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Fungal Systematics and Evolution: FUSE 2

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The present study introduces two new genera, 14 new species, five new combinations and 12 interesting host and/or geographical records. A majority of the fungi are Ascomycetes, but the study also includes a Basidiomycete, *Xerocomellus fulvus* described from Pakistan. Under single name nomenclature *Zeuctomorpha arecae* is reduced to synonymy under *Acroconidiellina arecae* (*Sympoventuriaceae, Venturiales, Dothideomycetes*). Based on morphology and phylogenetic affinities, *Wojnowicia dactylidis*, *W. lonicerae* and *W. spartii* are moved to the genus *Wojnowiciella* (*Phaeosphaeriaceae, Pleosporales, Dothideomycetes*) and *Zalerion arboricola* is now accommodated in *Lophium* (*Mytilinidiaceae, Mytilinidiales, Dothideomycetes*). Novel genera include: *Alfariacladiella* gen. nov. (*Stachybotryaceae, Hypocreales, Sordariomycetes*) with *A. spartii* sp. nov. as type species, and *Calvolachnella* gen. nov. (*Chaetosphaeriales, Sordariomycetes*) to accommodate *Calvolachnella guaviyuensis* comb. nov., previously included in *Pseudolachnella*. Novel species include: *Castanediella hyalopenicillata* from leaf litter (USA), *C. malaysiana* on *Eucalyptus brassiana* (Malaysia) (*Xylariales, Sordariomycetes*), *Morchella pakistanica* (*Morchellaceae, Pezizales, Pezizomycetes)* on loamy soil (Pakistan), *Muriphaeosphaeria viburni* (*Phaeosphaeriaceae, Pleosporales, Dothideomycetes*) on twigs of *Viburnum lantana* (Serbia), *Phyllosticta aucubae-japonicae* (*Phyllostictaceae, Botryosphaeriales, Dothideomycetes*) on fruit of *Aucuba japonica* (Japan), *Wojnowiciella leptocarpi* (*Phaeosphaeriaceae, Pleosporales, Dothideomycetes*) on stems of *Leptocarpus* sp. (Australia), and *Xylomelasma shoalensis* (*Sordariomycetes*) on a dead branch (USA). New species from Germany include: *Neosetophoma lunariae* and *Phaeosphaeria lunariae* (*Phaeosphaeriaceae, Pleosporales, Dothideomycetes*) on seeds of *Lunaria annua*, *Patellaria quercus* (*Patellariaceae, Patellariales, Dothideomycetes*) on twigs of *Quercus* sp., *Rhinocladiella coryli* on stems of *Corylus avellana* and *Rhinocladiella quercus* (*Herpotrichiellaceae, Chaetothyriales, Eurotiomycetes*) on twigs of *Quercus robur*. *Ramularia eucalypti* (*Mycosphaerellaceae, Capnodiales, Dothideomycetes*) is reported on leaves of *Citrus maxima* from Italy, *Beltrania rhombica* (*Beltraniaceae*, *Xylariales, Sordariomycetes*) on leaves of *Acacia* sp. from Malaysia and *Myrmecridium spartii* (*Myrmecridiaceae, Myrmecridiales, Sodariomycetes*) on *Sarothamnus scoparius* from Serbia. New reports from Australia include: *Dothiora ceratoniae* (*Dothideaceae, Dothideales, Dothideomycetes*) on leaves of *Eucalyptus* sp., *Readeriella dimorphospora* (*Teratosphaeriaceae, Capnodiales, Dothideomycetes*) on *Eucalyptus* sp., *Vermiculariopsiella dichapetali* (*Sordariomycetes*) on leaves of *Grevillea* sp. and *Acacia glaucoptera,* and *Verrucoconiothyrium nitidae* (*Montagnulaceae, Pleosporales, Dothideo-*

mycetes), on leaves of *Acacia leprosa* var. *graveolens*. New reports from La Reunion (France) include: *Botryosphaeria agaves* (*Botryosphaeriaceae, Botryosphaeriales, Dothideomycetes*) on branches of *Agave* sp., *Chrysofolia colombiana* (*Cryphonectriaceae, Diaporthales, Sordariomycetes*) on leaves of *Syzygium jambos, Colletotrichum karstii* (*Glomerellaceae, Glomerellales, Sordariomycetes*) on leaves of *Acacia heterophylla, Epicoccum sorghinum* (*Didymellaceae, Pleosporales, Dothideomycetes*) on leaves of *Paspalum* sp. and *Helminthosporium velutinum* (*Massarinaceae, Pleosporales, Dothideomycetes*) on branches of *Stoebia* sp. Finally, an epitype is designated for *Tracylla aristata* (*Sordariomycetes*) on *Eucalyptus regnans* (Australia).

Keywords: biodiversity, ITS barcodes, multi-gene phylogeny, systematics, typification.

The present paper is the second contribution in the Fungal Systematics and Evolution (FUSE) series. The series focuses on the epitypification of formerly described species, reports of new sexual-asexual connections, merging of sexual and asexual genera following the abandonment of the dual nomenclature for fungi (Hawksworth et al. 2011, Wingfield et al. 2012, Crous et al. 2015b), and the description of species or notes relating to interesting observations regarding fungi. Authors wishing to contribute to future issues in this series can e-mail submissions to Pedro Crous (p.crous@cbs.knaw.nl), Olinto Pereira (oliparini@gmail.com), Cai Lei (cail@im.ac.cn) or Chiharu Nakashima (chiharu@bio.mie-u.ac.jp). In parallel with the publication schedule for Fungal Planet, which appears in Persoonia (Crous et al. 2015e), and Genera of Fungi published in IMA Fungus (Crous et al. 2015a), FUSE is published in Sydowia.

Materials and methods

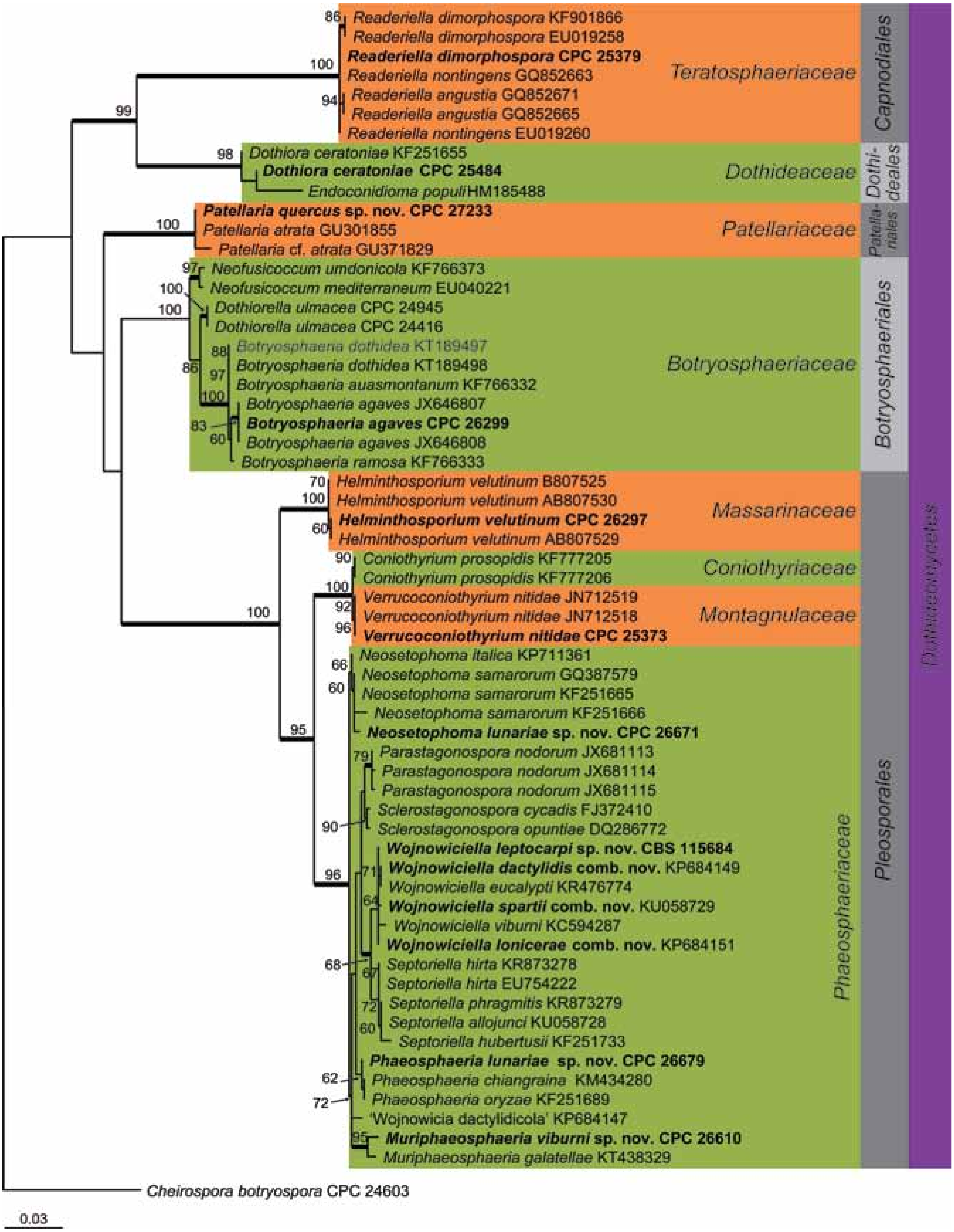
Isolates

Descriptions are based on cultures maintained at the CBS-KNAW Fungal Biodiversity Centre in Utrecht, The Netherlands (CBS), the working collection of P. W. Crous (CPC), housed at CBS, and on strains originating from other laboratories as indicated in the text. For fresh collections, leaves and twigs were placed in damp chambers, and incubated at room temperature for 1–2 d. Single conidial colonies were established from sporulating conidiomata and ascomata in Petri dishes containing 2 % malt extract agar (MEA) as described previously (Crous et al. 1991). Colonies were sub-cultured onto MEA, 2 % potato-dextrose agar (PDA), oatmeal agar (OA), MEA (Crous et al. 2009a), autoclaved pine needles on 2 % tap water agar (PNA) (Smith et al. 1996), and incubated at 25 °C under continuous near-ultraviolet light to promote sporulation. Reference strains and specimens are maintained at the CBS, except as indicated otherwise.

DNA isolation, amplification and analyses

Genomic DNA was extracted from fungal colonies growing on MEA using the Wizard® Genomic DNA purification kit (Promega, Madison, USA) following the manufacturer's protocols or directly from ascomata growing on natural substrate using the Omega Bio-Tek E.Z.N.A.® Forensic DNA (Omega Bio-tek, Georgia USA). The primers V9G (de Hoog & Gerrits van den Ende 1998) and LR5 (Vilgalys & Hester 1990) were used to amplify part (ITS) of the nuclear rDNA operon spanning the 3' end of the 18S nrRNA gene, the first internal transcribed spacer (ITS1), the 5.8S nrRNA gene, the second ITS region (ITS2) and approximately 900 bp of the 5' end of the 28S nrRNA gene. The primers ITS4 (White et al. 1990) and LROR (Rehner & Samuels 1994) were used as internal primers to ensure good quality sequences over the entire length of the amplicon. Part of the translation elongation factor 1-α gene (*tef1*), corresponding to the section 983–1567 bp (with the primers EF1-983F and EF1-1567R), was amplified and sequenced as described in Rehner & Buckley (2005). Part of the beta-tubulin gene region (*tub2*) was amplified and sequenced using primers T1 (O'Donnell & Cigelnik 1997) and Bt-2b (Glass & Donaldson 1995), and primers RPB–5F2 (Sung et al. 2007) and fRPB2-7cR (Liu et al. 1999) were used for the RNA polymerase II second largest subunit gene (*rpb2*). Amplification conditions for ITS and LSU followed those described by Cheewangkoon et al. (2008), and *rpb2* (Woudenberg et al. 2013). The program SeqMan Pro v. 10.0.1 (DNASTAR, Madison, WI, USA) was used to obtain consensus sequences for each isolate. Blast searches using ITS and LSU sequences were performed for each isolate and the closest matches were retrieved and included in the phylogenetic analyses.

Fig. 1. Maximum likelihood phylogenetic tree of the *Dothideomycetes* resulting from RAxML analysis of the LSU sequences alignment. Maximum likelihood bootstrap support values higher than 50 % are indicated at the nodes. Bayesian posterior probabilities > 0.95 are indicated as thickened lines. Families, orders and classes are indicated to the right of the tree. The tree was rooted to *Cheirospora botryospora* CPC 24603.


Readeriella dimorphospora KF901866
Readeriella dimorphospora EU019258
Readeriella dimorphospora CPC 25379
Readeriella nontingens GQ852663
Readeriella angustia GQ852671
Readeriella angustia GQ852665
Readeriella nontingens EU019260
Teratosphaeriaceae
Capnodiales
Dothiora ceratoniae KF251655
Dothiora ceratoniae CPC 25484
Endoconidioma populi HM185488
Dothideaceae
Dothi-deales
Patellaria quercus sp. nov. CPC 27233
Patellaria atrata GU301855
Patellaria cf. atrata GU371829
Patellariaceae
Patella-riales
Neofusicoccum umdonicola KF766373
Neofusicoccum mediterraneum EU040221
Dothiorella ulmacea CPC 24945
Dothiorella ulmacea CPC 24416
Botryosphaeria dothidea KT189497
Botryosphaeria dothidea KT189498
Botryosphaeria auasmontanum KF766332
Botryosphaeria agaves JX646807
Botryosphaeria agaves CPC 26299
Botryosphaeria agaves JX646808
Botryosphaeria ramosa KF766333
Botryosphaeriaceae
Botryosphaeriales
Helminthosporium velutinum B807525
Helminthosporium velutinum AB807530
Helminthosporium velutinum CPC 26297
Helminthosporium velutinum AB807529
Massarinaceae
Coniothyrium prosopidis KF777205
Coniothyrium prosopidis KF777206
Coniothyriaceae
Verrucoconiothyrium nitidae JN712519
Verrucoconiothyrium nitidae JN712518
Verrucoconiothyrium nitidae CPC 25373
Montagnulaceae
Neosetophoma italica KP711361
Neosetophoma samarorum GQ387579
Neosetophoma samarorum KF251665
Neosetophoma samarorum KF251666
Neosetophoma lunariae sp. nov. CPC 26671
Parastagonospora nodorum JX681113
Parastagonospora nodorum JX681114
Parastagonospora nodorum JX681115
Sclerostagonospora cycadis FJ372410
Sclerostagonospora opuntiae DQ286772
Wojnowiciella leptocarpi sp. nov. CBS 115684
Wojnowiciella dactylidis comb. nov. KP684149
Wojnowiciella eucalypti KR476774
Wojnowiciella spartii comb. nov. KU058729
Wojnowiciella viburni KC594287
Wojnowiciella lonicerae comb. nov. KP684151
Septoriella hirta KR873278
Septoriella hirta EU754222
Septoriella phragmitis KR873279
Septoriella allojunci KU058728
Septoriella hubertusii KF251733
Phaeosphaeria lunariae sp. nov. CPC 26679
Phaeosphaeria chiangraina KM434280
Phaeosphaeria oryzae KF251689
'Wojnowicia dactylidicola' KP684147
Muriphaeosphaeria viburni sp. nov. CPC 26610
Muriphaeosphaeria galatellae KT438329
Phaeosphaeriaceae
Pleosporales
Dothideomycetes
Cheirospora botryospora CPC 24603
0.03
86
100
94
99
98
100
97
100
100
88
86
97
100
83
60
70
100
60
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72
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62
72
95

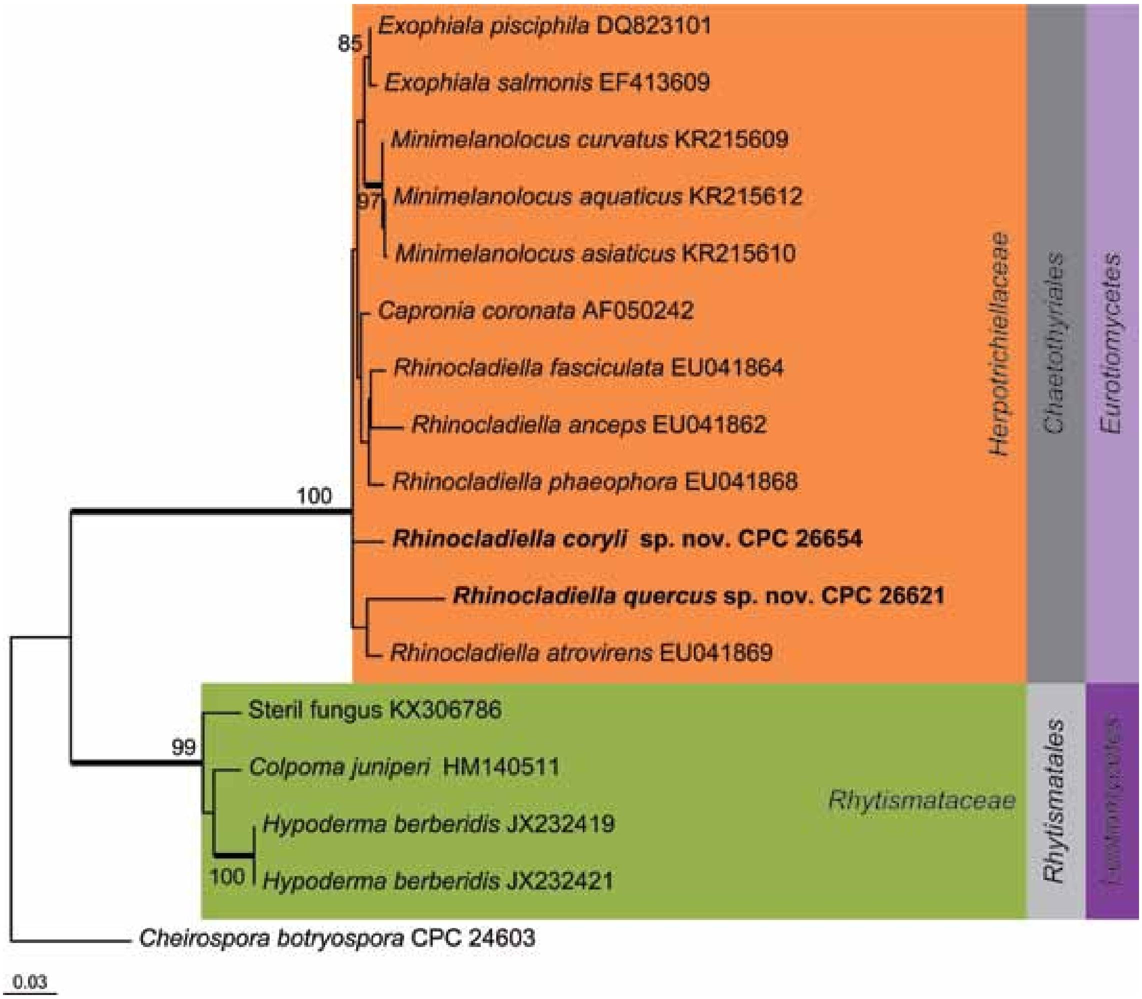


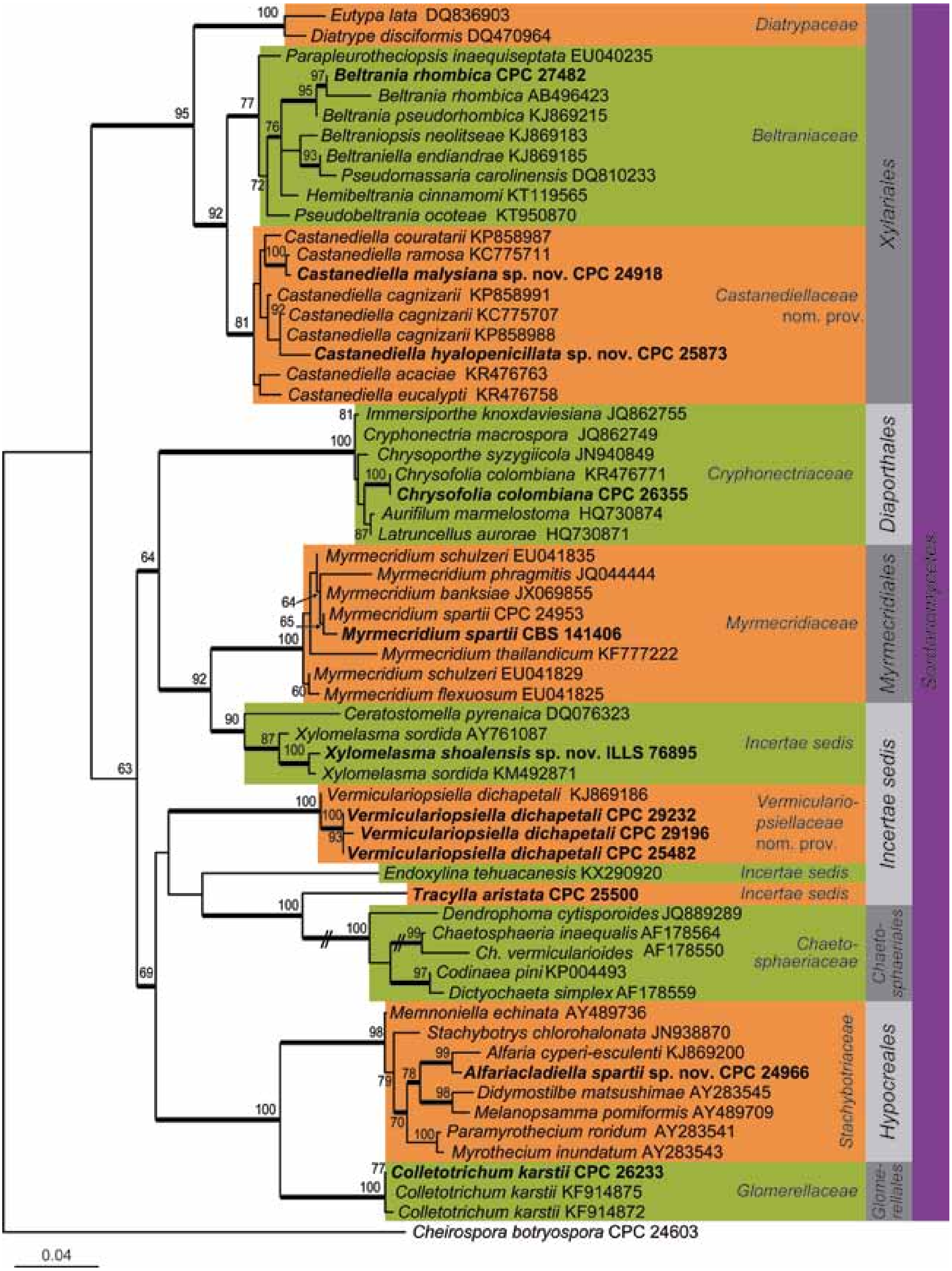
Fig. 2. Maximum likelihood phylogenetic tree of the *Eurotiomycetes* and *Leotiomycetes* resulting from RAxML analysis of the LSU sequences alignment. Maximum likelihood bootstrap support values higher than 50 % are indicated at the nodes. Bayesian posterior probabilities > 0.95 are indicated as thickened lines. Families, orders and classes are indicated to the right of the tree. The tree was rooted to *Cheirospora botryospora* CPC 24603.

