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, tub2 and rpb2 sequences for a multi-focus 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, 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, Neocucurbitariaceae Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, Neopyrenochaetopsidaceae Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, Polyporaceaefungiidae Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, Pyrenochaetopsidaceae Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, and some new genera, species and combinations are proposed within the Pleosporineae.

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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 papil- late) consisting of a peridial wall composed by several layers of cells, within which the fissional asci (bitunicate) 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 pleo- sporalean 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). Pleo- sporales are mainly saprobic on plant debris, epiphytic, endo- phytic 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 Pleo- sporales 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, Cucurbitariae, Didymellaceae, Dothidotthiaceae, Halqiulellaceae, 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 pathogen families of economic impor- tance 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 Cucurbitariae and Didymellaceae (Valenzuela-Lopez et al. 2016). Cucurbitariae 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, fissional unicate, cylindrical or clavate asci and dark, phragmosporous or muriform ascospores. In the last revision of Cucurbitariae, four sexual genera (Cucurbitaria, Curreya, Rhytidiella and Syncarpella) and two asexual genera (Pyrenochaeta and Pyrenochnetopsis) were accepted (Doilm 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. obductens, 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 Cucurbitariae. 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, McDougal & Peck 2009, Salam et al. 2011, de Gruyter et al. 2013), but also diverse endophytic, fungicolous and lichenicolous taxa belonging to this fungal group (Aveskamp et al. 2010), whereas 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 genus 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, Mac- roventuria, Monascostroma and Platychora. In general, these genera are characterised by dark pseudothecial ascomata, filamentous pseudoparaphyses, 8-spored, fissional unicate, clavate to saccate ascus, and hyaline, 1-septate, fusiform to biconical ascospores; with the only exception being Leptosphaerulina, which has hyaline to brown, ellipsoid, cylindrical or oblong, phrag- mosporous 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 Pyrenochnetopsis (Cucurbitariae), Neosetophoma and Seto- phoma (Pleosphaeriaceae), 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 Peyronellae. Furthermore, de Gruyter et al. (2013) transferred some species of Phoma sections Plenodo- mus and Heterospora to the Leptosphaeriaceae and some from Phoma section Pilosa and Ascochyta to Pleosporaceae. Recently, Chen et al. (2015) proposed nine genera (Allophoma, Calopoma, Heterospora, Neosacochyta, Neodidymellopsis, Nothophoma, Parabraeremia, Phomatodes and Xenoidymella) in Didymellaceae, transferred Microsphaeropsis (Didymellaceae) to the family Microsphaeropsidaceae, and restricted Phoma to Phoma herbarum (Chen et al. 2017). Other authors have added the generaBriania, Bresnionsymyces, Didymellolomarosporum, Her- acleicola, Neodidymella, Neomicrosphaeropsis and Pseu- doascochyta to Didymellaceae (Ariyawansa et al. 2015a, Crous & Groenewald 2016, Crous et al. 2016a, Thambungal et al. 2016, Wijayawardene et al. 2016). However, the genera Didymelloca- marosporum, 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 Konnerup & 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.

Morphomorphological 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 1 N 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, Holbrooke, 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 LRS (Vilgalys & Hester 1990), internal transcribed spacer region (ITS1-5.8S-ITS2) with the primer pair ITSS and ITS4 (White et al. 1990), a fragment of the beta-tubulin gene (tub2) with the primers TUB2Fw and TUB4Rd (Woudenberg et al. 2009) and a fragment of the RNA polymerase II subunit 2 gene (rpB2) 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 tub2 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 tub2 region 30 s at 94 °C, 45 s at 56 °C and 1 min at 72 °C. The PCR program for rpB2 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 Guzman 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 bootstrap 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 probabilities 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 teresica (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 | Other strain | Status | Host, substrate | Country       | GenBank accession numbers |
|--------------------------|---------------------------|------------|--------------|--------|-----------------|---------------|--------------------------|
| Allocucurbitaria botulispora | Pyrenochaeta sp.          | CBS 142452 | UTHSC:DI16-273; FMR 13764 | T      | Human superficial tissue | USA           | LN907416 LT592932 LT593001 LT593070 |
| Allocophoma cylindripora | 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 costaricensis       | CBS 497.91 | FMR 14902    | T      | Coffea arabica     | Unknown        | GU238059 GU237870 GU237597 LT623247 |
| A. piperis               |                           | CBS 268.93 |              | T      | Peperomia pereskifolia | Netherlands   | GU238129 GU237816 GU237644 KT389554 |
| A. tropica               |                           | CBS 436.75 | FMR 14903    | T      | Saintpaulia ionantha | Germany        | GU238149 GU237864 GU237663 KT389566 |
| A. zantedeschiae         |                           | CBS 131.93 |              |       | Calla sp.         | The Netherlands | GU238159 FJ427084 FJ427188 KT389567 |
| A. pipiens               |                           | CBS 229.32 | CPC 19479    | T      | Cicer arietinum    | Romania        | KT389690 KT389473 KT389558 KT389767 |
| Alternaria bidentis      |                           | CBS 134021 | CPC 19479    | T      | Bidens sulphurea   | Brazil         | KC609341 KC609333 – KC609347 |
| A. helianthi             |                           | CBS 327.69 | IFO 9089     | T      | Helianthus annuus  | Unknown        | KC5843496 KC609333 – KC584494 |
| Ascochyta herbicola      |                           | CBS 629.97 |              |       | Water             | USA            | GU238083 GU237898 GU237614 KP30421 |
| A. pisi                  |                           | CBS 126.54 | AFTOL-ID 1583|       | Pisum sativum     | The Netherlands | DG678070 GU237772 GU237531 DG677967 |
| 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. vicia                 |                           | CBS 451.68 |              |       | Vicia sepalum     | The Netherlands | KT389701 KT389844 KT389778 KT389562 |
| Boeremia exigua          |                           | CBS 118.38 |              |       |Cheiranthus cheiri | Denmark        | KT389706 KT389849 KT389783 KT389582 |
| B. lycopersici           |                           | CBS 119.38 |              |       | Nicotiana tabacum | Unknown        | KT389707 KT389849 KT389784 KT389583 |
| Brianssuttonomyces eucalypti |                     | CBS 114879 | CPC 362      | T      | Eucalyptus sp.    | South Africa   | KU728519 KU728479 KU728595 – |
| Calphoma aquilegicola    |                           | CBS 114887 | CPC 363      | T      | Eucalyptus sp.    | South Africa   | KU728520 KU728480 KU728596 – |
| C. clematidina           |                           | CBS 102.66 |              |       | Clematis sp.      | UK             | FJ516530 FJ426988 FJ427099 KT389587 |
| C. clematidis-rectae     |                           | CBS 108.79 |              |       | Clematis sp.      | The Netherlands | FJ516532 FJ426989 FJ427100 KT389588 |
| C. roseae                |                           | CBS 507.63 |              |       | Clematis sp.      | The Netherlands | FJ516547 FJ516506 FJ516524 KT389589 |
| CGMCC 3.18347 T          |                           |            |             |       | Rosa sp.          | China          | KY742203 KY742409 KY742291 KY742135 |
| LC 8119                 |                           |            |             |       | Rosa sp.          | China          | KY742204 KY742050 KY742292 KY742136 |

| LSU | ITS | TUB | RBP2 |
|-----|-----|-----|------|
|     |     |     |      |
Table 1. (Continued).

