Coelomycetous *Dothideomycetes* with emphasis on the families *Cucurbitariaceae* and *Didymellaceae*

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Abstract: The taxonomy of the coelomycetes has undergone dramatic changes in recent years, but remains controversial due to the high number of taxa involved, their poor morphological differentiation, the rare occurrence of the sexual morphs, and rapid loss of fertility *in vitro*. In the present study, we revisited the families *Cucurbitariaceae* and *Didymellaceae* (*Pleosporales, Dothideomycetes*), which include numerous plant pathogens, endophytic species associated with a wide host range, and saprobes. The taxonomy of two of the most relevant genera, i.e. *Phoma* and *Pyrenochaeta*, remains ambiguous after several phylogenetic studies, and needs further revision. We have studied a total of 143 strains of coelomycetes from clinical or environmental origin, by combining the LSU, ITS, *tub*2 and *rpb*2 sequences for a multi-locus analysis and a detailed morphological comparison. The resulting phylogenetic tree revealed that some fungi previously considered as members of *Cucurbitariaceae* represented five different families, and four of them, *Neopyrenochaetaceae, Parapyrenochaetaceae, Pseudopyrenochaetaceae* and *Pyrenochaetopsidaceae*, are proposed here as new. Furthermore, 13 new genera, 28 new species, and 20 new combinations are proposed within the *Pleosporineae*. Moreover, four new typifications are introduced to stabilise the taxonomy of these fungi.

Key words: *Cucurbitariaceae, Didymellaceae*, Multigene phylogeny, New taxa, *Phoma, Pleosporineae, Pleosporales, Pyrenochaeta, Pyrenochaetopsis*, Taxonomy.

Taxonomic novelties: New families: *Neopyrenochaetaceae* Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, *Parapyrenochaetaceae* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Pseudopyrenochaetaceae* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Pyrenochaetopsidaceae* Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel; **New genera:** *Allocucurbitaria* Valenzuela-Lopez, Stchigel, Guarro & Cano, *Cumuliphoma* Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, *Ectophoma* Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Juxtiphoma* Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Neopyrenochaeta* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Neopyrenochaetopsis* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Paracucurbitaria* Valenzuela-Lopez, Stchigel, Guarro & Cano, *Parapyrenochaeta* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Pseudopyrenochaeta* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Remotididymella* Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, *Similiphoma* Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, *Vacuiphoma* Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Xenopyrenochaetopsis* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano; **New species:** *Allocucurbitaria botulispora* Valenzuela-Lopez, Stchigel, Guarro & Cano, *Allophoma cylindrispora* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Cumuliphoma indica* Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Cu. pneumoniae* Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, *Didymella brunneospora* Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *D. keratinophila* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Epicoccum catenisporum* Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, *Ep. keratinophilum* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Ep. ovisporum* Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, *Ep. pneumoniae* Valenzuela-Lopez, Stchigel, Guarro & Cano, *Neoascochyta cylindrispora* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Neoa. tardicrescens* Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Neocucurbitaria aquatica* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Neocu. irregularis* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Neopyrenochaeta fragariae* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Neopyrenochaetopsis hominis* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Nothophoma variabilis* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Paracucurbitaria italica* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Pseudopyrenochaeta terrestris* Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, *Pyrenochaetopsis americana* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Py. botulispora* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Py. confluens* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Py. globosa* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Py. paucisetosa* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Py. setosissima* Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Py. uberiformis* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Remotididymella anthropophila* Valenzuela-Lopez, Cano, Guarro & Stchigel, *Vacuiphoma oculihominis* Valenzuela-Lopez, Stchigel, Guarro & Cano; **New combinations:** *Cumuliphoma omnivirens* (Aveskamp *et al.*) Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, *Ectophoma multirostrata* (P.N. Mathur *et al.*) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Ec. pomi* (Horne) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Epicoccum proteae* (Crous) Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, *Juxtiphoma eupyrena* (Sacc.) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Neocucurbitaria cava* (Schulzer) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Neocu. hakeae* (Crous) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Neocu. keratinophila* (Verkley *et al.*) Valenzuela-Lopez, Stchigel, Guarro & Cano, *Neopyrenochaeta acicola* (Moug. & Lév.) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Neopy. inflorescentiae* (Crous *et al.*) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Neopy. telephoni* (Rohit Sharma *et al.*) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Paracucurbitaria corni* (Bat. & A.F. Vital) Valenzuela-Lopez, Stchigel, Guarro & Cano, *Parapyrenochaeta acaciae* (Crous *et al.*) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Parapy. protearum* (Crous) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Pseudopyrenochaeta lycopersici* (R.W. Schneid. & Gerlach) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, *Remotididymella destructiva* (Plowr.) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Similiphoma crystallifera* (Gruyter *et al.*) Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, *Vacuiphoma bulgarica* (Aveskamp *et al.*) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, *Xenodidymella saxea* (Aveskamp *et al.*) Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, *Xenopyrenochaetopsis pratorum* (P.R. Johnst. & Boerema) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano.

INTRODUCTION

The *Pleosporales* is the largest order of the class *Dothideomycetes* (phylum *Ascomycota*), encompassing more than 4 700 species distributed over 332 genera, and 53 families (Kirk *et al.* 2008, Zhang *et al.* 2009, 2012, Ariyawansa *et al.* 2013, Hyde *et al.* 2013, Amaradasa *et al.* 2014, Trakunyingcharoen *et al.* 2014, Wijayawardene *et al.* 2014, Crous *et al.* 2015a, Sharma *et al.* 2015, Tanaka *et al.* 2015, Jaklitsch *et al.* 2016, Jaklitsch & Voglmayr 2016, Wanasinghe *et al.* 2016, Crous & Groenewald 2017, Hashimoto *et al.* 2017, Hernández-Restrepo *et al.* 2017). These fungi are characterised by the production of pseudothecial ascomata (mostly globose and usually papillate) consisting of a peridial wall composed by several layers of cells, within which the fissitunicate (bitunicate) asci are produced amidst a persistent hamathecium (the vegetative structures inside an ascoma) (Jaklitsch & Voglmayr 2016, Jaklitsch *et al.* 2017, Zhang *et al.* 2009, 2012) and ascospores, which are mostly septate but variable in shape and pigmentation. The asexual morphs of the *Pleosporales* are characterised by conidia produced within discrete sporocarps (conidiomata), and sometimes conidia are generated on conidiophores produced on mycelium. *Phoma* and its relatives are the most common pleosporalean asexual morphs and are characterised by the presence of pycnidia (globose to pyriform conidiomata from which the conidia arise throughout an apical opening) (de Gruyter *et al.* 2009, 2010, Aveskamp *et al.* 2010, Chen *et al.* 2015). *Pleosporales* are mainly saprobic on plant debris, epiphytic, endophytic or parasitic of living plants, fungi and insects, or mycobionts in lichens (Kruys *et al.* 2006, Aveskamp *et al.* 2008, 2010, de Gruyter *et al.* 2009, Zhang *et al.* 2009, 2012, Lawrey *et al.* 2012, Kocakaya *et al.* 2015). These fungi can also infect humans (Punithalingam 1979, Ahmed *et al.* 2014, 2015, 2017, Borman *et al.* 2016, Valenzuela-Lopez *et al.* 2016).

Modern phylogenetic studies support the division of the *Pleosporales* into the suborders *Pleosporineae* and *Massarineae* (Zhang *et al.* 2009, 2012, Hyde *et al.* 2013, Tanaka *et al.* 2015). The former includes nine families, i.e. *Coniothyriaceae*, *Cucurbitariaceae*, *Didymellaceae*, *Dothidotthiaceae*, *Halojulellaceae*, *Leptosphaeriaceae*, *Neophaeosphaeriaceae*, *Phaeosphaeriaceae*, *Pleosporaceae* and *Shiraiaceae* (Zhang *et al.* 2012, de Gruyter *et al.* 2013, Ariyawansa *et al.* 2013, 2015b, Liu *et al.* 2013), which encompass plant pathogens of economic importance including the well-known genera such as *Alternaria*, *Ascochyta*, *Bipolaris*, *Didymella* and *Leptosphaeria* (Zhang *et al.* 2012, Ariyawansa *et al.* 2013, de Gruyter *et al.* 2013, Liu *et al.* 2013, Woudenberg *et al.* 2013). Recently, Tanaka *et al.* (2015) revised the suborder *Massarineae* and accepted 12 families; however, more studies are needed for a better understanding of their phylogenetic relationships. Numerous species of *Pleosporales* are relatively common in clinical samples, most of which belong to the families *Cucurbitariaceae* and *Didymellaceae* (Valenzuela-Lopez *et al.* 2016). *Cucurbitariaceae* is still a poorly known family, which was erected by Winter (1885) with *Cucurbitaria* as the type genus, and characterised by ostiolate ascomata aggregated on a basal pseudostromatic structure, hamathecium composed of wide persistent filaments, fissitunicate, cylindrical to cylindrical-clavate asci and dark, phragmosporous or muriform ascospores. In the last revision of *Cucurbitariaceae*, four sexual genera (*Cucurbitaria*, *Curreya*, *Rhytidiella* and *Syncarpella*) and two asexual genera (*Pyrenochaeta* and *Pyrenochaetopsis*) were accepted (Doilom

et al. 2013). The latter two genera are characterised by phoma-like, setose pycnidia, and hyaline, aseptate conidia (de Gruyter *et al.* 2010, 2013). Recently, Jaklitsch & Voglmayr (2017) demonstrated that some species of *Cucurbitaria*, such as *C. obducens*, *C. piceae* (both producing muriform ascospores) and *C. rhododendri* (with phragmospores), belong to three different genera of *Melanommataceae*. Wanasinghe *et al.* (2017b) proposed *Neocucurbitaria*, characterised by solitary ascomata, the presence of periphyses and muriform ascospores, as a new genus of *Cucurbitariaceae*. However, the current members of this family need to be re-evaluated, including their asexual morphs.

The family *Didymellaceae* also includes economically important plant pathogens, such as the causal agents of blackleg and ascochyta blight (Rouxel & Balesdent 2005, McDonald & Peck 2009, Salam *et al.* 2011, de Gruyter *et al.* 2013), but also diverse endophytic, fungicolous and lichenicolous taxa belong to this fungal group (Aveskamp *et al.* 2010), whereas a few members are known as pathogens of humans (de Hoog *et al.* 2011). This family was established by de Gruyter *et al.* (2009) and embraces the species traditionally classified in the genera *Ascochyta*, *Didymella* and *Phoma*. However, *Phoma* is one of the largest and most polyphyletic fungal genera (with more than 3 000 names recorded) with species occurring in more than 25 families (http://www.indexfungorum.org).

Zhang *et al.* (2009), included *Didymellaceae* in their study and accepted the sexual genera *Didymella*, *Leptosphaerulina*, *Macroventuria*, *Monascostroma* and *Platychora*. In general, these genera are characterised by dark pseudothecial ascomata, filamentous pseudoparaphyses, 8-spored, fissitunicate, clavate to saccate asci, and hyaline, 1-septate, fusiform to biconical ascospores; with the only exception being *Leptosphaerulina*, which has hyaline to brown, ellipsoid, cylindrical or oblong, phragmosporous or muriformly septate ascospores, which also lack pseudoparaphyses. Several studies have tried to resolve the taxonomy of the asexual morphs of the *Didymellaceae*, especially *Phoma* and its relatives, with more or less success. Subsequently, de Gruyter *et al.* (2010) transferred several species of *Phoma* to *Pyrenochaetopsis* (*Cucurbitariaceae*), *Neosetophoma* and *Setophoma* (*Phaeosphaeriaceae*), and resurrected the genus *Paraphoma* (*Phaeosphaeriaceae*). The study by Aveskamp *et al.* (2010), based on the sequences of four loci, revealed that the subdivision of *Phoma* in sections (Boerema *et al.* 2004) was phylogenetically inconsistent, and they thus proposed *Boeremia* to accommodate species morphologically close to *Phoma exigua*, while species of *Phoma* section *Sclerophomella* were transferred to *Epicoccum* and *Peyronellaea*. Furthermore, de Gruyter *et al.* (2013) transferred some species of *Phoma* sections *Plenodomus* and *Heterospora* to the *Leptosphaeriaceae* and some from *Phoma* section *Pilosa* and *Ascochyta* to *Pleosporaceae*. Recently, Chen *et al.* (2015) proposed nine genera (*Allophoma*, *Calophoma*, *Heterophoma*, *Neoascochyta*, *Neodidymelliopsis*, *Nothophoma*, *Paraboeremia*, *Phomatodes* and *Xenodidymella*) in *Didymellaceae*, transferred *Microsphaeropsis* (*Didymellaceae*) to the family *Microsphaeropsidaceae*, and restricted *Phoma* to *Phoma herbarum* (Chen *et al.* 2017). Other authors have added the genera *Briansuttonomyces*, *Didymellocamarosporium*, *Heracleicola*, *Neodidymella*, *Neomicrosphaeropsis* and *Pseudoascochyta* to *Didymellaceae* (Ariyawansa *et al.* 2015a, Crous & Groenewald 2016, Crous *et al.* 2016a, Thambugala *et al.* 2016, Wijayawardene *et al.* 2016). However, the genera *Didymellocamarosporium*, *Heracleicola* and *Neodidymella* were studied by

Chen *et al.* (2017) and revealed as probable synonyms of older genera within *Didymellaceae*.

To resolve the taxonomy of the *Cucurbitariaceae* and the *Didymellaceae* we have tried to delineate the phylogenetic relationships within these families performing a multi-locus analysis including ex-type and reference strains of most of the phoma-like and pyrenochaeta-like taxa available in the culture collection of Westerdijk Fungal Biodiversity Institute (Utrecht, The Netherlands; formerly CBS-KNAW), and numerous isolates of clinical origin from the USA.

MATERIALS AND METHODS

Isolates and reference fungal strains

This study comprised 70 clinical isolates previously identified as belonging to the *Pleosporales* (Valenzuela-Lopez *et al.* 2016), provided by the Fungus Testing Laboratory of the University of Texas Health Science Center at San Antonio (UTHSC; San Antonio, Texas, USA), two environmental strains from Spain (CBS 141688) and New Zealand (CBS 141689) respectively, and 71 reference and ex-type strains belonging to the *Cucurbitariaceae* and *Didymellaceae* provided by the CBS culture collection (Table 1).

Phenotypic study

For cultural characterisation, isolates were grown on oatmeal agar (OA; 30 g of filtered oat flakes, 15 g of agar-agar, 1 L tap water) and malt extract agar (MEA; 40 g of malt extract, 15 g of agar-agar, 1 L distilled water), at 25 ± 1 °C for 14 d in darkness (recipes according to Boerema *et al.* 2004 and Crous *et al.* 2009). Some of the cultures were incubated under near-ultraviolet (UV) light (12 h light, 12 h dark) or on carnation leaf agar (CLA) to induce sporulation if necessary (Fisher *et al.* 1982, Su *et al.* 2012). Colony diameters were measured after 7 d at 25 ± 1 °C, and colony characterisation was performed 14 d after inoculation on the culture media. Colours were according to Kornerup & Wanscher (1978). The ability of the isolates to grow at cardinal temperatures were determined on potato dextrose agar (PDA; Pronadisa, Madrid, Spain) after 7 d in darkness, ranging from 5 to 35 °C at 5 °C intervals, and including 37 °C.

Micromorphological characterisation was performed by examining at least 30 individuals of each structure (Aveskamp *et al.* 2010, Chen *et al.* 2015). Wet mounts (in Shear's mounting medium and in water) of structures were examined by using an Olympus CH2 compound microscope (Olympus Corporation, Tokyo, Japan). Photo micrographs were captured using a Zeiss Axio-Imager M1 microscope (Oberkochen, Germany) with a DeltaPix Infinity X digital camera using Nomarski differential interference contrast. The production of metabolite E+ (NaOH spot test) was carried out by the application of a droplet of 1N NaOH on a colony grown on MEA (Dorenbosch 1970, Noordeloos *et al.* 1993).

DNA isolation, PCR amplification and sequencing

The total genomic DNA was extracted from colonies grown on PDA after 7 d incubation at 20 ± 1 °C, using the FastDNA kit protocol (Bio101, Vista, CA), with a FastPrep FP120 instrument (Thermo Savant, Holbrook, NY) according to the manufacturer's protocol. DNA was quantified by using Nanodrop 2000 (Thermo Scientific, Madrid, Spain). The following loci were amplified and sequenced: a fragment of the 28S nrRNA gene (LSU) with the primer pair LR0R (Rehner & Samuels 1994) and LR5 (Vilgalys & Hester 1990), internal transcribed spacer region (ITS1-5.8S-ITS2) with the primer pair ITS5 and ITS4 (White *et al.* 1990), a fragment of the beta-tubulin gene (*tub*2) with the primers TUB2Fw and TUB4Rd (Woudenberg *et al.* 2009) and a fragment of the RNA polymerase II subunit 2 gene (*rpb*2) with RPB2-5F2 (Sung *et al.* 2007) and fRPB2-7cR primers (Liu *et al.* 1999). The PCR amplifications were performed in a total volume of 25 µL containing 5 µL 10× PCR Buffer (Invitrogen, California, USA), 0.2 mM dNTPs, 0.5 µM of each primer, 1 U Taq DNA polymerase and 1–10 ng genomic DNA. PCR conditions for LSU, ITS and *tub*2 were set as follows: an initial denaturation at 95 °C for 5 min, followed by 35 cycles of denaturation, annealing and extension, and a final extension step at 72 °C for 10 min. For the LSU and ITS amplification, the 35 cycles consisted of 45 s at 95 °C, 45 s at 53 °C and 2 min at 72 °C; and for the *tub*2 region 30 s at 94 °C, 45 s at 56 °C and 1 min at 72 °C. The PCR program for *rpb*2 amplification consisted of 5 cycles of 45 s at 94 °C, 45 s at 60 °C and 2 min at 72 °C, then 5 cycles with a 58 °C annealing temperature and 30 cycles with a 54 °C annealing temperature (Woudenberg *et al.* 2013). Sequencing of the amplicons was made in both directions with the same primer pair used for amplification at Macrogen Europe (Macrogen Inc., Amsterdam, The Netherlands). The consensus sequences were obtained using the SeqMan software v. 7 (DNAStar Lasergene, Madison, WI, USA).

Phylogenetic analyses

Sequences of related species described in previous studies were obtained from GenBank (Aveskamp *et al.* 2009, 2010, de Gruyter *et al.* 2010, 2013, Wijayawardene *et al.* 2014, Chen *et al.* 2015, 2017, Thambugala *et al.* 2016), and listed in Table 1. For the phylogenetic study, the alignments of the sequences were performed using MEGA v. 6.06 (Tamura *et al.* 2013), using the ClustalW application (Thompson *et al.* 1994), refined with MUSCLE (Edgar 2004) and manually adjusted using the same software platform. The ambiguous regions were excluded from the analyses. Phylogenetic reconstructions were made by maximum-likelihood (ML) and Bayesian inference (BI) with RAxML v. 8.2.10 (Stamatakis 2014) and MrBayes v. 3.2.6 (Ronquist *et al.* 2012), respectively. The best substitution model for each gene matrix correspond to GTR+I+G, and was estimated using MrModelTest v. 2.3 (Nylander 2004). For ML analyses, nearest-neighbour interchange was used as the heuristic method for tree inference. Support for internal branches was assessed by 1 000 ML bootstrapped pseudoreplicates. Bootstrap support (BS) ≥70 was considered significant. For BI analyses, Markov chain Monte Carlo (MCMC) sampling was performed with 46 M generations, with samples taken every 1 000 generations. The 50 % majority rule consensus trees and posterior probability values (PP) were calculated after removing the first 25 % of the resulting trees for burn-in. A PP value ≥0.95 was considered as significant. Both ML and BS analyses were run in CIPRES (Miller *et al.* 2012). *Preussia terricola* (AFTOL-ID 282) and *Sporormiella minima* (CBS 524.50) served as outgroup taxa. Sequences generated in this study were deposited in GenBank

Table 1. Isolates used in this study and their GenBank accession numbers. Numbers of new taxa, combinations and sequences generated are indicated in bold.

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
Allocucurbitaria botulispora	*Pyrenochaeta* sp.	**CBS 142452**	**UTHSC:DI16-273; FMR 13764**	T	Human superficial tissue	USA	LN907416	**LT592932**	**LT593001**	**LT593070**
Allophoma cylindrispora	*Phoma* sp.	**CBS 142453**	**UTHSC:DI16-233; FMR 13723**	T	Human superficial tissue	USA	LN907376	**LT592920**	**LT592989**	**LT593058**
A. labilis		CBS 124.93			*Solanum lycopersicum*	The Netherlands	GU238091	GU237765	GU237619	KT389552
A. minor		CBS 325.82	FMR 14905	T	*Syzygium aromaticum*	Indonesia	GU238107	GU237831	GU237632	KT389553
A. nicaraguensis		CBS 506.91	FMR 14904	T	*Coffea arabica*	Nicaragua	GU238058	GU237876	GU237596	KT389551
A. oligotrophica	*Phoma costarricencis*	CBS 497.91	FMR 14902		*Coffea arabica*	Unknown	GU238059	GU237870	GU237597	**LT623247**
			CGMCC 3.18114	T	Air sample	China	KY742194	KY742040	KY742282	KY742128
A. piperis		CBS 268.93		T	*Peperomia pereskiifolia*	Netherlands	GU238129	GU237816	GU237644	KT389554
A. tropica		CBS 436.75	FMR 14903	T	*Saintpaulia ionantha*	Germany	GU238149	GU237864	GU237663	KT389556
A. zantedeschiae		CBS 131.93			*Calla* sp.	The Netherlands	GU238159	FJ427084	FJ427188	KT389557
		CBS 229.32			*Cicer arietinum*	Romania	KT389690	KT389473	KT389558	KT389767
Alternariaster bidentis		CBS 134021	CPC 19479	T	*Bidens sulphurea*	Brazil	KC609341	KC609333	–	KC609347
A. helianthi		CBS 327.69	IFO 9089		*Helianthus annuus*	Unknown	KC584369	KC609335	–	KC584494
Ascochyta herbicola		CBS 629.97			Water	USA	GU238083	GU237898	GU237614	KP330421
A. pisi		CBS 126.54	AFTOL-ID 1583		*Pisum sativum*	The Netherlands	DQ678070	GU237772	GU237531	DQ677967
A. rabiei		CBS 206.30			Unknown	Unknown	KT389695	KT389478	KT389772	KT389559
A. versabilis		CBS 876.97			*Silene* sp.	The Netherlands	GU238152	GU237909	GU237664	KT389561
A. viciae		CBS 451.68			*Vicia sepium*	The Netherlands	KT389701	KT389484	KT389778	KT389562
Boeremia exigua		CBS 118.38			*Cheiranthus cheiri*	Denmark	KT389706	KT389489	KT389783	KT389582
		CBS 119.38			*Nicotiana tabacum*	Unknown	KT389707	KT389490	KT389784	KT389583
B. lycopersici		CBS 378.67			*Solanum lycopersicum*	The Netherlands	GU237950	GU237848	GU237512	KT389580
Briansuttonomyces eucalypti		CBS 114879	CPC 362	T	*Eucalyptus* sp.	South Africa	KU728519	KU728479	KU728595	–
		CBS 114887	CPC 363		*Eucalyptus* sp.	South Africa	KU728520	KU728480	KU728596	–
Calophoma aquilegiicola		CBS 107.96			*Aconitum pyramidale*	The Netherlands	GU238041	GU237735	GU237581	KT389586
		CBS 108.96			*Aquilegia* sp.	The Netherlands	GU238042	GU237736	GU237582	–
C. clematidina		CBS 102.66			*Clematis* sp.	UK	FJ515630	FJ426988	FJ427099	KT389587
		CBS 108.79		T	*Clematis* sp.	The Netherlands	FJ515632	FJ426989	FJ427100	KT389588
C. clematidis-rectae		CBS 507.63		T	*Clematis* sp.	The Netherlands	FJ515647	FJ515606	FJ515624	KT389589
C. rosae			CGMCC 3.18347	T	*Rosa* sp.	China	KY742203	KY742049	KY742291	KY742135
			LC 8119		*Rosa* sp.	China	KY742204	KY742050	KY742292	KY742136

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
Camarosporidiella aborescentis	*Camarosporium aborescentis*		MFLUCC 14-0604	T	*Colutea arborescens*	Russia	KP711378	KP711377	–	–
	Camarosporium arezzoensis		MFLUCC 14-0238	T	*Cytisus* sp.	Italy	KP120927	KP120926	–	–
C. aureum	*Camarosporium aureum*		MFLUCC 14-0620	T	*Cotinus coggygria*	Russia	KP744478	KP744436	–	–
C. clematidis	*Camarosporium clematidis*		MFLUCC 13-0336	T	*Clematis vitalba*	Italy	KJ562188	KJ562213	–	–
C. elongata	*Cucurbitaria elongata*		MFLUCC 14-0260		*Cytisus scoparius*	Italy	KJ724249	–	–	–
	Cucurbitaria elongata	CBS 171.55	AFTOL-ID 1568		*Cytisus sessilifolius*	France	DQ678061	–	–	DQ677957
C. robiniicola	*Camarosporium robiniicola*		MFLUCC 13-0527		*Robinia pseudacacia*	Italy	KJ589412	KJ562214	–	–
C. spartii	*Camarosporium spartii*		MFLUCC 13-0548		*Cytisus* sp.	Italy	KJ589413	KJ562215	–	–
Camarosporium quaternatum		CBS 142617	CPC 23216		*Daphne mezereum*	Germany	KY929170	KY929135	–	–
		CBS 142616	CPC 31081	T	*Lycium barbarum*	Hungary	KY929136	KY929171	–	–
			CPC 31518		*Lycium barbarum*	Hungary	KY929172	KY929137	–	–
Camarosporomyces flavigenus		CBS 314.80		T	Water	Romania	GU238076	KY929138	–	–
Coniothyrium palmarum		CBS 758.73	CMW 5283		*Phoenix dactylifera*	Israel	JX681085	–	–	–
		CBS 400.71			*Chamaerops humilis*	Italy	EU754153	AY720708	KT389792	KT389592
C. telephii		CBS 188.71			Air sample	Finland	GQ387599	JF740188	KT389793	KT389593
		CBS 856.97			Mineral wool	Finland	GQ387600	JF740189		
Cucurbitaria berberidis			MFLUCC 11-0387		*Berberis vulgaris*	Austria	KC506796	–	–	–
		CBS 130007	FMR 15751; MFLUCC 11-0384; CB1	T	*Berberis vulgaris*	Austria	KC506793	**LT717673**	**LT717676**	**LT854936**
Cumuliphoma indica	*Phoma omnivirens*	**CBS 654.77**	**FMR 15341**	T	Unknown	India	GU238122	FJ427043	FJ427153	**LT623261**
	Phoma omnivirens	**CBS 991.95**	**FMR 15331**		Soil	Papua New Guinea	GU238121	FJ427044	FJ427154	**LT623262**
C. omnivirens	*Phoma omnivirens*	**CBS 341.86**	**FMR 14915**	T	*Phaseolus vulgaris*	Belgium	**LT623214**	FJ427042	FJ427152	**LT623260**
C. pneumoniae	*Phoma* sp.	**CBS 142454**	**UTHSC:DI16-249; FMR 13739**	T	Human respiratory tract	USA	LN907392	**LT592925**	**LT592994**	**LT593063**
Cucurbidothis pityophila		CBS 149.32	FMR 15744		Unknown	The Netherlands	JX681087	GQ203756	**LT854934**	**LT854935**
Didymella aeria			LC 8120		Air sample	China	KY742206	KY742052	KY742294	KY742138
			CGMCC 3.18353	T	Air sample	China	KY742205	KY742051	KY742137	KY742293
D. aliena		CBS 379.93			*Berberis* sp.	The Netherlands	GU238037	GU237851	GU237578	KP330416
D. americana		CBS 185.85			*Zea mays*	USA	GU237990	FJ426972	FJ427088	KT389594
D. anserina		CBS 253.80			Unknown	Germany	KT389715	KT389498	KT389795	KT389595
	Peyronellaea sp.		UTHSC:DI16-255; FMR 13745		Human respiratory tract	USA	LN907398	**LT592926**	**LT592995**	**LT593064**

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
D. aquatica			CGMCC 3.18349	T	Water	China	KY742209	KY742055	KY742297	KY742140
			LC 5555		Water	China	KY742210	KY742056	KY742298	KY742141
D. arachidicola		CBS 333.75		T	Arachis hypogaea	South Africa	GU237996	GU237833	GU237554	KT389598
D. aurea		CBS 269.93		T	Medicago polymorpha	New Zealand	GU237999	GU237818	GU237557	KT389599
D. bellidis		CBS 714.85			Bellis perennis	The Netherlands	GU238046	GU237904	GU237586	KP330417
D. boeremae		CBS 109942		T	Medicago littoralis cv. Harbinger	Australia	GU238048	FJ426982	FJ427097	KT389600
D. brunneospora	Didymella sp.	**CBS 115.58**	**FMR 15745**	T	Chrysanthemum roseum	Germany	KT389723	KT389505	KT389802	KT389625
D. chenopodii		CBS 128.93			Chenopodium quinoa cv. Sajana	Peru	GU238055	GU237775	GU237591	KT389602
D. chloroguttulata			CGMCC 3.18351	T	Air sample	China	KY742211	KY742057	KY742299	KY742142
			LC 8122		Air sample	China	KY742212	KY742058	KY742300	KY742143
D. coffeae-arabicae		CBS 123380	PD 84/1013	T	Coffea arabica	Ethiopia	GU238005	FJ426993	FJ427104	KT389603
D. curtisii			PD 92/1460		Sprekelia sp.	The Netherlands	GU238012	FJ427041	FJ427151	KT389604
D. ellipsoidea			CGMCC 3.18350	T	Air sample	China	KY742214	KY742060	KY742302	KY742145
			LC 8123		Air sample	China	KY742215	KY742061	KY742303	KY742146
D. eucalyptica		CBS 377.91			Eucalyptus sp.	Australia	GU238007	GU237846	GU237562	KT389605
D. exigua		CBS 183.55		T	Rumex arifolius	France	EU754155	GU237794	GU237525	EU874850
D. gardeniae		CBS 626.68	IMI 108771; FMR 14901	T	Gardenia jasminoides	India	GQ387595	FJ427003	FJ427114	KT389606
	Peyronellaea sp.		UTHSC:DI16-211; FMR 13701		Human superficial tissue	USA	LN907354	**LT592908**	**LT592977**	**LT593046**
	Peyronellaea calorpreferens		UTHSC:DI16-226; FMR 13716		Human superficial tissue	USA	LN907369	**LT592913**	**LT592982**	**LT593051**
	Peyronellaea sp.		UTHSC:DI16-274; FMR 13765		Human superficial tissue	USA	LN907417	**LT592933**	**LT593002**	**LT593071**
	Peyronellaea sp.		UTHSC:DI16-295; FMR 13788		Human superficial tissue	USA	LN907438	**LT592944**	**LT593013**	**LT593083**
D. glomerata		CBS 528.66		T	Chrysanthemum sp.	The Netherlands	JX681105	FJ427013	FJ427124	GU371781
	Peyronellaea glomerata		UTHSC:DI16-205; FMR 13695		Human superficial tissue	USA	LN907348	**LT592905**	**LT592974**	**LT593043**
D. heteroderae		CBS 109.92	PD 73/1405	T	Undefined food material	The Netherlands	GU238002	FJ426983	FJ427098	KT389601
	Peyronellaea calorpreferens		UTHSC:DI16-190; FMR 13680		Human superficial tissue	USA	LN907333	**LT592896**	**LT592965**	**LT593034**

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
	Peyronellaea calorpreferens		UTHSC:DI16-224; FMR 13714		Human superficial tissue	USA	LN907367	**LT592911**	**LT592980**	**LT593049**
	Peyronellaea calorpreferens		UTHSC:DI16-227; FMR 13717		Human superficial tissue	USA	LN907370	**LT592914**	**LT592983**	**LT593052**
	Peyronellaea calorpreferens		UTHSC:DI16-231; FMR 13721		Human superficial tissue	USA	LN907374	**LT592918**	**LT592987**	**LT593056**
	Peyronellaea calorpreferens		UTHSC:DI16-232; FMR 13722		Human deep tissue/ fluids	USA	LN907375	**LT592919**	**LT592988**	**LT593057**
	Peyronellaea calorpreferens		UTHSC:DI16-234; FMR 13724		Human superficial tissue	USA	LN907377	**LT592921**	**LT592990**	**LT593059**
	Peyronellaea calorpreferens		UTHSC:DI16-235; FMR 13725		Human superficial tissue	USA	LN907378	**LT592922**	**LT592991**	**LT593060**
	Peyronellaea calorpreferens		UTHSC:DI16-305; FMR 13798		Human respiratory tract	USA	LN907448	**LT592951**	**LT593020**	**LT593090**
D. ilicicola			CGMCC 3.18355	T	*Ilex chinensis*	Italy	KY742219	KY742065	KY742307	KY742150
			LC 8127		*Ilex chinensis*	Italy	KY742220	KY742066	KY742308	KY742151
D. infuscatispora			CGMCC 3.18356	T	*Chrysanthemum indicum*	China	KY742221	KY742067	KY742309	KY742152
			LC 8129		*Chrysanthemum indicum*	China	KY742222	KY742068	KY742310	–
D. keratinophila	*Peyronellaea* sp.	**CBS 143032**	**UTHSC:DI16-200; FMR 13690**	T	Human superficial tissue	USA	LN907343	**LT592901**	**LT592970**	**LT593039**
	Peyronellaea sp.		**UTHSC:DI16-228; FMR 13718**		Human superficial tissue	USA	LN907371	**LT592915**	**LT592984**	**LT593053**
	Phoma sp.		**UTHSC:DI16-282; FMR 13774**		Human superficial tissue	USA	LN907425	**LT592938**	**LT593007**	**LT593077**
D. lethalis		CBS 103.25			Unknown	Unknown	GU238010	GU237729	GU237564	KT389607
D. macrophylla			CGMCC 3.18357	T	*Hydrangea macrophylla*	Italy	KY742224	KY742070	KY742312	KY742154
			LC 8132		*Hydrangea macrophylla*	Italy	KY742225	KY742071	KY742313	KY742155
D. macrostoma		CBS 223.69			*Acer pseudoplatanus*	Switzerland	GU238096	GU237801	GU237623	KT389608
D. maydis		CBS 588.69		T	*Zea mays*	USA	EU754192	FJ427086	FJ427190	GU371782
D. microchlamydospora		CBS 105.95		T	*Eucalyptus* sp.	UK	GU238104	FJ427028	FJ427138	KP330424
	Phoma sp.		UTHSC:DI16-199; FMR 13689		Human superficial tissue	USA	LN907342	**LT592900**	**LT592969**	**LT593038**

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
	Peyronellaea sp.		UTHSC:DI16-365; FMR 13858		Human superficial tissue	USA	LN907508	**LT592964**	**LT593033**	**LT593103**
D. molleriana		CBS 229.79			Digitalis purpurea	New Zealand	GU238067	GU237802	GU237605	KP330418
D. musae	Phoma sp.		UTHSC:DI16-230; FMR 13720		Human superficial tissue	USA	LN907373	**LT592917**	**LT592986**	**LT593055**
		CBS 463.69	FMR 15339		Mangifera indica	India	GU238011	FJ427026	FJ427136	**LT623248**
D. negriana		CBS 358.71			Vitis vinifera	Germany	GU238116	GU237838	GU237635	KT389610
			ICMP 10845; LC 5249		Vitis vinifera	former Yugoslavia	KY742227	KY742073	KY742315	–
D. nigricans		CBS 444.81	PD 77/919		Actinidea chinensis	New Zealand	GU238001	GU237915	GU237559	KT389611
D. ocimicola			CGMCC 3.18358	T	Ocimum sp.	China	KY742232	KY742078	KY742320	–
			LC 8138		Ocimum sp.	China	KY742233	KY742079	KY742321	–
D. pedeiae		CBS 124517		T	Schefflera elegantissima	The Netherlands	GU238127	GU237770	GU237642	KT389612
D. pinodella		CBS 531.66			Trifolium pratense	USA	GU238017	FJ427052	FJ427162	KT389613
D. pinodes		CBS 525.77		T	Pisum sativum	Belgium	GU238023	GU237883	GU237572	KT389614
		CBS 374.84	FMR 15345		Pisum sativum	The Netherlands	EU754135	JF810523	**LT623229**	**LT623249**
D. pomorum		CBS 285.76		T	Heracleum dissectum	Russia	GU238025	FJ427053	FJ427163	KT389615
D. protuberans		CBS 381.96	FMR 14899	T	Lycium halifolium	The Netherlands	GU238029	GU237853	GU237574	KT389620
	Peyronellaea sp.		UTHSC:DI16-302; FMR 13795		Environmental	USA	LN907445	**LT592949**	**LT593018**	**LT593088**
D. pteridis		CBS 379.96	FMR 15750		Pteris sp.	The Netherlands	KT389722	KT389504	KT389801	KT389624
D. rhei		CBS 109177			Rheum rhaponticum	New Zealand	GU238139	GU237743	GU237653	KP330428
D. rumicicola	Didymella acetosellae	CBS 179.97			Rumex hydrolapathum	The Netherlands	GU238034	GU237793	GU237575	KP330415
		CBS 683.79		T	Rumex obtusifolius	New Zealand	KT389721	KT389503	KT389800	KT389622
D. sancta		CBS 281.83		T	Ailanthus altissima	South Africa	GU238030	FJ427063	FJ427170	KT389623
		CBS 644.97	FMR 15351		Opuntia ficus-indica	Argentina	**LT623211**	FJ427064	FJ427171	**LT623250**
D. segeticola			CGMCC 3.17489	T	Cirsium segetum	China	KP330455	KP330443	KP330399	KP330414
			CGMCC 3.17498		Cirsium segetum	China	KP330454	KP330442	KP330398	KP330413
D. sinensis			LC 8142		Dendrobium officinale	China	KY742241	KY742087	KY742329	KY742166
			LC 8143		Dendrobium officinale	China	KY742242	KY742088	KY742330	KY742167
Didymella sp.	Didymella segeticola		LC 8141		Camellia sasanqua	Japan	KY742238	KY742084	KY742326	KY742164
D. subglomerata		CBS 110.92			Triticum sp.	USA	GU238032	FJ427080	FJ427186	KT389626

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
D. suiyangensis			CGMCC 3.18352	T	Air sample	China	KY742243	KY742089	KY742330	KY742168
			LC 8144		Air sample	China	KY742244	KY742090	KY742332	KY742169
D. viburnicola		CBS 523.73			*Viburnum cassioides*	The Netherlands	GU238155	GU237879	GU237667	KP330430
Dothidotthia aspera		CBS 119688	CPC 12932		*Acer negundo*	USA	EU673275	–	–	–
D. symphoricarpi		CBS 119687	CPC 12929	T	*Symphoricarpos rotundifolius*	USA	EU673273	–	–	–
Ectophoma multirostrata	*Phoma multirostrata*	**CBS 110.79**	**FMR 15342**		*Cucumis sativus*	The Netherlands	GU238110	FJ427030	FJ427140	**LT623264**
	Phoma multirostrata	**CBS 274.60**	**FMR 15335**	T	Soil	Maharashtra	GU238111	FJ427031	FJ427141	**LT623265**
	Phoma multirostrata	**CBS 368.65**	**FMR 15336**		Unknown	India	GU238112	FJ427033	FJ427143	**LT623266**
E. pomi	*Phoma pereupyrena*	**CBS 267.92**	**FMR 15346**	T	*Coffea arabica*	India	GU238128	GU237814	GU237643	**LT623263**
Epicoccum brasiliense		CBS 120105	FMR 14907	T	*Amaranthus* sp.	Brazil	GU238049	GU237760	GU237588	KT389627
E. camelliae			CGMCC 3.18343	T	*Camellia sinensis*	China	KY742245	KY742091	KY742333	KY742170
	Epicoccum sorghinum		UTHSC:DI16-201; FMR 13691		Human respiratory tract	USA	LN907344	**LT592902**	**LT592971**	**LT593040**
	Epicoccum sorghinum		UTHSC:DI16-202; FMR 13692		Human superficial tissue	USA	LN907345	**LT592903**	**LT592972**	**LT593041**
	Epicoccum sorghinum		UTHSC:DI16-206; FMR 13696		Human superficial tissue	USA	LN907349	**LT592906**	**LT592975**	**LT593044**
	Epicoccum sorghinum		UTHSC:DI16-280; FMR 13772		Human superficial tissue	USA	LN907423	**LT592937**	**LT593006**	**LT593076**
	Epicoccum sorghinum		UTHSC:DI16-338; FMR 13831		Human superficial tissue	USA	LN907481	**LT592959**	**LT593028**	**LT593098**
	Epicoccum sorghinum		UTHSC:DI16-345; FMR 13838		Human subcutaneous tissue	USA	LN907488	**LT592961**	**LT593030**	**LT593100**
			LC 4862		*Camellia sinensis*	China	KY742246	KY742092	KY742334	KY742171
E. catenisporum	*Epicoccum sorghinum*	**CBS 181.80**	**FMR 14911**	T	*Oryza sativa*	Guinea-Bissau	**LT623213**	FJ427069	FJ427175	**LT623253**
E. dendrobii			CGMCC 3.18359	T	*Dendrobium fimbriatum*	China	KY742247	KY742093	KY742335	–
			LC 8146		*Dendrobium fimbriatum*	China	KY742248	KY74209	KY742336	-
E. draconis		CBS 186.83	FMR 14908		*Dracaena* sp.	Rwanda	GU238070	GU237795	GU237607	KT389628
E. duchesneae			LC 8147		*Duchesnea indica*	China	KY742250	KY742096	KY742338	–
			CGMCC 3.18345	T	*Duchesnea indica*	China	KY742249	KY742095	KY742337	–
E. henningsii		CBS 104.80			*Acacia mearnsii*	Kenya	GU238081	GU237731	GU237612	KT389629
E. hordei			CGMCC 3.18360	T	*Hordeum vulgare*	Australia	KY742251	KY742097	KY742339	–

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
			LC 8149		*Hordeum vulgare*	Australia	KY742252	KY742098	KY742340	–
E. huancayense		CBS 105.80		T	*Solanum* sp.	Peru	GU238084	GU237732	GU237615	KT389630
E. italicum			CGMCC 3.18361	T	*Acca sellowiana*	Italy	KY742253	KY742099	KY742341	KY742172
			LC 8151		*Acca sellowiana*	Italy	KY74225	KY742100	KY742342	KY742173
E. keratinophilum	*Phoma* sp.		**UTHSC:DI16-244; FMR 13734**		Human superficial tissue	USA	LN907387	**LT592924**	**LT592993**	**LT593062**
	Phoma sp.		**UTHSC:DI16-258; FMR 13748**		Human respiratory tract	USA	LN907401	**LT592928**	**LT592997**	**LT593066**
	Phoma sp.	**CBS 142455**	**UTHSC:DI16-271; FMR 13762**	T	Human superficial tissue	USA	LN907414	**LT592930**	**LT592999**	**LT593068**
	Phoma sp.		**UTHSC:DI16-272; FMR 13763**		Human superficial tissue	USA	LN907415	**LT592931**	**LT593000**	**LT593069**
	Phoma sp.		**UTHSC:DI16-299; FMR 13792**		Human deep tissue/ fluids	USA	LN907442	**LT592947**	**LT593016**	**LT593086**
E. latusicollum	*Epicoccum sorghinum*		UTHSC:DI16-197; FMR 13687		Human superficial tissue	USA	LN907340	**LT592898**	**LT592967**	**LT593036**
			CGMCC 3.18346	T	*Sorghum bicolor*	China	KY742255	KY742101	KY742343	KY742174
			LC 4859		*Camellia sinensis*	China	KY742256	KY742102	KY742344	KY742175
E. layuense			CGMCC 3.18362	T	*Perilla* sp.	China	KY742261	KY742107	KY742349	–
			LC 8156		*Perilla* sp.	China	KY742262	KY742108	KY742350	–
E. nigrum		CBS 125.82			Human toe nail	The Netherlands	GU237974	FJ426995	FJ427106	KT389631
		CBS 173.73		T	*Dactylis glomerata*	USA	GU237975	FJ426996	FJ427107	KT389632
E. ovisporum	*Epicoccum sorghinum*	**CBS 180.80**	**FMR 14910**	T	*Zea mays*	South Africa	**LT623212**	FJ427068	FJ427174	**LT623252**
E. pimprinum			PD 77/1028		Soil	India	GU237977	FJ427050	FJ427160	KT389633
E. plurivorum		CBS 558.81	FMR 14909	T	*Setaria* sp.	New Zealand	GU238132	GU237888	GU237647	KT389634
E. pneumoniae	*Epicoccum sorghinum*		**UTHSC:DI16-257; FMR 13747**	T	Human respiratory tract	USA	LN907400	**LT592927**	**LT592996**	**LT593065**
E. poae			LC 8161		*Poa annua*	USA	KY742268	KY742114	KY742356	KY742183
			CGMCC 3.18363	T	*Poa annua*	USA	KY742267	KY742113	KY742355	KY742182
			LC 8162		*Poa annua*	USA	KY742269	KY742115	KY742357	KY742184
E. proteae	*Phoma proteae*	**CBS 114179**	**CPC 1854; FMR 15332**	T	*Protea* cv. carnival	South Africa	JQ044452	JQ044433	**LT623230**	**LT623251**
E. sorghinum		CBS 179.80			*Sorghum vulgare*	Puerto Rico	GU237978	FJ427067	FJ427173	KT389635
		CBS 627.68			*Citrus* sp.	France	GU237979	FJ427072	FJ427178	KT389636
						USA	LN907431	**LT592940**	**LT593009**	**LT593079**

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
			UTHSC:DI16-288; FMR 13780		Human superficial tissue					
			UTHSC:DI16-301; FMR 13794		Human respiratory tract	USA	LN907444	**LT592948**	**LT593017**	**LT593087**
E. viticis			BRIP 29294; LC 5257		Andropogon gayanus	Australia	KY742271	KY742117	KY742359	–
			CGMCC 3.18344	T	Vitex negundo	China	KY742272	KY742118	KY742360	KY742186
Foliophoma fallens		CBS 161.78			Olea europaea	New Zealand	GU238074	KY929147	–	KC584502
		CBS 284.70			Nerium oleander	Italy	GU238078	KY929148	–	–
Halojulella avicenniae			BCC 18422		Mangrove wood	Thailand	GU371823	–	–	GU371787
			BCC 20173		Mangrove wood	Thailand	GU371822	–	–	GU371786
Heterophoma adonidis		CBS 114309			Adonis vernalis	Sweden	KT389724	KT389506	KT389803	KT389637
H. nobilis		CBS 507.91			Dictamnus albus	The Netherlands	GU238065	GU237877	GU237603	KT389638
H. verbascicola			CGMCC 3.18364	T	Verbascum thapsus	China	KY742273	KY742119	KY742361	KY742187
			LC 8164		Verbascum thapsus	China	KY742274	KY742120	KY742362	KY742188
Juxtiphoma eupyrena	Phoma eupyrena	**CBS 374.91**	**FMR 15329**		Solanum tuberosum	The Netherlands	GU238072	FJ426999	FJ427110	**LT623268**
	Phoma eupyrena	**CBS 527.66**	**FMR 15337**		Wheat field soil	Germany	GU238073	FJ427000	FJ427111	**LT623269**
Leptosphaeria conoidea		CBS 616.75			Lunaria annua	The Netherlands	JF740279	JF740201	KT389804	KT389639
L. doliolum		CBS 505.75		T	Urtica dioica	The Netherlands	GQ387576	JF740205	JF740144	KT389640
Leptosphaerulina americana		CBS 213.55			Trifolium pratense	USA	GU237981	GU237799	GU237539	KT389641
L. australis		CBS 317.83			Eugenia aromatica	Indonesia	EU754166	GU237829	GU237540	GU371790
Libertasomyces myopori		CBS 141302	CPC 27354	T	Myoporum serratum	South Africa	KX228332	NR_145200	–	–
L. platani		CBS 142112	CPC 29609	T	Platanus sp.	New Zealand	KY173507	KY173416	KY173604	KY173585
L. quercus		CBS 134.97	INIFAT C96/108	T	Quercus ilex	Spain	DQ377883	–	–	–
Macroventuria anomochaeta		CBS 525.71		T	Decayed canvas	South Africa	GU237984	GU237881	GU237544	GU456346
M. wentii		CBS 526.71		T	Plant litter	USA	GU237986	GU237884	GU237546	KT389642
Microsphaeriopsis olivacea		CBS 233.77			Pinus laricio	France	GU237988	GU237803	GU237549	KT389643
M. proteae		CBS 111319	CPC 1425		Protea nitida	South Africa	JN712563	JN712497	–	JN712650
Neoascochyta argentina		CBS 112524		T	Triticum aestivum	Argentina	KT389742	KT389524	KT389822	–
N. cylindrispora	Ascochyta sp.		UTHSC:DI16-352; FMR 13845		Human superficial tissue	USA	LN907495	**LT592962**	**LT593031**	**LT593101**
	Ascochyta sp.	**CBS 142456**	UTHSC:DI16-359; FMR 13852	T	Human superficial tissue	USA	LN907502	**LT592963**	**LT593032**	**LT593102**
N. desmazieri		CBS 297.69		T	Lolium perenne	Germany	KT389726	KT389508	KT389807	KT389644

