Phylogeny of saprobic microfungi from Southern Europe

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Abstract: During a survey of saprophic microfungi on decomposing woody, herbaceous debris and soil from different regions in Southern Europe, a wide range of interesting species of asexual ascomycetes were found. Phylogenetic analyses based on partial gene sequences of SSU, LSU and ITS proved that most of these fungi were related to Sordariomycetes and Dothideomycetes and to lesser extent to Leotiomycetes and Eurotiales. Four new monotypic orders with their respective families are proposed here, i.e. Catenulostromaceae, Paracatenuclostromaceae, Xylochloridiaceae and Xylochloridiaceae. Furthermore, additional genera and species are introduced to accommodate orphan taxa, viz. Catenulostroma, Leptodontidium, Xenospadicoides, Pirozynskia, and Parasympodiella.

Key words: Biodiversity, Dothideomycetes, Eurotiales, Leotiales, Sordariomycetes, Systematics.

Taxonomical novelties: New orders: Catenulostromaceae Hern.-Restr., Gené, R.F. Castañeda & Crous, Catenulostromaceae Hern.-Restr., R.F. Castañeda & Guarro, Xylochloridiaceae Hern.-Restr., Gené, R.F. Castañeda & Crous, Xylochloridiaceae Hern.-Restr., J. Mena & Gené, P. W. Crous & Gené, New genera: Catenulostroma Hern.-Restr., Gené, R.F. Castañeda & Crous, Catenulostroma Hern.-Restr., R.F. Castañeda & Guarro, Xylochloridium Hern.-Restr., Gené, R.F. Castañeda & Crous, Xylochloridium Hern.-Restr., J. Mena & Gené, and New species: Catenulostroma sp. nov., and Xylochloridium sp. nov.

INTRODUCTION

Fungi are hyper-diverse organisms, and although only 100,000 species are presently acknowledged, species numbers are estimated to range between 1.5 to 5.1 million (Hawksworth 2004, Blackwell 2011). This high diversity is partly due to the fact that many fungi are cosmopolitan, having a wider geographical distribution than plants and other organisms. Furthermore, many habitats and substrates remain unexplored as far as Fungi are concerned, and potentially might support many undescribed species. In addition, the use of new isolation techniques, culture media and molecular, DNA-based data will reveal many of the species that have thus far been overlooked (Hawksworth & Rossman 1997).

The current classification of the kingdom Fungi is based largely on polyphasic taxonomy in which numerous authors have...
attempted to integrate morphological and molecular data (Huhndorf et al. 2004, Geiser et al. 2006, James et al. 2006, Spatafora et al. 2006, Wang et al. 2006, Hibbett et al. 2007, McLaughlin et al. 2009, Schoch et al. 2009, Hyde et al. 2013, Liu et al. 2015a, b, Wang et al. 2015a, b, c, Vu et al. 2016). DNA barcoding based on the internal transcribed spacer (ITS) region has become, among several other molecular techniques, an important tool for species identification (Quaedvlieg et al. 2012, Schoch et al. 2012). However, the ITS is inconclusive in some genera and, therefore, additional genes such as, LSU, tef1, tub, rpb2, etc. are required for a more accurate identification (Stielow et al. 2015). Nevertheless, the majority of the described fungal species are only represented by dried specimens in fungaria and lack DNA barcode data (Crous et al. 2014a, 2015a), which represents a significant handicap for defining either a phylogenetic species concept, or in the best case, an integrated or consolidated species concept. Therefore, there is an important need for field studies in order to recollect and hopefully to isolate in pure culture as many fungal species as possible what would allow proper morphological and molecular characterisation. Furthermore, when necessary, this approach will also allow for the re-typification of taxa with living cultures and DNA barcodes.

In this context, different surveys were conducted in several areas of ecological interest of the Iberian continental and insular (Baleares and Canary Islands) areas in order to explore the diversity of microfungi in various substrates including litter, submerged dead plant material and soil (Mena-Portales et al. 2011, 2015, 2016, Hernández-Restrepo et al. 2012, 2013, 2014a, b, Castañeda-Ruiz et al. 2012, Madrid et al. 2016). As initial approach, we tried to culture and identify all of these fungi, and to elucidate their phylogeny within the Ascomycota.

In the present study, the taxonomy of more than 50 fungi, including 14 new species and nine new genera, has been resolved. Based on the combination of morphological features and sequence analyses of the nuclear rDNA operon, five new orders and seven new families distributed in different classes (i.e. Dothideomycetes, Eurotiomycetes, Leotiomycetes and Sordariomycetes) are introduced. Living cultures and sequences of the taxa found in the above-mentioned surveys have been deposited in public culture collections and DNA sequence databases, respectively.

MATERIALS AND METHODS

Isolates

The microfungi were isolated from dead leaves, wood, bark, seeds and soil samples collected in several natural areas of the Iberian Peninsula (Spain and Portugal) and Islands, during a period from 2009 to 2013, mainly during spring and autumn (Table 1). Plant debris were placed in moist chambers and treated according to Castañeda-Ruiz et al. (2016). Fungi from soil samples were isolated by using wood baiting and dilution-plating techniques, following the techniques described in Calduch et al. (2004). Single-conidial cultures were performed on water agar (Difco agar 5 g, 1 000 mL tap water, pH 6). All the isolates are maintained in the culture collection of the Faculty of Medicine at the Rovira i Virgili University (FMR), Reus, Spain. Type specimens and ex-type cultures of the novel fungi were deposited in the Westerdijk Fungal Biodiversity Institute (CBS), Utrecht, the Netherlands (Table 1), and some also in the Belgian Co-ordinated Collections of Microorganisms (MUCI), Belgium, and in Kew Royal Botanical Gardens, England. Additional type specimens, ex-type cultures or strains of different species used for comparison were obtained from the CBS culture collection (Table 1). The identification of the reference strains included in the study was confirmed mainly based on the comparison with the protologues and/or examination of holotypes when possible. Nomenclatural novelties and descriptions were deposited in MycoBank (Crous et al. 2004).

Morphology

Morphological features were obtained from fungi growing on the natural substratum and on potato carrot agar (PCA; potatoes 20 g; carrots 20 g; agar 20 g; distilled water 1 L) or on oatmeal agar (OA; filtered oat flakes, 20 g agar, distilled water 1 L), incubated at 25 °C in the dark. Colony colours were assessed according to the charts of Rayner (1970). Measurements and descriptions of microscopic structures were taken from specimens mounted in either lactic acid or polyvinyl alcohol, using an Olympus BH-2 light microscope (Olympus Corporation, Tokyo, Japan). Lactophenol cotton blue was used as contrast colourant to examine hyaline structures. Photomicrographs were taken using differential interference contrast and phase contrast optics with a Zeiss Axio Imager M1 light microscope (Zeiss, Oberkochen, Germany) and a DeltaPix Infinity X digital camera or a Nikon Eclipse Ni microscope, using a Nikon DS-U3 digital camera (Nikon, Tokyo, Japan) and NIS-Element imaging software v. 4.20.

DNA isolation, sequencing and phylogeny

Genomic DNA was extracted from fungal colonies using the FastDNA kit (MP Biomedicals, CA, USA) and PrepMan Ultra sample preparation reagent (Applied Biosystems, Foster City, CA, USA), following the manufacturer’s protocols. Colonies were growing on OA or PCA at 25 °C for 1–2 wk; potato-dextrose broth (PDB) was used for those strains with slow growth. The primer sets NL1-NL4b (O’Donnell 1993), LROR-LR5 and ITS4-ITS5 (White et al. 1990) were used to amplify part of the nuclear rDNA operon spanning the 3’ end of the 18S rRNA gene, the first internal transcribed spacer (ITS1), the 5.8S rRNA gene, the second ITS region (ITS2) and ±700 bp of the 5’ end of the 28S rRNA gene (LSU), respectively. The small subunit of the rRNA (SSU) was amplified with the primers NS1–NS4 (White et al. 1990). The amplification cycles were performed following Cano et al. (2004). PCR products were purified and sequenced at Macrogen Corp. Europe (Amsterdam Zuid-Oost, the Netherlands) with an ABI PRISM 3730XL DNA Analyzer (Applied Biosystems, CA, USA). The program SeqMan v. 7.0 (Lasergene, Madison, WI, USA) was used to obtain consensus sequences.

The evolutionary relationships of the fungal isolates with other Ascomycota were mainly based on the analysis of the LSU and SSU gene sequences. Additional homologous sequences were retrieved from GenBank after a BLAST search and added in the phylogenetic analysis. Alignments were made using the web interface MAFFT v. 7 (Katoh & Standley 2013), followed by manual adjustments with MEGA v. 6 (Tamura et al. 2013) and a text editor. These alignments were deposited in TreeBASE (www.treebase.org) under the submission number S20197.

Phylogenetic reconstructions were performed using Maximum-Likelihood (ML) and Bayesian Inference (BI)
Table 1. List of isolates included in the study.

| Taxa*                          | Preliminary Identification | Strain2 | Substrate | Locality3 | Fungal Class      | GenBank4 |
|--------------------------------|----------------------------|---------|-----------|-----------|-------------------|---------|
|                                |                            |         |           |           |                   | SSU     |
| *Anapleurothecium botulisporum*|                            | FMR 11490, CBS 132713 | Dead wood | Spain, Asturias, Picos de Europa N.P. | Sordariomycetes | KY853483 KY853423 |
| *Annungites syzygii*†          | FMR 11934                  |         |           | Spain, Castilla-La Mancha, Hayedo de la Tejera Negra | Dothideomycetes | KY853484 KY853424 |
| *Bactrodesmiastroma moniliodes*| FMR 10756, CBS 137251      | Dead wood | Spain, Aragón, Ordesa y Monte Perdido N.P. | Sordariomycetes | KF771879 KF771878 |
| *B. obovatum†*                 | FMR 6482, CBS 101300       | Dead wood | Spain, Mallorca, Sierra de Tramuntana | Sordariomycetes | FR870266 FR870264 |
| *B. pyriforme†*                | FMR 10747, CBS 127867      | Dead wood | Spain, Aragón, Ordesa y Monte Perdido N.P. | Sordariomycetes | KY853485 KY853425 |
| *Bactrodesmium pallidum*       | FMR 11345, CBS 130515      | Dead wood | Spain, Cantabria, Saja-Besaya N.P. | Sordariomycetes | HF937343 KY853428 |
| *Bloxamia truncata*            | FMR 11240                  |         |           | Cuba      | Leotiomycetes     | KY853486 KY853426 |
| *Brachysporiella navarrica sp. nov.* | Brachysporiella sp. FMR 12426, CBS 142296 | Dead wood | Spain, Navarra, Barbaren | Dothideomycetes | HF937359 KY853487 KY853427 |
| *Cacumisporium capitatum*      | FMR 11339                  | Dead wood | Spain, Galicia, Las Fragas del Eume P. | Sordariomycetes | HF677190 HF677176 |
| *Ceratosporella novae-zealandiae* |                            | FMR 12069 | Submerged wood | Spain, Aragón, Sierra y Cañones del Guara P. | Dothideomycetes | HF937343 KY853488 KY853428 |
| *Camposporium antennatum*      | CBS 734.96                 | Unknown  | Cuba      |            | Leotiomycetes     | KY853486 |
| *Chloridium chlorocoronum*     |                            | FMR 11940 | Dead wood of Quercus |          | Sordariomycetes | KY853495 KY853435 |
| *Cirrenalia iberica sp. nov.*  | Cirrenalia sp. FMR 12149, CBS 142289 | Soil | Spain, Aragón, Ordesa y Monte Perdido N.P. | Sordariomycetes | KY853496 KY853436 |
|                              |                            | FMR 12418, CBS 142295 | Submerged wood | Spain, Aragón, Valles Occidentales P. | Sordariomycetes | HF678542 HF678532 |
| *Cladophialophora pseudocamilloni* | FMR 12062, CBS 138591      | Soil | Spain, Castilla-La Mancha, Hayedo de la Tejera Negra | Eurotiomycetes | KU705844 KU705827 |
| *Conioscypha hoehnelii*        | FMR 11592                  | Dead wood | Spain, Castilla y León, San Pedro de Arlanza | Sordariomycetes | HF937348 KY853497 KY853437 |

(continued on next page)
Table 1. (Continued)

| Taxa² | Preliminary Identification | Strain² | Substrate | Locality³ | Fungal Class | GenBank⁴ SSU | LSU | ITS |
|-------|---------------------------|---------|-----------|-----------|--------------|-------------|-----|-----|
| C. minutispora† | FMR 11245, CBS 137253 | Twig | Spain, Cantabria, Saja-Besaya N.P. | Sordariomycetes | KF924559  KF924559 |
| C. pleiomorpha sp. nov. | Conioscypha sp. | FMR 13134, CBS 138110 | Dead wood | Spain, Canary Islands, Tenerife, Las Mercedes | Sordariomycetes | KY853498  KY853438 |
| Cordana verruculosa† | FMR 10754, CBS 121870 | Dead wood | Spain, Aragón, Ordesa y Monte Perdido N.P. | Sordariomycetes | HE672163  HE716752 |
| Dematoscypha dematicola | Haplographium delicatum | FMR 11585 | Dead wood | Spain, Aragón, Ordesa y Monte Perdido N.P. | Leotiomycetes | HF937351  HF677187  HF677177 |
| Dicyochaeta fuegiana | Chaetosphaeria fuegiana | FMR 13126 | Dead wood | Spain, Canary Island, La Palma | Sordariomycetes | KY853500  KY853440 |
| Dicotosporium elegans | FMR 13125, CBS 137303 | Dead wood | Spain, Asturias, Cangas de Narcea | Dothideomycetes | KY853501  KY853441 |
| Endophragmiella dimorphospora* | | FMR 12150 | Soil | Spain, Aragón, Ordesa y Monte Perdido N.P. | Leotiomycetes | HF937351  KY853502  KY853442 |
| Exophilalia equina | | FMR 12091 | Soil | Spain, Aragón, Ordesa y Monte Perdido N.P. | Eurotiomycetes | KY853503  KY853443 |
| Fuscoclera lignicola gen. et sp. nov. | | FMR 11236, CBS 142287 | Dead wood | Spain, Galicia, Los Ancares P. | Leotiomycetes | KY853504  KY853444 |
| Hansfodia pulvinata* | | FMR 12706, CBS 142297 | Grass leaves | Spain, Mallorca, Sierra de Tramuntana | Leotiomycetes | HF937351  KY853502  KY853442 |
| Hyaloscypha aureliella | Cheiromycella microscopica | FMR 10851 | Dead wood | Spain, Aragón, Teruel | Leotiomycetes | KY853505  KY853445 |
| | FMR 11559 | Dead wood of Pinus sp. | Spain, Castilla y León, Burgos, Hontoria del Pinar | Leotiomycetes | KY853506  KY853446 |
| Jalapiya toruloides | Dicotosporium toruloides | FMR 11942 | Dead wood | Spain, Aragón, Ordesa y Monte Perdido N.P. | Dothideomycetes | HF677188  HF677181 |
| | FMR 12419 | Dead wood | Spain, Aragón, Valles Occidentales P. | Dothideomycetes | HF678543  HF678533 |
| Lauromyces bellulus | | FMR 12188 | Dead leaves | Portugal, Viana do Castello, Lagos de Beriandos, P.A. | Leotiomycetes | HF678541  HF678531 |
| Leptodontidium aureum sp. nov. | | FMR 11834, CBS 142316 | Soil | Spain, Galicia, Las Fragas del Eume P. | Leotiomycetes | HF373555  KY853507  KY853447 |
| | L. irregularare | CBS 851.73 | Soil | Sweden, Skåne | Leotiomycetes | AY129281  KY853508  KY853448 |
| | L. trabinellum | CBS 329.53 | Decaying wood of Betula | France | Leotiomycetes | AY129280  KY853509  AY129285 |
| Magnohelicospora benicat†* | | FMR 12414, CBS 142293 | Dead leaves | Spain, Navarra, Robledal de Orgi | Dothideomycetes | KY853510 |
| Menispora glauca* | | FMR 12089 | Bark | Spain, Burgos, Sierra de la Demanda | Leotiomycetes | HF678538  HF678528 |
| Monochaetia kansensis | | FMR 11156 | Dead wood | Spain, Cantabria, Saja-Besaya N.P. | Leotiomycetes | KY853511 |
| Monodictys nigrosporum* | Monodictys levis | FMR 11941, CBS 132489 | Soil | Spain, Galicia, Los Ancares P. | Leotiomycetes | HF77186  HF77180 |
| Myrmecridium schulzeri | | FMR 12424 | Grass leaves | Spain, Navarra, Robledal de Orgi | Leotiomycetes | KY853512  KY853451 |
| Taxa*          | Preliminary Identification | Strain²   | Substrate            | Locality³  | Fungal Class       | GenBank⁴  |
|---------------|---------------------------|-----------|----------------------|------------|-------------------|-----------|
| Neosacotaiwania limnetica comb. nov. | Ascotaiaiwa lignicola | CBS 126576 | Submerged wood of Alnus glutinosa | France, Ariège, Rimont, Peyrau brook | Sordariomycetes | KY853513 KY853452 |
|               |                           | CBS 126792 | Submerged wood       | France, Ariège, Rimont, Peyrau brook | Sordariomycetes | KY853514 KY853453 |
| N. terrestris gen. et sp. nov.       |                           | FMR 12412, CBS 142291 | Soil                  | Spain, Asturias, Picos de Europa N.P. | Sordariomycetes | KY853547 KY853515 KY853454 |
| Oncopodiella trigonella*             |                           | FMR 10788, CBS 126413 | Bark                  | Spain, Aragón, Teruel                  | Dothideomycetes | KY853548 KY853516 KY853455 |
| Paradiplococcium singulare** gen. et comb. nov. | Diplococcium singulare | FMR 10752, CBS 126091 | Dead wood             | Spain, Aragón, Ordesa y Monte Perdido N.P. | Sordariomycetes | KY853517 KY853456 |
| Parryanrothecium roridae             |                           | FMR 11946 | Soil                  | Spain, Aragón, Teruel                  | Sordariomycetes | KY853517 KY853456 |
| Parasympodiella lauri sp. nov.       |                           | FMR 13132, CBS 138108 | Dead leaves of Laurus sp. | Spain, Canary Islands, La Palma | Sordariomycetes | KY853518 KY853457 |
| Phaeodactylium stadienti**           | Parasympodiella sp.      | FMR 12185, CBS 132715 | Dead leaves of Ammophila arenaria | Portugal, Playa de Ofr | Dothideomycetes | KY867536 KY867526 |
| Phaeoisaria sparsa*                  |                           | FMR 11939 | Dead wood             | Spain, Aragón, Ordesa y Monte Perdido N.P. | Sordariomycetes | KY867718 KY8677179 |
| Phragmocephala glanduliformis*       |                           | FMR 11237 | Bark                  | Spain, Valencia                        | Dothideomycetes | KY867539 KY867529 |
| Pirozynskiiella laurisilvatica sp. nov. | Pirozynskiella sp.       | FMR 13133, CBS 138109 | Dead leaves of Laurus sp. | Spain, Canary Islands, La Gomera       | Dothideomycetes | KY853520 KY853459 |
| Pleomanodictys capensis comb. nov.   | Monodictys capensis      | CBS 968.97 | South Africa, Western Cape Region | Sordariomycetes | KY853521 KY853460 |
| P. descalsii gen. et sp. nov.        | Monodictys sp.           | FMR 12716, CBS 142298 | Bark Quercus          | Spain, Mallorca, Sierra de Tramuntana  | Dothideomycetes | KY853522 KY853461 |
| Pleotrichocladium opacum gen. et comb. nov. | Trichocladium opacum     | FMR 12088, CBS 142288 | Soil                  | Spain, Aragón, Ordesa y Monte Perdido N.P. | Dothideomycetes | KY867540 KY867530 |
|                                           |                           | FMR 12416, CBS 142294 | Dead wood             | Spain, Navarra, Robledal de Orgi       | Dothideomycetes | KY853523 KY853462 |
|                                           |                           | CBS 450.70 | Dead wood of Thuja occidentalis | The Netherlands, Baarn, garden Eemneswegweg 90 | Dothideomycetes | KY853524 KY853463 |
|                                           |                           | CBS 534.66 | Soil                  | Austria, Vorarlberg                    | Dothideomycetes | KY853525 KY853464 |
|                                           |                           | CBS 709.92 | Lichen                | Antarctica, King George, Jubyay        | Dothideomycetes | KY853526 |
| Pseudodiplococcium ibericum* gen. et sp. nov. | “Diplococcium pulneyense” | FMR 10959, CBS 127864 | Dead wood             | Spain, Galicia, Los Ancares P.         | Sordariomycetes | KY867350 KY853527 KY853465 |
| Rhinocladiella amoena†                 | FMR 12063, CBS 138090   | Submerged wood       | Spain, Aragón, Ordesa y Monte Perdido N.P. | Eurotiomycetes | KU705857 KU705840 |
| Solicorynespora insolit†               | FMR 11497, CBS 131273   | On bark              | Spain, Cantabria, Picos de Europa N.P. | Dothideomycetes | KY8677183 KY8677174 |
| Sporoschisma mirabile*                | FMR 11247                | Dead wood            | Spain, Galicia, Encía do Lastra P.       | Sordariomycetes | KY8677183 KY8677174 |