| Species                      | Old name                  | CBS strain¹ no. | Other strain¹ no. | Status² | Host, substrate  | Country          | GenBank accession numbers³ |
|------------------------------|---------------------------|-----------------|-------------------|---------|-----------------|-------------------|---------------------------|
| **Camarosporidiella**        | **aborescentis**          | MFLUCC 14-0604  | T                 | Colutea arborescens | Russia             | KP711378         |
| Camarosporium                | aereaizoenesis            | MFLUCC 14-0238  | T                 | Cyttis sp.         | Italy              | KP120927         |
| C. aureum                   |                           | MFLUCC 14-0620  | T                 | Cotinus coggygria  | Russia             | KP744478         |
| C. clematidis                |                           | MFLUCC 13-0336  | T                 | Clematis vitalba   | Italy              | KJ562188         |
| C. elongata                  |                           | MFLUCC 14-0260  |                   | Cyttis scoparius   | Italy              | KJ724249         |
| C. robiniicola              |                           | MFLUCC 13-0527  |                   | Robinia pseudacacia| Italy              | KJ589412         |
| C. spartii                  |                           | MFLUCC 13-0548  |                   | Cyttis sp.         | Italy              | KJ589413         |
| Camarosporium                | quaternatum               | CBS 142617      |                   | Daphne mezereum    | Germany            | KY929170         |
| Camarosporomyces             | flavigenus                | CBS 314.80      | T                 | Phoenix dactylifera| Israel             | JX681085         |
| Coniothyrium                 | palmarum                  | CBS 758.73      |                   | Chamaerops humilis | Italy              | EU754153         |
| C. telephii                 |                           | CBS 188.71      |                   | Lycium barbarum    | Hungary            | KY929173         |
| Cucurbitaria                 | berberidis                | CBS 130007      | FMR 15751; MFLUCC | Berberis vulgaris  | Austria            | KC506796         |
| Cumuliphoma                  | indica                     | CBS 654.77      | FMR 15341         | T                   | Berberis vulgaris  | Austria          | KC506793         |
| Phoma omnivirens            |                           | CBS 991.95      | FMR 15331         | T                   | Unknown            | India            | GU238122         |
| C. omnivirens               | Phoma omnivirens          | CBS 341.86      | FMR 14915         | T                   | Phaseolus vulgaris | Belgium          | LT623214         |
| C. pneumoae                  | Phoma sp.                 | CBS 142454      | UTHSC:D16-249; FMR| Human respiratory tract | USA               | LN907392         |
| Cucurbitothys                  | pityophila                | CBS 149.32      | FMR 15744         | T                   | Unknown            | The Netherlands   | JX681087         |
| Didiymella                   | aeria                      | LC 8120         | CGMCC 3.18353     | T                   | Air sample         | China            | KY742206         |
| D. alena                    |                           | CBS 379.93      |                   | Berberis sp.       | The Netherlands    | GU238037         |
| D. americana                |                           | CBS 185.85      |                   | Zea mays           | USA                | GU237990         |
| D. anserina                  |                           | CBS 253.80      |                   | Unknown            | Germany            | KT389715         |
| Peyronella sp.              |                           | UTHSC:D16-255; FMR|                   | Human respiratory tract | USA | LN907398         |

(continued on next page)
| Species                      | Old name               | CBS strain no. | Other strain no. | Status | Host, substrate | Country         | GenBank accession numbers |
|------------------------------|------------------------|----------------|------------------|--------|----------------|------------------|--------------------------|
| D. aquatica                 |                        | COMCC 3.18349  | T                | Water  | China          |                 | KY742209, KY742055, KY742297, KY742140 |
|                             |                        | LC 5555        | T                | Water  | China          |                 | KY742210, KY742056, KY742298, KY742141 |
| D. arachidicola             | CBS 333.75             | T              | Arachis hypogaea | South Africa |                 |                 | GU237996, GU237833, GU237554, KT389598 |
| D. aurora                   | CBS 269.93             | T              | Medicago polymorpha | New Zealand |                 |                 | GU237999, GU237818, GU237557, KT389599 |
| D. bellidis                 | CBS 714.85             | T              | Bellis perennis  | The Netherlands |                 |                 | GU238046, GU237904, GU237586, KP300417 |
| D. boeremae                 | CBS 109942             | T              | Medicago littoralis cv. Harbinger | Australia |                 | GU238048, FJ426982, FJ427097, KT389600 |
| D. bruneospora              | Didymella sp.          | CBS 115.58     | FMR 15745        | T      | Chrysanthemum roseum | Germany       | KT389723, KT389505, KT389802, KT389625 |
| D. chenopodii               | CBS 128.93             | T              | Chenopodium quinoa cv. Sajana | Peru |                 |                 | GU238055, GU237775, GU237591, KT389602 |
| D. chloroguttulata          | CGMCC 3.18351          | T              | Air sample       | China  |                 |                 | KY742211, KY742057, KY742299, KY742142 |
| D. coffeae-arabicae         | CBS 123380             | T              | Air sample       | China  |                 |                 | KY742212, KY742058, KY742300, KY742143 |
| D. curtisi                  | PD 84/1013             | T              | Coffea arabica   | Ethiopia |                 |                 | GU238005, FJ426993, FJ427104, KT389603 |
| D. ellipsoidea              | CGMCC 3.18350          | T              | Air sample       | China  |                 |                 | KY742214, KY742060, KY742302, KY742145 |
| D. eucalyptica              | CBS 377.91             | T              | 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             | T              | Gardenia jasminoides | India |                 |                 | GQ387595, FJ427003, FJ427114, KT389606 |
| Peyronellaea sp.            | UTHSC:DI16-211; FMR 14901 | T              | Human superficial tissue | USA |                 | LN907354, LT592908, LT592977, LT593046 |
| Peyronellaea calorpreferens | UTHSC:DI16-226; FMR 13716 | T              | Human superficial tissue | USA |                 | LN907369, LT592913, LT592982, LT593051 |
| Peyronellaea sp.            | UTHSC:DI16-274; FMR 13765 | T              | Human superficial tissue | USA |                 | LN907417, LT592933, LT593002, LT593071 |
| Peyronellaea sp.            | UTHSC:DI16-295; FMR 13788 | T              | 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 | T              | Human superficial tissue | USA |                 | LN907348, LT592905, LT592974, LT593043 |
| D. heteroderiae             | CBS 109.92             | T              | Undefined food material | The Netherlands |                 | GU238002, FJ426983, FJ427098, KT389601 |
| Peyronellaea calorpreferens | UTHSC:DI16-190; FMR 13680 | T              | Human superficial tissue | USA |                 | LN90733, LT592986, LT592986, LT593034 |
Table 1 (Continued).