The sequence alignment and subsequent phylogenetic analyses of the LSU data (Figs. 1–3) were carried out using methods described by Crous et al. (2006). Sequence data were deposited in GenBank (Tab. 1) and the alignments and trees in TreeBASE (http://www.treebase.org). Remaining sequence data are discussed under the species notes below.

Morphology

Slide preparations were mounted in clear lactic acid either directly from specimens or from colonies sporulating on MEA, PDA, PNA, or OA. Sections of conidiomata were made by hand. Observations were made with a Nikon SMZ25 stereo-microscope, and with a Zeiss Axio Imager 2 light microscope using differential interference contrast (DIC) illumination and a Nikon DS-Ri2 camera and software. Additional photomicrographs were made using a Nikon Eclipse Ni-U microscope (Nikon, Tokyo), a Nikon SMZ1500 stereo-microscope, Nikon DS-U3 digital camera and NIS Elements imaging software. Colony characters and pigment production were noted after 2–4 wk of growth on MEA and OA

Fig. 3. Maximum likelihood phylogenetic tree of the *Sordariomycetes* resulting from RAxML analysis of the LSU sequences alignment. Maximum likelihood bootstrap support values higher than 50 % are indicated at the nodes. Bayesian posterior probabilities > 0.95 are indicated as thickened lines. Families, orders and classes are indicated to the right of the tree. The tree was rooted to *Cheirospora botryospora* CPC 24603.


100
Eutypa lata DQ836903
Diatrype disciformis DQ470964
Diatrypaceae
Parapleurotheciopsis inaequiseptata EU040235
97
Beltrania rhombica CPC 27482
95
Beltrania rhombica AB496423
95
77
Beltrania pseudorhombica KJ869215
76
Beltraniopsis neolitseae KJ869183
93
Beltraniella endiandrae KJ869185
Pseudomassaria carolinensis DQ810233
72
Hemibeltrania cinnamomi KT119565
92
Pseudobeltrania ocoteae KT950870
Beltraniaceae
Castanediella couratarii KP858987
100
Castanediella ramosa KC775711
Castanediella malysiana sp. nov. CPC 24918
Castanediella cagnizarii KP858991
92
Castanediella cagnizarii KC775707
81
Castanediella cagnizarii KP858988
Castanediella hyalopenicillata sp. nov. CPC 25873
Castanediella acaciae KR476763
Castanediella eucalypti KR476758
Castanediellaceae nom. prov.
Xylariales
81
Immersiporthe knoxdaviesiana JQ862755
100
Cryphonectria macrospora JQ862749
Chrysoporthe syzygiicola JN940849
100
Chrysofolia colombiana KR476771
Chrysofolia colombiana CPC 26355
Aurifilum marmelostoma HQ730874
87
Latruncellus aurorae HQ730871
Cryphonectriaceae
Diaporthales
64
Myrmecridium schulzeri EU041835
Myrmecridium phragmitis JQ044444
64
Myrmecridium banksiae JX069855
65
Myrmecridium spartii CPC 24953
100
Myrmecridium spartii CBS 141406
Myrmecridium thailandicum KF777222
92
Myrmecridium schulzeri EU041829
60
Myrmecridium flexuosum EU041825
Myrmecridiaceae
Myrmecridiales
90
Ceratostomella pyrenaica DQ076323
87
Xylomelasma sordida AY761087
100
Xylomelasma shoalensis sp. nov. ILLS 76895
Xylomelasma sordida KM492871
Incertae sedis
63
100
Vermiculariopsiella dichapetali KJ869186
100
Vermiculariopsiella dichapetali CPC 29232
Vermiculariopsiella dichapetali CPC 29196
93
Vermiculariopsiella dichapetali CPC 25482
Vermiculariopsiellaceae nom. prov.
Endoxylina tehuacanesis KX290920
Incertae sedis
Tracylla aristata CPC 25500
Incertae sedis
Incertae sedis
100
Dendrophoma cytisporoides JQ889289
100
99
Chaetosphaeria inaequalis AF178564
Ch. vermicularioides AF178550
97
Codinaea pini KP004493
Dictyochaeta simplex AF178559
Chaetosphaeriaceae
Chaetosphaeriales
69
Memnoniella echinata AY489736
98
Stachybotrys chlorohalonata JN938870
99
Alfaria cyperi-esculenti KJ869200
78
Alfariacladiella spartii sp. nov. CPC 24966
79
98
Didymostilbe matsushimae AY283545
Melanopsamma pomiformis AY489709
70
100
Paramyrothecium roridum AY283541
Myrothecium inundatum AY283543
Stachybotriaceae
Hypocreales
100
77
Colletotrichum karstii CPC 26233
100
Colletotrichum karstii KF914875
Colletotrichum karstii KF914872
Glomerellaceae
Glomerellales
Sordariomycetes
Cheirospora botryospora CPC 24603
0.04

Tab. 1. Details of sequences and strains included in the molecular and morphological analysis for the new species and interesting reports.

Species	Strain accession number[1]	Country	Locality	Substrate	Collector(s)	GenBank accession numbers[2]	
						ITS	LSU
Acroconidiellina arecae	NFCCI 3696	India	Kerala State, Palakad District, Kayiliad	on fallen leaves of *Areca catechu*	K.C. Rajeshkumar	KX306747	KX306776
Alfariacladiella spartii	CBS 141403 = CPC 24966, ex-type	Spain	Jaén, Los Villares	*Spartium junceum*	S. Tello	KX306748	KX306777
Beltrania rhombica	CPC 27482 = CBS 141507	Malaysia	Sabah	on leaves of *Acacia* sp.	M.J. Wingfield	KX306749	KX306778
Botryosphaeria agaves	CPC 26299 = CBS 141505	France	La Réunion	on branches of *Agave* sp.	P.W. Crous	KX306750	KX306779
Calvolachnella guaviyuensis	CBS 134695 = CMW 39055 ex-type	Uruguay	Quebrada de los Cuervos	*Myrcianthes pungens*	M.J. Wingfield & C. Perez	KJ834524	KJ843525
Castanediella hyalopenicillata	CPC 25873 = CBS 141510, ex-type	USA	Puerto Rico	on leaf litter	unknown	KX306751	KX306780
Castanediella malysiana	CPC 24918 = CBS 141509, ex-type	Malaysia	Sabah	on *Eucalyptus brassiana*	M.J. Wingfield	KX306752	KX306781
Chrysofolia colombiana	CPC 26355 = CBS 141506	France	La Réunion	on leaves of *Syzygium jambos*	P.W. Crous	KX306753	KX306782
Colletotrichum karstii	CPC 26233 = CBS 141503	France	La Réunion	on leaves of *Acacia heterophylla*	P.W. Crous	KX306754	KX306783
Dothiora ceratoniae	CPC 25484 = CBS 141501	Australia	Melbourne	on leaves of *Eucalyptus* sp.	P.W. Crous	KX306755	KX306784
Epicoccum sorghinum	CPC 26197 = CBS 141502	France	La Réunion	on leaves of *Paspalum* sp.	P.W. Crous	KX306756	–
Helminthosporium velutinum	CPC 26297 = CBS 141504	France	La Réunion	on branches of *Stoebia* sp.	P.W. Crous	KX306757	KX306785
Lophium arboricola	CBS 758.71 ex-type	UK	Forest of Dean	on cankers of *Larix decidua*	S.T. Buczacki	AF169307	KU705843
Lophium arboricola	CBS 102826	Spain	Arbolí	on dung	J. Gené	KU705825	KU705842
Morchella pakistanica	SJ121 (Holotype LAH35075)	Pakistan	Khanspur	Loamy soil	S. Jabeen & A. N. Khalid	KX306759	–
Morchella pakistanica	SJ121b	Pakistan	Khanspur	Loamy soil	S. Jabeen & A. N. Khalid	KX306760	–
Muriphaeosphaeria viburni	CBS 141412 = CPC 26610, ex-type	Serbia	Fruska Gora (Iriski Venac)	on twig of *Viburnum lantana*	D. Savic	KX306761	KX306787
Myrmecridium spartii	CBS 141406 = CPC 26548	Serbia	Fruska Gora (Iriski Venac)	on *Cytisus scoparius*	D. Savic	KX306762	KX306788
Neosetophoma lunariae	CBS 141409 = CPC 26671, ex-type	Germany		on seeds of *Lunaria annua*	R.K. Schumacher	KX306763	KX306789

Patellaria quercus	CPC 27232 = CBS 141410, ex-type	Germany		on twigs of *Quercus* sp.	R.K. Schumacher	KX306764	KX306790
Phaeosphaeria lunariae	CBS 141415 = CPC 26679, ex-type	Germany		on seeds of *Lunaria annua*	R.K. Schumacher	KX306765	KX306791
Phyllosticta aucubae-japonicae	MAFF 236703 = LC 4755, ex-type	Japan	Kagoshima	on fruit of *Aucuba japonica*	T. Kobayashi	KR233300	–
Phyllosticta aucubae-japonicae	MAFF 410353 = LC 4754	Japan	Kagoshima	on fruit of *Aucuba japonica*	T. Kobayashi	KR233301	–
Ramularia eucalypti	CPC 26186 = CBS 141518	Italy	Sicily	on leaves of *Citrus maxima*	V. Guarnaccia	KX306766	–
Readeriella dimorphospora	CPC 25379 = CBS 141497	Australia	Melbourne	*Eucalyptus* sp.	P.W. Crous	KX306767	KX306792
Rhinocladiella coryli	CPC 26654 = CBS 141407, ex-type	Germany		on stems of *Corylus avelana*	R.K. Schumacher	KX306768	KX306793
Rhinocladiella quercus	CPC 26621 = CBS 141448, ex-type	Germany		on twigs of *Quercus robur*	R.K. Schumacher	KX306769	KX306794
Tracylla aristata	CPC 25500 = CBS 141401, ex-epitype	Australia	Victoria, Toolangi State Forest	*Eucalyptus* sp.	P.W. Crous, J. Edwards & P.W.J. Taylor	KX306770	KX306795
Vermiculariopsiella dichapetali	CPC 25482 = CBS 141498	Australia	Melbourne	on leaves of *Grevillea* sp.	P.W. Crous	KX306771	KX306796
Vermiculariopsiella dichapetali	CPC 29196 = CBS 141499	Australia	Western Australia, Perth, Bedfordale	on leaves of *Grevillea* sp.	P.W. Crous	KX306772	KX306797
Vermiculariopsiella dichapetali	CPC 29232 = CBS 141500	Australia	Western Australia	on leaves of *Acacia glaucoptera*	P.W. Crous	KX306773	KX306798
Verrucoconiothyrium nitidae	CPC 25373 = CBS 141517	Australia	Melbourne	on leaves of *Acacia leprosa* var. *graveolens*	P.W. Crous	KX306774	KX306799
Wojnowiciella leptocarpi	CBS 115684, ex-type	Australia		stem of *Leptocarpus* sp.	F.G. Haddad	KX306775	KX306800
Xerocomellus fulvus	LAH926714, ex-type	Pakistan	Khyber Pakhtunkhwa, Swat, Ushu Kalam	on soil under *Cedrus deodara*	I. Ahmad		KU163374
Xylomelasma shoalensis	ILLS 76895, ex-type	USA	Illinois, Montgomery County, Shoal Creek Nature Conservation Area	branch on ground (6 cm. diam.)	A.N. Miller	–	KX290919

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[1] CBS: CBS-KNAW Fungal Biodiversity Centre, Utrecht, The Netherlands; CPC: Culture collection of Pedro Crous, housed at CBS; CMW: Culture collection of the Forestry and Agricultural Biotechnology Institute (FABI) of the University of Pretoria, Pretoria South Africa; ILLS: Herbarium of the Illinois Natural History Survey, Champaign, Illinois, USA; LAH: Herbarium of the Botany Department, at the University of the Punjab, Lahore, Pakistan; MAFF: Ministry of Agriculture, Forestry and Fisheries, Tsukuba, Ibaraki, Japan; NFCCI: National Fungal Culture Collection of India, Pune, India.

[2] ITS: internal transcribed spacer regions 1 & 2 including 5.8S nrRNA gene; LSU: 28S large subunit of the nrRNA gene.

(Crous et al. 2009b) incubated at 25 °C. Colony colours (surface and reverse) were rated according to the colour charts of Rayner (1970). Taxonomic novelties were deposited in MycoBank (www.MycoBank. org; Crous et al. 2004).

Taxonomy

Acroconidiellina arecae (Berk. & Broome) M.B. Ellis, *Mycol.* Pap. **125**: 26. 1971. – Fig. 4

Basionym. – *Helminthosporium arecae* Berk. & Broome [as ‘Helmisporium’] *J. Linn. Soc., Bot.* **14** (no. 74): 99. 1873 [1875].

≡ *Brachysporium arecae* (Berk. & Broome) Sacc., *Syll. Fung.* (Abellini) **4**: 429. 1886.

≡ *Exosporium arecae* (Berk. & Broome) Petch, *Ann. R. Bot. Gdns Peradeniya* **10**: 174. 1927.

= *Zeuctomorpha arecae* Sivan., P.M. Kirk & Govindu, *The Bitunicate Ascomycetes and their anamorphs*: 572. 1984.

≡ *Acantharia arecae* (Sivan., P.M. Kirk & Govindu) Y. Zhang ter & K.D. Hyde, *Fungal Diversity Res. Ser.* **51**: 258. 2011.

Fig. 4. *Acroconidiellina arecae* (AMH 9676). **A, B.** Habitat. **C–F.** Conidiophores and conidiogenous cells. **G.** Conidia. Scale bars **C–G** 10 µm

Description. – Colonies hypophyllous, punctiform or forming dark blackish brown patches. The bunch of conidiophores is anchored to the leaves by dark brown hyphae that form a semi-immersed stroma. – Conidiophores erect, mostly straight or slightly flexuous, unbranched or with a short branch, mid to dark brown, rugulose or verruculose, thick walled, septate, 115–450 µm, 5–7 µm thick at base slightly broadening towards tip, 9–13.5 µm at apex. – Conidia solitary, straight, obturbinate or obclavate, 0–5-septate, central cells darker and verruculose, mid to dark brown, cells at each end are pales and smoother, young conidia aseptate, 27–33.5 × 17–19 µm, mature conidia 1–5-septate, 43–63.5 × 18–21 µm. – Ascomata 175–300 *µm* diam., gregarious, superficial, globose to slightly flattened, collapsed at the apex when dry, ostiolate, covered with numerous long setae. – Peridium up to 25 *µm* wide, composed of heavily pigmented pseudoparenchymatous cells of *textura angularis*, to 7 *µm* diam. – Hamathecium of rare, 2–5 *µm* broad, septate, branched, anastomosing pseudoparaphyses. – Asci 8-spored, bitunicate, fissitunicate, broadly clavate to obclavate, 83–185 × 29–40(50) *µm,* with a short thick pedicel, up to 40 *µm* long, apically rounded, with a small ocular chamber. – Ascospores 2–4 seriate, ellipsoidal, 35–43 × 12.5–18 *µm*, dark brown, 1-septate, deeply constricted at the septum, usually slightly asymmetric, smooth-walled (description of the sexual morph adapted from Zhang et al. 2012).

Culture characteristics. – Colonies at 25±2 °C after 15 d on PDA and MEA, slow growing, 20–25 mm diam., dark olivaceous brown to coffee brown, velutinous to mid floccose, centre raised, margin low, regular, reverse coffee brown to brownish black. Exudates and soluble-pigments absent.

Material examined. – INDIA, Kerala State, Palakad District, Kayiliad, on fallen leaves of *Areca catechu* (*Arecaceae*), 23 Dec 2014, *leg.* K. C. Rajeshkumar, specimen AMH 9676, culture NFCCI 3696.

Notes. – *Acroconidiellina* was established based on the type species *A. loudetiae* (Ellis 1971) on *Loudetia arundinaceae* from Tanzania. The genus initially accommodated four species, *A. loudetiae, A. chloridis, A. urtiagae* and *A. arecae*. Sivanesan (1984) introduced *Zeuctomorpha arecae* as the sexual morph of *A. arecae* based on a specimen col-

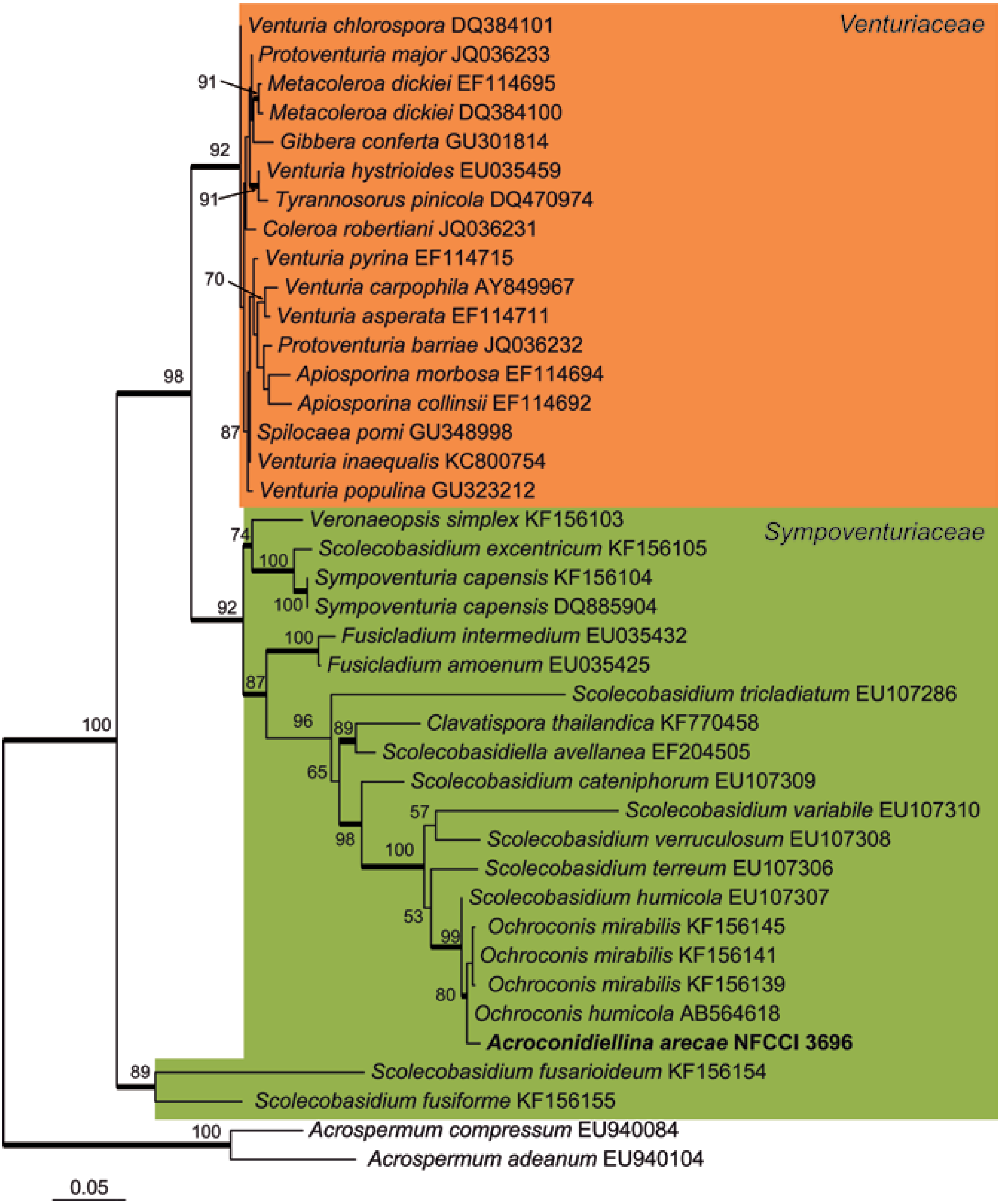


Fig. 5. Maximum likelihood phylogenetic tree of the *Venturiales* resulting from RAxML analysis of the LSU sequences alignment. Maximum likelihood bootstrap support values higher than 50 % are indicated at the nodes. Bayesian posterior probabilities > 0.95 are indicated as thickened lines. Families are indicated to the right of the tree. The tree was rooted to *Acrospermum compressum* and *A. adeanum*.

lected in India growing on leaf of *Arecae catechu* (holotype IMI 246067). Eriksson & Hawksworth (1998) classified *Zeuctomorpha* in *Pleosporaceae,* a treatment that was followed by Kirk et al. (2001), Kodsueb et al. (2006) and Lumbsch & Huhndorf (2010). However, Zhang et al. (2011) treated *Zeuctomorpha arecae* as a synonym of *Acantharia arecae* and *Zeuctomorpha* as a synonym of *Acantharia*. A year later, Zhang et al. (2012) resurrected the genus *Zeuctomorpha*, listing *Acroconidiellina* as asexual morph, speculating on its relationship to *Venturiaceae*. Ariyawansa et al. (2015) generated a "backbone" tree for families of *Pleosporaceae*, accepting 18 genera, but excluding seven genera, including *Zeuctomorpha* (*incertae sedis*). The present collection and phylogenetic analysis revealed that ITS and LSU sequences from the single conidial isolate of *Acroconidiellina arecae* (NFCCI 3696) is allied to the *Scolecobasidium–Ochroconis* complex, belonging to *Sympoventuriaceae* (*Venturiales, Dothideomycetes*) (Fig. 5).