(continued on next page)
| Taxa1 | Preliminary Identification | Strain2 | Substrate | Locality3 | Fungal Class | GenBank 4 |
|-------|---------------------------|---------|-----------|-----------|--------------|-----------|
|       |                           |         |           |           | SSU | LSU | ITS |
| Stachybotrys cylindrospora | FMR 11595 | Dead wood | Spain, Castilla y León, Olleros del Alba | Sordariomycetes | KY853528 | KY853466 |
| Sterigmatobotrys uniseptata* | FMR 11937 | Dead wood | Spain, Aragón, Ordesa y Monte Perdido N.P. | Sordariomycetes | HF677182 | HF677178 |
| Symphodiella acicola | CBS 425.76 | Soil | Canada, Ontario, Muskoka | Dothideomycetes | KY853529 | KY853467 |
|                 | CBS 487.82 | Needle of Pinus sylvestris | The Netherlands, Baarn, De Vuursche | Dothideomycetes | KY853530 | KY853468 |
| Trichocladium asperum | FMR 12054 | Soil | Spain, Castilla La Mancha, Alto Tajo | Sordariomycetes | KY853531 | KY853469 |
|                 | CBS 903.85 | Soil | Germany, Edersee, Nieder-Werbe | Sordariomycetes | KY853532 | KY853470 |
|                 | CBS 140.21 | Unknown | The Netherlands | Sordariomycetes | KY853533 | KY853471 |
|                 | CBS 415.52 | Culture contaminant | UK, Cumberland | Sordariomycetes | KY853534 |
|                 | CBS 157.22 | unknown | unknown | Sordariomycetes | KY853535 | KY853472 |
|                 | CBS 112.67 | Soil | Belgium, Konitch | Sordariomycetes | KY853536 | KY853473 |
| Triposporium deviatum* | FMR 13135, CBS 137300 | Dead wood | Spain, Canary Island, La Palma | Leotiomycetes | KY853537 | KY853474 |
| Tropospora fumosa | FMR 12437 | Dead wood | Spain, Cataluna, Alto Pirineo | Dothideomycetes | HF678544 | HF678534 |
| Vargamycyes aquaticus Xylomyces aquaticus | FMR 11587, CBS 130366 | Submerged wood | Spain, Burgos, Salas de Los Infantes | Dothideomycetes | KY853538 | KY853475 |
|                 | CBS 636.91 | Submerged wood | Hungary, Börzöny Mts., Morgó stream | Dothideomycetes | KY853539 |
| Vermiculiiangiella immersa | CBS 140223 | Rotten leaf | Spain, Canary Islands | Sordariomycetes | KY853540 | KY853476 |
| V. microsperma | CBS 101172 | Leaf litter | Brazil, Mata Atlantica, Engenho do Rei, Santa Rita | Sordariomycetes | KY853541 | KY853477 |
|                 | CBS 140231 | Dead leaf | French Guiana | Sordariomycetes | KY853542 | KY853478 |
| V. pediculata* | FMR 12187, CBS 132484 | Twig | Portugal, Viana do Castello, Lagos de Beriandos, P.A. | Sordariomycetes | HF678537 | HF678527 |
| Xenospadicoides atra gen. et comb. nov. Spadicoides atra | CBS 489.77 | Branch of Quercus petraea | Czech Republic, Central Bohemia, forest Lánská obora | Sordariomycetes | EF204521 | EF204506 |
| Xyladictyochaeta lisianica gen. et sp. nov.* Didycochaeta aff. eucalypti | FMR 12177, CBS 142290 | Dead leaves of Eucalyptus sp. | Portugal, Viana do Castello, Lagos de Beriandos, P.A. | Sordariomycetes | HF937349 | KY853543 | KY853479 |
| Zanclospora iberica sp. nov.* Zanclospora aff. novae-zelandiae | FMR 11584, CBS 130426 | Dead wood | Spain, Asturias, Picos de Europa N.P. | Sordariomycetes | HF937360 | KY853544 | KY853480 |
|                 | FMR 12186 | Bark of Eucalyptus sp. | Portugal, Viana do Castello, Lagos de Beriandos, P.A. | Sordariomycetes | HF937361 | KY853545 | KY853481 |
| Zygosporum gibbum* | FMR 13130, CBS 137308 | Dead leaves | Spain, Canary Island, La Palma | Sordariomycetes | KY853546 | KY853482 |

1 Species without sequences previous to this study, 2 Species recently described from the Iberian Peninsula, bold: new species.

2 CBS: Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands; FMR: Facultat de Medicina i Ciències de la Salut, Reus, Spain.

3 N.P.: National Park, P.: Natural Park, P.A.: Protected area.

4 SSU: partial small subunit of the rDNA; LSU: partial large subunit of the rDNA; ITS: internal transcribed spacer regions of the rDNA and 5.8S region.

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approaches under RAxML HPC BlackBox v. 8.2.8 (Stamatakis 2014) using the Cipres Science gateway portal (Miller et al. 2010) and MrBayes v. 3.2.6 (Ronquist et al. 2012), respectively. Confident branch support is defined as Bayesian posterior probabilities (BPP) ≥ 0.95 and maximum likelihood bootstrap values (BML) ≥ 70 %.

RESULTS AND DISCUSSION

Phylogenetic relationships

Sequences (LSU, SSU and ITS) were determined for the isolates selected (Table 1), while their distribution in different orders and families in Pezizomycotina (Ascomycota) were highlighted by using LSU and SSU analyses (SSU tree not shown, available in TreeBASE). The taxa tested corresponded to four classes, i.e. Dothideomycetes, Eurotiomycetes, Leotiomyces and Sordariomycetes. To maximise the quality of the alignment, four separate LSU alignments were created corresponding to the BI and ML for each dataset are in Table 2. The consensus trees generated from the alignment for each dataset were created using the Cipres Science gateway portal (Miller et al. 2010) and MrBayes v. 3.2.6 (Ronquist et al. 2012), respectively. The BI consensus trees were used to resolve the phylogenetic relationships among the members of that order and allies. The number of taxa, characters and information generated from the Bayesian Inference and Maximum Likelihood analysis for Dothideomycetes, Eurotiomycetes, Leotiomyces and Sordariomycetes is shown in Table 2.

Dothideomycetes

Within Dothideomycetes, a total of nine strongly supported main clades (I–IX) were discerned, which showed a moderately supported backbone (0.97 PP, 77 % BS).

Clade I represents the Venturiales (1 PP, 96 % BS), in which Magnohelicospora iberica (FMR 12414), Anungitea syzygii (FMR 11934) and Tropospora fumosa (FMR 12437) are included. Magnohelicospora iberica was placed in a subclade together with Venturia populina and Gibbera conferta (1 PP, 100 % BS). Magnohelicospora is a monotypic genus characterised by polyblastic conidiogenous cells producing single brown helicoidal conidia with a conidial filament coiled in three dimensions (Castañeda-Ruiz et al. 2012). It is morphologically similar to Helicodendron (Hd.) and Helicoon (Ho.). However, the conidia in Helicodendron are catenate, while in Helicoon they are produced singly on monoblastic conidiogenous cells. It is noteworthy that Helicodendron and Helicoon are polyphyletic (Tsui & Berbee 2006). For instance, Hd. paradoxum, the type species of the genus, and Hd. giganteum are both placed in Helobiae (Leotiomycetes) (Tsui & Berbee 2006) in which they are linked to sexual morphs of different genera, i.e. Hymenoscyphus and Mollisia, respectively (Fisher & Webster 1983). As for M. iberica, Hd. pinicola, the asexual morph of Tyrannosorus pinicola (Untereiner et al. 1995), is also related to Venturiaceae, specifically to Ceproventuria (Zhang et al. 2011). Furthermore, M. iberica and Hd. pinicola differ in the arrangement of conidia, solitary in the former and catenate in the latter.

Helicoon species are scattered in three classes of Ascomycota, i.e. Leotiomycetes, Dothideomycetes and Sordariomycetes. Based on cultural methods, Ho. sessile, the generic type, was associated to the sexual morph Orbilia luterubella (Orbiilaceae, Leotiomycetes) (Pfister 1997). Helicoon farinosum was shown to be the asexual morph of an ascofaiwania-like fungus (Fialah et al. 1999) and belongs to Pleurotheciaceae (Sordariomycetes) (Réblová et al. 2016b) (Fig. 4, clade XVI, Fig. 5). Based on the analysis of LSU and ITS sequences, Tsui & Berbee (2006) placed Ho. gigantasporum in Tuberiaceae, Ho. richonis in Pleosporales and Ho. fuscosporum as incertae sedis in Dothideomycetes. Our analysis suggests that Ho. fuscosporum, placed in Venturiaceae (Fig. 1, clade I), is congenic with M. iberica and a new combination is proposed. However, the redistribution of other species in Helicodendron and Helicoon and their related sexual morphs require further re-evaluation.

Anungitea syzygii (FMR 11943) is placed in a subclade together with Repetophragma goidanichii (DQ0408574) and Symphodiella acicola (CBS 425.76 and CBS 487.82). Other LSU sequences which were similar to that of A. syzygii were Cylindrosymodium lauri (EU035414, 96 %) and Torthia fuscolla (JF927766, 95 %). Anungitea was established by Sutton (1973) with A. fragils as type species. It is characterised by straight, simple and brown conidiophores with polyblastic, sympodial, denticulate conidiogenous cells and cylindrical, hyaline conidia produced in acropetal chains (Seifert et al. 2011). Cylindrosymodium lauri is morphologically similar to A. syzygii in having solitary conidiophores with polyblastic, sympodial conidiogenous cells. Nevertheless, they are different in conidial morphology; C. lauri produces solitary, subunicellular to narrowly subcylindrical, (4–)6–8-septate conidia (Crous et al. 2007b),

Table 2. Number of taxa, characters and information generated from the Bayesian Inference and Maximum Likelihood analysis for each dataset.

|                  | Dothideomycetes | Eurotiomycetes | Leotiomyces | Sordariomycetes | Savoryellales and allies |
|------------------|-----------------|----------------|-------------|-----------------|-------------------------|
| Number of taxa   | 99              | 22             | 33          | 158             | 58                      |
| Number of characters | 680          | 660            | 658         | 700             | 901                     |
| Bayesian Inference |                |                |             |                 |                         |
| Unique sites patterns | 469          | 280            | 279         | 544             | 550                     |
| Substitution model used | GTR G+I    | GTR G+I        | GTR G+I    | GTR G+I        | GTR G+I                |
| Maximum Likelihood analysis |        |                |             |                 |                         |
| Constant characters | 284          | 403            | 421         | 234             | 426                     |
| Parsimony informative sites | 307         | 191            | 228         | 358             | 370                     |
| Variable and parsimony uninformative | 382        | 249            | 149         | 447             | 461                     |
while *A. syzygii* produces short chains of cylindrical, 0–1-septate conidia. On the other hand, *R. goidanichii* shows conidiophores with terminal and monoblastic conidiogenous cells extending percurrently and producing solitary and brown phragmoconidia. *Thotia fuscella* has thyriothecial ascomata with no asexual morph reported (Wu et al. 2011). The placement of *Anungitea* within the *Venturiaceae* was previously suggested by Crous et al. (2007a) by comparing morphological similarities with the genus
Fusciadium. However, A. fragilis, the type species of Anungitea, has no preserved ex-type strain to confirm the definitive position of the genus.

Another helicosporous genus placed in the clade I (Fig. 1) is Troposporea. Troposporea, typified by T. fumosa (Karsten 1892), is characterised by producing brown sporodochial conidiomata, undifferentiated conidiophores, polyblastic, pale brown conidiogenous cells and helicoidal conidia. Tsui & Berbee (2010) showed that T. fumosa, T. monilipes and T. olivaceum showed that conidiogenous cells and helicoidal conidia. Tsui & Berbee (2010) showed that T. fumosa, T. monilipes and T. olivaceum showed that conidiogenous cells and helicoidal conidia. According to our results, the genus Troposporea belongs to the Sympoventuriaceae, Venturiales (1 PP, 98 % BS).

Clade II includes Asterina weinmanniae and Hemigepha atlantica, members of Asterinales, and the isolate FMR 13133, which shows, however, morphological and ecological affinities with Pirozynskiella. Pirozynskiella, typified by P. solaninum, is only known by an asexual morph characterised by brown conidiophores with elastic conidiogenous cells bearing a single unbranched acropetal chain of ellipsoidal to subcylindrical conidia (Hughes 2007). Our isolate FMR 13133 differs from other species of Pirozynskiella mainly by the verrucose conidia and, therefore, it is described below as P. laurisilvatica sp. nov.

Because no phylogenetic analyses have been done that include the type of Pirozynskiella, the taxonomic placement of the genus remains uncertain.

Our LSU and SSU sequence data reveal that Oncopodiella trigonella (FMR 10788) is unrelated to any previously established order or family in Dothideomycetes, and represents a potentially new lineage in this class. In order to stabilise the use of this name we propose the strain FMR 10788 as the epitype of O. trigonella since the generic type has no preserved cultures.

Clade III comprises members of Pleosporales (1 PP, 98 % BS). The Iberian isolates related to this clade include Campo- sporium cambrense (FMR 12069), Dictyosporium elegans (FMR 13125), Jalapriya toruloides (FMR 11942 and FMR 12491), Monodictys sp. (FMR 12716), Trichocladium opacum (FMR 12416 and FMR 12088), and Vargamycyes aquatic (FMR 11587). Dictyosporium elegans and Jalapriya toruloides are placed in the Dictyosporiaceae subclade (Fig. 1, 1 PP, 98 % BS), a pleosporalean family introduced recently by Boonmee et al. (2016) that includes fungi with cheiroid or digitate, palmate cheiroconidia. Nevertheless, based on phylogenetic differences they were proposed as different genera (Boonmee et al. 2016).

The isolate FMR 12176, identified as Monodictys sp. due to its dark brown and dictyosporous conidia, is included in a well-
supported clade (1 PP, 100 % BS) with two isolates of *Monodictys capensis*, including the ex-type strain (CBS 968.97), a fungus considered *incertae sedis* at family level by Tanaka et al. (2015). *Monodictys* is characterised by single, brown muriform conidia originating from monoblastic cylindrical conidiogenous cells (Ellis 1971). However, these characters have limited taxonomic value because *Monodictys* species are scattered in different classes, i.e. *Dothideomycetes*, *Sordariomycetes* and *Leotiomycetes* (Tanaka et al. 2015). According to our analysis, for instance, *M. nigrosperma* (FMK 11941) is placed in the *Chaetomiaceae* (Sordariales) (Fig. 4). Although the phylogenetic placement of the type species of *Monodictys*, *M. putredinis*, remains unclear, this species was reported as the asexual morph of *Ohleria brasilensis* (Samuels 1980). *Ohleria* was recently included in the *Ohleriaceae*, *Pleosporales* (Jaklitsch & Voglmayr 2016), which is distant from the *M. capensis* clade. Our results agree with the phylogeny presented by Tanaka et al. (2015), and support the proposal of the new genus *Pleomonodictys* for these two monodictys-like species. This lineage also represents a new family in the *Pleosporales*, *Pleomonodictydaceae* fam. nov.

Our isolates of *Trichocladium opacum* and several strains of the same species clustered in a supported clade (0.97 PP, 80 % BS) of the family *Melanommataceae* (Fig. 1, clade III). This fungus is characterised by conidiophores reduced to conidiogenous cells, producing ellipsoidal to clavate, dark brown conidia with schizolytic secession. Since the type species of the genus *Trichocladium*, *T. asperum*, is related to the *Chaetomiaceae* in the *Sordariomycetes* (Fig. 4, clade III), *T. opacum* clearly represents a different and distinct pleosporalean genus which is introduced below as *Pleotrichocladium*.

Camposporium cambrense forms a subclade (0.98 PP, 80 % BS) together with *C. antennatum* (CBS 734.96, GenBank KF156156 as *Paradendryphiella salina*) and *Camposporium* sp. (MHR 1565) in the *Melanommataceae*. *Camposporium* was erected by Harkness (1884) and typified with *C. antennatum*. It is characterised by dematiaceous, unbranched conidiophores with terminal, integrated, denticulate conidiogenous cells that produce multisepitate cylindrical conidia, either with or without hyaline appendages at the apex and a persistent portion of the denticle attached at the base. Our analysis shows for the first time that *Camposporium* is related to the *Pleosporales*.

*Vargamyces aquaticus* (FMK 11587 and CBS 639.63) and *Repetophragma ontariense* (GenBank DQ408575) also formed a full-supported subclade in *Pleosporales*. *Repetophragma ontariense* was previously shown to be related to the *Anniculicaceae*, which includes saprobic freshwater fungi (Zhang et al. 2009a, b). FMK 11587 also was isolated from a freshwater habitat. Recently, Révay et al. (2014) suggested that *V. aquaticus* and *R. ontariense* could be considered conspecific, but they did not introduce any taxonomic change. Based on morphological and genetic similarity, we regarded *R. ontariense* as synonym of *V. aquaticus*.