| Species                        | Old name            | CBS strain¹ no. | Other strain¹ no. | Status³ | Host, substrate                   | Country   | GenBank accession numbers³       |
|--------------------------------|---------------------|-----------------|-------------------|---------|-----------------------------------|-----------|---------------------------------|
|                                |                     |                 |                   |         |                                   |           | LSU                             |
| Pebonella calorpreferens       | UTHSC:Di16-224; FMR | 13714           |                   |         | Human superficial tissue          | USA       | LT592911                        |
|                                |                     |                 |                   |         |                                   |           | LT592980                        |
|                                |                     |                 |                   |         |                                   |           | LT593049                        |
| Pebonella calorpreferens       | UTHSC:Di16-227; FMR | 13717           |                   |         | Human superficial tissue          | USA       | LT592914                        |
|                                |                     |                 |                   |         |                                   |           | LT592983                        |
|                                |                     |                 |                   |         |                                   |           | LT593052                        |
| Pebonella calorpreferens       | UTHSC:Di16-231; FMR | 13721           |                   |         | Human superficial tissue          | USA       | LT592918                        |
|                                |                     |                 |                   |         |                                   |           | LT592987                        |
|                                |                     |                 |                   |         |                                   |           | LT593056                        |
| Pebonella calorpreferens       | UTHSC:Di16-232; FMR | 13722           |                   |         | Human deep tissue/ fluids         | USA       | LT592919                        |
|                                |                     |                 |                   |         |                                   |           | LT592988                        |
|                                |                     |                 |                   |         |                                   |           | LT593057                        |
| Pebonella calorpreferens       | UTHSC:Di16-234; FMR | 13724           |                   |         | Human superficial tissue          | USA       | LT592921                        |
|                                |                     |                 |                   |         |                                   |           | LT592989                        |
|                                |                     |                 |                   |         |                                   |           | LT593059                        |
| Pebonella calorpreferens       | UTHSC:Di16-235; FMR | 13725           |                   |         | Human superficial tissue          | USA       | LT592922                        |
|                                |                     |                 |                   |         |                                   |           | LT592991                        |
|                                |                     |                 |                   |         |                                   |           | LT593060                        |
| Pebonella calorpreferens       | UTHSC:Di16-305; FMR | 13798           |                   |         | Human respiratory tract           | USA       | LT592951                        |
|                                |                     |                 |                   |         |                                   |           | LT593020                        |
|                                |                     |                 |                   |         |                                   |           | LT593090                        |
| D. ilicicola                  | CGMCC 3.18355       | T               | Ilex chinensis    | Italy   |                                   |           | KY742219                        |
|                                |                     |                 |                   |         |                                   |           | KY742065                        |
|                                |                     |                 |                   |         |                                   |           | KY742307                        |
|                                |                     |                 |                   |         |                                   |           | KY742150                        |
| D. infusciapora               | CGMCC 3.18356       | T               | Chrysanthemum indicum | China |                                   |           | KY742221                        |
|                                |                     |                 |                   |         |                                   |           | KY742067                        |
|                                |                     |                 |                   |         |                                   |           | KY742309                        |
|                                |                     |                 |                   |         |                                   |           | KY742152                        |
| D. keratinophila             | CBS 143032          |                 |                   |         | Human superficial tissue          | USA       | LT592901                        |
|                                |                     |                 |                   |         |                                   |           | LT592970                        |
|                                |                     |                 |                   |         |                                   |           | LT593039                        |
| Peyronella sp.               | UTHSC:Di16-200; FMR | 13690           | T               |         | Human superficial tissue          | USA       | LT592915                        |
|                                |                     |                 |                   |         |                                   |           | LT592984                        |
|                                |                     |                 |                   |         |                                   |           | LT593053                        |
| Phoma sp.                     | UTHSC:Di16-282; FMR | 13774           |                 |         | Human superficial tissue          | USA       | LT592938                        |
|                                |                     |                 |                   |         |                                   |           | LT593007                        |
|                                |                     |                 |                   |         |                                   |           | LT593077                        |
| D. lethalis                  | CBS 103.25          |                 | Unknown          | Unknown |                                   |           | GU238010                        |
|                                |                     |                 |                   |         |                                   |           | GU237729                        |
|                                |                     |                 |                   |         |                                   |           | GU237564                        |
|                                |                     |                 |                   |         |                                   |           | KT389607                        |
| D. macrophylia               | CGMCC 3.18357       | T               | Hydrangea macrophylla | Italy |                                   |           | KY742224                        |
|                                |                     |                 |                   |         |                                   |           | KY742070                        |
|                                |                     |                 |                   |         |                                   |           | KY742312                        |
|                                |                     |                 |                   |         |                                   |           | KY742154                        |
| D. macrostoma                | LC 8132             |                 |                   |         |                                   |           | KY742225                        |
|                                |                     |                 |                   |         |                                   |           | KY742071                        |
|                                |                     |                 |                   |         |                                   |           | KY742313                        |
|                                |                     |                 |                   |         |                                   |           | KY742155                        |
| D. maydis                    | CBS 588.69          | T               | Zea mays          | USA     |                                   |           | EU754192                        |
|                                |                     |                 |                   |         |                                   |           | FJ427086                        |
|                                |                     |                 |                   |         |                                   |           | FJ427190                        |
|                                |                     |                 |                   |         |                                   |           | GU371782                        |
| D. microchlamydospora         | CBS 105.95          | T               | Eucalyptus sp.    | UK      |                                   |           | GU238104                        |
|                                |                     |                 |                   |         |                                   |           | FJ427208                        |
|                                |                     |                 |                   |         |                                   |           | FJ427138                        |
|                                |                     |                 |                   |         |                                   |           | KP330424                        |
| Phoma sp.                     | UTHSC:Di16-199; FMR | 13689           |                 |         | Human superficial tissue          | USA       | LT592900                        |
|                                |                     |                 |                   |         |                                   |           | LT592969                        |
|                                |                     |                 |                   |         |                                   |           | LT593038                        |

(continued on next page)
| Species                      | Old name                  | CBS strain\(^1\) no. | Other strain\(^1\) no. | Status\(^2\) | Host, substrate                | Country        | GenBank accession numbers  |
|------------------------------|---------------------------|----------------------|------------------------|--------------|--------------------------------|----------------|---------------------------|
| *Peyronellaea* sp.           |                           |                      |                        |              |                                |                |                           |
| *D. molleriana*              | CBS 229.79                |                      |                        |              |                                | USA            | LN907508                  |
| *D. musae*                   | Phoma sp.                 |                      |                        |              |                                | USA            | LT593033                  |
| *D. nigricans*               | CBS 358.71                |                      |                        |              |                                | Germany        | LT593055                  |
| *D. nigricans*               | CBS 358.71                |                      |                        |              |                                | Germany        | LT593055                  |
| *D. ocimicola*               | CBS 463.69                |                      |                        |              |                                | USA            | LT592917                  |
| *D. pedaeae*                 | CBS 124517                |                      |                        |              |                                | The Netherlands| LT593027                  |
| *D. pinodella*               | CBS 531.66                |                      |                        |              |                                | USA            | LT593081                  |
| *D. pinodes*                 | CBS 525.77                |                      |                        |              |                                | Belgium        | LT593081                  |
| *D. pomorum*                 | CBS 285.76                |                      |                        |              |                                | Russia         | LT593081                  |
| *D. protuberans*             | CBS 381.96                |                      |                        |              |                                | The Netherlands| LT593081                  |
| *Peyronellaea* sp.           |                           |                      |                        |              |                                | USA            | LT593081                  |
| *D. pteridis*                | CBS 379.96                |                      |                        |              |                                | The Netherlands| LT593081                  |
| *D. rhei*                    | CBS 109177                |                      |                        |              |                                | New Zealand    | LT593081                  |
| *D. ruminicola*              | Didymella acetosellae     | CBS 179.97           |                        |              |                                | The Netherlands| LT593081                  |
| *D. sancta*                  | CBS 281.83                |                      |                        |              |                                | South Africa   | LT593081                  |
| *D. segeticola*              | Didymella segeticola      | CBS 644.97           | FMR 15351              | T            | Ailanthus altissima            | Argentina      | LT623250                  |
| *D. sinensis*                | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
| *D. subglomerata*            | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 370.96                |                      |                        |              |                                | USA            | LT623250                  |
|                             | CBS 109177                |                      |                        |              |                                | New Zealand    | LT623250                  |
|                             | CBS 644.97                |                      |                        |              |                                | Argentina      | LT623250                  |
|                             | CBS 683.79                |                      |                        |              |                                | New Zealand    | LT623250                  |

\(^{1}\) CBS strain and other strain numbers are from CBS or other culture collections.

\(^{2}\) Status: no. indicates number of isolates.

\(^{3}\) GenBank accession numbers for LSU, ITS, TUB, and RPB2 are provided.
| Species                        | Old name                  | CBS strain¹ no. | Other strain¹ no. | Status² | Host, substrate       | Country | GenBank accession numbers³ |
|-------------------------------|---------------------------|----------------|-------------------|---------|-----------------------|---------|---------------------------|
| D. suiyangensis               | CGMCC 3.18352             | T              | Air sample        | China   | KY742243              |
| D. viburnicola                | LC 8144                   | T              | Air sample        | China   | KY742244              |
| Dothidothia aspera            | CBS 119688                | CPC 12932      | Acer negundo      | USA     | EU673275              |
| D. symphoricarpi              | CBS 119687                | CPC 12929      | T Symphoricarpous | USA     | EU673273              |
| Ectophoma multirrostrata      | CBS 110.79                | FMR 15342      | Cucumis sativus   | The Netherlands | GU238110 FJ427030 FJ427140 LT623264 |
| Phoma multirrostrata          | CBS 274.60                | FMR 15335      | Soil              | Maharashtra | GU238111 FJ427031 FJ427141 LT623265 |
| Phoma multirrostrata          | CBS 368.65                | FMR 15336      | Unknown           | India   | GU238112 FJ427033 FJ427143 LT623266 |
| E. pomi                       | CBS 267.92                | FMR 15346      | 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:D116-201; FMR 13691 | T              | Human respiratory tract | USA     | LN907344 LT592902 LT592971 LT593040 |
| Epicoccum sorghinum           | UTHSC:D116-202; FMR 13692 | T              | Human superficial tissue | USA     | LN907345 LT592903 LT592972 LT593041 |
| Epicoccum sorghinum           | UTHSC:D116-206; FMR 13696 | T              | Human superficial tissue | USA     | LN907349 LT592906 LT592975 LT593044 |
| Epicoccum sorghinum           | UTHSC:D116-280; FMR 13772 | T              | Human superficial tissue | USA     | LN907423 LT592937 LT593006 LT593076 |
| Epicoccum sorghinum           | UTHSC:D116-338; FMR 13831 | T              | Human superficial tissue | USA     | LN907481 LT592959 LT593028 LT593098 |
| Epicoccum sorghinum           | UTHSC:D116-345; FMR 13838 | T              | Human subcutaneous tissue | USA     | LN907488 LT592961 LT593030 LT593100 |
| E. catenisporum               | 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 |
| E. draconis                   | FMR 14908                | T              | Dercaea sp.       | Rwanda  | GU238070 GU237795 GU237607 KT389628 |
| E. duchesneae                 | LC 8147                  | T              | Duchesnea indica  | China   | KY742250 KY742096 KY742338 |
| E. henningsii                 | CGMCC 3.18345             | T              | Duchesnea indica  | China   | KY742249 KY742095 KY742337 |
| E. hordei                     | CBS 104.80                | T              | Hordeum vulgare   | Australia | KY742251 KY742097 KY742339 |