Authors: K. C. Rajeshkumar & P. W. Crous

Alfariacladiella Crous & R.K. Schumach., **gen. nov.**
MycoBank MB817207

Description. – Conidiomata sporodochial, cupulate, solitary, dark brown, immersed to erumpent, globose, oozing peach coloured slimy conidial masses, surrounded by hyaline, smooth, subcylindrical and septate marginal hyphae; conidiomatal wall of 6–12 layers of *textura angularis*. – Conidiophores lining the inner cavity, hyaline, smooth, septate, monoverticillate or not, subcylindrical. – Conidiogenous cells terminal or integrated on conidiophores, lateral, phialidic with minute collarette and periclinal thickening, at times with mucoid sheath, hyaline, smooth, subcylindrical. – Conidia accumulating in slime, single, hyaline, smooth, guttulate, fusiform, straight to irregular, widest in middle, tapering to a truncate base and subobtusely rounded apex, encased in mucoid cap.

Etymology. – The name reflects its morphological similarity to the genus *Alfaria*.

Type species. *Alfariacladiella spartii.*

Alfariacladiella spartii Crous & R.K. Schumach., **sp. nov.** – Fig. 6
MycoBank MB817208

Description. – Conidiomata (on MEA) sporodochial, cupulate, solitary, dark brown, immersed to erumpent, globose, up to 300 µm diam., oozing peach coloured slimy conidial masses, surrounded by hyaline, septate, smooth, subcylindrical, 20–50 × 2.5–3.5 µm, marginal hyphae; conidiomatal wall of 6–12 layers of *textura angularis*. – Conidi-

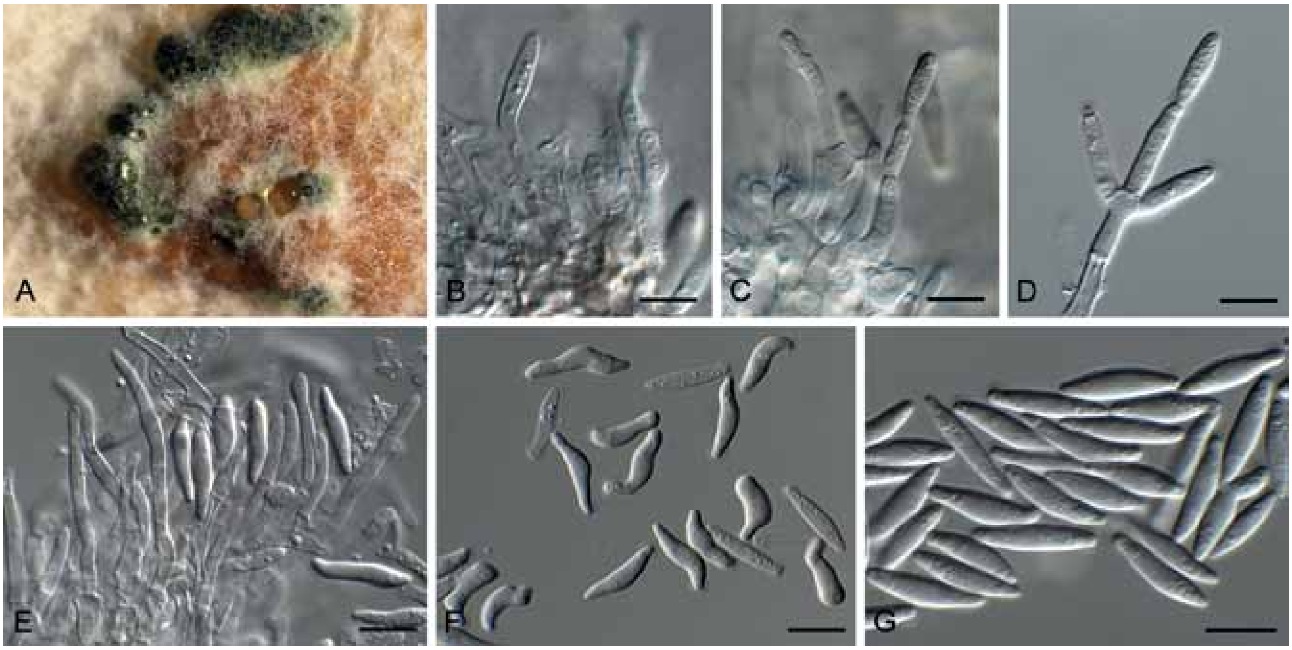


Fig. 6. *Alfariacladiella spartii* (CBS 141403). **A.** Colony on OA. **B–E.** Conidiophores and conidiogenous cells. **F, G.** Conidia. Scale bars **B–G** 10 µm.

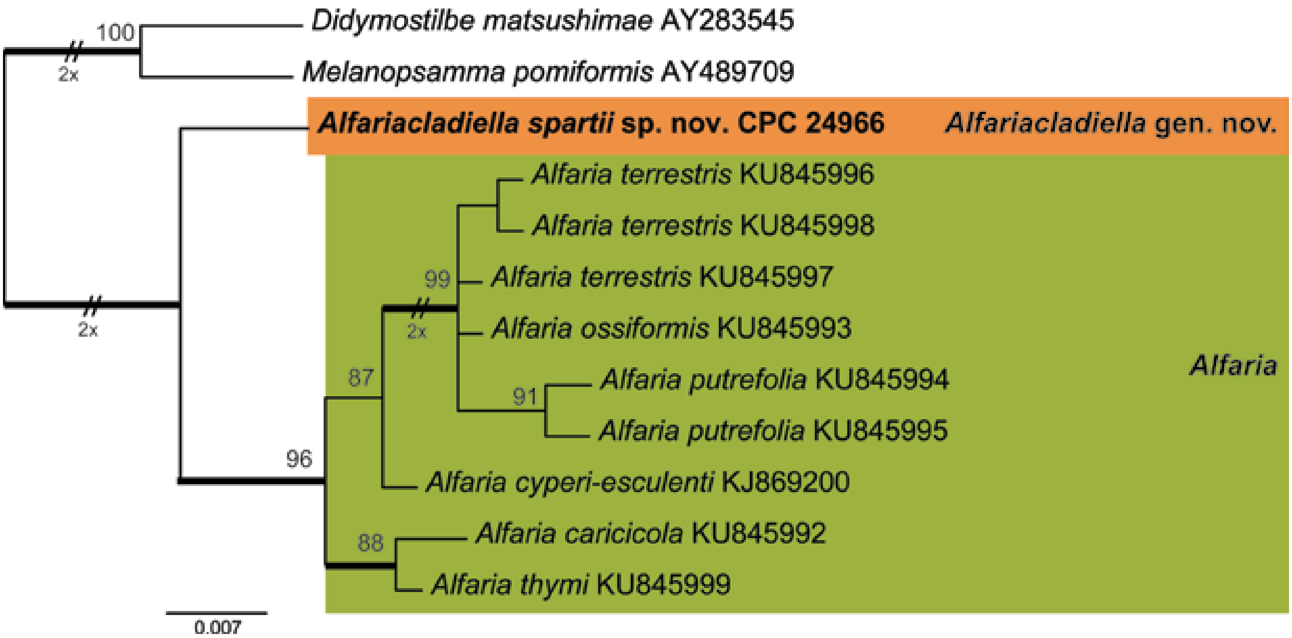


Fig. 7. Phylogenetic tree resulting from a Bayesian analysis of the LSU sequences alignment of *Alfaria* and *Alfariacladiella*. Bayesian posterior probabilities > 0.95 are indicated as thickened lines. Maximum likelihood bootstrap support values higher than 50 % are indicated at the nodes. The tree was rooted to *Didymostilbe matsushimae* and *Melanopsamma pomiformis*.

ophores lining the inner cavity, hyaline, smooth, 0–3-septate, monoverticillate or not, subcylindrical, 10–30 × 3–5 µm. – Conidiogenous cells terminal or integrated on conidiophores, lateral, phialidic with periclinal thickening, at times with mucoid sheath (1–2 µm thick), hyaline, smooth, subcylindrical, 10–20 × 2.5–3.5 µm. – Conidia solitary, hyaline, smooth, guttulate, fusiform, straight to irregular, widest in middle, tapering to a truncate base and subobtusely rounded apex, encased in mucoid cap, 1–1.5 µm diam., (12)14–17(20) × (3)3.5–4(4.5) µm.

Etymology. – The name refers to *Spartium*, the host genus from which this fungus was collected.

Culture characteristics. – Colonies flat, spreading, with sparse aerial mycelium, and smooth, even margins, reaching to 35 mm diam. after 2 wk at 25 °C. On MEA, PDA and OA surface saffron to peach with patches of salmon, reverse similar in colour.

Material examined. – SPAIN, Jaén, Los Villares, 3°48'14.02"O, 37°39'31.29"N, alt. 970 m.a.s.l., on stems of *Spartium junceum* (*Leguminosae*), 24 Jun 2014, *leg.* S. Tello (holotype CBS H-22655, culture ex-type CPC 24966 = CBS 141403).

Notes. – *Alfariacladiella* is allied to *Alfaria* (Fig. 3), a sexual genus associated with leaf apical necrosis of *Cyperus esculentus* (Crous et al. 2014). In a recent study, Lombard et al. (2016) introduced several asexual members of *Alfaria*, characterised by having myrothecium-like sporodochial conidiomata, two kinds of setae, branched to unbranched conidiophores, phialidic conidiogenous cells, and hyaline, ellipsoidal, straight to curved conidia. Although the LSU sequence places *Alfariacladiella spartii* as sister to *Alfaria* (Fig. 7), these fungi are clearly not congeneric. *Alfariacladiella* lacks brown setae surrounding its conidiomata, and its fusiform conidia have apical mucoid caps. *Alfariacladiella* is thus introduced as additional genus in *Stachybotriaceae* to accommodate *A. spartii*.

Authors: P. W. Crous, L. Lombard, M. Hernández-Restrepo & R. K. Schumacher

Calvolachnella Marinc., T.A. Duong & M.J. Wingf., **gen. nov.**
MycoBank MB815619

Description. – Conidiomata acervular, scattered, cupulate with the base broadly attached to the substrate; setae absent. – Conidiophores arising in the concavity of the conidiomata, pale brown, septate and branched at the base. – Conidiogenous cells phialidic, cylindrical, subhyaline to pale brown. – Conidia fusiform, hyaline to pale brown, straight to slightly curved, bearing setulae at both ends.

Etymology. – The name refers to the hair (setae)-less conidiomata.

Type species. – *Calvolachnella guaviyuensis*.

Calvolachnella guaviyuensis (Marinc. T.A. Duong, M.J. Wingf. & C.A. Perez) Marinc., T.A. Duong & M.J. Wingf. **comb. nov.** – Fig. 8.
MycoBank MB815620

Basionym. – *Pseudolachnella guaviyuensis* Marinc., T.A. Duong, M.J. Wingf. & C.A. Perez, *Persoonia* **32**: 295. 2014.

Description. – Conidiomata acervular, corticolous, scattered, superficial, elongate to oval in outline, cupulate with the edge slightly curved inward in section view and the base broadly attached to the substrate (subepidermal), up to 700 µm long, up to 420 µm wide, up to 200 µm deep, filled with olivaceous black agglutinated conidial mass; basal stroma well-developed, sub-epidermal, of *textura angularis* or *epidermoidea*, cells thick-walled, subhyaline when intercellular to pale brown, cells bordering the lateral wall becoming darker and thicker; lateral walls consisting of cells of *textura porrecta* in a few strata, cells thin-walled, pale brown to brown, marginal cells of each strata becoming darker. – Conidiophores arising in the concavity of the conidiomata, septate and branched at the base, pale brown, smooth. – Conidiogenous cells phialidic, cylindrical, subhyaline to pale brown, collarettes minutes with minimal periclinal thickening, 15–26 × 2–3 µm. – Conidia hyaline when young and becoming pale brown with age, fusiform, straight or slightly curved, gradually tapering towards the apex, with an obtuse and truncate base, smooth or verruculose with age, bearing single setulae at both ends, 26–43.5 × 2–3.5 µm, aseptate when young developing 3 septa with age, middle cells usually shorter than end cells, germinating from any of 4 cells; apical setulae 5–14 µm long, centric; basal setulae 4.5–13.5 µm long, excentric, both appendages 0.5–1 µm wide at the base and tapering towards the apex.

Culture characteristics. – On MEA with optimum growth at 25 °C in the dark, reaching 22 mm in 22 days, 18 mm at 30 °C, 16.5 mm at 20 °C and 12.5 mm at 15 °C. No growth occurred at 35 °C, sterile, above grey, reverse black, growing circular, radially striated with lobate edge, mycelia flat, velvety, medium dense, exuding dark brown pigmentation at the edge of colony in 2 mm width.

Material examined. – Uruguay, Quebrada de los Cuervos, on *Myrcianthes pungens* (*Myrtaceae*), Oct 2012, *leg.* M.J. Wingfield & C. Perez, holotype PREM 60964, culture ex-holotype CBS 134695 = CMW 39055, ex-isotypes CMW 39018–39020.

Notes. – *Pseudolachnella guaviyuensis* was introduced for a cupulate asexual fungus found on the bark of *Myrcianthes pungens* in Uruguay. Its taxonomic placement was based on conidial morphology and DNA sequence data available at that time, but an important characteristic of the genus, namely the presence of conidiomatal setae was not observed (Crous et al. 2014). Recently Hashimoto et al. (2015) published a taxonomic revision of *Pseudolachnea* and *Pseudolachnella*. This has made it necessary to re-consider the placement of *P. guaviyuensis* using freshly DNA sequence data of additional species of *Pseudolachnella* and closely related genera.

Phylogenetic analysis (Fig. 9) using combined ITS and LSU sequence data indicated that *P. guaviyuensis* forms an independent lineage and is not a member of established chaetosphaerialean genera such as *Pseudolachnella*, *Pseudolachnea* and *Dinemasporium* species, which were thought to be closely related to the fungus based on conidial morphology. *Calvolachnella* can be distinguished from other closely-related genera by the absence of setae in conidiomata, pale brown to brown conidiogenous cells and hyaline to pale brown conidia.

Authors: S. Marincowitz, T. A. Duong & M. J. Wingfield

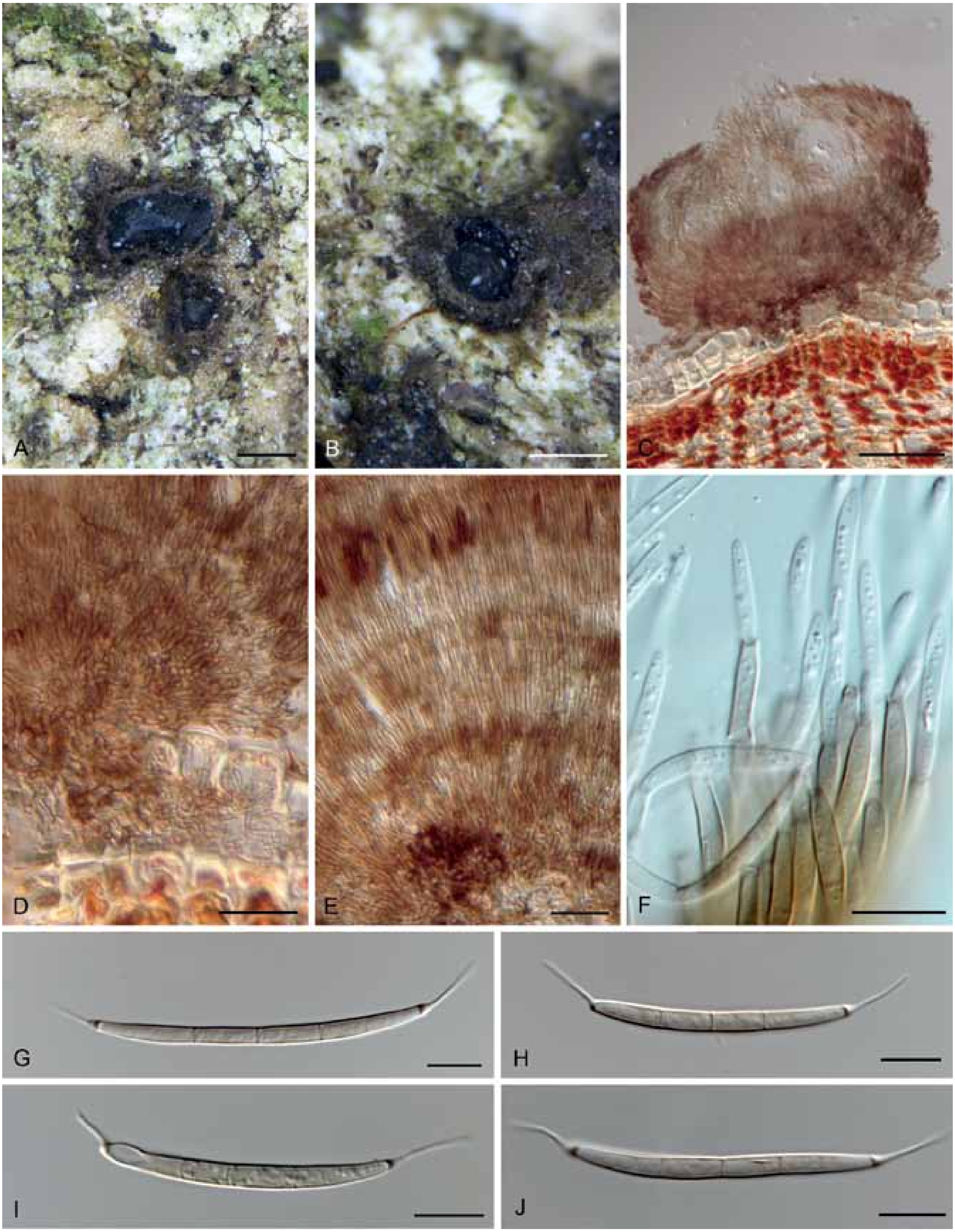
Castanediella hyalopenicillata Hern.-Restr. & Crous, **sp. nov.** – Fig. 10
MycoBank MB817209

Description (on SNA). – Mycelium hyaline, septate, smooth, 2–3 µm wide, sometimes moniliform, 3–4 µm wide. – Conidiophores erect to prostrate, cylindrical, branched, penicillate, mono-, bi-, and terverticillate, hyaline, 24–69 × 1.5–3 µm. – Conidiogenous cells mono- and polyblastic, terminal, short cylindrical, ampulliform, hyaline, smooth, 6.5–14 × 2–4 µm, denticulate, denticles refractive at the top, 0.5–1 µm wide, 0.5–1.5 µm long. – Conidia fusiform, 0–1-septate, base pointed, apex obtuse, hyaline, smooth, 14–24 × 2–3 µm. – Sexual morph unknown.

Etymology. – The name is derived from the hyaline and penicillate conidiophores.

Culture characteristics. – Colonies reaching 23–25 mm diam. after 1 wk at 25 °C. On MEA centre fasciculate, saffron, and glabrous to the margin, submerged mycelium vinaceous, margin ef-

Fig. 8. *Calvolachnella guaviyuensis* (CBS 134695). **A, B.** Cupulate conidiomata. **C.** Vertical section of conidioma. **D.** Close-up of basal stroma. **E.** Lateral wall. **F.** Conidiogenous cells. **G–J.** Conidium with cellular appendage at both ends. Scale bars: **A, B** 250 µm, **C** 100 µm, **D, E** 25 µm, **F–J** 10 µm.


