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ARTICLE

The Genera of Fungi - fixing the application of the type species of generic names – G 2: *Allantophomopsis, Latorua, Macrodiplodiopsis, Macrohilum, Milospium, Protostegia, Pyricularia, Robillarda, Rotula, Septoriella, Torula,* and *Wojnowicia*

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Abstract: The present paper represents the second contribution in the Genera of Fungi series, linking type species of fungal genera to their morphology and DNA sequence data, and where possible, ecology. This paper focuses on 12 genera of microfungi, 11 of which the type species are neo- or epitypified here: *Allantophomopsis* (*A. cytisporea*, *Phacidiaceae, Phacidiales, Leotiomycetes*), *Latorua* gen. nov. (*Latorua caligans, Latoruaceae, Pleosporales, Dothideomycetes*), *Macrodiplodiopsis* (*M. desmazieri*, *Macrodiplodiopsidaceae, Pleosporales, Dothideomycetes*), *Macrohilum* (*M. eucalypti*, *Macrohilaceae*, *Diaporthales, Sordariomycetes*), *Milospium* (*M. graphideorum*, *incertae sedis, Pezizomycotina*), *Protostegia* (*P. eucleae*, *Mycosphaerellaceae, Capnodiales, Dothideomycetes*), *Pyricularia* (*P. grisea*, *Pyriculariaceae, Magnaporthales*, *Sordariomycetes*), *Robillarda* (*R. sessilis*, *Robillardaceae, Xylariales, Sordariomycetes*), *Rutola* (*R. graminis*, *incertae sedis, Pleosporales, Dothideomycetes*), *Septoriella* (*S. phragmitis*, *Phaeosphaeriaceae, Pleosporales, Dothideomycetes*), *Torula* (*T. herbarum*, *Torulaceae, Pleosporales, Dothideomycetes*) and *Wojnowicia* (syn. of *Septoriella*, *S. hirta*, *Phaeosphaeriaceae, Pleosporales, Dothideomycetes*). Novel species include *Latorua grootfonteinensis, Robillarda africana, R. roystoneae, R. terrae*, *Torula ficus, T. hollandica,* and *T. masonii* spp. nov., and three new families: *Macrodiplodiopsisceae, Macrohilaceae,* and *Robillardaceae*. Authors interested in contributing accounts of individual genera to larger multi-authored papers to be published in IMA Fungus, should contact the associate editors listed for the major groups of fungi on the List of Protected Generic Names for Fungi (www.generaoffungi.org).

Key words:
DNA Barcodes
epitype
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INTRODUCTION

The present research series was launched in 2014 (www.GeneraOfFungi.org, Crous *et al*. 2014) with the specific aim of contributing to a revision of *The Genera of Fungi* (Clements & Shear 1931). The focus of this set of papers is on a subset of names that are currently accepted (Kirk *et al*. 2013), which it is anticipated will in due course obtain

"protected status", subject to changes in the rules governing the naming of fungi being proposed to the next International Botanical Congress (IBCXIX) in China in 2017) (Hawksworth *et al*. 2013, Hawksworth 2015).

The present endeavour is complicated by the fact that for many genera of *Fungi* no type was designated, and the vast majority were described before the DNA era (Hibbett *et al*. 2011), meaning that they lack DNA barcodes (Schoch *et al*. 2012). Many genera of *Ascomycetes* are also poly- or paraphyletic, meaning that their type species need to be recollected and sequenced to resolve their true higher order phylogeny. Other aspects that affect this process include the end of dual nomenclature (Hawksworth *et al.* 2011, Wingfield *et al.* 2012), and that many sexual-asexual links reported in literature were never confirmed in culture. To address these issues, several studies have recently been published revising major groups of fungi, to reach community consensus (Rossman *et al*. 2013, 2015, Johnston *et al*. 2014, Wijayawardene *et al*. 2014) about which names would eventually be taken up in the lists of protected names (Kirk *et al*. 2013). The present contribution represents the second paper in this series.

Stabilising the application of generic names

An important aim of the present series of papers is to fix the application of names by generating DNA barcodes of type species of genera. In cases where no cultures are available, and DNA cannot be isolated from type material (depauperate or missing specimens), this aim is achieved by means of epi- or neotypification. A classic example of where this approach has been successfully used was the neotypification of *Botryosphaeria dothidea* (Slippers *et al.* 2004), which eventually paved the way for others to revise the family, including all related genera (Crous *et al*. 2006, Phillips *et al*. 2013). An important hurdle for such typification events is to ensure that the epi- or neotype specimen is derived from the same host and location (e.g. country or region), and is morphologically identical to that of the holo- or lectotype specimen (Cannon *et al*. 2012). In fungi, many species and genera appear to represent complexes (Crous & Groenewald 2005), and thus the application of names not linked to definitive DNA barcodes remains ambiguous. This situation has serious consequences for trade, health and industry, stressing the need to fix the application of names *via* DNA data.

The current rules regarding epitypification (McNeill *et al.* 2012), require that the existing type must be "demonstrably ambiguous". It has been suggested that this means that every effort should be made to recover DNA for sequencing from the existing type before designation of an epitype can be justified (Jørgensen 2014). In practice it is extremely difficult to recover the actual DNA of a species of microfungi from old type material, and 19th century types in particular are frequently small, fragmentary, and co-colonised by several taxa. We consider it irresponsible to deplete or damage historic collections through repeated attempts to recover DNA just to demonstrate that this could not be done. Following extensive discussions, mycologists have consequently made a proposal to remove "demonstrably ambiguous" from the rules so that epitypification will be allowed when the existing type "cannot, in the opinion of the author making the typification, be critically identified for purposes of the precise application of the name to a taxon" (Hawksworth 2015).

In the case of many microfungi, particularly those growing on plants, as it has become increasingly clear that many are complexes of cryptic species, especially where several hosts are involved (see above) we consider that sequences are essential for a confident application of names. The epitypifications made here are on the assumption that the words "demonstrably ambiguous" will be deleted from the rules in 2017, and the revised provision which places the responsibility on the persons making the epitypification will remain. For the moment, we in any case consider the epitypifications made here are justified because, in our opinion, where there is no sequence data from the existing types the names are indeed ambiguous as regards generic placement and/or application of the species name.

The lack of sequenced types is a problem even for fungi currently being described. In 2013, approximately 65 % of the names published that year still lacked a DNA barcode (Crous *et al.* 2015), suggesting that a different approach is called for in the future. In the interim, in the case of previously published names, where the interpretation of a specimen is considered in the opinion of a later author to be ambiguous without molecular data, this can be rectified by designating an epitype, preferably linked to a culture, and DNA barcode. Such typification events can now also be registered in MycoBank and assigned a MBT number to ensure traceability of the nomenclatural act (Robert *et al*. 2013). This approach is followed here.

MATERIALS AND METHODS

Isolates

Descriptions are based on cultures obtained from the CBS-KNAW Fungal Biodiversity Centre in Utrecht, The Netherlands (CBS-KNAW) and the working collection of P.W. Crous (CPC), housed at CBS. 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 in Petri dishes containing 2 % malt extract agar (MEA) as described earlier (Crous *et al.* 1991). Colonies were sub-cultured onto MEA, 2 % potato-dextrose agar (PDA), oatmeal agar (OA), MEA (Crous *et al*. 2009b), 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.

DNA isolation, amplification and analyses

Genomic DNA was extracted from fungal colonies growing on MEA using the UltraClean™ Microbial DNA Isolation Kit (MoBio Laboratories, Inc., Solana Beach, CA, USA) according to the manufacturer's protocol. 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 (LSU). The primers ITS4 (White *et al*. 1990) and LSU1Fd (Crous *et al*. 2009) were used as internal sequence primers to ensure good quality sequences over the entire length of the amplicon. Part of the histone H3 gene (HIS) was amplified with primers CylH3F and CylH3R (Crous et al. 2004b). Amplification conditions for ITS and LSU followed Cheewangkoon *et al*. (2008), and for HIS Groenewald *et al*. (2013). SeqMan v. 7.0.0 (DNASTAR, Madison, WI) was used to compute consensus sequences. Blast searches using ITS and LSU sequences were performed for each strain and the closest matches were retrieved and included in the phylogenetic analyses. An overview LSU tree was inferred to determine the higher order phylogenetic placement and ITS phylogenies for selected species to determine higher resolution placement at the species level; for *Robillarda*, the ITS data was supplemented with HIS sequences. The sequence alignment and subsequent phylogenetic analyses of the alignments were carried out using methods described by Crous *et al*. (2006) for parsimony and Groenewald *et al*. (2013) for Bayesian analyses. Gaps were treated as "fifth state" data in the parsimony analysis. Novel sequence data were deposited in GenBank (Table 1) and the alignments and trees in TreeBASE (ID 17674; http://www.treebase.org).

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 for examination purposes. Observations were made with a Zeiss V20 Discovery stereo-microscope (Zeiss, Oberkochen, Germany), and with a Zeiss Axio Imager 2 light microscope using differential interference contrast (DIC) illumination and an AxioCam MRc5 camera and ZEN software. Additional photomicrographs were done using a Nikon Eclipse N*i*-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 (Crous *et al*. 2009b) incubated at 25 ºC. Colony colours (surface and reverse) were rated according to the colour charts of Rayner (1970). Taxonomic novelties and new typifications were deposited in MycoBank (www.MycoBank.org; Crous *et al*. 2004a).

RESULTS

Phylogeny

For the species treated here, amplicons of approximately 1 700 bases were obtained of ITS and LSU, and approximately 400 bases for HIS, of the isolates listed in Table 1. The LSU alignment was used to resolve the generic placement of strains (Fig. 1) and the remaining alignments (see below) for species identification.

The manually adjusted LSU alignment contained 140 sequences (including the outgroup sequence) and 745 characters including alignment gaps were used in the phylogenetic analysis; 296 of these were parsimony informative, 68 were variable and parsimony-uninformative, and 381 were constant. The parsimony analysis yielded the maximum setting of 1000 equally most parsimonious trees (TL = 1268 steps; CI = 0.476; RI = 0.937; RC = 0.446), which made it possible to evaluate the higher order classification of the species treated here (Fig. 1; discussed below in the Taxonomy section). A Bayesian analysis (337 unique site patterns, tree based on consensus of 80 328 trees) on the sequence alignment yielded a tree topology delimiting the same lineages to those of the parsimony analysis (posterior probability values plotted on Fig. 1, tree available in TreeBASE), but with some rearrangements at the terminal (for example the order of *Melanconiella*, *Macrohilum* and *Diaporthe* within *Diaporthales*) and the deeper nodes (for example the placement of *Capnodiales* compared to *Phacidiales*). The genus *Robillarda* represented a lineage distinct from *Amphisphaeriaceae* and therefore a novel family is introduced below to accommodate it in *Xylariales*. Likewise, new familial names are introduced below for *Latorua*, *Macrodiplodiopsis*, and *Torula* in *Pleosporales* and for *Macrohilum* in *Diaporthales*.