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
	Ascochyta sp.		UTHSC:DI16-207; FMR 13697		Human respiratory tract	USA	LN907350	**LT592907**	**LT592976**	**LT593045**
	Ascochyta sp.		UTHSC:DI16-320; FMR 13813		Unknown	USA	LN907463	**LT592956**	**LT593025**	**LT593095**
	Ascochyta sp.		UTHSC:DI16-332; FMR 13825		Human superficial tissue	USA	LN907475	**LT592958**	**LT593027**	**LT593097**
	Ascochyta sp.		UTHSC:DI16-341; FMR 13834		Human superficial tissue	USA	LN907484	**LT592960**	**LT593029**	**LT593099**
N. europaea		CBS 820.84		T	*Hordeum vulgare*	Germany	KT389729	KT389511	KT389809	KT389646
N. exitialis		CBS 118.40			Unknown	Unknown	KT389732	KT389514	KT389812	KT389647
		CBS 389.86			*Triticum aestivum*	Switzerland	KT389733	KT389515	KT389813	KT389648
N. graminicola		CBS 301.69			*Lolium multiflorum*	Germany	KT389737	KT389519	KT389817	KT389650
N. graminicola		CBS 816.84			*Hordeum vulgare*	Germany	KT389741	KT389523	KT389821	KT389651
N. paspali		CBS 560.81		T	*Paspalum dilatatum*	New Zealand	GU238124	FJ427048	FJ427158	KP330426
N. soli			LC 8166		Soil	China	KY742276	KY742122	KY742364	–
			CGMCC 3.18365	T	Soil	China	KY742275	KY742121	KY742363	–
N. tardicrescens	*Neoascochyta* sp.	**CBS 689.97**	**FMR 15352**	T	Hay	Norway	KT389744	KT389526	KT389824	KT389654
	Ascochyta sp.		**UTHSC:DI16-291; FMR 13783**		Human superficial tissue	USA	LN907434	**LT592942**	**LT593011**	**LT593081**
N. triticicola		CBS 544.74		T	*Triticum aestivum*	South Africa	EU754134	GU237887	GU237488	KT389652
Neocamarosporium betae		CBS 109410	PD 77/113		*Beta vulgaris*	Unknown	EU754178	KY940790	–	GU371774
		CBS 523.66	IHEM 3915; PD 66/270		*Beta vulgaris*	The Netherlands	EU754179	FJ426981	KT389842	KT389670
N. calvescens		CBS 246.79	PD 77/655		*Atriplex hastata*	Germany	EU754131	KY940774	–	KC584500
N. goegapense		CBS 138008	CPC 23676	T	*Mesembryanthemum* sp.	South Africa	KJ869220	KJ869163	–	–
Neocucurbitaria aquatica	*Pyrenochaeta quercina*	**CBS 297.74**	**FMR 14867**	T	Sea water	Montenegro	EU754177	**LT623221**	**LT623238**	**LT623278**
N. cava	*Pyrenochaeta cava*	**CBS 115979**	**FMR 15333**		Unknown	The Netherlands	EU754198	AY853248	**LT623234**	**LT623273**
	Pyrenochaeta cava	**CBS 257.68**	**FMR 15747; IMI 331911**	T	Wheat-field soil	Germany	EU754199	JF740260	KT389844	**LT717681**
N. hakeae	*Pyrenochaeta hakeae*	**CBS 142109**	**CPC 28920**	T	*Hakea* sp.	Australia	KY173526	KY173436	KY173613	KY173593
N. irregularis	*Pyrenochaeta unguis-hominis*	**CBS 142791**	**UTHSC:DI16-229; FMR 13719**	T	Human subcutaneous tissue	USA	LN907372	**LT592916**	**LT592985**	**LT593054**
N. keratinophila	*Pyrenochaeta keratinophila*	**CBS 121759**	**FMR 9444**	T	Man corneal scrapings	Spain	**LT623215**	EU885415	**LT623236**	**LT623275**
N. quercina	*Pyrenochaeta quercina*	CBS 115095	FMR 14868	T	*Quercus robur*	Italy	GQ387619	**LT623220**	**LT623237**	**LT623277**

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
N. unguis-hominis	*Pyrenochaeta unguis-hominis*		UTHSC:DI16-213; FMR 13703		Unknown	USA	LN907356	**LT592910**	**LT592979**	**LT593048**
	Pyrenochaeta unguis-hominis	CBS 111112	FMR 14866		*Agapornis* sp. Lung	The Netherlands	GQ387623	**LT623222**	**LT623239**	**LT623279**
	Pyrenochaeta unguis-hominis	CBS 112.79	FMR 15748		Air sample	Wales	GQ387622	**LT717672**	**LT717675**	**LT717682**
Neodidymelliopsis achlydis		CBS 256 77		T	*Achlys triphylla*	Canada	KT389749	KT389531	KT389829	–
N. cannabis		CBS 234.37			*Cannabis sativa*	Unknown	GU237961	GU237804	GU237523	KP330403
N. longicolla	*Phoma* sp.		UTHSC:DI16-322; FMR 13815		Human respiratory tract	USA	LN907465	**LT592957**	**LT593026**	**LT593096**
		CBS 382 96		T	Soil in desert	Israel	KT389750	KT389532	KT389830	–
N. polemonii		CBS 109181		T	*Polemonium caeruleum*	The Netherlands	GU238133	GU237746	KT389828	KP330427
N. xanthina		CBS 383.68		T	*Delphinium* sp.	The Netherlands	GU238157	GU237855	KT389831	KP330431
Neomicrosphaeriopsis italica			MFLUCC 15-0485	T	*Tamarix* sp.	Italy	KU729854	KU900318	–	KU674820
			MFLUCC 15-0484		*Tamarix* sp.	Italy	KU729853	KU900319	KX453298	KU695539
Neophaeosphaeria agaves		CBS 136429	CPC 21264	T	*Agave tequilana* var. azul	Mexico	KF777227	NR_137833	–	–
N. filamentosa		CBS 102202			*Yucca rostrata*	Mexico	GQ387577	JF740259	–	GU371773
Neoplatysporoides aloicola		CBS 139901	CPC 24435	T	*Aloe* sp.	Tanzania	KR476754	KR476719	–	–
Neopyrenochaeta acicola	*Pyrenochaeta acicola*	**CBS 812.95**	**FMR 14872**	T	Waterpipe	The Netherlands	GQ387602	**LT623218**	**LT623232**	**LT623271**
N. fragariae	*Pyrenochaeta acicola*	**CBS 101634**	**FMR 14871**	T	*Fragaria ananassa*	The Netherlands	GQ387603	**LT623217**	**LT623231**	**LT623270**
N. inflorescentiae	*Pyrenochaeta inflorescentiae*	**CBS 119222**	**FMR 15334**	T	*Protea neriifolia*	South Africa	EU552153	EU552153	**LT623233**	**LT623272**
N. telephoni	*Pyrenochaeta telephoni*	**CBS 139022**	**FMR 15754**	T	Screen of a mobile phone	India	KM516290	KM516291	**LT717678**	**LT717685**
Neopyrenochaetopsis hominis	*Pyrenochaeta* sp.	**CBS 143033**	**UTHSC:DI16-238; FMR 13728**	T	Human superficial tissue	USA	LN907381	**LT592923**	**LT592992**	**LT593061**
Nothophoma anigozanthi		CBS 381.91	FMR 14914	T	*Anigozanthus maugleisii*	The Netherlands	GU238039	GU237852	GU237580	KT389655
N. arachidis-hypogaeae		CBS 125.93			*Arachis hypogaea*	India	GU238043	GU237771	GU237583	KT389656
N. gossypiicola		CBS 377.67	FMR 14912		*Gossypium* sp.	USA	GU238079	GU237845	GU237611	KT389658
	Phoma sp.		UTHSC:DI16-294; FMR 13787		Human deep tissue/fluids	USA	LN907437	**LT592943**	**LT593012**	**LT593082**
N. infossa		CBS 123395		T	*Fraxinus pennsylvanica*	Argentina	GU238089	FJ427025	FJ427135	KT389659
N. macrospora		CBS 140674	UTHSC:DI16-276; FMR 13767	T	Human respiratory tract	USA	LN880537	LN880536	LN880539	**LT593073**

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
N. quercina		CBS 633.92	FMR 14913		*Quercus* sp.	Ukraine	EU754127	GU237900	GU237609	KT389657
	Leptosphaerulina sp.		UTHSC:DI16-270; FMR 13761		Human superficial tissue	USA	LN907413	**LT592929**	**LT592998**	**LT593067**
N. variabilis	*Phoma* sp.	**CBS 142457**	**UTHSC:DI16-285; FMR 13777**	T	Human respiratory tract	USA	LN907428	**LT592939**	**LT593008**	**LT593078**
Ochrocladosporium elatum		CBS 146.33	IMI 049629; ATCC 11280		Wood pulp	Sweden	EU040233	EU040233	–	–
O. frigidarii		CBS 103.81		T	Cooled room	Germany	EU040234	EU040234	–	–
Ophiosphaerella herpotricha		CBS 620.86	AFTOL-ID 1569		*Bromus erectus*	Switzerland	DQ678062	KF498728	–	DQ677958
Paraboeremia adianticola		CBS 187.83	FMR 15344		*Polystichum adiantiforme*	USA	GU238035	GU237796	GU237576	KP330401
P. camelliae			CGMCC 3.18106	T	*Camellia* sp.	China	KX829042	KX829034	KX829058	KX829050
			CGMCC 3.18107		*Camellia* sp.	China	KX829043	KX829035	KX829059	KX829051
			CGMCC 3.18108		*Camellia* sp.	China	KX829044	KX829036	KX829060	KX829052
P. litseae			CGMCC 3.18109	T	*Litsea* sp.	China	KX829037	KX829029	KX829053	KX829045
			CGMCC 3.18110		*Litsea* sp.	China	KX829038	KX829030	KX829054	KX829046
P. oligotrophica			CGMCC 3.18111	T	Limestone	China	KX829039	KX829031	KX829055	KX829047
			CGMCC 3.18112		Limestone	China	KX829040	KX829032	KX829056	KX829048
P. putaminum		CBS 130.69	FMR 15338		*Malus sylvestris*	Denmark	GU238138	GU237777	GU237652	**LT623254**
P. selaginellae		CBS 122.93	FMR 15348	T	*Selaginella* sp.	The Netherlands	GU238142	GU237762	GU237656	**LT623255**
Paraconiothyrium estuarinum		CBS 109850	FMR 14887	T	Sediment from estuarine	Brazil	JX496129	JX496016	JX496355	**LT854937**
Paracucurbitaria italica	*Pyrenochaeta corni*	**CBS 234.92**	FMR 14869	T	*Olea europaea*	Italy	EU754176	**LT623219**	**LT623235**	**LT623274**
P. corni	*Pyrenochaeta corni*	**CBS 248.79**	**FMR 16593**		*Fraxinus excelsior*	The Netherlands	GQ387608	**LT903672**	**LT900365**	**LT903673**
Paraepicoccum amazonense			MFLUCC 15-0493		*Tamarix* sp.	Italy	KU900294	KU752190	–	KU820871
			MFLUCC 15-0491		*Tamarix* sp.	Italy	KU900295	KU752191	–	KU820872
Paraleptosphaeria dryadis		CBS 643.86	ETH 9446		*Dryas octopetala*	Switzerland	GU301828	JF740213	–	GU371733
Parapyrenochaeta acaciae	*Pyrenochaeta acaciae*	**CBS 141291**	**FMR 15755; CPC 25527**	T	*Acacia* sp.	Australia	KX228316	KX228265	**LT717679**	**LT717686**
P. protearum	*Pyrenochaeta protearum*	**CBS 131315**	**FMR 15752; CPC 18322**	T	*Protea mundii*	South Africa	JQ044453	JQ044434	**LT717677**	**LT717683**
	Pyrenochaeta pinicola	**CBS 137997**	**FMR 15753; CPC 23455**		*Pinus* sp.	France	KJ869209	KJ869152	KJ869249	**LT717684**

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
Phaeomycocentrospora cantuariensis		CBS 132014	CPC 11694		*Humulus scandens*	South Korea	GU253716	GU269668	–	–
			CPC 10157		*Humulus scandens*	South Korea	GU253712	GU269664	–	–
Phaeosphaeria oryzae		CBS 110110		T	*Oryza sativa*	Korea	KF251689	KF251186	KF252680	–
Phoma herbarum		CBS 502.91			*Nerium* sp.	The Netherlands	GU238082	GU237874	GU237613	KP330419
		CBS 615.75	FMR 15340		*Rosa multiflora* cv. *Cathayensis*	The Netherlands	KF251715	FJ427022	KF252703	KP330420
		CBS 377.92			Human leg	UK	KT389756	KT389536	KT389837	KT389663
			UTHSC:DI16-319; FMR 13812		Human superficial tissue	USA	LN907462	**LT592955**	**LT593024**	**LT593024**
			UTHSC:DI16-204; FMR 13694		Human deep tissue/ fluids	USA	LN907347	**LT592904**	**LT592973**	**LT593042**
			UTHSC:DI16-212; FMR 13702		Human respiratory tract	USA	LN907355	**LT592909**	**LT592978**	**LT593047**
			UTHSC:DI16-306; FMR 13799		Human respiratory tract	USA	LN907449	**LT592952**	**LT593021**	**LT593091**
			UTHSC:DI16-307; FMR 13800		Human respiratory tract	USA	LN907450	**LT592953**	**LT593022**	**LT593092**
Phomatodes aubrietiae		CBS 627.97		T	*Aubrietia* sp.	The Netherlands	GU238045	GU237895	GU237585	KT389665
P. nebulosa		CBS 100191			*Thlaspi arvense*	Poland	KP330446	KP330434	KP330390	KT389666
		CBS 740.96			*Armoracia rusticana*	The Netherlands	KT389758	KT389540	KT389839	KT389667
Pleiochaeta ghindensis		CBS 552.92			*Acacia mellifera*	Namibia	EU167561	EU167561	–	–
P. setosa		CBS 496.63	MUCL 8091		*Cytisus racemosus*	Germany	EU167563	EU167563	–	–
Pleospora herbarum		CBS 191.86		T	*Medicago sativa*	Uttar Pradesh	JX681120	NR_111243	–	KC584471
P. typhicola		CBS 132.69			*Typha angustifolia*	The Netherlands	JF740325	–	KT389843	KC584505
Preussia terricola			AFTOL-ID 282; DAOM 230091		Unknown	Unknown	AY544686	KT225529	–	DQ470895
Pseudoascochyta novae-zelandiea		CBS 141689	FMR 15110; ICMP 10493	T	*Cordyline australis*	New Zealand	LT592893	LT592892	LT592894	LT592895
P. pratensis		CBS 141688	FMR 14524	T	Soil	Spain	LT223131	LT223130	LT223132	LT223133
Pseudopyrenochaeta lycopersici	*Pyrenochaeta lycopersici*	**CBS 306.65**	**FMR 15746**	T	*Lycopersicon esculentum*	Germany	EU754205	NR_103581	**LT717674**	**LT717680**
P. terretris	*Pyrenochaeta lycopersici*	**CBS 282.72**	**FMR 15327**	T	Soil	The Netherlands	LT623216	LT623228	LT623246	LT623287
Pyrenochaeta nobilis		CBS 407.76	FMR 14870	T	*Laurus nobilis*	Italy	EU754206	EU930011	KT389845	**LT623276**
Pyrenochaetopsis americana	*Pyrenochaetopsis* sp.				Unknown	USA	LN907368	**LT592912**	**LT592981**	**LT593050**

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
			UTHSC:DI16-225; FMR 13715							
P. botulispora	Pyrenochaetopsis sp.		UTHSC:DI16-289; FMR 13781		Human respiratory tract	USA	LN907432	**LT592941**	**LT593010**	**LT593080**
	Pyrenochaetopsis sp.		UTHSC:DI16-297; FMR 13790		Human superficial tissue	USA	LN907440	**LT592945**	**LT593014**	**LT593084**
	Pyrenochaetopsis sp.	**CBS 142458**	**UTHSC:DI16-298; FMR 13791**	T	Human respiratory tract	USA	LN907441	**LT592946**	**LT593015**	**LT593085**
P. confluens	Pyrenochaetopsis sp.	**CBS 142459**	**UTHSC:DI16-303; FMR 13796**	T	Human deep tissue/ fluids	USA	LN907446	**LT592950**	**LT593019**	**LT593089**
P. decipiens		CBS 343.85	FMR 14880	T	Globodera pallida	The Netherlands	GQ387624	**LT623223**	**LT623240**	**LT623280**
P. globosa	Pyrenochaetopsis sp.	**CBS 143034**	**UTHSC:DI16-275; FMR 13766**	T	Human superficial tissue	USA	LN907418	**LT592934**	**LT593003**	**LT593072**
P. indica		CBS 124454	FMR 14879	T	Saccharum officinarum	India	GQ387626	**LT623224**	**LT623241**	**LT623281**
P. leptospora		CBS 101635	FMR 14877	T	Secale cereale	Unknow	GQ387627	JF740262	**LT623242**	**LT623282**
	Coniothyrium cereale	CBS 122787	FMR 14873		Unknown	Germany	EU754151	**LT623225**	**LT623243**	**LT623283**
P. microspora	Pyrenochaetopsis sp.		UTHSC:DI16-198; FMR 13688		Human superficial tissue	USA	LN907341	**LT592899**	**LT592968**	**LT593037**
		CBS 102876	FMR 14874	T	Water	Montenegro	GQ387631	**LT623226**	**LT623244**	**LT623284**
P. paucisetosa	Pyrenochaetopsis sp.	**CBS 142460**	**UTHSC:DI16-193; FMR 13683**	T	Human superficial tissue	USA	LN907336	**LT592897**	**LT592966**	**LT593035**
P. poae		CBS 136769	FMR 14876	T	Poa sp.	The Netherlands	KJ869175	KJ869117	KJ869243	**LT623286**
P. setosissima	Pyrenochaetopsis microspora	**CBS 119739**	**FMR 14875**	T	Coffea arabica	Brazil	GQ387632	**LT623227**	**LT623245**	**LT623285**
P. tabarestanensis		CBS 139506	IBRC-M 30051	T	Soil	Iran	KF803343	KF730241	KX789523	–
P. uberiformis	Pyrenochaetopsis sp.	**CBS 142461**	**UTHSC:DI16-277; FMR 13769**	T	Human superficial tissue	USA	LN907420	**LT592935**	**LT593004**	**LT593074**
Querciphoma carteri		CBS 105.91			Quercus robur	Germany	KF251712	JF740181	KF252700	KT389591
Remotididymella anthropophila	Phoma sp.	**CBS 142462**	**UTHSC:DI16-278; FMR 13770**	T	Human respiratory tract	USA	LN907421	**LT592936**	**LT593005**	**LT593075**
R. destructiva	Phoma destructiva var. destructiva	**CBS 133.93**	**FMR 15349**		Solanum lycopersicon	Guadeloupe	GU238064	GU237779	GU237602	**LT623257**
	Phoma destructiva var. destructiva	**CBS 378.73**	**FMR 15328**	T	Lycopersicon esculentum	Tonga	GU238063	GU237849	GU237601	**LT623258**
	Phoma destructiva var. diversispora	**CBS 162.78**	**FMR 14906**		Lycopersicon esculentum	The Netherlands	GU238062	GU237788	GU237600	**LT623259**

Table 1. (Continued).

Species	Old name	CBS strain[1] no.	Other strain[1] no.	Status[2]	Host, substrate	Country	GenBank accession numbers[3]			
							LSU	ITS	TUB	RPB2
Shiraia bambusicola			NBRC 30754		*Phyllostachys* sp.	Japan	AB354969	AB354988	AB355003	–
			NBRC 30771		*Phyllostachys* sp.	Japan	AB354971	AB354990	AB355005	–
			NBRC 30753		*Phyllostachys* sp.	Japan	AB354968	AB354987	AB355002	–
			NBRC 30772		*Phyllostachys* sp.	Japan	AB354972	AB354991	AB355006	–
Similiphoma crystallifera	*Phoma crystallifera*	**CBS 193.82**	**FMR 15343**	T	*Chamaespartium sagittale*	Austria	GU238060	GU237797	GU237598	**LT623267**
Sporormiella minima		CBS 524.50	AFTOL-ID 1256		Dung of goat	Panama	DQ678056	KT389543	–	DQ677950
Stagonosporopsis dorenboschii		CBS 426.90		T	*Physostegia virginiana*	The Netherlands	GU238185	GU237862	GU237690	KT389678
S. hortensis		CBS 572.85			*Phaseolus vulgaris*	The Netherlands	GU238199	GU237893	GU237704	KT389681
Staurosphaeria aloes	*Hazslinszkyomyces aloes*	CBS 136437	CPC 21572	T	*Aloe dichotoma*	South Africa	KF777198	NR_137821	–	–
S. aptrootii	*Hazslinszkyomyces aptrootii*	CBS 483.95		T	*Lycium* sp.	The Netherlands	GU301806	KY929149	–	–
S. lyciicola	*Hazslinszkyomyces lycii*	CBS 142619	CPC 30998	T	*Lycium barbarum*	Hungary	KY929180	KY929150	–	–
	Hazslinszkyomyces lycii		CPC 31014		*Lycium barbarum*	Hungary	KY929181	KY929151	–	–
Vacuiphoma bulgarica	*Phoma bulgarica*	**CBS 357.84**	**FMR 14917**	T	*Trachystemon orientale*	Bulgaria	GU238050	GU237837	GU237589	**LT623256**
V. oculihominis	*Phoma* sp.		**UTHSC:DI16-308; FMR 13801**	T	Human superficial tissue	USA	LN907451	**LT592954**	**LT593023**	**LT593093**
Xenodidymella applanata		CBS 205.63			*Rubus idaeus*	The Netherlands	GU237998	GU237798	GU237556	KP330402
		CBS 115577			*Rubus idaeus*	Sweden	KT389762	KT389546	KT389850	KT389688
X. asphodeli		CBS 375.62		T	*Asphodelus albus*	France	KT389765	KT389549	KT389853	KT389689
X. catariae		CBS 102635			*Nepeta catenaria*	The Netherlands	GU237962	GU237727	GU237524	KP330404
X. humicola		CBS 220.85			*Franseria* sp.	USA	GU238086	GU237800	GU237617	KP330422
X. saxea	*Phoma saxea*	**CBS 419.92**	**FMR 15347**	T	Corroded mediterranean marble	Unknown	GU238141	GU237860	GU237655	KP330429
Xenopyrenochaetopsis pratorum	*Pyrenochaetopsis pratorum*	**CBS 445.81**	**FMR 14878**	T	*Lolium perenne*	New Zealand	GU238136	JF740263	KT389846	KT389671

[1] **AFTOL**: Assembling the Fungal Tree of Life; **ATCC**: American Type Culture Collection, Virginia, USA; **BCC**: Biotec Culture Collection, Pathum Thani, Thailand; **BCCM/IHEM**: Biomedical Fungi and Yeasts Collection, Louvain-la-Neuve, Belgium; **BCCM/MUCL**: Mycothèque de l'Université catholique de Louvain, Louvain-la-Neuve, Belgium; **BRIP**: Plant Pathology Herbarium, Department of Employment, Economic, Development and Innovation, Queensland, Australia; **CBS**: Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands; **CGMCC**: China General Microbiological Culture Collection, Beijing, China; **CMW**: Collection of the Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, South Africa; **CPC**: Culture collection of Pedro Crous, housed at CBS; **DAOM**: Canadian Collection of Fungal Cultures, Ottawa, Canada; **ETH**: Herbaria of the department of Environmental Systems Science. Institute of Integrative Biology, Zürich, Switzerland; **FMR**, Facultat de Medicina, Universitat Rovira i Virgili, Reus, Spain; **IBRC**: Iranian Biological Resources Center, Tehran, Iran; **ICMP**: International Collection of Microorganisms from Plants, Auckland, New Zealand; **IFO**: Institute for Fermentation, Osaka, Japan, now NBRC; **IMI**: International Mycological Institute, CABI-Bioscience, Egham, Bakeham Lane, U.K.; **INIFAT**: Instituto de Investigaciones Fundamentales en Agricultura Tropical "Alejandro de Humboldt", Santiago de las Vegas, Cuba; **LC**: Corresponding author's personal collection deposited in laboratory, housed at CAS, China; **MFLUCC**: Mae Fah Luang University Culture Collection, Chiang Rai, Thailand; **NBRC**: Biological Resource Center, National Institute of Technology and Evaluation, Chiba, Japan; **PD**: Plant Protection Service, Wageningen, the Netherlands; **UTHSC**, Fungus Testing Laboratory at the University of Texas Health Science Center, San Antonio, Texas, USA.

[2] T: ex-type strain

[3] ITS: internal transcibed spacer regions 1 & 2 including 5.8S nrDNA gene; LSU: 28S large subunit of the nrRNA gene; *RPB2*: RNA polymerase II second subunit; *TUB*: ß-tubulin.
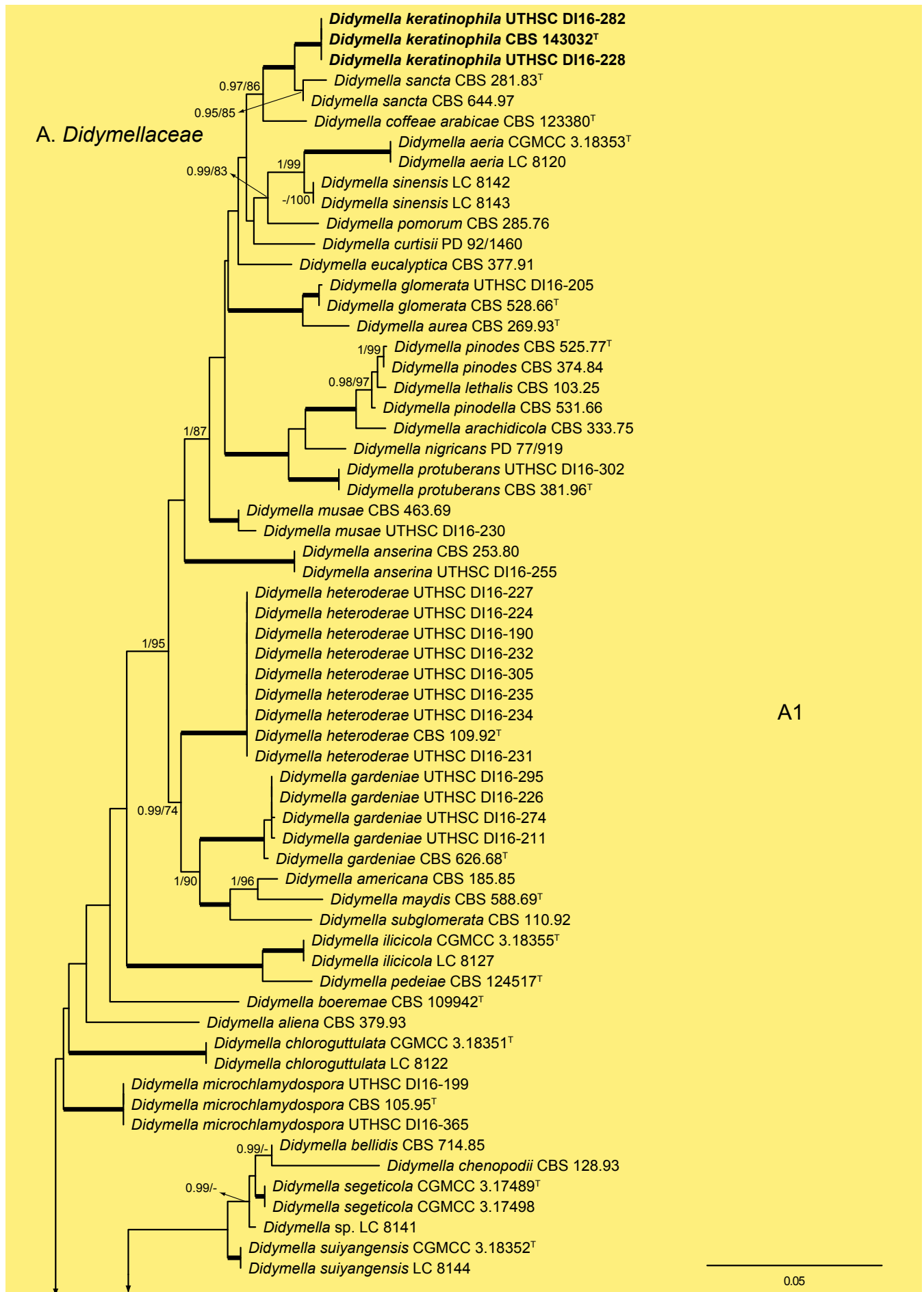
Fig. 1. Phylogenetic tree inferred from a Maximum likelihood analysis based on a concatenated alignment of LSU, ITS, *tub*2 and *rpb*2 sequences of 357 strains representing species in *Cucurbitariaceae*, *Didymellaceae* and allied families within *Pleosporales*. The Bayesian posterior probabilities (PP) above 0.95 and the RAxML bootstrap support

(see Table 1), the final matrices used for phylogenetic analyses in TreeBASE (www.treebase.org; accession number: S21115) and the novel taxonomic descriptions and nomenclature in MycoBank (www.mycobank.org; Crous *et al.* 2004).

RESULTS

Phylogenetic analyses

The final concatenated dataset obtained with both ML and Bayesian analysis contained 357 ingroup strains with a total of 1 888 characters including gaps (519 for LSU, 336 for ITS, 434 for *tub*2 and 599 for *rpb*2), of which 742 are parsimony informative (132 for LSU, 111 for ITS, 149 for *tub*2 and 350 for *rpb*2). The sequence datasets did not show conflict in the tree topologies for the 70 % reciprocal bootstrap trees, which allowed to combine the four genes for the multi-locus analysis.

The ML analysis showed similar tree topology and was congruent with that obtained in the Bayesian analysis. For the BI multi-locus analysis, a total of 34 677 trees were sampled after the burn-in with a stop value of 0.01. The support values were slightly different with the two analysis methods; with BI, posterior probabilities being higher than the ML bootstrap support values (Fig. 1).

The phylogenetic tree distinguished two main supported clades corresponding to the suborders *Massarineae* (1 PP / 100 % BS), with only the family *Didymosphaeriaceae* (clade T) here included, and *Pleosporineae* (1 PP / 74 % BS), emcompassing over 19 families (clades A–S), respectively. Four of the families of the latter suborder are proposed here as new, i.e., *Pseudopyrenochaetaceae* (clade D), *Neopyrenochaetaceae* (clade E), *Pyrenochaetopsidaceae* (clade F) and *Parapyrenochaetaceae* (clade N). The main clade of the *Pleosporineae* corresponded to the *Didymellaceae* (clade A) showing 25 well-supported terminal clades with the only exception being *Epicoccum* (A2). Twenty terminal clades corresponded to known genera and six are proposed here as new: *Ectophoma* (A7), *Remotididymella* (A8), *Similiphoma* (A9), *Cumuliphoma* (A12), *Juxtiphoma* (A13) and *Vacuiphoma* (A14). The genus *Didymella* (A1; 1 PP / 90 % BS), comprised 48 species and one undescribed, including two proposed here as new: *D. keratinophila* sp. nov. (the type strain CBS 143032, UTHSC DI16-228 and UTHSC DI16-282), which is phylogenetically close to *D. sancta* and *D. coffeae-arabicae*, and *D. brunneospora* sp. nov. (CBS 115.58). Several of the clinical strains included in *Didymella* were distributed among seven known species, i.e., *D. heteroderae* (nine strains), *D. gardeniae* (four strains), *D. microchlamydospora* (two strains), and *D. anserina*, *D. glomerata*, *D. musae* and *D. protuberans* with only one strain for each. *Epicoccum* (A2; unsupported) was represented by 17 previously described species (including the type species *E. nigrum*), the new species *E. catenisporum* sp. nov., *E. ovisporum* sp. nov., *E. pneumoniae* sp. nov. (phylogenetically related with *E. camelliae*, *E. latusicollum*, *E. sorghinum* and *E. viticis*), and *E. keratinophilum* sp. nov. (phylogenetically related with *E. brasiliense* and *E. draconis*). Finally, *E. proteae*

(basionym *Phoma proteae*), which clustered with *E. huancayense*, is here combined in *Epicoccum*. *Allophoma* (clade A3; 1 PP / 96 % BS) is enlarged with *A. cylindrispora* sp. nov., previously identified as *Phoma* sp. (Valenzuela-Lopez *et al.* 2016), clustering with *A. minor* and *A. piperis*. The clades from A4 to A6 encompassed three genera i.e. *Heterophoma* (A4; 1 PP / 98 % BS), *Stagonosporopsis* (A5; 1 PP / 75 % BS) and *Boeremia* (A6; 1 PP / 100 % BS). The new genus *Ectophoma* (clade A7; 1 PP / 100 % BS) comprise two new combinations previously included in *Phoma*, i.e. the generic type *E. multirostrata* (syn. *P. multirostrata*) and *E. pomi* (syn. *P. pereupyrena*). The new genus *Remotididymella* (A8; 0.97 PP / 91 % BS) comprised *R. destructiva* comb. nov. (basionym *Phoma destructiva*), the type species, and the new species *R. anthropophila*. For *Phoma crystallifera* the new monotypic genus *Similiphoma* (clade A9) and the new combination *S. crystallifera* are proposed. The clade corresponding to the genus *Paraboeremia* (clade A10; 1 PP / 99 % BS) included the six accepted species. *Macroventuria* formed a well-supported clade (A11; 1 PP / 100 % BS) and included the ex-type strains of *M. anomochaeta* and *M. wentii*. *Cumuliphoma* gen. nov. (clade A12; 1 PP / 94 % BS) included *C. omnivirens* comb. nov. (syn. *Phoma omnivirens*), *C. indica* sp. nov. (with two strains previously identified as *P. omnivirens*) and *C. pneumoniae* sp. nov., the latter represented by a clinical strain. The proposed new monotypic genus *Juxtiphoma* (clade A13; 1 PP / 100 % BS), includes two strains of *J. eupyrena* comb. nov. (basionym *Phoma eupryena*). The new genus *Vacuiphoma* (clade A14; 1 PP / 100 % BS), included the type species *V. bulgarica* comb. nov. (basionym *Phoma bulgarica*) and the new species *V. oculihominis* described from a sterile clinical strain (UTHSC DI16-308). The genus *Nothophoma* (clade A15; 1 PP / 95 % BS) comprised seven species, including the generic type, *N. infossa*, and *N. variabilis* sp. nov., which is based on a clinical strain phylogenetically related with the ex-type strain of *N. anigozanthi*. The clade corresponding to *Ascochyta* (clade A16; 1 PP / 92 % BS), grouped five species, including the type species *A. pisi*. Clade A17 (1 PP / 100 % BS) included the type species of *Phomatodes* (*P. aubrietiae*) and two strains of *P. nebulosa*, the other species of the genus. The *Briansuttonomyces* clade (A18, 1 PP / 100 % BS), included two strains of the only species of the genus, *B. eucalypti*. The clade A19 (1 PP / 100 % BS) encompassed the ex-type strains of the two species of *Pseudoascochyta*, *P. novae-zelandiae* and *P. pratensis*. The *Neomicrosphaeropsis* clade (A20; 1 PP / 100 % BS), contained the type species of the genus, *N. italica*. In *Phoma* (A21; 1 PP / 100 % BS) eight strains were grouped, all of them identified as *P. herbarum* (five from clinical origin and three reference strains). The genus *Calophoma* (A22; 1 PP / 93 % BS) comprised four species: *C. aquilegiicola*, *C. clematidis-rectae*, *C. clematidina* (type species of the genus) and *C. rosae*. The clade corresponding to *Leptosphaerulina* (A23; 1 PP / 100 % BS) contained the two known species, *L. americana* and *L. australis*. *Xenodidymella* (A24; - PP / 74 % BS), grouped the four species of this genus and the new combination *Xenodidymella saxea* (basionym *Phoma saxea*), which forms a basal clade with a strain of *X. humicola*. The clade A25 (1 PP / 100 % BS) included five species of *Neodidymelliopsis*. *Neoascochyta* (A26; 1 PP / 98 % BS) represented a basal clade of the

values (BS) above 70 % are given at the nodes (PP/BS). Fully supported branched (1 PP/100 BS) are indicated in bold. Some branches were shortened to fit them to the page, these are indicated by two diagonal lines with the number of times a branch was shortened. Newly proposed taxa are given in bold. Type strains are indicated by a superscript T. The tree was rooted with *Preussia terricola* (AFTOL-ID 828) and *Sporormiella minima* (CBS 524.50).
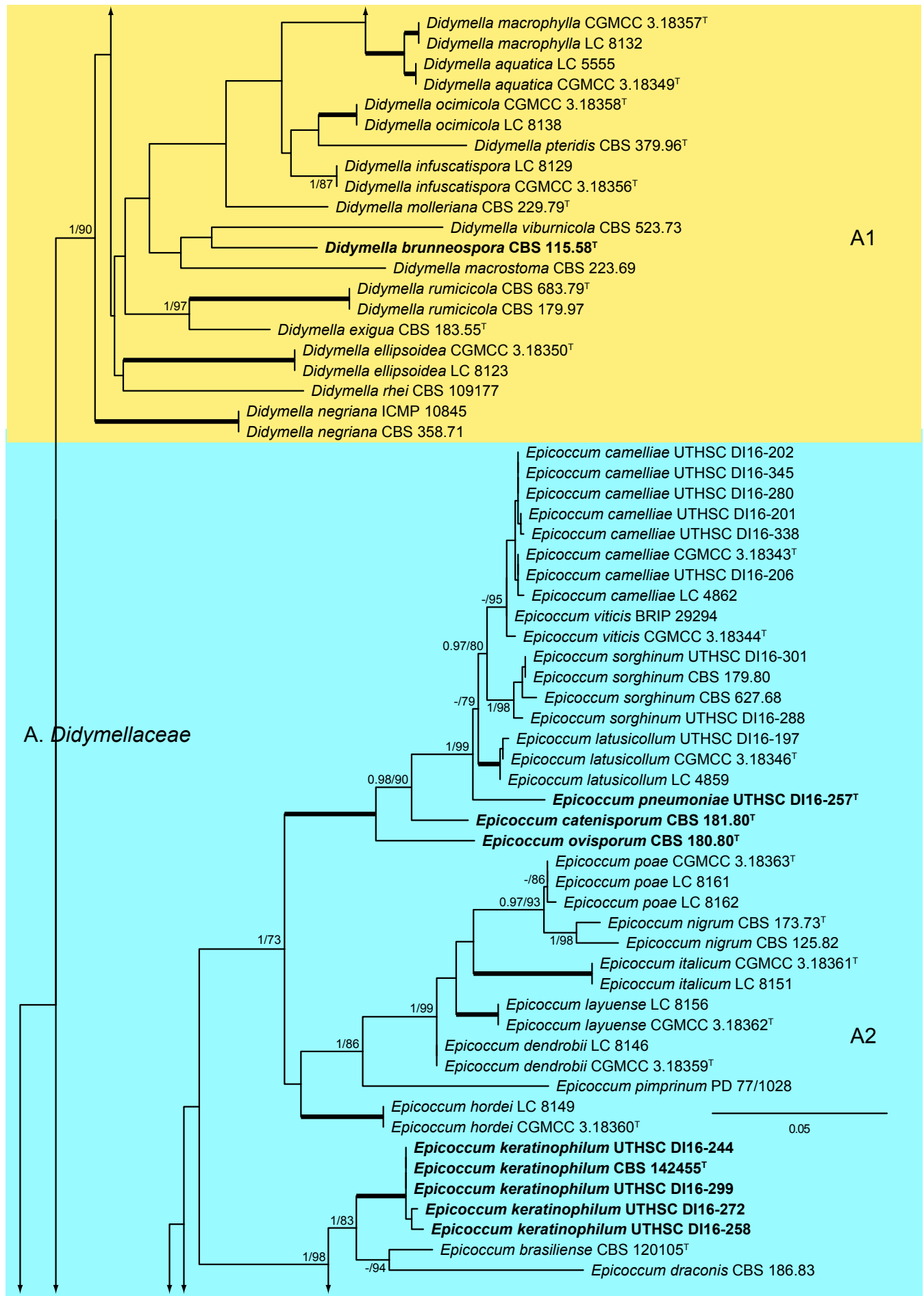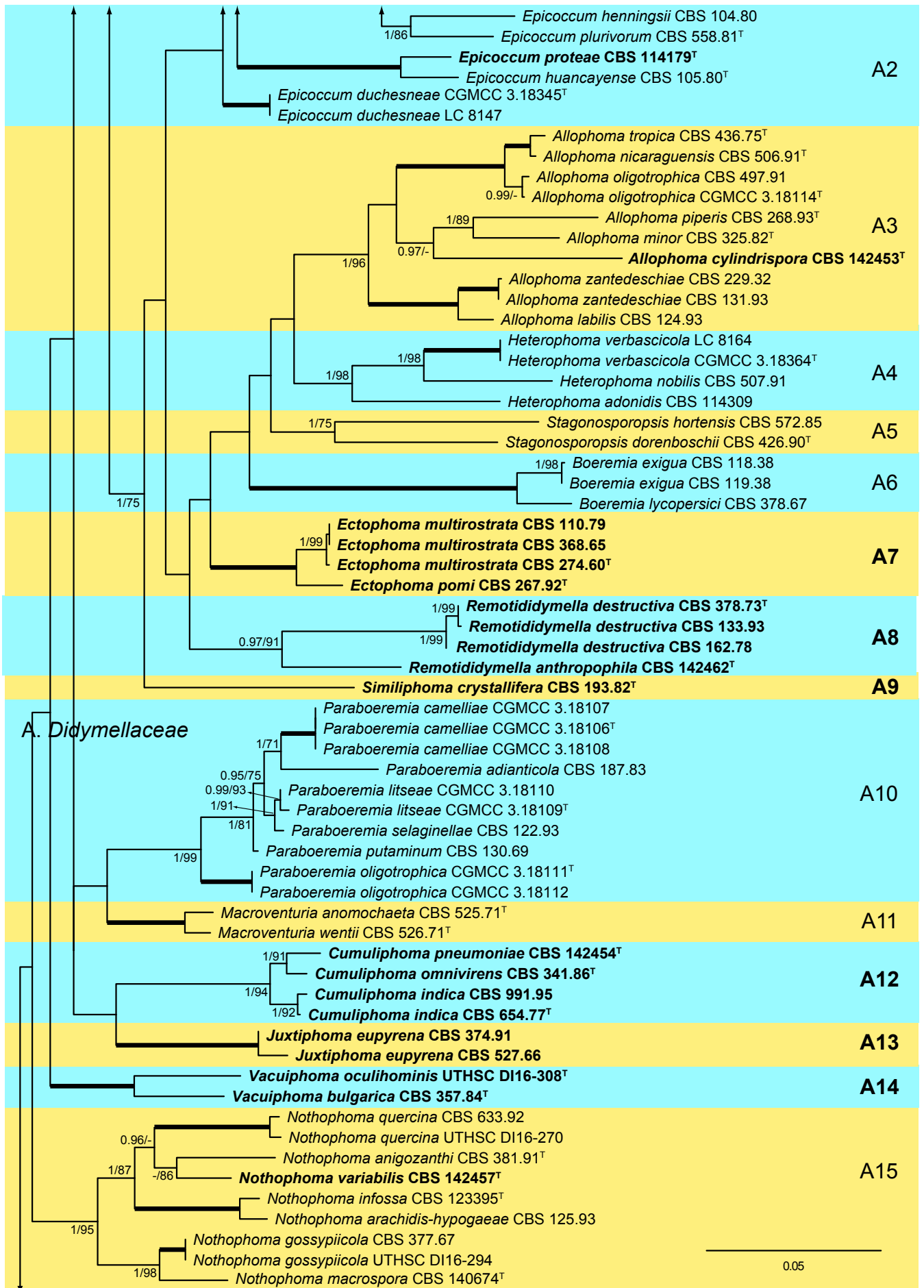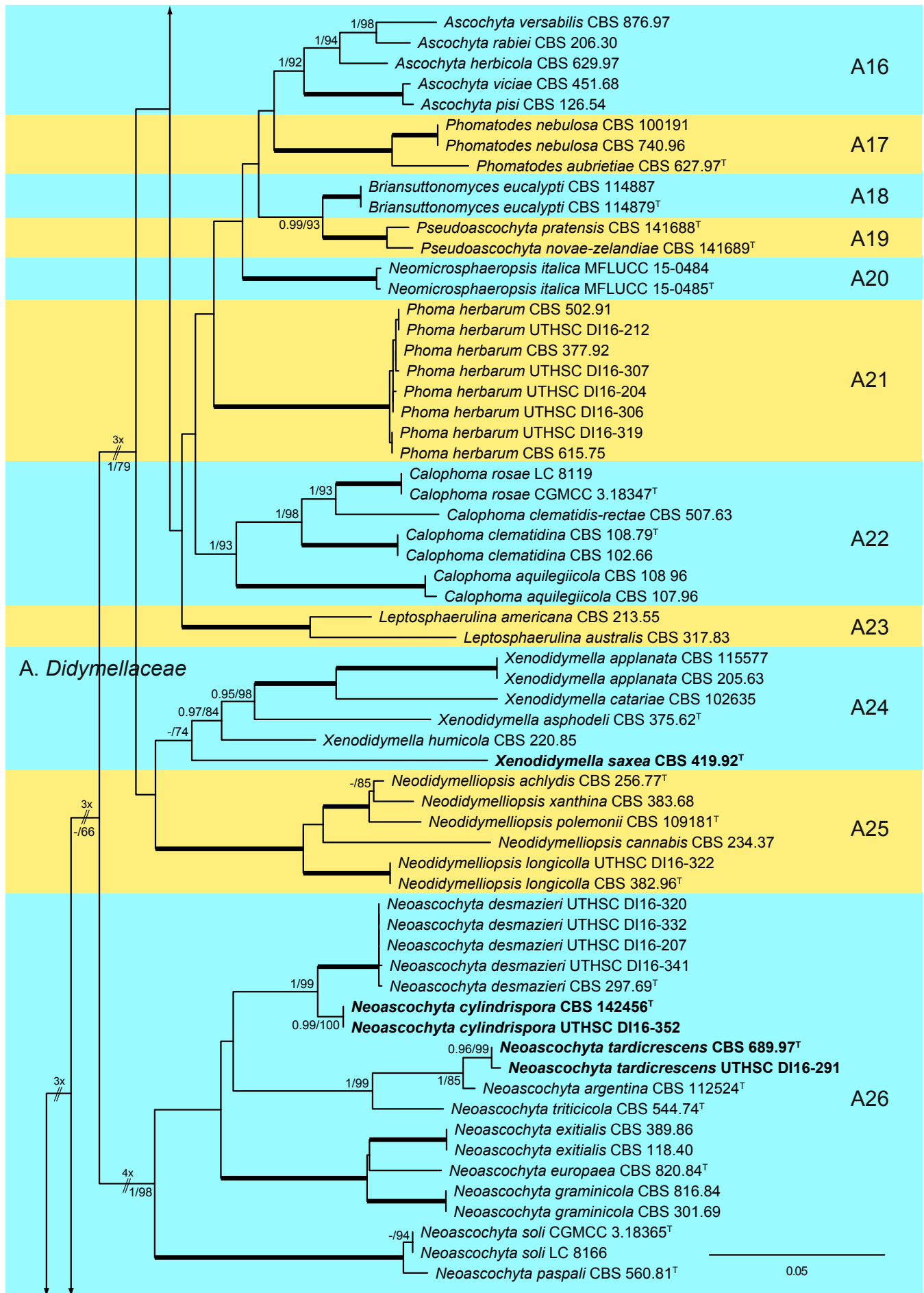
Fig. 1. (Continued).

Epicoccum henningsii CBS 104.80
1/86 — *Epicoccum plurivorum* CBS 558.81^T
***Epicoccum proteae* CBS 114179^T**
Epicoccum huancayense CBS 105.80^T
Epicoccum duchesneae CGMCC 3.18345^T
Epicoccum duchesneae LC 8147

A2

Allophoma tropica CBS 436.75^T
Allophoma nicaraguensis CBS 506.91^T
Allophoma oligotrophica CBS 497.91
0.99/- *Allophoma oligotrophica* CGMCC 3.18114^T
1/89 *Allophoma piperis* CBS 268.93^T
Allophoma minor CBS 325.82^T
0.97/- ***Allophoma cylindrispora* CBS 142453^T**
Allophoma zantedeschiae CBS 229.32
Allophoma zantedeschiae CBS 131.93
Allophoma labilis CBS 124.93

A3

Heterophoma verbascicola LC 8164
1/98 *Heterophoma verbascicola* CGMCC 3.18364^T
1/98 *Heterophoma nobilis* CBS 507.91
Heterophoma adonidis CBS 114309

A4

1/75 *Stagonosporopsis hortensis* CBS 572.85
Stagonosporopsis dorenboschii CBS 426.90^T

A5

1/98 *Boeremia exigua* CBS 118.38
Boeremia exigua CBS 119.38
Boeremia lycopersici CBS 378.67

A6

1/99 ***Ectophoma multirostrata* CBS 110.79**
***Ectophoma multirostrata* CBS 368.65**
***Ectophoma multirostrata* CBS 274.60^T**
***Ectophoma pomi* CBS 267.92^T**

A7

1/99 ***Remotididymella destructiva* CBS 378.73^T**
***Remotididymella destructiva* CBS 133.93**
0.97/91 1/99 ***Remotididymella destructiva* CBS 162.78**
***Remotididymella anthropophila* CBS 142462^T**

A8

***Similiphoma crystallifera* CBS 193.82^T**

A9

1/75

Paraboeremia camelliae CGMCC 3.18107
Paraboeremia camelliae CGMCC 3.18106^T
1/71 *Paraboeremia camelliae* CGMCC 3.18108
Paraboeremia adianticola CBS 187.83
0.95/75 *Paraboeremia litseae* CGMCC 3.18110
0.99/93 *Paraboeremia litseae* CGMCC 3.18109^T
1/91 *Paraboeremia selaginellae* CBS 122.93
1/81 *Paraboeremia putaminum* CBS 130.69
Paraboeremia oligotrophica CGMCC 3.18111^T
1/99 *Paraboeremia oligotrophica* CGMCC 3.18112

A10

Macroventuria anomochaeta CBS 525.71^T
Macroventuria wentii CBS 526.71^T

A11

1/91 ***Cumuliphoma pneumoniae* CBS 142454^T**
***Cumuliphoma omnivirens* CBS 341.86^T**
1/94 ***Cumuliphoma indica* CBS 991.95**
1/92 ***Cumuliphoma indica* CBS 654.77^T**

A12

***Juxtiphoma eupyrena* CBS 374.91**
***Juxtiphoma eupyrena* CBS 527.66**

A13

***Vacuiphoma oculihominis* UTHSC DI16-308^T**
***Vacuiphoma bulgarica* CBS 357.84^T**

A14

A. Didymellaceae

Nothophoma quercina CBS 633.92
0.96/- *Nothophoma quercina* UTHSC DI16-270
Nothophoma anigozanthi CBS 381.91^T
1/87 -/86 ***Nothophoma variabilis* CBS 142457^T**
Nothophoma infossa CBS 123395^T
Nothophoma arachidis-hypogaeae CBS 125.93
Nothophoma gossypiicola CBS 377.67
1/95 *Nothophoma gossypiicola* UTHSC DI16-294
1/98 *Nothophoma macrospora* CBS 140674^T

A15

0.05

Fig. 1. (Continued).