The fully supported clade IV includes species of *Acrospermum*, *Gonatophragmium triuiae* and *Phaeodactylum stadii*, the latter being sequenced for the first time in the present study. According to our analysis, this clade represents the *Acrospermatales* (Minter & Watson 2007). *Acrospermum* species are saprophytic fungi found on different substrates, with an assexual morph characterised by unbranched, pale brown conidiophores, with polyblastic, scattered conidiogenous cells that
produce hyaline to pale brown, smooth conidia (Webster 1956, Minter & Watson 2007). Phaeodactylum stadleri resembles the asexual morph of Acrospermum, but differs in having branched conidiophores and verrucose conidia (Castañeda-Ruiz et al. 2012). Phaeodactylum is also similar to Gonatophragmium having branched conidiophores with polyblastic denticulate conidigenous cells. However, in Gonatophragmium conidigenous cells are unilateral nodose and darker than those observed in Phaeodactylum. Unfortunately, there are no DNA sequence data of the type species of Phaeodactylum, P. venkatesanum, making it impossible to resolve its phylogeny.

Clade V (1 PP, 100 % BS) includes members of the Kirschsteiniotheliaceae and other fungi of uncertain taxonomic position, i.e. Solicosyphespora insolita, Astrosphaeriella livistonica and an isolate of Brachysporiella sp. (FMR 12426). With the exception of A. livistonica, for which no asexual morph is known (Hyde & Fröhlich 1997), the asexual morphs of most members of this clade (i.e. Brachysporiella, Kirschsteiniothelia (=Dendryphiopsis), Solicosyphespora s.l., Sporidium s.l. and Taeniella s.s.) are characterised by pigmented conidigenous cells and septate, dark brown conidia (Shearer et al. 2009, Hernández-Restrepo et al. 2014a, Ertz et al. 2016).

Brachysporiella has macronematous conidiophores, mono- and polyblastic conidigenous cells and dark brown, separte and terminal conidia (Batista 1952, Ellis 1971). The isolate FMR 12426 shares these features, but differs in some aspect from the other species accepted in Brachysporiella. It is therefore described as B. navarrica sp. nov. Astrosphaeriella is polyphytic, with species scattered in different pleosporalean lineages (Liu et al. 2011, Zhang et al. 2012). Since clade V is distantly related to other lineages representative of different orders in Dothideomycetes, it is introduced below as the new order Kirschsteiniotheliaceae.

Clade VI includes members of Capnodiales and Dothideales (Fig. 1, 1 PP, 96 % BS). The isolate FMR 11491 belongs to the asexual morph of Acrospermum, but differs in having branched conidiophores and verrucose conidia (Castañeda-Ruiz et al. 2012). Phaeodactylum is also similar to Gonatophragmium having branched conidiophores with polyblastic denticulate conidigenous cells. However, in Gonatophragmium conidigenous cells are unilateral nodose and darker than those observed in Phaeodactylum. Unfortunately, there are no DNA sequence data of the type species of Phaeodactylum, P. venkatesanum, making it impossible to resolve its phylogeny.

Clade V (1 PP, 100 % BS) includes members of the Kirschsteiniotheliaceae and other fungi of uncertain taxonomic position, i.e. Solicosyphespora insolita, Astrosphaeriella livistonica and an isolate of Brachysporiella sp. (FMR 12426). With the exception of A. livistonica, for which no asexual morph is known (Hyde & Fröhlich 1997), the asexual morphs of most members of this clade (i.e. Brachysporiella, Kirschsteiniothelia (=Dendryphiopsis), Solicosyphespora s.l., Sporidium s.l. and Taeniella s.s.) are characterised by pigmented conidigenous cells and septate, dark brown conidia (Shearer et al. 2009, Hernández-Restrepo et al. 2014a, Ertz et al. 2016).

Brachysporiella has macronematous conidiophores, mono- and polyblastic conidigenous cells and dark brown, separte and terminal conidia (Batista 1952, Ellis 1971). The isolate FMR 12426 shares these features, but differs in some aspect from the other species accepted in Brachysporiella. It is therefore described as B. navarrica sp. nov. Astrosphaeriella is polyphytic, with species scattered in different pleosporalean lineages (Liu et al. 2011, Zhang et al. 2012). Since clade V is distantly related to other lineages representative of different orders in Dothideomycetes, it is introduced below as the new order Kirschsteiniotheliaceae.

Clade VI includes members of Capnodiales and Dothideales (Fig. 1, 1 PP, 96 % BS). The isolate FMR 11491 belongs to the former. This isolate was morphologically regarded as the new order Kirschsteiniotheliaceae.

Clade VII includes members of the Kirschsteiniotheliaceae and other fungi of uncertain taxonomic position, i.e. Solicosyphespora insolita, Astrosphaeriella livistonica and an isolate of Brachysporiella sp. (FMR 12426). With the exception of A. livistonica, for which no asexual morph is known (Hyde & Fröhlich 1997), the asexual morphs of most members of this clade (i.e. Brachysporiella, Kirschsteiniothelia (=Dendryphiopsis), Solicosyphespora s.l., Sporidium s.l. and Taeniella s.s.) are characterised by pigmented conidigenous cells and septate, dark brown conidia (Shearer et al. 2009, Hernández-Restrepo et al. 2014a, Ertz et al. 2016).

Brachysporiella has macronematous conidiophores, mono- and polyblastic conidigenous cells and dark brown, separte and terminal conidia (Batista 1952, Ellis 1971). The isolate FMR 12426 shares these features, but differs in some aspect from the other species accepted in Brachysporiella. It is therefore described as B. navarrica sp. nov. Astrosphaeriella is polyphytic, with species scattered in different pleosporalean lineages (Liu et al. 2011, Zhang et al. 2012). Since clade V is distantly related to other lineages representative of different orders in Dothideomycetes, it is introduced below as the new order Kirschsteiniotheliaceae.
whereas in *Heteroconium* conidiophores are differentiated, bearing an apical metula, and conidia are born in acropetal chains (Hughes 2007). *Catnulostroma* belongs to the *Trichosphaeriaceae* (Crous et al. 2007a, Quadrievig et al. 2014), while *Heteroconium* is polyphyletic (Cheewangkoon et al. 2012). *Heteroconium* s.s. (based on the type species, *H. citharexyli*) belongs to the *Capnodiaceae* but other species are of uncertain affinities within *Dothideomycetes* or allocated to new genera, as

**Fig. 4.** Phylogenetic tree inferred from the Bayesian analysis of the LSU sequences alignment of *Sordariomycetes*. Posterior probabilities inferred from the Bayesian analysis (≥ 0.95) and bootstrap (≥ 70%) are indicated at the nodes of the branches (PP/BML). Thickened lines indicate a PP of 1.0 and a BML of 100 %. // indicates the branch was reduced 75 %. New taxa and species recently described from the Iberian Peninsula are indicated in bold. Con. = Coniochaetales, i. s. = incertae sedis. Microascales, *Trich.* = Trichosphaeriaceae. Glom. = Glomerales, Mic. = Microascales. Tree was rooted with *Saccharomyces cerevisiae* AH005487, *Orbilia auricola* DQ470953 and *O. virios* DQ470952.
Alysidiella eucalypti and A. kleinziense, both occurring on Eucalyptus (Cheewangkoon et al. 2012). Due to the phylogenetic affinity of FMR 11491 with Catenulostruma and considering its morphological differences from the currently accepted species, C. lignicola sp. nov. is introduced.

Clade IX (1 PP, 100 % BS) groups Phragmocephala glanduliformis (FMR 11237) with members of the Microthyriaceae (Microthyriales). The former is placed in a long single branch distantly related to the lineages representing Mycrothyrium and Anungitopsis speciosa. Phragmocephala
Phragmocephala was erected by Mason & Hughes (1951), with Ph. cookei as type species. It is characterised by dark brown conidiophores and holoblastic, dark brown and septate conidia. Currently, Phragmocephala includes nine species (Seifert et al. 2011) and, in addition to Ph. glanduliformis (Microthyriaceae), phylogenetic data are only known from Ph. atra, Ph. garethjonesii (Melanommataceae) (Su et al. 2015), and Ph. stemphylioides (Pleurotheciaceae) (Réblóvá et al. 2016b).

Hence Phragmocephala is another polyphyletic genus that needs further study.

Eurotiomycetes

Four Iberian isolates were related to the Herpotrichiellaceae (Fig. 2), i.e. Ceratospora nova-zealandiae (FMR 10760),
Cladophialophora pseudocarrionii (FMRI 12062), Exophiala equina (FMRI 12091) and Rhinocladiella amoenae (FMRI 12063). Members of this family include numerous black-yeast fungi of clinical relevance such as Exophiala, Cladophialophora, Phialophora, and Rhinocladiella (de Hoog et al., 2011), but also fungi isolated from soil, plant debris and water (Réblová et al., 2013). With the exception of C. novae-zeelandiae, the other fungi have been previously studied phylogenetically. Exophiala equina belongs to the Exophiala salmonis-clade. It has been reported as etiologic agent of subcutaneous infections in animals (horses and turtles) and humans, but it has been also isolated from water, soil and plant material (de Hoog et al., 2011). Clado-

philophora pseudocarrionii and Rhinocladiella amoenae have recently been described by Madrid et al. (2016) from soil and submerged wood, respectively. Ceratospora novae-zea-

lndiae formed a distinct lineage, related to Capronia villosa (GenBank AF050261 sequences from ex-type strain) (1 PP, 100 % BS). Capronia villosa is characterised by setose peri-

thecial ascomata and an exophiala-like asexual morph (Müller et al. 1987), features that clearly distinguish this fungus from Ceratospora. Ceratospora includes species with macro-

nematous unbranched conidiophores, with monoblastic, per-

current conidigenous cells, which produce solitary, branched, and brown to dark brown conidia. The generic type, C. bicornis, is a parasitic fungus on Zea mays, although most species in the genus are saprophytic (Hughes 1971, Matsushima 1993, Castaneda-Ruiz et al. 1996). Our result represents a novel phylogenetic scenario in which asexual fungi with branched conidia are reported within this order, which in addition could represent an undescribed family in the Chaetothyriales. However, no DNA sequence is available, neither for the type species of Ceratospora nor for any of the 90 species included in the genus. Therefore, the phylogenetic placement of the genus remains uncertain until new molecular data for these fungi can be provided.

Leotiomycetes

The Iberian isolates related to the Leotiomycetes (Fig. 3) were distributed in different clades among members of the Helotiales (Clade I–VIII), except the clade IX which could represent a different order. The order Helotiales lacks sufficient genetic data and the placement of several genera at family level is, in many cases, based on morphological criteria (Jaklitsch et al. 2016a).

Clade I (1 PP, 100 % BS) is composed of Diplcococcium spicatum (EF204497), Trimmatostroma salicis (EU019300) and an unidentified isolate FMRI 11236. Previous phylogenetic ana-

lyses have shown that Diplcococcium and Trimmatostroma belong to the Helotiales and more specifically to the Mollisiaceae (Crous et al. 2015b, Jaklitsch et al. 2016a). These two genera are characterised by producing catenate conidia, while the Iberian isolate produces solitary conidia. In addition, D. spicatum exhibits differentiated conidiomata, polytretic conidigenous cells and 1-septate conidia (Ellis 1971), whereas T. salicis has meristematic, arthic conidigenous cells, producing chains of phragmo- or dictyoconidia (Seifert et al. 2011). FMRI 11236 has meristematic, blastic conidigenous cells, and solitary, black to dark brown conidia formed by masses of rounded to angular cells. Therefore, these peculiar morphological features and its phylogenetic distance with the fungi compared support the introduction below of Fuscosclera gen. nov.

In our phylogenetic tree (Fig. 3), Bloxaxia truncata, the type species of the genus, was placed on an isolated branch, which we recognise as representative of the previously proposed family Bloxaxiaceae (Locquin 1984). Since this family name was invalidly published (Art. 39.1; no Latin diagnosis), we validate Bloxaxiaceae in the taxonomy section. Jaklitsch et al. (2016a) treated Bloxaxiaceae as a presumed synonym of Pezizellaceae. However, in our phylogenetic analysis, Pezizellaceae (Fig. 3, Clade VII), which contains members of Chaiera, is distantly related to the Bloxaxia lineage. Bloxaxia truncata is characterised by sporodochial conidiomata, phalidic conidigenous cells and hyaline, rectangular conidia held in readily disarticulating chains. It has been associated with the sexual morph Bisporella sulfurina (Johnston 1988), but we have not been able to confirm this basid our isolate. The genus Bisporella (Bis.) was established by Korf & Carpenter (1974) with Bis. pallescens as generic type. Unfortunately, cultures and se-

quences of this species are not available. Additional studies are needed to clarify the phylogenetic relationship of those genera.

In our analyses the Hyaloscyphaceae appears polyphyletic, with members distributed in two well-supported, distant clades (II and IV). The clade II includes Hyaloscypry aurieili (AB546943) and sequences of two Iberian isolates that are cheiromyccella-like (FMRI 11559 and FMRI 10851). Hyaloscyphace sexual morphs are characterised by minute, sessile, white apothecia; while the asexual morphs have holoblastic or enteroblastic conidigenous that are cheiromyccella-, pseudae-

genita- and phialophora-like (Huhtinen 1989, Quijada et al. 2017). Hyaloscypha aurieili asexual morph ( = Cheiromyccella micro-

scopica) is characterised by brown sporodochia and simple, but usually branched, cleoid, brown conidia (Ellis 1971). These conidia have usually been reported with two to three rows of cells (Ellis 1971, Sutton 1985); however, our isolates show conidia predominantly with one row of cells. Despite the morphological differences observed, considering the high similarity of their ITS and LSU sequences (99 % similarity with both markers) we identified both isolates as H. aurieili.

Clade IV (1 PP, 100 % BS) includes isolate FMRI 11585 identified as Haplographium deliciatum, and the sequence of Haplographium catenatum CBS 482.67 (FJ839656). Haplographium deliciatum is the asexual morph of Dematiaceous dematiciola (Huhtinen 1987). Since the latter species is the type of Dematiaceous and this genus is preserved against Haplographium, H. deliciatum is currently named D. dematiciola (Johnston et al. 2014). On the other hand, the taxonomy of H. catenatum seems to be controversial. Although initially included in Haplographium (Holubová-Jechová 1973), it was transferred to the genus Lauromyces because of the production of conidia in chains (Castaneda-Ruiz & Kendrick 1990). Our phylogeny agrees in placing this species in Dematiaceous rather than Lauromyces (Fig. 3, clade IX). However, since the identity of CBS 482.67 is unclear, an extensive study including more isolates of the species and allied taxa is necessary to confirm the taxonomy of this fungus.

Clade V comprises a fully supported lineage with two species of Triposporium (Tps.), Tp. cycadiolica (KJ869177) previously reported in Helotiales by Crous et al. (2014b), and Tp. deviantum (FMRI 13135). Species of this genus are characterised by straight or flexuous, brown conidiophores, monoblastic, integrated, ter-

minal, percurrent, cylindrical, doliiform or lageniform con-

idigenous cells and the conidia are branched, with 3–4 smooth, septate arms. Triposporum was erected by Corda (1837) with
Tp. elegans as generic type and placed in the Triposporiaceae according to Nannizz (1934). However, since Tp. elegans has never been sequenced, the placement of the genus in Helotiales is provisional.

Clade VII (1 PP, 98 % BS) includes Chalara hughesii (FMR 12413), Ch. kentriki (AF222464) and Ch. aurea (AF222449). Chalara is a heterogeneous genus characterised by sessile or stalked, usually pigmented phialides with a basal venter and a long cylindrical collarette. The conidia are mostly hyaline, catenate, cylindrical, 1–2– or occasionally multi-celled (Nag-Raj & Kendrick 1975). The type species Ch. fusidioides was originally described as Torula fusidioides from bark of a conifer in Bohemia (Corda 1838); however, no holotype was designated in the protologue. Based on SSU and LSU sequence data, Cai et al. (2009) demonstrated that Chalara was polyphyletic within the Helotiales.

Clade VIII (1 PP, 76 % BS) is composed by Leptodontidium trabinellum, the type species of the genus (CBS 329.53 ex-type), L. irregulare (CBS 851.73 ex-type) and Leptodontidium sp. FMR 11834. Leptodontidium is characterised by grey to black funicolose colonies, hyaline conidiogenous cells, and small conidia formed more or less sympodially; it currently includes 10 species (de Hoog & Hermanides-Nijhof 1977, Seifert et al. 2011). Morphological features of FMR 11834 do not fit with any of the species described in the genus and it is therefore introduced here as L. aureum sp. nov. This lineage is distantly related to other helotiallean families and it is sufficiently distinct to be recognised as a new family, Leptodontidiales fam. nov.

Clade IX is represented by Lauriomyces (La.) bellulus and La. helicocephalus. Lauriomyces, typified by La. pulcher, is characterised by penicillate, brown conidiophores, sympodial denticulate conidiogenous cells, branched acropetal chains of hyaline conidia and longer basal ramosclonia, found commonly on dead leaves (Castañeda-Ruíz & Kendrick 1990). According to our tree (Fig. 3), Lauriomyces represents a fully supported independent lineage (1 PP, 100 % BS) basal to the Helotiales, and here we introduce a new order and family, Lauriomycales ord. nov., Lauriomyceatales fam. nov. to accommodate it.

### Sordariomycetes

A total of 52 % of the Iberian isolates belong to the Sordariomycetes, dispersed into 17 clades (Fig. 4, clades I–XVII). The backbone of this class was highly supported (1 PP, 100 % BS) with the LSU phylogeny.

Clade I is represented by members of Xylariales (0.98 PP, 83 % BS), including Ceratocladium polysetosum (FMR 10750), Hansfordia pulvinata (FMR 12076), Monochaetia kansensis (FMR 11156), Zygosporium gibbum (FMR 13130) and the unidentified isolate FMR 12177. With the exception of M. kansensis, the mentioned fungi are of uncertain position in the order.

Monochaetia kansensis is a pestalotioid fungus causing leaf spots in plants, characterised by dark acervular conidiomata and phragmoconidia with brown central cells and hyaline apical cells, bearing appendages. Traditionally, Monochaetia was treated as a member of Amphisphaeraceae, but recently it has been placed in Sporocadaceae (Jaklitsch et al. 2016b).

The strain FMR 12177, collected from fallen leaves of Eucalyptus sp., is similar to Dictyochaeta eucalyti from which it differs, however, mainly in the presence of polyphialdic conidiogenous cells with inconspicuous collarettes. Dictyochaeta eucalyti has setiform conidiophores, with intercalary and terminal monophialid conidiogenous cells with conspicuous collarettes, which are born directly on the conidiophore (Sutton & Hodges 1975). Although no sequence of this species is available to infer its affinities, several molecular studies include D. tychocheta species in the Chaetosphaeriaceae (Réblová 2004, Fernández et al. 2006). The isolated position of FMR 12177 among the Xylariales and its morphological peculiarities support the introduction of the new genus Xyladictyochaeta.

In the present analysis, several species of Castanediella, including the type, C. acaciae, form a monophyletic clade, sister to the Beltraniaceae lineage. Since it is a supported undescribed lineage in Xylariales, it is introduced here as Castanediellales fam. nov.