A
B
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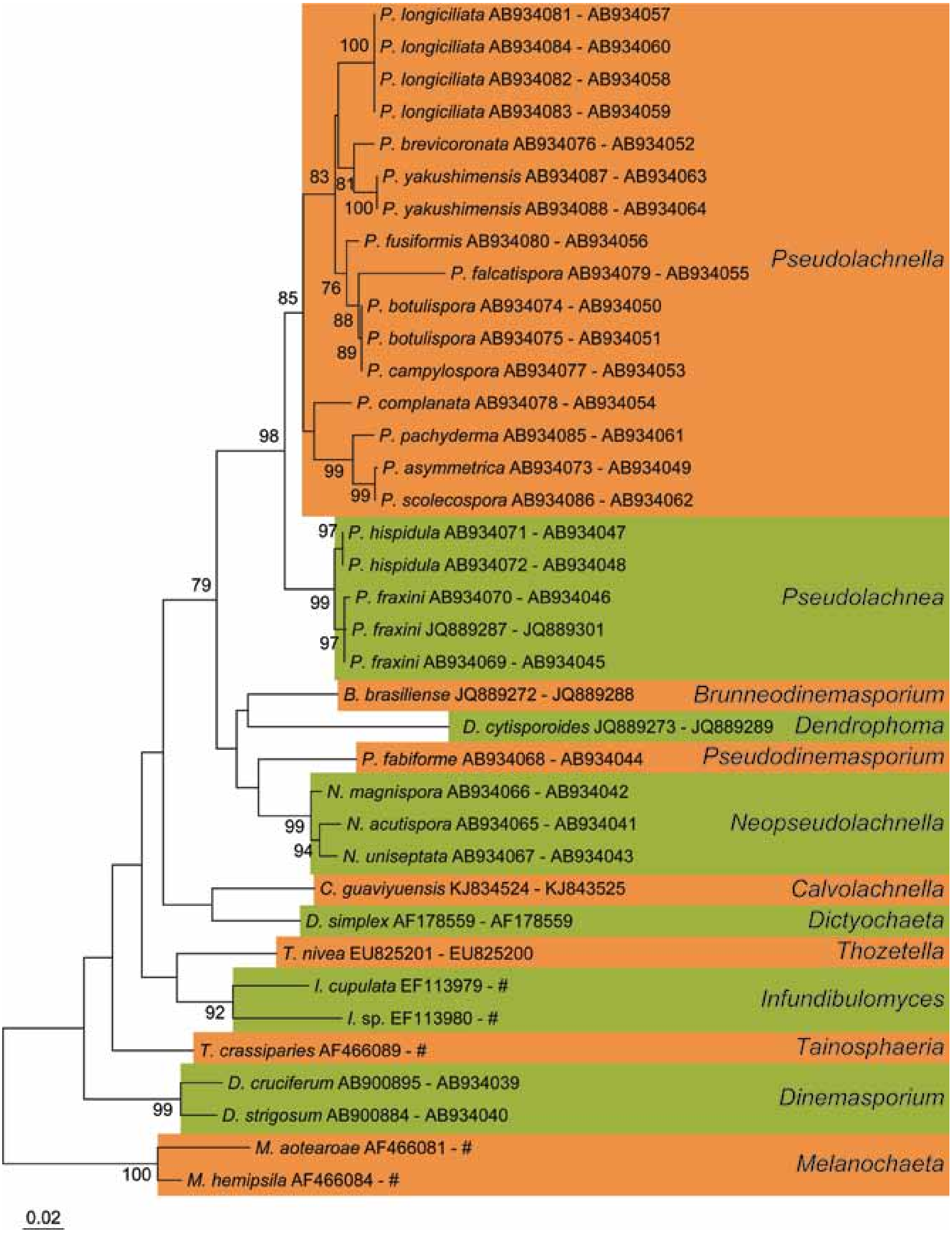

P. longiciliata AB934081 - AB934057
100
P. longiciliata AB934084 - AB934060
P. longiciliata AB934082 - AB934058
P. longiciliata AB934083 - AB934059
P. brevicoronata AB934076 - AB934052
83
81
P. yakushimensis AB934087 - AB934063
100
P. yakushimensis AB934088 - AB934064
P. fusiformis AB934080 - AB934056
P. falcatispora AB934079 - AB934055
Pseudolachnella
76
85
P. botulispora AB934074 - AB934050
88
P. botulispora AB934075 - AB934051
89
P. campylospora AB934077 - AB934053
P. complanata AB934078 - AB934054
98
P. pachyderma AB934085 - AB934061
99
P. asymmetrica AB934073 - AB934049
99
P. scolecospora AB934086 - AB934062
97
P. hispidula AB934071 - AB934047
P. hispidula AB934072 - AB934048
79
99
P. fraxini AB934070 - AB934046
Pseudolachnea
P. fraxini JQ889287 - JQ889301
97
P. fraxini AB934069 - AB934045
B. brasiliense JQ889272 - JQ889288
Brunneodinemasporium
D. cytisporoides JQ889273 - JQ889289
Dendrophoma
P. fabiforme AB934068 - AB934044
Pseudodinemasporium
N. magnispora AB934066 - AB934042
99
N. acutispora AB934065 - AB934041
Neopseudolachnella
94
N. uniseptata AB934067 - AB934043
C. guaviyuensis KJ834524 - KJ843525
Calvolachnella
D. simplex AF178559 - AF178559
Dictyochaeta
T. nivea EU825201 - EU825200
Thozetella
I. cupulata EF113979 - #
Infundibulomyces
92
I. sp. EF113980 - #
T. crassiparies AF466089 - #
Tainosphaeria
D. cruciferum AB900895 - AB934039
Dinemasporium
99
D. strigosum AB900884 - AB934040
M. aotearoae AF466081 - #
Melanochaeta
100
M. hemipsila AF466084 - #
0.02

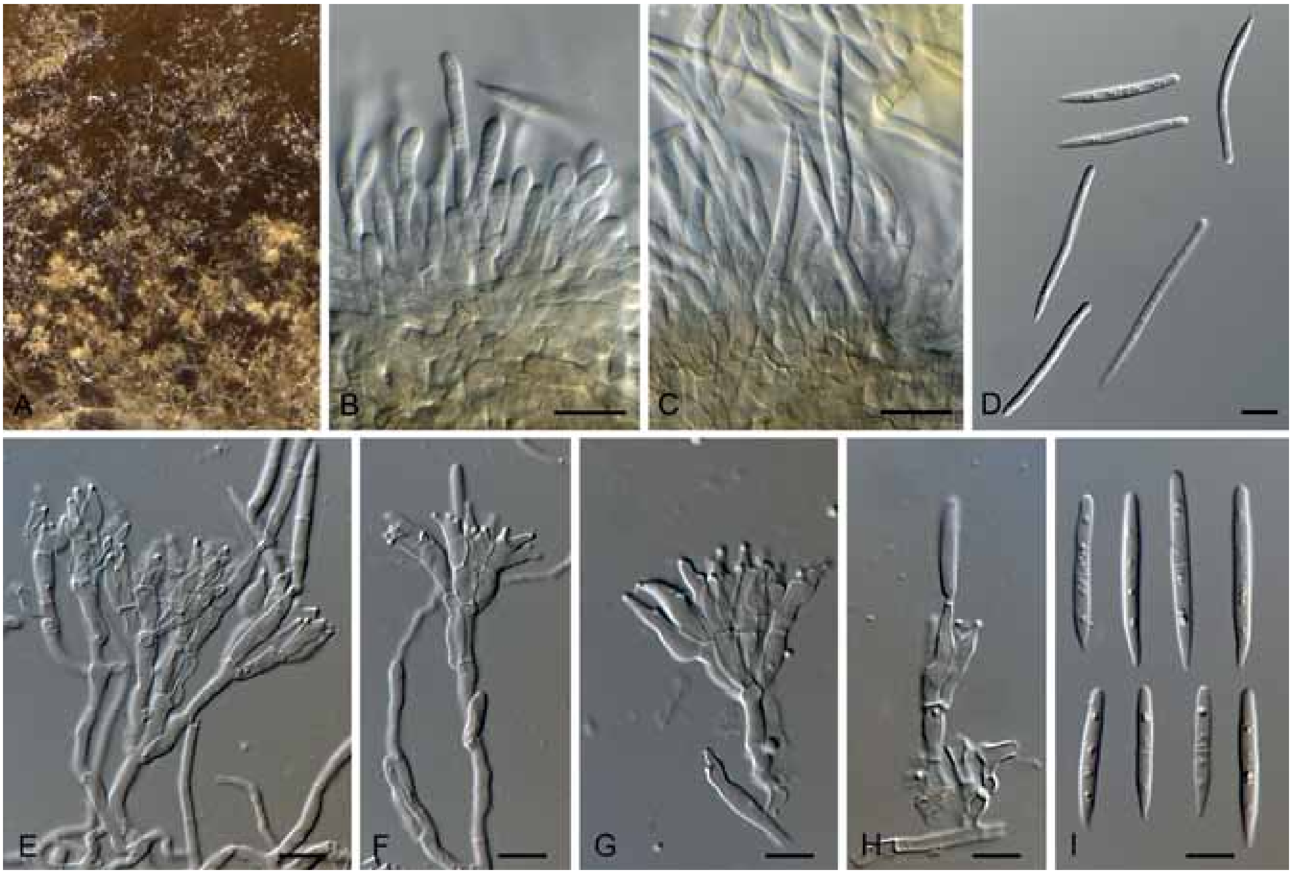


Fig. 10. *Castanediella hyalopenicillata* (CPC 25873, A–D on MEA; E–I on SNA). **A.** Colony overview on MEA. **B, C**. Conidiogenous cells. **D, I**. Conidia. **E–H.** Conidiophores and conidiogenous cells. **E**. Conidia. Scale bars 10 µm.

fuse; reverse brick, margin rosy buff. On PDA fasciculate, dark sienna, fascicule cinnamon, margin white, effuse; reverse umber. On OA glabrous with few fascicles in the centre, sienna to pale sienna in the centre, margin white, effuse; reverse saffron.

Material examined. – USA, Puerto Rico, from leaf litter, 2014, unknown collector (holotype CBS H-22658, culture ex-type CBS 141510 = CPC 25873).

Notes. – *Castanediella* was recently introduced for idriella-like fungi, distinguished by having branched conidiophores with straight to slightly curved conidia. This genus is placed in the *Castanediellaceae* family (Hernández-Restrepo et al. in prep.) and includes five species (Crous et al. 2015d, Hernández-Restrepo et al. 2016). Based on ITS sequence data, *C. hyalopenicillata* is 98 % similar to *C. cagnizarii* (CBS 101043 and CBS 542.96). The two species are similar in having branched conidiophores and cylindrical conidia. However, *C. cagnizarii* can be distinguished from the new species in having pale brown and irregularly branched conidiophores; and larger and narrow conidia (22–31 × 1.5–2.5 µm, in *C. cagnizarii* on OA) and usually curved at both ends. Furthermore, the conidiogenous cells are minutely denticulate in *C. cagnizarii*.

Authors: M. Hernández-Restrepo & P. W. Crous

Castanediella malaysiana Hern.-Restr., M. J. Wingf. & Crous, **sp. nov.** – Fig. 11
MycoBank MB817210

Description. – Mycelium hyaline to pale brown, septate, smooth, 1–2.5 µm wide. – Conidiophores erect, cylindrical, branched, biverticillate, pale brown, 76–157 × 2.5–3 µm. – Conidiogenous cells polyblastic, terminal, cylindrical,

Fig. 9. Maximum likelihood phylogenetic tree derived from combined dataset of ITS and LSU sequences of *Chaetosphaeriales*. Bootstrap supports (1000 replicates) greater than 70 are indicated at nodes. Genbank numbers presented next to taxa name as: ITS - LSU; # represent missing sequence data. The tree was rooted to *Melanochaeta aotearoae* and *M. hemipsila*.

subcylindrical, hyaline, smooth, 19–28 × 2.5–3.5 µm, denticulate, inconspicuous denticles. – Conidia fusiform, curved, hyaline, smooth, 0–1-sepatate, apex acuminate, and base acuminate or slightly flattened, 18–30 × 2–3 µm. – Sexual morph unknown.

Etymology. – The name reflects the name of the country, Malaysia, from which the species was collected the first time.

Culture characteristics. – Colonies reaching 30–39 mm diam. after 1 wk at 25 °C. On MEA cottony, white, margin effuse; reverse umber at the centre, with some concentric saffron rings. On PDA dense cottony, aerial mycelium white, submerged mycelium olivaceous black, margin effuse; reverse olivaceous black. On OA glabrous to velvety, centre olivaceous black, aerial mycelium white, margin effuse, entire and white; reverse olivaceous black.

Material examined. – MALAYSIA, Sabah, on leaves of *Eucalyptus brassiana* (*Myrtaceae*), May 2014, *leg.* M. J. Wingfield (holotype CBS H-22659, culture ex-type CBS 141509 = CPC 24918).

Notes. – *Castanediella malaysiana* is phylogenetically closely related to *C. ramosa* and *C. couratarii*. *Castanediella malaysiana* differs from both species by conidial morphology. *Castanediella ramosa* has larger conidia (26–44 × 2–3 µm) that are 0–3-septate, and *C. couratarii* has shorter conidia (9.5–19 × 2–3 µm) without septa.

Authors: M. Hernández-Restrepo, M. J. Wingfield & P. W. Crous

Lophium arboricola (Buczacki) Madrid & Gené, **comb. nov.** – Fig. 12
MycoBank MB813862

Basionym. – *Zalerion arboricola* Buczacki, Trans. Br. Mycol. Soc. **59**: 159. 1972.

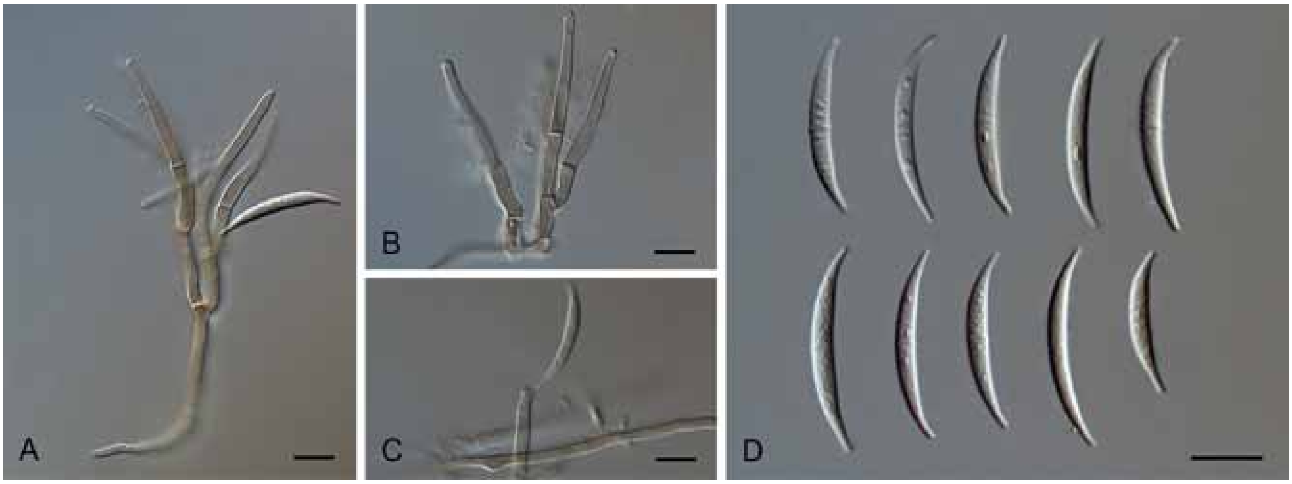


Fig. 11. *Castanediella malaysiana* (CPC 24918). **A–C.** Conidiophores and conidiogenous cells. **D.** Conidia. Scale bars 10 µm.

Fig. 12. *Lophium arboricola* (CBS 102826). **A.** Conidiophore and detached conidium. **B–D.** Conidia. Scale bars 10 µm.

Description. – Vegetative hyphae septate, branched, light olive to brown, smooth-walled to verrucose, thin- to thick-walled, 2–5 µm wide. – Conidiophores micronematous, septate, light olivaceous grey to olive-brown, smooth to verrucose, length indeterminate, 2–5 µm wide. – Conidiogenous cells mostly intercalary, but also terminal, subcylindrical to clavate, light olive to brown, smooth to verrucose, 2–27 × 2–5 µm. – Conidial filament simple or branched at the base, curved, sinuous or irregularly coiled, smooth when young, verrucose in age, light olive to dark brown, composed of acropetal chains of globose, doliiform or ellipsoidal cells 3.5–9 × 3.5–7 µm, slightly to strongly constricted at the septa.

Culture characteristics. – Colonies on OA attaining 45–49 mm diam. in 28 d at 25 °C, umbonate, floccose at the centre, powdery towards the periphery, olivaceous grey to black, with a regular margin; reverse blackish.

Material examined. – UNITED KINGDOM, England, Gloucestershire, Forest of Dean, from canker on bark of *Larix decidua* (*Pinaceae*), 20 Nov 1969, *leg.* S.T. Buczacki, (holotype IMI 146505, ex-type cultures ATCC 24411, CBS 758.71, FMR 10049). SPAIN, Tarragona, Arbolí, from dung, Oct 1990, *leg.* J. Gené (culture CBS 102826 = FMR 3868).

Notes. – The ex-type isolate of *Zalerion arboricola* (CBS 758.71 and FMR 10049) did not sporulate in culture. Therefore, the description of microscopic structures was based on isolate CBS 102826. The latter isolate was preserved for decades at FMR (Medicine Faculty of Universitat Rovira i Virgili, Reus, Spain) and CBS under the name "*Cladophialophora boppii*", because of its ability to produce chains of globose to subglobose pigmented conidia from undifferentiated conidiophores (Figs. 12 A, B, D). That species belongs in the order *Chaetothyriales* (Badali et al. 2008). An examination of CBS 102826, however, revealed that its conidia differed from those of typical *C. boppii* in becoming verrucose and irregularly coiled with age. These morphological differences prompted a DNA sequence-based study to reassess the identity of the strain. The closest matches in a BLAST search with the ITS sequence of CBS 102826 were *Zalerion arboricola* (99% similar to GenBank accession numbers FR837917 (440/444), AF169308 (438/444) and AF169307 (438/444)) and *Lophium mytilinum* (*Mytilinidiaceae*, accession numbers EF596817 and EF596819, 95 and 97 % identical, respectively). Based on molecular data and morphology, isolate CBS 102826 was re-identified as *Z. arboricola*. A phylogenetic tree based on LSU sequences shows the placement of this taxon among other members of *Mytilinidiaceae* and related *Dothideomycetes* (Fig. 13). No LSU sequences are currently available for other *Zalerion* species, except for the generic type, *Z. maritimum*, generated by Campbell et al. (2005).

Zalerion was proposed by Moore & Meyers (1962) to accommodate marine hyphomycetes with dematiaceous conidia irregularly coiled in three dimensions. In his monograph of the genus, Goos (1985) recognized two marine species, i.e. *Zalerion maritimum* (generic type) and *Zalerion varia* (as "*Z. varium*"), and two terrestrial taxa, i.e. *Zalerion arboricola* and *Zalerion sachidanandii*. Subsequent to the monograph of Goos (1985), three additional species and one variety have been described, i.e. *Z. guadalupensis*, *Z. longispiralis*, *Z. thermophylli*, and *Z. varia* var. *terrestris* (Castañeda 1985, Udaiyan 1992, Cabello et al. 1993, Ramaley 1999). Furthermore, unnamed zalerion-like asexual morphs were described for a *Trematosphaeria* sp. endophyte of cotton roots (Fisher & Webster 1992), and for *Hadrospora fallax* (Tanaka & Harada 2003).

Morphological and ecological differences motivated taxonomic changes in *Zalerion*. *Inesiosporium* was erected by Castañeda & Gams (1997) to accommodate *Z. longispiralis*, a terrestrial species that differs from typical *Zalerion* by having conidia with a very long filament lacking constrictions at the septa. In a revision of the helicosporous hyphomycetes from China, Zhao et al. (2007) considered *Z. varia* var. *terrestris* to be a superfluous variety distinguished only by its terrestrial habitat (polluted soil) and undeserving of recognition as distinct from *Z. varia* var. *varia*. Those authors, however, apparently did not consider that the variety proposed by Cabello et al. (1993) also differed from typical *Z. varia* in producing melanised mycelium and conidiophores.

