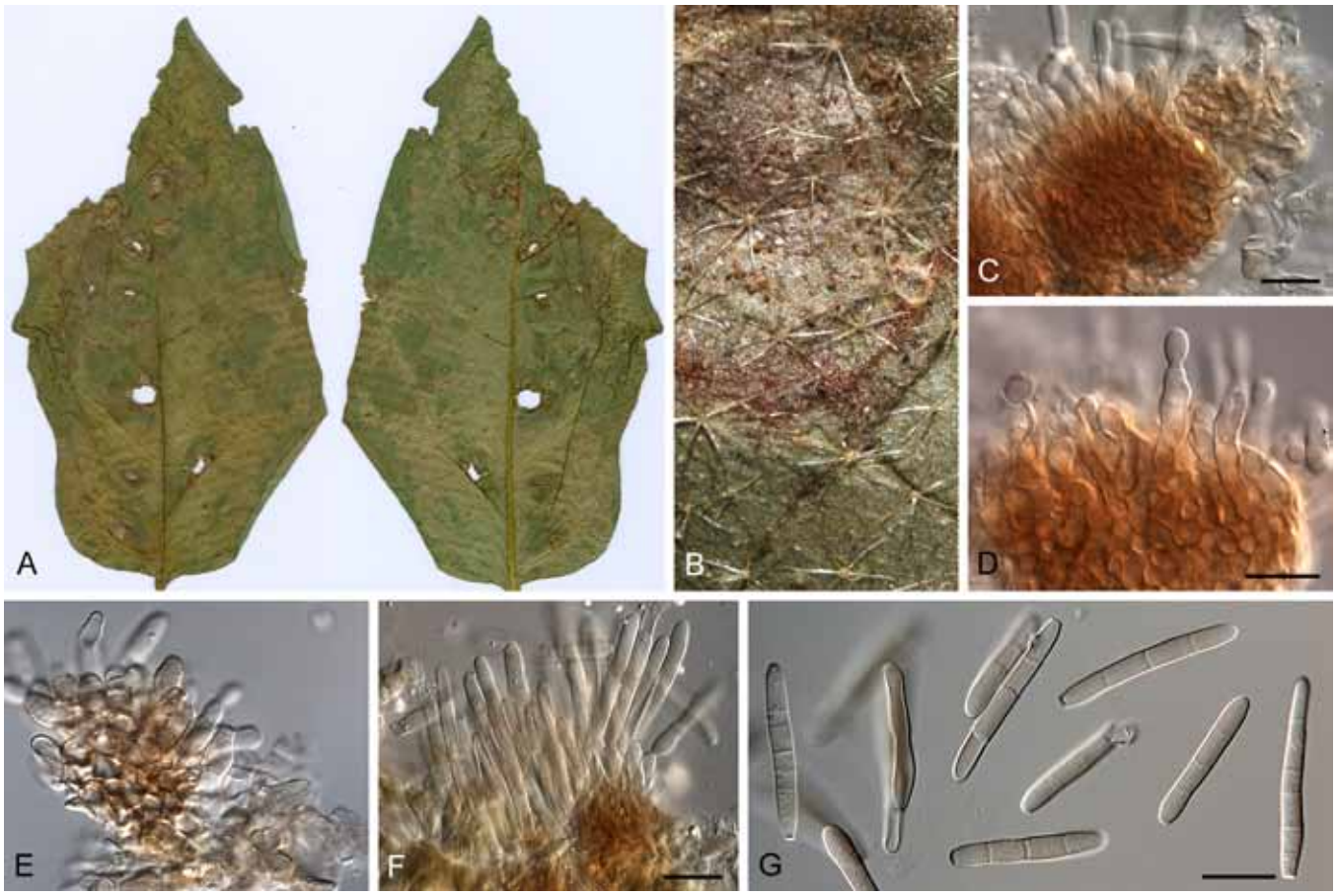

Fig. 9. *Paracercospora egenula* (CPC 12537). A. Leaf spots on upper and lower leaf surface. B. Close-up of lesion. C–F. Fascicles with conidiogenous cells. G. Conidia. Scale bars = 10 µm.

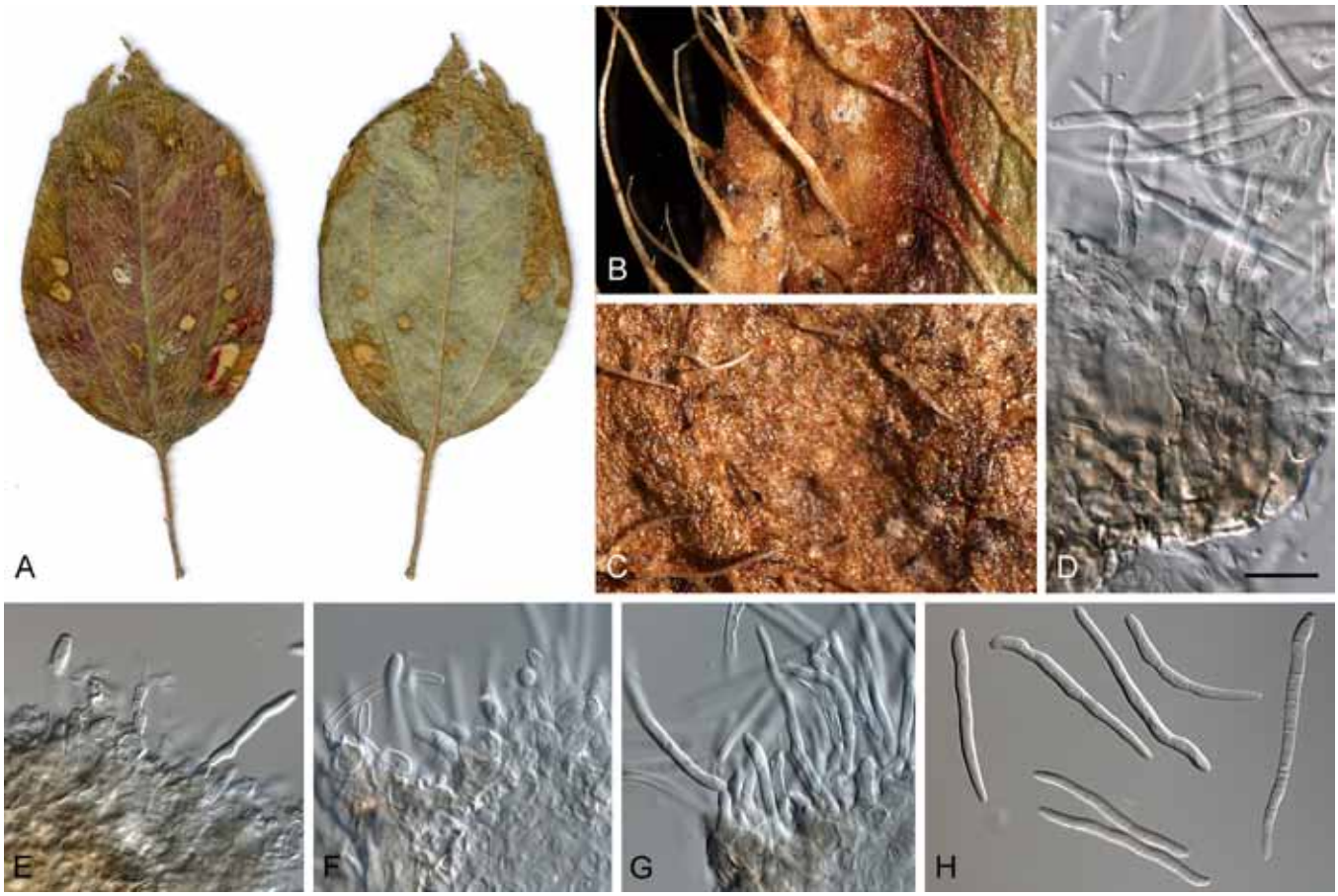

Fig. 10. *Pseudocercospora tibouchinigena* (CBS 116462). A. Leaf spots on upper and lower leaf surface. B, C. Close-up of lesions. D–G. Fascicles with conidiogenous cells. H. Conidia. Scale bar = 10 µm.

prominent, thickened, darkened scars; also visible when sporulating in culture), and *Pseudocercospora tibouchinigena* described below, which has subhyaline conidia, and unthickened hila and scars. This indicates that it is neither a species of *Pseudocercospora s. str.* (subhyaline conidia), nor *Paracercospora* (lacking any form of scar thickening). As a temporary solution, the species on *Tibouchina* is described in *Pseudocercospora*, although taxa in this subclade may eventually be shown to represent a distinct genus.

Pseudocercospora tibouchinigena Crous & U. Braun, **sp. nov.** MycoBank MB564816. Fig. 10.

Etymology: Name is derived from *Tibouchina,* the host on which it was collected.

Leaf spots amphigenous, angular to irregular, 1–3 mm diam, up to 10 mm long, medium brown, with raised, dark brown border. *Mycelium* internal, hyaline, smooth, consisting of septate, branched, smooth, 1.5–2 µm diam hyphae. *Caespituli* fasciculate, predominantly hypophyllous, hyaline to pale olivaceous on leaves, up to 60 µm wide and 40 µm high. *Conidiophores* aggregated in dense fascicles, arising from the upper cells of a hyaline to subhyaline stroma, up to 50 µm wide and 20 µm high; conidiophores subcylindrical to ampulliform, 0–3-septate, straight to variously curved or geniculate-sinuous, unbranched, 15–25 × 3–5 µm. *Conidiogenous cells* terminal, unbranched, hyaline, smooth, tapering to flat-tipped apical loci, proliferating sympodially, 5–10 × 2.5–3.5 µm. *Conidia* solitary, subhyaline, smooth, guttulate or not, subcylindrical or narrowly obclavate, apex subobtuse, base obconically truncate, straight to variously curved, 3–10-septate, (15–)30–40(–60) × (1.5–)2–2.5(–3) µm; hila unthickened, not darkened nor refractive, 1–1.5 µm diam; prominent microcyclic conidiation observed *in vivo*.

Culture characteristics: Colonies after 1 mo at 24 ºC in the dark on MEA; erumpent, spreading, with moderate aerial mycelium, and smooth, lobate margins. Surface pale olivaceous-grey; reverse olivaceous-grey. Colonies reaching 30 mm diam.

Specimen examined: **New Zealand**, Auckland, Princes Street, Auckland University Campus, on leaves of *Tibouchina* sp. (*Melastomataceae*), 9 Aug. 2004, C.F. Hill 1061, **holotype** HAL 2359F, culture ex-type CBS 116462.

Notes: *Pseudocercospora tibouchinigena* was initially reported from New Zealand as *P. tibouchina* (Braun *et al*. 2006), which is hitherto known only from Brazil. It differs from *P. tibouchinae* in that the latter species has narrowly subcylindrical conidia that are larger, 40–120 × 2–3 µm (Viégas 1945), than those of *P. tibouchinigena.* The subhyaline conidia of *P. tibouchinigena* are not typical of *Pseudocercospora s. str*., but for the present, we choose to name it in *Pseudocercospora* until the clade in which it resides has been more fully resolved (Fig. 5).

Clade 10: *Cercospora, Miuraea, Phloeospora, Pseudocercosporella, Septoria, Xenocercospora*

Cercospora Fresen., in Fuckel, Hedwigia 1(15): 133. 1863 and in Fuckel, Fungi Rhen. Exs., Fasc. II, No. 117. 1863.

Mostly phytopathogenic producing conspicuous lesions, but also including saprobes. *Mycelium* internal, rarely also external; hyphae colourless or almost so to pigmented, branched, septate, smooth to faintly rough-walled. *Stromata* lacking to well-developed, subhyaline to usually pigmented, substomatal to intraepidermal. *Conidiophores* mononematous, macronematous, solitary to fasciculate, arising from internal hyphae or stromata, emerging through stomata or erumpent, very rarely arising from superficial hyphae, erect, continuous to pluriseptate, subhyaline to pigmented, smooth to faintly rough-walled, thin- to moderately thick-walled. *Conidiogenous cells* integrated, terminal or intercalary or conidiophores reduced to conidiogenous cells, monoblastic, determinate to usually polyblastic, sympodial, rarely with a few enteroblastically percurrent rejuvenations which are not connected with conidiogenesis; conidiogenous loci (scars) conspicuous, thickened and darkened, planate. *Conidia* solitary, very rarely catenate, scolecosporous, obclavate, cylindrical-filiform, acicular, hyaline or subhyaline (with a pale greenish tinge), mostly pluriseptate, euseptate, rarely with 0–1 or few septa, smooth or almost so, hila thickened and darkened, planate (from Crous & Braun 2003).

Type species: *Cercospora penicillata* (Ces.) Fresen., Beiträge zur Mykologie 3: 93. 1863. [= *C. depazeoides* (Desm.) Sacc.].

Cercospora sojina Hara, Nogyo Sekai, Tokyo 9: 28. 1915. Fig. 11.

≡ *Passalora sojina* (Hara) H.D. Shin & U. Braun, Mycotaxon 58: 163. 1996.

Specimen examined: **South Korea**, Hongcheon, on *Glycine soja* (= *G. max* subsp. *soja*), 20 Jul. 2004, H.D. Shin, CBS H-20837, culture CPC 12322.

Notes: Despite sparingly septate and broadly obclavate-cylindrical conidia that tend to be subhyaline, this species is better accommodated in *Cercospora* than *Passalora* (Shin & Braun 1996) based on phylogenetic analysis.

Cercospora eucommiae Crous, U. Braun & H.D. Shin, **sp. nov.** MycoBank MB564817. Fig. 12.

Etymology: Name derived from *Eucommia*, the host on which it occurs.

Leaf spots amphigenous, irregular to subcircular, 2–5 mm diam; surface grey-brown to brown with diffuse border; reverse olivaceous-brown with diffuse border. *Mycelium* internal, hyaline, consisting of septate, branched, smooth, 2–3 µm diam hyphae. *Caespituli* fasciculate, pale brown, amphigenous, up to 40 µm diam and 50 µm high (conidial mass white on leaf surface). *Conidiophores* aggregated in loose fascicles arising from the upper cells of a weakly developed brown stroma, up to 30 µm diam and 20 µm high, conidiophores pale brown, smooth, 1–3-septate, subcylindrical, straight to variously curved, unbranched, 20–50 × 4–5 µm. *Conidiogenous cells* terminal, unbranched, pale brown, smooth, tapering to flat-tipped apical loci that are thickened, somewhat darkened, slightly refractive, 2 µm diam, 15–25 × 4–5 µm, proliferating sympodially at apex. *Conidia* solitary, or in unbranched short chains, hyaline to pale olivaceous (with age), smooth, guttulate, obclavate, apex obtuse to subobtuse or clavate, base obconically subtruncate, straight to mildly curved, 3–8-septate, (35–)60–75(–80) × (4–)5–6(–8) µm; hila thickened along the rim, but not darkened or planate, 1.5–2 µm diam.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; erumpent, spreading, with sparse aerial mycelium, and

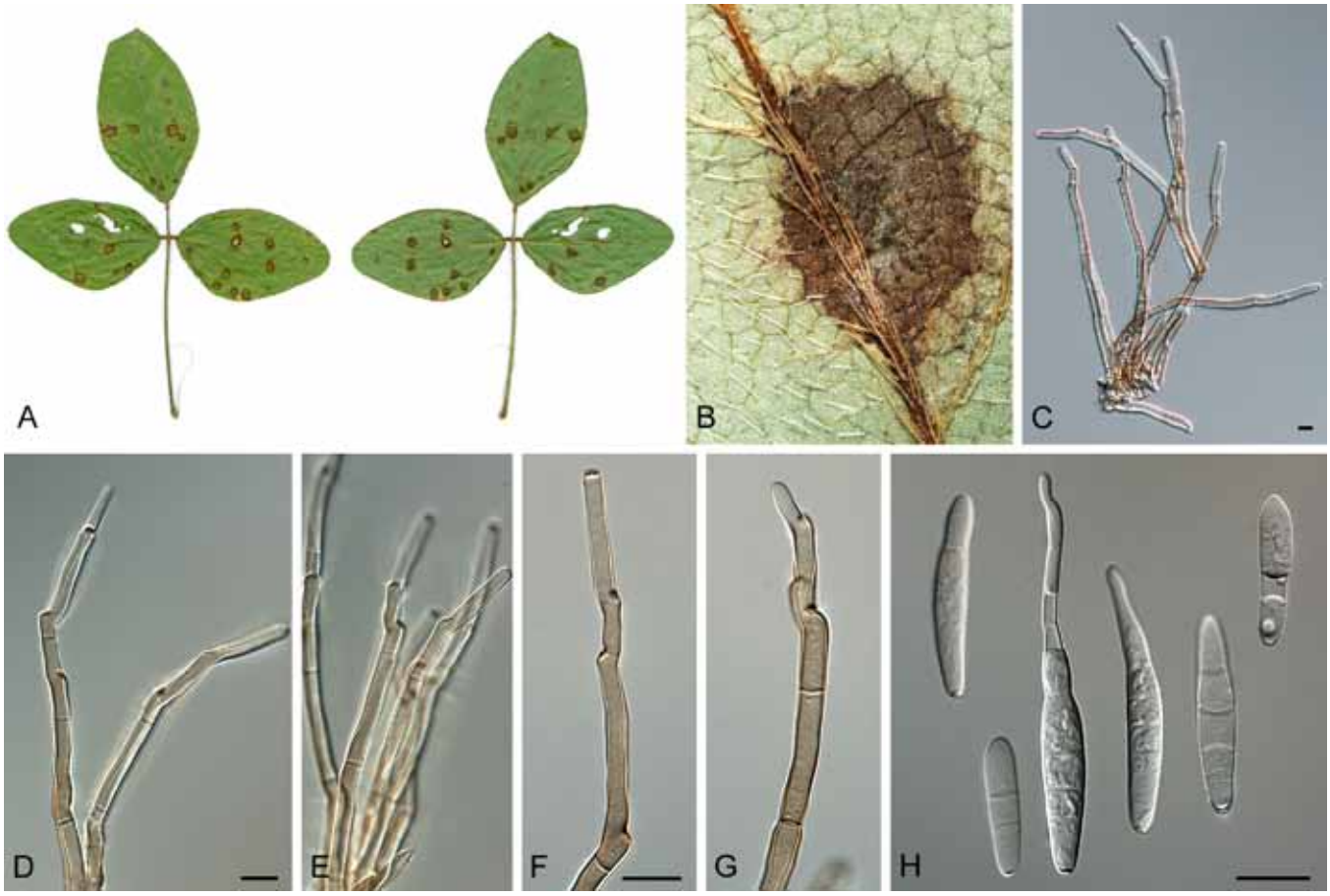

Fig. 11. *Cercospora sojina* (CPC 12322). A. Leaf spots on upper and lower leaf surface. B. Close-up of lesion. C–G. Fascicles with conidiophores and conidiogenous cells. H. Conidia. Scale bars = 10 µm.

smooth, lobate margins. Surface folded, dark mouse-grey with patches of dirty white; reverse fuscous black becoming greyish sepia at margin. Colonies reaching 12 mm diam.

Specimens examined: **South Korea**, Chuncheon, on *Eucommia ulmoides,* 7 Oct. 2003, H.D. Shin, **holotype** CBS H-20839, cultures ex-type CPC 10802 = CBS 131932, CPC 10803, 10804; Chuncheon, on *E. ulmoides,* 11 Oct. 2002, H.D. Shin, CBS H-20838, culture CPC 10047.

Notes: In the Korean material *C. eucommiae* occurred in mixed infections with a *Pseudocercospora* species (conidia 22–160 × 4–7 µm) that resembles *P. eucommiae* (conidia 15–75 × 2–4 um), which is known from this host in China (Guo & Hsieh 1995). The description of *C. eucommiae* reveals the genus *Cercospora* to be paraphyletic. Morphologically *C. eucommiae* is distinct from other species in *Cercospora* in that the conidial hila and conidiogenous scars are different (thickened along the rim, not darkened and planate), and conidia also tend to occur in unbranched chains, which is not typical of *Cercospora*. Interestingly, it does not cluster with *C. eremochloae*, which also forms conidia in chains (Crous *et al*. 2011a). Although this species is not part of *Cercospora s. str*., we name it in this genus until further taxa are collected and studied to resolve the status of this subclade in relation to *Cercospora s. str.*

Miuraea Hara, Byochugai-Hoten (Manual of Pests and Diseases): 779. 1948.
Synonyms: See Braun (1995).

Foliicolous, phytopathogenic, causing leaf spots. *Mycelium* internal and external, consisting of septate, branched, hyaline to subhyaline hyphae. *Conidiophores* semi-macronematous, mononematous, reduced to a single conidiogenous cell, integrated on hyphae, with small lateral peg-like protuberances; conidiogenesis holoblastic, monoblastic, determinate, occasionally polyblastic, proliferation sympodial or percurrent; conidiogenous loci more or less truncate, inconspicuous, unthickened, not darkened. *Conidia* solitary, ellipsoid-ovoid, subcylindrical-vermiform, obclavate, subclavate, somewhat asymmetrical, euseptate, transversely pluriseptate to muriformly septate, hyaline to faintly pigmented, thin-walled; hila truncate to somewhat convex, unthickened, not darkened (adapted from Braun 1995).

Type species: *Miuraea degenerans* (Syd. & P. Syd.) Hara, Byochugai-Hoten (Manual of Pests and Diseases): 260. 1948.

Notes: Morphologically *Miuraea* is intermediate between *Pseudocercospora* and *Pseudocercosporella*, which explains its phylogenetic position in this clade (Fig. 4). It differs from *Pseudocercosporella* in having superficial mycelium, and very broad, muriformly septate conidia.

Miuraea persicae (Sacc.) Hara, Byochugai-Hoten (Manual of pests and diseases): 224. 1948. Fig. 13.
Basionym: *Cercospora persicae* Sacc., Hedwigia 15: 119. 1876.
Teleomorph: "*Mycosphaerella" pruni-persicae* Deighton, Trans. Brit. Mycol. Soc. 50: 328. 1967.

Specimens examined: **South Korea**, Chuncheon, *Prunus persica,* 11 Oct. 2002, H.D. Shin, CBS H-20841, culture CPC 10069; Chuncheon, 7 Oct. 2003, *P. armeniaca,* H.D. Shin, CBS H-20840, CPC 10828–10830.

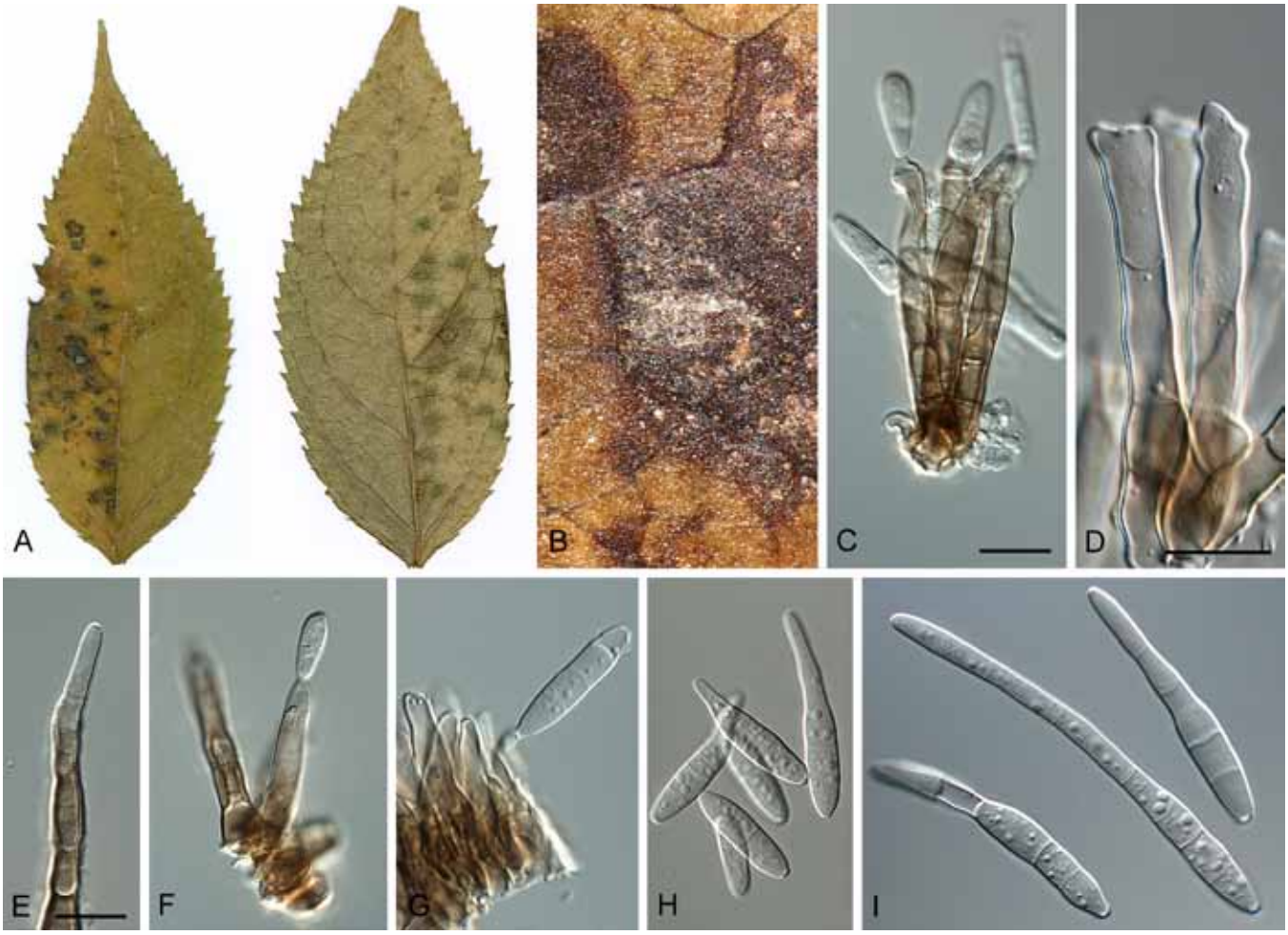

Fig. 12. *Cercospora eucommiae* (CPC 10047). A. Leaf spots on upper and lower leaf surface. B. Close-up of lesion. C–G. Fascicles with conidiophores and conidiogenous cells. H, I. Conidia. Scale bars = 10 µm.

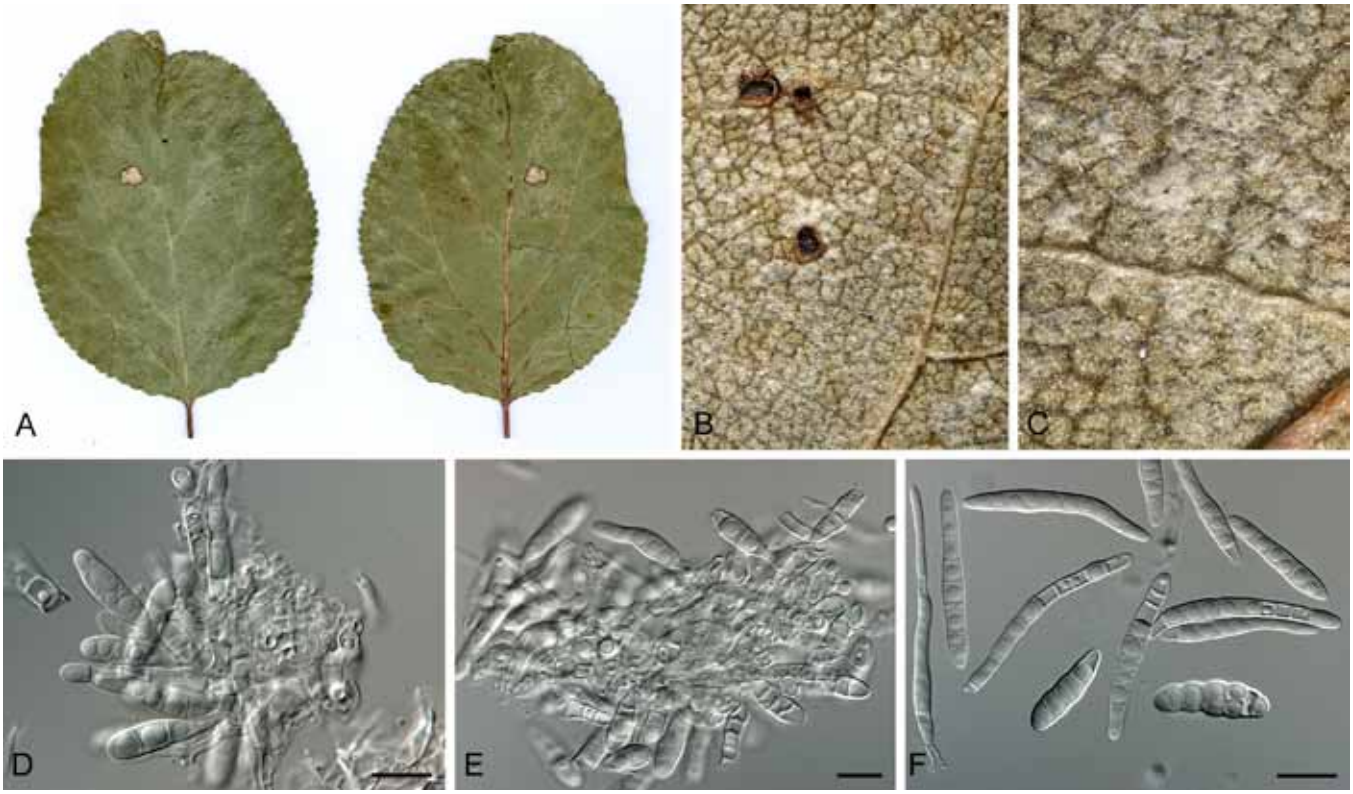

Fig. 13. *Miuraea persicae* (CPC 10069). A. Leaf spots on upper and lower leaf surface. B, C. Close-up of fruiting (rather inconspicuous). D, E. Fascicles with conidiophores and conidiogenous cells. F. Conidia (note septation). Scale bars = 10 µm.

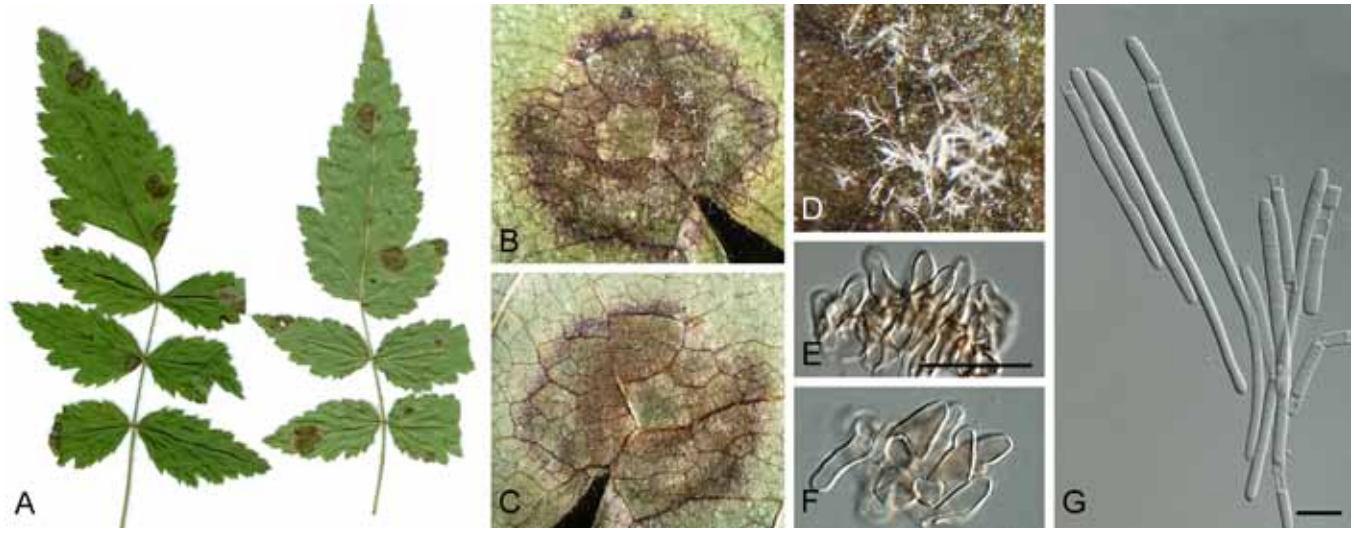

Fig. 14. *Pseudocercosporella arcuata* (CPC 10050). A. Leaf spots on upper and lower leaf surface. B–D. Close-up of lesions. E, F. Fascicles with conidiophores and conidiogenous cells. G. Conidia. Scale bars = 10 µm.

Phloeospora Wallr., Flora Cryptogamica Germaniae 2: 176. 1833.

Phytopathogenic, commonly associated with leaf spots, occurring on leaves and fruit. *Mycelium* immersed, consisting of hyaline, septate, branched hyphae. *Conidiomata* acervular, subepidermal, erumpent; wall of thin-walled *textura angularis*, opening by means of an irregular split. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* hyaline, smooth, cylindrical, discrete, indeterminate, proliferating via percurrent proliferations, or sympodially, formed from the upper cells of the acervulus. *Conidia* solitary, hyaline, smooth, septate, cylindrical, apex subobtuse to obtuse, base truncate, straight to curved.

Type species: *Phloeospora ulmi* (Fr.) Wallr., Flora Cryptogamica Germaniae 2: 177. 1833.

Specimens examined: **Austria**, *Ulmus* sp., H.A. van der Aa, CBS 613.81; *Ulmus glabra,* G. Verkley, CBS 344.97. **Netherlands**, *Ulmus* sp., H.A. van der Aa, CBS 101564.

Notes: *Phloeospora* is distinguished from *Septoria* by the production of conidia in acervuli, whereas conidiomata in the latter genus are pycnidial. Both genera are known to be polyphyletic (Verkley & Priest 2000, Quaedvlieg *et al*. 2011) and require further revision.

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

Foliicolous, phytopathogenic, causing discrete leaf spots. *Mycelium* mostly consistently internal, in some species with internal as well as external hyphae, hyaline to pale brown, septate, branched, smooth or almost so; *stromata* lacking or weakly to well-developed, substomatal to intraepidermal, usually colourless. *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 aggregated in crustose to subglobose sporodochia; conidiophores simple, rarely branched, straight and subcylindrical to geniculate-sinuous, hyaline, occasionally faintly pigmented at the base, rarely throughout, one-celled or septate. *Conidiogenous cells* integrated, terminal, or reduced to conidiogenous cells, mono- to polyblastic, sympodial; conidiogenous loci inconspicuous, unthickened, neither darkened nor conspicuously refractive. *Conidia* formed singly, rarely in simple or branched chains, subcylindrical, filiform, somewhat obclavate, 1–multi-euseptate, hyaline, thin-walled, mostly smooth, apex obtuse to subacute, base subtruncate, hilum unthickened, neither darkened, nor refractive (adapted from Braun 1995).

Type species: *Pseudocercosporella ipomoeae* Deighton, Mycol. Pap. 133: 39. 1973. [= *P. bakeri* (Syd. & P. Syd.) Deighton, Mycol. Pap. 133: 41. 1973].

Note: *Pseudocercosporella* is polyphyletic (see Frank *et al.* 2010, Crous *et al.* 2011b) and new taxonomically useful morphological features will need to be determined to delineate all the genera presently accommodated in this clade.

Pseudocercosporella arcuata S.K. Singh, P.N. Singh & Bhalla, Mycol. Res. 101: 542. 1997. Fig. 14.

Specimen examined: **South Korea**, Chuncheon, on *Rubus oldhamii* (≡ *R. pungens* var. *oldhamii*), 11 Oct. 2002, H.D. Shin, CBS H-20842, culture CPC 10050.

Pseudocercosporella capsellae (Ellis & Everh.) Deighton, Mycol. Pap. 133: 42. 1973.
Basionym: *Cylindrosporium capsellae* Ellis & Everh., J. Mycol. 3(11): 130. 1887.
Additional synonyms in Braun (1995).
Teleomorph: "*Mycosphaerella" capsellae* A.J. Ingman & Sivan., Mycol. Res. 95: 1339. 1991.

Specimen examined: **South Korea**, Namyangju, *Raphanus sativus,* 22 Oct. 2007, H.D. Shin, CBS H-20843, cultures CPC 14773 = CBS 131896.

Pseudocercosporella chaenomelis (Y. Suto) C. Nakash., Crous, U. Braun & H.D. Shin, **comb. nov.** MycoBank MB564818. Fig. 15.
Basionym: *Cercosporella chaenomelis* Y. Suto, Mycoscience 40: 513. 1999.
= *Mycosphaerella chaenomelis* Y. Suto, Mycoscience 40: 513. 1999.

Leaf spots amphigenous, irregular to angular, 5–20 mm diam, brown, delimited by leaf veins. *Mycelium* internal, hyaline, consisting of septate, branched, smooth, 1.5–2 µm diam hyphae. *Caespituli*

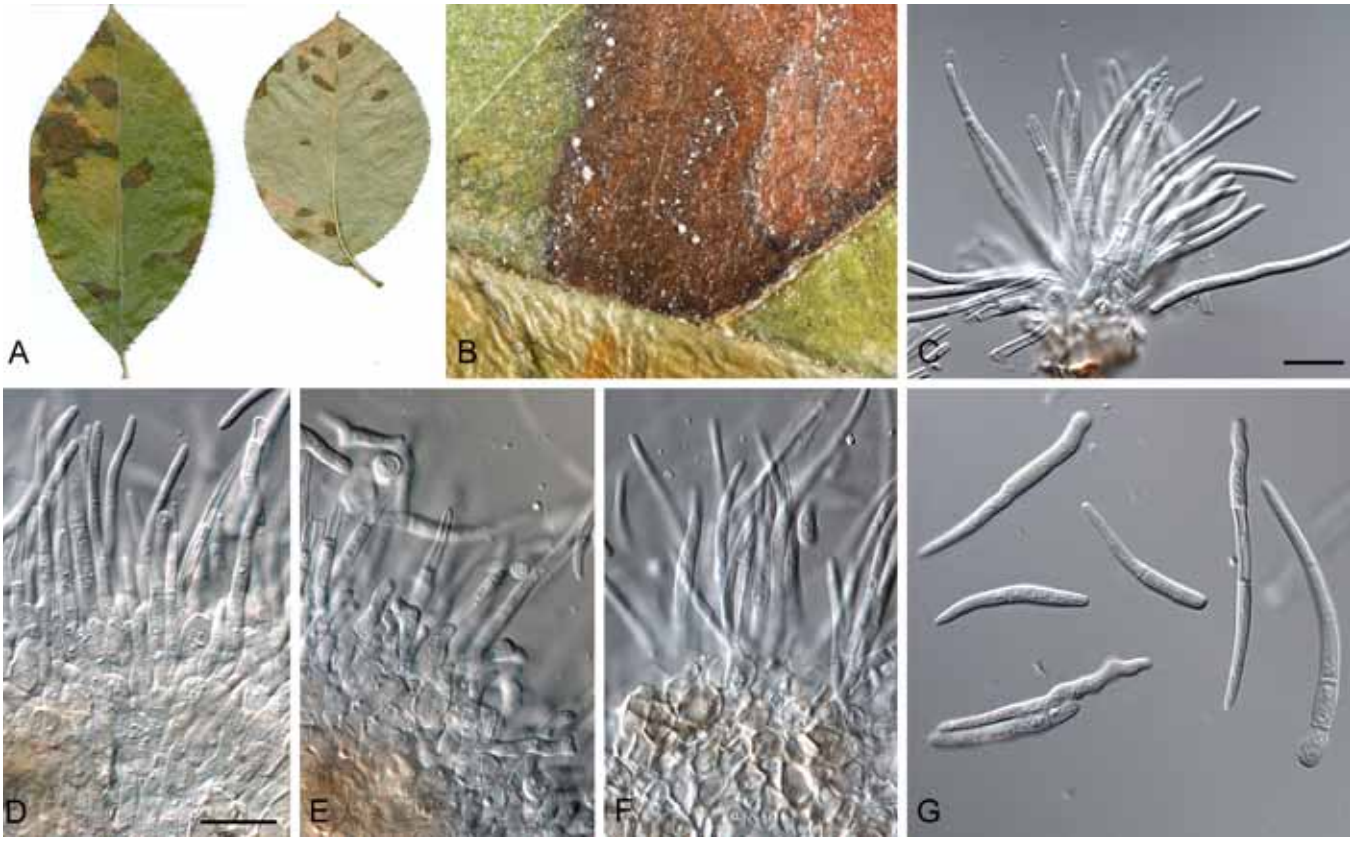

Fig. 15. *Pseudocercosporella chaenomelis* (CPC 14795). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with white fruiting (rather inconspicuous). C–F. Fascicles with conidiophores and conidiogenous cells. G. Conidia. Scale bars = 10 µm.

fasciculate to sporodochial, white, predominantly epiphyllous, up to 200 µm diam and 120 µm high. *Conidiophores* aggregated in dense fascicles, arising from the upper cells of a hyaline stroma, up to 180 µm diam and 100 µm high; conidiophores hyaline, smooth, subcylindrical to ampulliform, straight to variously curved, unbranched, reduced to conidiogenous cells, 5–12 × 3–4 µm, proliferating sympodially at apex. *Conidia* solitary, hyaline, smooth, guttulate to granular, subcylindrical to obclavate, apex subobtuse, base obconically truncate, straight to variously curved, 1–4-septate, (10–)30–38(–50) × (2–)2.5–3(–4) µm; hila unthickened, not darkened nor refractive, 1.5–2 µm diam; undergoing microcyclic conidiation on the host. Description based on CPC 14795.