The LSU phylogeny could not discriminate the relationship of species included in *Phacidiales*, therefore a focussed ITS phylogeny was constructed (Fig. 2). The manually adjusted ITS alignment contained 46 sequences (including the outgroup sequence) and 533 characters including alignment gaps were used in the phylogenetic analysis; 36 of these were parsimony informative, 91 were variable and parsimony-uninformative, and 406 were constant. The parsimony analysis yielded 62 equally most parsimonious trees (TL = 160 steps; CI = 0.887; RI = 0.933; RC = 0.828), the first if which is shown in Fig. 2. Overall, the phylogeny was poorly supported, with many nodes having no or low bootstrap support values. Species of *Phacidium* clustered in the same clade (no bootstrap support), with species representing *Allantophomopsiella*, *Bulgaria*, *Phacidiopycnis*, *Potebniamyces* and *Pseudophacidium* being distinct. The allantophomopsis-like species turned out to be non-monophyletic in this phylogeny and formed predominantly more basal, separate lineages. It is possible that the addition of extra loci to the dataset might increase the backbone support and resolution of the phylogeny.

The LSU phylogeny could not discriminate the relationship of species included in *Robillarda*, therefore a focussed combined ITS and HIS phylogeny was constructed (Fig. 3). The manually adjusted combined alignment contained nine sequences (including the outgroup sequence) and 935 characters including alignment gaps (ITS: 573; HIS: 362) were used in the phylogenetic analysis; 61 (ITS: 7; HIS: 54) of these were parsimony informative, 75 (ITS: 54; HIS: 21) were variable and parsimony-uninformative, and 799 (ITS: 512; HIS: 287) were constant. The parsimony analysis yielded two equally most parsimonious trees (TL = 182 steps; CI = 0.912; RI = 0.833; RC = 0.760), the first if which is shown in Fig. 3. All species were supported in this phylogeny, while the HIS sequences contributed some intra-specific variation to the clade. The HIS sequences of CBS 101440, CBS 276.78 and CBS 173.65 differ with 1, 4 and 8 bases respectively from the HIS sequence of the ex-epitype culture CBS 114312.

The LSU phylogeny could not discriminate the relationship of species included in *Phaeosphaeriaceae*, therefore a focussed combined LSU and ITS phylogeny was constructed

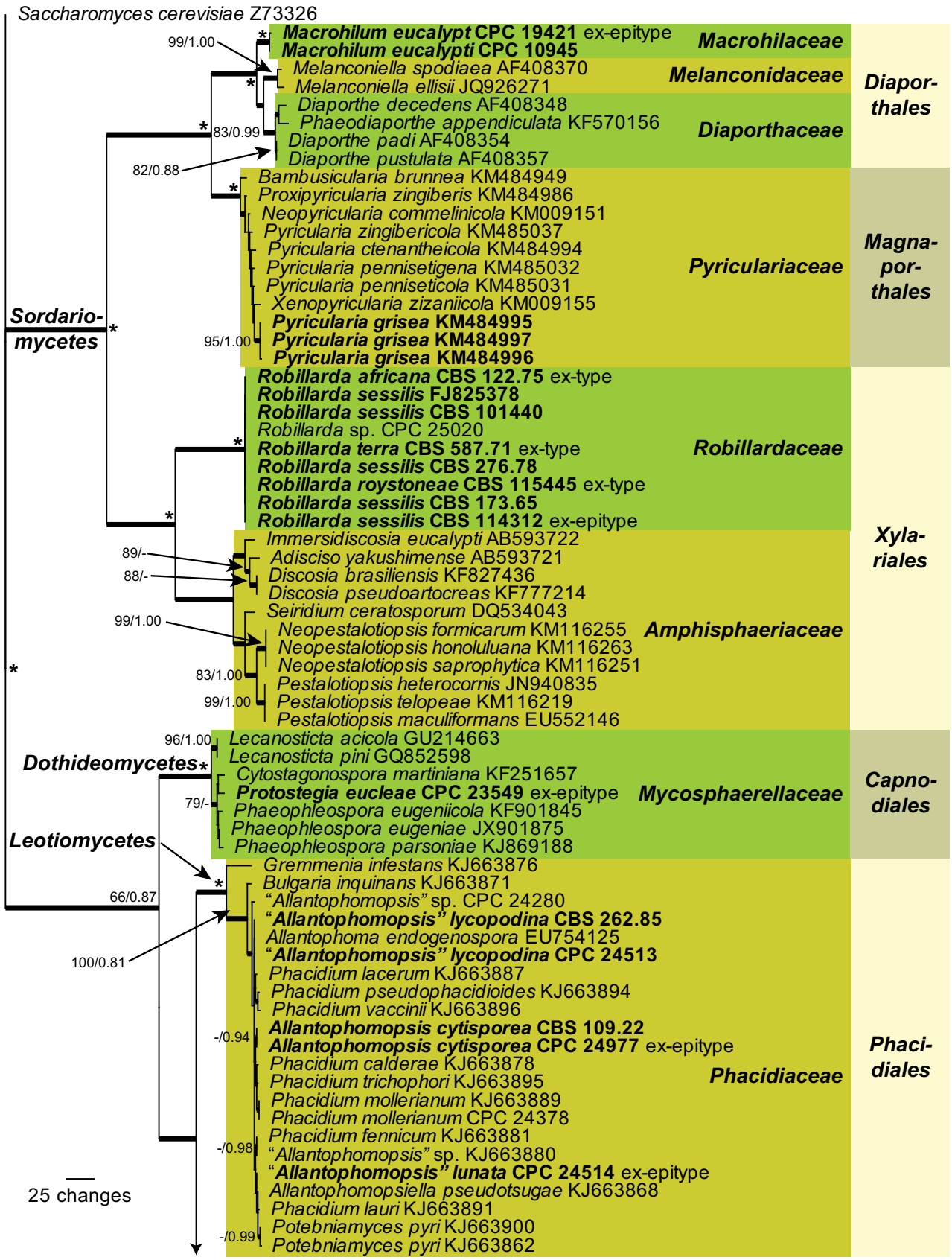

Fig. 1. The first of 1000 equally most parsimonious trees obtained from a heuristic search with 100 random taxon additions of the LSU sequence alignment. Parsimony bootstrap support values >74 % and Bayesian posterior probabilities >0.79 are plotted at the nodes, strict consensus branches from the parsimony analysis are thickened, and the scale bar represents the number of changes. An asterisk (*) denotes a node with 100 % parsimony bootstrap support and 1.00 Bayesian posterior probability. Families and orders are indicated in different colours to the right of the tree and classes at the nodes to the left of the tree. Species treated here for which LSU sequences were available are shown in **bold** face. The tree was rooted to *Saccharomyces cerevisiae* (GenBank Z73326).

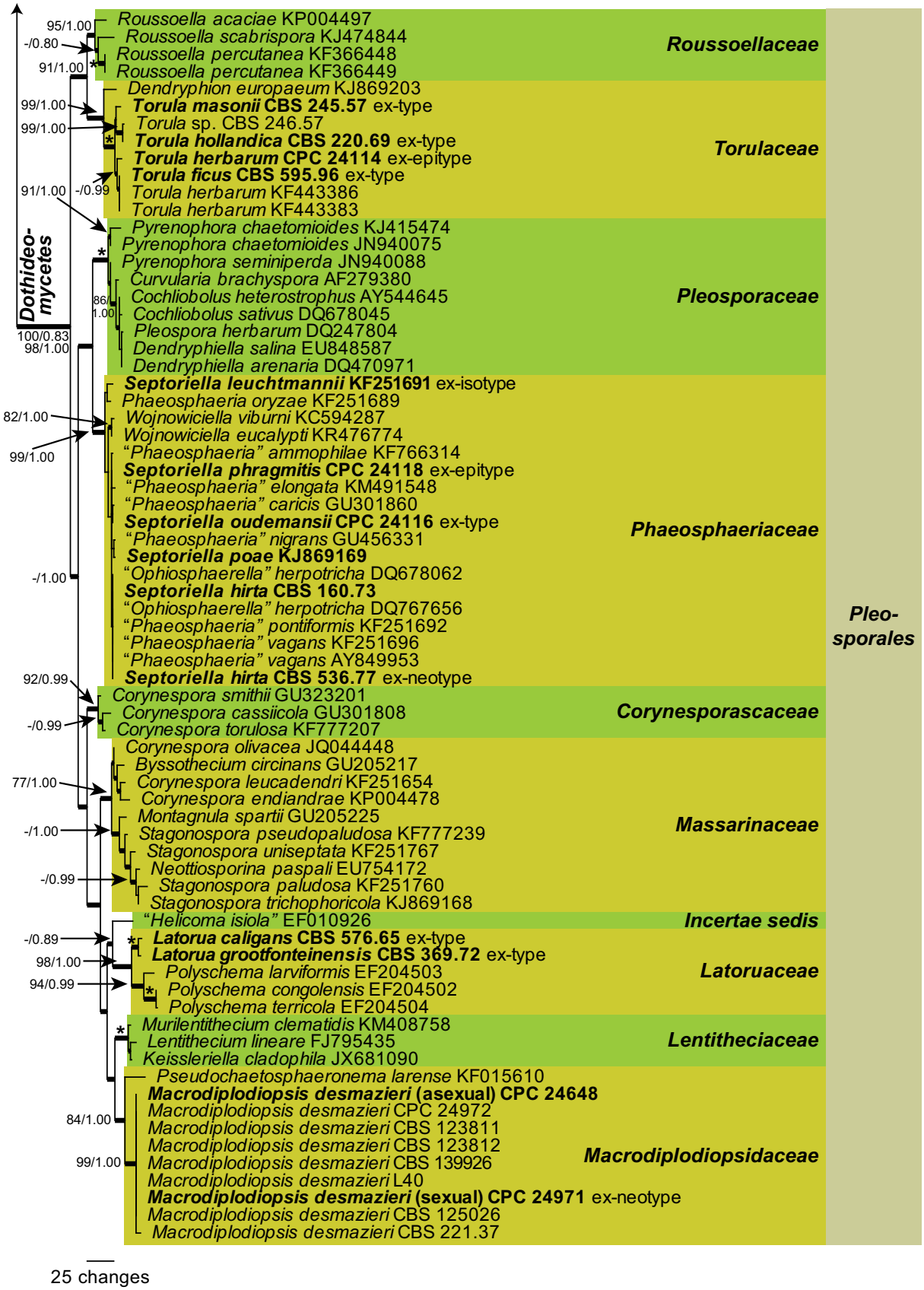

Fig. 1. (Continued).