Ceratocladium (Ce.) polysetosum (Mena-Portales et al. 2011) is closely related to Circinotrichum (Ci.) papakurae and Ci. cycadis. These species form a well-supported clade (1 PP, 99 % BS), that is, however, distantly related to the Circinotrichum s.s. lineage, represented by Ci. macuiliforme, the generic type. Unfortunately, there are no molecular data from other Ceratocladium species to infer their affinities and the mono- or polyphyletic nature of the genus as presently circumscribed. Ceratocladium and Circinotrichum are morphologically similar, they are both characterised by dark setae, polyblastic, lageniform conidiogenous cells and unicellular hyaline conidia. They differ in the branching pattern of the setae, simple in Circinotrichum and apically branched in Ceratocladium. The taxonomic value of the setae branching pattern needs to be assessed. In our analysis, the Circinotrichum s.s. lineage nested with Hansfordia pulvinata in an unsupported subclade. This latter species is characterised by macronematous and branched conidiophores with terminal polyblastic conidiogenous cells, producing globose to subglobose hyaline conidia. The lack of molecular data for most of the species of Ceratocladium, Circinotrichum or Hansfordia hinders the elucidation of taxonomic groups in these fungi.

Zygosporium gibbum formed a separate and independent lineage in Xylariales. Zygosporium is typified with Z. oscheoides and characterised by darkly pigmented, incurved vesicular cells usually born from the side of setiform conidiophores; the vesicles may be stalked or sessile, and give rise to 2–4 ampulliform conidiogenous cells that produce aseptate, ellipsoid or globose, smooth or variously ornamented conidia (Mason 1941, Hughes 1951). This is the first report of Zygosporium in Xylariales. However, the phylogeny of this genus remains uncertain pending further studies including more isolates and molecular markers.

Clade II (0.98 PP, 86 % BS) includes members of Coniochaetales and Cordanales distributed in two well- (1 PP, 99 % BS) and moderate-supported (0.97 PP, 77 % BS) subclades. Two species of Cordana were collected from plant debris during our sampling and described as C. mercadiana and C. verruculosa (Hernández-Restrepo et al. 2014b). Only C. verruculosa is included in the present phylogenetic analysis. Cordanales was recently introduced for species of Cordana (Hernández-Restrepo et al. 2015b).

Clade III is represented by members of the Sordariales. The Chaetomiaceae forms a strongly supported subclade (1 PP, 97 % BS), which includes several poorly discriminated genera using LSU data (Wang et al. 2016a, b). Two Iberian isolates, Monodictys nigrospora (FMR 11941) and Trichocladium asperum (FMR 12054), were included in the Chaetomiaceae. Monodictys and Trichocladium are two heterogeneous and polyphyletic genera (Mantle et al. 2006, Tanaka et al. 2015) (also
in Dothideomycetes, Fig. 1, clade III). Although, the two genera share conidiophores slightly differentiated, with holoblastic conidiogenous cells and dark brown conidia, they can be differentiated by conidial features; *T. asperum* has subglobose to oval or cylindrical-oval, transversely septate and coarsely warted conidia, whereas *M. nigrospora* has smooth, clavate to pyriform conidia, with longitudinal and transverse septa. *Trichochladium* s.s. based on the type species, *T. asperum*, was previously shown to be related to the *Sordariales* close to *Chaetomium* and *Humicola* (Hambleton et al. 2005), although Martí et al. (2006) considered *T. asperum* as member of *Calosphaeriales*. Our results agree with Hambleton et al. (2005) relating *T. asperum* with *Sordariales*, specifically with the *Chaetomiaceae*.

This is the first report of the phylogenetic affinity of *M. nigrospora* with the *Chaetomiaceae*. Monodictys s.s., based on *M. putredinis*, the presumable asexual morph of *Olieria brasilienis* (Samuels 1980), is a member of the *Olieriaceae* (*Dothideomycetes*) (Jaklitsch & Voglmayr 2016). *Monodictys nigrospora* likely does not belong to *Monodictys*, but possibly to *Humicola*, *Mycothermus* or *Trichochladium* (Fig. 4, clade III). However, considering the unclear position of *Monodictys* and the low discrimination power of the LSU in the *Chaetomiaceae* (Wang et al. 2016a, b), we prefer to not introduce any taxonomic change until additional sampling and molecular analyses with other markers prove the definitive placement of *M. nigrospora*.

Clade IV, represented by members of *Chaetosphaeriaceae* (1 PP, 99 % BS), includes *Chloridium chloroconium* (FMRI 11940), *Dictyochaeta fujigana* (FMRI 13126), *Cacumisporium capitulatum* (FMRI 11339), *Menispora gauca* (FMRI 12089), *Sporoschisma mirabile* (FMRI 11247), and *Zanclospora sp.* (FMRI 11585 and FMRI 12186). The relationships of those genera with *Sordariales* have previously been discussed by other authors (Ráblová 2000, Fernández et al. 2006). This family shows a great diversity of asexual morphs. They are mainly characterised by pigmented conidiophores and phialidic conidiogenous cells (i.e. *Chloridium*, *Codinaceae*, *Dictyochaeta*, *Gonytrichum*, *Menispora*, *Sporoschisma* and *Zanclospora*), although genera with holoblastic conidiogenesis (i.e. *Cacumisporium*, *Excitclava* and *Stanje-hughesia*) or tricropic conidiogenous cells (*Paliphora*) are also included in *Chaetosphaeriaceae* (Ráblová 2000, Fernández et al. 2006, Shenoy et al. 2010), Ráblová et al. (2016a) recently recommended the use of the generic nomenclature attributed to the assexual morphs, such as *Chloridium*, *Menispora* and *Sporoschisma*, rather than the respective generic sexual names *Chaetosphaeria*, *Zignoella* or *Melanochaeta*.

The two isolates of *Zanclospora* (FMRI 11584 and FMRI 12186) formed a distinct and distant lineage within the *Chaetosphaeriaceae*. Although phylogenetic data of other *Zanclospora* species are not available, based on morphological criteria, Ráblová et al. (1999) included this genus in the family. The two *Zanclospora* isolates show a very similar morphology; i.e. presence of brown, smooth, simple or branched, setiform conidiophores with phialidic conidiogenous cells that produce fusiform, hyaline and smooth-walled conidia. Since they are different from other previously described species in the genus (Calduch et al. 2002, Almeida et al. 2013), the new species *Z. iberica* is introduced below.

Clade V (0.99 PP, 81 % BS) includes sequences of two *Helminthostaphyria* species (i.e. *H. clariaurum* and *H. tomaculatum*) and one of *Endophragmiella dimorphospora* (FMRI 12150), all representatives of the *Helminthostaphyriaceae* (Miller et al. 2014). This is the first time that an *Endophragmiella* species is linked to the *Helminthostaphyriaceae* based on molecular data. Previous morphological studies had associated *Endophragmiella* with other sexual morphs in *Helminthostaphyriaceae*, such as *Echinospaeria canescens* and *Helminthostaphyria punctata* (Miller et al. 2014, Jaklitsch et al. 2016a).

The fully supported clade X includes two distinct branches, one for *Spadicoides atra* (EF204506) and the other for *Diplococcium pulneyense* (FMRI 10959). *Spadicoides* and *Diplococcium* share most of their morphological characters, including brown conidiophores, terminal or intercalary, polytretic conidiogenous cells and brown conidia. They are mainly distinguished by their conidial arrangement, solitary in *Spadicoides* and catenate in *Diplococcium*. However, a previous molecular study (Shenoy et al. 2010) as well as our current analysis shows that both genera are polyphyletic. Considering that the type species of *Diplococcium* (*D. spicatum*) and *Spadicoides* (*S. bina*) are respectively placed in the *Helotiales* (*Leotiomycetes*) and the *Cordanales* (*Sordariomycetes*), our study reveals a novel phylogenetic scenario for *S. atra* and for *D. pulneyense* and *D. singulare*. Two new genera are introduced to accommodate *S. atra* and the isolate formerly identified as *D. pulneyense* in Hernández-Restrepo et al. (2012), i.e. *Xenospadicoides* and *Pseudodiplococcium*, respectively. Since both genera are nested in the clade X, clearly separated from any other family and order accepted in the *Sordariomycetes*, we introduce the new order *Xenospadicoidales* typified with the new family *Xenospadicoidaceae* for the taxonomic stability of these fungi in the class. The *D. singulare* clade is distantly related to other members of *Sordariomycetes*, forming a single lineage, paraphyletic with the *Vermiculariopsiella* lineage (Fig. 4, clade XIII). It is therefore considered here representative of a new genus, which is proposed as *Paradiplococcium*.

Clade XI (1 PP, 98 % BS) is represented by members of the genus *Mymecridium* (*Mymecriaceae*, *Mymecridiales*), including *M. schulzeri* (FMRI 12424). *Mymecridium* is a genus segregated from *Ramichloridium*, commonly found on soil and plant debris, and able to cause human and animal diseases (Arzanlou et al. 2007, de Hoog et al. 2011). It is characterised by differentiated conidiophores, with integrated sympodial and denticulate conidiogenous cells that produce pale brown conidia, often with a mucilaginous sheath (Arzanlou et al. 2007, Crous et al. 2011, 2015b).

Clade XIII is represented by *Vermiculariopsiella spp.*, which includes *V. pediculata* (FMRI 12187) isolated from Spain. *Vermiculariopsiella*, typified with *V. immersa*, is characterised by seitose conidiomata, with simple or branched conidiophores bearing phialidic conidiogenous cells, often curved at the tip, that produce hyaline, aseptate conidia (Bender 1932, Seifert et al. 2011). The genus includes more than 10 species and, based on culture methods, some of them have been described as asexual morphs of *Echinospaeria* (Dharagalk & Bhat 2009, Jaklitsch et al. 2016a). However, the type species of *Echinospaeria*, *E. canescens*, which has also been described producing an *Endophragmiella* synasexual morph (Miller et al. 2014), belongs to the *Helminthostaphyriaceae* (Chaetosphaeriaceae) as mention before. In our analysis this family is placed in a distant lineage (Fig. 4, clade V) from that composed solely of *Vermiculariopsiella spp.*, which forms a novel strongly supported monophyletic clade in *Sordariomycetes* (1 PP, 98 % BS). Based on this result, we introduce a new order and new family for the genus *Vermiculariopsiella*.
Clade XV is represented by members of Hypocreales, and includes four of our isolates identified as Chaetopsis fulva (FMR 13129), Ch. penicillata (FMR 10948), Paramyrothecium roridum (FMR 11946) and Stachybotrys cylindrospora (FMR 11595). Some molecular studies have previously reported all these species as belonging to this order (Luo & Zhuang 2010, Lombard et al. 2015, 2016), which commonly includes asexual morphs with phialidic conidigenous cells producing slimy conidia.

Clade XVI includes 13 of our isolates and taxa that belong to Conioscyphales, Fuscosporaellales, Pleurotheciaceae and Savorcellales. One clade containing Parasympodiella species is shown as a novel lineage in Sordariomycetes. Furthermore, several of our isolates have also been detected as putative new species (i.e. Parasympodiella sp. FMR 13132, Conioscypha sp. FMR 13134, and the unidentified isolates FMR 11490 and FMR 12412). The Parasympodiella lineage comprised the three species P. laxa, P. eucalypti, P. elongata and our isolate FMR 13132. Parasympodiella is typified by P. laxa, and characterised by unbranched, sympodial conidiophores with thallic-arthric, terminal and intercalary conidigenous cells that produce unbranched chains of hyaline conidia (Ponnappa 1975). Species of this genus are commonly found growing on litter. Parasympodiella sp. FMR 13132 mainly differs from the other species of the genus by its smaller conidia. It is closely related to P. elongata, but shows enough genetic difference within the LSU (97 % similarity, 619/640) and ITS (92 % similarity, 460/501) sequence data to be proposed as a new species, P. lauri. Since the monophyletic group of Parasympodiella species represents a new lineage in Sordariomycetes, we introduce the novel order Parasympodiellales, typified by the new family Parasympodiellaceae.

The Bactrodesmiaceae clade which includes B. moniloides, B. obovatum and B. pyriforme represents the recently introduced order Fuscosporaellales (Yang et al. 2016).

In the additional LSU sequence analysis (Fig. 5) with a wider species sampling of four related sordariomycetous orders (i.e. Conioscyphales, Fuscosporaellales Pleurotheciaceae and Savorcellales), the Savoryellales formed a monophyletic group, including species of Ascostaiania, Canalisporium, Savoryella, and Triadelphia uniseptata, as previously reported in the family Savoryellaceae (Boonyuen et al. 2011, Réblóvá et al. 2016b). Two of our isolates, Bactrodesmium pallidum (FMR 11345) and the unidentified fungus FMR 12412 nested within this Savoryellales lineage. Bactrodesmium pallidum nested with A. mitiformis and T. uniseptata. Ascostaiania mitiformis shows a monosporic-like asexual morph (Ranghoo & Hyde 1996), which resembles B. pallidum and T. uniseptata in producing holoblastic, brown, septate conidia. However, B. pallidum differs from these species by its sporodochial conidiomata composed of slightly differentiated, hyaline conidiophores. The taxonomy of Bactrodesmium remains undetermined and, based on known data, it seems to be polyphyletic (Hernández-Restrepo et al. 2013). For instance, as previously published by Koukol & Kolárová (2010), B. gabretae is related with Helotiales (Leotiomycetes, Fig. 3), while Tanaka et al. (2015) reported B. cubense as a member of Massarineae, Pleosporales (Fig. 1, clade III). Bactrodesmium is one of the earliest described hyphomycete genera, with the type species B. abruptum being already described in 1865 by Berkeley & Broome from dead wood in UK (Berkeley & Broome 1865). However, the holotype was not designated in the protologue, nor authentic type material or living culture of the fungus preserved for comparison. Taking into account this fact and considering the great number of species described in the genus (ca. 50) and the restricted number of cultures available, it is challenging to reconstruct the phylogeny of Bactrodesmium. The unidentified isolate FMR 12412 grouped with A. limnetica (CBS 126576 and CBS 126792) in a fully supported clade (Fig. 5), but with a genetic difference (98 % and 95 % similarity with LSU and ITS markers, respectively) sufficient to be considered a distinct species. Considering Ascostaiania is polyphyletic (Boonyuen et al. 2011, Hernández-Restrepo et al. 2015a), with the type species A. lignicola placed on a separate branch far from the clade of FMR 12412 and A. limnetica, we accommodate both species in the new genus Neoascotaiwania, with the Spanish isolate being proposed as N. terrestris sp. nov.

The recently introduced Conioscyphales (Réblóvá et al. 2016b), typhified by Conioscyphaceae, forms a well-supported lineage in our phylogenetic analyses (Fig. 4, clade XVI; 1 PP, 84 % BS; Fig. 5, 0.92 PP, 79 % BS). This includes sequences of Conioscypha varia, C. lignicola and C. peruviana retrieved from GenBank, but also sequences of Conioscypha species identified from Spanish samples, such as C. minutispora (FMR 11245, Crous et al. 2014b), C. hoehnelii (FMR 11592), and Conioscypha sp. (FMR 13134). Species of this genus are characterised by monoblastic conidigenous cells with percurrent proliferations producing deep, hyaline collarettes and brown conidia. The singular features of Conioscypha sp. FMR 13134 (i.e. ornamented blastoconidia and a thallic-arthric synasexual morph) and its phylogenetic position justify the recognition of C. pleiomorpha sp. nov.

The isolates Phaeosaria sparsa (FMR 11939), Sterigmatobotrys uniseptata (FMR 11937), and the unidentified fungus FMR 11490 are distributed in different well-supported lineages within the Pleurotheciaceae (Fig. 4, clade XVI; Fig. 5). Phaeosaria sparsa, which is here sequenced for the first time, nested in a subclade with other Phaeosaria species, i.e. P. clematidis, the generic type, P. fasciculata and P. sedimenticola (Fig. 5, 1 PP, 98 % BS). Phaeosaria species are characterised by synnematous conidiomata, dark brown conidiophores, polyblastic, sympodial, denticulate conidigenous cells and subhyaline conidia. Isolate FMR 11490 nested in another lineage with Ho. farinosum, Monotosporella setosa and Pleurothecium obovoideum (Fig. 5, 1 PP, 87 % BS). Helicobacter produces hyaline conidiophores and coiled, hyaline conidia; Monotosporella has brown conidiophores bearing monoblastic, terminal conidigenous cells with brown, septate conidia, usually obovate to pyriform. FMR 11490 resembles P. obovoideum in having unbranched, brown conidiophores, with polyblastic, denticulate conidigenous cells and brown conidia, but it differs in having larger conidiophores and denticles, and botuliform, septate conidia. This fungus is described here as a new genus Anapleurothecium in the Pleurotheciaceae. Finally, S. uniseptata (FMR 11937), which is sequenced for the first time, clustered with GenBank sequences of S. macrocarpa and S. rudis (Fig. 4, 1 PP, 87 % BS; Fig. 5, 1 PP, 94 % BS). This latter species, formerly known as Taeniolella rudis, was recently transferred to Sterigmatobotrys, based on the morphology of the penicillate synasexual morph and molecular data. Taeniolella exilis, the type species, is related to the Kirschsteiniotheliaceae in Dothideomycetes (Ertz et al. 2016). The molecular taxonomy of S. macrocarpa and S. rudis has been previously studied by Réblóvá & Seifert (2011) and Réblóvá et al. (2012, 2016b), who based on multi-locus phylogenies demonstrated the relationship
of Sterigmatobotrys with members of Ascostaiania, Conioscypha, Pleurotheciella and Pleurothecium.

Clade XVII (Fig. 4) is a well-supported lineage basal in the Sordariomycetes. It comprises the type species of the genus Cirrenalia, C. macrocephala, and two Spanish isolates FMR 12149 and FMR 12418 with morphological affinity to this genus. Cirrenalia macrocephala is characterised by dark sporodochial conidiomata, with conidiophores reduced to conidiogenous cells, and helicoidal brown conidia. Although the two isolates show some genetic difference, they are morphologically similar, and differ from the other species of the genus mainly by their straight conidia, as well as by the colour, size and number of septa. Based on these data, they are introduced below as C. iberica. The order affiliation of Cirrenalia remains unclear, since Abdel-Wahab et al. (2010) related the genus to the Halosphaeriales, and more recently Jaklitsch et al. (2016a) considered it as member of the Microscales.

TAXONOMY
Dothideomycetes

Asterinales, Asterinaceae

Pirozynskiella laurisilvatica Hern.-Restr., R.F. Castañeda & Gené, sp. nov. MycoBank MB820269. Fig. 6.

Etymology: Named after the Laurisila forest where the sample was collected, in La Gomera (Canary Islands, Spain).

Colonies on the natural substratum hairy, brown, growing on the upper leaf surface. Mycelium partly superficial and partly immersed, consisting of branched, septate, brownish, smooth- to rough-walled hyphae, 2–3 μm wide. Conidiophores semi-macronematous or micronematous, erect, cylindrical, 50–75 × 4–4.5 μm, brown, smooth-walled. Conidiogenous cells holoblastic, integrated, terminal, and cylindrical. Conidia in unbranched acropetal chains, dry, 1–3-septate, subcylindrical to cylindrical, 19–31 × 3–4 μm, tapering toward both ends 1–2 μm wide, brown to pale brown, verruculose. Sexual morph not observed.

Culture characteristics: Colonies on PCA and OA at 25 °C slow-growing, reaching 5 mm diam in 2 wk, velvety, black, margin slightly erodate; reverse black. Sporulation abundant. Conidia on OA 15–26 × 2.5–4 μm.

Specimen examined: Spain, Canary Islands, La Gomera, Garajonay Reserve Biosphere, Los Cedros, on fallen leaves of Laurus sp., Jul. 2013, M. Hernández-Restrepo & J. Guarro (holotype CBS H-21889; cultures ex-type CBS 138109, FMR 13133).