Culture characteristics: Colonies after 1 mo at 24 ºC in the dark on MEA; Colonies erumpent, spreading, with aerial mycelium sparse to absent, margins smooth, lobate. Surface irregularly folded, with a prominent network of ridges; folds appearing cinnamon, with surrounding areas and border brown-vinaceous; reverse sepia to chestnut, reaching up to 35 mm diam.

Specimens examined: **Japan**, Shimane Pref., Matsue, on leaves of *Chaenomeles sinensis,* Y. Suto, 6 Nov. 1983, **holotype** SFH-917, in Herbarium of SPFRC; Mie Pref., Tsu, on leaves of *C. sinensis*, C. Nakashima, 29 Oct. 2011, **epitype designated here** TFM: FPH-8101, culture ex-epitype MUCC 1510 = CBS 132131. **South Korea**, Kimhae, *C. speciosa* (= *C. lagenaria*), 14 Nov. 2007, H.D. Shin, CBS H-20844, culture CPC 14795 = CBS 131897.

Notes: Suto (1999) established the connection between *Pseudocercosporella chaenomelis* (as *Cercosporella*) and *Mycosphaerella chaenomelis*, which is the cause of a serious leaf spot disease referred to as frosty mildew on *Chaenomeles sinensis* in Japan. The fungus was found to overwinter by means of ascomata on fallen leaves, which provided the primary inoculum for new infections (April to June). Since the disease was previously known in Japan to be caused by a species of *Cercosporella*, Suto (1999) chose the latter genus to accommodate the anamorph. The hyaline conidia with unthickened conidial hila indicate that the fungus is better placed in *Pseudocercosporella*, and hence a new combination is proposed. Based on DNA sequence data from the ITS and ACT gene regions, strains from Japan and Korea appear identical (unpubl. data).

Pseudocercosporella chaenomelis occurs in mixed infections with *Pseudocercospora cydoniae*. *Pseudocercosporella chaenomelis* is morphologically comparable only with *Ps. gei*, known on *Geum* spp. in North America and the Far East of Russia (Braun 1995). The latter species differs in having smaller stromata (20–45 µm diam) and much longer filiform-acicular conidia, 20–120 × 1–3(–4) µm (Braun 1995). *Pseudocercosporella crataegi* on *Crataegus* spp. in North America is distinct, forming superficial hyphae with solitary conidiophores, and its much smaller stromata and much longer conidia, and *P. potentillae* on *Potentilla* sp. in Russia also differs by having very long conidia (Braun 1995).

Pseudocercosporella koreana Crous, U. Braun & H.D. Shin, **sp. nov.** MycoBank MB564819. Fig. 16.

Etymology: Name derived from the country where it was collected.

Leaf spots amphigenous, indistinct, irregular, chlorotic, up to 6 mm diam. *Mycelium* internal, hyaline, consisting of septate, branched, smooth, 1.5–2.5 µm diam hyphae. *Caespituli* fasciculate, white, amphigenous, up to 60 µm diam and 90 µm high. *Conidiophores* aggregated in dense fascicles, on the upper cells of a pale brown to hyaline, usually substomatal stroma, up to 45 µm diam and 20

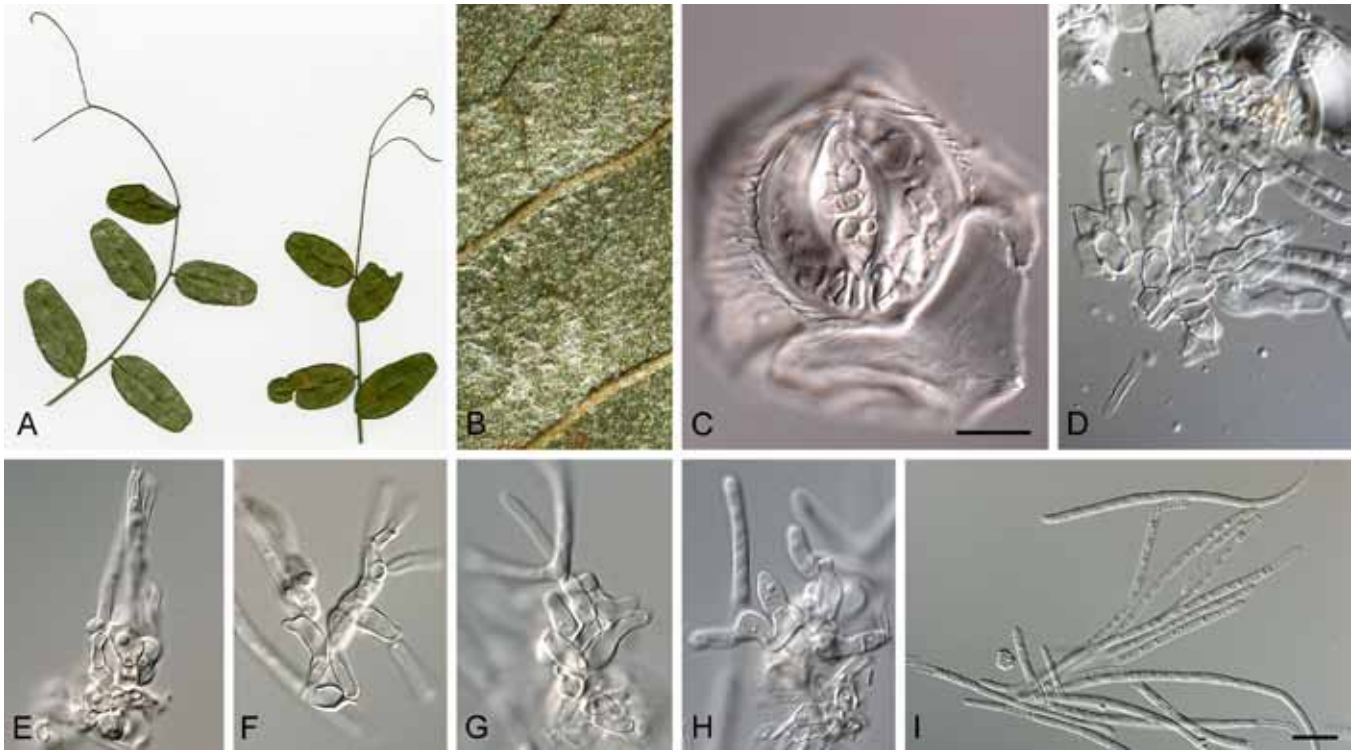

Fig. 16. *Pseudocercosporella koreana* (CPC 11414). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with white fruiting. C. Substomatal stroma. D–H. Fascicles with conidiophores and conidiogenous cells. I. Conidia. Scale bars = 10 µm.

µm high; conidiophores hyaline or pale brown at base, smooth, 0–2-septate, but frequently reduced to conidiogenous cells, subcylindrical, straight to variously curved or geniculate-sinuous, unbranched or branched below, 15–25 × 4–5 µm, proliferating sympodially at apex. *Conidia* solitary, hyaline, smooth, prominently guttulate, narrowly obclavate, apex obtuse to subobtuse, base obconically subtruncate, straight to variously curved, 3–13-septate, (40–)60–80(–130) × (2.5–)3(–4) µm; hila unthickened, neither darkened nor refractive, 2 µm diam.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; surface folded with a prominent network of ridges, erumpent, spreading, with sparse aerial mycelium, and smooth, lobate margins. Surface olivaceous-grey to iron-grey; reverse iron-grey to greenish black. Colonies reaching 6 mm diam.

Specimen examined: **South Korea**, Hoengseong, on *Vicia amurensis,* 4 Aug. 2004, H.D. Shin, **holotype** CBS H-20845, **isotype** HAL 1850 F, culture ex-holotype CPC 11414.

Notes: Braun (1995) listed several species of *Pseudocercosporella* on *Fabaceae*. None of these occur on *Vicia*, and only one, *P. tephrosiae* (on *Tephrosia*, Africa), has conidia of similar length (40–110 × 3–4.5 µm), although they are wider, subcylindrical-acicular, and have 3–6 septa.

Pseudocercosporella oxalidis (Goh & W.H. Hsieh) U. Braun, Nova Hedwigia 55: 218. 1992.
Basionym: *Pseudocercospora oxalidis* Goh & W.H. Hsieh, Bot. Bull. Acad. Sinica 30: 127. 1989.

Specimen examined: **Taiwan**, Taipei, Wulai, on living leaves of *Oxalis debilis* (= *O. corymbosa*), R. Kirschner, 2258, 22 Feb. 2005, culture CBS 118758.

Septoria Sacc., Syll. Fung. 3: 474. 1884.
Synonyms: See Sutton (1980).

Phytopathogenic and endophytic, occurring on leaves, fruit and stems, causing discrete lesions. *Conidiomata* pycnidial, immersed, separate or aggregated, globose, papillate or not, brown, with a thin wall of brown *textura angularis*. *Ostiole* single, circular, central, sometimes papillate. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* hyaline, smooth, ampulliform, doliiform or lageniform to short cylindrical, holoblastic, determinate or indeterminate, proliferating sympodially and/or percurrently; conidiogenous loci unthickened. *Conidia* solitary, hyaline, multiseptate, guttulate or not, thin-walled, filiform, smooth, continuous or constricted at the septa; hila unthickened.

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

Note: *Septoria* is polyphyletic (Quaedvlieg *et al*. 2011).

Clade 11: *Sonderhenia*

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

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 colorless cells. *Asci*

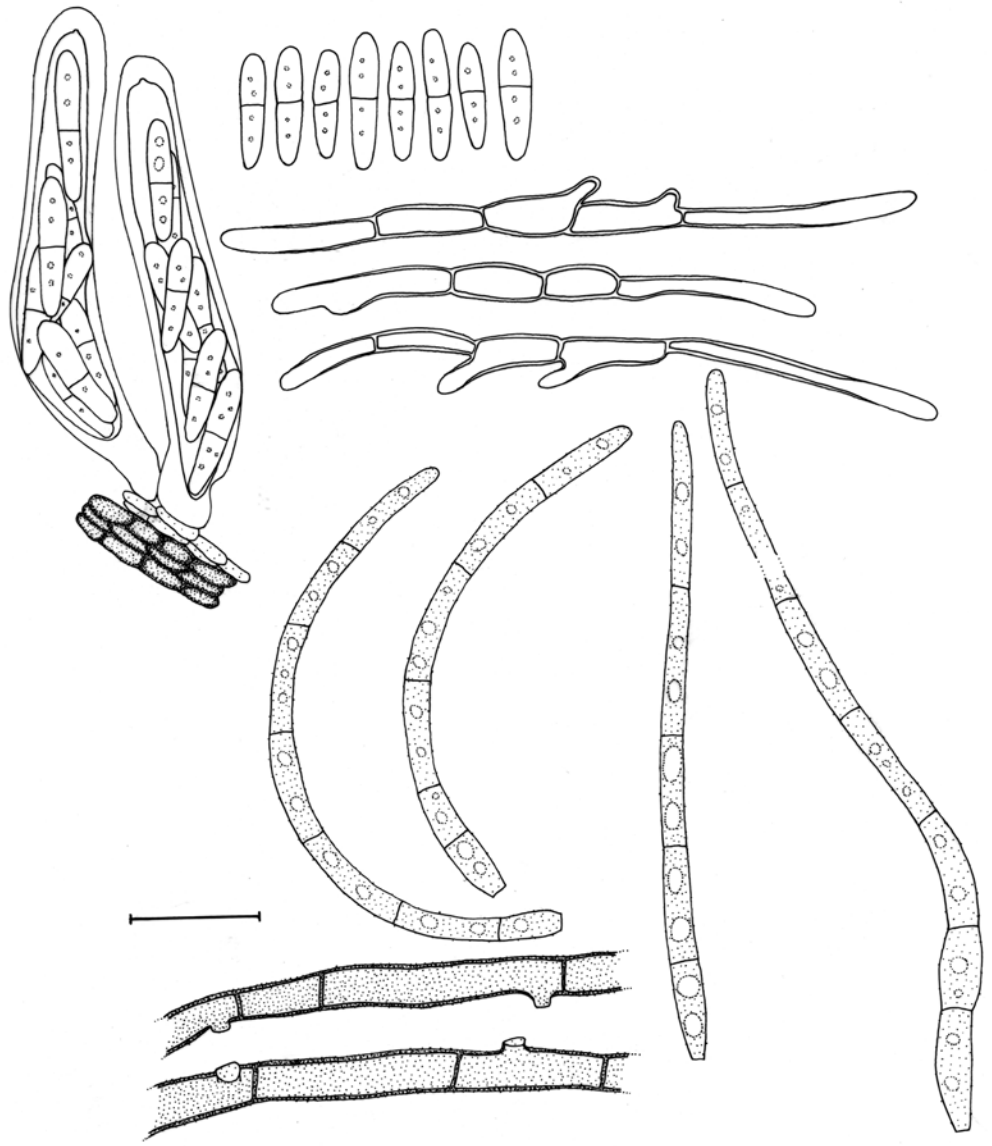

Fig. 17. *Pallidocercospora heimii* (CPC 1395). Asci, ascospores, germinating ascospores (after 24 h on malt extract agar), hyphae with conidiogenous loci, and conidia. Scale bar = 10 µm.

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* ellipsoid to cylindrical or ovoid, straight or bent, brown, 3-distoseptate, not constricted, verruculose, apex obtuse, base truncate with marginal frill (adapted from Crous 1998).

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

Notes: *Sonderhenia* includes taxa with *Mycosphaerella*-like teleomorphs and pycnidial anamorphs that form brown, transversely distoseptate conidia on brown, percurrently proliferating conidiogenous cells. Only two species, *S. eucalypticola* and *S. eucalyptorum* are known.

Clade 12: *Pallidocercospora*, *Scolecostigmina*, *Trochophora* and *Pseudocercospora*-like

Pallidocercospora Crous, **gen. nov.** MycoBank MB564820. Fig. 17.

Etymology: The name reflects the pale brown *Cercospora*-like conidia in this genus.

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–multi-seriate, oblique, overlapping, straight ellipsoidal to obovoid, colourless, 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; conidiogenous loci unthickened, not darker than the surrounding conidiogenous cell. *Conidia* solitary, straight to irregularly curved, guttulate, pale olivaceous to olivaceous-brown, subcylindrical to narrowly obclavate, multiseptate; hila neither thickened nor darkened.

Type species: *Pallidocercospora heimii* (Crous) Crous, comb. nov.

Notes: Species of *Pallidocercospora* have pale olivaceous, smooth conidia (generally referred to as the *Mycosphaerella heimii* complex; Crous *et al.* 2004c), and form red crystals when cultivated in agar (on WA, SNA, PDA, MEA), which distinguishes them from *Pseudocercospora*. *Pseudocercospora* has several synonyms (see Seifert *et al*. 2011). *Cercoseptoria* with its mostly acicular conidia, was correctly treated as synonym of *Pseudocercospora* by Deighton (1976). Other synonyms include *Ancylospora* Sawada (based on *A. costi*), now treated as *P. costina*; *Cercocladospora* G.P. Agarwal & S.M. Singh (based on *C. adinae*, *nom. non rite publ.*), now treated as *P. adinicola*; and *Helicominia* L.S. Olive (based on *H. caperonia*), now *P. caperoniae*, and *Pantospora* Cif. (based on *P. guazumae*) (see Ellis 1971, Deighton 1976), the muriformly septate conidia of the latter are similar to those of *Pseudocercospora pseudostigmina-platani*, though *Pantospora* has been shown to be a genus in its own right (Minnis *et al.* 2011).

Pallidocercospora acaciigena (Crous & M.J. Wingf.) Crous & M.J. Wingf., **comb. nov.** MycoBank MB564821.
Basionym: *Pseudocercospora acaciigena* Crous & M.J. Wingf., Stud. Mycol. 50: 464. 2004.
Teleomorph: "*Mycosphaerella" acaciigena* Crous & M.J. Wingf., Stud. Mycol. 50: 463. 2004.

Specimen examined: **Venezuela**, Acarigua, on leaves of *Acacia mangium*, May 2000, M.J. Wingfield, CBS H-9873, **holotype** of *M. acaciigena* and *P. acaciigena*; cultures ex-type CBS 115432, 112515, 112516 = CPC 3836–3838.

Pallidocercospora crystallina (Crous & M.J. Wingf.) Crous & M.J. Wingf., **comb. nov.** MycoBank MB564822.
Basionym: *Pseudocercospora crystallina* Crous & M.J. Wingf., Mycologia 88: 451. 1996.
Teleomorph: "*Mycosphaerella" crystallina* Crous & M.J. Wingf., Mycologia 88: 451. 1996.

Specimens examined: **South Africa**, Kwazula-Natal Province,Umvoti, on leaves of *Eucalyptus bicostata*, Oct. 1994, M.J. Wingfield (**holotypes** PREM 51922, teleomorph; PREM 51923, anamorph, cultures ex-type CPC 800–802); Kwazula-Natal Province, leaf litter of *E. grandis* × *camaldulensis*, Jun. 1995, M.J. Wingfield (PREM 51937, cultures CPC 1178–1180).

Pallidocercospora heimii (Crous) Crous, **comb. nov.** MycoBank MB564823. Fig. 17.
Basionym: *Pseudocercospora heimii* Crous, S. African For. J. 172: 4. 1995.
Teleomorph: "*Mycosphaerella" heimii* Crous, S. African For. J. 172: 2. 1995.
≡ "*Mycosphaerella" heimii* Bouriquet, Encycl. Mycol. 12: 418. 1946. *nom. nud*.

Specimens examined: **Madagascar**, Moramanga, on leaves of *Eucalyptus* sp., Apr. 1994, P.W. Crous, PREM 51749, **holotype** of teleomorph; PREM 51748, **holotype** of anamorph, cultures ex-type CPC 760–761 = CBS 110682.

Pallidocercospora heimioides (Crous & M.J. Wingf.) Crous & M.J. Wingf., **comb. nov.** MycoBank MB564824.
Basionym: *Pseudocercospora heimioides* Crous & M.J. Wingf., Can. J. Bot. 75: 787. 1997.
Teleomorph: "*Mycosphaerella" heimioides* Crous & M.J. Wingf., Can. J. Bot. 75: 787. 1997.

Specimens examined: **Indonesia**, N. Sumatra, Lake Toba area, leaves of *Eucalyptus* sp., Mar. 1996, M.J. Wingfield, **holotype** of teleomorph PREM 54966; **holotype** of anamorph PREM 54967; cultures ex-type CPC 1311, 1312 = CBS 111190).

Pallidocercospora holualoana (Crous, Joanne E. Taylor & M.E. Palm) Crous, **comb. nov.** MycoBank MB564825.
Basionym: "*Mycosphaerella" holualoana* Crous, Joanne E. Taylor & M.E. Palm, Mycotaxon 78: 458. 2001.

Specimen examined: **USA**, Hawaii, Kona district, Holualoa, on a living leaf of *Leucospermum* sp., P.W. Crous & M.E. Palm, 17 Nov. 1998, **holotype** PREM 56926, cultures ex-type CPC 2126–2128).

Pallidocercospora irregulariramosa (Crous & M.J. Wingf.) Crous & M.J. Wingf., **comb. nov.** MycoBank MB564826.
Basionym: *Pseudocercospora irregulariramosa* Crous & M.J. Wingf., Can. J. Bot. 75: 785. 1997.
Teleomorph: "*Mycosphaerella" irregulariramosa* Crous & M.J. Wingf., Can. J. Bot. 75: 785. 1997.

Specimens examined: **South Africa**, Northern Province, Tzaneen, on leaves of *Eucalyptus saligna*, Mar. 1996, M.J. Wingfield, **holotype** of teleomorph PREM 54964; **holotype** of anamorph PREM 54965; cultures ex-type CPC 1360 = CBS 114777).

Pallidocercospora konae (Crous, Joanne E. Taylor & M.E. Palm) Crous, **comb. nov.** MycoBank MB564827.
Basionym: "*Mycosphaerella" konae* Crous, Joanne E. Taylor & M.E. Palm, Mycotaxon 78: 459. 2001.

Specimen examined: **USA**, Hawaii, Kona district, Holualoa, on a living leaf on *Leucadendron* cv. Safari Sunset, 17 Nov. 1998, P.W. Crous & M.E. Palm, **holotype** PREM 56921; ex-type cultures CPC 2123–2125.

Scolecostigmina U. Braun, N. Z. J. Bot. 37: 323. 1999. Fig. 18.

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 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; secession schizolytic (adapted from Braun *et al.* 1999).

Type species: *Scolecostigmina mangiferae* (Koord.) U. Braun & Mouch., N. Z. J. Bot. 37: 323. 1999.

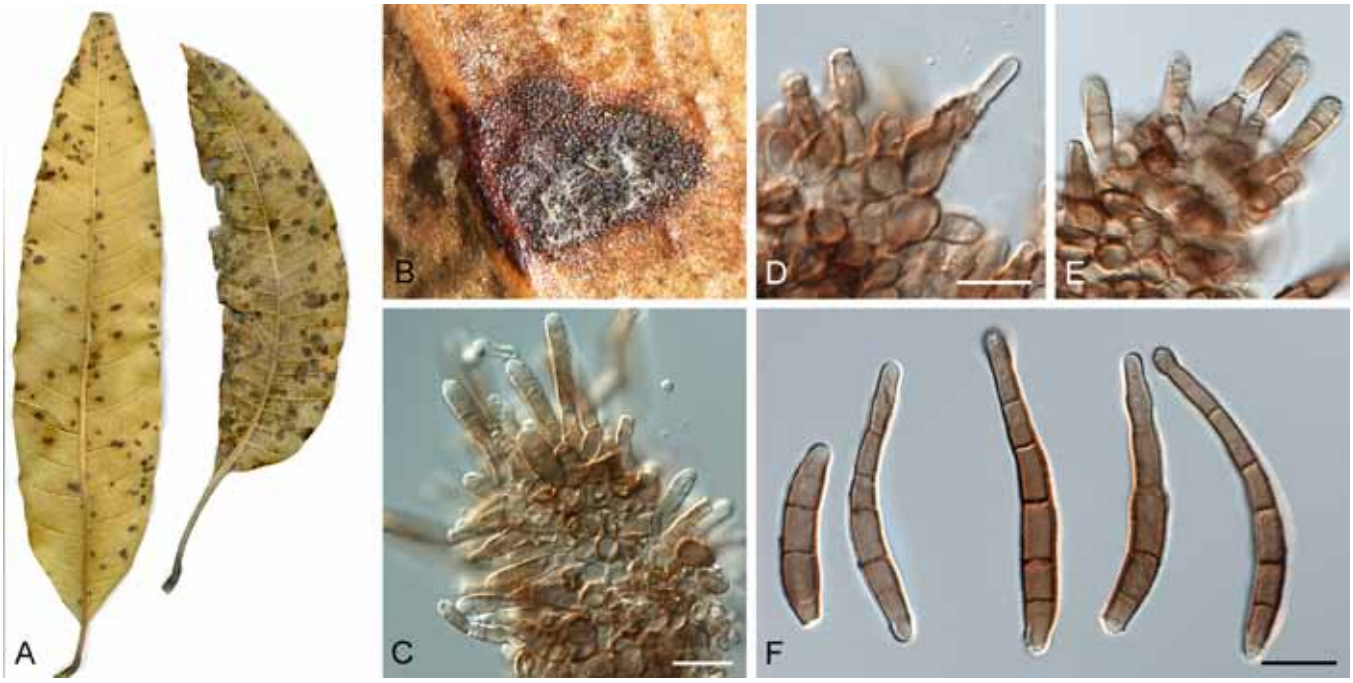

Fig. 18. *Scolecostigmina mangiferae* (CBS 125467). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores and conidiogenous cells (note rough percurrent proliferations). F. Conidia. Scale bars = 10 µm.

Fig. 19. *Trochophora simplex* (CBS 124744). A. Leaf spots on upper and lower leaf surface. B, C. Close-up of leaf spot with fruiting. D–G. Fascicles with conidiophores and conidiogenous cells. H, I. Conidia. Scale bars = 10 µm.

Specimen examined: **Australia**, Queensland, Mareeba, S16°58'75.5" E145°20'60.8", leaves of *Mangifera indica*, 10 Aug. 2009, P.W. Crous & R.G. Shivas, CBS H-20846, culture CPC 17352, 17351 = CBS 125467.

Trochophora R.T. Moore, Mycologia 47: 90. 1955. Fig. 19.

Foliicolous, but pathogenicity unproven. *Colonies* hypophyllous, medium to dark brown, consisting of numerous synnemata. *Stroma* absent, but with a superficial network of hyphae linking the various

synnemata. *Conidiophores* 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 scar, 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 (adapted from Crous *et al*. 2009a).

Type species: *Trochophora simplex* (Petch) R.T. Moore, Mycologia, 47: 90. 1955.

Specimens examined: **Japan**, Shimane, on *Daphniphyllum teijsmannii,* 26 April 2008, C. Nakashima & I. Araki, MUMH 11134, culture MUCC 952. **South Korea**, Jeju, Halla arboretum, on *D. macropodum,* 29 Oct. 2005, H.D. Shin, CBS H-20847, culture CBS 124744.

Notes: Other *Pseudocercospora*-like species found in this clade are *P. colombiensis* (foliar pathogen of *Eucalyptus*; Crous 1998), and *P. thailandica* (foliar pathogen of *Acacia*; Crous *et al.* 2004d), both also having *Mycosphaerella*-like teleomorphs. Morphologically, these taxa appear typical members of *Pseudocercospora s. str.* so it would be difficult to identify these as different from *Pseudocercospora* without the aid of DNA sequence comparisons.

Clade 13: *Passalora*-like

Notes: This clade is represented by *Passalora eucalypti*, which was originally described as a leaf spot pathogen of *Eucalyptus saligna* in Brazil (Crous 1998, Crous & Braun 2003). Recently, a second species was found to belong to this clade, namely *Passalora leptophlebiae,* which was described from *Eucalyptus leptophlebia* leaves collected in Brazil (Crous *et al.* 2011a). Both species are charaterised by fasciculate conidiophores and catenate, pale brown conidia, with thickened, darkened and refractive scars and hila.

Clade 14: *Pseudocercospora s. str.*

Pseudocercospora Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires, Ser. 3, 20: 437. 1910.

Foliicolous, chiefly phytopathogenic, but also endophytic; commonly associated with leaf spots, but also occurring on fruit. *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, pale to dark brown, smooth to finely verruculose. *Conidiogenous cells* integrated, terminal, occasionally intercalary, polyblastic, sympodial, or monoblastic, proliferating percurrently via inconspicuous or darkened, irregular annellations, at times denticulate, pale to dark brown; scars inconspicous, or only thickened along the rim, or flat, and slightly thickened and darkened, but never pronounced. *Conidia* solitary, rarely in simple chains, subhyaline, olivaceous, pale to dark brown, usually scolecosporous, *i.e.* obclavate–cylindrical, filiform, acicular, and transversely plurieuseptate, 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, and slightly thickened and darkened, but never pronounced.

Type species: *P. vitis* (Lév.) Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires, Ser. 3, 20: 438. 1910.

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

Pseudocercospora abelmoschi (Ellis & Everh.) Deighton, Mycol. Pap. 140: 138. 1976. Fig. 20.

Basionym: *Cercospora abelmoschi* Ellis & Everh., J. Inst. Jamaica 1: 347. 1893.

= *Cercospora hibisci* Tracy & Earle, Bull. Torrey Bot. Club 22: 179. 1895.
= *Cercospora hibisci-manihotis* Henn., Hedwigia 43: 146. 1904.

Specimen examined: **South Korea**, Suwon, on *Hibiscus syriacus*, 2 Oct. 2007, H.D. Shin, CBS H-20849, CPC 14478 = CBS 132103.

Pseudocercospora ampelopsis Crous, U. Braun & H.D. Shin, **sp. nov.** MycoBank MB564828. Fig. 21.

Etymology: Name derived from the host *Ampelopsis,* from which it was collected.

Leaf spots amphigenous, irregular to subcircular, 2–8 mm diam, dark brown on upper surface, dull brownish green on lower surface. *Mycelium* internal and external, pale brown to brown, consisting of septate, branched, smooth, 1.5–4 µm diam hyphae, anastomosing on surface. *Caespituli* fasciculate, brown, amphigenous, emerging through stomata (but stromata lacking). *Conidiophores* aggregated in loose fascicles, or solitary, arising from superficial mycelium, medium to dark brown, smooth to finely verruculose, 3–6-septate, subcylindrical, straight to variously curved, unbranched, 20–80 × (2.5–)3–5(–6) µm. *Conidiogenous cells* terminal, unbranched, brown, finely verruculose, tapering to flat-tipped apical loci, proliferating sympodially, 10–15 × 4–5 µm. *Conidia* solitary, dark brown, finely verruculose, guttulate, obclavate-cylindrical, apex obtuse, base obconically subtruncate, straight to gently curved, 3–12-septate, (35–)40–90(–110) × 3–5(–6) µm; hila unthickened, neither darkened nor refractive, 2 µm diam.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; surface folded, erumpent, spreading, with sparse aerial mycelium, and smooth, lobate margins. Surface olivaceous-grey; reverse iron-grey. Colonies reaching 7 mm diam.

Specimen examined: **South Korea**, Hongcheon, on *Ampelopsis glandulosa var. heterophylla,* 24 Oct. 2004, H.D. Shin, **holotype** CBS H-20850, **isotype** HAL 1866 F, culture ex-type CPC 11680 = CBS 131583.

Notes: *Pseudocercospora brachypus*, which also occurs on *Ampelopsis*, has much shorter and narrower conidia, 25–60 × 2–3.5 µm (Guo & Hsieh 1995). *Pseudocercospora ampelopsis* is morphologically close to *P. riachuelii* var. *horiana* on *Ampelocissus*,

Fig. 20. *Pseudocercospora abelmoschi* (CPC 14478). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–G. Hyphae giving rise to conidiogenous cells and conidia. H. Conidia. Scale bars = 10 µm.

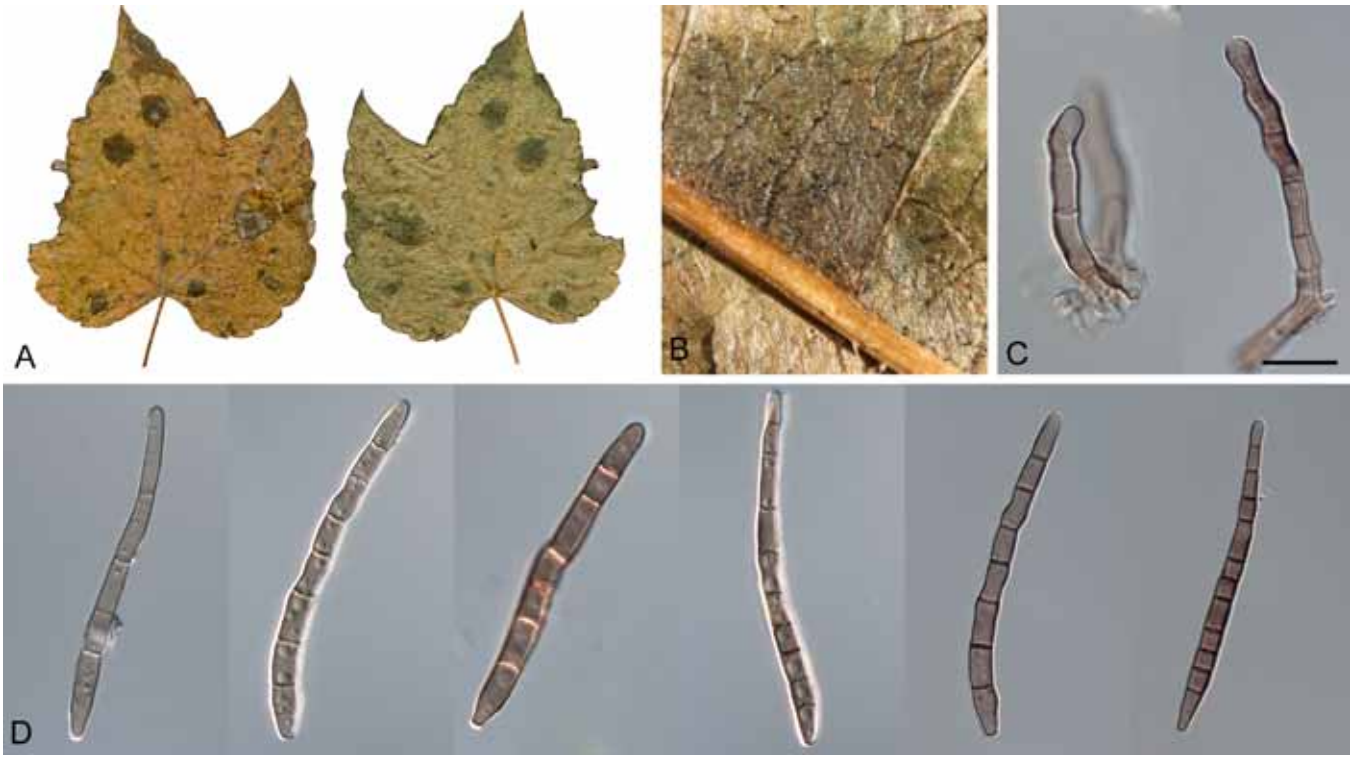

Fig. 21. *Pseudocercospora ampelopsis* (CPC 11680). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C. Conidiophores and conidiogenous cells. D. Conidia. Scale bar = 10 µm.

Cissus and *Parthenocissus* species (Crous & Braun 2003). The two are similar in that conidiophores are solitary and form in fascicles and arise from superficial hyphae, and conidia of the two taxa are similar in size. *Pseudocercospora ampelopsis* differs in having much longer pluriseptate conidiophores whereas those of *P. riachuelii* var. *horiana* are much shorter and 0–1-septate.

Pseudocercospora angolensis (T. Carvalho & O. Mendes) Crous & U. Braun, Sydowia 55: 301. 2003.

Basionym: *Cercospora angolensis* T. Carvalho & O. Mendes, Bol. Soc. Brot. 27: 201. 1953.

≡ *Phaeoramularia angolensis* (T. Carvalho & O. Mendes) P.M. Kirk, Mycopathologia 94: 177. 1986.

≡ *Pseudophaeoramularia angolensis* (T. Carvalho & O. Mendes) U. Braun, Cryptog. Mycol. 20: 171. 1999.

Specimens examined: **Angola**, Mozambique Province, on leaves of *Citrus* × *aurantium* (= ×*sinensis*), Dec. 1951, Carvalho & O. Mendes, BPI 432660, BPI 442839 (**paratypes**), BPI 442837 (**holotype**), IMI 56597 (**isotype**). **Camaroon**, Yaoundé, on leaves of *C.* × *aurantium*, 17 Mar. 1978, E. Milla, IMI 252792. **Ethiopia**, on leaves of *Citrus* sp., IMI 361170. **Kenya**, on leaves of *C.* × *aurantium*, 15 Nov. 1991, A. Seif W3753, IMI 351626. **Uganda**, on leaves of *C.* × *aurantium*, 14 Jun. 1991, W.T.H. Peregrine, IMI 384297. **West Africa**, intercepted at San Pedro, California, USA, on leaves of *Citrus* sp., 2 Oct. 1953, L.A. Hart, BPI 432661, BPI 432659. **Zambia**, on leaves of *Citrus* sp., 18 Jun. 1973, R.H. Raemakers 7837, IMI 176562; Chilanga, on leaves of *C.* × *aurantium*, 28 Sep. 1983, D.M. Naik, IMI 280618; Chilanga, on leaves of *Citrus* sp., 18 Jul. 1975, B.K. Patel, IMI 196889; Lusaka, on leaves of *Citrus* sp., 17 June 1977, I. Javaid, IMI 214501. **Zimbabwe**,

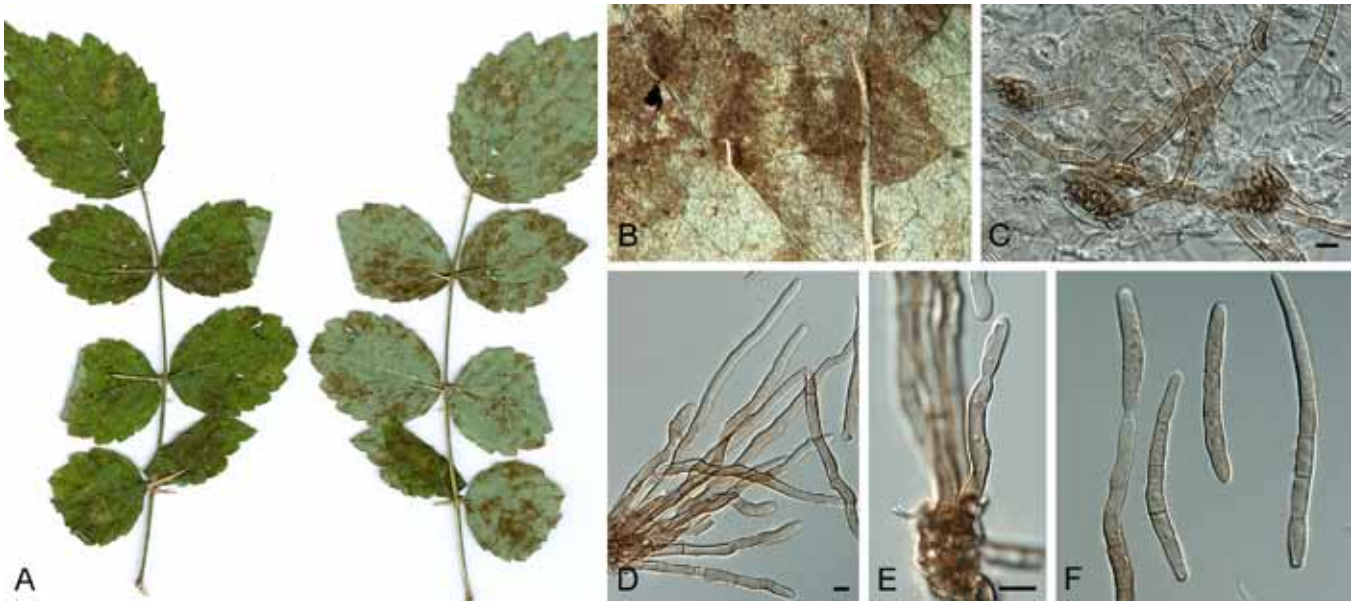

Fig. 22. *Pseudocercospora araliae* (CPC 10154). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores and conidiogenous cells. F. Conidia. Scale bars = 10 µm.

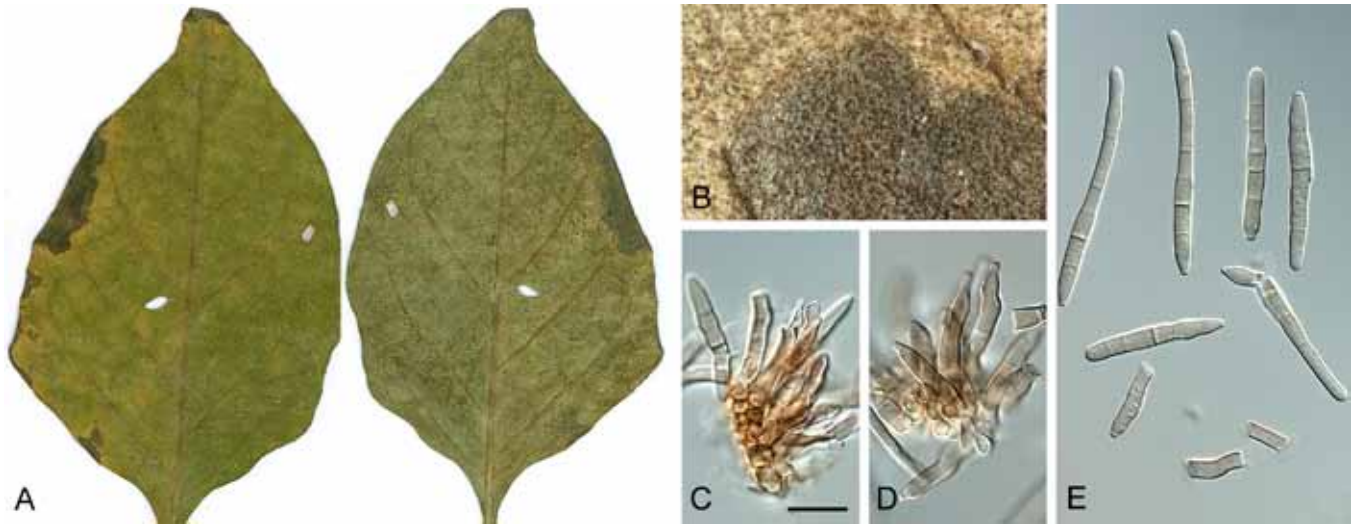

Fig. 23. *Pseudocercospora atromarginalis* (CPC 11372–11374). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidia. Scale bar = 10 µm.