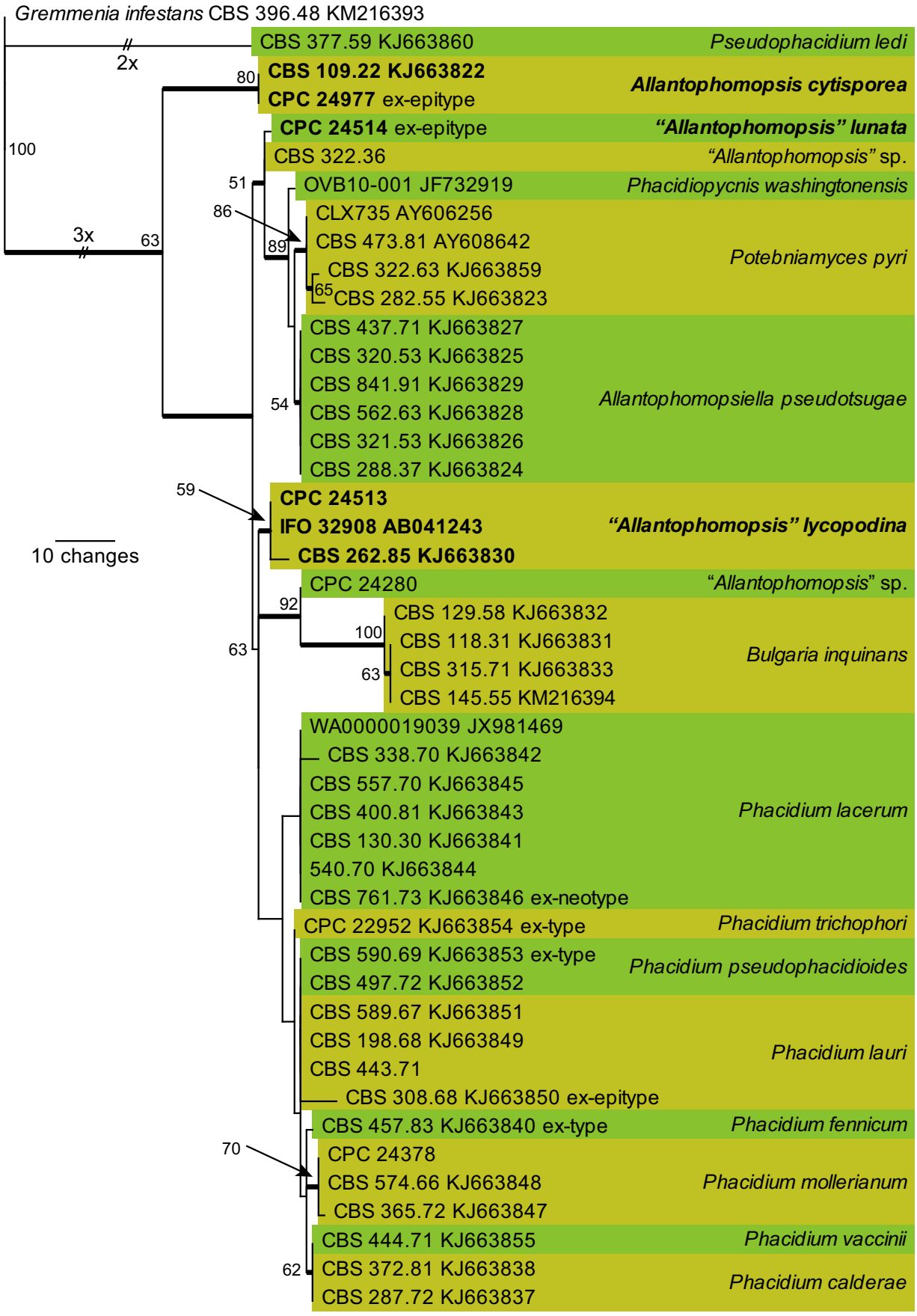

Fig. 2. The first of 62 equally most parsimonious trees obtained from a heuristic search with 100 random taxon additions of the ITS sequence alignment. The scale bar shows the number of changes, and bootstrap support values from 1 000 replicates are shown at the nodes. Thickened lines indicate the strict consensus branches and the species treated here are printed in **bold** face. The species boundaries are delimited with coloured blocks. The tree was rooted to *Gremmenia infestans* (GenBank accession KM216393).

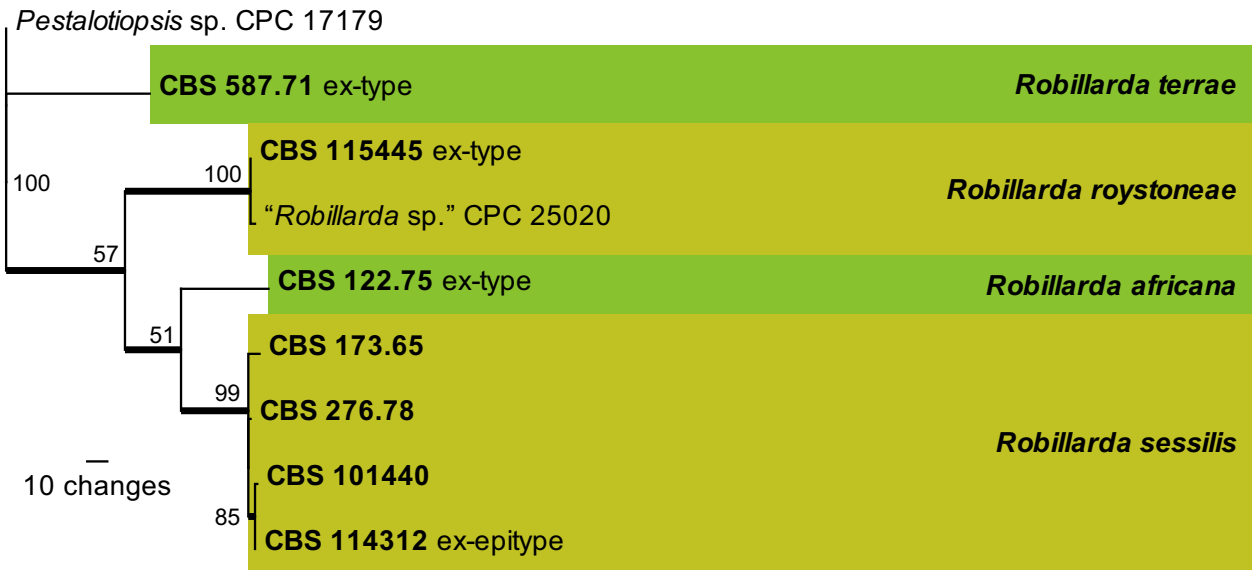

Fig. 3. The first of two equally most parsimonious trees obtained from a heuristic search with 100 random taxon additions of the combined ITS and HIS sequence alignment. The scale bar shows the number of changes, and bootstrap support values from 1 000 replicates are shown at the nodes. Thickened lines indicate the strict consensus branches and the species treated here are printed in **bold** face. The species boundaries are delimited with coloured blocks. The tree was rooted to *Pestalotiopsis* sp. (culture CPC 17179).

(Fig. 4). The manually adjusted combined alignment contained 52 sequences (including the outgroup sequence) and 1283 including alignment gaps characters (LSU: 779; ITS: 504) were used in the phylogenetic analysis; 274 (LSU: 62; ITS: 212) of these were parsimony informative, 126 (LSU: 38; ITS: 88) were variable and parsimony-uninformative, and 883 (LSU: 679; ITS: 204) were constant. The parsimony analysis yielded 148 equally most parsimonious trees (TL = 1564 steps; CI = 0.458; RI = 0.693; RC = 0.318), the first of which is shown in Fig. 4. Overall, the backbone of the phylogeny was poorly supported, with many nodes having no or low bootstrap support values. Species previously belonging to *Wojnowicia*, as well as "*Ophiosphaerella*" *herpotricha* and several "*Phaeosphaeria*" species clustered with *Septoriella phragmitis*. *Phaeosphaeria* is non-monophyletic in this phylogeny and several lineages distinct from *Phaeosphaeria s.str.* are present and these might need to be accommodated in novel genera.

THE GENERA

Allantophomopsis Petr., *Ann. Mycol.* **23**: 104 (1925).
Synonym: *Apostrassseria* Nag Raj, *Canad. J. Bot.* **61**: 13 (1983).

Classification: *Phacidiaceae, Phacidiales, Leotiomycetes*.

Current generic circumscription: *Conidiomata* stromatic, pycnidial to pycnidioid, immersed, semi-immersed or erumpent, unilocular, often irregularly multilocular with the locules convoluted or irregularly divided, glabrous, brown to dark brown or black, ostiolate; wall of *textura angularis*, *globulosa, epidermoidea* or *intricata*, cells dark brown and thick-walled in the outer layers, paler and thin-walled in the inner layers; interlocular tissue of hyaline to subhyaline, of thin-walled *textura prismatica*. *Conidiophores* arising all around the cavity of the conidiomata, often reduced to conidiogenous cells, sometimes septate and branched, invested in mucus. *Conidiogenous cells* discrete or integrated, ampulliform, conical, lageniform or subcylindrical, hyaline, smooth, proliferating percurrently at apex, with visible annellations. *Conidia* conical, symmetrically or asymmetrically ellipsoid, fusoid, lunate, naviculate, obovate, reniform, or irregular with narrowly truncate base, aseptate, hyaline, smooth, guttulate, bearing mucoid appendages of type C at one or both ends; subapical appendage conspicuous, conical, flabelliform or irregular in shape; basal appendage often small and inconspicuous.

Type species: *Allantophomopsis cytisporea* (Fr.) Petr. 1925.

Allantophomopsis cytisporea (Fr.) Petr., *Annls mycol.* **23**: 104 (1925).
(Fig. 5)
Basionym: *Sphaeria cytisporea* Fr., *Syst. Mycol.* **2**: 489 (1823).

Description based on CPC 24977: *Conidiomata* pycnidioid, scattered, globose, to 600 µm diam (becoming loose with age on the surface of PDA plates), unilocular but convoluted or irregularly divided, glabrous, dark brown to black, ostiolate, wall up to 40 µm thick, of *textura angularis*, cells of outer layers brown, thick-walled; inner layers hyaline to subhyaline, thin-walled. *Conidiophores* lining the cavity of the conidiomata, reduced to conidiogenous cells or sparsely septate and branched. *Conidiogenous cells* discrete, occasionally integrated, ampulliform hyaline, thin-walled, smooth, 7–12 × 2.5–4 µm with several annellations, invested in mucus. *Conidia* naviculate with a broad rounded apex and narrow truncate base, hyaline, thin-walled, smooth, (5–)6–6.5(–7) × 2(–2.5) µm, bearing a conical or irregular, mucoid, apical appendage.