A16
- *Ascochyta versabilis* CBS 876.97
- *Ascochyta rabiei* CBS 206.30
- *Ascochyta herbicola* CBS 629.97
- *Ascochyta viciae* CBS 451.68
- *Ascochyta pisi* CBS 126.54

A17
- *Phomatodes nebulosa* CBS 100191
- *Phomatodes nebulosa* CBS 740.96
- *Phomatodes aubrietiae* CBS 627.97ᵀ

A18
- *Briansuttonomyces eucalypti* CBS 114887
- *Briansuttonomyces eucalypti* CBS 114879ᵀ

A19
- *Pseudoascochyta pratensis* CBS 141688ᵀ
- *Pseudoascochyta novae-zelandiae* CBS 141689ᵀ

A20
- *Neomicrosphaeropsis italica* MFLUCC 15-0484
- *Neomicrosphaeropsis italica* MFLUCC 15-0485ᵀ

A21
- *Phoma herbarum* CBS 502.91
- *Phoma herbarum* UTHSC DI16-212
- *Phoma herbarum* CBS 377.92
- *Phoma herbarum* UTHSC DI16-307
- *Phoma herbarum* UTHSC DI16-204
- *Phoma herbarum* UTHSC DI16-306
- *Phoma herbarum* UTHSC DI16-319
- *Phoma herbarum* CBS 615.75

A22
- *Calophoma rosae* LC 8119
- *Calophoma rosae* CGMCC 3.18347ᵀ
- *Calophoma clematidis-rectae* CBS 507.63
- *Calophoma clematidina* CBS 108.79ᵀ
- *Calophoma clematidina* CBS 102.66
- *Calophoma aquilegiicola* CBS 108 96
- *Calophoma aquilegiicola* CBS 107.96

A23
- *Leptosphaerulina americana* CBS 213.55
- *Leptosphaerulina australis* CBS 317.83

A. *Didymellaceae*

A24
- *Xenodidymella applanata* CBS 115577
- *Xenodidymella applanata* CBS 205.63
- *Xenodidymella catariae* CBS 102635
- *Xenodidymella asphodeli* CBS 375.62ᵀ
- *Xenodidymella humicola* CBS 220.85
- **Xenodidymella saxea** CBS 419.92ᵀ

A25
- *Neodidymelliopsis achlydis* CBS 256.77ᵀ
- *Neodidymelliopsis xanthina* CBS 383.68
- *Neodidymelliopsis polemonii* CBS 109181ᵀ
- *Neodidymelliopsis cannabis* CBS 234.37
- *Neodidymelliopsis longicolla* UTHSC DI16-322
- *Neodidymelliopsis longicolla* CBS 382.96ᵀ

A26
- *Neoascochyta desmazieri* UTHSC DI16-320
- *Neoascochyta desmazieri* UTHSC DI16-332
- *Neoascochyta desmazieri* UTHSC DI16-207
- *Neoascochyta desmazieri* UTHSC DI16-341
- *Neoascochyta desmazieri* CBS 297.69ᵀ
- **Neoascochyta cylindrispora** CBS 142456ᵀ
- **Neoascochyta cylindrispora** UTHSC DI16-352
- **Neoascochyta tardicrescens** CBS 689.97ᵀ
- **Neoascochyta tardicrescens** UTHSC DI16-291
- *Neoascochyta argentina* CBS 112524ᵀ
- *Neoascochyta triticicola* CBS 544.74ᵀ
- *Neoascochyta exitialis* CBS 389.86
- *Neoascochyta exitialis* CBS 118.40
- *Neoascochyta europaea* CBS 820.84ᵀ
- *Neoascochyta graminicola* CBS 816.84
- *Neoascochyta graminicola* CBS 301.69
- *Neoascochyta soli* CGMCC 3.18365ᵀ
- *Neoascochyta soli* LC 8166
- *Neoascochyta paspali* CBS 560.81ᵀ

0.05

Fig. 1. (Continued).

B. Dothidotthiaceae
- 3x — Pleiochaeta setosa CBS 496.63
- 1/97 — Pleiochaeta ghindensis CBS 552.92
- 3x — Dothidotthia aspera CBS 119688
- 2x
- 4x — Phaeomycocentrospora cantuariensis CPC 10157
- 9x / 1/89 — Phaeomycocentrospora cantuariensis CBS 132014
- Dothidotthia symphoricarpi CBS 119687ᵀ

C. Cucurbitariaceae
- Neocucurbitaria unguis-hominis CBS 111112
- -/80 — Neocucurbitaria unguis-hominis CBS 112.79
- 1/99 — 2x — Neocucurbitaria unguis-hominis UTHSC DI16-213
- 1/99 — 3x — **Neocucurbitaria aquatica CBS 297.74ᵀ**
- **Neocucurbitaria irregularis CBS 142791ᵀ**
- 1/99 — **Neocucurbitaria keratinophila CBS 121759ᵀ**
- 1/94 — 4x — Neocucurbitaria quercina CBS 115095ᵀ
- 5x — **Neocucurbitaria cava CBS 115979**
- **Neocucurbitaria cava CBS 257.68ᵀ**
- 2x — **Neocucurbitaria hakeae CPC 28920ᵀ**
- C1
- 4x — **Paracucurbitaria corni CBS 248.79**
- 1/98 — 2x — **Paracucurbitaria italica CBS 234.92ᵀ**
- C2
- 9x — **Allocucurbitaria botulispora CBS 142452ᵀ** — C3
- 2x — 9x — Cucurbitaria berberidis MFLUCC 11-0387
- Cucurbitaria berberidis CBS 130007ᵀ — C4

D. Pseudopyrenochaetaceae
- 1/99 — 11x — **Pseudopyrenochaeta lycopersici CBS 306.65ᵀ**
- **Pseudopyrenochaeta terrestris CBS 282.72ᵀ**
- Pyrenochaeta nobilis CBS 407.76ᵀ

E. Neopyrenochaetaceae
- 0.95/97 — **Neopyrenochaeta fragariae CBS 101634ᵀ**
- 4x — 3x — **Neopyrenochaeta acicola CBS 812.95ᵀ**
- **Neopyrenochaeta inflorescentiae CBS 119222ᵀ**
- 4x — **Neopyrenochaeta telephoni CBS 139022ᵀ**

F. Pyrenochaetopsidaceae
- **Pyrenochaetopsis botulispora UTHSC DI16-297**
- 0.98/99 — **Pyrenochaetopsis botulispora CBS 142458ᵀ**
- 5x — **Pyrenochaetopsis botulispora UTHSC DI16-289**
- Pyrenochaetopsis tabarestanensis CBS 139506ᵀ
- 0.95/- — **Pyrenochaetopsis paucisetosa CBS 142460ᵀ**
- Pyrenochaetopsis leptospora CBS 122787
- 5x — Pyrenochaetopsis leptospora CBS 101635ᵀ
- Pyrenochaetopsis poae CBS 136769ᵀ
- **Pyrenochaetopsis setosissima CBS 119739ᵀ**
- **Pyrenochaetopsis americana UTHSC DI16-225ᵀ**
- 1/92 — 5x — **Pyrenochaetopsis uberiformis CBS 142461ᵀ**
- Pyrenochaetopsis microspora UTHSC DI16-198
- 1/98 — Pyrenochaetopsis microspora CBS 102876ᵀ
- 9x — **Pyrenochaetopsis globosa CBS 143034ᵀ**
- 9x — Pyrenochaetopsis decipiens CBS 343.85ᵀ
- 3x — 1/93 — 4x — Pyrenochaetopsis indica CBS 124454ᵀ
- 1/90 — 9x — **Pyrenochaetopsis confluens CBS 142459ᵀ**
- F1
- 0.98/97 — 14x
- 0.98/75
- 5x — 9x
- 8x — **Xenopyrenochaetopsis pratorum CBS 445.81ᵀ** — F2
- 10x — **Neopyrenochaetopsis hominis CBS 143033ᵀ** — F3

G. Libertasomycetaceae
- 4x — Libertasomyces quercus CBS 134.97ᵀ
- 4x — 1/85 — Libertasomyces platani CBS 142112ᵀ
- 7x — Libertasomyces myopori CBS 141302ᵀ
- 6x — 1/98 — 1/99
- Neoplatysporoides aloicola CBS 139901ᵀ

H. Pleosporaceae
- 8x — Pleospora typhicola CBS 132.69
- 4x — 3x — Pleospora herbarum CBS 191.86
- 1/99 — 6x

I. Neocamarosporiaceae
- Neocamarosporium betae CBS 109410
- 1/99 — Neocamarosporium betae CBS 523.66
- 7x — Neocamarosporium goegapense CBS 138008ᵀ
- 1/94 — Neocamarosporium calvescens CBS 246.79
- 3x

J. Shiraiaceae
- Shiraia bambusicola NBRC 30771
- Shiraia bambusicola NBRC 30772
- 9x — Shiraia bambusicola NBRC 30754
- Shiraia bambusicola NBRC 30753

K. Phaeosphaeriaceae
- 1/96 — 5x — 8x — Phaeosphaeria oryzae CBS 110110
- 1/83 — 4x — Ophiosphaerella herpotricha CBS 620.86

0.05

Fig. 1. (Continued).

Pleosporineae

Massarineae

Ochrocladosporium elatum CBS 146.33
Ochrocladosporium frigidarii CBS 103.81^T
Coniothyrium telephii CBS 856.97
Coniothyrium telephii CBS 188.71
Foliophoma fallens CBS 284.70
Foliophoma fallens CBS 161.78
Staurosphaeria lyciicola CPC 31014
Staurosphaeria lyciicola CBS 142619^T
Querciphoma carteri CBS 105.91
Staurosphaeria aptrootii CBS 483.95^T

L. *Camarosporiaceae*
Camarosporium quaternatum CBS 142616^T
Camarosporium quaternatum CPC 31518
Camarosporium quaternatum CBS 142617
Staurosphaeria aloes CBS 136437^T
Paraleptosphaeria dryadis CBS 643.86
Camarosporomyces flavigenus CBS 314.80^T

M. *Camarosporidiellaceae*
Camarosporidiella clematidis MFLUCC 13-0336^T
Camarosporidiella spartii MFLUCC 13-0548
Camarosporidiella elongata CBS 171.55
Camarosporidiella elongata MFLUCC 14-0260
Camarosporidiella aureum MFLUCC 14-0620^T
Camarosporidiella robiniicola MFLUCC 13-0527
Camarosporidiella aborescentis MFLUCC 14-0604^T
Camarosporidiella arezzoensis MFLUCC 14-0238^T

N. *Parapyrenochaetaceae*
Parapyrenochaeta protearum CBS 137997
Parapyrenochaeta protearum CBS 131315^T
Parapyrenochaeta acaciae CBS 141291^T
Paraepicoccum amazonense MFLUCC 15-0491
Paraepicoccum amazonense MFLUCC 15-0493

O. *Coniothyriaceae*
Coniothyrium palmarum CBS 400.71
Coniothyrium palmarum CBS 758.73
Alternariaster bidentis CBS 134021^T
Alternariaster helianthi CBS 327.69

P. *Neophaeosphaeriaceae*
Neophaeosphaeria agaves CBS 136429^T
Neophaeosphaeria filamentosa CBS 102202

Q. *Leptosphaeriaceae*
Leptosphaeria doliolum CBS 505.75^T
Leptosphaeria conoidea CBS 616.75

R. *Microsphaeropsidaceae*
Microsphaeropsis proteae CBS 111319
Microsphaeropsis olivacea CBS 233.77

S. *Halojulellaceae*
Halojulella avicenniae BCC 18422
Halojulella avicenniae BCC 20173

T. *Didymosphaeriaceae*
Cucurbidothis pityophila CBS 149.32
Paraconiothyrium estuarinum CBS 109850^T

Sporormiella minima CBS 524.50
Preussia terricola AFTOL-ID 282

0.05

Fig. 1. (Continued).

Didymellaceae, very distant from the other genera of that family, and grouped 10 species, two of which are here proposed as new: *Neoascochyta cylindrispora* sp. nov. and *Neoascochyta tardicrescens* sp. nov.

In the family *Cucurbitariaceae* (clade C; 1 PP / 98 % BS) analyses resulted in four clades, which we recognise as genera. *Neocucurbitaria* (C1; 1 PP / 94 % BS), which included two new species, *N. irregularis* (CBS 142791) and *N. aquatica* (CBS 297.74), and the three new combinations, *N. cava* (syn. *Pyrenochaeta cava*), *N. hakeae* (basionym *Pyrenochaeta hakeae*) and *N. keratinophila* (basionym *Pyrenochaeta keratinophila*); the new genus *Paracucurbitaria* (C2; 1 PP / 100 % BS), with two species *P. corni* comb. nov. (syn. *Pyrenochaeta corni*) and *P. italica* sp. nov.; the new genus *Allocucurbitaria* (clade C3), with

the type species *A. botulispora* sp. nov. Finally, the genus *Cucurbitaria* (clade C4; 1 PP / 100 % BS) including only the type species, *C. berberidis*.

Pseudopyrenochaetaceae fam. nov. (clade D; 1 PP / 99 % BS) is introduced to accommodate *Pyrenochaeta lycopersici* and *P. terrestris* in the new genus *Pseudopyrenochaeta*.

The generic type of *Pyrenochaeta*, *Pyrenochaeta nobilis*, was phylogenetically distant from the *Cucurbitariaceae* in our phylogeny, and therefore we consider this species as *incertae sedis*.

The proposed new family *Neopyrenochaetaceae* (clade E; 1 PP / 100 % BS) encompassed several taxa previously included in *Pyrenochaeta*. However, since they were located outside from *Cucurbitariaceae s. str.* we propose the new genus *Neopyrenochaeta*, with the new combinations: *N. acicola* (syn.

Pyrenochaeta acicola), *N. inflorescentiae* (basionym. *Pyrenochaeta inflorescentiae*) and *N. telephoni* (basionym *Pyrenochaeta telephoni*), and the new species *N. fragariae*.

The new family *Pyrenochaetopsidaceae* (clade F; 0.98 PP / 75 % BS) grouped three clades, which correspond to the genera *Pyrenochaetopsis*, the type genus (type species, *P. leptospora*) (F1; 1 PP / 100 % BS), *Xenopyrenochaetopsis* (type species, *X. pratorum* comb. nov.) (F2) and *Neopyrenochaetopsis* (type species, *N. hominis* sp. nov.) (F3). *Pyrenochaetopsis* encompassed seven new species: *P. americana*, *P. botulispora*, *P. confluens*, *P. globosa*, *P. pauciseptata, P. setosissima* and *P. uberiformis*.

The Clade N (1 PP / 100 % BS), which consists of several isolates previously recognised in *Pyrenochaeta*, is proposed as the new family *Parapyrenochaetaceae*. Accordingly, the new genus *Parapyrenochaeta* is proposed for *P. acaciae* comb. nov. (basionym *Pyrenochaeta acaciae*), and the type species *Parapyrenochaeta protearum* comb. nov. (basionym *Pyrenochaeta protearum*). The strain CBS 137997, previously identified as *Pyrenochaeta pinicola*, was re-identified as *Parapyrenochaeta protearum*.

The monospecific genus *Paraepicoccum* was introduced by Matsushima (1993), later epitypified as *Paraepicoccum amazonense* by Thambugala *et al.* (2016) and considered as *incertae sedis* in *Pleosporineae*, which is supported by our phylogenetic results.

Taxonomy

After multi-locus sequence analysis of 357 strains distributed among several families within *Pleosporineae* and the morphological study of 143 strains, in the present paper we propose: four new families, 13 new genera, 28 new species, 20 new combinations, and four typifications. Novel taxa are described and illustrated. Six species proved to be sterile in culture, and therefore are described based on DNA sequence data, following the approach of Chen *et al.* (2017). Clades and genera are given as they appear in the phylogenetic tree, and species are listed in alphabetical order.

Clade A: *Didymellaceae* Gruyter *et al.*, Mycol. Res. 113: 516. 2009.

Type genus: *Didymella* Sacc.

Clade A1: *Didymella*

Didymella Sacc. ex Sacc., Syll. Fung. 1: 545. 1882. emend. Chen *et al.*, Stud. Mycol. 82: 173. 2015.
Synonym: *Peyronellaea* Goid. ex Togliani, Ann. Sperim. Agrar. II 6: 93. 1952.

Type species: *Didymella exigua* (Niessl) Sacc.

Didymella anserina (Marchal) Q. Chen & L. Cai, Stud. Mycol. 82: 173. 2015.
Basionym: *Phoma anserina* Marchal, Champignon Copr. 11: 1891.
Synonyms: *Peyronellaea anserina* (Marchal) Aveskamp *et al.*, Stud. Mycol. 65: 31. 2010.
Phoma radicis-callunae R.W. Rayner, Bot. Gaz. 73: 231. 1922.
Phoma suecica J.F.H. Beyma, Antonie van Leeuwenhoek 8: 110. 1942.

Description: de Gruyter & Noordeloos (1992).

Materials examined: **Germany**, Giessen, Dec. 1979, R. Hadlok, living culture CBS 253.80. **USA**, from human sputum sample, 2008, D.A. Sutton, living cultures UTHSC DI16-255 = FMR 13745.

Notes: *Didymella anserina* is a ubiquitous soil fungus that has been found in Africa, Europe and North America. Although frequently present on herbaceous or woody plants, it has been recorded from many other substrates. Our strain UTHSC DI16-255 is the first report from a human clinical specimen, and it is morphologically similar to the reference strain of *D. anserina* (CBS 253.80).

Didymella brunneospora Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **sp. nov.** MycoBank MB820815. Fig. 2.

Etymology: From Latin *brunneus-*, brown, and *-spora*, spore, because of the conidial pigmentation.

Description: *Hyphae* hyaline to pale brown, smooth- and thin-walled, septate, 2–5 μm wide. *Conidiomata* pycnidial, pale brown to dark brown, mostly solitary, occasionally confluent, superficial on OA, glabrous, globose, 140–250 μm diam, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2–5 layered, 25–70 μm thick, composed of pale brown to brown, flattened polygonal cells of 8–15 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 7–10 × 6.5–8 μm. *Conidia* aseptate, hyaline to pale brown, smooth- and thin-walled, obovoid to cylindrical, 4.5–7 × 3–3.5 μm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 26 mm diam after 7 d at 25 ± 1 °C, flattened, with abundant production of pycnidia, olive brown (M. 4E6); reverse yellowish brown (M. 5E4). Colonies on MEA reaching 28 mm diam after 7 d at 25 ± 1 °C, flattened, orange melon (M. 5A6) to orange-white (M. 5A2); reverse orange melon (M. 5A6) to orange white (M. 5A2). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **Germany**, isolated from flower-stalk of *Chrysanthemum roseum*, R. Schneider (**holotype** CBS H-23199, ex-holotype living cultures IMB 8675 = DSM 62044 = CBS 115.58 = FMR 15745).

Notes: *Ascochyta pyrethri* (Brunaud 1887), reported on decaying stems of *Pyrethri sinensis* in Saintes (France), was originally described (very briefly and lacking of measurements of their reproductive structures) in French, but later Latinised by Saccardo (Saccardo 1892), changing the order of the authors. The description of that fungus by Saccardo was based on the original diagnosis: pycnidia conical-globose, sparse to arrange in linear series, erumpent, black; conidia numerous, ovoid, ellipsoidal or long ellipsoidal, somewhat obtuse at both ends, straight or slightly curved, subhyaline. However, Saccardo described the conidia as not being constricted at the septum, which was not mentioned in the original description. Moreover, the protologue lacks illustrations and references to herbarium material, which makes this taxon doubtful. The strain CBS 115.58, previously identified as *Ascochyta pyrethri*; clusters distant from *Ascochyta* and produces pale brown, aseptate conidia, features not seen in that genus, and thus being considered herein as a new species of the genus *Didymella*.

Didymella gardeniae (S. Chandra & Tandon) Q. Chen & L. Cai, Stud. Mycol. 82: 176. 2015.
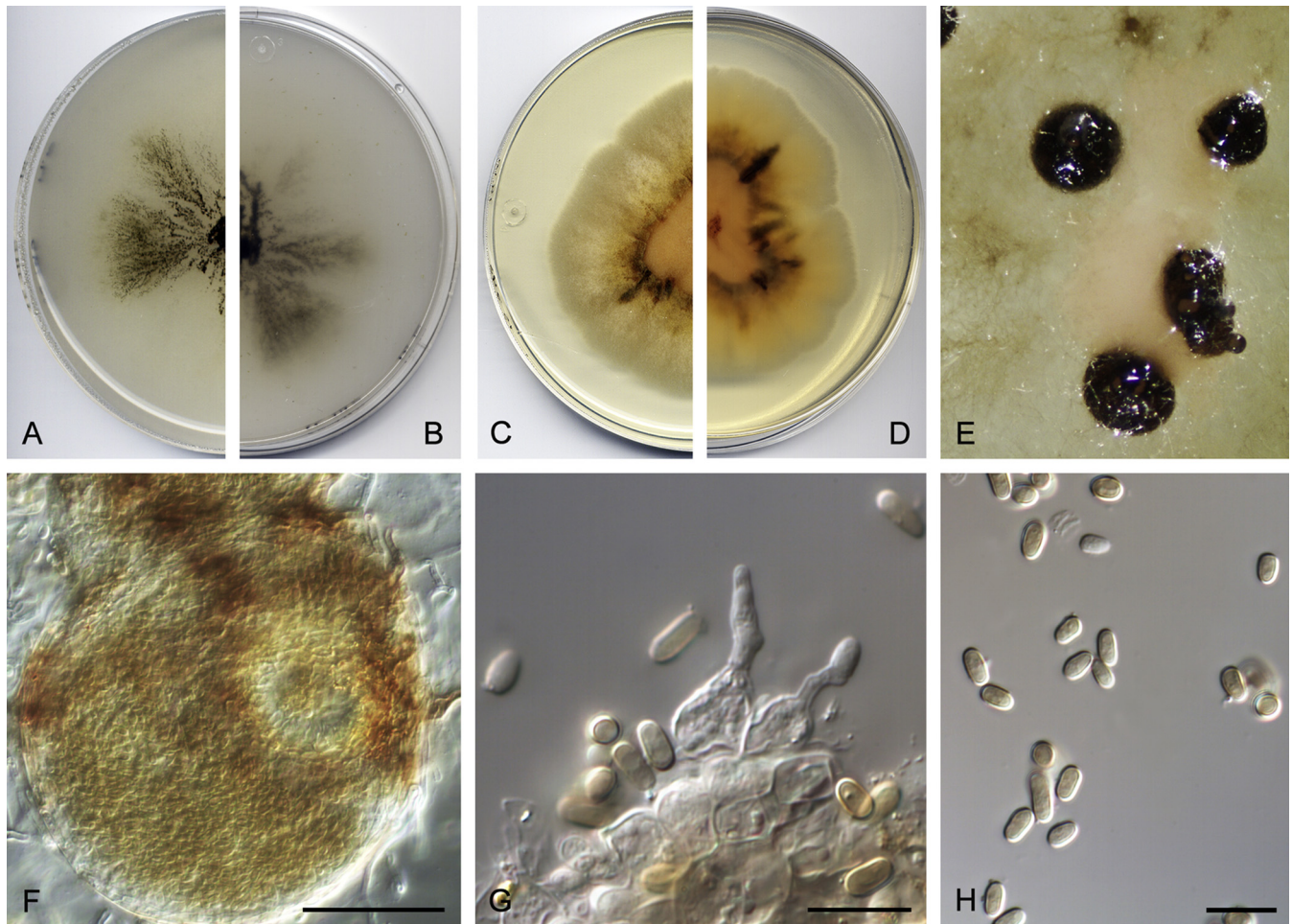
Fig. 2. *Didymella brunneospora* (CBS 115.58). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 μm. G, H = 10 μm.

Basionym: *Pyrenochaeta gardeniae* S. Chandra & Tandon, Mycopathol. Mycol. Appl. 29: 274. 1966.
Synonyms: *Phoma gardeniae* (S. Chandra & Tandon) Boerema, Verslagen Meded. Plantenziektenk. Dienst Wageningen 156: 27. 1980.
Peyronellaea gardeniae (S. Chandra & Tandon) Aveskamp *et al.*, Stud. Mycol. 65: 32. 2010.

Description: de Gruyter & Boerema (2002).

Materials examined: **India**, Allahabad, from the leaf of *Gardenia jasminoides*, 1966, S. Chandra & R.N. Tandon (**isotype** CBS H-7605, ex-isotype living cultures CBS 626.68 = IMI 108771 = FMR 14901). **USA**, from human nail distrophy, 2006, D.A. Sutton, living cultures UTHSC DI16-211 = FMR 13701; from human toe nail, 2007, D.A. Sutton, living cultures UTHSC DI16-226 = FMR 13716; from human toe nails, 2009, D.A. Sutton, living cultures UTHSC DI16-274 = FMR 13765; from human wound neck, 2010, D.A. Sutton, living cultures UTHSC DI16-295 = FMR 13788.

Notes: *Didymella gardeniae* was first isolated from a leaf of *Gardenia jasminoides* in India (Chandra & Tandon, 1966), and it seems to be a common soil- and air-borne fungus recovered also from Netherlands Antilles. Here, it is for first time associated with human clinical specimens from North America. Morphologically our strains resemble *D. gardeniae*, but have setose pycnidia, which are more characteristic of *Pyrenochaeta* than phoma-like taxa. Also remarkable is the fact that our strains are capable of growing at 37 °C.

Didymella glomerata (Corda) Q. Chen & L. Cai, Stud. Mycol. 82: 176. 2015. Fig. 3.
Basionym: *Coniothyrium glomeratum* Corda, Icon. Fung. (Prague) 4: 39. 1840.

Synonyms: *Phoma glomerata* (Corda) Wollenw. & Hochapfel, Z. Parasitenk. 3: 592. 1936.
Peyronellaea glomerata (Corda) Goid. ex Togliani, Ann. Sperim. Agrar. III 6: 93. 1952.

Description: Boerema *et al.* (2004).

Materials examined: **Lectotype** designated here (MBT 377971): plate 8, fig. 108, in Corda, AKJ. 1840. Icones fungorum hucusque cognitorum. Tomus IV, Praga (http://bibdigital.rjb.csic.es/ing/Libro.php?Libro=1812). **The Netherlands**, from *Chrysanthemum* sp., 1963 (**epitype designated here** CBS H-16351, MBT377905, ex-epitype living cultures CBS 528.66 = PD 63/590). **USA**, from human superficial tissue sample, 2006, D.A. Sutton, living culture UTHSC DI16-205 = FMR 13695.

Notes: *Coniothyrium glomeratum* was introduced by Corda (1840). The description of this fungus is brief, and the illustrations are not very detailed. The natural source has been mentioned as dry greyed wood chips, but without any geographic location. No original material of the basionym exists. Therefore, we designate the illustration by Corda here as lectotype and CBS H-16351 as epitype of *Coniothyrium glomeratum*. Other authors placed this fungus in other genera, such as *Aphosphaeria*, *Ascochyta*, *Peyronella* and *Phoma*, but also in *Alternaria*, because the production of alternarioid chains of chlamydospores *in vitro*. For a complete discussion about synonymies of this fungus see Boerema *et al.* (1965), who gave an exhaustive morphological description *in vitro* of this fungus. *Didymella glomerata* is characterised by the production of subhyaline to carbonaceous, small to large, glabrous pycnidia bearing one (to two or three) ostioles, aseptate, hyaline to dark-coloured, ovoid
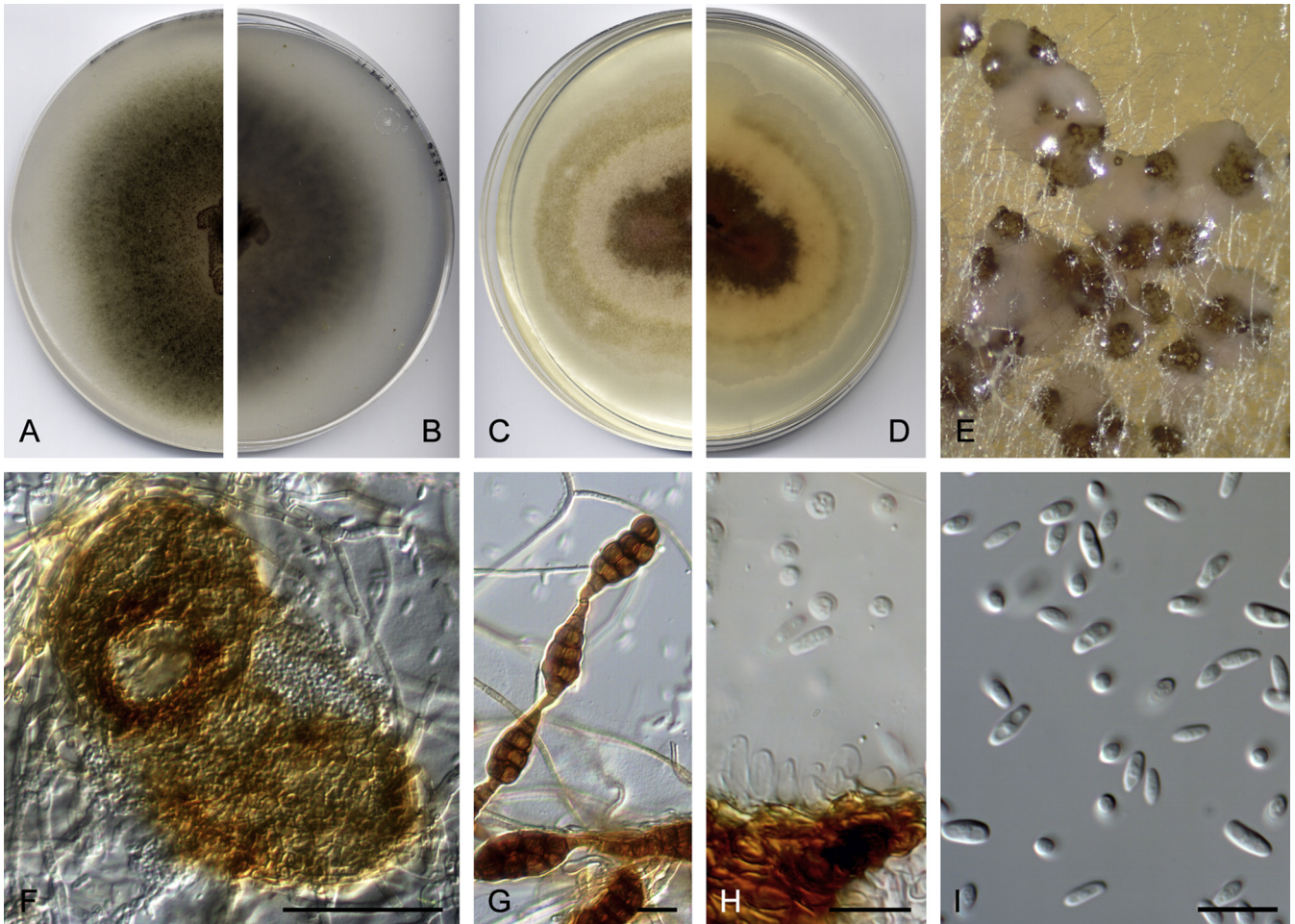
Fig. 3. *Didymella glomerata* (UTHSC DI16-205). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Alternaroid chlamydospores. **H.** Conidiogenous cells. **I.** Conidia. Scale bars: F = 100 μm. G–I = 10 μm.

to ellipsoidal conidia measuring mostly 6–7.5 × 3–3.5 μm, and alternaroid chlamydospores in chains. The fungus is distributed worldwide, and has been recovered from soil, different kinds of living and dead plants, and inorganic materials, and it can also infect humans (Punithalingam 1979, de Hoog *et al.* 2011). The strain UTHSC DI16-205, that phylogenetically clusters with the reference strain CBS 528.66 of *Didymella glomerata*, is morphologically indistinguishable from it.

Didymella heteroderae (Sen. Y. Chen *et al.*) Q. Chen & L. Cai, Stud. Mycol. 82: 176. 2015.
Basionym: *Phoma heteroderae* Sen Y. Chen *et al.*, Mycologia 88: 885. 1996 (1997).
Synonyms: *Peyronellaea heteroderae* (Sen Y. Chen *et al.*) Crous, Persoonia 32: 223. 2014.
Phoma pomorum var. *calorpreferens* Boerema *et al.*, Persoonia 15: 207. 1993.
Phoma calorpreferens (Boerema *et al.*) Aveskamp *et al.*, Mycologia 101: 370. 2009.
Peyronellaea calorpreferens (Boerema *et al.*) Aveskamp *et al.*, Stud. Mycol. 65: 31. 2010.

Description: Boerema (1993).

Materials examined: **The Netherlands**, from undefined food material, 1973, G.H. Boerema (**holotype** L 990.290.418, ex-holotype living cultures CBS 109.92 = PD 73/1405). **USA**, from human left plantar foot, 2005, D.A. Sutton, living cultures UTHSC DI16-190 = FMR 13680; from human nail, 2007, D.A. Sutton, living cultures UTHSC DI16-224 = FMR 13714; from human nail, 2007, D.A. Sutton, living cultures UTHSC DI16-227 = FMR 13717; from human fingernail, 2007, D.A.

Sutton, living cultures UTHSC DI16-231 = FMR 13721; from human urine, 2007, D.A. Sutton, living cultures UTHSC DI16-232 = FMR 13722; from human nail, 2007, D.A. Sutton, living cultures UTHSC DI16-234 = FMR 13724; from human scalp, 2007, D.A. Sutton, living cultures UTHSC DI16-235 = FMR 13725; from human sputum sample, 2011, D.A. Sutton, living culturse UTHSC DI16-305 = FMR 13798.

Notes: Our strains are morphologically similar to the ex-type strain of *D. heteroderae*, and also show an identical DNA nucleotide sequence dataset. However, we proved that our strains are able to grow and sporulate at 37 °C (Valenzuela-Lopez *et al.* 2016), a higher temperature than that given in the original species description (Boerema *et al.* 2004).

Didymella keratinophila Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB820813. Fig. 4.

Etymology: From Greg *κερατινων*-, keratin, and – *φίλος*, friend of, because the source from which the fungus was isolated.

Description: *Hyphae* pale brown, smooth- and thin-walled, septate, 2.5–8 μm wide. *Conidiomata* pycnidial, brown, solitary, superficial on OA, glabrous, broadly ellipsoidal, 250–270 × 200–230 μm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2–5 layered, 15–35 μm thick, composed of brown, flattened polygonal cells of 5–10 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform or globose, 4.5–6 × 3–4.5 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, guttulate, ovoid to cylindrical, 4–6 × 2.5–3 μm. *Chlamydospores* absent.
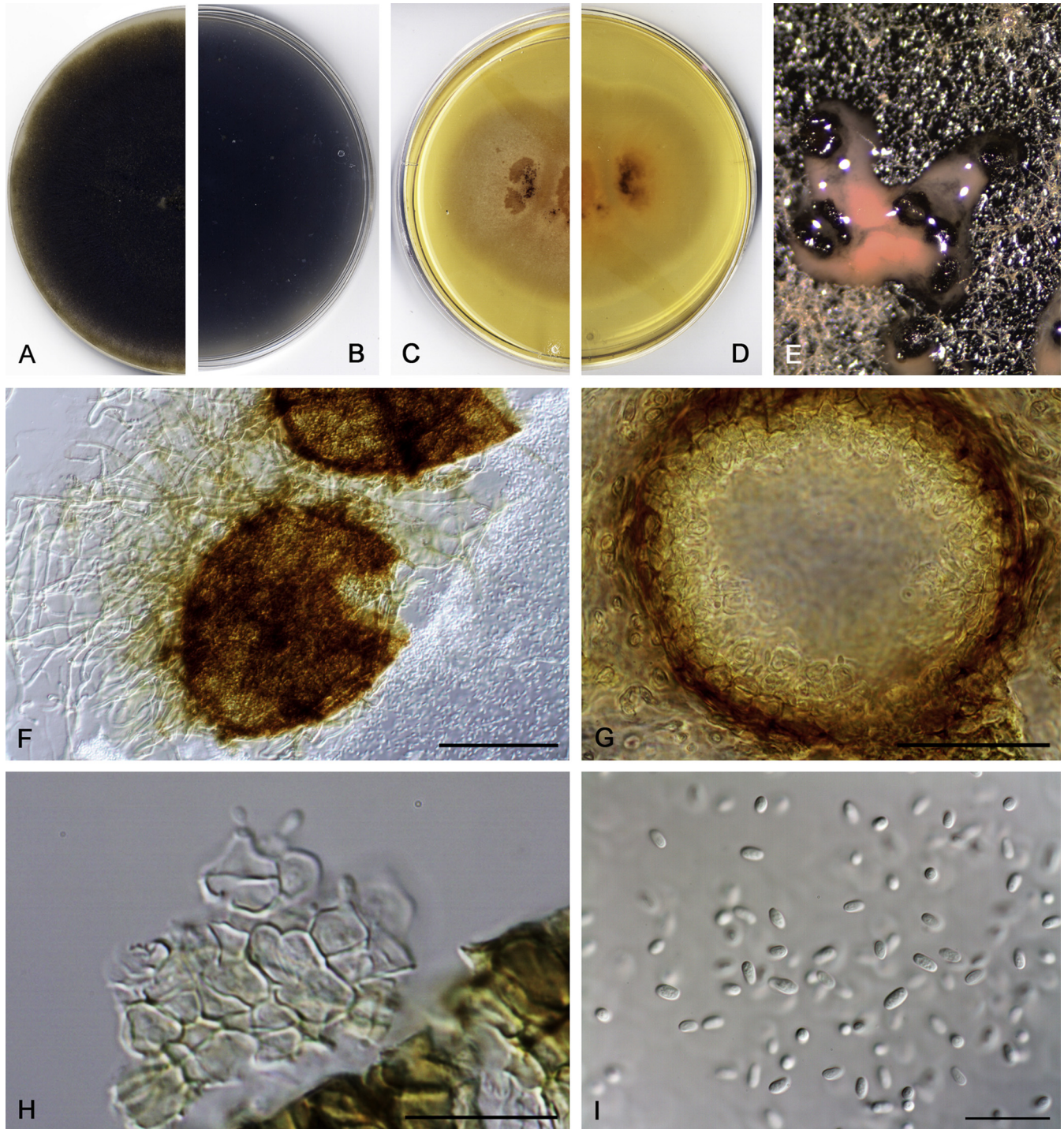
Fig. 4. *Didymella keratinophila* (CBS 143032). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Section of pycnidium. **H.** Conidiogenous cells. **I.** Conidia. Scale bars: F, G = 100 μm. H, I = 10 μm.

Culture characteristics: Colonies on OA reaching 54 mm diam after 7 d at 25 ± 1 °C, flattened, greyish brown (M. 5F3); reverse greyish brown (M. 5F3). Colonies on MEA reaching 57–67 mm after 7 d at 25 ± 1 °C, flattened, brownish orange (M. 5C3); reverse brownish grey (M. 5C2). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 37 °C.

Materials examined: **USA**, from human finger-hand lesion, 2006, D.A. Sutton (**holotype** CBS H-23200, ex-type living cultures CBS 143032 = UTHSC DI16-200 = FMR 13690); from human toe nail, 2007, D.A. Sutton, living cultures

UTHSC DI16-228 = FMR 13718; from human nail, 2009, D.A. Sutton, living cultures UTHSC DI16-282 = FMR 13774.

Notes: *Didymella keratinophila* was recovered from a human superficial tissue specimen in the USA, and forms a well-supported sister clade with *D. sancta*. *Didymella keratinophila* differs phenotypically from *D. sancta* (and related species, such as *D. glomerata*, *D. musae* and *D. pomorum*) by the absence of chlamydospores *in vitro* (brown, alternarioid, phragmosporous and dyctiosporous, singly and terminally produced in *D. sancta*), smaller conidia (4–6 × 2.5–3 μm *vs.* 5–7 (–7.5) × 2.5–4 (–4.5) μm in *D. sancta*) and a negative NaOH spot test.
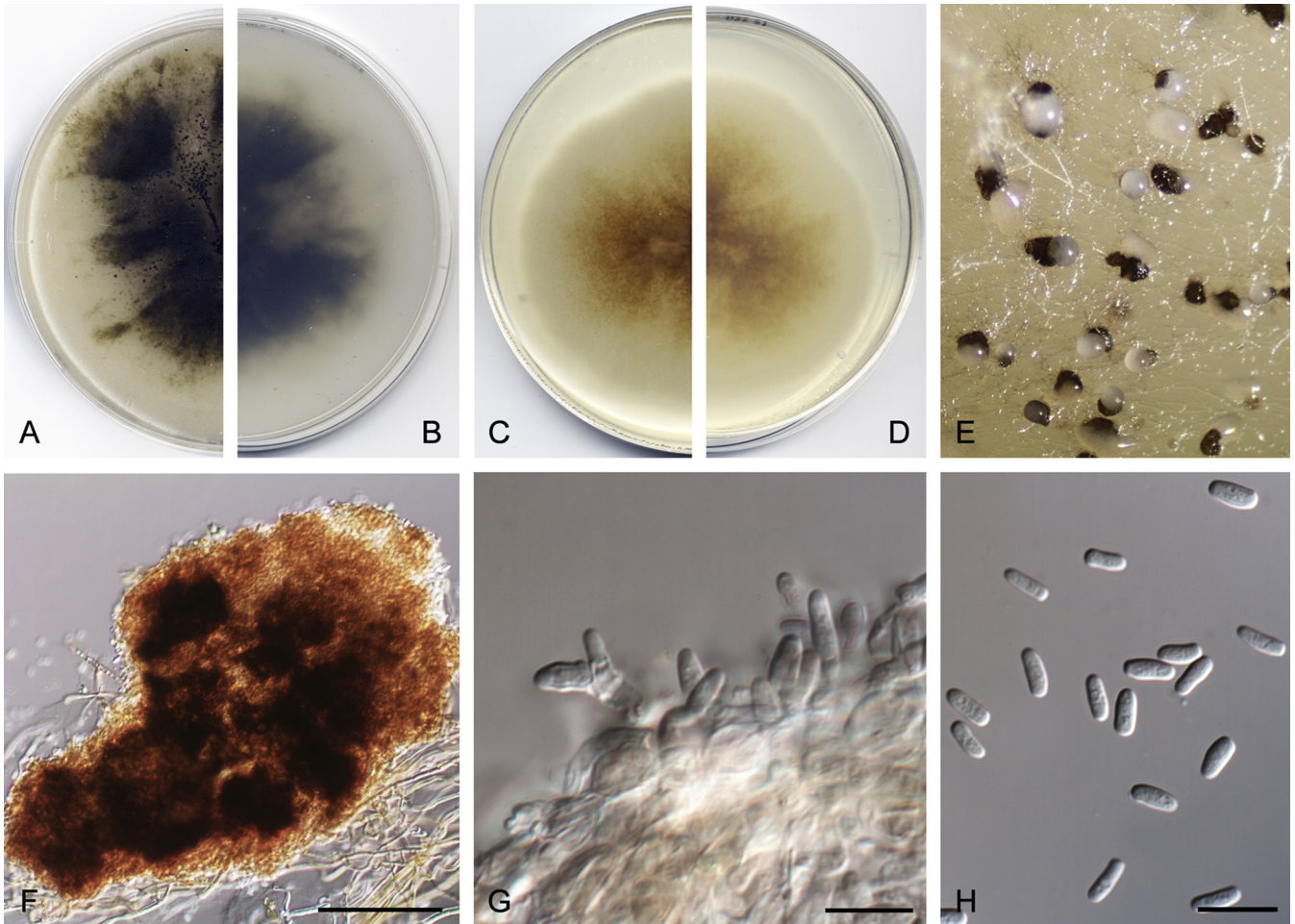
Fig. 5. *Didymella musae* (CBS 463.69). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

Didymella microchlamydospora (Aveskamp & Verkley) Q. Chen & L. Cai, Stud. Mycol. 82: 178. 2015.
Basionym: *Phoma microchlamydospora* Aveskamp & Verkley, Mycologia 101: 374. 2009.

Description: Aveskamp et al. (2009).

Materials examined: **UK**, from leaves of *Eucalyptus* sp., 1994, A.M. Ainsworth (**holotype** CBS H-20147, ex-holotype living culture CBS 105.95). **USA**, from human skin leg, 2006, D.A. Sutton, living cultures UTHSC DI16-199 = FMR 13689; from human corneal lesion, 2014, D.A. Sutton, living cultures UTHSC DI16-365 = FMR 13858.

Notes: *Phoma microchlamydospora* was described as a new species by Aveskamp et al. (2009) from leaves of *Eucalyptus* sp. in Great Britain, being subsequently transferred to the genus *Didymella* by Chen et al. (2015) after a phylogenetic study. Our two strains of this species differ in the geographic origin (USA) and in substrate (isolated from human clinical specimens), but they are morphologically and genetically similar to the ex-type living culture of *D. microchlamydospora*, being characterised by the production of abundant micropycnidia, globose pycnidia with 1–3 papillate ostioles, frequently on a neck, hyaline, one-celled, globose to ellipsoidal conidia, and relatively small, one-celled to multi-celled chlamydospores arranged in chains.

Didymella musae (P. Joly) Q. Chen & L. Cai, Stud. Mycol. 82: 178. 2015. Fig. 5.
Basionym: *Peyronellaea musae* P. Joly, Rev. Mycol. 26: 97. 1961.

Synonym: *Phoma jolyana* Piroz. & Morgan-Jones, Trans. Brit. Mycol. Soc. 51: 200. 1968.

Description: Boerema (1993).

Materials examined: **India**, from fruit of *Mangifera indica*, May 1969, living cultures CBS 463.69 = FMR 15339. **USA**, from human cornea lesion, 2007, D.A. Sutton, living cultures UTHSC DI16-230 = FMR 13720.

Notes: The strain UTHSC DI16-230, which is morphologically similar to the reference strain CBS 463.69, only differs genetically in a few nucleotides of the *tub*2 gene.

Didymella protuberans (Lév.) Q. Chen & L. Cai, Stud. Mycol. 82: 180. 2015.
Basionym: *Phoma protuberans* Lév., Ann. Sci. Nat. Bot. III 5: 281. 1846.
Synonyms: *Peyronellaea protuberans* (Lév.) Aveskamp et al., Stud. Mycol. 65: 33. 2010.
Didymella alectorolophi Rehm, Hedwigia 64: 294. 1923.
Peyronellaea alectorolophi (Rehm.) Aveskamp et al., Stud. Mycol. 65: 31. 2010.
Phoma alecotorolophi Boerema et al., Persoonia 16: 366. 1997.
Phoma obtusa Fuckel, Jahrb. Nassauischen Vereins Naturk. 23–24: 378. 1870.
Peyronellaea obtusa (Fuckel) Aveskamp et al., Stud. Mycol. 65: 33. 2010.

Description: Chen et al. (2015).

Materials examined: **The Netherlands**, from a leaf of *Lycium halimifolium*, 1971 (**neotype** HMAS 246694, ex-neotype living cultures CBS 381.96 = PD 71/706). **USA**, from chocolate, 2011, D.A. Sutton, living cultures UTHSC DI16-302 = FMR 13795.

Notes: The strain UTHSC DI16-302 isolated from the USA clusters with the ex-neotype strain of *Didymella protuberans*, being morphologically similar.

Didymella rumicicola (Boerema & Loer.) Q. Chen & L. Cai, Stud. Mycol. 82: 181. 2015.
Basionym: *Phoma rumicicola* Boerema & Loer., New Zealand J. Bot. 18: 473. 1980.

Description: Chen *et al.* (2015).

Materials examined: **New Zealand**, Levin, from *Rumex obtusifolius*, Jun. 1979, G.F. Laundon (**holotype** PDD 50667, **isotype** CBS H-7627, ex-isotype living cultures CBS 683.79 = LEV 15094). **The Netherlands**, Baarn, from a stem of *Rumex hydrolapathum*, Mar. 1996, H.A. van der Aa, living culture CBS 179.97.

Notes: The strain CBS 179.97 was initially identified as *Didymella acetosellae*; this strain is genetically identical to the ex-type strain of *D. rumicicola* (CBS 683.79), and the host pertains to the same genus of plants (*Rumex*). Consequently, we assigned this strain to *D. rumicicola*.

Didymella sp.

Material examined: **Japan**, from *Camellia sasanqua*, living culture LC 8141.

Notes: This strain was considered by Chen *et al.* (2017) as a reference strain of *Didymella segeticola*. However, in our phylogenetic study, this strain is distinct from the ex-type strain of *Didymella segeticola*, with strain LC 8141 differing in 7 bp in *rpb*2. It was also isolated from a different host and country, and therefore we maintain this strain as *Didymella* sp.

Clade A2: *Epicoccum*

Epicoccum Link, Mag. Neuesten Entdeck. Gesammten Naturk. Ges. Naturf. Freunde Berlin 7: 32. 1815, emend. Q. Chen & L. Cai, Stud. Mycol. 82: 171. 2015.

Type species: *Epicoccum nigrum* Link.

Epicoccum camelliae Q. Chen *et al.*, Stud. Mycol. 87: 140. 2017.

Description: Chen *et al.* (2017).

Materials examined: **China**, Jiangxi, Ganzhou, leaves of *Camellia sinensis*, 7 Sep. 2013, Y. Zhang (**holotype** HMAS 247159, ex-holotype culture CGMCC 3.18343 = LC 4858); *ibid*. LC4862. **USA**, from human respiratory tract, 2006, D.A. Sutton, living cultures UTHSC DI16-201 = FMR 13691; from human nail, 2006, D.A. Sutton, living cultures UTHSC DI16-202 = FMR 13692; from human toe nail, 2006, D.A. Sutton, living cultures UTHSC DI16-206 = FMR 13696; from human toe nail, 2009, D.A. Sutton, living cultures UTHSC DI16-280 = FMR 13772; from human nail, 2011, D.A. Sutton, living cultures UTHSC DI16-338 = FMR 13831; from human abscess, 2012, D.A. Sutton, living cultures UTHSC DI16-345 = FMR 13838.

Notes: A total of six isolates molecularly identified as *E. camelliae* clustered together with *E. viticis* forming a low-supported clade. Our isolates, as well as those of Chen *et al.* (2017), remained sterile. Consequently, further studies will be needed to fully characterise this species.

Epicoccum catenisporum Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, **sp. nov.**, MycoBank MB819762. Fig. 6.

Etymology: From Latin *catena*-, chain, and -*spora*, spore, because of the disposition of the chlamydospores in chains.

Description: *Hyphae* pale brown, smooth- and thin-walled, septate, 2.5–5 µm wide. *Conidiomata* pycnidial, brown to dark brown, solitary, superficial and immersed (OA), glabrous, subglobose, 170–190 × 140–160 µm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2–5 layered, 15–50 µm thick, composed of brown to dark brown, flattened polygonal cells of 5–10 µm diam, *Conidiogenous cells* phialidic, hyaline, smooth-walled, doliiform or ampulliform, 4–6 × 2–4 µm. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid or ellipsoidal, 4–5 × 2–3 µm, guttulate. *Chlamydospores* aseptate, dark brown, smooth- and thick-walled, in chains or singly, then intercalary disposed, ellipsoidal to ovoid, 9.5–12 × 4.5–8.5 µm.

Culture characteristics: Colonies on OA reaching 53 mm diam after 7 d at 25 ± 1 °C, flattened, powdery due to the production of abundant pycnidia, orange grey (M. 5B1) to yellowish brown (M. 5F5); reverse pale brown (M. 5D4) to brownish grey (M. 5F2). Colonies on MEA reaching 36 mm after 7 d at 25 ± 1 °C, flattened to floccose, white (M. 5A1) to orange white (M. 5A2); reverse white (M. 5A1) to pale orange (M. 5A4). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 15 °C; maximum temperature of growth 35 °C.