Bindura, on leaves of *Citrus* sp., 13 Aug. 1979, A. Rothwell, IMI 240682; on leaves of *Citrus* sp., Sep. 2000, M.C. Pretorius, **epitype designated here** CBS H-20851, culture ex-epitype CPC 4112–4118, 4111 = CBS 112933.

Pseudocercospora araliae (Henn.) Deighton, Mycol. Pap. 140: 19. 1976. Fig. 22.

Basionym: *Cercospora araliae* Henn., Bot. Jahrb. Syst. 31: 742. 1902; also 37: 165. 1906.

≡ *Cercosporiopsis araliae* (Henn.) Miura, Fl. Manchuria & E. Mongolia, 27, 3: 533. 1928.

= *Cercospora atromaculans* auct., non Ellis & Everh.

Specimens examined: **Japan**, Tosa, Ushioe-yama, on *Aralia elata* var. *glabrescens,* Aug. 1901, T. Yoshinaga, **holotype** B 700015014; *A. elata,* T. Kobayashi & C. Nakashima, **epitype designated here** TFM: FPH-8094, ex-epitype cultures MUCC 873, MAFF 238192. **South Korea**, Jeju, Halla Arboretum, on *A. elata,* 14 Sep. 2002, H.D. Shin, CBS H-20852, culture CPC 10154; Wonju, on *A. elata,* 21 Sep. 2003, H.D. Shin, CBS H-20853, cultures CPC 10782–10784.

Pseudocercospora atromarginalis (G.F. Atk.) Deighton, Mycol. Pap. 140: 139. 1976. Fig. 23.

Basionym: *Cercospora atromarginalis* G.F. Atk. (*atramarginalis*), J. Elisha Mitchell Sci. Soc. 8: 59. 1892.

= *Cercospora rigospora* G.F. Atk., J. Elisha Michell Sci. Soc. 8: 65. 1892.

= *Cercospora tosensis* Henn., Bot. Jahrb. Syst. 34: 605. 1905.

= *Cercospora nigri* Tharp, Mycologia 9: 112. 1917.

= *Cercospora solani-biflori* Sawada, Formosan Agric. Rev. 39: 701. 1942 (*nom. inval.*).

Specimens examined: **Japan**, Prov. Tosa, Aki-machi, on *Solanum nigrum*, Oct. 1903, Yoshinaga No. 43, (**holotype** of *C. tosensis*, B 700015016). **South Korea**, Namyangju, on *S. nigrum*, 27 Jul. 2004, H.D. Shin, CBS H-20854, CPC 11372–11374. **New Zealand**, Auckland, Jan. 2004, C.F. Hill 970, CBS 114640.

Notes: *Pseudocercospora atromarginalis* was described from *Solanum* collected in Auburn Alabama, USA. Material studied here from New Zealand and Korea represents the same species, which might be authentic for the name. Fresh material from *Solanum* in the USA, and a detailed study of the synonyms listed by Chupp (1954) would resolve this issue. An isolate identified as *P. chengtuensis* (on *Lycium*, *Solanaceae*) appears identical to *Pseudocercospora atromarginalis*.

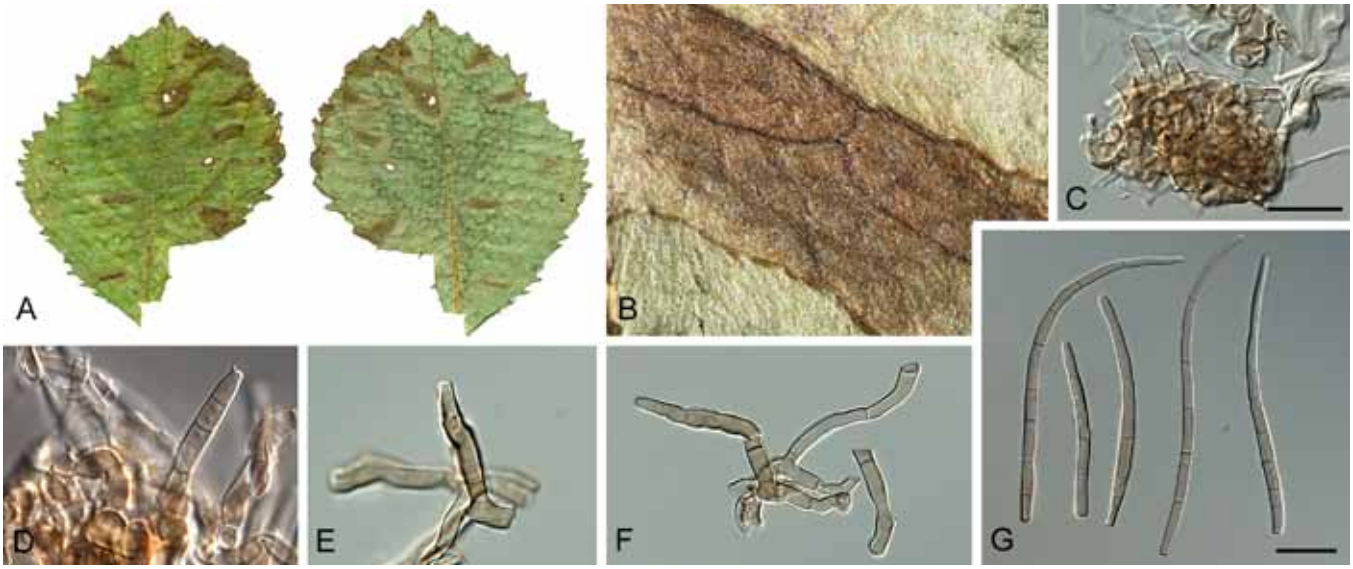

Fig. 24. *Pseudocercospora balsaminae* (CPC 10044). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–F. Fascicles and solitary conidiophores with conidiogenous cells. G. Conidia. Scale bars = 10 µm.

Pseudocercospora balsaminae (Syd.) Deighton, Mycol. Pap. 140: 139. 1976. Fig. 24.
Basionym: *Cercoseptoria balsaminae* Syd., Ann. Mycol. 33: 69. 1935.

Specimens examined: **South Korea**, Chuncheon, on *Impatiens textorii*, 11 Oct. 2002, H.D. Shin, CBS H-20856, CPC 10044 = CBS 131882; Dongducheon, on *I. textorii*, 11 Oct. 2004, H.D. Shin, CBS H-20855, CPC 10699–10701.

Pseudocercospora callicarpae (Cooke) Y.L. Guo & W.X. Zhao, Acta Mycol. Sin. 8: 118. 1989.
Basionym: *Cercospora callicarpae* Cooke, Grevillea 6: 140. 1878.
= ? *Cercospora callicarpicola* Naito, Mem. Coll. Agric. Kyoto Imp. Univ. 47: 49. 1940.

Specimen examined: **Japan**, Ibaraki, on *Callicarpa japonica*, 11 Sep. 1998, T. Kobayashi, MUCC 888, MAFF 237784, CNS-442.

Pseudocercospora catalpigena U. Braun & Crous, Mycol. Progr. 2: 198. 2003.

Specimen examined: **Japan**, Wakayama, on *Catalpa ovata*, 30 Oct. 2007, C. Nakashima & I. Araki, MUMH 10868, culture MUCC 743.

Pseudocercospora catappae (Henn.) X.J. Liu & Y.L. Guo, Mycosystema 2: 230. 1989.
Basionym: *Cercospora catappae* Henn., Bot. Jahrb. Syst. 34: 56. 1905.
= *Pseudocercospora catappae* Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar fungi from Taiwan: 57. 1990, homonym of *P. catappae* (Henn.) X.J. Liu & Y.L. Guo, 1989.
= *Ramularia catappae* Racib., Paras. Algen u. Pilze Javas II, Batavia: 41. 1900.
= *Cercospora terminaliae* Sawada (*terminariae*), Taiwan Agric. Rev. 38: 701. 1942 (*nom. illeg.*), homonym of *C. terminaliae* Syd. 1929.

Specimens examined: **Tanzania**, Zanzibar, Dar-es-Salam, on *Terminalia catappa*, 26 Oct. 1901, Stuhlmann **holotype** B 700015015. **Japan**, Okinawa, on *T. catappa*, 17 Nov. 2007, C. Nakashima & T. Akashi, MUMH 10913, culture MUCC 809.

Pseudocercospora cercidicola Crous, U. Braun & C. Nakash., **sp. nov**. MycoBank MB564829. Fig. 25.

Etymology: Name reflects the host *Cercis,* from which it was collected.

Leaf spots amphigenous, irregular to angular, 1–5 mm diam, confined by leaf veins, brown on upper surface, with raised, dark brown border, on lower surface medium brown, with indistinct borders. *Mycelium* internal, consisting of pale brown, smooth, septate, branched, 2–3 µm diam hyphae. *Caespituli* fasciculate to sporodochial, amphigenous, but predominantly epiphyllous, grey-brown on leaves, up to 130 µm wide and 150 µm high. *Conidiophores* aggregated in dense fascicles arising from the upper cells of a brown stroma up to 80 µm wide and 60 µm high; conidiophores brown, finely verruculose, 2–6-septate, subcylindrical, straight to variously curved, unbranched or branched above, 20–50 × 3–5 µm. *Conidiogenous cells* terminal or lateral, unbranched, medium brown, finely verruculose, tapering to flat-tipped apical loci, proliferating sympodially, 10–20 × 2–3 µm. *Conidia* solitary, medium brown, smooth, guttulate, subcylindrical to narrowly obclavate, apex subobtuse, base long obconically subtruncate, straight to variously curved, (0–)3–6-septate, (27–)30–50(–60) × (2.5–)3(–3.5) µm; hila neither thickened, nor darkened-refractive, 1.5–2 µm diam.

Culture characteristics: Colonies on MEA 10–15 mm after 2 wk at 20 °C in the dark, restricted, with margin mildly lobed, felty, pale olivaceous or greyish olivaceous, surrounded by greyish margin; reverse olivaceous.

Specimens examined: **Japan**, Ibaraki, on *Cercis chinensis*, 10 Sep. 1998, T. & Y. Kobayashi, **holotype** CBS H-20895, culture ex-type MUCC 896, MAFF 237791 = CBS 132041; Tokyo, Koishikawa Botanical Garden, on *Cercis chinensis*, 10 Nov. 2007, I. Araki & M. Harada, MUMH 11108, culture MUCC 937; Japan, Kanagawa, on *Cercis chinensis*, May 1992, K.Kishi, culture MAFF 237128.

Notes: Asian collections of cercosporoid fungi on *Cercis chinensis* were considered as representative of *Cercospora chionea* by Chupp (1954). The latter species was shown to be a member of *Passalora* by Braun (1993). Shin & Braun (2000) introduced a new species of *Pseudocercospora* for the taxon occurring on *Cercis* in Asia, namely *P. cercidis-chinensis*, based on material collected in Korea. Phylogenetic data obtained in the present study (Fig. 5) show that the Japanese collections are distinct. As the name

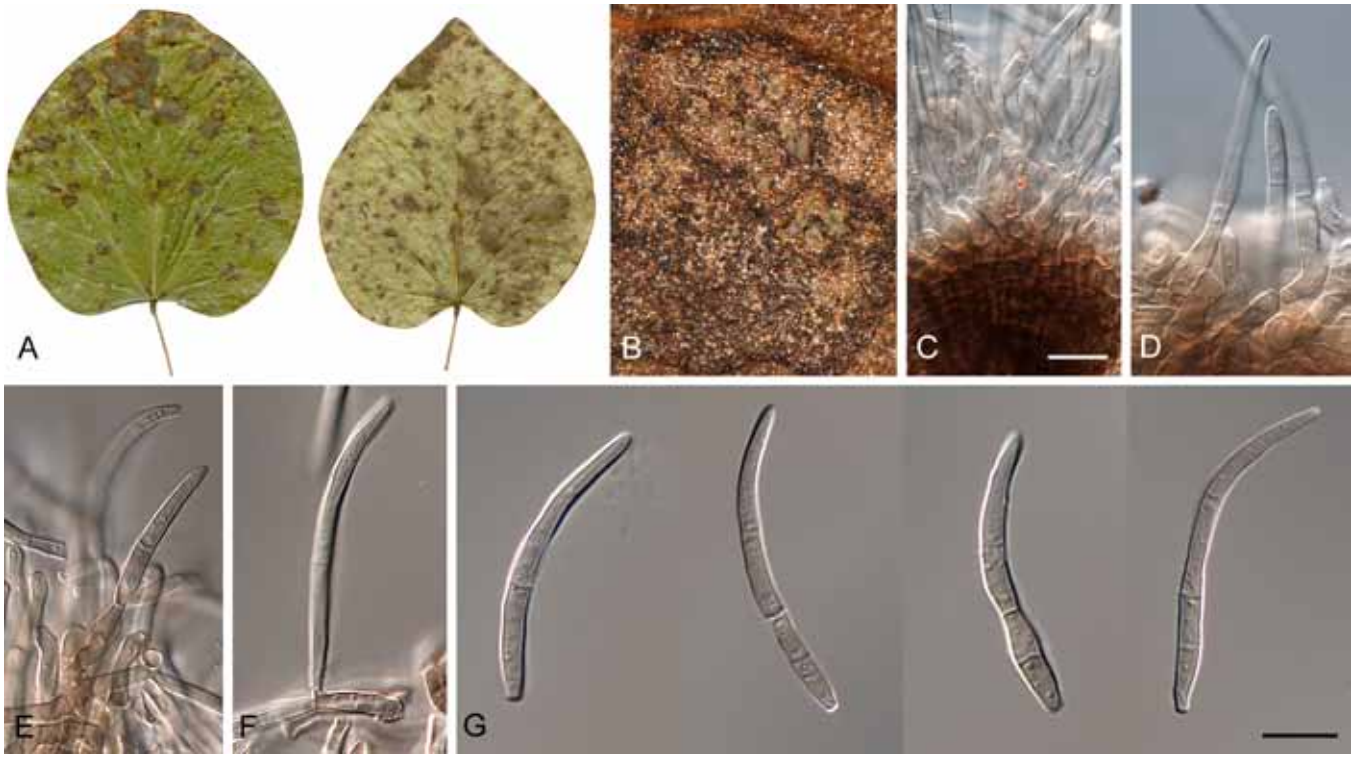

Fig. 25. *Pseudocercospora cercidicola* (CBS H-20895). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E, F. Conidiophores on superficial hyphae. G. Conidia. Scale bars = 10 µm.

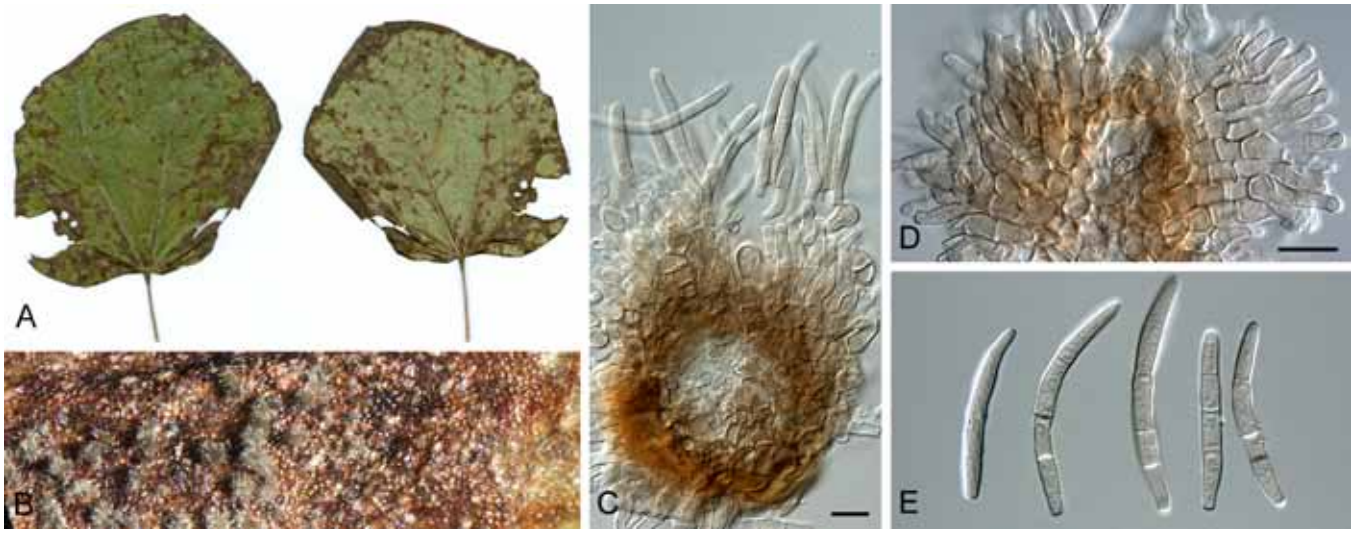

Fig. 26. *Pseudocercospora cercidis-chinensis* (CPC 14481). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidia. Scale bars = 10 µm.

Cercospora cercidis Nishikado is illegitimate, a new name, *P. cercidicola* is introduced for the species occurring on *Cercis* in Japan. *Pseudocercospora cercidicola* is morphologically very close to *P. cercidis-chinensis* but superficial hyphae with solitary conidiophores are not formed and the conidia are shorter.

Pseudocercospora cercidis-chinensis H.D. Shin & U. Braun, Mycotaxon 74: 109. 2000. Fig. 26.

Specimens examined: **South Korea**, Kyeongju, on *Cercis chinensis*, 26 Aug. 1998, H.D. Shin, **holotype** KUS-F 14914, **isotype** HAL; Suwon, *C. chinensis*, 2 Oct. 2007, H.D. Shin, **epitype designated here** CBS H-20857, culture ex-epitype CPC 14481 = CBS 132109.

Note: See *P. cercidicola.*

Pseudocercospora chengtuensis (F.L. Tai) Deighton, Mycol. Pap. 140: 141. 1976. Fig. 27.
Basionym: *Cercospora chengtuensis* F.L. Tai, Lloydia 11: 40. 1948.

Specimens examined: **China**, Szechuan, Chengtu, *Lycium chinense*, Lee Ling No. 126, 1943, **holotype** (not seen). **South Korea**, Dongducheon, *Lycium chinense,* 28 Sep. 2003, H.D. Shin, CBS H-20858, culture CPC 10696–10698.

Notes: The isolate identified here as *P. chengtuensis* appears to be identical to *P. atromarginalis* (also on *Solanaceae*) based on phylogenetic analysis and the two are morphologically similar. Study of of additional collections of both are needed to determine whether they are synonymous or distinct species.

Pseudocercospora chionanthi-retusi Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar fungi from Taiwan: 249. 1990. Fig. 28.

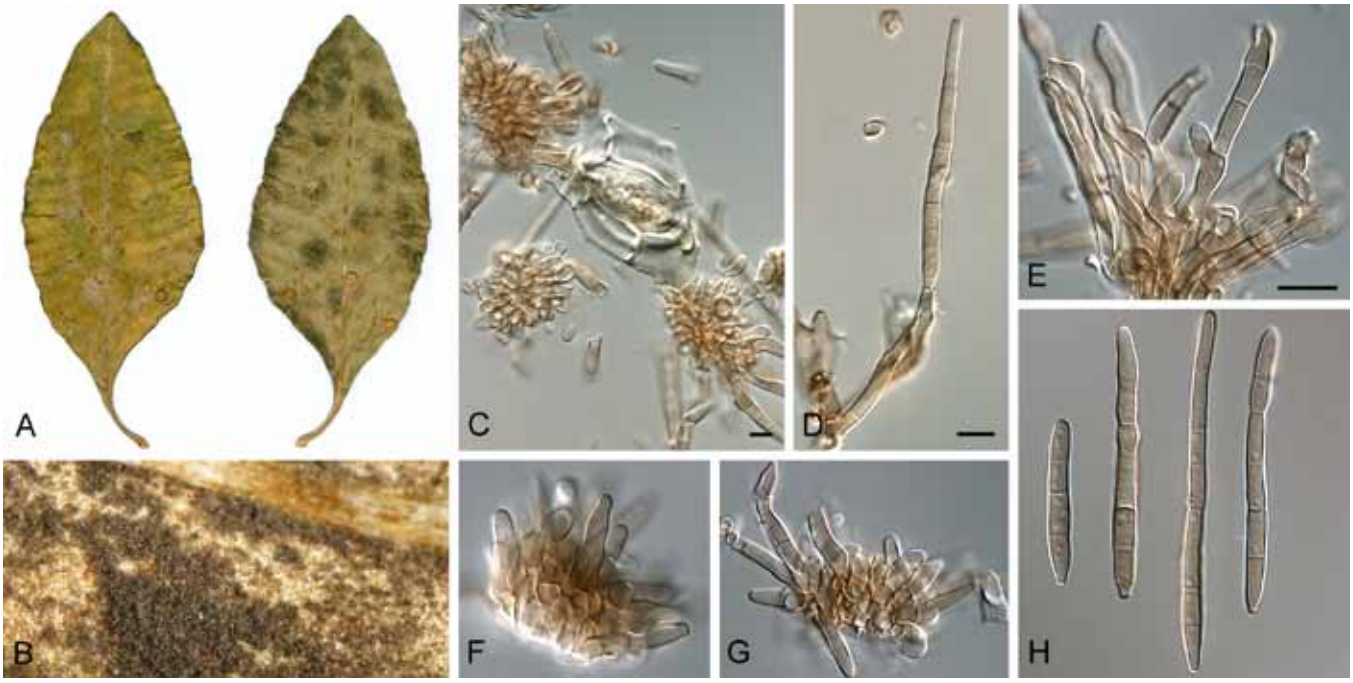

Fig. 27. *Pseudocercospora chengtuensis* (CPC 10696–10698). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–G. Fascicles with conidiophores and conidiogenous cells. H. Conidia. Scale bars = 10 µm.

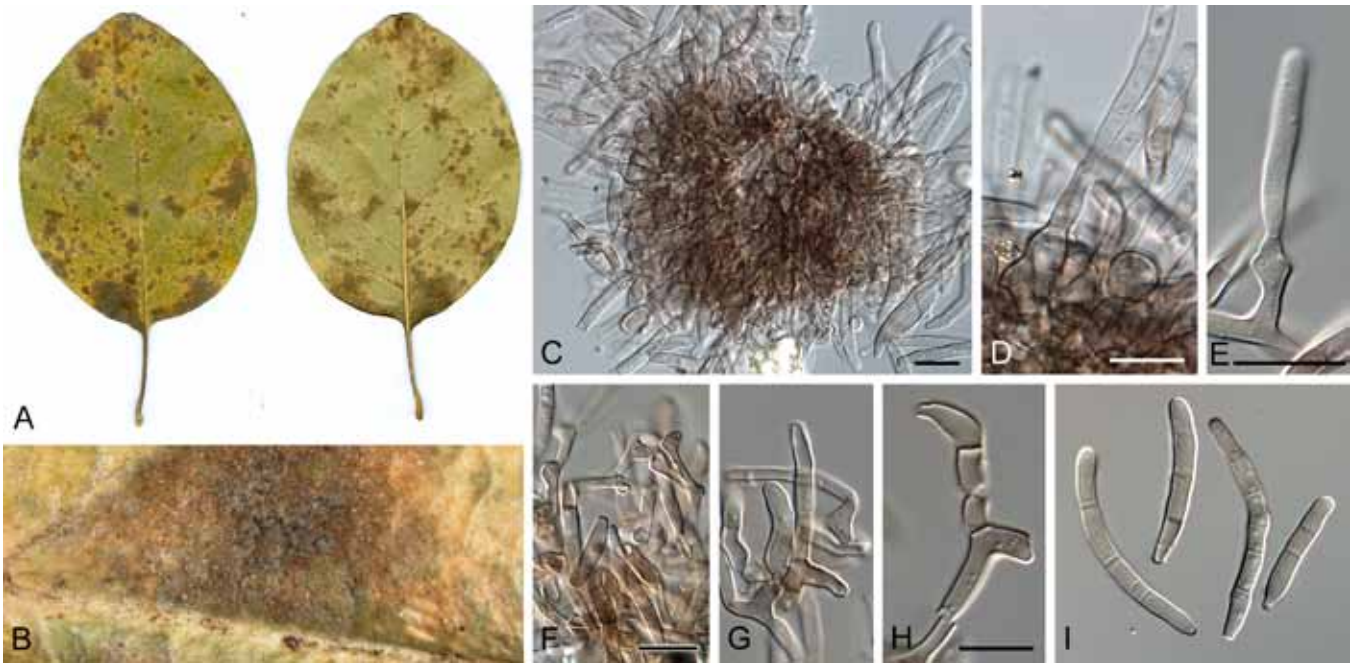

Fig. 28. *Pseudocercospora chionanthi-retusi* (CPC 14683). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–H. Fascicles and solitary conidiophores with conidiogenous cells. I. Conidia. Scale bars = 10 µm.

= *Cercospora chionanthi-retusi* Togashi & Katsuki, Sci. Rep. Yokohama Nat. Univ. Sect. II, 1: 1. 1952.

≡ *Pseudocercospora chionanthi-retusi* (Togashi & Katsuki) Nishijima, C. Nakash. & Tak. Kobay., Mycoscience 40: 270. 1999 (*nom. illeg.*), homonym of *P. chionanthi-retusi* Goh & Hsieh, 1990.

= *Pseudocercospora chionanthicola* C. Nakash. & Tak. Kobay., Mycoscience 43: 98. 2002.

Specimen examined: **South Korea**, Osan, on *Chionanthus retusus*, 30 Oct. 2007, H.D. Shin, CBS H-20859, culture CPC 14683 = CBS 132110.

Pseudocercospora chrysanthemicola (J.M. Yen) Deighton, Mycol. Pap. 140: 141. 1976.

Basionym: *Cercospora chrysanthemicola* J.M. Yen, Rev. Mycol. 29: 216. 1964.

Specimen examined: **South Korea**, Seoul, on *Chrysanthemum* sp., 6 Sep. 2003, H.D. Shin, CPC 10633.

Pseudocercospora contraria (Syd. & P. Syd.) Deighton, Mycol. Pap. 140: 30. 1976. Fig. 29.

Basionym: *Cercospora contraria* Syd. & P. Syd., Ann. Mus. Congo, Bot., Ser. V, 3: 21. 1909.

= *Cercospora wildemanii* Syd. & P. Syd., Ann. Mus. Congo, Bot., Ser. V, 3: 21. 1909.

= *Mycosphaerella contraria* Hansf., Proc. Linn. Soc. London 153: 22. 1941.

Specimen examined: **South Korea**, Bukjeju, Jeolmul recreation forest, on *Dioscorea quinqueloba,* 2. Nov. 2007, H.D. Shin, CBS H-20861, CPC 14714 = CBS 132108.

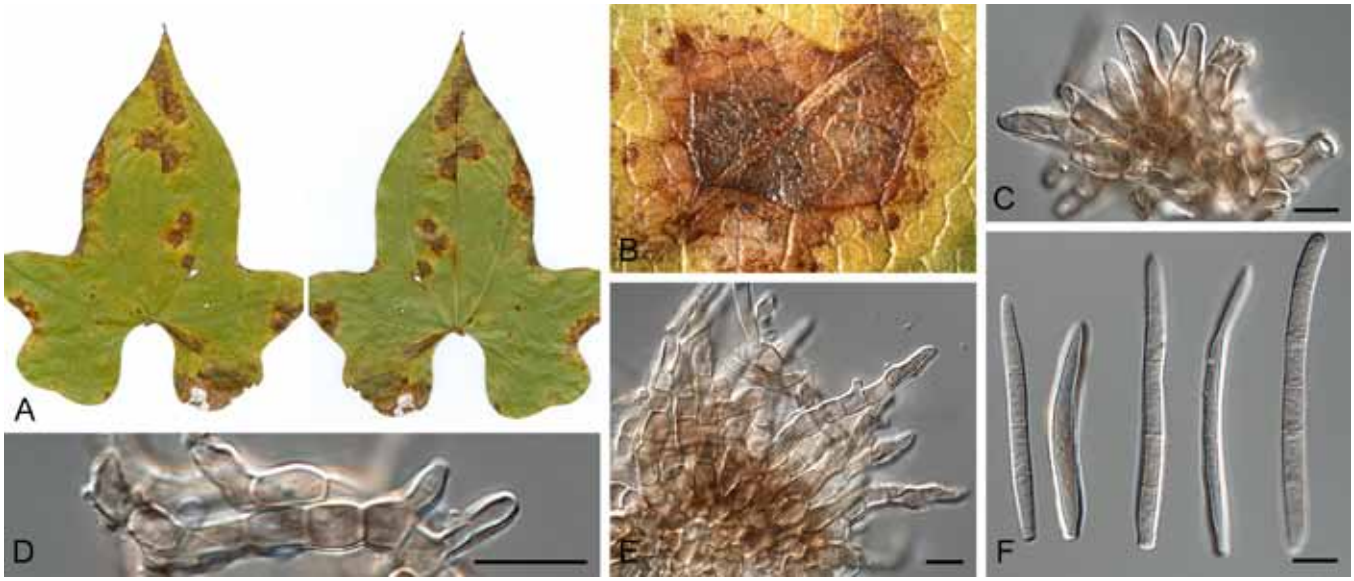

Fig. 29. *Pseudocercospora contraria* (CPC 14714). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores, and solitary loci on hyphae. F. Conidia. Scale bars = 10 µm.

Notes: This fungus was first reported from Korea by Shin & Kim (2001). Conidial measurements (16–75 × 2.5–4.5 µm) are smaller than those of the type collected in the Democratic Republic of the Congo (20–120 × 5–8 µm, Chupp 1954), and the Korean material may eventually be shown to represent a distinct species.

Pseudocercospora coriariae (Chupp) X.J. Liu & Y.L. Guo, Mycosystema 2: 232. 1989.

Basionym: *Cercospora coriariae* Chupp, J. Dept. Agric. Puerto Rico 14: 285. 1930.

= *Cercospora coriariae* F.L. Tai, Lloydia 11: 43. 1948 (*nom. illeg.*), homonym of *C. coriariae* Chupp, 1930.

Specimen examined: **Japan**, Tokyo, on *Coriaria japonica*, 10 Nov. 2007, I. Araki & M. Harada, MUMH 10942, culture MUCC 840.

Pseudocercospora cornicola (Tracy & Earle) Y.L. Guo & X.J. Liu, Mycosystema 2: 232. 1989.

Basionym: *Cercospora cornicola* Tracy & Earle, Bull. Torrey Bot. Club 23: 205. 1896.

Specimen examined: **Japan**, Tokyo, *Cornus alba* var. *sibirica*, 7 Nov. 1998, C. Nakashima & E. Imaizumi, CNS-494, culture MUCC 909, MAFF 237773.

Pseudocercospora corylopsidis (Togashi & Katsuki) C. Nakash. & Tak. Kobay., Mycoscience 40: 270. 1999.

≡ *Cercospora corylopsidis* Togashi & Katsuki, Bot. Mag. (Tokyo) 65: 20. 1952.

= *Cercospora hamamelidis auct*.; *sensu* Togashi & Katsuki, Bot Mag. (Tokyo) 65: 21. 1952, non (Peck) Ellis & Everh.

Specimens examined: **Japan**, Kagoshima, on *Corylopsis pauciflora*, 26 Oct. 1949, S. Katsuki, **holotype** YNU, **Isotype** TNS-F-243824; Ibaraki, Tsukuba Botanical Garden, on *C. pauciflora*, Oct. 1996, T. Kobayashi; Ibaraki, on *C. pauciflora*, 9 Nov. 1998, T. Kobayashi; Tokyo, Todori, on *C. pauciflora*, 12 Oct. 1979, M. Kusunoki, TFM:FPH-6152; Tokyo, Jindai Bot. Park, on *C. spicata*, 7 Nov. 1998, C. Nakashima & E. Imaizumi, **epitype designated here** TFM: FPH-8095, ex-epitype cultures MUCC 908, MAFF 237795; Saitama, isolated from *C. pauciflora*, Nov. 1995, MUCC1249, MAFF 237302; Kagoshima, 26 Oct. 1949, on *Hamamelis japonica*, S. Katsuki, SK2077; Shizuoka, 2 Nov. 1996, on *H. japonica*, T. Koboyashi & C. Nakashima, CNS-114, cultures MAFF 237632, MUCC 874.

Notes: Isolate MUCC 874, which was isolated from *Hamamelis japonica* (*Hamamelidaceae*), appears to be phylogenetically identical to *P. corylopsidis*. Based on morphology, there is little difference between these specimens other than the presence or absence of external mycelium.

Togashi & Katsuki (1952) reported a fungus on *Hamamelis japonica* as *Cercospora hamamelidis* (Peck) Ellis & Everh. based on a specimen collected in Kagoshima (SK2077). Recently, *C. hamamelidis* was transferred to the genus *Passalora* (Crous & Braun 2003). The Japanese specimens of *C. hamamelidis* are morphologically and phylogenetically identical to *Pseudocercospora corylopsidis*. We conclude that the fungus on *Corylopsis* and *Hamamelis* in Japan represents *P. corylopsidis*. In addition, a species of *Pseudocercospora* collected in Tokyo (TFM:FPH-4348, isolate MAFF 410032) was recognised as a distinct taxon on *Corylopsis* plants, based on its longer and narrower conidia, and DNA phylogeny.

Pseudocercospora cotoneastri (Katsuki & Tak. Kobay.) Deighton, Trans. Brit. Mycol. Soc. 88: 389. 1987.

Basionym: *Cercospora cotoneastri* Katsuki & Tak. Kobay. (*cotoneasteris*), Trans. Mycol. Soc. Japan 17: 276. 1976.

Specimens examined: **Japan**, Tokyo, Asakawa Experimental Forest Station, on *Cotoneaster dammeri*, 13 Aug. 1974, T. Kobayashi, **holotype** TFM:FPH-4185, ex-holotype culture MAFF 410089; Tokyo, Tokyo Agric. Exp. Stn., on *C. franchetii*, 27 Sep. 1978, T. Kobayashi, TFM:FPH-4924; Tokyo, Jindai Bot. Park, on *C. horizontalis*, 4 Sep. 1975, H. Horie, TFM: FPH-4417; Tokyo, on *C. horizontalis*, 23 Oct. 1975, K. Sasaki, TFM:FPH-4798; Tokyo, culture isolated from *Cotoneater* sp., 1977, H. Horie, culture MAFF 305633; Fukuoka, Kitakyushu, on *C. horizontalis*,4 Oct. 1975, S. Ogawa (TFM:FPH-4401); Shizuoka, Hamamatsu, on *C. salicifolius*, 1 Nov. 1996, T. Kobayashi & C. Nakashima, CNS-126, culture MUCC 876, MAFF 237629.

Note: Three isolates including the ex-holotype, MAFF 410089, 305633 and 237629, were identical based on ACT gene sequence data (data not shown).

Pseudocercospora crispans G.C. Hunter & Crous, **sp. nov.** MycoBank MB564830. Fig. 30.

Etymology: Name reflects the characteristic curling or undulate nature of the conidia produced by this fungus.

Leaf spots amphigenous, angular to irregular, predominantly occurring next to or close to the mid-rib, 2–15 mm diam, pale

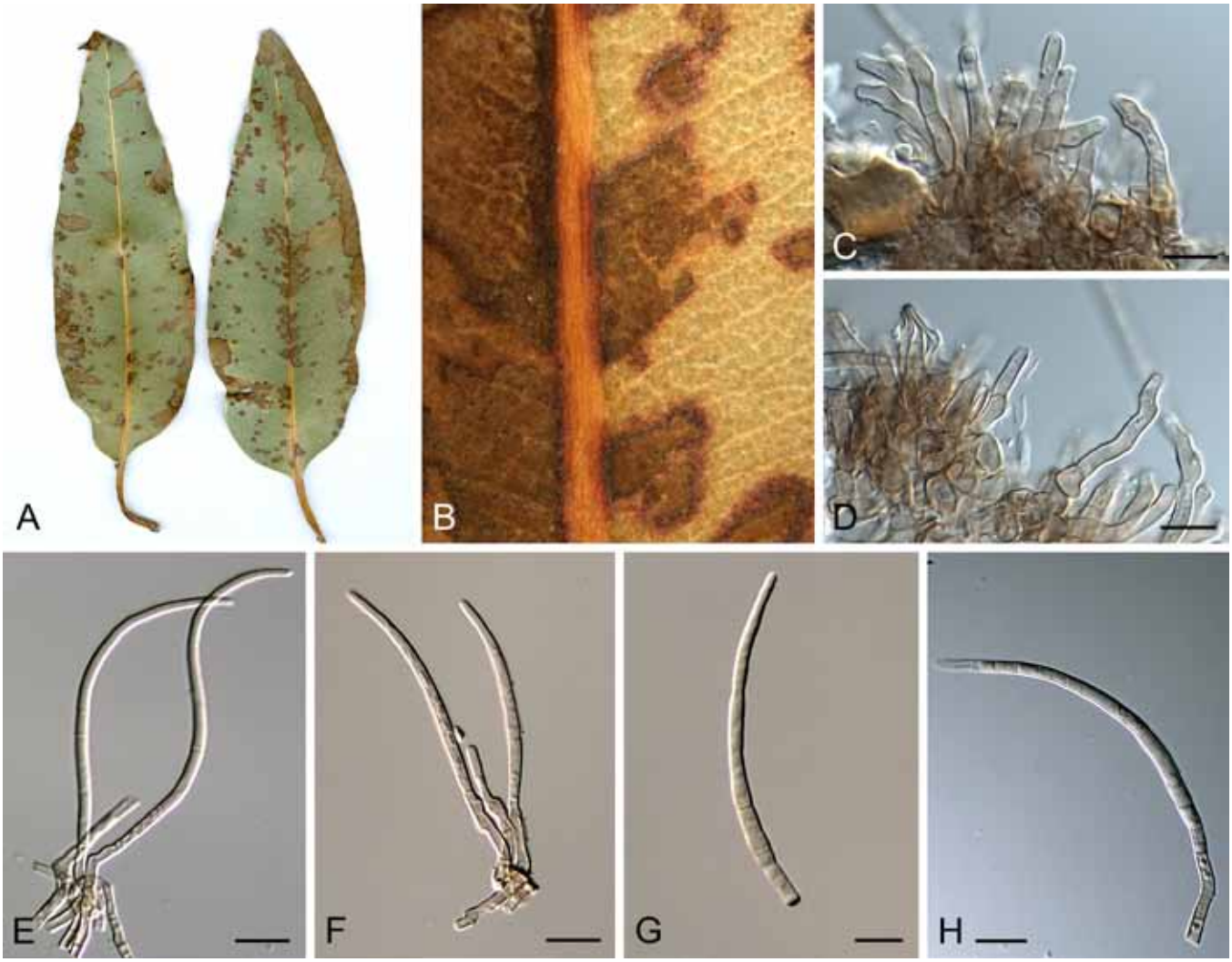

Fig. 30. *Pseudocercospora crispans* (CPC 14883). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–F. Fascicles with conidiophores and conidiogenous cells. G, H. Conidia. Scale bars = 10 µm.

brown on the upper side of the leaf, and pale to darker brown on the bottom side of the lesion, surrounded by a raised, dark brown border with a diffuse red pigment emanating away from the border; single, discrete lesions may coalesce to form larger lesions. *Mycelium* smooth, septate, guttulate, thick-walled, branched, internal and external, pale brown, 2–4 mm wide. *Caespituli* amphigenous, sparsely scattered over lesion, floccose, whitish. *Stromata* hypophyllous, brown, well-developed, immersed, globular to irregular, 40–120 mm diam. *Conidiophores* brown at base, becoming paler toward apex, arising from cells of brown stroma; arranged in loose fascicles, smooth, thick-walled, guttulate, unbranched, straight to curved, 0–4-septate, straight to geniculate–sinuous, (14–)17–31(–42) × (2–)3–4(–5) µm. *Conidiogenous cells* terminal, unbranched, smooth, guttulate, pale brown, straight to geniculate to geniculate–sinuous, proliferating sympodially and percurrently, tapering toward apex; apex obtuse to truncate, (8–)9–15(–19) × (2–)3(–4) µm. *Conidia* solitary, smooth, guttulate, curved to undulate, pale brown, 3–9-septate, apex acute to subacute, base truncate, (40–)65–96(–102) × (2–)3(–4) µm; hila unthickened, not darkened.

