Families of *Diaporthales* based on morphological and phylogenetic evidence

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Abstract: *Diaporthales* is an important ascomycetous order comprising phytopathogenic, saprobic, and endophytic fungi, but interfamilial taxonomic relationships are still ambiguous. Despite its cosmopolitan distribution and high diversity with distinctive morphologies, this order has received relatively few systematic, macrolichal, Melanconidaceae, Pseudoplagiophellaceae, Schizoparmaceae, Stilbosporaceae and Sydowiellaceae. Taxonomic uncertainties among genera are also clarified and recurrent discrepancies in the taxonomic position of families within the *Diaporthales* are discussed. An updated outline and key to families and genera of the order is presented.

**Key words:** Multi-gene DNA phylogeny, New taxonomic arrangement, Phytopathogenic fungi, Sordariomycetes, Systematics.

**Taxonomic novelties: New families:** Apiosporospissaceae Senan., Maharachch. & K.D. Hyde, Apotheknassyeaceae Senan., Maharachch. & K.D. Hyde, Asterosporaceae Senan., Maharachch. & K.D. Hyde, Auratopycniellaceae Senan., Maharachch. & K.D. Hyde, Erythroglacieaeae Senan., Maharachch. & K.D. Hyde, Melanconidaceae Senan., Maharachch. & K.D. Hyde, Prosopocolaceae Senan. & K.D. Hyde; **New genera:** Marsupiomyces Senan., & K.D. Hyde, Microascompora Senan., & K.D. Hyde, Phaeoapendiciculospora Senan., Q.R. Li & K.D. Hyde, Paradiaporthe Senan., & K.D. Hyde, Hyalalaxsporea Senan., & K.D. Hyde, Chiangraiomyces Senan. & K.D. Hyde; **New species:** Chiangraiomyces baumhiana Senan. & K.D. Hyde, Coniella pseudokoreanae Senan., Tangthir. & K.D. Hyde, Cytospora centrivillosa Senan., Camporesi & K.D. Hyde, Cytospora junipericola Senan., Camporesi & K.D. Hyde, Cytospora quercicola Senan., Camporesi & K.D. Hyde, Cytospora rosea Senan., Camporesi & K.D. Hyde, Cytospora fraxignena Senan., Camporesi & K.D. Hyde, Diaporthe illitorea Senan., E.B.G. Jones & K.D. Hyde, Diotopella bispata R.H. Perera, Senan., Camporesi & K.D. Hyde, Gnomoniopsis agrimoniae Senan., Camporesi & K.D. Hyde, Hyalalaxsporea gali Senan., Camporesi & K.D. Hyde, Marsupiomyces epideridoea R.H. Perera, Senan., Bulgakov & K.D. Hyde, Marsupiomyces quercina Senan., Camporesi & K.D. Hyde, Melanconis italic Senan., Camporesi & K.D. Hyde, Microascompora rubi Senan., Camporesi & K.D. Hyde, Paradiaporthe artemissiae Senan., Camporesi & K.D. Hyde, *Paradiaporthe thailandensis* Senan., Q.R. Li & K.D. Hyde, Plagiosiomyces jonesi Senan., & K.D. Hyde, Plagiosiomyces salticola Senan., Camporesi & K.D. Hyde, Sydowiella urticicola Senan., & K.D. Hyde, Tubakia thailandensis Senan., Tangthir. & K.D. Hyde; **New combinations:** Coryneum arausiaca (Fabre) Senan., Maharachch. & K.D. Hyde, Microascompora fragariae (F. Stevens & Peterson) Senan., Maharachch. & K.D. Hyde.

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**INTRODUCTION**

The *Diaporthales* is a distinct order in the subclass *Diaporthymycetidae* (Sordariomycetes) and it includes pathogens, saprobes and endophytes, with no known coprophilous, hypersaprobes or mycophylic species (Barr 1978, Rossman et al. 2007, Vasilyeva et al. 2007, Maharachchikumbura et al. 2015, 2016). Taxa of this order inhabit a wide diversity of hosts and substrates, including most economically and ecologically important trees and crops, soil and living animal and human tissues (Barr 1978, Gryzenhout et al. 2006c). Species in *Diaporthales* form solitary or aggregated, immersed to erumpent, rarely superficial, orange, brown to black perithecial ascomata, with short or long necks, that are located in stromatic tissues or substrates, with a centrum (or hama-thecium) lacking or with few paraphyses (Alexopoulos & Mims 1978, Barr 1978, Castlesbury et al. 2002). Asci are unitunicate with a conspicuous refractive ring (Hawksworth et al. 1995, Rossman et al. 2007). Ascospore morphology is diverse, ranging from short to elongate and aseptate or septate with hyaline or pigmented walls. The asexual morphs of *Diaporthales* are generally coelomycetous (Rossman et al. 2007), producing acervuli or pycnidial conidiomata, with or without a well-developed stroma. Conidiogenesis is phialidic or rarely annelidic and conidia are usually unicellular or 1-septate (Rossman et al. 2007).
Fungal taxa placed in “Diaporthaceae sensu lato” were divided into two groups (von Höhnel 1917) as “Eu-Diaportheeen,” to accommodate genera without allantoid ascospores and “Valseen” to accommodate genera with allantoid ascospores. Nannfeld (1932) introduced the order Diaporthales to accommodate von Höhnel’s Eu-Diaportheeen group. Luttrell (1951) described Diaporthales as an order comprising species that have a “Diaportha-type centrum” and “Endothia-type ascus.” Chadefaud (1960) analysed characters of stromatic tissues in diaporthid taxa and recognised families as Diaporthaceae or Cytosporaceae (= Valsaceae), Melanconidaceae and Gnomoniaceae. Wehmeyer (1975) classified the Diaporthales to include three families: Diaporthaceae, Gnomoniaceae and Cytosporaceae. Barr (1978) revised the order Diaporthales accepting Gnomoniaceae and Cytosporaceae in the suborder Gnomonineae. Melanconidaceae and Pseudovalsaceae were accommodated in the suborder Melanconidinae. To differentiate genera, Barr (1978) used characters such as presence or absence of stroma, stromatic development and tissue types, the position of the perithecia and perithecial necks relative to the substrate, as well as ascospore shape; and Monod (1983) distinguished genera within Gnomoniaceae based on characters of the stromatic tissues, asexual morphs and ascospores. Three families were recognised in Diaporthales by Eriksson (2001), including Cytosporaceae, Melanconidaceae and Via-laeaceae. Based on analysis of LSU nrDNA sequence data, Castelbury et al. (2002) accepted Diaporthaceae, Gnomoniaceae, Melanconidaceae and Cytosporaceae in Diaporthales. Gnomoniaceae was revised by several recent studies and new taxa were introduced (Sogonov et al. 2008, Walker et al. 2010, 2012, Mejia et al. 2011). Castelbury et al. (2002) did not confirm Vialaeaceae as a family in Diaporthales and therefore excluded it from Diaporthales. Réblóvá et al. (2004) introduced Togniniaceae to this order based on small subunit (SSU) nrDNA; however, Mostert et al. (2006) concluded that its placement was ambiguous based on large subunit (LSU) nrDNA. Maharachchikumbura et al. (2015) excluded Togninia-ceae from Diaporthales and accommodated it in Togniniales. Gryzenhout et al. (2006c) described the Cryphnetria–Endothia complex as the family Cryphnetriaceae. Sydowielleaceae and the Schizoparmaceae–Pildiiella complex with the genus Coniella were introduced as Schizoparmaceae in Diaporthales (Rossman et al. 2007, Alvarez et al. 2016). Hartnessiaceae was introduced into Diaporthales accommodating Hartnessia with wuennsteia like sexual morphs (Crous et al. 2012b). Pseudoplagiostomataceae was introduced by Cheewangkoon et al. (2010) to accommodate Pseudoplagiostoma. Voglmayr & Jaklitsch (2014) resurrected Stilbosporaceae in Diaporthales based on phylogenetic analysis of LSU nrDNA sequence data and transferred the genera Stegosporum and Stilbospora to this family. Macroliaceae was introduced by Crous et al. (2015), based on an analysis of LSU nrDNA to accommodate Macrophilum. Suetrong et al. (2015) introduced Tirisporelaceae into Diaporthales; however, Jones et al. (2015) excluded this family from Diaporthales. Norphanphoun et al. (2016) introduced Lamproconiacae to accommodate Lamproconium and Hercospora. Juglanconidaceae was introduced in the Diaporthales by Voglmayr et al. (2017). However, molecular data suggest that additional families still remain to be elucidated (Gryzenhout et al. 2006c, Crous et al. 2012a, 2015, Voglmayr et al. 2017). Currently there are 14 families accepted in the Diaporthales.

Given the taxonomic discrepancies within Diaporthales, the present study uses a combined taxonomic approach based on morphology and DNA sequence analyses of the partial 28S nrDNA (LSU), the internal transcribed spacer regions and intervening 5.8S nrDNA (ITS), DNA-directed RNA polymerase II second largest subunit (rpb2), and translation elongation factor 1-alpha (tef1) gene regions to investigate phylogenetic relationships of all genera in Diaporthales to update their classification. All taxonomic novelties and present taxonomic families are re-described and illustrated where necessary. We also present new data on each family to provide a better taxonomic understanding.

MATERIALS AND METHODS

Isolates and specimens

Specimens were collected from Germany, Italy, Russia, Thailand and the UK. They were placed in paper bags and collection details noted. Specimens were brought to the laboratory in Zip-lock plastic bags and examined with a Motic SMZ 168 stereo-microscope. Rehydrated fruiting bodies were used to observe morphological characteristics of ascomata, asc, ascospores and other tissues and characters were photographed with a Canon 550D digital camera fitted to the Nikon ECLIPSE 80i compound microscope. Photomicrographs were arranged with Adobe Photoshop v. CS6 and all measurements were made with Tar-soft v. 0.9.0.7. Specimens were preserved and are deposited at the BBH and MFLU fungaria. Taxonomic novelties and descriptions were deposited in MycoBank (Crous et al. 2004), and new species were established using modern criteria and standards (Taylor et al. 2000, Seifert & Rossman 2010, Jeewon & Hyde 2016).

Sporocarps were removed from the substrate using a sterilised needle and placed in a few drops of sterilised distilled water on a sterilised cavity slide and a spore suspension was prepared as described in Chomnunti et al. (2014). Germinating ascospores were aseptically transferred to Petri dishes containing Potato Dextrose Agar (PDA) or Malt Extract Agar (MEA) (Crous et al. 2009). Colonies were photographed and characters were noted. Colony colour on PDA and MEA was determined with the colour charts of Rayner (1970). Living cultures are deposited at Mae Fah Luang University (MFLU) and the Westerdijk Fungal Biodiversity Institute (CBS) culture collections. Autoclaved pine needles were placed on water agar (WA) to observe conidiomatal development and sporulating (Crous et al. 2009).

Types and other relevant authentic specimens were loaned from accessible fungaria [New York State Museum (NY), Naturhistorisches Museum Wien (W), Swedish Museum of Natural History (S), Royal Botanic Gardens, Kew (K), Universität Wien (WU)]. A small part of the fungarium specimen was cut and rehydrated in water or 5 % KOH. Micro-morphological characters were observed from rehydrated ascomata and photography was done as previously described.
DNA extraction, PCR amplification and phylogeny

Fresh fungal mycelia grown on MEA for 4 wk at 18 °C was scraped from the colony margin and sometimes perithecial content of fresh specimens were used for genomic DNA extraction following the protocol outlined by Jeewon et al. (2002). PCR amplification and sequencing of the LSU nrDNA region using the primer pair LROR/LR5 (Vilgalys & Hester 1990, Rehner & Samuels 1994), ITS nrDNA region using primer pair ITS5/ITS4 (White et al. 1990), rpb2 region using the primer pair FRPB2-5F/ FRPB2-7cR (Liu et al. 1999), and tef1 region using primer pair EF1-728F/EF1-986R (Carbone & Kohn 1999) were performed.

Each amplification reaction contained 0.125 μL of 5 units/μL Ex-Taq DNA polymerase (TaKaRa), 2.5 μL of 10 × PCR buffer, 2 μL of 2 mM MgCl₂, 2.5 μL of 2 mM dNTPs, 1 μL of 0.2–1.0 μM primer, ~500 ng DNA template and was adjusted with double-distilled water to a total volume of 25 μL. Amplification reactions were performed in a thermal-cycler (BIORAD 1000™ Thermal Cycler, Bio-Rad Laboratories, Hercules, California). The temperature profile for both ITS nrDNA and LSU nrDNA was an initial denaturing step for 2 min at 94 °C, followed by 35 amplification cycles of denaturation at 94 °C for 60 s, annealing at 58 °C for 60 s and extension at 72 °C for 90 s and a final extension step of 72 °C for 10 min (Phillips et al. 2008). The temperature profile for the rpb2 was: initial denaturation at 94 °C for 120 s, followed by 35 amplification cycles of denaturation at 95 °C for 45 s, annealing at 57 °C for 50 s and extension at 72 °C for 90 s (Liu et al. 1999). The temperature profile for tef1 was: initial denaturation at 94 °C for 120 s, followed by 35 amplification cycles of denaturation at 95 °C for 30 s, 58 °C for 50 s, 72 °C for 60 s (Glass & Donaldson 1995). All PCR products with a DNA ladder were determined by electrophoresis at 120 V/cm for 20 min in 1 % agarose gel stained with ethidium bromide (0.5 mg/mL). The gel was visualised under a UV transilluminator for 20 min in 1 % agarose gel stained with ethidium bromide.

PCR products were purified and sequenced with both primers at the Sunbiotech Company, Beijing, China. Sequences were edited and condensed with DNASTAR Lasergene v. 7.1. The sequences generated in this study were supplemented with additional sequences obtained from GenBank (Table 1) based on blast searches and published literature. Multiple sequence alignments were generated with MAFFT v. 7 (http://mafft.cbrc.jp/alignment/server/index.html) and the alignment was manually improved with BioEdit v. 7.0.5.2 (Hall 1999).

Maximum likelihood analysis (ML) was performed by RAxML GUI v. 1.3 (Stamatakis et al. 2008, Silvestro & Michalak 2012). The search strategy was set to rapid bootstrapping and the analysis was carried out with 1 000 replicates using the GTR+GAMMA model of nucleotide substitution, which was the best model predicted for the concatenated LSU nrDNA, ITS nrDNA, rpb2 and tef1 alignment by MrModeltest v. 2.3 (Nylander 2004).

For the Bayesian analyses (BI) of the individual loci and concatenated LSU nrDNA, ITS nrDNA, rpb2 and tef1 alignment, MrModeltest v. 2.3 (Nylander 2004) was used to determine the best nucleotide substitution model settings for MrBayes. A dirichlet state frequency was predicted for all four data partitions and GTR+I+G as best model for LSU nrDNA, ITS nrDNA, and rpb2; for tef1 the best model was GTR+G. The heating parameter was set to 0.2 and trees were saved every 1 000 generations (Ronquist et al. 2012). The Markov Chain Monte Carlo (MCMC) analysis of four chains started in parallel from a random tree topology.

The maximum parsimony analysis (MP) was performed with PAUP v. 4.0b10 (Swofford 2003). Ambiguously aligned regions were excluded and all characters were unordered and given equal weight. Alignment gaps were treated as a fifth character state. Trees were inferred using the heuristic search option with TBR branch swapping and 100 random sequence additions. MaxTrees were set to 1 000, branches of zero length were collapsed and all multiple parsimonious trees were saved. Tree length (TL), consistency index (CI), retention index (RI), rescaled consistency index (RC), homoplasy index (HI), and log likelihood (-ln L) were calculated for trees generated under different optimality criteria. The robustness of the most parsimonious trees was evaluated by 1 000 bootstrap replications resulting from the maximum parsimony analysis, each with 10 replicates of random step-wise addition of taxa (Felsenstein 1985). The Kishino–Hasegawa tests (Kishino & Hasegawa 1989) were performed to determine whether the trees inferred under different optimality criteria were significantly different.

Trees were viewed in FigTree v. 1.4.3 (Rambaut 2012). The final alignments and the trees obtained were deposited in TreeBASE (http://purl.org/phylo/treebase/phylows/study/TB2: S21148) and are available under study accession no. S21148.

RESULTS

To reveal the phylogenetic position of genera, families and genera incertae sedis within the order Diaporthales, a phylogenetic analysis was performed with LSU nrDNA, ITS nrDNA, rpb2 and tef1 sequence data. Sequences of representative species were selected from Maharachchikumbura et al. (2016), Norphanphoung et al. (2016), Voglmayr et al. (2017) and supplemented with sequences from GenBank. The LSU nrDNA, ITS nrDNA, rpb2, tef1 and combined data matrices contained 1 423, 735, 1 064, 427 and 3 652 characters with gaps, respectively. The alignment comprised 310 strains and Eutypella sp. (MFLUCC 16–1215) was selected as the outgroup.

The same concatenated alignment was subjected to phylogenetic analyses, including a Bayesian analysis, a maximum parsimony analysis and a maximum likelihood analysis. The concatenated sequence alignment contained 2 027 parsimony-informative characters, 385 were variable and parsimony uninformative and 1 241 were constant. The parsimony analysis yielded the maximum of 1 000 equally most parsimonious trees (TL = 16 973 steps; CI = 0.278; RI = 0.728; RC = 0.202; HI = 0.722). The ML analysis yielded a tree with a likelihood value of ln: –7529.054554 and the following model parameters: alpha: 0.368178; Π(A): 0.246723, Π(C): 0.249231, Π(G): 0.277805, and Π(T): 0.226241. The Bayesian analysis lasted 72 151 000 generations (average standard deviation of split frequencies value = 0.016671) and the consensus trees and posterior possibilities were calculated from the 103 301 trees in each of the two run files, of which a total of 72 152 trees in each of the two run files, of which a total of 108 228 were sampled after discarding the first 25 % of generations for burn-in. The different data partitions contained 787, 529, 761 and 390 unique site patterns (LSU nrDNA, ITS nrDNA, rpb2 and tef1, respectively).

The phylogeny resulting from the analysis of combined gene sequence data is shown in Fig. 1. Overall, the topologies obtained from the different phylogenetic analyses were mostly
Table 1. Details of the strains included for molecular and/or morphological study.

| Fungal species | Culture accession no. | Specimen voucher no. | Host/substrate | GenBank accession numbers |
|----------------|-----------------------|----------------------|----------------|--------------------------|
|                |                       |                      |                | ITS | LSU | tef-1-α | rpb2 |
| Alnecium auctum | CBS 124263            | WU 30206             | Alnus glutinosa| KF570154 | KF570154 | KF570200 | KF570170 |
| Ambarignomonia petelorum | CBS 121227            | BPI 844274           | Liquidambar styraciflua | EU254748 | EU255070 | EU221898 | EU219307 |
| Amphiportes francensis | CBS 119289            | BPI 843515           | Tilia platyphyllos | EU199178 | EU199122 | –           | EU199137 |
| Anisogramma virgulatum | CBS 114575            | –                    | Eucalyptus pellita | EU883064 | EU883065 | –           | –           |
| Apiognomonia errabunda | AR 2813               | –                    | Fagus sylvatica | DQ131352 | NG027592 | DQ131365 | DQ862014 |
| Apiognomonia veneta | MFLUCC 16−1193        | MFLU 17−0896B        | Platanus acerifolia | MF190114 | MF190056 | –           | –           |
| Apiosporopsis carpinea | CBS 897.79            | Monod LAU            | Platanus orientalis | –   | EU255195 | EU221910 | EU219259 |
| Apiosporopsis sp. |CBS 777.79             | –                    | Populus tremuloides | KP637024 | – | –             | –           |
| Apoharknessia insueta | Masuya 11AF2−1        | –                    | Alnus firma | –   | AB669034 | –           | –           |
| Ascendendus austriacus | CBS 131685            | –                    | Decayed driftwood of Alnus glutinosa | – | AF261067 | JQ429257 | –           |
| Asteroma alnenum | CBS 109840            | –                    | Alnus glutinosa | EU167609 | EU167609 | –           | –           |
| Asteroma sp. | Masuya 8AH9−1         | –                    | Alnus hirsuta | –   | AB669035 | –           | –           |
| Asterothecium asterothecium | –                     | MFLU 15−3555        | Fagus sylvatica | MF190062 | MF377615 | –           | –           |
| Aurantiotheca coni | MNA 1003              | –                    | Comus alternifolia | KF490504 | KF490508 | –           | –           |
| Aurantiosaccus acutatus | CPC 13704             | CBS H-20933          | Eucalyptus viminalis | JO685514 | JO685520 | –           | –           |
| Aurantiosaccus eucalyptorum | CPC 13229             | –                    | Eucalyptus globulus | JO685515 | JO685521 | –           | –           |
| Aurex stellata | CMW 12906             | –                    | Myrica faya | AY194090 | – | –             | –           |
| Aurexcystidium strians | –                     | MFLU 17−0965        | Rumex acetosa | –   | MF190063 | –           | –           |
| Aurexstria | CBS 124930            | CMW 28288             | Terminalia ivorense | FJ882856 | HG730874 | –           | –           |
| Brachysporium nigrum | MR 1346               | –                    | Terminalia mentula | FJ882855 | HG730873 | –           | –           |
| Caiella johnsonii | Krus 727 (UPS)        | –                    | Dryas sp. | JF701922 | – | –             | –           |
| Calosphaeria pulchella | CBS 115999            | –                    | Prunus sp. | EU367451 | YA761075 | GU180661 | –           |
| Celoperthe dispersa | CMW 9978              | –                    | Syzygium cordatum | AY214316 | HG730854 | HG730841 | –           |
| Celoperthe eucalypti | CMW 26913             | –                    | Eucalyptus EC8 clone | HG730839 | HG730865 | HG730852 | –           |
| Chaetocalon coni | –                     | MFLU 17−0965        | Rumex acetosa | –   | MF190063 | –           | –           |
| Chaetocalon coni | CBS 405.95            | –                    | Polyergus sachalinense | – | EU754141 | –           | –           |
| Chaetocarpus nigrospora | CBS 125532            | BPI 863766           | Betula sp. | JF881957 | HG883068 | –           | –           |
| Fungal species                        | Culture accession no. | Specimen voucher no. | Host/substrate             | GenBank accession numbers |
|--------------------------------------|-----------------------|----------------------|---------------------------|--------------------------|
|                                       |                       |                      |                           | ITS         | LSU     | tef1-α | rpb2   |
| Chiangraiomyces bauhiniae            | MFLUCC 17–1669        | MFLU 17–0964         | Bauhinia sp.              | MF190119    | MF190064| MF377598| MF377603|
|                                       | MFLUCC 17–1670        | CHUNI 81             | Bauhinia sp.              | MF190118    | MF190065| MF377599| MF377604|
| Chromendothia citrina                | AR 3445               | –                    | Quercus mongolica         | EU2555074   | EU222013| EU219342|
|                                       | CBS 109758             | BPI 747935           | Quercus mongolica         | AF408335    | –       | –       | –       |
| Chrysocrypta corymbiae               | CBS 132528             | CPC 19279            | Corymbia sp.              | JX069867    | JX069851| –       | –       |
| Chrysosporia barringtoniae           | TBRC 5647             | SDRM-CMUEJB048       | Barringtonia sp.          | KU948046    | KU948045| –       | –       |
| Chrysosporia colombiana              | CPC 24986             | CBS 139909           | Eucalyptus urophylla      | KR746738    | KR746771| –       | –       |
| Chrysoporthea cubensis               | CMW 14394             | –                    | Eucalyptus sp.            | JN942342    | JN940856| GQ290137| –       |
| Chrysoporia hedgesiana               | CMW 10641             | CBS 115854           | Tömbochis semidecandra    | AY692322    | –       | –       | –       |
| Coniella africana                    | CBS 114133             | CBS H-22706          | Eucalyptus nitens         | AY339344    | AY339293| KX833600| KX833421|
| Coniella australiensis               | IMI 261318             | BPI 784425           | Leaf litter               | AF408336    | AF408336| KX833692| KX833497|
| Coniella crousi                       | NFCCI 2213             | AMH 9406             | Terminalia chebula        | HQ264189    | –       | –       | –       |
| Coniella fragaria                    | CBS 110394             | RMF 74.01            | Forest soil               | KJ710463    | KJ710441| KX833695| KX833499|
| Coniella fragaria                    | CBS 172.49             | STE-U 3930           | Fragaria sp.              | AY339317    | AY339282| AY339352| –       |
| Coniella foreana                     | CBS 143.97             | CBS H-22710          | –                         | KX833584    | AF408378| KX833684| KX833490|
| Coniella pseudokoreana               | MFLUCC 12–0427        | MFLU 13–0282         | –                         | MF190145    | –       | –       | –       |
| Coniella pseudostromatinae           | MFLUCC 17–1673        | MFLU 13–0282B        | –                         | MF190146    | –       | –       | –       |
| Coniella quercicola                  | CBS 283.76             | IMI 233050           | Fragaria sp.              | KX833582    | –       | KX833682| –       |
| Coniella straminea                   | CBS 149.22             | STE U 3932           | Fragaria sp.              | AY339348    | AY339296| KX833666| KX833506|
| Coniella mobilis                      | CPC 16511              | BEMCI                 | Tömbochis granulosa       | JQ281776    | JQ281776| JQ281776| KX835307|
| Coniella wangiensis                  | CPC 19397              | CPC 19397            | Eucalyptus sp.            | JX069873    | JX069857| KX833705| KX833509|
| Coryneum longipes                    | AR 3541               | BPI 870201           | Quercus cernis            | EU863072    | –       | –       | –       |
| Coryneum modesta                     | AR 3558               | BPI 749131           | Castanea sativa           | EU863073    | –       | –       | –       |
| Coryneum umbonata                    | AR 3897               | BPI 843585           | Quercus cernis            | EU863074    | –       | –       | –       |
| Corynum arausica                     | MFLUCC 13–0658        | MFLU 17–0875         | Quercus sp.               | MF190120    | MF190066| MF377574| MF377609|
|                                       | MFLUCC 15–1110        | BBH 42437            | Quercus sp.               | MF190121    | MF190067| MF377575| MF377610|
| Cristinospora pulchra                | CBS 138014             | CBS H-21729          | Mangifera indica          | KJ710466    | KJ710443| –       | –       |
| Cryptonechla parasitica              | ATCC 38755             | –                    | Castanea dentata          | AY141856    | EU199123| EU222014| –       |
| Cryptodiaethel writer               | –                     | –                    | –                         | –           | –       | –       | –       |
| Cryptodiachorerae ascendit           | AR 3580               | BPI 748340           | Aesculus hippocastanum    | EU199179    | AF408342| –       | EU199138|
| Cryptometron aestesoscorens          | CBS 109765             | AFTOL-ID 1238        | Aesculus hippocastanum    | DG836905    | –       | DG836892| –       |
| Cryptoporia hyperderma               | CBS 116866             | BPI 748342           | Ulmus minor               | EU199181    | AF408346| –       | EU199140|
| Cryptoporia pulchra                  | CBS 121077             | BPI 871231           | Alnus incana              | EU199184    | EU199124| –       | EU199142|
| Cytopsora ambiens                    | ATCC 52280             | ATCC 52280           | Acer rubrum               | AY347345    | AF277146| –       | –       |
| Cytopsora australis                   | Willow21               | –                    | –                         | KM669911    | –       | KM669767| –       |
| Cytopsora carbonacea                 | CFCC 50056             | –                    | Ulmus pumila              | KP281263    | KP310809| KP310852| –       |
| Cytopsora cedri                      | CBS 196.50             | –                    | –                         | AF192311    | –       | JX438575| –       |
| Cytopsora centivirglossa             | MFLUCC 16–1206         | MFLU 17–0887         | Sorbus domestica          | MF190122    | MF190068| MF377600| –       |
|                                       | MFLUCC 17–1660         | BBH 42449            | Sorbus domestica          | MF190123    | MF190069| MF377601| –       |
|                                       | –                     | MFLU 17–0999         | Sorbus domestica          | MF190124    | MF190070| –       | –       |
| Cytopsora ceratosperma               | AR 3426               | –                    | –                         | EU255209    | –       | –       | –       |
| Cytopsora chrysosperma               | CFCC 89630             | –                    | Salix paemophilina        | KF765674    | KF765690| –       | KF765706|
| Cytopsora fraxinigena                | MFLUCC 14–0868        | BBH 42442            | Fraxinus ornus            | MF190133    | MF190078| –       | –       |
|                                       | MFLU 17–0880          | –                    | Fraxinus ornus            | MF190134    | MF190079| –       | –       |
| Fungal species | Culture accession no. | Specimen voucher no. | Host/substrate | GenBank accession numbers |
|----------------|----------------------|----------------------|----------------|--------------------------|
| Cytorespora germanica | CYO 217 | – | Populus sp. | JQ086564 JX24618 – – |
| Cytorespora hippophaes | CFCC 89640 | – | Hippophae rhamnoides | KF763582 KF765989 KP310865 KF765714 |
| Cytorespora junipericola | – BEH 42444 | – | Juniperus communis | MF190126 MF190071 MF377597 |
| – | MFLU 17–0882 | – | Juniperus communis | MF190125 MF190072 MF377580 |
| Cytorespora malii | CFCC 50044 | – | Malus baccata | KR045637 KR045717 – – |
| Cytorespora malicolia | SXFX–V2 | – | Malus pumila | GU174597 – JQ090335 |
| Cytorespora melanodiscus | Jimslanding2 | – | Alnus tenuifolia | JX438621 – JX438605 |
| Worrall2b | – | – | Alnus tenuifolia | JX438620 – JX438606 |
| Cytorespora melnikii | MFLUCC 16–0635 T 1104 | – | Populus nigra | KY417736 KY417770 – – |
| Cytorespora nivea | CFCC 89643 | – | Salix psammophila | KF765685 KF765701 – KF765717 |
| Cytorespora punicae | CBS 199.50 | – | Punica granatum | JX438622 – JX438658 |
| Cytorespora quercicola | MFLUCC 14–0867 BEH 42443 | – | Quercus sp. | MF190129 MF190073 – – |
| – | MFLU 17–0881 | – | Quercus sp. | MF190128 MF190074 – – |
| Cytorespora ribis | CFCC 50027 | – | Ulmus pumila | KP281288 KP310814 KP310857 |
| Cytorespora rosae | MFLUCC 14–0845 MFLU 17–0885 | – | Rosa canina | MF190131 MF190075 – – |
| MFLUCC 17–1664 BEH 42447 | – | – | Rosa canina | MF190130 MF190076 – – |
| Cytorespora sacculus | CFCC 89625 | – | Juglans regia | KR045646 KR045725 KP310861 |
| Cytorespora salicina | MFLUCC 16–0637 T-1017 | – | Salix fragilis | KY417751 KY417785 – – |
| MFLUCC 16–1190 MFLU 17–1655 | – | – | Cornus sanguinea | MF190132 MF190077 – – |
| Cytorespora sordida | HMBF 159 | – | Juglans regia | KF225613 KF225627 |
| Cytorespora sp. | CNO41 | – | Phaseolus vulgaris | JQ953989 JQ954081 – – |
| Cytorespora translucens | CZ230 | – | – | FJ755269 FJ755269 – – |
| Diaporthe azadiractae | TN 01 | – | Azadirachta indica | KC631323 – – – |
| Diaporthe cassiniae | CBS 136440 CPC 21916 | – | Cassine peragua | KF777155 KF772208 KF772244 |
| Diaporthe cyanaroidis | 150e | – | Myrtus communis | KC959207 – – – |
| Diaporthe decedens | CBS 114281 | – | Corylus avellana | KC343058 EU552122 – – |
| Diaporthe eres | MFLUCC 17–1667 T400 | – | Fraxinus pennsylvanica | MF190137 MF190080 MF377594 |
| MFLUCC 17–1668 MFLU 17–0890 | – | – | Fraxinus pennsylvanica | MF190138 MF190081 MF377595 |
| MFLUCC 14–0862 T68 | – | – | Catalpa bignonioides | MF190135 MF190082 MF377596 |
| MFLUCC 17–1661 MFLU 17–0889 | – | – | Catalpa bignonioides | MF190136 MF190083 MF377597 |
| AR 5193 | – | – | Ulmus sp. | KJ210529 – KJ210550 |
| PS57 | – | – | Glycine max | JF430494 JF704176 – – |
| Diaporthe eucalyptorum | MFLUCC 12–0306 | – | Leaf litter | KT459419 – KT459453 |
| Diaporthe eutonii | MFLUCC 16–1195 BBH 42436 | – | Stem of sea-shore plant | MF190139 MF190086 – – |
| Diaporthe myrticola | CBS 136441 CPC 21896 | – | Maytenus acuminata | KF777157 KF777210 – – |
| Diaporthe nobilis | Napa911 | – | – | KM669958 – KM669914 |
| Diaporthe rudis | – IT 1526 | – | Acer campestre | MF190141 MF190088 MF377576 |
| – | MFLU 17–0895 | – | Acer campestre | MF190142 MF190089 MF377577 |
| MFLUCC 16–1197 BBH 42452 | – | – | Umbelliferous stem | MF190143 MF190085 – – |
| MFLUCC 17–1658 MFLU 15–2661 | – | – | Umbelliferous stem | MF190144 MF190084 – – |
| LC6147 | – | – | Dendrothrips japonica | KY011890 KY011864 KY011901 |
| BPS 748231 | – | – | – | AF362560 – – – |
| Diaporthe s. | CBS 113201 CBS H-7950 | – | Vitis vinifera | KC343234 – KC343960 |
| Diaporthe s. | CBS 121124 BPS 871218 | – | Corylus sp. | KC343004 – – – |
| Diaporthe s. | CN5 | – | Corylus avellana | KP205483 – KP205456 |
| CN13 | – | Corylus avellana | KP205484 – KP205457 |
| Dicarpella dryna | ICMP 14042 | – | Quercus sp. | KC145909 – KC145954 |
| Fungal species                                      | Culture accession no. | Specimen voucher no. | Host/substrate           | GenBank accession numbers |
|----------------------------------------------------|-----------------------|----------------------|--------------------------|---------------------------|
| Diplodina microsperma                              | ICMP 14043            | –                    | Quercus ilex             | KS146283                  |
|                                                    |                       |                      | Eucalyptus regnans       | KY427073                  |
| Discella destructiva                               | CBS 114545            | CPC 2336             | Protea sp.               | JN172416                  |
|                                                    |                       |                      | Corus nuttallii          | JN172525                  |
| Discoides eucalyptorum                             | CBS 109771            | BPI 1107757          | Comus florida            | EU199186                  |
|                                                    |                       |                      | AF429741                 |
| Discoides eucalyptorum                             | MD 254                | BPI 1107741          | Eucalyptus sp.           | AF429721                  |
|                                                    |                       |                      | AF429732                 |
| Ditopella bisepata                                 | CBS 109748            | BPI 782061           | Alnus glutinosa          | MQ235625                  |
|                                                    |                       |                      | Eucalyptus regnans       | EA219254                  |
| Dwiroopa lythri                                    | AR 3383               | BPI 747560           | Lythrum salicaria        | AF408364                  |
| Endothia gyrosa                                    | CMW 10436             | CRY 1515             | Quercus palustris        | AY194114                  |
| Endothiella gyrosa                                 | CMW 2091              | Populus sp.          | Corylus avellana         | MQ491151B                |
|                                                    |                       |                      | GU830372                 |
| Endothiella gyrosa                                 | CBS 199.53            | –                    | Quercus sp.              | AF452117                  |
|                                                    |                       |                      | Hymenaea courbari        | JQ865519                  |
| Eutypella sp.                                      | MFLU 16–1215          | BBH 42446            | Alnus cordata            | MF190165                  |
|                                                    |                       |                      | Agromonia eugenia        | MF190099                  |
| Foliocryphia eucalypti                             | CBS 124779            | CPC 12494            | Eucalyptus coccifera     | GQ303276                  |
|                                                    |                       |                      | GSQ303307                |
| Gnomonia gnomon                                    | CBS 829.79            | Monod 267 LAU        | Populus sp.              | AY819897                  |
|                                                    |                       |                      | AY819864                 |
|                                                    | CBS 199.53            | –                    | Corylus avellana         | MQ491151B                |
|                                                    |                       |                      | GU830372                 |
| Gnomoniella fraxini                                | AR 3999               | BPI 843391           | Fraxinus americana       | JQ865814                  |
|                                                    |                       |                      | AY455818                 |
| Gnomonciopsis agrimoniaea                         | MFLUCC 14–0844        | MBU 78003            | Euphorbia angustifolium   | EU254841                  |
|                                                    |                       |                      | EB255122                 |
|                                                    | MFLUCC 17–1662        | BBH 42450            | Agromonia eugenia        | E2U21889                  |
|                                                    |                       |                      | MQ377585                 |
| Gnomonciopsis alderdunensis                       | CBS 125680            | BPI 879186           | Rubus parviflorus        | GU320825                  |
|                                                    |                       |                      |                   |
| Gnomonciopsis chamaemorci                         | CBS 803.79            | Monod 345 LAU        | Rubus chamaemorus        | EU254808                  |
|                                                    |                       |                      | EU255107                 |
| Gnomonciopsis racemula                             | AR 3892               | BPI 871003           | Epilobium angustifolium   | EU254841                  |
|                                                    |                       |                      | EU255122                 |
| Greenenia saprophytica                             | MFLUCC 12–0298        | MBU 13–0255          | Syzygium cuminii         | KJ201933                  |
|                                                    |                       |                      | KJ201935                 |
| Greenenia uvicola                                  | F11 2007              | –                    | Vitis sp.                | HOG86009                  |
|                                                    |                       |                      | HG870619                 |
|                                                    | F11 2008              | –                    | Vitis sp.                | HOG86010                  |
|                                                    |                       |                      | HG870620                 |
| Hapalocystis berkeleyi                             | AR 3851               | –                    | Platanus sp.             | EU883069                  |
|                                                    |                       |                      |                   |
| Harknessia eucalypti                               | CBS 342.97            | –                    | Eucalyptus regnans       | AY720745                  |
|                                                    |                       |                      | MF190099                 |
| Harknessia karwaria                                 | CPC 13643             | –                    | Eucalyptus regnans       | AY720745                  |
|                                                    |                       |                      | JM190092                 |
| Harknessia kolokiaiensig                          | CBS 114877            | –                    | Eucalyptus robusta       | AY720749                  |
|                                                    |                       |                      | AY720842                 |
| Harknessia weresubiae                               | CBS 113057            | –                    | Eucalyptus sp.           | AY720741                  |
|                                                    |                       |                      | AY720835                 |
| Herospora tiliae                                   | AR 3526               | –                    | Tilia tomentosa          | AF408365                  |
| Holocryphia eucalypti                              | CBS 115852            | CMW 14545            | Eucalyptus sp.           | MQ862840                  |
|                                                    |                       |                      | MQ862797                 |
| Hyalolaccispora gallii                             | MFLUCC 16–1208        | MFLU 17–0893         | Eucalyptus salmonicolor   | MQ862838                  |
|                                                    |                       |                      | MQ862795                 |
| Hyaloparaphysia gallii                             | MFLUCC 17–1671        | MFLU 17–0966         | Galium sp.               | MQ190150                  |
|                                                    |                       |                      | MF190094                 |
| Hyalostrophium brunneisporsum                      | A573 2b               | ILL 40792            | –                        | HML191720                 |
| Immerisia porphyracnudavensis                      | CMW 37314             | PREM 60740           | Raphanea melanophleoides | MQ862770                  |
|                                                    |                       |                      | MQ862760                 |
| Juglanconis juglandina                             | AR 3860               | WU 35969             | Juglans regia            | KY427154                  |
|                                                    |                       |                      | KY427214                 |
| Juglanconis oblonga                                | CBS 121083            | BPI 843622           | Juglans regia            | KY427149                  |
|                                                    |                       |                      | KY427218                 |
|                                                    |                       |                      | KY427219                 |
|                                                    |                       |                      | KY427217                 |
|                                                    |                       |                      | KY427216                 |