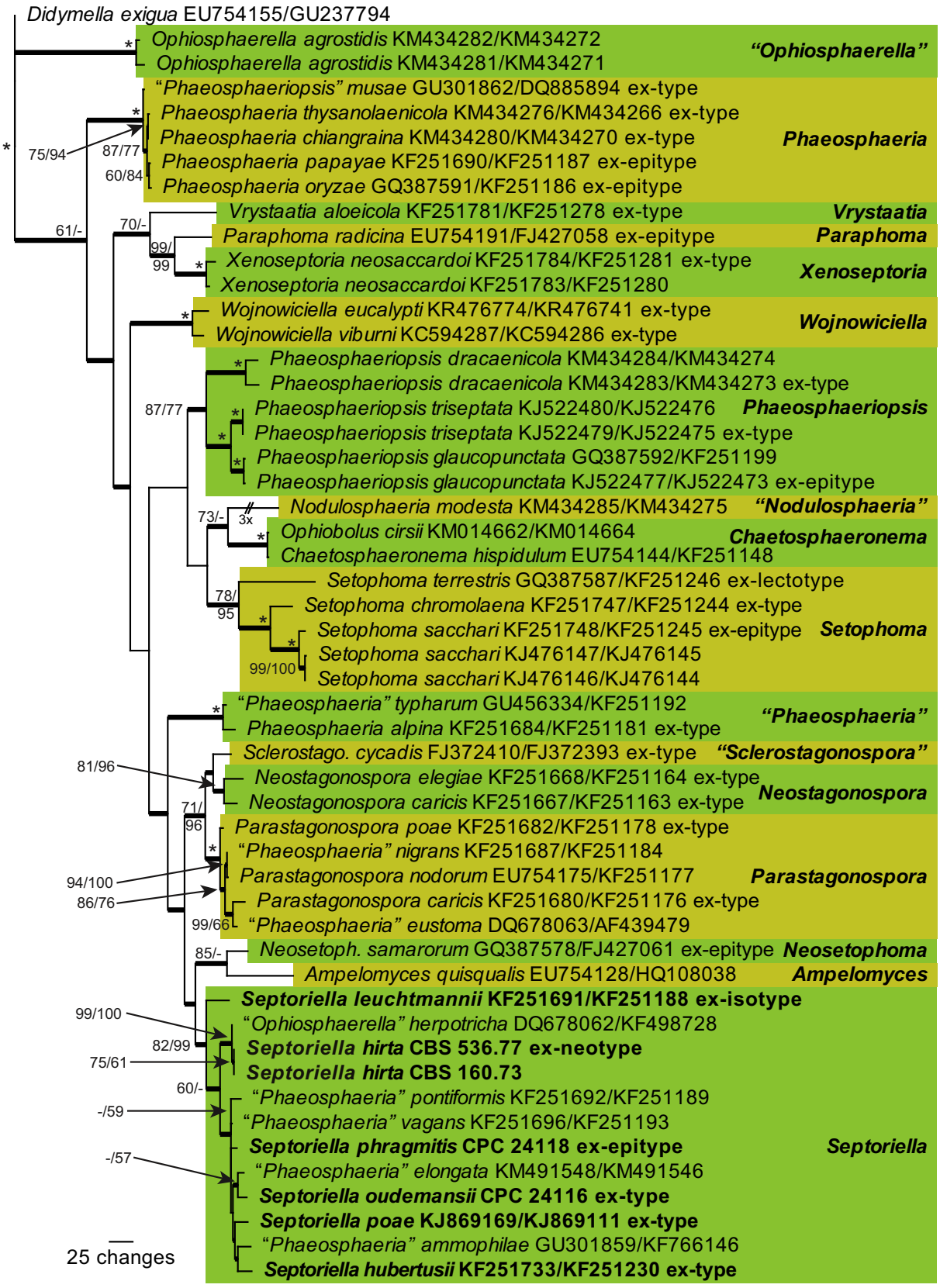

Fig. 4. The first of 148 equally most parsimonious trees obtained from a heuristic search with 100 random taxon additions of the combined LSU and ITS sequence alignment. The scale bar shows the number of changes, and bootstrap support values from 1 000 replicates are shown at the nodes (Parsimony bootstrap support / Distance bootstrap support). An asterisk (*) identifies those branches with both 100 % parsimony and distance bootstrap support. Thickened lines indicate the strict consensus branches and the species treated here are printed in **bold** face. The genus boundaries are delimited with coloured blocks and genus names are printed to the right of the tree in **bold** face – genus names with inverted commas refer to those genera which do have the generic type species included in the clade whereas those without inverted commas have their generic type species included. The tree was rooted to *Didymella exigua* (culture CBS 183.55).

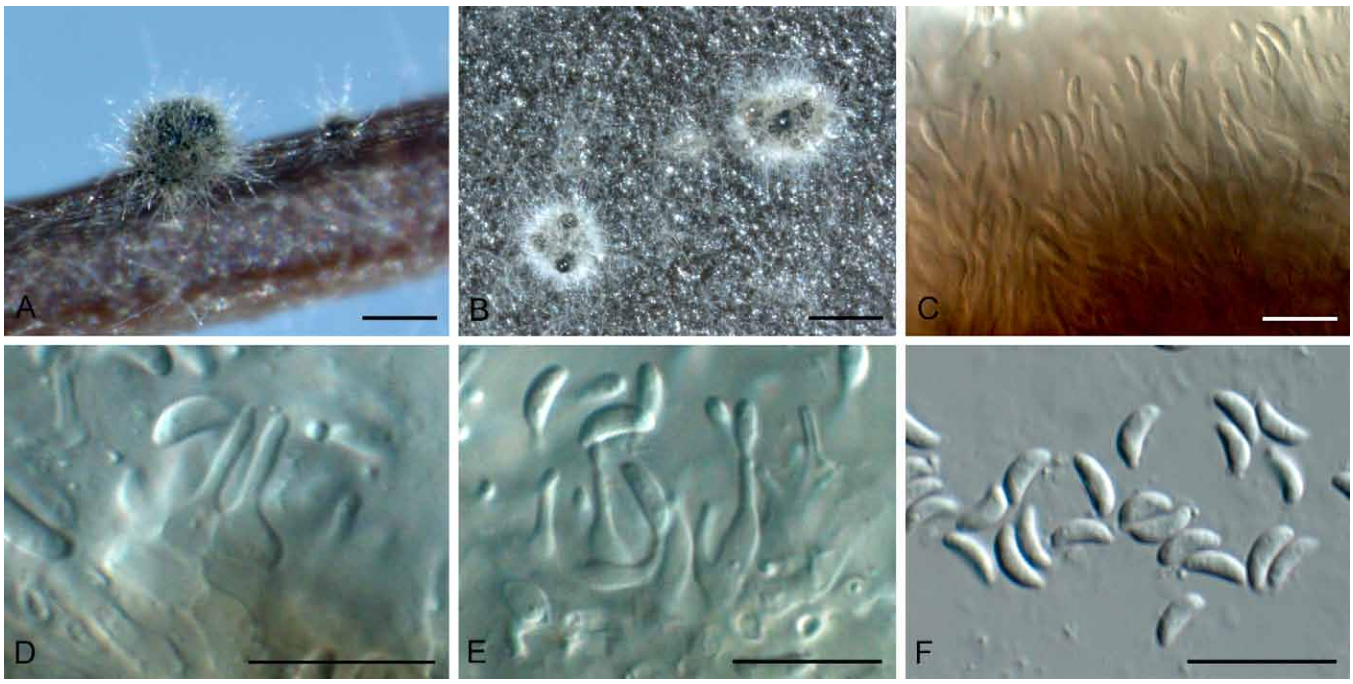

Fig. 5. *Allantophomopsis cytisporea* (CPC 24977). **A.** Conidioma on PNA. **B.** Conidiomata forming on OA. **C–E.** Conidiogenous cells. **F.** Conidia. Bars: A, B = 600 µm, all others = 10 µm.

Specimens examined: **Sweden**: *sine loc.,* on leaves of *Vaccinium vitis-idaea*, *E.M. Fries* [Fries, *Scler. Suec*. no. 290, as "*Cytispora vaccinii*"] (UPS – **lectotype designated here**, MBT201544). – **USA**: on leaves of *Oxycoccus macrocarpos*, Apr. 1922, *C.L. Shear* (culture CBS 109.22; sterile). – **Latvia**: Aluksne, on infected berries of *Oxycoccus macrocarpus*, Sept. 2012, *L. Vilka* (CBS H-22265 – **epitype designated here**, MBT201545, culture ex-epitype CPC 24977 = CBS 140061).

Notes: *Allantophomopsis* was introduced by Petrak (1925) with *A. cytisporea* as type species. Its description was based on a species previously described by Fries (1823) as *Sphaeria cytisporea*, isolated from *Vaccinium vitis-idaea* leaves, and considered by the same author as a synonym of *Cytospora vaccinii* and *C. endophylla*. Clements & Shear (1931) considered *Allantophomopsis* a synonym of *Phoma.* Based on their conidial morphology, Sutton (1977) regarded *Allantophomopsis* to be synonymous with *Ceuthospora*. However, Carris (1990) regarded the morphology of the conidiomata, conidiophores and conidia as valuable characters to distinguish *Allantophomopsis* from both *Phoma* and *Ceuthospora*, but not from *Apostrasseria*. The latter genus was proposed by Nag Raj (1983) to accommodate *Ceuthospora lunata* (syn. *Strasseria lycopodina*) the causal agent of black rot of cranberry. After examination of the type specimens of *Allantophomopsis cytisporea* and *Apostrasseria lunata*, Carris (1990) concluded that the degree of locular partitioning does not seem to be adequate justification for retaining them as separate genera, and reduced them to synonymy. Carris (1990) also reviewed the type material of *Strasseria lycopodina* and proposed the new combination *Allantophomopsis lycopodina*. The last revision of *Allantophomopsis* was made by Nag Raj (1993) and included two new species, *A. abietina* and *A. pusilla* from needles of *Abies pectinata* and stems of *Rubus fructicosus*, respectively. Nag Raj (1993) also transferred species from *Apostrasseria* and *Phomopsis* to *Allantophomopsis,* and proposed the new combinations *A. fusiformis*, *A. pseudotsugae* and *A. robusta*.

In his treatment of *A. cytisporea,* Nag Raj (1993) regarded this as a wide host range taxon, occurring on *Andromeda catesbae*, *Azalea* sp., *Gaultheria procumbens*, *Gaylussacia brachysera*, *Kalmia latifolia*, *Pinus* sp., *Pyrola secunda*, *Rhododendron maximum*, *R. praecox*, *Vaccinium macrocarpum,* and *V. vitis-idaea* in Europe and North America. Although the asexual morph was clearly not congeneric with *Ceuthospora*, the sexual morph was treated as *Phacidium lunatum* (DiCosmo *et al.* 1983), although *Phacidium s. str*. should be confined to taxa with *Ceuthospora* asexual morphs (Crous *et al*. 2014, Johnston *et al.* 2014). The type of *Ceuthospora lunata* on *V. macrocarpon* has conidia 6–9 × 2–3.5 µm (Nag Raj 1983), while those of *Sphaeria cytisporea* on *V. vitis-idaea* are 6–8 × 2–2.5 µm (Carris 1990), closely matching those in the epitype. Nag Raj (1993) regarded *A. cytisporea* as having several synonyms, and conidia to fall in the range 5–13 × 2–3(–3.5) µm (av. 8.2 × 2.5 µm) (Nag Raj 1993). We are of the opinion, however, that this is a species complex, and that as isolates of "*cytisporea*" are recollected from different hosts and sequenced, they will be revealed to be phylogenetically distinct. For this reason, we prefer to retain *A. lunata* as separate from *A. cytisporea*.