Culture characteristics: Colonies on MEA reaching 54 mm diam after 30 d at 24 °C. Colonies circular, flat to slightly convex, with a feathery margin and profuse aerial mycelium; lavender-grey to glaucous-grey (surface) and olivaceous-grey (reverse).

Specimen examined: **South Africa**, Western Cape Province, Knysna, on leaves of *Eucalyptus* sp., Jan. 2008, P.W. Crous, **holotype** CBS H-20392, culture ex-type CPC 14883 = CBS 125999.

Notes: *Pseudocercospora crispans* is phylogenetically distinct from other taxa described from *Eucalyptus* (Crous *et al*. 1989, Crous & Alfenas 1995, Crous & Wingfield 1997, Crous 1998, Braun & Dick 2002, Hunter *et al*. 2006a), and can be distinguished morphologically by its prominently curled conidia.

Pseudocercospora crocea Crous, U. Braun, G.C. Hunter & H.D. Shin, **sp. nov.** MycoBank MB564831. Fig. 31.

Etymology: Name reflects the typical diffuse yellow border surrounding leaf lesions caused by this fungus.

Leaf spots distinct, scattered and at the leaf margin, pale brown to brown, circular to irregular, 2–5 mm diam, indefinite border, with a pale yellow diffuse halo. *Mycelium*, internal and external, subhyaline, septate, branched, smooth, 2–5 mm wide. *Caespituli* amphigenous, grey, scattered over the lesion surface, arachnoid. *Stromata* well-developed, 40–100 mm diam, subimmersed, globular, dark brown. *Conidiophores* fasciculate, brown, becoming paler toward the apex, 0–1-septate, smooth, unbranched, straight to curved, apex truncate to subtruncate, 0–1-septate, (14–)17–24(–32) × (3–)4(–5) µm. *Conidiogenous cells* terminal, unbranched, pale

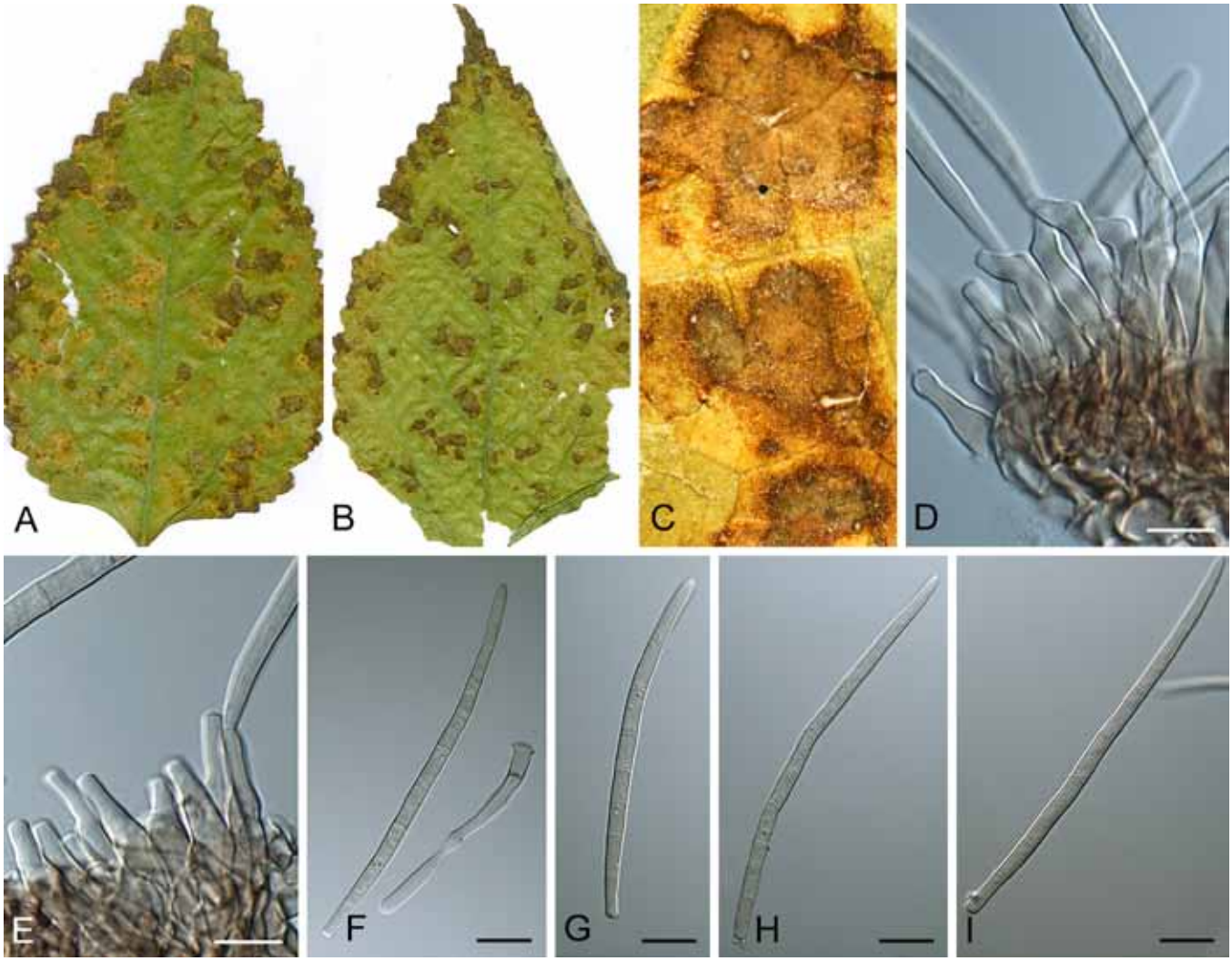

Fig. 31. *Pseudocercospora crocea* (CPC 11668). A, B. Leaf spots on upper and lower leaf surface. C. Close-up of leaf spot with fruiting. D, E. Fascicles with conidiophores and conidiogenous cells. F–I. Conidia. Scale bars = 10 µm.

brown, smooth to slightly verruculose, proliferating percurrently, (9–) 13–18(–21) × (3–)4(–5) µm. *Conidia* solitary, 4–10-septate, straight to curved, sparsely guttulate, narrowly obclavate, apex subobtuse, base obconically truncate to long obconically truncate, smooth, subhyaline, (67–)79–94(–104) × (3–)4(–5)µm, hila unthickened not darkened.

Culture characteristics: Colonies on MEA reaching 53 mm diam after 30 d at 24 °C. Colonies circular with feathery margin, flat to slightly convex, some folding occurs, with a darker radial ring toward the colony margin, aerial mycelium medium; iron-grey to olivaceous-grey (surface) and iron-grey (reverse).

Specimen examined: **South Korea**, Suwon, on leaves of *Pilea hamaoi* (≡ *P. pumila* var. *hamaoi*), 5 Nov. 2004, H.D. Shin, **holotype** CBS H-20387, isotype HAL 1860 F, cultures ex-type CPC 11668 = CBS 126004.

Notes: Singh *et al*. (1996) provide an account of the *Pseudocercospora* spp. present on members of *Urticaceae*. Of these, *P. crocea* is most similar to *P. pileae* as it also has a well-developed stroma. *Pseudocercospora pileae* is distinct from *P. crocea*, which lacks stromata and has conidiophores that are consistently solitary, arising from superficial hyphae.

Pseudocercospora cydoniae (Ellis & Everh.) Y.L. Guo & X.J. Liu, Mycosystema 5: 103. 1992. Fig. 32.

Basionym: *Cercospora cydoniae* Ellis & Everh., J. Mycol. 8: 72. 1902.

≡ *Cercosporina cydoniae* (Ellis & Everh.) Sacc., Syll. Fung. 25: 915. 1931.
≡ *Pseudocercospora cydoniae* (Ellis & Everh.) U. Braun & H.D. Shin, Mycotaxon 49: 356. 1993.

Specimens examined: **South Korea**, Seoul, on *Chaenomeles speciosa* (= *C. lagenaria*), 17 Sep. 2003, H.D. Shin, cultures CPC 10678 = CBS 131923; Jeonju, *C. sinensis,* 15 Oct. 2003, H.D. Shin, CBS H-20863.

Pseudocercospora dovyalidis (Chupp & Doidge) Deighton, Mycol. Pap. 140: 143. 1976. Fig. 33.

Basionym: *Cercospora dovyalidis* Chupp & Doidge, Bothalia 4: 885. 1948.

≡ *Pseudocercosporella dovyalidis* (Chupp & Doidge) B. Sutton, Mycol. Pap. 138: 99. 1975.

Leaf spots amphigenous, distinct, 1–3 lesions per leaf, scattered over the leaf, 3–10 mm diam, pale brown surrounded by a dark brown to black border. *Mycelium* internal, consisting of pale brown, septate, smooth, 2–6 µm diam hyphae. *Caespituli* hypophyllous, evenly distributed over the leaf spot, floccose to punctiform, olivaceous to black. *Stromata* well-developed, subimmersed to erumpent, globular, dark brown, 40–100 mm diam. *Conidiophores* fasciculate, emerging from the upper cells of stromata, brown, becoming paler toward the apex, smooth, 0–2-septate, straight to variously curved, guttulate, apex

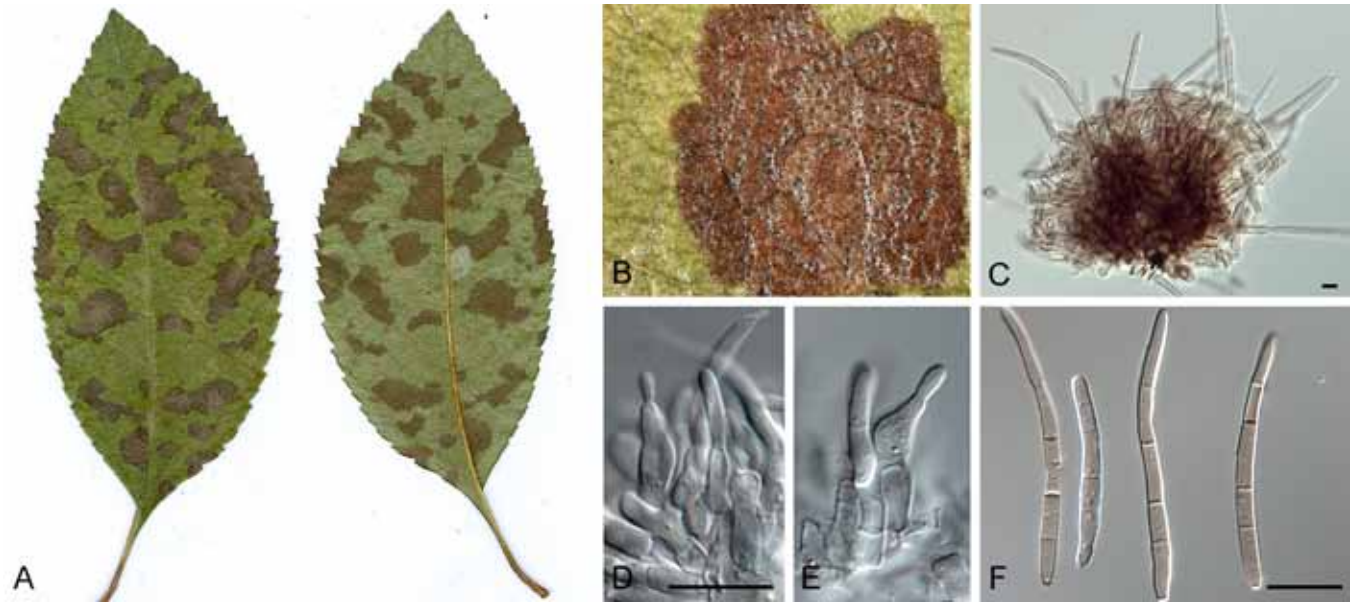

Fig. 32. *Pseudocercospora cydoniae* (CPC 10678). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C. Fascicle with conidiophores and conidiogenous cells. D, E. Conidiogenous cells. F. Conidia. Scale bars = 10 µm.

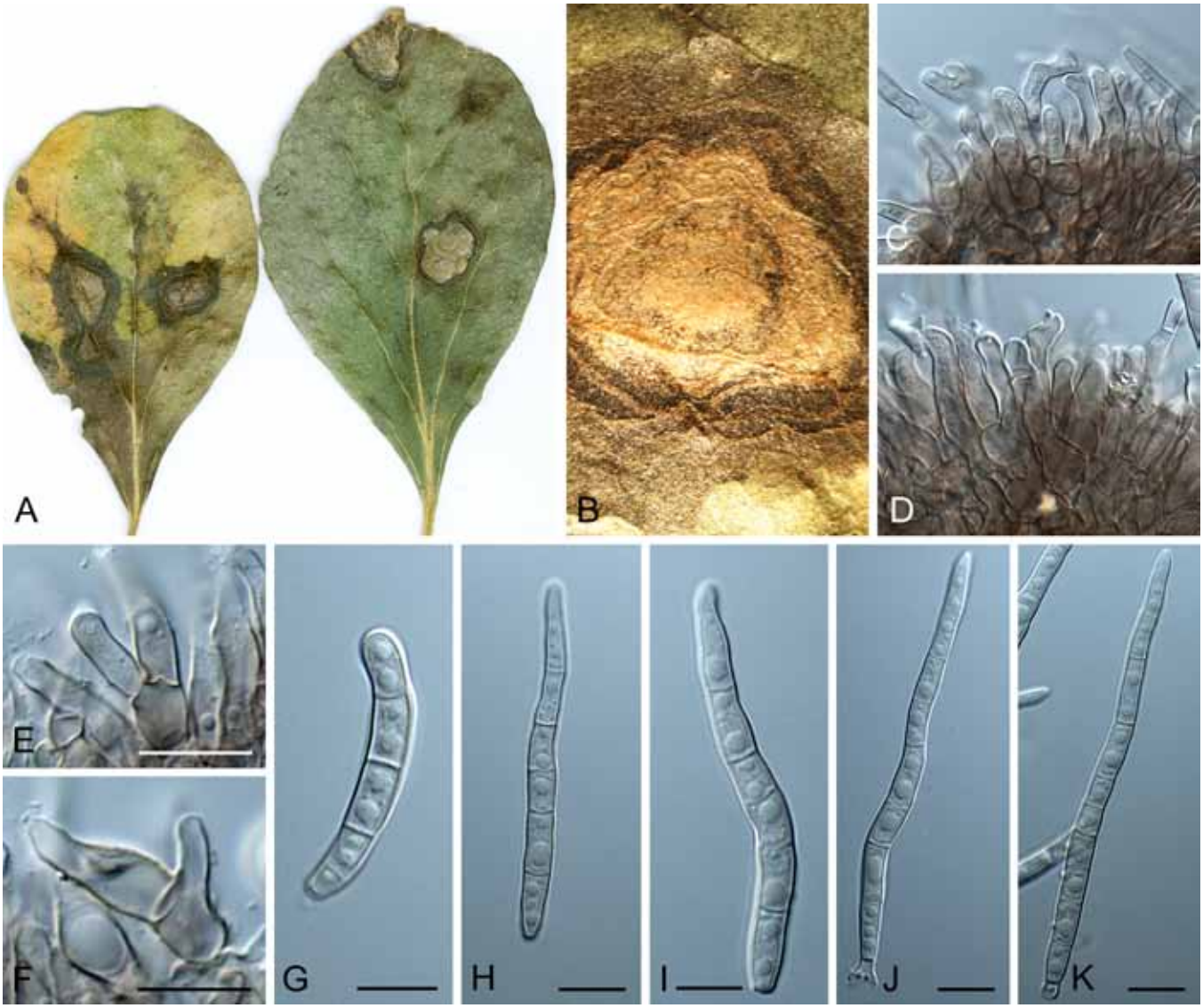

Fig. 33. *Pseudocercospora dovyalidis* (CPC 13771–13773). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E, F. Conidiogenous cells. G–K. Conidia. Scale bars = 10 µm.

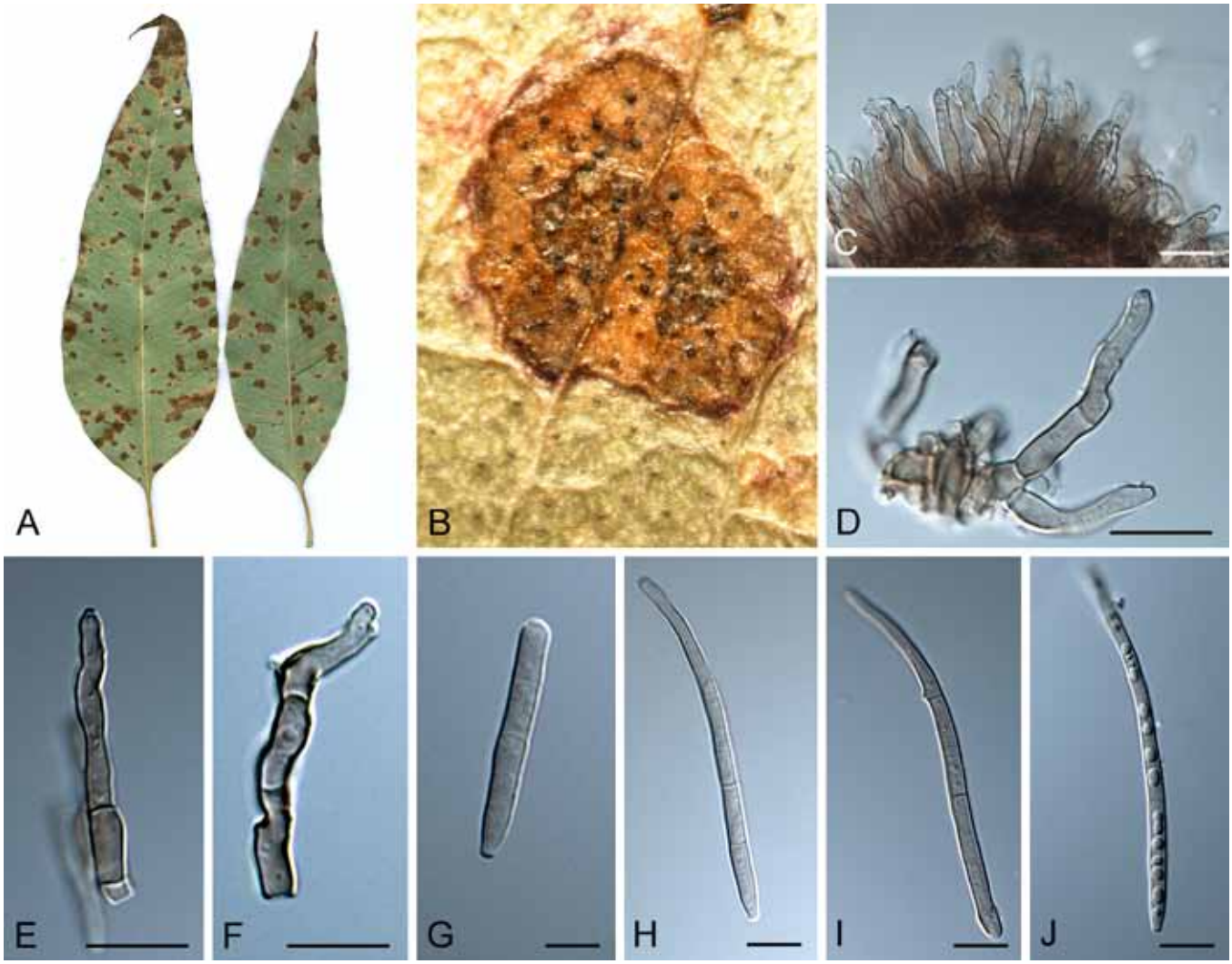

Fig. 34. *Pseudocercospora flavomarginata* (CPC 14142). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C. Fascicle with conidiophores and conidiogenous cells. D–F. Conidiogenous cells. G–J. Conidia. Scale bars = 10 µm.

rounded, conidiophores rarely branched below, (12–)13–22(–34) × (3–)3–5(–6) µm. *Conidiogenous* cells terminal, pale brown, smooth, guttulate, proliferating percurrently, (4–)6–12(–15) × (2–)3–4(–5) µm. *Conidia* solitary, pale brown or subhyaline, smooth, distinctively guttulate, 1–10-septate, thick-walled, straight to curved, broadly filliform to cylindrical, apex rounded to subacute, base long obconically truncate, (20–)30–70(–84) × (3–)3–5(–6) µm; hila neither thickened nor darkened.

Culture characteristics: Colonies on MEA reaching 32 mm diam after 30 d at 24 °C. Colonies circular with a smooth margin, either flat with excessive folding into the media or convex, aerial mycelium moderate, margin of colony darker than colony interior; greenish glaucous to olivaceous-grey (surface) and olivaceous-grey (reverse).

Specimens examined: **South Africa**, Gauteng, Pretoria, Groenkloof, on *Dovyalis zeyheri*, 18 Feb. 1914, E.M. Doidge, **holotype** PREM 7398; Gauteng, Walter Susulu Botanical Garden, on leaves of *D. zeyheri*, 2 Mar. 2007, P.W. Crous, **epitype designated here** CBS H-20389, culture ex-type CPC 13771 = CBS 126002.

Pseudocercospora eucalyptorum Crous, M.J. Wingf., Marasas & B. Sutton, Mycol. Res. 93: 394. 1989.

= *Pseudocercospora pseudoeucalyptorum* Crous, Stud. Mycol. 50: 210. 2004.

Specimens examined: **South Africa**, Western Cape Province, Stellenbosch, Stellenbosch Mountain, on leaves of *E. nitens*, 21 Dec. 1987, P.W. Crous, **holotype** of *P. eucalyptorum* PREM 49112, cultures ex type CPC16 = CBS 110777. **Spain**, Pontevedra, Lourizán, Areeiro, on leaves of *E. globulus*, 2003, J.P. Mansilla, **holotype** of *P. pseudoeucalyptorum* CBS H-9893, culture ex-type CPC 10390 = CBS 114242.

Note: *Pseudocercospora pseudoeucalyptorum* is reduced to synonymy with *P. eucalyptorum* on the basis of the phylogeny obtained here and similarity in pigmentation (Crous *et al.* 2004c).

Pseudocercospora exosporioides (Bubák) B. Sutton & Hodges, Mycologia 82: 320. 1990.

Basionym: *Cercospora exosporioides* Bubák, Ann. Mycol. 13: 33. 1915.

Specimen examined: **Japan**, Ibaraki, on *Sequoia sempervirens*, 11 Sep. 1998, T. Kobayashi, CNS-448, cultures MUCC 893, MAFF 237788.

Pseudocercospora flavomarginata G.C. Hunter, Crous & M.J. Wingf., Fungal Diversity 22: 80. 2006. Fig. 34.

Specimens examined: **Thailand**, Chang Gao Province near Pratchinburi, on leaves of *Eucalyptus camaldulensis,* 2004, M.J. Wingfield, **holotype** PREM 58952, cultures ex-type CBS 118841, 118823, 118824; Chachoengsao Province, on leaves of *E. camaldulensis*, 2001, W. Himaman, CBS H-20388, culture CPC 13492–13494.

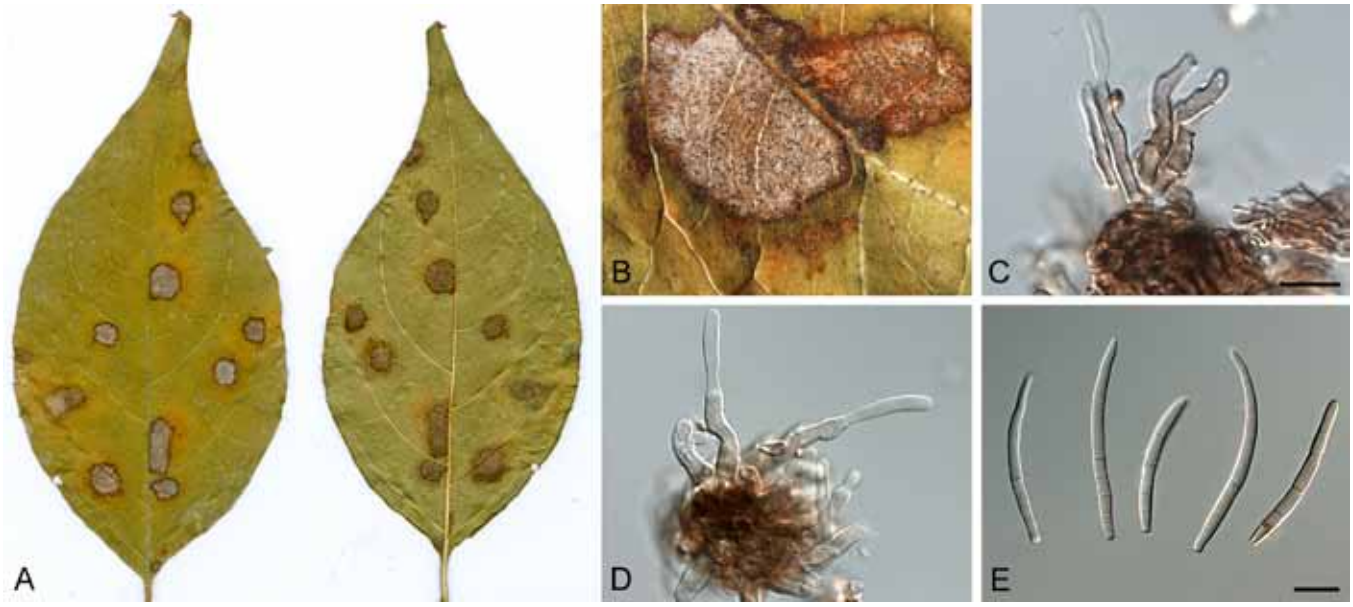

Fig. 35. *Pseudocercospora fukuokaensis* (CPC 14689). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidia. Scale bars = 10 µm.

China, on leaves of *Eucalyptus* sp., 2003, X. Zhou, CBS H-20390, culture ex-type CPC 14142 = CBS 126001.

Notes: *Pseudocercospora flavomarginata* was described as the causal agent of a prominent leaf spot disease of *E. camaldulensis* in Thailand (Hunter *et al*. 2006a). Based on this study it appears that it is present also on this host in China.

Pseudocercospora fukuokaensis (Chupp) X.J. Liu & Y.L. Guo, Mycosystema 5: 103. 1992. Fig. 35.
Basionym: *Cercospora fukuokaensis* Chupp, Sci. Rep. Yokahama Natl. Univ., Sect. II, Biol. Sci. 1: 2. 1952.

Specimens examined: **Japan**, Fukuoka, Futsukaichi-machi, on *Styrax japonicus*, 5 Sep. 1951, S. Katsuki, **holotype** TNS-F243813; Ibaraki, on *S. japonicus,* 11 Sep. 1998, T. Kobayashi & C. Nakashima, **epitype designated here** TFM: FPH-8096, ex-epitype cultures MUCC 887, MAFF 237768; Ibaraki, Ibaraki Nat. Mus., on *S. japonicus,* 10 Sep. 1998, T. & Y. Kobayashi; Fukuoka, Fukuoka For. Exp. Stn., on *S. japonicus,* 30 Jul. 1975, S. Ogawa (TFM: FPH-4356); Kaogshima, Tanegashima Is., on *S. japonicus,* 18 Oct. 1997, T. Kobayashi & C. Nakashima (culture: MAFF238203); Kagoshima, Tokunoshima Is., on *S. japonicus*, 8 Nov. 1993, T. Kobayashi & T. Hosoya (Culture: MAFF236995); Okinawa, Kunigami, on *S. japonicus*, 18 Nov. 1999, T. Kobayashi & C. Nakashima; Fukuoka, Fukuoka For. Exp. Stn., on *S. obassia*, 14 Sep. 1978, S. Ogawa (TFM: FPH -4941); Fukuoka, on *S. grandiflora* (= *S. japonicus* var. *kotoensis*), Oct. 2001, T. Kobayashi (MAFF 238480); Yamaguchi, on *S. japonicus*, Dec. 1996, T. Kobayashi (MAFF 237634); Saitama, on *S. japonicus*, Sep. 2002, T. Kobayashi & Y.Ono (MAFF 239411). **South Korea**, Osan, *S. japonicus,* 30 Oct. 2007, H.D. Shin, culture CPC 14689 = CBS 132111.

Notes: DNA sequence data for different isolates from *Styrax japonica* collected in Japan are identical, and distinct from the strain collected in Korea, suggesting that the Korean material represents a different taxon.

Pseudocercospora fuligena (Roldan) Deighton, Mycol. Pap. 140: 144. 1976.
Basionym: *Cercospora fuligena* Roldan, Philipp. J. Sci. 66: 8. 1938.

Holotype: **Philippines**, Luzon, Laguna, College of Agriculture Campus, on *Solanum lycopersicum* (≡ *Lycopersicon esculentum*), E.F. Roldan No 32, holotype (not seen).

Specimens examined: **Thailand**, on *Solanum lycopersicum* (variety FMMT260), 28 Aug. 2005, Z. Mersha, CBS H-20864, culture CPC 12296 = CBS 132017. **Japan**, Mie, on *Lycopersicon esculentum,* 6 Feb. 2007, C. Nakashima, MUCC 533.

Notes: DNA sequence data (ITS and EF-1α) for 40 Japanese isolates revealed variation in only one position (data not shown) and the culture from Thailand is very similar genetically. The collections of *P. fuligena* treated in this study are also morphologically similar to the description of the holotype specimen, which was collected in the Philippines. Chupp (1954) did not see the holotype, nor did Deighton (1976) refer to it. Fresh collections from the type location are needed to resolve this apparent species complex.

Pseudocercospora glauca (Syd.) Y.L. Guo & X.J. Liu, Acta Mycol. Sin. 11: 132. 1992. Fig. 36.
Basionym: *Cercospora glauca* Syd., Ann. Mycol. 27: 432. 1929.

Specimen examined: **South Korea**, Wando, Wando arboretum, on *Albizzia julibrissin,* 9 Nov. 2002, H.D. Shin, CBS H-20865, culture CPC 10062 = CBS 131884.

Pseudocercospora guianensis (F. Stevens & Solheim) Deighton, Mycol. Pap. 140: 145. 1976.
Basionym: *Cercospora guianensis* F. Stevens & Solheim, Mycologia 23: 375. 1931.

Specimen examined: **Japan**, Tateyama, Chiba, on *Lantana camara*, 4 June 1997, C. Nakashima CNS-162, cultures MUCC 879, MAFF 238239.

Pseudocercospora haiweiensis Crous & X. Zhou, **sp. nov.** MycoBank MB564832. Fig. 37.

Etymology: Name is derived from Hai Wei, China, where this fungus was collected.

Leaf spots amphigenous, irregular to subcircular or angular, 2–4 mm diam, brown, with raised border, and at times with a red-purple margin. *Mycelium* internal, subhyaline, consisting of septate, branched, smooth, 2–3 µm diam hyphae. *Caespituli* fasciculate to sporodochial, amphigenous, breaking through epidermis, appearing

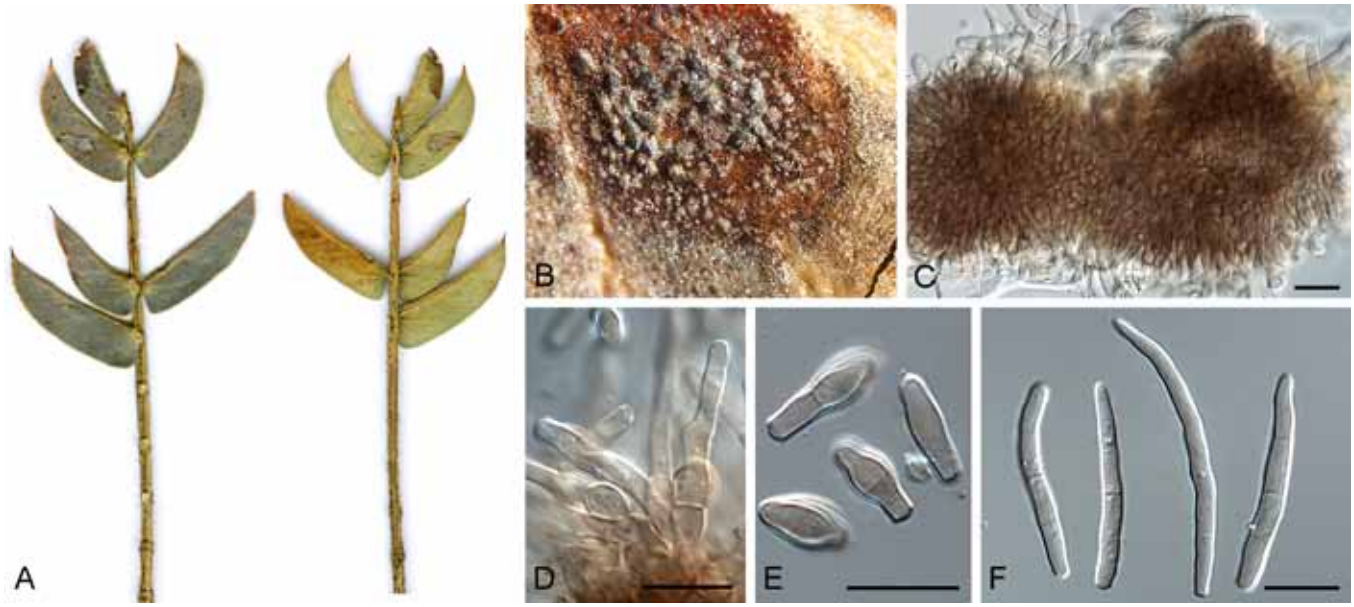

Fig. 36. *Pseudocercospora glauca* (CPC 10062). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C. Fascicle with conidiophores and conidiogenous cells. D. Conidiophores. E, F. Conidia. Scale bars = 10 µm.

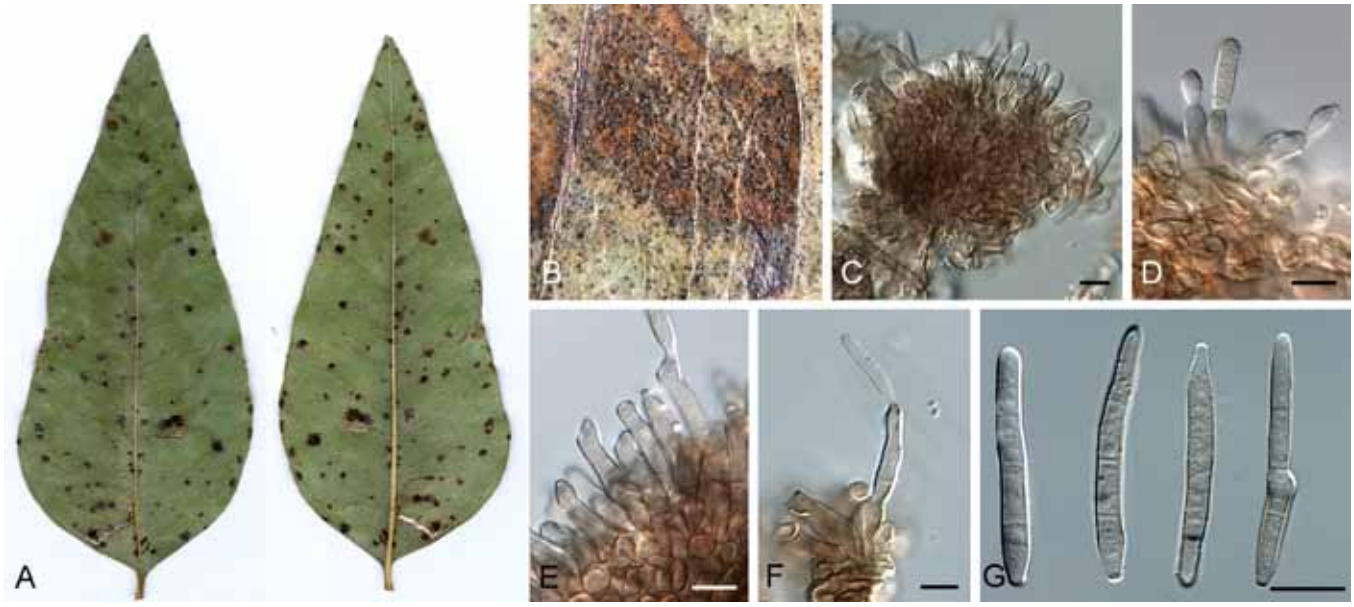

Fig. 37. *Pseudocercospora haiweiensis* (CPC 14084). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C. Fascicle with conidiophores and conidiogenous cells. D–F. Conidiophores. G. Conidia. Scale bars = 10 µm.

almost acervular, grey-brown on leaves, up to 90 µm wide and 50 µm high. *Conidiophores* aggregated in dense fascicles arising from the upper cells of a brown stroma up to 60 µm wide and 30 µm high; conidiophores brown, smooth to finely verruculose, 0–2-septate, subcylindrical, straight to variously curved or geniculate-sinuous, unbranched, 10–25 × 3–4 µm. *Conidiogenous cells* terminal, unbranched, brown, subcylindrical, smooth to finely verruculose, tapering to flat-tipped apical loci, proliferating sympodially, rarely percurrently near apex, 10–15 × 2.5–3.5 µm. *Conidia* solitary, brown, finely verruculose, guttulate, subcylindrical, apex obtuse, base obconically subtruncate to truncate, straight to gently curved, 3(–5)-septate, (25–)30–40(–45) × 3(–4) µm; hila unthickened, neither darkened nor refractive, 1.5 µm wide.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; surface folded, erumpent, spreading, with moderate aerial mycelium, and smooth, lobate margins. Surface olivaceous-grey with patches of pale olivaceous-grey; reverse olivaceous-grey. Colonies reaching 12 mm diam.

Specimen examined: **China**, Hai Wei, on leaves of *Eucalyptus* sp. (APP 21), 3 June 2007, X. Zhou, **holotype** CBS H-20866, culture ex-type CPC 14084 = CBS 131584.

Notes: A combination of relatively short conidia (1–3-septate, 25–45 × 3–4 µm) that are subcylindrical in shape, the absence of superficial mycelium, and dense fascicles with well-developed stromata, distinguish this new species on *Eucalyptus* from other taxa known from this host (Crous 1998, Braun & Dick 2002).

Pseudocercospora hakeae (U. Braun & Crous) U. Braun & Crous, **comb. et stat. nov.** MycoBank MB564833.

Basionym: *Cercostigmina protearum* var. *hakeae* U. Braun & Crous, Sydowia 46: 206. 1994.

≡ *Pseudocercospora protearum* var. *hakeae* (U. Braun & Crous) U. Braun & Crous, Mycol. Progr. 1: 22. 2002.

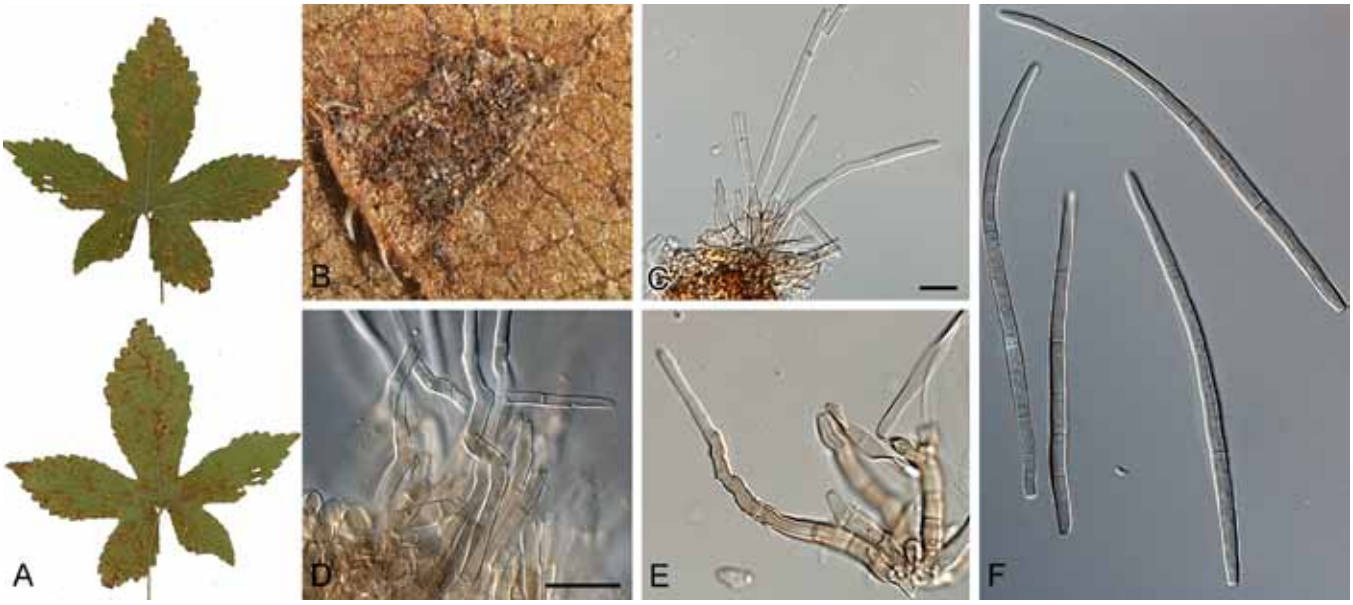

Fig. 38. *Pseudocercospora humulicola* (CPC 11358). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores and conidiogenous cells. F. Conidia. Scale bars = 10 µm.