(continued on next page)
| Fungal species                  | Culture accession no. | Specimen voucher no. | Host/substrate            | GenBank accession numbers |
|--------------------------------|-----------------------|----------------------|---------------------------|---------------------------|
| **Mammaliania**                |                       |                      |                           |                           |
|                    |                       |                      |                           |                           |
| **Lasmania**                   | CBS 124122            | LMS 2011b            | *Nephelium lappaceum*     | GU797405                  |
|                    | CBS 124123            | LMS 2011c            | *Nephelium lappaceum*     | GU797406                  |
|                    | CBS 124124            | LMS 2011d            | *Nephelium lappaceum*     | JF838336                  |
|                    | CBS 124125            | LMS 2011a            | *Nephelium lappaceum*     | GU797407                  |
| **Macrotheca**                 | CPC 19421             | CBS H-22279          | *Eucalyptus piperita*     | KR873244                  |
|                    | –                     | BPI 877578           | *Corylus californica*     | EU254862                  |
| **Marsupiomyces**              | –                     | MFLU 15–2921         | *Quercus robur*           | MF190058                  |
|                    | –                     | BBH 42451            | *Quercus robur*           | MF190059                  |
| **Marsupiomyces quercina**     | MFLUCC 13–066         | MFLU 17–0876         | *Quercus sp.*             | MF190116                  |
|                    | MFLUCC 14–0566        | BBH 42438            | *Quercus sp.*             | MF190117                  |
| **Mastigocarpellina**          | CPC 22461             | –                    | *Anisophyllum sp.*        | KF779492                  |
|                    | CBS 136421            | CBS H-21429          | *Anisophyllum sp.*        | NR137844                  |
| **Mazzantia napellii**         | AR 3498               | BPI 748443           | *Aconitum lycocotonum*    | AF408386                  |
|                    | AFTOL-ID 2126         | AR 3498              | –                         | –                         |
| **Melanconia**                 |                        |                      |                           |                           |
| **Melanconia chrysosclerotina**| MFLUCC 17–1671        | MFLU 16–1309          | *Fagus sylvatica*         | MF190166                  |
| **Melanconia chrysosclerotina**| –                     | MFLU 17–0879         | *Carpinus betulus*        | MF190167                  |
| **Melanconia ellisi**          | –                     | BPI 878343           | *Carpinus caroliniana*    | JO926271                  |
| **Melanconia spodiacea**       | SPOD1                 | WU 3185              | *Carpinus betulus*        | JO926301                  |
| **Melanconis alni**            | AR 3748               | BPI 672035           | *Alnus viridis*           | EU199195                  |
|                    | AR 3500               | BPI 748444           | *Alnus viridis*           | AF408371                  |
| **Melanconis italicca**        | MFLUCC 17–1659        | MFLU 15–1112         | *Alnus cordata*           | MF190152                  |
|                    | MFLUCC 16–1199        | MFLU 17–0883         | *Alnus cordata*           | MF190151                  |
| **Melanconis marginalis**      | AR 3442               | BPI 748446           | *Alnus rubra*             | EU199197                  |
| **Melanconis stilboforma**     | E01051                | –                    | –                         | AY577814                  |
|                    | E00153                | –                    | –                         | AY577811                  |
| **Microascompora**             | 1.1                   | –                    | –                         | HMB54850                  |
|                    | 1.3                   | –                    | –                         | HMB54852                  |
| **Microascompora rubi**        | –                     | MFLU 17–0886         | *Rubus ulmifolia*         | MF190154                  |
|                    | –                     | BBH 42448            | *Rubus ulmifolia*         | MF190153                  |
| **Microthia**                  | CMW 11298             | PREM 57518           | *Eucalyptus saligna*      | AY214320                  |
| Fungal species                              | Culture accession no. | Specimen voucher no. | Host/substrate          | GenBank accession numbers |
|--------------------------------------------|-----------------------|----------------------|-------------------------|---------------------------|
| Myrmecodium montseggurinum                | CMW 38367             | –                    | Psidium cattleyanum     | KJ027495                  |
| Occultocarpus afoaohanense                | LCM 524.01            | BPI 879253           | Alnus nepalensis        | KF779249 KF779253         |
| Ophiocystostroma cyanthaeae               | YMJ 1526              | HAST 1364            | Cyathus fegleri         | JX57089 JX570891          |
| Ophiognomonia melanoostyla                | LCM 389.01            | BPI 879257           | Tilia cordata           | JF779850 JF779854         |
| Ophiognomonia vassilevae                 | AR 4298               | BPI 877671           | Juglans nigra           | EU254977 EU255162         |
| Ophiostoma gemellus                      | CMW 23059             | –                    | Tarsonemus sp.          | DQ821562 DQ821533         |
| Pachytrype princeps                     | Rogers s.n.           | –                    | –                       | FJ532382 FJ532381         |
| Pachytrype rimosae                      | FF1066                | –                    | –                       | FJ532381                 |
| Populus amesporora                     | AFTOL-ID 748          | JK 554F              | –                       | DQ70950 DQ70901           |
| Paradiaporia artemisiae                | MFLUCC 14–0650        | MFLUCC 12–2131       | Artemisia sp.           | MF190155 MF190100 MF377583 |
| Phaeoacremonium aleophilum              | CBS 631.94            | –                    | Vitis vinifera          | AF266847 AB278175         |
| Phaeoacremonium vibritas                | CBS 117115            | BPI 2460             | Fagus sylvatica         | KF764735 DK49065 KF764645 |
| Phaeoappendispora thailandensis         | MFLUCC 13–0116        | MFLUCC 17–0873       | Quercus sp.             | MF190157 MF190102 MF377613 |
| Phaeoappendispora appendiculata         | CBS 123821            | WU 32449             | Acer campestre          | KF570156 KF570156         |
| Phragmoporia conformis                  | MFLUCC 14–0567        | MFLUCC 15–2662       | Alnus glutinosa         | KU315838 KU315839 KU315931 |
| Plagiotrema dilatatum                   | LCM 402.02            | BPI 878957           | Salix irrorata          | GU367070 GU367104         |
| Plagiotrema jonesii                     | MFLUCC 16–1189        | MFLUCC 17–0878       | Umbelliferous stem      | MF190159 MF190104 MF377589 |
| Plagiotrema salicellum                  | CBS 109755            | BPI 843490           | Salix sp.               | EU255047 EU221912         |
| Plagiotrema salicola                    | MFLUCC 13–0656        | MFLUCC 17–0877       | Salix sp.               | MF190161 MF190106         |
| Pleurocera caprearia                    | CBS 372.89            | –                    | Salix sp.               | AF277143                 |
| Pleurocera oregonesa                    | AR 4333               | BPI 877719           | Salix sitchensis        | EU255060 EU221913 EU221913 |
| Pleurocera pleurostylum                 | CBS 906.79            | Monod 469/LAU        | Salix helvetica         | EU255061 EU221912 EU221962 EU221911 |
| Pleurocera tenellum                     | CBS 121082            | BPI 871059           | Acer rubrum             | EU199199 EU255202 EU221907 EU199155 |
| Prosopidicta mexicana                   | CBS 113529            | CBS-H 7948           | Prosopis glandulosa     | AY270279 – – –           |
| Pseudoplagiotrema corymbi               | CPC 19287             | CBS H- 20957         | Corymbia sp.            | JX060961 JX060945 – – –  |
| Pseudoplagiotrema eucalypti             | CPC 124807            | CBS H-20303          | Eucalyptus urophylla    | GU973512 GU973606 GU973542 |
| Pseudoplagiotrema oldii                 | CPC 14161             | –                    | Eucalyptus camaldulensis| GU973510 GU973604 GU973540 |
| Pseudoplagiotrema variabilis            | CPC 115722            | –                    | Eucalyptus camaldulensis| GU973535 GU973610 GU973595 |
| Pseudoplagiotrema variabilis            | CPC 124808            | CBS H-20300          | Eucalyptus camaldulensis| GU973534 GU973609 GU973564 |
| Pseudoplagiotrema oldii                 | CPC 113067            | CBS H-20304          | Eucalyptus globulus     | GU973536 GU973611 GU973566 |
| Pseudoplagiotrema variabilis            | LPCUCC 11–0436        | MFLU 13–0399         | Bambusa sp.             | KF806752 KF806753 GF96755 |
| Pyricularia oryzae                      | REA 8401              | PH06063              | Ophiuro exsatus         | KM484916 KM485022 – – –  |
| Rossmania ukurdunensis                  | AR 3484               | BPI 747566           | Acer ukurdunense        | EU683075 – – –           |
| Rostraureum tropicae                    | CMW 9972              | PREM 57519           | Terminalia ivorensis    | AY167436 AY194092 – – –  |
| CMW 9975                               | –                    | Terminalia ivorensis  | AY167439 – – –          |

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Table 1. (Continued).

| Fungal species       | Culture accession no. | Specimen voucher no. | Host/substrate               | GenBank accession numbers |
|----------------------|-----------------------|----------------------|-----------------------------|---------------------------|
|                      |                       |                      |                             | ITS | LSU | tef1-α | rpb2 |
| Sillia ferruginea    | AR 3440               | BPI 843619           | Corylus avellana            | JF681959                  | EU683076 | –  | –  |
|                      | CBS 126567            | BPI 843619           | Corylus avellana            | JF681959                  | EU683076 | –  | –  |
| Siroccocus tsugae    | CBS 119626            | BPI 871167           | Tsuga mertensiana           | EU199203                  | EU199136 | EFS12534 | EU199159 |
|                      | AR 4010               | –                    | Cedrus deodora              | EFS12478                  | EU225027 | EU219289 | EU219289 |
| Sordaria fimicola    | CBS 508.50            | –                    | Dung                        | AY681188                  | AY681160 | –  | DQ368647 |
| Stegonsporum acerophilum | CBS 117025       | WU 28050             | Acer saccharum              | EU039982                  | EU003999 | EU040027 | KF570173 |
| Stenocarpella macrospora | CBS 117560       | MRC 8615             | Zea mays                    | FR748048                  | EU754219 | –  | –  |
| Stenocarpella maydis | CBS 117559           | MRC 8614             | Zea mays                    | FR748052                  | DQ377937 | –  | –  |
| Stilbospora ellipsoспорorum | WU 1840         |                       | Carpinus betulus            | –                         | AY616229 | –  | –  |
| Stilbospora macrospora | CBS 121883         | –                    | Carpinus betulus            | JX517290                  | JX517299 | –  | KF570196 |
| Sydowiella depressula | CBS 813.79           | –                    | Rubus sp.                   | EU552156                  | –  | –  | –  |
| Sydowiella fenestrans | CBS 125530           | BPI 843503           | Chamerion angustifolium     | JF681956                  | EU683078 | –  | –  |
| Sydowiella urticicola | MFLUCC 13–0665       | MFLU 660983          | Urtica dioica               | –                         | MF190108 | –  | –  |
| Thyridium vitustum   | AFTOL-ID 172         | OSC 100064           | –                           | –                         | AY544671 | –  | DQ470889 |
| Tubakia seoraksanensis | CBS 127490         | –                    | Quercus mongolica           | HM991734                  | KP260499 | –  | –  |
|                      | BJFCC140824–15       | –                    | Chamenon angustifolium      | KP260502                  | KP260501 | –  | –  |
| Tubakia thailandensis | MFLUCC 12–0030      | MFLU 12–0026         | Decaying leaf               | MF190163                  | MF190110 | –  | –  |
|                      | MFLUCC 17–1672       | MFLU 13–0026B        | Decaying leaf               | MF190164                  | MF190111 | –  | –  |
| Ursicillium fallax   | CMW 18119            | PREM 58840           | Coccocloa uvifera           | DQ368755                  | EF392860 | –  | –  |
| Valsalnicola oxytoma  | AR 4833              | BPI 881137           | Alnus viridis               | JX1519569                 | JX1519653 | –  | –  |
|                      | AR 5137              | BPI 881135           | Alnus tenuifolia            | JX1519561                 | –  | –  | –  |
| Valsella salisii     | AR 3514              | BPI 748461           | Salix fragilis              | –                         | EU255210 | EU222018 | EU219396 |
| Valseuta pleuricosta | CBS 105.89           | –                    | Quercus ilex                | DQ243803                  | –  | –  | –  |
| Waydora typica       | PDD 103894           | PDD 103894           | –                           | –                         | KF727412 | KF727413 | –  |

AFTOL: Assembling the Fungal Tree of Life culture collection; AMH: Ajrekar Mycological Herbarium, India; ATCC: American Type Culture Collection, Virginia, USA; BHI: National Science and Technology Development Agency, Thailand; BECM: British Empire and Commonwealth Museum, UK; BJFCC: Beijing Forestry University, China; BPI: U.S. National Fungus Collections, Systematic Botany and Mycology Laboratory, USA; CBS: Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands; CFCC: China Forestry Culture Collection Center, Beijing, China; CMW: Forestry and Agricultural Biotechnology Institute, University of Pretoria, South Africa; CPC: Culture collection of Pedro Crous, The Netherlands; FIU: Museo di Storia Naturale dell’Universita, Italy; HAST: Herbarium, Biodiversity Research Center, Academia Sinica, Taiwan; HHUF: Hirotsuki University, Japan; ICM: International Collection of Microorganisms from Plants, New Zealand; ILL: University of Illinois, USA; IMI: International Mycological Institute, Kew, UK; JF: Jonkershoek Forest Research Centre, South Africa; LCM: Universidad de Chile, Laboratorio de Citogenetica de Mamiferos, Chile; MAFF: MAFF Genebank, Ministry of Agriculture Forestry and Fisheries, USA; MFLU: Mae Fah Luang University herbarium, Thailand; MFLUCC: Mae Fah Luang University Culture Collection, Thailand; MNA: Museum of Northern Arizona, USA; NCFC: National Fungal Culture Collection, India; OSC: Oregon State University, Corvallis, USA; PERM: University of Perm, South Africa; PERT: Western Australian Herbarium, Australia; PK: Academy of Natural Sciences of Dreisl University, Philadelphia, PA; RMF: Rocky Mountain Herbarium, University of Wyoming, USA; SDSL: San Diego State University, USA; STEU: University of Stellenbosch, Plant Pathology Department, South Africa; TRC: Thailand Biodiversity Research Center, Bangkok, Thailand; TFM: Forestry and Forest Products Research Institute, Matsunosato, Japan; UPSC: Fungal Culture Collection at the Botanical Museum, Uppsala University, Sweden; WU: Universiteit Wien, Austria.

similar and the best scoring RAxML tree is illustrated here. The bootstrap support values of maximum likelihood analysis (MLB), maximum parsimony analysis (MPB) and Bayesian posterior probability scores (PP) are noted at the nodes. The separation of Diaporthales from other Sordariomycetes taxa is well-supported (MLB/MPB/PP = 100/96/1). The order separates into 21 familial clades with good support values, and two genera incertae sedis clades labelled as 5 and 18.

Clade 1 is represented by Gnomoniaceae with moderate support values (MLB/MPB/PP = 60/–0.9) and comprised Alnecium, Ambarginomonia, Ampiphorite, Anisogramma, Apiognomonia, Apiolagiomycota, Astromora, Cryptodiaporthe, Cryptospora, Discula, Ditopella, Ditopellipsis, Gnomoniella, Gnomoniopsis, Mamianiella, Marasmiomycetes, Occultocarp, Ophiognomonia, Phragmamorpha, Plagiomastoma, Pleurocera, Siroccous and Valsalnicola. Anisogramma and Mamianiella formed a distinct clade with high support value. Morphologically they are similar and these genera appear to be congeneric. Therefore we synonymise Anisogramma under Mamianiella giving priority to the older name and its taxonomic stability. In addition, Mamianiella is nested in between Anisogramma species and this supports that both genera should be synonymised. Here we introduce one new genus and six new species to Gnomoniaceae. We introduce Plagiostoma salicicola based on morphology and phylogeny. Plagiostoma jonesii, the second species, was a fully-supported clade sister to Plagios-

Clade 2 is A,

Plagiostoma salicellum, P. dilatatum and P. salicicola. It is morphologi-

Clade 3 is B,

Plagiostoma jonesii, the second species, was a fully-supported clade sister to Plagios-

Clade 4 is C,
addition, we include sequences of *Melanconiella* and high bootstrap support values con-

**FAMILIES OF** _Diaporthales_

**Clade 2** is represented by *Melanconidaceae sensu stricto* with good support values (MLB/MPB/PP = 93/91/0.9) and it is considered as *Melanconidaceae*. Most genera listed under *Melanconidaceae* in recent publications are excluded from this family, based on morphology and available sequence data. We introduce a new *Melanconis* species as *M. italica*.

**Clade 3** (MLB/MPB/PP = 100/92/1) represents the new family *Apiosporopsidaceae* which is introduced to accommodate a single genus, *Apiosporopsis*.

**Clade 4** is represented by *Juglanconidaceae* (MLB/MPB/PP = 99/94/1), which was recently introduced by Voglmayr et al. (2017) based on a fungal species isolated from *Juglans nigra*.

**Clade 5** is represented by *Diaporthaceae* species with low bootstrap support and is considered here as *Diaporthales* genera *incertae sedis*, pending the availability of sequence data for the type species *Diaporthella aristata*.

The family *Cryphonectriaceae* is represented by Clade 6 which is phylogenetically poorly-supported (MLB/MPB/PP = 63/−0.9) but morphologically distinct from other families in *Diaporthales*. Almost all taxa in this family have molecular data.

**Clade 7** is represented by the *Harknessiaceae*, which is phylogenetically poorly-supported (MLB/MPB/PP = 60/68/−). Species of *Harknessia* and *wuestneia-like* sexual morphs have been linked by morphological characteristics (Crous & Rogers 2001, Crous et al. 2012b), but the types of both genera have not been linked by molecular data. *Dwipoopa lythri* clusters basal to *Harknessia* species with low support values (MLB/MPB/PP = 60/68/−; Fig. 1).

**Schizoparmaceae** (Clade 8) is phylogenetically well-supported (MLB/MPB/PP = 94/88/−). We introduce a new *Coniella* species as *Coniella pseudokoreana* and it clusters sister to *Coniella straminea*.

**Clade 9** (MLB/MPB/PP = 91/71/1) represents the new family *Erythrolgaleaceae* which is introduced in this study to accommodate *Chrysocrypta, Discuoloides* and *Erythrolgaleum*.

**Clade 10** (MLB/MPB/PP = 93/−1) currently encompasses 6 genera within the *Melanconidaceae*. In particular, *Melanconia* sisters to *Microascospora* where as *Greeneria* is nested in between *Dicarpea* and *Tubakia*. *Microascospora* is introduced here based on *Microascospora rubi* collected from Italy and *Microascospora fragariae (= Sphaeronaemella fragariae*) which was already placed in *Microasciales*. Other genera were previously placed in *Melanconidaceae*, but phylogenetically they do not cluster with *M. stibostoma*, which is the family type of the *Melanconidaceae*. *Dicarpea* and *Tubakia* form a distinct clade within this family to represent both genera as holomorphs. *Greeneria saprophytica* is distant from *Greeneria uvicola*, which is the type of this genus. We introduce a new *Tubakia* species as *T. thailandensis*. A new genus *Microascospora* based on *M. rubi* is introduced here and *M. rubi* strains have high support as a distinct species. *Microascospora ruvi* forms a sister clade to *Microascospora fragariae (= Sphaeronaemella fragariae)* and high bootstrap support values confirmed it as a species. In addition, we include sequences of *Melanconiella chrysodiscosporina* and *M. chrysomelanconium* from recently collected specimens.

**Clade 11** is represented by the monotypic family *Auratiogynidiellaceae*, which is newly introduced in this study based on *Auratiogynidiella tristaniopsis*, and it is morphologically and phylogenetically well-supported (MLB/MPB/PP = 95/−1).

**Clade 12** comprises the monotypic family *Pseudoplagiostomaceae* with full-support (MLB/MPB/PP = 100/100/1).

**Clade 13** (MLB/MPB/PP = 100/68/1) represents *Apoharknessiaceae* to accommodate *Apoharknessia* and *Lasmenia*.

**Clade 14** is represented by the family *Diaporthaceae* with good support (MLB/MPB/PP = 86/91/0.9). We also introduce several new genera such as *Chiangraiomyces* which is typified by *C. bauhiniae*; *Paradiaporthe*, typified by *P. artemisiae* and *Hyaliappendispora* typified by *H. gali*. *Paradiaporthe* is nested with reliable support between *Chiangraiomyces* and *Pheacoctostroma* while *Chiangraiomyces*, clusters sister to *Ophidiopora*. *Hyaliappendispora* grouped sister to *Pheacoedipora*. Here we included several new isolates of *Diaporthaceae* species and *Diaportha subitula* forms a fully-supported clade sister to *Diaportha warbyi*. In addition, we include a new collection of *Diaporthae* and a new collection of *Diaportha rubi*.

**Clade 15** represents the family *Macrohiliaceae* with full-support (MLB/MPB/PP = 100/100/0.9).

**Clade 16** is represented by *Cytosporaceae* with good support (MLB/MPB/PP = 88/51/1). In addition to *Cytospora*, we include *Waydora* and *Pachytypha* in *Cytosporaceae* based on molecular data. Here we introduce five *Cytospora* species viz., *Cytospora centrivillosa*, *Cytospora fraxini*, *Cytospora junipericola*, *Cytospora quercicola*, and *Cytospora rosae*. *Cytospora centrivillosa* forms a distinct clade that is sister to *Cytospora melanodiscus* and *Cytospora mali*. *Cytospora melanodiscus* is morphologically quite different having 1-septate ascospores. Here we added sequences of *C. salicina* from freshly collected specimens.

**Prosopidicolaceae** (Clade 17) is introduced to accommodate *Prosopidicola mexicana*.

**Phaeoappendicosporaceae thailandensis** (Clade 18) forms separate fully-supported (MLB/MPB/PP = 100/100/0.9) clade. It currently does not have a high affinity with any known family in *Diaporthales*, therefore we consider this species as *Diaporthales* genera *incertae sedis*.

**Clade 19** represents the family *Stilbosporaceae* that is fully-supported (MLB/MPB/PP = 100/100/1). Although *Cirtitospora* is morphologically different from *Stegonosporium* and *Stilbospora*, inclusion of this genus in the family is phylogenetically well-supported.

**Clade 20** comprises the family *Coryneaceae* and includes molecular data for *Coryneum arauasiaca* collected from Italy. *Coryneum arauasiaca* has high support (MLB/PP = 100/96/1) as a separate species.

**Clade 21** represents the family *Sydowiellaceae* with very good support (MLB/MPB/PP = 98/79/1) and here we introduce a new species *Sydowiella uralicina*. *Sydowiella uralicina* clade received high support values.

**Lamproconiacae** is represented by clade 22 and comprises *Lamproconium* and *Hercospora*.

The new family *Asterosporiaceae* (23) is introduced to accommodate *Asterosporium asterospermum*. This monogenic family received high support (MLB/MPB/PP = 100/96/1) and is sister to *Sydowiellaceae* and *Lamproconiacae*.
Fig. 1. Consensus tree resulting from a maximum likelihood analysis of a combined LSU nrDNA, ITS nrDNA, rpb2 and tef1 sequence alignment for taxa of Diaporthales and other species in Sordariomycetes. Families are indicated in coloured blocks. RAxML bootstrap support values (MLB above 50 %), maximum parsimony bootstrap support values (MPB above 50 %) and Bayesian posterior probabilities (BPP above 0.90) are given at the nodes (MLB/MPB/BPP). The scale bar represents the expected number of changes per site. The tree is rooted to Eutypella sp. (MFLUCC 16–1215). All the new sequences used in this study are in blue bold and type sequences are in black bold. The nodes that received maximum support (MLB/MPB/BPP = 100/100/1) are indicate by *
| Family                | Species / Accession Numbers                      |
|-----------------------|--------------------------------------------------|
| Schizoparmaceae       | Harknessiaceae (7)                                |
|                       | *Harknessiaceae eucalypti CBS 342.97             |
|                       | *Harknessia eucalypti CPC 13643                  |
|                       | *Harknessia molokaiensis CPC 19269               |
|                       | *Harknessia karwarrae CPC 10928                  |
|                       | *Harknessia wereesubiae CBS 113075               |
|                       | *Harknessia wereesubiae CPC 5109                 |
|                       | *Dwiroopa lythri AR 3383                         |
|                       | Schizoparmaceae (8)                               |
|                       | *Coniella tibouchinae CPC 18511                  |
|                       | *Coniella africana CBS 114133                    |
|                       | *Coniella pseudokoreana MFLUCC 17-1673           |
|                       | *Coniella pseudokoreana MFLUCC 12-0427           |
|                       | *Coniella straminiae CBS 149.22                  |
|                       | *Coniella koreana CBS 143.97                     |
|                       | *Coniella crousii NFCCI 2213                     |
|                       | *Coniella fragariae CBS 172.49                   |
|                       | *Coniella wangiensis CPC 19397                   |
|                       | *Coniella fragariae CBS 110394                   |
|                       | *Coniella australiensis IMI 261318               |
|                       | Erythrogloeaceae (9)                              |
|                       | *Microascospora fragariae 1.3                    |
|                       | *Microascospora fragariae 1.1                    |
|                       | *Microascospora fragariae 1.2                    |
|                       | *Microascospora rubi MFLU 15-1112                |
|                       | *Microascospora rubi MFLU 17-0883                |
|                       | *Melanconiaella chrysodiscosporina MFLUCC 17-0893|
|                       | *Melanconiaella chrysomelanconium MFLUCC 17-0966 |
|                       | *Melanconiaella ellisii BPI 878343              |
|                       | *Melanconiaella spodiaea SPOD1                   |
|                       | Greeneria uvicola Fi12008                        |
|                       | Greeneria uvicola Fi12007                        |
|                       | Tubakia seorakashanensis CBS 127490             |
|                       | Tubakia seorakashanensis BJFCCC 14082415        |
|                       | *Dicarpella dryina ICMP 14043                    |
|                       | *Dicarpella dryina ICMP 14042                    |
|                       | *Tubakia thailandensis MFLUCC 17-1672           |
|                       | *Tubakia thailandensis MFLUCC 12-0303           |
|                       | *Greeneria saprophytica MFLUCC 12-0298           |
|                       | Melanconiaellaceae (10)                          |
|                       | *Auratiopycnidiella tristaniopsis CBS 132180     |
|                       | Pseudoplagiostoma oldii CBS 115722              |
|                       | *Pseudoplagiostoma oldii CBS 124808             |
|                       | *Pseudoplagiostoma eucalypti CBS 124807         |
|                       | *Pseudoplagiostoma eucalypti CPC 14161          |
|                       | *Pseudoplagiostoma variabile CBS113067           |
|                       | *Pseudoplagiostoma corymbiae CPC 19287          |
|                       | *Apoharknessiella insueta CBS 114575            |
|                       | *Apoharknessiella insueta CBS 111377            |

Fig. 1. (Continued)
Fig. 1. (Continued).
Saprobic or pathogenic in plants, and animals, including humans or inhabiting soil. Sexual morph: *Pseudostroma* or *ascostroma* well-developed, poorly developed or absent, scattered, immersed or erumpent, solitary to aggregated, valsoid to diatrypoid, globose to subglobose, sometimes with plate-like ornamentation around ostiole, black to brown, ostiolate, papillate. *Papilla* lacking or upright, long or short, one or more, central or eccentric, slanted to horizontal on host tissue, sometimes converging, with neck swollen at the tips, fuscous black to brown, ostiole with hyaline paraphyses. *Peridium* thin or thick, comprising outer, dark, thick-walled, cells of *textura angularis* and inner, mostly small, hyaline, thin-walled, flattened cells of *textura angularis*. *Hamathecium* aparyphylate or comprising few broad cellular, filiform to cylindrical, septate to asceptate, branches to unbranched, hyaline paraphyses and sometimes parenchymatous cells attached at the base and asci dissolving at maturity. Asci generally 2–32-spored, unitunicate, ellipsoid, cylindrical, fusiform, clavate, oblong-clavate, broadly fusoid to cylindrical-fusoid, short pedicellate, apex blunt, usually with distinct, J- refractive ring. Ascospores overlapping uniseriate, biseriate, partially biseriate to fascicularly arrange, ovoid, ellipsoid, oblong, fusoid, cylindrical, filamentous or allantoid, asceptate to multi-septate, rarely distoseptate, constricted or not at the septa, hyaline, olivaceous to brown, smooth- to sometimes ornamented walled, ends mostly rounded, rarely pointed, multi-guttulate, straight or curved, smooth- to sometimes ornamented walled to rarely ornamented, hyaline to dark brown. *Appendages* absent or present; if present, apical or basal, subulate, navicular or whip-shaped, smooth, hyaline. *Ascosporum* developing scutellum, densely aggregated or few, supported by the upper most cells of basal and parietal tissue or under the conical, densely aggregated or few, subcylindrical, brown cells of *textura angularis* and inner, mostly small, hyaline, thin-walled, flattened cells of *textura angularis*. *Hamathecium* aparyphylate or comprising few broad cellular, filiform to cylindrical, septate to asceptate, branches to unbranched, hyaline paraphyses and sometimes parenchymatous cells attached at the base and asci dissolving at maturity. Asci generally 2–32-spored, unitunicate, ellipsoid, cylindrical, fusiform, clavate, oblong-clavate, broadly fusoid to cylindrical-fusoid, short pedicellate, apex blunt, usually with distinct, J- refractive ring. Ascospores overlapping

### Taxonomy

**Diaporthales** Nannf., Nova Acta R. Soc. Scient. Upsal. 8: 53. 1932.

Saprobic or pathogenic in plants, and animals, including humans or inhabiting soil. Sexual morph: *Pseudostroma* or *ascostroma* well-developed, poorly developed or absent, scattered, immersed or erumpent, solitary to aggregated, valsoid to diatrypoid, broadly elliptical, oval to circular from above, yellowish orange, pale brown, dark brown to black, some species turning purple or umbre in KOH. *Entostroma* normally limited to the region near the perithecial walls, prosenchymatous, pale-coloured, and slightly differentiated from the surrounding bark tissue. *Ectostromatic disc* well- or poorly developed, subhyaline, yellowish white, pale brown, rarely dark brown to black, pulvinate, flat or slightly convex, orbicular, circular or somewhat irregular, at or slightly convex, orbicular, circular or somewhat irregular, sometimes with or without black zone or a crust consisting of fungus tissue, *Ectostromatic disc* and slightly differentiated from the surrounding bark tissue. *Peridium* thin or thick, comprising outer, dark, thick-walled, cells of *textura angularis* and inner, mostly small, hyaline, thin-walled, flattened cells of *textura angularis*. *Hamathecium* aparyphylate or comprising few broad cellular, filiform to cylindrical, septate to asceptate, branches to unbranched, hyaline paraphyses and sometimes parenchymatous cells attached at the base and asci dissolving at maturity. Asci generally 2–32-spored, unitunicate, ellipsoid, cylindrical, fusiform, clavate, oblong-clavate, broadly fusoid to cylindrical-fusoid, short pedicellate, apex blunt, usually with distinct, J- refractive ring. Ascospores overlapping

### Families of Diaporthales

| Family | Genera |
|--------|--------|
| Togniniales | Calosphaeriales |
| Calosphaeria | Taphrinales |
| Phomatosporales | Ophiostomatales |
| Mycrocordiales | Trichosporales |
| Ascolacicola | Papulosaceae |
| Myrmecridiales | Magnaporthales |
| Asco- | outgroup |
| | |

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**Fig. 1.** (Continued.)