(continued on next page)
| Species                      | Old name           | CBS strain¹ no. | Other strain² no. | Status² | Host, substrate                  | Country        | GenBank accession numbers³ |
|-----------------------------|--------------------|----------------|-------------------|---------|---------------------------------|----------------|---------------------------|
|                             |                    | LSU            | ITS               | TUB     | RPB2                            |                |                           |
| *E. huancaayense*           | CBS 105.80         | LC 8149        |                   |         | Hordeum vulgare                  | Australia      | KY742252 KY742098 KY742340 – |
| *E. italicum*               | CGMCC 3.18361      | T              |                   |         | Solanum sp.                      | Peru           | GU238084 GU237732 GU237615 KT389630 |
|                             | LC 8151            |                |                   |         | Acca sellowiana                  | Italy          | KY742253 KY742099 KY742341 KY742172 |
| *E. keratinophilum*         | Phoma sp.          | UTHSC:DI16-244| FMR 13734         | T       | Human superficial tissue         | USA            | LN907387 LT592924 LT592993 LT593062 |
|                             | Phoma sp.          | UTHSC:DI16-258| FMR 13748         | T       | Human respiratory tract          | USA            | LN907401 LT592928 LT592997 LT593066 |
|                             | Phoma sp.          | CBS 142455     |                   |         | Human superficial tissue         | USA            | LN907414 LT592930 LT592999 LT593068 |
|                             | Phoma sp.          | UTHSC:DI16-271| FMR 13762         | T       | Human superficial tissue         | USA            | LN907415 LT592931 LT593000 LT593069 |
|                             | Phoma sp.          | UTHSC:DI16-272| FMR 13763         | T       | Human superficial tissue         | USA            | LN907442 LT592947 LT593016 LT593086 |
|                             | Phoma sp.          | UTHSC:DI16-299| FMR 13792         | T       | Human deep tissue/ fluids        | USA            | LN907340 LT592989 LT592967 LT593036 |
| *E. latusicollum*           | Epicoccum sorghinum| UTHSC:DI16-197| FMR 13687         | T       | Human superficial tissue         | USA            | LN907340 LT592989 LT592967 LT593036 |
|                             | CGMCC 3.18346      | T              |                   |         | Sorghum bicolor                  | China          | KY742255 KY742101 KY742343 KY742174 |
|                             | LC 4859            |                |                   |         | Camellia sinensis                | China          | KY742256 KY742102 KY742342 KY742175 |
| *E. layuense*               | LC 8156            | T              |                   |         | Penilla sp.                      | China          | KY742261 KY742107 KY742349 – |
| *E. nigrum*                 | CBS 125.82         | LC 8161        |                   |         | 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. pimpinum*               | CBS 558.81         | FMR 14909      | T                 |         | Setaria sp.                     | New Zealand    | GU238132 GU237888 GU237647 KT389634 |
| *E. plurivorum*             | Epicoccum sorghinum| UTHSC:DI16-257| FMR 13747         | T       | Human respiratory tract          | USA            | LN907400 LT592927 LT592996 LT593065 |
| *E. pneumoniae*             |                    | 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         | CPC 1854       |                   |         | Sorghum vulgare                  | Puerto Rico    | GU237978 FJ427067 FJ427173 KT389635 |
|                             | CBS 627.68         |                |                   |         | Citrus sp.                      | France         | GU237979 FJ427072 FJ427178 KT389636 |
|                             |                    |                |                   |         |                                | USA            | LN907431 LT592940 LT593009 LT593079 |

1. Strain numbers refer to CBS (Centraalbureau voor Schimmelcultures) and CGMCC (China General Microbiological Culture Collection) databases.
2. Status: T indicates teleomorph stage.
3. Accession numbers refer to GenBank databases.
| Species | Old name | CBS strain¹ no. | Other strain¹ no. | Status² | Host, substrate | Country | GenBank accession numbers³ | LSU | ITS | TUB | RPB2 |
|---------|----------|-----------------|-------------------|---------|----------------|---------|---------------------------|-----|-----|-----|------|
| E. viticis | BRIP 29294; LC 5257 | UTHSC:DI16-301; FMR 13794 | Human respiratory tract | Australia | KY742271 KY742117 KY742359 | – | | | | |
| Foliophoma fallens | CBS 161.78 | UTHSC:DI16-288; FMR 13780 | Human superficial tissue | USA | LN907444 LT592948 LT593017 LT593087 | | | | |
| Halojulella avicenniae | BCC 18422 | CGMCC 3.18344 T | Oilex negundo | China | KY742272 KY742118 KY742360 KY742186 | | | | |
| Heterophoma adonidis | CBS 114309 | BCC 18422 | Mangrove wood | Thailand | GU371823 – – | GU371787 | | | |
| H. nobilis | CBS 507.91 | CGMCC 3.18364 T | Verbacum thapsus | China | KY742272 KY742119 KY742361 KY742187 | | | | |
| H. verbascicola | CBS 507.91 | LC 8164 | Verbacum thapsus | China | KY742272 KY742120 KY742362 KY742188 | | | | |
| Juxtiphoma eupyrena | CBS 374.91 | FMR 15329 | Solanum tuberosum | The Netherlands | GU238072 FJ426999 FJ427110 LT623268 | | | | |
| Leptosphaeria conoida | CBS 616.75 | CPC 27354 T | Lunaria annua | The Netherlands | JF740201 JF740201 KT389004 KT389639 | | | | |
| L. dolium | CBS 505.75 | CPC 29609 T | Ulricia dioica | The Netherlands | QQ387576 JF740205 JF740144 KT389640 | | | | |
| Leptosphaerulina americana | CBS 213.55 | INIFAT C96/108 | Trifolium pratense | USA | GU237981 GU237979 GU237959 KT389641 | | | | |
| L. australis | CBS 317.83 | CPC 1425 | Euphrasia aromatica | Indonesia | GU237984 GU237984 GU237946 KT389642 | | | | |
| Libertasomyces myoporii | CBS 141302 | CPC 27354 | Myoporum serratum | South Africa | KX222983 NR.145200 – – | | | | |
| L. platani | CBS 142112 | CPC 29609 T | Platanus sp. | New Zealand | KY173507 KY173416 KY173604 KY173585 | | | | |
| L. querus | CBS 134.97 | INIFAT C96/108 | Quercus ilex | Spain | DG377883 – – – | | | | |
| Macroventuria anomochaeta | CBS 525.71 | T | Decayed canvas | South Africa | GU237984 GU237881 GU237544 GU456346 | | | | |
| M. wentii | CBS 526.71 | T | Plant litter | USA | GU237984 GU237884 GU237546 KT389642 | | | | |
| Microsphaeriopsis olivacea | CBS 233.77 | CPC 1425 | T | Protea nitida | South Africa | JN712563 JN712497 – JN712650 | | | | |
| M. proteae | CBS 111319 | CPC 1425 | T | Protea nitida | South Africa | JN712563 JN712497 – JN712650 | | | | |
| Neoascophyta argentina | CBS 112524 | CPC 1425 | T | Trichostomum aestivum | Argentina | KT389742 KT389624 KT389822 – | | | | |
| N. cylindrispora | Ascochyta sp. UTHSC:DI16-352; FMR 13845 | T | Human superficial tissue | USA | LN907495 LT592962 LT593031 LT593101 | | | | |
| N. desmazieri | CBS 142456 | UTHSC:DI16-359; FMR 13852 | T | Lolium perenne | Germany | KT389726 KT389508 KT389807 KT389644 | | | | |