Specimens examined: **South Africa**, Northern Province, Louis Trichardt, Hangklip Forest Station, on leaves of *Hakea salicifolia* (= *H. saligna*), Apr. 1988, C. Roux, **holotype** PREM 51117. **Australia**, New South Wales, Mount Annan Botanic Gardens, on leaves of *Grevillea* sp., Aug. 1999, P.W. Crous & B. Summerell, JT 926, DAR 74861, CPC 2968; Mount Tomah Botanic Gardens, on leaves of *Grevillea* sp., Aug. 1999, P.W. Crous & B. Summerell, JT 873, DAR 74862, CPC 3145 = CBS 112226.

Note: No culture from *Hakea* is presently available, and thus the position of this taxon on *Hakea* and *Grevillea* has yet to be confirmed based on DNA sequence comparisons.

Pseudocercospora humuli (Hori) Y.L. Guo & X.J. Liu, Acta Mycol. Sin., Suppl. 1: 345. (1986) 1987.

Basionym: *Cercospora humuli* Hori, in S. Takimoto, Trans. Agric. Assoc. Chosen 13(12): 34. 1918.

≡ *Cercospora humuli* Hori, in Salmon & Wormald. J. Bot. (London) 61: 135. 1923.

= *Cercospora humuli-japonici* Sawada, Taiwan Agric. Rev. 38: 697. 1942 (*nom. inval.*).

≡ *Pseudocercospora humuli-japonici* Sawada ex Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar fungi from Taiwan: 239. 1990.

Specimens examined: **Japan**, Tokyo, Nishigahara, on *Humulus scandens*, 28 Sep. 1915, S. Hori, **holotype** NIAES herbarium C-487; Wakayama, on *H. lupulus* var. *lupulus*, 30 Oct. 2007, C. Nakashima & I. Araki, **epitype designated here** TFM: FPH-8097, ex-epitype culture MUCC 742.

Pseudocercospora humulicola Crous, U. Braun & H.D. Shin, **sp. nov.** MycoBank MB564834. Fig. 38.

Etymology: Name derived from *Humulus*, the plant on which it was collected.

Leaf spots amphigenous, irregular to angular, 0.5–1.5 mm diam, brown, with raised border and wide chlorotic halo. *Mycelium* internal, subhyaline, consisting of septate, branched, smooth, 2–3 µm diam hyphae. *Caespituli* fasciculate to sporodochial, amphigenous, predominantly epiphyllous, pale brown on leaves, up to 90 µm wide and 200 µm high. *Conidiophores* aggregated in dense fascicles arising from the upper cells of a brown stroma up to 80 µm wide and 30 µm high; conidiophores pale brown, smooth, 2–5-septate, subcylindrical, straight to variously curved or geniculate-sinuous, unbranched, 40–90 × 3–4 µm. *Conidiogenous cells* terminal, unbranched, subhyaline to pale brown, subcylindrical, smooth, tapering to flat-tipped apical conidiogenous loci, 2 µm diam, proliferating sympodially, 10–30 × 3–4 µm. *Conidia* solitary, subhyaline, smooth, finely granular, subcylindrical, apex obtuse, base truncate, straight to gently curved, 3–12-septate, (70–)80–95(–120) × 2.5(–3) µm; hila unthickened, neither darkened nor refractive, 2–3 µm wide.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; surface folded, erumpent, spreading, with sparse aerial mycelium, and smooth, lobate margins. Surface pale olivaceous-grey; reverse olivaceous-grey. Colonies reaching 10 mm diam.

Specimens examined: **South Korea**, Hongchon, on leaves of *Humulus scandens,* 9 Jul. 2004, H.D. Shin, **holotype** CBS H-20867, culture ex-type CPC 11358 = CBS 131585; Chuncheon, on *H. scandens,* 11 Oct. 2002, H.D. Shin, CBS H-20868, culture CPC 10049 = CBS 131883; Cheongju, on *H. scandens,* 4 June 2004, H.D. Shin, CBS H-20869, culture CPC 10002.

Notes: *Pseudocercospora humulicola* is very similar to *P. humuli*, originally described from Japan, but it is distinct based on DNA sequence comparisons. In *P. humuli* conidia are obclavate-cylindrical, 35–120 × 2.5–4 µm (Chupp 1954), while conidia of *P. humulicola* are subcylindrical, and on average longer than 80 µm. Furthermore, *P. humuli* has shorter conidiophores (10–55 µm long, 0–2-septate) than those of *P. humulicola*, which are 2–5-septate, and 40–90 µm long.

Pseudocercospora jussiaeae (G.F. Atk.) Deighton, Mycol. Pap. 140: 146. 1976. Fig.39.

Basionym: *Cercospora jussiaeae* G.F. Atk., J. Elisha Mitchell Sci. Soc. 8: 50. 1892.

= *Cercospora ludwigiae* G.F Atk., J. Elisha Mitchell Sci. Soc. 8: 58. 1892.

Specimen examined: **South Korea**, Hongcheon, on *Ludwigia prostrata*, 9 Oct. 2007, H.D. Shin, KUS-F22981, CBS H-20870, culture CPC 14625 = CBS 132117.

Fig. 39. *Pseudocercospora jussiaeae* (CPC 14625). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidia. Scale bars = 10 µm.

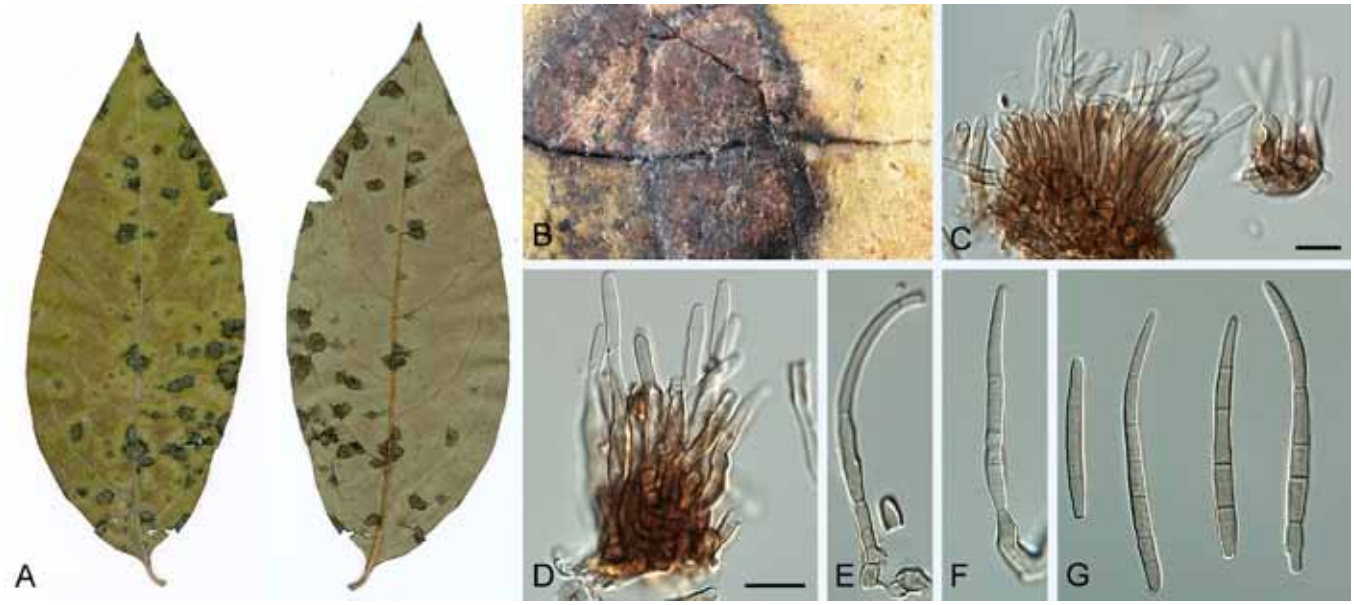

Fig. 40. *Pseudocercospora kaki* (CPC 10837–10839). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E, F. Conidiogenous cells. G. Conidia. Scale bars = 10 µm.

Pseudocercospora kaki Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar fungi from Taiwan: 109. 1990. Fig. 40.

Specimens examined: **Japan,** Toyama, Kureha, on *Diospyros kaki*, 25 Sep. 1998, T. Kobayashi & E. Imaizumi, CNS-472, culture MAFF 238214; Chiba, on *D. kaki*, 18 Sep. 1998, S. Uematsu & C. Nakashima, CNS-464, cultures MUCC 900, MAFF 238238; Chiba, on *D. kaki*, Nov. 1993, T. Kobayashi, cultures MAFF 237013. **South Korea**, Gongju, on *D. lotus*, 28 Oct. 2003, H.D. Shin, CBS H-20871, cultures CPC 10837–10839.

Additional isolates examined (representing a different lineage): **Japan,** Kagoshima, Oshima Is., on *D. kaki*, 11 Nov. 1993, T. Kobayashi, CNS-993, culture MAFF 236999; Chiba, on *D. kaki*, Oct. 1991, T. Kobayashi, culture MAFF 235880.

Notes: The type specimen of this species is from Taiwan but the type was not cultured or sequenced. It may be synonymous with *Cercospora kaki*, which is based on material from the USA. The Japanese material studied here is different from the Korean material based on DNA sequence data. Actin sequences generated for additional Japanese isolates resolved two different lineages, one of which may be attributed to *Cercospora kakivora*, but this can only be resolved once fresh collections from Taiwan and the USA have been obtained.

Pseudocercospora kiggelariae (Syd.) Crous & U. Braun, Sydowia 46: 215. 1994.

Basionym: *Cercospora kiggelariae* Syd., Ann. Mycol. 22: 434. 1924.

Holotype: **South Africa**, Western Cape Province, Stellenbosch, on leaves of *Kiggelaria africana*, May 1924, C.K. Brain No 1449 (not preserved).

Specimens examined: **South Africa**, Gauteng, Walter Susulu Botanical Garden, on leaves of *K. africana*, Jan. 2005, W. Gams, **neotype designated here** CBS H-20872, cultures ex-neotype CPC 11853 = CBS 132016; Western Cape Province, Hermanus, Fernkloof Botanical Garden, S34º23'52.1" E19º15'58.5", *K. africana*, 2 May 2010, P.W. Crous, CBS H-20873, CPC 18286, 18287.

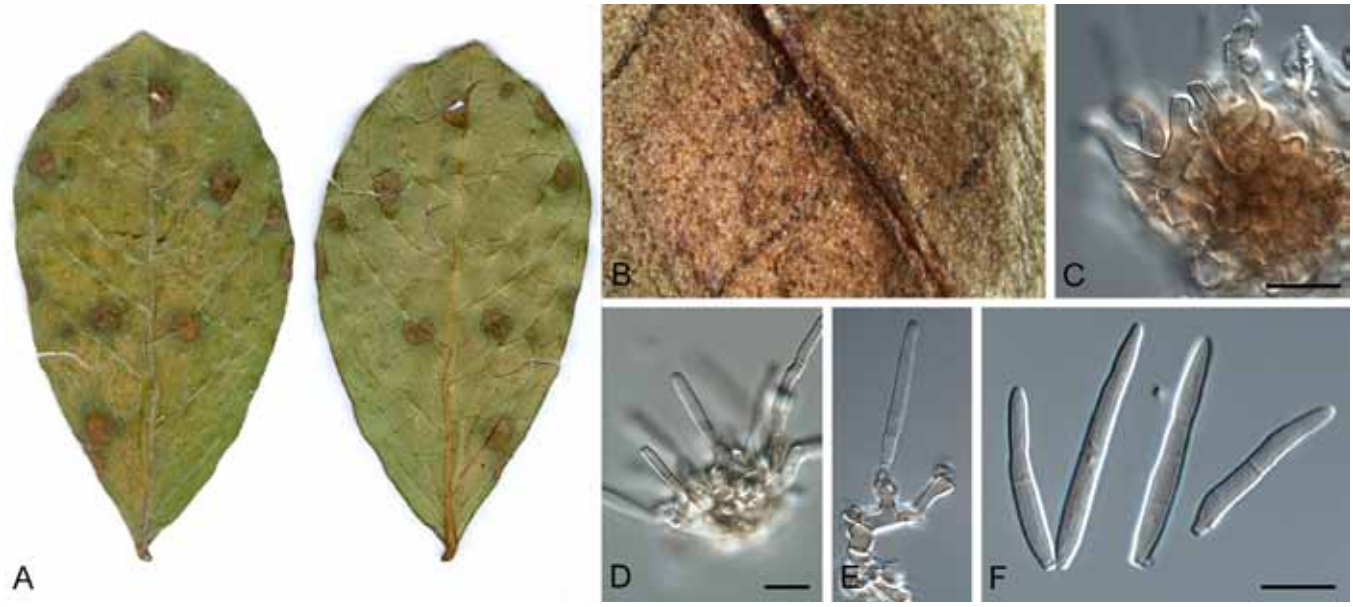

Fig. 41. *Pseudocercospora lythracearum* (CPC 10707). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidiophore with conidiogenous cells. F. Conidia. Scale bars = 10 µm.

Pseudocercospora latens (Ellis & Everh.) Y.L. Guo & X.J. Liu, Mycosystema 2: 236. 1989.

Basionym: *Cercospora latens* Ellis & Everh., J. Mycol. 4: 3. 1888.

≡ *Pseudocercospora latens* (Ellis & Everh.) U. Braun, Trudy Bot. Inst. im. V.L. Komarova 20: 67. 1997 (*comb. superfl.*).

Specimen examined: **Japan**, Okinawa, on *Lespedeza wilfordii* (= *L. thunbergii* subsp. *formosa*), 18 Nov. 2007, C. Nakashima & T. Akashi, MUMH 10815, culture MUCC 763.

Pseudocercospora leucadendri (Cooke) U. Braun & Crous, **comb. et stat. nov.** MycoBank MB564835.

Basionym: *Cercospora protearum* var. *leucadendri* Cooke, Grevillea 12: 39. 1883.

≡ *Stigmina protearum* var. *leucadendri* (Cooke) M.B. Ellis, Mycol. Pap. 131: 7. 1972.

≡ *Cercostigmina protearum* var. *leucadendri* (Cooke) U. Braun & Crous, in Crous & Braun, Sydowia 46: 206. 1994.

≡ *Pseudocercospora protearum* var. *leucadendri* (Cooke) U. Braun & Crous, Mycol. Progr. 1: 22. 2002.

= *Passalora protearum* Kalchbr. & Cooke, Grevillea 19: 6. 1890.

Specimen examined: **South Africa**, Western Cape Province, Stellenbosch, Devon Valley, Protea Heights, on *Leucadendron* sp., 3 Apr. 1998, S. Denman & P.W. Crous, specimen JT-178, culture CPC 1869 (no longer viable).

Note: *Pseudocercospora protearum* has three varieties on *Proteaceae*, *viz*. *protearum, leucadendri* and *hakeae* (Braun & Hill 2002), that should be recognised as distinct species (Crous *et al*. 2004a) as shown here (Fig. 5).

Pseudocercospora lonicericola (W. Yamam.) Deighton, Mycol. Pap. 140: 146. 1976.

Basionym: *Cercospora lonicericola* W. Yamam. J. Soc. Trop. Agric. 6: 604. 1934.

Holotype: **Taiwan**, Taihoku, on *Lonicera japonica* var. *sempervillosa*, 3 Nov. 1933, W. Yamamoto (holotype could not be located, and is probably lost).

Specimens examined: **Japan,** Tokyo, Jindai Bot. Park, on *L. japonica*, 21 Oct. 1976, T. Kobayashi, TFM: FPH-4479; Chiba, Matsudo, on *L. japonica*, 14 Sep. 1951, E. Kurosawa, SK -2207; Fukuoka, Yame, on *L. japonica*, 29 Nov. 1949, S. Katsuki, SK -2206; Kagoshima, Yaku Is., on *L. japonica*, 29 Dec. 1952, S. Katsuki, SK -392; Ibaraki, *L. gracilipes* var. *glabra*, 11 Sep. 1998, T. Kobayashi, **neotype designated here** TFM: FPH-8098, ex-neotype cultures MUCC 889, MAFF 237785.

Pseudocercospora lyoniae (Katsuki & Tak. Kobay.) Deighton, Trans. Brit. Mycol. Soc. 88: 389. 1987.

Basionym: *Cercospora lyoniae* Katsuki & Tak. Kobay., Trans. Mycol. Soc. Japan 16: 3. 1975.

Specimens examined: **Japan**, Tokyo, Asakawa Experimental Forest, Government Forest Experimental Station, on *Lyonia ovalifolia* var. *elliptica,* 21 Sep. 1973, H. Horie, **holotype** TFM: FPH-3999; Tokyo, Jindai Bot. Garden, on *L. ovalifolia* var. *elliptical,* 25 Sep. 1974, T. Kobayashi, TFM: FPH -4202; Tokyo, Jindai Bot. Garden, on *L. ovalifolia* var. *elliptica,* 7 Nov. 1998, C. Nakashima & E. Imaizumi, **epitype designated here** TFM: FPH-8100, ex-epitype cultures MUCC 910, MAFF 237775.

Pseudocercospora lythracearum (Heald & F.A. Wolf) X.J. Liu & Y.L. Guo, Acta Mycol. Sin. 11: 294. 1992. Fig. 41.

Basionym: *Cercospora lythracearum* Heald & F.A. Wolf, Mycologia 3: 18. 1911.

≡ *Cercosporina lythracearum* (Heald & F.A. Wolf) Sacc., Syll. Fung. 25: 909. 1931.

= *Cercospora lagerstroemiae* Syd. & P. Syd., Ann. Mycol. 12: 203. 1914.

= *Cercospora lagerstroemiae-subcostatae* Sawada, Taiwan Agric. Res. Inst. Rept. 51: 129. 1931.

≡ *Pseudocercospora lagerstroemiae-subcostatae* (Sawada) Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar fungi from Taiwan: 212. 1990.

= *Cercospora lagerstroemiicola* Sawada, Taiwan Agric. Res. Inst. Rept. 85: 112. 1943 (*nom. inval.*).

Specimens examined: **Japan**, Ibaraki, on *Lagerstroemia indica*, 11 Sep. 1998, T. Kobayashi, CNS-444, cultures MUCC 890, MAFF 237786; Kanagawa, isolated from *L. subcostata*, collection date unknown, T. Kobayashi, MAFF 410017; Ibaraki, isolated from *L. subcostata*, Oct. 1994, T. Nishijima, MAFF 237185; Chiba, isolated from *L. subcostata*, Oct. 1993, T. Kobayashi, MAFF 236964. **South Korea**, Jinju, *L. indica*, 15 Oct. 2003, H.D. Shin, CBS H-20874, KUS-F 19899, culture CPC 10707 = CBS 131925.

Notes: The material collected from Korea is genetically similar to that from Japan (Fig. 5). However, fresh collections from the USA are required to determine if the Asian material is the same as that from the USA. The synonyms cited by Chupp (1954) could represent different species.

Fig. 42. *Pseudocercospora lythri* (CPC 14588). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidia. Scale bars = 10 µm.

Pseudocercospora lythri H.D. Shin & U. Braun, Mycotaxon 74: 111. 2000. Fig. 42.

Specimens examined: **Japan**, Tokyo, on *Lythrum salicaria* (incl. *L. anceps*) 10 Nov. 2007, I. Araki & M. Harada, MUMH 11104, culture MUCC865. **South Korea**, Chuncheon, on *L. salicaria*, 21 Sep. 1991, H.D. Shin, **holotype** KUS-F 11109; Yangku, on *L. salicaria,* 28 Sep. 2007, H.D. Shin, **epitype designated here** CBS H-20875, culture ex-epitype CPC 14588 = CBS 132115.

Pseudocercospora marginalis G.C. Hunter, Crous, U. Braun & H.D. Shin, **sp. nov.** MycoBank MB564836. Fig. 43.

Etymology: *Margo*, *marginalis*, referring to border or margin; indicating leaf spots that extend along the leaf margin.

Leaf spots distinct, 2–5 mm diam, also predominantly forming larger blotches extending along the length of the leaf margin, brown, irregular; border indefinite. *Mycelium* internal and external, septate, smooth, subhyaline, branched, 2–4 µm wide. *Caespituli* epiphyllous, aggregated along leaf veins, floccose, olivaceous, emerging from stomata. *Stromata* well-developed, subimmersed to erumpent, globular to elongated, brown, 20–75 µm diam. *Conidiophores* fasciculate, pale brown to brown, straight to curved to undulate, cylindrical, unbranched, apex rounded to subtruncate, smooth, finely guttulate, 0–4-septate, (15–)18–31(–41) × (3–)4(–5) µm. *Conidiogenous cells* terminal, unbranched, smooth, finely guttulate, pale brown, straight to curved, cylindrical, apex rounded to subtruncate, proliferating sympodially or percurrently, (5–)8–11(–14) × 3(–4) µm. *Conidia* solitary, smooth, cylindrical to narrowly obclavate, guttulate, thick-walled, straight to curved, pale brown to pale olivaceous, apex rounded to obtuse, base obconic to long obconically truncate, 1–7-septate, (19–)30–48(–58) × (3–)4(–5) µm; hila neither thickened nor darkened.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; erumpent, spreading, with moderate aerial mycelium, and smooth, even margins. Surface pale olivaceous-grey; reverse olivaceous-grey. Colonies reaching 10 mm diam.

Specimen examined: **South Korea**, Jeju, Halla arboretum, on leaves of *Fraxinus rhynchophylla* (≡ *F. chinensis* subsp. *rhynchophylla*), 29 Oct. 2005, H.D. Shin, **holotype** CBS H-20397, culture ex-type CPC 12497 = CBS 131582, CPC 12498, 12499.

Specimens examined of P. fraxinites: **South Korea**, Jinju, on *Fontanesia phillyreoides*, 15 Oct. 2003, H.D. Shin, CBS H-20876, cultures CPC 10743–10745. **Japan**, Ibaraki, on *Fraxinus excelsior*, 11 Sep. 1998, T. Kobayashi, CNS-445, cultures MUCC 891, MAFF 237787.

Notes: Although similar to *P. fraxinites* (conidia 20–60 × 1.5–3 µm; Chupp 1954) (Fig. 44), conidia of *P. marginalis* are wider and cluster apart from isolates of *P. fraxinites* on *Fontanesia* from Korea (CPC 10743–10745) and *Fraxinus* from Japan (MUCC 891). *Pseudocercospora fraxinites* was originally described from *Fraxinus* in the USA. Morphological and molecular characterisation of new collections and cultures from this host in the USA are needed to clarify the limits of *P. fraxinites* and *P. marginalis*.

Pseudocercospora melicyti U. Braun & C.F. Hill, Australas. Pl. Pathol. 33: 489. 2004.

Specimen examined: **New Zealand**, Auckland, Waiatarua, on *Melicytus macrophyllus*, 13 Mar. 2003, C.F. Hill, **holotype** HAL 1787 F (isotype PDD 77567), culture ex-type ICMP 14984 = CBS 115023.

Pseudocercospora myrticola (Speg.) Deighton, Mycol. Pap. 140: 148. 1976.

Basionym: *Cercospora myrticola* Speg., Anales Soc. Ci. Argent. 16: 167. 1883.

= *Cercospora myrti* Erikss., Bidrag Känn. om vara odlade Vaxters s jukdomar, Stockholm 8: 79. 1885 and Rev. Mycol. 8: 60. 1886.
= *Cercospora saccardoana* Scalia, Atti Accad. Gioenia Sci. Nat. Catania, Ser. 4, 14: 35. 1901.
= *Cercospora amadelpha* Syd., Ann. Mycol. 30: 89. 1932.
= *Fusariella cladosporioides* P. Karst., Hedwigia 30: 248. 1891.

Specimen examined: **Japan**, Kagoshima, on *Myrtus communis*, 29 May 2007, C. Nakashima & K. Motohashi, MUMH 10572, culture MUCC 632.

Pseudocercospora ocimi-basilici Crous, M.E. Palm & U. Braun, **sp. nov.** MycoBank MB564837. Fig. 45.

Etymology: Name derived from *Ocimum basilicum*, the host from which it was collected.

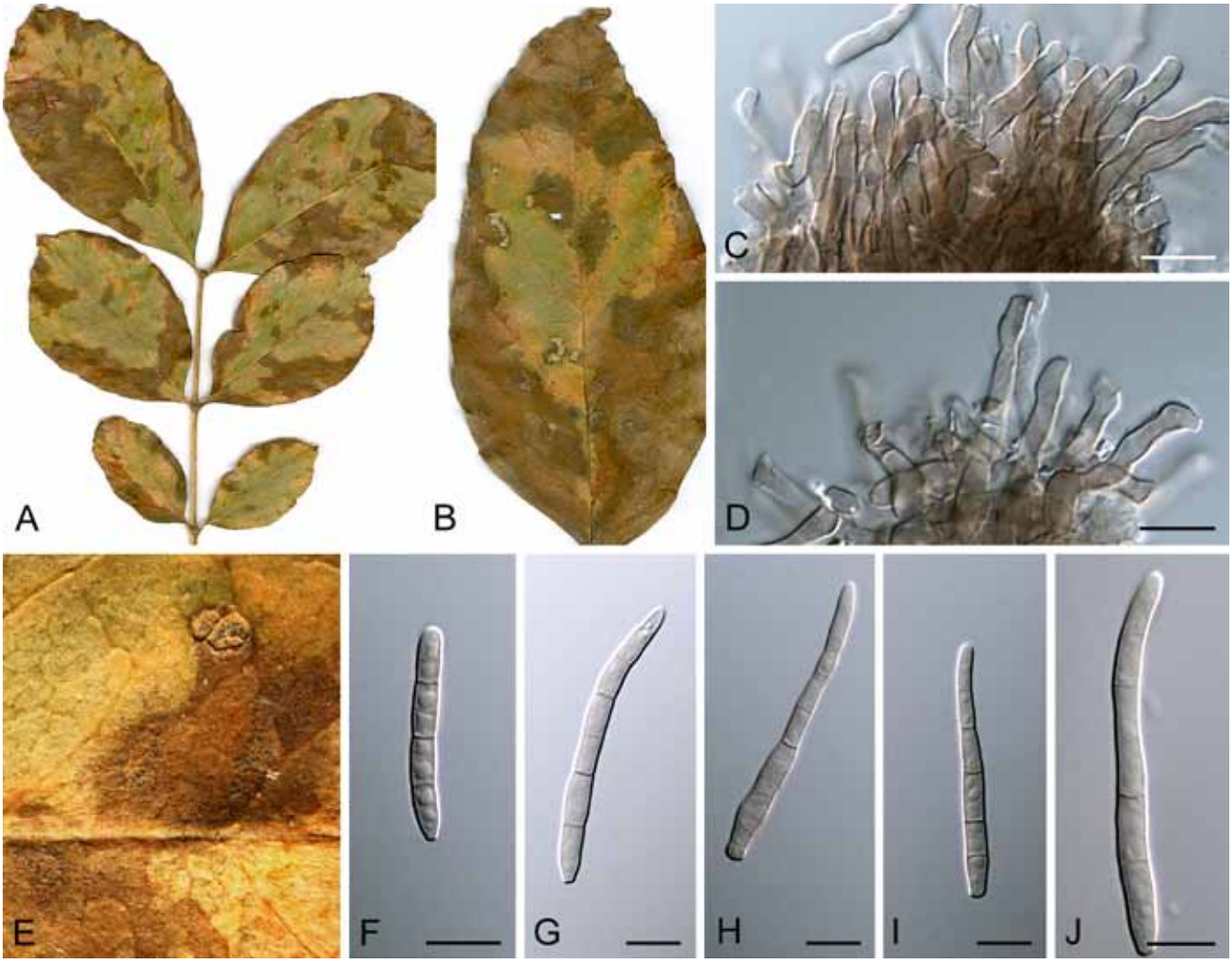

Fig. 43. *Pseudocercospora marginalis* (CPC 12497). A, B. Leaf spots on upper and lower leaf surface. C, D. Fascicles with conidiophores and conidiogenous cells. E. Close-up of leaf spot with fruiting. F–J. Conidia. Scale bars = 10 µm.

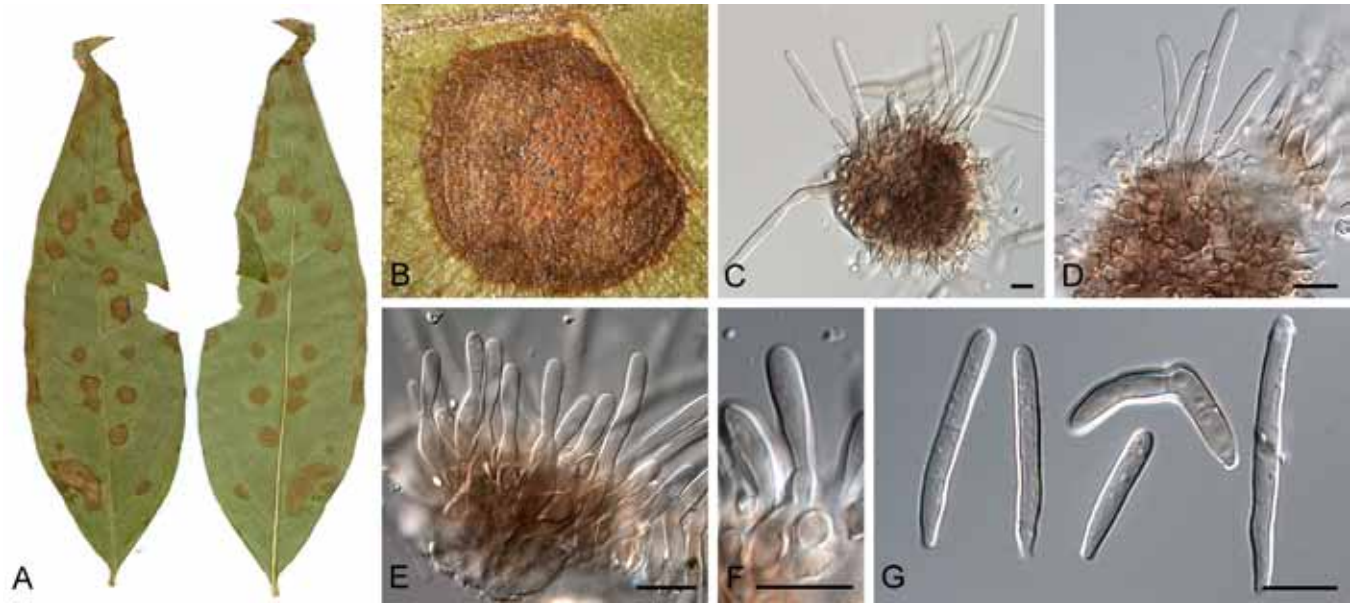

Fig. 44. *Pseudocercospora fraxinites* (CPC 10743–10745). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores and conidiogenous cells. F. Conidiogenous cells. G. Conidia. Scale bars = 10 µm.

Leaf spots amphigenous, subcircular, circular or somewhat irregular, 2–10 mm diam, greyish green, dull grey to dark brown, border indistinct, at times raised. *Mycelium* internal, pale brown, consisting of septate, branched, smooth, 2–3 µm diam hyphae. *Caespituli* fasciculate to sporodochial, brown, predominantly hypophyllous, up to 90 µm diam and 70 µm high. *Conidiophores* aggregated in mostly

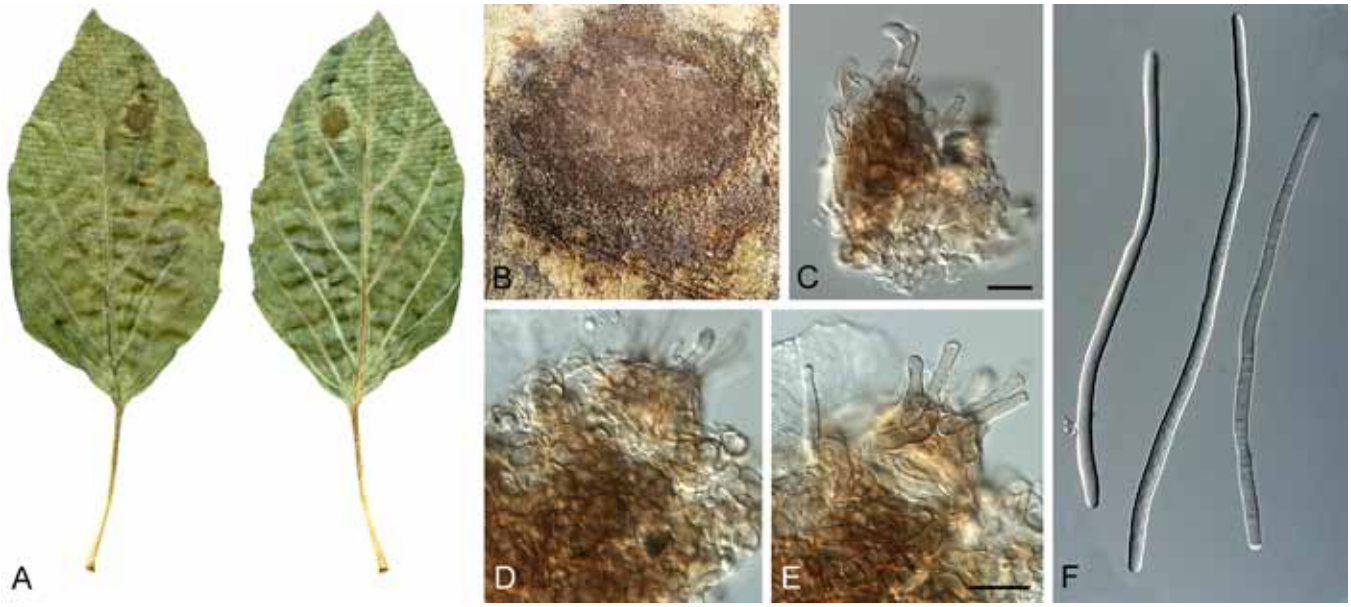

Fig. 45. *Pseudocercospora ocimi-basilici* (CPC 10283–10285). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores and conidiogenous cells. F. Conidia. Scale bars = 10 µm.

dense, small to large, sometimes almost sporodochial fascicles, emerging through stomata or erumpent through the cuticle, arising from the upper cells of a brown, substomatal to mostly intraepidermal stroma, 10–80 µm; conidiophores pale to medium brown or olivaceous-brown, smooth, thin-walled, 0–2-septate, subcylindrical or attenuated towards the tip, straight to moderately geniculate-sinuous, unbranched or branched above, 5–35 × 2–5 µm. *Conidiogenous cells* integrated, terminal or conidiophores reduced to conidiogenous cells, pale olivaceous-brown, smooth, tapering to flat-tipped apical loci, 1–2 µm wide, proliferating sympodially, 5–20 × 2–4 µm. *Conidia* solitary, subhyaline to pale olivaceous-brown, smooth, guttulate, shape and size variable, small conidia short obclavate-cylindrical to fusiform, longer conidia narrowly obclavate-filiform, sometimes acicular, apex subacute to subobtuse, base short to long obconically truncate to truncate in acicular conidia, straight to curved, 3–12-septate, (25–)30–120(–130) × (2–)2.5–5(–5.5) µm; hila unthickened, neither darkened nor refractive, 1.5–2.5 µm diam.

Specimens examined: **Fiji** (intercepted at the Auckland International Airport, on basil foliage imported from Fiji), on *Ocimum basilicum,* 24 Feb. 2002, C.F. Hill 529, HAL. **Mexico**, on *O. basilicum,* Dec. 2001, without collector (cultured as MEP 1515), BPI 841445; (intercepted at Los Angeles), 2 Nov. 2002, L.C. Lastra 1395 A, BPI 747831; 6 Dec. 2002, M.E. Palm, **holotype** CBS H-20877, culture ex-type CPC 10283–10285 (unfortunately no longer viable). **New Zealand**, Auckland, Botanical Garden, on *O. basilicum,* 9 Mar. 2002, C.F. Hill 546, HAL. **Vanuatu**, Efate, Vanuatu Tropical Products, on *O. basilicum,* 25 Oct. 1996, E. McKenzie, PDD 66438; Rainbow Garden, on *O. basilicum,* 22 Oct. 1996, E. McKenzie, PDD 66537.

Notes: Braun *et al*. (2003b) examined *Pseudocercospora* collections on *Ocimum basilicum* from Fiji, New Zealand, and Vanuatu and identified those collections as *P. ocimicola*, in spite of some morphological differences observed. *Pseudocercospora ocimicola* differs from collections on *Ocimum basilicum,* herein described as *P. ocimi-basilici*, in having shorter conidia (about 25–80 µm long), conidiophores in small, loose fascicles as well as solitary conidiophores arising from superficial hyphae, and lacking or almost lacking stromata.

The description of *Cercospora ocimicola* provided by Chupp (1954) covers type material of this species as well as material on *O. basilicum*. Based on type material and additional collections, *C. ocimicola* is redescribed as *P. ocimicola* in the current study (see below).

Pseudocercospora ocimicola (Petr. & Cif.) Deighton, Mycol. Pap. 140: 149. 1976.

Basionym: *Cercospora ocimicola* Petr. & Cif., Ann. Mycol. 30: 324. 1932.

= *C. hyptidicola* ("*hypticola*") Chupp & A.S. Mull., Bol. Soc. Venez. Ci. Nat. 8: 47. 1942. *nom. inval.*

Leaf spots lacking or almost so to indistinct or angular-irregular, yellowish ochraceous, olivaceous to brownish, centre finally sometimes paler, dingy greyish brown to grey, 1–10 mm diam., margin indefinite. *Mycelium* internal and external, superficial, hyphae emerging through stomata, sparingly branched, septate, subhyaline to olivaceous-brown, 1–3 µm wide, thin-walled, smooth. *Stromata* lacking or small, mostly substomatal, occasionally intraepidermal, 10–30 µm diam. *Caespituli* amphigenous, usually not very conspicuous, olivaceous-brown, finely punctiform to subeffuse. *Conidiophores* in small, loose to moderately large and denser fascicles, arising from stromata or internal hyphae, through stomata or erumpent through the cuticle, or conidiophores solitary, arising from superficial hyphae, lateral or occasionally terminal, straight and subcylindrical to conical or usually geniculate-sinuous, unbranched or occasionally branched, pale olivaceous to olivaceous-brown, 0–3-septate, thin-walled, smooth, 5–50 × (2–)3–5 µm. *Conidiogenous cells* integrated, terminal or conidiophores reduced to conidiogenous cells, 5–20 × 2–4 µm, proliferating sympodially, with a single or several inconspicus to flat-tipped conidiogenous loci, 1–2 µm wide. *Conidia* solitary, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth, obclavate-subcylindrical, apex obtuse to subacute, base truncate to obconically truncate, 1–8-septate, (15–)25–75(–85) × 2–4 µm, hila unthickened, neither darkened nor refractive, 1–2 µm diam.