Carris (1990) considered another specimen of Fries' in UPS from Femsjö to be the holotype, but the only collection actually mentioned in the protologue is *Scleromyceti Suecici* no. 290, issued in 1822 (Pfister 1985: 108) and there appears to be no evidence that the Femsjö specimen was collected before *Systema Mycologicum* vol. 2 was issued. The example of this exsiccate in UPS illustrated by Carris (1990) is therefore selected as lectotype here as there is no doubt that

Table 1. Details of sequences and/or strains included in the molecular and/or morphological analyses.

Species name	Strain accession number[1]	Locality	Substrate	Collector(s)	GenBank accession numbers[2]		
					ITS	LSU	HIS
Allantophomopsis cytisporea	CBS 109.22	USA	*Oxycoccus macrocarpos*, leaf	C.L. Shear	KJ663822	KJ663861	–
	CBS 140061, CPC 24977, ex-epitype	Latvia: Aluksne	*Oxycoccus macrocarpus*, berry	L. Vilka	KR873228	KR873262	–
Allantophomopsis lunata	CBS 137781, CPC 24514, ATCC 66956, ex-epitype	USA: New Jersey	*Vaccinium macrocarpon*, fruit exhibiting symptoms of black rot	C. Constantelos	KR873229	KR873263	–
Allantophomopsis lycopodina	CBS 137782, CPC 24513, ATCC 66958	USA: New Jersey	*Vaccinium macrocarpon*, fruit exhibiting symptoms of black rot	C. Constantelos	KR873230	KR873264	–
	CBS 262.85, CPC 24515, IFO 32643	Germany	From roots of conifers	H. Courtois	KJ663830	KJ663869	–
Allantophomopsis sp. 1	CBS 322.36	New Zealand	*Pinus radiata*, diseased tissue	–	KJ663839	KJ663880	–
Allantophomopsis sp. 2	CPC 24280	Ukraine	*Crataegus laevigata*	R.K. Schumacher	KR873231	KR873265	–
Latorua caligans	CBS 576.65, ATCC 26267, IMI 115285, IMUR 1955, MUCL 7922, ex-type	Brazil: Recife, Caruaru	Soil, A horizon, 5 cm depth	–	KR873232	KR873266	–
Latorua grootfonteinensis	CBS 369.72, ex-type	Namibia: Namkali, East of Grootfontein	Brown sandy soil	G. Franz	–	KR873267	–
Macrodiplodiopsis desmazieri	CBS 123811, L2-1	Austria: Wien, 3. Bez., Botanischer Garten (HBV)	*Platanus* × *hispanica*, corticated dead twig	H. Voglmayr	KR873233	KR873268	–
	CBS 123812, L1-1	Austria: Wien, 3. Bez., Botanischer Garten (HBV)	*Platanus* × *hispanica*, corticated dead twig	H. Voglmayr	KR873234	KR873269	–
	CBS 125026, L40	UK: England, London, Surrey, Kew Gardens	*Platanus* × *hispanica*, corticated twig	H. Voglmayr	KR873235	KR873270	–
	CBS 139926, L138	Spain: Tenerife, Guamasa	*Platanus orientalis*, branches	W. Jaklitsch	KR873243	KR873274	–
	CBS 140062, CPC 24971, ex-neotype	Switserland: Zurich	*Platanus* sp., branches	O. Holdenrieder	KR873240	KR873272	–
	CBS 221.37 (AFTOL-ID 1574)	USA	*Platanus occidentalis*	–	KR873236	DQ678065	–
	CPC 22645	Germany: Dortmund	*Platanus orientalis*, branches	R.K. Schumacher	KR873237	–	–
	CPC 22689	Germany	*Platanus orientalis*, twig, lying on ground	R.K. Schumacher	KR873238	–	–
	CPC 24648	Germany: Dortmund	*Platanus* × *hispanica*, branches	R.K. Schumacher	KR873239	KR873271	–
	CPC 24972	Switserland: Zurich	*Platanus* sp., branches	O. Holdenrieder	KR873241	KR873273	–
	CPC 24973	Switserland: Zurich	*Platanus* sp., branches	O. Holdenrieder	KR873242	–	–
Macrohilum eucalypti	CBS 118551, CPC 10945	New Zealand	*Eucalyptus* sp.	J.A. Stalpers	DQ195781	DQ195793	–
	CBS 140063, CPC 19421, ex-epitype	Australia: Northern Territories, Darwin, Kurrajong Heights	*Eucalyptus piperita*,, leaves	P.W. Crous	KR873244	KR873275	–
Milospium graphideorum	–	UK: Hants, New Forest National Park	*Lecanographa lyncea* on *Quercus robur*, bark	D.L. Hawksworth	KR873245	–	–
Pestalotiopsis sp.	CPC 17179	Australia: Queensland	–	P.W. Crous	KR873246	KR873276	KR873291

Table 1. (Continued).

Species name	Strain accession number[1]	Locality	Substrate	Collector(s)	GenBank accession numbers[2]		
					ITS	LSU	HIS
Phacidium mollerianum	CBS 138856, CPC 24378	Germany	*Loranthus europeus*	R.K. Schumacher	KR873247	KR873277	–
Protostegia eucleae	CBS 137232, CPC 23549, ex-epitype	South Africa: North West Province, Magaliesberg, Hekpoort District, Shelter Rock hiking trail	*Euclea undulata*, leaves	E. van der Linde	KR873252	KR873280	–
Pyricularia grisea	BR0029	Brazil	*Digitaria sanguinalis*	J.-L. Nottéghem	KM484880	KM484995	–
	Br33	Brazil	*Digitaria horizontalis*	–	AB274430	KM484996	–
	CBS 128304, KACC 41641	Korea	*Echinochloa crus-galli* var. *frumentacea*	H.K. Sim	KM484881	–	–
	CBS 138707, CPC 26131, US0043, G184, ex-epitype	USA: Delaware	*Digitaria* sp.	B. Valent	KM484885	–	–
	CR0024	South Korea	*Lolium perenne*	C.K. Kim	KM484882	KM484997	–
	JP0034, NI980	Japan	*Digitaria smutsii*	–	KM484883	–	–
	PH0055, Dc88420	Philippines	*Digitaria ciliaris*	IRRI	KM484884	–	–
Robillarda africana	CBS 122.75, BCC 38220, ex-type	South Africa	–	W. Joosten	KR873253	KR873281	KR873292
Robillarda roystoneae	CBS 115445, HKUCC 10134, ex-type	Hong Kong	*Roystonea regia*, leaf	D. Vijaykrishna	KR873254	KR873282	KR873293
Robillarda sessilis	CBS 101440, BCC 37544	USA: Minnesota	*Heterodera glycines*, cyst	F.-J. Chen	KR873255	KR873283	KR873294
	CBS 114312, ex-epitype	Germany: Oldenburg	Dust	S. Ammermann	KR873256	KR873284	KR873295
	CBS 173.65, MUCL 8202	South Africa: North West Province: Potchefstroom	*Acacia karroo*, leaf litter	M.C. Papendorf	KR873257	KR873285	KR873296
	CBS 276.78	Colombia: Dep. del Meta, Municipio de Villavicencio	Soil under *Manihot utilissima*	J. Veerkamp	KR873258	KR873286	KR873297
Robillarda sp.	CPC 25020	–	–	–	KR873259	KR873287	KR873298
Robillarda terrae	CBS 587.71, ex-type	India: Poona	Soil	M.N. Kamat	KJ710484	KJ710459	–
Septoriella hirta	CBS 160.73	Germany: near Stuttgart	*Triticum aestivum*, stubble residues	K.E. Knoth	KR873248	EU754222	–
	CBS 536.77, ex-neotype	Germany: Göttingen-Weend	*Agropyron repens*	P. Reinecke	KR873249	KR873278	–
Septoriella hubertusii	CBS 338.86, ex-type	France: Landes, Seignosse, Étang d'Hardy	*Phragmites australis*	H.A. van der Aa	KF251230	KF251733	
Septoriella leuchtmannii	CBS 459.84, ETH 9276, ex-isotype	Switzerland: Kt. Zürich, Andelfingen, Husemersee	*Phragmites australis*	A. Leuchtmann	KF251188	KF251691	–
Septoriella phragmitis	CBS 140065, CPC 24118, ex-epitype	The Netherlands: Den Haag, Loosduinen	*Phragmites* sp.	M. Nauta	KR873251	KR873279	–
Septoriella poae	CBS 136766, D762, ex-type	The Netherlands, Elspeet	*Poa* sp.	W. Quaedvlieg	KJ869111	KJ869169	–
Septoriella oudemansii	CBS 138012, CPC 24116, ex-type	The Netherlands: Veenendaal	*Phragmites australis*, leaves	W. Quaedvlieg	KR873250	KJ869224	–

Table 1. (Continued).

Species name	Strain accession number[1]	Locality	Substrate	Collector(s)	GenBank accession numbers[2]		
					ITS	LSU	HIS
Torula ficus	CBS 595.96, INIFAT C95/72-1, ex-type	Cuba	*Ficus religiosa*	R.F. Castañeda	KF443408	KF443385	–
Torula herbarum	CBS 140066, CPC 24114, ex-neotype	The Netherlands: Wageningen	*Phragmites australis*, culms	W. Quaedvlieg	KR873260	KR873288	–
Torula hollandica	CBS 220.69, ex-type	The Netherlands: Baarn	*Delphinium* sp., dead stem	H.A. van der Aa	KF443406	KF443384	–
Torula masonii	CBS 245.57, IMI 001332, ex-type	UK: Surrey, Haslemere	*Brassica* sp., stem	E.W. Mason	KR873261	KR873289	–
Torula sp.	CBS 246.57, IMI 069095, MUCL 7905, PD 1354	The Netherlands: Wageningen	*Brassica oleracea* var. *capita-purpurea*	–	KF443411	KR873290	–

[1] ATCC: American Type Culture Collection, Virginia, USA; BCC: BIOTEC Culture Collection, National Center for Genetic Engineering and Biotechnology (BIOTEC), Bangkok, Thailand; CBS: CBS Fungal Biodiversity Centre, Centraalbureau voor Schimmelcultures, Utrecht, The Netherlands; CPC: Collection Pedro Crous, housed at CBS; ETH: ETH Zurich, Rämistrasse 101, 8092 Zurich, Switzerland; HKUCC: The University of Hong Kong Culture Collection, Hong Kong, China; IFO: Institute for Fermentation, Osaka, Japan; IMI: CABI-Bioscience, Egham, Bakeham Lane, UK; INIFAT: Alexander Humboldt Institute for Basic Research in Tropical Agriculture, Ciudad de La Habana, Cuba; KACC: Korean Agricultural Culture Collection, National Institute of Agricultural Biotechnology, Rural Development Administration, Suwon, Republic of Korea; MUCL: Université Catholique de Louvain, Louvain-la-Neuve, Belgium; PD: Dutch National Reference Laboratory of the Plant Protection Service, Wageningen, Netherlands.