(continued on next page)
| Species          | Old name                     | CBS strain no. | Other strain no. | Status            | Host, substrate        | Country    | GenBank accession numbers |
|------------------|------------------------------|----------------|------------------|-------------------|------------------------|------------|--------------------------|
|                  |                              |                |                  |                   |                        |            | LSU | ITS | TUB | RPB2                    |
| Ascochyta sp.    | UTHSC:DI16-207; FMR 13897    | Human respiratory tract | USA      |                  |                        |            | LN907350 | LT592907 | LT592976 | LT593045 |
|                  |                              |                |                  |                   |                        |            | LT593095                  |
| 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 |
|                  |                              |                |                  |                   |                        |            | LT592961 | LT593015 | LT593091 | LT593081 |
| N. exitialis     | CBS 116.40                   | Unknown        | Unknown          | Switzerland        | KT389732 | KT389514 | KT389812 | KT389647 |
|                  |                              |                |                  |                   |                        |            | LT592961 | LT593015 | LT593091 | LT593081 |
| N. graminicola   | CBS 301.69                   | Lolium multiflorum | Germany        | KT389737 | KT389519 | KT389817 | KT389650 |
|                  |                              |                |                  |                   |                        |            | LT592961 | LT593015 | LT593091 | LT593081 |
| N. graminicola   | CBS 816.84                   | Hordeum vulgare | Germany        | KT389741 | KT389523 | KT389821 | KT389651 |
|                  |                              |                |                  |                   |                        |            | LT592961 | LT593015 | LT593091 | LT593081 |
| N. paspalis      | CBS 560.81                   | T              | Paspalum dilatatum | New Zealand    | GU238124 | FJ427048 | FJ427158 | KP330426 |
|                  |                              |                |                  |                   |                        |            | LT592961 | LT593015 | LT593091 | LT593081 |
| N. soi           | LC 8166                      | Soil           | China           |                   | KY742276 | KY742122 | KY742364 | –                  |
|                  |                              |                |                  |                   |                        |            | KY742275 | KY742121 | KY742363 | –                  |
| N. tardicrescens | Neosascochyta sp. CBS 689.97 | FMR 15352      | Hay              | Norway             | KT389744 | KT389526 | KT389824 | KT389654 |
|                  |                              |                |                  |                   |                        |            | LT592961 | LT593015 | LT593091 | LT593081 |
| N. triticicola   | CBS 544.74                   | T              | Triticum aestivum | South Africa | EU754134 | GU237887 | GU237848 | KT389652 |
| Neocamarosporium betae | CBS 109410 | PD 77/113 | Beta vulgaris | Unknown | EU754178 | KY940790 | –            | GU371774 |
|                  |                              |                |                  |                   |                        |            | EU754179 | FJ426981 | KT389842 | KT389670 |
| N. calvenscens   | CBS 246.79                   | PD 77/655      | Atriplex hastata | Germany        | EU754131 | KY940774 | –            | KC584500 |
| N. goegapense    | CBS 138008                   | CPC 23676      | T               | Mesembryanthemum sp. | KJ869220 | KJ869163 | –            | –                  |
| Neocucurbitaria aquatic | Pyrenochaeta quercina | CBS 297.74     | FMR 14867       | 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 | LT398844 | LT717681 |
| N. hakeae        | Pyrenochaeta hakeae CBS 142109 | CPC 28920     | T              | Haakea 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 | Other strain | Status | Host, substrate | Country | GenBank accession numbers |
|---------|----------|------------|--------------|--------|-----------------|---------|----------------------------|
|         |          | no.        | no.          |        |                 |         | LSU ITS TUB RPB2           |
| N. unguis-hominis | Pyrenochaeta unguis-hominis | UTHSC:D16-213; FMR 13703 | Unknown | USA | LN907356           | LT592910 | LT592979 | LT593048 |
| Pyrenochaeta unguis-hominis | CBS 111112 | FMR 14866 | Agaricini 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 | KT389631 | KT389829 | – |
| N. cannabis | CBS 234.37 | T | Cannabis sativa | Unknown | GU237961 | GU237804 | GU237523 | KP330403 |
| N. longicolla | Phoma sp. | UTHSC:D16-322; FMR 13815 | Human respiratory tract | USA | LN907465 | LT592857 | LT593026 | LT593096 |
|         |          | CBS 382 96 | T | Soil in desert | Israel | KT389750 | KT389632 | 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 |
| Neophaeosphaeria agaves | CPC 21264 | T | Agave tequilana var. azul | Mexico | KF777227 | NR_137833 | – | – |
| N. filamentosa | CBS 102202 | T | Yucca rostrata | Mexico | GQ387577 | JF740259 | – | GU371773 |
| Neoplatysporodes aloicola | CBS 139901 | CPC 24435 | Aloe sp. | Tanzania | KR476754 | KR476719 | – | – |
| Neopyrenochaeta acicola | CBS 812.95 | FMR 14872 | Waterpipe | The Netherlands | GQ387630 | LT623218 | LT623232 | LT623271 |
| N. fragariae | CBS 101634 | FMR 14871 | Fragaria ananassa | The Netherlands | GQ387630 | LT623217 | LT623231 | LT623270 |
| N. inflorescentiae | CBS 119222 | FMR 15334 | Protea neriifolia | South Africa | EU552153 | EU552153 | LT623233 | LT623272 |
| N. telephoni | CBS 139022 | FMR 15754 | Screen of a mobile phone | India | KM516290 | KM516291 | LT717678 | LT717685 |
| Neopyrenochaetopsis hominis | CBS 143033 | UTHSC:D16-238; FMR 13728 | Human superficial tissue | USA | LN907381 | LT592923 | LT592992 | LT593061 |
| Nothophoma anigozanthi | CBS 381.91 | FMR 14914 | Anigozanthus maugliei | The Netherlands | GU238039 | GU237852 | GU237580 | KT389655 |
| N. arachidis-hypogaeae | CBS 125.93 | FMR 14912 | Arachis hypogaeae | India | GU238043 | GU237771 | GU237583 | KT389656 |
| N. gossypicola | CBS 377.67 | UTHSC:D16-204; FMR 13787 | Human deep tissue/ fluids | USA | LN907437 | LT592843 | LT593012 | LT593082 |
| Phoma sp. | CBS 123395 | T | Fraxinus pennsylvanica | Argentina | GU238089 | FJ427025 | FJ427135 | KT389659 |
| N. infossa | CBS 140674 | UTHSC:D16-276; FMR 13767 | Human respiratory tract | USA | LN880537 | LN880536 | LN880539 | LT593073 |