Specimens examined: **Brazil**, State of Ceará, Pentecoste County, on *Ocimum* sp., 2 Mar. 2001, F. Freire, HAL; State of Ceará, Cascavel County, Preaoca, on *Marsypianthes chamaedrys*; 12 June 1999, F. Freire, HAL. **Cuba**, Habana, Santiago de las Vegas, on *Ocimum gratissimum*, 6 Sep. 1988, R.F. Castañeda [C88/316], HAL; Habana, Santiago de las Vegas, on *O. sanctum*, 28 Dec. 1987, R.F. Castañeda [C87/382], HAL. **Dominican Republic**, Santiago, Valle del Cibao, Prov. Santiago, Hato

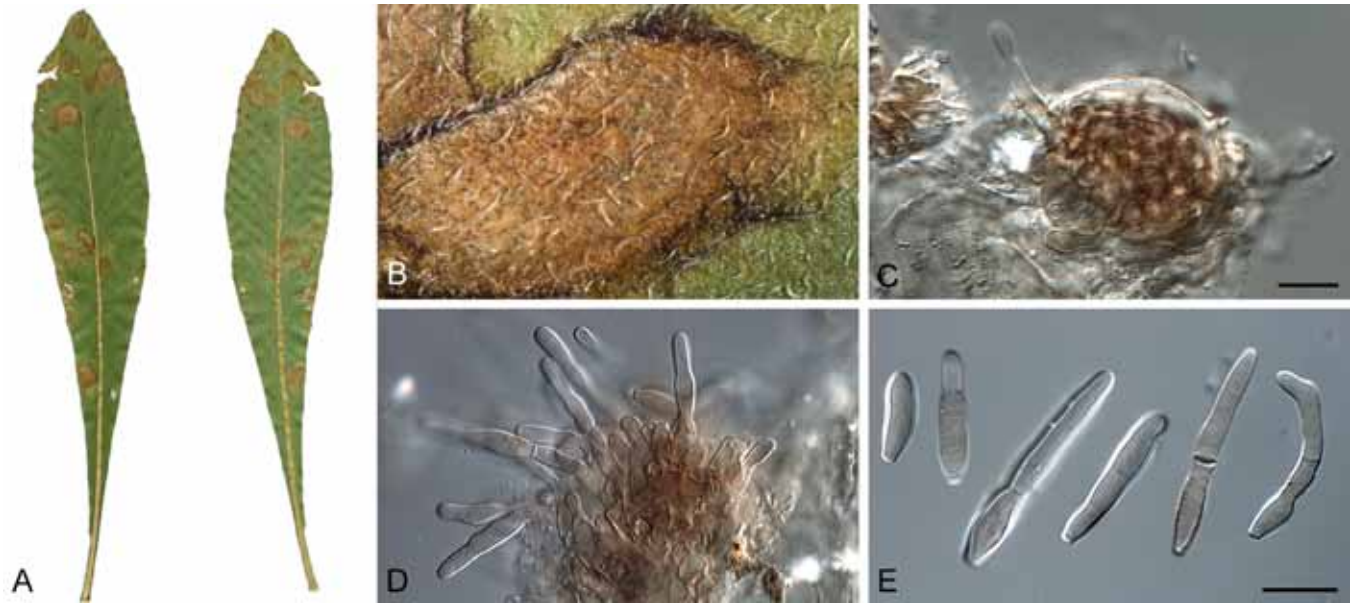

Fig. 46. *Pseudocercospora oenotherae* (CPC 10290, 10041). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidia. Scale bars = 10 µm.

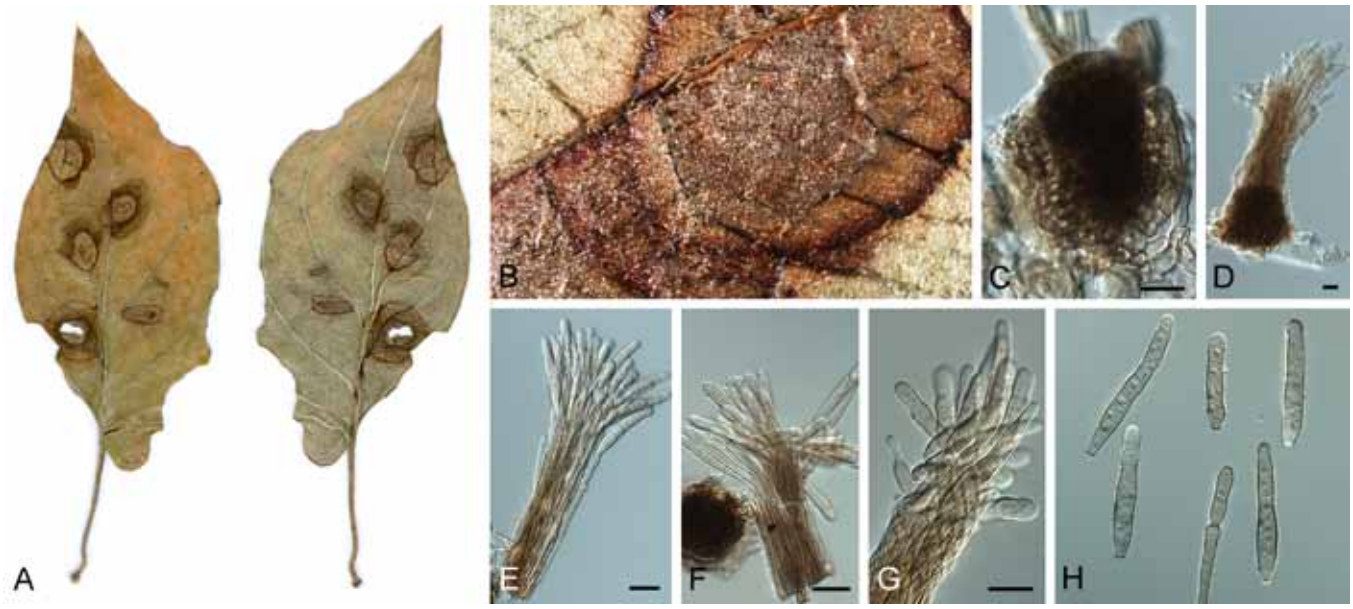

Fig. 47. *Pseudocercospora paederiae* (CPC 10007). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C. Broken base of detached fascicle. D–G. Synnematal fascicles with conidiophores and conidiogenous cells. H. Conidia. Scale bars = 10 µm.

del Yonque, on *O. campechianum* (= *O. micranthum*), 26 Nov. 1930, E.L. Ekman, Cif., Mycofl. Doming. Exs. 359, **lectotype designated here** BPI 845245 and isolectotype BPI 438987. **India**, Midnapur, Daspur, on *O. sanctum*, 3 Dec. 1967, M. Mandal, BPI 438988. **Venezuela**, Les Tincheras, Edo Carabobo, on *Hyptis* sp., 24 Feb. 1940, M.F. Barrus & A.S. Muller, type of *Cercospora hyptidicola*, CUP-VZ 3863; La Cuchilla, Río Claro, Lara, on *Hyptis suaveolens*, June 2007, R. Urtiaga, HAL.

Notes: Chupp (1954) reduced *C. hyptidicola*, described from Venezuela on *Hyptis* sp., to synonymy with *C. lycopodis*, and Crous & Braun (2003) followed this treatment. Braun & Urtiaga (2008) examined type material of this species and an additional new collection from Venezuela and considered *C. hyptidicola* a synonym of *C. ocimicola* since the two species are morphologically indistinguishable. Both also occur on two closely related plants, *Hyptis* and *Ocimum*, in the *Lamiaceae* subfam. *Ocimoideae*. *Pseudocercospora* collections on *Marsypianthes* (subfam. *Ocimoideae*) in Brazil, is morphologically also indistinguishable from collections on *Ocimum* spp. and was assigned to *P. ocimicola* by Braun & Freire (2002).

Pseudocercospora oenotherae (Ellis & Everh.) Y.L. Guo & X.J. Liu, Acta Mycol. Sin. 11: 297. 1992. Fig. 46.

Basionym: *Cercospora oenotherae* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 46: 380. 1894.

Specimens examined: **South Korea**, Seoul, *Oenothera odorata*, 6 Sep. 2003, H.D. Shin, KUS-F 19606, CPC 10630 = CBS 131920; *O. odorata*, 2 Oct. 2002, H.D. Shin, CBS H-20878, cultures CPC 10290 = CBS 131885, CPC 10041.

Pseudocercospora paederiae Goh & W.H. Hsieh, *Cercospora* and similar fungi from Taiwan: 291. 1990. Fig. 47.

Leaf spots amphigenous, irregular to subcircular, 3–7 mm diam, pale brown in centre, with raised, dark brown border, at times with concentric zones delimited by dark borders. *Mycelium* internal, occasionally in addition with a few external hyphae

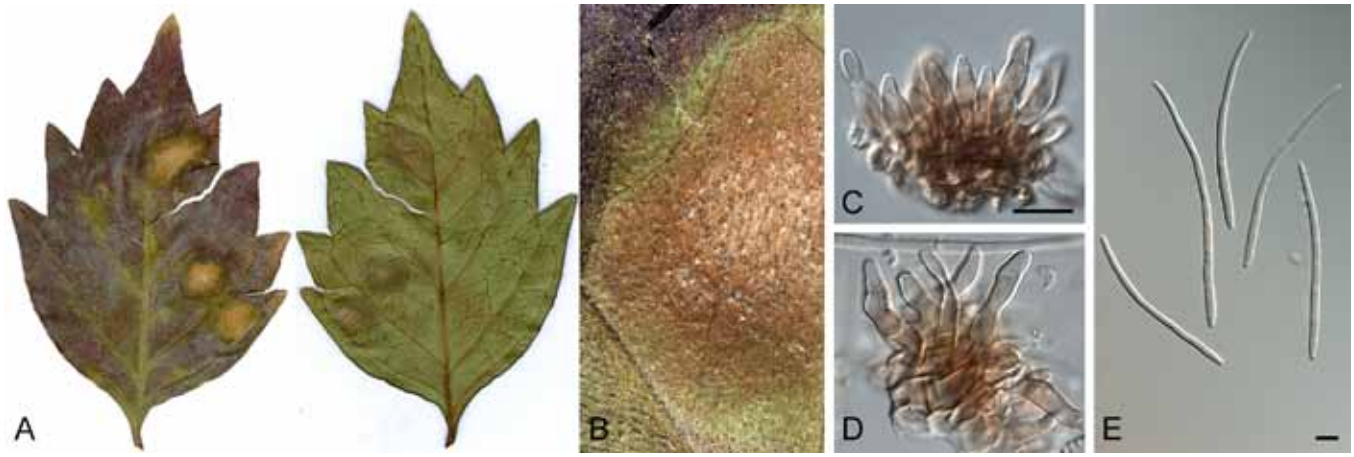

Fig. 48. *Pseudocercospora pallida* (CPC 10776–10778). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidia. Scale bars = 10 µm.

emerging through stomata, pale to medium brown, consisting of septate, branched, smooth to finely verruculose, 3–4 µm diam hyphae. *Caespituli* predominantly hypophyllous, synnematous, dark brown on leaves, 25–50 µm wide and 100–200 µm high. *Conidiophores* aggregated in dense synnemata arising from the upper cells of a brown substomatal stroma 20–40 µm diam; individual conidiophores subhyaline to olivaceous-brown, smooth, multiseptate, subcylindrical-filiform, straight to gently curved, unbranched, 80–200 × 3–5 µm. *Conidiogenous cells* terminal, unbranched, brown, subcylindrical to clavate, smooth, tapering to flat-tipped apical loci, neither thickened nor darkened, proliferating sympodially, or rarely percurrently near apex, 20–35 × 2–5 µm. *Conidia* solitary, subhyaline, greenish yellow to pale brown, smooth to finely verruculose, guttulate, obclavate, short conidia sometimes cylindrical or fusiform, apex obtuse to subobtuse, base obconically truncate, straight to curved, 1–10-septate, (20–)40–60(–70) × 3–7 µm; hila not thickened nor darkened or refractive, 1–2 µm diam.

Specimen examined: **South Korea**, Pocheon, National Arboretum, *Paederia foetida* (= *P. scandens*), 23 Oct. 2002, H.D. Shin, CBS H-20879, culture CPC 10007 (unfortunately no longer viable).

Notes: A brown leaf spot on *P. scandens* was reported from the Keryong Mountain in Chungnam district, South Korea, including the southern districts, Chonnam, Kyeongnam, and Jeju Island by Lee *et al.* (2001). The associated fungus was identified as *Pseudocercospora paederiae*. Characteristics of the Korean material are consistent with the original description of *P. paederiae* (from Taiwan), except for longer conidiophores and shorter conidia that are up to 10-septate. All characterstics overlap, and the Korean collections are tentatively assigned to *P. paederiae*. New collections from Taiwan, together with cultures and sequence data are necessary to reassess *Pseudocercospora* on *Paederia scandens* in Asia.

Pseudocercospora pallida (Ellis & Everh.) H.D. Shin & U. Braun, Mycotaxon 74: 114. 2000. Fig. 48.

Basionym: *Cercospora pallida* Ellis & Everh., J. Mycol. 3: 21. 1887.

≡ *Cercospora langloisii* Sacc., Syll. Fung. 10: 647. 1892 (*nom. superfl.*).
= *Cercospora duplicata* Ellis & Everh., J. Mycol. 5: 70. 1889.
= *Cercospora capreolata* Ellis & Everh., J. Mycol. 8: 70. 1902.

Specimen examined: **South Korea**, Suwon, on *Campsis grandiflora,* 14 Oct. 2003, H.D. Shin, KUS-F 19888, CBS H-20880, CPC 10776 = CBS 131889.

Pseudocercospora paraguayensis (Kobayashi) Crous, Mycotaxon 57: 270. 1996.

Basionym: *Cercospora paraguayensis* Kobayashi, Trans. Mycol. Soc. Japan 25: 263. 1984.

Specimen examined: **Brazil**, São Paulo, Susano clonal orchard, leaves of *Eucalyptus nitens*, Jun. 1996, P.W. Crous, CPC 1458 = CBS 111317.

Pseudocercospora pini-densiflorae (Hori & Nambu) Deighton, Trans. Brit. Mycol. Soc. 88: 390. 1987.

Basionym: *Cercospora pini-densiflorae* Hori & Nambu, J. Pl. Protect. (Tokyo) 4: 353. 1917.

≡ *Cercoseptoria pini-densiflorae* (Hori & Nambu) Deighton, Mycol. Pap. 140: 167. 1976.

Teleomorph: "*Mycosphaerella" gibsonii* H.C. Evans, Mycol. Pap. 153: 61. 1984.

Specimens examined: **Japan**, C-511, NIAES herbarium; Shizuoka, Kanaya, on *P. densiflora*, 6 Mar. 1976, K. Kasai, TFM: FPH-4544; Kumamoto, isolated from *P. thunbergii,* 24 April 1964, Y. Tokushige, MUCC 534.

Pseudocercospora plectranthi G.C. Hunter, Crous, U. Braun & H.D. Shin, **sp. nov.** MycoBank MB564839. Fig. 49.

Etymology: Name derived from the host genus *Plectranthus,* from which it was collected.

Leaf spots distinct, scattered over leaf surface and along leaf border, amphigenous, subcircular to irregular, 2–12 mm diam, brown to pale brown. *Mycelium* internal and external, pale brown to hyaline, branched, smooth, 1.5–4 mm diam. *Caespituli* amphigenous, predominantly epiphyllous, black, distributed evenly over the leaf spot, punctiform. *Stromata* almost absent, weakly developed, subimmersed, globular, olivaceous-brown, 20–70 µm diam. *Conidiophores* fasciculate, brown to pale brown, straight to curved, smooth, unbranched, apex rounded to truncate, 0–2-septate, (18–)22–35(–45) × (3–)4(–5) µm. *Conidiogenous cells* integrated, terminal, unbranched, brown to pale brown, smooth, proliferating sympodially, (9–)14–21(–25) × (2–)3–4(–5) µm. *Conidia* solitary, pale brown to subhyaline, guttulate, 2–10-septate, slightly constricted at septa, filiform, apex obtuse to subobtuse, base obconic to long obconic, (41–)62–98(–112) × (3–)4(–5) µm, hila unthickened, not darkened.

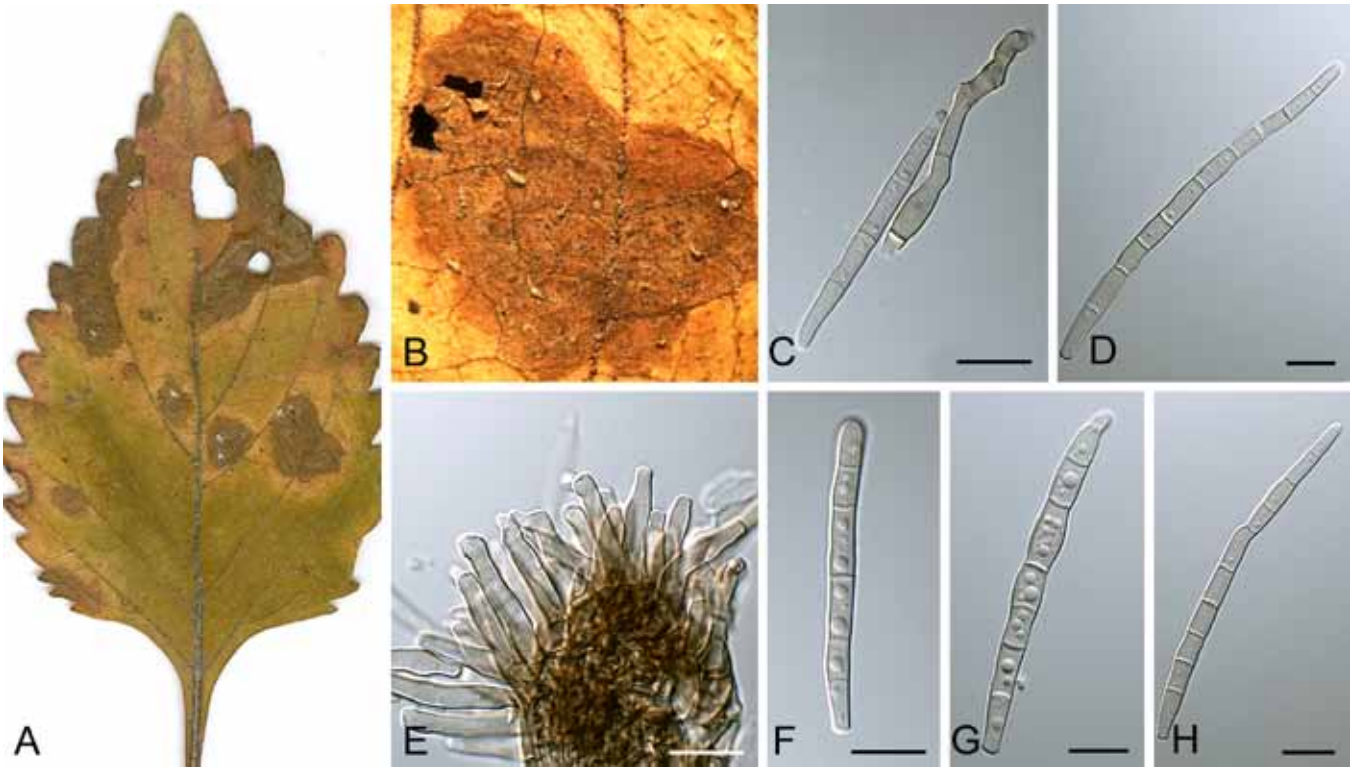

Fig. 49. *Pseudocercospora plectranthi* (CPC 11462). A. Leaf spots on lower leaf surface. B. Close-up of leaf spot with fruiting. E. Fascicle with conidiophores and conidiogenous cells. C, D, F–H. Conidia. Scale bars = 10 µm.

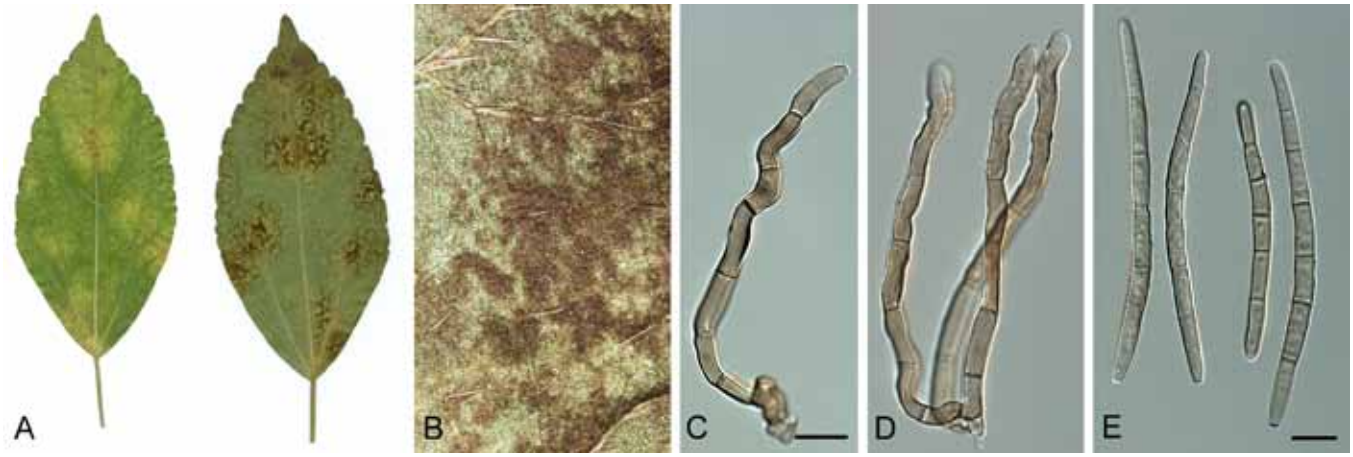

Fig. 50. *Pseudocercospora profusa* (CPC 10055). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Conidiophores and conidiogenous cells. E. Conidia. Scale bars = 10 µm.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; erumpent, spreading, with moderate aerial mycelium, and smooth, lobate margins. Surface pale olivaceous-grey; reverse iron-grey. Colonies reaching 8 mm diam.

Specimen examined: **South Korea**, Jeonju, on leaves of *Plectranthus* sp., 1 July 2004, H.D. Shin, **holotype** CBS H-20396, cultures ex-type CPC 11462 = CBS 131586, CPC 11463.

Notes: No species of *Pseudocercospora* are presently known from *Plectranthus* and allied genera, and as *P. plectranthi* does not correspond to any sequences available in GenBank at present, it is described as a new species. Numerous *Pseudocercospora* species have been described from hosts in the *Lamiaceae*, *e.g. P. anisomelicola*, *P. colebrookiae*, *P. colebrookiicola*, *P. lamiacearum*, *P. leucadis*, *P. lycopodis*, *P. ocimicola*, *P. perillulae*, *P. pogostemonis*, *P. salvia*, and *P. scutellariae*, but all of them are morphologically easily distinguishable from *P. plectranthi* by having different conidial shapes (mostly obclavate-cylindrical), smaller or no stromata or abundant superficial mycelium with solitary conidiophores. *Pseudocercospora salvia* has filiform conidia similar to those of *P. plectranthi* but in the former they are narrower (Hsieh & Goh 1990) and conidiophores are not fasciculate.

Pseudocercospora profusa (Syd. & P. Syd.) Deighton, Trans. Brit. Mycol. Soc. 88: 388. 1987. Fig. 50.

Basionym: *Cercospora profusa* Syd. & P. Syd., Ann. Mycol. 7(2): 175. 1909.

≡ *Cercosporiopsis profusa* (Syd. & P. Syd.) Miura, in: M. Miura, Flora of Manchuria and East Mongolia. Part III. Cryptogams, fungi 3: 530. 1928.

Specimens examined: **South Korea**, Seoul, *Acalypha australis,* 17 Sep. 2003, H.D. Shin, CBS H-20882, culture CPC 10713–10715; Wonju, *A. australis,* 18 Oct. 2002, H.D. Shin, CBS H-20881, culture CPC 10055.

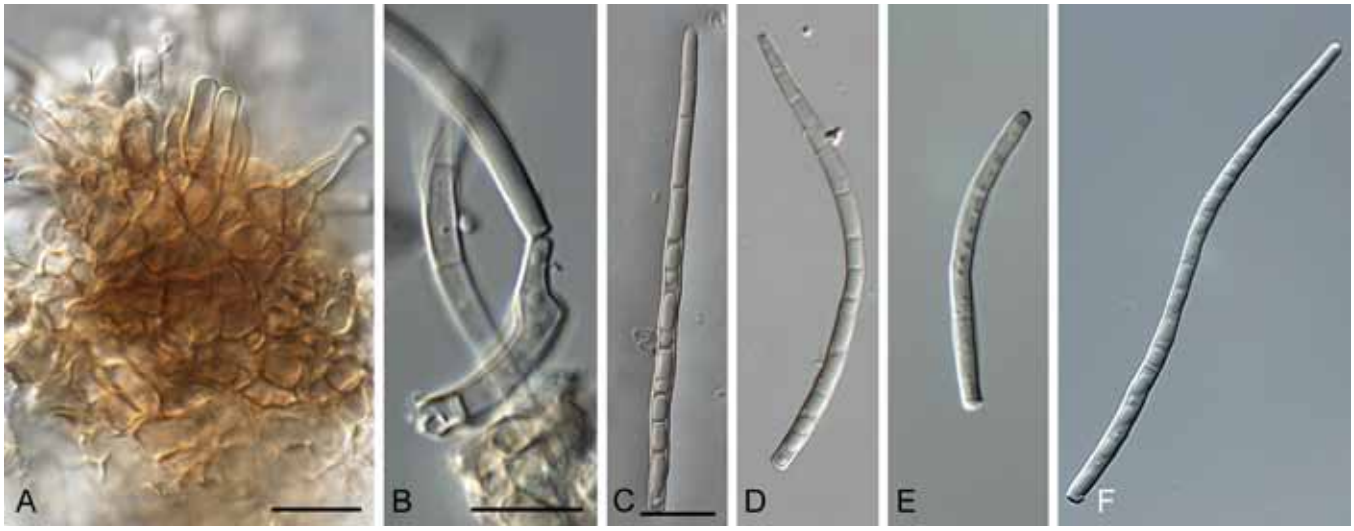

Fig. 51. *Pseudocercospora proteae* (CPC 15217). A. Fascicle with conidiophores and conidiogenous cells. B. Conidiogenous cell giving rise to a conidium. C–F. Conidia. Scale bars = 10 µm.

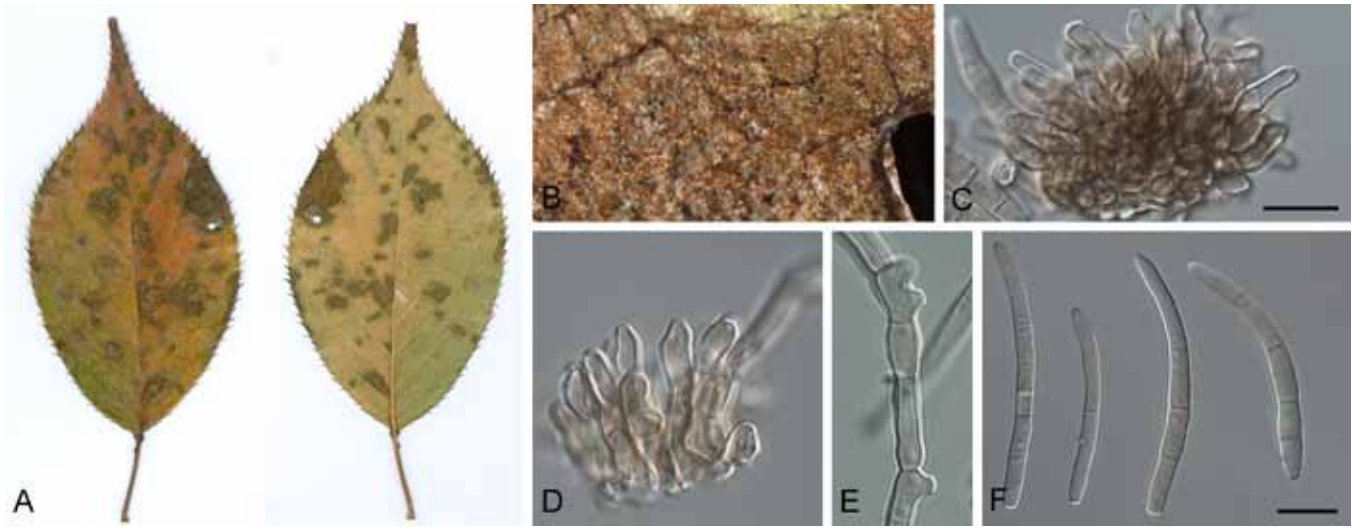

Fig. 52. *Pseudocercospora prunicola* (CPC 14511). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores with conidiogenous cells. E. Hypha with conidiogenous loci. F. Conidia. Scale bars = 10 µm.

Pseudocercospora proteae Crous, **sp. nov.** MycoBank MB564840. Fig. 51.

Etymology: Name derived from *Protea*, the host genus from which it was collected.

Leaf spots absent, with sporulation on adaxial leaf surface, prominent among leaf hairs. *Mycelium* internal and external, pale brown, consisting of septate, branched, smooth, 1.5–2 µm diam hyphae. *Caespituli* fasciculate, brown, hypophyllous, up to 120 µm diam and 40 µm high. *Conidiophores* aggregated in dense fascicles, arising from the upper cells of a brown stroma, up to 100 µm diam and 20 µm high; conidiophores pale brown to brown, smooth, 0–2-septate, subcylindrical to somewhat doliiform at base, straight to geniculate-sinuous, unbranched or branched above, 15–40 × 3–6 µm. *Conidiogenous cells* terminal, unbranched, pale brown to brown, smooth, proliferating sympodially near apex, with flat-tipped loci, 10–15 × 2.5–5 µm. *Conidia* solitary, pale brown, smooth, guttulate, subcylindrical, straight to curved, apex obtuse, base truncate, (3–)8–12-septate, (35–)70–85(–100) × 3(–3.5) µm; hila unthickened, neither darkened nor refractive, 2.5–3 µm diam.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; erumpent, spreading, with sparse aerial mycelium, and smooth, even margins. Surface olivaceous-grey; reverse iron-grey. Colonies reaching 10 mm diam.

Specimen examined: **South Africa**, Western Cape Province, Stellenbosch, Assegaaibos, on leaves of *Protea mundii,* 16 Apr. 2008, F. Roets, **holotype** CBS H-20883, culture ex-type CPC 15216 = CBS 131587, CPC 15218, 15217.

Notes: The long, multi-septate, subcylindrical conidia of *P. proteae* are distinct from those of *P. stromatosa* (25–40 × 2.5–3 µm), and from the shorter, verruculose conidia of *P. protearum* (Taylor & Crous 2000, Crous *et al*. 2004a).

Pseudocercospora prunicola (Ellis & Everh.) U. Braun, in: Braun & Mel'nik, Trudy Bot. Inst. Im. V.L. Komarova 20: 82. 1997. Fig. 52.

Basionym: *Cercospora prunicola* Ellis & Everh., J. Mycol. 3: 17. 1887.

≡ *Cercoseptoria prunicola* (Ellis & Everh.) J.M. Yen, Bull. Trimest. Soc. Mycol. France 97: 92. 1981.

= *Cercospora pruni-yedoensis* Sawada, Rep. Gov. Agric. Res. Inst. Taiwan 85: 120. 1943, *nom. inval.*

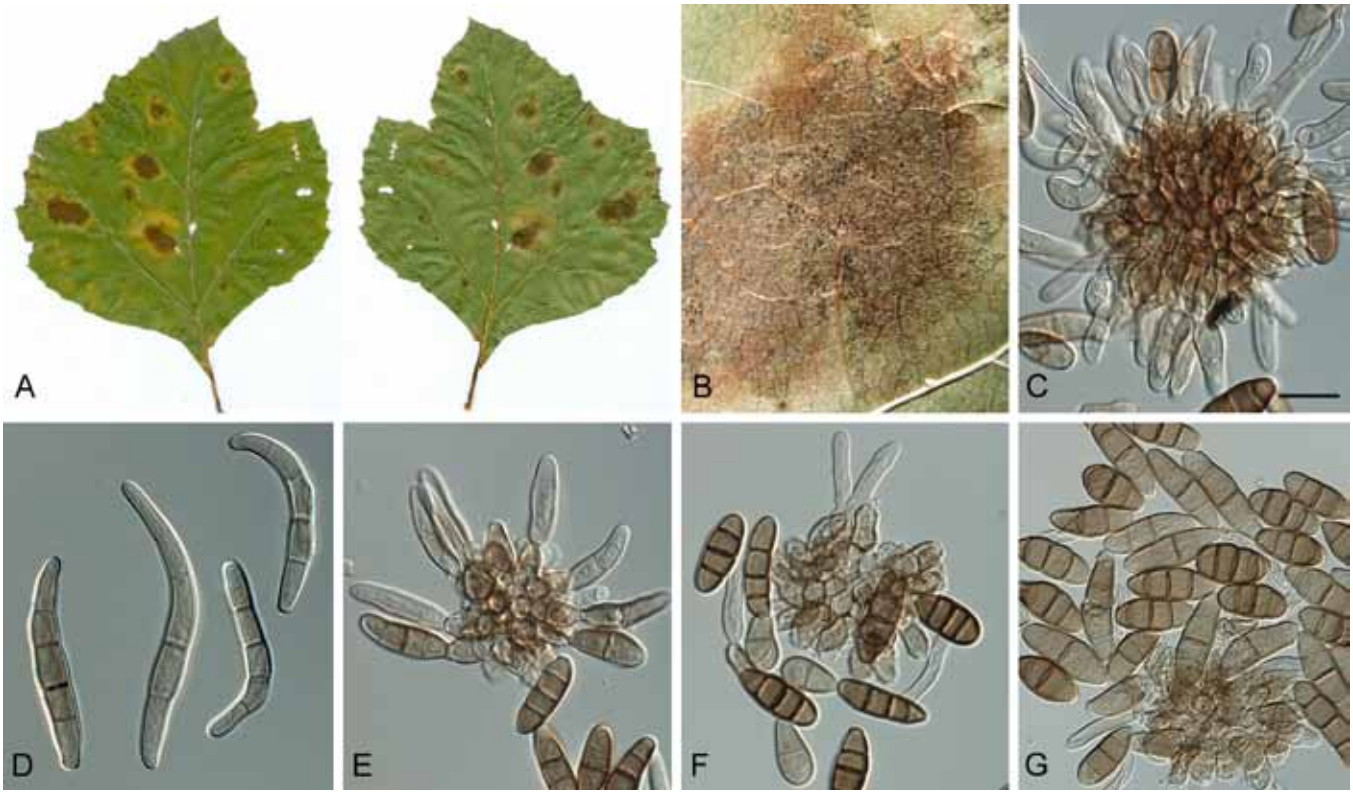

Fig. 53. *Pseudocercospora pseudostigmina-platani* (CPC 11726). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, E, F. Fascicles with conidiophores and conidiogenous cells, giving rise to dimorphic conidia. D. *Pseudocercospora* conidia. G. Conidia of *Stigmina*-like synanamorph. Scale bars = 10 µm.

≡ *Pseudocercospora pruni-yedoensis* Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar genera from Taiwan: 282. 1990.

= *Cercospora pruni-persicae* J.M. Yen, Bull. Trimest. Soc. Mycol. France 94: 61. 1978 and Rev. Mycol. 42: 59. 1978.

≡ *Cercoseptoria pruni-persicae* (J.M. Yen) J. M. Yen, Bull. Trimest. Soc. Mycol. France 97: 92. 1981.

Misapplied name: *Pseudocercospora circumscissa* (Sacc.) Y.L. Guo & X.J. Liu, Mycosystema 2: 231. 1989.

Descriptions: Hsieh & Goh (1990: 282–283, as *Pseudocercospora pruni-yedoensis*), Braun & Mel'nik (1997: 82–83).

Illustrations: Hsieh & Goh (1990: 283, fig. 216, as *Pseudocercospora pruni-yedoensis*), Braun & Mel'nik (1997: 121, fig. 48).

Specimens examined: **South Korea**, Suwon, on *Prunus yedoensis* (≡ *Cerasus yedoensis*), 2 Oct. 2007, H.D. Shin, CBS H-20860, CPC 14511 = CBS 132107. **Taiwan**, Taipei, on *Prunus yedoensis*, 30 Nov. 1930, K. Sawada, holotype of *Pseudocercospora pruni-yedoensis*, NTU-PPE. **USA**, Louisiana, Point a la Hache, Langlois 542, holotype of *Cercospora prunicola*, NY (also Ellis & Everh., North American Fungi 1771, NY, isotype).

Notes: Braun & Mel'nik (1997) discussed the intricate taxonomy of *Passalora* and *Pseudocercospora* on species of *Prunus s. lat*. in detail and demonstrated, based on type material and other collections, that two distinct species are involved. *Cercospora circumscissa* is a true *Passalora* with somewhat thickened and darkened conidiogenous loci and hila. Its placement in *Passalora s. str.* has recently been confirmed based on molecular data (unpubl.). Superficial mycelium with solitary conidiophores is lacking, and the conidia are mostly somewhat rough-walled. *Passalora circumscissa* is also known from Asia, e.g. China, Iran and Japan. Some Chinese collections deposited at HMAS have been examined and proved to be true *Passalora circumscissa* (e.g. on *Prunus mandshurica* ° *Armeniaca mandshurica*, Yanji, Jilin, HMAS 55845). Other collections belong to *Pseudocercospora prunicola* (e.g. on *Prunus yedoensis*, Nanjing, Jiangsu, HMAS 06632, and Changshan, Hunan, HMAS 55847). The Chinese authors misapplied the name *Pseudocercospora circumscissa*. The published descriptions of "*Pseudocercospora circumscissa*" in Guo & Hsieh (1995) and Guo & Liu (1998) cover both species, namely *Passalora circumscissa* as well as *Pseudocercospora prunicola*, but the illustrations seem to be based on material of the true *Pseudocercospora* on *Prunus*. *Pseudocercospora prunicola* is morphologically easily distinguishable from *Passalora circumscissa* by its inconspicuous, unthickened, not darkened conidiogenous loci and hila, well-developed superficial hyphae with solitary conidiophores and smooth conidia. The position of *P. prunicola* within the *Pseudocercospora* clade has been confirmed on the basis of sequence data retrieved from the present Korean culture.

Pseudocercospora pseudostigmina-platani Crous, U. Braun & H.D. Shin, **sp. nov.** MycoBank MB564841. Fig. 53.

Etymology: Name reflects its morphological similarity to the *Pseudocercospora* anamorph of *Mycosphaerella stigmina-platani*.

Leaf spots amphigenous, irregular to subcircular, 5–10 mm diam, medium brown with a wide chlorotic margin. *Mycelium* predominantly internal, pale brown, consisting of septate, branched, smooth, 2–3 µm diam hyphae. *Caespituli* fasciculate to sporodochial, brown, predominantly hypophyllous, up to 60 µm diam and 30 µm high. *Conidiophores* aggregated in loose to dense fascicles, arising from the upper cells of a brown stroma, up to 50 µm diam and 20 µm high; conidiophores brown, verruculose, 0–1-septate, subcylindrical to somewhat doliiform, straight to slightly curved, unbranched, 10–20 × 7–10 µm. *Conidiogenous cells* terminal, unbranched, brown, verruculose, proliferating percurrently near apex, with 1–4 irregular

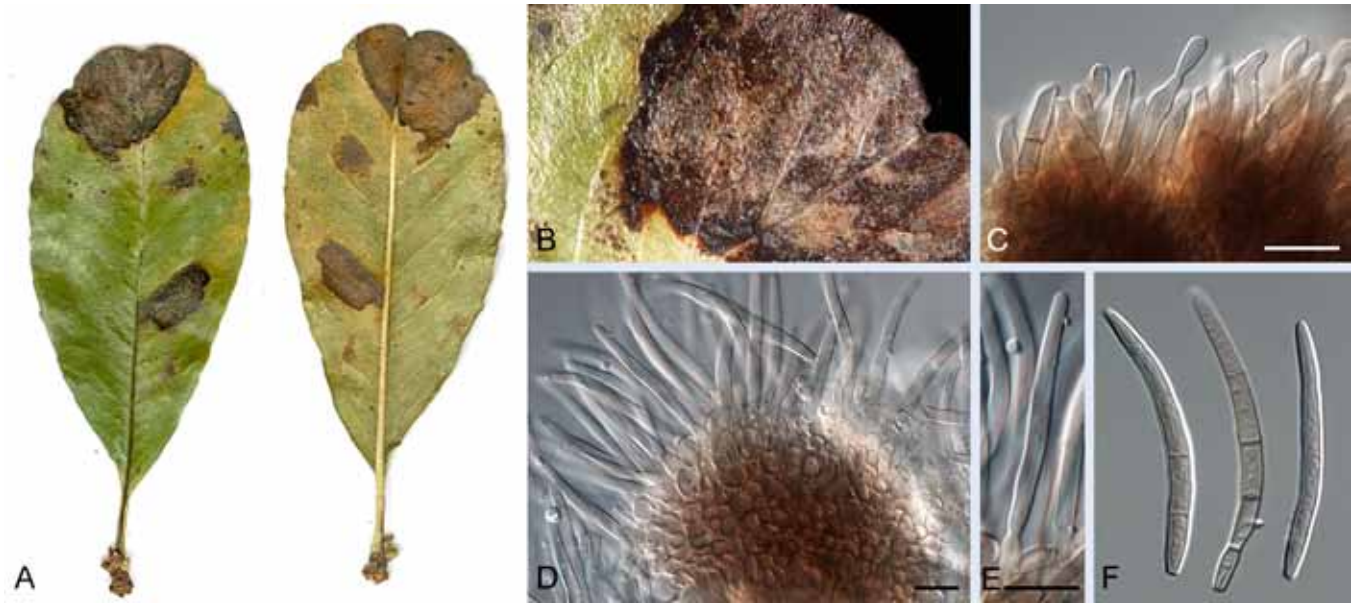

Fig. 54. *Pseudocercospora pyracanthigena* (CPC 10808). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidiogenous cell giving rise to a conidium. F. Conidia. Scale bars = 10 µm.

proliferations, 8–20 × 5–8 µm. *Conidia* dimorphic: *Cercostigmina*-like conidia fusoid-ellipsoidal to obclavate, straight to curved, apex obtuse, base obconically subtruncate, brown, verruculose, 3–5-septate, at times constricted at septa, (28–)30–35(–38) × (5–)7–8(–9) µm; *Stigmina*-like conidia broadly ellipsoid, straight to curved, apex obtuse, base obconically subtruncate, brown, verruculose, 3-septate, at times constricted at septa, which can also be darkened, and wall can appear thick though not distoseptate *sensu stricto*, (17–)21–25(–28) × (9–)10–12 µm; hila unthickened, neither darkened nor refractive, 3–3.5 µm diam.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; surface folded, erumpent, spreading, with sparse aerial mycelium, and smooth, lobate margins. Surface pale olivaceous-grey, with thin, olivaceous-grey margin; reverse iron-grey. Colonies reaching 7 mm diam.