Material examined: **Guinea-Bissau**, Gacheu, from a leaf spot of *Oryza sativa*, Oct. 1978, deposited by G.H. Boerema (**holotype** CBS H-23203, ex-holotype living cultures CBS 181.80 = PD 78/974 = FMR 14911).

Notes: The strain CBS 181.80 was previously identified as *Phoma sorghina* (currently *E. sorghinum*) by Aveskamp *et al.* (2009). However, it is phylogenetically different from that species. *Epicoccum catenisporum* is morphologically characterised by the production of pycnidia as observed in several other members of *Epicoccum*.

Epicoccum keratinophilum Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.**, MycoBank MB819758. Fig. 7.

Etymology: From Greek κεράτινη-, keratin, and -φίλος, friend, linked to the origin of the fungus.

Description: *Hyphae* pale brown, smooth- and thin-walled, septate, 2.5–5 µm wide. *Conidiomata* pycnidial, brown, solitary, superficial or immersed (OA), glabrous, subglobose, 200–300 × 180–240 µm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2–4 layered, 15–45 µm thick, composed of brown to dark brown, flattened polygonal cells of 5–20 µm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform to globose, 4–5 µm diam. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical, 4–6 × 1.5–2 µm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 30–35 mm diam after 7 d at 25 ± 1 °C, flattened, entire edge, yellowish brown (M. 5E7) to brownish grey (M. 5F2); reverse brownish grey (M.5F2). Colonies on MEA reaching 30–37 mm diam after 7 d at 25 ± 1 °C, flattened, entire edge, white (M. 2A1) to yellowish white (M. 3A2); reverse dull yellow (M. 3B3). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Materials examined: **USA**, Texas, from animal skin lesion, 2009, D.A. Sutton (**holotype** CBS H-23032, ex-holotype living cultures CBS 142455 = UTHSC DI16-271 = FMR 13762); Texas, from human superficial tissue, 2007, D.A. Sutton, living cultures UTHSC DI16-244 = FMR 13734; from human bronchial
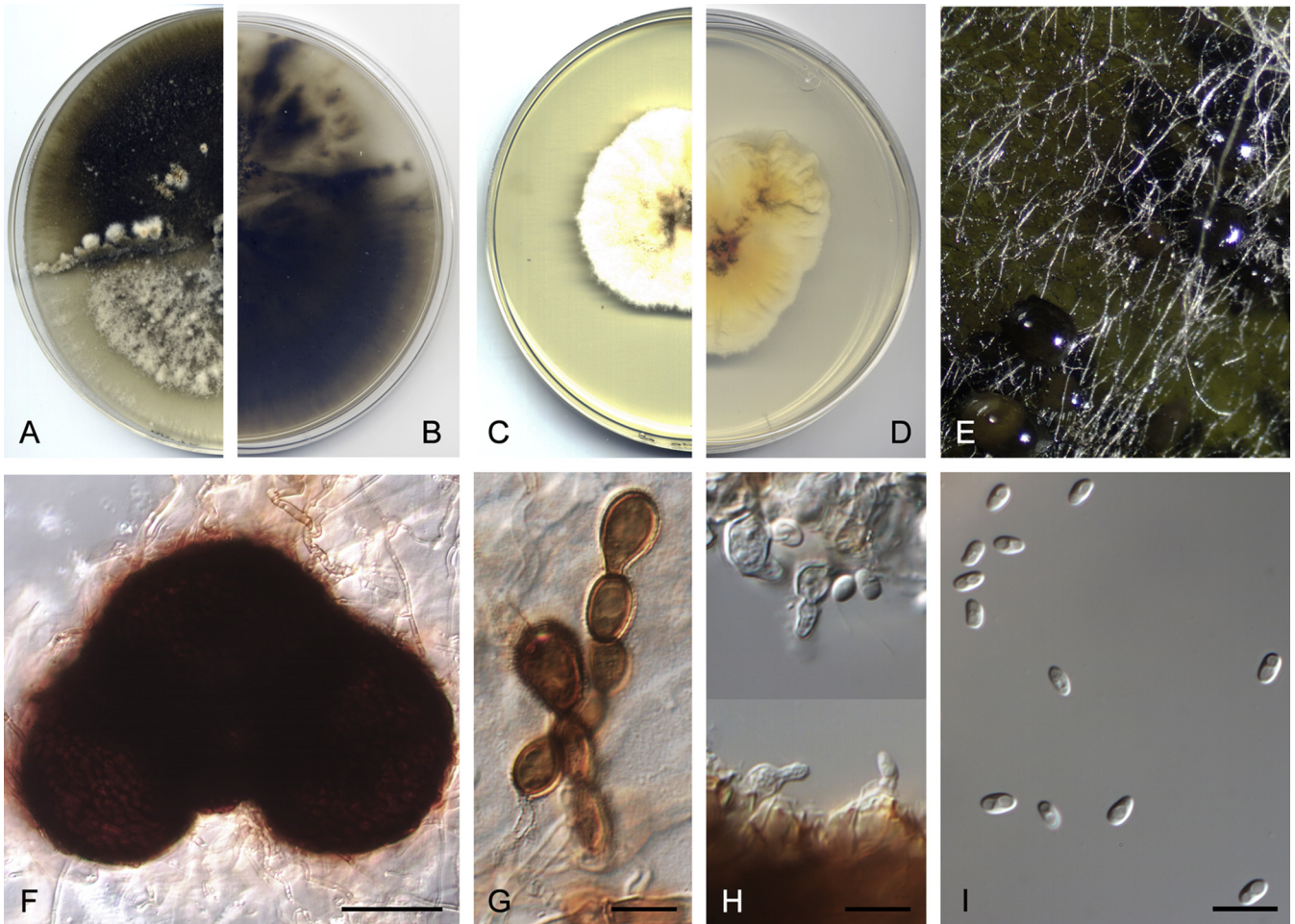
Fig. 6. *Epicoccum catenisporum* (CBS 181.80). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Chlamydospores in chains. **H.** Conidiogenous cells. **I.** Conidia. Scale bars: F = 100 µm. G–I = 10 µm.

wash sample, 2008, D.A. Sutton, living cultures UTHSC DI16-258 = FMR 13748; from human toe nail, 2009, D.A. Sutton, living cultures UTHSC DI16-272 = FMR 13763; from human biopsy tissue, 2011, D.A. Sutton, living culture UTHSC DI16-299 = FMR 13792.

Notes: In our phylogenetic tree *E. keratinophilum* forms a well-supported clade distant from its morphological relatives *E. brasiliense* and *E. draconis*. All *E. keratinophilum* strains have been recovered from clinical samples, and morphologically differ from *E. brasiliense* in producing smaller pycnidia and conidia, and from both *E. brasiliense* and *E. draconis* by a negative NaOH spot test reaction.

Epicoccum latusicollum Q. Chen *et al.*, Stud. Mycol. 87: 144. 2017.

Description: Chen *et al.* (2017).

Materials examined: **China**, Jiangxi, Ganzhou, endophyte of *Camellia sinensis*, 7 Sep. 2013, Y. Zhang, living culture LC 4859; Shandong, Jining, on leaves of *Sorghum bicolor*, 3 Aug. 2013, N. Zhou (**holotype** HMAS 247164, ex-holotype living culture CGMCC 3.18346 = LC 5158). **USA**, from human eye, 2005, D.A. Sutton, living cultures UTHSC DI16-197 = FMR 13687.

Notes: The strain UTHSC DI16-197 that was isolated from a human eye sample clustered with the ex-type strain of *E. latusicollum* that was recently introduced by Chen *et al.* (2017), being characterised by the production of pycnidial conidiomata. Unfortunately, our strain was sterile, and morphological comparison was not possible, but genetically it is identical to the latter species.

Epicoccum ovisporum Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, **sp. nov.**, MycoBank MB819761. Fig. 8.

Etymology: From Latin *ovum*-, egg, and -*spora*, spore, due to the shape of the conidia.

Description: *Hyphae* hyaline to pale brown, smooth- and thin-walled, septate, 2.5–5 µm wide. *Conidiomata* pycnidial, brown, solitary, mostly superficial on OA and immersed into MEA, glabrous, subglobose to globose, 100–190 × 85–180 µm, with short papillate ostiolar neck; pycnidial wall of *textura angularis*, 3–4 layered, 12.5–35 µm thick, composed of brown, flattened polygonal cells of 5–20 µm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, doliiform to ampulliform, 5–6 × 2–3 µm. *Conidia* aseptate, hyaline, smooth- and thin-walled, guttulate, ovoid, ellipsoidal to cylindrical, 5–7 × 2–3 µm. *Chlamydospores* multi-celled, brown to dark brown, smooth-walled, disposed in chains or singly, then intercalary and terminally, globose to subglobose, 10–22.5 × 10–20 µm.

Culture characteristics: Colonies on OA reaching 36 mm diam after 7 d at 25 ± 1 °C, flattened, with abundant production of pycnidia, greenish grey (M. 29B2); reverse orange grey (M.5B2). Colonies on MEA reaching 38 mm after 7 d at 25 ± 1 °C, floccose, orange grey (M. 5B2) to grey (M. 5C1), producing a hyaline exudate; reverse yellowish brown (M. 5D8). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 15 °C; maximum temperature of growth 30 °C.

Material examined: **South Africa**, Potchefstroom, from a leaf of *Zea mays*, Nov. 1978, isolated by W.J. Jooste, deposited by G.H. Boerema (**holotype** CBS H-23204, ex-holotype living cultures CBS 180.80 = PD 78/1100 = FMR 14910).
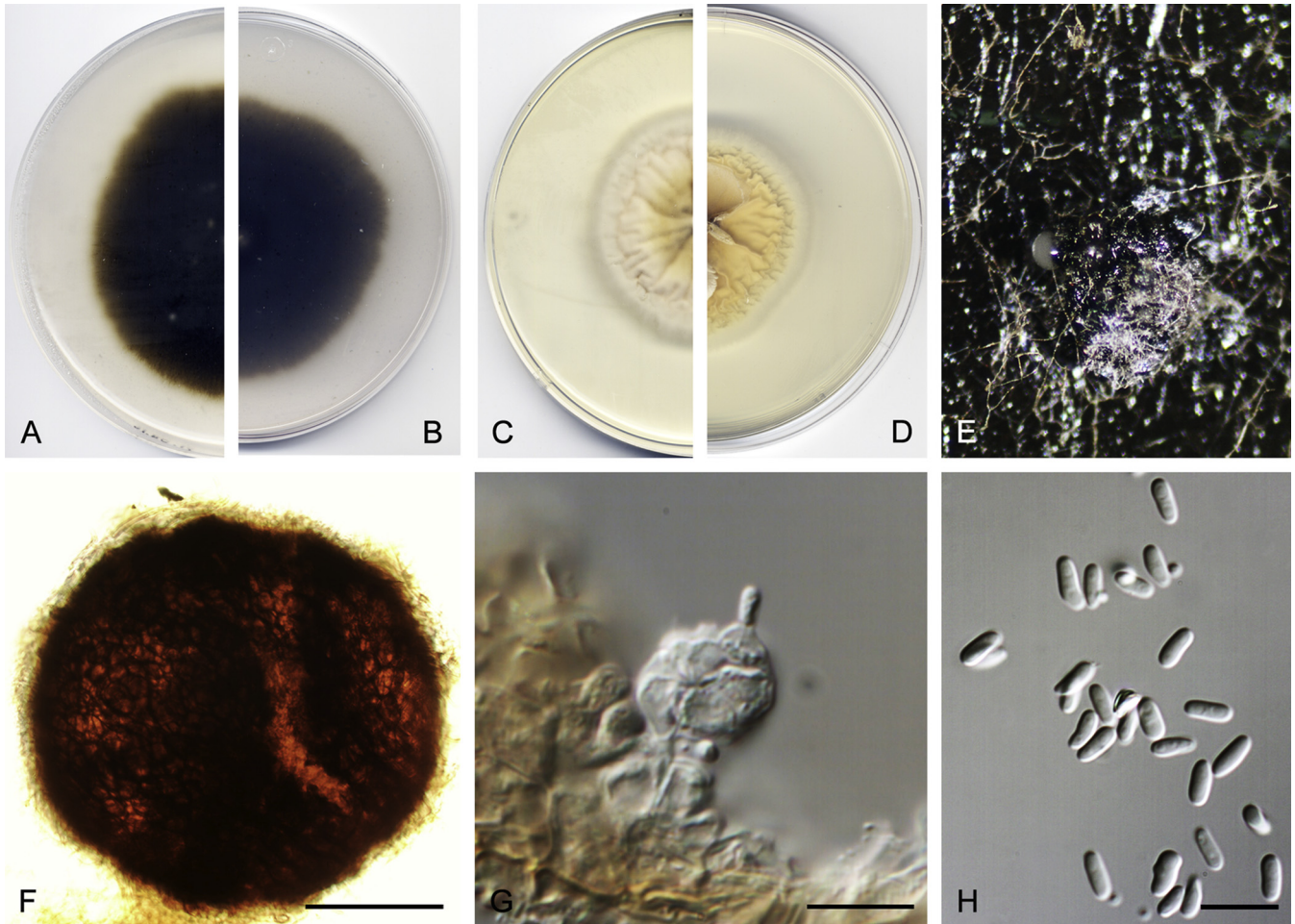
Fig. 7. *Epicoccum keratinophilum* (CBS 142455). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cell. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

Notes: The strain CBS 180.80 was previously assigned to *E. sorghinum* (Aveskamp *et al.* 2009, 2010); however, in our phylogenetic tree it represents a new species, forming a basal clade together with *E. catenisporum* and *E. sorghinum*, being distant from the rest of the species of the genus. The above-mentioned species are morphologically similar to *E. ovisporum* by producing pycnidia instead of sporodochia.

Epicoccum pneumoniae Valenzuela-Lopez, Stchigel, Guarro & Cano, **sp. nov.** MycoBank MB822112.

Etymology: The species name refers to the infection associated with this specimen.

Culture sterile. *Epicoccum pneumoniae* differs from its closest phylogenetic species *Epicoccum latusicollum* based on alignment of the concatenated four loci deposited in TreeBASE (S21115): LSU deletion in position: 382; ITS positions: 587 (C); *tub*2 positions: 1075 (T), 1102 (T), 1152 (T), 1159 (T), 1161 (G), 1207 (G), 1209 (T), 1210 (A), 1212 (G), 1213 (T), 1254 (T), 1260 (C), 1284 (C); *rpb*2 positions: 1312 (A), 1336 (A), 1339 (G), 1351 (C), 1354 (T), 1384 (C), 1453 (T), 1456 (C), 1495 (T), 1553 (C), 1609 (T), 1757 (T), 1769 (C), 1813 (C), 1816 (C), 1843 (C), 1873 (C), 1897 (C).

Culture characteristics: Colonies on OA reaching 29 mm diam after 7 d at 25 ± 1 °C, flattened, reddish grey (M. 9B2) to white (M. 9A1); reverse white (M. 9A1). Colonies on MEA reaching 31 mm after 7 d at 25 ± 1 °C, flattened to floccose, pinkish white (M. 9A2) to white (M. 9A1); reverse white (M. 9A1). NaOH spot test negative. Crystals absent.

Material examined: **USA**, from human sputum sample, 2008, D.A. Sutton (**holotype** FMR H-13747, ex-holotype living cultures UTHSC DI16-257 = FMR 13747).

Notes: The strain UTHSC DI16-257, which remained sterile, forms a basal clade with *E. latusicollum*; however, this strain clearly differs phylogenetically from the latter species mainly in the loci *tub*2 and *rpb*2. Therefore it is proposed here as a new species, *Epicoccum pneumoniae*.

Epicoccum proteae (Crous) Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, **comb. nov.** MycoBank MB820830.
Basionym: *Phoma proteae* Crous, Persoonia 27: 151. 2011.

Description: Crous *et al.* (2011).

Material examined: **South Africa**, Western Cape Province, Somerset West, Karibia Farm, from leaves of *Protea* cv. Carnival (*P. compacta* × *P. neriifolia*), 21 July 1998, J.E. Taylor & S. Denman (**holotype** CBS H-20771, ex-holotype living cultures CPC 1854 = CBS 114179 = FMR 15332).

Notes: This species was first proposed by Crous *et al.* (2011) within *Phoma*, which is characterised by producing brown, globose pycnidia and hyaline, aseptate conidia. However, our phylogenetic study showed that the ex-type strain of this species clustered in *Epicoccum*. Therefore, we propose a new combination for this species.

Epicoccum sorghinum (Sacc.) Aveskamp *et al.*, Stud. Mycol. 65: 36. 2010.
Basionym: *Phyllosticta sorghina* Sacc., Michelia 1: 140. 1878.
Synonym: *Phoma sorghina* (Sacc.) Boerema *et al.*, Persoonia 7: 134. 1973.
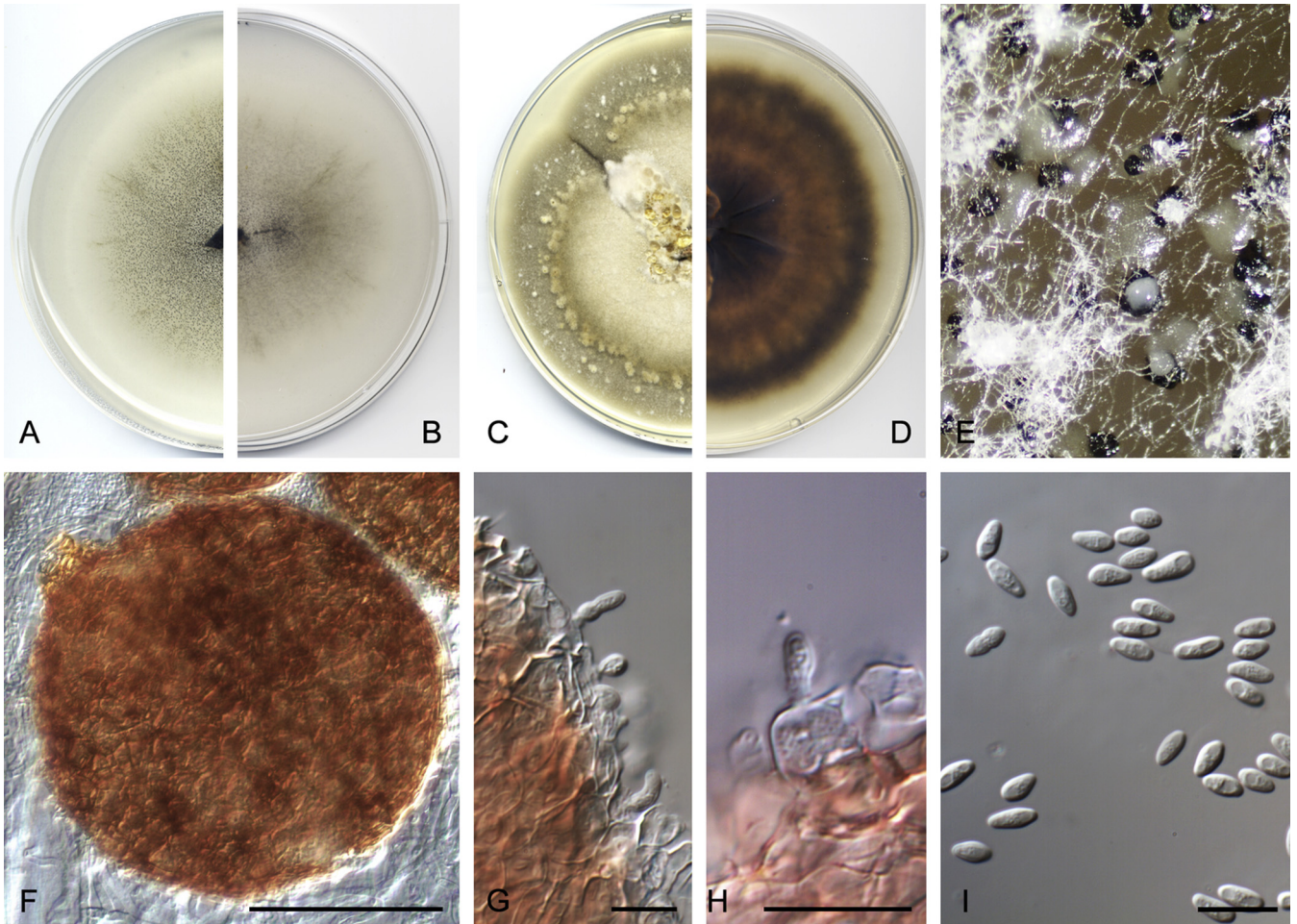
Fig. 8. *Epicoccum ovisporum* (CBS 180.80). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G, H.** Conidiogenous cells. **I.** Conidia. Scale bars: F = 100 µm. G–I = 10 µm.

Description: Boerema *et al.* (2004).

Materials examined: **France**, Antibes, from a twig of *Citrus* sp., 1966, living cultures CBS 627.68 = PD 66/926. **Puerto Rico**, Mayaguez, from *Sorghum vulgare*, Apr. 1976, R. Alconera, living cultures CBS 179.80 = PD 76/1018; **USA**, from human foot, 2010, D.A. Sutton, living cultures UTHSC DI16-288 = FMR 13692; from human bronchial wash sample, 2011, D.A. Sutton, living cultures UTHSC DI16-301 = FMR 13794.

Notes: Two strains (UTHSC DI16-288 and UTHSC DI16-301) isolated from human clinical specimens in the USA clustered with the reference strains CBS 179.80 and CBS 627.68 of *E. sorghinum*. The latter species had been reported from several different substrates mainly from vegetal materials and it seems to be a widely distributed fungus, also having been associated with human infections (Punithalingam 1985, Rai 1989). Morphologically *E. sorghinum* was described producing mainly pycnidial conidiomata. Unfortunately, our strains were sterile, and further studies are needed to resolve the taxonomy of this species.

Clade A3: *Allophoma*

Allophoma Q. Chen & L. Cai, Stud. Mycol. 82: 162. 2015.

Type species: *Allophoma tropica* (R. Schneid. & Boerema) Q. Chen & L. Cai, Stud. Mycol. 82: 162. 2015.

Allophoma cylindrispora Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB819625. Fig. 9.

Etymology: From Latin *cylindricus*-, of cylindrical shape, and -*spora*, spore.

Description: *Hyphae* brown, septate, smooth- and thin-walled, 2.5–5 µm wide. *Conidiomata* pycnidial, brown to dark brown, confluent, superficial and immersed (OA), glabrous, ovoid, 120–210 × 90–140 µm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2–4-layered, 15–30 µm thick, composed of brown to dark brown, flattened polygonal cells of 5–12.5 µm diam,. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 3.5–4 × 4.5–5 µm. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical, 3–4 × 2 µm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 36 mm diam after 7 d at 25 ± 1 °C, flattened, beige (M. 4C3) to olive brown (M. 4F3); reverse blond (M. 4C4) to olive brown (M. 4F3). Colonies on MEA reaching 25–27 mm after 7 d at 25 ± 1 °C, flattened, white (M. 4A1); reverse pale yellow (M. 4A4) to yellowish orange (M. 4B7). NaOH spot test negative. Crystals absent. Optimal temperature of growth and of sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **USA**, from a human eye lesion, 2007, D.A. Sutton (**holotype** CBS H-23030, ex-holotype living cultures CBS 142453 = UTHSC DI16-233 = FMR 13723).

Notes: This species forms a clade which is distinct from the closest relatives, *A. minor* and *A. piperis*. Unfortunately, the morphological distinction between these three species is difficult. Although these species differ in geography and substrate,
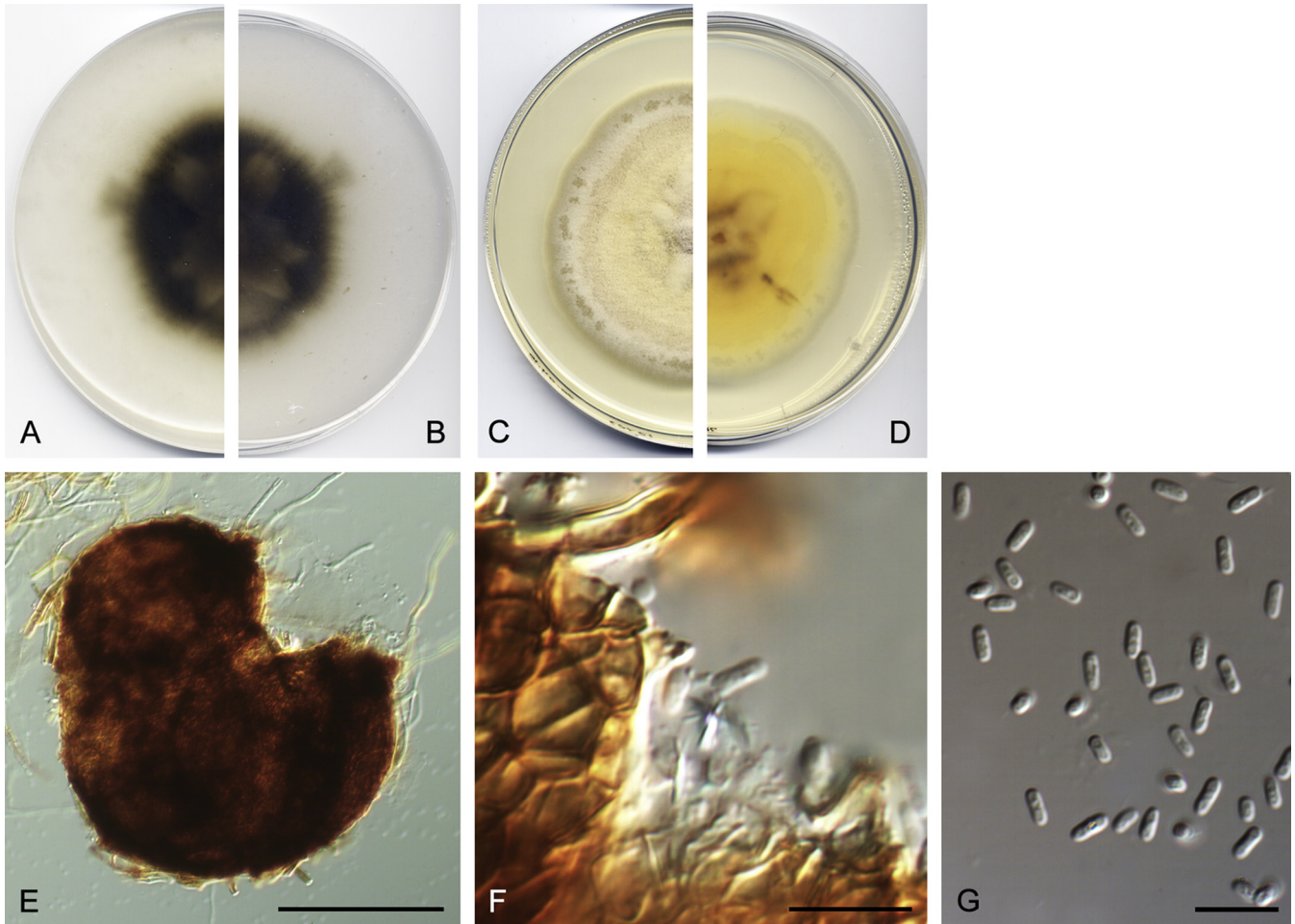
Fig. 9. *Allophoma cylindrispora* (CBS 142453). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidium. **F.** Conidiogenous cells. **G.** Conidia. Scale bars: E = 100 μm. F, G = 10 μm.

molecular data is required for species identification. *Allophoma cylindrispora* sporulates poorly in culture.

Clade A7: *Ectophoma*

Ectophoma Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **gen. nov.** MycoBank MB819952.

Etymology: From the Greek εκτος, outside, because it is phylogenetically far from *Phoma*.

Conidiomata pycnidial, brown to dark brown, solitary or confluent, pycnidial wall of *textura angularis*, glabrous, globose to subglobose or irregular, ostiolate, with one or more short necks. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform to globose. *Conidia* aseptate, hyaline, smooth- and thin-walled, oblong to ellipsoidal, guttulate.

Type species: *Ectophoma multirostrata* (P.N. Mathur *et al.*) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel.

Ectophoma multirostrata (P.N. Mathur *et al.*) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **comb. nov.**, MycoBank MB819953. Fig. 10.
Basionym: *Sphaeronaema multirostratum* P.N. Mathur *et al.*, Sydowia 13: 146. 1959.
Synonym: *Phoma multirostrata* (P.N. Mathur *et al.*) Dorenb. & Boerema, Mycopathol. Mycol. Appl. 50: 256. 1973.
Description: Boerema *et al.* (2004).

Materials examined: **India**, Maharashtra, Poona, Talegaon, from poultry farm soil, Mar. 1959, M. J. Thirumalachar (**isotype** CBS H-7616, ex-isotype living cultures

CBS 274.60 = IMI 081598 = FMR 15335); Maharashtra, Poona, Talegaon, from soil, Mar. 1959, M.J. Thirumalachar, living cultures CBS 368.65 = PD 92/1757 = FMR 15336. **The Netherlands**, Hoorn, greenhouse, from the stem of *Cucumis sativus*, Aug. 1967, G.H. Boerema, living cultures CBS 110.79 = PD 65/8875 = FMR 15342.

Notes: Aveskamp *et al.* (2009) transferred this species from *Sphaeronaema* to *Phoma*. In our study, *P. multirostrata* forms a distinct clade, separated from all genera previously described in the *Didymellaceae*. Therefore, we propose a new genus to accommodate this species.

Ectophoma pomi (A.S. Horne) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **comb. nov.** MycoBank MB819954. Fig. 11.
Basionym: *Polyopeus pomi* A.S. Horne, J. Bot., Lond. 58: 240. 1920.
Synonym: *Phoma pereupyrena* Gruyter *et al.*, Persoonia 15: 398. 1993.

Description: Boerema *et al.* (2004).

Material examined: **India**, from a leaf spot of *Coffea arabica*, 1976, deposited by J. de Gruyter (**neotype designated here** CBS H-23202, MBT377913, ex-neotype living cultures CBS 267.92 = PD 76/1014 = FMR 15346).

Notes: *Polyopeus pomi*, introduced by Horne (1920) was validly described growing on potato mush agar, and was isolated from the fruits of *Malus domestica* "Cox's Orange Pippin", in the UK, where it produced dark spots. No illustration is available, and no type material is mentioned in the publication. Therefore, based on the original description, we propose CBS H-23202 as neotype. The fungus produces black, subglobose to irregularly
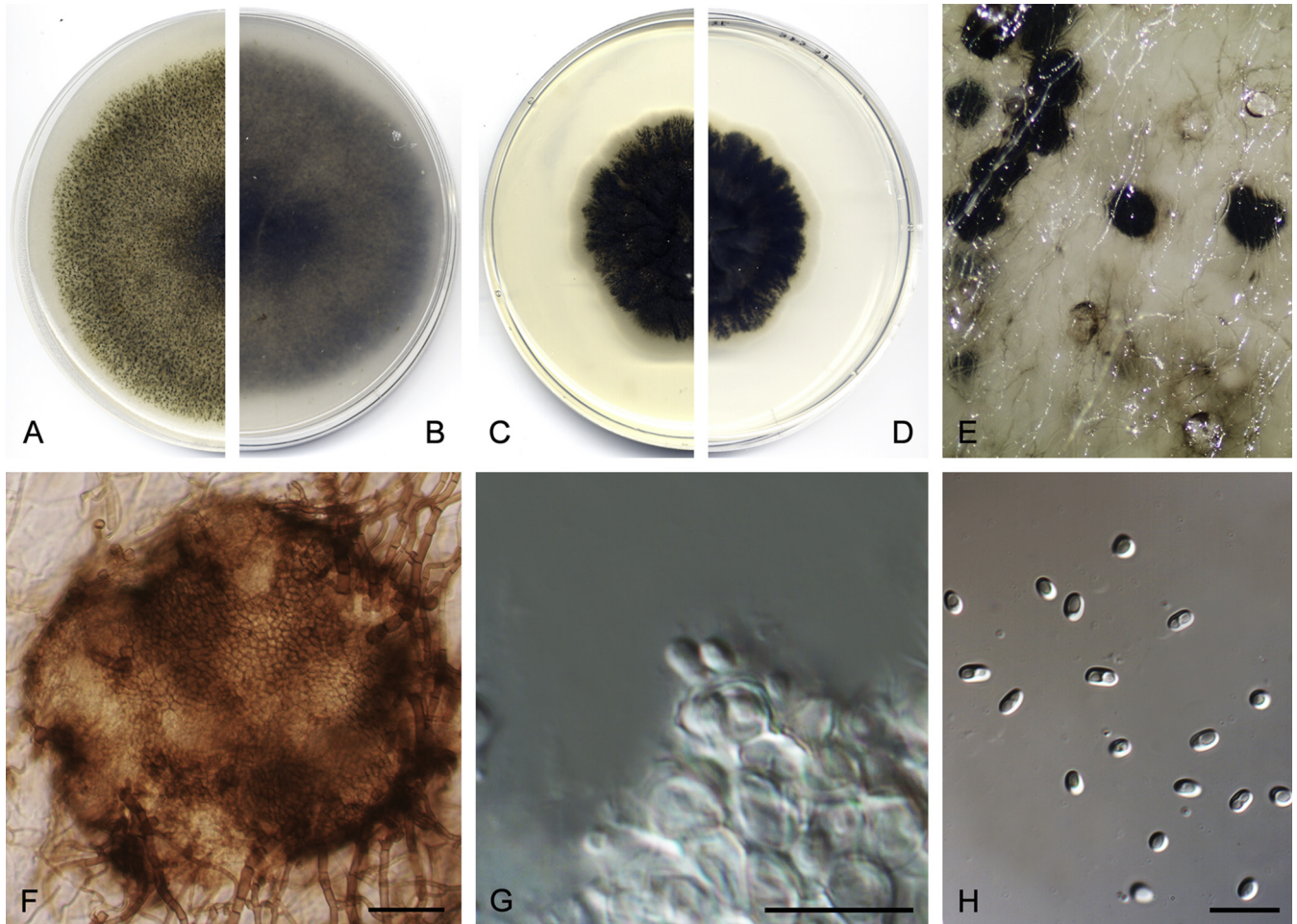
Fig. 10. *Ectophoma multirostrata* (CBS 274.60). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 µm. G, H = 10 µm.

shaped pycnidia with a blackish neck, and hyaline, ellipsoidal conidia, 5−9 × 2−3 µm.

Clade A8: *Remotididymella*

Remotididymella Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, **gen. nov.** MycoBank MB819990.

Etymology: From Latin *remotus*-, distant, because it is phylogenetic far removed from the similar genus *Didymella*.

Conidiomata pycnidial, brown to dark brown, mostly confluent; pycnidial wall of *textura angularis*, mostly glabrous, globose or irregularly-shaped, with a single ostiole. *Conidiogenous cells* phialidic, hyaline, smooth-walled, globose or ampulliform. *Conidia* aseptate, hyaline, smooth- and thin-walled, allantoid or cylindrical, guttulate.

Type species: *Remotididymella destructiva* (Plowr.) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel.

Remotididymella anthropophila Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB819991. Fig. 12.

Etymology: From Greek ανθρώπος-, human, and −φίλος, friend, because that fungus has been isolated from a human sample.

Description: *Hyphae* brown, smooth- and thin-walled, septate, 2.5−8 µm wide. *Conidiomata* pycnidial, apricot to pale brown, translucent, solitary or confluent, superficial (OA), glabrous,

globose to subglobose, 300−400 × 250−400 µm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2−5 layered, 30−40 µm thick, composed of subhyaline to pale brown flattened polygonal cells of 5−20 µm diam,. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform to globose, 5−6 µm diam. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical, 5.5−7.5 × 1.5−2.5 µm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 60 mm diam after 7 d at 25 ± 1 °C, flattened, yellowish brown (M. 5E3) to greyish brown (M. 5F3); reverse greyish brown (M. 5F3). Colonies on MEA reaching 35−36 mm diam after 7 d at 25 ± 1 °C, flattened, greyishorange (M. 5B3) to pale brown (M. 5D6); reverse orange white (M. 5A2) to brownish yellow (M. 5C7). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 35 °C.

Material examined: **USA**, Texas, from human bronchial secretion, D.A. Sutton (**holotype** CBS H-23039, ex-holotype living cultures CBS 142462 = UTHSC DI16-278 = FMR 13770).

Notes: The new species *Remotididymella anthropophila* is genetically distinct from its nearest neighbour *R. destructiva*. Morphologically it is the only species of the genus that produces pale-brown pycnidia, which is unusual in phoma-like species, and it differs in substrate and location with the latter species.
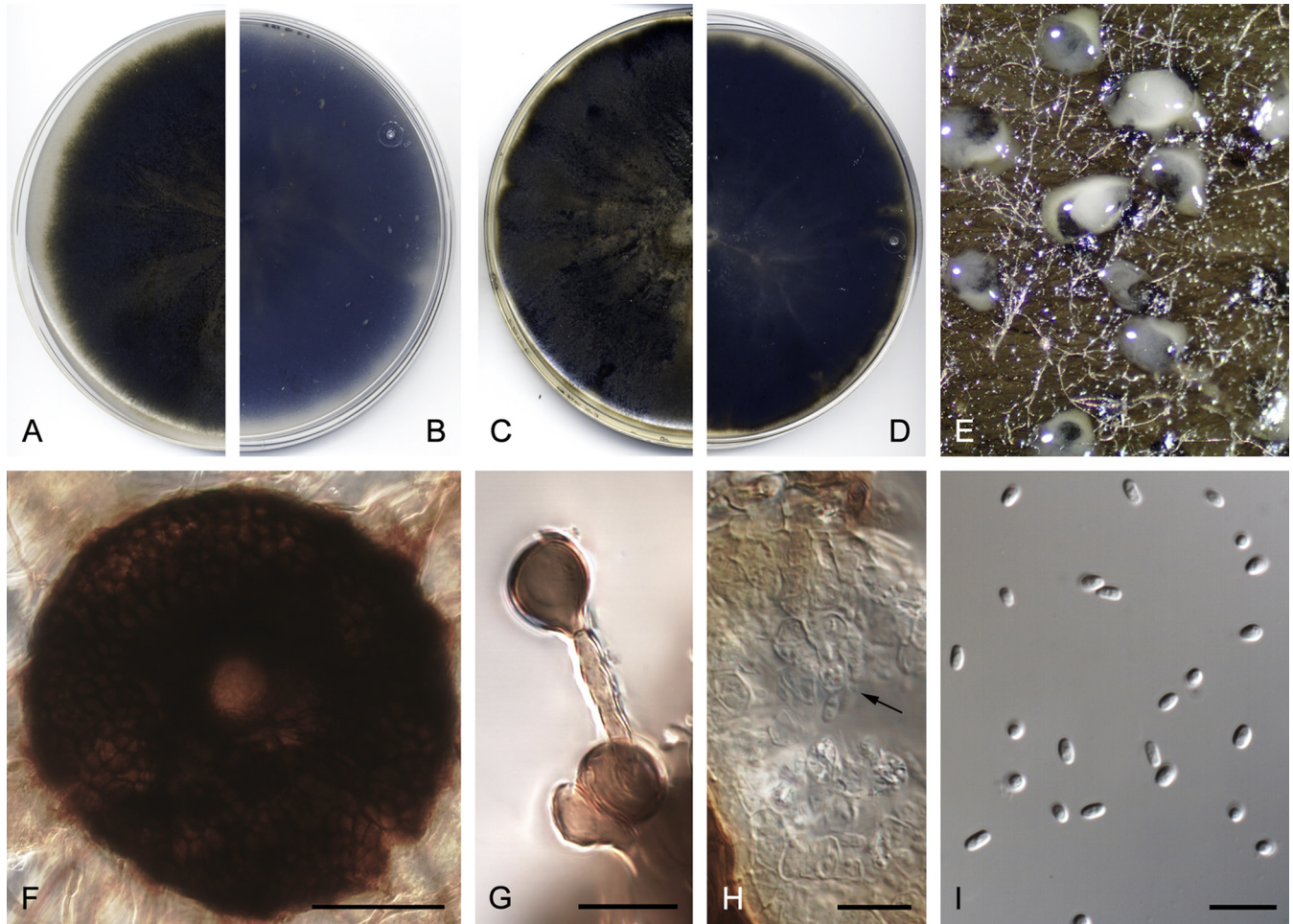
Fig. 11. *Ectophoma pomi* (CBS 267.92). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Chlamydospores. **H.** Arrow indicate the conidiogenous cell. **I.** Conidia. Scale bars: F = 50 µm. G−I = 10 µm.

Remotididymella destructiva (Plowr.) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **comb. nov.** MycoBank MB819992. Fig. 13.

Basionym: *Phoma destructiva* Plowr., Gard. Chron. II 16: 621. 1881.

Synonyms: *Diplodina destructiva* (Plowr.) Petr., Annls mycol. 19(1/2): 19. 1921.

Phoma destructiva var. *diversispora* Gruyter *et al*., Persoonia 18: 28. 2002.

Description from ex-epitype (CBS 378.73): *Hyphae* brown, smooth- and thin-walled, septate, 2.5−6 µm wide. *Conidiomata* pycnidial, dark brown, mostly confluent, rarely solitary, superficial or immersed (OA), glabrous, ovoid to irregularly-shaped, 120−250 × 90−180 µm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2−4 layered, 12.5−50 µm thick, composed of brown, flattened polygonal cells of 5−10 µm diam,. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 10−12 × 5−6 µm. *Conidia* aseptate, hyaline, smooth- and thin-walled, variable in shape, mostly allantoid to cylindrical, 3.5−8 × 2−2.5 µm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 21 mm diam after 7 d at 25 ± 1 °C, flattened, front and reverse dark grey (M. 4F1). Colonies on MEA reaching 10 mm diam after 7 d at 25 ± 1 °C, flattened, front and reverse olive brown to dark grey (M. 5F2). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 15 °C; maximum temperature of growth 30 °C.

Materials examined: **Lectotype** designated here (MBT378116): fig. 123, in Plowright. 1881. The Gardeners' chronicle: a weekly illustrated journal of horticulture and allied subjects (http://www.biodiversitylibrary.org/item/84372#page/639/mode/1up). **Guadeloupe**, from fruit of *Lycopersicon esculentum*, 1987, living cultures CBS 133.93 = PD 88/961 = IMI 173142. **The Netherlands**, Berkel en Rodenrijs, from a leaf of *Lycopersicon esculentum*, Oct. 1977, G.H. Boerema, living culture CBS 162.78 = PD 77/725. **Tonga**, Friendly Islands, from decaying fruit of *Lycopersicon esculentum*, 1967, G.F. Laundon (**epitype designated here** CBS H-16200, MBT377914, ex-epitype living cultures CBS 378.73 = FMR 15328 = CECT 2877).

Notes: *Phoma destructiva* was originally described by Plowright (1881), infecting fruits of *Lycopersicon esculentum* in King's Lynn, UK. Later, many representative specimens were collected from the similar hosts in other countries of Europe, and in North and South America (de Gruyter *et al*. 2002, Boerema *et al*. 2004). *Phoma destructiva* is characterised by the production of olivaceous black, globose, glabrous pycnidia with up to three papillate ostioles, hyaline, aseptate, subglobose to ellipsoidal conidia of σ = 5.8 × 2.2 µm, scarce and larger 1-septate conidia, and by the absence of chlamydospores. De Gruyter *et al*. (2002), based on morphological differences of the conidia, recognized two varieties, *destructiva* and *diversispora*. However, the isolates CBS 378.73 and CBS 133.93, representative strains of "*Phoma destructiva* var. *destructiva*", and CBS 162.78, representative of "*Phoma destructiva* var. *diversispora*", were phylogenetically and
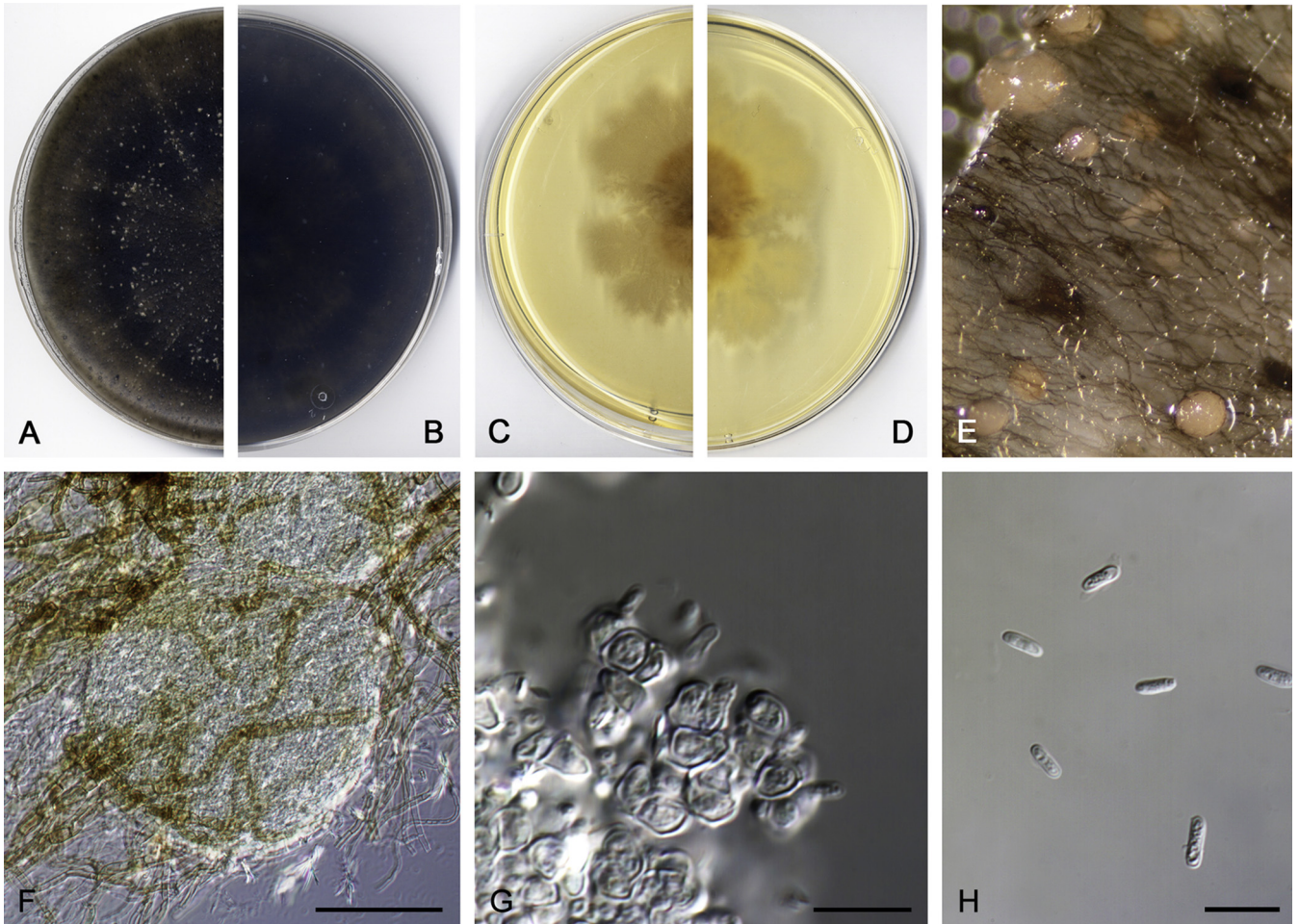
Fig. 12. *Remotididymella anthropophila* (CBS 142462). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

morphologically very similar in our study. Therefore, we did not accept these varieties, and propose CBS H-16200 as the epitype of *Remotididymella destructiva*.

Clade A9: *Similiphoma*

Similiphoma Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, **gen. nov.**, MycoBank MB820847.

Etymology: From Latin *similis-*, similar to, due to the morphological similarity with *Phoma*.

Conidiomata pycnidial, brown, confluent or solitary; pycnidium wall of *textura angularis*, glabrous or with short hyphal outgrowths, globose to subglobose, with one or two papillate ostioles. *Conidiogenous cells* phialidic, hyaline, smooth-walled, globose or ampulliform. *Conidia* aseptate, hyaline, smooth- and thin-walled, ellipsoidal to cylindrical, guttulate.

Type species: *Similiphoma crystallifera* (de Gruyter *et al.*) Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel.

Similiphoma crystallifera (Gruyter *et al.*) Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, **comb. nov.** MycoBank MB820848. Fig. 14.
Basionym: *Phoma crystallifera* Gruyter *et al.*, Persoonia 15: 393. 1993.

Description: Boerema *et al.* (2004).

Material examined: **Austria**, Kärnten, Wallersberg near Völkermarkt, from *Chamaespartium sagittale*, 1982, H.A. van der Aa (**holotype** L 992.177-456, ex-holotype living cultures CBS 193.82 = FMR 15343).

Notes: *Similiphoma crystallifera* CBS 193.82 clustered phylogenetically distant from the closest morphologically related genera *Ectophoma*, *Epicoccum* and *Phoma*. Consequently, we designated this strain as the type species of the new genus *Similiphoma*.

Clade A10: *Paraboeremia*

Paraboeremia Q. Chen & L. Cai, Stud. Mycol. 82: 183. 2015.

Type species: *Paraboeremia selaginellae* (Sacc.) Q. Chen & L. Cai.

Paraboeremia putaminum (Speg.) Q. Chen & L. Cai, Stud. Mycol. 82: 184. 2015. Fig. 15.
Basionym: *Phoma putaminum* Speg., Atti Soc. Crittog. Ital. 3: 66. 1881.

Description: de Gruyter & Noordeloos (1992).

Material examined: **Denmark**, from the rhizosphere of *Malus sylvestris*, Mar. 1968, E. Sønderhousen, living cultures CBS 130.69 = CECT 20054 = IMI 331916 = FMR 15338.