Early molecular studies based on rDNA sequences revealed that *Zalerion* is highly polyphyletic (Bills et al. 1999). The generic type, *Z. maritimum*, is a member of *Lulworthiaceae* (Campbell et al. 2005), but other species thus far included in molecular studies belong in different taxonomic groups, supporting their relocation to other genera. ITS sequences of *Zalerion varia* revealed its affinities with the *Leotiaceae* (Bills et al. 1999) and therefore this species was transferred to the segregate genus *Halenospora* (Jones et al. 2009). Similarly, *Z. arboricola* was shown to belong in *Mytilinidiaceae* in the present study (Fig. 13), closely related to the type species of *Lophium*, *L. mytilinum,* a genus of ascomycetes characterised by carbonaceous conchate ascomata with very elongate asci and filiform

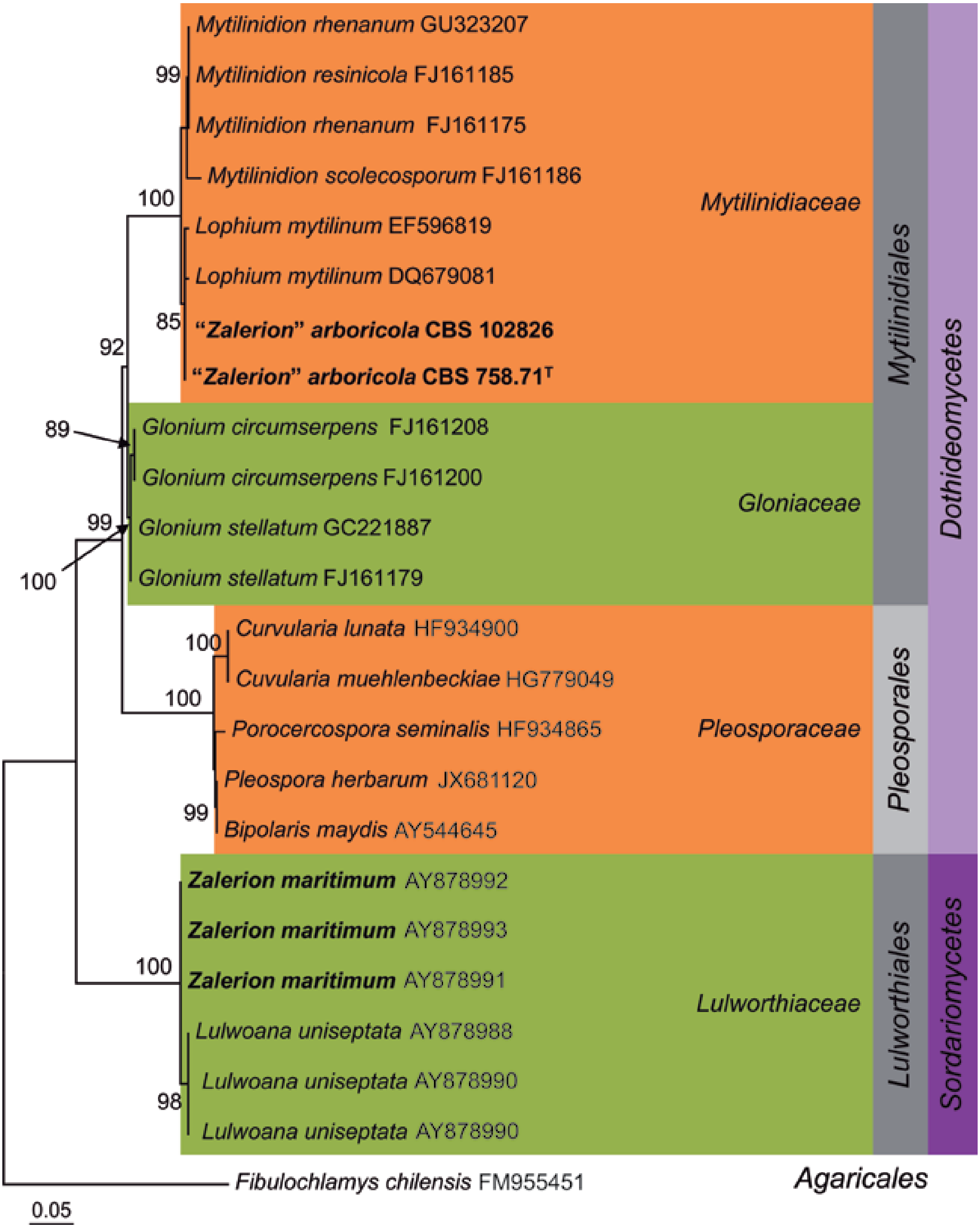


Fig. 13. Maximum likelihood tree constructed with the MEGA 6 software, based on partial sequences of the LSU rDNA of *Zalerion maritimum*, *Z. arboricola* and members of different orders of *Dothideomycetes* and *Sordariomycetes*. Branch lengths are proportional to distance. Bootstrap values ≥ 70 % are shown near the internodes. ^{T}ex-type strain. The tree was rooted to *Fibulochlamys chilensis* CBS 123018.

multiseptate ascospores. These are widespread fungi, usually associated with coniferous hosts. *Lophium mytilinum* produces pycnidia and papulaspora-like bulbils *in vitro* (Lohman 1933), which were not observed in *Z. arboricola*. Following the rules of a single name nomenclature (Hawksworth et al. 2011), *Z. arboricola* is transferred to *Lophium* above.

Lulwoana uniseptata was proposed as the sexual morph of *Zalerion maritimum* based on 18S and 28S nrDNA sequence analyses (Campbell et al. 2005), but this relationship should be reassessed using more variable loci. The evolutionary relationships of *Z. sachidanandii* and Z. *thermophylli* cannot be evaluated because no strains are available for these species.

Authors: H. Madrid, J. Gené & M. Hernández-Restrepo

Morchella pakistanica S. Jabeen & A. N. Khalid, **sp. nov.** – Fig. 14

MycoBank MB817224

Description. – Ascomata 45 mm high. – Hymenophore conical, 42 mm long, apex flat, 20 mm wide, becoming narrower towards the base, up to 10 mm wide, off white (5Y9/2), becoming brownish (5YR4/6) when dry; pitted and ridged, pits sunken, ridges prominent, rounded to elongated, grayish black (7.5YR2/2). – Context off white and brittle. – Paraphyses 104–124 × 5–6 µm, cylindrical, apices rounded to clavate, hyaline. – Asci 129–132 × 7.5–8 µm, eight-spored, cylindrical; hyaline. – Ascospores 7.5–10 × 4.5–6.5 µm, subglobose to ellipsoidal, smooth, contents homogeneous, hyaline. Paraphyses, asci and ascospores examined in 5 % KOH.

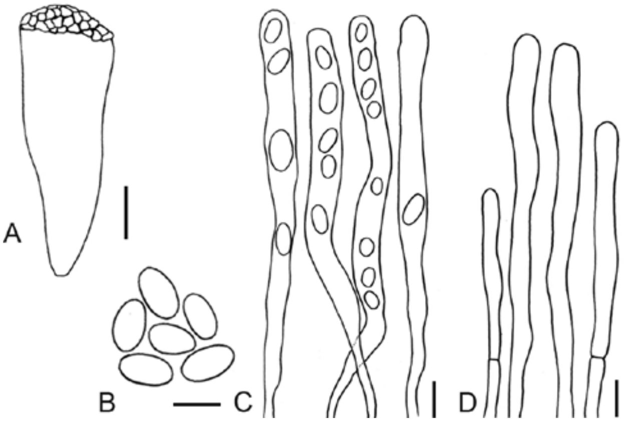


Fig. 14. *Morchella pakistanica* (LAH35075). **A.** Ascocarp. **B.** Ascospores. **C.** Asci. **D.** Paraphyses. Scale bars: **A** 1 cm, **B–E** 10 µm.

Etymology. – The specific epithet refers to the country name Pakistan, from where the sample was collected.

Material examined. – PAKISTAN, on loamy soil, 19 May 2014, *leg.* S. Jabeen & A. N. Khalid (holotype LAH35075).

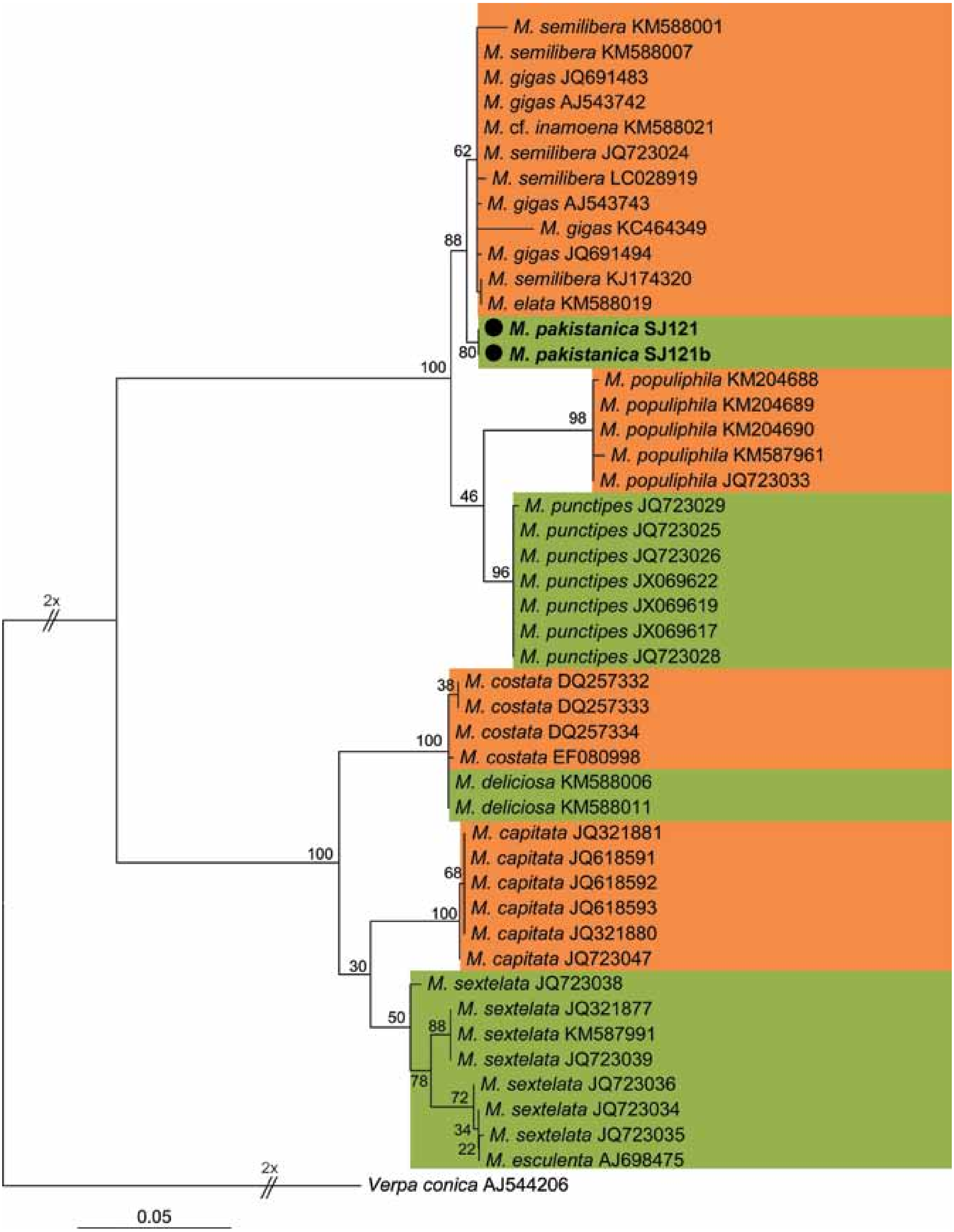
Notes. – *Morchella pakistanica* is characterised by its greyish hymenium at the top of the hymenophore, off-white stipe becoming brownish when dry and subglobose to ellipsoidal, smooth, hyaline spores. It can be compared with a closely related taxon, *M. semilibera*, which is mostly found in Europe, rare in Asia and not known to occur in America (Moreau et al. 2014). That species has campanulate, half free apothecial margins and a long slender stipe (Moreau et al. 2014), while *M. pakistanica* bears a thin hymenium on a wide hymenophore becoming narrower towards the base in the form of a cone. ITS rDNA sequences have been proven useful in identifying 77.4 % of the known phylospecies of *Morchella* (Du et al. 2012). In our study, ITS sequence from the neotype of *M. semilibera* (GenBank KJ174320) clustered with other similar taxa. *Morchella pakistanica* diverged from all these taxa with a strong bootstrap support, which suggests that it is a distinct taxon (Fig. 15). During this investigation, sampling was carried out at the Himalayan moist temperate forest of Pakistan. The forest is comprised of mixed vegetation of broad-leaved trees along with conifers as dominants. *Morchella pakistanica* was found growing under obligatory ectomycorrhizal symbiont, *Cedrus deodara*, which is a major part of the conifer community in the region.

Authors: S. Jabeen & A. N. Khalid

Muriphaeosphaeria viburni Crous, D. Savic & R.K. Schumach., **sp. nov.** – Fig. 16

MycoBank MB817243

Description. – Ascomata solitary to aggregated, erumpent, dark brown, globose, to 250 µm diam., with slightly papillate central ostiole; wall of 3–6 layers of dark brown *textura angularis*. – Pseudoparaphyses numerous, hyaline, smooth, septate, branched, hyphae-like, 2–2.5 µm diam. – Asci fissitunicate, hyaline, smooth, subcylindrical with obtuse apices, stipitate with foot cell, bitunicate with well-developed apical chamber, 80–160 × 12–15 µm. – Ascospores uniseriate but overlapping, fusiform-ellipsoidal, brown, smooth, ends obtusely rounded, 3-septate, constricted at septa, but more so at median septum, (15)20–22(24) × (8)9–10(11) µm. – Conidiomata pycnidial, globose, to 250 µm diam., pale brown, with dark brown


M. semilibera KM588001
M. semilibera KM588007
M. gigas JQ691483
M. gigas AJ543742
M. cf. inamoena KM588021
62
M. semilibera JQ723024
M. semilibera LC028919
M. gigas AJ543743
M. gigas KC464349
88
M. gigas JQ691494
M. semilibera KJ174320
M. elata KM588019
● M. pakistanica SJ121
80
● M. pakistanica SJ121b
100
M. populiphila KM204688
M. populiphila KM204689
98
M. populiphila KM204690
M. populiphila KM587961
M. populiphila JQ723033
46
M. punctipes JQ723029
M. punctipes JQ723025
M. punctipes JQ723026
96
M. punctipes JX069622
M. punctipes JX069619
M. punctipes JX069617
M. punctipes JQ723028
2x
38
M. costata DQ257332
M. costata DQ257333
100
M. costata DQ257334
M. costata EF080998
M. deliciosa KM588006
M. deliciosa KM588011
M. capitata JQ321881
100
M. capitata JQ618591
68
M. capitata JQ618592
100
M. capitata JQ618593
M. capitata JQ321880
M. capitata JQ723047
30
M. sextelata JQ723038
50
M. sextelata JQ321877
88
M. sextelata KM587991
M. sextelata JQ723039
78
M. sextelata JQ723036
72
M. sextelata JQ723034
34
M. sextelata JQ723035
22
M. esculenta AJ698475
2x
Verpa conica AJ544206
0.05

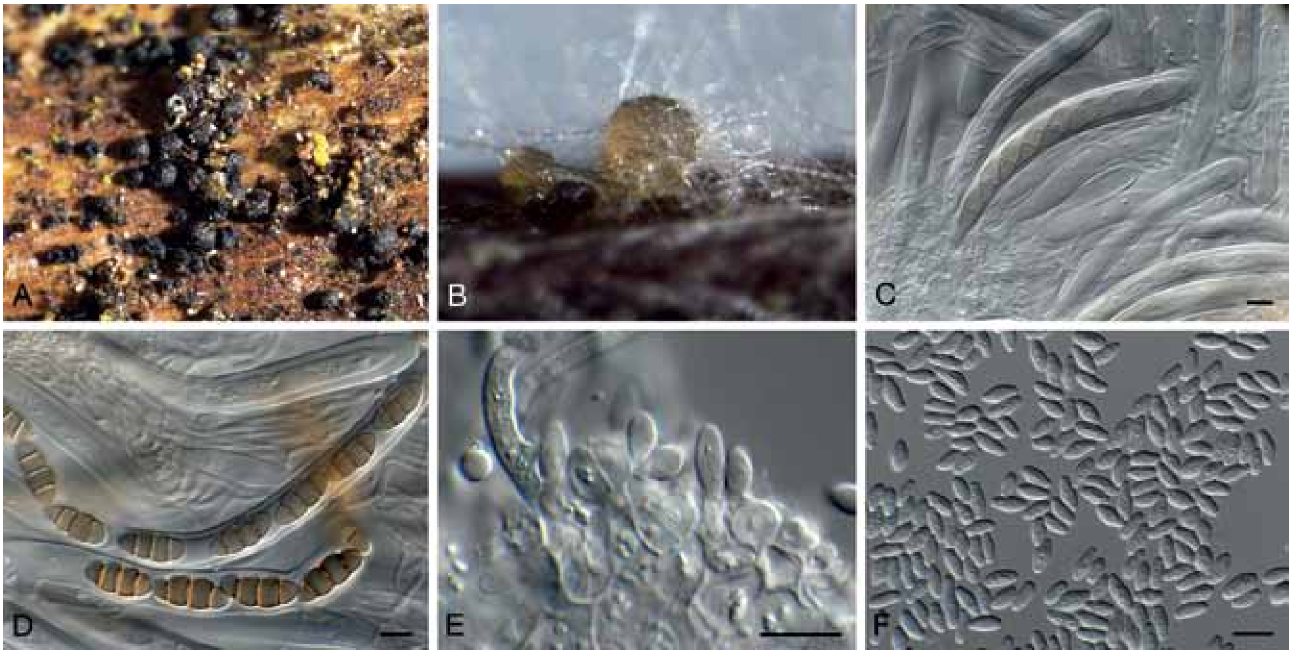


Fig. 16. *Muriphaeosphaeria viburni* (CBS 141412). **A.** Ascomata on host. **B.** Conidiomata on PNA. **C–D.** Asci with ascospores. **E.** Conidiogenous cells. **F.** Conidia. Scale bars 10 µm.

central ostiole, exuding a creamy white conidial mass; wall of 3–6 layers of pale brown *textura angularis*. – Conidiophores reduced to conidiogenous cells. – Conidiogenous cells doliiform, hyaline, smooth, with percurrent proliferation at apex, 5–7 × 4–5 µm. – Conidia solitary, aseptate, hyaline, smooth, fusiform-ellipsoidal, apex subobtuse, base truncate, prominently granular, (6)7–8(10) × (3)3.5(4) µm.

Etymology. – The name refers to *Viburnum*, the host genus from which this fungus was collected.

Culture characteristics. – Colonies reaching up to 45 mm diam. after 2 wk at 25 °C, with spreading, flat surface; margins smooth, even, and moderate amounts of aerial mycelium. On MEA surface pale mouse grey in centre, dirty white in outer region; reverse greyish sepia. On OA surface pale luteous. On PDA surface pale luteous, reverse luteous.

Material examined. – SERBIA, Fruska Gora (Iriski Venac), on twig of *Viburnum lantana* (*Adoxaceae*), 21 Apr 2015, *leg.* D. Savic (holotype CBS H-22645, culture ex-type CPC 26610 = CBS 141412).

Notes. – The monotypic genus *Muriphaeosphaeria,* typified by *M. galatellae,* was introduced by Phukhamsakda et al. (2015) for a pleospora-like ascomycete collected on stems of *Galatella villosa* in Russia. In *M. galatellae* ascospores are muriform, and in culture it produced pycnidial conidiomata with cylindrical, 1–3-transversely septate and brown conidia. Based on LSU sequence data, *M. viburni* is 99 % similar to *M. galatellae* (MFLUCC 14-0614). The two species can be distinguished by the narrower ascospores (13–27 × 4–11 µm), and larger (10–17 × 2–6 µm), 1–3-septate, brown conidia of *M. galatellae* (Phukhamsakda et al. 2015).

Authors: P. W. Crous & R. K. Schumacher

Neosetophoma lunariae Crous & R.K. Schumach., **sp. nov.** – Fig. 17
MycoBank MB817213

Description. – Conidiomata (on pine needle agar; PNA) pycnidial, solitary, brown, erumpent, globose, 150–300 µm diam., with one to several slightly darkened ostioles; wall of 2–3 layers of brown *textura angularis*. – Conidiophores

Fig. 15. Phylogenetic tree of *Morchella* spp. from ITS sequences; inferred by the Maximum Likelihood method based on Jukes-Cantor model (The analysis involved 47 nucleotide sequences. There were a total of 774 positions in the final dataset). Sequences generated from LAH35075 are marked with a solid circle and in bold.

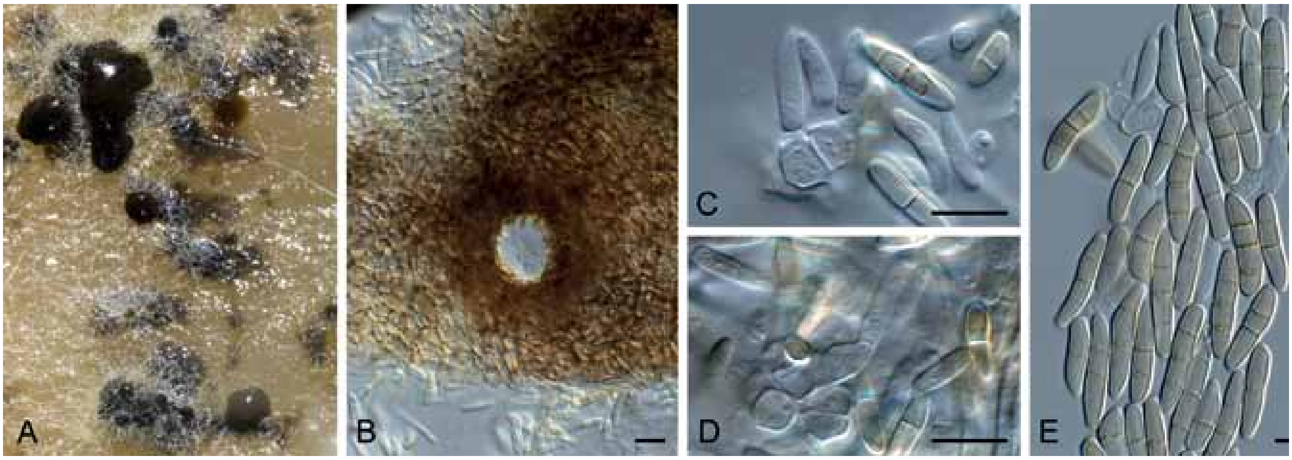


Fig. 17. *Neosetophoma lunariae* (CBS 141409). **A.** Conidiomata on OA. **B.** Pycnidium showing ostiolar region. **C, D.** Conidiogenous cells. **E.** Conidia. Scale bars 10 µm.

reduced to conidiogenous cells lining the inner cavity, doliiform to ampulliform, 4–6 × 4–5 µm, extending percurrently at apex, smooth, hyaline, becoming pale brown with age. – Conidia accumulating in dense greyish to brown slime, solitary, pale brown, smooth, subcylindrical, apex obtusely rounded, base bluntly rounded to truncate, 2 µm diam., (1)3(4)-septate, (10)14–17(22) × (2.5)3 µm.