![Diagram of families of Diaporthales](image-url)

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terminal and lateral apex, with minute periclinal thickening and collarette. Beta conidiophores interspersed among alpha conidiophores, hyaline, subcylindrical, branched, septate. Conidiogenous cells lining the inner cavity of conidium, enteroblastic to holoblastic, annellidic or phialidic, discrete or integrated, hyaline to oivaceous, smooth, lageniform, subcylindrical to annelliform, with terminal truncate locus, simple or branched, proliferating several times percurrently near apex, with flaring collarettes or apex truncate, with minute periclinal thickening or terminal truncate locus. Conidia broadly ellipsoid, oval, obvoid, allantoid, fusoid to sigmoid, sinuate to slightly angular, hyaline to dark allantoid, fusoid to sigmoid, sinuate to slightly angular, hyaline to brown, hyaline when immature, becoming medium brown to dark brown at maturity, smooth-walled, guttulate, aseptate to septate or distoseptate, apex obtuse, base truncate with a visible scar or a flat protruding scar at the base, sometimes the apical and basal cell darker than other cells or with hyaline tip in apical cell, sometimes with or without a longitudinal germ slt, sometimes with marginal frill or becoming golden brown at germination, with solitary, brown, wavy germ tubes.

Notes: The order Diaporthales was introduced to accommodate “true” diaportheen taxa and Eriksson & Winka (1997) accommodated Diaporthales in Sordariomycetidae. Barr (1978), Monod (1983), Castlebury et al. (2002), Rossman et al. (2007), Maharachchikumbura et al. (2015, 2016), Rossman et al. (2015) and Voglmayr et al. (2017) clarified the taxonomic and phylogenetic concepts. Maharachchikumbura et al. (2015) introduced the subclass Diaporthymycetidae to accommodate the order Diaporthales. Morphologically and phylogenetically this is a well-supported order comprising Apiosporopsidaceae, Aposharknessiaceae, Astrosporiaceae, Auratiozygnematiellaceae, Cystochyphaceae, Cryptonectriaceae, Cryphonectriaceae, Lamproconiaceae, Melanconidaceae, Melanconiellaceae, Pseudoplagnostomaceae, Schizoparmaceae, Stilbosporaceae, and Sydowiellaceae.

Apiosporopsidaceae Senan., Maharachch. & K.D. Hyde, fam. nov. MycoBank MB821538. Facesoffungi number FoF03455. Clade 3.

Parasitic on living leaves and twigs. Sexual morph: Ascomata scattered, black, oval to almost spherical, immersed in the leaf tissue beneath a thin, well-developed clypeus, neck lacking or only slightly papillate, periphysate. Peridium comprises 5–6 outer layers of dark, thick-walled cells of textura angularis and inner, thin-walled, strongly flattened cells of textura angularis. Hamathecium apophysate. Asci 8-spored, ununcticate, short-pedicellate, apex blunt with J- apical ring. Ascospores 1–2-seriate, elliptical to fusoid, somewhat flattened on one side, unicellular, hyaline. Asexual morph: Coelomycetous. Stroma loculate, globose to irregular, sometimes with beaks. Conidiogenous cells phialidic, short to elongate, simple or branched. Conidia oblong or cylindrical to allantoid, 1-celled, hyaline.

Type genus: Apiosporopsis (Traverso) Mariani.

Type species: Apiosporopsis saccardoana Mariani.

Apiosporopsis carpinea (Fr.) Mariani, Atti Soc. ital. Sci. nat. (Modena) 50: 165. 1911. Facesoffungi number FoF03456. Fig. 2. Basionym: Xyloma carpini Fr., Observ. mycol. (Havniae) 2: 363. 1818.

Illustration: For asexual morph see Potебnia (1910).

Saprobic on over-wintered plants. Sexual morph: Cylpeus 70–140 μm wide, 50–70 μm high, slight, prosenchymatous. Ascomata 112–250 μm diam, 140–170 μm high, globose or depressed, immersed, usually hypophyllous, appapillate, apex rounded with plane pore or short papillate or conic. Peridium 10–20 μm wide, comprising thick-walled, brown cells of textura angularis. Asci 40–75 × 8–14 μm, 8-spored, ununcticate, cylindrical, sessile, apical ring bilobed, distinct, shallow. Ascospores 10–15 × 3.5–6.5 μm, overlapping uniseriate, ellipsoid, ovoid or fusoid, straight or often inequilateral, guttulate, hyaline, aseptate. Asexual morph: Conidiomata acervular, superficial, black, coriaceous. Conidiophores reduced to conidiogenous cells. Conidiogenous cells 5–10 μm long, conical, wide, aseptate, hyaline. Conidia 12–15 × 8–9 μm, oblong to ellipsoid, hyaline, aseptate, with two small guttules (description of asexual morph from Potебnia 1910).

Material examined: Austria, Sonntagberg, New Rosenau, July, on leaves of Carpinus betulus (Betulaceae), P.P. Strasser, IMI 11662.

Notes: Traverso (1907) erected Apiosporopsis as a subgenus of Guignardia to accommodate Guignardia carpinea and G. veneta based on their distinct morphological characters. Mariani (1911) raised Apiosporopsis to generic rank describing A. saccardiana as a third species. Von Höhnel (1917) proposed Sphaerognomonia to accommodate Apiosporopsis carpinea. Reid & Dowser (1990) evaluated this genus and proposed Apiosporopsis as the correct name for Sphaerognomonia, retaining the type species as Apiosporopsis carpinea. Index Fungorum (2017) and MycoBank (2017) list another two species of Apiosporopsis as A. saccardoana and A. coronilae.

Apiosporopsis carpinea was recorded only on over-wintered living leaves. Gloeosporium robergei was reported as the asexual morph of A. carpinea (Potебnia 1910, Treigien & Markovska 2007). However, there are no molecular data to prove this. Gloeosporium robergei was reported as the causal agent of bud mortality and twig cankers on Ostrya virginiana (Sinclair & Hudler 1980). Sequences of this species (CBS 617.72 and CBS 738.68) placed the genus in the Diaporthales, but not in the Gnomoniaceae or Melanconidaceae (Sogonov et al. 2008). The molecular analysis of this study revealed that Apiosporopsis species formed a separate, well-supported clade (Fig. 1, Clade 3). Morphologically this clade is distinct from other families of Diaporthales having ascospores with pseudo-septate, sharply pointed ends, sessile ununcicate asci with a bilobed apical ring, and appapillate, immersed ascomata. Hence, we introduce the family Apiosporopsidaceae to accommodate these species.

Apoharknessiaceae Senan., Maharachch. & K.D. Hyde, fam. nov. MycoBank MB821881. Facesoffungi number FoF03457. Clade 13.

Endophytic, saprobic or pathogenic. Sexual morph: Undetermined. Asexual morph: Conidiomata stromatic or eustromatic, subepidermal to immersed, solitary to gregarious, subglobose to irregular, unicellular, pale brown. Conidiomata wall outer layer composed of thin-walled, pale brown cells of textura
angularis, inner layer pale yellow to hyaline. Conidiophores reduced to conidiogenous cells or hyaline, septate, cylindrical, and sparingly branched. Conidiogenous cells holoblastic, cylindrical, lageniform to ampulliform, hyaline, smooth, invested in mucus. Conidia obclavate, conical, aseptate, pale brown, with a longitudinal band on the flat surface, thick and smooth-walled, guttulate, with short hyaline apiculus, with small globule of mucus on base or obtuse apex with a scar at the base.

**Type genus:** Apoharknessia Crous & S.J. Lee.

**Type species:** Apoharknessia insueta (B. Sutton) Crous & S.J. Lee.

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Notes: Apoharknessia displays similar morphological characters to Harknessia but differs in having a hyaline, apical apiculus. Nag Raj (1993) listed Mastigonetron, as a synonym for Harknessia. Mastigonetron is typified by M. fuscum (= H. insueta). However, this species has a Wuestneia sexual morph, W. fusca, and it does not cluster with other Harknessia species. Therefore, Apoharknessia was introduced to accommodate H. insueta (Lee et al. 2004). The genus Apoharknessia presently accommodates two species (Crous et al. 2017).

Lasmenia species cause rachis necrosis, flower abortion and necrotic spots on leaves of Nephelium lappaceum. Several Lasmenia species associated with tropical fruits as pathogens have been isolated. DNA-based studies report a close affinity of Lasmenia to Cryphonectriaceae (Serrato-Diaz et al. 2011).
Lasmenia was introduced in 1886 without designating any type species and L. balansae was selected as the lectotype species by von Höhnel (1910). There are 12 species recorded under Lasmenia in Index Fungorum (2017). Lasmenia species are reported as the causative agents of rachis necrosis, flower abortion, fruit rot, and leaf spots on Nepheleium lappaceum (Serrato-Díaz et al. 2011). A few species have been transferred to Lasmeniella, but some species remain doubtful.

Phylogenetic analysis in the present study indicates that Apoharknessia and Lasmenia clearly belong to the Diaporthales in a well-supported clade (Fig. 1, Clade 13). However, the sequences of Lasmenia which are included in this study are not of a known species and given the sparse taxa in this family, any affinity between the two genera can not be ascertained.

Hence, we introduce a new family Apoharknessiaceae to accommodate these two genera. Morphologically species of this clade are distinct from other families of Diaporthales in having eustromatic to stromatic pycnidal conidiomata, bispicyllic or phialidic conidiogenesis and ellipsoid to conical conidia with a longitudinal band on the flat surface or small globule of mucus at the base.

Apoharknessia insueta (B. Sutton) Crous & S.J. Lee, Stud. Mycol. 50: 240. 2004. Facesoffungi number FoF03458.

Illustration: See Lee et al. (2004).

Follicolous forming bleached spots or saprobic on various substrates. Sexual morph: Undetermined. Asexual morph: Conidiomata stromatic, subependemal to immersed, solitary to gregarious, subglobose to irregular, unilocular, pale brown. Conidiomata wall outer layer composed of thin-walled, pale brown cells of textura angularis, inner layer pale yellow to hyaline. Conidiophores reduced to conidiogenous cells. Conidiogenous cells 5–15 × 4–6 μm (x = 9 × 4.8 μm), lageniform to ampulliform, hyaline, smooth, invested in mucus. Conidia 10–12 × 7.5–9 μm (x = 10.5 × 8 μm), conical, aseptate, brown, with a longitudinal band on the flat surface, thick and smooth-walled, guttulate, with short hyaline apiculus, with small globule of mucus on base. Basal appendage 2 × 1–1.5 μm, often gelatinising and resulting in a minute marginal frill on the truncate base of the conidium (description based on Nag Raj 1993).

Notes: Apoharknessia was introduced and typified by Apoharknessia insueta and it clustered distant from Harknessia sensu stricto (Clade 7) (Lee et al. 2004). Apoharknessia is morphologically similar to Harknessia but distinct in having a hyaline apical apiculus in conidia and cultures on oatmeal or malt extract agar not forming fluffy aerial mycelium. In addition, it grows within the medium and sporulates directly on hyphae without forming conidiomata. Crous et al. (2017) introduced a new species as Apoharknessia eucalyptorum.

Asterosporiaceae Senan. Maharachch. & K.D. Hyde, fam. nov. MycoBank MB821539. Facesoffungi number FoF03459. Clade 23.

Endophytic or saprobic on Betulaceae, Fagaceae, Juglandaceae and Sapindaceae. Sexual morph: Undetermined. Asexual morph: Conidiomata acervular, subependemal, erumpent at maturity, solitary, or occasionally confluent, unilocular, dark brown to black. Conidiomata wall composed of thin-walled, brown cells of textura angularis. Conidiophores cylindrical, branched at the base, septate, hyaline to pale brown. Conidiogenous cells holoblastic, cylindrical, unbranched, integrated, determinate, hyaline to pale brown, smooth. Conidia terminal, transversely distoseptate, consisting of four arms, with reduced lumina, brown, smooth-walled.

Type genus: Asterosporium Kunze.

Type species: Asterosporium hoffmannii Kunze.

Notes: A molecular phylogenetic analysis based on SSU nrDNA, LSU nrDNA, ITS nrDNA and beta-tubulin positions Asterosporium species within Sordariomycetes (Tanaka et al. 2010). Wijayawardene et al. (2016) showed that Asterosporium species are related to Diaporthales forming a sister clade to species in Sydowiellaceae based on combined ITS nrDNA and LSU nrDNA sequence analyses. In this study, Asterosporium species are positioned in Diaporthales (Fig. 1, Clade 23) and constitute a well-supported sister clade to Sydowiellaceae and Lamproconiaceae. Morphologically, Asterosporium species are distinct from other members of Diaporthales in having star-like, brown conidia. Hence, we introduce a novel family Asterosporiaceae to accommodate Asterosporium species. We illustrate Asterosporium asterospermum collected from Italy.

Asterosporium asterospermum (Pers.) Hughes, Canad. J. Bot. 36: 738. 1958. Fig. 3. Basionym: Stilbospora asterosperma Pers. [as ‘asterospora’], Syn. meth. fung. (Göttingen) 1: 96. 1801.

Saprobic on twigs and branches of Fagus sylvatica. Sexual morph: Undetermined. Asexual morph: Conidiomata 2–2.5 mm high, 0.8–1 mm diam (x = 2.1 × 0.86 mm, n = 15), acervular, subependemal, erumpent at maturity, solitary, or occasionally confluent, unilocular, dark brown to black. Conidiomata wall 25–30 μm (x = 29, n = 20), composed of thin-walled, brown cells of textura angularis. Conidiophores 30–35 μm high, 5–8 μm wide (x = 29 × 7 μm, n = 20), cylindrical, branched at the base, septate, hyaline to pale brown. Conidiogenous cells 70–100 μm high, 4–7 μm wide (x = 80 × 5 μm, n = 20), holoblastic, cylindrical, unbranched, integrated, determinate, hyaline to pale brown, smooth-walled. Conidia 65–75 × 90–115 μm (x = 68 × 100 μm, n = 20), terminal, transversely distoseptate, consisting of four arms, with reduced lumina, brown, smooth-walled.

Specimen examined: Italy, Forlì-Caesena Province, Santa Sofia, near Passo la Cellina, on dead branch of Fagus sylvatica (Fagaceae), 29 Sep. 2012, E. Campos, IT 805, MFLU 15-3555, HKAS 92536.

Notes: Asterosporium was introduced and typified by Asterosporium asterospermum (= Stilbospora asterosperma and Asterosporium hoffmannii) and there are five species listed in Index Fungorum (2017), namely A. acerinum, A. asterospermum, A. attenuatum, A. hoffmannii and A. strobilorum. However, only A. asterospermum has DNA sequence data in GenBank. There are no records for the sexual morph of Asterosporium (Tanaka et al. 2010). Species of this genus are associated with twigs and stems of overwintered plants as endophytes.
**Auratiopycnidiellaceae** Senan., Maharachch. & K.D. Hyde, fam. nov. MycoBank MB821540. Facesoffungi number FoF03460. Clade 11.

Foliicolous. Sexual morph: Undetermined. Asexual morph: **Conidiomata** amphigenous, pycnidia, globose, orange on leaves with dark brown border. **Peridium** comprises pale brown cells of texture angularis. **Paraphyses** hyaline, cellular, subcylindrical, branched or not, with obtuse apex, septate, constricted at septa. **Conidiophores** reduced to conidiogenous cells. **Conidiogenous cells** hyaline, smooth, lageniform to ampulliform, with terminal truncate locus, thick-walled, sometimes appearing to proliferate percurrently. **Conidia** ellipsoid, smooth, solitary, median 1–septate, constricted at septum, apex obtuse, base truncate, thickened, at times with marginal frill, becoming golden brown at germination with solitary, brown, wavy germ tubes.

**Type genus:** *Auratiopycnidiella* Crous & Summerell.

**Type species:** *Auratiopycnidiella tristaniopsidis* Crous & Summerell.

**Notes:** Crous et al. (2012a) described *Auratiopycnidiella* as a genus with subepidermal, orange, pycnidial conidiomata, forming hyaline, holoblastic conidiogenous cells, with or without a thickened scar and hyaline, ellipsoid, 1-septate conidia having a thickened hilum or minute marginal frill. Crous et al. (2012a) reported that the genus is phylogenetically distant to *Melanconiaceae* based on LSU nrDNA sequence data and treated this genus as *Diaporthales* genera incertae sedis pending the availability of more molecular data. A megablast search of NCBI’s GenBank nucleotide database using the calmodulin, ITS nrDNA, and beta-tubulin sequences retrieved sequence similarities with *Harknessiaceae* and *Cryptonectriaceae* (Crous et al. 2012a). Our phylogenies generated herein indicate that *Auratiopycnidiella* forms a single branch which is phylogenetically distinct from all other included families (Fig. 1, Clade 11) and hence we introduce *Auratiopycnidiellaceae* to accommodate *Auratiopycnidiella*. *Auratiopycnidiella* currently comprises a single species with a single isolate.

**Auratiopycnidiella tristaniopsidis** Crous & Summerell [as ‘tristaniopsis’], Persoonia 28: 69. 2012. Facesoffungi number FoF03461.

**Illustration:** See Crous et al. (2012a).

Foliicolous. Sexual morph: Undetermined. Asexual morph: **Conidiomata** up to 200 μm diam, amphigenous, pycnidia, globose, orange on leaves with dark brown border, with irregular central opening. **Peridium** up to 25 μm thick, comprising 4–7 layers of pale brown cells of texture angularis. **Paraphyses** hyaline, cellular, subcylindrical, branched or not, with obtuse apex, 2–6-septate, constricted at septa **Conidiophores** 10–25 × 3–6 μm, reduced to...
Conidiogenous cells. *Conidiogenous cells* hyaline, smooth, lageniform to ampulliform, with terminal truncate locus, thick-walled, sometimes appearing to proliferate percurrently. *Conidia* 13–15 × 5–5.5 μm, ellipsoid, smooth, solitary, medially 1-septate, constricted at septum, obcluse at apex, truncate at base, thickened at times with marginal frill, hyaline becoming golden brown during germination with solitary, brown, wavy germ tubes 90° to the long axis of the spore (description based on Crous et al. 2012a).

Notes: *Auratiopycnidiella* was introduced and typified by *Auratiopycnidiella tristaniopsis*. This is a monotypic genus comprising only the type species, *A. tristaniopsis*. *Auratiopycnidiella tristaniopsis* forms leaf spots on its host species. Morphologically this taxon shows some similarities to taxa of the *Cryptonectriaceae* in having orange conidiotoma. However, phylogenetically it is distinct from *Cryptonectriaceae*.

**Coryneaceae** Corda, Icon. fung. (Prague) 3: 36. 1839. Clade 20. *Synonym: Pseudovalsaceae* M.E. Barr, Mycol. Mem. 7: 151. 1978.

Saprobic on dead wood or pathogenic. Sexual morph: *Stromata* solitary, erumpent, comprising pseudoparenchymatous cells. *Ectostromatous disc* well or poorly developed, brown to black, comprising small cells of *textura prismatica* cells. *Ascomata* perithelial, arranged in valsalid configuration, immersed, aggregated, globose to subglobose, coneraceous, brown to black, papillate, ostiolate. *Papilla* upright, central, broad, sometimes converging, comprising brown cells of *textura porrecta*. *Peridium* comprising outer, thick-walled, brown cells of *textura angularis* and inner, thick-walled, hyaline, compressed cells of *textura angularis*. *Hamathecium* comprising broad, cellular, septate paraphyses, attached to base, longer than asci. *Asci* 8-spored, unitunicate, ellipsoid to cylindrical, thin-walled, pedicellate, apex rounded with a J-apical neck. *Ascospores* overlapping unit- to biseriate, hyaline or initially hyaline, brown at maturity, irregularly fasciculate, ellipsoid, fusoid or elongate, 1–3–septate, often distoseptate, end cells pale brown or hyaline, sometimes end cells pointed, straight or curved not constricted at the septa, gutulate, smooth-walled. Asexual morph: *Coeolymentosus*. *Conidiomata* acervular, solitary, erumpent through the outer periderm layers of host or immersed, scattered, surface tissues above slightly dome-shaped. *Conidiomatal wall* composed of thin-walled, vertically arranged dark brown cells of *textura angularis*. *Conidiophores* branched at the base or not, cylindrical to globose, septate or aseptate, hyaline or hyaline at the apex, pale brown at the base. *Conidiogenous cells* terminal, hyaline, annelidic, cylindrical, sometimes with selulose apical appendages. *Conidia* hyaline to dark brown, curved, broadly fusiform to cylindrical or clavate, smooth-walled, 4–6–distoseptate, sometimes the apical and basal cell darker than other cells with hyaline tip in apical cell.

**Type genus**: *Coryneum* Nees.

**Type species**: *Coryneum umbonatum* Nees.

Notes: The family *Coryneaceae* (Fig. 1, Clade 20) was introduced by Corda (1839) based on *Coryneum*. However, Barr (1978) introduced the family *Pseudovalsaceae* based on *Pseudovalsella lanciformis*, which is the sexual morph of *Coryneum umbonatum*. Hence *Pseudovalsaceae* must be synonymised under *Coryneaceae* giving priority to the older name. Rossman et al. (2015) protected the earliest name *Coryneum* (1816) over *Pseudovalsella* (1883) and conserved *Coryneum umbonatum* as the type species. This family comprises fungal taxa with upright, erumpent perithelia and central beaks. However, many genera previously included in *Coryneaceae* have been placed in various other families (Castlebury et al. 2002) and the only genus remaining in the family is *Coryneum*.

**Coryneum arausiaca** (Fabre) Senan., Maharachch. & K.D. Hyde, comb. nov. MycoBank MB821543. Facesoffungi number FoF03462. Fig. 4.

Basionym: *Pseudovalsa arausiaca* Fabre, Sphér. Vauc.: 56. 1883.

Saprobic on branches of *Quercus* sp. Sexual morph: *Stromata* comprising loosely packed, black, hyphae mostly around the neck. *Ascomata* 600–700 μm high, 315–365 μm diam (x = 640 × 340 μm, n = 20), immersed, 5–10 aggregated in one group, visible only as ostiolar opening through cracks in bark, volsoid, globose, brown to black, papillate, ostiolate, ostiole peripherystis, periphyses hyaline, long. *Peridium* 25–50 μm (x = 45 μm, n = 10), 10–15 layers of thick-walled, brown-walled cells of *textura angularis* and papilla comprising brown cells of *textura porrecta*. *Paraphyses* 5–10 μm (x = 7.6 μm, n = 20), few, hyaline, septate, attached at base, longer than asci. *Asci* 145–155 × 25–30 μm (x = 146 × 25.6 μm, n = 10), 8-spored, unitunicate, clavate, short pedicellate, apically rounded, narrow, J-, without an obvious apical ring. *Ascospores* 70–90 × 6.5–8.5 μm (x = 77 × 7.5 μm, n = 10), 2–3–seriate, broadly ellipsoid, ends pointed, 1–3–septate, not constricted at the septa, hyaline, gutulate, smooth-walled. Asexual morph: *Conidionoma* acervular, 1–1.3 mm wide, 0.5–0.55 mm high (x = 1.1 × 0.51 mm, n = 20), solitary, erumpent through the outer periderm layers of host, scattered, surface tissues above slightly domed. *Conidionatal wall* 100–150 μm (x = 135 μm, n = 20), composed of thin-walled, vertically arranged, dark brown cells of *textura epidermis*. *Conidiophores* 20–35 μm long, 4–7 μm wide (x = 30 × 6 μm, n = 20), branched at the base, cylindrical, septate, hyaline at the top, pale brown at the base. *Conidigenous cells* 4–7 μm long, 4.5–6 μm wide (x = 6 × 5 μm, n = 20), formed from the apical cell of the conidiophore, holoblastic, cylindrical, hyaline. *Conidia* 42–56 × 13–16 μm (x = 48 × 14 μm, n = 20), curved, broadly fusiform to fusiform-cylindrical or clavate (rather variable in form), brown, smooth-walled, 4–6–distoseptate, with apical and basal cells darker than other cells, apical cell with a hyaline tip, truncate and black at base.

**Culture characteristics**: Ascospores germinating on MEA within 12 h and germ tubes produced from both ends, fast growing on MEA at 25 °C, after 1 wk reaching 3 cm diam, white, cottony, margin wavy, superficial, slightly effuse, radially striated, edges with more aerial mycelium than centre.

Specimens examined: **Italy**: Province of Forlì-Cesena, Civitella di Romagna, Pian di Spino, on branch of *Quercus* sp. (Fagaceae), 25 Mar. 2013, E. Campcorsi, IT 1144, (neotype designated here) MFLU 14–0796, cultures ex-neotype, MFLUCC 13–0658; Province of Forlì-Cesena, Civitella di Romagna, Pian di Spino, on branch of *Quercus* sp. (Fagaceae), 16 Feb. 2015, E. Campcorsi, IT 1144A, paraneotype HKAS83943, cultures ex-paraneotype, MFLUCC 15–1110.
Notes: We have re-collected and neotypified *Pseudovalsa arausiaca*. *Pseudovalsa arausiaca* has immersed, globose perithecia in a valsoid configuration with broadly ellipsoidal, 1–3-septate, hyaline ascospores. The neotype is morphologically identical to *Pseudovalsa arausiaca* described by Fabre (1883). However, we could not locate the type specimens and assume that they are lost. Fortunately, we obtained fresh material from the same host genus and location. Therefore, a neotype is designated here with sequence data. Rossman et al. (2015) protected *Coryneum* over *Pseudovalsa*. Hence, we propose a new combination for *Pseudovalsa arausiaca* as *Coryneum arausiaca*. Both sexual and asexual morphs of *Coryneum arausiaca* were obtained from the same specimen as well as cultures which indicate a holomorph connection. We illustrate both sexual and asexual morphs of *Coryneum arausiaca* and the combined gene analysis of LSU nrDNA, ITS nrDNA, rpb2 and tef1 shows the distinct placement of *C. arausiaca* within *Coryneaceae* (Fig. 1, Clade 20).

*Cryphonectriaceae* Gryzenh. & M.J. Wingf., Mycologia 98: 246. 2006. Clade 6.

Saprobic or pathogenic in forest trees and economic crops. Sexual morph: Ascostromata scattered, immersed or erumpent, aggregated, oval to circular from above, comprising two layers, upper layer of yellowish orange to pale brown cells, purpling in
KOH and inner layer of hyaline cells, mixed with plant cells. Ascomata immersed, aggregated, several in one stroma, globose to subglobose, fuscous black to umber, with long neck, or ostiolar canal sometimes immersed in stromatic tissues, or superficial, necks covered in umber stromatic tissue of textura porrecta, inner wall of the necks or ostiolar canal covered with hyaline, filamentosous periphyses. Peridium comprising inner layer of small, hyaline cells of textura angularis and outer layer of small, brown cells of textura angularis. Hamathecium comprising a few cellular paraphyses and parenchymatous cells, attached at the base and asci dissolving at maturity. Asci 8-spored, unitunicate, cylindrical-fusoid to clavate, pedicellate, with distinct, J-refractive ring. Ascospores overlapping uniseriate to biseriate, ellipsoidal, fusoid to cylindrical, aseptate to multi-septate, not constricted at the septa, hyaline, sometimes brown, smooth-walled. Asexual morph: Coelomycetous. Conidiomata occurring as a part of ascomata as conidial locules or solitary structures, unilocular to multiloculate, pyriform, subglobose to pulvinate, necks absent or present, if present, with one to several attenuated necks, superficial or semi-immersed, orange to fuscous-black. Conidiophores cylindrical, aseptate, hyaline, sometimes reduced to conidiogenous cells. Conidiogenous cells lining the inner cavity of the conidiomata, phialidic, sometimes within flattened bases, ampulliform, inconspicuous, with attenuated or truncate apices, hyaline, smooth. Conidia minute, sometimes both micro- and macro-conidia present, sigmoid, broadly ellipsoidal to fusoid, obvoid-cylindrical to allantoid, aseptate, hyaline.

Type genus: Cryphonectria (Sacc.) Sacc. & D. Sacc.

Type species: Cryphonectria parasitica D. Sacc.

Notes: Cryphonectriaceae (Fig. 1, Clade 6) is mostly a pathogenic family comprising some of the world’s most important tree pathogens (Vermeulen et al. 2011). Cryphonectriaceae species are saprobes, endophytes and phytopathogens. They cause cankers, blights and dieback of economically important plants and forest trees. Castlebury et al. (2002) recognised the Cryphonectria-Endothia complex (a precursor to the Cryphonectriaceae) as a separate clade in Diaporthales based on analysis of LSU nrDNA sequence data. Cryphonectriaceae was formally established by Gryzenhout et al. (2006c) to accommodate the Cryphonectria-Endothia complex and other allied genera when analysing LSU nrDNA sequence data of

Fig. 5. Cryphonectria parasitica (NY 01293321). A. Herbarium packet. B. Herbarium specimen. C. Ascostromata on substrate. D. Horizontal section of ascostrum. E. Vertical cross section of ascus. F–I. Asci. J–M. Ascospores. N. Horizontal cross section of conidium. O. Vertical cross section of conidium. P, Q. Conidia attached to the conidiogenous cells and conidiophore. R. Conidia. Scale bars: C, D = 1 mm, F–I, P–R = 10 μm, E, Q, O = 100 μm, N = 200 μm, J–M = 5 μm.
**Families of Diaporthales**

fungal taxa in *Diaporthales*. Species of this family can be distinguished from other families of *Diaporthales* by orange stromatic tissues, which turn purple in KOH and yellow in lactic acid. Initially Amphilia, Chrysosporthe, Cryphonectria, Endothia and *Rostraureum* were placed in the family (Gryzenhout et al. 2006c). Subsequently, several additional genera were added to the family, some associated with serious canker or foliar diseases, namely: *Aurantiosaccus, Arapax, Aurapax, Celoporethe, Chromendothia, Crispycorepta, Chrysosporthe, Cryptometiom, Diversisporbus, Foliocorypa, Holocarya, Immersiporthe, Lasmenia, Latruncellus, Luteocirrhus, Mastigosporella, Microthia, Prosopidicola and *Usriculm* (Vasilyeva 1993, Gryzenhout et al. 2006a, b, Nakajone et al. 2006, Begoude et al. 2010, Gryzenhout et al. 2010, Vermeulen et al. 2011, Crous et al. 2012a, Chen et al. 2013, Crane & Burgess 2013, Crous et al. 2013).

*Endothia* (1949) is typified by *E. gyrosa* and the asexual morph of this genus was reported as an *Endothelia* species (Barr 1978). However, *Endothelia* is congeneric with *Cryphonectria* and *Endothelia eucalypti* is the asexual morph of type species of *Cryphonectria, C. eucalypti* (Jackson 2003). *Endothelia* (1906) is based on the type species, *Endothelia gyrosa*, now placed in *Cryphonectria* as *C. decipiens* (Gryzenhout et al. 2009). Barr (1978) observed several specimens of *Cryphonectria* and *Endothia* and she used stromatic configuration and ascospore characters to differentiate these two genera. According to Barr (1978), *Cryphonectria* has a valsid configuration of perithecia in prosenchymatous stroma and ellipsoid or ovoid, 1-septate ascospores, while *Endothia* has a diatrypoid configuration of perithecia in pseudoparenchymatous stroma and allantoid, unicellular ascospores. Based on these characters, most *Endothia* species have been moved to *Cryphonectria* and the generic name *Endothia* was restricted to the species with a diatrypoid configuration of the perithecia and allantoid, unicellular ascospores. Combined analysis of LSU nrDNA, ITS nrDNA, rpb2 and teft sequence data in the present study shows *Cryphonectriaeae* is not well-supported (Fig. 1, Clade 6). Phylogenetic analyses of this study also place *Cryphonectria* and *Endothia* as two separate genera, as *Chrysocrypa* (Fig. 1, Clade 9), *Lasmenia* (Fig. 1, Clade 13) and *Prosopidicola* (Fig. 1, Clade 17) outside of *Cryphonectriaeae*. Hence, currently this family comprises *Amphilia, Aurantioporthe, Aurantiosaccus,urons, Aurapax, Aurifillum, Celoporethe, Chromendothia, Chrysosporthe, Chrysosporthe, Crispycorepta, Cryptometiom, Diversisporbus, Endothia, Foliocorypa, Holocarya, Immersiporthe, Latruncellus, Luteocirrhus, Mastigosporella, Microthia, Rostraureum and Usriculm*.