Notes: This species was introduced by Spegazzini in 1881, isolated from pine wood in Sweden, and in the last study of this species by Chen *et al.* (2015) from two reference strains (CBS 130.69 and CBS 372.91) was placed within the genus *Paraboeremia*. However, without an illustration and *rpb*2 sequences, in our study, the *rpb*2 sequence and the illustration were provided of the reference strain CBS 130.69, which it resembles morphologically (de Gruyter & Noordeloos 1992), but further studies are needed to clarify its typification.
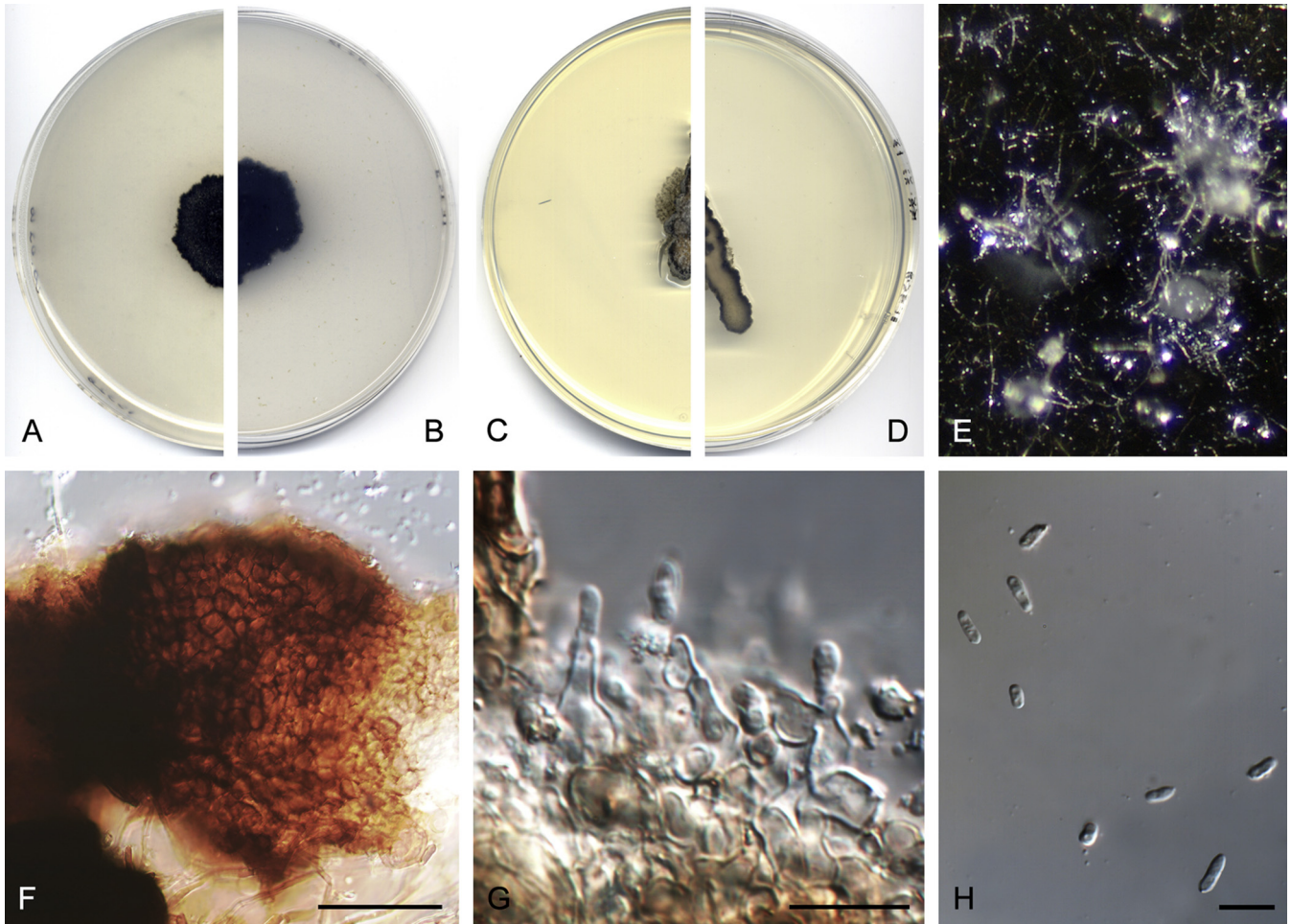
Fig. 13. *Remotididymella destructiva* (CBS 378.73). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 μm. G, H = 10 μm.

Paraboeremia selaginellae (Sacc.) Q. Chen & L. Cai, Stud. Mycol. 82: 184. 2015.
Basionym: *Phyllosticta selaginellae* Sacc., Malpighia 11: 304. 1897.
Synonym: *Phoma selaginellicola* Gruyter *et al.*, Persoonia 15: 399. 1993.

Description: Chen *et al.* (2015).

Material examined: **The Netherlands**, from a leaf of *Selaginella* sp., 1977, G.H. Boerema (**neotype** HMAS 246693, MBT202501, ex-neotype living cultures CBS 122.93 = PD 77/1049 = FMR 15348).

Notes: This species was already typified by Chen *et al.* (2015) providing DNA sequence data and illustrations. However, the *rpb*2 sequence was not given, and therefore in the present study the *rpb*2 sequence of the ex-type strain CBS 122.93 is added.

Clade A12: *Cumuliphoma*

Cumuliphoma Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, **gen. nov.** MycoBank MB819878.

Etymology: From Latin *cumulus*-, heap or pile, in reference to the aggregated pycnidia.

Conidiomata pycnidial, brown, mostly confluent, pycnidial wall of *textura angularis*, mostly glabrous, globose or nearly so, with a single ostiole. *Conidiogenous cells* phialidic, hyaline, smooth-walled, globose to ampulliform. *Conidia* aseptate, hyaline, smooth- and thin-walled, ellipsoidal to cylindrical, guttulate. *Chlamydospores* mostly absent.

Type species: *Cumuliphoma omnivirens* (Aveskamp *et al.*) Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano.

Cumuliphoma indica Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **sp. nov.** MycoBank MB819880. Fig. 16.

Etymology: The name refers to the geographic origin of the fungus, India.

Description: *Hyphae* pale brown to brown, smooth- and thin-walled, septate, 2.5–8 μm wide. *Conidiomata* pycnidial, brown to dark brown, mostly confluent, rarely solitary, immersed (OA and MEA), glabrous, ovoid to irregularly-shaped, 150–180(–520) × 140–150(–490) μm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 3–5-layered, 25–60 μm thick, composed of brown, flattened polygonal cells of 7–23 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, globose to ampulliform, 5–6 × 4–5.5 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, ellipsoidal to cylindrical, 4–5.5 × 2–2.5 μm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 42 mm diam after 7 d at 25 ± 1 °C, flattened, olive brown (M. 4F3); reverse dark grey (M. 4F1). Colonies on MEA reaching 37 mm diam after 7 d at 25 ± 1 °C, flattened, brownish grey (M. 5F2) to pale grey (M. 5C2); reverse brownish grey (M. 5F2). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 15 °C; maximum temperature of growth 30 °C.
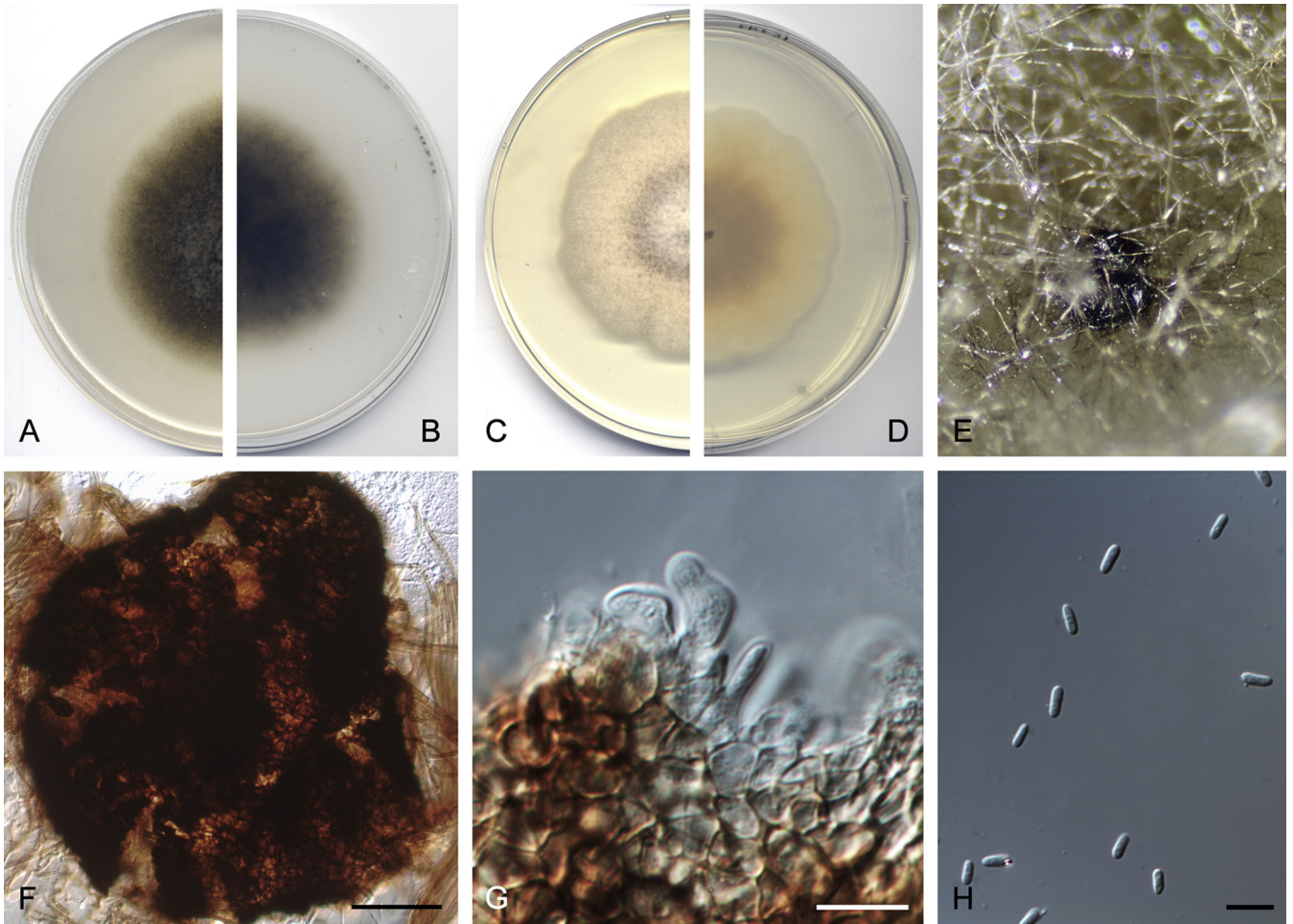
Fig. 14. *Similiphoma crystallifera* (CBS 193.82). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

Materials examined: **India**, Jabalpur, from an unknown substrate, 1977, isolated by D.P. Tiwari (**holotype** CBS H-20152, ex-holotype living cultures CBS 654.77 = FMR 15341). **Papua New Guinea**, Varirata National Park, from soil, Aug. 1995, A. Aptroot, living cultures CBS 991.95 = FMR 15331.

Notes: The isolates CBS 654.77 and CBS 991.95 were received as "*Phoma omnivirens*". However, these isolates were phylogenetically distant from the ex-type strain of *C. omnivirens* (CBS 341.86), and also both differ morphologically from the latter due to the absence of chlamydospores and micropycnidia.

Cumuliphoma omnivirens (Aveskamp *et al.*) Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, **comb. nov.** MycoBank MB819882.
Basionym: *Phoma omnivirens* Aveskamp *et al.*, Mycologia 101: 375. 2009.

Description: Aveskamp *et al.* (2009).

Material examined: **Belgium**, Gembloux, from *Phaseolus vulgaris*, 1968, isolated by L. Obando (**holotype** CBS H-20151, ex-holotype living cultures CBS 341.86 = FMR 14915).

Notes: *Cumuliphoma omnivirens* is the only species of the genus that produces chlamydospores. Phylogenetically, it is closely related to *C. pneumoniae*, but is distinct from this species in both *rpb*2 and *tub*2 sequences by 9 bp.

Cumuliphoma pneumoniae Valenzuela-Lopez, Stchigel, Crous, Guarro & Cano, **sp. nov.** MycoBank MB819881. Fig. 17.

Etymology: From Greek πνευμονικός-, pulmonary, due to the origin of the ex-type strain.

Description: *Hyphae* hyaline to brown, smooth- and thin-walled, septate, 2.5–6 µm wide. *Conidiomata* pycnidial, brown to dark brown, confluent, superficial (OA), glabrous, globose to subglobose, 200–240 × 200 µm, with a short papillate ostiolar neck; pycnidial wall of *textura angularis*, 3–5 layered, 25–35 µm thick, composed of brown to dark brown, flattened polygonal cells of 5–12 µm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform to globose, 5–6 × 5 µm. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid to cylindrical, 2.5–5 × 2 µm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 28 mm diam after 7 d at 25 ± 1 °C, flattened, yellowish brown (M. 5F5); reverse brownish grey (M. 5F3). Colonies on MEA reaching 27–29 mm after 7 d at 25 ± 1 °C, flattened, grey (M. 6C1), producing a diffusible greyish orange pigment; reverse dark brown (M. 6F6). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **USA**, from human sputum sample, D.A. Sutton (**holotype** CBS H-23031, ex-holotype living cultures CBS 142454 = UTHSC DI16-249 = FMR 13739).

Notes: *Cumuliphoma pneumoniae* was isolated from a clinical sample of the respiratory tract. This species is morphologically closely related to *C. omnivirens*, which is also the phylogenetically nearest species. However, *C. pneumoniae* does not produce chlamydospores.

Clade A13: *Juxtiphoma*
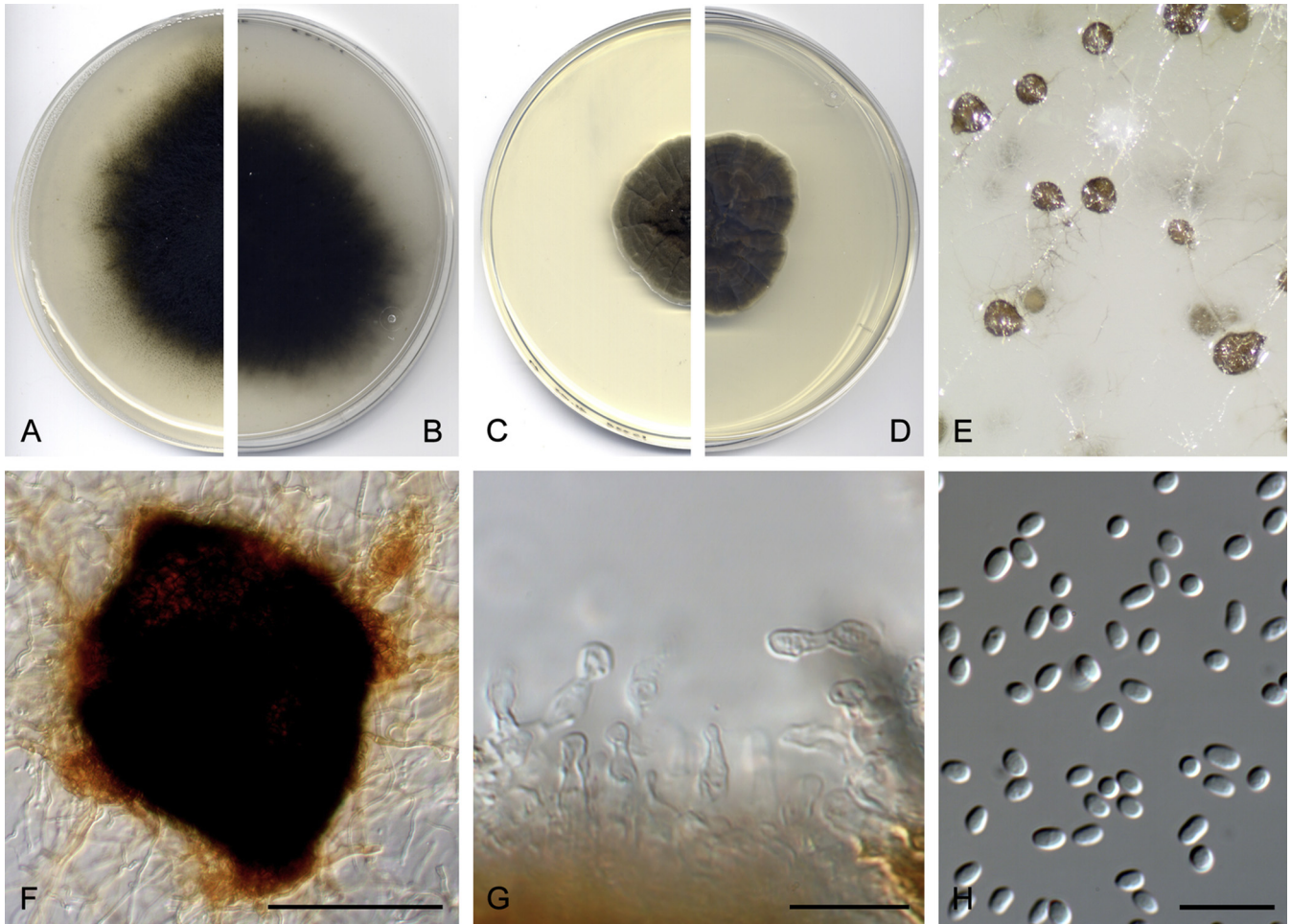
Fig. 15. *Paraboeremia putaminum* (CBS 130.69). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

Juxtiphoma Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **gen. nov.** MycoBank MB821111.

Etymology: From Latin *juxta*, next to, due to the morphological and phylogenetic similarity with *Phoma*.

Conidiomata pycnidial, brown, mostly solitary, sometimes confluent, pycnidial wall of *textura angularis*, glabrous, subglobose to conical, papillate, ostiolate. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid, ellipsoidal or cylindrical, biguttulate. *Chlamydospores* aseptate, ochraceous-brown, single or in chains, subglobose, barrel-shaped or ellipsoidal.

Type species: *Juxtiphoma eupyrena* (Sacc.) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel.

Juxtiphoma eupyrena (Sacc.) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **comb. nov.** MycoBank MB821112.
Basionym: *Phoma eupyrena* Sacc., Michelia 1: 525. 1879.

Description: Boerema *et al.* (2004).

Materials examined: **Germany**, Kiel-Kitzeberg, from wheat field soil, 1966, W. Gams, living cultures CBS 527.66 = FMR 15337 = ATCC 22238. **The Netherlands**, from the tuber of *Solanum tuberosum*, 1991, J. de Gruyter, living cultures CBS 374.91 = PD 78/391 = FMR 15329.

Notes: *Phoma eupyrena*, introduced by Saccardo (1879) and reported on stems of *Solanum tuberosum* (geographic origin not cited), has been revised by several authors. The description from Saccardo is minimal: blackish, depressed conical, ostiolate

pycnidia with hyaline, ovoid conidia, 4 × 1.5 µm. Boerema *et al.* (2004) characterised this species morphologically and placed it in the section *Phoma*. Aveskamp *et al.* (2009) considered it phylogenetically close to "*Phoma omnivirens*", and later Aveskamp *et al.* (2010) regarded *P. eupyrena* closely related to *Microsphaeropsis*. However, in our phylogenetic tree this species formed a well-supported monophyletic clade, separate from the other genera of *Didymellaceae*. Therefore, we propose the new genus *Juxtiphoma* to accommodate this species.

Clade A14: *Vacuiphoma*

Vacuiphoma Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **gen. nov.** MycoBank MB821451.

Etymology: Based on the occurrence of empty pycnidial structures.

Conidiomata pycnidial, brown to dark brown, solitary, glabrous, subglobose or obpyriform; pycnidial wall of *textura angularis*, non-papillate.

Type species: *Vacuiphoma bulgarica* (Aveskamp *et al.*) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel.

Vacuiphoma bulgarica (Aveskamp *et al.*) Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **comb. nov.** MycoBank MB821452.
Basionym: *Phoma bulgarica* Aveskamp *et al.*, Stud. Mycol. 65: 47. 2010.
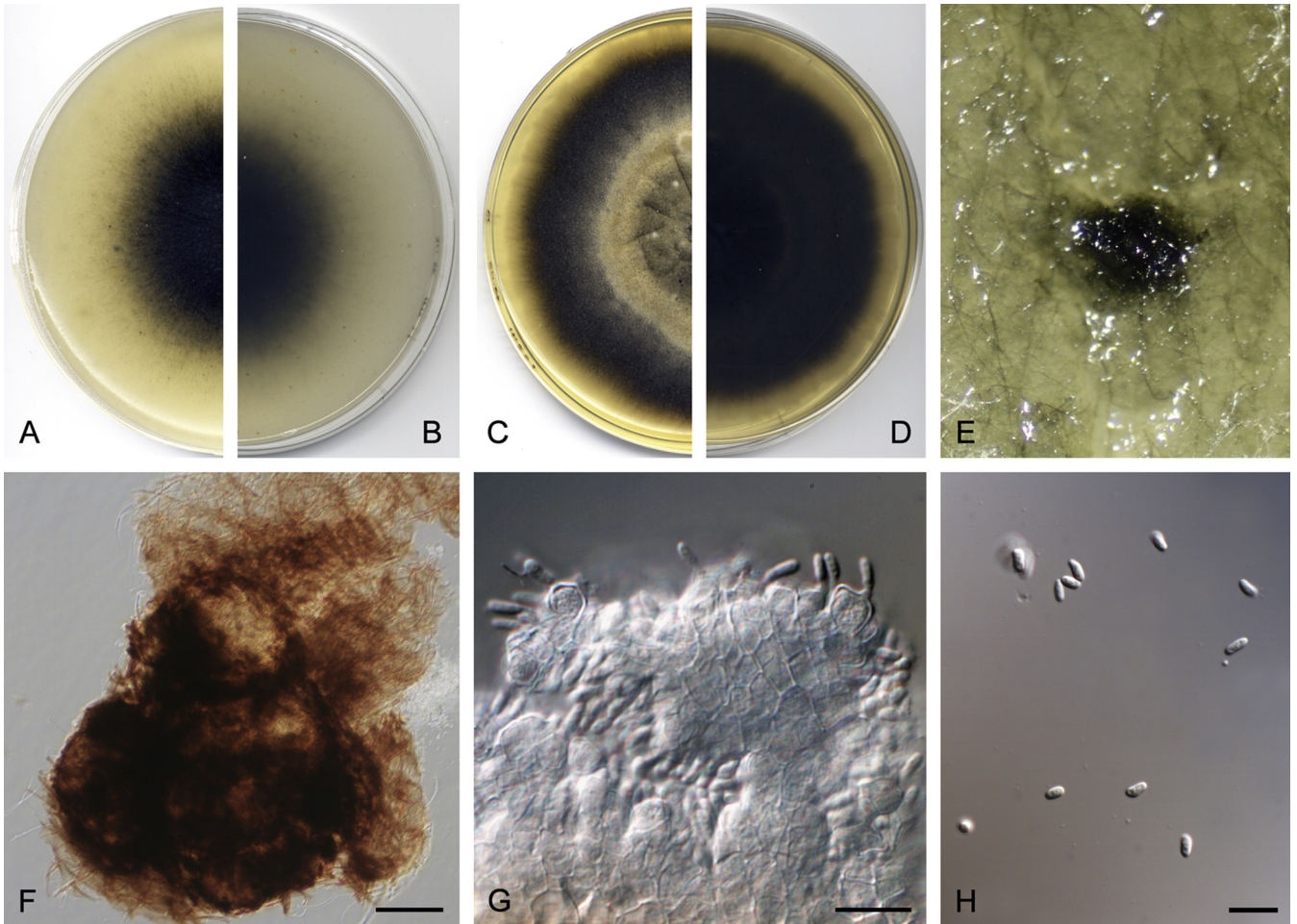
Fig. 16. *Cumuliphoma indica* (CBS 654.77). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 μm. G, H = 10 μm.

Description: Aveskamp *et al.* (2010).

Material examined: **Bulgaria**, Silkossia, Strandga Mountain, from leafs of *Trachystemon orientale*, 20 Jun. 1980, S. Vanev (**holotype** CBS H-20242, ex-holotype living cultures CBS 357.84 = FMR 14917).

Notes: This species was introduced by Aveskamp *et al.* (2010) within the genus *Phoma* due to the production of pycnidial conidiomata. However, this species was not able to produce conidia and remains poorly characterised. Genetically this species along with *V. oculihominis* form a distinct clade within *Didymellaceae*, thus we treat these species within the new genus *Vacuiphoma*.

Vacuiphoma oculihominis Valenzuela-Lopez, Stchigel, Guarro & Cano, **sp. nov.** MycoBank MB822113.

Etymology: The epithet refers to the human eye clinical sample, from which the fungus was isolated.

Culture sterile. *Vacuiphoma oculihominis* differs from its closest phylogenetic species, *Vacuiphoma bulgarica,* in two bp of the ITS nucleotide sequence, 12 bp of *tub*2 and 44 bp of *rpb*2, based on alignment of the concatenated four loci deposited in TreeBASE (S21115).

Culture characteristics: Colonies on OA reaching 30–34 mm diam after 7 d at 25 ± 1 °C, flattened, yellowish grey (M. 2B2) to olive grey (M. 2E2); reverse white (M. 2A1) to olive grey (M. 2E2). Colonies on MEA reaching 33 mm diam after 7 d at 25 ± 1 °C, slightly floccose, white (M. 5A1) to light orange (M. 5A4); reverse light orange (M. 5A4). NaOH spot test negative.

Crystals absent. Optimal temperature of growth 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **USA**, Illinois, from human eye secretion, 2011, D.A. Sutton (**holotype** FMR H-13801, ex-holotype living cultures UTHSC DI16-308 = FMR 13801).

Notes: The strain UTHSC DI16-308 was recovered from a human eye clinical specimen, and remained sterile despite being cultured on different types of media. Because this strain is phylogenetically related with *V. bulgarica*, but distant from that species, it is proposed here as a new taxon.

Clade A15: *Nothophoma*

Nothophoma Q. Chen & L. Cai, Stud. Mycol. 82: 212. 2015.

Type species: *Nothophoma infossa* (Ellis & Everh.) Q. Chen & L. Cai, Stud. Mycol. 82: 213. 2015.

Nothophoma gossypiicola (Gruyter) Q. Chen & L. Cai, Stud. Mycol. 82: 213. 2015.
Basionym: *Phoma gossypiicola* Gruyter, Persoonia 18: 96. 2002.

Description: de Gruyter (2002).

Materials examined: **USA**, Texas, from a leaf of *Gossypium* sp., 1963, L.S. Bird, living cultures CBS 377.67 = FMR 14912; from human ethmoid sinus lesion, 2010, D.A. Sutton, living cultures UTHSC DI16-294 = FMR 13787.

Notes: This species was recently placed within the genus *Nothophoma* by Chen *et al.* (2015). In our study, one isolate from human clinical specimen was identified as *N. gossypiicola*, which
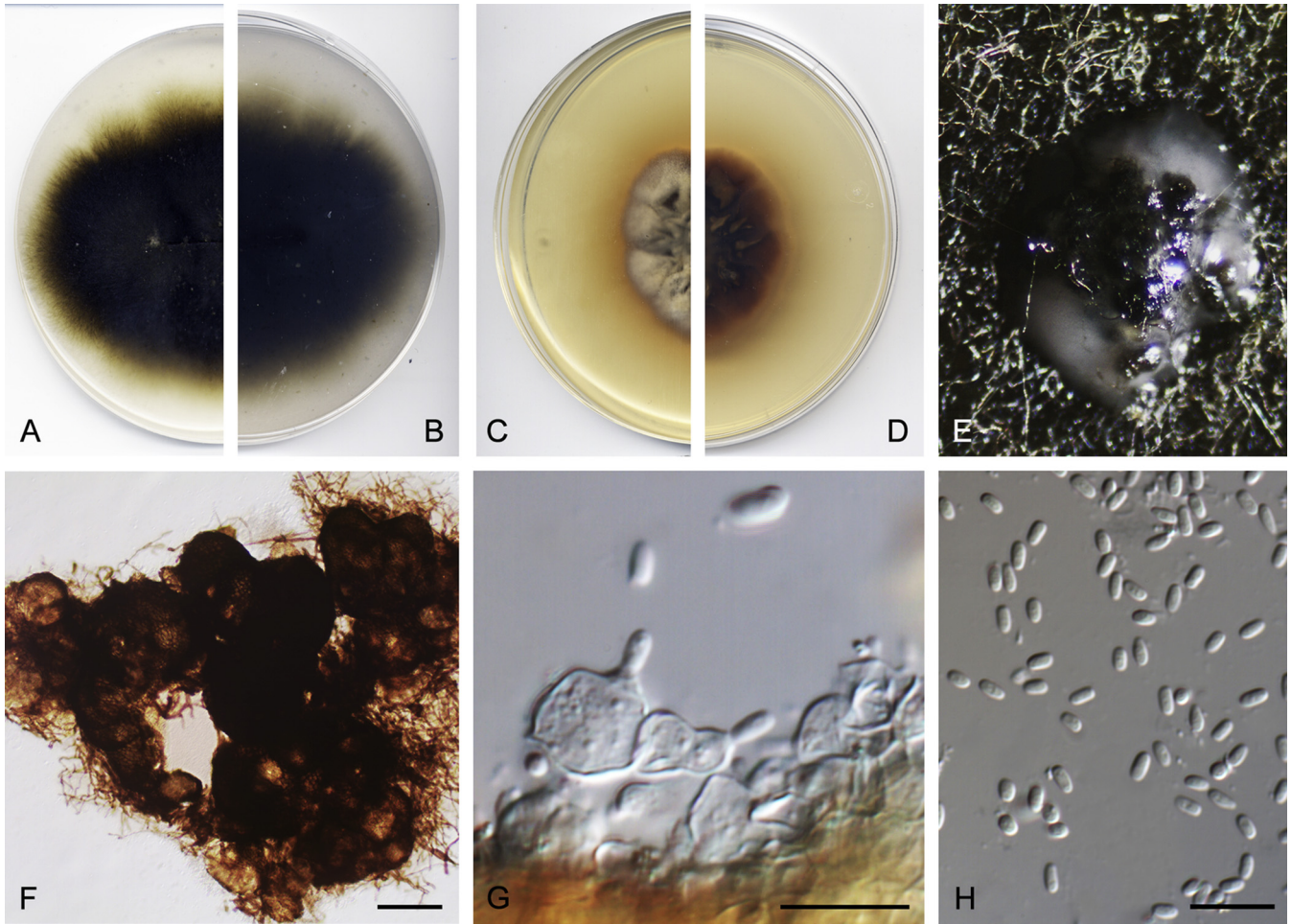
Fig. 17. *Cumuliphoma pneumoniae* (CBS 142454). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

it resembles in both morphology and DNA sequences from the reference strain CBS 377.67, isolated from the same country. This species is morphologically characterised by producing longer conidia (10–12.5 × 2.5–3.5 µm) and chlamydospores arranged in chains. However, further studies are needed to resolve its typification.

Nothophoma macrospora Valenzuela-Lopez *et al.*, Persoonia 36: 431. 2016.

Description: Crous *et al.* (2016b).

Material examined: **USA**, Arizona, Phoenix, from human respiratory secretion of a patient with pneumonia, 1 Apr. 2009, D.A. Sutton (**holotype** CBS H-22377, ex-holotype living cultures CBS 140674 = UTHSC DI16-276 = FMR 13767).

Notes: This species was recently proposed by Valenzuela-Lopez *et al.* (2016), which is phylogenetically related with *N. gossypii-cola*, but differs morphologically from the latter species in pyc-nidial shape, conidia (up to 2 *vs* non-septate) and the absence of chlamydospores (see Crous *et al.* 2016b). Furthermore, here the sequence of *rpb*2 is provided and differs in 13 bp from *N. gos-sypiicola*, and therefore *N. macrospora* is also phylogenetically distinct from *N. gossypiicola*.

Nothophoma quercina (Syd*.*) Q. Chen & L. Cai, Stud. Mycol. 82: 213. 2015.
Basionym: *Cicinobolus quercinus* Syd., Ann. Mycol. 13: 42. 1915.
Synonyms: *Ampelomyces quercinus* (Syd.) Rudakov, Mikol. Fitopatol. 13: 109. 1979.

Phoma fungicola Aveskamp *et al.*, Stud. Mycol. 65: 26. 2010.

Description: Aveskamp *et al.* (2010).

Materials examined: **Ukraine**, Crimea, in the vicinity of Feodosiya, on *Microsphaera alphitoides* from *Quercus* sp., 1979, O.L. Rudakov living cultures CBS 633.92 = ATCC 36786, VKM MF-325 = FMR 14913. **USA**, from human superficial foot lesion, 2009, D.A. Sutton, living cultures UTHSC DI16-270 = FMR 13761.

Notes: This species was already accommodated by Chen *et al.* (2015) within *Nothophoma*, and is characterised by producing globose to suboblate, glabrous, solitary pycnidia and hyaline, aseptate conidia (see Aveskamp *et al.* 2010). In our study, one human clinical strain isolated in the USA clustered with the reference strain CBS 633.92 of *N. quercina*. Morphologically it resembles the latter strain, and only a few differences in bp were genetically noted. However, both strains form a well-supported clade and were identified as the same species.

Nothophoma variabilis Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB819624. Fig. 18.

Etymology: From Latin *variabilis*, due to the variable shape of the conidia.

Description: *Hyphae* pale brown, septate, smooth- and thin-walled, 2.5–6 µm wide. *Conidiomata* pycnidial, brown, confluent, superficial (OA), glabrous, subglobose, 150–350 × 130–270 µm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 3–6-layered, 25–35 µm thick, composed of brown to dark brown, flattened polygonal cells of
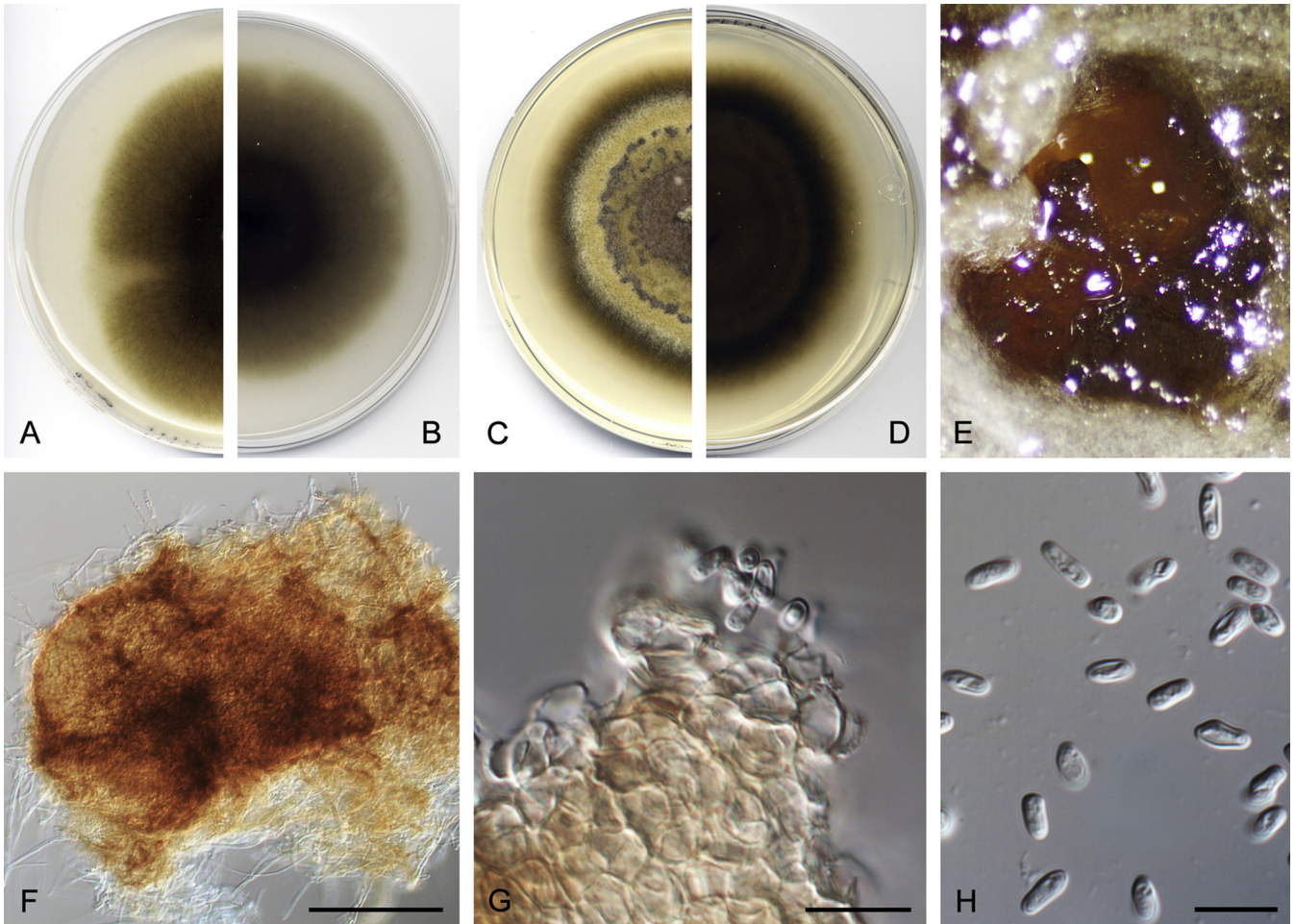
Fig. 18. *Nothophoma variabilis* (CBS 142457). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

5–20 µm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 6 × 5 µm. *Conidia* aseptate, hyaline, smooth- and thin-walled, ellipsoidal to cylindrical or irregularly shaped, 4–7 × 3–3.5 µm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 31 mm diam after 7 d at 25 ± 1 °C, flattened, greyish yellow (M. 4B4) to olive brown (M. 4F3); reverse olive brown (M. 4F3). Colonies on MEA reaching 36 mm after 7 d at 25 ± 1 °C, flattened, olive brown (M. 4F3) to greyish yellow (M. 4C5); reverse olive brown (M. 4F3) to brownish grey (M. 4F2). NaOH spot test negative. Crystals absent. Optimal temperature of growth and of sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 35 °C.

Material examined: **USA**, from human bronchial wash sample, 2009, D.A. Sutton (**holotype** CBS H-23034, ex-holotype living cultures CBS 142457 = UTHSC DI16-285 = FMR 13777).

Notes: This species was recovered from a clinical specimen of the respiratory tract, and it is closely related to *N. anigozanthi*. Both species can be differentiated by the presence of a single pycnidial ostiole (*vs.* 1–4 in *N. anigozanthi*), absence of a neck and production of wider conidia (3–3.5 µm *vs.* 1.5–2.5 µm) in *N. variabilis*. The NaOH spot test was negative, whereas it produces a dull green to vinaceous black pigmentation in *N. anigozanthi*.

Clade A21: *Phoma*

Phoma Sacc., Michelia 2: 4. 1880. emend. Q. Chen & L. Cai, Stud. Mycol. 82: 194. 2015.
Synonym: *Atradidymella* M.L. Davey & Currah, Amer. J. Bot. 96: 1283. 2009.

Type species: *Phoma herbarum* Westend.

Phoma herbarum Westend., Bull. Acad. Roy. Sci. Belgique, Cl. Sci. 19: 118. 1852. emend. Chen *et al.*, Stud. Mycol. 82: 195. 2015.
Synonyms: *Atradidymella muscivora* M.L. Davey & Currah, Amer. J. Bot. 96: 1283. 2009.
Phoma muscivora M.L. Davey & Currah, Amer. J. Bot. 96: 1283. 2009.
Phoma cruris-hominis Punith., Nova Hedwigia 31: 135. 1979.

Description: Chen *et al.* (2015).

Materials examined: **The Netherlands**, Emmeloord, from the stem of *Rosa multiflora* cv. Cathayensis, Apr. 1965, G.H. Boerema, living cultures CBS 615.75 = PD 73/665 = IMI 199779 = FMR 15340; Naaldwijk, from a stem base of *Nerium* sp., 1986, J. de Gruyter, living cultures CBS 502.91 = PD 82/276. **UK**, from a leg of woman, Apr. 1977, Y.M. Clayton, holotype of "*Phoma cruris-hominis*" IMI 213845, living cultures CBS 377.92 = IMI 213845. **USA**, from human urine catheter, 2006, D.A. Sutton, living cultures UTHSC DI16-204 = FMR 13694; from human bronchial wash sample, 2006, D.A. Sutton, living cultures UTHSC DI16-212 = FMR 13702; from human sputum sample, 2011, D.A. Sutton, living cultures UTHSC DI16-306 = FMR 13799; from human bronchial sample, 2011, D.A. Sutton, living cultures UTHSC DI16-307 = FMR 13800; from human nail, 2010, D.A. Sutton, living cultures UTHSC DI16-319 = FMR 13812.

Notes: In this study five strains from human clinical specimens were identified as *Phoma herbarum*, all of them corresponding in morphology and genetically with the reference strains CBS 377.92, CBS 502.91 and CBS 615.75. This species was already described as an opportunistic human pathogenic fungus by Punithalingam (1979), and this fact is confirmed in our study.

Clade A24: *Xenodidymella*

Xenodidymella Q Chen *et al*., Stud. Mycol. 82: 205. 2015.

Type species: *Xenodidymella applanata* (Niessl) Q. Chen & L. Cai.

Xenodidymella saxea (Aveskamp *et al*.) Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, **comb. nov.** MycoBank MB820831.
Basionym: *Phoma saxea* Aveskamp *et al*., Stud. Mycol. 65: 23. 2010.

Description: Aveskamp *et al*. (2010).

Material examined: **Germany**, Oldenburg, from corroded Mediterranean marble, June 1992, J. Kuroczkin (**holotype** CBS H-20240, ex-holotype cultures CBS 419.92 = FMR 15347).

Notes: This species was introduced by Aveskamp *et al*. (2010) and placed together with "*Phoma humicola*" (currently *Xenodidymella humicola*). In our phylogenetic tree, this species was related to the *Xenodidymella* clade. Despite that this species could represent another genus based on its low phylogenetic support and morphology, more studies are needed to resolve its taxonomic placement in the *Didymellaceae*. Thus, a new combination is proposed for this species. Morphologically *X. saxea* is characterised by producing dimorphic conidia: I) aseptate, hyaline, smooth- and thin-walled, (sub-) globose, (3–)3.5–5.5 μm diam, guttulate; and II) aseptate, hyaline, smooth- and thin-walled, cylindrical to ellipsoidal, (3.5–)4.5–7(–7.5) × 2.5–3.5 (–4) μm.

Clade A25: *Neodidymelliopsis*

Neodidymelliopsis Q. Chen *et al*., Stud. Mycol. 82: 207. 2015.

Type species: *Neodidymelliopsis cannabis* (G. Winter) Q. Chen & L. Cai.

Neodidymelliopsis longicolla L.W. Hou *et al*., Stud. Mycol. 87: 153. 2017.

Description: Chen *et al*. (2017).

Materials examined: **Israel**, En Avdat, Negev desert, from soil, Feb. 1996, A. van Iperen (**holotype** CBS H-23016, ex-holotype living culture CBS 382.96). **USA**, from human bronchial wash sample, 2011, D.A. Sutton, living cultures UTHSC DI16-322 = FMR 13815.

Notes: This species was recently proposed by Chen *et al*. (2017), and is characterised by producing globose to flask-shaped, glabrous or pycnidia with hyphal outgrowths. The most characteristic features include its elongated neck, the conidia that are initially hyaline and aseptate, but became pale-brown and septate with age. In our study, the strain UTHSC DI16-322 clustered with the ex-type strain of *N. longicolla*. However, no morphological comparison was possible because our strain remained sterile.

Clade A26: *Neoascochyta*

Neoascochyta Q. Chen& L. Cai, Stud. Mycol. 82: 198. 2015.

Type species: *Neoascochyta exitialis* (Morini) Q. Chen & L. Cai, Stud. Mycol. 82: 199. 2015.

Neoascochyta cylindrispora Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB819691. Fig 19.

Etymology: From Latin *cylindricus*-, of cylindrical shape, and -*spora*, spore, due to the conidial morphology.

Description: *Hyphae* pale to dark brown, septate, smooth- and thin- to thick-walled, 4–6 μm wide. *Conidiomata* pycnidial, brown to dark brown, solitary or confluent, superficial on natural substrate (palm leaf), immersed in culture (OA), glabrous, subglobose, 150–300 × 130–160 μm, bearing a single ostiolar neck; pycnidial wall of *textura angularis*, composed of brown to dark brown, flattened polygonal cells of 4.5–11.5 μm diam, 2–4 layered, 15–60 μm thick,. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform or globose, 5 × 6 μm wide. *Conidia* 0–1-septate, hyaline, smooth- and thick-walled, mostly cylindrical or slightly allantoid, 11–11.5 × 3.5–4 μm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 30–34 mm diam after 7 d at 25 ± 1 °C, flattened, with an entire edge, dark green (M. 28F6); reverse dark green (M. 28F6) to greenish grey (M. 28F2). Colonies on MEA reaching 25–28 mm 7 d at 25 ± 1 °C, flattened, with an entire edge, white (M. 2A1) to olive grey (M. 2E2); reverse white (M. 2A1) to dark green (M. 27F3). NaOH spot test negative. Crystals absent. Optimal temperature for sporulation, 15 °C; optimal temperature of growth 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Materials examined: **USA**, from human corneal secretion, 2013, D.A. Sutton (**holotype** CBS H-23033, ex-holotype cultures CBS 142456 = UTHSC DI16-359 = FMR 13852); from human eye secretion, 2012, D.A. Sutton, culture UTHSC DI16-352 = FMR 13845.

Notes: *Neoascochyta cylindrispora* is phylogenetically distinct from *N. desmazieri*. It differs from the latter also morphologically by its glabrous pycnidia (covered by hyphal outgrowths in *N. desmazieri*), its smaller conidiogenous cells (5–6 μm wide *vs*. 7.5–11 μm wide in *N. desmazieri*) and shorter conidia (11–11.5 μm *vs*. 8.5–18 μm in *N. desmazieri*).

Neoascochyta desmazieri (Cavara) Q. Chen & L. Cai, Stud. Mycol. 82: 198. 2015.
Basionym: *Ascochyta desmazieri* Cavara, Z. Pflanzenkrankh 3: 21. 1893 (as "*desmazieresii*").

Description: Chen *et al*. (2015).

Materials examined: **Germany**, Hohenlieth, from *Lolium perenne*, Apr. 1967, U.G. Schlösser (**neotype** HMAS 246690, ex-neotype living culture CBS 297.69). **USA**, from human respiratory tract, 2006, D.A. Sutton, living cultures UTHSC DI16-207 = FMR 13697; from unknow source of clinical sample, 2010, D.A. Sutton, living cultures UTHSC DI16-320 = FMR 13813; from human head superficial tissue sample, 2011, D.A. Sutton, living cultures UTHSC DI16-332 = FMR 13825; from human toe nail, 2011, D.A. Sutton, living cultures UTHSC DI16-341 = FMR 13834.

Notes: In this study four strains from human clinical specimens clustered with the ex-type strain of *N. desmazieri*, and those strains were morphologically and genetically identical with the type, only differing in location and substrate of isolation.

Neoascochyta tardicrescens Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **sp. nov.**, MycoBank MB819693. Fig 20.
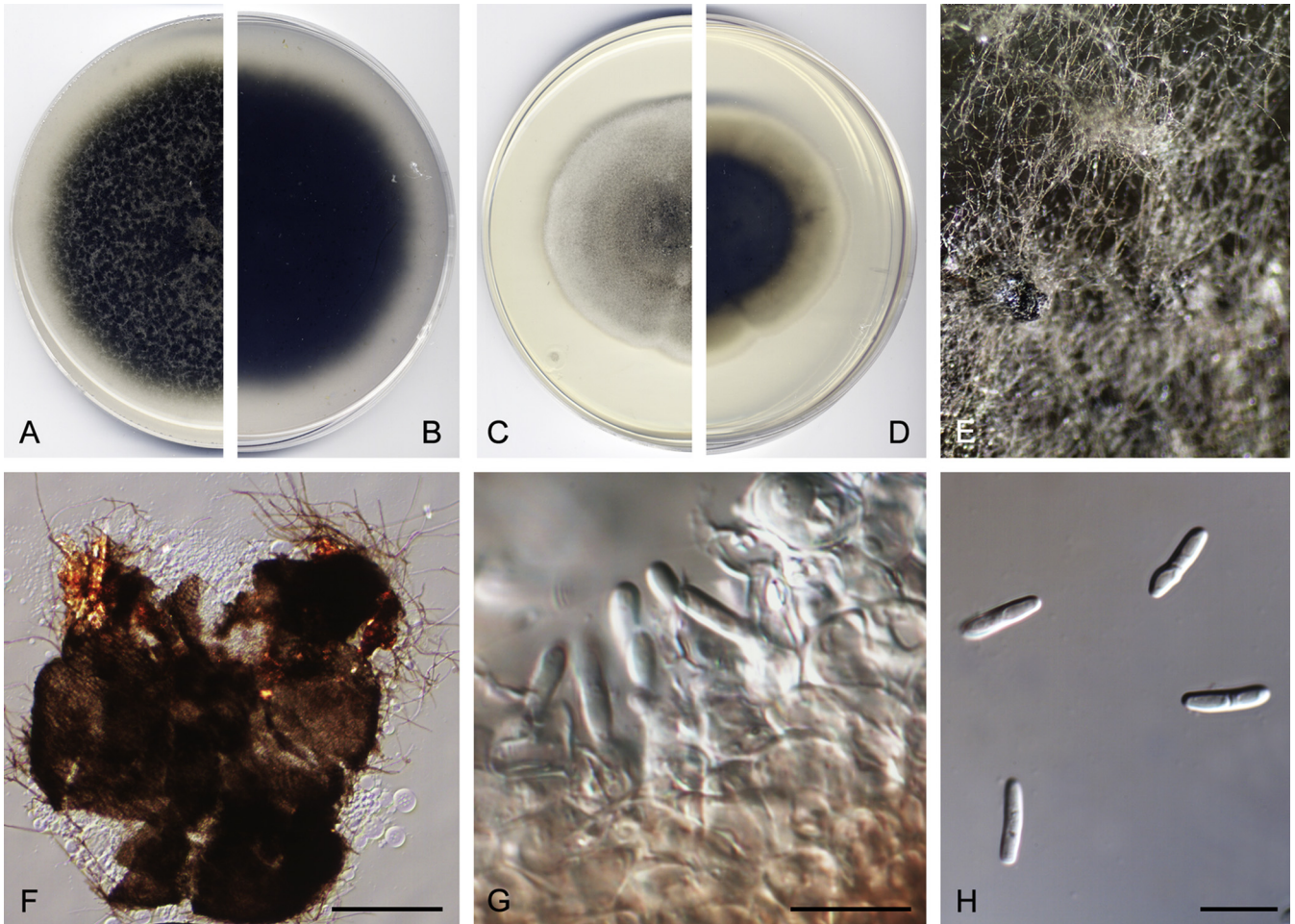
Fig. 19. *Neoascochyta cylindrispora* (CBS 142456). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

Etymology: From Latin *tarde-*, slowly, and *-crescens*, growing, in reference to the slow growing colonies.

Description: *Hyphae* pale to dark brown, septate, smooth- and thin- to thick-walled, 4–6 µm wide. *Conidiomata* pycnidial, brown to dark brown, solitary, superficial and immersed (OA), glabrous or covered with hyphal outgrows, globose to subglobose, 100–120 × 100–170 µm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2–4 layered, composed of brown to dark brown, flattened polygonal cells of 12.5–25 µm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 5–10.5 × 5–8.5 µm. *Conidia* 1-septate, hyaline, smooth- and thick-walled, cylindrical to allantoid, 10–13.5 × 3–4 µm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 6 mm diam after 7 d at 25 ± 1 °C, flattened, undulate, dark green (M. 27F3); reverse olive brown (M. 4F3) to brownish grey (M. 4F2). Colonies on MEA reaching 7 mm diam after 7 d at 25 ± 1 °C, flattened, undulate, yellowhish grey (M. 2B2); reverse yellowish-brown (M. 5E8) to greenish grey (M. 28F2). NaOH spot test negative. Crystals absent. Optimal temperature for sporulation 15 °C; optimal temperature of growth 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Materials examined: **Norway**, Oslo, from hay, Apr. 1997, M. Torp (**holotype** CBS H-9005, ex-holotype living cultures CBS 689.97 = FMR 15352). **USA**, from human feet, 2010, D.A. Sutton, living cultures UTHSC DI16-291 = FMR 13783.