Etymology. – The name refers to *Lunaria*, the host genus from which this fungus was collected.

Culture characteristics. — Colonies reaching up to 50 mm diam. after 2 wk at 25 °C, with spreading, flat, folded surface; margins smooth, lobate, and moderate amount of aerial mycelium. On MEA surface buff, reverse isabelline. On OA surface rosy buff with patches of grey olivaceous. On PDA surface mouse-grey, reverse grey olivaceous.

Material examined. – GERMANY, near Berlin, on seeds of *Lunaria annua* (*Brassicaceae*), 7 Mar 2015, *leg.* R. K. Schumacher (holotype CBS H-22648, culture ex-type CPC 26671 = CBS 141409).

Notes. – *Neosetophoma* was introduced by de Gruyter et al. (2010) to accommodate a clade phylogenetically closely related to *Paraphoma*. *Neosetophoma* presently includes three species, with the ITS of *N. lunariae* on ITS being 98 % (549/560) similar to that of *N. clematidis* (MFLUCC 13-0734; conidia 3-septate, 11–15 × 2–4 µm), and 96 % (548/571) to *N. samarorum* (CBS 568.94; conidia 1–2-septate, 7–16 × 2–3 µm).

Authors: P. W. Crous & R. K. Schumacher

Patellaria quercus Crous & R.K. Schumach., **sp. nov.** – Fig. 18
MycoBank MB817214

Description. – Conidiomata (on pine needle agar; PNA) pycnidial, solitary, black, erumpent, globose, to 200 µm diam., with 1–3 ostioles surrounded by setae, brown, septate, to 40 µm long, with obtuse ends. – Conidiophores lining the inner cavity, hyaline, smooth, base becoming slightly pigmented, 1–5-septate, branched, densely aggregated, 10–25 × 3–4 µm. – Conidiogenous

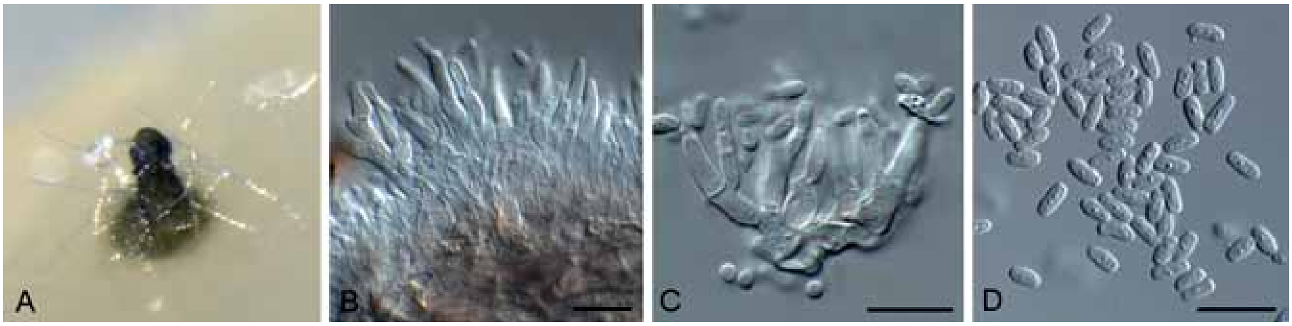


Fig. 18. *Patellaria quercus* (CBS 141410). **A.** Conidiomata on OA. **B, C.** Conidiogenous cells. **D.** Conidia. Scale bars 10 µm.

cells hyaline, smooth, subcylindrical with apical taper, phialidic with periclinal thickening, but also extending percurrently, 5–10 × 2–3 µm. – Conidia solitary, hyaline, smooth, aseptate, guttulate, subcylindrical, apex obtuse, base truncate, 1.5–2 µm diam., (3)4(4.5) × 2 µm.

Etymology. – The name refers to *Quercus*, the host genus from which this fungus was collected.

Culture characteristics. – Colonies reaching up to 6 mm diam. after 2 wk at 25 °C, with spreading, erumpent, folded surface; margins feathery, and sparse to moderate aerial mycelium. On MEA surface dirty white, with diffuse umber pigment in agar, reverse umber. On OA surface pale luteous. On PDA surface and reverse dirty white.

Material examined. – GERMANY, near Berlin, on twigs *Quercus* sp. (*Fagaceae*), 7 Mar 2015, *leg.* R.K. Schumacher (holotype CBS H-22647, culture ex-type CPC 27232 = CBS 141410).

Notes. – Based on the LSU sequence, the present fungus has a 99 % similarity with *Patellaria* cf. *atrata* (BCC28877, BCC28876). Because very little is known about the asexual morphs of *Patellaria*, we have chosen to describe this phoma-like fungus in *Patellaria*, hoping that further collections will eventually resolve the asexual morphs linked to *Patellariaceae* (see Hyde et al. 2013).

Authors: P. W. Crous & R. K. Schumacher

Phaeosphaeria lunariae Crous & R.K. Schumach., **sp. nov.** – Fig. 19
MycoBank MB817215

Description. – Conidiomata (on pine needle agar; PNA) pycnidial, solitary, immersed to erumpent, globose, brown, to 300 µm diam.; wall of 3–6 layers of pale brown *textura angularis*. – Conidiophores reduced to conidiogenous cells lining the inner cavity, doliiform to ampulliform, hyaline, smooth, 5–7 × 3–5 µm; phialidic with periclinal thickening or extending percurrently, lacking visible collarettes. – Paraphyses intermingled among conidiogenous cells, hyaline, smooth, subcylindrical, aseptate, 15–25 × 1.5–2 µm. – Conidia exuding in slimy, olivaceous mass, solitary, pale brown, smooth, granular, straight to slightly curved, subcylindrical, apex obtuse, tapering to truncate base, 1–1.5 µm diam., 1(3)-septate, (9)12–13(15) × (2)2.5–3(3.5) µm.

Etymology. – The name refers to *Lunaria*, the host genus from which this fungus was collected.

Culture characteristics. – Colonies reaching up to 40 mm diam. after 2 wk at 25 °C, with spreading, flat surface; margins smooth, even, and sparse aerial mycelium. On MEA surface pale mouse-grey, reverse greyish sepia. On OA surface smoke grey. On PDA surface smoke grey, reverse grey olivaceous.

Material examined. – GERMANY, near Berlin, on seed pods of *Lunaria annua* (*Brassicaceae*), 7 Mar 2015, *leg.* R. K. Schumacher (holotype CBS H-22642, culture ex-type CPC 26679 = CBS 141415).

Notes. – Quaedvlieg et al. (2013) revised *Septoria* and allied genera including *Phaeoseptoria* and *Phaeosphaeria*, and chose the well-established name *Phaeosphaeria* over that of *Phaeoseptoria*, which is more obscure and not commonly used in literature. Based on ITS sequence data, *P. lunariae* is 98 % identical to *Parastagonospora nodorum* (NRRL 62560; conidia (0)1–3-septate, 13–28 × 2.8–4.6 µm) and 96 % to *Phaeosphaeria podocarpi* (CBS 138903; conidia 1-septate, (7)8–10(12) × (2)2.5(3) µm). *Phaeosphaeria lunariae* is thus introduced as new species for the fungus occurring on seed pods of *Lunaria annua*.

Authors: P. W. Crous & R. K. Schumacher

Phyllosticta aucubae-japonicae N. Zhou & L. Cai, **sp. nov.** – Fig. 20
MycoBank MB812253

Description. – Conidiomata (on PDA) pycnidial, black, visible after 7 days at 25 °C, aggregated or decentralised, subglobose to globose or

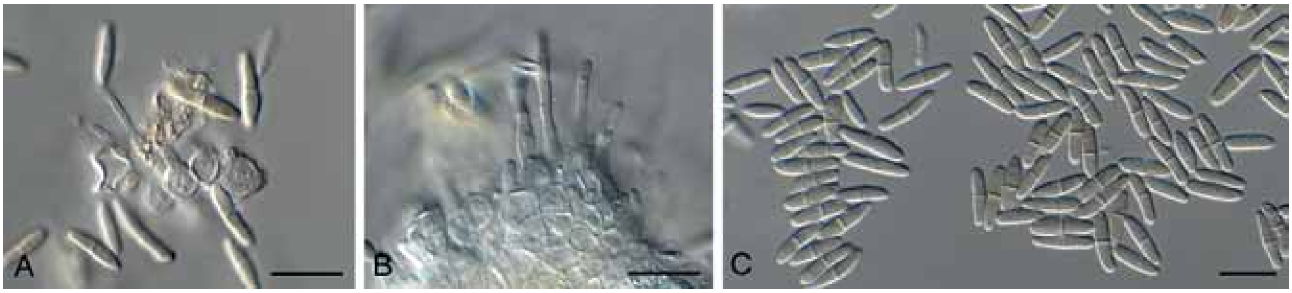


Fig. 19. *Phaeosphaeria lunariae* (CBS 141415). **A, B.** Conidiogenous cells. **C.** Conidia. Scale bars 10 µm.


A
B
C
D
E
F
G
H
I
J
K

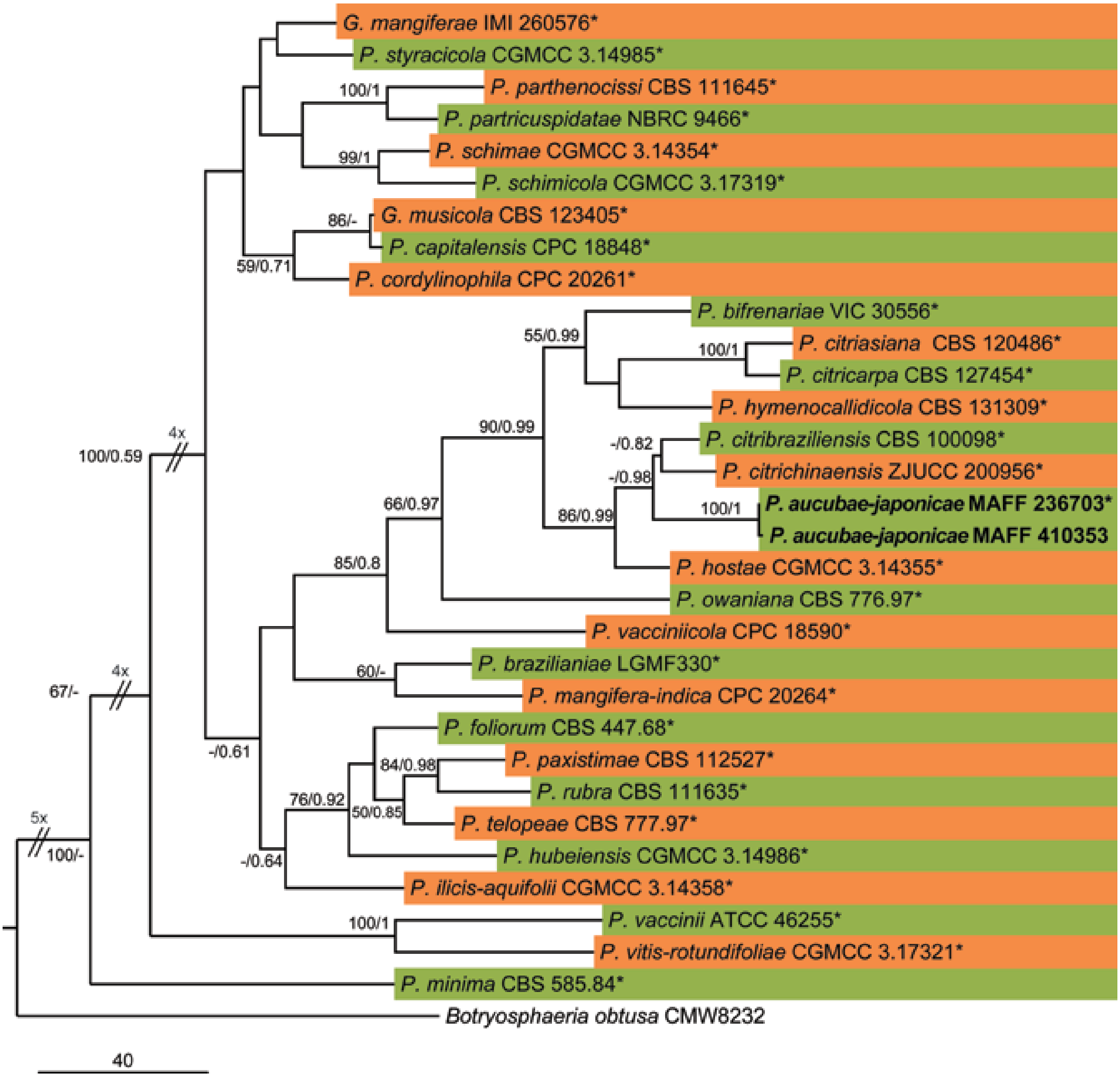


Fig. 21. Phylogenetic tree generated from a maximum parsimony analysis based on the ITS, *actA* and *tef1* sequences alignment. Bootstrap support values (1000 replicates) above 50 % and Bayesian posterior probability values are shown at the nodes. The tree is rooted to *Botryosphaeria obtusa*. An asterisk (*) indicates the ex-type strains.

somewhat irregular, 100–300 µm diam. – Conidiogenous cells 6.5–14 × 2–5 µm (mean ± SD = 9.6 ± 2.1 × 3.4 ± 0.7, n = 25), holoblastic, hyaline, long cylindrical, subcylindrical to ampulliform, extending 1–2 times percurrently near apex. – Conidia accumulating in yellowish slime,10–13 × 5–8.5 µm (mean ± SD = 11.4 ± 0.6 × 7.3 ± 0.5, n = 30), unicellular, ovoid, obovoid, ellipsoidal to subglobose, enclosed in a mucilaginous sheath, 0.5–1.5 µm (mean ± SD = 0.7 ± 0.3, n = 25) thick, and bearing a hyaline, mucoid apical appendage, 6.5–31 µm long, straight to flexible, unbranched, deciduous.

Fig. 20. *Phyllosticta aucubae-japonicae* (HMAS 246374). **A, B**. Colonies on PDA (upper and reverse). **C, D.** Pycnidia. **E–G.** Conidiogenous cells. **H–K.** Conidia. Scale bars: **C, D** 100 µm, **E–K** 10 µm.

Etymology. – The name refers to *Aucuba japonica,* the host genus from which this fungus was first isolated.

Culture characteristics. – Colonies on PDA flat, with irregular margins, olive green in obverse and reverse when young, becoming greenish black at maturity. Aerial mycelia loose, white.

Material examined. – JAPAN, Kagoshima, on fruit of *Aucuba japonica* (*Garryaceae*), Dec 1992, *leg.* T. Kobayashi (holotype HMAS 246374; ex–type culture MAFF 236703 = LC 4755, ITS sequence GenBank KR233300, *actA* sequence GenBank: KR233305, *tef1* sequence GenBank: KR233310); *ibid.*, living culture MAFF 410353 (= LC 4754).

Notes. – This species was originally published as *P. aucubae*, but no species description was provided (Shirai & Hara 1927), and the name was a later homonym of *P. aucubae* (Saccardo 1878). Togashi (1936) renamed this species *P. harai,* but also did not provide a species description. According to Melbourne Code Art. 39.1, both *P. harai* and *P. aucubae* are invalid names. Isolates MAFF 236703 and MAFF 410353 were deposited as *P. harai* in NIAS, Japan. *Phyllosticta aucubae-japonicae* is morphologically similar and phylogenetically closely related to *P. citribraziliensis*, *P. hostae* and *P. citrichinaensis* (Glienke et al. 2011, Su & Cai 2012, Wang et al. 2012) (Fig. 21), but these species occur on different host plants. In addition, *P. aucubae-japonicae* can be distinguished from the three species respectively by several molecular loci, i.e. ITS (17 bp, 8 bp, 12 bp), *actA* (14 bp, 9 bp, 1 bp) and *tef1* (22 bp, 16 bp, 39 bp).

Authors: N. Zhou & L. Cai

Rhinocladiella coryli Crous & R.K. Schumach., **sp. nov.** – Fig. 22
MycoBank MB817216

Description. – Mycelium consisting of pale brown, smooth, septate, branched, 2–3 µm diam. hyphae. – Conidiophores solitary, erect, straight to slightly curved, grey-brown, smooth, subcylindrical with slight apical taper, unbranched, 0–7-septate, 10–70 × 2.5–3 µm. – Conidiogenous cells integrated, terminal, pale brown, subcylindrical, 10–25 × 2.5–3 µm, with terminal rachis containing numerous slightly darkened sympodial scars, up to 0.5 µm diam. – Conidia solitary, aseptate, pale brown, smooth, ellipsoidal with obtuse apex, tapering to truncate base, hilum 0.5 µm diam., (3)4–4.5(5) × 2(2.5) µm. – Synasexual morph not observed.

Etymology. – The name refers to *Corylus*, the host genus from which this fungus was first isolated.

Culture characteristics. – Colonies reaching up to 10 mm diam. after 2 wk at 25 °C, with spreading erumpent surface; margins smooth,

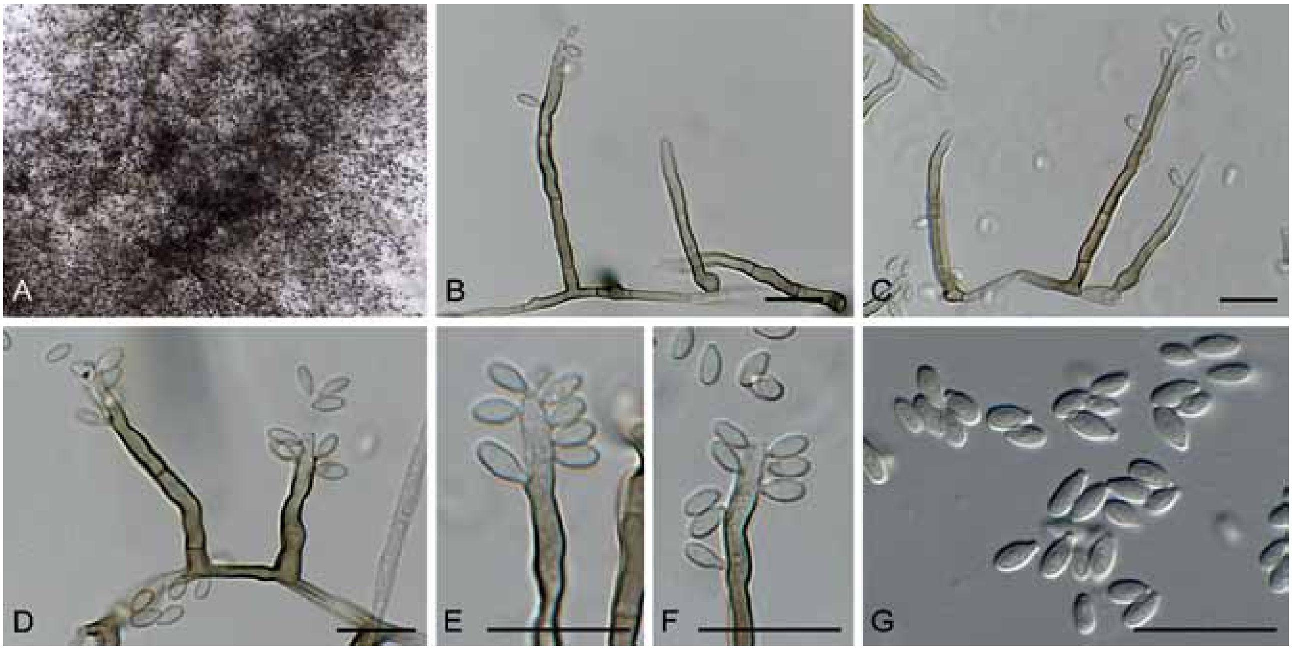


Fig. 22. *Rhinocladiella coryli* (CBS 141407). **A.** Colony overview on SNA. **B–D.** Conidiophores. **E, F.** Conidiogenous cells. **G.** Conidia. Scale bars 10 µm.