Notes: Pirozynskiella was proposed by Hughes (2007) to accommodate two asexual fungi, P. solaninum as type and P. costaricense, with simple, brown conidiophores, bearing a single unbranched acropetal chain of ellipsoidal to subcylindrical conidia. These species were segregated from the genus Heteroconium by their fungicolous nature and the sequence of septation during the maturation of conidia. The conidial septation in Pirozynskiella is at first central and then centrifugal and/or intercalary, while in Heteroconium the first formed septum is at the base of the conidium, with subsequent septa produced in sequence from the base to the apex (Hughes 2007). Pirozynskiella laurisilvatica was found growing on leaves of Laurus sp., in association with an unidentified fungus. This novel species can be easily differentiated from P. solaninum and P. costaricense by its verrucose conidia. Pirozynskiella laurisilvatica is phylogenetically related to Asterinales. However, there is no molecular data available of the other two Pirozynskiella species to confirm the phylogenetic position of the genus.

Capnodiales, Teratosphaeriaceae

Catenulostroma lignicola Hern.-Restr., J. Mena & Gené, sp. nov. MycoBank MB820270. Fig. 7.

Etymology: From the Latin lignum meaning wood, and colo meaning to inhabit, since this fungus was found growing on wood.
Description on OA. Mycelium mostly immersed, composed of septate, brown, smooth hyphae, 2.5–5 μm wide. Conidiophores micro- or semi-macronematous, solitary or fasciculate, erect, cylindrical, brown to dark brown, smooth to reticulate in the apex, 19.5–69.5 × 5–6 μm, or reduced to inconspicuous conidiogenous loci in the hyphae. Conidiogenous cells integrated, terminal, monoblastic, cylindrical, brown. Conidia arranged in acropetal chains, commonly unbranched, some branched near the base, tending to remain attached to each other, 0–9-septate, with different degrees of constriction at the septa, straight to slightly curved, brown to medium brown, reticulate, terminal conidia with rounded apex, truncate base, intercalary conidia with truncate ends; unicellular conidia lageniform to barrel shape, 9–13.5 × 4–5 μm; 1-septate conidia cylindrical, constricted at the septum and truncate ends, 16–25 × 4–5.5 μm; 3–9-septate, subcylindrical, 21–98.5 × 3–4.5 μm. Sexual morph not observed.

Culture characteristics: Colonies on PDA and OA at 25 °C slow-growing, reaching 6 mm diam in 2 wk, with moderate amount of mycelium, velvety, olivaceous black, margin fimbriate; reverse olivaceous black. Sporulation abundant.

Specimen examined: Spain, Galicia, Las Fragas del Eume Natural Park, on dead wood, Jul. 2010, M. Hernández-Restrepo, J. Mena & J. Guarro (holotype CBS H-22994, cultures ex-type CBS 130285, IMI 500759, FMR 11491).

Notes: Catenulostroma currently comprises six species of saprobic and pathogenic fungi. This genus was erected with C. protearum together with eight other species in Teratosphaeriaceae (Crous et al. 2007a). Later, three were added to the genus (i.e. C. eucalyptorum, C. corymbiae and C. hermanuseense) (Crous et al. 2011, Crous & Groenewald 2011), whereas four species were transferred to Neocatenulostroma (i.e. C. abietis, C. excentricum, C. germanicum and C. microsporum) (Quaedvlieg et al. 2014)

Catenulostroma lignicola is morphologically similar to C. chromoblastomycosum in having transversely septate conidia, with more than 5 septa. Nevertheless, the conidia of C. chromoblastomycosum are smaller [(8–)20–35(–60) × 4–5(–7) μm] and smooth to finely verruculose, while those in C. lignicola are larger (up to 98.5 μm) and with a reticulate ornamentation. It is noteworthy that C. chromoblastomycosum was described from a case of human chromoblastomycosis (Crous et al. 2007a).

Kirschsteiniotheliales Hern.-Restr., R.F. Castañeda, Gené & Crous, ord. nov. MycoBank MB821220.

Saprobic on wood and bark. Sexual morph. Ascomata superficial, perithecioid, dark brown to black. Hamathecium with pseudoparaphyses. Asci bitunicate, with ocular chamber. Ascospores septate, ellipsoidal, pigmented. Asexual morph. Conidiophores macronematous, brown. Conidiogenous cells blastic or tretic, brown. Conidia septate, brown.

Type family: Kirschsteiniotheliacae Boonmee & K.D. Hyde.

Type genus: Kirschsteiniothelia D. Hawksw.

Genera included: Kirschsteiniothelia (=Dendryphiopsis), Taeniolella, Solicorynespora (based on S. insolita not generic type), Sporidesmium s.l. and Brachysporiella (based on B. navarrica not generic type).
**Kirschsteinitiotheliales, Incertae sedis**

**Brachysporiella navarrica** Hern.-Restr., R.F. Castaño & Gené, sp. nov. MycoBank MB820273. Fig. 8.

**Etymology:** Name refers to Navarra, a Spanish locality where this fungus was collected.

**Description on OA.** *Mycelium* immersed and superficial, composed of septate, straight to sinuous, brown, smooth hyphae, 2.5–4 μm wide. *Conidiophores* macronematous, irregularly branched, erect, cylindrical, 76–357 × 2.5–4 μm, brown, smooth. *Conidiogenous cells* integrated, terminal, mono- and polyblastic, cylindrical to clavate, brown, smooth-walled. *Conidia* solitary, 2–4-septate, covered with a mucilaginous sheath, obvoid, clavate to pyriform, 24.5–40 × 11–16 μm, with a base rounded or truncate, 2.5–4 μm wide, brown, upper cells darker, smooth, often with a portion of the conidiogenous cell attached to the base of the conidia when these are released. Sexual morph not observed.

**Culture characteristics:** Colonies on PDA and OA at 25 °C reaching 14 and 19 mm diam in 2 wk, respectively, with moderate amount of cottony mycelium, elevated, olivaceous black, hyaline exudate abundant, margin fimbriate; reverse olivaceous black. Sporulation abundant.

**Specimen examined:** Spain, Navarra, Baribar, on dead wood, Mar. 2012, M. Hernández-Restrepo & J. Capilla (*holotype* CBS H-22990; culture ex-type CBS 142296, FMR 12426).

**Notes:** *Brachysporiella* was introduced by Batista (1952) with *B. gayana* as generic type. *Brachysporiella* is characterised by branched or unbranched conidiophores, without basal rhizoids.

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![Fig. 8. Brachysporiella navarrica (FMR 12426 ex-type). A–K. Conidiophores and conidia. L–Q. Conidia. Scale bars = 10 μm.](https://www.studiesinmycology.org/73)
and with clavate to obvoid conidia. Currently, it comprises about 12 saprobic species, which are usually found growing on wood and litter.

Brachysporiella is morphologically similar to Monotosporella; however, the taxonomy of these fungi is still unclear. Hughes (1958) introduced Monotosporella to accommodate M. setosa, a fungus characterised by unbranched conidiophores with basal rhizoids, and subglobose conidia. However, this genus was considered a synonym of Brachysporiella by Ellis (1959). Unfortunately, original material from both type species is not available for study. R. fortunately, original material from both type species is not available for study. R.fortunately, original material from both type species is not available for study. R. fortunately, original material from both type species is not available for study.

Pleosporales, Amniculicolaceae

Aspergillus mitriformis (Basionym: Polyspora mitriformis) was described as C. aquaticum (Dudka 1966), is commonly found on rotten submerged leaves of Alnus glutinosa, Populus nigra and Acer sp. (Révy et al. 2014). Sporidesmium ontariense was introduced by Matsushima (1983) for a fungus that was found in Canada, growing on a dead branch of Aceris sacchari. It was later transferred to Repetophragma because the conidiophores were shown to proliferate percurrently (Wu & Zhuang 2005). Although similarities among V. aquaticus and R. ontariense have been noticed previously (Gönczöl et al. 1999, Révy et al. 2014), no new combination has been introduced. Morphological and molecular data suggest that R. ontariense and V. aquaticus are conspecific, and here we list them as synonyms. Based on LSU sequences of R. ontariense (DQ408575, culture HKUCC 10830), Zhang et al. (2009a) placed this species in the Amniculicolaceae.

The type material for V. aquaticus has been lost (Révy et al. 2014); therefore, the illustration included in the protologue (Dudka 1966) is selected as lectotype. In addition, to assure the availability of information for modern identification, CBS 636.91 is designated as ex-epitype culture. Morphological features of the epitype fit well with the protologue of C. aquaticum (Dudka 1966). The Spanish strain shows slightly larger and more septate conidia than those described above (101–135 × 16–20 μm, base 4–6 μm wide, 5–9-septate). However, CBS 636.91 and FMR 11587 show identical LSU and ITS sequences.

Notes: In our phylogenetic tree, V. aquaticus and R. ontariense (GenBank DQ408575) formed a supported clade in Pleosporales (Fig. 1, clade III). Vargamycyes aquaticus, initially described as C. aquaticum (Dudka 1966), is commonly found on rotten submerged leaves of Alnus glutinosa, Populus nigra and Acer sp. (Révy et al. 2014). Sporidesmium ontariense was introduced by Matsushima (1983) for a fungus that was found in Canada, growing on a dead branch of Aceris sacchari. It was later transferred to Repetophragma because the conidiophores were shown to proliferate percurrently (Wu & Zhuang 2005). Although similarities among V. aquaticus and R. ontariense have been noticed previously (Gönczöl et al. 1999, Révy et al. 2014), no new combination has been introduced. Morphological and molecular data suggest that R. ontariense and V. aquaticus are conspecific, and here we list them as synonyms. Based on LSU sequences of R. ontariense (DQ408575, culture HKUCC 10830), Zhang et al. (2009a) placed this species in the Amniculicolaceae.

The type material for V. aquaticus has been lost (Révy et al. 2014); therefore, the illustration included in the protologue (Dudka 1966) is selected as lectotype. In addition, to assure the availability of information for modern identification, CBS 636.91 is designated as ex-epitype culture. Morphological features of the epitype fit well with the protologue of C. aquaticum (Dudka 1966). The Spanish strain shows slightly larger and more septate conidia than those described above (101–135 × 16–20 μm, base 4–6 μm wide, 5–9-septate). However, CBS 636.91 and FMR 11587 show identical LSU and ITS sequences.

Melanommataceae

Pleotrichocladium Hern.-Restr., R.F. Castañeda & Gené, gen. nov. MycoBank MB820277.

Etymology: Pleo- referring to Pleosporales; and -trichocladium referring to the assexual genus Trichocladium. Morphologically similar to Trichocladium, but phylogenetically related to Pleosporales.

Myceium superficial and immersed, composed of branched, septate, hyaline to pale brown, smooth hyphae. Conidiophores monomorphenous, reduced to a hyphal cell that extents laterally to form a conidium or arising as short lateral pedicels on the hyphae, unbranched or loosely branched. Conidiogenous cells integrated, mono- and polybasic, cylindrical, subglobose or barrel-shaped, subhyaline to pale brown, smooth. Conidial scession...
schizolytic. Conidia solitary, septate, ovoid, ellipsoid to clavate, straight or curved, brown and smooth. Sexual morph not observed.

Type species: Pleotrichocladium opacum (Corda) Hern.-Restr., R.F. Castañeda & Gené.

Pleotrichocladium opacum (Corda) Hern.-Restr., R.F. Castañeda & Gené, comb. nov. MycoBank MB820278. Fig. 10.

Basionym: Sporidesmium opacum Corda Icon. Fung. 1: 7. 1837.

Synonyms: Xenodochus opacus (Corda) Bonord., Handb. Allgem. mykol.: 49. 1851.
Clasterosporium opacum (Corda) Sacc., Syll. Fung. 4: 387. 1886.
Trichocladium opacum (Corda) S. Hughes, Trans. Br. Mycol. Soc. 35: 154. 1952.

Fig. 9. Vargamyces aquaticus (A–I, FMR 11587; J–V, CBS 636.91 ex-epitype). A, E, J, K. Conidiophores and conidia. B–D. Conidiophores with percurrent proliferation (indicated by rows). F–I, L–N. Conidia. O–V. Microconidia. Scale bars = 10 μm.
Description on OA. Mycelium partly superficial and partly immersed, composed of septate, hyaline to pale brown, smooth hyphae, 1.5–3 μm wide. Conidiophores micronematous, often reduced to a hyphal cell that laterally extents to form a conidium or arising as short lateral pedicels on the hyphae, unbranched or loosely branched. Conidiogenous cells integrated, mono- and polyblastic, terminal or intercalary, cylindrical or doliiform, 7–14 × 3–3.5 μm, subhyaline to pale brown, smooth.

Conidia solitary, 2–4(–5)-septate, ovoid, ellipsoid or clavate, 22–37 × 12–18.5 μm, dark brown, basal cells paler, smooth.

Sexual morph not observed.

Culture characteristics: Colonies on OA at 25 °C reaching 35–55 mm diam in 2 wk, lanose, white to grey olivaceous, margin white, effuse; reverse olivaceous black. Colonies on PDA at 25 °C reaching 35–40 mm diam in 2 wk, lanose, smoke grey, grey olivaceous or greenish olivaceous, margin white, effuse; reverse olivaceous black. Sporulation moderate to abundant.

Specimens examined: Lectotype designated here: tab. II, fig. 115 in Corda ACJ, Icones Fungorum hucusque Cognitorum 1: i–iv, 1837. MBT375536. Antarctica, King George, Jubany, on lichen, 1991, C. Möller (CBS 709.92). Austria, Vorarlberg, isolated from soil, summer 1966, M.A.A. Schipper (CBS 534.66). The Netherlands, Baarn, garden Eemnesserweg 90, on dead wood of Thuja occidentalis, Mar 1970, H.A. van der Aa (CBS 450.70). Spain, Aragón, Ordesa y Monte Perdido, National Park, isolated from soil, Mar. 2011, M. Hernández-Restrepo & J. Capilla (CBS 142298, FMR 12088). Navarra, Robledal de Orgi, on dead wood, Mar. 2012, M. Hernández-Restrepo & J. Gené, MBT375363 (epitype designated here CBS H-22985; cultures ex-epitype CBS 142294, FMR 12416).

Notes: Trichocladium opacum is a widely-distributed species, usually found on plant material or isolated from soil (Kendrick & Bhath 1966, Ellis 1971). Corda (1837) introduced that species as S. opacum from dead wood in Reichenberg (Czech Republic). Later it was re-described and illustrated by Hughes (1952), and considered congeneric with T. asperum. Holotype material is unavailable for S. opacum. However, the protologue of the species contains an illustration and is designated here as the lectotype of S. opacum. Furthermore, an ex-epitype culture is selected to fix the use of this name. It is noteworthy that Hughes (1958) considered more Sporidesmium species conspecific with T. opacum, i.e. S. ovoidum, S. fasciculare and S. pyriforme. However, further studies based on type specimens are needed to confirm these synonyms.

In our phylogenetic analyses, several strains of T. opacum were placed in Melanommataceae (Pleosporales; Fig. 1, clade III), as previously suggested by Mantle et al. (2006). Since Trichocladium is polyphyletic with the type species, T. asperum, placed in the Chaetomiaceae (Hambleton et al. 2005) (Sordariales; Fig. 4, clade III), we propose the new genus Pleotrichocladium to accommodate T. opacum. Besides the phylogenetic differences, P. opacum differs morphologically from T. asperum by its pale brown conidiogenous cells and smooth conidia with schizolytic secession. Trichocladium asperum has hyaline conidiogenous cells, and its conidia are warty and with rhexolytic secession (Fig. 22).

Pleomonodictydaceae Hern.-Restr., J. Mena & Gené, fam. nov. MycoBank MB822079.

Saprobic on wood and bark. Sexual morph. Unknown. Asexual morph. Conidiophores micro- to semi-macronematous, often reduced to conidiogenous loci in the hyphae. Conidia blastic, solitary or in short chains, variable in shape, muriform, dark brown to black, verrucose to tuberculate.
Type genus: Pleomonomictys Hern.-Restr., J. Mena & Gené.

Included genus: Pleomonomictys.

Notes: In a multi-locus study using LSU, SSU and tef1 genes, Tanaka et al. (2015) showed that Monodictys capensis clustered together with Inflatispora pseudostromatica in a clade of uncertain position "unknown clade IV" in the suborder Massariniae (Pleosporales). The phylogeny of the former species was based on the reference strain CBS 134928, identified from dead wood in Russia (Mel'nik & Shabunin 2010), not from the type material. In our phylogenetic analysis that isolate was shown to be closely related to Monodictys sp. FMR 12716, which formed a lineage very distant to that of I. pseudostromaticac (Fig. 1, Clade III). Therefore, the taxonomy of these two monodictys-like fungi is resolved with the introduction of Pleomonomictydaceae to accommodate the new genus Pleomonomictys, although the family placement of Inflatispora remains unclear.

Pleomonomictys Hern.-Restr., J. Mena & Gené, gen. nov. MycoBank MB820280.

Etymology: Pleo- referring to Pleosporales; and -monodictys referring to the asexual genus Monodictys. Morphologically similar to Monodictys, but phylogenetically related to Pleosporales.

Colonies effuse, black. Mycelium mostly immersed, composed of branched, septate, smooth often verrucose hyphae. Conidiophores micronematous or semi-macronematous, often reduced to conidiogenous loci in the hyphae. Conidia blastic, solitary or in short chains, variable in shape, muriform, dark brown to black, verrucose to tuberculate. Sexual morph not observed.

Type species: Pleomonomictys descalsii Hern.-Restr., J. Mena & Gené.

Notes: Pleomonomictys is introduced for P. descalsii and P. capensis, previously accommodated in Monodictys. Those fungi differ morphologically from M. putredinis, the type species of Monodictys, in having verrucose to tuberculate conidia and/or hyphae. Monodictys is a polyphyletic genus with species evenly spread in different classes, i.e. Dothideomycetes, Sordariomycetes and Leotiomycetes (Campbell et al. 2002, Han et al. 2014, Tanaka et al. 2015). Although molecular data for the type species of Monodictys are not available, based on culture methods, M. putredinis has been reported as the asexual morph of Olieria brasiliensis (Samuels 1980). Recently, Olieria was included in the pleosporalean family Olieriaceae (Jaklitsch & Voglmayr 2016). Phylogenetic reassessment of species in Monodictys and related sexual genera, including types, is needed to clarify the taxonomy of this genus.

Pleomonomictys capensis (R.C. Sinclair et al.) Hern.-Restr., J. Mena & Gené, comb. nov. MycoBank MB821221.

Basionym: Monodictys capensis R.C. Sinclair et al., Mycotaxon 59: 359. 1996.

Description and illustration: Sinclair et al. (1996)

Specimen examined: South Africa, Cape Province, on decorticated wood, Jul. 1994, R.C. Sinclair (ex-type cultures CBS 968.97, PPRI 5984).

Notes: Monodictys capensis was mainly characterised by the irregularity in the conidial shape and ornamented wall (Sinclair et al. 1996). The ITS sequence of the ex-type strain CBS 968.97 and that retrieved from GenBank (LC014570) corresponding to Mel’nik’s strain (CBS 134928) were identical, confirming the identification of this latter strain.