**Cryphonectria parasitica** (Murrill) M.E. Barr, Mycol. Mem. 7: 143. 1978. Facesoffungi number FoF03463. Fig. 5. Basionym: *Diaportha parasitica* Murrill, Torreya 6: 189. (1906).

Pathogenic on branches of *Castanea dentata*. Sexual morph: *Ascomonata* 6.5–1 mm diam (R × 0.8 mm, n = 20), comprising erumpent to superficial, orange epistomatic portion and immersed, hyaline, parenchymatous portion. *Ascomata* 650–715 μm high, 210–220 μm diam (R × 685 × 216 μm, n = 20), perithecial, immersed, globose to subglobose, with black to brown ostiole, ostiolar canal slender, covered with orange to fuscous-black stromatic tissue. *Hamathecium* a paraphyses, comprising parenchymatous tissues. *Asci* 20–35 × 5–8 μm (R × 28 × 6.4 μm, n = 20), 8-spored, unitunicate, fusiform to cylindrical base with small pedicel, apex oblong. *Ascospores* 5–6 × 2–2.5 μm (R × 5.5 × 2.2 μm, n = 20), overlapping uni- or biseriate, hyaline, ellipsoid to fusiform, 1-septate. Asexual morph: *Conidiomata* 250–300 μm high, 180–200 μm diam (R × 280 × 185 μm, n = 20), eustromatic, erumpent, pyriform to pulvinate, orange to fuscous black, occurring in the same stroma as perithecia. *Conidiophores* 3–4 × 1–1.5 μm (R × 3.4 × 1.1 μm, n = 20), cylindrical, unbranched, hyaline. *Conidigenous cells* 2.5–5 × 0.5–1 μm (R × 3.3 × 0.8 μm, n = 20), phialidic, simple or branched. *Conidia* 1.8–2.5 × 0.5–1 μm (R × 2.1 × 0.9 μm, n = 20), hyaline, minute, allantoid to cylindrical, aseptate.

**Notes:** American chestnut blight, caused by *Cryphonectria parasitica*, destroyed American chestnut trees in the USA and Canada at the end of the 19th century. Scientists believed *Cryphonectria parasitica* arrived from north-east Asia in the late 19th century and they discovered that Japanese and Chinese chestnut varieties showed resistance to *C. parasitica*. Spores of this fungus are highly resistant to unfavourable environmental conditions and they can be produced at any time of year when conditions are suitable. The fungus can exist as a saprobe and a parasite. Mycelium can survive more than 10 mo in dried bark and soil (Hepting 1974). Conidia and ascospores of *C. parasitica* are sometimes forcibly ejected and spread in wind and rain. Spores of *Cryphonectria parasitica* are also dispersed by beetles and birds. In addition to chestnut species, some oak species and Chinquapin are also infected by *Cryphonectria parasitica*.

**Cytosporaceae** Fr. [as ‘Cytispori’], Syst. orb. veg. (Lundae) 1: 118. 1825. Clade 16. Synonym: *Valsaceae* Tul. & C. Tul. [as ‘Valsarum’], Select. fung. carpol. (Paris) 1: 180. 1861.

Pathogenic or saprobic on plant tissues. Sexual morph: *Stromata* well or poorly developed. *Ectostroma* circular or irregular, usually well developed in the upper regions. *Entostroma* normally limited to the region near the perithecial walls. *Ascomata* perithecia, immersed to erumpent, solitary or 6–10 ascomata aggregated in valsid configuration, globose to oblong, coriaceous, black to brown, with long neck swollen at the tips, ostiolar. *Ostiole* periphysate, open through the neck. *Peridium* thin, comprising outer, 4–6 layers of, dark brown, thick-walled, cells of *textura angularis* and 5–7 layers of, inner, small, hyaline, thin-walled, cells of *textura angularis*. *Hamathecium* comprising few, hyaline paraphyses limited only at young stage. *Asci* unitunicate, 8-spored, clavate, short-pedicellate, apex round, with apical ring. Ascospores uni- to biseriate, unicellular or rarely bicellular, allantoid or ellipsoid, hyaline, smooth-walled. Asexual morph: *Stromata* uniloculate, black, circular in shape. *Locule* composed of numerous inter connecting chambers arranged radially or irregularly within a continuous mass of ectostromatic tissue, one conidioma per locule. *Conidiomata* pyriform in section, brown, divided into compartments by bending of peridium. *Peridium* consists of brown, 5–7 layers of *textura angularis* cells. *Conidiophores* reduced to conidigenous cells. *Conidigenous cells* arising from conidiomatal wall, phialidic, simple or branched, hyaline, cylindrical. *Conidia* unicellular, allantoid, hyaline, smooth-walled.
Type genus: Cytospora Ehrenb.
Type species: Cytospora chrysosperma (Pers.) Fr.

Notes: The Cytosporaceae (Fig. 1, Clade 16) comprises phytopathogenic species and saprobes. Most Cytospora species are plant pathogens and cause cankers and dieback of many hardwoods and coniferous trees, as well as rarely on herbaceous plants. Generally, Cytospora cankers are known as valsa-canker, Leucostoma-canker or perennial canker (Farr et al. 1989). Cytospora species have been reported as highly virulent and destructive pathogens on Prunus and Populus trees (Biggs 1989, Kepley & Jacobi 2000). A few Cytospora species are considered as facultative wound parasites that attack damaged or weakened plants. Maharachchikumbura et al. (2015, 2016) listed 13 genera under this family as Amphipytostroma, Chaldefaullomyces, Cryptascoma, Cytospora, Ditopellina, Durispora, Harposotroma, Hyposplina, Kapooria, Leptosillia, Maculatifalama, Pachytrype, and Paravalsa. However, the type species of Amphipytostroma, A. tiliae is the asexual morph of the type species of Amphiporthe, A. hranicensis, and these generic names are synonyms (Sutton 1980). Ampiporthe is more widely used than Amphipytostroma and it seems best to protect the former (Rossman et al. 2015). However, Amphiporthe belongs in Gymnoconiaceae (Sogonov et al. 2008; Fig. 1, Clade 1) and we exclude this genus from Cytosporaceae. Rossman et al. (2015) proposed to use Cytospora (1818) rather than Valsa (1825), Valsella (1870), Leucostoma (1917), Valseutypella (1919), or Leucocytospora (1927). Xenytopia is a genus in Gymnoconiaceae and typified by Xenytopia aterrima. This genus is characterised by having solitary or aggregated, erumpent, globose, papillate ascomata with allantoid to cylindrical, ostiolate, papillate. Ascomata wall thick, internally covered by hyaline periphyses. This genus is characterised by having solitary or aggregated, erumpent, globose, papillate ascomata with allantoid to cylindrical, ostiolate, papillate.

Cytospora centrivillosa Senan., Camporeisi & K.D. Hyde, sp. nov. MycoBank MB821568. Facesoffungi number FoF03465. Fig. 7.

Etymology: Named after the host genus Fraxinus.

Saprobic on dead branch of Fraxinus ornus. Sexual morph: Stromata poorly developed, comprising loosely packed parenchymatous cells, black. Ascomata 350–500 μm × 150–230 μm (x = 429 × 189 μm, n = 20), immersed in stromatic tissues, globose to subglobose, dark brown, coriaceous, ostiolar, papillate. Papilla 185–200 × 60–95 μm (x = 193 × 79 μm, n = 20), long, central, wide, thick-walled, internally covered by hyaline periphyses. Peridium comprises brown, thick-walled cells of textura angularis. Asci 26–33 × 6.2–7.5 μm (x = 30 × 6.7 μm, n = 20), 8-spored, uniloculate, clavate to fusiform, without apical ring and pedicel. Ascospores 5.5–7.5 × 1.5–2 μm (x = 6.4 × 1.7 μm, n = 20), biseriate, allantoid, hyaline, smooth. Asexual morph: Coleomycetous. Conidiomata on MEA appears as pale yellow, slimy heads of conidial mass, immersed, black. Conidiophores 6.5–8 × 3–3.5 μm (x = 7.4 × 3.1 μm, n = 20), cylindrical, unbranched, hyaline. Conidigenous cells 10–13.5 × 1–2 μm (x = 11.7 × 1.6 μm, n = 20), cylindrical, tapering towards the apices, bearing single conidia at each tip, hyaline. Conidia 4–6 × 1–1.5 μm (x = 5.1 × 1.1 μm, n = 20), eguttulate, allantoid, aseptate, hyaline.

Cultivar characteristics: Colonies growing on MEA attenuated 1 cm incubated at 18 °C within 4 d, fast growing, circular, flat, entire, white, thin, tightly attached to the media, mycelia clots arrange radially from centre to margin.

Specimens examined: Italy, Province of Forlì-Cesena, Predappio, Monte Mirabellò, on dead and aerial branch of Sorbus domestica (Rosaceae), 1 Oct. 2014, E. Camporeisi, IT 2132, holotype MFLU 17–0887, isotype MFLUCC 16–1206; Province of Forlì-Cesena, Predappio, Monte Mirabellò, on dead and aerial branch of Sorbus domestica (Rosaceae), 13 Oct. 2014, E. Camporeisi, IT 2132B, MFLU 17–0999, culture MFLUCC 17–1660.

Note: Cytospora centrivillosa is morphologically and phylogenetically distinct from other species in Cytospora and our analysis results in a distinct clade with full support (Fig. 1, Clade 16).

Cytospora fraxinigena Senan., Camporeisi & K.D. Hyde, sp. nov. MycoBank MB821568. Facesoffungi number FoF03465. Fig. 6.

Etymology: Name based on two Latin words “centrum” and “villoso” meaning hamathecium comprising filament paraphyses.

Saprobic on dead branch of Sorbus domestica. Sexual morph: Stromata poorly developed, comprising loosely packed parenchymatous cells, black. Ascomata 550–725 μm high, 160–215 μm diam (x = 611 × 190 μm, n = 20), aggregated, immersed, globose to subglobose, dark brown, coriaceous, ostiolate, papillate. Papilla 285–430 μm high, 90–130 μm diam (x = 340 × 101 μm, n = 20), long, central or asymmetrically located, wall thick, internally covered by hyaline periphyses. Peridium comprises brown, thick-walled cells of textura angularis. Asci 75–85 × 15–19 μm (x = 79 × 18 μm, n = 20), 8-spored, uniloculate, clavate to fusiform, without apical ring and pedicel. Ascospores 16–20 × 4–6 μm (x = 17 × 5 μm, n = 20), biseriate, allantoid, hyaline, smooth. Asexual morph: Coleomycetous. Conidiomata on MEA appears as pale yellow, slimy heads of conidial mass, immersed, black. Conidiophores 6.5–8 × 3–3.5 μm (x = 7.4 × 3.1 μm, n = 20), cylindrical, unbranched, hyaline. Conidigenous cells 10–13.5 × 1–2 μm (x = 11.7 × 1.6 μm, n = 20), cylindrical, tapering towards the apices, bearing single conidia at each tip, hyaline. Conidia 4–6 × 1–1.5 μm (x = 5.1 × 1.1 μm, n = 20), eguttulate, allantoid, aseptate, hyaline.

Cultivar characteristics: Colonies growing on MEA attenuated 1 cm incubated at 18 °C within 7 d, moderate fast growing, irregular, flat, undulate, white, woolly, loosely attached to the media.

Specimen examined: Italy, Province of Forlì-Cesena, Santa Sofia, near Corniolo, dead branch of Fraxinus ornus (Oleaceae), 6 Dec. 2013, E. Camporeisi, IT 1562, holotype MFLU 17–0980, isotype BBH 42442, culture ex-type MFLUCC 14–0868.

Notes: Cytospora fraxinigena forms a distinct clade which is sister to Cytospora cedri and Cytospora rosea (Fig. 1, Clade 16). Morphologically, Cytospora fraxinigena differs from those species in having slightly horizontal necks closely arranged at apex and hamathecium without paraphyses.

Cytospora junipericola Senan., Camporeisi & K.D. Hyde, sp. nov. MycoBank MB821569. Facesoffungi number FoF03466. Fig. 8.
**Etymology:** Named after the host genus *Juniperus*.

Saprobic on dead branch of *Juniperus* sp. Sexual morph: Stroma poorly developed, comprising loosely packed parenchymatous cells, black. Ascomata 630–700 μm high, 150–250 μm diam (x = 670 × 170 μm, n = 20), immersed in stromatic tissues, globose to subglobose, dark brown, ostiolate, papillate. Papilla 300–500 μm high, 45–65 μm diam (x = 440 × 58 μm, n = 20), long, central, wide, thick-walled, internally covered by hyaline periphyses. Peridium comprises brown, thick-walled cells of textura angularis. Asci 30–35 × 5.5–7 μm (x = 32 × 6 μm, n = 20), 8-spored, unitunicate, clavate to fusiform, without apical ring and pedicel. Ascospores 5–10 × 1–2 μm (x = 7 × 1.5 μm, n = 20), biseriate, allantoid, hyaline, smooth. Asexual morph: Not observed.

**Culture characteristics:** Colonies growing on MEA attenuated 1 cm incubated at 18 °C within 7 d, moderate fast growing, irregular, flat, undulate, greenish ash, woolly, curled, loosely attached to the media.

**Specimen examined:** Italy, Province of Forlì-Cesena, Santa Sofia, near Cabelli, dead branch of *Juniperus communis* (Cupressaceae), 13 Jan. 2014, E. Camporesi, IT 1643 (holotype MFLU 17–0882, isotype BBH42444).

**Notes:** *Cytospora junipericola* forms a distinct clade that is sister to *Cytospora quercicola* with high bootstrap support (Fig. 1, Clade 16). Morphologically *Cytospora junipericola* produces tightly packed aggregated ascomata in poorly developed stromatic tissues. Papilla are asymmetrically located and only the ostiolar openings are close together.
Cytospora quercicola Senan., Camporesi, & K.D. Hyde, sp. nov. MycoBank MB821570. Facesoffungi number FoF03467. Fig. 9.

Etymology: Named after the host genus Quercus.

Saprobic on dead branch of Quercus sp. Stromata poorly developed, spread around the papilla, black. Ascomata 550–725 μm high, 160–215 μm diam (x = 611 × 190 μm, n = 20), scattered, aggregated, immersed, globose to subglobose, dark brown, coriaceous, ostiolate, papillate. Papilla 285–430 μm high, 90–130 μm diam (x = 340 × 101 μm, n = 20), long, central or asymmetrically located, papilla close to each other when open to host surface.

Peridium comprises brown, thick-walled cells of textura angularis. Asci 75–85 × 15–19 μm (x = 79 × 18 μm, n = 20), 8-spored, unitunicate, clavate to fusiform, without apical ring and pedicel.

Ascospores 16–20 × 4–6 μm (x = 17 × 5 μm, n = 20), biseriate, allantoid, hyaline, smooth.

Culture characteristics: Colonies growing on MEA becoming 1 cm within 7 d incubated at 18 °C, circular, flat, smooth colony with white mycelium, mycelia loosely attached to the substrate.

Specimen(s) examined: Italy, Province of Forlì-Cesena, Santa Sofia, near Camposonaldo, on dead branch of Quercus sp. (Fagaceae), 10 Dec. 2013, E. Camporesi, IT 1568 (holotype MFLU 17-0881, isotype BBH 42443, culture ex-type MFLUCC 14-0867).

Notes: The Cytospora quercicola clade is fully-supported by the multi-gene phylogenetic analyses (Fig. 1, Clade 16). This species is sister to Cytospora junipericola.

Cytospora rosae Senan., Camporesi, & K.D. Hyde, sp. nov. MycoBank MB821571. Facesoffungi number FoF03468. Fig. 10.

Etymology: Named after the host genus Rosa.

Saprobic on Rosa canina. Sexual morph: Stromata restricted to around the ostiolar neck, black. Ascomata 235–255 μm high, 130–150 μm diam (x = 240 × 140 μm, n = 20), solitary to rarely aggregated, scattered, immersed, globose, brown, coriaceous, ostiolate, papillate. Papilla 127–140 μm high, 70–90 μm diam (x = 135 × 87 μm, n = 20), straight or curved, long, brown, internally covered by hyaline periphyses, wall comprising elongated, thick-walled cells. Peridium 16–23 μm diam (x = 20 μm, n = 20), comprising outer, thick-walled, brown cells of textura angularis and inner, compressed, thick-walled, hyaline cells of textura angularis. Hamathecium comprising septate, hyphae-like, hyaline, 1.5–2.7 μm diam (x = 2.5 μm, n = 20) paraphyses. Asci 20–23 × 3.2–3.7 μm (x = 21 × 3.7 μm, n = 20), unitunicate, 8-spored, clavate, short-pedicellate, apex round, with apical ring. Ascospores 4.2–6.3 × 1–1.5 μm (x = 5.5 × 1.3 μm, n = 20), unito biseriate, unicellular, allantoid, or elliptoid, hyaline, smooth-walled. Asexual morph: Conidiomata 100–200 μm diam
(X = 150 μm, n = 20), solitary to aggregate, immersed, pyriform to subglobose, multi-loculate, black, coriaceous, ostiolate, papillate, peridium folded into centrum. Pycnidial walls 4–7 μm diam (X = 6 μm, n = 20), comprising small, thick-walled, brown cells of textura angularis. Conidiophores 8–12 × 1.5–2.5 μm (X = 12 × 1.2 μm, n = 20), phialidic, cylindrical, tapering towards the apices, bearing single conidia at each tip. Conidia 3–5 × 0.5–1 μm (X = 2 × 1 μm, n = 20), aguttulate, elongated to allantoid, slightly curved, aseptate, hyaline.

Culture characteristics: Colonies growing on MEA attained 2 cm within 7 d incubated at 18 °C, filamentous, flat, filiform, middle blackish ash, margin off white, cottony, tiny mycelium clots arrange radially from centre to margin.

Specimen(s) examined: Italy. Province of Forlì-Cesena, Galeata, near Passo delle Forche, on dead branch of Rosa canina (Rosaceae), 15 Apr. 2014, E. Camporesi, IT 1814 (holotype MFLU 17–0885, isotype BBH 42447, cultures ex-type MFLUCC 14–0845; Province of Forlì-Cesena, Galeata, near Passo delle Forche, on dead branch of Rosa canina (Rosaceae), 4 Jan. 2016, E. Camporesi, IT 1814 (paratype MFLU 15–3596, cultures ex-paratype MFLUCC 17–1664).

Notes: Combined ITS nrDNA, LSU nrDNA, rpb2 and tef1 sequence data in the current study shows that Cytospora rosae forms a distinct clade with high bootstrap support, basal to Cytospora fraxinigena (Fig. 1, Clade 16). Morphologically, Cytospora rosae has unique characters of solitary ascomata and small ascii with septate, wide, hyaline, hyphae-like paraphyses.

Cytospora salicina Norphanphoun et al., Mycosphere 8: 80. 2017. Fig. 11.

Saprobic on twigs and branches of Cornus sanguinea. Sexual morph: Undetermined. Asexual morph: Stromata appear as black pinhead spots surrounding by yellow to pale brown tissues on the substrate, immersed, rosette, labyrinthine, pale brown to black, 1–5 pycnidia in a stroma, comprising loosely packed, pale brown cells of textura globosa, ostiole. Papilla narrow, short, internally covered by periphyses, converged, black, furfuraceous. Pycnidial locules multi-chambered, subdivided by invaginations of common pycnidial walls. Conidiomata 530–600 μm high, 600–870 μm diam (X = 570 × 705 μm, n = 20), solitary to aggregate, immersed, pyriform to subglobose, black, coriaceous, ostiolate, papillate, peridium folded into centrum. Pycnidial walls 7–11 μm diam (X = 9.2 μm, n = 20), comprising small, thick-walled, brown cells of textura angularis, separates from...
stromata at maturity. *Conidiophores* 9–15 × 1.5–2.5 μm (x = 11.4 × 2 μm, n = 20), cylindrical, shorter than conidiogenous cells, branched, hyaline. *Conidiogenous cells* 10–20 μm high, 1–1.5 μm diam (x = 16 × 1.3 μm, n = 20), phialidic, cylindrical, tapering towards the apices, bearing single conidia at each tip. *Conidia* 4.5–6 × 0.5–1.5 μm (x = 5 × 1.3 μm, n = 20), eguttulate, elongated to allantoid, slightly curved, aseptate, hyaline.

*Culture characteristics*: Colonies growing on PDA attenuated 2 cm incubated at 18 °C within 10 d, circular, flat, entire, white, thin, slightly aerial mycelia, loosely attached to the media.

Specimen examined: Russia, Rostov Region, Krasnosulinsky District, Donskoye forestry, Kabanya Balka (Boar gully), twigs and branches of *Cornus sanguinea* subsp. *australis* (Cornaceae), 27 Oct. 2015, T.S. Bulgakov, R1111, MFLU 17–0891, living culture MFLUCC 16–1190.

Notes: *Cytospora salicina* was introduced by Norphanphoun et al. (2017) from Russia causing canker on *Salix* sp. However, we collected this specimen from Russia associated with twigs and branches of *Cornus sanguinea*. *Cytospora salicina* is closely related to *C. chrysosperma*, *C. melnikii*, and *C. sordida* (Fig. 1, Clade 16).

**Diaporthaceae** Höhn. ex Wehm., Am. J. Bot. 13: 638. 1926. Clade 14.

Pathogenic, endophytic or saprobic on terrestrial and rarely submerged plants. Sexual morph: *Pseudostromata* well- or poorly developed, pulvinate, erumpent, flat or slightly convex, orbicular, circular or somewhat irregular, sclerotoid, coriaceous, whitish to brownish black, with or without black zone or a crust consisting of fungus tissue, solitary or containing up to 10 ascomata in a stroma. *Ectostromatic disk* subhyaline to brown. *Ascomata* perithecial, immersed to erumpent, solitary or aggregated in a valvoid configuration, globose or compressed, coriaceous, black, ostiolate, papillate. *Papilla* short or long, erumpent, convergent, cylindrical to conical, black, internal wall covered by hyaline periphyses, composed of vertically arranged parenchymatous tissues. *Peridium* comprising outer layer of flattened, thick-walled, dark-brown cells of *textura angularis* and inner, hyaline, thin-walled cells of *textura angularis*. *Hamatheciun* comprising septate, unbranched, cylindrical paraphyses. *Asci* 8-spored, unitalunate, clavate, oblong-clavate to broadly fusoid, sessile, with a distinct apical ring. *Ascospores* biseriate to partially biseriate, ellipsoid, oblong to fusoid, unicellular or 1-
septate, constricted at septum, with or without appendages at both ends, hyaline, dark brown, sometimes narrowly rounded ends and multi-guttulate, smooth-walled. Asexual morph: Conidiomata acervular or pycnidial, globose, initially immersed, erumpent at maturity, solitary, scattered, coriaceous, black, elongated ostiolar neck, sometime becoming multi-loculate with one to several clearly defined black necks extending above the stroma, often with yellowish, conidial mass extruding from ostiole. Peridium comprising 3–4 layers of pale brown cells of textura intricata to textura angularis. Conidiophores sometimes dimorphic. Alpha conidiophores tightly aggregated, subcylindrical, branched in mid region, consisting of 2–3 supporting cells, giving rise to septate, ampulliform, cylindrical to irregular conidiogenous cells or paraphyses, straight to sinuous, 1–5-septate, cylindrical, hyaline to pale brown, branched only at the base, smooth, formed from the inner most cell layers of the conidiomatal wall, sometimes terminal and lateral, apex with minute periclinal thickening and collarette. Beta conidiophores interspersed among alpha conidiophores, hyaline, subcylindrical, branched, 1–3-septate. Alpha conidiogenous cells enteroblastic, phialidic, cylindrical or subcylindrical, terminal and lateral, slightly tapering towards the apex or sometimes apex
with minute periclinal thickening and collarette. *Beta conidiogenous cells* phialidic, integrated, terminal and lateral. *Alpha conidia* abundant, fusiform, ovate, subcylindrical to narrowly ellipsoid, straight or curved, occasionally irregular, smooth-walled, 0–2-septate, hyaline, base truncate to sub-truncate, apex obtuse, straight to curved, occasionally slightly sigmoid, pale to medium brown, with many guttules, sometimes short, hyaline, appendages at both ends. *Beta conidia* subcylindrical, fusiform to hooked, straight to slightly curved, aseptate, hyaline, smooth, base sub-truncate, sometimes widest in middle or in upper third, tapering to acutely rounded apex, truncate at base.

Fig. 11. *Cytospora salicina* (MFLU 17–0891). A. Conidiomata on substrate. B. Horizontal cross section of conidioma. C, D. Vertical cross section of conidiomata. E. Conidiophore, conidiogenous cells arrangement. F. Peridium. G–M. Conidiophores, conidiogenous cells, conidia. N. Conidia. Scale bars: A = 500 μm, B = 200 μm, C, D = 100 μm, E, F = 15 μm, G–M = 10 μm, N = 5 μm.
Type genus: Diaporthe Nitschke.

Type species: Diaporthe eres Nitschke.

Notes: The family Diaporthaceae (Fig. 1, Clade 14) comprises many endophytic and phytopathogenic fungal species (Udayanga et al. 2011) and it was introduced and accommodated in Diaporthales by von Höhnel (1917). Wehmer (1975) confirmed this family to Diaporthe and Mazzantia. However, Barr (1978) synonymised Diaporthaceae under Valsaceae. Castlebury et al. (2002) analysed LSU nrDNA sequence data of diapothoid taxa and showed the distinct placement of Diaporthaceae in Diaporthales, forming a well-supported clade. Diaporthaceae previously comprised only Diaporthe (Phomopsis) and Mazzantia based on phylogenetic analysis (Castlebury et al. 2002). However, Lumbsch & Huhndorf (2010) included Apioporthella and Leucodiaporthe in this family. A LSU nrDNA sequences analysis by Lamprecht et al. (2002) confirmed the phylogenetic placement of Phaeodiaporthe in Diaporthaceae based on analysis of LSU nrDNA sequence data. Maharachchikumbura et al. (2015) listed Allantoporthe, Apioporthella, Clypeoporthella, Diaporthe, Diaporthaceae, Leucodiaporthe, Mazzantia, Mazzantillia, Ophiopodiaporthe and Pustulomyces as genera of Diaporthaceae. Rossman et al. (2015) synonymised Mazzantillia under Mazzantia based on greater usage of Mazzantia. The genus Clypeoporthella is based on C. brencklei, and a recently collected C. brencklei (BPI 843482) specimen was grown in culture and sequenced. DNA sequence data showed that C. brencklei clustered together with Diaporthe and it has a Phomopsis asexual morph. Thus, Clypeoporthella is considered as a synonym of Diaporthe (Sogonov et al. 2008). The genus Diaporthaceae was introduced to accommodate species that are similar to Diaporthe, with unicellular ascospores and was typified by D. angeliaca. Molecular analysis of LSU nrDNA sequence data showed that D. angeliaca clustered within the Diaporthe. In addition, Diaporthaceae angeliaca has similar morphological characters of stromata, perithecia, and centrum to species of Diaporthe. Based on morphology and molecular data, Diaporthaceae was synonymised under Diaporthe (Castlebury et al. 2003, Gomes et al. 2013). The genus Diaporthe has aggregated perithecia within well-developed stromata and median, 1-septate ascospores. Diaporthe corti is strongly parasitic and causes dieback of Corylus stems. Morphologically Diaporthe corti shows similar characters to Anisogramma anomala. Anisogramma based on A. virgultorum is known to belong in the Gnomoniaceae (Castlebury et al. 2002, Vasilyeva et al. 2007). However, the LSU nrDNA, ITS nrDNA, rpβ2 and tef1 combined gene analyses in the current study show (Fig. 1, Clade 5) the phylogenetic placement of Diaporthe is outside of Diaporthaceae and it does not show affinities with any families in Diaporthales. Hence Diaporthaceae comprises Allantoporthe, Apioporthella, Chaeoconis, Diaporthe, Leucodiaporthe, Mazzantia, Ophiopodiaporthe, Phaeocylostroma, Phaeodiaporthe, Pustulomyces and Stencarpella. Based on an LSU nrDNA phylogeny, Gao et al. (2017) showed Diaporthe sensu lato to be polyphyletic, including genera such as Mazzantia, Ophiopodiaporthe, Pustulomyces, Phaeocylostroma, and Stencarpella. In the present study, we address this situation by proposing Chiangraiomyces, Paradiaporthe, Hyalilappendispora as new genera in Diaporthaceae. We collected and illustrate here several taxa in Diaporthaceae that are new to science or are poorly studied.

Chiangraiomyces Senan. & K.D. Hyde, gen. nov. MycoBank MB821545. Facesoffungi number FoF03469.

Etymology: Name related to the collection locality of Chiang Rai, Thailand.

Saprobic on dead wood. Sexual morph: Ascomata solitary, scattered, immersed to erumpent, globose to subglobose, coriaceous, black, papillate, ostiolate. Papila long, internally covered by hyaline, periphyses. Peridium comprising outer, thick-walled, brown cells of textura angularis and inner, hyaline, thick-walled, compressed cells of textura angularis. Hamathecium comprising hyaline, asperate, filamentous paraphyses. Asci unitunicate, 8-spored, fusiform, sessile to short pedicellate, with J-, funnel-shaped, apical ring. Ascospores biseriate to overlapping uniseriate, fusiform to ellipsoid, hyaline, smooth-walled, 1-septate, with two large guttules in the centre and two small guttules at the ends. Asexual morph: Conidiomata produced on PDA when incubated at 18 °C after 2 wk, pycnidial, globose, erumpent at maturity, black, coriaceous, short neck. Conidiomatal wall comprising pale brown, thick-walled cells of textura angularis. Conidiophores ampulliform, straight, branched, septate, hyaline, smooth. Conidigenous cells phialidic, terminal, cylindrical, slightly tapering towards the apex. Hamathecium apophyses. Alpha conidia asperate, hyaline, smooth, ovate to ellipsoid, less in amount. Beta conidia fusiform to hooked, base subtruncated, asperate, hyaline, smooth.

Type species: Chiangraiomyces bauhiniae Senan. & K.D. Hyde.

Chiangraiomyces bauhiniae Senan. & K.D. Hyde, sp. nov. MycoBank MB821545. Facesoffungi number FoF03470. Fig. 12.

Etymology: Name based on the host Bauhinia, from which it was collected.

Saprobic on Bauhinia sp. Sexual morph: Ascomata 200–300 μm high, 150–180 μm diam (x = 230 × 240 μm, n = 20), solitary, scattered, immersed to erumpent, globose to subglobose, coriaceous, black, papillate, ostiolate. Papila 115–140 μm high, 75–90 μm diam (x = 130 × 85 μm, n = 20), long, internally covered by hyaline, periphyses. Peridium 11–14 μm wide (x = 12.5 μm, n = 20), comprising outer, thick-walled, brown cells of textura angularis and inner, hyaline, thick-walled, compressed cells of textura angularis. Hamathecium 2.5–3 μm wide (x = 2.8 μm, n = 20), comprising hyaline, asperate, filamentous paraphyses. Asci 75–90 × 12–13 μm (x = 78 × 12.5 μm, n = 20), unitunicate, 8-spored, fusiform, with J-, funnel-shaped, apical ring, sessile to short pedicellate. Ascospores 17–18 × 3–4 μm (x = 17.8 × 3.6 μm, n = 20), biseriate to overlapping uniseriate, fusiform to ellipsoid, hyaline, smooth-walled, 1-septate, with two large guttules in the centre and two small guttules at the ends. Asexual morph: Conidiomata 300–500 μm diam (x = 450 μm, n = 20), produced on PDA when incubated at 18 °C after 2 wk, pycnidial, globose, erumpent at maturity, black, coriaceous, short neck. Conidiomatal wall comprising pale brown, thick-walled cells of textura angularis. Conidiophores 4–6 × 2–4 μm
(\(x = 5 \times 3 \, \mu m, n = 20\)), ampulliform, straight, branched, septate, hyaline, smooth. *Conidiogenous cells* 7–10 × 2–3 \(\mu m\) (\(x = 8 \times 2.3 \, \mu m, n = 20\)), phialidic, terminal, cylindrical, slightly tapering towards the apex. *Hamathecium* aparaphysate. *Alpha conidia* 3–5 × 2–4 \(\mu m\) (\(x = 4.7 \times 3.3 \, \mu m, n = 20\)), aseptate, hyaline, smooth, ovate to ellipsoidal, less in amount. *Beta conidia* 18–38 × 1.5–2 \(\mu m\) (\(x = 24 \times 1.7 \, \mu m, n = 20\)), fusiform to hooked, base sub-truncate, aseptate, hyaline, smooth.

**Culture characteristics**: Colonies growing on MEA attained 1 cm within 7 d when incubated 25 °C, fast growing, circular, irregular, flat, white, forming aerial mycelia with hyphae loosely attached to the medium.

**Specimen examined**: Thailand, Chiang Rai, Mae Fah Luang University, near University President’s house, on dead twigs of Bauhinia sp. (Fabaceae), I.C. Senanayake, 25 Dec. 2014, CHUNI 81 (holotype MFLU 17-0964, cultures ex-type MFLUCC 17–1669, MFLUCC 17–1670).

**Notes**: *Chiangraiomyces bauhiniae* has immersed, solitary ascomata, fusiform asci, with a J-, funnel-shaped, apical ring, and oval to fusiform ascospores with 2 large central guttules and 2 small marginal guttules. Phylogenetically, *Chiangraiomyces bauhiniae* forms a fully-supported clade that is sister to *Ophiodiaporthe cyatheae* (Fig. 1, Clade 14). Hence, we introduce *Chiangraiomyces* to accommodate this taxon.
Paradiaporthe Senan., Camporesi & K.D. Hyde, gen. nov. MycoBank MB821546. Facesoffungi number FoF03471.

Etymology: The name reflects the morphological similarity to *Diaporthe*.

Saprobic on dead twigs of *Artemisia* sp. Sexual morph: Ascomata solitary, scattered, immersed, becoming erumpent when mature, globose to subglobose, black, coriaceous, ostiolate, papillate. Papilla periphysate with short, wide, prominent ostiole. Peridium thin at the base, gradually thickening towards the neck, comprising inner, hyaline, compressed, thin-walled cells of textura angularis and outer, thick-walled, brown cells of textura angularis. Hamathecium ap paraphysate. Asci 8-spored, unitunicate, fusiform to clavate, sessile, apex rounded with a J-, apical ring. Ascospores biseriate, fusiform with pointed ends, medially 1-septate, hyaline, smooth-walled. Asexual morph: Undetermined.

Type species: *Paradiaporthe artemisiae* Senan., Camporesi & K.D. Hyde.