Notes: The strains CBS 689.97 and UTHSC DI16-291 grow and sporulate better at lower temperatures (around 15 °C) than at room temperature, and clearly differ morphologically from *N. argentina* in producing smaller conidiomata (100–120 × 100–170 µm *vs.* 210–390 × 140–270 ìm), in the presence of necks (absent *vs.* present), in the number of ostioles (1 *vs.* 1–3), and in their smaller conidiogenous cells (5–10.5 × 5–8.5 µm *vs.* 7.5–14.5 × 6–13.5 µm). Nonetheless, these strains formed a sister clade to *N. argentina*.

Clade C: ***Cucurbitariaceae*** G. Winter, Rabenhorst's Kryptogamen-Flora, Pilze-Ascomyceten 1.2: 308. 1885.

Type genus: *Cucurbitaria* Gray, Nat. Arr. Brit. Pl. (London) 1: 519. 1821.

Clade C1: ***Neocucurbitaria*** Wanas., E.B.G. Jones & K.D. Hyde, Mycosphere 8: 408. 2017.

Type species: *Neocucurbitaria unguis-hominis* (Punith. & M.P. English) Wanas. *et al.*

Neocucurbitaria aquatica Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **sp. nov.** MycoBank MB822114.

Etymology: The species name refers to the habitat from which the fungus was recovered (sea water).

Culture sterile. *Neocucurbitaria aquatica* differs from its phylogenetically closest species *N. unguis-hominis*, based on the
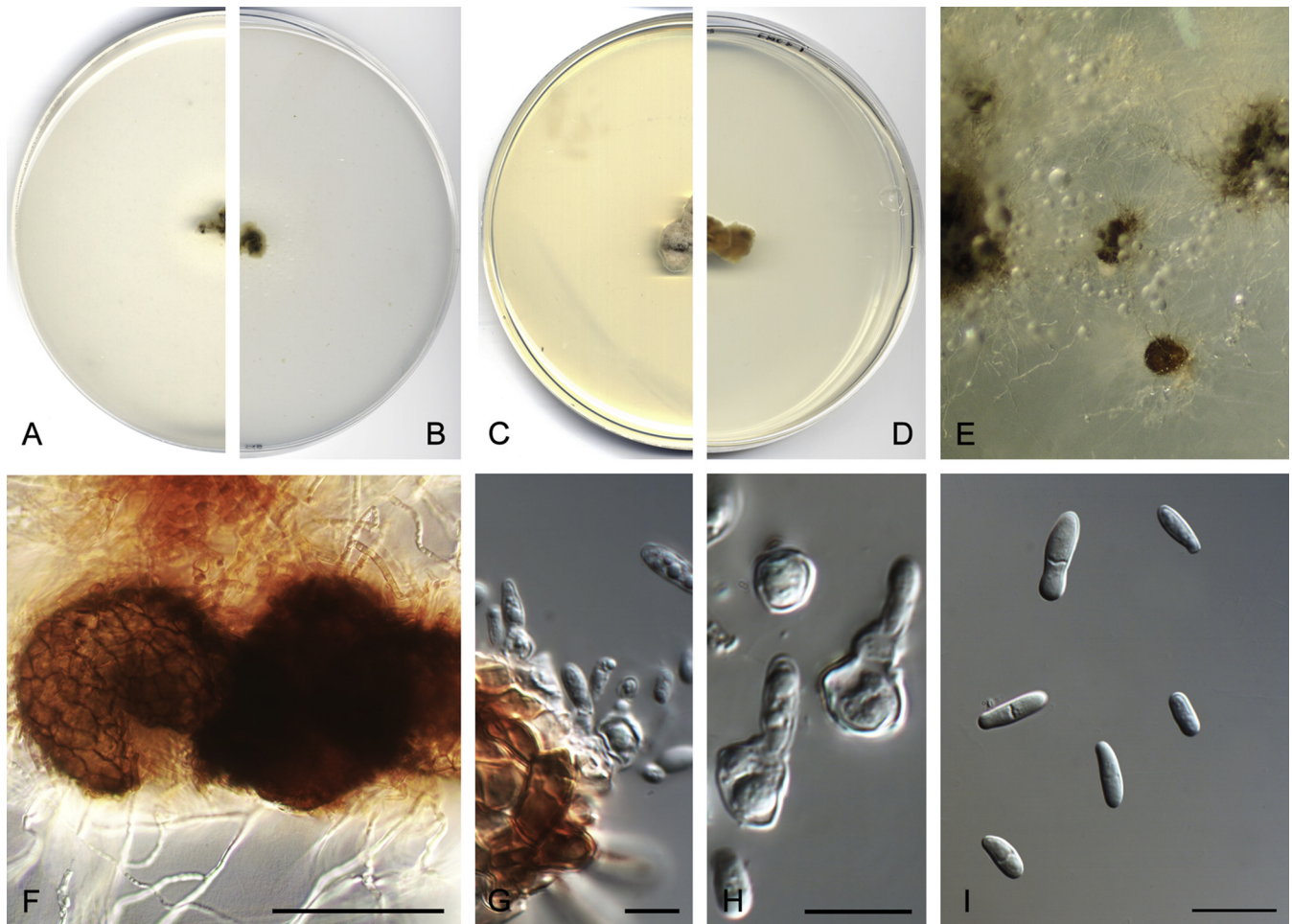
Fig. 20. *Neoascochyta tardicrescens* (CBS 689.97). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G, H.** Conidiogenous cells. **I.** Conidia. Scale bars: F = 100 µm. G–I = 10 µm.

alignment of the concatenated four loci deposited in TreeBASE (S21115): LSU position, 412 (C); ITS positions, 539 (C), 595 (A); *tub*2 positions, 1121 (G), 1170 (G), 1257 (T); *rpb*2 positions, 1351 (A), 1387 (T), 1439 (T), 1801 (C), and 1816 (C).

Culture characteristics: Colonies on OA reaching 21–24 mm diam after 7 d at 25 ± 1 °C, flattened, olive (M. 3F4); reverse olive (M. 3F4) to dark grey (M. 3F1). Colonies on MEA reaching 16–17 mm diam after 7 d at 25 ± 1 °C, flattened, yellowish grey (M. 3B2); reverse grey (M. 3B1). NaOH spot test negative. Crystals absent. Optimal temperature of growth 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 35 °C.

Material examined: **Montenegro**, Kotor bay, from sea water, Oct. 1973, M. Muntañola-Cvetkovic, (**holotype** CBS H-16102, ex-holotype living culture CBS 297.74 = FMR 14867).

Notes: *Neocucurbitaria aquatica* was previously identified as "*Pyrenochaeta quercina*" based on LSU and SSU loci sequencing (de Gruyter *et al.* 2010). However, in our phylogenetic analysis using four loci, *N. aquatica* was closely related to *Neocucurbitaria unguis-hominis*. As *N. aquatica* was recovered from sea water, and is phylogenetically unrelated to the ex-type strain of *Neocucurbitaria quercina* (CBS 115095), we propose it as a new species.

Neocucurbitaria cava (Schulzer) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB821491. Fig. 21.

Basionym: *Phoma cava* Schulzer, Verh. Zool.-bot. Ges. Wien 21:1248. 1871.
Synonyms: *Aposphaeria cava* (Schulzer) Sacc. & Schulzer, Syll. fung. (Abellini) 3: 174. 1884.
Coniothyrium cavum (Schulzer) Kuntze, Revis. gen. pl. (Leipzig) 3(2): 459. 1898.
Pleurophoma cava (Schulzer) Boerema *et al.*, Persoonia 16: 172. 1996.
Pyrenochaeta cava (Schulzer) Gruyter *et al.*, Mycologia 102: 1076. 2010.

Description from ex-epitype culture (CBS 257.68): *Hyphae* hyaline to brown, smooth- and thin-walled, septate, 2.5–3.5 µm wide. *Conidiomata* pycnidial, brown, solitary or confluent, semi-immersed or immersed (OA), glabrous, subglobose, 140–200 × 100–140 µm, with one ostiolar neck; pycnidial wall of *textura angularis*, composed of brown, flattened polygonal cells of 2.5–5 µm diam. *Conidiophores* hyaline, smooth-walled, straight or sinuous to slightly curved, slightly tapering towards the apex, branched at the base, 10–22 × 1.5–2.5 µm. *Conidiogenous cells* integrated to the conidiophore, phialidic, hyaline, smooth-walled, doliiform, with a more or less cylindrical collarette, up to 3 per conidiophore. *Conidia* aseptate, hyaline, smooth- and thin-walled, mostly cylindrical to slightly allantoid, 2.5–3.5 × 1–1.5 µm, guttulate.

Culture characteristics: Colonies on OA reaching 16 mm diam after 7 d at 25 ± 1 °C, flattened, olive (M. 3F4); reverse dark grey
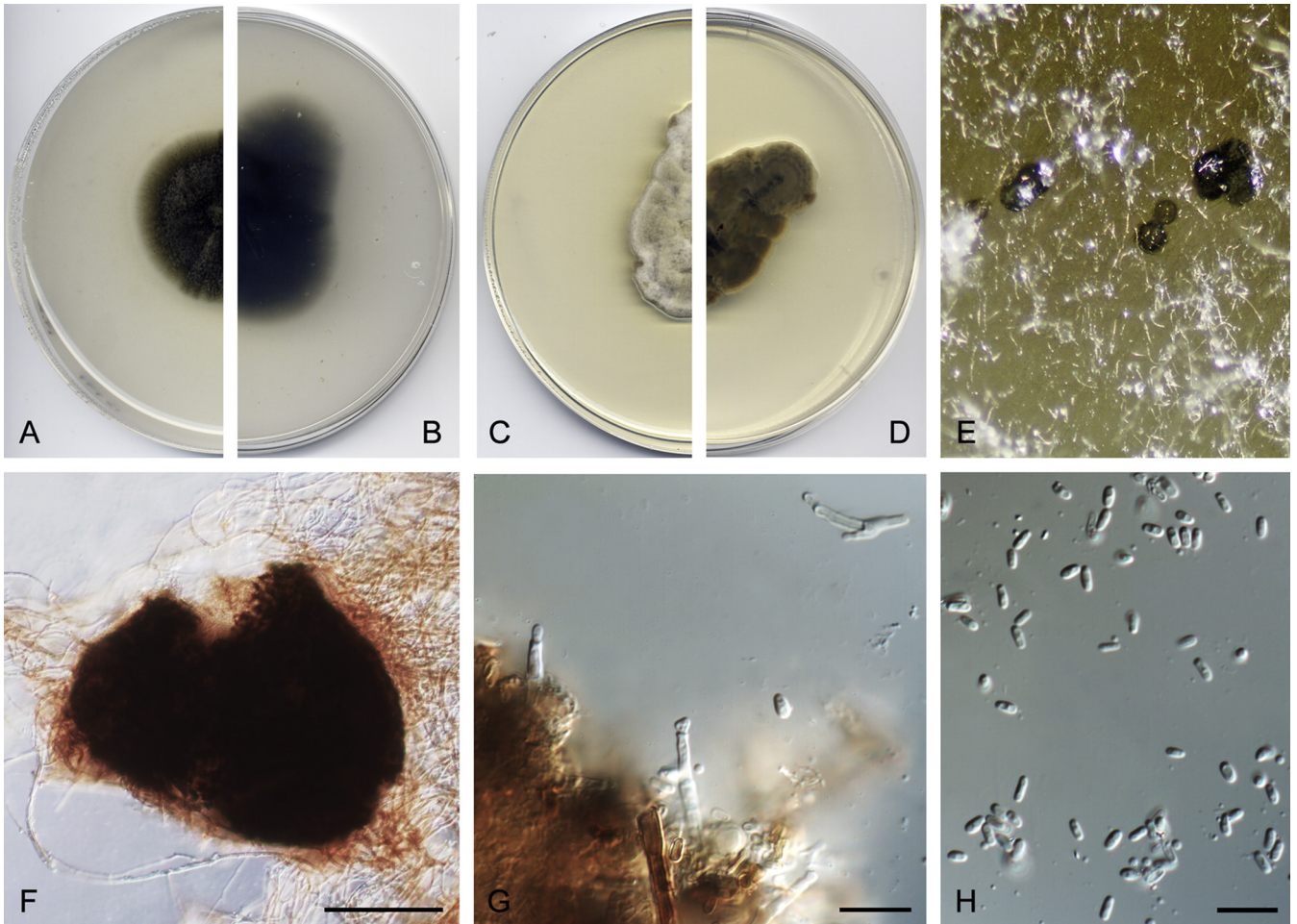
Fig. 21. *Neocucurbitaria cava* (CBS 257.68). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiophores. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

(M. 3F1). Colonies on MEA reaching 14 mm after 7 d at 25 ± 1 °C, flattened, yellowish grey (M. 3B2); reverse olive brown (M. 4E4). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 35 °C.

Materials examined: **Germany**, Kiel-Kitzeberg, from wheat field soil, 1965, W. Gams (**epitype** CBS H-20320, ex-epitype living cultures CBS 257.68 = IMI 331911 = FMR 15747). **Italy**, on branch of *Quercus cerris*, M. Farras, living cultures CBS 115953 = FMR 15333.

Notes: *Pyrenochaeta cava* was epitypified by de Gruyter *et al.* (2010). In our phylogenetic analysis this species clustered in *Neocucurbitaria*, a genus recently introduced by Wanasinghe *et al.* (2017b). Therefore, we propose the new combination *N. cava*.

Neocucurbitaria hakeae (Crous) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB821492.
Basionym: *Pyrenochaeta hakeae* Crous, Persoonia 37: 353. 2016.

Description: Crous *et al.* (2016a).

Material examined: **Australia**, Western Australia, Denmark, Lights Beach, on leaves of *Hakea* sp., 19 Sep. 2015, P.W. Crous (**holotype** CBS H-22894, ex-holotype living cultures CBS 142109 = CPC 28920).

Notes: In our phylogenetic tree, this species forms a sister clade to *N. cava*. Therefore, we propose a new combination to accommodate this species in the genus *Neocucurbitaria*. Morphologically, *N. hakeae* resembles *N. unguis-hominis*, but the former species is the only species of the genus that produces pale brown conidiophores.

Neocucurbitaria irregularis Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB819769. Fig. 22.

Etymology: From Latin *irregularis*, irregular, referring to the shape of its conidia.

Description: *Hyphae* brown, smooth- and thin-walled, septate, 2–5 µm wide. *Conidiomata* pycnidial, brown, solitary or confluent, superficial (OA), glabrous, subglobose to ovoid, 75–130 × 65–120 µm, with 3–4 papillate ostiolar necks, pycnidial wall of *textura angularis*, 2–5 layered, 10–35 µm thick, composed of brown, flattened polygonal cells of 3–12 µm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, doliiform, 2.5 × 3.5 µm. *Conidia* aseptate, hyaline, smooth- and thin-walled, ellipsoidal to cylindrical, 2.5–4 × 1.5–2. µm, guttulate.

Culture characteristics: Colonies on OA reaching 17–18 mm diam after 7 d at 25 ± 1 °C, flattened, olive brown (M. 4F6); reverse brownish grey (M. 4F2). Colonies on MEA reaching 11 mm after 7 d at 25 ± 1 °C, flattened, pale yellow (M. 4A3); reverse pale yellow (M. 4A4) to greyish yellow (M. 4C6). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 35 °C.

Material examined: **USA**, from human arm injury, 2000, D.A. Sutton (**holotype** CBS H-23029, ex-holotype living cultures CBS 142791 = UTHSC DI16-229 = FMR 13719).
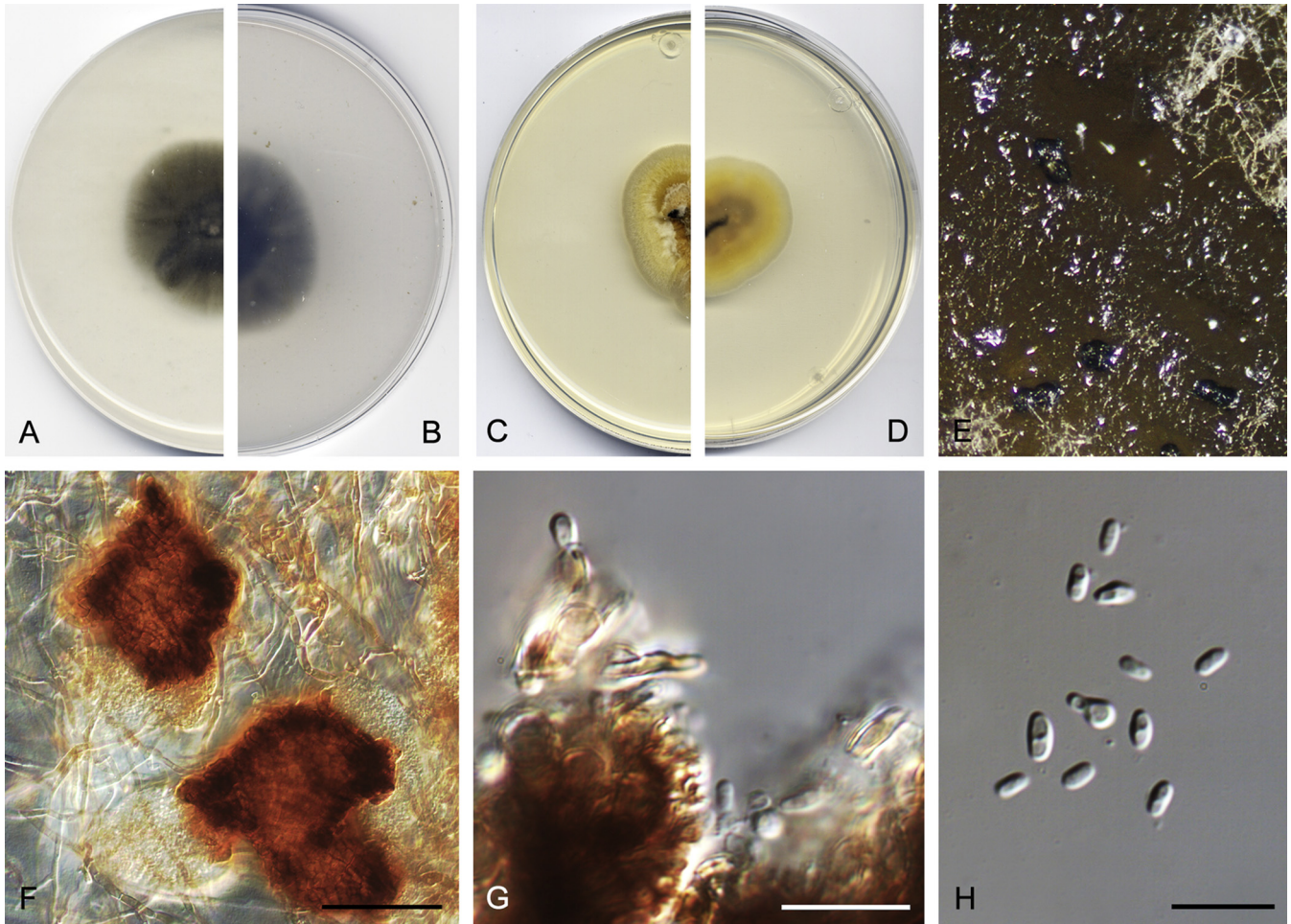
Fig. 22. *Neocucurbitaria irregularis* (CBS 142791). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 μm. G, H = 10 μm.

Notes: *Neocucurbitaria irregularis* is proposed to accommodate a clinical isolate previously identified as "*Pyrenochaeta unguis-hominis*" (Valenzuela-Lopez *et al*. 2016). This isolate forms a basal clade together with *N. keratinophila* and *N. unguis-hominis*. However, it is morphologically well-differentiated from the latter two species, by having small, simple conidiogenous cells instead of filiform conidiophores.

Neocucurbitaria keratinophila (Verkley *et al*.) Valenzuela-Lopez, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB821494.
Basionym: *Pyrenochaeta keratinophila* Verkley *et al*., Revta Iberoamer. Micol. 27: 24. 2010.

Description: Verkley *et al*. (2010).

Material examined: **Spain**, Alicante, from human corneal scrapings (keratitis), Mar. 2007, A. Rodriguez & J. Guarro (**holotype** CBS H-20122, ex-holotype living CBS 121759 = FMR 9444).

Notes: This species described by Verkley *et al*. (2010) was isolated from a human corneal specimen with a case of keratitis. Morphologically it resembles *Pyrenochaeta*. However, in our phylogenetic analyses this species clustered close to *N. irregularis*. Therefore, we propose a new combination for this fungus in *Neocucurbitaria*.

Neocucurbitaria quercina (Kabát & Bubák) Wanas. *et al*., Mycosphere 8: 412. 2017. Fig. 23.
Basionym: *Pyrenochaeta quercina* Kabát & Bubák, Hedwigia 52: 342. 1912.

Description taken from Bubák & Kabát (1912), which is based on the holotype: *Conidiomata* pycnidial dark brown, solitary or confluent, setose, globose, 150–220 μm diam. *Setae* dark brown, tapered towards the apex, erect or decumbent, smooth- and thick-walled, up to 65 μm long, 5 μm broad at the base. *Conidiophores* cylindrical, tapered toward the apex, erect or slightly curved, hyaline, 25 × 3–3.5 μm. *Conidia* aseptate, hyaline, bacilliform, 2–3 × 1.5 μm.

Description from the ex-neotype culture (CBS 115095): *Hyphae* brown, smooth- and thin-walled, septate, 2.5–5 μm wide. *Conidiomata* pycnidial brown, solitary or confluent, superficial (OA), mostly glabrous or covered with somewhat shortest setae, globose, 70–90 μm diam, 100–230 × 90–130 μm when ovoid, with 1–2 papillate ostiolar necks; pycnidial wall of *textura angularis*, composed of brown, flattened polygonal cells of 3–12 μm diam; setae brown, erect, rounded at the top, septate, thin-walled, 7–10 × 2.5–3.5 μm,. *Conidiophores* hyaline, smooth-walled, straight or sinuous to slightly curved, slightly tapering towards the apex, branched at the base, 6.5–14 × 2–3 μm. *Conidiogenous cells* terminal and lateral on the conidiophore, phialidic, hyaline, smooth-walled, ampulliform when terminal, with a more or less cylindrical collarette, up to 4 per conidiophore. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid to cylindrical, 1.5–3 × 1.2–1.5 μm, guttulate.

Culture characteristics: Colonies on OA reaching 21 mm diam after 7 d at 25 ± 1 °C, flattened, olive (M. 3F4); reverse dark grey (M. 3F1). Colonies on MEA reaching 12 mm after 7 d at 25 ± 1 °C,
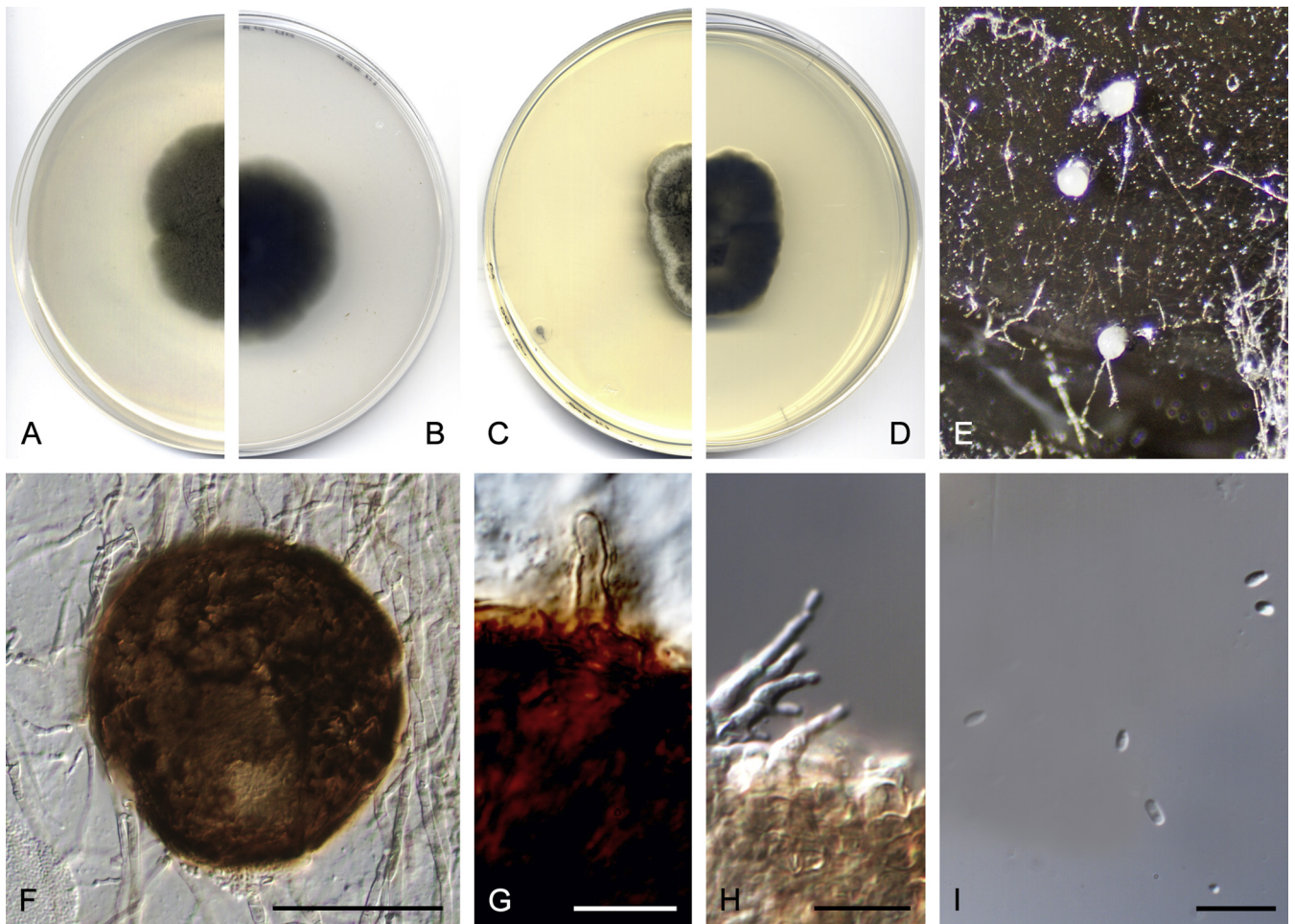
Fig. 23. *Neocucurbitaria quercina* (CBS 115095). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Setae. **H.** Conidiophores. **I.** Conidia. Scale bars: F = 50 µm. G–I = 10 µm.

flattened, olive (M. 3F4) to pale grey (M. 3B1); reverse dark grey (M. 3F1). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 15 °C; maximum temperature of growth 35 °C.

Material examined: **Italy**, from *Quercus robur*, Nov 1971, S. Mutto Accordi (**neotype designated here** CBS H-23205, MBT377969, ex-neotype living cultures CBS 115095 = FMR 14868).

Notes: Bubák & Kabát (1912) described *Pyrenochaeta quercina* from *Quercus cerris* leaves, in Bukovina forest, Moldavia. The holotype is apparently missing. We studied the isolate CBS 115095, identified previously as *P. quercina* by de Gruyter *et al.* (2010), which has been recovered from *Quercus robur* in Italy. Recently, Wanasinghe *et al.* (2017b) transferred *P. quercina* to *Neocucurbitaria*. In our phylogenetic tree this strain clustered with *N. cava* and *N. hakeae*, confirming the right placement into *Neocucurbitaria*. Because the strain CBS 115095 was isolated from a related host to that of the basionym (both are different species of oaks), we designated this strain as the neotype for *Pyrenochaeta quercina*, in order to stabilize the taxonomy of the species.

Neocucurbitaria unguis-hominis (Punith. & M.P. English) Wanas. *et al.*, Mycosphere 8: 412. 2017. Fig. 24.
Basionym: *Pyrenochaeta unguis-hominis* Punith. & M.P. English, Trans. Br. mycol. Soc. 64: 539. 1975.

Description: Punithalingam & English (1975).

Materials examined: **The Netherlands**, Utrecht, from lung sample of *Agapornis* sp., C. Hoek, living cultures CBS 111112 = FMR 14866. **USA**, unknown substrate,

2006, D.A. Sutton, living cultures UTHSC DI16-213 = FMR 13703. **Wales**, Cardiff, from air sample, Apr. 1974, G.H. Boerema, living cultures CBS 112.79 = IMI 386095 = PD 74/1018 = FMR 15748.

Notes: *Pyrenochaeta unguis-hominis* was established by Punithalingam & English (1975) for a fungus recovered from a human toe-nail. Later, Wanasinghe *et al.* (2017b) considered this the type species of *Neocucurbitaria*. Interestingly, the three strains studied by us were able to grow and sporulate at 37 °C, being the only species of the genus that displays such abilities.

Clade C2: *Paracucurbitaria*

Paracucurbitaria Valenzuela-Lopez, Stchigel, Guarro & Cano, **gen. nov.** MycoBank MB821453.

Etymology: From Greek παρα-, beside, referring to the morphological similarity with the asexual morph of *Cucurbitaria*.

Conidiomata pycnidial, pale brown to brown, solitary or confluent, superficial or semi-immersed, pycnidial wall of *textura angularis*, 2–4 layered, glabrous or ornamented, subglobose to ovoid, ostiolate. *Conidiophores* if present, septate, hyaline, straight or sinuous to slightly curved, slightly tapering towards the apex. *Conidiogenous cells* integrated in the conidiophore, phialidic, hyaline, smooth-walled, ampulliform when terminal, with a more or less cylindrical collarette, several per conidiophore. *Conidia* aseptate, hyaline, smooth- and thin-walled, ellipsoidal to cylindrical, guttulate.

Type species: *Paracucurbitaria corni* (Bat. & A.F. Vital) Valenzuela-Lopez, Stchigel, Guarro & Cano.
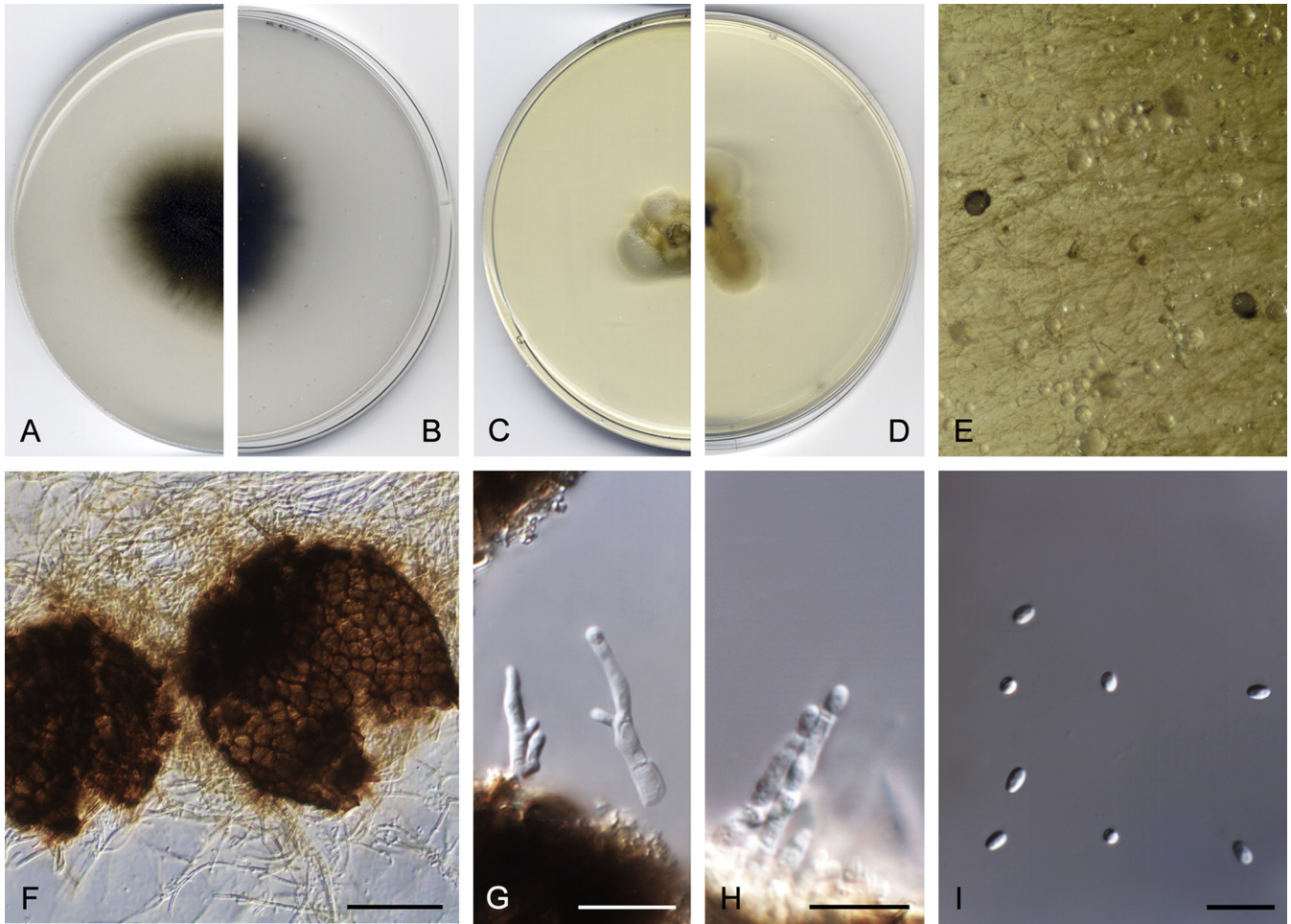
Fig. 24. *Neocucurbitaria unguis-hominis* (CBS 112.79). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G, H.** Conidiophores. **I.** Conidia. Scale bars: F = 50 μm. G–I = 10 μm.

Paracucurbitaria corni (Bat. & A.F. Vital) Valenzuela-Lopez, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB821454. Fig. 25.

Basionym: *Plenodomus corni* Bat. & A.F. Vital, Anais Soc. Biol. Pernambuco 15: 420. 1957.

Synonyms: *Phoma riggenbachii* Boerema & J.D. Janse, Eur. J. For. Path. 11: 428. 1981.

Pyrenochaeta corni (Bat. & A.F. Vital) Boerema, Loer. & Hamers, Persoonia 16: 158. 1996.

Description from reference strain (CBS 248.79): *Hyphae* hyaline to pale brown, smooth- and thin-walled, septate, 2.5–4 μm wide. *Conidiomata* pycnidial, pale brown to brown, solitary or confluent, superficial or semi-immersed (OA), glabrous, globose to subglobose, 110–210 × 110–190 μm diam, with 2–5 ostiolar necks; pycnidial wall of *textura angularis*, initially pseudoparenchymatous, scleroplectenchymatous with the age (mainly on MEA), 3–4 layered, 15–30 μm thick, composed of brown to dark brown, flattened polygonal cells of 3–6 μm diam. *Conidiophores* branched at the base, septate, hyaline, straight or sinuous to slightly curved, slightly tapering towards the apex, 6.5–18 μm long. *Conidiogenous cells* integrated in the conidiophore, phialidic, hyaline, smooth-walled, doliiform or ampulliform, 3.5–7.5 × 1.3–3.5 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, mostly cylindrical or rarely ovoid, 1.8–4 × 1.2–1.6 μm, guttulate.

Culture characteristics: Colonies on OA reaching 14 mm diam after 7 d at 25 ± 1 °C, flattened, olive (M. 2E6); reverse olive (M.

2E6) to dark grey (M. 2F1). Colonies on MEA reaching 10 mm after 7 d at 25 ± 1 °C, flattened, olive brown (M. 4D6) to dark grey (M. 4F1); reverse olive brown (M. 4D6) to dark grey (M. 4F1). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined **The Netherlands**, Scheerwolde, from *Fraxinus excelsior* with bacterial canker (also from *Prays fraxinella*), 1978, deposited by G. H. Boerema, living cultures CBS 248.79 = PD 78/1092 = FMR 16593.

Notes: *Plenodomus corni* was erected by Batista & Vital (1957) as a new species on branches of *Cornus sanguinea* from Hungary, and it was characterised by producing brown to black, solitary or clustered, mostly immersed, glabrous, globose to subglobose, pycnidial conidiomata of 115–135 μm diam, with a pseudoparenchymatous wall 12.5–20 μm thick, composed of polygonal to subglobose cells of 2.5–4 μm diam, with phialidic, hyaline, filiform or flask-shaped conidiogenous cells, 3.5–6 × 1–2 μm, and hyaline, bacilliform, 1.5–3 × 1 μm conidia. Later, Janse (1981) isolated a similar fungus from *Fraxinus excelsior* with a bacterial canker, and also from dead, discoloured tissue surrounding galleries and holes of *Prays fraxinella* (ash bud moth). This fungus (living culture CBS 248.79) was considered by Boerema *et al.* (1981) as the same taxon as *Plenodomus corni*. However, a new name was necessary to transfer *Plenodomus corni* to the genus *Phoma* because the species name was occupied (*Phoma corni* Fuckel ex Sacc.). The strain CBS 248.79 was characterised by the production of
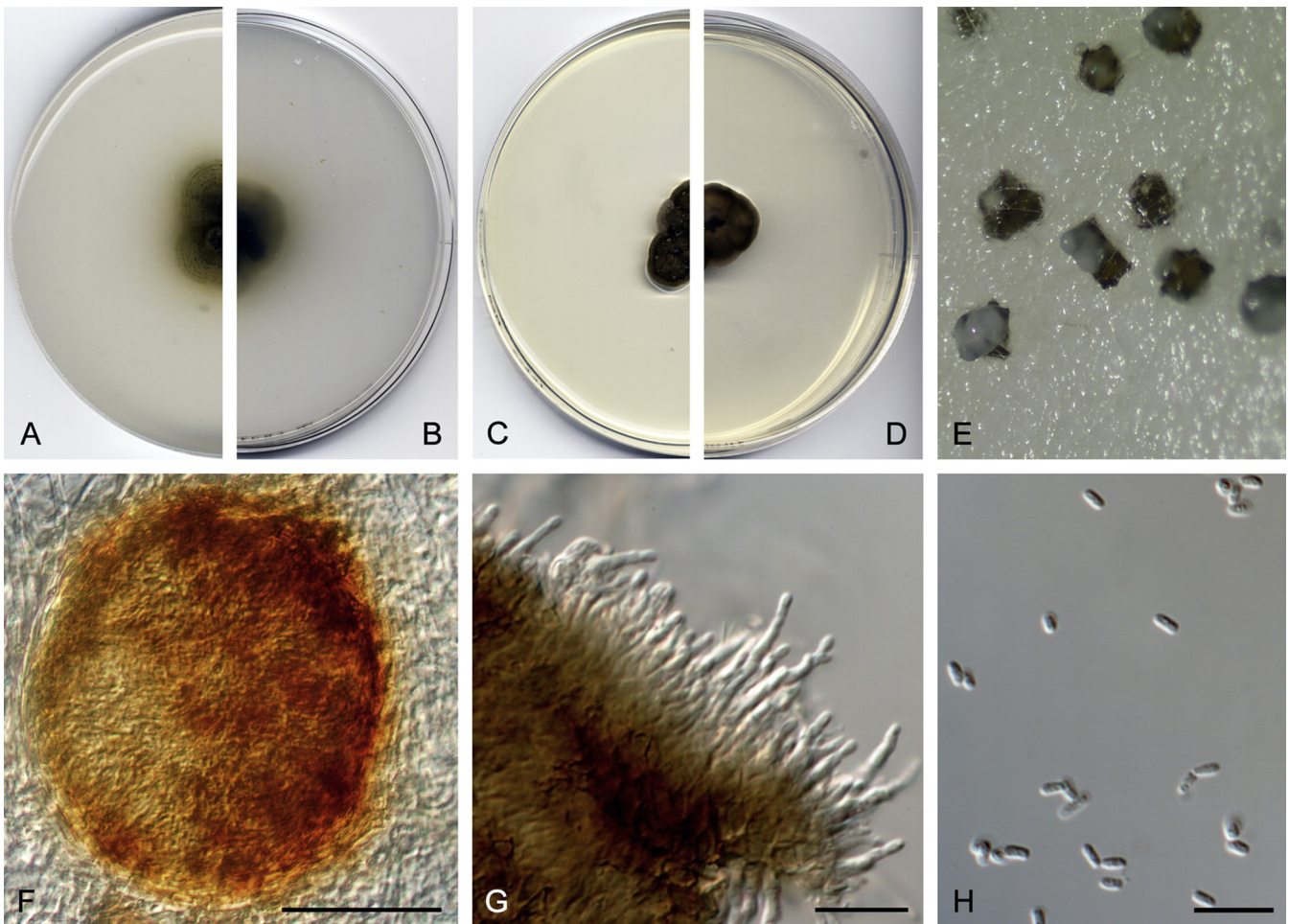
Fig. 25. *Paracucurbitaria corni* (CBS 248.79). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium **G.** Conidiophores. **H.** Conidia. Scale bars: F = 50 µm. G, H = 10 µm.

pycnidial conidiomata with a scleroplectenchymatous wall, variable in size and in shape, 100–200 µm diam, and of aseptate conidia (measuring 2.1–2.6 × 0.8–1.2 µm), produced on elongated conidiogenous cells. However, CBS 248.79 shows some morphological variation depending of the culture media employed: on MEA it shows a scleroplectenchymatous wall as given in the original description by Janse, but on OA it resembles the description given by Batista & Vital (1957), but it does not produce setose pycnidia as mentioned by Boerema *et al.* (1996). The strain CBS 248.79 forms a distinct monophyletic clade within the *Cucurbitariaceae*. Therefore, we propose the new combination, *Paracucurbitaria corni*.

Paracucurbitaria italica Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **sp. nov.** MycoBank MB822116. Fig. 26.

Etymology: The name of the species refers to the country of origin of the fungus, Italy.

Description: *Hyphae* hyaline to pale brown, smooth- and thin-walled, septate, 2.5–4 µm wide. *Conidiomata* pycnidial, brown, solitary or confluent, superficial or semi-immersed (OA), covered by hyphal outgrowths, subglobose to ovoid, 190–240 × 170–190 µm diam, with 1–2 ostiolar necks; pycnidial wall of *textura angularis*, 2–4 layered, 10–15 µm thick, composed of brown to dark brown, flattened polygonal cells of 5–13 µm diam. *Conidiophores* septate, hyaline, straight or sinuous to slightly curved, slightly tapering towards the apex,

15–20 µm long. *Conidiogenous cells* phialidic, hyaline, smooth-walled, filiform or flask-shaped, 4–9 × 2–3.5 µm. *Conidia* aseptate, hyaline, smooth- and thin-walled, ellipsoidal to cylindrical, 2.5–3 × 1–1.5 µm, guttulate.

Culture characteristics: Colonies on OA reaching 13 mm diam after 7 d at 25 ± 1 °C, flattened, olive (M. 2E6); reverse olive (M. 2E6) to dark grey (M. 2F1). Colonies on MEA reaching 11 mm after 7 d at 25 ± 1 °C, flattened, white (M. 2A1); reverse white (M. 2A1). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **Italy**, Rende, from *Olea europaea* leaves, 26 Feb. 1992, C. Candiano (**holotype** CBS H-16104, ex-holotype living cultures CBS 234.92 = FMR 14869).

Notes: The strain CBS 234.92 was previously identified as "*Pyrenochaeta corni*" by de Gruyter *et al.* (2010). However, this strain is phylogenetically distinct from its closest relative, *Paracucurbitaria corni*, and differs morphologically by the production of ornamented conidiomata (covered with hyphal outgrowths *vs.* glabrous). Consequently, we propose CBS 234.92 as the ex-type strain of *Paracucurbitaria italica* sp. nov.

Clade C3: *Allocucurbitaria*

Allocucurbitaria Valenzuela-Lopez, Stchigel, Guarro & Cano, **gen. nov.** MycoBank MB821455.
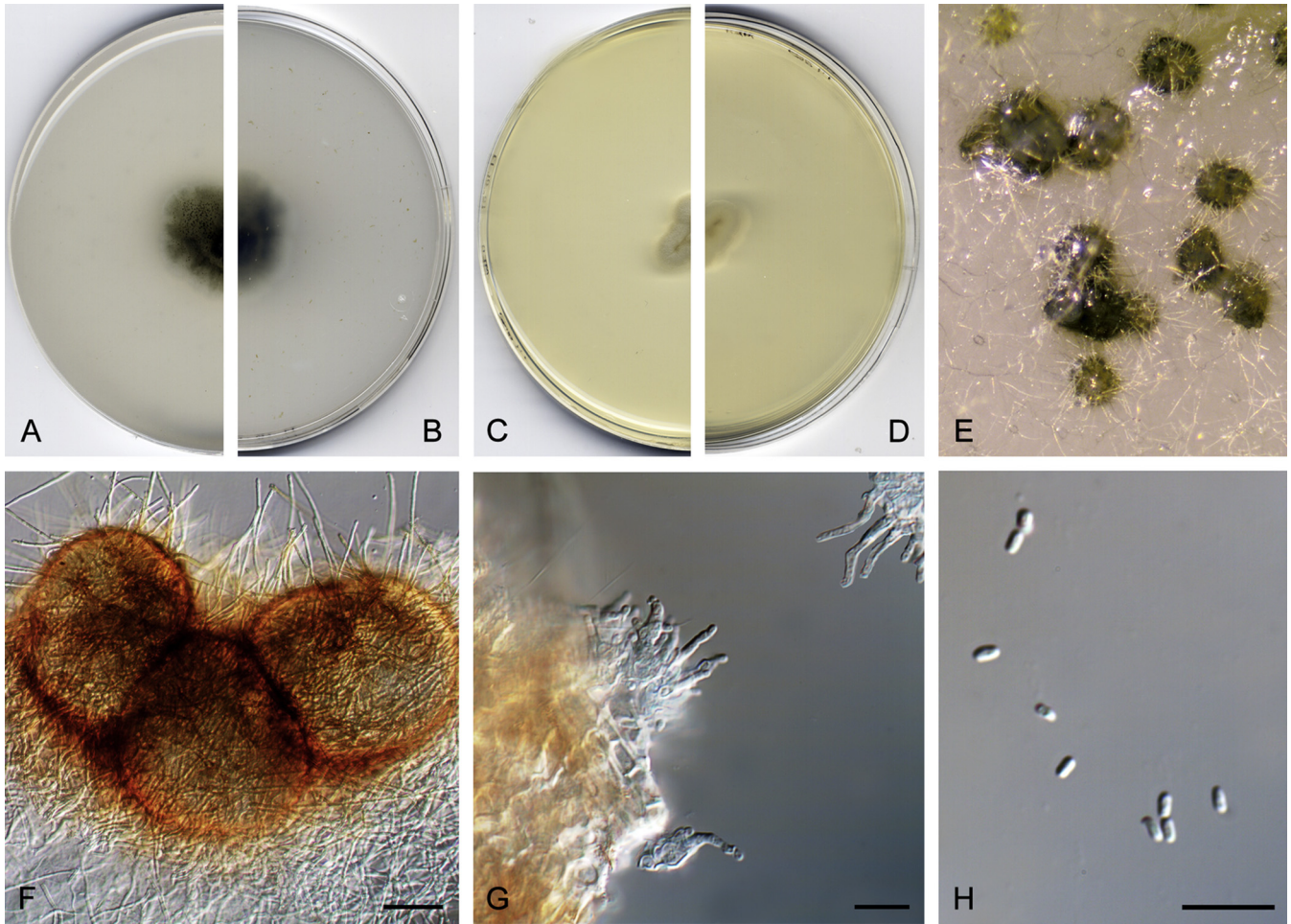
Fig. 26. *Paracucurbitaria italica* (CBS 234.92). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiophores. **H.** Conidia. Scale bars: F = 50 μm. G, H = 10 μm.

Etymology: From Greek ἀλλο-, different, due to is related but phylogenetically and morphologically different to the genus *Cucurbitaria*.

Conidiomata pycnidial, brown, solitary or confluent, superficial, pycnidial wall of *textura angularis*, glabrous, subglobose to ovoid, ostiolate. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical to allantoid, guttulate.

Type species: *Allocucurbitaria botulispora* Valenzuela-Lopez, Stchigel, Guarro & Cano.

Allocucurbitaria botulispora Valenzuela-Lopez, Stchigel, Guarro & Cano, **sp. nov.** MycoBank MB819770. Fig. 27.

Etymology: From Latin *botulus*-, sausage, and -*spora*, spores, due to the shape of the conidia.

Description: *Hyphae* pale brown, smooth- and thin-walled, septate, 1.5–2.5 μm wide. *Conidiomata* pycnidial, brown, confluent, superficial (OA), glabrous, subglobose to ovoid, 60–160 × 60–120 μm diam, with 1–2 papillate ostiolar necks; pycnidial wall of *textura angularis*, 2–4 layered, 10–30 μm thick, composed of pale brown to brown, flattened polygonal cells of 3–10 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 5–8 × 2–2.5 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical to allantoid, 3–5 × 1–1.5 μm, guttulate.

Culture characteristics: Colonies on OA reaching 26–29 mm diam after 7 d at 25 ± 1 °C, flattened, greyish yellow (M. 4C6); reverse olive brown (M. 4D5). Colonies on MEA reaching 22 mm after 7 d at 25 ± 1 °C, slightly floccose, yellowish white (M. 4A2); reverse pale orange (M. 5A3) to deep orange (M. 5A8). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 15 °C; maximum temperature of growth 37 °C.

Material examined: **USA**, from human scab on leg, 2009, D.A. Sutton (**holotype** CBS H-23028, ex-holotype living cultures CBS 142452 = UTHSC DI16-273 = FMR 13764).

Notes: The strain CBS 142452 (= UTHSC DI16-273) was originally assigned to *Pyrenochaeta* (Valenzuela-Lopez *et al.* 2016). Morphologically, this strain displays a morphology more similar to phoma-like taxa (with glabrous pycnidia) than to species of *Pyrenochaeta* (because of its setose conidiomata). In our phylogenetic analysis, this fungus was placed in an uncertain taxonomic position within *Cucurbitariaceae*. Therefore, we proposed to accommodate CBS 142452 as a new species of the new genus *Allocucurbitaria*.

Clade D: ***Pseudopyrenochaetaceae*** Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **fam. nov.** MycoBank MB820426.