Pleomonomictys descalsii Hern.-Restr., J. Mena & Gené, sp. nov. MycoBank MB820281. Fig. 11.

Etymology: In honour to the Spanish mycologist Enrique Descals.

Colonies on OA. Mycelium partly superficial and partly immersed, composed of branched, septate, brown to pale brown, nodulose, smooth hyphae, 2.5–5 μm wide. Conidiophores micronematous, often reduced to conidiogenous loci in the hyphae, terminal or intercalary. Conidia solitarious or in irregular branched chains, muriform, obvoid, clavate to pyriform, ellipsoid to subglobose, 28–70 × 24–54 μm, brown to dark brown, or irregularly pigmented, sometimes basal cells paler than the others, base rounded or truncate, 3–8.5 μm wide, tuberculate. Sexual morph not observed.

Culture characteristics: Colonies on PDA and OA at 25 °C reaching 10 mm diam in 2 wk, with moderate amount of aerial mycelium, white, fasciculate, immersed mycelium iron grey, margin fimbriate or effuse on PDA and OA, respectively; reverse olivaceous grey in PDA, pale mouse grey in OA. Sporulation abundant.

Specimen examined: Spain, Mallorca, Sierra de Tramuntana, on bark of Quercus sp., Sep. 2012, M. Hernández-Restrepo, E. Descals & J. Gené (holotype CBS H-22991, cultures ex-type CBS 142298, FMR 12716).

Notes: This new species differs from P. capensis in having smaller conidia (P. capensis 30–100 × 17–60 μm from the natural substratum, up to 175 × 110 μm in culture). Monodictys castaneae (Ellis 1971) resembles the novel species in having ornamented conidia. However, hyphae in M. castaneae are smooth and its conidia smaller (14–40 × 10–25 μm). The phylogenetic placement of M. castaneae is still unknown, but unpublished LSU and ITS sequences of three strains (CBS 100.07, CBS 101.60 and CBS 102.60, not ex-types) relate this Monodictys species with Preussia (Sporiaceae, Pleosporales).

Venturiales, Venturiaceae

Magnohelicospora fuscospora (Linder) R.F. Castañeda, Hern.-Restr. & Gené, comb. nov. MycoBank MB820282.

Basionym: Heliccoon fuscosporum Linder, Annls Miss. Bot. Gdn. 16: 326. 1929.

Notes: LSU analyses of the sequences of M. iberica and Ho. fuscosporum, the latter retrieved from GenBank and generated by Tsui & Berbee (2006), revealed that both fungi are congeneric (Fig. 1, clade I). Therefore, based on their phylogeny and morphological affinities, we transfer Ho. fuscosporum to Magnohelicospora. These two species differ in conidial size; while M. iberica has conidia 25–50 × 17–30 μm (up to 60 μm long in culture), in M. fuscospora they are 20–25 × 22.5–33 μm (Linder 1929).
**Magnohelicospora iberica** R.F. Castañeda et al., Mycotaxon 121: 172. 2013. Fig. 12.

Description on OA. Mycelium partly superficial and partly immersed, consisting of septate, branched, sometimes sinuous, brown, smooth hyphae, 1.5–3.5 µm wide. Conidiophores erect, unbranched, brown, smooth, cylindrical, 24–60 × 2.5–4 µm. Conidiogenous cells mono- and polyblastic, cylindrical, 10–22 × 2.5–3.5 µm, denticulate; denticles 1–4 × 1.5–3 µm. Conidial secession schizolytic. Conidia dry, solitary, compactly

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Fig. 11. Pleomonodictys descalsii (FMR 12716 ex-type). A–L. Conidiophores and conidia. M–U. Conidia. Scale bars = 10 µm.
circinate in three dimensions, doliiform to somewhat conical, 25–60 × 17–27 μm, composed of a filament tightly coiled 7–10 times in 3-dimensions, euseptate, brown or olivaceous-brown, smooth, 3–4 μm wide. Sexual morph not observed.

Culture characteristics: Colonies on PDA and OA at 25 °C, 18–20 mm diam after 2 wk, elevated, velvety, with moderate amount of short mycelium, mouse grey, margin fimbriate, greyish sepia; reverse dark mouse grey. Sporulation moderate.

Specimen examined: Portugal, Minho province, Lagos do Bertiandos protected area, on rotten leaf of unidentified plant, Nov. 2011, R.F. Castaño-Ruiz et al. (holotype, HAL 2447 F; isotype, FMR 12184). Spain, Navarra, Robledal de Orgi, on dead leaves, Mar. 2012, M. Hernández-Restrepo & J. Capilla, MBT-375365 (epitype designated here CBS H-22989; culture ex-epitype CBS 142293, FMR 12414).

Notes: Magnohelicospora iberica was described from Portugal growing on dead leaves, but the type specimen could not be cultivated (Castaño-Ruiz et al. 2012). In contrast, the second isolate of the species from Spain, which morphologically fits with the protologue on the natural substratum, grew well in the different culture media tested. However, it produced conidia slightly longer and thinner than those described in the holotype (25–60 × 17–27 μm vs. 35–50 × 23–30 μm).

**Dothideomycetes, Incertae sedis**

*Oncopodiella trigonella* (Sacc.) Rifai 1965, Persoonia 3: 409. Fig. 13.

Basionym: *Sporidesmium trigonellum* Sacc., Michelia 2 (no. 8): 641. 1882.
Description on OA. Mycelium mostly immersed, composed of septate, hyaline to brown, smooth hyphae, 1.5–2 µm wide. Conidiophores macronematous or reduced to conidiogenous cells. Conidiogenous cells mono- and polyblastic, sympodial, flexuous, cylindrical to conical, 5–27 × 1.5–2.5 µm, hyaline to pale brown. Conidia solitary, muriform, obovoid to oval, cominulate, 17–23.5 × 10.5–16.5 µm, with 2–4, mostly 3, hyaline horn-like protruding cells, 2.5–5 × 3–5.5 µm, basal cell conical and truncate, 1.5–2 µm wide, at the begin hyaline becoming brown with the age, smooth. Sexual morph not observed.

Fig. 13. Oncopodiella trigonella (FMR 10788 ex-epitype). A–G. Conidiophores and conidia. H–S. Conidia. Scale bars = 10 µm.

Specimens examined: Belgium, Malmedy, on bark of Ailanthus, holotype PAD Libert. 432. Spain, Teruel province, Valbona, on bark of unidentified tree, Oct. 2009, col. M. Hernández-Restrepo, MBT375358 (epitype designated here CBS H-22993; cultures ex-epitype CBS 126413, MUCL 52643, FMR 10788).

Notes: This isolate fits in all morphological aspects with the protologue of O. trigonella (Sacardo 1882, Rifai 1965), the type species of Oncopodiella. The genus currently comprises more than 10 species (Magyar & Révay 2009), but no molecular data are available to assess their relationship. Here, we propose CBS
126413 as ex-epitype of *O. trigonella* to fix the concept of both the species and genus. Further taxon sampling is needed to determine the real taxonomic structure of this undescribed lineage within the *Dothideomycetes*.

**Leotiomycetes**

**Helotiales**

*Bloxamiaceae* Locq., *fam. nov.* MycoBank MB820283.

*Synonym:* *Bloxamiaceae* Locq., Mycol. gén. struct. (Paris): 209. 1984, nom. inval. (Art. 39.1).

Saprobic on wood. **Sexual morph.** Unknown. **Asexual morph.** *Conidiomata* sporodochial, pulvinate with a basal stroma. *Conidiophores* often reduced to conidiogenous cells. *Conidiogenous cells* phialidic, terminal arising from the stroma surface in a densely-packed palisade, subcylindrical, pale brown, smooth. *Conidia* produced in easily fragmenting basipetal chains, cylindrical to quadrate, truncate, hyaline, smooth.

**Type genus:** *Bloxamia* Berk. & Broome.

*Included genus:* *Bloxamia*.

**Notes:** According to MycoBank and Index Fungorum, *Bloxamiaceae* is invalid because a Latin diagnosis was not provided by the author (*Locquin* 1984) (Art. 39.1, Melbourne). Here we validate this name by providing a valid description. In our phylogenetic tree of *Leotiomycetes* (Fig. 3) this family is represented by a single strain of the type species, *Bloxamia truncata*.

**Leptodontidiaceae** Hern.-Restr., Crous & Gené, *fam. nov.* MycoBank MB820284.

Colonies growing moderately slowly, appearing smooth to funicolose, grey to black or yellow. **Asexual morph.** *Conidiophores* erect, brown, paler at the apex, simple or irregularly branched. *Conidiogenous cells* polyblastic, integrated, terminal, subcylindrical to lageniform, with pale brown venter, and a hyaline rachis often with a terminal conidiogenous cell remaining attached; rachis acicular, 1–30 × 1–1.5(–2) μm, provided with minute, crowded, unpigmented conidial scars. *Conidia* dry, solitary, obvoid to oblong, 4.5–8 × 2–3 μm, truncate base, hyaline, smooth. **Synsexual morph** beaupheria-like. *Conidiophores* macronematous, grouped in dense clusters, hyaline. *Conidiogenous cells* polyblastic, sympodial, lageniform to subcylindrical, curved, 5–14.5 × 2.5–3 μm, apex 1–1.5 μm long, hyaline, smooth. *Conidia* in buffer colour slimy masses, globose, 3–4 μm diam, with apiculate base, gullulate, hyaline, smooth. *Chlamydospores* terminal or intercalary, solitary or in simple or branched chains, 0–1-septate, ellipsoidal to subglobose, 6–19 × 4–7.5 μm, hyaline becoming brown, smooth. **Sexual morph** not observed.

**Type genus:** *Leptodontidium* de Hoog.

*Included genus:* *Leptodontidium*.

**Notes:** *Leptodontidiaceae* is hereby introduced to accommodate species of *Leptodontidium*. This genus currently comprises about nine species (de Hoog & Hermanides-Nijhof 1977, Castañeda-Ruiz 1988, Baral 2015). In our phylogenetic tree (Fig. 3), this family is represented by three taxa, namely *L. trabinellum* (generic type), *L. irregularare* and a new species from Spain, *L. aureum*. The relationships with other species of the genus need further molecular analyses.

**Leptodontidium aureum** Hern.-Restr., Guarro & Gené, *sp. nov.* MycoBank MB820285. Fig. 14.

**Etymology:** From the Latin *aureus*, meaning yellow; referring to the colour of the pigment produced in culture.

Description on OA. *Mycelium* partly immersed and partly superficial, composed of septate, hyaline to brown, smooth hyphae, 2.5–4 μm wide. **Asexual morph.** *Conidiophores* macronematous, erect, straight, simple or irregularly branched, 37–108 × 2–4.5 μm, brown at the base, paler at the apex, smooth. *Conidiogenous cells* polyblastic, integrated, terminal, sympodial, cylindrical to lageniform, 4.5–51 × 1–3.5 μm, with pale brown venter, and a hyaline rachis often with a terminal conidiogenous cell remaining attached; rachis acicular, 1–30 × 1–1.5(–2) μm, provided with minute, crowded, unpigmented conidial scars. *Conidia* dry, solitary, obvoid to oblong, 4.5–8 × 2–3 μm, truncate base, hyaline, smooth. **Synsexual morph** beaupheria-like. *Conidiophores* macronematous, grouped in dense clusters, hyaline. *Conidiogenous cells* polyblastic, sympodial, lageniform to subcylindrical, curved, 5–14.5 × 2.5–3 μm, apex 1–1.5 μm long, hyaline, smooth. *Conidia* in buff colour slimy masses, globose, 3–4 μm diam, with apiculate base, gullulate, hyaline, smooth. *Chlamydospores* terminal or intercalary, solitary or in simple or branched chains, 0–1-septate, ellipsoidal to subglobose, 6–19 × 4–7.5 μm, hyaline becoming brown, smooth. **Sexual morph** not observed.

**Culture characteristics:** On PDA at 25 °C reaching 23 mm diam in 2 wk, flat or slightly elevated at the centre, funicolose, dark mouse grey with some slimy buff masses, aerial mycelium white to mouse grey, diffusible pigment at first (1 wk) orange becoming reddish (2 wk), margin whitish, effuse; reverse zonate, with concentric areas, from orange at the centre to dark brown and white toward the periphery. On OA at 25 °C reaching 26 mm diam in 2 wk, flat, sparse aerial mycelium, somewhat velvety, slimy at the centre, luteous, margin whitish effuse; reverse luteous. Sporulation abundant of both asexual morphs on the two media tested.

Specimen examined: **Spain**, Galicia, Fragas do Eume Natural Park, isolated from forest soil, May 2010, M. Hernandez-Restrepo, J. Mena-Portales & J. Guarro (**holotype** CBS H-22997; cultures ex-type CBS 142316, FMR 11834).

**Notes:** *Leptodontidium aureum* is morphologically similar to the generic type, *L. trabinellum*, in having erect conidiophores and conidiogenous cells with a long rachis; nevertheless, conidia of the latter are cylindrical, straight to curved, and smaller (3.5–5 × 1–1.5 μm) than those of *L. aureum*, which are obvoid to oblong and 4.5–8 × 2–3 μm. *Leptodontidium irregularare* is the closest relative of *L. aureum*, from which it differs by its larger beaupheria-like conidia (up to 5.5 μm diam vs. 3–4 μm in *L. aureum*) and by the smaller chlamydospores (8–13 × 4–6 μm vs. 6–19 × 4–7.5 μm in *L. aureum*). Furthermore, the ITS sequence of *L. aureum* is 90 % (301/306) similar to that of the ex-type strain (CBS 851.73) of *L. irregularare* and 87 % (287/330) to that of the ex-type strain (CBS 329.53) of *L. trabinellum*, respectively.
Mollisiaceae

Fuscosclera Hem.-Restr., J. Mena & Gené, gen. nov. MycoBank MB820286.

Etymology: Latin -fusco, meaning dark; and Greek -sclera, meaning hard; referring to the dark brown to black multi-septate conidia.

Mycelium partly superficial and partly immersed, composed of cylindrical, dark brown, septate hyphae, often aggregated in strands. Conidiophores semi-macronematous or micro-nematous, brown. Conidiogenous cells terminal or intercalary, blastic, meristematic. Conidia consisting of multi-septate, dark brown to black, irregular propagules formed by masses of rounded to angular cells, 5–8 μm wide. Sexual morph not observed.

Type species: Fuscosclera lignicola Hem.-Restr., J. Mena & Gené.

Fuscosclera lignicola Hem.-Restr., J. Mena & Gené, sp. nov. MycoBank MB820287. Fig. 15.

Etymology: From the Latin lignum meaning wood, and colo meaning to inhabit, since this fungus was found growing on wood.

Description on OA. Mycelium immersed and superficial, composed of septate, dark brown, cylindrical hyphae, 2–5 μm wide, often aggregated in strands of 2–4 hyphae. Conidiophores single, unbranched, septate, arising from the aerial mycelium, up to 36 μm long and 2–5 μm wide, often reduced to conidiogenous loci on the hyphae, brown. Conidia consisting of multi-septate, dark brown to black, irregular propagules, 14–31.5 × 11–38 μm, formed by masses of rounded to angular cells, 5–8 μm wide. Sexual morph not observed.

Culture characteristics: Colonies on PDA at 25 °C reaching 24 mm diam in 2 wk, elevated, with dense funiculose mycelium at the centre, cottony to the periphery, mouse grey, margin whitish, effuse to fimbriate; reverse dark mouse grey. Colonies on OA at 25 °C reaching 26 mm diam in 2 wk, elevated, funiculose centre, velvety to the periphery, metallic dark olivaceous, margin whitish, effuse to fimbriate; reverse dark olivaceous. Sporulation abundant.

Specimen examined: Spain, Galicia, Los Ancares Natural Park, on dead wood, Oct. 2010, M. Hernández-Restrepo, J. Mena-Portales & J. Guarro (holotype CBS H-22996; cultures ex-type CBS 142287, FMR 11236).

Notes: Meristematic fungi are scattered in different orders in Ascomycota, but mainly placed in Dothideomycetes (Selbmann et al. 2005, Egidi et al. 2014). Fuscosclera is related to Mollisiaceae (Helotiales, Leotiomycetes) and is distinguished from other meristematic fungi by its single, multi-celled brown conidia. Trimmatostroma is another meristematic fungus member of Mollisiaceae, linked with Mollisia (Crous et al. 2007a). Nevertheless, Fuscosclera is easily differentiated from Trimmatostroma salicis, the generic type, by its solitary conidia consisting of irregular masses of cells, while the conidia of Trimmatostroma are cylindrical, transversely septate, and produced in branched chains (Ellis 1971).
**Lauriomycetales** Hern.-Restr., R.F. Castañeda & Guarro, *ord. nov.* MycoBank MB820288.

Saprobic on dead fallen leaves. *Sexual morph.* Unknown. *Asexual morph.* Conidiophores macronematous, mononematous, developing a complex, branched conidiogenous apparatus at the apex. Conidiogenous cells blastic, discrete, hyaline. Ramoconidia in 1 or several tiers, hyaline, smooth. *Conidia* in acropetal chains, hyaline, smooth.

*Type family:* Lauriomycetaceae Hern.-Restr., R.F. Castañeda & Guarro.

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**Lauriomycetaceae** Hern.-Restr., R.F. Castañeda & Guarro, *fam. nov.* MycoBank MB820289.

*Conidiophores* macronematous, mononematous, erect, straight, septate, cylindrical, brown paler at the apex, developing a complex, branched conidiogenous apparatus at the apex. Conidiogenous cells blastic, discrete, terminal, hyaline. *Conidial secession* schizolytic. Ramoconidia in 1 or several tiers, hyaline, smooth. *Conidia* in acropetal chains, hyaline, smooth.

*Type genus:* Lauriomyces R.F. Castañeda.
Included genus: Lauriomyces.

Notes: Lauriomycetales comprises only Lauriomyces. This genus was introduced with L. pulcher as generic type together with other three species, L. catenata, L. helicocephala and L. ventricosa (Castañeda-Ruiz & Kendrick 1990). Currently, Lauriomyces comprises about nine species often found on fallen leaves. Morphological similarities with Haplographium (currently Dematoscypha) were previously discussed by other authors (Castañeda-Ruiz & Kendrick 1990, Somrithipol & Jones 2007). However, our phylogenetic analysis supports that Haplographium and Lauriomyces are different genera and they comprise two distant monophyletic lineages in Leotiomycetes.
Sordariomycetes

**Chaetosphaeriales, Chaetosphaeriacae**

**Zanclospora iberica** Hern.-Restr., J. Mena & Gené, sp. nov. MycoBank MB820290. Fig. 16.

*Etymology:* Referred to the geographical origin where the fungus was found, the Iberian Peninsula.

*Description on OA:* Mycelium partly immersed and partly superficial, composed of branched, septate, hyaline and brown, smooth hyphae, 1.5–3 μm wide. Conidiophores macro-nematous, erect, straight, sometimes curved, setiform, attenuate toward the apex, simple or irregularly branched, 148–340 μm long, 3–6 μm wide at the base, 6–10 μm wide at the fertile region, 2.5–5 μm wide at the apex, brown paler in the apex, smooth; fertile region of the conidiophore situated about 43–194 μm below the apex. **Conidiogenous cells** discrete, monopodial, formed in 1–3 whorls, appressed to the conidiophore laterally, lageniform to ampulliform, 8.5–12.5 × 4–6.5 μm, 1–2(–2.5) μm wide at the tapered open distal end, subhyaline to pale brown, smooth. **Conidia** unicellular, fusiform, falcate, straight or slightly curved, 12.5–22 × 2–3 μm, rounded end, hyaline, smooth.