Paradiaporthe artemisiae Senan., Camporesi & K.D. Hyde, sp. nov. MycoBank MB821547. Facesoffungi number FoF03472. Fig. 13.

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**Fig. 13.** Paradiaporthe artemisiae (MFLU 17–0886). A. Ascomata on substrate. B. Cross section of ascoma. C. Peridium. D–G. Asci. H–L. Ascospores. Scale bars: A = 200 μm, B = 100 μm, C = 20 μm, D–G, H–L = 10 μm.
**Etymology:** The name reflects the host genus *Artemisia*.

Saprobic on dead twigs of *Artemisia* sp. Sexual morph: Ascomata 280–300 μm high, 180–200 μm wide (x = 290 × 190 μm, n = 10), solitary, scattered, immersed, becoming erumpent when mature, globose to subglobose, black, coriaceous, ostiolate, papillate. *Papilla* 135–138 μm high, 110–140 μm wide, (x = 136 × 115 μm, n = 10), comprising filiform, hyaline paraphyses with short, wide, prominent ostiole. *Peridium* 8–13 μm (x = 10 μm, n = 10), thin at the base, gradually thickened towards the neck, comprising inner, hyaline, compressed, thin-walled cells of *textura angularis* and outer, thick-walled, brown cells of *textura angularis*. *Hamathecium* aparaphysate. Asci 45–60 × 11–14 μm (x = 51 × 13.5 μm, n = 20) 8-spored, unitunicate, fusiform to clavate, sessile, apex rounded, with a J-, bi-lobed, apical ring. Ascospores 14–18.5 × 4–5 μm (x = 16 × 4.2 μm, n = 20) biseriate to overlapping uniseriate, fusiform with two small globles at the ends and two large globles at the middle of spore, medially 1-septate, hyaline, smooth-walled. Asexual morph: Undetermined.

**Culture characteristics:** Colonies growing on MEA attained 1 cm within 7 d when incubated at 18 °C, irregular, circular, flat, woolly, white, mycelia loosely attached to the substrate.

**Notes:** *Paradiaporthe artemisiae* has erumpent, solitary ascomata with prominent, wide papilla. Morphologically, *Paradiaporthe artemisiae* forms a distinct clade which is sister to *Phaeoecytomata artemisiae* (Fig. 1, Clade 14). Hence, we introduce *Paradiaporthe* as a new genus based on morphology and phylogeny.

**Hyaliappendispora** Senan., Camporesi & K.D. Hyde, **gen. nov.** MycoBank MB821548. Facesoffungi number FoF03473.

**Etymology:** Name reflects hyaline ascospores with long appendages.

Saprobic on dead stems. Sexual morph: Ascomata solitary to aggregate, immersed, globose to subglobose, black to brown, coriaceous, ostiolate, papillate. *Papilla* short, wide, internally covered by hyaline paraphyses. *Peridium* comprising outer, dark brown, thick-walled cells of *textura angularis* and inner, thin-walled, hyaline, compressed cells of *textura angularis*. *Hamathecium* comprising filiform, septate paraphyses which are longer than asci. Asci 110–125 × 20–25 μm (x = 116 × 21 μm, n = 20), 8-spored, unisericate, cylindrical to fusiform, short pedicellate, apex rounded with a J- apical ring. Ascospores 20–25 × 7–10 μm (x = 22 × 9 μm, n = 20), biseriate to overlapping biseriate, oval to ellipsoid, hyaline, medially 1-septate, multiguttulate, with appendages. Appendages 6–11 × 2–3 μm (x = 8 × 2.3 μm, n = 10), at both ends, long, thread-like, covered by loose capsule. Asexual morph: Ceolomycetous. Sporulate on PDA at 18 °C after 1 mo, crowded at colony margin, appears at pale yellow bubbles when release the conidial mass. *Conidiomata* globose, erumpent, black. *Peridium* comprising thick-walled, pale brown cells of *textura angularis*. *Conidiophores* amphiliform, septate, branched, hyaline. Conidiogenous cells phialidic, terminal, cylindrical, elongate, hyaline. *Conidia* fusiform, unicellular, hyaline, smooth.

**Type species:** *Hyaliappendispora galii* Senan., Camporesi & K.D. Hyde.

**Hyaliappendispora galii** Senan., Camporesi & K.D. Hyde, **sp. nov.** MycoBank MB821548. Facesoffungi number FoF03474. **Fig. 14.**

**Etymology:** The name reflects the host genus *Galioum*.

Saprobic on dead stem of *Galium* sp. Sexual morph: Ascomata 395–450 μm high, 180–200 μm wide (x = 419 × 190 μm, n = 10), solitary to aggregated, immersed, globose to subglobose, black to brown, coriaceous, ostiolate, papillate. *Papilla* 160–210 μm high, 100–185 μm wide (x = 172 × 158 μm, n = 10), short, wide, internally covered by hyaline paraphyses. *Peridium* 15–25 μm wide (x = 20 μm, n = 10), comprising outer, dark brown, thick-walled cells of *textura angularis* and inner, thin-walled, hyaline, compressed cells of *textura angularis*. *Hamathecium* comprising filiform, septate paraphyses 1.5–3.5 μm wide (x = 2 μm, n = 10), which are longer than asci. Asci 110–125 × 20–25 μm (x = 116 × 21 μm, n = 20), 8-spored, unisericate, cylindrical to fusiform, short pedicellate, apex rounded with a J- apical ring. Ascospores 20–25 × 7–10 μm (x = 22 × 9 μm, n = 20), biseriate to overlapping biseriate, oval to ellipsoid, hyaline, medially 1-septate, multiguttulate, with appendages. Appendages 6–11 × 2–3 μm (x = 8 × 2.3 μm, n = 10), at both ends, long, thread-like, covered by loose capsule. Asexual morph: Ceolomycetous. Sporulate on PDA at 18 °C after 1 mo, crowded at colony margin, appears at pale yellow bubbles when release the conidial mass. *Conidiomata* globose, erumpent, black. *Peridium* comprising thick-walled, pale brown cells of *textura angularis*. *Conidiophores* 10–15 × 1.5–2.5 μm (x = 13 × 2.1 μm, n = 10), amphiliform, septate, branched, hyaline. Conidiogenous cells 8–16 × 1.5–3 μm (x = 11 × 2.5 μm, n = 20), phialidic, terminal, cylindrical, elongate, hyaline. *Conidia* 7.5–9.5 × 1.5–2.5 μm (x = 8.3 × 2.2 μm, n = 20), fusiform, unicellular, hyaline, smooth.

**Culture characteristics:** Colonies growing on PDA incubated at 18 °C attaining 1 cm diam within 14 d, irregular, undulate, umbonate, whitish ash clots with tightly arranged, short, aerial droplets produced after 7 d, when colonies incubated further, condiomata arise on culture media, concentrated at colony margin. *Conidiomata* globose, erumpent, black. *Peridium* comprising thick-walled, pale brown cells of *textura angularis*. *Conidiophores* amphiliform, septate, branched, hyaline. Conidiogenous cells phialidic, terminal, cylindrical, elongate, hyaline. *Conidia* fusiform, unicellular, hyaline, smooth.

**Specimen examined:** Italy. Province of Arezzo, Quota, near Castiglion Fiorentino, on dead stem of *Galium* sp. (Asteraceae), E. Camporesi, 8 Jun. 2015, IT 2925 (holotype MFLU 15–2269, isotype BBH 42450, culture ex-type MFLUCC 16–1208).

**Notes:** *Hyaliappendispora* is morphologically distinct from other genera in *Diaporthaceae* in having biguttulate, uniseptate,
hyaline ascospores with long filamentous apical and basal appendages and wall of the appendages makes a ring-like ornamentation at the proximal end. Phylogenetically *Hyaliappendispora galii* forms a fully-supported distinct clade that is sister to *Pheoadioparthe* (Fig. 1, Clade 14).

**Chaetoconis polygoni** (Ellis & Everh.) Clem., Gen. fung. (Minneapolis): 176. 1909. Facesoffungi number FoF03475. Fig. 15.

**Synonym:** *Amphorula polygoni* (Ellis & Everh.) Petr., Sydowia 13: 181. 1959.

Saprobic on stem of *Rumex acetosa*. Sexual morph: Undetermined. Asexual morph: *Conidiomata* 175–250 μm high, 200–275 μm diam (x = 200 × 250 μm, n = 20), pycnidial, scattered, immersed to erumpent, globose to sub-globose, dark brown, unilocular or multilocular, ostiolate, papillate. *Peridium* 20–30 μm thick, comprising several layers of inner thin-walled, hyaline, compressed cells of *textura angularis* and outer, thick-walled, dark brown cells of *textura angularis*. Ostiole one or more, circular. *Conidiophores* 12–25 × 2–3.5 μm (x = 20 × 3 μm, n = 20), hyaline, branched, septate, smooth, with acropleurogenous conidia, formed from the inner pycnidial wall cells. *Conidiogenous cells* 30–45 × 9–11 μm (x = 32 × 9.5 μm, n = 20), enterothelial, phialidic, determinate, integrated, cylindrical, hyaline, smooth, with minute channel and collarate. *Conidia* 35–50 × 4.5–5 μm (x = 37.5 × 4.5 μm, n = 20), hyaline, 2-euseptate, continuous, base obtuse, apex extended into a filiform, cellular, unbranched appendage, thin-walled, smooth, guttulate, obclavate.

Specimen examined: Germany, on the edge of a mixed forest, 39 m asl, sandy, acid, fresh, mesotroph, on stem of *Rumex acetosa* (Polygonaceae), 9 May 2013. RK. Schumacher, CHUNI 73, MFLU 17–0965.

Notes: Chaetoconis polygoni has quite different morphological characteristics compared to other taxa in Diaporthaceae. Molecular analyses in this study showed that our collection clustered together with *C. polygoni* (CBS 405.95; Fig 1, Clade 14). However, we could not obtain a culture and therefore extracted DNA directly from the sporocarps. The sexual morph of Chaetoconis polygoni was reported as Ceriospora polygonacearum (Barney et al. 2006) which was assigned to *Sordariales* (Campbell et al. 2003) and later Senanayake et al. (2015) reassigned it to *Xylariales*. However, morphologically *Ceriospora polygonacearum* does not show any affinity to *Diaporthales*.

**Diaporthe litoricola** Senan., E.B.G. Jones & K.D. Hyde, sp. nov. MycoBank MB821550. Facesoffungi number FoF03477. Fig. 16.

Etymology: The name is based on the Latin words “litore” and “cola” meaning “beach-loving” since this fungus was collected from dead branches of beach plants.

Saprobic on dead stem of sea-shore plants. Sexual morph: Ascomata 800–900 μm high, 450–600 μm diam (x = 880 × 475 μm, n = 20), solitary, scattered, immersed, globose to subglobose, dark brown, coriaceous, ostiolate, papillate. *Papilla* 380–430 μm high, 110–140 μm diam (x = 420 × 130 μm, n = 20), conspicuous, long, black, with pale yellow apex, brown, unbranched seta in apex, internally covered by hyaline, filamentous periphyses. *Peridium* 7–12 μm wide, (x = 9.3 μm, n = 20), comprising several layers of compressed, thick-walled, oliveaceous to brown cells of *textura angularis*. *Hamathecium* aparaphysate or sometimes with a few cellular paraphyses. Asci 80–90 × 11–12 μm (x = 87.5 × 11.1 μm, n = 20), 8-spored, uniloculate, cylindrical, pedicellate, apex rounded, with bilobed, distinct apical ring. Ascospores 16–19 × 4.5–5 μm (x = 18 × 4.8 μm, n = 20), biseriate, fusiform to ellipsoid, 1-septate, hyaline, guttulate. Asexual morph: *Conidiomata* 500–900 μm high, 800–1000 μm diam (x = 880 × 900 μm, n = 20), produced on PDA when incubated at 18 °C after 4 wk, pycnidial, globose, initially immersed, erumpent at maturity, black, coriaceous, elongated neck, often yellowish white, with conidial cirrus extruding from ostiole. *Conidiotimal wall* comprising pale brown, thick-walled cells of *textura angularis*. *Conidiophores* 5–7 × 4–7 μm (x = 6.3 × 5.3 μm, n = 20), ampulliform, straight to sinuous, unbranched, hyaline to olivaceous, smooth. *Conidiogenous cells* 11.5–21.1 × 1.8–2.8 μm (x = 17.3 × 2.3 μm, n = 20), phialidial, terminal, cylindrical, slightly tapering towards the apex. *Hamathecium* aparaphysate. *Alpha conidia* 13–16 × 2.8–3.8 μm (x = 14.7 × 3.3 μm, n = 20), asceptate, hyaline, smooth, ovate to ellipsoidal, base subtruncate, often biguttulate. *Beta conidia* 1.5–2 × 18–38 μm (x = 1.7 × 24 μm, n = 20), fusiform to hooked, base sub-truncate, asceptate, hyaline, smooth. *Culture characteristics:* Colonies growing on PDA attained 1 cm diam within 7 d when incubated at 18 °C, flat, circular, smooth, white, slightly woolly, tightly attached to media, mycelial ends unbranched.

Specimen examined: UK, Hampshire, Eastney shore, on stem of undetermined sea-shore plant, 20 Mar. 2016, E.B.G. Jones, GU 242 (holotype MFLU 17–0674, isotype BBH 42436, cultures ex-type MFLUCC 16–1195, MFLUCC 17–1657).

Notes: *Diaporthe litoricola* differs morphologically from *D. maytenicola* in having large, multi-guttulate ascospores, cylindrical asci, deeply immersed, long papillate, solitary ascomata and elongate, fusiform to cylindrical alpha conidia. Phylogenetically this fungus is closely related to *Diaporthe maytenicola, D. decedens* and *D. nobilis*. *Diaporthe litoricola* forms a moderately-supported clade in this study (Fig 1, Clade 14).

**Diaporthe rudis** (Fr.) Nitschke, Pyrenomycetes Germanici 2: 282. 1870. Facesoffungi number FoF03477. Fig. 17.

Saprobic on dead umbelliferous stems. Sexual morph: *Clypeus* appears as black, wide patches, forming a black mat on substrate connecting all the ascomata and spread around the individual ascomata. Ascomata 540–620 μm high, 250–275 μm wide (x = 590 × 260 μm, n = 10), solitary or rarely aggregated, erumpent, globose to subglobose, black, coriaceous, ostiolate, papillate. *Papilla* 290–375 μm high, 75–95 μm wide (x = 330 × 85 μm, n = 10), long, asymmetrically located, straight or curved, internally covered by hyaline periphyses, with apex of papilla pale brown, swollen, blunt, sometimes slightly covered by black, mycelial mat. *Peridium* 11–16 μm wide (x = 14 μm, n = 10), comprising thick-walled, brown, compressed cells of *textura angularis*. *Hamathecium* aparaphysate. *Asci* 43–46 × 11–12 μm (x = 43 × 11.6 μm, n = 10), 8-spored, uniloculate, clavate to fusiform, sessile, apex rounded, with a characteristic, bilobed, J- apical ring. *Ascospores* 11–13 × 3.4–5.5 μm (x = 12 × 3.9 μm, n = 10), biseriate, fusiform to elongate ellipsoid, 1-median septe,
Fig. 15. Chaetoconis polygoni (MFLU 17–0965). A. Conidiomata on substrate. B, D. Cross section of conidioma. C. Peridium. E–H. Conidiogenous cells attached to conidia. I–K. Conidia. Scale bars: A = 1 mm, B, D = 100 μm, C, E–H = 50 μm, I–K = 10μm.
Fig. 16. *Diaporthe litoricola* (MFLU 17–0874). A–C. Ascomata on substrate. D. Cross section of ascomata. E. Peridium. F–I. Asci. J–L. Ascospores. M, N. Conidioma. O, P. Conidiophores, conidiogenous cells and conidia arrangement. Q. Alpha conidia. R, S. Beta conidia. Scale bars: A = 500 μm, B–D, M, N = 200 μm, E = 50 μm, F–I, O, P = 20 μm, J–L, Q, S = 10 μm.
Fig. 17. Diaporthe rudis (MFLU 17–0895). A–C. Ascomata on substrate. D–E. Cross sections of ascoma. F. Peridium. G–J. Asci. K–P. Ascospores. Scale bars: A = 500 μm, B, C = 200 μm, D, E = 100 μm, F = 20 μm, G–P = 10 μm.
with each cell containing two guttules, hyaline, smooth-walled. Asexual morph: Undetermined.

Culture characteristics: Colonies growing on PDA attaining 2.5 cm diam within 10 d when incubated at 18 °C, circular, entire, flat, white, tightly attached to the media, aerial mycelia less or sparse, forming few, erumpent, globose, black, viscous droplets after 7 d.

Specimen examined: UK, Hampshire, Winchester, Whiteley, Botley Wood, on umbelliferous stem, 25 May 2016, E.B.G. Jones, JG 301 (MFLU 17–0895, BBH 42452, living cultures MFLUCC 16–1197, MFLUCC 17–1658).

Notes: Diaporthe rudis was epitypified by Udayanga et al. (2014) based on morphology and phylogeny. Diaporthe rudis has a broad host range. This collection was obtained from umbelliferous woody stems and it forms very long, curved, narrow, papilla deeply immersed in substrate. They appear as pale yellow spots with black margins. Ostioles are blunt and covered by pale yellow cells. However, the base of the ascomata is immersed in deep layers of substrate. All D. rudis cluster together and phylogenetically related to D. cynaroidis and D. cassinae. The phylogenetic affinities of these species are still unclear, but morphologically they are differing in terms of asc and ascospor morphology and size.

Diaporthe eres Nitschke, Pyrenomyces Germanici 2: 245. 1870. Fig. 18.

Saprobic on stem of Fraxinus pennsylvanica. Sexual morph: Not observed. Asexual morph: Conidiomata 125–140 μm high, 265–300 μm diam at base (X = 135 × 280 μm, n = 10), pycnidial, pyriform, initially immersed, erumpent at maturity, globose to pyriform, black, coriaceous, elongated neck, often with yellowish white, conidial cirrus extruding from ostiole. Conidiomatal wall 34–36 μm diam (X = 35 μm, n = 10), parenchymatous, consisting of 4–7 layers of pale brown, thick-walled cells of textura angularis. Conidiophores 4–6 × 4.5–8 μm (X = 4.6 × 6.6 μm, n = 20), ampulliform, straight to sinuous, unbranched, hyaline, smooth. Conidiogenous cells 8–14 × 1.5–3 μm (X = 11.2 × 2.2 μm, n = 20), phialidic, terminal, cylindrical, slightly tapering towards the apex. Hamathecium apophyses. Alpha conidia 5.8–7.5 × 2.5–3.5 μm (X = 6.4 × 2.8 μm, n = 10), aseptate, hyaline, smooth, ovate to ellipsoidal, base subtruncate, often biguttulate. Beta conidia not seen.

Culture characteristics: Colonies growing on MEA attenuated 2 cm within 10 d incubated at 18 °C, fast growing, entire, flat circular, white, with radially arranged minute mycelium clots later becoming creamy or pale yellow.

Specimen examined: Russia, Cotton Fabric urban micro district, on stem of Fraxinus pennsylvanica (Oleaceae), 14 May 2015, T.S. Bulgakov, T-400 (MFLU 15–2104, MFLU 17–0890, living cultures MFLUCC 17–1667, MFLUCC 17–1668).

Notes: Phylogenetic analyses from the current study based on combined LSU nrDNA, ITS nrDNA, rpB2, and rbcL sequences showed that Chrysocrypta is basal to Disculoides and Erythrogloeum (Fig. 1, Clade 9). Chrysocrypta has previously been accommodated in the Cryphonectriaceae but the latter is distantly related (Fig. 1, Clade 6). Morphologically members of clade 9 depicts distinct characters in having epiphyllous acervuli, and subcylindrical to ampulliform conidiogenous cells. The sexual morphs of those taxa have not been reported. Disculoides was introduced and typified by Disculoides eucalyptorum (Crous et al. 2012a). Disculoides eucalyptorum was shown to be distinct from Erythrogloeum hymenaeae, which was sister to the Greeneria-Melanconiella complex based on rDNA sequence gene analyses (Crous et al. 2012a).

Chrysocrypta was introduced based on Chrysocrypta corymbiae, which was isolated from leaves of Corymbia species. Chrysocrypta is similar to Foliocryphia (Cryphonectriaceae), but is distinct in forming dimorphic conidia. Crous et al. (2012c) accommodated this taxon in Cryphonectriaceae based on morphology and rDNA sequence phylogeny. However, stromatic tissues of Chrysocrypta corymbiae do not turn purple with KOH, which is a basic characteristic of Cryphonectriaceae. In addition, DNA sequence data herein indicate that Chrysocrypta corymbiae does not belong in Cryphonectriaceae. Hence given the morphological distinctiveness and strongly supported clade (9), a new family Erythrogloeaceae is introduced to accommodate Chrysocrypta, Disculoides and Erythrogloeum.

Erythrogloeum hymenaeae Gonz. Frag. & Cif. ex Petr., Sydowia 7: 379. 1953. Facesoffungi number FoF03479. Fig. 19.

Folicolous, associated with leaf spots. Sexual morph: Undetermined. Asexual morph: Conidiomata up to 250 μm
diam, acervular, epiphyllous, eustromatic, subepidermal, solitary, rupturing surface by irregular splits. Peridium comprises thin-walled cells of textura angularis. Conidiophores reduced to conidiogenous cells. Conidiogenous cells 5–10 × 2.5–4 μm, hyaline, smooth, phialidic with periclinal thickening, discrete, lageniform to cylindrical, lining the inner walls of cavity. Conidia 7–9 × 2.5–3 μm, hyaline, smooth, guttulate or not, thin-walled, ellipsoid to ovoid, apex obtusely rounded, tapering to a truncate base (description based on Crous et al. 2012a).

Fig. 18. Diaporthe eres (MFLU 15–2104). A, B. Conidiomata on substrate. C. Cross section of conidioma. D. Wall of conidioma. E–H. Conidiophore, conidiogenous cell attached to conidia. I, J. Conidia. Scale bars: A = 1 mm, B = 200 μm, C = 100 μm, D = 20 μm, E–H = 10 μm, I, J = 5 μm.
Specimen examined: Costa Rica, San José, on leaves of Hymenaea courbaril, Nov. 1929, H. Schmidt (F45468 syntype).

Notes: The monotypic genus Erythrogloeum comprises the type species Erythrogloeum hymenaeae, which is validly described based on Phyllosticta hymenaeae by Petrak (1953). Erythrogloeum hymenaeae is associated with a severe anthracnose of apical twigs and seedlings of Hymenaea species (Ferreira et al. 1992). This fungus has been reported from in Brazil and Costa Rica.

Gnomoniaceae G. Winter [as ‘Gnomonieae’], Rabenh. Krypt.-Fl., Edn 2 (Leipzig) 1:2. 570. 1886. Clade 1.

Saprobic on bark and leaves of overwintered plants. Sexual morph: Stromata lacking, or poorly to well-developed, scattered, erumpent, pustuliform with one or rarely two ascomata or valsoid, broadly elliptic to rounded, large. Ectostromata well-developed, brown to black, thick ectostromatic disc at perithecial necks. Ascomata immersed to erumpent, solitary or aggregated, globose to subglobose, black, coriaceous, thin-walled, with one or more long, central or eccentric necks with hyaline peripheryses. Peridium comprising few layers of brown, thick-walled cells of textura angularis. Hamathecium comprising few hyaline, septate, cellular paraphyses. Asci 8–32-spored, unitunicate, oval, fusiform to almost filiform, short pedicellate, with a distinct, J- apical ring. Ascospores biseriate, overlapping uniseriate to fasciculate, oval, fusiform, ovoid to subulate, small, unicellular to 1-septate, rarely multi-septate, ends mostly rounded, rarely pointed, appendages absent or subulate, navicular or whip-shaped, smooth. Asexual morph: Conidiomata acervulal or pycnidial, subcuticular, papillate or not, oblate to globose, black, thick-walled, with one chamber containing whitish conidial mass. Conidiogenous cells usually phialidic, rarely with a few annellidic scars, irregular in shape, lageniform to cylindrical, gradually tapering to ends for one quarter to three-quarters of their length, or abruptly narrowing to long neck at about half the phialide length, or abruptly narrowing at apex, straight or curved, sometimes asymmetric swollen nodes, proliferating into other conidiogenous cells at basal or middle part. Conidia broadly ellipsoid to oval, sometimes obvoid, allantoid, occasionally curved or sinuate to slightly angular, hyaline, often unicellular.
Type genus: Gnomonia Ces. & De Not.

Type species: Gnomonia gnomon (Tode) J. Schröt.

Notes: Gnomoniaceae (Fig. 1, Clade 1) was introduced by Winter (1886). This family is characterised by immersed, rarely erumpent or superficial ascomata, without a stroma or aggregated with a rudimentary stroma. Species in Gnomoniaceae inhabit various hosts and substrates, including herbaceous plants, shrubs and trees as endophytes, pathogens and saprobes (Rossman et al. 2007, Walker et al. 2012). Pathogenicity of gnomoniaceous taxa is quite diversified, causing various diseases on plants. However, most gnomoniaceous species are restricted to overwintered plants in temperate and subtropical biomes. Maharachchikumbura et al. (2015) accommodated 33 genera in Gnomoniaceae. Additionally, we introduce a new genus Marsupiomyces based on M. quercina and the second species M. epidermoidea. However, we exclude five genera from the family based on morphology and phylogeny and also included the additional genera Mamianiella and Marsupiomyces within this family. Hence, we accept 30 genera in this family: Alnecium, Ambarignomonia, Amphiporthe, Anisomyces, Apiognomonia, Apioplagiostoma, Asteroma, Bagcheea, Cryptosorella, Cylindrosporella, Diplacella, Ditopella, Ditopellopsis, Gloeosporidina, Gnomonia, Gnomoniella, Gnomoniopsis, Mamianiella, Marsupiomyces, Millerburtonia, Occultocarpon, Ophiognomonia, Phragmoporthe, Phylloporthe, Plagiostoma, Pleuroceras, Siroccus, Spataporthe, Uniseta and Valsalnicola. Here we introduce, describe and illustrate new fungal taxa which belong to Gnomoniaceae.

Doubtful genera or genera excluded from Gnomoniaceae

Anisogramma was introduced and typified by Anisogramma virgultorum, and almost all characters of this genus are similar to Mamianiella. De Silva et al. (2009) analysed the phylogenetic relationship of Anisogramma species based on LSU nrDNA sequence data and reported its placement outside of Gnomoniaceae. Both Mamianiella and Anisogramma commonly occur on Corylus species. Combined LSU nrDNA, ITS nrDNA, rpb2 and tef1 gene analyses of the present study show that Mamianiella is nested in between Anisogramma species. Morphological comparison also reveals that both genera are characterised by Mamianiella and hence Mamianiella does not warrant generic status with high bootstrap support value (Fig. 1, Clade 1).
Mamianiella is an older name than Anisogramma. Therefore, we synonymise Anisogramma under Mamianiella giving priority to the older name. Mamianiella Höhn. was introduced and typified by M. coryli, (based on Sphaeria coryli) and Mamiania was introduced and typified by M. fimbriata (based on Sphaeria fimbriata). Von Arx & Muller (1954) suggested to retain both genera as one genus. However, Barr (1978) separated these two genera based on ascospore morphology as Mamianiella has unicellular ascospores, while Mamiania produces apiosporous ascospores. This is, however, not a strong character to differentiate these two genera, while almost all other characters are similar to each other. Hence, we synonymise Mamiania under Mamianiella giving priority to the older name Mamianiella.

Clypeoporthe, was reduced to synonymy in Gnomonia by Monod (1983). However, some species in this genus have eutypelloid configuration of ascomata in paraphyomatous stromatic tissues. However, it is necessary to obtain DNA sequence data to resolve this genus. Depazea was typified by D. frondicola and it was assigned to Mycopsphaerellaceae as Sphaerulina frondicola (Verkley et al. 2013). Hence, we exclude Depazea form Gnomoniaceae.

Phylloporthe, a plant parasitic, monotypic genus was introduced and is typified by P. vernoniae. There is no molecular data for P. vernoniae and it is not clear whether this genus belongs to Gnomoniaceae or not. Hence, we maintain this genus in Gnomoniaceae until molecular data for the type species are available.

Skottsbergiella was introduced and typified by Skottsbergiella diaporthoides which has large perithecium immersed in massive, externally crustose, pseudoparenchymatous stromata. Petrak (1971) assigned this genus to eutypoid fungi based on its stromatic consistency. This genus is morphologically similar to Diaporthella, which is placed in Diaporthales incertae sedis (Barr 1978). Skottsbergiella diaporthoides was renamed as Diaporthe diaporthoides and accommodated in Diaporthaceae (Barr 1978). Hence Skottsbergiella is not a valid genus.

Xenotypa is typified by X. aterrima. We observed a specimen of X. aterrima (as Hydnium aterrima, from S under accession no: F130640) on account of the elongated allantoid ascospores and solitary to aggregated ascomata, this taxon has closer affinity to Cytosporaceae than Gnomoniaceae. Hence, we exclude Xenotypa from Gnomoniaceae and include it in Cytosporaceae, until molecular data is available to confirm the placement.

Zythia is typified by Z. resinæ which is synonymised under Sarea resinæ. Molecular data demonstrate a placement of Sarea resinæ within Tracheliaceae (Baemomyctaeæ, Ostropomycteiæ). Therefore, here we exclude Zythia from Gnomoniaceae. However, Z. fragariae shows an affinity to Gnomoniaceae. It is a common parasite on strawberry and Shipton (1967) reported Zythia fragariae as the asexual morph of Gnomonia fragariae. Walker et al. (2010) synonymised Gnomonia fragariae in Gnomoniopsis as G. comari. Hence Zythia is not considered to be a genus in Gnomoniaceae.

Plagiostoma salicicola Senan., Camporesi & K.D. Hyde, sp. nov. MycoBank MB821552. Facesoffungi number FoF03480. Fig. 20.

Etymology: Based on the host genus Salix on which this fungus occurs and the Latin “cola” which means loving.

Saprobioc on dead twigs of Salix sp. Sexual morph: Stromata loosely packed comprising pseudoparenchymatous tissues. Ascomata 400–600 μm high, 250–400 μm diam (X = 580 × 300 μm, n = 20), perithecial, aggregated in groups of 3–10, immersed, oblate globose when moist and become convex with irregular dents around base of papilla when dry, coriaceous, black, ostiolate, papillate. Necks 420–700 μm long, 100–150 μm wide at base, 60–150 μm wide at apex, converged or not, eccentric to marginal, slightly curved. Asci 45–70 × 10–20 μm (X = 62 × 16 μm, n = 20), 8-spored, unicellular, fusiform, apex narrowly obtuse, sessile, with J-apical ring. Ascospores 15–25 × 4–7 μm (X = 17 × 6 μm, n = 20), obliquely biseriate to fasciculate, ellipsoidal to fusiform, medianly 1-septate, constricted or not at the septum, ends rounded to tapering, with upper cell slightly wider than basal cell, hyaline. Asexual morph: Undetermined.

Culture characteristics: Colonies growing on PDA attained 1 cm within 10 d incubated at 18 °C, circular, umbonate, undulate, white median region with ash outer margin, woolly, loosely attached to the substrate.

Specimen examined: Italy. Province of Trento, Val di Sole, near Croviana, on dead branch of Salix sp., 29 Jul. 2013, E. Camporesi, IT 1394 (holotype MFLU 17–0878, isotype BBH 42440, cultures ex-type MFLUCC 13–0056); Province of Trento, Val di Sole, near Croviana, on dead branch of Salix sp., 29 Jul. 2013, E. Camporesi, IT 1394 (paratype MFLU 15–2261, living cultures MFLUCC 17–1666).

Notes: Mejia et al. (2011) revisited the genus Plagiostoma and observed distinct grouping pattern of Plagiostoma species with expanded necks and species with cylindrical necks on Salicaceae. With species with expanded necks, P. salicicola is morphologically similar to Plagiostoma dilatatum. However, P. dilatatum has relatively small ascomata with short necks and long-pedicellate, cylindrical asci. The combined gene sequence analyses herein indicate a relationship of P. salicicola with other species of Plagiostoma separated with moderate support values, but sufficiently distinct of P. dilatatum (Fig. 1, Clade 1).

Plagiostoma jonesii Senan., & K.D. Hyde, sp. nov. MycoBank MB821553. Facesoffungi number FoF03481. Fig. 21.

Etymology: In honour of Prof. Gareth Jones, an eminent mycologist who collected this species.

Saprobiotic on umbelliferous stems. Sexual morph: Ascomata 380–420 μm high, 250–280 μm diam (X = 400 × 270 μm, n = 10), solitary or rarely aggregated, erumpent, globose to subglobose, black, coriaceous, ostiolate, papillate. Papilla 165–260 μm high, 70–100 μm wide (X = 200 × 80 μm, n = 10), short, symmetrically or asymmetrically located, narrow at the base, widening towards the top, straight or curved, internally covered by hyaline peripheries. Peridium 15–25 μm wide (X = 18.5 μm, n = 10), comprises thick-walled, brown, compressed cells of texture porrecta. Asci 40–50 × 8–9.5 μm (X = 48 × 8.8 μm, n = 10), 8-spored, unicellular, fusiform to clavate, apex with J-, bilobed, distinct apical ring, short pedicellate. Ascospores 12–14 × 2.6–3.8 μm (X = 13 × 3.2 μm, n = 10), biseriate, fusiform to ellipsoid, hyaline, 1-septate, with two globules in each cell, with
small spine-like appendages at both ends. Asexual morph: Undetermined.

Culture characteristics: Colonies growing on PDA attenuated 1 cm within 7 d, incubated at 18 °C, fast-growing, flat, circular, smooth, less in aerial mycelia, white, tightly attached to the medium.

Specimen examined: UK, Sussex Occidental, Arundel, river bank, on umbelliferous stem, 17 Feb. 2016, E.G.B. Jones, GJ 227 (holotype MFLU 17–0873, isotype BBH 42435, cultures ex-type MFLUCC 16–1189, MFLUCC 17–1654).

Notes: Plagiostoma jonesii is morphologically and phylogenetically distinct from other Plagiostoma species in having long, curved papilla arising out from the substrate appearing as spines and the opening is wider than base, ellipsoid to fusiform, 1-septate, slightly or non-constricted ascospores with small appendages. Our phylogeny shows that Plagiostoma jonesii is phylogenetically close to P. salicellum and P. populinum, but morphologically distinct from both species.