(continued on next page)
| Species | Old name | CBS strain\(^1\) no. | Other strain\(^1\) no. | Status\(^2\) | Host, substrate | Country | GenBank accession numbers\(^3\) |
|---------|----------|----------------------|-----------------------|-------------|----------------|---------|--------------------------------|
| N. quercina | CBS 633.92 | FMR 14913 | Quercus sp. | Ukraine | EU754127 GU237900 GU237609 KT389657 |
| Leptosphaeria sp. | UTHSC:DI16-270; FMR 13761 | Human superficial tissue | USA | LN907413 LT592929 LT592998 LT593007 |
| N. variabilis | 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 | DO678062 KF498728 – – DO677958 |
| Paraberoemia 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. itiseae | 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 GU237672 LT623254 |
| P. selaginellae | CBS 122.93 | FMR 15348 | Selaginella sp. | The Netherlands | GU238142 GU237762 GU237656 LT623255 |
| Paraconiothyrium estuarium | CBS 109850 | FMR 14887 | Sediment from estuarine | Brazil | JX496129 JX496016 JX496355 LT654937 |
| Paracucurbitaria italica | Pyrenochaeta corni | CBS 234.92 | FMR 14869 | T | Olea europaea | Italy | EU754176 LT623219 LT623235 LT623274 |
| P. cori | Pyrenochaeta corni | CBS 248.79 | FMR 16593 | T | Fraxinus excelsior | The Netherlands | GQ387608 LT903672 LT903065 LT903673 |
| Paraspecia amazonense | MFLUCC 15-0493 | Tamarix sp. | Italy | KU900294 KU752190 – KU828717 |
| | MFLUCC 15-0491 | Tamarix sp. | Italy | KU900295 KU752191 – KU82872 |
| 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 |
| 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** |                   |                      |                        |              | *Humulus scandens*     | South Korea    | GU253716 | GU269668 | –   | –   |
| **P. oryzae**                 |                   |                      |                        |              | *Oryza sativa*        | Korea          | KF251589 | KF251186 | KF252680 | –   |
| **Phoma herbarum**            |                   |                      |                        |              | *Nerum sp.*           | The Netherlands| GU238082 | GU237874 | GU237613 | KF330419|
|                              |                   |                      |                        |              | *Rosa multiflora cv.* | The Netherlands| KF251715 | FJ427022 | KF252703 | KF330420|
|                              |                   |                      |                        |              | *Human leg*            | USA             | LN907462 | LT592955 | LT593024 | LT593024 |
|                              |                   |                      |                        |              | *Human superficial tissue* | USA          | LT592904 | LT592973 | LT593042 | LT593042 |
|                              |                   |                      |                        |              | *Human deep tissue/ fluids* | USA         | LT597355 | LT592909 | LT592978 | LT593047 |
|                              |                   |                      |                        |              | *Human respiratory tract* | USA           | LT597449 | LT592952 | LT593021 | LT593091 |
|                              |                   |                      |                        |              | *Human respiratory tract* | USA           | LT597450 | LT592953 | LT593022 | LT593092 |
| **Phomatosodes aubrietiae**   |                   |                      |                        | T            | *Aubretia sp.*        | The Netherlands| GU238045 | GU237895 | GU237585 | KT389665 |
| **P. nebulosa**               |                   |                      |                        |              | *Thlaspi arvense*     | Poland         | KP330446 | KP330434 | KP330390 | KT389666 |
|                              |                   |                      |                        |              | *Armoracia rusticana*  | The Netherlands| KT389758 | KT389540 | KT389839 | KT389667 |
| **Pleocheta ghindensis**      |                   |                      |                        |              | *Acacia mellifera*    | Namibia        | EU167561 | EU167561 | –   | –   |
| **P. setosa**                 |                   |                      |                        | T            | *Cytisus racemosus*   | Germany        | EU167563 | EU167563 | –   | –   |
| **Pleospora herbarum**        |                   |                      |                        | T            | *Medicago sativa*     | Uttar Pradesh | JX681120 | NR_11243 | –   | K584471 |
| **P. typhicola**              |                   |                      |                        |              | *Typha angustifolia*   | The Netherlands| JF403225 | –   | KT389643 | K584505 |
| **Preussia terricola**        |                   |                      |                        |              | Unknown                | Unknown        | AY544686 | KT225529 | –   | DQ470895 |
| **Pseudobasochytha novae-zelandiae** |               |                      |                        | T            | *Cordyline australis*  | New Zealand    | LT592893 | LT592892 | LT592894 | LT592895 |
| **P. pratensis**              |                   |                      |                        | T            | Soil                   | Spain          | LT23131 | LT223130 | LT223132 | LT223133 |
| **Pseudopyrenochaeta lycopersici** |           |                      |                        | T            | *Lycopersicon esculentum* | Germany      | EU754205 | NR_103581 | LT716774 | LT716780 |
| **P. terrestris**             |                   |                      |                        | T            | Soil                   | The Netherlands| LT623216 | LT623228 | LT623246 | LT623287 |
| **Pyrenochaeta nobilis**      |                   |                      |                        | T            | *Laurus nobilis*       | Italy          | EU754206 | EU930011 | KT389645 | LT623276 |
| **Pyrenochaetopsis americana**|                   |                      |                        | T            | Unknown                | USA            | LN907368 | LT592912 | LT592981 | LT593050 |

(continued on next page)
| Species | Old name | CBS strain | Other strain | Status | Host, substrate | Country | GenBank accession numbers |
|---------|----------|------------|--------------|--------|----------------|---------|--------------------------|
| P. botulispora | Pyrenochaetopsis sp. | UTHSC:DI16-225; FMR 13715 | | Human respiratory tract | USA | LN907432, LT592941, LT593010, LT593080 |
| Pyrenozaetopsis sp. | | UTHSC:DI16-289; FMR 13781 | | Human superficial tissue | USA | LN907440, LT592945, LT593014, LT593084 |
| Pyrenozaetopsis sp. | CBS 142458 | UTHSC:DI16-298; FMR 13791 | T | Human respiratory tract | USA | LN907441, LT592946, LT593015, LT593085 |
| P. confluentes | Pyrenozaetopsis sp. | UTHSC:DI16-289; FMR 13781 | | Human superficial tissue | USA | LN907440, LT592945, LT593014, LT593084 |
| P. confluens | Pyrenozaetopsis sp. | CBS 142459 | UTHSC:DI16-303; FMR 13796 | T | Human deep tissue/ fluids | USA | LN907446, LT592950, LT593019, LT593089 |
| P. decipiens | Pyrenozaetopsis sp. | CBS 343.85 | FMR 14880 | T | Globodera pallida | The Netherlands | GQ387624, LT623223, LT623240, LT623280 |
| P. globosa | Pyrenozaetopsis sp. | CBS 143034 | UTHSC:DI16-275; FMR 13766 | T | Human superficial tissue | USA | LN907418, LT592934, LT593003, LT593072 |
| P. indica | Pyrenozaetopsis sp. | CBS 124454 | FMR 14879 | T | Saccharum officinarum | India | GQ387626, LT623224, LT623241, LT623281 |
| P. leptospora | Coniothyrium cereale | CBS 101635 | FMR 14877 | T | Secale cereale | Unknown | GQ387627, JF762062, LT623242, LT623282 |
| P. microspora | Pyrenozaetopsis sp. | CBS 102876 | FMR 14874 | T | Water | Montenegro | GQ387631, LT623226, LT623244, LT623284 |
| P. paucisetosa | Pyrenozaetopsis sp. | CBS 142460 | UTHSC:DI16-193; FMR 13683 | T | Human superficial tissue | USA | LN907336, LT592987, LT593096, LT593035 |
| P. poae | Pyrenozaetopsis sp. | CBS 136769 | FMR 14876 | T | Poa sp. | The Netherlands | KJ869175, KJ869117, KJ869243, LT623286 |
| P. setosissima | Pyrenozaetopsis microspora | CBS 119739 | FMR 14875 | T | Coffea arabica | Brazil | GQ387632, LT623227, LT623245, LT623285 |
| P. tabarestanensis | Pyrenozaetopsis sp. | CBS 139506 | IBRC-M 30051 | T | Soil | Iran | KF603343, KF730241, KX789523 – |
| P. tabarestanensis | Pyrenozaetopsis sp. | CBS 142461 | UTHSC:DI16-277; FMR 13769 | T | Human superficial tissue | USA | LN907420, LT592935, LT593004, LT593074 |
| Querciphoma carteri | CBS 105.91 | | | | | | |
| Remotididymella anthropolli | Phoma sp. | CBS 142462 | UTHSC:DI16-278; FMR 13770 | T | Human respiratory tract | USA | KF251712, JF730181, KF252700, KT389591 |
| R. destructiva | Phoma destructiva var. destructiva | CBS 133.93 | FMR 15349 | T | 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. diversissipa | CBS 162.78 | FMR 14906 | T | Lycopersicon esculentum | The Netherlands | GU238062, GU237788, GU237600, LT623259 |
| Species                        | Old name               | CBS strain\(^1\) no. | Other strain\(^1\) no. | Status\(^3\) | Host, substrate       | Country | GenBank accession numbers\(^3\) |
|-------------------------------|------------------------|----------------------|------------------------|--------------|----------------------|---------|---------------------------------|
| 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 | GJU38060 GJU237797 GJU23798 LT623267 |
| Sporormiella minima           |                        | CBS 524.50           |                        | Deng of goat | Panama               | DQ678056 KT389543 – DQ677950 |
| Stagonosporopsis dorenboschii |                        | CBS 426.90           | Phyllostachys sp.      | The Netherlands | GU238185 GU237862 GU237690 KT389676 |
| S. hortensis                  |                        | CBS 572.85           | Phaseolus vulgaris     | The Netherlands | GU238199 GU237893 GU237704 KT389681 |
| Staurophaeria alocis          | Hatzizilszkzymyces aloces | CBS 136437          | CPC 21572              | T            | Aloe dichotoma       | South Africa | KF777198 NR_137821 – – |
| S. aptrodicti                 | Hatzizilszkzymyces aptrodicti | CBS 483.95          | CPC 30998              | T            | Lycium sp.           | The Netherlands | GU301806 KY929149 – – |
| S. lycicola                  | Hatzizilszkzymyces lycii | CBS 142619           | CPC 31014              | Lycium barbarum | Hungary   | KY929180 KY929150 – – |
| Vacuphoma bulgarica           | Phoma bulgarica        | CBS 357.84           | FMR 14917              | T            | Trachystemon orientale | Bulgaria | GJU38050 GJU237837 GJU237589 LT623256 |
| V. ocullominis                | Phoma sp.              |                      | UTHSC:DI16-308; FMR 13801 | T            | Human superficial tissue | USA | LNNR7451 LT592954 LT593023 LT593093 |
| Xenodidymella applanata       |                        | CBS 205.63           | Rubus idaeus           | The Netherlands | GU237998 GU237798 GU237556 KP330402 |
|                              |                        | CBS 115577           | Rubus idaeus           | Sweden       | KT389762 KT389546 KT389650 KT389688 |
| X. asphodelii                | Asphodelus albus       | CBS 375.62           | T                      | France       | KT389765 KT389549 KT389653 KT389689 |
| X. catanea                   | Nepeta catanea         | CBS 102635           | T                      | The Netherlands | GU237962 GU237727 GU237524 KP330404 |
| X. humicola                  | Franseria sp.          | CBS 220.85           | T                      | USA          | GU238086 GU237800 GU237617 KP330422 |
| X. saxea                     | Phoma saxea            | CBS 419.92           | FMR 15347              | T            | Comoded Mediterranean marble | Unknown | GU238141 GU237860 GU237865 KP330429 |
| Xenopyrenocheptopsis pratorum | Pyrenocheptopsis pratorum | CBS 445.81          | FMR 14878              | T            | Lollum perenne        | New Zealand | GU238136 JF740263 KT389686 KT389671 |