Etymology: From Latin *pseudo*-, resembling but not equalling, because the morphological similarity to *Pyrenochaeta*.
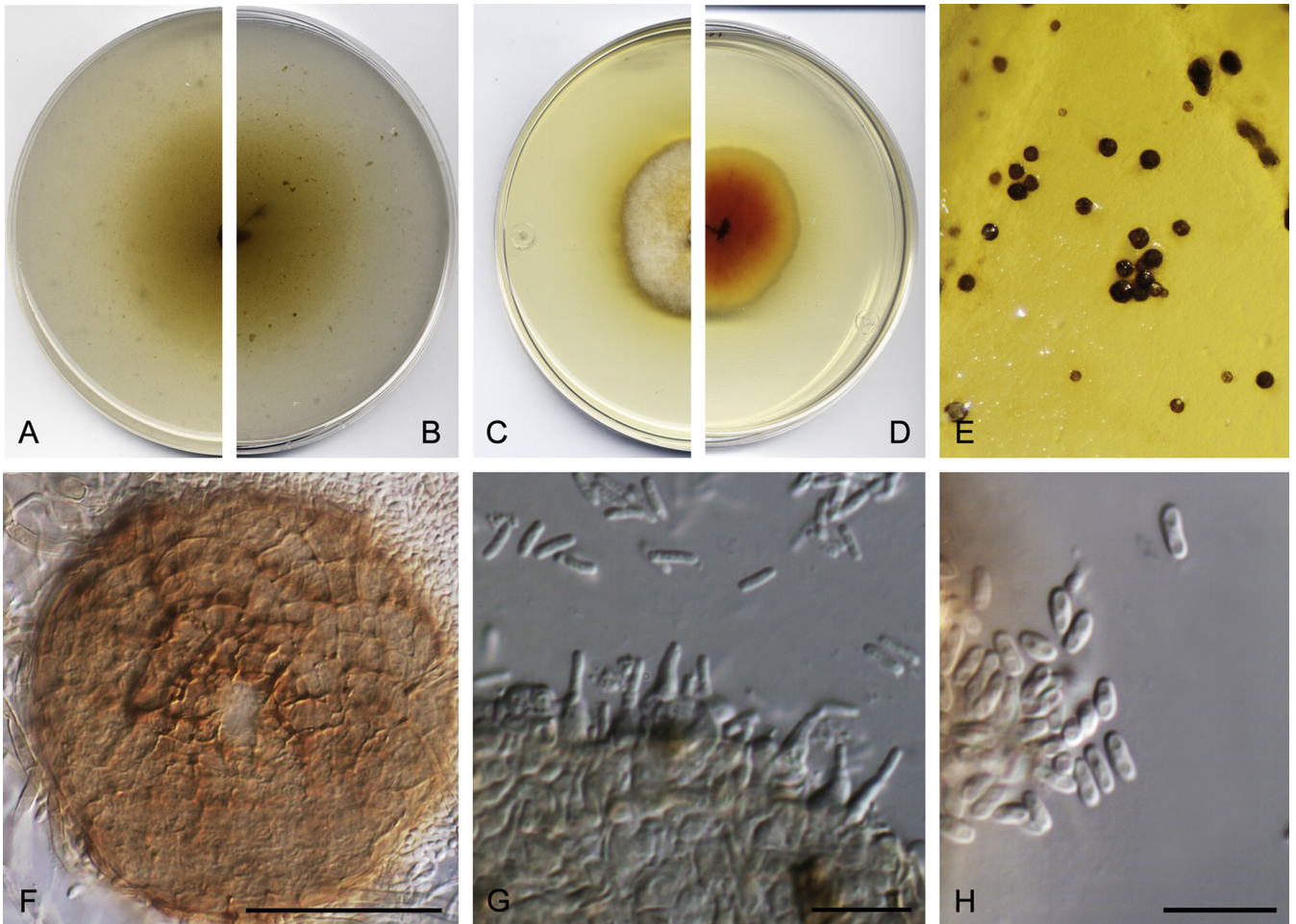
Fig. 27. *Allocucurbitaria botulispora* (CBS 142452). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiophores. **H.** Conidia. Scale bars: F = 50 µm. G, H = 10 µm.

Conidiomata pycnidial, brown to dark brown, solitary, setose, globose to subglobose, papillate, ostiolate. *Conidiophores* simple, filiform, septate. *Conidiogenous cells* phialidic, intercalary, disposed along the conidiophores as short side projections. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical to allantoid.

Type genus: *Pseudopyrenochaeta* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano.

Pseudopyrenochaeta Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **gen. nov.** MycoBank MB820427.

Etymology: The name refers to the morphological similarity with the genus *Pyrenochaeta*.

Conidiomata pycnidial, brown to dark brown, solitary, setose, globose to subglobose, with a papillate ostiolar neck. *Conidiophores* hyaline, simple, filiform, septate. *Conidiogenous cells* phialidic, hyaline, intercalary along the conidiophore, arising as very short lateral projections immediately below the transverse septa. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical to allantoid.

Type species: *Pseudopyrenochaeta lycopersici* (R.W. Schneid. & Gerlach) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano.

Pseudopyrenochaeta lycopersici (R.W. Schneid. & Gerlach) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB820431.
Basionym: *Pyrenochaeta lycopersici* R.W. Schneid. & Gerlach, Phytopath. Z. 56: 121. 1966.

Description: Schneider & Gerlach (1966).

Material examined: **Germany**, Berlin, from *Lycopersicon esculentum* root, Nov. 1971, R. Schneider & G.H. Boerema (**isotype** CBS H-17628, ex-isotype culture CBS 306.65 = FMR 15746 = BBA 9911 = DSM 62931).

Notes: In previous studies, the ex-isotype strain of *Pyrenochaeta lycopersici* (CBS 306.65) was phylogenetically located in the *Cucurbitariaceae* (de Gruyter *et al.* 2010, Wanasinghe *et al.* 2017b). However, de Gruyter *et al.* (2013) placed it as *incertae sedis*. According to our results, *P. lycopersici* falls phylogenetically outside the family *Cucurbitariaceae* and represents a new genus, *Pseudopyrenochaeta*, in the new family, *Pseudopyrenochaetaceae*.

Pseudopyrenochaeta terrestris Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB822117.

Etymology: The species name refers to soil, the substrate from which the fungus was recovered.

Culture sterile. *Pseudopyrenochaeta terrestris* differs from its closest phylogenetic species, *P. lycopersici*, based on the alignment of the concatenated four loci deposited in TreeBASE (S21115), by six bp of LSU, 20 bp of ITS, 16 bp of *tub*2, and 47 bp of *rpb*2.

Culture characteristics: Colonies on OA reaching 22 mm diam after 7 d at 25 ± 1 °C, flattened, olive grey (M. 3E3); reverse olive grey (M. 3E3) to dark grey (M. 3F1). Colonies on MEA reaching 11 mm after 7 d at 25 ± 1 °C, slightly flattened, white (M. 3A1); reverse yellowish grey (M. 3C2). NaOH spot test negative. Crystals absent.
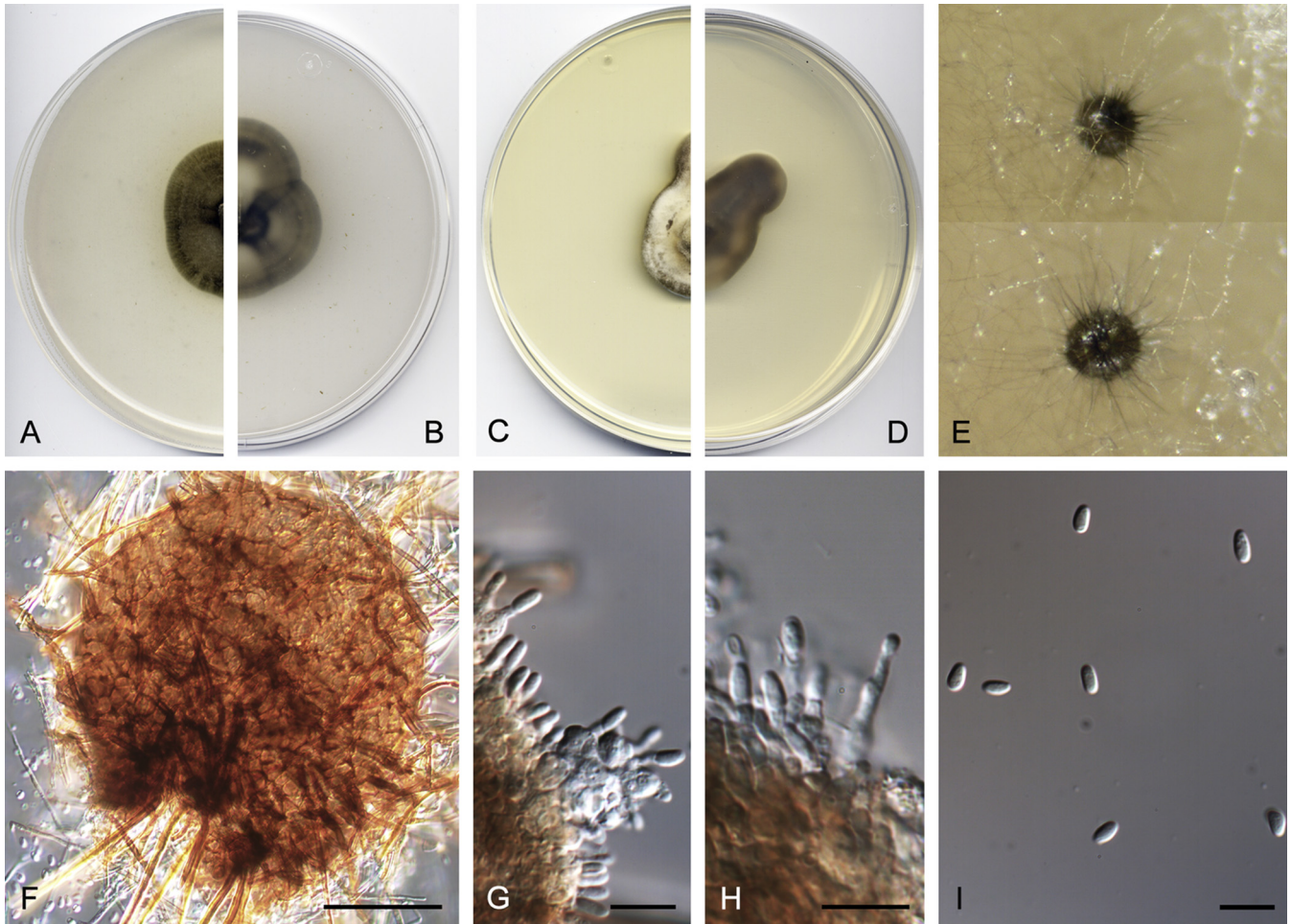
Fig. 28. *Neopyrenochaeta acicola* (CBS 812.95). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G, H.** Conidiogenous cells. **I.** Conidia. Scale bars: F = 50 µm. G–I = 10 µm.

Material examined: **The Netherlands**, Naaldwijk, from greenhouse soil, Feb. 1972, L.H. Kaastra-Höweler (**holotype** FMR H-15327, ex-holotype living cultures CBS 282.72 = FMR 15327).

Notes: The strain CBS 282.72, deposited as *"Pyrenochaeta lycopersici"*, clustered with the ex-type strain of *Pseudopyrenochaeta lycopersici*. However, both strains differ significantly in all nucleotide sequences of the phylogenetic markers used in the present study. Therefore, strain CBS 282.72 is proposed here as the new species *Pseudopyrenochaeta terrestris*.

Clade E: *Neopyrenochaetaceae* Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, **fam. nov.** MycoBank MB820416.

Etymology: Relating to the distinct phenotypic and genetic relationship to the genus *Pyrenochaeta* and its relatives.

Conidiomata pycnidial, pale brown to brown, solitary, pycnidial wall of *textura angularis*, setose, ovoid to globose, with a non-papillate or papillate ostiolar neck. *Conidiogenous cells* phialidic, ampulliform or lageniform. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid to subcylindrical.

Type genus: *Neopyrenochaeta* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano.

Neopyrenochaeta Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **gen. nov.** MycoBank MB820313.

Etymology: Referring to its morphological similarity to the genus *Pyrenochaeta*.

Conidiomata pycnidial, pale brown to brown, solitary, pycnidial wall of *textura angularis*, setose, ovoid to globose, ostiolate. *Conidiogenous cells* phialidic, ampulliform or lageniform. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid to subcylindrical.

Type species: *Neopyrenochaeta acicola* (Moug. & Lév.) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano.

Neopyrenochaeta acicola (Moug. & Lév.) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB820314. Fig. 28.
*Basionym*: *Vermicularia acicola* Moug. & Lév. apud Léveillé, Annls Sci. nat. (Bot.) III, 9:259. 1848 (as "Moug. Lév."; non *Phoma acicola* sensu Saccardo), Syll. Fung. 3:100. 1884 [as "(Lév.) Sacc."; = *Sclerophoma pythiophila* (Corda) Höhn.].
Synonym: *Phoma leveillei* var. *leveillei* Boerema & G.J. Bollen, Persoonia 8: 115. 1975.

Description and synonymy: Boerema *et al.* (2004).

Material examined: **The Netherlands**, from water pipe sample, 1995, Y. Driessen (**neotype** CBS H-20314, ex-neotype living cultures CBS 812.95 = FMR 14872).

Notes: *Pyrenochaeta acicola* was neotypified and relegated to the *Cucurbitariaceae* by de Gruyter *et al.* (2010). Although *Neopyrenochaeta acicola* morphologically resembles a *Pyrenochaeta* species, our phylogenetic analyses revealed that this taxon is distant from the type species of *Pyrenochaeta*, *P. nobilis*, and therefore we proposed the new genus *Neopyrenochaeta* for this and a few related species.
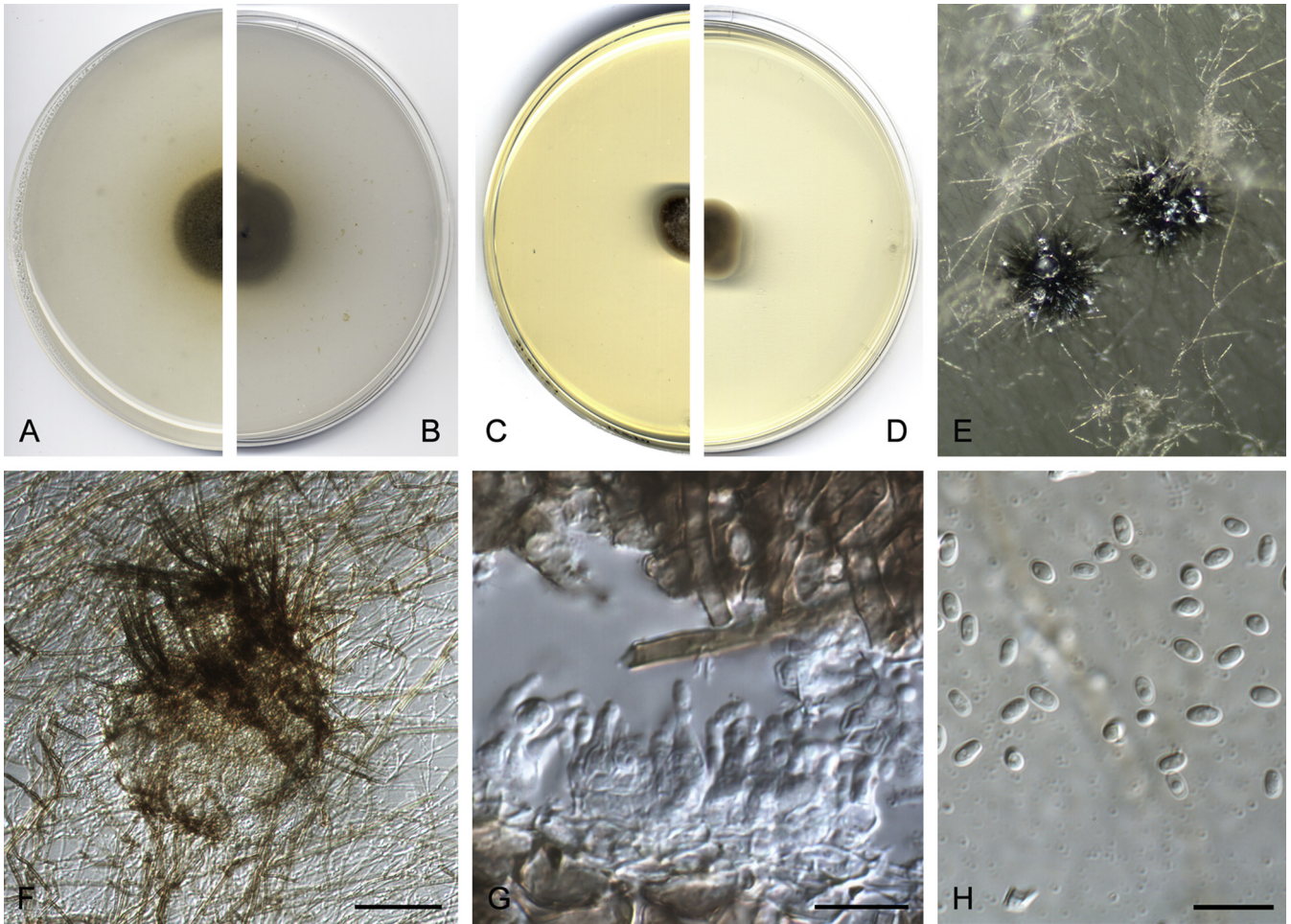
Fig. 29. *Neopyrenochaeta fragariae* (CBS 101634). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 μm. G, H = 10 μm.

Neopyrenochaeta fragariae Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **sp. nov.** MycoBank MB820316. Fig. 29.

Etymology: Relating to the host from the fungus was isolated, *Fragaria* (strawberry).

Description: *Hyphae* pale brown, smooth- and thin-walled, septate, 2.5–3 μm wide. *Conidiomata* pycnidial, pale brown to brown, solitary, superficial (OA), ovoid to globose, 170–220 × 160–210 μm, covered with brown to dark brown, septate, erect, smooth- and thick-walled setae tapering towards the apex, 110–120 × 2.5–5.5 μm, mainly disposed around the ostiole, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2–5 layered, 20–60 μm thick, composed of brown, flattened polygonal cells of 5–15 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 4.5–7 × 3.5–4 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid to ellipsoidal, 3.5–5 × 2–3 μm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 14 mm diam after 7 d at 25 ± 1 °C, flattened, olive brown (M. 4E8); reverse olive brown (M. 4F2). Colonies on MEA reaching 11 mm after 7 d at 25 ± 1 °C, flattened, yellowish-brown (M. 5F4); reverse yellowish brown (M. 5E4). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **The Netherlands**, Arnhem, from *Fragaria* sp., 1976, M.M.J. Dorenbosch (**holotype** CBS H-23206, ex-holotype living cultures CBS 101634 = PD 76/416 = FMR 14871).

Notes: The strain CBS 101634 was previously named *Pyrenochaeta acicola*. Although it is morphologically similar to the latter mentioned species (now in *Neopyrenochaeta*), these fungi differ in 23 and 11 nucleotides for *rpb*2 and *tub*2, respectively. Therefore, a new species name is proposed for CBS 101634.

Neopyrenochaeta inflorescentiae (Crous *et al.*) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **comb. nov.** Myco-Bank MB820317.
Basionym: *Pyrenochaeta inflorescentiae* Crous *et al.*, CBS Diversity Ser. (Utrecht) 7: 115. 2008.

Description: Marincowitz *et al.* (2008).

Material examined: **South Africa**, Western Cape Province, from *Protea neriifolia*, 6 Jun. 2000, S. Marincowitz (**holotype** PREM 58657, ex-holotype living cultures CBS 119222 = CPC 13163 = FMR 15334).

Notes: In our phylogenetic analysis, the ex-type strain of *Pyrenochaeta inflorescentiae* (CBS 119222) clustered with *N. acicola* and *N. fragariae* in a terminal clade distant from the type species of the genus *Pyrenochaeta*, *P. nobilis*, and outside the family *Cucurbitariaceae*, where that fungus was previously placed. For that reason, we accommodate *P. inflorescentiae* in the new genus *Neopyrenochaeta* (*Neopyrenochaetaceae*).
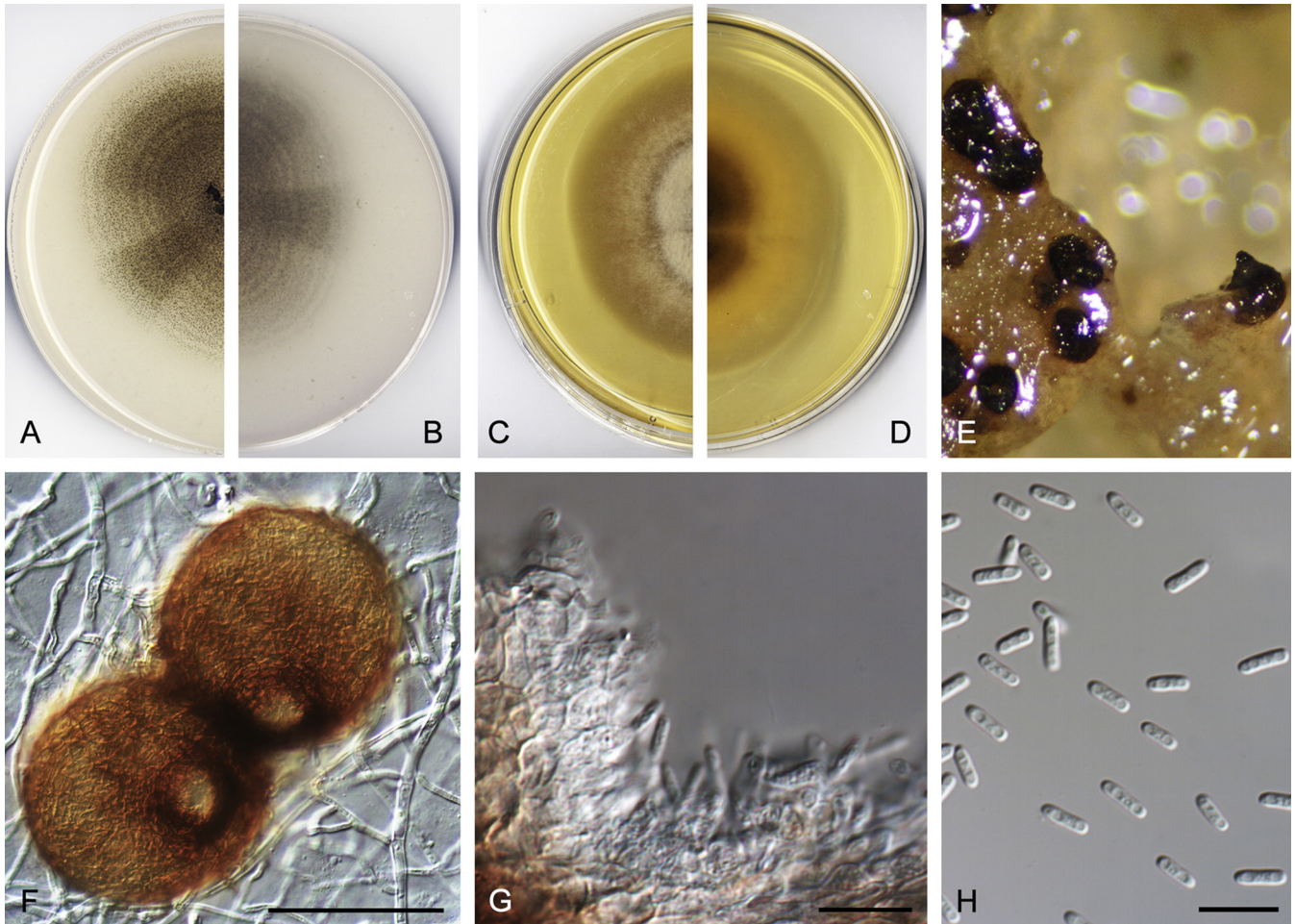
Fig. 30. *Pyrenochaetopsis botulispora* (CBS 142458). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 μm. G, H = 10 μm.

Neopyrenochaeta telephoni (Rohit Sharma *et al.*) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB820318.

Basionym: *Pyrenochaeta telephoni* Rohit Sharma *et al.*, Persoonia 35: 321. 2015.

Description: Crous *et al.* (2015b).

Material examined: **India**, Maharashtra, Pune, from screen of mobile phone, 2013, R. Kurli & P. Rahi (**holotype** MCC H1001, ex-holotype living cultures MCC 1159 = CBS 119222 = FMR 15754).

Notes: Recently, Sharma *et al.* (in Crous *et al.* 2015b) proposed the new species *Pyrenochaeta telephoni*, recovered from a mobile phone. Morphologically, it resembles other species of *Pyrenochaeta*; however, in our phylogenetic analysis this fungus forms a basal terminal clade in *Neopyrenochaeta*, which is distant from *Cucurbitariaceae s. str.*

Clade F: *Pyrenochaetopsidaceae* Valenzuela-Lopez, Crous, Cano, Guarro & Stchigel, **fam. nov.** MycoBank MB820308.

Conidiomata pycnidial, pale brown to brown, solitary or confluent; pycnidial wall of *textura angularis*, glabrous or setose, subglobose to ovoid, with a non-papillate or papillate ostiolar neck. *Conidiogenous cells* phialidic, hyaline, discrete or integrated in septate, acropleurogenous conidiophores. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid, cylindrical to allantoid, guttulate.

Type genus: *Pyrenochaetopsis* Gruyter, Aveskamp & Verkley.

Clade F1: *Pyrenochaetopsis*

Pyrenochaetopsis Gruyter, Aveskamp & Verkley, Mycologia 102: 1076. 2010.

Conidiomata pycnidial, honey to citrine or olivaceous to olivaceous black, solitary to confluent, superficial or submerged, with a non-papillate or papillate ostiolar neck; pycnidial wall pseudoparenchymatous, setose, globose to subglobose. *Conidiogenous cells* phialidic, hyaline, discrete and integrated in septate, acropleurogenous conidiophores. *Conidia* aseptate, cylindrical to allantoid, guttulate (de Gruyter *et al.* 2010).

Type species: *Pyrenochaetopsis leptospora* (Sacc. & Briard) Gruyter *et al.*

Pyrenochaetopsis americana Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB822115.

Etymology: The species name denotes the geographic area where the fungus is from.

Culture sterile. *Pyrenochaetopsis americana* differs from its closest phylogenetic species, *Pyrenochaetopsis uberiformis*, in five nucleotides for ITS, 19 for *tub*2 and 34 for *rpb*2, based on alignment of the concatenated four loci deposited in TreeBASE (S21115).

Culture characteristics: Colonies on OA reaching 30 mm diam after 7 d at 25 ± 1 °C, flattened, dark olive (M. 3F3); reverse olive
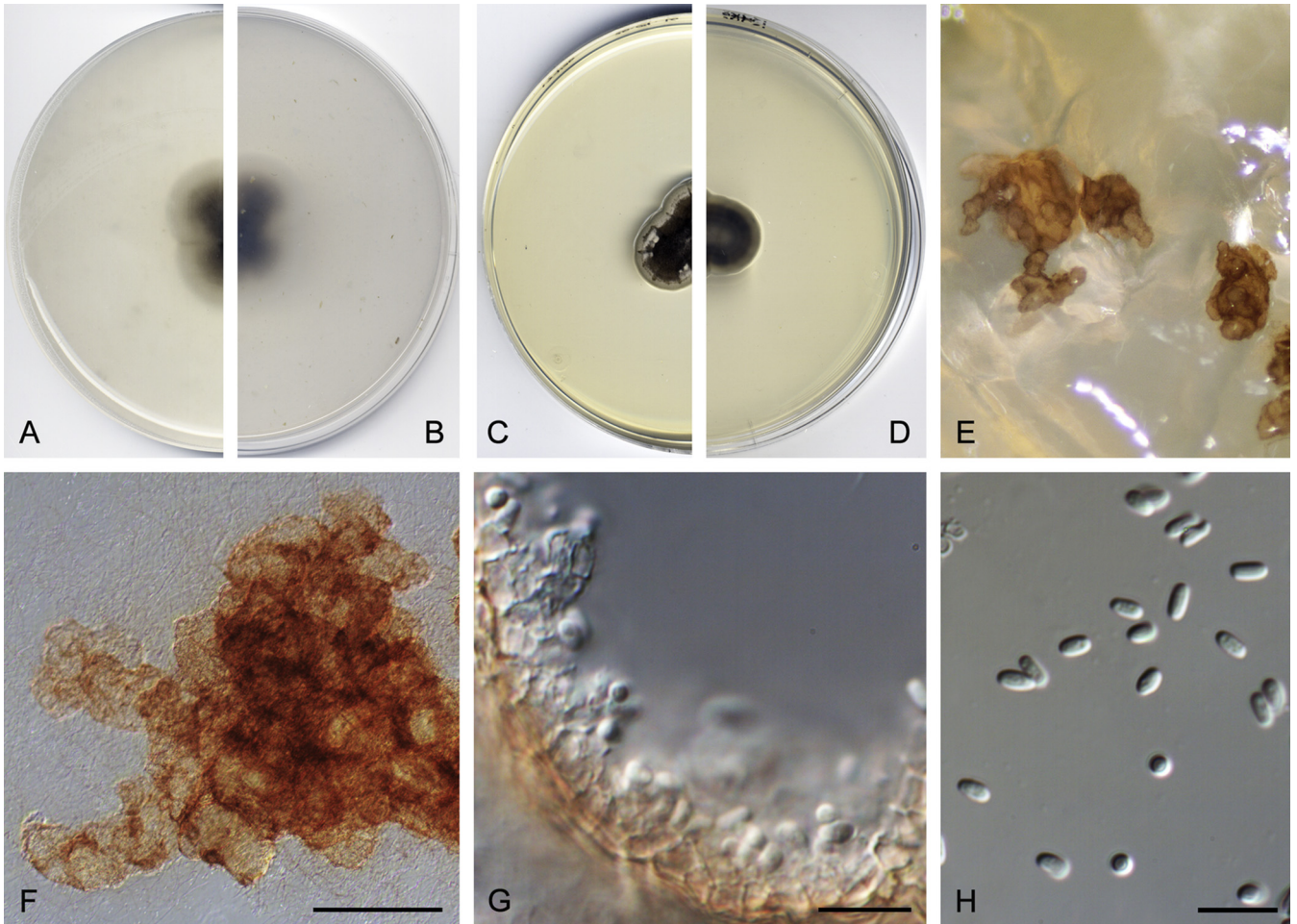
Fig. 31. *Pyrenochaetopsis confluens* (CBS 142459). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 μm. G, H = 10 μm.

grey (M. 3D2). Colonies on MEA reaching 19 mm diam after 7 d at 25 ± 1 °C, flattened, olive grey (M. 3D2) to white (M. 3A1); reverse white (M. 3A1). NaOH spot test negative. Crystals absent.

Material examined: **USA**, substrate unknown, 2007, D.A. Sutton (**holotype** FMR H-13715, ex-holotype living cultures UTHSC DI16-225 = FMR 13715).

Notes: The strain UTHSC DI16-225, which remained sterile in all culture media tested in this study, forms an unsupported sister clade with *P. uberiformis*, from which it is phylogenetically distant. Therefore, UTHSC DI16-225 is proposed here as a new species different from *P. uberiformis*.

Pyrenochaetopsis botulispora Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB819764. Fig. 30.

Etymology: From Latin *botulus*-, sausage, and *-spora*, spore, relating to the morphology of the conidia.

Description: *Hyphae* brown, smooth- and thin-walled, septate, 2–7 μm wide. *Conidiomata* pycnidial, brown, solitary or confluent, superficial (OA), glabrous, subglobose or globose, 140–190 × 130–160 μm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2–3 layered, 15–35 μm thick, composed of brown, flattened polygonal cells of 5–8 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, subglobose, ca. 4 × 5 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical, 4.5–6 × 2–2.5 μm, guttulate.

Culture characteristics: Colonies on OA reaching 25–30 mm diam after 7 d at 25 ± 1 °C, flattened, with abundant production of pycnidia, yellowish brown (M. 5E8); reverse yellowish-brown (M. 5F6). Colonies on MEA reaching 30 mm diam after 7 d at 25 ± 1 °C, flattened, orange grey (M. 5B2) to brownish orange (M. 5C5); reverse yellowish brown (M. 5E7) to greyish orange (M. 5B5). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 15 °C; maximum temperature of growth 30 °C.

Material examined: **USA**, from human sputum sample, 2011, D.A. Sutton (**holotype** CBS H-23035, ex-holotype living cultures CBS 142458 = UTHSC DI16-298 = FMR 13791); from human bronchial wash sample, 2010, D.A. Sutton, living culture UTHSC DI16-289 = FMR 13781; from human foot skin, 2011, D.A. Sutton, living culture UTHSC DI16-297 = FMR 13790.

Notes: *Pyrenochaetopsis botulispora* is proposed to accommodate three isolates from clinical specimens, which form a sister clade to *P. paucisetosa*, being well differentiated phylogenetically from their closest relatives. Morphologically, *P. botulispora* is characterised by producing glabrous pycnidia, which are setose in *P. paucisetosa*, and by its slightly longer conidia (4.5–6 × 2–2.5 μm *vs*. 3–4 × 2–2.5 μm in in *P. paucisetosa*).

Pyrenochaetopsis confluens Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB819763. Fig. 31.

Etymology: From Latin *confluens*, confluent, due to the production of tightly aggregated conidiomata.
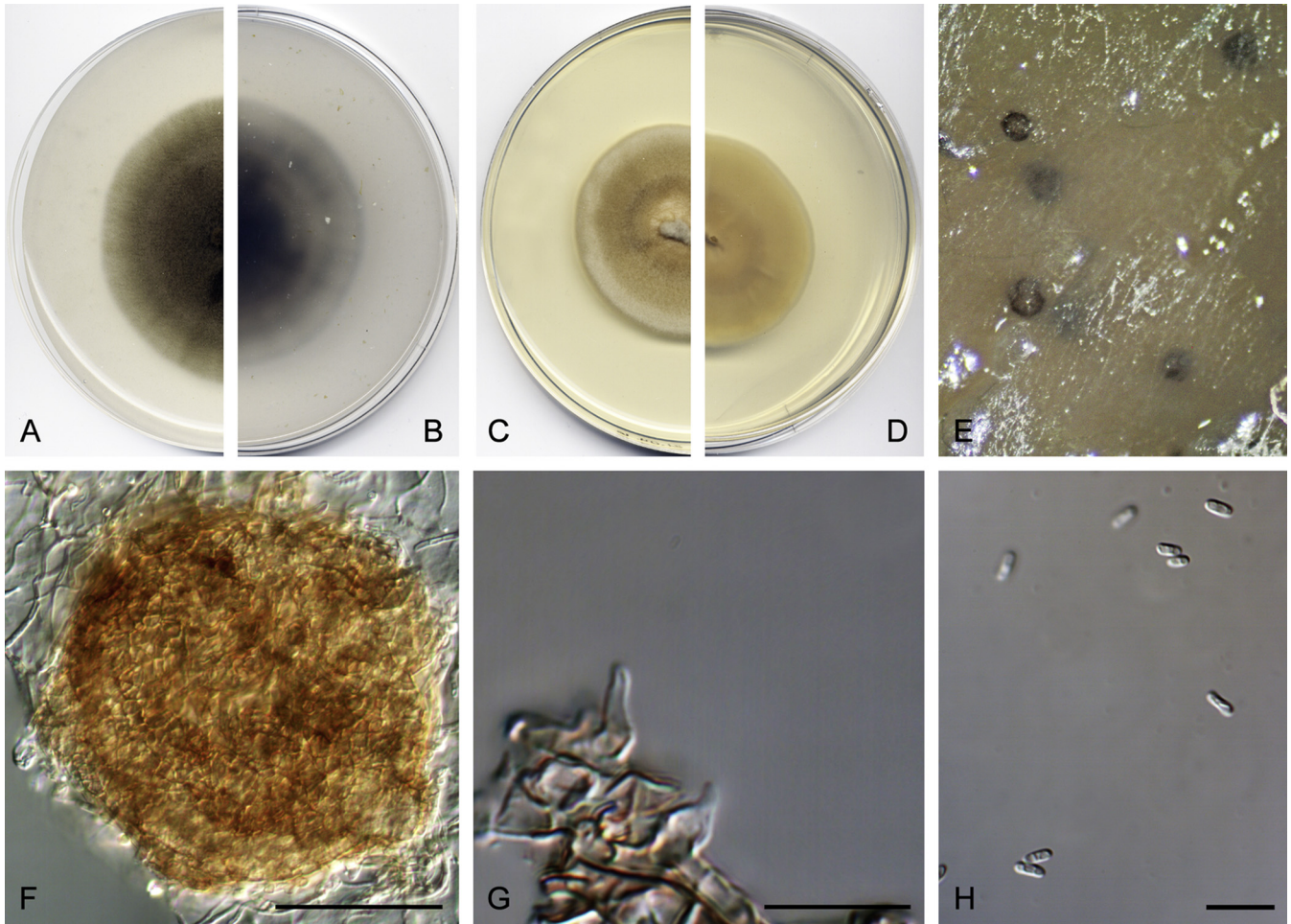
Fig. 32. *Pyrenochaetopsis globosa* (CBS 143034). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 µm. G, H = 10 µm.

Description: *Hyphae* pale brown, smooth- and thin-walled, septate, 2–5 µm wide. *Conidiomata* pycnidial, pale brown, translucent, aggregated, immersed (MEA), subglobose or globose, 80–140 × 70–90 µm, with 1–2 papillate ostiolar necks, covered by brown setae around the ostiole; setae erect, smooth- and thick- walled, septate, 15–22.5(–35) × 2.5–4.5 µm; pycnidial wall of *textura angularis*, 2–3 layered, 13–20 µm thick, composed of brown, flattened polygonal cells of 5–8 µm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, subglobose, 4.5–7.5 × 6.5–7.5 µm. *Conidia* aseptate, hyaline, aseptate, smooth- and thin-walled, guttulate, ovoid to cylindrical, 2–4 × 2–2.5 µm.

Culture characteristics: Colonies on OA reaching 15 mm diam after 7 d at 25 ± 1 °C, flattened, white (M. 4A1) to olive brown (M. 4E4); reverse olive brown (M. 4F3). Colonies on MEA reaching 10 mm diam after 7 d at 25 ± 1 °C, flattened, white (M. 4A1) to brownish-grey (M. 4F2); reverse brownish-grey (M. 4F2). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **USA**, from human blood sample, 2011, D.A. Sutton (**holotype** CBS H-23036, ex-holotype living cultures CBS 142459 = UTHSC DI16-303 = FMR = 13796).

Notes: The strain CBS 142459 forms a distinct clade phylogenetically distant from *P. decipiens* and *P. indica*. This new species grows slowly on all culture media tested and produces aggregated conidiomata.

Pyrenochaetopsis decipiens (Marchal) Gruyter *et al.*, Mycologia 102: 1077. 2010.

Basionym: *Pyrenochaeta decipiens* Marchal, Bull. Soc. Roy. Bot. Belg. 30:139. 1891.

Synonym: *Phoma terricola* Boerema, Versl. Meded. plziektenk. Dienst Wageningen 163 (Jaarb. 1984): 38. 1985.

Material examined: **The Netherlands**, Hoofddorp, on cyst of *Globodera pallida*, May 1985, D. Hugo, No. 727 (**neotype** CBS H-20315, ex-neotype living cultures CBS 343.85 = IMI 386097 = FMR 14880).

Notes: In this study, newer genomic sequences data from the ex-type strain of *Pyrenochaetopsis decipiens* are provided. Unfortunately, we have not been able to induce this fungus to sporulate.

Pyrenochaetopsis globosa Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB821496. Fig. 32.

Etymology: From Latin *globosus*, globose, due to the production of globose conidiomata.

Description: *Hyphae* hyaline to pale brown, smooth- and thin-walled, septate, 2–4 µm wide. *Conidiomata* pycnidial, pale olivaceus-brown to brown, solitary or aggregated, semi-immersed or immersed, mainly globose (70–200 µm diam), sometimes ovoid (150–220 × 140–190 µm), glabrous or covered by hyphal outgrowths, with 1–2 papillate ostiolar necks; pycnidial wall of *textura angularis*, 3–5 layered, 25–35 µm thick, composed of pale olive-brown to brown, flattened polygonal cells of 3–10 µm diam. *Conidiogenous cells* phialidic, hyaline,
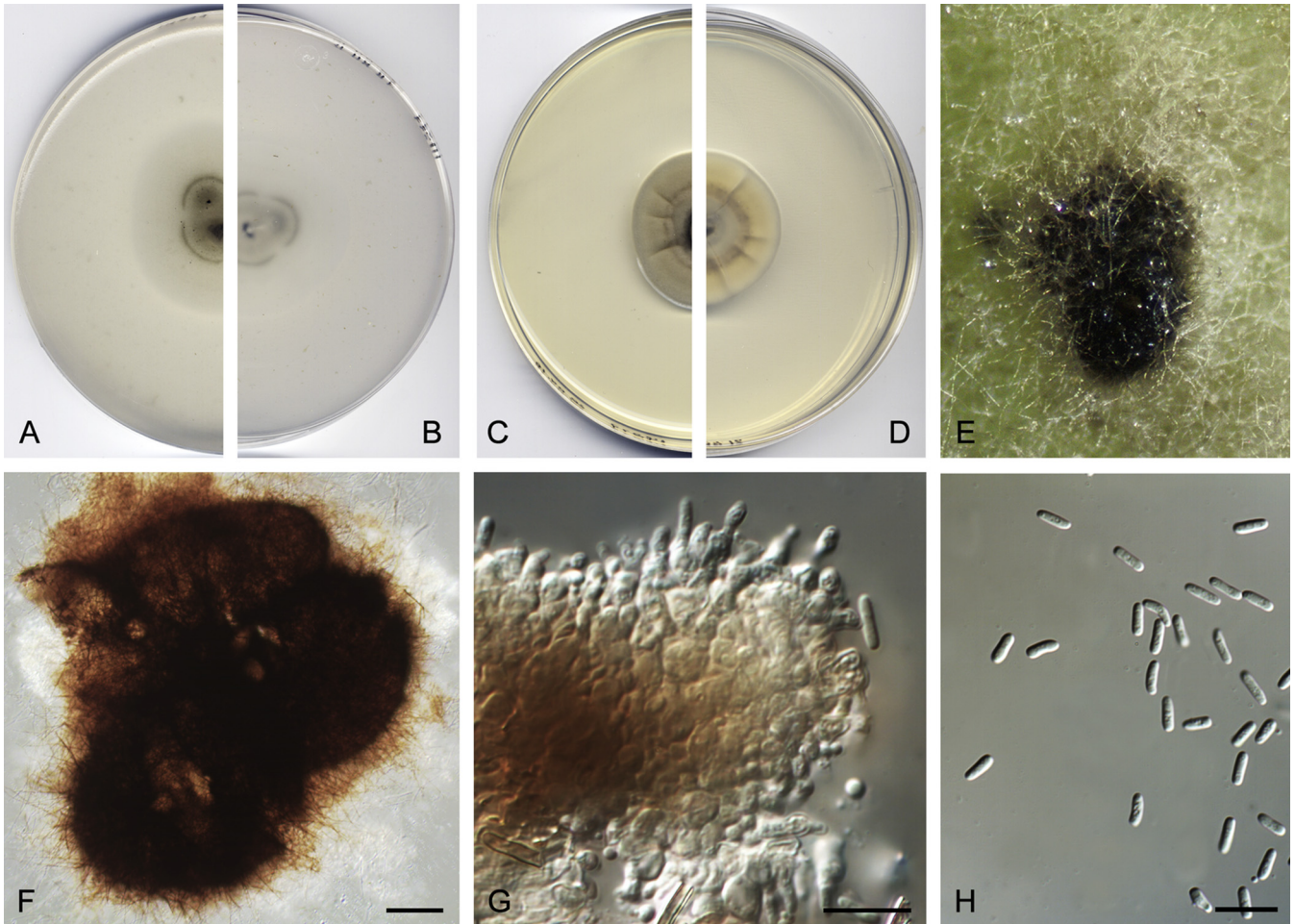
Fig. 33. *Pyrenochaetopsis leptospora* (CBS 101635). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 μm. G, H = 10 μm.

smooth-walled, lageniform to ampulliform, 3.5–5 × 2.5–3 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid to cylindrical, 3–5.5 × 1.5–2 μm, guttulate.

Culture characteristics: Colonies on OA reaching 27 mm diam after 7 d at 25 ± 1 °C, flattened, yellowish brown (M. 5E5); reverse greyish brown (M. 5F3). Colonies on MEA reaching 20 mm diam after 7 d at 25 ± 1 °C, flattened, brownish-orange (M. 5C3); reverse pale brown (M. 5D4). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **USA**, from human dermatitis sample, 2009, D.A. Sutton (**holotype** CBS H-23208 ex-holotype living cultures CBS 143034 = UTHSC DI16-275 = FMR 13766).

Notes: The strain CBS 143034, which is morphologically similar to *P. uberiformis* (slightly different in pycnidial and conidial size), forms a large clade wherein there is *P. uberiformis* and several other species of the genus *Pyrenochaetopsis*. Because the nucleotide sequences of both fungi differ in 19 bp for *rpb*2 and 13 bp for *tub*2, *P. globosa* is proposed as a new species for the genus.

Pyrenochaetopsis indica (T.S. Viswan.) Gruyter *et al.*, Mycologia 102: 1077. 2010.
Basionym: *Pyrenochaeta indica* T.S. Viswan., Curr. Sci. 26:118. 1957.
Synonym: *Phoma indica* (T.S. Viswan.) Gruyter & Boerema, Persoonia 17: 556. 2002.

Description: Boerema *et al.* (2004).

Material examined: **India**, Poona, on leaf spot of *Saccharum officinarum* (**holotype** AMH-11, ex-holotype living cultures IMI 062569 = CBS 124454 = FMR 14879).

Notes: We studied the ex-type strain of *Pyrenochaetopsis indica*, providing new genomic sequence data. It is morphologically characterised by its setose pycnidia, and the production of globose to subglobose, olivaceous chlamydospores solitary or in chains. Morphologically it is difficult to differentiate this species from *P. decipiens*. However, *Pyrenochaetopsis indica* clearly differs genetically from the latter in its *tub*2 and *rpb*2 sequences. Unfortunately, all cultures remained sterile.

Pyrenochaetopsis leptospora (Sacc. & Briard) Gruyter *et al.*, Mycologia 102: 1076. 2010. Fig. 33.
Basionym: *Pyrenochaeta leptospora* Sacc. & Briard, Revue Mycol. 11: 16. 1889.
Synonyms: *Pyrenochaeta spegazziniana* Trotter, Syll. Fung. 25: 190. 1931.
Phoma briardii Gruyter & Boerema, Persoonia 17: 555. 2002.

Description: Boerema *et al.* (2004).

Material examined: **Germany**, subtrate unknown, J.W. Veenbaas, living cultures CBS 122787 = FMR 14873. **The Netherlands**, on *Secale cereal* (**epitype** CBS H-20313, ex-epitype living cultures CBS 101635 = PD 71/1027 = FMR 14877).
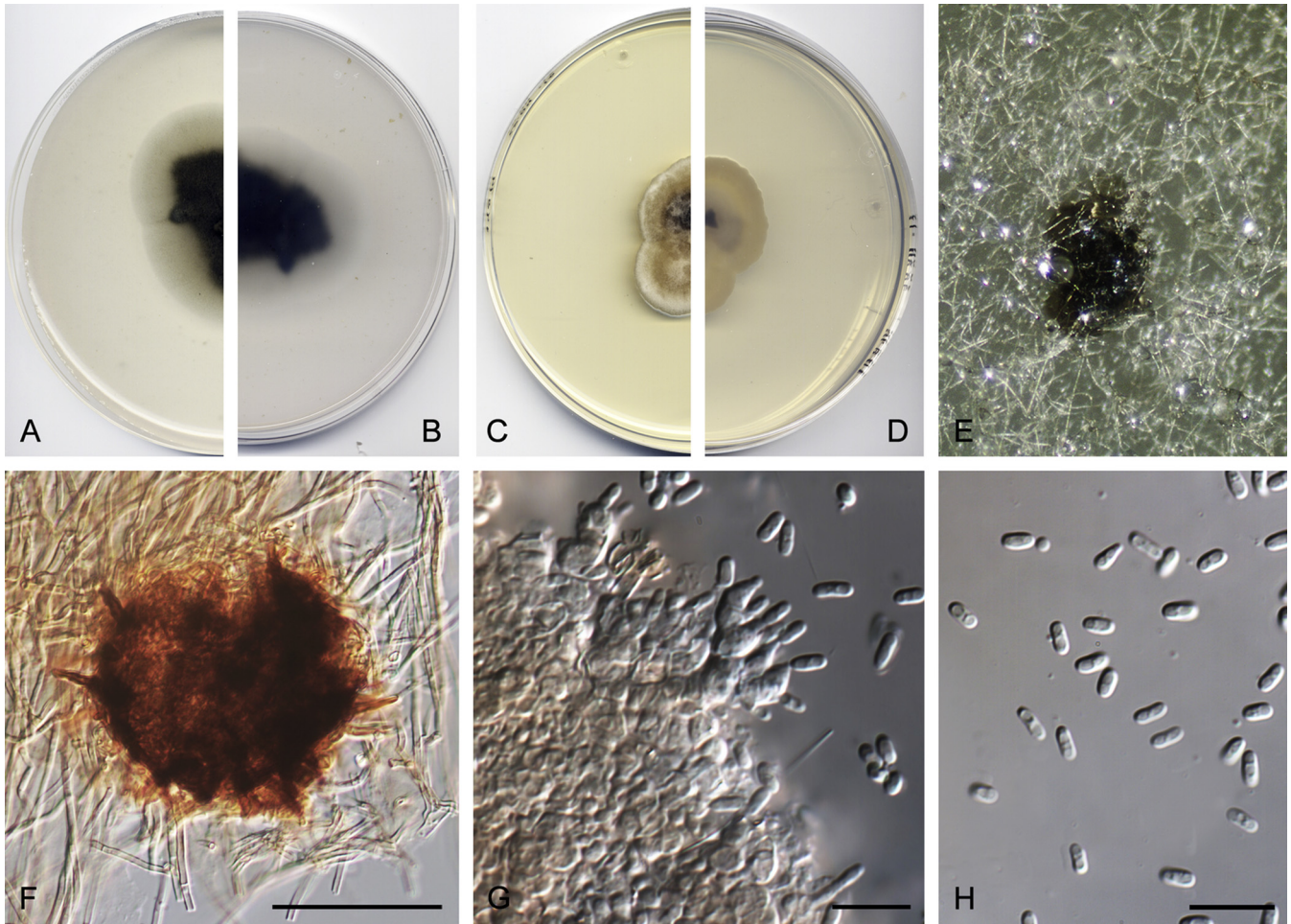
Fig. 34. *Pyrenochaetopsis microspora* (CBS 102876). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 μm. G, H = 10 μm.