Gnomoniopsis agrimoniae Senan., Camporesi & K.D. Hyde, sp. nov. MycoBank MB821554. Facesoffungi number FoF03482. Fig. 22.

Etymology: Species epithet based on the host genus Agrimonia.

Saprobic on dead stems of Agrimonia eupatoria. Sexual morph: Ascomata 200–320 μm high, 245–400 μm diam (x = 273 ± 332 μm, n = 20) solitary, scattered, erumpent, globose, black, coriaceous, ostiolate, papillate. Papilla 100–170 μm high,
70–105 μm diam (X = 160 × 80 μm, n = 20), short, comprising elongate brown cells of textura porrecta. Peridium 35–45 μm (X = 39 μm, n = 10) comprising inner, hyaline, compressed cells of textura angularis and outer, brown, thick-walled, cells of textura globosa. Asci 28–32.5 × 5–5.5 μm (X = 30.5 × 34.9 μm, n = 20), 8-spored, unitunicate, cylindrical to fusiform, short-pedicellate, apex obtuse with bilobed, J-apical ring. Ascospores 7–8 × 1.8–2.2 μm (X = 7.5 × 2.1 μm) overlapping uni- to biseriate, aposporous, hyaline, uniseptate, smooth-walled. Asexual morph: Undetermined.

**Culture characteristics**: Colonies growing on MEA becoming 2 cm within 7 d incubated at 18 °C, fast growing, circular, smooth mycelia concentrated at margins making a concave colony, off white, loosely attached to the substrate, wooly.

Specimen examined: Italy, Province of Forlì-Cesena, near Santa Sofia, on dead stem of Agrimonia eupatoria (Rosaceae), 5 Apr. 2014, E. Camporesi, IT 1798 (holotype MFLU 17–0884, isotype BBH 42446, cultures ex-type MFLUCC 14–0844, MFLUCC 17–1662).

Notes: Gnomoniopsis agrimoniae has minute asci and ascospores compared to the other Gnomoniopsis species. Coriaceous, thick-walled ascomata and small aposporous ascospores are prominent characters in this genus. Our combined gene analyses indicate a moderately supported phylogenetic distinction of Gnomoniopsis agrimoniae from other species with moderate support. Phylogeny analyses based on ITS sequence data following Walker et al. (2010) reported that Gnomoniopsis agrimoniae is distinct from other Gnomoniopsis species. Gnomoniopsis species are considered host specific and only Gnomoniopsis agrimoniae and G. guttulata are reported on Agrimonia species.

**Apiognomonia veneta** (Sacc. & Speg.) Höhn., Hedwigia 62: 47. 1920. Facesoffungi number FoF03483. Fig. 23. Basionym: Laestadia veneta Sacc. & Speg., Michelia 1(no. 3): 351. 1878.

Pathogenic on living leaves of Platanus acerifolia. Sexual morph: Undetermined. Asexual morph: Conidiomata 180–200 μm high, 250–265 μm diam (X = 188 × 260 μm, n = 10), acervular, irregularly round or oval, erumpent to immersed, solitary, scattered, conidiogenous layer covering the entire inner surface of acervular chambers and mostly in basal layer, yellowish-brown, initially developing under epidermis, then breaking through epidermis and forming thick whitish amorphous conidial masses. Conidiophores 10–15 × 2.5–4.5 μm (X = 12 × 3.4 μm, n = 20), densely branched, ampulliform, hyaline. Conidiogenous cells...
14–21 × 2.7–3.5 μm (x = 18 × 3 μm, n = 10), usually phialidic, rarely annellidic, lageniform to cylindrical, gradually tapering towards the apex, straight or curved, hyaline, smooth. Conidia 12–20 × 4–6 μm (x = 15.6 × 5 μm, n = 10), broadly ellipsoid to oval, sometimes obovoid, occasionally curved or sinuate to slightly angular, hyaline, thick-walled, aseptate, guttulate.

**Culture characteristics:** Colonies growing on MEA attenuated 1 cm within 7 d, incubated at 18 °C, flat, circular, irregular, with circular ornamentations, margins concentrated with mycelial ends, white, rich in short aerial mycelia, loosely attached to the medium.

**Specimen examined:** Russia, Rostov region, Krasnosulinsky district, Donskoye forestry, lining-out nursery, on live leaves of Platanus acerifolia (Platanaceae), 27 Oct. 2015, T.S. Bulgakov, R 1048, MFLU 15–3710, living cultures MFLUCC 16–1193, MFLUCC 17–1656.

**Notes:** Apiognomonia veneta is a common pathogen on Platanaceae. Here we illustrate the asexual morph of Apiognomonia veneta. This is a common epifoliar pathogen. We could not obtain the sexual morph in culture or from the specimen.

**Marsupiomyces** Senan. & K.D. Hyde, gen. nov. MycoBank MB821555. Facesoffungi number FoF03484.

**Etymology:** Referring to the ascomata located in mycelial cavity not in stromatic tissues.
Saprobic on leaves of Fagaceae. Sexual morph: Appearing on the surface as black solitary swellings on the leaf surface. Ascomatal cavity pale in colour, tightly packed cells, forming a thin coating around ascomata. Ascomata solitary, scattered, immersed horizontally in the lower and upper leaf epidermis, globose to subglobose, coriaceous, black, ostiolate, papillate. Papilla long, asymmetrically located, slanted on or substrate, curved or erect. Peridium comprising thick-walled, brown, large cells of textura globulosa or textura epidermoidea. Hamathecium aparp astraphyte. Asci 8-spored, ununiticate, fusiform, with short, pointed pedicel, apex rounded with bi-lobed, distinct, apical ring. Ascospores uni- to tri-seriate, fusiform, cylindrical to elongate fusiform, straight or very slightly curved, 1-septate, hyaline, guttulate, smooth-walled. Asexual morph: Undetermined.

Type species: Marsupiomyces quercina Senan., Camporesi & K.D. Hyde.

Notes: Marsupiomyces is introduced and typified by M. quercina. Members of this genus occur on members of Fagaceae. Marsupiomyces comprises M. quercina and M. epidermoidea. Phylogenetically Marsupiomyces is closely related to Apioplagiostoma (Fig. 1, Clade 1). However, Apioplagiostoma differs from Marsupiomyces in having leaf lesions with dark purple to brown pigmentation, and apiosporous ascospores.

Marsupiomyces quercina Senan., Camporesi & K.D. Hyde, sp. nov. MycoBank MB821556. Facesoffungi number FoF03485. Fig. 24.

Etyymology: Species epithet based on the host genus Quercus.

Saprobic on leaves of Quercus. Sexual morph: Stromatic cavity pale in colour, tightly packed cells, forming a thin, coating around ascomata. Ascomata 150–250 μm high 160–300 μm diam (x = 175 ± 200 μm, n = 10) solitary, scattered, immersed horizontally in the lower and upper leaf epidermis, globose to subglobose, coriaceous, black, ostiolate, papillate. Papilla long, asymmetrically located, slanted on or substrate, curved or erect. Peridium 25–45 μm wide (x = 35 μm, n = 10), comprising thick-walled, brown, large cells of textura globulosa. Hamathecium aparp astraphyte. Asci 125–150 × 9–11 μm (x = 134 × 9.8 μm, n = 30), ununiticate, 8-spored, fusiform, with short, pointed pedicel, apex rounded with bilobed, distinct, apical ring. Ascospores 15–21 × 6–8 μm (x = 17.4 × 6.6 μm, n = 40), biseriate, cylindrical to elongate fusiform, 1-septate, hyaline, guttulate. Asexual morph: Undetermined.

Specimen examined: Italy. Province of Forli-Cesena, San Paolo in Alpe, Santa Sofia, dead leaves of Quercus sp. (Fagaceae), 2 May 2013, E. Camporesi, IT 1214 (holotype MFLU 17–0876, isotype BBH 42438, cultures ex-type = MFLUCC 14–0566, MFLUCC 13–0664).

Notes: The combined ITS nrDNA, LSU nrDNA, rpb2 and tef1 sequences analyses of this study shows that Marsupiomyces quercina forms a distinct clade which is sister to Marsupiomyces epidermoidea (Fig. 1, Clade 1).

Marsupiomyces epidermoidea R.H. Perera, Senan., Bulgakov & K.D. Hyde, sp. nov. MycoBank MB821557. Facesoffungi number FoF03486. Fig. 25.

Etyymology: Fungal peridium comprising cells of textura epidermoidea.

Saprobic on dead leaves of Quercus robur. Sexual morph: Appearing on the surface as black solitary swellings on the leaf surface. Ascomatal cavity pale in colour, tightly packed cells, forming a thin, coating around ascomata. Ascomata 200–310 μm diam, depressed globose to irregular. Peridium 11–36 μm thick, comprising 3–8 layers of brown to hyaline cells of textura epidermoidea, outer cell layer brown to pale brown, inner cells hyaline, elongate. Asci 54–83 × 11–15 μm (x = 71 × 14 μm, n = 25), 8-spored, ununiticate, clavate, apedicellate, with a J-refractive apical ring, lying without paraphyses. Ascospores 18–21 × 3–3.6 μm (x = 19 × 3.4 μm, n = 30), uni- to tri-seriate, 1-septate, not constricted at the septum, broadly fusiform, rounded at both ends, straight or very slightly curved, hyaline, guttulate, smooth-walled. Asexual morph: Undetermined.

Specimen examined: Russia. Rostov region, Shakhty city, Maisky, Cemetery Park, (47.6922302° E, 40.0925446° N), on dried leaf of Quercus robur (Fagaceae), 21 Jun. 2015, T.S. Bulgakov, T 776 (holotype MFLU 15–2921, isotype BBH 42451).

Notes: Our new taxon, Marsupiomyces epidermoidea is a sister taxon to Marsupiomyces quercina, but sufficiently distinct. In addition, it is different from Marsupiomyces epidermoidea in having a distinct peridium comprising cells of textura epidermoidea.

Ditopella biseptata R.H. Perera, Senan., Camporesi & K.D. Hyde, sp. nov. MycoBank MB821558. Facesoffungi number FoF03487. Fig. 26.

Etyymology: Species name refers to the ascospores that have two septa.

Saprobic on dead branch of Alnus glutinosa. Sexual morph: Stromata surrounding the perithelial necks, extending outward beneath the host periderm as a distinct clypeus, composed of dark brown thick-walled angular cells. Ascomata 500–900 μm diam, immersed in the ectostroma, situated between the epidermis and the cortex of the host tissue, appearing as solitary swellings of the host epidermis, sometimes epidermis ruptures to expose the rounded apex of the ostiole, perithelial, depressed globose to oval, ostiolate. Ostiolar neck lined with thin-walled hyaline, septate paraphyses. Peridium 44 μm thick, 2-layered, outer layer composed of angular, sometimes slightly compressed, dark brown, thick-walled cells of textura angularis, inner layer of elongate, hyaline, thin-walled, compressed cells of textura angularis, wider around the ostiole, composed of dark brown, thick-walled cells of textura angularis. Ascii 63–90 × 15–19 μm (x = 79 × 18.3 μm, n = 10), 16- to 32-spored, elongate-ellipsoidal to clavate, apedicellate, with a J-refractive apical ring, lying without paraphyses. Ascospores 18–27 × 3–4 μm (x = 23.8 × 3.6 μm, n = 30), multi-seriate, (1) 2(−3)-septate, not constricted at the septum, cylindrical to narrowly ellipsoidal, straight or very slightly curved, tapering slightly to brocaded rounded ends, hyaline, guttulate, smooth-walled, with 2-polar appendages. Asexual morph: Undetermined.

Specimen examined: Italy. Province of Forli-Cesena, Bagno di Romagna, near Lago Pontini, on dead branch of Alnus glutinosa (Betulaceae), 26 May 2014, E. Camporesi, IT 1891 (holotype MFLU 15–2961).
Notes: Here we introduce a new species *Ditopella biseptata* based on phylogeny. *Ditopella biseptata* forms a distinct clade which is sister to *Ditopella ditopa* (Fig. 1, Clade 1). Morphologically *Ditopella biseptata* has 2-septa and minute appendages at both ends. We could not obtain a culture from this fungus and extracted DNA directly from the sporocarps.

**Harknessiaceae** Crous, Persoonia 28: 55. 2012. Clade 7.

Saprobic or pathogenic forming leaf spots. Sexual morph: *Ascomata* perithecial, solitary or aggregated, immersed, globose, coriaceous, brown, papillate. *Papilla* emergent to depressed, wall comprising 3–5 layers of brown-walled cells of *textura angularis*. *Hamathecium* comprising hyaline, septate paraphyses. *Asci* 8-spored, unitunicate, cylindrical to clavate, short pedicellate, with J- apical ring. *Ascospores* unicell to biseriate, hyaline, ellipsoid to fusoid, aseptate, thick-walled, guttulate, smooth-walled. Asexual morph: Coelomycetous. *Conidiomata* eustromatic, pycnidial, scattered or aggregated, immersed, globose, coriaceous, with single or several locules, dark brown to black. *Peridium* comprising thin-walled, almost hyaline to brown cells of *textura angularis*. Ostiole wide,
central, surrounded by brown cells. Conidiophores lining the inner cavity or reduced to the basal layer, sometimes reduced to conidiogenous cells, sometimes septate, branched. Conidiogenous cells holoblastic, discrete, lageniform, subcylindrical to cylindrical, hyaline to pale yellow, smooth, producing macroconidia and sometimes microconidia from same conidiogenous cell, proliferating sympodially one or several times. Macroconidia with a basal appendage, hyaline when young, brown at maturity, unicellular, although basal appendage separated by a septum thick-walled, smooth-walled, with or without pale and dark longitudinal bands, sometimes longitudinally striate, guttulate, basal appendage cellular, cylindrical to subcylindrical, hyaline, thin-walled, devoid of contents, apical appendage present or absent, if
present elongated. *Microconidia* hyaline, oval to ellipsoid, aseptate, smooth-walled.

**Type genus:** *Harknessia* Cooke.

**Type species:** *Harknessia eucalypti* Cooke.

**Notes:** *Harknessiaceae* (Fig. 1, Clade 7) was introduced to accommodate *Harknessia* with its wuestneia-like sexual morph. *Harknessia* species, distributed in both tropical and temperate biomes, are associated with leaves and branches of host trees (Farr & Rossman 2001). Most pathogenic *Harknessia* species are associated with leaf spots, leaf tip dieback, leaf scorch and stem cankers (Crous et al. 1989, 1993, Yuan et al. 2000), but pathogenicity has not been properly studied (Crous et al. 2012b). Some saprobic species have also been isolated from asymptomatic plant tissues (Marincowitz et al. 2008, Crous et al. 2017).

Twenty-one of the 60 species and seven of the 13 wuestneia-like assexual morphs have been linked to *Harknessia* assexual morphs (Crous et al. 2012b, 2017). Ribosomal DNA sequence analysis of diaporthoid taxa revealed a distinct lineage for *Harknessia sensu stricto* within Diaporthales (Crous et al. 2012b). Crous et al. (2012b) introduced six novel species of *Harknessia* from *Eucalyptus* and phylogenetic relationships based on a multi-gene analysis of ITS nrDNA, calmodulin and beta-tubulin genes were provided for these species. However morphologically, *Dwiroopa lythri* has similar characters to *Harknessia* and phylogenetically it is moderately supported here. Hence, *Dwiroopa lythri* is accommodated within *Harknessiaceae* for now. Phylogeny herein, indicates support for the establishment of this family.

*Harknessia eucalypti* Cooke, Grevillea 9 (no. 51): 85. 1881. Facesoffungi number FoF03488. Fig. 27.

Saprobic on *Eucalyptus globulus* appearing as nearly circular, black distinct spots. Sexual morph: Undetermined. Asexual morph: *Conidiomata* 390–550 μm high, 400–600 μm diam, erumpent, scattered, pycnidial, unilocular, globose to

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**Fig. 26.** *Ditopella biseptata* (MFLU 15–2661). A. Herbarium specimen. B, C. Appearance of ascomata on host substrate. D. Vertical section through ascoma. E. Papilla. G–J. Asci (J in Melzer’s reagent). K–M. Ascospores (M in Indian ink). Scale bars: C = 1 mm, D = 200 μm, E = 100 μm, F = 50 μm, G–J = 20 μm, K–M = 10 μm.

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subglobose, brown. Peridium 3–4 layers of brown cells of textura angularis. Conidiophores short, cylindrical, almost globose, branched, 1–2 layers, hyaline, mixed with peridium cells. Conidiogenous cells 8–13 × 4–6 μm, ampulliform, cylindrical, hyaline to brown. Conidia 11.5–15 × 8–9.5 μm (x = 13 × 8.5 μm, n = 20), globose to ovoid with a truncate apiculate apex and an obtuse to blunt base, smooth, hyaline when young, brown at maturity, with longitudinal striations along the length of some conidia. Basal appendages 5–15 × 1.5–3 μm (x = 10 × 2.5 μm, n = 20), hyaline, tubular, smooth, thin-walled, often collapsing.

Material examined: USA, California, on leaves of Eucalyptus globulus, Harkness 1280, isotype K (M) 195744.

Notes: Yuan & Mohammed (1997) observed the asexual morph of Wuestneia epispora from culture which was morphologically identical to Harknessia eucalypti, although this has not been proven based on sequences. Harknessia is associated with leaf spots, leaf tip dieback or leaf scorch, stem cankers and is also common on leaf litter (Crous et al. 1989, Marincowitz et al. 2008).

Juglanconidaceae Voglmayr & Jaklitsch, Persoonia 38: 142. 2017. Facesoffungi number FoF03489. Clade 4.

Synonym: Melansporellaceae C.M. Tian et al. Phytotaxa 305: 194. 2017.

Saprobic on dead corticated twigs and branches of Juglandaceae species. Sexual morph: Pseudostromata inconspicuous, ectostromatic disc pale yellow to pale brown, causing a more or less postulate bark surface. Central column more or less conical, beneath the disc. Ascomata surrounding the ectostromatic disc, with long, asymmetrical or symmetrical, lateral ostioles that emerge at the margin or within the ectostromatic disc, globose to subglobose, coriaceous, black. Hamathecium comprising hyaline paraphyses which deliquesce at maturity. Asci 8-spored, unitunicate, with a distinct apical ring, sessile. Ascospores hyaline, b cellular, with or without gelatinous appendages. Asexual morph: melanconium-like. Conidiomata acervular, with ectostromatic disc and central column. Conidiophores aseptate or few-celled, smooth, hyaline to brown. Conidiogenous cells annellidic, cylindrical, base swollen, hyaline to brown. Conidia ellipsoid to oval, brown, with gelatinous sheath. Conidial wall smooth on the outer surface, with inconspicuous to distinct irregular verrucae on the inner surface (description based on Voglmayr et al. 2017).

Type genus: Juglanconis Voglmayr & Jaklitsch.
Type species: *Juglanconis juglandina* (Kunze) Voglmayr & Jaklitsch.

**Notes:** *Juglanconidaceae* (Fig. 1, Clade 4) was introduced by Voglmayr et al. (2017) based on *Melanconium juglandinum*. This family comprises *Juglanconis juglandina*, *J. oblonga*, *J. pterocarya*, and *J. appendiculata*. *Juglanconidaceae* is morphologically and phylogenetically distinct from other families of Diaporthales. Species in this family are mostly pathogenic on *Juglandaceae* tree species causing black postural dieback disease (Graves 1923, Belisario 1999). Du et al. (2017) introduced a new family *Melansporellaceae* for *Juglanconis* species and here we synonymise *Melansporellaceae* under *Juglanconidaceae*.

*Juglanconis juglandina* (Kunze) Voglmayr & Jaklitsch, Persoonia 38: 144. 2017. Facesoffungi number FoF03490. 

**Illustration:** See Voglmayr et al. (2017).

Saprobic on dead twigs and branches of *Juglandaceae*. Sexual morph: *Pseudostromata* 0.8–2 mm diam, typically inconspicuous, sometimes distinct, circular, slightly projecting, without perithecial bumps. *Ectostromatidisc* 0.5–1.2 mm diam, indistinct, circular or oval, dark grey, brown or black, often covered by densely arranged ostioles, pulvinate. *Central column* yellowish to brownish grey. *Eustoma* indistinct. *Ascomata* 440–565 μm diam, perithecial, aggregated, immersed, globose to subglobose, coriaceous, black, arranged in various configurations. *Asci* 140–160 × 17–22 μm, 8-spored, unitunicate, clavate to fusoid, indistinct apical ring, with small narrow stalk. *Ascospores* 25–30 × 8–11 μm, uni- to irregularly biseriate, hyaline, inequilateral ellipsoid or broadly fusoid, asymmetric, distinctly constricted at the septum, without appendages, upper cell mostly larger, with rounded to subacute end, lower cell subacute to narrowly rounded, multiguttulate, containing mostly one large and numerous small guttules per cell. Asexual morph: *Conidiomata* acervular, 1–4 mm diam, black, scattered or occasionally confluent, with central or eccentric stromatic mass, at maturity covered by black discharged conidiomatal masses, usually conspicuous. *Conidiophores* 25–35 μm high, 5–6.5 μm wide, cylindrical to lageniform, simple, rarely branched at the base, smooth, subhyaline to pale brown. *Conidiogenous cells* anellidic with distinct annellations, integrated. *Conidia* 20–25 × 12–15 μm, unicellular, hyaline when immature, brown to blackish when mature, broadly ellipsoid to broadly pip-shaped, truncate with distinct scar at the base, multiguttulate, thick-walled, wall ornamented on the inside of the wall with irregular confluent verrucae and with gelatinous sheath.

**Notes:** Voglmayr et al. (2017) neotypified *Melanconium juglandinum* based on a freshly collected specimen due to misplacement or loss of the type specimen and poor condition of other authentic specimens. The conidiomata, conidiophores and conidia was nicely illustrated by Corda (1839) and the asexual morph is very common and conspicuous, while the sexual morph is infrequently found in fully-developed condition.

*Lamproconicaceae* C. Norphanphoun, T.C. Wen & K.D. Hyde, Phytotaxa 270: 94. 2016. Facesoffungi number FoF03491. Clade 22.

Pathogenic and saprobic on dead herbaceous branches. Sexual morph: *Stromata* prosenchymatous around perithecia, delimited externally by greenish, blackened, dense pseudoparenchymatous zone, interior whitish, composed of interwoven hyphae mixed with substrate cells, 3–5 ascomata in a stroma. *Ascomata* perithecial, small, aggregated, scattered, globose to subglobose, pale to dark brown, coriaceous, ostiolate, papillate. *Papilla* converging and erumpent through stroma surface as single, large opening. *Peridium* comprises pale brown, compressed, cells of textura angularis. *Asci* 8-spored, unitunicate, cylindrical, short-stalked, *J* apical apparatus. *Ascospores* uniseriate, broadly ellipsoid, 1–septate, not or slightly constricted at the septa, hyaline, smooth. Asexual morph: *Conidiomata* pycnidial, solitary, partly immersed in host tissue, uni- to multilocular or convoluted, dark blue or dark blackish brown, erumpent in the centre. *Pyecnidium* thick-walled, thin at inner layer, hyaline or dark brown, comprising wall cells of textura angularis or textura intricata. *Ostiole* absent, dehiscence irregular. Paraphyses interspersed within conidiophores. *Conidiophores* filiform or cylindrical, pale-bluish or hyaline, septate, branched, smooth-walled, formed at the base of conidiomatal wall. *Conidigenous cells* holoblastic, cylindrical to subcylindrical, each forming a single conidium at the apex, or annellidic, colourless to olivaceous, smooth-walled. *Conidia* fusiform, ellipsoid, thick-walled, contents granular, aseptate, bluish to glistening dark blue or hyaline, smooth-walled, produced in mucilage but without a distinct mucilaginous envelope or appendage.

Type: *Lamproconium* (Grove).

**Type species:** *Lamproconium desmazieri* (Berk. & Broome) Grove.

*Lamproconium desmazieri* (Berk. & Broome) Grove [as ‘des- mazier’], British Stern- and Leaf-Fungi (CoeIomyetes) (Cambridge) 2: 321. 1937. Facesoffungi number FoF03492. Fig. 28.

Pathogenic and saprobic on dead twigs and branches of lime trees (*Tilia* sp.). Sexual morph: Undetermined. Asexual morph: *Conidiomata* 0.8–1 × 0.4–0.55 mm, pycnidial, solitary, partly immersed in host tissue, uniloculate, dark blue, with a raised centre. *Pyecnidium* 50–70 μm, with multi-layered wall, thin at inner layer, hyaline, wall cells of textura angularis. Paraphyses interspersed with conidiophores. *Conidiophores* 30–120 μm high, arising from the outermost wall layer at the basal of pycnidium, filiform or cylindrical, pale-bluish to hyaline, septate, branched, smooth-walled. *Conidigenous cells* cylindrical to sub-cylindrical, anellidic, with flared periclinal thickening in the collarette zone, colourless to olivaceous, smooth-walled. *Conidia* 22–28 × 8–10 μm (x = 25.25 × 9 μm, n = 30), fusiform, ellipsoid, infrequently slightly curved, aseptate, initially hyaline, bluish to glistening dark blue at maturity, narrowly rounded at ends, smooth-walled.

**Material examined:** Russia, Rostov region, Krasnosulinsky district, Donskoye forestry, artificial forest, on dead branches of *Tilia cordata* (*Tiliaceae*), 21 May 2014, T. Bulgakov, MFLU 14–0780.

**Notes:** *Melanconium desmazieri* was reported as the asexual morph of *Melanconium desmazieri* from *Tilia* species (Petrak 1938). Grove (1937) re-circumscribed the species of *Melanconium* and postulated that *Melanconium desmazieri* differed from the type species of *Melanconium* in having 1-septate, bluish to glistening dark blue conidia. Therefore, Grove introduced a new genus *Lamproconium* to accommodate this taxon (Grove 1937, Sutton 1980), and *Lamproconium desmazieri* was placed in...
Diaporthales genera incertae sedis by Cannon & Minter (2014). Based on phylogenetic study, Norphanphoun et al. (2016) synonymised Melanconis desmazieri under Lamproconium desmazieri and introduced a new family Lamproconiaceae to accommodate Lamproconium and Hercospora. Morphologically Lamproconiaceae is distinct from other families of Diaporthales in having dark blue or dark blackish brown pycnidial conidiomata and fusiform to ellipsoid, aseptate, bluish to glistening dark blue or hyaline conidia. The sexual morph is reported only for Hercospora. Combined gene analysis of LSU nrDNA, ITS nrDNA, rpb2, and tef1 shows that Lamproconiaceae is a distinct family that is sister to Sydowiellaceae (Fig. 1, Clade 22).
Macroliliaceae Crous, IMA Fungus 6: 180. 2015. Clade 15.

Pathogenic forming leaf spots. Sexual morph: Undetermined. Asexual morph: Coelomycetous. Conidiomata pycnidial, immersed, becoming erumpent, medium brown, globose. Conidiophore reduced to conidigenous cells. Conidigenous cells lining the inner cavity, pale brown, cylindrical, proliferating percurrently near the apex. Conidia solitary, medium to dark brown, ovoid, smooth, guttulate, medianly septate, apex obtuse, base truncate with a visible scar.

Type genus: Macrohilum H.J. Swart.

Type species: Macrohilum eucalypti H.J. Swart.

Notes: The family Macroliliaceae was introduced and typified by Macrohilum (Crous et al. 2015) and its taxonomic placement in Diaporthales has been reported based on LSU nrDNA sequence data. In this study, our concatenated analysis on LSU nrDNA, ITS nrDNA, rpb2 and tef1 also indicates that the Macrohilum eucalypti strains cluster together with high support and belong to the Macrohilaceae (Fig. 1, Clade 15). Macroliliaceae differs from other families of Diaporthales in having single, dark brown, guttulate, thick-walled, medianly septate, oval conidia with obtuse apex and truncate base (Crous et al. 2015). This monotypic family comprises only a single species commonly associated with leaf spots of Eucalyptus.

Macrolium eucalypti H.J. Swart, Trans. Br. mycol. Soc. 90: 288. 1988. Facesoffungi number FoF03493.

Illustration: See Crous et al. (2015).

Pathogenic forming leaf spots. Sexual morph: Undetermined. Asexual morph: Conidiomata immersed, becoming erumpent, medium brown, globose, to 300 μm diam. Conidigenous cells lining the inner cavity, pale brown, cylindrical, finely roughened, proliferating percurrently near the apex, 10–15 × 3–5 μm. Conidia solitary, medium to dark brown, ovoid, smooth, guttulate, developing a single, dark brown, supra-median septum, thick-walled, frequently constricted at the septum, apex obtuse, base truncate and protruding, with a visible scar, 2–3 μm wide, 15–20 × 10–12 μm (description based on Crous et al. 2015).

Notes: Crous et al. (2015) epitypified Macrolium eucalypti using an Australian specimen collected from Eucalyptus piperta. Although a New Zealand isolate (CPC 10945) differed from the Australian ex-epitype isolate (CPC 19421) by four base pairs in the ITS nrDNA, Crous et al. (2015) did not propose this isolate as a new species pending collection of more material.

Melanconidaceae G. Winter [as ‘Melanconideae’], Rabenh. Krypt.-Fl., Edn 2 (Leipzig) 1.2: 764. 1886. Clade 2.

Saprobic or pathogenic on plants. Sexual morph: Pseudostromatella well-developed, oblong to fusiform, with distinct, J-apical ring, Ascspores overlapping uni- to biseriate, hyaline, ellipsoid, 1-septate. Asexual morph: coelomycetous, melanconium-like. Conidiomata acervular, scattered, solitary, superficial, black, coriaceous. Conidiophores branched at the base, septate, Conidigenous cells annellidic, cylindrical. Conidia hyaline to brown, ellipsoid or subglobose, smooth-walled, thick-walled.

Type genus: Melanconis Tul. & C. Tul.

Type species: Melanconis stipitata (Fr.) Tul. & C. Tul.

Notes: The family Melanconidaceae was introduced by Winter (1886) to accommodate species having yellowish-white ectostromatic discs surrounding ascomata arranged in a circle. Members of this family are plant pathogens causing disease on economic plant species, as well as saprobes. Maharachchikumbura et al. (2016) listed 24 genera under this family based on morphology, following Lumbsch & Huhndorf (2010). However, most genera do not have any DNA sequence data, exceptDicarpeila, Melanconella, Melanconis, Melanconium, and Prosthecium. Voglmayr & Jaklitsch (2014) synonymised Prosthecium under Stilbospora and included it in Stilbosporaceae. Crous et al. (2012b) have linked more than half of known wuestneia-like species to Harknessiella species accommodating it in Harknessiellaceae. Based on morphological and phylogenetic evidence, Castlebury et al. (2002) and Rossman et al. (2007) reported that this family is monogenic with Melanconis and its asexual morph Melanconium. However, Rossman et al. (2015) synonymised Melanconium under Melanconis based on the poor phylogenetic resolution of Melanconium species and poor host-specificity. Phylogenies generated in this study position Dicarpeila and Melanconella (both in Melanconiniellaceae; Fig. 1, Clade 10) outside the Melanconidaceae (Fig. 1, Clade 2). Considering the lack of molecular data, diverse ecological strategies and variable morphology, the family Melanconidaceae is restricted to Melanconis sensu stricto. Hence, we exclude all genera listed in Maharachchikumbura et al. (2016) from this family except Melanconis.

Melanconis apiocarpum and M. marginale have been reported from leaf spots of Alnus species in Canada, England, and Switzerland (Sieber et al. 1991). Melanconium juglandinum causes black pustular dieback of Juglans species in Europe and was consistently isolated from diseased twigs and branches of Persian walnut trees (Juglans regia), proving to be a virulent pathogen (Belisario 1999).

Melanconis italica Senan., Camporesi & K.D. Hyde, sp. nov. MycoBank MB821560. Facesoffungi number FoF03494. Figs 29, 30.

Etymology: Species epithet based on the country where the fungus was collected, Italy.

Saprobic on Alnus cordata. Sexual morph: Pseudostromatella poorly-developed, erumpent. Ectostromatic disc 500–600 μm diam, surrounded by bark or not, yellowish-white, causing a coarse bark surface, inverted conical, ostoles open into margin and rarely middle of the disc. Ascoma 0.90–1 mm high, 0.4–0.5 mm diam (χ = 0.98 × 0.47 mm, n = 20), perithecial, oblique, globose to subglobose, coriaceous, black, with long periphery, lateral ostiolar canal. Hamathecium comprising wide, hypha-like, paraphyses, deliquescent at maturity. Asci 8-spored, unitunicate, oblong to fusiform, with distinct, J-apical ring, Ascspores overlapping uni- to biseriate, hyaline, ellipsoid, 1-septate. Asexual morph: coelomycetous, melanconium-like. Conidiomata acervular, scattered, solitary, superficial, black, coriaceous. Conidiophores branched at the base, septate, Conidigenous cells annellidic, cylindrical. Conidia hyaline to brown, ellipsoid or subglobose, smooth-walled, thick-walled.
4–12 μm wide (X = 9 μm, n = 20) paraphyses. Peridium 15–28 μm diam (X = 21 μm, n = 10), comprising thick-walled, brown cells of textura angularis. Asci 80–92 × 11–14 μm (X = 13 × 8.5 μm, n = 20), 8-spored, unitunicate, cylindrical, short pedicellate, with distinct, J-apical ring. Ascospores 18–21 × 2.8–4 μm (X = 19 × 3.5 μm), biseriate, hyaline, fusiform, 1-septate, slightly constricted at the septum, smooth-walled. Asexual morph: Conidiomata on MEA solitary, superficial, globose, appears as slimy bubbles of conidia mass, black. Conidiophores cylindrical, branched, thick-walled, hyaline. Conidiogenous cells blastic, terminal or intercalary, bottle-shaped, narrowing towards the apex, hyaline, thick-walled. Conidia fusiform to ellipsoidal, aseptate, thick-walled, basal end pointed, apical end blunt, olivaceous.

Culture characteristics: Colonies growing on MEA attained 1 cm within 7 d incubation at 18 °C, flat, circular, smooth margin, white, tightly attached to the substrate, little aerial mycelia.
**Melanconissima** Senan. & Maharachch., K.D. Hyde, fam. nov. MycoBank MB821561. Facesoffungi number FoF03495.

**Notes:** *Melanconis italica* clusters in a clade with *M. alni* with high support (Fig. 1, Clade 2). Both *M. italica* and *M. alni* are associated with *Alnus* species. *Melanconis alnicola* is also reported from *Alnus* species. However, there are no DNA sequence data in GenBank for *Melanconis alnicola*. Morphologically, *M. alni* differs from *M. italica* in having short to long, hyaline, filiform appendages at both ends, and oval to ellipsoid ascospores. In contrast, *M. alnicola* has large, oval to ellipsoid ascospores (25–45 × 9–12 μm) and small asci (50–60 × 10–15 μm). Hence, a new species, *Melanconis italica*, is introduced to accommodate this taxon.