*Culture characteristics:* Colonies on PCA at 25 °C reaching 4–7 mm diam in 2 wk, velvety, brown, margin effuse; reverse black. OA at 25 °C reaching 5–7 mm diam in 2 wk, elevated, velvety to fuscose, black, margin effuse; reverse similar. Sporulation abundant.

*Specimens examined:* Spain, Asturias, Picos de Europa National Park, La Molina, on dead wood of unidentified plant, Jul. 2010, M. Hernández-Restrepo, J. Mena-Portales & J. Guarro (holotype CBS H-22995; cultures ex-type CBS 130426, FMR 12186). Portugal, Minho Province, Lagoas do Bertandos protected area, on dead wood of unidentified plant, Nov. 2011, R.F. Castañeda, M. Hernández-Restrepo, J. Gené & J. Mariné-Gené (FMR 12186).

*Notes:* Zanclospora iberica resembles *Z. novae-zealandiae*, the generic type, in having branched conidiophores. **Zanclospora novae-zealandiae** is characterised by apically verrucose conidiophores, conidiogenous cells are arranged in whorls of 3–7 tiers, and conidia are larger and 18–35 × 1.6–2.5 μm (Hughes & Kendrick 1965). In contrast, the conidiophores in *Z. iberica* are smooth, its conidiogenous cells are arranged in whorls of 1–3 tiers, and the conidia are 12.5–22 × 2–3 μm. Unfortunately, there are no sequences available from *Z. novae-zealandiae* for comparison. This is the first time that the placement of *Zanclospora* is confirmed in *Chaetosphaeriacae*.

**Conioscyphales, Conioscyphaceae**

**Conioscypha pleiomorpha** Hern.-Restr., R.F. Castañeda & Gené, sp. nov. MycoBank MB820291. Fig. 17.

*Etymology:* Greek, pleio-, meaning more than usual; and -morph, referring to existing two different forms of conidial ontogeny.

*Colonies* on the natural substratum effuse, black. Mycelium mostly immersed, composed of branched, septate, hyaline, smooth hyphae, 1–3 μm wide. Conidiophores micronematous, reduced to conidiogenous cells. **Conidiogenous cells** monoblastic, cupulate, endogenous, multilayer-cupulate collarette after several percurrent enteroblastic tiny elongations, 9–12 × 13–16 μm, up to 14 μm deep, hyaline or subhyaline, smooth. **Conidia** solitary, unicellular, ellipsoidal, obovoid or subglobose, 13–18 × 12–14 μm, base truncate with a central pore of 1–1.5 μm diam, brown, pitted.

*Culture characteristics:* Colonies on PCA and OA at 25 °C reaching 10 mm diam in 1 wk, scarce aerial mycelium, powdery, elevate, black, margin erodate, white; reverse grey. Sporulation abundant. Mycelium composed of septate, subhyaline to very pale brown, smooth hyphae, 1–4 μm wide. **Conidiogenous cells** similar to those observed on the natural substratum but measuring 12–18 × 8–10 μm, up to 14 μm deep. **Conidia** subglobose to broadly ellipsoidal or broadly obovoid to elongate napiform, sometimes slightly curved toward the base, 9–15 × 6–9 μm, truncate base with a central pore of 1–1.5 μm diam, usually with strongly pigmented deposit with lacunose aspect, dark reddish-brown to black, smooth. **Synasexual morph** consisting of thallic-arthric conidia formed by disarticulation of branched or unbranched conidiogenous hyphae on the aerial mycelium; apical conidia oblong with rounded apex and truncate base, intercalary and basal conidia doliiform, sub-hemispherical, or Y-shaped, terminally truncated, 3–5 × 2–4 μm, light brown to brown, smooth.

*Specimen examined:* Spain, Canary Islands, Tenerife, Las Mercedes, on dead wood of unidentified plant, Jul. 2013, M. Hernández-Restrepo & J. Guarro (holotype CBS H-21890; cultures ex-type FMR 13134, CBS 138110).

*Notes:* Phylogenetically, *C. pleiomorpha* formed a separate branch, basal to the clade of other species of *Conioscypha*. It is noteworthy that in culture this species produces a synasexual
morph with thallic-artic conidia similar to that observed in C. dimorpha (Matsushima 1996). However, the synasexual morph of this latter was described by the author as “microconidia oblong to cylindrical rounded at the apex and truncate at the base, 2–3 × 2–2.5 μm”, without any mention on the mode of conidial ontogeny. The blastic conidia of C. dimorpha are oblong to cylindrical, (8–)10–14(–18) × (4–)4.5–5.5(–6.5) μm, and smooth-walled, and can be clearly differentiated from those of C. pleiomorpha which are much wider (13–18 × 12–14 μm), and pitted on the natural substratum.

Microascales, Halosphaeriaceae

Cirrenalia iberica Hern.-Restr. & Gené, sp. nov. MycoBank MB820292. Fig. 18.

Etymology: Refers to the name of the region, Iberian Peninsula, from which the species was collected.

Description on OA. Mycelium immersed and superficial, composed of septate, branched, hyaline, smooth hyphae, 1–4 μm wide. Conidiophores micronematous, pale brown to brown. Conidiogenous cells mono- or polyblastic, integrated, clavate, cylindrical, 11–23 × 4.5–8.5 μm, base 2–3.5 μm wide, pale brown to brown, smooth. Conidia solitary, straight or slightly curved, (1–)2–3(–4)-septate, constricted at the septa, 19–41 μm long, cells increasing in size and pigmentation from the base to the apex; basal cell, subglobose, hemi-globose to cuneiform, often paler than the rest, 3–9(–12.5) μm wide; median cell subglobose, mid brown; apical cell subglobose, 10–15 μm wide, mid brown.

Culture characteristics: Colonies on PDA and OA at 25 °C reaching 2–4 and 4–10 mm diam respectively in 2 wk, velvety, brown-vinaceous, margin effuse; reverse dark; diffusible pigment saffron after 7 d. Sporulation abundant in the aerial and submerged mycelium.

Specimens examined: Spain, Aragón, Sierra y Cañones de Guara Natural Park, isolated from forest soil, Mar. 2011, M. Hernández-Restrepo & J. Capilla (holotype CBS H-22986; cultures ex-type CBS 142289, FMR 12149). Navarra, Valles Occidentales Natural Park, on submerged wood, Mar. 2012, M. Hernández-Restrepo & J. Capilla (CBS 142295, FMR 12418).

Notes: Cirrenalia comprises 13 species isolated from marine and terrestrial environments (Kohlmeyer 1966). Based on molecular and morphological data, several species were transferred to different genera, i.e. Halazoon, Hiogispora, Hydea and Matsusporium in the Lulworthiales (Abdel-Wahab et al. 2010). Cirrenalia iberica is morphologically similar to C. macrocephala, C. pseudomacrocephala, C. basiminuta, and C. pallescens. However, it can be distinguished by its commonly straight conidia, in contrast to the coiled conidia of these latter species. In addition, the conidia of C. iberica are longer (19–41 μm) than those of C. macrocephala (12–35 μm) and C. pallescens (12.5–25 μm). The conidia of C. basiminuta are more septate (3–5 vs. 2–3 in C. iberica), and paler with a darker apical cell and a narrower basal cell (2.5–7 μm vs 3–9(–12.5) μm in C. iberica). Cirrenalia pseudomacrocephala has wider conidia (16–20 μm vs up to 15 μm wide in C. iberica) and with more septa (3–6).
Parasymphydiielaeas Hern.-Restr., Gené, R.F. Castañeda & Crous, ord. nov. MycoBank MB820297.

Saprobic on leaves and twigs. Sexual morph. Unknown. Asexual morph. Conidiophores macronematous, mononematous, brown. Conidiogenous cells holoblastic, pale brown or hyaline. Conidia thallic-arthric, aseptate or septate, hyaline.

Type family: Parasymphydiielaceae Hern.-Restr., Gené, Guarro & Crous.

Parasymphydiielaceae Hern.-Restr., Gené, Guarro & Crous, fam. nov. MycoBank MB820298.

Conidiophores macronematous, mononematous, unbranched, brown. Conidiogenous cells holoblastic, sympodial, hyaline or pale brown, giving conidia in basipetal succession. Conidial secession schizolytic. Conidia thallic-arthric, aseptate or septate, cylindrical, hyaline, in unbranched, dry, basipetal, chains. Syn-asexual morph stylaspergillius-like often present. Conidiophores macronematous, mononematous, branched or unbranched, brown. Conidiogenous cells phialidic, formed on terminal or intercalary vesicle-like cells, pale brown. Conidia produced in slimy masses, filiform, hyaline.

Type genus: Parasymphydiiella Ponnappa.

Included genus: Parasymphydiiella.

Notes: Parasymphydiielaceae and Parasymphydiielales are introduced for the clade that encompasses four Parasymphydiiella species (Fig. 4, clade XVI), including P. laxa, the generic type, previously accommodated in Symphydiiella (Ponnappa 1975). Symphydiiella species have small conidiophores (up to 280 μm) with terminal or subterminal conidiogenous cells and conidial chains with up to six conidia (Kendrick 1958), while Parasymphydiiella has larger conidiophores (up to 700 μm), the conidiogenous cells are along the conidiophore stipe at irregular intervals and the conidia are produced in chains that appear to extend indefinately. Furthermore, sequences of two strains of S. acicola (CBS 425.67 and CBS 487.82) include this genus in Venturiales (Dothideomycetes). Parasymphydiiella currently comprises 10 species, which are usually found colonising leaves and twigs of conifers and dicotyledonous plants (Crous et al. 1995, Cheewangkoon et al. 2009, Seifert et al. 2011).

Parasymphydiiella lauri Hern.-Restr., Gené & Guarro, sp. nov. MycoBank MB820299. Fig. 19.

Etymology: The name refers to Laurus, the botanical host from which the species was found.

Colonies on the natural substratum effuse, like a white net. Mycelium mostly immersed, composed of brown, smooth hyphae. Conidiophores macronematous, mononematous, erect, unbranched, septate, cylindrical; sterile part with slightly-thickened walls, brown, 100–300 × 6–8 μm; fertile part with thinner walls, pale brown, becoming paler toward the apex, 150–320 × 5–6 μm, with up to seven conidiogenous cells. Conidiogenous cells holothallic terminal or intercalary, integrated, indeterminate, proliferating sympodially, smooth, pale brown, becoming hyaline toward the apex, 45–80 × 4–6 μm. Conidia thallic-arthric, forming unbranched, dry, chains, (0–1)-septate, cylindrical, (22–) 27–40(–47) × 5–6(–7) μm, apex and base of intercalary conidia truncate, with a septal plug at each end, apical conidia with obtuse or rounded apex, hyaline, smooth, thin-walled. Stylaspergillus-like asexual morph not observed. Sexual morph not observed.

Culture characteristics: Colonies on PCA at 25 °C reaching 60 mm diam in 2 wk, with sparse aerial mycelium, zonate, dark green. Mycelium superficial or immersed, consisting of branched, septate, smooth, pale brown to dark brown hyphae, 2–12 μm wide. Conidia (0–)1(–2) septate, cylindrical or clavate 26–40(–50) × 5–9 μm. Chlamydospores present on the vegetative hyphae, intercalary, solitary or in short chains, spherical, 15–40 μm diam, brown, thin-walled, smooth, guttulate. Syn-asexual morph not observed.

Specimen examined: Spain, Canary Islands, La Palma, Biosphere Reserve Los Tilos, on fallen leaves of Laurus sp., Jul. 2013, M. Hernández-Restrepo & J. Guarro (holotype CBS H-21888; cultures ex-type FMR 13132, CBS 138108).

Notes: Parasymphydiiella lauri is morphologically similar to P. elongata and P. eucalypti in having cylindrical, (0–1)(–2) septate conidia. Nevertheless, on the natural substratum P. lauri has smaller conidia (22–47 × 5–7 μm) than those of P. elongata (30–65 × 6–8 μm), and P. eucalypti (25–65 × 8–11 μm) (Cheewangkoon et al. 2009). The phylogenetic tree (Fig. 4, Clade XVI) includes all the sequences of the different Parasymphydiiella species available for comparison, P. lauri being placed as sister to P. elongata.

Pleurotheciales, Pleurotheciaceae

Anapleurothecium Hern.-Restr., R.F. Castañeda & Gené, gen. nov. MycoBank MB820300.

Etymology: From the Greek, Ana-, meaning upwards, back, again; and -pleurothecium, referring to the asexual genus Pleurothecium. Morphologically similar, but distinct from Pleurothecium.

Colonies on the natural substratum effuse, hairy, dark brown to black. Mycelium mostly immersed, composed of septate, smooth, hyaline hyphae. Conidiophores macronematous, mononematous, unbranched, erect, straight, smooth, brown. Conidiogenous cells phialidic, formed on terminal or intercalary hyphae, acropleurogenous, dry, septate, bo tuliform to cylindrical, rounded at both ends, smooth, brown, sometimes with a paler basal cell. Sexual morph unknown.

Type species: Anapleurothecium bulitisporum Hern.-Restr., R.F. Castañeda & Gené.

Anapleurothecium bulitisporum Hern.-Restr., R.F. Castañeda & Gené, sp. nov. MycoBank MB820301. Fig. 20.

Etymology: From the Latin botulis, which means “sausage”; and the Greek spore meaning “seed, sowing”. Named after the sausage-shape of its conidia.

Colonies on the natural substratum effuse, hairy, dark brown to black. Mycelium mostly immersed, composed of septate, smooth, hyaline hyphae. Conidiophores macronematous,
mononematous, unbranched, erect, straight, cylindrical, 74–185 × 5–6 μm, smooth, brown. Conidiogenous cells terminal or intercalary, polyblastic, sympodial, denticulate, cylindrical, 10–47 × 4–7 μm, mid-brown; denticles up to 4 μm long, 1 μm wide. Conidia solitary, (2–)3-septate, botuliform to cylindrical, 15–21 × 6–8.5 μm, smooth, brown, often with a basal cell pale brown.

Culture characteristics: Colonies on OA after 2 wk reaching up to 10 mm diam, flat, mycelium mainly submerged on the agar, with black spots corresponding to sporulating zones. Conidiophores and conidiogenous cells are similar to those observed on the natural substratum, producing slightly smaller conidia (15–20 × 5–7.5 μm).

Specimens examined: Spain, Asturias, Poncebos (Cares River), Picos de Europa National Park, on dead wood, Nov. 2010, M. Hernández-Restrepo, J. Guarro & J. Mena (holotype CBS H-20749; cultures ex-type FMR 11490, CBS 132713, IMI 502222, MUCL 54492); Cantabria, Saja-Besaya Natural Park, on dead wood, Nov. 2010, M. Hernández-Restrepo, J. Guarro & J. Mena (FMR 11580).

Notes: According to our phylogenetic analyses Anapleurothecium is placed in the Pleurotheciales (Fig. 4, Clade XVI; Fig. 5). This monotypic order was recently introduced with six clades (I–VI), and represents at least 11 genera (Reblova et al. 2016b). Anapleurothecium is related to “clade II” of Reblova et al. (2016b), that includes Helicoon farinosum, Monotosporella setosa (as Brachysporiella setosa), Phragmocephala sternphylioides and Pleurothecium obovoideum. These fungi are morphologically very different from Anapleurophragium as mentioned before. The most similar is P. obovoideum, but this differs in having shorter conidiophores (up to 35 μm long) and asepitate conidia, often arranged in short chains (Arzaniou et al. 2007). Anapleurothecium also resembles Pleurophragium in having denticulate conidiogenous cells and more or less cylindrical conidia, but it mainly differs in having larger denticles (up to 4 μm) and darkly pigmented conidia. The conidiogenous cells in Pleurophragium have shorter denticles (up to 2 μm long) and its conidia are hyaline or pale brown (Ellis 1971, Seifert et al. 2011). In addition, the generic type, Pleurophragium parvisporium, is related to the Papulosaceae (Reblova & Štěpánek 2009, Jaklitsch et al. 2016a). Other genera with similar conidiogenous cells to Anapleurothecium are Camposporium and Paratrichoconis, but their conidial secession is rhexolytic, while in Anapleurothecium it is schizolytic. The phylogenetic position of Camposporium and Paratrichoconis remains uncertain, and only species of the former genus have been related to Pleosporales (Fig. 1, clade III).

Savoryellales, Savoryellaceae
Neoscoatiaiwaenia Hern.-Restr., R.F. Castañeda & Guarro, gen. nov. MycoBank MB820302.

Etymology: Neo- meaning new; -scotaïwania referring to the sexual genus Ascoatiaiwa. Name refers to the similarity with the genus Ascoatiaiwa.

Sexual morph. Ascomata perithecial, non-stromatic, semi-immersed, gradually erumpent to almost superficial, scattered or clustered in small groups, black, subglobose, papillate, with a periphysate ostiole. Ascomatal wall outer layer dark brown, textura prismatica, with pores; inner layer composed by hyaline, flattened cells. Asci cylindrical, with a non-amyloid, discoid apical ring, with 8 uniseriate ascospores. Paraphyses partially disintegrating at maturity, septate, branched, anastomosing. Ascospores ellipsoidal, septate, slightly constricted at the septa, versicolourous, middle cells brown, with small guttules, polar cells smaller and hyaline, smooth, without sheath or

Fig. 19. Parasympodiella lauri (FMR 13132 ex-type). A. Conidiophores and conidiogenous cells. B, C. Conidia. Scale bars, A = 20 μm; B, C = 10 μm.
appendages. Asexual morph. Conidiophores micronematous, reduced to conidiogenous cells, hyaline to subhyaline. Conidiogenous cells monoblastic, integrated, arising directly from the hyphae. Conidial secession rhexolytic. Conidia solitary, dry, transversely septate, ellipsoidal to obovoid, dark brown, basal cell often paler, septa with darker bands.

Type species: Neoascotaiwania terrestris Hern.-Restr., R.F. Castañeda & Guarro.

Notes: Ascotaiwania was established with *A. lignicola* as type species, a fungus similar to Savoryella but distinguished by having asci with a prominent non-amyloid apical ring and 7-septate pigmented ascospores with hyaline end cells (Sivanesan & Chang 1992). Subsequently, some species with 3- or 5-septate ascospores were added to the genus, i.e. *A. hsilio*, *A. sawada*, *A. palmicola*, *A. persoonii*, *A. hughesii*, *A. pallida* and *A. pennisetorum*, as well as other species with 7-septate ascospores, i.e. *A. wulai*, *A. mitriformis* and *A. mauritiana* (Chang et al. 1998, Ranghoo & Hyde 1998, Fallah et al. 1999, Hyde & Goh 1999). Different asexual morphs have been observed for Ascotaiwania species: monodictys-like with multicellular dark brown conidia in *A. lignicola* (Chang 2001); trichocladium-like with 1-septate conidia, dark brown apical cell and hyaline and smaller basal cell in *A. hsilio* (Chang 2001); monotosporella-like in two species, i.e. *A. sawada* (Sivichai et al. 1998) and *A. mitriformis* (Ranghoo & Hyde 1998), and Helicoon farinosum for *A. hughesii* (Fallah et al. 1999). The current circumscription of Ascotaiwania is polyphyletic (Réblová et al. 2016b) (Fig. 5) and apparently like in other genera as Chaetosphaeria and Capronia, the asexual morph seems to be phylogenetically more relevant than the sexual morph. Neoascotaiwania differs from Ascotaiwania in having 3-septate ascospores, asci with thinner, non-amyloid apical ring, and the asexual morph is bactrodesmium-like.