Specimen examined: **South Korea**, Suwon, on leaves of *Platanus occidentalis,* 7 Nov. 2007, H.D. Shin, **holotype** CBS H-20884, culture ex-type CPC 11726 = CBS 131588.

Notes: *Pseudocercospora pseudostigmina-platani* resembles the *Pseudocercospora/Stigmina* synanamorphs of *Mycosphaerella stigmina-platani* on *Platanus* in the USA, although its conidia are larger in size. The *Stigmina*-like anamorph has conidia that are 3–6-septate, (15–)23–30(–45) × (6–)8–9(–10) µm, and the *Pseudocercospora* conidia are 3–7-septate, (35–)45–60(–100) × (4–)4.5–6(–6.5) µm (Crous & Corlett 1998). Based on DNA sequence comparisons, the genus *Stigmina* was treated as synonym of *Pseudocercospora* (Crous *et al.* 2006). The two species occurring on *Platanus* both with *Pseudocercospora/Stigmina* synanamorphs treated here, further support this synonymy.

Pseudocercospora pyracanthae (Katsuki) C. Nakash. & Tak. Kobay., Ann. Phytopathol. Soc. Japan 63: 313. 1997.
Basionym: *Cercospora pyracanthae* Katsuki, Bull. Agric. Improv. Sect. Econ. Dept. Fukuoka Pref. 1: 19. 1949.

Specimens examined: **Japan**, Fukuoka, Kurume, on *Pyracantha angustifolia*, 6 Nov. 1947, S Katsuki, **holotype** TNS-F-243829; Chiba, Sanbu, October 1976, E. Ishizawa, TFM: FPH-4432; Okayama, Okayama, on *P. angustifolia*, 20 Nov. 1960, H. Tanaka, TFM: FPH-3247; *P. angustifolia,* T. Koboyashi & C. Nakashima, CNS-446, culture MUCC892; Ibaraki, on *P. angusti*, Nov. 1994, T. Nishijima, culture MAFF 237140; Kumamoto, on *P. crenulata*, 1973, T. Kobayashi, culture MAFF 410022.

Notes: DNA sequence data obtained for Japanese isolates of this species indicate at least two different taxa. Further research is required to select a specimen and isolate that is authentic for the name, while other collections probably represent a novel species.

Pseudocercospora pyracanthigena Crous, U. Braun & H.D. Shin, **sp. nov.** MycoBank MB564842. Fig. 54.

Etymology: Name derived from the host plant *Pyracantha*, from which it was collected.

Leaf spots amphigenous, irregular to angular, up to 7 mm diam, brown, with inconspicuous border. *Mycelium* internal, hyaline to pale brown, consisting of septate, branched, smooth, 2–3 µm diam hyphae. *Caespituli* fasciculate to sporodochial, amphigenous, but predominantly epiphyllous, olivaceous on leaves, up to 150 µm wide and 60 µm high. *Conidiophores* aggregated in dense fascicles arising from the upper cells of a brown stroma up to 120 µm wide and 35 µm high; conidiophores medium brown, smooth, 0–1-septate, subcylindrical to ampulliform, straight, unbranched, mostly reduced to conidiogenous cells, tapering to flat-tipped apical loci, proliferating sympodially or percurrently near apex, 7–15 × 2–3 µm. *Conidia* solitary, brown, smooth, guttulate, subcylindrical to narrowly obclavate, apex subobtuse, base obconically subtruncate to truncate, straight to gently curved, 1–4-septate, (30–)35–40(–45) × (2.5–)3(–3.5) µm; hila unthickened, neither darkened nor refractive, 1.5 µm wide.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; surface folded, erumpent, spreading, with sparse aerial mycelium, and smooth, lobate margins. Surface smoke-grey; reverse olivaceous-grey. Colonies reaching 15 mm diam.

Specimen examined: **South Korea**, Jeju, Halla arboretum, on leaves of *Pyracantha angustifolia,* 1 Nov. 2007, M.J. Park, **holotype** CBS H-20885, culture ex-type CPC 10808 = CBS 131589.

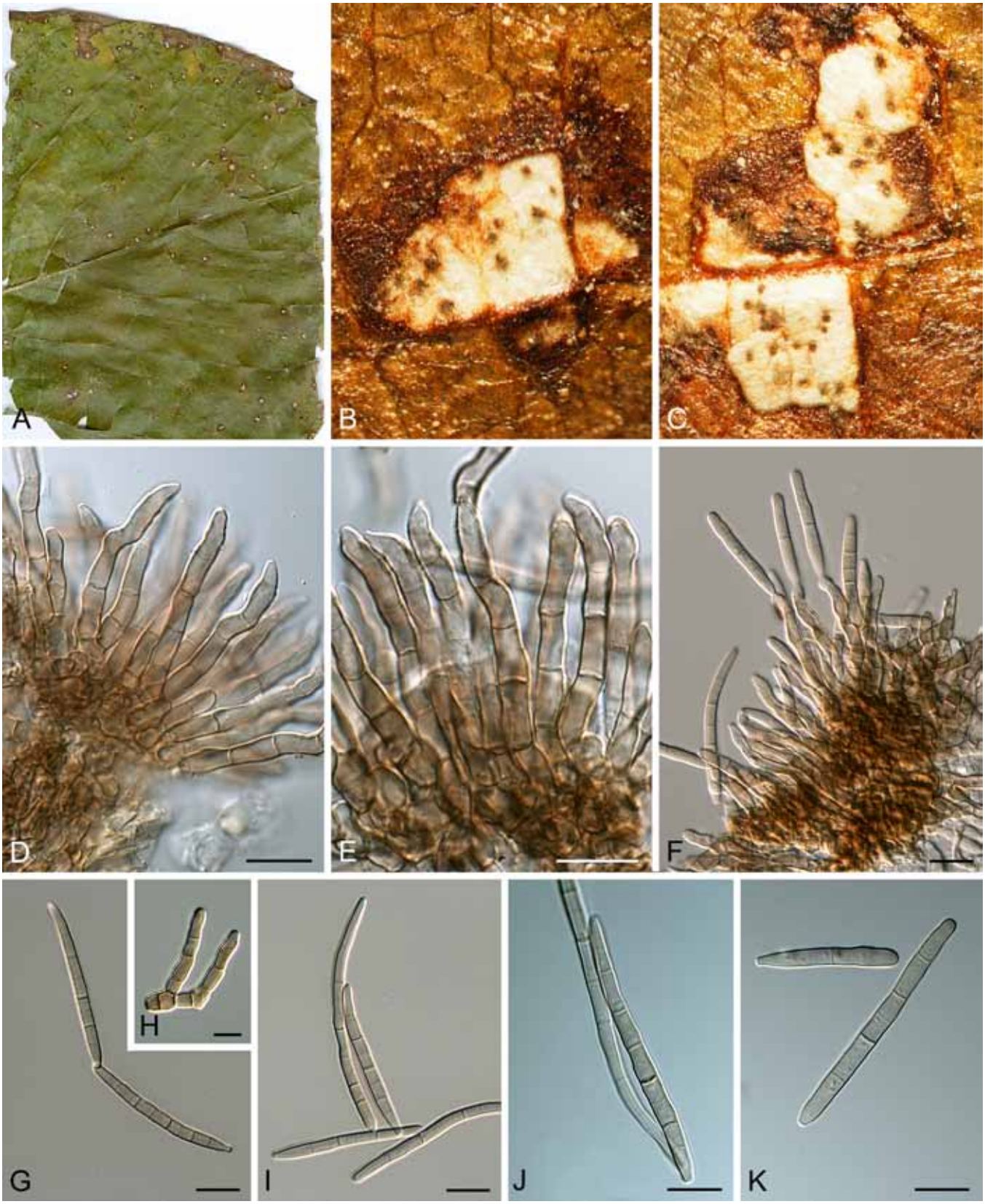

Fig. 55. *Pseudocercospora ranjita* (CPC 11141). A. Leaf spots on upper leaf surface. B, C. Close-up of leaf spots with fruiting. D–F. Fascicles with conidiophores and conidiogenous cells. H. Branched conidiophore. G, I–K. Conidia. Scale bars = 10 µm.

Notes: *Pseudocercospora pyracanthigena* is distinct from *P. pyracanthae* (conidia 25–65 × 2.4–4 µm, conidiophores 15–40 × 2.5–3 µm; Chupp 1954) in having shorter conidia and conidiophores. A second species has been recorded on *Pyracantha angustifolia* in Korea (CPC 14711–14713), for which a new name is required.

Pseudocercospora ranjita (S. Chowdhury) Deighton, Mycol. Pap. 140: 151. 1976. Fig. 55.
Basionym: *Cercospora ranjita* S. Chowdhury, Lloydia 21: 155. 1958.

Leaf spots epiphyllous, distinct, scattered, white to pale brown, irregular, 1–4 mm diam, definite raised brown border, surrounded

Fig. 56. *Pseudocercospora ravenalicola* (CBS 122468). A. Leaf spots on upper leaf surface. B, C. Close-up of leaf spots. D–G. Fascicles with conidiophores and conidiogenous cells. H–L. Conidia. Scale bars = 10 µm.

entirely or partly by brown to dark brown irregular halo. *Mycelium* internal and external, 2–5 mm wide, branched, smooth, septate, subhyaline to pale brown. *Caespituli* epiphyllous, few in number, distributed over the leaf spot, dark brown to black. *Stromata* well-developed, intraepidermal to subimmersed, brown, globular to irregular, 40–90 µm diam. *Conidiophores* fasciculate, arising from the upper cells of stromata, pale brown, straight to curved, unbranched and branched, 1–4-septate, irregular in width, apex truncate, (20–)27–38(–42) × (3–)3.5–4.5(–5) µm. *Conidiogenous* cells terminal, unbranched, pale brown, smooth to finely verrucose, proliferating percurrently, (8–)9–15(–19) × 3(–4) µm. *Conidia* solitary, cylindrical to obclavate, 2–9-septate, subhyaline to pale brown, smooth, apex rounded to subobtuse, base obconically to long obconically truncate, (26–)44–67(–84) × (3–)4–5(–6) µm; hila unthickened nor darkened.

Culture characteristics: Colonies on MEA reaching 27 mm diam after 30 d at 24 °C on MEA. Colonies circular with a smooth margin, that is darker than the colony centre, slight folding; aerial mycelium moderate; greyish blue to olivaceous-grey (surface) and iron-grey (reverse).

Specimen examined: **Indonesia**, Northern Sumatra, on leaves of *Gmelina* sp., Mar. 2004, M.J. Wingfield, CBS H-20386, culture CPC 11141 = CBS 126005.

Note: The present collection closely matches the morphological description of the type specimen, which was collected from India (Chowdhury 1958).

Pseudocercospora ravenalicola G.C. Hunter & Crous, **sp. nov.** MycoBank MB564843. Fig. 56.

Etymology: Name derived from the plant host *Ravenala*, from which this fungus was isolated.

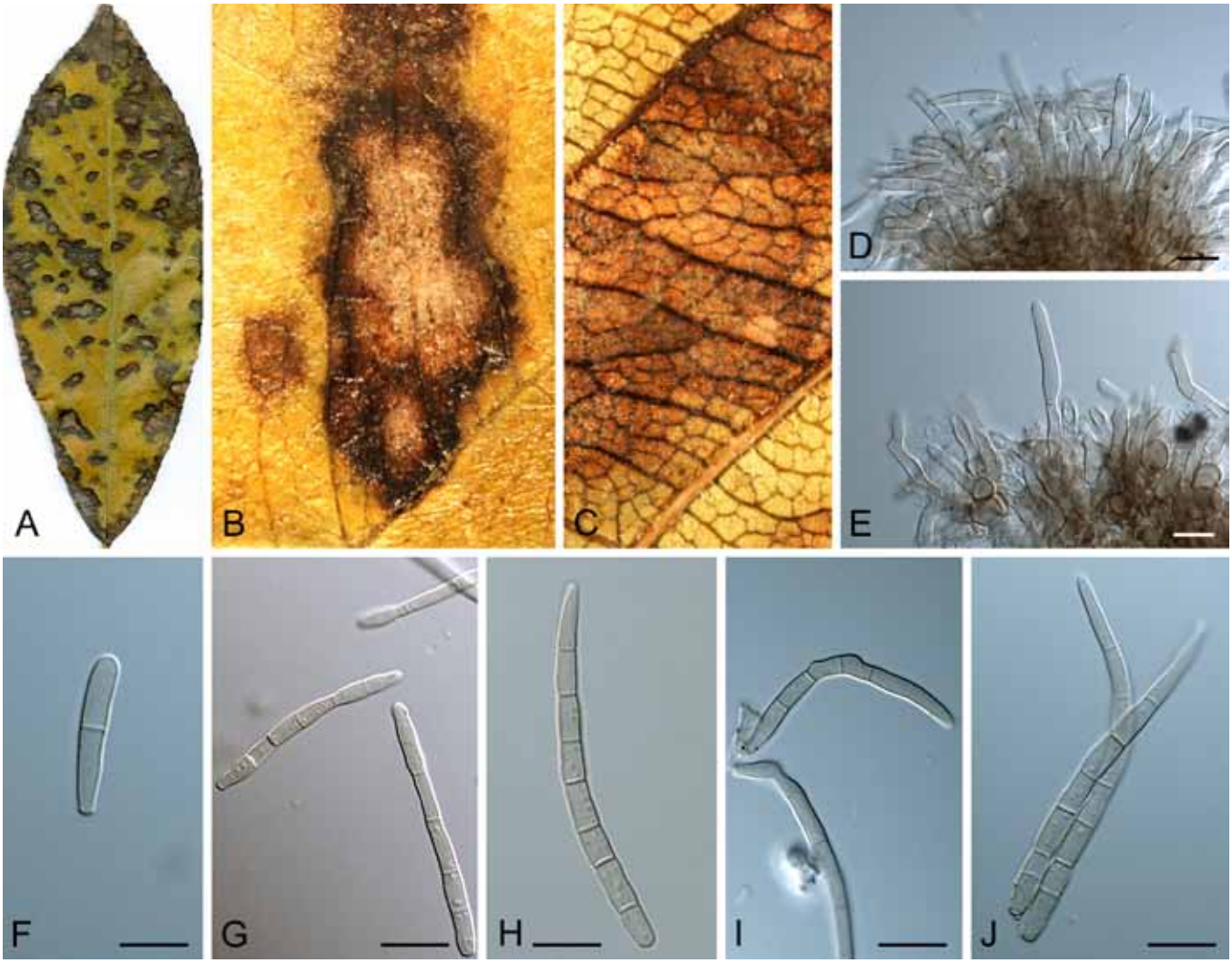

Fig. 57. *Pseudocercospora rhamnellae* (CPC 12500–12502). A. Leaf spots on upper leaf surface. B, C. Close-up of leaf spots with fruiting. D, E. Fascicles with conidiophores and conidiogenous cells. F–J. Conidia. Scale bars = 10 µm.

Leaf spots amphigenous, distinct, brown to pale, predominantly at leaf margin, but smaller spots are scattered over the whole leaf, elongated to irregular; border definite, raised, with dark brown to black border. *Caespituli* amphigenous, sparsely scattered over the leaf spot and aggregated toward the lesion margin, flocculose, pale to pale olivaceous. *Stromata* erumpent to superficial, globular, pale to dark brown, 30–80 µm diam. *Conidiophores* fasciculate, arising from the stromata, brown, becoming paler toward the apex, smooth, 0–3-septate, straight to curved, apex subtruncate to rounded, predominantly unbranched, sometimes branched below, (14–)17–25(–32) × (3–)4–5(–6) µm. *Conidiogenous cells* terminal, pale brown, smooth, straight to geniculate, tapering to a truncate to blunt apex, proliferating sympodially and percurrently, (7–)13(–15) × (3–)3.5(–4) µm. *Conidia* solitary, cylindrical, straight to curved, smooth, subhyaline to pale brown, 1–6-septate, infrequently constricted at the septa, apex obtuse to narrowly rounded, base obconically truncate to long obconically truncate, (16–)25–47(–60) × (3–)4(–5) µm; hila unthickened, nor darkened.

Culture characteristics: Colonies after 1 mo at 24 ºC in the dark on MEA; erumpent, spreading, with moderate aerial mycelium, and smooth, lobate margins. Surface smoke-grey in centre, pale olivaceous-grey in outer region; reverse olivaceous-grey. Colonies reaching 35 mm diam.

Specimen examined: **India**, Chandigarh, on leaves of *Ravenala madagascariensis*, 2 Mar. 2004, W. Gams, **holotype** CBS H-20394, culture ex-type CBS 122468.

Note: *Pseudocercospora ravenalicola* represents the first species of *Pseudocercospora* known from this host and the *Strelitziaceae*.

Pseudocercospora rhabdothamni U. Braun & C.F. Hill, Australas. Plant Pathol. 33: 489. 2004.

Specimen examined: **New Zealand**, Auckland, University Campus, Princes Street, on *Rhabdothamnus solanderi*, 9 Nov. 2003, C.F. Hill, **holotype** HAL 1790 F, isotype PDD 80279, culture ex-isotype CBS 114872, ICMP 15289.

Note: Two strains have been deposited in CBS under the name *P. rabdothamni*.

Pseudocercospora rhamnellae G.C. Hunter, H.D. Shin, U. Braun & Crous, **sp. nov.** MycoBank MB564844. Fig. 57.

Etymology: Name derived from the plant host *Rhamnella*, from which this fungus was isolated.

Leaf spots distinct, amphigenous, subcircular to irregular, pale to dark brown, dark brown to black raised border with effuse spreading pale to dark brown halo, solitary or sometimes coalescing, 2–11

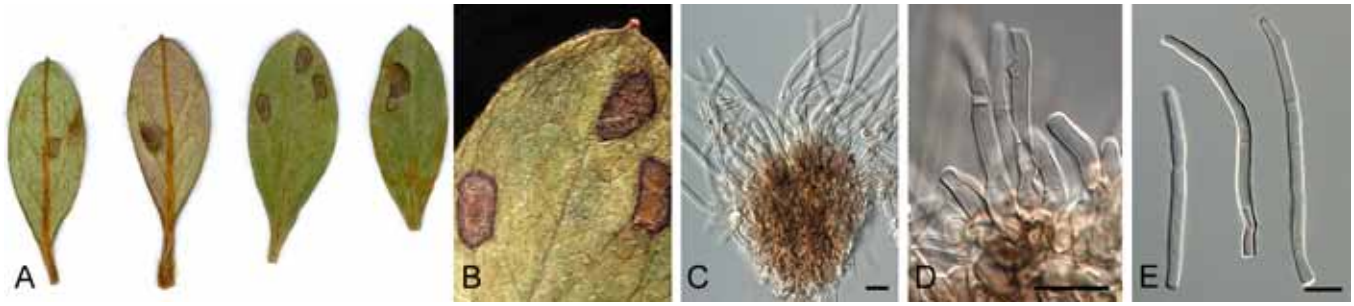

Fig. 58. *Pseudocercospora rhododendri-indici* (CPC 10822–10824). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidia. Scale bars = 10 µm.

mm diam. *Mycelium* smooth, branched, internal and external, pale brown, septate 2–4 µm diam. *Caespituli* amphigenous, on adaxial surface single, scattered to slightly aggregated, pale to light brown, on abaxial surface significantly more dense, mostly aggregated over the lesions surface, light brown to light olive-green. *Stromata* medium to large, well-developed, superficial to intraepidermal, pale to dark brown, 30–85 µm diam. *Conidiophores* fasciculate, straight to curved, brown, becoming paler to the apex, unbranched, smooth to finely verruculose, subcylindrical, 0–1-septate, (10–)13–19(–23) × (2–)3–4(–5) µm. *Conidiogenous cells* terminal, unbranched, pale brown, smooth to slightly verruculose, proliferating sympodially or percurrently near apex, (3–)5–10(–15) × (2–)3–4(–5) µm. *Conidia* solitary, guttulate, straight to curved, apex obtusely rounded, base truncate, solitary, pale brown, thin-walled, smooth, subcylindrical to narrowly obclavate, 1–12-septate, (17–)33–57(–80) × (2–)3(–4) µm, hila neither thickened, nor darkened or refractive, 2–3 µm diam.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; surface folded, erumpent, spreading, with sparse aerial mycelium, and smooth, lobate margins. Surface olivaceous-grey with patches of pale olivaceous-grey; reverse iron-grey. Colonies reaching 10 mm diam.

Specimen examined: **South Korea**, Jeju, Halla arboretum, on leaves of *Rhamnella franguloides*, 29 Oct. 2005, H.D. Shin, **holotype** CBS H-20395, culture ex-type CPC 12500 = CBS 131590, CPC 12501, 12502.

Notes: No species of *Pseudocercospora* are presently known to occur on *Rhamnella* (*Rhamnaceae*). *Pseudocercospora rhamnellae* is distinct from *P. rhamnaceicola* (on *Paliurus*, *Rhamnus* and *Zizyphus*; conidia 18–85 × 1.5–2.5 µm, apex pointed, base obconically truncate, Hsieh & Goh 1990) by having wider conidia, which are subcylindrical-obclavate with an obtusely rounded apex and truncate base. The conidiophores are also shorter and wider. Further collections are needed to determine whether isolates from other hosts in the *Rhamnaceae* all represent *P. rhamnaceicola.*

Pseudocercospora rhododendri-indici Crous, U. Braun & H.D. Shin, **sp. nov.** MycoBank MB564845. Fig. 58.

Etymology: Name derived from the plant host *Rhododendron indicum*, from which it was collected.

Leaf spots amphigenous, subcircular to circular, 2–3 mm diam, medium brown with a raised, dark brown border. *Mycelium* internal, pale brown, consisting of septate, branched, smooth, 2–3 µm diam hyphae. *Caespituli* fasciculate to sporodochial, olivaceous-brown, predominantly epiphyllous, up to 100 µm diam and 80 µm high. *Conidiophores* aggregated in dense fascicles, arising from the upper cells of a brown stroma, up to 80 µm diam and 40 µm high; conidiophores pale brown, smooth, 0–2-septate, subcylindrical, straight to geniculate-sinuous, unbranched, 10–30 × 3–4 µm. *Conidiogenous cells* terminal, pale brown, smooth, tapering to flat-tipped apical loci, proliferating sympodially, 10–15 × 3–3.5 µm. *Conidia* solitary, pale brown, smooth, guttulate, subcylindrical, apex subobtuse, base truncate, straight to variously curved, 1–4-septate, (35–)40–55(–65) × (2–)3 µm; hila unthickened, neither darkened nor refractive, 2–3 µm diam.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; erumpent, spreading, with moderate aerial mycelium, and smooth, lobate margins. Surface olivaceous-grey in centre, pale olivaceous-grey in outer region; reverse iron-grey. Colonies reaching 14 mm diam.

Specimen examined: **South Korea**, Seoul, on *Rhododendron indicum*, 27 Oct. 2003, H.D. Shin, **holotype** CBS H-20886, cultures ex-type CPC 10822 = CBS 131591, CPC 10823, 10824.

Notes: Of the species occurring on *Rhododendron*, *P. rhododendri-indici* differs from *P. handelii* (conidia narrowly linear to obclavate, indistinctly multiseptate, 12–140 × 1.5–3 µm; Chupp 1954) by its subcylindrical, 1–4-septate conidia with truncate base and obtuse apex, and phylogentic position (Fig. 5). The description and illustration of *P. handelii* based on Chinese material (Guo & Hsieh 1995) agrees well with Chupp's (1954) description. The identity of Korean collections on *Rhododendron indicum* described in Shin & Kim (2001), characterised by much longer acicular-filiform conidia with truncate base, is unclear. *Pseudocercospora rhododendri-indici* differs from *P. rhododendricola* (conidia 54–96 × 2–2.5 µm; Yen 1966) by its shorter conidia. Beside epiphyllous colonies, *P. rhododendricola* forms hypophyllous colonies composed of small, loose fascicles of conidiophores that emerge through stomata, together with superficial hyphae that give rise to solitary conidiophores. The hypophyllous fruiting was neither mentioned in the original description nor in Yen & Lim (1980). It was observed during the re-examination of type material (**Singapore**, Botanic Gardens, on *Rhododendron* sp., 13 Apr. 1965, S.H. Yen No. 112, **holotype** PC).

Pseudocercospora rhoina (Cooke & Ellis) Deighton, Mycol. Pap. 140: 152. 1976. Fig. 59.

Basionym: *Cercospora rhoina* Cooke & Ellis, Grevillea 6: 89. 1878.
= *Cercospora copallina* Cooke, Grevillea 12: 31. 1883.
= *Cercospora rhoina* var. *nigromaculans* Peck, Rep. (Annual) New York State Mus. Nat. Hist. 42: 129. 1889.

Specimen examined: **South Korea**, Namhae, on *Rhus chinensis,* 30 Jun. 2004, H.D. Shin, CBS H-20887, KUS-F 20367, CPC 11464 = CBS 131891.

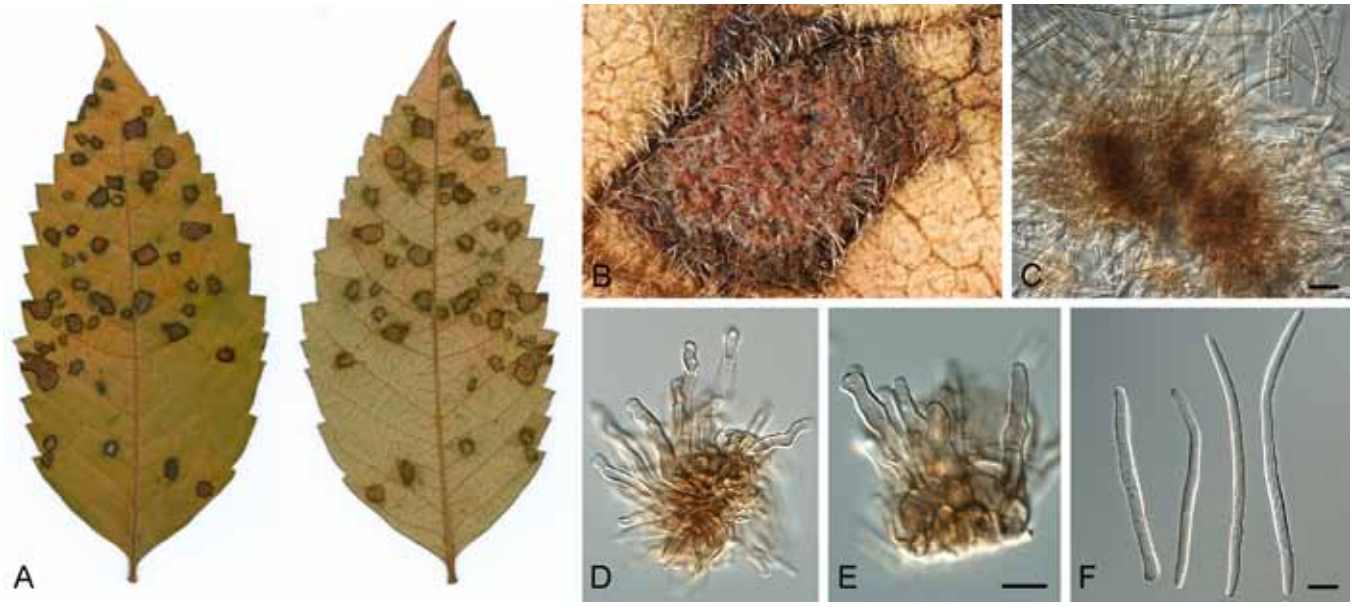

Fig. 59. *Pseudocercospora rhoina* (CPC 11464–11465). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores and conidiogenous cells. F. Conidia. Scale bars = 10 µm.

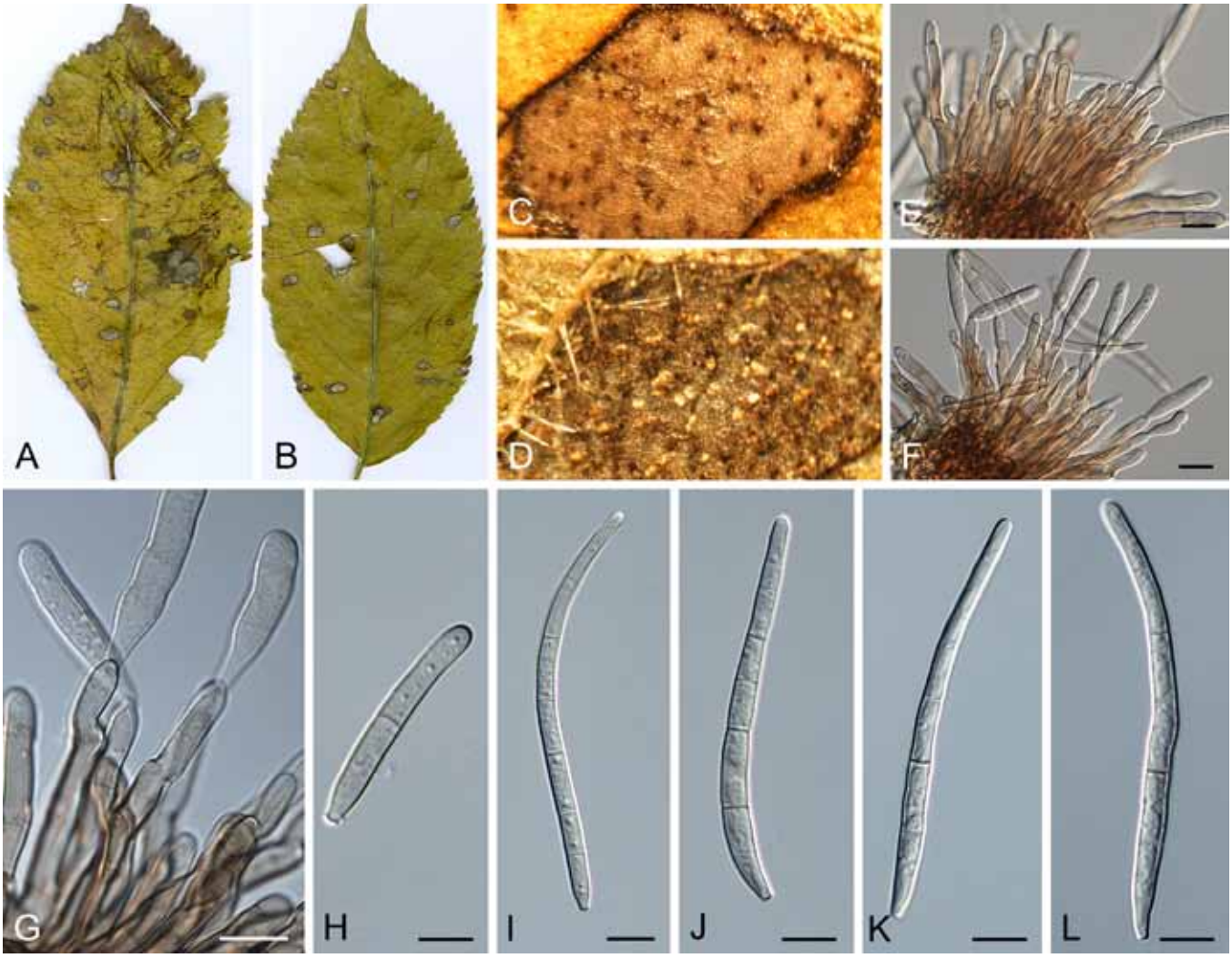

Fig. 60. *Pseudocercospora sambucigena* (CPC 14397–14399). A, B. Leaf spots on upper and lower leaf surface. C, D. Close-up of leaf spots with fruiting. E, F. Fascicles with conidiophores and conidiogenous cells. G. Conidiogenous cells. H–L. Conidia. Scale bars = 10 µm.

Pseudocercospora sambucigena U. Braun, Crous & K. Schub., Mycotaxon 92: 400. 2005. Fig. 60.

Leaf spots distinct, scattered over leaf surface, amphigenous, upper surface pale brown to grey, with definite border that is raised and dark brown in colour; lower surface pale grey to pale brown,

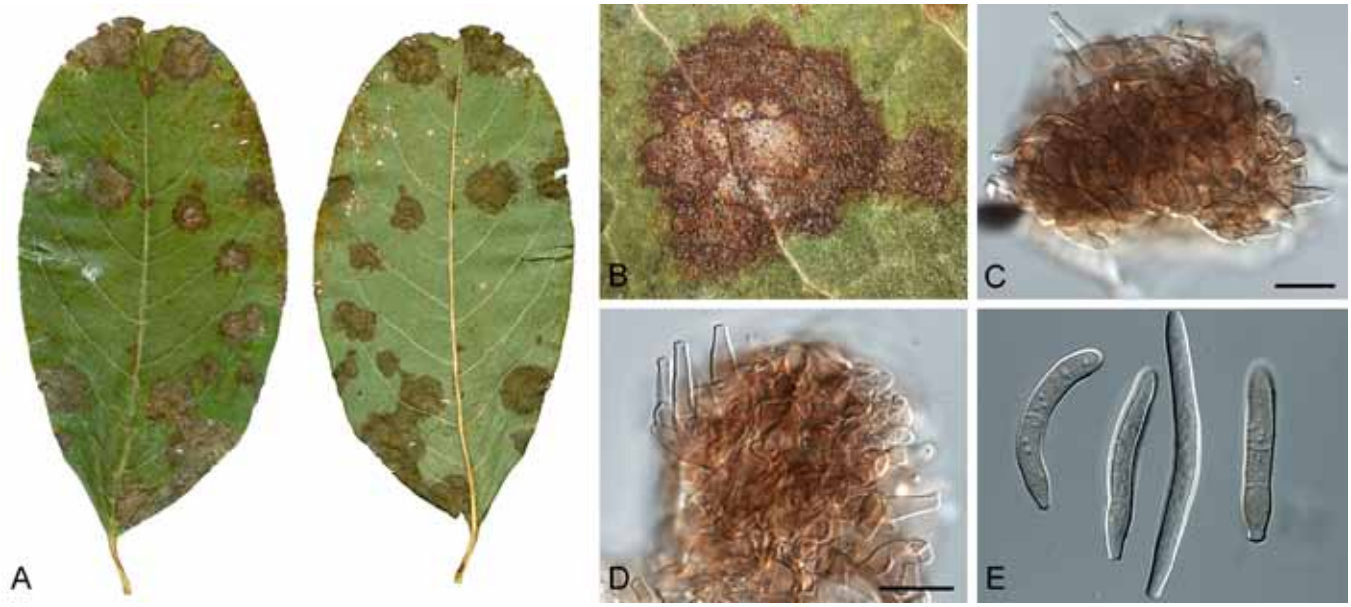

Fig. 61. *Pseudocercospora securinegae* (CPC 10793). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Conidia. Scale bars = 10 µm.

with distinctly raised, brown border, 2–10 mm diam. *Mycelium* smooth, internal and external, consisting of branched, subhyaline, 2–4 µm diam hyphae. *Caespituli* amphigenous, predominantly occurring on the abaxial lesion surface, evenly distributed over the lesion, punctiform, grey to dark brown. *Stromata* well-developed, subimmersed becoming erumpent, globular, dark brown, 45–100 mm diam. *Conidiophores* fasciculate, emerging from stomata, brown, becoming paler toward the apex, unbranched, straight to curved, cylindrical, uniform or irregular in width, rounded apex, indistinctly 0–3-septate, (25–)35–51(–60) × (4–)5(–7) µm. *Conidiogenous cells* terminal, unbranched, smooth, pale brown, proliferating sympodially and percurrently, conidiogenous loci (scars) unthickened to slightly thickened, but not darkened, (10–)19–34(–46) × (3–)5 µm. *Conidia* solitary, pale olivaceous to pale brown, smooth, guttulate, apex obtuse, base long obconically truncate, shape variable from cylindrical to obclavate, 1–7-septate, (40–)68–117(–156) × (4–)5–6(–7) µm; hila unthickened to slightly thickened, but not darkened.

Culture characteristics: Colonies on MEA reaching 16 mm diam after 30 d in the dark at 24 °C. Colonies circular to subcircular, smooth to slightly irregular margin, prominently convex, moderate aerial mycelium; pale greenish grey to pale olivaceous-grey (surface) and olivaceous-black (reverse).

Specimens examined: **Italy**, Parma, on leaves of *Sambucus nigra*, G. Passerini, **paratype** B 70-6710. **Netherlands**, Milingerwaard on leaves of *Sambucus nigra*, 2007, P.W. Crous, **epitype designated here** CBS H-20391, cultures ex-epitype CPC 14397 = CBS 126000. **USA**, Pennsylvania, Dauphin Co., on leaves of *Sambucus pubens*, 21 Aug. 1921, O.E. Jennings, Acc. 6736, **holotype** NY.

Pseudocercospora securinegae (Togashi & Katsuki) Deighton, Mycol. Pap. 140: 152. 1976. Fig. 61.
Basionym: *Cercospora securinegae* Togashi & Katsuki, Ann. Phytopathol. Soc. Japan 17: 7. 1952.

Specimen examined: **South Korea**, Yangpyong, on *Flueggea suffruticosa* (≡ *Securinega suffruticosa*), 30 Sep. 2003, H.D. Shin, CBS H-20888, culture CPC 10793 = CBS 131930.

Pseudocercospora snelliana (Reichert) U. Braun, H.D. Shin, C. Nakash. & Crous, **comb. nov.** MycoBank MB564846. Figs 62, 63.
Basionym: *Cercospora snelliana* Reichert, Bot. Jahrb. Syst. 56: 724. 1921.
= *Clasterosporium mori* Syd. & P. Syd., Mem. Herb. Boiss. 4: 6. 1900.
≡ *Sirosporium mori* (Syd. & P. Syd.) M.B. Ellis, Mycol. Pap. 87: 7. 1963.
≡ *Cercospora kusanoi* Sawada, Rep. Dept. Agric. Gov. Res. Inst. Formosa 35: 109. 1928 (*nom. nov.*), non *Cercospora mori* Hara, 1918.
= *Cercospora bremeri* Petr., Sydowia 2: 312. 1948.
= *Cercospora flexuosa* Tanaka, unknown, *nom. nud.*, non Tracy & Earle, 1895.