*Melanconissima* clusters in a clade with *M. alni* with high support (Fig. 1, Clade 2). Both *M. italica* and *M. alni* are associated with *Alnus* species. *Melanconis alnicola* is also reported from *Alnus* species. Morphologically, *M. alni* differs from *M. italica* in having short to long, hyaline, filiform appendages at both ends, and oval to ellipsoid ascospores. In contrast, *M. alnicola* has large, oval to ellipsoid ascospores (25–45 × 9–12 μm) and small asci (50–60 × 10–15 μm). Hence, a new species, *Melanconis italica*, is introduced to accommodate this taxon.

**Melanconiellaceae** Senan. & Maharachch., K.D. Hyde, fam. nov. MycoBank MB821561. Facesoffungi number FoF03495.

**Notes:** *Melanconis italica* clusters in a clade with *M. alni* with high support (Fig. 1, Clade 2). Both *M. italica* and *M. alni* are associated with *Alnus* species. *Melanconis alnicola* is also reported from *Alnus* species. Morphologically, *M. alni* differs from *M. italica* in having short to long, hyaline, filiform appendages at both ends, and oval to ellipsoid ascospores. In contrast, *M. alnicola* has large, oval to ellipsoid ascospores (25–45 × 9–12 μm) and small asci (50–60 × 10–15 μm). Hence, a new species, *Melanconis italica*, is introduced to accommodate this taxon.

**Type genus:** *Melanconia* Sacc.

**Type species:** *Melanconia spodiaea* (Tul. & C. Tul.) Sacc.

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**Fig. 30.** Asexual morph of *Melanconis italica* (MFLUCC 16–1199). A, B. Conidiomata on PDA. C–F. Conidia attached to conidiogenous cells, and conidiophores. G. Conidia. Scale bars: A = 500 μm, B = 200 μm, C–F = 10 μm, G = 5 μm.
Notes: The phylogenetic analyses of this study showed that Greeneria, Melanconiella, and Dicarpella (previously placed in Melanconidaceae), Tubakia (previously placed as Diaporthales incertae sedis), Sphaeronaemella fragariae (previously placed in Microascales incertae sedis) and Microascospora gen. nov. forms a distinct clade with moderate support, which we recognise as Melanconiellaceae (Fig. 1, Clade 10).

The genus Greeneria was introduced based on *G. fuliginea* (Scribnér & Viala 1887) and was synonymised under *Melanconium* (Cavara 1889) as *Melanconium fuligineum*. Later van der Aa (1973) accommodated this genus in *Phyllosticta* as *P. ampelicida*. Punithalingam (1974) renamed this taxon as *Greeneria uvicola* providing a detailed description and illustration. A LSU nrDNA sequence analysis by Farr & Rossman (2001) showed the phylogenetic placement of *Greeneria uvicola* outside of Melanconidaceae, but within Diaporthales. Analyses in this current study showed the phylogenetic placement of *G. uvicola* and *G. saprophytica* within Melanconidaceae (Fig. 1, Clade 10). However, *G. saprophytica* does not show a very close affinity to *G. uvicola*. *Greeneria uvicola* is one of the most common pathogens causing various diseases in grapes (Navarrete et al. 2009). Greeneria lacks a known sexual morph (Zhang & Blackwell 2001) and it differs from other diaporthalean asexual morphs in having holoblastic conidiogenesis, producing phialidic conidigenous cells in acervuli or pycnidia, and pale asexual morphs in having holoblastic conidiogenesis, producing spores of the type species. Thus, here we retain *Greeneria* as Melanconidaceae (Fig. 1, Clade 10).

The genus *Dicarpella* is based on *Dicarpella bina* and the asexual morph of this genus was reported as *Tubakia* (Belisario 1991). *Tubakia* is typified by *Tubakia japonica*. The type species of these two genera are not linked to each other. However molecular data linked *Tubakia* and *Diplacella* together and a few *Diplacella* species have *Tubakia* asexual morphs (Sogonov et al. 2008). *Tubakia* is more commonly encountered compared with *Dicarpella*. The phylogenetic analyses in this study indicate a plausible relationship of *Dicarpella dryina* and *Tubakia seoraksanensis* as a holomorph genus (Fig. 1, Clade 10). However, it is hard to confirm that *Dicarpella* and *Tubakia* are congeneric without analysing sequence data of the type species. Thus, here we retain *Dicarpella* and *Tubakia* as two separate genera until sequence data becomes available.

Voglmayr et al. (2012) reviewed the genus *Melanconiella* based on herbarium material and recently collected specimens. The morphological and phylogenetic distinctness of *Melanconiella* from *Melanconium* was discussed. The generic type of *Melanconiella* was confirmed as *M. spodiae*. Phylogenetic analysis in this study showed the distinct placement of *Melanconiella* within this new clade (Fig. 1, Clade 10).

A new genus *Microascospora* is introduced to this family based on *Microascospora rubi*. Phylogenetically *Sphaeronaemella fragariae* did not cluster with other *Sphaeronaemella* species and it forms a clade with *Microascospora rubi*. Hence *Sphaeronaemella fragariae* is excluded from *Sphaeronaemella* and accommodated in *Microascospora* as *M. fragariae*. However, *Melanconiellaceae* was originally invalidly published (Art. 39.1, Melbourne) by Locquin (1984). Hence *Melanconiellaceae* is herewith validated to accommodate *Dicarpella*, Greeneria, *Melanconiella*, Microascospora and Tubakia.

*Melanconiella chrysodiscosporina* Voglmayr & Jaklitsch, Fungal Diversity 57: 14. 2012. Facesoffungi number FoF03496. Fig. 31.

Saprobic on dead branch of *Fagus sylvatica*. Sexual morph: *Pseudostromata* indistinct, irregular or circular outline. *Ectostromatic disc* minute, circular, narrowly fusoid to oblong, yellow or greyish brown, central column yellow. *Ectostroma* comprising subhyaline to yellowish hypheae. *Ascorna* 1.2–1.3 mm high, 0.3–0.5 mm diam (x = 1.25 × 0.45 mm, n = 20), immersed, aggregated, globose to subglobose, coriaceous, black, arranged in volsid configuration. *Papilla* 600–950 μm high, 90–130 μm diam (x = 800 × 117 μm, n = 10), long, asymmetrical or symmetrical, black, converging at upper region and make a common canal to open out, internally covered by hyaline periphyses. *Peridium* 14–17 μm diam (x = 15 μm, n = 10), comprising outer few layers of thick-walled, brown, compressed cells of textura angularis and inner thick-walled, hyaline, compressed cells of textura angularis. *Asci* 85–100 × 13–17 μm (x = 95 × 15 μm, n = 20), 8-spored, uniseriately cylindrical to fusoid, with J-distinct apical ring, sessile or with short pedicel. *Ascospores* 17–20 × 6–9 μm (x = 17.6 × 7.5 μm, n = 20), uni- or biseriate, broadly ellipsoidal, not constricted at the septum, ends broadly rounded, hyaline, medianly 1-septate, multiguttulate with one large and numerous small guttules per cell, wall swelling and sometimes thickened and stuffed at the septum. Asexual morph: discosporina-like. *Conidiomata* 140–180 μm high, 490–600 μm diam (x = 150 × 507, n = 20), visible as darker spots margined by a distinct dark brown to blackish marginal zone, with a central stromatic column, at maturity covered by whitish discharged conidial masses. *Conidiophores* 6–10 × 5–7.5 μm (x = 7.4 × 6 μm, n = 20), few layers, cubic, thick-walled, hyaline. *Conidiogenous cells* 9–12 × 1–2 μm (x = 11 × 1.8 μm, n = 20), phialidic, conical, base enlarged, narrowing towards the apex, thick-walled, hyaline. *Conidia* 10–12 × 4–6 μm (x = 10.8 × 5.2 μm, n = 20), ellipsoid, oblong or cylindrical, with two large and numerous small guttules, hyaline, with gelatinous sheath.

Specimen examined: Italy. Province of Forlì-Cesena, Bagno di Romagna, near Rometown, on dead branches of *Fagus sylvatica* (*Fagaceae*), 14 Aug. 2016, E. Camporesi, IT 3069, living culture MFLUCC 17–0893, living culture MFLUCC 17–1671.

Notes: *Melanconiella chrysodiscosporina* was introduced by Voglmayr et al. (2012). This fungus was mostly found in the summer season from late spring to autumn (Voglmayr et al. 2012). The holotype and other authentic specimens were collected from dead branches of *Carpinus betulus* (*Betulaceae*). However, we collected this specimen from dead branches of *Fagus sylvatica* (*Fagaceae*). This is the first host record of *Melanconiella chrysodiscosporina* on *Fagus sylvatica*.

*Melanconiella chrysomelanconium* Voglmayr & Jaklitsch, Fungal Diversity 57: 16. 2012. Facesoffungi number FoF03497. Fig. 32.

Saprobic on branches of *Carpinus betulus*. Sexual morph: Not observed. Asexual morph: melanconium-like. *Conidiomata* 0.4–1 mm diam, visible as blackish spots with central or eccentric ostiolar opening, pycnidial, epidermal to
subepidermal, globose to subglobose, black, coriaceous, at maturity covered by black discharged conidial masses. Ostiole present, pointed. Conidiomatal wall composed of thin-walled, brown cells of textura angularis. Conidiophores reduced to conidiogenous cells, arising from the uppermost layer of cells of the basal stromatic pycnidial wall. Conidiogenous cells 7–18 μm high, 2–6 μm diam (x = 14.4 × 4 μm, n = 20), annellidic, hyaline, cylindrical, thick-walled, determinate, integrated, with flared collarette and periclinal wall-thickening. Conidia 13–20 × 7–11 μm (x = 15 × 8.5 μm, n = 20), dark brown, broadly ellipsoid to globose, circular in outline, slightly truncate at base, aseptate, multiguttulate with 1–2 large and numerous small guttules, thick-walled, with distinct gelatinous sheath, smooth.

Specimen examined: Italy, Province of Forlì-Cesena, Via Nenni, Forlì, on dead aerial branches of Carpinus betulus (Betulaceae), 2 Jan. 2015, E. Camporesi, IT 1622, MFLU 17-0966.

Notes: Melanconiella chrysomelanconium is morphologically similar and phylogenetically related to M. chrysodiscosporina (Voglmayr et al. 2012). The combined gene analysis of this study...
illustrates its phylogenetic relationship to other *Melanconiella* species (Fig. 1, Clade 10).

*Microascospora* Senan. & K.D. Hyde, gen. nov. MycoBank MB821562. Facesoffungi number FoF03498.

**Etymology**: Name based on small ascospores (<20 μm in length).

*Saprobic* on dead stems. Sexual morph: *Ascomata* scattered, solitary, immersed, globose to subglobose, brown, coriaceous, papillate, ostiolate. *Papilla* narrow, long, straight or curved, comprising thick-walled, brown, compressed cells of *textura angularis*, internally covered by hyaline periphyses. *Peridium* comprising thick-walled, brown, somewhat compressed cells of *textura angularis*. *Hamathecium* aparaphysate. *Asci* 8-spored, unitunicate, clavate to fusiform, J- apical ring, attached to base without a pedicel. *Ascospores* overlapping biseriate, ellipsoid to fusiform, hyaline, aseptate, with two large fat globules at ends, appendages long, filiform to wavy, hyaline. Asexual morph: Undetermined.

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**Fig. 32.** *Melanconiella chrysomelanconium* (MFLU 17–0966). A, B. Conidiomata on substrate. C. Cross section of conidioma. D–F. Conidiophores, conidiogenous cells and attached conidia. G–J. Conidia. Scale bars: B = 200 μm, C = 500 μm, D–F = 20 μm, G–J = 10 μm.
Type species: Microascospora rubi Senan., Maharachch. & K.D. Hyde.

Microascospora rubi Senan., Camporesi & K.D. Hyde, sp. nov. MycoBank MB821563. Facesoffungi number FoF03499. Fig. 33.

Etymology: Name based on host genus Rubus.

Saprobic on dead stems of Rubus ulmifolia. Sexual morph: Ascomata 250–290 × 205–255 μm (x = 269 × 230 μm), scattered, solitary, immersed, globose to subglobose, brown, coriaceous, papillate, ostiolate. Papilla 115–155 μm high, 55–67 μm diam (x = 139 × 65 μm, n = 10), narrow, long, straight or curved, comprising thick-walled, brown, compressed cells of textura angularis, internally covered by hyaline periphyses. Hamathecium aparaphysate. Asci 68–70 × 15–18 μm (x = 69 × 16 μm, n = 20), 8-spored, unitunicate, clavate to fusiform, J- apical ring, attached to base without a pedicel. Ascospores 14–19 × 5–7 μm (x = 17 × 6 μm, n = 20), overlapping biseriate, ellipsoid to fusiform, hyaline, aseptate, with two large fat globules at ends, appendages long, filiform to wavy, hyaline. Asexual morph: Undetermined.

Culture characteristics: Colonies growing on MEA slow growing, becoming 1 cm within 10 d at 18 °C, circular, umbonate, irregular margin, cream to olivaceous, cotton-like, loosely attached to the substrate.

Specimen(s) examined: Italy. Province of Forlì-Cesena, Bagno di Romagna, Ridracoli, on dead branch of Rubus ulmifolia (Rosaceae), 24 Jan. 2014, E. Camporesi, IT 1675 (holotype MFLU 15–1112, isotype BBH 42445).

Notes: A new genus Microascospora is introduced based on M. rubi. This genus is morphologically and phylogenetically distinct from other genera in Melanconiiellaceae having small ascospores (<20 μm length) with wavy, filiform long appendages, and immersed, solitary ascomata with wavy papilla.

Microascospora fragariae (F. Stevens & Peterson) Senan., Maharachch. & K.D. Hyde, comb. nov. MycoBank MB821631. Facesoffungi number FoF03500.

Basionym: Sphaeronaemella fragariae F. Stevens & Peterson, Phytopathology 6: 258. 1916.

Notes: The multi-gene sequence analysis in this study shows that Sphaeronaemella fragariae (Fig. 1, Clade 10) does not have any affinities to the type species of Sphaeronaemella, S. helvellae (incertae sedis in Microasccales). Sphaeronaemella fragariae forms a well-supported clade that is sister to Microascospora rubi in Melanconiiellaceae. Hence, we exclude Sphaeronaemella fragariae from Sphaeronaemella and accommodate this taxon in Microascospora and propose a new combination as Microascospora fragariae.
Fig. 34. *Tubakia thailandensis* (MFLU 13–0260). A. Herbarium specimen. B. Conidiomata on the host surface. C. Vertical section of pycnothyrium. D. Top view of radiate scutellum and conidiogenous cells with developing conidia. E–H. Conidiogenous cells with developing conidia stained with lactophenol cotton blue. I–K. Conidia. L. Conidia stained with lactophenol cotton blue. M. Germinating conidium. N–O. Colonies on PDA from top. P–Q. Colonies on PDA from reverse. Scale bar: C = 50 μm, D, F–M = 10 μm, E = 5 μm.
Tubakia thailandensis Senan., Tangthir. & K.D. Hyde, sp. nov.
MycoBank MB821565. Facesoffungi number FoF03501. Fig. 34.

Etymology: Name based on the country from which this species was collected, Thailand.

Saprobic on dead leaves. Conidiomata 40–50 μm high, 50–75 μm diam, pycnothryia with radiate scutella, scattered to gregarious, superficial on the substratum. Scutella convex, brown to dark brown, thick-walled cells, radiating from a central point. Conidiophores short, forming under the developing scutella. Conidiogenous cells 5–10 × 2–4 μm, phialidic, with a minute collarette and wide periclinal thickening. Conidia 10–12.4 × 7.4–8.7 μm (x̄ = 11.3 × 8.1 μm, n = 20), globose to subglobose, smooth, hyaline, thick-walled.

Notes: Tubakia comprises seven species (Index Fungorum 2017, MycoBank 2017). Braun et al. (2014) presented a taxonomic key to the genus Tubakia and according to that key, this species is morphologically quite similar to “Tubakia sp.” which has a small scutellum (40–80 μm diam.) and hyaline or subhyaline conidia (9–11 × 7–9 μm) collected from Castanea henryi in China. Therefore, we introduce this species as Tubakia thailandensis. Tubakia thailandensis differs from other Tubakia species in having small (length < 15 μm), globose or subglobose, hyaline conidia, without microconidial development. Tubakia shares close phylogenetic affinities to Greeneria saprophytica (Fig. 1, Clade 10).

Prosopidicolaense Senan. & K.D. Hyde, fam. nov. MycoBank MB821565. Facesoffungi number FoF03502. Clade 17.

Pathogenic on species of Fabaceae. Conidiomata pycnidial, rarely acervular, solitary or aggregated in a eustromatic stroma with one to several ostioles or astromatic, grey to black, erumpent, rarely acervular, solitary or aggregated in a eustromatic stroma comprising small, brown cells of textura angularis. Conidiophores reduced to conidigenous cells or lining the whole inner layer of the wall, subcylindrical, branched, septate, straight to irregularly curved, base pale brown, becoming medium brown at apex. Conidiogenous cells mononematous to polyphialidic, tightly aggregated, hyaline, smooth, ampulliform, subcylindrical to lageniform, prominent periclinal thickening, at times with percurrent proliferation. Conidia solitary, subhyaline to brown, smooth, guttulate, straight to variously curved, ellipsoid to fusoid-ellipsoid, apex obtuse, base truncate to bluntly round.

Type genus: Prosopidicola Crous & C.L. Lennox.

Type species: Prosopidicola mexicana Crous & C.L. Lennox.

Notes: Prosopidicolaense is a monotypic family introduced here to accommodate Prosopidicola species. Prosopidicolaense (Fig. 1, Clade 17) is phylogenetically not associated with any support to known families of Diaporthales, but is morphologically well-delineated. Species in this family are pathogens on Fabaceae host plants. This family comprises Prosopidicola albizziae and P. mexicana (Lennox et al. 2004, Crous et al. 2016).

Prosopidicola mexicana Crous & C.L. Lennox, Stud. Mycol. 50: 191. 2004. Facesoffungi number FoF03503.

Illustration: See Lennox et al. (2004).

Pathogenic causing pod rot disease on Prosopis glandulosa. Lesions 2–3 mm wide and up to 7 mm long, covering the pod, irregular, extending across the width of the pod, pale brown with a raised, dark brown margin. Conidiomata up to 250 μm diam, amphiogenous, pycnidial, rarely acervular, scattered, immersed to erumpent, globose to subglobose, unicellular, black. Peridium up to 15 μm thick, consisting of 3–4 layers of brown cells of textura angularis. Conidiophores 5–50 μm high, 3–4 μm diam, lining the whole inner layer of the wall, subcylindrical, branched, 0–3-septate, straight to irregularly curved, base pale brown, becoming medium greenbrown at apex. Conidiogenous cells 5–16 × 3–4 μm, phialidic when young, with prominent periclinal thickening and proliferating percurrently with age, subcylindrical to lageniform, green-brown, smooth when young, becoming medium to dark green-brown and warty with maturity, apex obtaining flared collarettes, rarely with two loci per conidigenous cell. Conidia 10–15 × 4.5–5.5 μm, solitary, broadly ellipsoid, medium brown, straight to slightly curved, rounded at the apex, tapering to a subtruncate base, with an inconspicuous dehiscence scar, smooth, thin-walled, asceptate (description based on Lennox et al. 2004).

Notes: Prosopidicola mexicana is the cause of a severe pod rot disease on Prosopis glandulosa. It appears as black lesions surrounded by a dark brown margin. Lennox et al. (2004) revealed it to group closely to Cryphonectriaceae. However in the phylogenetic analyses generated in this study, it forms a distinct clade which is basal to Cytopsoraceae.

Pseudoplagiostomataceae Cheew. et al., as “Pseudoplagiostomataceae”, Fungal Diversity 44: 95. 2010. Clade 12.

Pathogenic on leaves, forming spots. Sexual morph: Ascomata solitary, scattered, immersed, slanted to horizontal on host tissue, globose or elliptical, black, coriaceous, papillate, ostiolate. Papilla short, internally covered with hyaline, filamentous periphyses. Peridium comprising a few layers of thick-walled, brown cells of textura angularis. Hamathecium lacking paraphyses. Ascii 8-spored, unitunicate, cylindrical, sessile, with J-, subapical ring. Ascospores overlapping uni- to biseriate, hyaline, fusiform to ellipsoid, 1-septate, with terminal, elongate, hyaline appendages. Asexual morph: Coelomycetous. Conidiomata acervular or pycnidial, brown. Peridium comprising small, brown cells of textura angularis. Conidiophores absent. Conidiogenous cells cylindrical to ampulliform, enteroblastic, percurrently proliferating with periclinal thickening and collarette. Conidia holoblastic, hyaline to brown, ellipsoid, unicellular, subglobose to broadly allantoid, with obtuse apex and a flat protruding scar at the base.

Type genus: Pseudoplagiostoma Cheew. M.J. Wingf. & Crous.
Notes: Pseudoplagiostomataceae was introduced by Cheewangkoon et al. (2010). Pseudoplagiostomataceae is similar to Gnomoniaceae (Fig. 1, Clade 1) based on morphological characters of its sexual morph, such as solitary, immersed, non stromatic ascomata with lateral beaks, asci with a distinct apical ring and 1-septate ascospores (Sogonov et al. 2008). However, in our phylogenetic analyses it formed a fully-supported clade (Fig. 1, Clade 12) sister to Apoharknessiaceae.

Pseudoplagiostoma eucalypti Cheew., M.J. Wingf. & Crous, Fungal Diversity 44: 98. 2010. Facesoffungi number FoF03504.

Illustration: See Cheewangkoon et al. (2010).

Pathogenic on leaves forming leaf spots. Sexual morph: Ascomata 130–150 μm high, 100–130 μm diam, perithecia, immersed in host tissue, slanted to horizontal, globose to elliptical, coriaceous, brown to black, papillate, ostiolate. Papilla 60–65 μm diam, erumpent, internal wall lined by hyaline periphyses. Peridium comprising few layers of thick-walled, brown cells of textura angularis. Hamathecium apaphysate. Asci 65–70 × 11–13 μm, 8-spored, unitunicate, subcylindrical to long obovoid, with wedge-shaped, J-subapical ring, apex blunt and without a distinct pedicel. Ascospores 17–19 × 5–7 μm, overlapping uni- to biseriate, ellipsoid, tapering towards rounded ends, hyaline, median 1-septate, widest at septum, with terminal, elongate, hyaline appendages. Asexual morph: Conidialata 180–200 μm high, 170–190 μm diam, acervular to pycnidial, subcutical to epidermal. Peridium comprising small, brown cells of textura angularis. Coelidiophiodes absent. Conidiogenous cells 8–12 × 2–4 μm, cylindrical to ampulliform, enteroblastic proliferation with periclinal thickening. Conidia 17–19 × 7–8 μm, holoblastic, ellipsoid, unicellular, with obtuse apex and a flat protruding scar at the base (description based on Cheewangkoon et al. 2010).

Notes: The monotypic family Pseudoplagiostomataceae was introduced by Cheewangkoon et al. (2010) to accommodate a cryptosporiopsis-like fungus isolated from Eucalyptus. The type species, P. eucalypti (as Cryptosporiopsis eucalypti) and two other new species, P. oldii and P. variabile, were isolated as fungal pathogens from Eucalyptus leaf spots. However, Cryptosporiopsis eucalypti was not closely related to the generic type of Cryptosporiopsis, C. nigra (Dermataceae, Helotiiales), and hence Cheewangkoon et al. (2010) introduced Pseudoplagiostoma to accommodate this taxon. Pseudoplagiostoma corymbiae (Crous et al. 2012c) and P. dipeterocarpi (Suwananarch et al. 2016) were introduced to this genus from Cryptosporiopsis sp. and Dipeterocarpus tuberculatus respectively. The ascospore morphology, in particular, is distinct and morphologically this family differs from other families in the order in having stromatic, slanted to horizontal, globose ascomata with apaphysate hamathecium, ascospores with terminal, elongate, hyaline appendages and a cryptosporiopsis-like asexual morph. Cheewangkoon et al. (2010) analysed LSU nrDNA sequence data of the order Diaporthales, to show the distinct placement of Pseudoplagiostomataceae with 100 % bootstrap support.

Schizoparmaceae Rossman, Mycoscience 48: 137. 2007. Clade 8.

Saprobic, parasitic or pathogenic on woody, herbaceous plants. Sexual morph: Ascomata perithecial, solitary, scattered, subepidermal, immersed to erumpent, becoming superficial, globose, coriaceous, brown to black, short papillate, ostiole with hyaline periphyses, plate-like ornamentation around ostiole. Peridium comprising thick-walled, brown-cells of textura angularis. Hamathecium apaphysate. Asci 8-spored, unitunicate, ellipsoid to fusiform, sessile, with a J-apical ring. Ascospores biseriate, hyaline to becoming pale brown at maturity, ellipsoidal, aseptate, with or without mucoid caps. Asexual morph: Coelomycetous. Conidiomata pycnidial, subepidermal, immersed to erumpent, unilocular, globose, slightly depressed globose to subglobose. Coelidiophiodes densely aggregated, slender, subulate, simple or branched, hyaline, smooth, occasionally septate and branched at base, invested in mucus, developing from basal pad. Conidigenous cells discrete, simple, subcylindrical, obclavate or lageniform, smooth, proliferating percurrently or with prominent periclinal thickening. Conidia ellipsoid, globose, napiform, fusiform or naviculate with a truncate base and an obtuse to apiculate apex, hyaline or olivaceous brown to brown, unicellular, broadly or narrowly ellipsoidal, apices tapering, with or without a longitudinal germ slit, with or without a mucoid appendage.

Type genus: Coniella Höhn.

Type species: Coniella pulchella Höhn.

Notes: The monogeneric family Schizoparmaceae (Fig. 1, Clade 8) was introduced to accommodate Coniella (= Pilidiella, Schizoparme). Species of the asexual Pilidiella have been more widely reported than Schizoparme (Farr & Rossman 2015) and thus, Schizoparme was synonymised under Pilidiella giving priority to the older name (Rossman et al. 2015). Although van Niekerk et al. (2004) treated Coniella and Pilidiella as two distinct genera, the generic boundaries of the former were recently expanded to include “hyaline to dark brown conidia”, as Alvarez et al. (2016) reported that conidial pigmentation was lost or gained several times during the evolution of species within Coniella.

Coniella pseudokoreana Senan., Tangthir. & K.D. Hyde, sp. nov. MycoBank MB821542. Facesoffungi number FoF03505. Fig. 35.

Eymology: Somewhat similar to Coniella koreana, however phylogenetically distant from this species.

Saprobic on dead leaves. Conidiomata pycnidial, solitary to gregarious, globose, brown, unilocular, ostiolate, 85–130 μm high, 78–106 μm diam (x = 108 × 92 μm, n = 10), immersed, with a central short ostiolar canal on each conidioma. Conidiomata wall 2–4-layered, 6–15 μm wide (x = 10 μm), with outer brown to dark brown layers composed of thick-walled cells of textura angularis, with inner pale brown layer composed of thin-walled cells of textura prismatica, except at the base which has a pulvinate convex giving rise to conidiophores or conidigenous cells. Conidiophores 4–8 μm high, 1.5–4 μm wide, short, branched at the base, hyaline, smooth. Conidiogenous cells 5–10 μm high, 1.5–2 μm wide, holoblastic to enteroblastic, phialidic. Conidia 18–26 × 3–4 (x = 23 × 3.6 μm) fusiform, navicular, with one side slightly curved and another straight, smooth, hyaline, conidium length/width ratio = 6:5:1.

Culture characteristics: Colonies attaining a diam of 4 cm on PDA after 5 d at 27 ºC; surface white with medium to sparse mycelium, flat, irregular, undulate or wavy margin.
Fig. 35. Coniella pseudokoreana (MFLU 13–0282). A. Specimen on dead leaf. B. Conidiomata on host surface. C–D. Longitudinal section of a conidioma. E–H. Conidiogenous cells with developing conidia. I. Conidiogenous cells with developing conidia stained in lactophenol cotton blue. J. Conidia. K. Conidia stained with lactophenol cotton blue. L. Germinating conidium. M. Colonies on PDA from top. N. Colonies on PDA from reverse. Scale bar: C = 100 μm, D = 50 μm, E–L = 10 μm.
Notes: Coniella pseudokoreana displays somewhat similar morphological characters to C. koreana and C. castaneicola in having linear, falcate, pale brown conidia (Alvarez et al. 2016). The colony morphology of Coniella koreana described in Alvarez et al. (2016) on PDA is similar to the colony morphology of our strain. However, conidiomatal morphology and size of the conidia are different. We collected Coniella pseudokoreana on a decaying leaf in Thailand. Our phylogeny reveals, C. pseudokoreana is distant from Coniella koreana and shares a sister taxon relationship to C. straminea (Fig. 1, Clade 8).

Stilbosporaceae Link [as ‘Stilbospore’], Abh. Königl. Akad.-Wiss. Berlin 1824: 180. 1826, emend. Clade 19.

Saprobic on bark of trees and shrubs. Sexual morph: Pseudostromata inconspicuous, immersed. Ectostromatic disc absent or present, if present inconspicuous, pale brown, rarely dark brown. Entostroma prosenchymatous, pale coloured, slightly differentiated from the surrounding bark tissue. Ascomata loosely arranged as valloid groups in a single layer, immersed, aggregated, globose to subglobose, coriaceous, black, ostiolate, papillate. Ostiole not obvious, convergent in groups. Hamathecium comprising filiform, aseptate, hyaline paraphyses. Ascii 8-spored, unistellate, cylindrical, initially attached to the base, later floating in centrum, with J-refractive, apical ring. Ascospores overlapping unis to bisepitate, brown, ellipsoid to oblong, distoseptate. Asexual morph: Coelomycetous. Conidiomata stromatic, acervular with circular outline, epidermal, immersed to semi-immersed, brown, basal stroma of textura angularis to textura globulosa, with simple, septate, hyaline paraphyses and hyaline, unbranched cylindrical conidiophores. Conidiophores arising from the uppermost cells of basal and parietal tissue, unbranched, cylindrical, septate at the only the base, hyaline, smooth, invested in mucous. Conidiogenous cells annellidioid, discrete or integrated, cylindrical to lageniform, hyaline, smooth-walled, proliferating several times percurrently at apex. Conidia ellipsoid or oblong, with an oblate apex and broad truncate base, sometimes 3-euseptate or distoseptate, with a hyaline sheath, hyaline to brown, thick-walled, smooth, sometimes with several, tubular, unbranched, filiform, flexuous, apical appendages.

Type genus: Stilbospora Pers.

Type species: Stilbospora macrospora Pers.

Notes: The family Stilbosporaceae was introduced by Link (1826) to accommodate Prosthecium and its asexual morph. However, it is not a phylogenetically well-supported family and hence, Stilbosporaceae has been synonymised under several different families. Voglmayr & Jaklitsch (2014) resurrected the family Stilbosporaceae in Diaportheales based on a phylogenetic analysis of LSU nrDNA sequence data and accommodated the genera Stegonasporum and Stilbospora within the family, synonymising Prosthecium under Stilbospora. This decision is also supported by our multi-gene phylogeny (Fig. 1, Clade 19). The type species of Stilbospora, S. macrospora has been linked to its asexual morph Prosthecium ellipsoidosporum, the generic type of Prosthecium (Voglmayr & Jaklitsch 2008). This genus comprises opportunist or moderately phytopathogenic fungal species that cause branch dieback or twig blight of various plants. Maharachchikumbura et al. (2015) included Natarajania in Stilbosporaceae based on LSU nrDNA, SSU nrDNA, tef1 and rp2 sequence data. However, in other analyses (not shown here), phylogenies also indicated a close association to the genera Crinitospora, Stilbospora and Stegonsporum. This is rather interesting as up to date, this is the only hyphomycetous taxon affiliated to the diaporthean taxa which are known to have coelomycetous asexual morphs. The reliability of the deposited sequences as well as the identification of that taxon needs further investigation.

Stilbospora macrospora Pers., Syn. meth. fung. (Göttingen) 1: 96 (1801). Facesoffungi number FoF03506. Fig. 36.

Saprobic on branches of Acer pseudoplatanus. Sexual morph: Pseudostroma comprising white, greyish to yellowish hyphae. Ascomata 300–350 μm high, 350–465 μm diam (x = 325 ± 420 μm, n = 20), immersed, aggregated, globose to subglobose, coriaceous, ostiolate, papillate. Papilla cylindrical, pale brown, emerging from perithecial apices and merging separately with the stromatal disc, inconspicuous, often invisible on the bark surface. Peridium 20–40 μm diam (x = 32 μm, n = 20), comprising thick-walled, brown, large, cells of textura angularis and hyaline, thick-walled, compressed cells of textura angularis around the base of papilla. Hamathecium comprising multi-guttulate, hyaline, septate paraphyses. Asci 165–200 × 35–50 μm (x = 182 ± 42 μm, n = 20), 8-spored, unistellate, clavate to ellipsoidal, thick-walled, very short pedicellate, apex containing a J-refractive canal usually wider towards its base. Ascospores 40–50 × 20–26 μm (x = 46 ± 22 μm, n = 20), biseriate, ellipsoidal, oblong or rarely pyriform, with (3–)5-distosepta and sometimes 1, longitudinal, distoseptum, appendages on both ends projecting, subglobose, outer margin becoming diffuse. Asexual morph: Conidiomata 340–450 μm high, 450–460 μm diam (x = 410 ± 453 μm, n = 20), immersed, acervular, solitary, with circular outline, dark brown to black. Paraphyses 2.5–4 μm diam (x = 3.2 μm, n = 10), unbranched, aseptate, hyaline. Conidiophores reduced to conidiogenous cells. Conidiogenous cells 25–35 × 7–10 μm (x = 31 ± 9 μm, n = 20), holoblastic, cylindrical, septate, hyaline. Conidia 40–45 × 20–25 μm (x = 43 ± 23 μm, n = 20), pyriform, oval, ellipsoidal or oblong, base truncate and hyaline, brown, with several distosepta, 1(–2)-longitudinal distosepta, with hyaline sheath.

Material examined: Austria, Wien, Landstraße, 3rd District, Botanical Garden of the University of Vienna (HBV), grid square 7864/1, on dead corticated branches of Acer pseudoplatanus (Sapindaceae), holomorph, 4 Feb. 2006, H. Voglmayr, D39 = (epitype WU 28068).