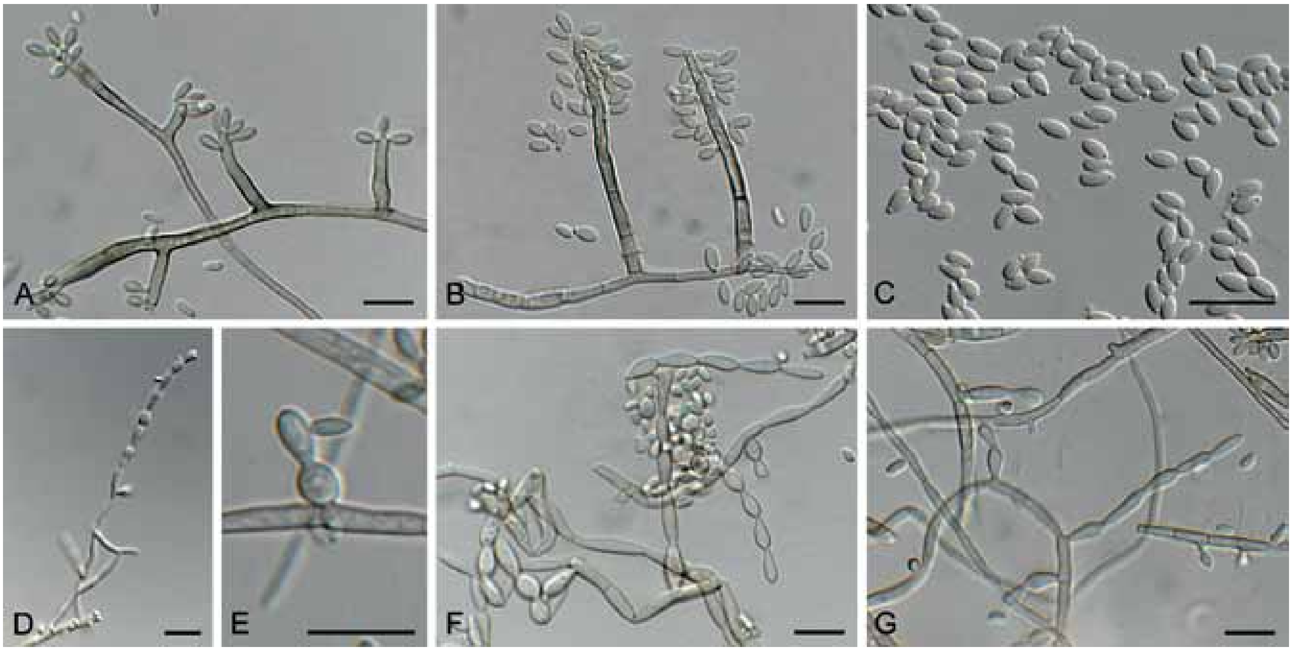


Fig. 23. *Rhinocladiella quercus* (CBS 141448). **A, B.** Conidiophores on SNA. **C.** Conidia. **D–E.** Exophiala-like synasexual morph. Scale bars 10 µm.

lobate, and moderate aerial mycelium. On MEA and PDA surface mouse-grey, reverse dark mouse grey. On OA surface mouse-grey with dark mouse-grey border.

Material examined. – GERMANY, near Berlin, on stems of *Corylus avellana* (*Corylaceae*), 7 Mar 2015, *leg.* R. K. Schumacher (holotype CBS H-22651, culture ex-type CPC 26654 = CBS 141407).

Notes. – *Rhinocladiella coryli* clusters among other species of the genus *Rhinocladiella*, along with their *Exophiala* synasexual morphs (see Arzanlou et al. 2007). Phylogenetically, *R. coryli* is quite distinct from other species presently known, and shares, based on ITS sequence data, 86 % identity (539/627) with *Rhinocladiella aquaspersa* IFM 4930 (GenBank AB091214), and 86 % identity (525/614) with *Exophiala angulospora* NJM 0562 (GenBank AB972402). Because this generic complex is in need of revision, our collection is allocated to the genus *Rhinocladiella* based on morphology and in advance of additional DNA data becoming available.

Authors: P.W. Crous & R. K. Schumacher

Rhinocladiella quercus Crous & R.K. Schumach., **sp. nov.** – Fig. 23
MycoBank MB817217

Description. – Mycelium consisting of pale brown, smooth, septate, branched, 1.5–2 µm diam. hyphae. – Conidiophores erect, rarely branched, arising from superficial hyphae, solitary, subcylindrical, brown, at times reduced to conidiogenous cells, 0–4-septate, 5–50 × 2.5–3.5 µm. – Conidiogenous cells terminal, integrated, 5–45 × 3–3.5 µm, brown, smooth, with a terminal rachis containing an aggregated cluster of pimple-like denticles, slightly thickened and darkened, up to 0.5 µm diam. – Conidia solitary, pale brown, smooth, ellipsoidal, apex obtuse, tapering to a truncate base, hilum 0.5 µm diam., slightly thickened and darkened, (3)4(5) × (1.5–)2 µm. – Synasexual morph exophiala-like, developing on hyphal cells that tend to become swollen and constricted at septa.

Etymology. – The name refers to *Quercus*, the host genus from which this fungus was collected.

Culture characteristics. – Colonies reaching up to 20 mm diam. after 2 wk at 25 °C, with spreading, erumpent surface; margins smooth, lobate, and moderate aerial mycelium. On MEA surface and reverse dark mouse-grey. On OA and PDA surface and reverse mouse-grey.

Material examined. – GERMANY, near Berlin, on twigs of *Quercus robur* (*Fagaceae*), 11 Apr 2015, *leg.* R. K. Schumacher (holotype CBS H-22649, culture ex-type CPC 26621 = CBS 141448).

Notes. – Based on LSU sequence data, *Rhinocladiella quercus* is 99 % (792/794) similar to *Cap-*

ronia sp. A (WUC-2011 strain WUC 102-C), and 96 % (761/794) to *Capronia fungicola* (CBS 614.96). The genus *Capronia* has been linked to *Rhinocladiella*, *Exophiala, Cladophialophora and Phialophora* as asexual morphs (Untereiner & Naveau 1999).

Authors: P. W. Crous & R. K. Schumacher

Tracylla aristata (Cooke) Tassi, *Bulletin Labor. Orto Bot. de R. Univ. Siena* **6**: 62. 1904. – Fig. 24

Basionym. – *Leptothyrium aristatum* Cooke, *Grevillea* **20**(no. 93): 6. 1891.

Description. – Conidiomata pycnothyrial, scattered, superficial, circular to subcircular, occasionally with irregular margin, 85–200 µm diam.; conidiomatal disc consisting of several layers, upper shield linked to mycelium via central column; shield becomes thinner towards the margin; central part of pale brown cells, peripheral zone of radially elongated pale brown cells, with entire margin. – Conidiophores reduced to conidiogenous cells lining the underside of the shield, encased in mucus. – Conidiogenous cells cuboid, hyaline to pale brown, smooth, 4–5 × 3–4 µm. – Conidia exuded in slimy mass, naviculate to lunate or subcylindrical, 13–17 × 2–3 µm, base obtuse, apex acute, giving rise to flexuous apical appendage, 6.5–14 µm long. – Pycnothyria not formed in culture, but colonies form slimy masses of conidia on sporodochia that contain a basal layer of brown verruculose hyphae. – Hyphal cells form phialides that give rise to aseptate, hyaline conidia, (11)14–16(17) × (2)2.5–3(3.5) µm, apical appendage 6–14 µm long.

Culture characteristics. – Colonies spreading, flat, with sparse aerial mycelium and feathery margin, to 50 mm diam. after 2 wk at 25 °C. On MEA surface isabelline with patches of honey, reverse hazel. On PDA surface and reverse isabelline. On OA surface dark mouse grey.

Material examined. – AUSTRALIA, Victoria, on *Eucalyptus* sp. (*Myrtaceae*), *leg.* Mrs. Martin No. 752, holotype K(M); Victoria, Toolangi State Forest, S37°33'25.3" E145°31'55.9", on leaves of *Eucalyptus regnans* (*Myrtaceae*), 9 Nov 2014, *leg.* P.W. Crous, J. Edwards & P. W. J. Taylor (epitype designated here CBS H-22654, MBT371905, culture ex-epitype CPC 25500 = CBS 141404).

Notes. – The genus *Tracylla* is based on *T. spartinae* (on *Spartina patens*, and several other grasses) from Brazil, Jamaica, Philippines, Sri Lanka, Thailand and the USA (Nag Raj 1993). *Tracylla aristata*, was originally described from *Eucalyptus* leaf litter collected in Australia, although it has also been reported from New Zealand and South Africa (Crous & Van der Linde 1993), and apparently also occurs on *Hakea dactyloides* (Nag Raj 1993). The two species differ in their conidial morphology (conidia of *T. spartinae* are 14–18 × 6–8 µm, with apical

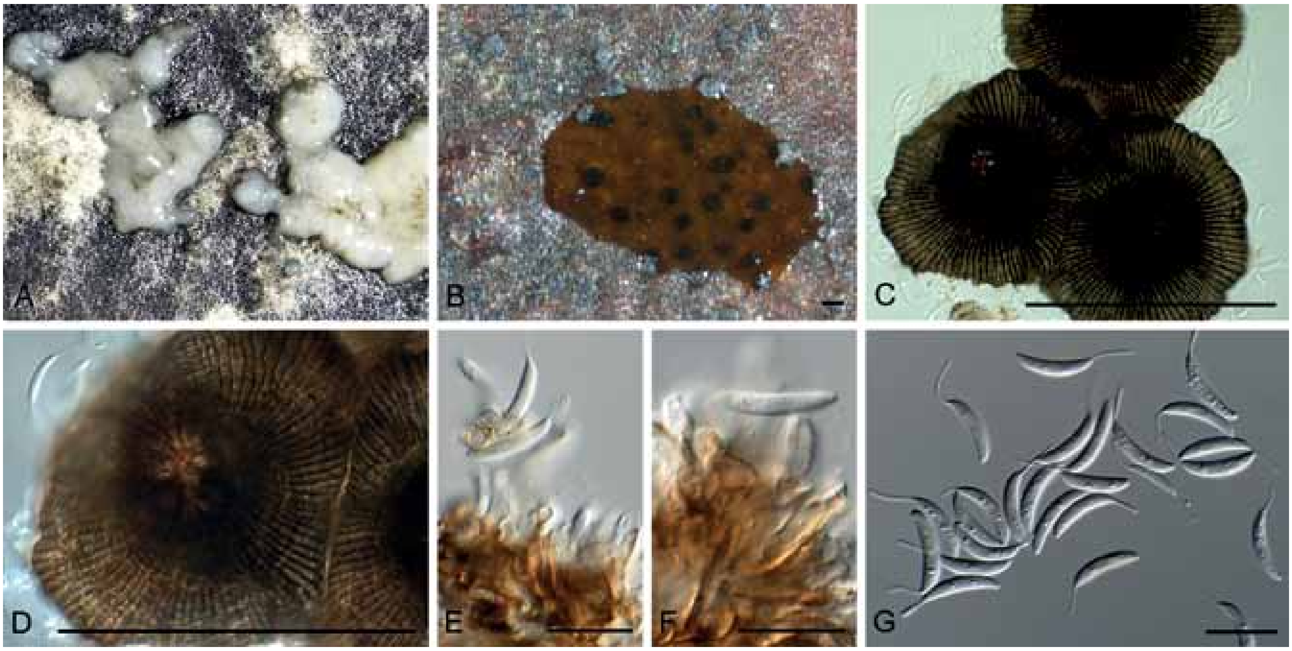


Fig. 24. *Tracylla aristata* (CBS 141404). **A.** Sporulation on PDA. **B.** Conidiophores. **C–D.** Conidiogenous cells. **E, F.** Conidiogenous cells giving rise to conidia. **G.** Conidia. Scale bars 10 µm.

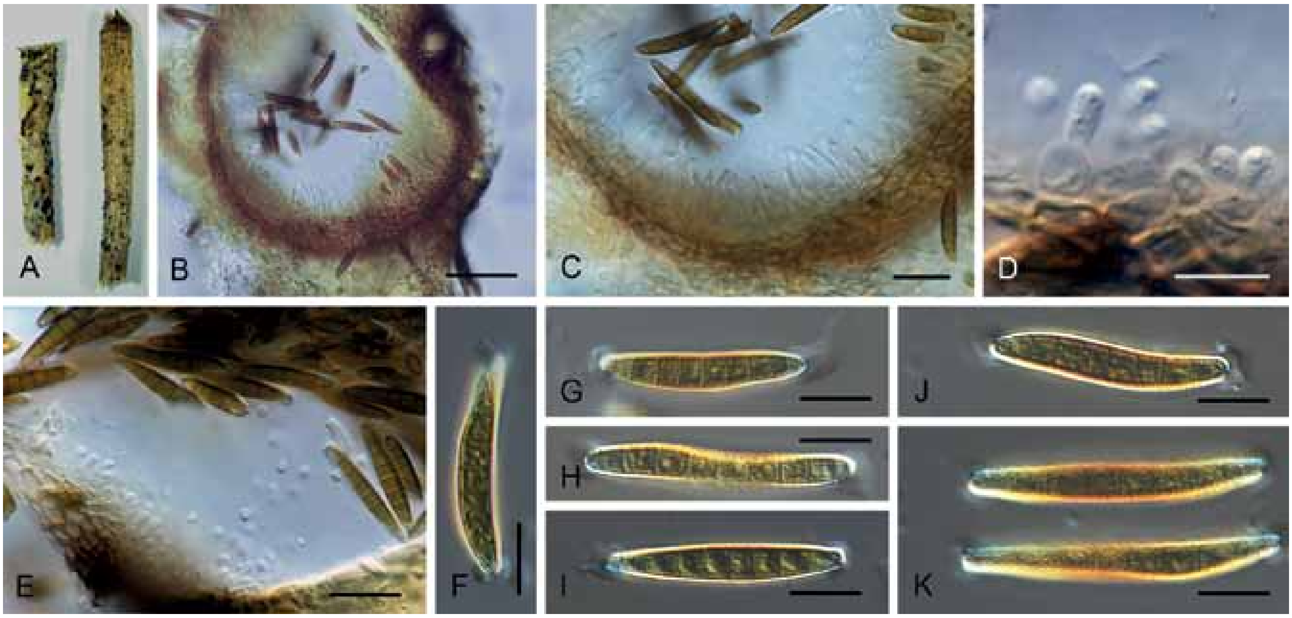


Fig. 25. *Wojnowiciella leptocarpi* (CBS 115684). **A.** Conidiomata on natural substrate. **B, C.** Section of the conidiomata. D. Conidiogenous cells. **E.** Macro- and microconidia. **F–K.** Macroconidia. Scale bars **B** 50 µm; **C, E** 20 µm; **D**, **F–K** 10 µm.

and basal appendages, 11–30 µm long; Nag Raj 1993), and to determine whether they are really congeneric fresh collections of *T. spartinae* must be obtained.

Authors: P. W. Crous, J. Edwards & P. W. J. Taylor

Wojnowiciella leptocarpi Crous, Hern.-Restr. & M. Palm, **sp. nov.** – Fig. 25
MycoBank MB817218

Description. – Conidiomata pycnidial, globose, brown, submerged and superficial, 100–205 µm diam., separate, with central dark ostiole; wall of 2–3 layers of orange brown *textura intricata*. – Conidiophores reduced to conidiogenous cells. – Conidiogenous cells lining the inner cavity, subglobose, ampulliform to subcylindrical, hyaline, smooth, 2.3 – 4.5 × 3–6 µm. – Macroconidia subcylindrical, widest in the middle, straight, apex and base obtuse, 7-septate, thick-walled, verruculose, orange brown, paler and with a mucous caps at both ends, 26–36 × 4–6 µm. – Microconidia globose, short cylindrical, amorphous, hyaline, smooth, 2.5–4 × 2–3 µm; produced in the same pycnidia together with macroconidia.

Etymology. – The name reflects the host genus *Leptocarpus* from which this species was isolated.

Culture characteristics. – Colonies reaching 21 mm diam. after 1 wk at 25 °C, cottony, greenish olivaceous, margin effuse. On PDA diffusible pigment luteous and reverse luteous and black. On MEA exudate luteous, reverse fulvous.

Material examined. – AUSTRALIA, [imported from Australia, intercepted at Los Angeles airport, California, USA], on stem of *Leptocarpus* sp. (*Restionaceae*), 16 Jun 2000, *leg.* F.G. Haddad (holotype CBS H-22661, culture ex-type CBS 115684).

Notes. – *Wojnowiciella* was recently introduced and differentiated from *Wojnowicia* based on brown conidia and the absence of setae on the conidiomata (Crous et al. 2015d). Morphologically, *W. leptocarpi* can be distinguished from other species in the genus by the presence of conidia with mucoid caps at both ends. Although microconidia are also observed in the type species *W. eucalypti*, macroconidia are narrower in *W. leptocarpi*. Recently described species in *Wojnowicia* (Li et al. 2015, Liu et al. 2015) are transferred here to *Wojnowiciella*, because the type species of *Wojnowicia*, *W. hirta*, was reduced to synonymy with *Septoriella* (Crous et al. 2015a). In addition, our phylogenetic analyses, supported by morphological data, also place these species in *Wojnowiciella*.

Wojnowiciella dactylidis (Wijayawardene, Camporesi & K.D. Hyde) Hern.-Restr. & Crous, **comb. nov.**
MycoBank MB817219

Basionym. – *Wojnowicia dactylidis* Wijayawardene, Camporesi & K.D. Hyde, *Fungal Diversity* **72**: 144. 2015.

Wojnowiciella lonicerae (Wijayawardene, Camporesi & K.D. Hyde) Hern.-Restr. & Crous, **comb. nov.**
MycoBank MB817220

Basionym. – *Wojnowicia lonicerae* Wijayawardene, Camporesi & K.D. Hyde, *Fungal Diversity* **72**: 145. 2015.

Wojnowiciella spartii (W.J. Li, Camporesi & K.D. Hyde) Hern.-Restr. & Crous, **comb. nov.**
MycoBank MB817244

Basionym. – *Wojnowicia spartii* W.J. Li, Camporesi & K.D. Hyde, *Mycosphere* **6**: 703. 2015.

Authors: M. Hernández-Restrepo & P.W. Crous

Xerocomellus fulvus Sarwar, Ahmad & Khalid, **sp. nov.** – Figs. 26, 27
MycoBank MB815528

Description. – Pileus 2.0–3.1 cm across, convex to hemispheric, deep pink to strong yellowish brown (2.5R 6/14–10YR 5/8), dry and aerolate; obtuse central disc; curvature deflexed; margin cottony. – Stipe 5–6 × 1.5–1.7 cm, net stipe (pseudoreticulation), equal or slightly tapering toward base, smooth and cylindrical, light greyish red (2.5R 6/8) from top to centre and dark yellowish brown (10YR 2/4) from centre to base. – Pore surface adnexed, soft, light greenish yellow to vivid greenish yellow (7.5Y 9/6 – 7.5Y 9/8). – Basidiospores 13–17 × 6–8 µm [av. = 7 × 15 µm, Q = 2.214], ellipsoidal to oblong, apiculate, smooth, yellow to green olive, amyloid. – Basidia 13–15.5 × 37.5–39.5 µm, clavate, two- to three-spored basidia, thin-walled, hyaline. – Cheilocystidia 29–36.5 × 11.5–13.5 µm, clavate, thin walled, hyaline. – Pleurocystidia 31– 42 × 11–12.5 µm, clavate, guttulate, thin-walled, hyaline. – Pileipellis hyphae cylindrical, 9–13 µm diam., thin-walled, hyaline. – Stipitipellis hyphae cylindrical, 11–12.5 µm, hyaline. Examined in 5 % KOH.

Fig. 26. *Xerocomellus fulvus* (LAH 926714). **A, B.** Fresh basidiomata. Scale bars 1.8 cm.

Etymology. – The species epithet *fulvus* refers to the reddish brown colour of the basidiomata of this species.

Material examined. – PAKISTAN, Khyber Pakhtunkhwa (KPK), Swat, Ushu Kalam, solitary on soil under *Cedrus deodara* (*Pinaceae*), 26 Jul 2014, *leg.* I. Ahmad (holotype LAH926714).

Notes. – *Xerocomellus,* a recently described genus, is clearly separated from *Xerocomus* based on phylogenetic inference (Šutara 2008). Morphological and molecular data suggest that *Xerocomellus* is a heterogeneous taxon (Ladurner & Simonini 2003, Binder & Hibbett 2004, 2007, Šutara 2008).

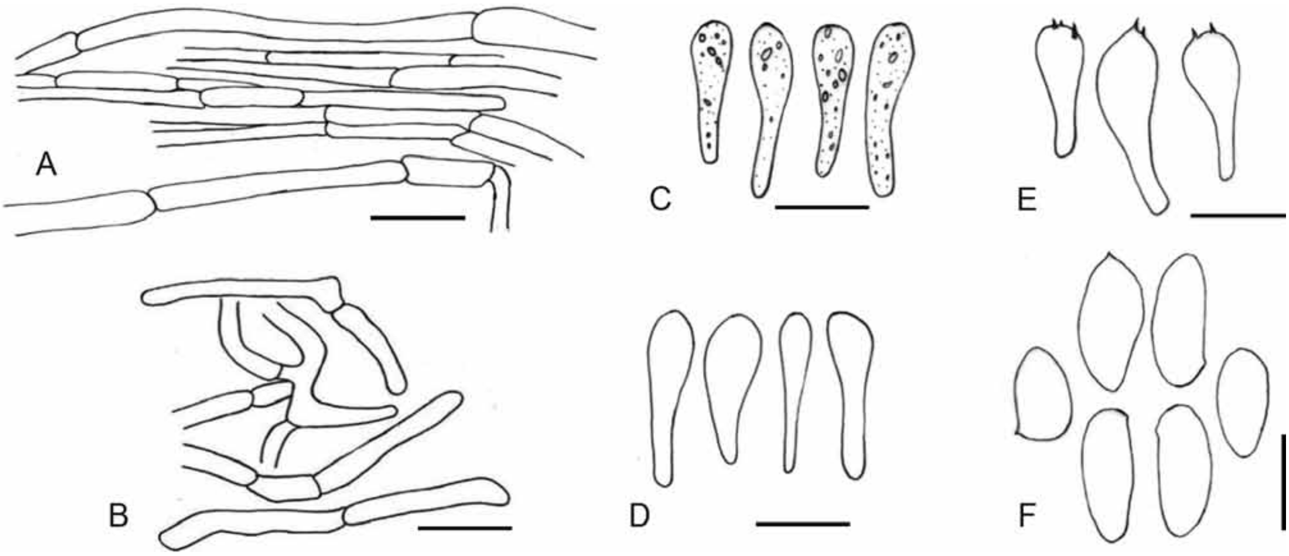


Fig. 27. *Xerocomellus fulvus* (LAH 926714). **A.** Stiptipellis. **B.** Pileal hyphae. **C.** Cheilocystida. **D.** Pleurocystidia. **E.** Basidia **F.** Basidiospores. Scale bars **A** 34 µm, **B** 44 µm, **C** 18 µm, **D** 22 µm, **E** 17 µm, **F** 11 µm.