Neoascotaiwania limnetica (H.S. Chang & S.Y. Hsieh) Hern.-Restr., R.F. Castañeda & Gené, comb. nov. MycoBank MB820303.

Basionym: Savoryella limnetica H.S. Chang & S.Y. Hsieh, Mycol. Res. 102: 715. 1998.

Synonym: Ascotaiwania limnetica (H.S. Chang & S.Y. Hsieh) Réblová & J. Fourn., Persoonia 37: 71. 2016.

Descriptions and illustrations: Chang et al. (1998), Réblová et al. (2016b).
Neoascotaiwania terrestris Hern.-Restr., R.F. Castañeda & Guarro, sp. nov. MycoBank MB820304. Fig. 21.

Etymology: From the Latin –terra, meaning earth, soil, grown; since this fungus was isolated from a soil sample.

Description on OA. Mycelium partly immersed and partly superficial, composed of septate, smooth, hyaline to pale brown hyphae, 1.5–3 μm wide. Conidiophores micronematous, reduced to intercalary conidiogenous cells producing lateral blastic conidia. Conidia solitary, straight or curved, (2–)3–4(–5)-septate, ellipsoidal, obovoid, 25.5–44.5 × 13–22 μm, black to reddish brown, basal cell often subhyaline to pale brown or brown and truncate, 2.5–6 μm wide, smooth. Sexual morph not observed.

Culture characteristics: Colonies on PDA and OA at 25 °C reaching 4–5 mm diam in 2 wk, black, with aerial mycelium velvety, with a margin white and effuse; reverse black. Sporulation abundant in both submerged and superficial mycelium.

Specimen examined: Spain, Asturias, Picos de Europa National Park, isolated from forest soil, Oct. 2010, M. Hernández-Restrepo, J. Mena & J. Guarro (holotype CBS H-22988; cultures ex-type CBS 142291, FMR 12412).

Notes: Neoascotaiwania terrestris differs from N. limnetica in having larger conidia with a wider basal scar (25.5–44.5 × 13–22 μm, 2.5–6 μm vs 23–39 × 14.5–18.5 μm, base 3–4.5 μm in N. limnetica) (Chang et al. 1998). Furthermore, N. limnetica is known from submerged dead wood in Taiwan and France (Chang et al. 1998, Rébélová et al. 2016b), while N. terrestris was isolated from forest soil in Spain.

Sordariales, Chaetomiaceae

Trichocladium asperum (Corda) Harz. Fig. 22.

Basionym: Sporidesmium asperum Corda, Icon. fung. 2: 6. 1838.

Synonyms: Diococcus asperum (Corda) Sacc., Syll. fung. 4: 342. 1886.

Monodictys aspera (Corda) S. Hughes, Canad. J. Bot. 36: 785. 1958.

Piricauda aspera (Corda) R.T. Moore, Rhodora 61: 96. 1959.

Specimens examined: Lectotype designated here: tab. VIII, fig. 27 in Corda ACJ, Icones Fungorum hucusque Cognitorum 2, 1838. MBT375510. Belgium, Kontich, isolated from agricultural soil, Jan. 1964, G.L. Hennebert (CBS 112.67). Germany, Edensee, Nieder-Werbe, isolated from acidic soil, E. Falk, No. C48, MBT375512 (epitype designated here CBS H-23060; culture ex-epitype CBS 903.85). Spain, Castilla La Mancha, Alto Tajo Natural park, isolated from soil, May 2011 M. Hernández-Restrepo, J. Mena & J. Guarro (FMR 12054). The Netherlands, unknown substrate, unknown date, C.M. Berkhou (CBS 140.21). Unknown country, unknown substrate, unknown date, O. da Fonseca (CBS 157.22).

Notes: Hughes (1952) lectotypified Trichocladium with T. asperum as type species. Unfortunately, the holotype of this species, formerly described as Sporidesmium (Corda 1838) seems to be lost. However, the protologue contains an illustration which is designated here as the lectotype of S. asperum. We
selected the strain CBS 903.85 as ex-epitype culture to fix the use of the name. CBS 903.85 matches with the protologue of the fungus described by Corda (1838) and it was collected in Germany, the same country where the species was formerly found. Our study agrees with Hambleton et al. (2005) confirming that T. asperum was phylogenetically related to Chaetomium and Humicola (Sordariales).

Vermiculariopsiellales Hern.-Restr., J. Mena, Gené & Crous, ord. nov. MycoBank MB820346.

Saprobic on leaves. Sexual morph. Unknown. Asexual morph. Conidiomata sporodochial, setose. Setae branched or unbranched. Conidiophores macronematous, densely packed in a palisade. Conidiogenous cells monophaialdic, discrete. Conidia grouped in dry masses, unicellular or septate. Stroma present or absent.

Type family: Vermiculariopsiellaceae Hern.-Restr., J. Mena, Gené & Crous.

Vermiculariopsiellaceae Hern.-Restr., J. Mena, Gené & Crous, fam. nov. MycoBank MB820347.

Conidiomata sporodochial, scattered, setose. Setae branched or unbranched, brown. Conidiophores macronematous, densely packed in a palisade, pale brown or hyaline. Conidiogenous cells monophaialdic, cylindrical to lageniform, with collarette, hyaline to pale brown. Conidia grouped in pale dry masses, unicellular or septate, cylindrical, hyaline. Stroma present or absent.

Type genus: Vermiculariopsiella Bender.

Included genus: Vermiculariopsiella.

Notes: In our phylogenetic analysis of the Sordariomycetes, the type species of Vermiculariopsiella, V. immersa, and other species of the genus, i.e. V. dichapetali, V. eucalypti, V. microperma and V. pediculata, were placed in a monophyletic well-supported clade which is introduced in the present study as a new monotypic order and family (Fig. 4, clade XIII). Previous studies, based on culture techniques, reported Vermiculariopsiella spp. as asexual morphs of Echinosphaeria macrospora and E. pteridis (Gawas et al. 2006, Dhargalkar & Bhat 2009); however, further molecular studies are needed to confirm this relationship, since the type species of Echinosphaeria, E. canescens, is related to the family Helminthosphaeriaceae in the order Chaetosphaeriales (Miller & Huhndorf 2004, Miller et al. 2014).

Xenospadicoidales Hern.-Restr., J. Mena & Gené, ord. nov. MycoBank MB820348.

Saprobic on dead wood. Sexual morph. Unknown. Asexual morph. Conidiophores macronematous, mononematous, unbranched or branched. Conidiogenous cells tretic, integrated. Conidia solitary or in chains, dry, unicellular or septate.

Type family: Xenospadicoidaceae Hern.-Restr., J. Mena & Gené.

Xenospadicoidaceae Hern.-Restr., J. Mena & Gené, fam. nov. MycoBank MB820349.

Conidiophores macronematous, mononematous, erect, straight, unbranched or branched, brown. Conidiogenous cells tretic, terminal or intercalary, cylindrical, pale brown to brown. Conidia...
solitary or in chains, dry, unicellular or transversely septate, oblong, ellipsoidal or obovoid, brown.

Type genus: Xenospadicoides Hern.-Restr., J. Mena & Gené.

Included genera: Xenospadicoides, Pseudodiplococcium.

Xenospadicoides Hern.-Reestr., J. Mena & Gené, gen. nov. MycoBank MB820350.

Etyymology: Name reflects a morphological similarity with the genus Spadicoides.

Type species: Xenospadicoides atra (Corda) Hern.-Reestr., J. Mena & Gené.

Colonies effuse, velvety, dark brown to black. Mycelium partly superficial, composed of branched, septate, pale to dark brown, smooth hyphae. Conidiophores single or in small groups, erect or ascending, straight or flexuous, unbranched, mid to dark brown paler toward the apex. Conidiogenous cells polytretic, integrated, terminal and intercalary, cylindrical. Conidia solitary, acropleurogenous, unicellular, ellipsoidal, oblong with rounded ends, occasionally obovoid, pale brown to very dark brown, smooth. Sexual morph unknown.

Xenospadicoides atra (Corda) Hern.-Reestr., J. Mena & Gené, comb. nov. MycoBank MB820392.

Basionym: Psilonia atra Corda, Icon. fung. 4: 27. 1840.

Synonyms: Acladium atrum (Corda) Bonorden, Handbuch der allgemeinen Mycologie Stuttgart: 87. 1851.

Catenularia atra (Corda) Sacc., Syll. fung. 2: 560. 1882.

Spadicoides atra (Corda) S. Hughes, Canad. J. Bot. 36: 805. 1958.

Virgaria indivisa (Corda) Sacc., Michelia 2: 560. 1882.

Xenospadicoides atra (Corda) Hern.-Reestr., J. Mena & Gené, sp. nov. MycoBank MB820394.

Etyymology: Refers to the name of the region, Iberian Peninsula, from where the species was collected.

Colonies on the natural substratum effuse, velvety, brown to dark brown. Mycelium partly superficial, partly immersed in the substratum. Conidiophores macronematous, mononematous, extensively branched, dark brown, smooth. Conidiogenous cells polytretic, pores inconspicuous after conidial secession, integrated, terminal and intercalary, cylindrical, brown and smooth. Conidia in branched chains, dry, acropleurogenous, unicellular or septate transversely, cylindrical, pale brown to mid brown, concolourous, smooth.

Type species: Pseudodiplococcium ibericum Hern.-Reestr., J. Mena & Gené.

Notes: Because herbarium material of Psilonia atra, the basionym of Spadicoides atra, is not preserved and no authentic specimens have been located, we lectotypify the species with the original drawing included in the protologue of this fungus (Corda 1840). In addition, an ex-epitype culture (CBS 489.77) is designated here to fix the use of the name.

Xenospadicoides resembles Spadicoides in having polytretic conidiogenous cells that produce solitary conidia. However, these genera differ in their conidial septation, viz. 1-septate in Spadicoides and asepitate in Xenospadicoides. Furthermore, those two taxa are phylogenetically unrelated; Spadicoides bina is a member of the Cordanales (Shenoy et al. 2010, Hernández-Restrepo et al. 2014b, 2015b) and Xenospadicoides forms a new lineage in Sordariomycetes (Fig. 4, clade X).

Pseudodiplococcium Hern.-Reestr., J. Mena & Gené, gen. nov. MycoBank MB820353.

Etyymology: Pseudo- meaning “false”; and diplococcium referring to the asexual genus Diplococcium. Morphologically similar to Diplococcium.

Colonies on the natural substratum effuse, velvety, brown to dark brown. Mycelium partly superficial, partly immersed in the substratum. Conidiophores macronematous, mononematous, pro fusely branched, dark brown, smooth, up to 360 μm long, 3 μm wide, 3.5–5 μm at the apex, 5 μm at the base. Conidiogenous cells polytretic, pores inconspicuous after conidial secession, integrated, terminal and intercalary, cylindrical, brown and smooth. Conidia in branched chains, dry, acropleurogenous, unicellular or septate transversely, cylindrical, pale brown to mid brown, concolourous, smooth.

Notes: The isolate FMR 10959 introduced here as P. ibericum, based on morphological data, was formerly identified as D. pulneyense (Hernández-Restrepo et al. 2012). This latter species is described as the asexual morph of Ottia pulneyensis.
(Subramanian & Sekar 1987), a presumed member of Dothideomycetes. Nevertheless, in our analysis, FMR 10959 is placed in a clade together with Xenospadicoides in Sordariomycetes (Fig. 4, clade X). After a re-examination of this material, we conclude that, in addition to the phylogenetic position, there are slight morphological differences which can help to distinguish both fungi. Although P. ibericum resembles D. pulneyense in having long chains of conidia born from polytretic conidiogenous cells, the former differs in the production of aseptate conidia occurring intercalary in the conidial chains, on both, culture and the natural substratum (Hernández-Restrepo et al. 2012). In D. pulneyense only septate conidia were described (Subramanian & Sekar 1987).

**Xylariales**

**Castanediellaceae** Hern.-Restr., Guarro & Crous, fam. nov. MycoBank MB820354.

Foliicolous, saprobic or associated to leaf spots. Sexual morph. Unknown. Asexual morph. Conidiophores macronematous, mononematous or aggregated in sporodochia, branched, brown to pale brown. Conidiogenous cells mono or polyblastic, sympodial, discrete, solitary or in whorls, cylindrical to lageniform, hyaline to subhyaline. Conidial secession schizolytic. Conidia unicellular or septate transversely, cylindrical, fusiform or lunate, hyaline. Type genus: Castanediella Hern.-Restr., Crous & M.J. Wingf.

Included genus: Castanediella.

Notes: Castanediella was recently introduced with C. acacia as type species and six species are currently accepted (Crous et al. 2015b, 2016, Hernández-Restrepo et al. 2016). Castanediella as currently circumscribed is monophyletic (Fig. 4, clade I) and represents a distinct taxonomic group at the family level closely related to the Beltraniaceae in Xylariales.

**Xyladictyochaeta** Hern.-Restr., R.F. Castañeda & Gené, gen. nov. MycoBank MB820355.

Etymology: Xyla- referring to Xylariales; and -dictyochaeta referring to the asexual genus Dictyochaeta. Morphologically similar to Dictyochaeta but phylogenetically related to Xylariales.

Colonies on natural substratum effuse, hairy, brown. Mycelium partly superficial and partly immersed, composed of septate, hyaline or medium brown, smooth hyphae. Conidiophores macronematous, mononematous, setiform, commonly unbranched, rarely branched at the base, erect, cylindrical, brown, smooth. Conidiogenous cells integrated, mono- or polyphialidic and sympodial, collarette inconspicuous, terminal and usually lageniform, or intercalary and cylindrical with a lateral extension near a septum bearing terminally the conidiogenous loci, brown, smooth. Conidia solitary, mucous, 0–1-septate, falcate, base truncate, apex acute, hyaline, smooth, with an unbranched setula at each end.

Type species: Xyladictyochaeta lusitanica Hern.-Restr., R.F. Castañeda & Gené.

Notes: Morphologically, Xyladictyochaeta differs from Dictyochaeta in having setiform conidiophores with intercalary and terminal polyphialidic conidiogenous cells. In Dictyochaeta, the setae are mainly sterile and the conidiogenous cells are born from conidiophores in the lower part of the setae (Ellis 1971, Réblóva et al. 1999, Seifert et al. 2011). Moreover, several Dictyochaeta species are commonly associated as asexual morphs of Chaetosphaeria, a genus integrated in the Chaetosphaeriaceae (Chaetosphaeriales) (Réblóva et al. 1999, Réblóva 2000, 2004, Fernández & Huhndorf 2005, Fernández et al. 2006).

**Xyladictyochaeta lusitanica** Hern.-Restr., R.F. Castañeda & Gené, sp. nov. MycoBank MB820356. Fig. 23.

Fig. 23. Xyladictyochaeta lusitanica (FMR 12177 ex-type). A–D. Conidiophores. E. Conidia. Scale bars = 10 μm.
Description on OA. Mycelium composed of septate, hyaline or brown, smooth hyphae, 1–3 μm wide. Conidiophores macro- nematous, mononematous, erect, setiform, usually unbranched, some branched at the base, cylindrical, 40–110 × 3–5 μm, brown, smooth. Conidiogenous cells integrated, mono- or poly- phalidic and sympodial, collarette inorganicus, terminal and usually lageniform, 6–14.5 × 2.5–5 μm, or intercalary and cylin- drical with a lateral extension near a septum, 2–5 × 1–2 μm. Conidia solitary, mucous, 0–1-septate, falcate, 11–16 × 2–2.5 μm, with a truncate base and an acute apex, hyaline, smooth, bearing an unbranched setula at each end, 3–7 μm long, up to 0.3 μm wide.

Culture characteristics: Colonies on OA and PDA at 25 °C reaching 24–25 mm diam in 2 wk, white and lanose, with white hyphal strands, submerged mycelium greenish grey in OA, umber in PDA, margin white, effuse; reverse greenish grey in OA, ochraceous in PDA. Sporulation abundant.

Specimen examined: Portugal, Viana do Castelo, Lagos de Berliandos Protected Area, on dry leaves of Eucalyptus sp., Nov. 2011, M. Hernández-Restrepo, R.F. Castaneda & J. Gené (holotype CBS H-22986; cultures ex-type CBS 142290, FMR 12177).

Notes: Xyladiccyochaeta lusitanica is similar to Dictyochaeta eucalypti; both species have setiform conidiophores with inte- grated, intercalary and terminal phialides and (0–)1-septate conidia with setulae at both ends (Sutton & Hodges 1975). Nevertheless, they differ by the morphology of their con- idiogenous loci; X. lusitanica has polyphalidial with denticles-like openings instead of monophalidial with conspicuous flared to tubular collarettes as in D. eucalypti.

Sordariomycetes, Incertae sedis

Paradiplococcium Hern.-Restr., J. Mena & Gené, gen. nov. MycoBank MB820295.

Etymology: The name reflects the morphological similarity with Diplococcium.

Conidiophores macro-nematous, mononematous or in small fascicles, erect, straight, unbranched, brown. Conidiogenous cells poly-tretic, terminal and intercalary, integrated and cylin- drical or discrete and globose, brown. Conidia in short dry, chains, acropseudoconidial, septate, cylindrical, brown, smooth. Synasexual morph idriella-like in morphology is present in culture. Conidiophores macro-nematous, mononematous, bearing whorls of conidiogenous cells, or reduced to con- idiogenous cells growing on Diplococcium conidia, pale brown, smooth. Conidiogenous cells polyblastic, discrete, sympodial, with a long and denticulate neck, lageniform, pale brown, smooth. Conidia often in slinky heads, unicellular, falcate or filiform, hyaline, smooth.

Type species: Paradiplococcium singulare (Hern.-Restr. et al.) Hern.-Restr., J. Mena & Gené.

Paradiplococcium singulare (Hern.-Restr. et al.) Hern.-Restr., J. Mena & Gené, comb. nov. MycoBank MB820296.

Basionym: Diplococcium singulare Hern.-Restr. et al., Mycol. Progr. 11: 194. 2012.

Description and illustration: See Hernández-Restrepo et al. (2012).

Specimen examined: Spain, Aragon, Ordesa y Monte Perdido National Park, Fanlo, Arisicol canyon, on dead wood, Jun. 2009, M. Hernández-Restrepo, J. Mena Portales & J. Cano (cultures ex-type CBS 126091, FMR 10752).

Notes: This species was formerly identified as Diplococcium because of the presence of polytretic and cylindrical conidigenous cells that produce chains of septate and brown conidia (Hernández-Restrepo et al. 2012). However, the fungus also showed discrete and globose conidiogenous cells on the conidiophores, a feature not described in other species of Dip- lococcium. Therefore, the presence of these discrete conidigenous cells and the production of short conidial chains allow us to distinguish Paradiplococcium from Diplococcium. In addi- tion, the type species of this latter genus, D. spicatum, is related to Helotiales in Leotiomycetes (Shenoy et al. 2010).

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