Notes: Voglmayr & Jaklitsch (2014) epitypified the type species of Stilbospora, Stilbospora macrospora and S. macrospora was confirmed as the asexual morph of Prosthecium ellipsoidosporum, the generic type of Prosthecium (Voglmayr & Jaklitsch 2008), Stilbospora (1801) is older than Prosthecium (1852) and therefore Stilbospora has priority (Voglmayr & Jaklitsch 2014).

Sydowiellaceae Lar.N. Vassiljeva, Pirenomits. Lokuloaskomits. Severa Dal'nego Vostoka (Leningrad): 210. 1987. Clade 21.
Fig. 36. Stilbospora macrosperma (WU 28068). A. Herbarium specimen. B. Stromata on host substrate. C. Cross section of ascoma. D. Peridium. E–H. Asci. I–M. Ascospores. N. Paraphyses. O. Cross section of conidioma. P. Conidia attached to conidiogenous cells. Q–S. Conidia. Scale bars: C–D = 500 μm, E, O, P = 100 μm, F = 50 μm, H–K = 20 μm, G, L–M, Q–S = 10 μm.
Saprobic or parasitic on plant matter. Sexual morph: Stromata well- or poorly developed, prosenchymatous, scattered, immersed to erumpent, appearing as an aggregation of ostioles, rounded or elliptic in shape, dark brown to black, composed of compact pseudoparenchymatous tissues, several ascomata in a stromata, some species tum umber in 5 % KOH. Ascomata solitary or aggregated, immersed or erumpent, globose to sub-globose, sometimes cinerate, coriaceous, central or asymmetrically located ostiolar canal opens through an individual or converged ostiole, internally covered by filamentous, hyaline periphyses, sometime ostiolar opening wider than canal, black to brown. Peridium comprising a few layers of brown, thick-walled cells of textura angularis. Hamathecium comprising cellular, septate, branched, hyaline paraphyses. Ascii 8-spored, unitunicate, cylindrical to sub-globose, short pedicellate, apex blunt with J-apical ring. Ascospores uniseriate, filamentous, ellipsoid or long fusoid-cylindrical, 11–11-septate, hyaline, pale brown to dark brown, sometimes with apical and basal appendages, wall smooth. Asexual morph: Conidiomata sometimes stromatic, pycnidial, uniloculate, superficial, aggregated 3–5 in one group, globose, orange to brown. Conidiomatal wall comprising thick-walled, orange cells of textura angularis. Conidiophores elongate, branched, hyaline, few conidiogenous cells arising from one conidiophore, attached to conidiomatal wall. Conidiogenous cells cylindrical, hyaline, ampulliform, septate, ends pointed, phalidial. Conidia ovoid to ellipsoid, unicellular, hyaline, smooth-walled. 

Type genus: Sydowiella Petr.

Type species: Sydowiella fenestrans (Duby) Petr.

Notes: The family Sydowiellaceae (Fig. 1, Clade 21) was established to accommodate the genus Sydowiella, which is typified by S. fenestrans. Members of this family occur on herbaceous plants, dicotyledonous and hardwood trees as saprobes, parasites and pathogens. Initially, most genera in this family were placed in Diaporthales incertae sedis (Rossman et al. 2006). However, DNA sequence data analyses of different gene regions of taxa in the family Sydowiellaceae proved it to be a well-supported, and its relationships to other families have been clarified (Rossman et al. 2007, Maharachchikumbura et al. 2015, Senanayake et al. 2017). Sydowiellaceae comprises the genera Alborbis, Breviappendix, Ciniella, Calosporella, Chapecia, Italiomyces, Hapaloecystis, Lambro, Paragnomonia, Ranulospora, Rossmania, Siliia, Sydowiella, Tenuiappendicula and Tortilispora (Senanayake et al. 2017). Here we introduce a new Sydowiella species as S. urchicola. Sydowiella urchicola produces solitary ascomata and ascospores containing a large guttule in each cell. Phylogenetically it is distinct from other Sydowiella species (Fig. 1, Clade 21).

Diaporthales genera incertae sedis

Phaeoappendicospora Senan., Q.R. Li & K.D. Hyde, gen. nov. MycoBank MB821572. Facesoffungi number FoF03508. Clade 18.

Etymology: Name based on three Latin words “phaeo”, “appendic” and “spora” referring to the brown spores with appendages.

Saprobic on dead stems of Fagaceae species. Sexual morph: Stromata forming thick weft of pale brown hyphae around upper part of perithecia. Ascomata immersed, aggregated, subglobose to globose, coriaceous, black, ostiolate, papillate. Papilla black, cylindrical, lateral, periphysate. Periphyses hyaline, filamentous. Peridium comprising few layers of black, thick-walled, cells of textura angularis. Hamathecium comprising few, septate, hyaline paraphyses attached to the base, longer than asci. Ascii 8-spored, unitunicate, ellipsoid, with a short pedicel, inconspicuous, slightly constricted at the septum, with a large fat globule in each cell. Asexual morph: Undetermined.

Notes: Here we introduce a new Sydowiella species as S. urchicola. Sydowiella urchicola produces solitary ascomata and ascospores containing a large guttule in each cell. Phylogenetically it is distinct from other Sydowiella species (Fig. 1, Clade 21).

Sydowiella urchicola Senan., Camporesi & K.D. Hyde, sp. nov. MycoBank MB821566. Facesoffungi number FoF03507. Fig. 37.

Etymology: Named after the host genus Urtica.

Saprobic on dead branches of deciduous plants. Sexual morph: Ascomata 290–325 μm high, 290–395 μm diam (x = 309 × 314 μm, n = 20), perithecia, astromatic, scattered, solitary, superficial to erumpent, globose to sub-globose, coriaceous, black, papillate, ostiolate. Papilla 115–150 μm, 155–205 μm diam (x = 133 × 173 μm, n = 20), short, wide, internally covered by hyaline periphyses. Peridium 15–25 μm diam (x = 19 μm, n = 20) comprising inner, hyaline, thick-walled, compressed, 1–3 layers of cells of textura angularis and outer, dark brown, thick-walled, rigid, 3–7 layers of cells of textura angularis. Hamathecium comprising wide, cellular, septate paraphyses. Asci 125–145 × 10–15 μm (x = 136 × 14 μm, n = 20) 8-spored, unitunicate, cylindrical, short pedicellate, distinct, J-apical ring. Ascospores 20–25 × 10–15 μm (x = 22 × 12 μm, n = 20), overlapping uniseriate, ends blunted, hyaline, 1-septate, slightly constricted at the septum, with a large fat globule in each cell. Asexual morph: Undetermined.

Culture characteristics: Colonies growing on MEA becoming 2 cm within 5 d at 18 °C, fast growing, circular, umbonate, margin irregular, white, tightly attached to the substrate without spreading aerial mycelium.

Specimen examined: Italy. Province of Forlì-Cesena, Monte Fumaio, dead stem of Urtica dioica (Urticaceae), 16 May 2013, N. Camporesi, IT 1268 (holotype MFLU 17–0877, isotype BBH 42439, cultures ex-type MFLUCC 13–0665, MFLUCC 17–1665).

Phaeoappendicospora thailandensis Senan., Q.R. Li & K.D. Hyde, sp. nov. MycoBank MB821573. Facesoffungi number FoF03509. Fig. 38.

Etymology: The species epithet is based on the collection locality.
Fig. 37. Sydowiella urticicola (MFLU 17–0877). A–C. Ascomata on host surface. D. Cross section of ascoma. E. Peridium. F. Papilla. G–I. Asci. J–N. Ascospores. Scale bars: A = 500 μm, B, C = 200 μm, D, E = 100 μm, F–I = 50 μm, J–N = 20 μm.
Saprobic on dead stems of *Quercus*. Sexual morph: Stromata 2–4 mm diam (x = 3 mm, n = 15), forming thin weft of pale brown hyphae around upper part of perithecia. Ascomata 180–230 μm high, 170–220 μm diam (x = 208 × 198 μm, n = 25), immersed, aggregated, subglobose to globose, coriaceous, black, ostiolate, papillate. Papilla black, cylindrical, lateral, periphysate. Periphyses hyaline, filamentous. Peridium 20–35 μm wide (x = 28 μm, n = 20), comprising few layers of black, thick-walled cells of *textura angularis*. Hamathecium comprising few, septate, hyaline paraphyses attached to the base, longer than asci. Asci 195–265 × 18.5–27 μm (x = 223 × 22.5 μm, n = 30), 8-spored, unitunicate, ellipsoid, with a short pedicel, inconspicuous, flat, J-refractive ring at the lower end of the thickened apical wall, apex narrow and blunted. Ascospores 26–34.5 × 11–13 μm.
Notes: The newly introduced monotypic genus Phaeoappendicospora is typified by *P. thailandensis* and it comprises brown ascospores with guttules and appendages. Phaeoappendicospora *thailandensis* is associated with dead plant parts may be as saprobes. This fungus is morphologically similar to *Hapalocystis berkeleyi* in *Sydowiellaceae*. However, phylogenetically it does not show an affinity to any of the families in *Diaporthales* (Fig. 1, Clade 18). Hence, we accommodate this species in *Diaporthales* genera *incertae sedis*.

### Key to families and genera of *Diaporthales*

| Key | Description | Genus |
|-----|-------------|-------|
| 1.  | Coelomycetous | Docosporaceae |
| 2.  | Ascomycetous | Disciliales |
| 3.  | Conidia hyaline to olivaceous or bluish to glistening dark blue | Phaeoapendicospora |
| 4.  | Conidia brown to dark brown | Phaeoapendicospora |
| 5.  | Conidial wall thick, mostly specific on *Tilia* host | Lamproconiaceae |
| 6.  | Conidial wall thin, mostly on *Myrtaceae*, *Fabaceae* host | Phaeoapendicospora |
| 7.  | Conidia aseptata | Phaeoapendicospora |
| 8.  | Conidia 1-septate | Phaeoapendicospora |
| 9.  | Conidiophores reduced to conidiogenous cells, conidia with acute apex | Erythroglaeaceae |
| 10. | Conidiophores olivaceous | Discilioides |
| 11. | Conidiomata acervular, sides of conidiomatal wall appearing dark brown to black cells of *textura angularis*, conidigenous cells lageniform to cylindrical, conidia monomorphic | Erythroglaeum |
| 12. | Conidia cylindrical, ellipsoid to fusoid, occasionally allantoid | Immersiporthe |
| 13. | Conidia sigmoid with obtuse to subobtuse apex and swollen, obtuse apex | Erythroglaeum |
| 14. | Conidiophores reduced to conidiogenous cells, conidia with acute apex | Discilioides |
| 15. | Conidiophores cylindrical, branched, 0–3-septate, conidia with obtuse apex | Prosopidicolaceae |
| 16. | Conidia ovoid, obclavate to conical, aseptata | Aporharknessiaceae |
| 17. | Conidia obclavate, with a scar at the base | Lasmenia |
| 18. | Conidia conical, with small appendage at base and apical apiculus | Apoharknessiaceae |
| 19. | Stromata well-developed | Chromendothia |
| 20. | Stromata absent or poorly developed | Chromendothia |
| 21. | Stromatic tissues orange, becoming purple in KOH | Chromendothia |

(Continued).
(Continued).

10q. Conidiomata with necks..........................................................10r
10q. Conidiomata without necks.......................................................10s
10r. Conidiomata with prominent, delimit neck..............Latrunculus
10r. Conidiomata with neck continuous with base, rostrate, white sheath of tissue surrounding perithecial necks....................Rostraureum
10s. Conidiomata conical, uniformly orange.........................Amphilologia
10s. Conidiomata convex, with blackened ostiolar openings........Auritillum
10t. Conidiomata uniformly black when mature.........................10u
10t. Conidiomata black with orange neck.................................Aurapex
10u. Conidiomata base tissue of textura globulosa when sectioned longitudinally, perithecial necks long and covered with dark tissue, emerging from orange stroma...............................Chrysoporthe
10u. Conidiomata tissue prosenchymatous, apices of conidiomata can be orange to scarlet when young, perithecial necks short, orange to umbo stroma............................................................Celoporthe
10. Stromatic tissues dark brown to black, not becoming purple in KOH..................................................................................11
11. Perithecia with very long, narrow, wavy ostiolar neck opening to or around ectostromatic disc......................................................12
11. Perithecia with medium to short, somewhat wide, straight ostiolar neck opening to host surface..................................................14
12. Ectostroma conspicuous.........................................................Melanconiellaceae
12. Ectostroma inconspicuous.......................................................13
13. Ascospores distoseptata.........................................................Stilbosporaceae
13a. Conidia hyaline with several tubular, unbranched, filiform apical appendages.........................................................Crinitospora
13a. Conidia brown without any appendages.....................13b
13b. Ascospores and conidia with three transverse eusepta, ellipsoid to oblong; asci without a refractive canal in the apex.......................Stilbospora
13b. Ascospores and conidia with more than three transverse disstosepta, ascospores sometimes and conidia always with additional longitudinal distosepta, ascospores ellipsoid to oblong, conidia mostly pyriform; asci with a cylindrical, slightly refractive canal in the apex............................................................Stegonsporium
13. Ascospores not distoseptata.............................................Melanconiellaceae
13a. Coelomycetous..............................................................13b
13a. Ascomycetous..............................................................13c
13b. Conidiomata subcylindrical, acervular.........................Greeneria
13b. Conidiomata epiphyllous or hypophyllous with radiate scutella.................13d
13c. Astromic with solitary ascoma...........................................13d
13c. Astromic with aggregated ascoma....................................13e
13d. Ascospores ellipsoid without appendages........................Microascopsora
13d. Ascospores fusiform with appendages.......................13f
14. Perithecia arranged in valsid configuration.....................15
14. Perithecia not arranged in valsid configuration...............16
15. Conidiomata non-loculate and forming both alpha and beta conidia.........................................................Diaporthaceae
15a. Coelomycetes..............................................................15b
15a. Ascomycetes..............................................................15c
15b. Conidia olivaceous......................................................15c
15b. Conidia brown..............................................................15d
15c. Conidia aseptate, guttulate, elongate fusiform to sigmoid.........................Pustulomyces
15c. Conidia 2-(3)-septate, ovoid with filiform apical cell and obtuse base.................................Chaetherosia
15. Conidia dimorphic, aseptate, ellipsoid to pyriform..................................................Phaeocytopsora
15d. Conidia monomorphic, uniseptate, subcylindrical to narrowly ellipsoid..........................Stenocarpella
15e. Ascospores brown..............................................................Phaeodiaporthe
15e. Ascospores hyaline..............................................................15f
15f. Ascospores aseptata...........................................................Mazzantia
15g. Ascospores septate.............................................................15h
15h. Septa submedian, large cell usually 2-guttulate, small cell usually 1-guttulate.............................Apiothecaria
15i. Septa median, with or without guttules.................................15j
15j. Ascospores with long slender, thread-like appendage at both ends.................................15k
15k. Ascii form long, pointed apex by narrowing towards the apical ring..................................................15l
15l. Ascospores fusiform to elongate-ellipsoid, constricted at the septa.............................15m
15m. Ascospores fusiform to elliptical, ends round, papilla long and narrow..................................................15n
15n. Conidiomata loculate forming numerous interconnecting chambers arranged radially or irregularly in ectostromatic tissues and without forming beta conidia...............................................Cytopsora
15. Conidiomata dimorphic, aseptate, ellipsoid to pyriform..................................................Phaeocytopsora
15d. Conidia monomorphic, uniseptate, subcylindrical to narrowly ellipsoid..........................Stenocarpella
15e. Ascospores brown..............................................................Phaeodiaporthe
15e. Ascospores hyaline..............................................................15f
15f. Ascospores aseptata...........................................................Mazzantia
15g. Ascospores septate.............................................................15h
15h. Septa submedian, large cell usually 2-guttulate, small cell usually 1-guttulate.............................Apiothecaria
15i. Septa median, with or without guttules.................................15j
15j. Ascospores with long slender, thread-like appendage at both ends.................................15k
15k. Ascii form long, pointed apex by narrowing towards the apical ring..................................................15l
15l. Ascospores fusiform to elongate-ellipsoid, constricted at the septa.............................15m
15m. Ascospores fusiform to elliptical, ends round, papilla long and narrow..................................................15n
15n. Conidiomata loculate forming numerous interconnecting chambers arranged radially or irregularly in ectostromatic tissues and without forming beta conidia...............................................Cytopsora
15a. Coelomycetes..............................................................15b
15a. Ascomycetes..............................................................15c
15b. Stromata inconspicuous, ascospores allantoids..............................15c
15c. Stromata conspicuous, well-developed, ascospores fusiform..................................................15d
15c. Stromata conspicuous, well-developed, ascospores fusiform..................................................15d
15c. Ascomata solitary..............................................................15e
15e. Ascomata aggregated..........................................................15f
15f. Paraphoria in groups with convergent beaks; ascii clavate to fusoid..................................................15g
15g. Paraphoria in groups with convergent beaks; ascii clavate to fusoid..................................................15h
15h. Paraphoria in groups with non-convergent beaks; asci more or less rectangular..................................................15i
16. Conidia dark brown, broadly fusiform to cylindrical or clavate, 3-5-cellular, distoseptata..................................................Coryneaceae
16. Conidia hyaline, ellipsoid, unicellular..............................Sydowia
16a. Stromata conspicuous, well-developed..............................16b
16a. Stromata absent, inconspicuous, poorly developed..............................16c
16b. Ascomata valsoid, stromatic tissues do not turn any colour with 10 % KOH..................................................................................16c
16b. Ascomata diatrypoid, stromatic tissues form dull red with 10 % KOH..................................................................................16c
16c. Ascomata oval to fusoid-oval, 1-septate, hyaline or hyaline to brown..................................................16d
16c. Ascomata oval to fusoid-oval, 1-septate, hyaline or hyaline to brown..................................................16d
16d. Ascomata fusiform to clavate, 1-septate, stromatic tissues form dull red with 10 % KOH..................................................................................16d
16d. Ascomata fusiform to clavate, 1-septate, stromatic tissues form dull red with 10 % KOH..................................................................................16d
(Continued).

20y. Ascospores non-apiosporous..................................................20aa
20z. Ascospores form brown large cell and small hyaline cell at maturity... ..........................................................Anisomyces
20z. Ascospores form both cells hyaline at maturity..............Mamaniella
20aaa. Ascospores 3-septate..............................................................Phragmoporthe
20aaa. Ascospores 1-euseptate.........................................................20ab
20ab. Stromata immersed in host tissues in bark, ascospores fusiform...... ..........................................................Alnecium
20ab. Stromata erumpent to superficial on leaves, ascospores oval........ ..........................................................Phylloporthe
20ac. Ascospores oval to ellipsoid.....................................................Amphiporthe
20ac. Ascospores allantoid..............................................................Valsnicola

List of accepted families and genera in Diaporthales

**Apiosporopsidaceae** Senan. et al.
Apiosporopsis (Traverso) Mariani

**Apoharknessiaceae** Senan. et al.
Apoharknessia Crous & S.J. Lee
Lasmenia Speg.

**Asterosporiaceae** Senan. et al.
Asterosporium Kunze

**Auratiopycnidiellaceae** Senan. et al.
Auratiopycnidiella Crous & Summerell

**Coryneaceae** Corda
= Pseudovalsaceae M.E. Barr
Coryneum Nees

**Cryptonectriaceae** Gryzenh. & M.J. Wingf.
Amphiloga Gryzenh. et al.
Aurantiumsaccus Dyko & B. Sutton
Aurapex Gryzenh. & M.J. Wingf.
Auriflum Begoude et al.
Celoporthe Nakab. et al.
Chromendothia Lar. N. Vassiljeva
Chrysocrypta Crous & Summerell

**Cytosporaceae** Fr.
=A/=Valsaceae Tul. & C. Tul.

(Continued).

Cytospora Ehrenb.
Pachythrype Berl. ex M.E. Barr et al.
Paravalsa Ananthap
Waydora B. Sutton
Xenotypa Petr.

**Diaporthaceae** Höhn. ex Wehm.
Allantopora Petr.
Apiopora Petr.
Chaetoconis Clem.
Chiangnaiomyces Senan. & K.D. Hyde
Diaporthe Nitschke
Hyaliappendispora Senan. et al.
Leucodiaporthe M.E. Barr et al.
Mazzantia Mont.
Ophidiaporthe Y.M. Ju et al.
Paradiaporthe Senan. et al.
Phaeocytopsora Petr.
Phaeodiaporthe Petr.
Pustulomyces D.Q. Dai et al.
Stenocarpella Syd. & P. Syd.

**Erythrogloeaceae** Senan. et al.
Chrysocrypta Crous & Summerell
Disculosides Crous et al.
Erythrogloeum Petr.

**Gnomoniaceae** G. Winter
Alnecium Voglmayr & Jakitsch
Ambargnomonia Sogonov
Amphipothe Petr.
Anisomyces Theiss. & Syd.
Apiognomonia Höhn.
Apioplagiostoma M.E. Barr
Asteroma DC
Bagcheea E. Müll. & R. Menon
Clupeopora Höhn.
Cryptospora Sacc.
Cylindrosporella Höhn.
Diplacella Syd.

(Continued).

Ophiognomonia (Sacc.) Sacc.
Phylloporthe Syd.
Plagiostoma Fuckel
Pleuroceras Riess.
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Siroccoccus Preuss
Spataporthe Bronson et al.
Uniseta Ciccar
Valsalnicola D.M. Walker & Rossman

Harknessiaceae Croux
Dwiropa Subram. & Muthumary
Harknessia Cooke

Juglanconiaceae Voglmayr & Jaklitsch
Juglansconis Voglmayr & Jaklitsch

Lamproconiaceae C. Norphanphoun et al.
Hercospora Fr.
Lamproconium (Grove) Grove

Macrohihalea Croux
Macrohiium H.J. Swart

Melanconidaceae G. Winter
Melancosis Tul. & C. Tul.

Melanconiellaceae Senan. et al.
Dicarpeilia Syd.
Greeneria Scribn. & Viala
Melanconila Sacc.
Microascospora Senan. & K.D. Hyde
Tubakia B. Sutton

Prosopidicolaceae Senan. & K.D. Hyde
Prosopidicola Croux & C.L. Lennox

Pseudoplagnostomatataceae Cheew. et al.
Pseudoplagnostoma Cheew. et al.

Schizoparmaceae Rossman DF et al.
Coniella Höhn.

Stillbosporaceae Link
Crinitospora B. Sutton & Alcorn
Stegonporum Corda
Stillbospora Pers.

Sydowiellaceae Lar.N. Vassiljeva
Albonis Senan. & K.D. Hyde
Breviappendix Senan. & K.D. Hyde
Cainiella E. Müll
Calosporella J. Schröt
Chapekia M.E. Barr
Italiomyces Senan. et al.
Hapalocystis Auerew. ex Fuckel
Lambro Racib.

Paragromonnia Senan. & K.D. Hyde
Ranulospora Senan. et al.
Rossmania Lar.N. Vassiljeva
Silia P. Karst.
Sydowiella Petr.

Tenuiappendicula Senan. et al.
Tortilispora (Sacc.) Senan. & K.D. Hyde

Diaportheles genera incertae sedis
Anisomycespora I. Hino & Katum.

(Continued).

Caudospora Starback
Chadeaufadiumyces Kamat et al.
Cryptascma Ananthap.
Cryptoleptosphaenia Petr.
Cryptoleptosphaenia Petr.
Dilopellina J. Reid & C. Booth
Dontriopa K.D. Hyde
Fremineavia Nieuwl.
Hypodermina Höhn.
Hypophtoedia K.D. Hyde & E.B.G. Jones
Kapooria J. Reid & C. Booth
Keinstirschia J. Reid & C. Booth
Lollipoppa Indebitzen
Macrodiaporthe Petr.
Maculatipalma J. Fröhlich & K.D. Hyde
Massariovalsa Sacc.
Mebaria J. Reid & C. Booth
Melanamphora Lafl.
Melanconiopsis Ellis & Everh.
Natarajania Pratibha & Bhat
Phaeoappendicospora Senan. et al.
Phragmodiaporthe Wehm.
Plagiophiale Petr.
Plagiostigme Syd.
Prostratus Sivan. et al.
Pseudoaxoporella J. Reid & C. Booth
Pseudothis Theiss. & Syd.
Pseudovalsella Höhn.
Rabenhorstia Fr.
Savulescua Petr.
Skottsbergiella Petr.
Stoelettia Dennis
Trematovalsa Jacobesco
Uleoporthe Petr.
Vismaya V.V. Sarma & K.D. Hyde
Wehmeyera J. Reid & C. Booth
Wuestneia Auerew. ex Fuckel
Wuestneiopsis J. Reid & Dowsett

FAMILIES OF DIAPORTHALES

(Continued).

Trematovalsa Jacobesco
Uleoporthe Petr.
Vismaya V.V. Sarma & K.D. Hyde
Wehmeyera J. Reid & C. Booth
Wuestneia Auerew. ex Fuckel
Wuestneiopsis J. Reid & Dowsett

(continued on next page)
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REFERENCES

Alexopoulos CJ, Mims CW (1978). Introductory mycology, 3rd ed. John Wiley, New York, USA.

Alvarez LV, Groenewald JZ, Crous PW (2016). Revising the Schizoperaeaceae: Coniella and its synonyms Pliiddiiella and Schizoperae. Studies in Mycology 85: 1–34.

Ananthapadmanaban D (1990). Paravalsa indica sp. nov. from India. Mycological Research 94: 275–276.

Barney JR, Tharayil N, DiTommaso A, et al. (2006). The biology of invasive alien plants in Canada; Polygonum cuspidatum Sieb & Zucc [= Fallopia japonica (Houtt) Ronse Decr]. Canadian Journal of Plant Science 86: 887–905.

Barr ME (1978). The Diaporthales in North America: with emphasis on Gnomonia and its segregates. Mycologia Memoirs 7: 1–232.

Begoude BAD, Slippers B, Wingfield MJ, et al. (2010). Botryosphaeriaceae associated with Terminalia catappa in Cameroon, South Africa and Madagascar. Mycological Progress 9: 101–123.

Belisario A (1991). Diaporia drya sp. nov., teleomorph of Tubakia drya. Mycologia 41: 147–155.

Belisario A (1999). Cultural characteristics and pathogenicity of Melanconium juglandinum. European Journal of Forest Pathology 29: 317–322.

Biggs AR (1989). Integrated control of Leucostoma-canker of peach plant in Ontario. Plant Disease 73: 869–874.

Braun U, Bien S, Hantsch L, et al. (2000). The classification of Diaporthaceae, Diaporthales and molecular analyses. Mycological Research 104: 23–28.

Campbell J, Anderson JL, Shearer CA (2003). Systematics of Holosphaeria based on morphological and molecular data. Mycologia 95: 530–552.

Cannon PF, Minter DW (2014). Lamprocnonium desmazieresii. IMI descriptions of fungi & bacteria. 1996. CABI Bioscience, Wallingford, UK: 1–3.

Carbone I, Kohn LM (1999). A method for designing primer sets for speciation studies in filamentous ascomycetes. Mycologia 91: 553–556.

Castlebury LA, Farr DF, Rossman AY (2014). Diaporthaceae: Diaporthales nov. and three new species of Cryptosporiopsis eucalypti based on morphological and molecular data. Mycologia 106: 530–552.

Crahay GH (1974). Death of the American chestnut. Fungal Biology 31: 101–103.

Cava F (1889). Matériaux de mycologie Lombarde. Revue Mycologique 11: 173–1913.

Chafeaud M, Emberger L, eds. Masson, Paris: 1–1019.

Cheewangkoon R, Groenewald JZ, Verkley GJM, et al. (2013). Fungal biodiversity. CBS sheets: 240–250.

Chomuntu P, Hongsanag S, Aguirre-hudson B, et al. (2014). The sooty moulds. Fungal Diversity 66: 1–36.

Corda AC (1839). Coniomyces Nees ab Esemb. Icones Fungorum hucusque Cognitorum 3: 1–55.

Crane C, Burgess TI (2012). Luteocirrhus shearii gen. sp. nov. (Diaporthales, Cystoporiaceae) pathogenic to Proteaceae in the South Western Australian Floristic Region. IMA Fungus 4: 111–122.

Crous PW, Crous LM, Giraldo A, et al. (2015). The Genera of Fungi: fixing the application of the type species of generic names – O 2: Allantophomopsis, Latorua, Macrosporidoplodia, Macrocladium, Millospodium, Protostega, Pyricularia, Robillarda, Rotula, Septoria, Torula, and Wojnowicia. IMA Fungus 6: 163–198.

Crous PW, Gams W, Stalpers JA, et al. (2004). MycoBank: an online initiative to launch mycology into the 21st century. Studies in Mycology 50: 19–22.

Crous PW, Knox-Davies PS, Wingfield MJ (1989). Newly-recorded foliage fungi of Euclayptus sp. in South Africa. Phytotaxa 21: 85–98.

Crous PW, Rogers JD (2001). Wuestneia molokaiensis and its anamorph Harknessia molokaiensis sp. nov. from Eucalyptus. Sydowia 53: 74–80.

Crous PW, Summerell BA, Afenas AC, et al. (2012a). Genera of diaporthalean coelomycetes associated with leaf spots of tree hosts. Persoonia 28: 66–75.
Van Niekerk JM, Groenewald JZ, Verkley GJ (1980). The Coelomycetes Fungi imperfecti with pycnidia, acervuli and stromata. Commonwealth Mycological Institute, Kew, UK.

Sutton BC (2016). Pseudoplagiostoma dipterocarpi sp. nov., a new endophytic fungus from Thailand. Mycosen 57: 118–122.

Swofford DL (2003). PAUP* phylogenetic analysis using parsimony (and other methods). Sinauer Associates, Sunderland, Massachusetts. Version 4.

Tanaka K, Melnik VA, Kamiyama M, et al. (2010). Molecular phylogeny of two coelomycetous fungal genera with stellate conidia, Prosthemium and Asterosporium, on Fagales trees. Botany 88: 1057–1071.

Taylor JW, Jacobson DJ, Kroken S, et al. (2000). Phylogenetic species recognition and species concepts in fungi. Fungal Genetics and Biology 31: 21–32.

Traverso GB (1907). Flora Italica Cryptogama Pars 1: Fungi Pyrenomycetae. Societa Botanica Italiana, Rocca S Cassiano, Italy: 353–492.

Trejlen A, Markovskaja S (2007). Microscopic fungi on Sphaerella from eastern Asia and eastern North America. Flora Italica Cryptogama Pars 1: Fungi Pyrenomycetae. Societä der Kaiserlichen Akademie der Wissenschaften in Wien 119: 632–633.

Udayanga D, Castlebury LA, Rossman AY, et al. (2014). Insights into the genus Diaporthe: phylogenetic species delimitation in the D. aereus species complex. Fungal Diversity 67: 203–229.

Udayanga D, Xingzhong L, McKenenzie EHC, et al. (2011). The genus Phomopsis: biology, applications, species concepts and names of common pathogens. Fungal Diversity 50: 189–225.

Van der Aa HA (1973). Studies in Phyllosticta I. Studies in Mycology 5: 1–110.

Van Niekirk JM, Groenewald JZ, Verkley GJ, et al. (2004). Systematic reappraisal of Coniella and Pildiella, with specific reference to species occurring on Eucalyptus and Vitis in South Africa. Mycological Research 108: 283–303.

Vasilyeva LN (1993). Chromendothia, a new genus of the family Hypocreaceae. Mikrobiologiya i Fitopatologiya 27: 1–7.

Vasilyeva LN, Rossman AY, Farr DF (2007). New species of the Diaporthales from eastern Asia and eastern North America. Mycologia 99: 916–923.

Verkley GJM, Quaedvlieg W, Shin HD, et al. (2013). A new approach to species delimitation in Septoria. Studies in Mycology 75: 213–205.

Vermeulen M, Gryzenhout M, Wingfield MJ, et al. (2011). New records of the Cryphonectriaceae from southern Africa including Latruncellus aurorae gen. sp. nov. Mycologia 103: 554–569.

Vilgalys R, Hester M (1990). Rapid genetic identification and mapping of enzymatically amplified ribosomal DNA from several Cryptococcus species. Journal of Bacteriology 172: 4239–4246.

Voglmayr H, Castlebury LA, Jaklitsch WM (2017). Juglanconis gen. nov. on Juglandaceae, and the new family Juglanconidaceae (Diaporthales). Persoonia 38: 136–155.

Voglmayr H, Jaklitsch WM (2008). Prosthecium species with Stelosporium anamorphs on Acar. Mycological Research 112: 885–905.

Voglmayr H, Jaklitsch WM (2014). Stelosporaceae resurrected: generic reclassification and speciation. Persoonia 33: 61–82.

Voglmayr H, Rosman AY, Castlebury LA, et al. (2012). Multigene phylogeny and taxonomy of the genus Melanconella (Diaporthales). Fungal Diversity 57: 1–44.

Von Ax JA, Müller E (1954). Die Gattungen der amerosporen Pyrenomyceten. Beiträge zur Kryptogamenflora der Schweiz 11: 1–434.

Von Höhnel FXR (1910). Fragmentz zur Mykologie no. 538. Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften in Wien 119: 632–633.

Von Höhnel FXR (1917). Über die Benennung Stellung und Nebenfruchtformen von Sphaerella Fries. Berichte der Deutschen Botanischen Gesellschaft 35: 627–631.

Walker DM, Castlebury LA, Rossman AY, et al. (2010). Systematics of genus Gnomoniopsis (Gnomoniaceae, Diaporthales) based on a three gene phylogeny, host associations and morphology. Mycologia 102: 1479–1496.

Walker DM, Castlebury LA, Rossman AY, et al. (2012). Phylogeny and taxonomy of Ophiognomonia (Gnomoniaceae, Diaporthales), including twenty-five new species in this highly diverse genus. Fungal Diversity 57: 85–147.

Wehmeyer LE (1975). The Pyrenomycetous Fungi. Mycologia Memoirs 6: 1–250.

White T, Bruns T, Lee S, et al. (1990). PCR protocols: a guide to methods and applications (Innis MA, Gelfand DH, Sninsky JJ, White TJ, eds). Academic Press, San Diego, California: 315–322.

Wijayawardene NN, Hyde KD, Wanasinghe DN, et al. (2016). Taxonomy and phylogeny of dematiaceous coelomycetes. Fungal Diversity 77: 1–316.

Winter G (1886). Fungi Australienses. Lithuan 2. Societä der Kaiserlichen Akademie der Wissenschaften in Wien 119: 632–633.