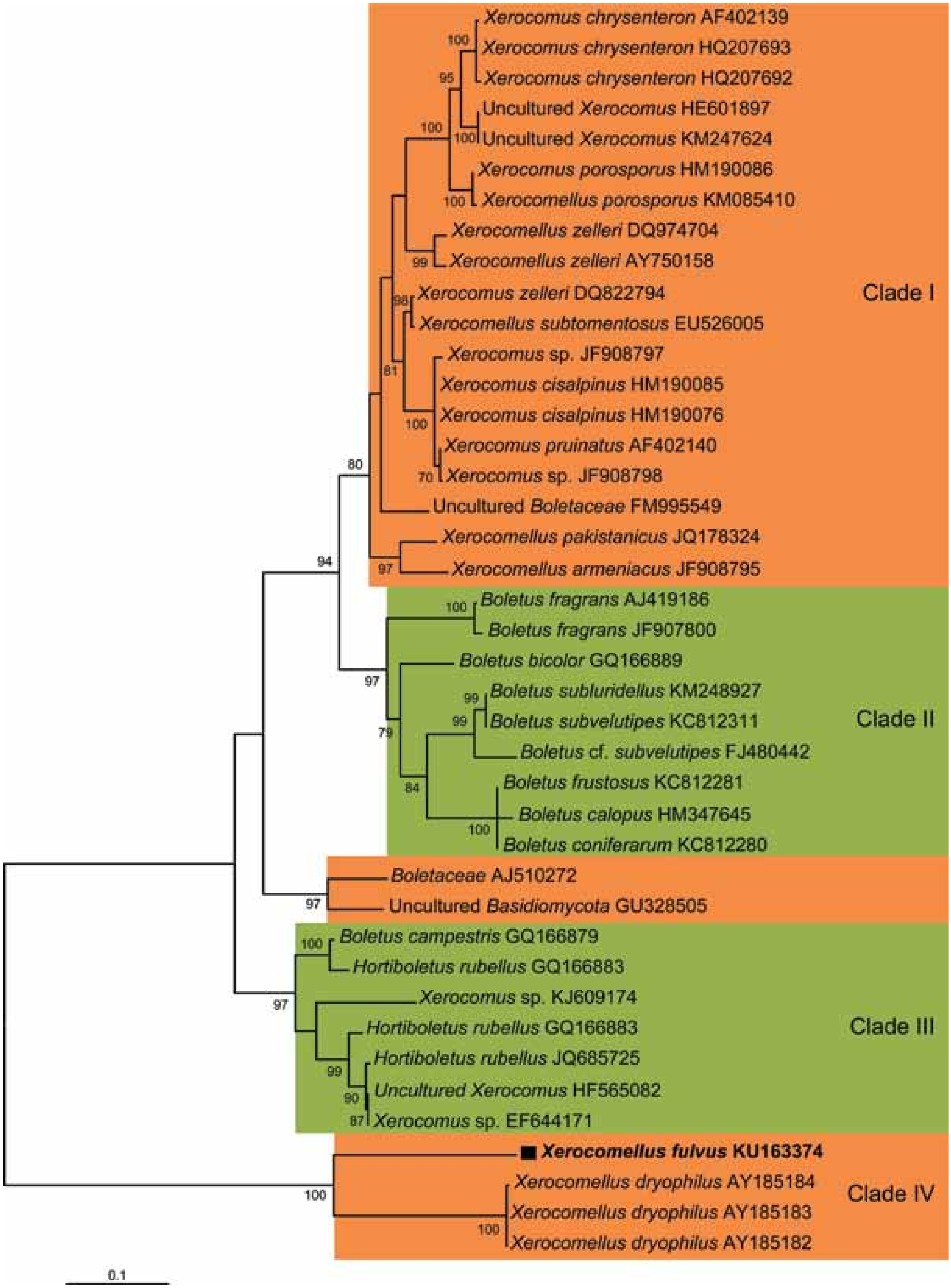


Fig. 28. Phylogenetic tree of *Xerocomellus fulvus* and allies. Tree inferred by maximum likelihood analysis based on ITS-nrDNA sequences. Bootstrap support values (1000 replicates) > 50 % are shown at the nodes. GenBank accession numbers are given at the end of species names. ■ indicate the new species reported from Pakistan.

Eight species of this genus are already reported from Pakistan (Ahmad 1980, Iqbal & Khalid 1996, Razaq 2007, Sultana et al. 2011, Sarwar 2013, Sarwar et al. 2014). ITS sequence data showed that *X. fulvus* is closest to *X. dryophilus*, *X. pakistanicus* and *Rheubarbiboletus armeniacus* (syn. *Xerocomellus armeniacus*). In the phylogenetic tree, *Xerocomellus fulvus* is a sister clade to *X. dryophilus* (Fig. 28).

Morphologically *X. fulvus* is characterised by deep pink to strong yellowish brown pileus colour, and smooth spores that can be easily differentiated from species with striated spores. It shows a very close resemblance to *X. dryophilus* but can be distinguished from that species by its smaller pileus, dark reddish brown stipe base and slightly larger spores, compared to the reddish pileus, yellowish stipe base and smaller spores in *X. dryophilus*.

Authors: I. Ahmad, S. Sarwar, A. Rashid & A. N. Khalid

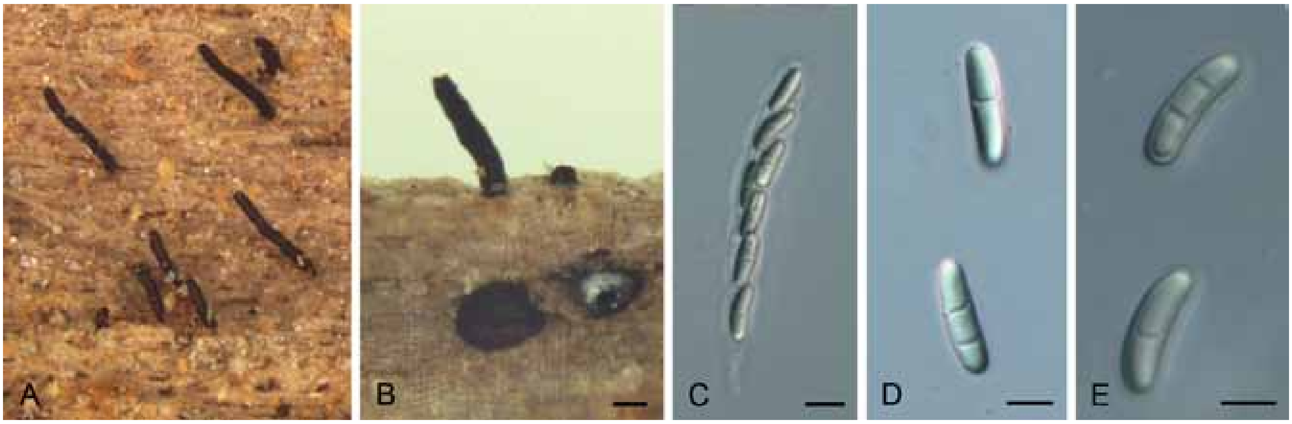


Fig. 29. *Xylomelasma shoalensis* (from Holotype ILLS 76895). **A, B.** Ascomata. **C.** Ascus. **D, E.** Ascospores. Scale bars **B** 100 µm, **C** 10 µm, **D–E** 5 µm.

Xylomelasma shoalensis A.N. Mill., Y. Marín & Stchigel, **sp. nov.** – Fig. 29
Mycobank MB815633

Description. – Ascomata immersed in wood, partly erumpent, solitary to aggregated, ostiolate, black, globose to subglobose, 175–265 µm, with a prominent neck, non-sulcate, up to 570 µm long. – Paraphyses sparse, filiform, hyaline. – Asci 8-spored, unitunicate, clavate, 65–80 × 7–10 µm, stipe 7–17 µm long, with a non-amyloid small apical ring. – Ascospores uniseriate, biseriate or irregularly arranged in the asci, allantoid to subcylindrical, thin- and smooth-walled, hyaline to yellowish-brown, 10–13(–15) × 3.5–5 µm, uniseptate or biseptate (occasionally non-septate). Asexual morph not observed.

Etymology. – *shoalensis* referring to the Shoal Creek Conservation Area, where the fungus was collected.

Material examined. – USA, Illinois, Montgomery County, Shoal Creek Conservation Area, 39.1871 N, -89.5963 W, on 6 cm. diam. decorticated branch on ground, 4 Apr 2004, *leg.* A.N. Miller, *ANM 1* (holotype ILLS 76895).

Notes. – *Xylomelasma* was introduced by Réblová (2006) for two new taxa isolated from rotten wood, *X. novae-zelandiae* and *X. sordida* (Réblová 2006). Recently, another new species was described isolated from the same kind of substrate, *X. moderata* (Vasilyeva & Stephenson 2014). *Xylomelasma shoalensis* can easily be distinguished from the other species by its allantoid to subcylindrical, uni- or biseptate ascospores vs. ellipsoidal to oblong and aseptate, or rarely uniseptate in the other three species. In fact, ascospore morphology is more similar to that observed in *Endoxylina*. However, the phylogenetic study based on the D1–D3 region of 28S nucLSU sequences demonstrated that our taxon belongs to *Xylomelasma* and that this genus is unrelated to *Endoxylina*. In the phylogenetic tree (Fig. 3) *Xylomelasma* remains *incertae sedis* and *Endoxylina tehuacanesis* is outside the family *Diatrypaceae,* although *Endoxylina* was included in that family to accommodate *Eutypa astroidea* (Romell 1892).

Authors. – A. N. Miller, Y. Marin-Felix & A. M. Stchigel

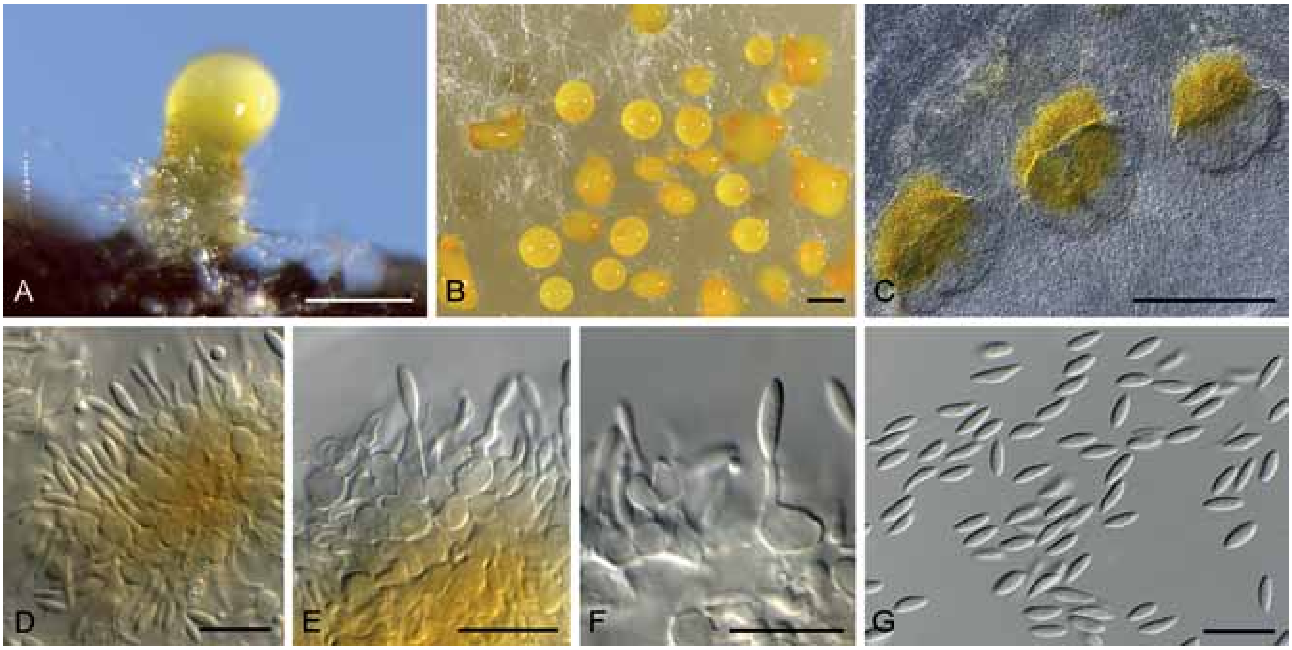


Fig. 30. *Crysopholia colombiana* (culture CBS 141506). A. Conidiomata on SNA. B. Conidiomata on OA. C. Conidiomata on SNA. D–F. Conidiogenous cells. G. Conidia. Scale bars **A–C** 300 µm, all others 10 µm.

Interesting host and geographical records

Beltrania rhombica Penz., *Michelia* **2** (no. 8): 474. 1882.

Material examined. – MALAYSIA, Sabah, on leaves of *Acacia* sp. (*Fabaceae*), May 2015, *leg.* M.J. Wingfield, CPC 27482 = CBS 141507.

Notes. – *Beltrania rhombica* is commonly associated with leaf litter, although a recent paper by Shi et al. (2012) also reports it from leaf spots of *Tibouchina* in China. DNA data is rather sparse for this complex, and it may be that the present collection will eventually be shown to represent a species allied to the *B. rhombica/pseudorhombica* complex (Crous et al. 2014).

Botryosphaeria agaves (Henn.) E.J. Butler, *Annls mycol.* **9**(4): 415. 1911.

Basionym. – *Physalospora agaves* Henn., *Bot. Jb.* 34: 51. 1904.
Material examined. – FRANCE, La Réunion, on branches of *Agave* sp. (*Agavaceae*), 10 Mar 2015, *leg.* P.W. Crous, CPC 26299 = CBS 141505.

Notes. – *Botryosphaeria agaves* appears to have a wide distribution, and is commonly associated with leaves of *Agave* spp. (Liu et al. 2012, Phillips et al. 2013). This is the first record from La Réunion.

Chrysofolia colombiana Crous et al., *Persoonia* **34**: 207. 2015. – Fig. 30

Material examined. – FRANCE, La Réunion, on leav es of *Syzygium jambos* (*Myrtaceae*), 12 Mar 2015, *leg.* P.W. Crous, CPC 26355 = CBS 141506.

Notes. – *Chrysofolia colombiana* (type species of *Chrysofolia*) was recently described from leaves of a *Eucalyptus* sp. collected in Colombia (Crous et al. 2015d). The fact that this fungus is reported here from *Syzygium,* also in the *Myrtaceae,* is thus unsurprising. However, its occurence in La Réunion was unexpected. Further multi-gene analyses are required to confirm this identification, which is presently supported only by morphology and ITS sequence data.

Colletotrichum karstiiY.L. Yang et al., Cryptog. Mycol. **32**: 241. 2011.

Material examined. – FRANCE, La Réunion, on leaves of *Acacia heterophylla* (*Fabaceae*), 8 Mar 2015, *leg.* P.W. Crous, CPC 26233 = CBS 141503.

Notes. – *Colletotrichum karstii* represents a species in the *C. boninense* complex, which is known to have a wide host range and distribution, being commonly associated with a range of different disease symptoms (Damm et al. 2012).

Dothiora ceratoniae (Quaedvl. et al.) Crous, Fungal Biol.: in press. MB816138

Basionym. – *Cylindroseptoria ceratoniae* Quaedvl. et al., *Stud. Mycol.* **75**: 358. 2013.

Material examined. – AUSTRALIA, Victoria, Melbourne, on leaves of *Eucalyptus* sp. (*Myrtaceae*), 2 Nov 2014, *leg.* P.W. Crous, CPC 25484 = CBS 141501.

Notes. – *Cylindroseptoria ceratoniae,* occurring on leaves of *Ceratonia siliqua* (*Fabaceae*) in Spain, is the type species *Cylindroseptoria* (Quaedvlieg et al. 2013). However, a recent study has shown that the genus is a synonym of *Dothiora* (Crous & Groenewald 2016, in press).

Epicoccum sorghinum (Sacc.) Aveskamp, Gruyter & Verkley [as 'sorghi'], *Stud. Mycol.* **65**: 36. 2010.

Material examined. – FRANCE, La Réunion, on leaves of *Paspalum* sp. (*Poaceae*), 7 Mar 2015, *leg.* P.W. Crous, CPC 26197 = CBS 141502.

Notes. – *Epicoccum sorghinum* appears to represent a species complex occurring on a range of different hosts, and awaits further treatment (Aveskamp et al. 2010).

Helminthosporium velutinum Link [as '*Helmisporium*'], *Mag. Gesell. naturf. Freunde, Berlin* **3**(1–2): 10, tab. 1: 9. 1809.

Material examined. – FRANCE, La Réunion, on branches of *Stoebe* sp. (*Asteraceae*), 7 Mar 2015, *leg.* P.W. Crous, CPC 26297 = CBS 141504.

Notes. – *Helminthosporium velutinum,* the type species of *Helminthosporium* is commonly isolated from leaf and twig litter as endophyte, and appears to have a cosmopolitan distribution. This is the first record from La Réunion.

Myrmecridium spartii Crous & R.K. Schumach. Sydowia **67**: 106. 2015.

Material examined. – SERBIA, Fruska Gora (Iriski Venac), on twigs of *Cytisus* (= *Sarothamnus*) *scoparius* (*Fabaceae*), 10 Mar 2015, *leg.* D. Savic, CPC 26548 = CBS 141406.

Notes. – *Myrmecridium* presently includes seven species, characterised by hyaline mycelium and pale to unpigmented, pimple-like denticles on the conidiogenous cells (Arzanlou et al. 2007, Crous et al. 2011, 2012, 2015c). This specimen of *M. spartii* represents a new geographical record from Serbia.

Ramularia eucalypti Crous, *Fungal Diversity* **26**: 174. 2007.

Material examined. – ITALY, Sicily, on leaves of *Citrus maxima* (*Rutaceae*), 13 Mar 2015, *leg.* V. Guarnaccia, CPC 26186 = CBS 141518.

Notes. – *Ramularia eucalypti* was originally described causing leaf spots of *Eucalyptus* (*Myrtaceae*) in Italy (Crous et al. 2007). Since its initial publication, numerous isolates were reported as *R. eucalypti*, associated with infections of different agricultural crops, and humans. Based on a multigene phylogenetic study, however, Videira et al. (2015) split the *R. eucalypti* complex into seven well-defined species that differ in host range and distribution.

Readeriella dimorphospora (Crous & C. Mohammed) Crous, *Persoonia* **23**: 111. 2009.

Basionym. – *Cibiessia dimorphospora* Crous & C. Mohammed, *Fungal Diversity* **26**: 151. 2007.

Material examined. – AUSTRALIA, Victoria, Melbourne, on leaves of *Eucalyptus* sp., 7 Nov 2014, *leg.* P.W. Crous, CPC 25379 = CBS 141497.

Notes. – *Readeriella dimorphospora* was originally described from leaf spots of *Eucalyptus nitens* collected in Tasmania (Crous et al. 2007). Since its initial description, this fungus has been isolated from leaves of different *Eucalyptus* species in Australia, and appears to be quite common on this host.

Vermiculariopsiella dichapetali Crous, *Persoonia* **32**: 213. 2014.

Material examined. – AUSTRALIA, Melbourne, on leaves of *Grevillea* sp. (*Proteaceae*), 7 Nov 2014, *leg.* P.W. Crous, CPC 25482 = CBS 141498; Western Australia, Perth, Bedfordale, on leaves of *Grevillea* sp., 29 Sept 2015, *leg.* P.W. Crous, CPC 29196 = CBS 141499; Western Australia, on leaves of *Acacia glaucoptera* Benth. (*Fabaceae*), 22 Sept 2015, *leg.* P.W. Crous, CPC 29232 = CBS 141500.

Notes. – *Vermiculariopsiella dichapetali* was recently described from leaves of *Dichapetalum rhodesicum* collected in Botswana (Crous et al. 2014). Although the present isolates appear to be closely related to this fungus based on their ITS sequence data, a multigene phylogenetic study is needed to clarify whether this might be a complex of closely related cryptic species. This genus is placed in the *Vermiculariopsiellaceae nom. prov.* in the Sordariomycetes (Hernández-Restrepo et al. unpubl.)

Verrucoconiothyrium nitidae (Crous & Denman) Crous, *Sydowia* **67**: 110. 2015.

Basionym. – *Coniothyrium nitidae* Crous & Denman, *S. Afr. J. Bot.* **64**: 138. 1998.

Material examined. – AUSTRALIA, Victoria, Melbourne, on leaves of *Acacia leprosa* var. *graveolens* (*Fabaceae*), 2 Nov 2014, *leg.* P.W. Crous, CPC 25373 = CBS 141517. FRANCE, La Réunion, on leaves of *Acacia heterophylla* (*Fabaceae*), 8 Mar 2015, *leg.* P.W. Crous, CPC 26289 = CBS 141496.

Notes. – *Verrucoconiothyrium nitidae* is a foliar pathogen of *Proteaceae* (Swart et al. 1998, Crous et al. 2013, 2015c), and this is the first record from Australia.

Authors: P. W. Crous, M. J. Wingfield & M. Hernández-Restrepo

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