Leaf spots lacking or amphigenous, but inconspicuous on upper leaf surface, chlorotic, irregular, as small speckles, up to 8 mm diam, or effuse and much larger, forming large blotches or covering large portions of the hypophyllous surface with blackish colonies. *Mycelium* internal and external; internal hyphae pale olivaceous to pale brown, smooth, 3–4 µm diam, arising through stomata, giving rise to external mycelium that is pale yellowish green, olivaceous to brown, smooth, thin-walled, 1.5–5 µm diam. *Conidiophores* arising singly from superficial mycelium and in small, divergent fascicles from a few substomatal swollen hyphal cells, 2–8 µm diam., emerging through stomata, brown, smooth, becoming roughened towards apex, wall up to 1 µm thick, 1–12-septate, subcylindrical to often subclavate, *i.e.* width somewhat increasing towards the apex, straight to variously curved or geniculate-sinuous, unbranched or branched above, 15–100 × 3–6 µm. *Conidiogenous cells* terminal or lateral, unbranched, brown, becoming paler towards the tip, roughened, tapering towards flat-tipped loci, 2–3 µm diam, proliferating sympodially (lateral scars as illustrated by Ellis 1971 observed), or percurrently near apex, 10–30 × 4–7 µm. *Conidia* solitary, medium to dark olivaceous-brown or brown, small young conidia sometimes subhyaline to pale olivaceous, wall up to 1 µm thick, smooth or almost so to verruculose, guttulate, smaller conidia ellipsoid-ovoid, subcylindrical, larger conidia usually distinctly obclavate, apex obtuse, base obconically truncate, subtruncate or sometimes rounded, straight to gently curved, 1–10-septate (septa somewhat refractive, at times also 1(–2) oblique or vertical septa present), (15–)30–70(–80) × (3–)4–6(–7) µm;

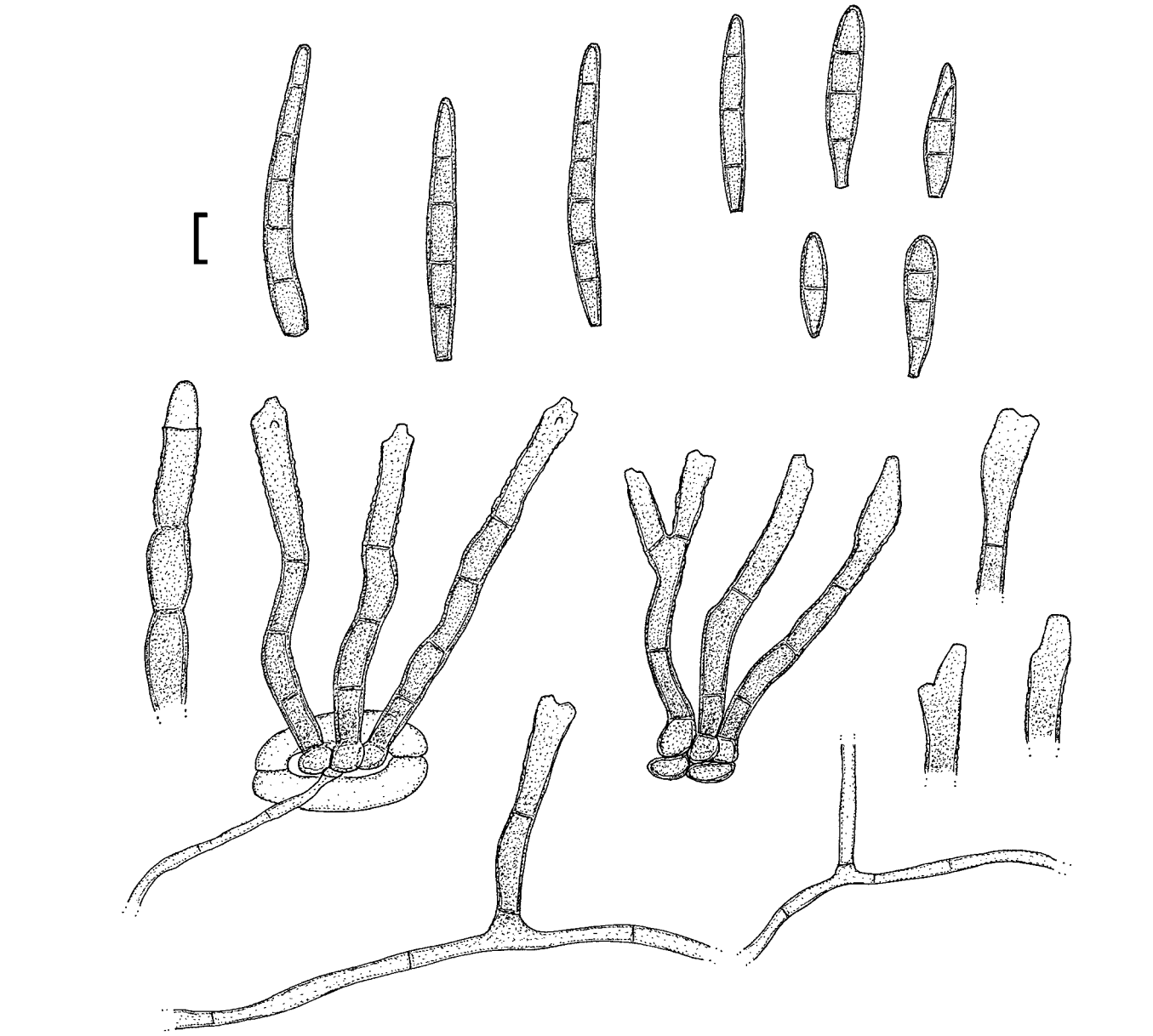

Fig. 62. *Pseudocercospora snelliana* **(**B 700014740, holotype). Sparse fascicles, and solitary conidiophores on superficial mycelium giving rise to muriformly septate, thick-walled conidia. Scale bar = 10 µm.

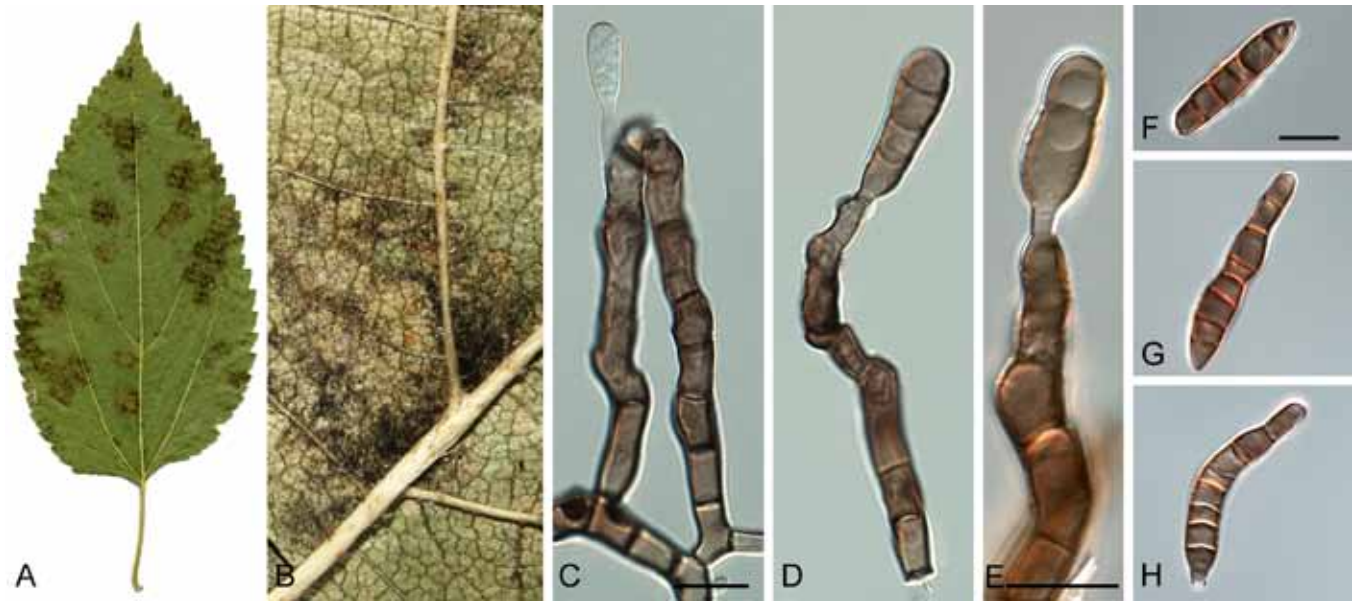

Fig. 63. *Pseudocercospora snelliana* (CPC 11654–11656). A. Leaf spots on the lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Solitary conidiophores and conidiogenous cells. F–H. Conidia. Scale bars = 10 µm.

hila neither thickened, nor darkened or refractive, 1–1.5(–2) µm diam.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; erumpent, spreading, with sparse aerial mycelium, and smooth, lobate margins. Surface pale olivaceous-grey; reverse olivaceous-grey. Colonies reaching 7 mm diam.

Specimens examined: **Egypt**, Kahirahm, near Bahtim, on *Morus alba*, Nov. 1913, Snell, **holotype** B 700014740. **South Korea**, Hoengseong, on *Morus bombycis,* 11 Oct. 2004, H.D. Shin, CBS H-20889, HAL 1867 F, culture CPC 11654 = CBS 131592, CPC 11655, 11656.

Notes: *Cercospora kusanoi* is based on the same type specimen used by Sydow to describe *Clasterosporium mori*. Sawada (1928) considered this fungus a species of *Cercospora*. He introduced the name *Cercospora kusanoi* because the species epithet *mori* was occupied in *Cercospora*. The Korean material we studied closely resembles the description of the type, which was originally described on *Morus alba* from Japan (Sawada 1928). *Pseudocercospora mori* is also already occupied so type material of *P. snelliana*, the next available epithet, was re-examined. We determined it to be conspecific with *C. kusanoi,* so *P. snelliana* is introduced as a new combination.

Pseudocercospora stephanandrae (Tak. Kobay. & H. Horie) C. Nakash. & Tak. Kobay., Mycoscience 41: 27. 2000.
Basionym: *Cercospora stephanandrae* Tak. Kobay. & H. Horie, Trans. Mycol. Soc. Japan 20: 331. 1979.

Specimens examined: **Japan,** Tokyo, Jindai Bot. Park, on *Stephanandra incisa,* 21 Oct. 1976, T. Kobayashi & H. Horie TFM: FPH-4712; Tokyo, Jindai Botanical Park, Chofu-City, on *S. incisa*, 26 Oct. 1974, H. Horie, **holotype** TFM: FPH 4411; Tokyo, Jindai Bot. Park, on *S. incisa*, 7 Nov. 1998, C. Nakashima & E. Imaizumi, **epitype designated here** TFM: FPH-8099, ex-epitype cultures MUCC 914, MAFF 237799.

Pseudocercospora timorensis (Cooke) Deighton, Mycol. Pap. 140: 154. 1976.
Basionym: *Cercospora timorensis* Cooke, Grevillea 12: 38. 1883.
= *Ramularia batatae* Racib., Paras. Algen Pilze Javas, Batavia 1: 35. 1900.
= *Cercospora batatae* A. Zimmerm., Ber. Land.-Forstw. Deutsch Ostafrikas 2: 28. 1904.
= *Cercospora batatae* Henn., Bot. Jahrb. Syst. 38: 118. 1907 (*nom. illeg.*), homonym of *C. batatae* A. Zimmerm., 1904.
= *Cercospora ipomoeae-purpureae* J.M. Yen, Rev. Mycol. 30: 173. 1965.
≡ *Pseudocercospora ipomoea-purpureae* (J.M. Yen) J.M. Yen, in Yen & Lim, Gard. Bull., Singapore 33: 177. 1980.

Specimen examined: **Japan**, Okinawa, *Ipomoea indica*, 19 Nov. 2007, C. Nakashima & T. Akashi, MUMH 10923, culture MUCC 819.

Pseudocercospora udagawana (Katsuki) X.J. Liu & Y.L. Guo, Mycosystema 2: 238. 1989. Fig. 64.
Basionym: *Cercospora udagawana* Katsuki, Ann. Phytopathol. Soc. Japan 20(2–3): 72. 1955.

Specimen examined: **South Korea**, Dongducheon, on *Hovenia dulcis,* 28 Sep. 2003, H.D. Shin, CBS H-20890, CPC 10799 = CBS 131931.

Pseudocercospora viburnigena U. Braun & Crous, Mycol. Progr. 1: 23. 2002. Fig. 65.
Basionym: *Cercospora tinea* Sacc., Michelia 1(2): 268. 1878 (non *P. tinea* Y.L. Guo & W.H. Hsieh, 1994).
≡ *Cercoseptoria tinea* (Sacc.) Deighton, Mycol. Pap. 140: 167. 1976.
≡ *Cercostigmina tinea* (Sacc.) U. Braun, Cryptog. Bot. 4: 108. 1993.

Leaf spots distinct, scattered, amphigenous, 4–15 mm diam, lesions on abaxial surface dark to pale brown, subcircular to irregular, surrounded by a slightly raised dark brown border, lesions on adaxial surface dark to pale brown, surrounded by a dark brown border with a light red diffuse pigment extending outward from the border in older lesions. *Mycelium* internal and external, smooth, subhyaline, branched, 1.5–4 µm wide. *Caespituli* amphigenous, but predominantly hypophyllous, evenly distributed over the leaf spot, velvety, olivaceous. *Stromata* well-developed, subimmersed, globular, dark brown, 30–80 µm diam. *Conidiophores* fasciculate, smooth, 0–2-septate, emerging from the upper cells of the stroma, pale brown, straight to curved, irregular in width, apex subtruncate to rounded, (14–)17–24(–30) × (3–)4–5(–6) µm. *Conidiogenous cells* integrated, terminal, inconspicuously proliferating percurrently, cylindrical, straight, pale brown, at times slightly verruculose, (5–)9–15(–19) × (2–) 3(–4) µm. *Conidia* solitary, pale brown, smooth, guttulate, apex obtusely rounded, base narrowly truncate, narrowly ellipsoidal to acicular, curved or sigmoid, 5–11-septate, (68–)87–110(–120) × (2–)3–4(–5) µm, hila unthickened.

Culture characteristics: Colonies on MEA reaching 23 mm diam after 30 d at 24 °C in the dark. Colonies circular, convex, smooth margin that is distinctly darker than the rest of the colony, slight folding occurs toward the edge of the colony, moderate to profuse aerial mycelium; olivaceous-grey (surface) and greenish black (reverse).

Specimens examined: **Italy**, Padova, *Viburnum tinus*, Oct. 1877, Bizzozera, Sacc., Mycoth. Venet. 1252, **syntype** HAL. **Netherlands**, Bilthoven, Sweelincklaan 87, on leaves of *Viburnum davidii*, 26 May 2008, M.K. Crous, **epitype designated here** CBS H-20393, culture ex-epitype CPC 15249 = CBS 125998.

Note: The epitype closely matches the morphology of the holotype (Braun & Hill 2002), representing a species that is common on *Viburnum* in Europe.

Pseudocercospora viticicola (J.M. Yen & Lim) J.M. Yen, Gardens Bulletin, Singapore 33: 190. 1980.
Basionym: *Cercospora viticicola* J.M. Yen & Lim, Cah. Pacifique 17: 104. 1973.
= *Cercospora viticis* Ellis & Everh. (as *viteae*), J. Mycol. 3: 18. 1887, non *Pseudocercospora viticis* Goh & W.H. Hsieh, 1989.
≡ *Pseudocercosporella viticis* (Ellis & Everh.) B.K. Gupta & Kamal, Indian Phytopathol. 42: 388. 1989 (*nom. inval.*).
≡ *Pseudocercospora viticicola* U. Braun, Mycotaxon 48: 296. 1993 (*nom. illeg.*), homonym of *P. viticicola* (J.M. Yen & Lim) J.M. Yen, 1980.
= *Cercospora viticis* Sawada, Rep. Gov. Agric. Res. Inst. Taiwan 87: 90. 1944 (*nom. illeg.*), homonym of *C. viticis* Ellis & Everh., 1887.
≡ *Pseudocercospora viticis* Goh & W.H. Hsieh, Trans. Mycol. Soc. Republ. China 4: 11. 1989.
= *Cercospora viticis-quinatae* J.M. Yen, Bull. Trimestriel Soc. Mycol. France 93: 158. 1977.
≡ *Pseudocercospora viticis-quinatae* (J.M. Yen) J.M. Yen, Bull. Trimestriel Soc. Mycol. France 94: 388. (1978) 1979.
= *Pseudocercospora viticigena* J.M. Yen, A.K. Kar & B.K. Das, Mycotaxon 16: 68. 1982.

Specimens examined: **Japan**, Okinawa, Okinawa Is, on *Vitex trifolia*, 19 Nov. 2007, C. Nakashima, MUMH 10828, culture MUCC 777; Chiba, Matsudo, on *V. agnus-castus*, 7 Nov. 1987, M. Nagashima & T. Kobayashi, TFM: FPH-6912; Shizuoka, Kanzanji, on *V. agnus-castus*, 1 Nov. 1996, T. Kobayashi & C. Nakashima, CNS-101, culture MUCC 1069, MAFF 237866; Kuroki, Fukuoka, on *V. cannabifolia* (≡ *V. negundo* var. *cannabifolia*), 25 Sep. 1974, S. Ogawa, TFM: FPH-4193.

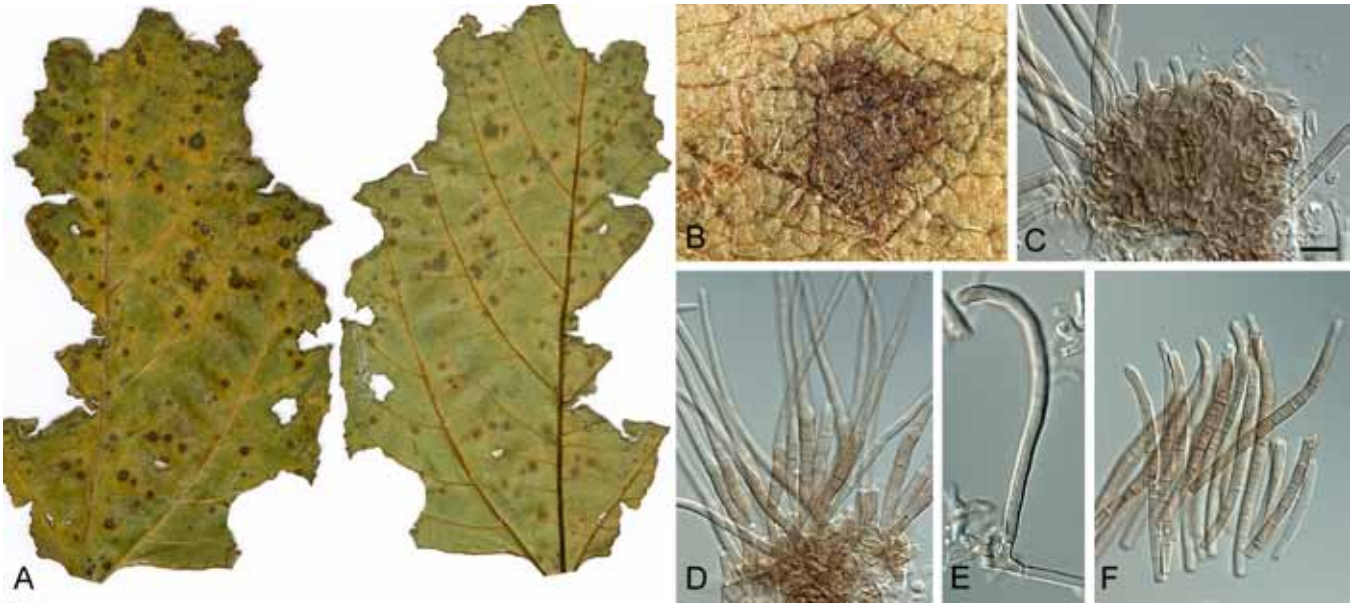

Fig. 64. *Pseudocercospora udagawana* (CPC 10799–10801). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C, D. Fascicles with conidiophores and conidiogenous cells. E. Solitary conidiogenous cell on superficial hypha. F. Conidia. Scale bar = 10 µm.

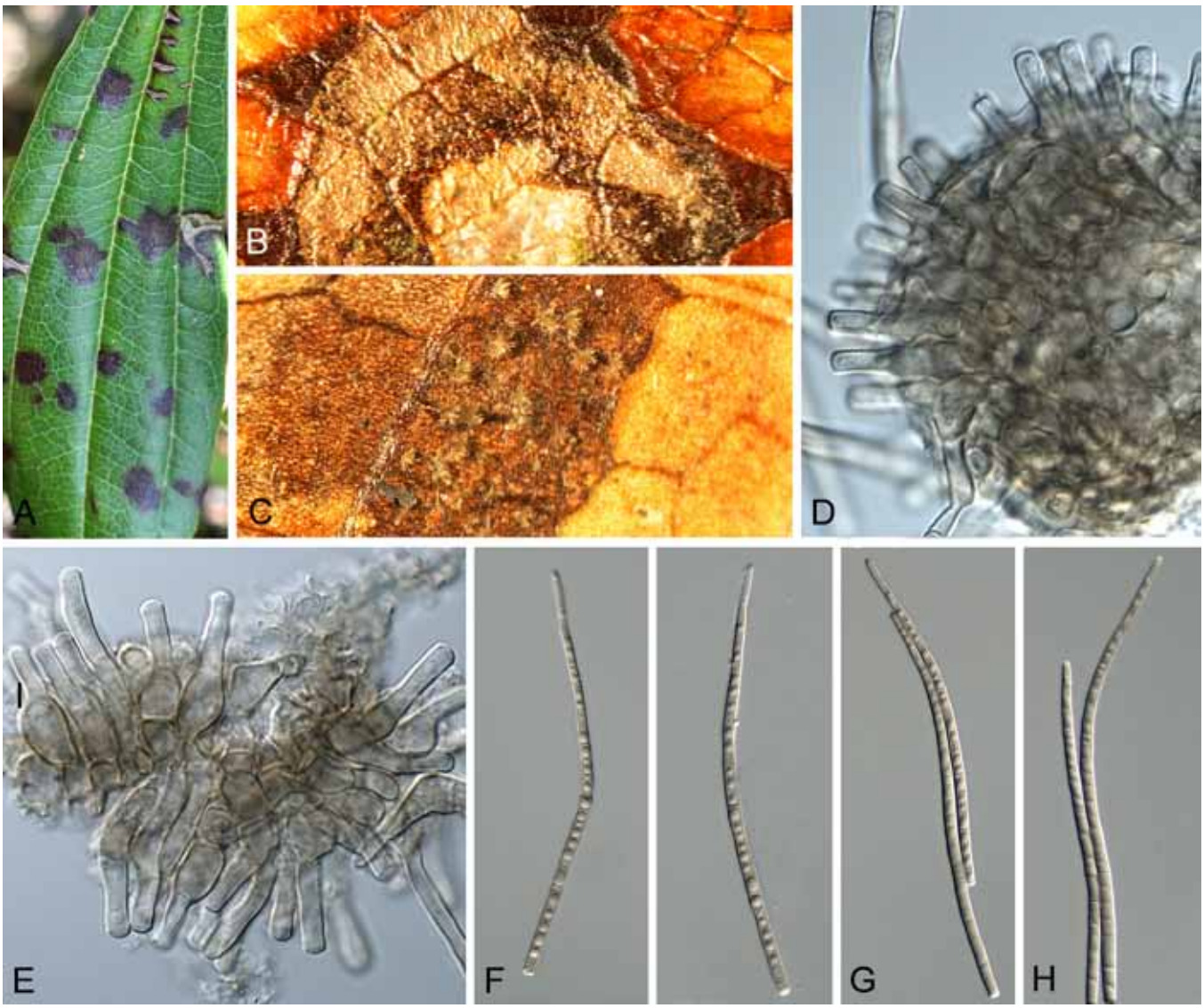

Fig. 65. *Pseudocercospora viburnigena* (CPC 15249). A. Leaf spots on upper leaf surface. B, C. Close-up of leaf spots with fruiting. D, E. Fascicles with conidiophores and conidiogenous cells. F–H. Conidia. Scale bars = 10 µm.

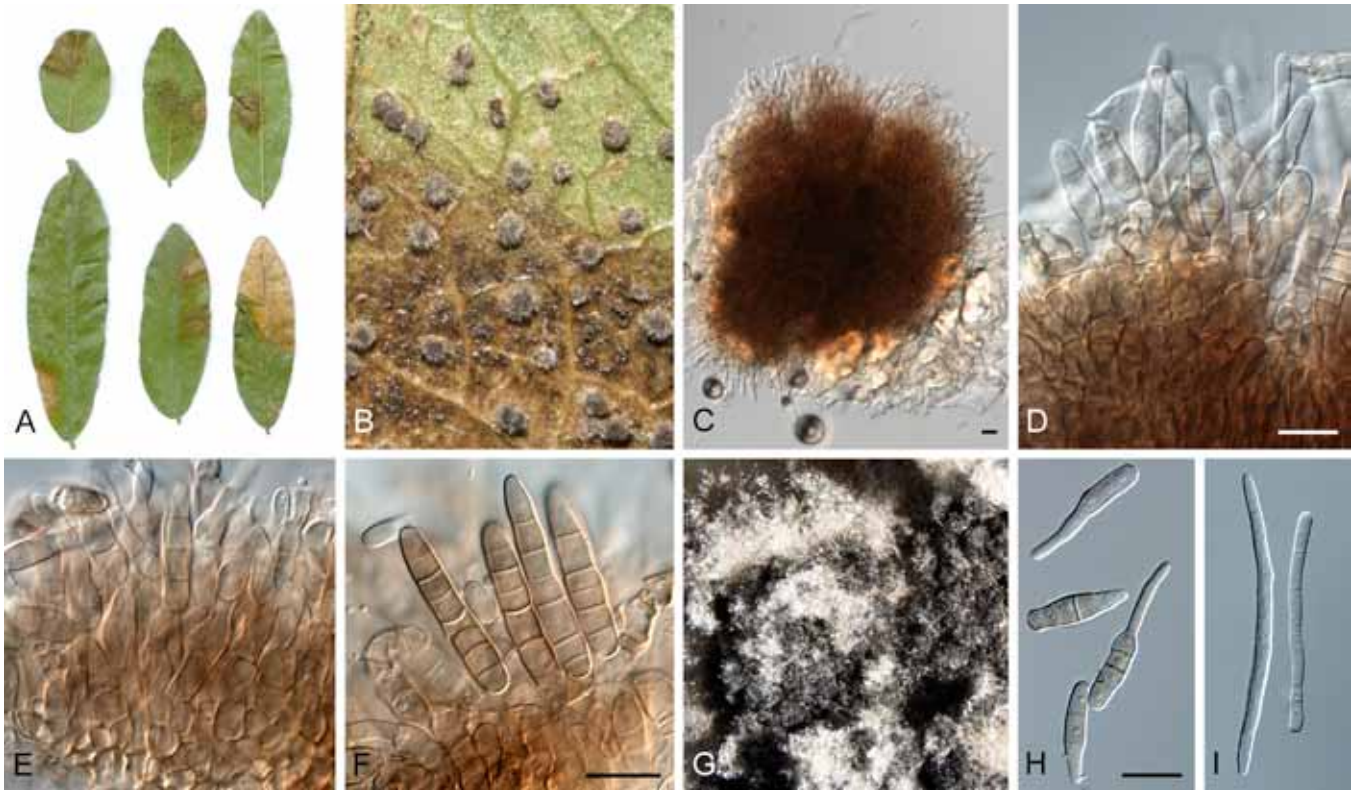

Fig. 66. *Pseudocercospora xanthocercidis* (CPC 11665–11667). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores and conidiogenous cells. F. Conidia. G. Colony on malt extract agar. H, I. Conidia formed in culture. Scale bars = 10 µm.

Pseudocercospora weigelae (Ellis & Everh.) Deighton, Trans. Brit. Mycol. Soc. 88: 389. 1987.
Basionym: *Cercospora weigelae* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 45: 170. 1893.

Specimen examined: **Japan**, Ibaraki, on *Weigela coraeensis*, 10 Sep. 1998, T. & Y. Kobayashi, CNS-455, culture MUCC 899, MAFF 237794.

Pseudocercospora xanthocercidis Crous, U. Braun & A. Wood, **sp. nov.** MycoBank MB564847. Fig. 66.

Etymology: Name derived from the plant host *Xanthocercis*, from which it was collected.

Leaf spots amphigenous, irregular to subcircular, 3–8 mm diam, pale to medium brown, with indistinct border. *Mycelium* internal, pale brown, consisting of septate, branched, smooth, 2–3 µm diam hyphae. *Caespituli* sporodochial, hypophyllous, also occurring on green leaf tissue, prominent, appearing like insect galls, olivaceous-brown on leaves, up to 400 µm wide and 300 µm high. *Conidiophores* aggregated in dense sporodochial fascicles arising from the upper cells of a brown stroma up to 300 µm wide and 250 µm high; conidiophores brown, finely verruculose, 1–2-septate, subcylindrical, straight to slightly curved, 20–30 × 5–7 µm. *Conidiogenous cells* terminal, unbranched, brown, subcylindrical, finely verruculose, proliferating percurrently near apex, with several irregular, rough proliferations, 7–12 × 5–6 µm. *Conidia* solitary, brown, finely verruculose, guttulate, narrowly obclavate, apex obtuse, base obconically subtruncate to truncate, straight to gently curved, 5–8-septate, (25–)28–36(–40) × (5–)6–7 µm; hila unthickened, neither darkened nor refractive, 3–4 µm diam, with minute marginal frill visible.

Culture characteristics: Colonies after 2 wk at 24 ºC in the dark on MEA; surface irregular, folded, erumpent, spreading, with sparse aerial mycelium, and smooth, irregularly lobate margins. Surface olivaceous-grey, with patches of iron-grey; reverse iron-grey. Colonies reaching 5 mm diam.

Specimen examined: **South Africa**, Mpumalanga, Nelspruit, Lowveld National Botanical Garden, on *Xanthocercis zambesiaca,* 14 Sep. 2004, A. Wood, **holotype** HAL 1859 F, **isotype** CBS H-20891, culture ex-type CPC 11665 = CBS 131593, CPC 11666, 11667.

Notes: No other species of *Pseudocercospora* are known from this host. *Pseudocercospora xanthocercidis* differs from other *Pseudocercospora* species on legumes by its very large sporodochial conidiomata with percurrently proliferating conidiogenous cells and verruculose conidia with visible marginal frill at the base. There is no comparable species on legumes.

Pseudocercospora xanthoxyli (Cooke) Y.L. Guo & X.J. Liu, Mycosystema 4: 115. 1991. Fig. 67.
Basionym: *Cercospora xanthoxyli* Cooke, Grevillea 12: 30. 1883.
= *Cercospora fagaricola* Sawada (*fagariae*), Rep. Gov. Agric. Res. Inst. Taiwan 85: 105. 1943 (*nom. inval.*).
≡ *Pseudocercospora fagaricola* Goh & W.H. Hsieh, in Hsieh & Goh, *Cercospora* and similar species from Taiwan: 294. 1990.

Specimen examined: **South Korea**, Wando, Wando Arboretum, on *Xanthoxylum ailanthoides*, 9 Nov. 2002, H.D. Shin, CBS H-20892, CPC 10009, 10064–10065.

Pseudocercospora zelkovae (Hori) X.J. Liu & Y.L. Guo, Acta Mycol. Sin. 12: 33. 1993. Fig. 68.
Basionym: *Cercospora zelkowae* Hori, Nambu N. Jour. Plant Protection 8: 492. 1921.

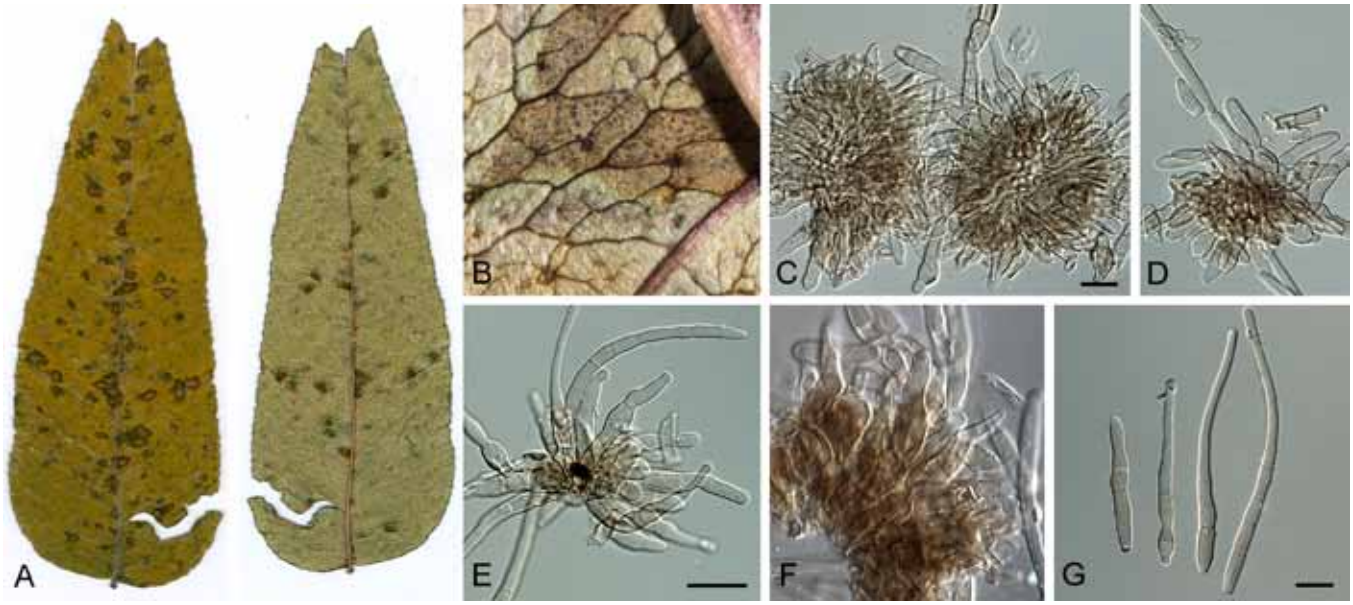

Fig. 67. *Pseudocercospora xanthoxyli* (CPC 10009, 10064–10065). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores and conidiogenous cells. F. Close-up of conidiogenous cells. G. Conidia. Scale bars = 10 µm.

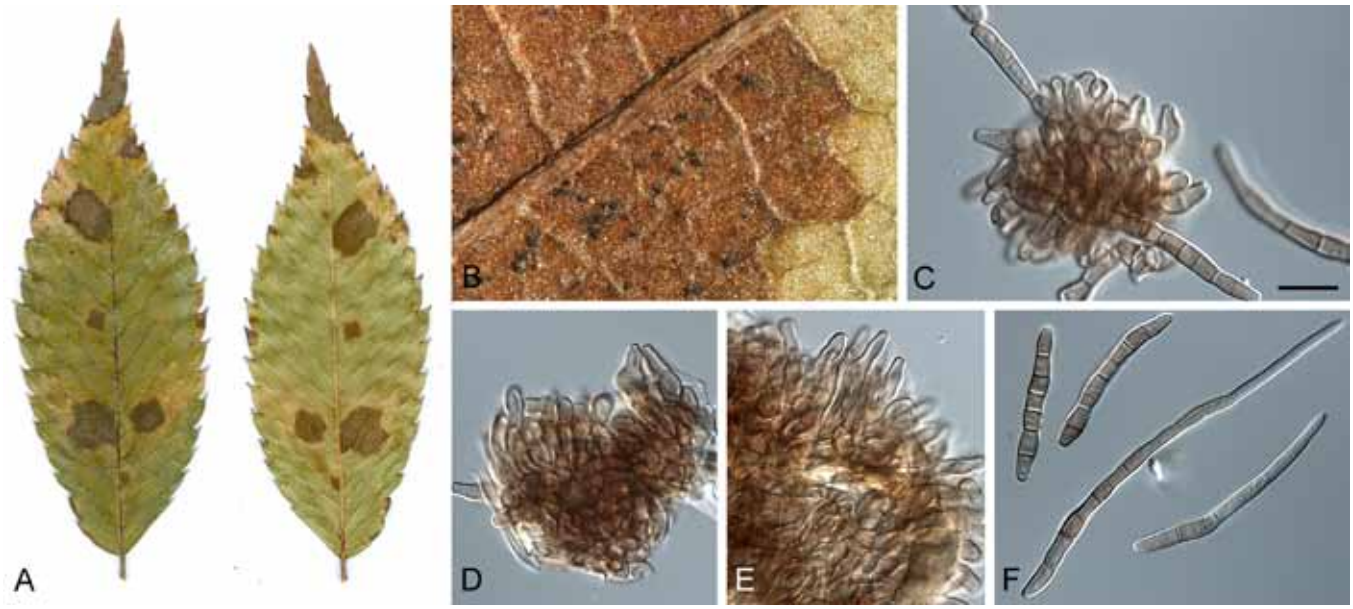

Fig. 68. *Pseudocercospora zelkovae* (CPC 14484). A. Leaf spots on upper and lower leaf surface. B. Close-up of leaf spot with fruiting. C–E. Fascicles with conidiophores and conidiogenous cells. F. Conidia. Scale bar = 10 µm.

Holotype: **Japan**, Tokyo, Forest Experimental Station, on *Zelkova serrata*, Jun. 1920 (not preserved).

Specimens examined: **Japan**, Yamagata, Kamabuchi, on *Z. serrata*, 5 July 1956, K. Ito, **neotype designated here** TFM:FPH169, cultures ex-neotype MAFF 410008, MUCC 1398. **South Korea**, Suwon, on *Z. serrata*, 2 Oct. 2007, H.D. Shin, CBS H-20893, culture CPC 14484 = CBS 132106; Osan, on *Z. serrata*, 30 Oct. 2007, H.D. Shin, CBS H-20894, CPC 14717 = CBS 132118.

DISCUSSION

This study provides a broad framework and phylogeny for the genus *Pseudocercospora*. These fungi are very common and the foundation that has been set will form the basis for additional species to be described and for specific groups to be more thoroughly investigated. Although the results clarify several issues relating to the taxonomy of *Pseudocercospora s. str.*, the study also highlights many remaining taxonomic questions relating to this complex. To resolve these issues many species will need to be recollected, cultured, and sequenced so that they can be placed into this phylogenetic backbone. This is especially true for species described in some of the obscure genera treated by Braun (1995) and Crous & Braun (2003), many of which (or their type species) are not currently known from culture, and thus DNA sequence comparisons and phylogenetic inference has not been possible.

Amongst the cercosporoid fungi, it appears possible and even probable that the approximately 1 500 names in *Pseudocercospora* represent the tip of the iceberg in terms of biodiversity. Indeed it seems likely that this could emerge as the largest genus of cercosporoid fungi known. A significant result of this study was the determination that names based on American or European type specimens could in most cases not be used when identifying

identical diseases on the same hosts in Asia, Africa or South America. In this regard, it was surprising to find diversity even within a region such as Asia, where isolates from the same host and disease symptoms from Korea frequently differed from similar collections made in Japan. These important issues, which have significant ramifications pertaining to plant health and quarantine, will only be resolved when fresh collections from the American and European type locations have been made, thus allowing DNA sequence based comparisons. Furthermore, it emphasises the need to ensure that a DNA sequence has been provided for all novel taxa in this complex and that an authentic DNA barcode (Schoch *et al*. 2012) is available. The ITS gene region was found to be capable of differentiating only 25 of the 146 *Pseudocercospora* taxa (17 %) to species level in the present study. Where the ITS locus fails to provide acceptable resolution, it can be supplemented with sequences from the ACT or EF-1α gene regions (Fig. 5), though these loci still proved relatively conserved, and 57 taxa had less than 1% variation from their closest neighbours, suggesting that additional loci still have to be found to provide a more robust identification of *Pseudocercospora* species.

Focused studies on specific crops such as those on *Eucalyptus* (Crous 1998, Hunter *et al*. 2006b), *Musa* (Arzanlou *et al*. 2007, 2008, 2010), *Chromolaena* (Den Breeÿen *et al*. 2006) and *Citrus* (Pretorius *et al*. 2003) will undoubtedly confirm the already emerging view that many plant species are infected by a complex of *Pseudocercospora* spp. Some of these will clearly be specific to the host from which they were isolated, while others reflect chance occurrences or infections or broader host ranges (Crous & Groenewald 2005). In some instances, these chance infections may be caused by fungi that are major pathogens of other, completely unrelated hosts (Crous & Groenewald 2005, Arzanlou *et al*. 2008). Although the present study has succeeded in delineating *Pseudocercospora* within the *Mycosphaerellaceae*, and in the process has also delineated several other *Pseudocercospora*-like genera, the question relating to host specificity still remains largely unanswered.

The taxa investigated during this study represent the largest collection of *Pseudocercospora* and *Pseudocercospora*-like taxa ever subjected to DNA sequence analysis. Of these, the vast majority appear to be host-specific. Of the 146 taxa subjected to multi-gene analysis, only four were found to occur on more than one host. These include *P. norchiensis* (*Myrtaceae* and *Rosaceae*), *P. fraxinites* (*Oleaceae*), *P. atromarginalis* (*Solanaceae*) and *P. corylopsidis* (*Hamamelidaceae*). In the latter three examples, the same species was found on different host genera within the same plant family, but never on unrelated hosts. This result was somewhat surprising as we initially expected to find at least some examples where species are generalists and occur on many hosts which are unrelated such as those in the *Cercospora apii* complex (Groenewald *et al.* 2006, 2007). The occurrence of *P. norchiensis* (a foliar pathogen of *Eucalyptus* in Italy; Crous *et al*. 2007c) on *Rubus* in New Zealand (CBS 114641), was highly unexpected, and further collections on *Rubus* from New Zealand will have to be made to resolve if this was a mere chance occurrence (Crous & Groenewald 2005), or true indication of its host range.

In future studies of *Pseudocercospora*, additional taxa should be included in the analyses, and further loci screened to obtain a better separation of species. There is an urgent need to conduct inoculation tests to confirm inferences from taxonomic studies about host specificity in this important group of predominantly plant pathogenic fungi. For example, it remains to be shown whether isolates from different hosts with identical DNA barcodes and similar morphology have the ability to cross-infect hosts under natural conditions in the field. It appears that for the most part, F.C. Deighton was correct in his statement "If a sparrow flies to a cherry tree, it's a cherry tree sparrow. If the same sparrow sits in an apple tree, it is an apple tree sparrow".

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