\(^1\) AFTOL: Assembling the Fungal Tree of Life; ATCC: American Type Culture Collection, Virginia, USA; BCC: Biotec Culture Collection, Pathum Thani, Thailand; BCCMIHEM: Biomedical Fungi and Yeasts Collection, Louvain-La-Neuve, Belgium; BCCM/MUCL: Biomedical Fungi and Yeasts Collection, Louvain-la-Neuve, Belgium; 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: Facultad 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, Bkehame 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 transcribed 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, tub2 and rpb2 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 analyses contained 357 ingroup strains with a total of 1888 characters including gaps (519 for LSU, 336 for ITS, 434 for tub2 and 599 for rpb2), of which 742 are parsimony informative (132 for LSU, 111 for ITS, 149 for tub2 and 350 for rpb2). 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 Massariniae (1 PP / 100 % BS), with only the family Didymosphaeriaceae (clade T) here included, and Pleosporineae (1 PP / 74 % BS), encompassing over 19 families (clades A–S), respectively. Four of the families of the latter suborder are proposed here as new, i.e., Pseudopyrenchaetaceae (clade D), Neopyrenchaetaceae (clade E), Pyrenochaetaceae (clade F) and Parapyrenchaetaceae (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), Remototidymella (A8), Similiphoma (A9), Cimelilopteria (A10), Juxtaphoma (A13) and Vaccuiphoma (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 D16-228 and UTHSC D16-228), 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. latuscillum, E. sorghinum and E. vitcis), and E. keratinophila sp. nov. (phylogenetically related with E. brasiliense and E. dracoconis). 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. cylindrospora sp. nov., previously identified as Phoma sp. (Valenzuela-Lopez et al. 2016), clustering with A. minor and A. pipers. The clades from A4 to A6 encompassed three genera i.e. Heterophoma (A4; 1 PP / 98 % BS), Stagonosporopsis (A5; 1 PP / 75 % BS) and Boeremelia (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. multirrostrata (syn. P. multirostrata) and E. pomi (syn. P. pereupyrena). The new genus Remotidymella (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. wendtii. 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 Juxtaphoma (clade A13; 1 PP / 100 % BS), includes two strains of J. eupyrena comb. nov. (basionym Phoma eupyrena). The new genus Vaccuiphoma (clade A14; 1 PP / 100 % BS), included the type species V. bulgarica comb. nov. (basionym Phoma bulgarica) and the new species V. oculominis described from a sterile clinical strain (UTHSC D16-308). 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. pis. Clade A17 (1 PP / 100 % BS) included the type species of Phomatosides (P. aubrietiae) and two strains of P. nebulous, the other species of the genus. The Briarsuttonomyces 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. novaezelandiae 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 Caliphoma (A22; 1 PP / 93 % BS) comprised four species: C. aquilegicola, C. clematidis-rectae, C. clematidina (type species of the genus) and C. rosea. The clade corresponding to Leptosphaeraulina (A23; 1 PP / 100 % BS) contained the two known species, L. americana and L. australis. Xenodidymella (A24; 1 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 Neodidymellia. Neoascocytta (A26; 1 PP / 98 % BS) represented a basal clade of the
Fig. 1. (Continued).
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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 crescens sp. nov.

In the family Cucurbitariaceae (clade C; 1 PP / 98 % BS) analyses resulted in four clades, which we recognise as genera. The proposed new family Paracucurbitaria and Neocucurbitaria analyses resulted in four clades, which we recognise as genera.

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In the family Cucurbitariaceae (clade C; 1 PP / 98 % BS) analyses resulted in four clades, which we recognise as genera. The proposed new family Paracucurbitaria and Neocucurbitaria analyses resulted in four clades, which we recognise as genera. The new genus Paracucurbitaria (C; 1 PP / 100 % BS), with two species P. corni comb. nov. (syn. Pyrenochnaeta corni) and P. italic sp. nov.; the new genus Allocucurbitaria (clade C3), with the type species A. botuliforma sp. nov. Finally, the genus Cucurbitaria (clade C4; 1 PP / 100 % BS) including only the type species, C. berberidis.

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

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

The proposed new family Neopyrenochaetaeae (clade E; 1 PP / 100 % BS) encompassed several taxa previously included in Pyrenochnaeta. However, since they were located outside from Cucurbitariaceae s. str. we propose the new genus Neopyrenochnaeta, with the new combinations: N. acticola (syn. 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 crescens sp. nov.

In the family Cucurbitariaceae (clade C; 1 PP / 98 % BS) analyses resulted in four clades, which we recognise as genera. The proposed new family Paracucurbitaria and Neocucurbitaria analyses resulted in four clades, which we recognise as genera. The new genus Paracucurbitaria (C; 1 PP / 100 % BS), with two species P. corni comb. nov. (syn. Pyrenochnaeta corni) and P. italic sp. nov.; the new genus Allocucurbitaria (clade C3), with the type species A. botuliforma sp. nov. Finally, the genus Cucurbitaria (clade C4; 1 PP / 100 % BS) including only the type species, C. berberidis.

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In the family Cucurbitariaceae (clade C; 1 PP / 98 % BS) analyses resulted in four clades, which we recognise as genera. The proposed new family Paracucurbitaria and Neocucurbitaria analyses resulted in four clades, which we recognise as genera. The new genus Paracucurbitaria (C; 1 PP / 100 % BS), with two species P. corni comb. nov. (syn. Pyrenochnaeta corni) and P. italic sp. nov.; the new genus Allocucurbitaria (clade C3), with the type species A. botuliforma sp. nov. Finally, the genus Cucurbitaria (clade C4; 1 PP / 100 % BS) including only the type species, C. berberidis.

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

The new family Pyrenochaetopsidaeae (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. confluenta, 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 Para- pyrenochaeta 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 amzonense 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:** Peyronellaeas 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. Hadlisk, 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 brunneaospo** 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 pycnidal, 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 Pyrethrum 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 Asco- chyta 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.
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 13785; 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, Praha (http://bibdigital.jb.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 Aphisphaeria, 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...
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 13724; from human scalp, 2007, D.A. Sutton, living cultures UTHSC DI16-235 = FMR 13725; from human sputum sample, 2011, D.A. Sutton, living culture 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 κερατινο-, 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.
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 DI16-228 = 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. 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.
**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 corneal 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 *tub2* 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 alectorolophi* 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 Lycum hallifolium, 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 rumicola (Boerema & Loer.) Q. Chen & L. Cai, Stud. Mycol. 82: 171. 2015.