[2] ITS: internal transcribed spacers and intervening 5.8S nrDNA; LSU: partial 28S nrDNA; HIS: partial histone H3 gene.

was "orginal material". This choice also has the advantage that it means that other collections with this exsiccatum have isolectotypes (including BPI, C, K, FH).

Allantophomopsis lunata (Shear) Crous & Carris, **comb. nov.**

MycoBank MB812789

(Fig. 6)

Basionym: *Ceuthospora lunata* Shear, *Bull. Torrey bot. Club* **34**(6): 312 (1907).

Synonyms: *Apostrasseria lunata* (Shear) Nag Raj, *Canad. J. Bot.* **61**: 19 (1983).

Phacidium lunatum DiCosmo *et al., Canad. J. Bot.* **61**: 38 (1983); as "*lunatus*".

Description and illustration: Nag Raj (1983).

Culture characteristics: Colonies covering the dish in 2 wk, lacking aerial mycelium, with even, smooth margins. On OA surface olivaceous grey. On PDA surface and reverse olivaceous grey.

Specimens examined: **USA**: *New Jersey*: Whitesville, on leaves of *Vaccinium macrocarpon*, 2 Oct. 1904, *C.L. Shear* (BPI US0365950 – **lectotype designated here**, MBT201546); Burlington County, on fruit of *Vaccinium macrocarpon*, 1 May 1985, *C. Constantelos* (CBS H-22266 – **epitype designated here**, MBT201547; ATCC 66956 = CBS 137781 = CPC 24514 – culture ex-epitype).

Notes: DiCosmo *et al.* (1983) linked *Apostrasseria lunata* to a sexual morph occurring on *Gaultheria procumbens*, which they described as *Phacidium lunatum.* No reason was, however, provided for this association, or conidial dimensions given to support this link. In a separate study, Nag Raj (1983) treated the type specimen of *A. lunata*, and gave the conidia as 6–9 × 2–3.5 µm, though he later (Nag Raj 1993) treated *A. lunata* as a synonym of *A. cytisporea*, choosing a wider circumscription of the species, with conidia 5–13 × 2–3(–3.5) µm.

Conidia of CBS 137781 are (7–)8–9(–10) × (2.5–)3 µm, thus closely fitting that of the authentic specimen. Furthermore, as it also has the same location and host as the original type collection, we regard CBS 137781 as a suitable epitype for this species.

Allantophomopsis lycopodina (Höhn.) Carris, *Canad. J. Bot.* **68**: 2290 (1990).

(Fig. 7)

Basionym: *Neottiospora lycopodina* Höhn., *Sber. Akad. Wiss. Wien*, *Math.-naturw. Kl.*, Abt. 1 **118**: 889 [77 repr.] (1909).

Synonym: *Strasseria lycopodina* (Höhn.) Höhn., *Mitt. bot. Inst. tech. Hochsch. Wien* **1**(3): 85 (1924).

Description based on CBS 262.85: Caulicolous, foliicolous or fructicolous. *Conidiomata* pycnidial to pycnidioid, scattered to gregarious, subepidermal, globose to depressed globose, 170–500 µm diam, 130–300 µm tall, often with a distinct conical or subconical neck, 20–40 µm long and 30 µm wide, unilocular but convoluted or irregularly divided, glabrous, dark brown to black, ostiolate, wall to 40 µm thick, of *textura angularis*, cells of outer layers brown, thick-walled; inner

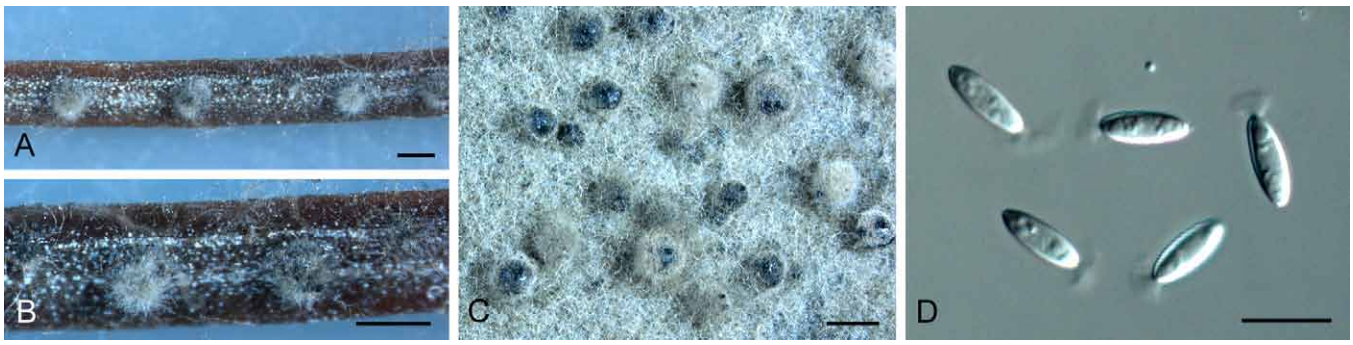

Fig. 6. *Allantophomopsis lunata* (CBS 137781). **A, B.** Conidiomata on PNA. **C.** Conidiomata forming on PDA. **D.** Conidia. Bars: A–C = 250 µm, C = 10 µm.

layers hyaline to subhyaline, thin-walled; ostiole papillate, circular or oval, 15–40 µm diam. *Conidiophores* lining the cavity of the conidiomata, reduced to conidiogenous cells or sparsely septate and branched. *Conidiogenous cells* discrete, occasionally integrated, ampulliform to lageniform or conical, hyaline, thin-walled, smooth, (5–)6–8(–9) × 3–4 µm with several annellations, invested in mucus. *Conidia* naviculate with a broad rounded apex and narrow truncate base, hyaline, thin-walled, smooth, (8–)9–11(–12) × (2–)2.5–3(–3.5) µm, bearing a conical or irregular, mucoid, apical appendage.

Culture characteristics: Colonies reaching 85 mm diam in 2 wk, lacking aerial mycelium, with even, smooth margins. On OA surface olivaceous grey. On PDA surface and reverse iron-grey.

Specimens examined: **Austria**: Sonntagberg, on *Lycopodium complanatum*, Oct. 1908, *P.P. Strasser* (FH 9484 – holotype). – **Germany**: Freiburg, Inst. Forstbot. Holzbiol. Univ. Freiburg, from roots of conifers, Dec. 1984, *H. Courtois* (CBS H-8826, culture CBS 262.85). – **USA**: *New Jersey*: Burlington County, on fruit of *Vaccinium macrocarpon*, *C. Constantelos* (CPC 24513 = CBS 137782 = ATCC 66958).

Culture characteristics: Colonies as for CBS 262.85, but only reaching 70 mm diam after 2 wk.

Notes: Although these two isolates cluster together, conidia of CBS 262.85 are smaller (8–)9–11(–12) × (2–)2.5–3(–3.5) µm than those reported for CBS 137782 (7–)8–15(–17) × 2–3.5 µm (Carris 1990), but as this culture failed to sporulate, conidial measurements could not be compared under the conditions used in this study. The original description by Höhnel (1909) cites the conidia as 8–12 × 2–2.5 µm, thus corresponding with that observed in CBS 262.85. In spite of their similar morphology, we decided to not designate CBS 262.85 as epitype for *A. lycopodina*, as the host differs

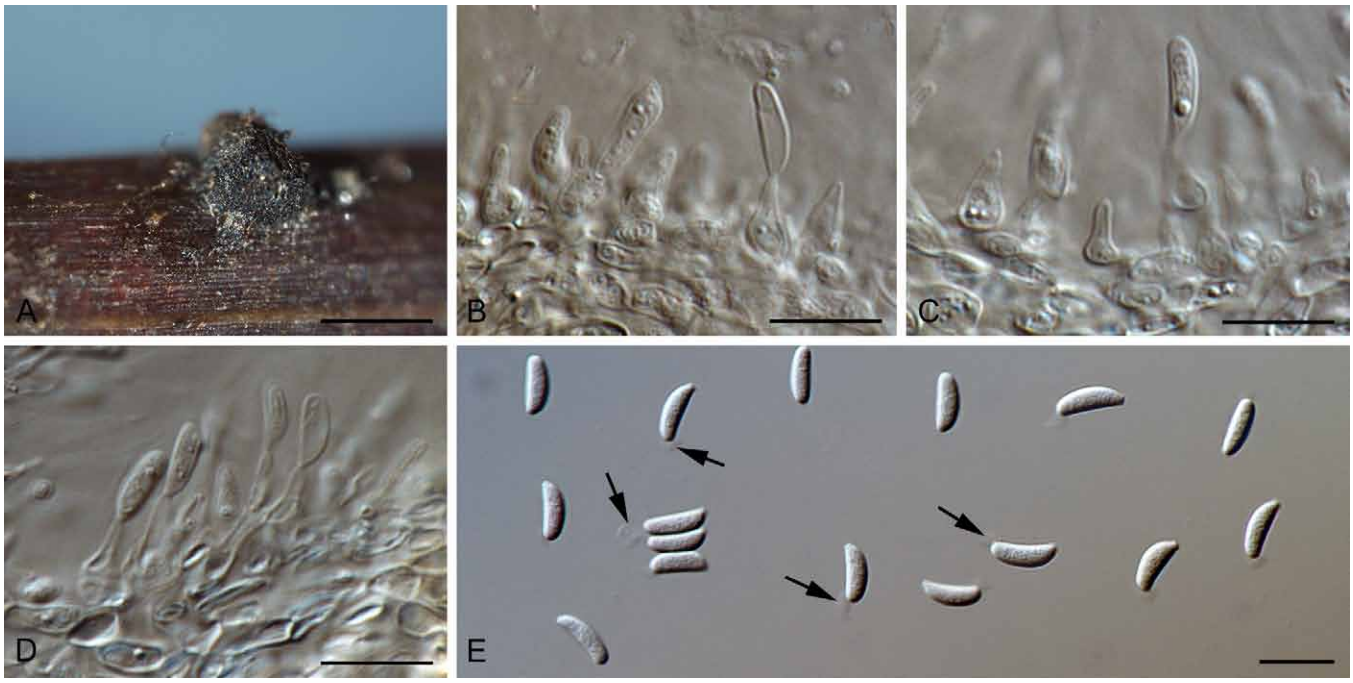

Fig. 7. *Allantophomopsis lycopodina* (CBS 262.85). **A.** Conidioma on PNA. **B–D.** Conidiogenous cells. **E.** Conidia (arrows denote mucoid caps). Bars: A = 600 µm, all others = 10 µm.

from that of the holotype specimen, which is on *Lycopodium complanatum*.