Notes: We received isolate CBS 122787 as "*Coniothyrium cerealis*", but it was identified as *P. leptospora* in our phylogenetic study.

Pyrenochaetopsis microspora (Gruyter & Boerema) Gruyter *et al.*, Mycologia 102: 1077. 2010. Fig. 34.
Basionym: *Phoma leveillei* var. *microspora* Gruyter & Boerema, Persoonia 17: 553. 2002.

Description: Boerema *et al.* (2004).

Materials examined: **Montenegro**, Lake of Skadar, from water, 1975 (**holotype** HLB 999-242399, ex-holotype living cultures CBS 102876 = PD 75/911 = FMR 14874). **USA**, from human sinusitis sample, 2006, D.A. Sutton, living cultures UTHSC DI16-193 = FMR 13688.

Notes: In this paper, the ex-type strain of *Pyrenochaetopsis microspora* was examined, and new genomic sequence data and illustrations are provided. Furthermore, one human clinical specimen clustered with the ex-type living culture, being morphologically and genetically very closely related.

Pyrenochaetopsis paucisetosa Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB819766. Fig. 35.

Etymology: From Latin *paucus*, few, and *-setosus*, setose, because the conidiomata are covered by a few setae.

Description: *Hyphae* brown, smooth- and thin-walled, septate, 2–3 μm wide. *Conidiomata* pycnidial, brown, solitary, superficial or immersed (OA), setose, globose to ovoid, 150–190 × 140–160 μm, with a papillate ostiolar neck, covered by a few, brown, erect or slightly curved, smooth- and thick-walled, septate setae, (50–)63–68(–83) × 2–3.5 μm; pycnidial wall of *textura angularis*, 2–5 layered, 20–50 μm thick, composed of brown, flattened polygonal cells of 4–13 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 3.5–4 × 3–3.5 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical, 3–4 × 2–2.5 μm, guttulate.

Culture characteristics: Colonies on OA reaching 25 mm diam after 7 d at 25 ± 1 °C, flattened, olive brown (M. 4F5); reverse brownish grey (M. 4F2). Colonies on MEA reaching 21 mm diam after 7 d at 25 ± 1 °C, floccose, pale grey (M. 4C1); reverse medium-grey (M. 4E1). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 15 °C; maximum temperature of growth 35 °C.

Material examined: **USA**, from human toe nail, 2005, D.A. Sutton (**holotype** CBS H-23037, ex-holotype living cultures CBS 142460 = UTHSC DI16-193 = FMR 13683).

Notes: *Pyrenochaetopsis paucisetosa*, recovered from a specimen of superficial human tissue, produces pycnidia covered by a few setae, and conidia smaller than in other species of the genus. Phylogenetically, *P. paucisetosa* is well-separated from *P. botulispora*.

Pyrenochaetopsis poae Crous & Quaedvlieg, Persoonia 32: 197. 2014.

Description: Crous *et al.* (2014).
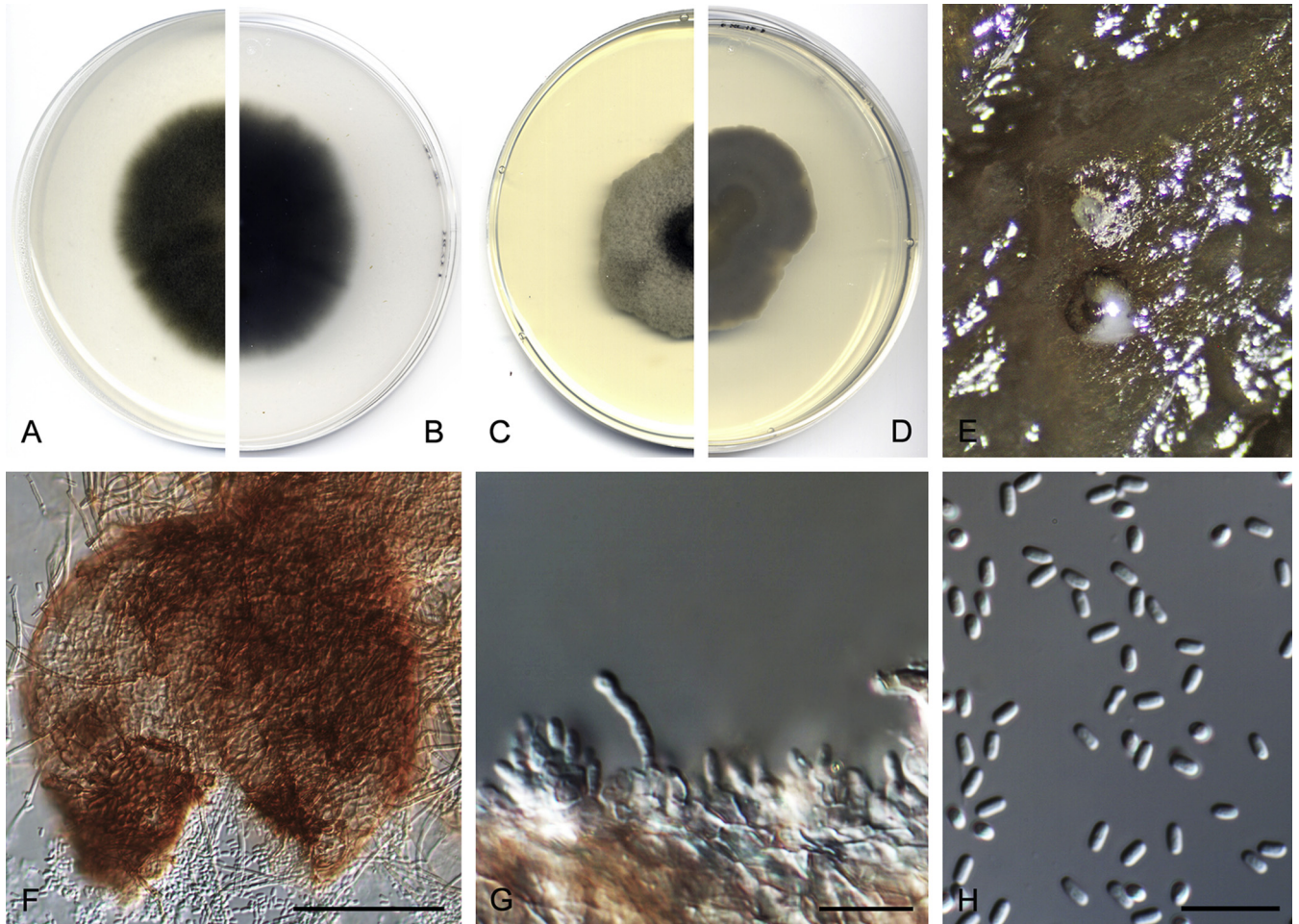
Fig. 35. *Pyrenochaetopsis paucisetosa* (CBS 142460). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 µm. G, H = 10 µm.

Material examined: **Netherlands**, Raalte, on *Poa* sp. (*Poaceae*), 2013, W. Quaedvlieg (**holotype** CBS H-21677, ex-holotype living cultures CBS 136769 = D779 = FMR 14876).

Notes: We studied the ex-type strain of *Pyrenochaetopsis poae*, which is morphologically similar to the generic type of *P. leptospora*. In this paper, we provide *rpb*2 sequence that, together with *tub*2, are useful to differentiate these taxa.

Pyrenochaetopsis setosissima Valenzuela-Lopez, Cano, Crous, Guarro & Stchigel, **sp. nov.** MycoBank MB819767. Fig. 36.

Etymology: From Latin −*setosissimus*, bearing many setae, relating to the ornamentation of the pycnidia.

Description: *Hyphae* brown, smooth- and thin-walled, septate, 2−5 µm wide. *Conidiomata* pycnidial, brown, solitary or confluent, superficial (OA), subglobose to ovoid, 150−230 × 150−200 µm, with a papillate ostiolar neck, covered by many dark brown, erect, smooth- and thick-walled, septate setae, 33−83 × 2−4 µm; pycnidial wall of *textura angularis*, 2−4 layered, 20−50 µm thick, composed of brown, flattened polygonal cells of 5−15 µm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 5−4.5 × 4−4.5 µm. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical, 4−5 × 2−2.5 µm, guttulate.

Culture characteristics: Colonies on OA reaching 25 mm diam after 7 d at 25 ± 1 °C, flattened, olive brown (M. 4F4); reverse brownish grey (M. 4F2). Colonies on MEA reaching 18 mm diam

after 7 d at 25 ± 1 °C, flattened, light orange (M. 5A4); reverse orange white (M. 5A2). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **Brazil**, Minas Gerais, Lavras, from *Coffea arabica* leaf, Jun. 1999, L.H. Pfenning (**holotype** CBS H-23209, ex-holotype living cultures CBS 119739 = FMR 14875).

Notes: The isolate CBS 119739 was identified as *P. microspora* by de Gruyter *et al.* (2010) using SSU and LSU sequences as phylogenetic markers. However, in our phylogenetic study employing more markers, it clusters distant from the latter species. *Pyrenochaetopsis setosissima* is morphologically very similar to *P. microspora*, and can only be distinguished based on molecular data (differing in 19 bp for *tub*2 and 31 bp for *rpb*2).

Pyrenochaetopsis uberiformis Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB819765. Fig. 37.

Etymology: From Latin −*ubera*, mammaries, and -*forma*, shape, relating to the anatomy of its pycnidia.

Description: *Hyphae* brown, smooth- and thin-walled, septate, 2−3 µm wide. *Conidiomata* pycnidial, brown, solitary or confluent, superficial or immersed (OA), glabrous, globose or ovoid, 200−440 × 130−410 µm, with a papillate ostiolar neck; pycnidial wall of *textura angularis*, 2−4 layered, 15−30 µm thick, composed of pale brown to brown, flattened polygonal cells of
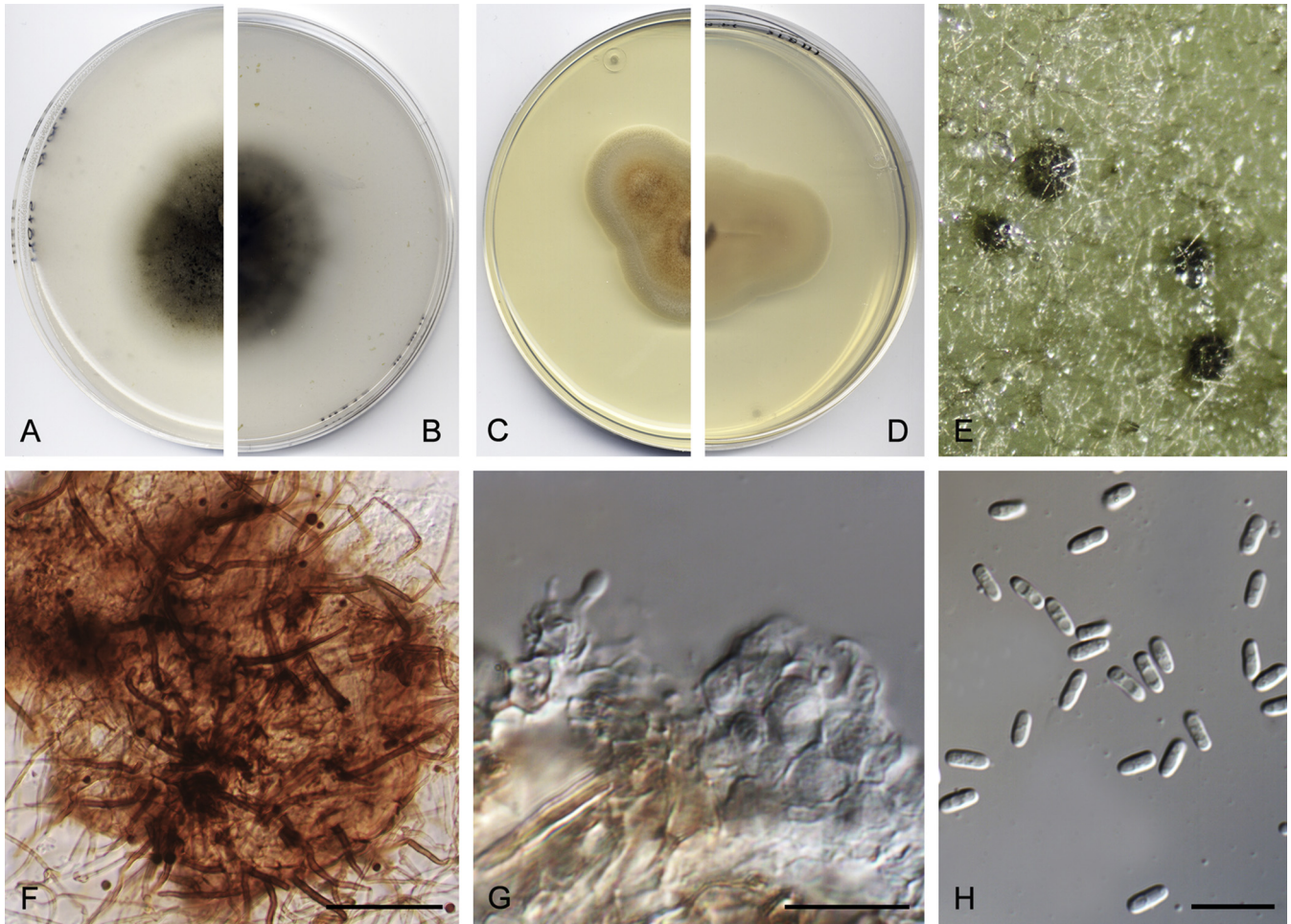
Fig. 36. *Pyrenochaetopsis setosissima* (CBS 119739). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 μm. G, H = 10 μm.

5–10 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 3–4 × 4–5 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical, 4–6 × 2–2.5 μm, guttulate.

Culture characteristics: Colonies on OA reaching 27 mm diam after 7 d at 25 ± 1 °C, flattened, yellowish brown (M. 5E5); reverse greyish brown (M. 5F3). Colonies on MEA reaching 20 mm diam after 7 d at 25 ± 1 °C, flattened, brownish orange (M. 5C3); reverse pale brown (M. 5D4). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **USA**, from human ear lesion, 2009, D.A. Sutton (**holotype** CBS H-23038, ex-holotype living cultures CBS 142461 = UTHSC DI16-277 = FMR 13769).

Notes: The strain CBS 142461 clustered within the *Pyrenochaetopsis* clade, distant from other species of the genus, with the exception of *P. americana*, which forms a sister clade. Both strains differ in their *rpb*2 and *tub*2 sequences. Therefore, we propose strain CBS 142461 as representative of the new species *P. uberiformis*.

Clade F2: *Xenopyrenochaetopsis*

Xenopyrenochaetopsis Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **gen. nov.** MycoBank MB820311.

Etymology: From Greek ξένος-, strange, alien, because it is phylogenetically distinct from the genus *Pyrenochaetopsis*.

Conidiomata pycnidial, pale brown to brown, solitary or confluent; pycnidial wall of *textura angularis*, glabrous, globose, ostiolate. *Conidiogenous cells* phialidic, hyaline. *Conidia* aseptate, hyaline, smooth- and thin-walled, cylindrical, guttulate.

Type species: *Xenopyrenochaetopsis pratorum* (P.R. Johnst. & Boerema) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano.

Xenopyrenochaetopsis pratorum (P.R. Johnst. & Boerema) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB820312. Fig. 38.
*Basionym*: *Phoma pratorum* P.R. Johnst. & Boerema, New Zealand J. Bot. 19: 395. 1981.
Synonym: *Pyrenochaetopsis pratorum* (P.R. Johnst. & Boerema) Gruyter *et al.*, Stud. Mycol. 75: 24. 2012.

Description from ex-isotype (CBS 445.81): *Hyphae* pale brown to brown, smooth- and thin-walled, septate, 2.5–5 μm wide. *Conidiomata* pycnidial, pale brown to brown, solitary or confluent, semi-immersed or immersed (OA), glabrous, globose to irregular, (88–)160–270 × (80–)100–250 μm, with 1–3 papillate ostiolar necks; pycnidial wall of *textura angularis*, 2–4 layered, 10–30 μm thick, composed of pale brown to brown, flattened polygonal cells of 2.5–8 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform, 3–3.5 × 1.5–2 μm. *Conidia* aseptate, hyaline, smooth- and thin-walled, subreniform to oblong or cylindrical, 4–5 × 1.5–2 μm, guttulate.

Culture characteristics: Colonies on OA reaching 5 mm diam after 7 d at 25 ± 1 °C, flattened, olive (M. 3D4) to olive grey (M.3F2);
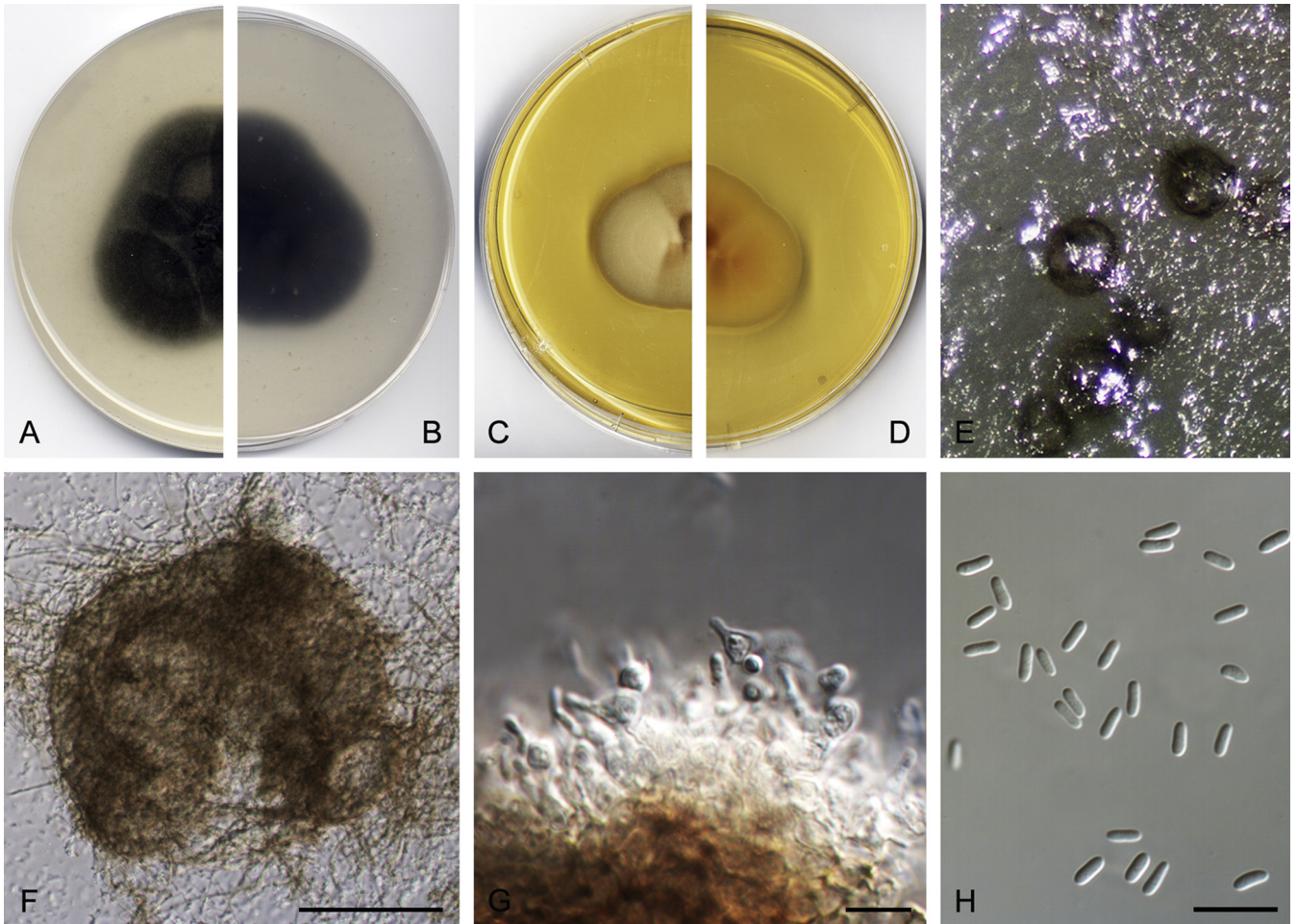
Fig. 37. *Pyrenochaetopsis uberiformis* (CBS 142461). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 μm. G, H = 10 μm.

reverse olive (M.3F4). Colonies on MEA reaching 4 mm diam after 7 d at 25 ± 1 °C, flattened, yellowish white (M. 3A2); reverse ash blonde (M. 3C3). NaOH spot test negative. Crystals absent. Optimal temperature of growth and sporulation 25 °C; minimum temperature of growth 15 °C; maximum temperature of growth 25 °C.

Material examined: **New Zealand**, Rakura, near Hamilton, from a leaf of *Lolium perenne* (*Poaceae*), 1980, P.R. Johnston (**isotype** CBS H-7625, CBS H-7626, ex-isotype living cultures CBS 445.81 = PDDCC 7049 = PD 80/1254 = FMR 14878).

Notes: *Pyrenochaetopsis pratorum* was proposed as a new combination for *Phoma pratorum* by de Gruyter *et al.* (2013). In that study, it clustered with *Pyrenochaetopsis* but was situated phylogenetically distinct from *P. leptospora*. However, in our phylogenetic analysis this species clustered outside *Pyrenochaetopsis* s. str. Moreover, *Phoma pratorum* differs in the main distinctive morphological feature of the genus *Pyrenochaetopsis*, the production of setose pycnidia (glabrous in *P. pratorum*). Therefore, we accommodate this species in the new genus *Xenopyrenochaetopsis*.

Clade F3: *Neopyrenochaetopsis*

Neopyrenochaetopsis Valenzuela-Lopez, Cano, Guarro & Stchigel, **gen. nov.** MycoBank MB820309.

Etymology: Referring to its close phylogenetic relationship with the genus *Pyrenochaetopsis*.

Conidiomata pycnidial, brown, solitary or confluent, pycnidial wall of *textura angularis*, glabrous, subglobose to ovoid, ostiolate.

Conidiogenous cells phialidic, ampulliform to globose. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid to cylindrical.

*Type species*: *Neopyrenochaetopsis hominis* Valenzuela-Lopez, Cano, Guarro & Stchigel.

Neopyrenochaetopsis hominis Valenzuela-Lopez, Cano, Guarro & Stchigel, **sp. nov.** MycoBank MB820310. Fig. 39.

Etymology: Relating to its isolation from a human specimen.

Description: *Hyphae* pale yellow to pale brown, smooth- and thin-walled, septate, 2–3 μm wide. *Conidiomata* pycnidial, brown, solitary or confluent, superficial or immersed (OA), glabrous, subglobose to ovoid, 160–170 × 140–160 μm, with a single papillate ostiolar neck; pycnidial wall of *textura angularis*, 2–4 layered, 15–40 μm thick, composed of brown, flattened polygonal cells of 2.5–8 μm diam. *Conidiogenous cells* phialidic, hyaline, smooth-walled, ampulliform to globose, 4–5 μm diam wide. *Conidia* aseptate, hyaline, smooth- and thin-walled, ovoid to narrowly ellipsoidal, 3–3.5 × 1.5–2 μm, guttulate. *Chlamydospores* absent.

Culture characteristics: Colonies on OA reaching 31 mm diam after 7 d at 25 ± 1 °C, flattened, greyish yellow (M. 3B4); reverse greyish yellow (M. 3C4); yellow pigment diffusing into the agar. Colonies on MEA reaching 29 mm diam after 7 d at 25 ± 1 °C, floccose, dull yellow (M. 3B3) to white (M. 3A1); reverse brownish yellow (M. 5C8); diffusible pigment yellowish. NaOH spot test negative. Crystals absent. Optimal temperature of
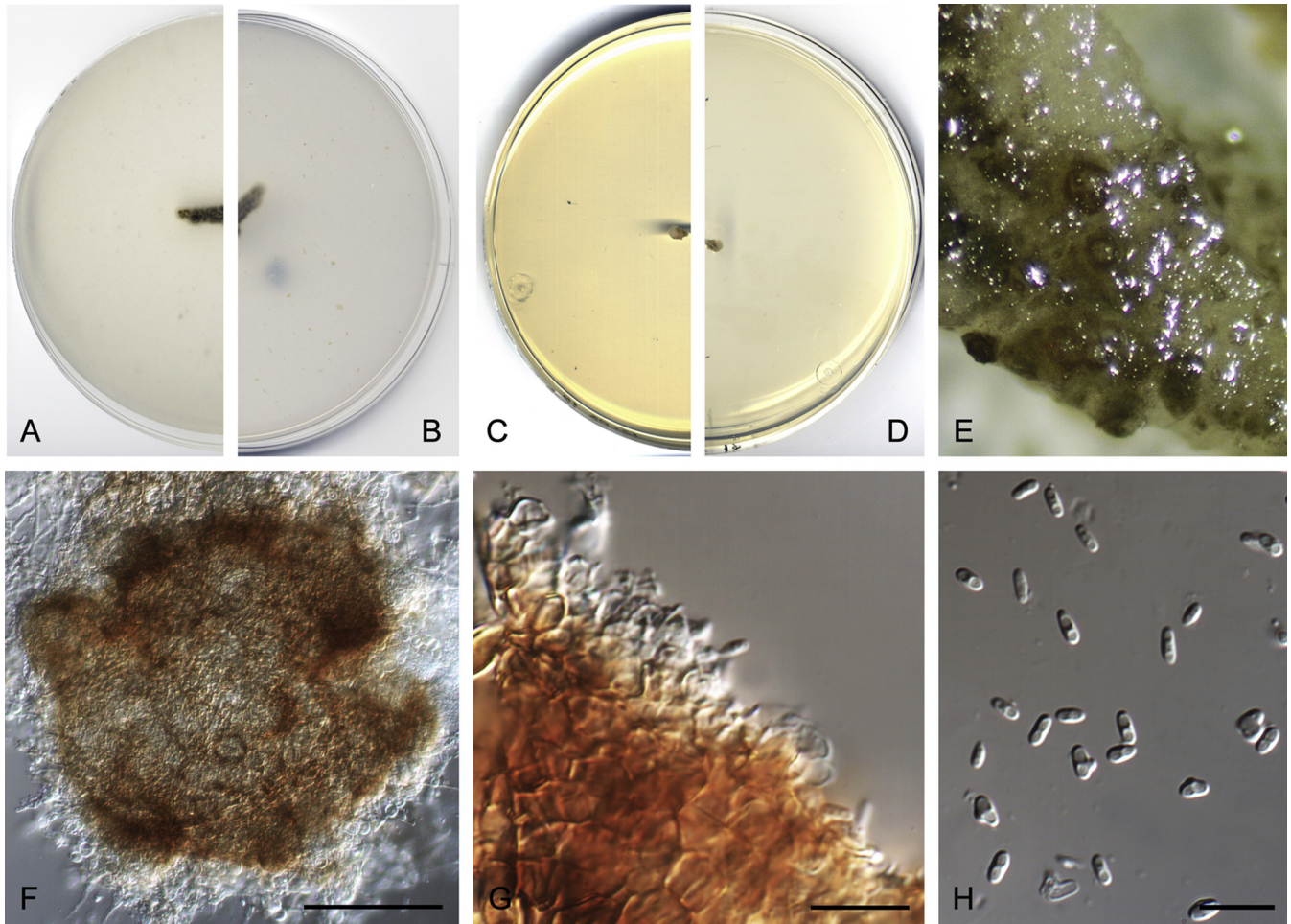
Fig. 38. *Xenopyrenochaetopsis pratorum* (CBS 445.81). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 100 μm. G, H = 10 μm.

growth and sporulation 25 °C; minimum temperature of growth 5 °C; maximum temperature of growth 30 °C.

Material examined: **USA**, from human skin tissue, 2007, D. A. Sutton (**holotype** CBS H-23207, culture ex-holotype living cultures CBS 143033 = UTHSC DI16-238 = FMR 13728).

Notes: The strain CBS 143033, recovered from a clinical sample, forms a distinct basal clade within the *Pyrenochaetopsidaceae*. Morphologically, *N. hominis* can be differentiated from the other taxa mainly by the production of smaller-sized conidia, and a yellow diffusing pigment on MEA and OA.

Clade N: *Parapyrenochaetaceae* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **fam. nov.** MycoBank MB820418.

Etymology: Named after its close morphological relationship with *Pyrenochaeta*.

Conidiomata pycnidial, brown, solitary, pycnidial wall of *textura angularis*, setose, globose, ostiolate. *Conidiogenous cells* phialidic, ampulliform or lageniform. *Conidia* aseptate, hyaline, smooth- and thin-walled, allantoid or ellipsoidal.

Type genus: *Parapyrenochaeta* Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano.

Parapyrenochaeta Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **gen. nov.** MycoBank MB820319.

Etymology: Based on its close morphological relationship to *Pyrenochaeta*.

Conidiomata pycnidial, pale brown to brown, solitary, setose, globose, ostiolate; pycnidial wall of *textura angularis*. *Conidiogenous cells* phialidic, ampulliform or lageniform. *Conidia* aseptate, hyaline, smooth- and thin-walled, allantoid or ellipsoidal.

Type species: *Parapyrenochaeta protearum* (Crous) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano.

Parapyrenochaeta acaciae (Crous *et al*.) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB820321. Fig. 40.
Basionym: *Pyrenochaeta acaciae* Crous *et al*., Persoonia 36: 349. 2016.

*Description*: Crous *et al*. (2016b).

Material examined: **Australia**, Victoria, on leaf of *Acacia* sp. (*Fabaceae*), 7 Nov. 2014, J. Edwards, I.G. Pascoe & P.W. Crous (**holotype** CBS H-22601, ex-holotype living cultures CPC 25527 = CBS 141291 = FMR 15755).

Notes: *Pyrenochaeta acaciae* was described by Crous *et al*. (2016b) based on morphological and nucleotide sequence data, highlighting the close relationship with *P. protearum*. In our phylogenetic study, *P. acaciae* clustered distant from the *Cucurbitariaceae* s. str., forming a distinct clade related to *P. protearum*.

Parapyrenochaeta protearum (Crous) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, **comb. nov.** MycoBank MB820320. Fig. 41.
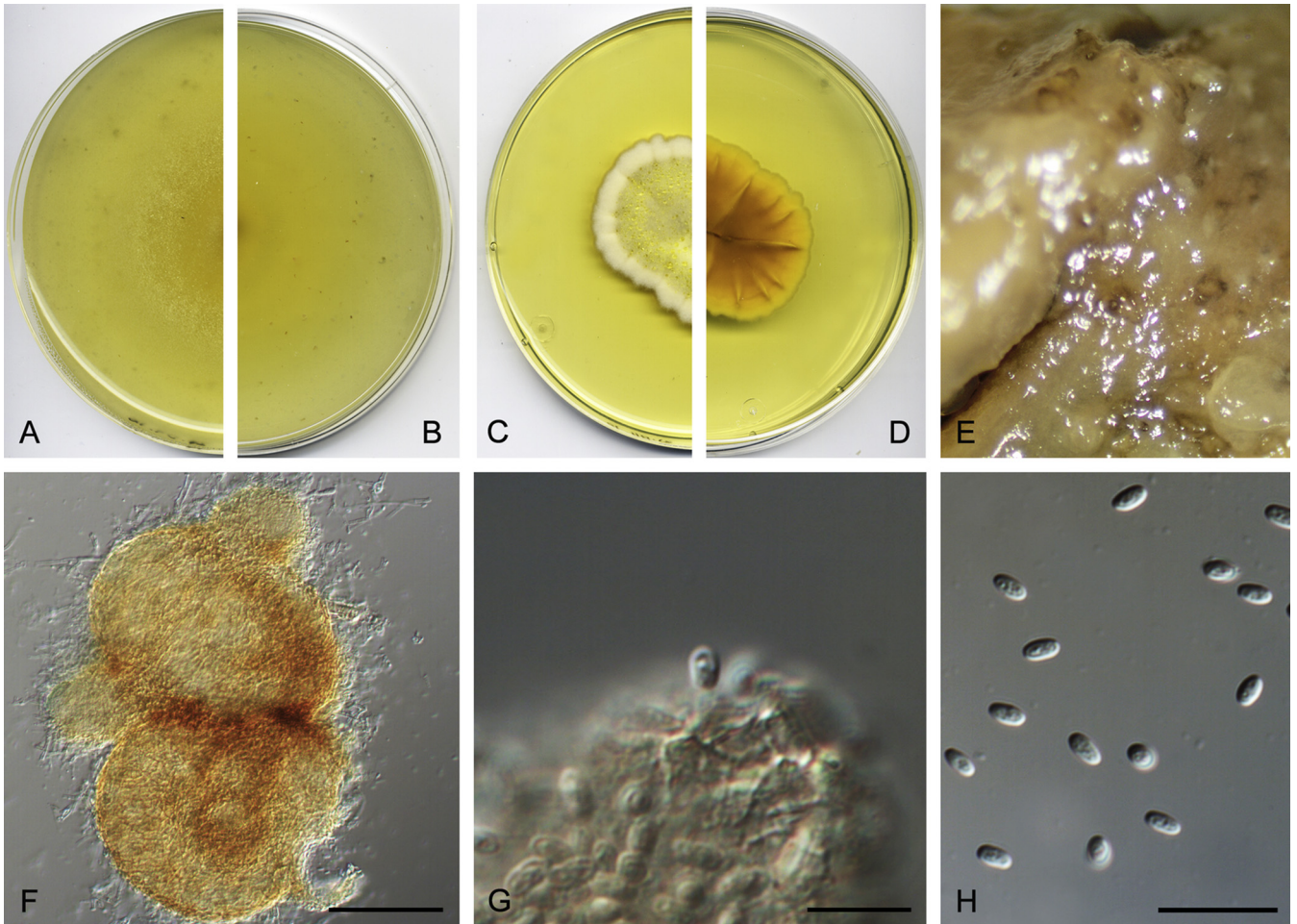
Fig. 39. *Neopyrenochaetopsis hominis* (CBS 143033). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiogenous cell. **H.** Conidia. Scale bars: F = 100 µm. G, H = 10 µm.

Basionym: *Pyrenochaeta protearum* Crous, Persoonia 27: 153. 2011.

Synonym: *Pyrenochaeta pinicola* Crous, Persoonia 32: 255. 2014.

Description: Crous *et al.* (2011).

Materials examined: **France**, Nice, L'aire d'Esterel petrol filling station, on needles of *Pinus* sp., 20 Jul. 2013, P.W. Crous, living cultures ex-type of *P. pinicola*, CPC 23455 = CBS 137997 = FMR 15753. **South Africa**, Western Cape Province, on leaves of *Protea mundii*, 4 May 2010, P.W. Crous (**holotype** of *P. protearum*, CBS H-20772, ex-holotype living cultures CPC 18322 = CBS 131315 = FMR 15752).

Notes: *Pyrenochaeta protearum* morphologically resembles phoma-like taxa in producing single phialides covering the inner source of the pycnidia, and having small, ((3−)4−5(−6) × (2−)2.5(−3) µm), aseptate, hyaline conidia, but also resembles pyrenochaeta-like species due to its setose pycnidia (Crous *et al.* 2011). Based on ITS and LSU nucleotide sequences, this fungus has been related to *Leptosphaeria*, *Pyrenochaeta* and *Pyrenochaetopsis*, and was included in the genus *Pyrenochaeta* (Crous *et al.* 2011). However, our results revealed that this fungus is phylogenetically distant from *Pyrenochaeta* spp., and from the members of the *Cucurbitariaceae*, and therefore we accommodated it in the new genus *Parapyrenochaeta*. We also studied the ex-type strain of *Pyrenochaeta pinicola* (Crous *et al.* 2014), which was morphologically and genetically very closely related to *Pa. protearum*. Therefore, we reduce *Py. pinicola* to synonymy under *Pa. protearum*.

DISCUSSION

The taxonomy of the coelomycetes has undergone major changes in recent years, mainly due to the extensive use of molecular techniques, which has resulted in a more natural classification of these fungi. In this regard, the taxonomic circumscription of the genera *Phoma* (*Didymellaceae*) and *Pyrenochaeta* (*Cucurbitariaceae*) have proven to be especially complex. In recent studies on *Didymellaceae,* Chen *et al.* (2015, 2017) restricted *Phoma* to *P. herbarum*, accepting 17 genera in the family *Didymellaceae*. They demonstrated that by combining four loci, but especially by using the *rpb*2 marker, it was possible to resolve the phylogeny of the *Didymellaceae*. However, in recent studies, several *Phoma* species accepted by Aveskamp *et al.* (2010) such as *P. bulgarica*, *P. crystallifera*, *P. destructiva*, *P. eupyrena*, *P. multirostrata*, *P. omnivirens*, *P. pereupyrena* and *P. saxea*, were not included. Currently, several genera such as *Didymellocamarosporium*, *Endocoryneum*, *Heracleicola*, *Neodidymella*, *Platychora* and *Pseudohendersonia* have been added to the *Didymellaceae* based mainly on the ribosomal gene analyses (Ariyawansa *et al.* 2015a, Hyde *et al.* 2016, Wijayawardene *et al.* 2016). However, recently, Chen *et al.* (2017) demonstrated that the genera mentioned above are simple synonyms of previous genera of that family such as *Ascochyta*, *Boeremia*, *Stagonosporopsis* and *Neomicrosphaeropsis*. Therefore, sequences of those taxa need to be verified with proper genes to resolve their taxonomic
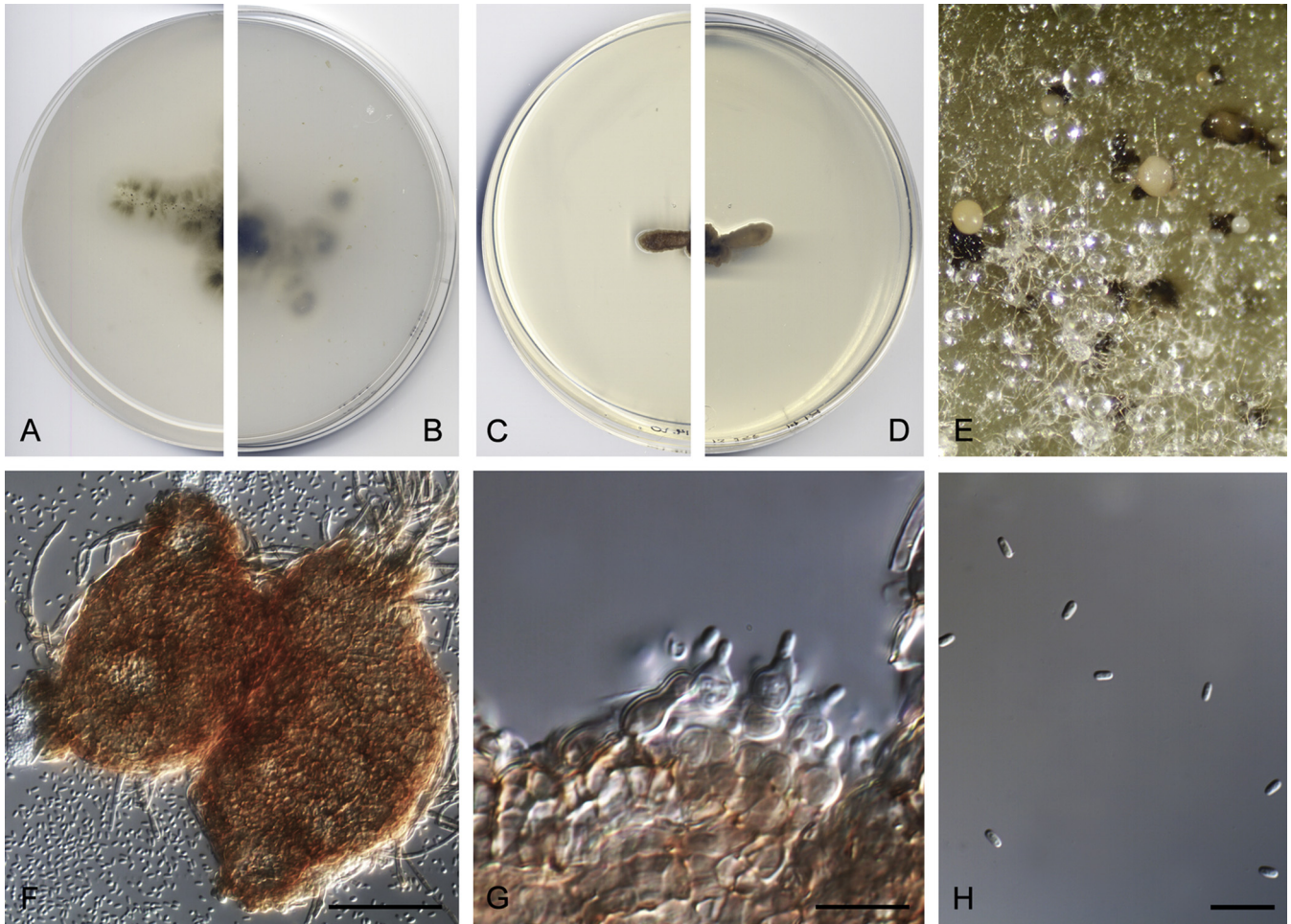
Fig. 40. *Parapyrenochaeta acaciae* (CBS 141291). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidia. **G.** Conidiogenous cells. **H.** Conidia. Scale bars: F = 50 µm. G, H = 10 µm.

placement within the *Didymellaceae*. For this reason, our proposal was to revise this family testing a large set of coelomycetous fungi recently isolated from clinical specimens (Valenzuela-Lopez *et al.* 2016), but also including several reference species of *Phoma* from the prior study of Aveskamp *et al.* (2010). This resulted in the proposal of six new genera, viz. *Cumuliphoma*, *Ectophoma*, *Juxtiphoma*, *Remotididymella*, *Similiphoma* and *Vacuiphoma*, 14 new species, and nine new combinations.

The taxonomic placement of *Pyrenochaeta* continues to be a topic of discussion, as this genus accommodates at least 163 epithets (www.indexfungorum.org). It is currently related to the *Cucurbitariaceae*, but an earlier phylogenetic study involving *Pyrenochaeta* species performed by Schoch *et al.* (2006), showed that *P. nobilis*, its type species, occupied an unclear taxonomic placement within the *Pleosporales*. Subsequently, this genus occupied an intermediate position as *incertae sedis* between the *Leptosphaeriaceae* and *Didymellaceae* (de Gruyter *et al.* 2009), or belonging to the *Leptosphaeriaceae* (Zhang *et al.* 2009). Later, de Gruyter *et al.* (2010) placed *Pyrenochaeta* in *Cucurbitariaceae*, and several species of *Phoma* in the new genus *Pyrenochaetopsis*. However, by employing additional gene *loci* in our phylogeny, the type species *P. nobilis* clustered distant from *Cucurbitariaceae s. str.*, being placed as *incertae sedis* in the *Pleosporineae*. Moreover, several species previously identified as *Pyrenochaeta* have proved to be phylogenetically scattered within the *Pleosporineae*. Therefore, we introduced four new families with several new genera to accommodate all *Pyrenochaeta* species which clustered outside the *Cucurbitariaceae*, i.e. *Neopyrenochaetaceae* (which includes *Neopyrenochaeta* gen. nov.), *Parapyrenochaetaceae* (within *Parapyrenochaeta* gen. nov.), *Pseudopyrenochaetaceae* (including *Pseudopyrenochaeta* gen. nov.) and *Pyrenochaetopsidaceae* (including the two new genera, *Neopyrenochaetopsis* and *Xenopyrenochaetopsis*).

In the revision of *Cucurbitariaceae* by Doilom *et al.* (2013), the authors accepted six genera in the family, although *Curreya*, *Rhytidiella* and *Syncarpella* were not sequenced. This family was recently enlarged by Wanasinghe *et al.* (2017b) proposing the new genus *Neocucurbitaria* to accommodate *N. acerina*, *N. unguis-hominis* (syn. *Pyrenochaeta unguis-hominis*, the type species of that genus) and *N. quercina* (syn. *Pyrenochaeta quercina*) and considering the genus *Fenestella* as belonging to this family; however, the type species and more species of this genus should be studied to clarify its taxonomy. *Neocucurbitaria* has been also modified in our study to include *N. cava* (syn. *Pyrenochaeta cava*), *N. hakeae* (syn. *Pyrenochaeta hakeae*), *N. keratinophila* (syn. *Pyrenochaeta keratinophila*), and the new species *N. aquatica* and *N. irregularis*. Here, we have also enlarged the current concept of *Cucurbitariaceae* with the proposal of the new genera *Allocucurbitaria* (with the only species *A. botulispora*), which is closely related to *Cucurbitaria* and *Paracucurbitaria*, with *P. corni* and the new species *P. italica* forming a clade distinct from *Neocucurbitaria*. In fact, *Cucurbitariaceae* is currently circumscribed with four genera, i.e. the three mentioned above, and *Cucurbitaria*. In contrast, *Camarosporium*, which was included in *Cucurbitariaceae* by Doilom
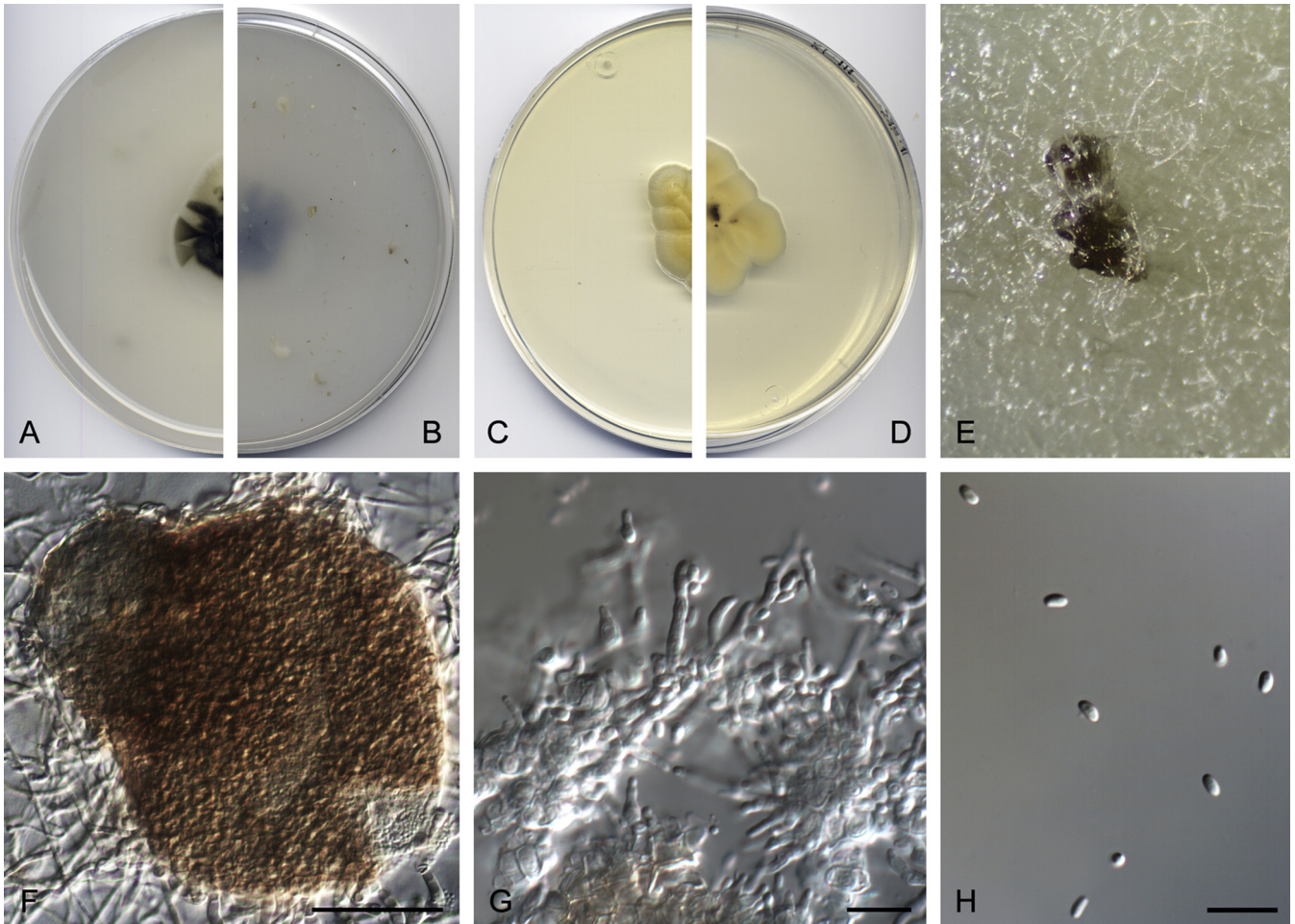
Fig. 41. *Parapyrenochaeta protearum* (CBS 131315). **A, B.** Colony on OA (front and reverse). **C, D.** Colony on MEA (front and reverse). **E.** Pycnidia forming on OA. **F.** Pycnidium **G.** Conidiophores. **H.** Conidia. Scale bars: F = 50 μm. G, H = 10 μm.

et al. (2013), has been recently placed in *Coniothyriaceae* by Crous & Groenewald (2017), who studied and epitypified the generic type of *Camarosporium* and several phoma-like species, proposing the new family *Libertasomycetaceae* within *Pleosporineae*. In the same year, Wanasinghe *et al.* (2017a) have studied a large set of camarosporium-like fungi proposing the new families *Camarosporidiellaceae* and *Neocamarosporiaceae* and resurrected the family *Camarosporiaceae.* However, in our phylogeny, several members of *Coniothyriaceae* and *Leptosphaeriaceae* remain in an ambiguous taxonomic position within *Pleosporineae*. Furthermore, in our study the family *Camarosporidiellaceae* was phylogenetically unsupported, which is probably caused by the lack of *rpb*2 or *tub*2 sequences; therefore further studies are needed to understand the relationships of this family with the other members of this suborder.

At the present study, we have clarified the generic concept of two of the largest genera of coelomycetes (*Phoma* and *Pyrenochaeta*) through a polyphasic approach that included the analysis of four phylogenetic markers of 143 additional isolates. This approach allowed a better delimitation of members of *Cucurbitariaceae* and *Didymellaceae* of the suborder *Pleosporineae* that currently encompasses the following 19 families: *Camarosporiaceae*, *Camarosporidiellaceae*, *Coniothyriaceae*, *Cucurbitariaceae*, *Didymellaceae*, *Dothidotthiaceae*, *Halojulellaceae*, *Leptosphaeriaceae*, *Libertasomycetaceae*, *Microsphaeropsidaceae*, *Neocamarosporiaceae*, *Neophaeosphaeriaceae*, *Neopyrenochaetaceae*, *Parapyrenochaetaceae*, *Phaeosphaeriaceae*, *Pleosporaceae*, *Pseudopyrenochaetaceae*, *Pyrenochaetopsidaceae* and *Shiraiaceae*.

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