Description: 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 rpb2. 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. Bot. 18: 473. 1980.

Type species: Epicoccum nigrum (Link.) Fr.

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, doliform or ampulliform, 4–6 × 4–8 μm. Conidia aseptate, hyaline, smooth- and thin-walled, ovoid or ellipsoidal, 4.5–6 × 2–3 μm, guttulate. Chlamydosporae 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. SD4) to brownish grey (M. SF2). Colonies on MEA reaching 36 mm after 7 d at 25 ± 1 °C, flattened to floccose, white (M. SA1) to orange white (M. SA2); reverse white (M. SA1) to pale orange (M. SA4). 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.

Materials 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.
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 13867.

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. 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).
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); *tub2* 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); *rpb2* 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 *tub2* and *rpb2*. 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, Kanbia Farm, from leaves of Protea cv. Camival (*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.
**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 13792; 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,
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 ἔκτος, 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).

**Material 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. 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.
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 orange (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.
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 Gardener’s chronicle: a weekly illustrated journal of horticulture and allied subjects (http://www.biodiversitylibrary.org/item/64372#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...
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 ostiules. Conidiogenous cells phialidic, hyaline, smooth-walled, globose or ampulliform. Conidia aseptate, hyaline, smooth- and thin-walled, ellipsoid 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, Wallenberg 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., *Att i 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 *rpb2* sequences, in our study, the *rpb2* 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.
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 rpb2 sequence was not given, and therefore in the present study the rpb2 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 pycnidal, 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 pycnidal, 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.
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 microcypnidia.

*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 rpb2 and tub2 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 sub-globose, 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*
**Juxtiphoma** Valenzuela-Lopez, Cano, Crous, Guaro & 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, Guaro & Stchigel.

**Juxtiphoma eupyrena** (Sacc.) Valenzuela-Lopez, Cano, Crous, Guaro & 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 omnivires”, 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, Guaro & 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, Guaro & Stchigel.

**Vacuiphoma bulgarica** (Aveskamp *et al.*) Valenzuela-Lopez, Cano, Crous, Guaro & Stchigel, comb. nov. MycoBank MB821452.

*Basionym:* Phoma bulgarica Aveskamp *et al.*, Stud. Mycol. 65: 47. 2010.
Description: Aveskamp et al. (2010).

Material examined. Bulgaria, Silkossia, Strandga Mountain, from leaves 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 tub2 and 44 bp of rpb2, 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 377.87 = 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...
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 pycnidial shape, conidia (up to 2 vs non-septate) and the absence of chlamydospores (see Crous et al. 2016b). Furthermore, here the sequence of rpb2 is provided and differs in 13 bp from *N. gossypii-cola*, and therefore *N. macrospora* is also phylogenetically distinct from *N. gossypii-cola*.

**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.

**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 thinly-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

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**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.**
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

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**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. Kuruczcin (holotype CBS H-20240, ex-holotype cultures CBS 419.92 = FMR 13547).

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 D16-322 = 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 D16-322 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, sub-globose, 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* phialidial, 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, while (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 D16-359 = FMR 13852); from human eye secretion, 2012, D.A. Sutton, culture UTHSC D16-352 = 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 “*desmazeresii*”).

Description: Chen et al. (2015).

Materials examined: Germany, Hohenheim, from Lolium perenne, Apr. 1967, U.G. Schlösser (neotype HMAS 246960, ex-neotype living culture CBS 297.69). USA, from human respiratory tract, 2006, D.A. Sutton, living cultures UTHSC D16-207 = FMR 13697; from unknown source of clinical sample, 2010, D.A. Sutton, living cultures UTHSC D16-320 = FMR 13813; from human head superficial tissue sample, 2011, D.A. Sutton, living cultures UTHSC D16-332 = FMR 13825; from human toe nail, 2011, D.A. Sutton, living cultures UTHSC D16-341 = 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.
Etymology: From Latin tard-, 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, yellowish 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 μm), 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
alignment of the concatenated four loci deposited in TreeBASE (S21115): LSU position, 412 (C); ITS positions, 539 (C), 595 (A); tub2 positions, 1121 (G), 1170 (G), 1257 (T); rpb2 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. Munterida-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, Stichigil, 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. Conidigenous cells integrated to the conidiophore, phialidic, hyaline, smooth-walled, doliform, 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
(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 Neocucurbitaria cava.

Neocucurbitaria hakeae (Crous) 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, goutulate.

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.

Materials examined: Australia, Western Australia, Denmark, Lights Beach, on leaves of Haakea 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 MB821492. Fig. 21.

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, goutulate.

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.

Materials 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).
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 filiiform 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 Pyrenocheata. 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 & Bubáč) Wanas. et al., Mycosphere 8: 412. 2017. Fig. 23. Basionym: Pyrenocheata quercina Kabát & Bubáč, Hedwigia 52: 342. 1912.

Description taken from Bubáč & 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 colliarette, 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.
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 D16-213 = 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.
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, doliform 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 781092 = 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
pycnidal 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 on 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, 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.
**Etymology:** From Greek ἀλλό-, 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 equaling, because the morphological similarity to *Pyrenochaeta*.
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 terrestris Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, sp. nov. MycoBank MB822117.

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

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 tub2, and 47 bp of rpB2.

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.
Material examined. The Netherlands, Naaldwijk, from greenhouse soil, Feb. 1972, L.H. Kaatstra-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, Stchigel, Guarro & Cano, 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 Lév. eveill. 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.
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 764/16 = 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 rpb2 and tub2, respectively. Therefore, a new species name is proposed for CBS 101634.

Neopyrenochaeta inflorescentiae (Crous et al.) Valenzuela-Lopez, Crous, Stchigel, Guarro & Cano, comb. nov. MycoBank 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).
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: Pyrenochaetopsis 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, acroleurogenous 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.

Etyymology: 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 tub2 and 34 for rpbl2, 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
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, sub-globose, 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 P. paucisetosa).

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

Etymology: From Latin confluent, confluent, due to the production of tightly aggregated conidiomata.
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, asetate, 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. plantenk. 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 olivaceous-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,
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 rpb2 and 13 bp for tub2, 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 tub2 and rpb2 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, substrate 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).
Notes: We received isolate CBS 122787 as “Coniothyrium cerealis”, but it was identified as *P. leptospora* in our phylogenetic study.

**Pyrenoachetopsis 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 75911 = 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 *Pyrenoachetopsis 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.

**Pyrenoachetopsis 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:* *Pyrenoachetopsis 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*.

**Pyrenoachetopsis poae** Crous & Quaedvlieg, Persoonia 32: 197. 2014.

*Description:* Crous et al. (2014).
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 rpb2 sequence that, together with tub2, 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, 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 tub2 and 31 bp for rpb2).

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

Etymology: From Latin –uberamina, 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. 35. Pyrenochaetopsis paucisetosa (CBS 142460). A, B. Colony on OA (front and reverse). C, D. Colony on MEA (front and reverse). E. 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 rpb2 and tub2 sequences. Therefore, we propose strain CBS 142461 as representative of the new species P. ubeniformis.

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 pycnidal, 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);
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 pycnidal, brown, solitary or confluent, pycnidial wall of textura angularis, glabrous, subglobose to ovoid, ostiolar. 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 pycnidal, 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
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 *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.
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’aïre 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 rpb2 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. multistriata, P. omnivirens, P. perepyrena and P. saxea, were not included. Currently, several genera such as Didymellocomarosporium, 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
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
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 rpb2 or tub2 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, Halojulaceae, Leptosphaeriaceae, Libertasomycetaceae, Microsphaeropsidaceae, Neocamarosporiaceae, Neophaeosphaeriaceae, Neopyrenochaetaceae, Parapyrenochaetaceae, Phaeosphaeriaceae, Pleosporaceae, Pseudopyrenochaetaceae, Pyrenochaetopsidaceae and Shiraiaceae.

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