Authors: **L.M. Carris, J. Vilcāne, and P.W. Crous**

Latoruaceae Crous, **fam. nov.**
MycoBank MB812790

Description: *Colonies* discrete, dark brown to black, effuse, dry. *Mycelium* immersed to superficial, hyaline to brown, branched, septate. *Conidiophores* reduced to conidiogenous cells, or erect, moniliform, brown. *Conidiogenous cells* solitary on mycelium, or terminal on conidiophores, erect, brown, smooth to verruculose, polyblastic, or reduced to inconspicuous loci on hyphae. *Conidia* brown, solitary or in acrogenously branched chains, smooth or with warts, septate, fusoid-ellipsoidal, clavate or ovoid; frequently constricted at septa, with cells or septa darker pigmented that the rest of conidium; conidia in chains or not, at times becoming cupulate, with secondary conidia.

Type genus: *Latorua* Crous 2015.

Genera included: *Latorua, Polyschema*.

Latorua Crous, **gen. nov.**
MycoBank MB812791

Classification: *Latoruaceae, Pleosporales, Dothideomycetes.*

Etymology: An anagram of *Torula*, as was the case in *Rutola*.

Diagnosis: *Conidiogenous cells* solitary, erect, clavate, pale brown, polyblastic. *Conidia* acrogenous, brown, in branched chains, dry, with spikey warts, septate, fusoid-ellipsoidal, with obtusely rounded basal cell, and small, globose apical cell; constricted at septa; conidia giving rise to secondary conidia via apical cell.

Description: *Mycelium* immersed to superficial, hyaline, branched, septate. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* solitary on mycelium, erect, clavate, pale brown, smooth to verruculose, polyblastic, or reduced to inconspicuous loci on hyphae. *Conidia* acrogenous, brown, in branched chains, apical conidium pale brown, dry, with spikey warts, septate, fusoid-ellipsoidal, with obtusely rounded basal cell, and small, globose apical cell; constricted at septa, with second and third cell from base being more swollen and darker brown than the rest of conidium; conidia giving rise to secondary conidia via apical cell, which subsequently collapses after conidiogenesis, becoming cupulate; secondary conidia again forming additional conidia.

Type species: *Latorua caligans* (Bat. & H.P. Upadhyay) Crous 2015.

Latorua caligans (Bat. & H.P. Upadhyay) Crous, **comb. nov.**
MycoBank MB812792
(Fig. 8)

Basionym: *Bahusandhika caligans* Bat. & H.P. Upadhyay, *Atas Inst. Micol. Univ. Recife* **2**: 321 (1965).

Synonym: *Torula caligans* (Bat. & H.P. Upadhyay) M.B. Ellis, *Demat. Hyph.*: 337 (1971).

Description: *Mycelium* immersed to superficial, hyaline, branched, septate, 3–4 µm diam. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* solitary on mycelium, erect, clavate, pale brown, smooth, polyblastic, 5–10 × 4–5 µm, or reduced to inconspicuous loci on hyphae. *Conidia* acrogenous, brown, in branched chains, apical conidium pale brown, dry, with spikey warts (1 µm long), (3–)4-septate, fusoid-ellipsoidal, with obtusely rounded basal cell, and small, globose apical cell; constricted at the septa, with second and third cell from base being more swollen and darker brown than the rest of conidium; conidia giving rise to 1–3 secondary conidia via apical cell, which subsequently collapses after conidiogenesis, becoming cupulate, secondary conidia again forming 1–2 additional conidia; basal cell 5–6 µm diam, second and third cells from base 5–7 µm diam, subapical cell 5–6 µm diam, apical cell 4–5 µm diam; conidia (18–)22–25(–27) × (6–)7–8(–9) µm.

Culture characteristics: Colonies spreading, reaching 65 mm diam after 2 wk at 25 ºC, with moderate aerial mycelium, flat, spreading, with smooth, even margins. On OA surface greenish grey, on MEA surface pale olivaceous-grey, sectored, reverse olivaceous grey.

Specimen examined: **Brazil**: Recife, Caruaru, soil, A horizon, 5 cm depth, 11 Aug. 1964, *E. de Barros Correia* (CBS H-22267 – specimen; CBS 576.65 – ex-type culture; = ATCC 26267 = IMI 115285 = IMUR 1955 = MUCL 7922).

Notes: *Latorua caligans* was originally described in the genus *Bahusandhika*. However, the latter does not have cupulate apical cells, and conidia are not prominently constricted at septa, and do not have the same spikey ornamentation as in *Bahusandhika*. The single LSU sequence of *Bahusandhika* in GenBank (Accession KF460274 *Bahusandhika indica*) allies the genus to *Sporormiaceae* (Pratibha *et al*. 2014).

Latorua grootfonteinensis Crous, **sp. nov.**
MycoBank MB812793
(Fig. 9)

Etymology: Named after the region in South Africa where it was collected, Grootfontein.

Diagnosis: *Conidiophores* pale brown, smooth to finely verruculose, 1–3-septate, to 20 µm long, 3–4 µm diam. *Conidiogenous cells* integrated, clavate, solitary, pale brown, finely verruculose, polyblastic, 4–10 × 4–5 µm. *Conidia* acrogenous, brown, in short branched chains, with spikey warts (1.5 µm long), fusoid-ellipsoidal with obtusely rounded basal cell and small apical cell (5–6 µm diam) that collapses

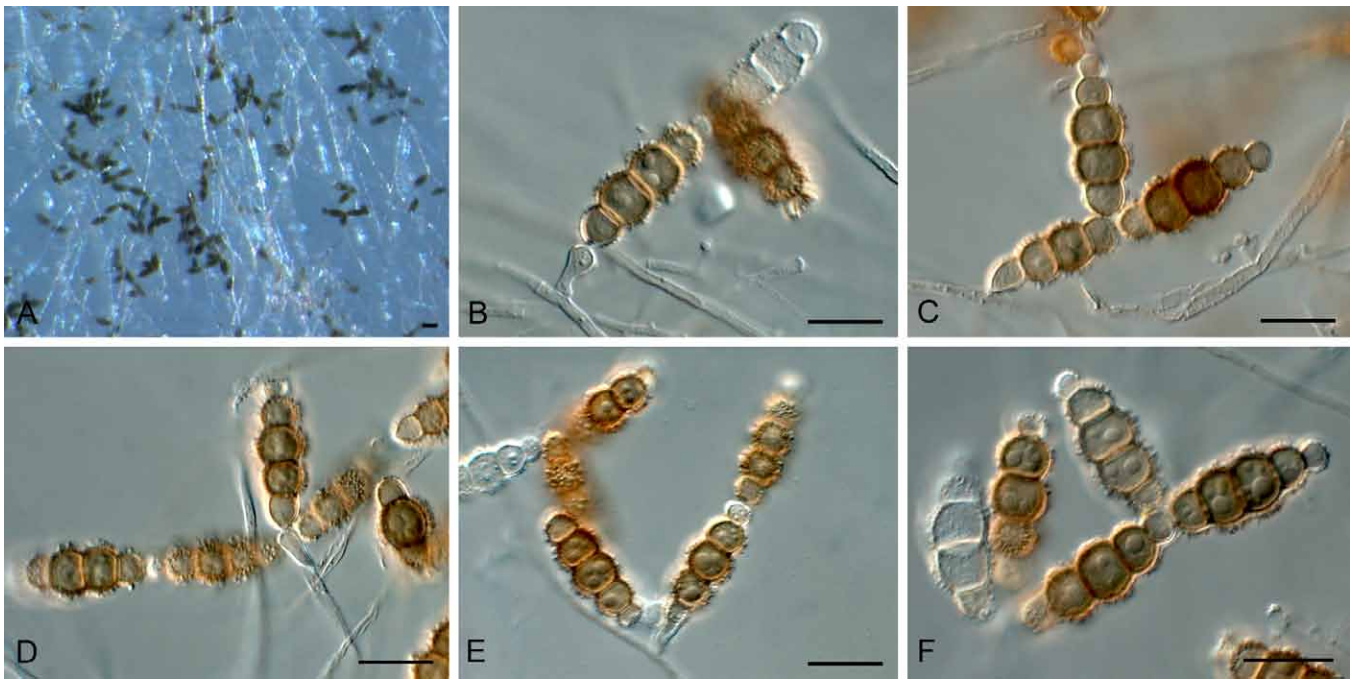

Fig. 8. *Latorua caligans* (CBS 576.65). **A.** Sporulation on SNA. **B–F.** Conidiogenous cells giving rise to conidial chains. Bars = 10 µm.

during conidiogenesis, becoming cupulate; conidia 3-septate, constricted at the septa, (18–)20–22(–25) × (8–)9 µm.

Type: **Namibia**: Nankali, East of Grootfontein, from brown, sandy soil, Mar. 1972, *G. Franz* (CBS H-22268 – holotype; CBS 369.72 – ex-type culture).

Description: *Mycelium* immersed to superficial, pale brown, finely verruculose, branched, septate, 2–3 µm diam. *Conidiophores* pale brown, smooth to finely verruculose, erect, flexuous, 1–3-septate, to 20 µm long, 3–4 µm diam. *Conidiogenous cells* integrated, clavate, solitary on mycelium, erect, pale brown, finely verruculose, polyblastic, 4–10 × 4–5 µm. *Conidia* acrogenous, brown, in short branched chains, apical conidium pale brown, dry, with spikey warts (1.5 µm long), fusoid-ellipsoidal with obtusely rounded basal cell and small apical cell (5–6 µm diam) that collapses during conidiogenesis, becoming cupulate; conidia 3-septate, constricted at the septa, widest in second cell from base, which is darker brown than other cells, conidia (18–)20–22(–25) × (8–)9 µm.

Fig. 9. *Latorua grootfonteinensis* (CBS 369.72). **A.** Sporulation on SNA. **B–G.** Conidiogenous cells giving rise to conidial chains. Bars = 10 µm.

Culture characteristics: Colonies spreading, reaching 60 mm diam after 2 wk at 25 ºC, with sparse aerial mycelium, flat, spreading, with feathery margins (OA), or smooth and even margins (MEA). On OA surface olivaceous-grey, on MEA surface and reverse iron-grey.

Notes: This isolate was originally identified as *Torula caligans* (i.e. *Latorua caligans*) (see notes on *Torula* below). It differs from the latter in having more prominent ornamentation, being predominantly 3-septate, and on having shorter conidia on average.

Author: **P.W. Crous**

Macrodiplodiopsidaceae Voglmayr, Jaklitsch & Crous, **fam. nov.**
MycoBank MB812794

Description: *Mycelium* immersed, branched, septate, brown. *Conidiomata* single or gregarious, globose to collabent, papillate or not, dark brown to black, unilocular; wall thick, of *textura porrecta* to *textura angularis*. *Ostiole* single, circular, papillate. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* discrete, indeterminate, cylindrical, hyaline, smooth, with percurrent proliferations. *Conidia* ellipsoid to obovoid or clavate, distoseptate, occasionally with a longitudinal septum, pale brown, thick-walled, base truncate, apex obtuse, surrounded by a large gelatinous sheath. *Ascomata* black, immersed, solitary or aggregated, globose. *Asci* cylindric-clavate to broadly clavate. *Ascospores* dark brown, obovoid, straight to inequilateral, asymmetric, eudistoseptate, constricted at septa, surrounded by a mucoid sheath.

Type genus: *Macrodiplodiopsis* Petr. 1922.

Genera included: *Macrodiplodiopsis* and *Pseudochaetosphaeronema*.

Macrodiplodiopsis Petr., *Annls mycol.* **20**: 343 (1922).

Classification: *Macrodiplodiopsidaceae, Pleosporales, Dothideomycetes.*

Current generic circumscription: *Mycelium* immersed, branched, septate, brown. *Conidiomata* single or gregarious, immersed, peridermal, globose to collabent, papillate, dark brown to black, unilocular, thick-walled; outer walls of thick-walled *textura porrecta,* except at the base where they are of *textura angularis*, becoming progressively pale and more hyaline towards the conidiogenous region. *Ostiole* single, circular, papillate. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* discrete, indeterminate, cylindrical, hyaline, smooth, thick-walled, with 1–2 percurrent proliferations, formed from the inner cells of the pycnidial wall. *Conidia* ellipsoid to obovoid or clavate, 3-distoseptate, occasionally with a longitudinal septum, lumina very much reduced and often surrounded by dark brown wall deposits, continuous, pale brown, thick-walled, base truncate, apex obtuse, surrounded by a large gelatinous sheath. *Ascomata* black, immersed, solitary or aggregated, globose. *Asci* cylindric-clavate to broadly clavate. *Ascospores* dark brown, obovoid with obtuse to subacute ends, straight to inequilateral, distinctly asymmetric, eudistoseptate, with an excentric primary eudistoseptum and secondary distosepta, constricted at septa, surrounded by a mucoid sheath.

Type species: *Macrodiplodiopsis desmazieri* (Mont.) Petr. 1922

Macrodiplodiopsis desmazieri (Mont.) Petr., *Annls mycol.* **20**: 343 (1922).
(Fig. 10)

Basionym: *Hendersonia desmazieri* Mont., *Annls Sci. Nat., Bot., sér.* 3, **12**: 310 (1849) [“1848–1849”].

Synonyms: *Sphaeria platani* Ces., in Rabenhorst, *Klotzschii Herb. Viv. Mycol.*, fasc. 19 no. 1842 (1854); nom. illegit. (Art. 53.1), non *S. platani* Schwein. 1832.

Splanchnonema platani (Ces.) M.E. Barr, *Mycotaxon* **15**: 364 (1982).

Description: *Mycelium* immersed, branched, septate, brown. *Conidiomata* single or aggregated, 500–1000 µm diam, separate or gregarious, immersed, subepidermal, globose to collabent, papillate, dark brown to black, unilocular, thick-walled; outer wall layers of thick-walled *textura porrecta*, base of *textura angularis*, becoming progressively pale and more hyaline towards the conidiogenous region. *Ostiole* single, circular, papillate. *Paraphyses* not observed. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* hyaline, smooth, discrete, indeterminate, doliiform to subcylindrical, thick-walled, with several percurrent proliferations at apex, formed from the inner cells of the pycnidial wall, 7–15 × 4–8 µm. *Conidia* (28–)35–44(–50) × (14–)18–20(–22) µm, ellipsoid to obovoid, or clavate, (1–)3(–4)-distoseptate, occasionally with a longitudinal septum, lumina very much reduced and often surrounded by dark brown wall deposits, continuous, pale brown, thick-walled (2–4 µm diam), finely verruculose, base truncate (4–8 µm diam), with minute marginal frill, apex obtuse, surrounded by a large gelatinous sheath (4–10 µm diam). *Ascomata* black, immersed, solitary or aggregated, globose, to 1 mm diam. *Asci* 110–250 × 27–35 µm, cylindric-clavate to broadly clavate. *Ascospores* 40–66 × 10–17.5 µm, dark brown, obovoid with obtuse to subacute ends, straight to inequilateral, strongly asymmetric, 3–5(–6) eudistoseptate, with an excentric primary eudistoseptum and 1–3 distosepta in the upper, 1 distoseptum in the lower part of the spore, strongly constricted at the primary septum and weakly to not constricted at secondary septa, surrounded by a mucoid sheath, 2–6.5 µm diam (sexual morph adapted from Barr 1982).

Specimens examined: **Austria**: Wien, 3. Bez., Botanischer Garten (HBV), on branches of *Platanus* ×*hispanica*, 12 Feb. 2006, *H. Voglmayr* (WU 35926, cultures L1 = CBS 123812, sexual morph; L2 = CBS 123811, asexual morph). – **France**: bark of *P. orientalis, J.B.H.J. Desmazières* (PC 0142158 – **lectotype designated here**, ex-herb. Montagne, MBT201549). – **Germany**: Dortmund, on branches of *P.* ×*hispanica*, *R.K. Schumacher* (CBS H-5/5/14-86,

Fig. 10. *Macrodiplodiopsis desmazieri* (CPC 24971). **A.** Conidioma on host tissue. **B–E.** Conidiogenous cells. **F, G.** Conidia (arrows denote mucoid sheaths). **H.** Asci. **I.** Ascospores (arrows denote mucoid sheaths). **J.** Colony on PDA. **K.** Conidiogenous cells *in vitro*. **L, M.** Conidia *in vitro* (arrows denote mucoid sheaths). Bars: A = 600 µm, J = 10 mm, all others = 10 µm.

culture CPC 24648, asexual morph); on branches of *P. orientalis*, 3 Mar. 2013, *R.K. Schumacher* (culture CPC 22645, sexual morph). – **Switzerland**: Zurich, on branches of *Platanus* sp., 24 Jun. 2014, *O. Holdenrieder* (CBS H-22269 – **epitype designated here**, MBT201550, CPC 24971, CBS 140062 – culture ex-epitype; sexual morph, producing asexual morph in culture); Zurich, on branches of *Platanus* sp., 24 Jun. 2014, *O. Holdenrieder* (CBS H-22270, culture CPC 24973, asexual morph). – **Spain**: *Tenerife*: Guamasa, on branches of *Platanus orientalis*, 19 Dec. 2013, *W. Jaklitsch* (WU 35929, culture L138 = CBS 139926). – **UK**: *Surrey*: Richmond, Kew Gardens, on branches of *Platanus* ×*hispanica*, 6 Nov. 2008, *H. Voglmayr* (WU 35927, culture L40 = CBS 125026).

Notes: We examined several original specimens deposited in PC under the name *Hendersonia desmazieri* (PC 0142156–PC 0142160), and choose one (PC 0142158) as lectotype, enabling us to designate fresh material as epitype. Single conidial isolates of *M. desmazieri* were identical in sequence

to that of ascospore isolates of *Splanchnonema platani*, confirming the observations of Shear & Davidson (1936), who obtained single conidial and ascospore cultures which were morphologically identical, and after 5–7 wk colonies of both collections produced similar conidia. The name to use for this genus is *Macrodiplodiopsis,* as the genus *Splanchnonema* is based on *S. pustulatum*, which clusters remotely from *Macrodiplodiopsis*. *Macrodiplodiopsis desmazieri* causes an economically important disease that infects branches of plane trees, commonly known as Massaria disease.

The recent treatment of the genus *Macrodiplodiopsis* by Wijayawardene *et al.* (2013b) is incorrect. That study was based on the culture MFLUCC 12-0088 (incorrectly cited as ex-type), which led to the introduction of numerous new combinations from *Misturatosphaeria* (Mugambi & Huhndorf 2009) to *Macrodiplodiopsis.* Culture MFLUCC 12-0088 does not, however, represent *Macrodiplodiopsis desmazieri* so their conclusion over the generic name to use was erroneous.

Authors: **H. Voglmayr, W.M. Jaklitsch, R.K. Schumacher, and P.W. Crous**

Macrohilaceae Crous, **fam. nov.**
MycoBank MB812795

Description: *Conidiomata* pycnidial, immersed, becoming erumpent, medium brown, globose. *Conidiogenous cells* lining the inner cavity, pale brown, cylindrical, proliferating percurrently near the apex. *Conidia* solitary, medium to dark brown, ovoid, smooth, guttulate, medianly septate, apex obtuse, base truncate with a visible scar.

Type genus: *Macrohilum* H.J. Swart 1988.

Macrohilum H.J. Swart, *Trans. Brit. Mycol. Soc*. **90**: 288 (1988).

Classification: *Macrohilaceae*, *Diaporthales, Sordariomycetes.*

Current generic circumscription: *Conidiomata* immersed, becoming erumpent, medium brown, globose. *Conidiogenous cells* lining the inner cavity, pale brown, cylindrical, proliferating percurrently near the apex. *Conidia* solitary, medium to dark brown, ovoid, smooth, guttulate, developing a single supra-median septum, thick-walled, frequently constricted at the septum, apex obtuse, base truncate with a visible scar.

Type species: *Macrohilum eucalypti* H.J. Swart 1988.

Macrohilum eucalypti H.J. Swart, *Trans. Brit. Mycol. Soc*. **90**: 288 (1988).
(Fig. 11)

Description: *Conidiomata* immersed, becoming erumpent, medium brown, globose, to 300 µm diam. *Conidiogenous cells* lining the inner cavity, pale brown, cylindrical, finely roughened, proliferating percurrently near the apex, 10–15 × 3–5 µm. *Conidia* solitary, medium to dark brown, ovoid, smooth, guttulate, developing a single, dark brown, supra-median septum, thick-walled, frequently constricted at the septum, apex obtuse, base truncate and protruding, with a visible scar, 2–3 µm wide, (15–) 17–19(–20) × (8–)10–12(–13) µm.

Culture characteristics: Colonies fast growing, reaching 60 mm diam after 2 wk at 25 ºC, with moderate, fluffy aerial mycelium, zonate growth rings, and even, lobate margins. On MEA, OA and PDA surface cream to dirty white; buff in reverse.

Specimens examined: **Australia**: *Victoria*: Panton Hill, on living leaves of *Eucalyptus polyanthemos*, 27 Mar. 1971, *H.J. Swart* (DAR 59000 – holotype). *Northern Territories*: Darwin, Kurrajong Heights, on leaves of *Eucalyptus piperita*, Apr. 2011, *P.W. Crous* (CBS H-22279 – **epitype designated here**, MBT201551; CPC 19421 – culture ex-epitype = CBS 140063). – **New Zealand**, on *Eucalyptus* sp., 2004, *J.A. Stalpers* (CPC 10945 = CBS 118551, as *Macrohilum* sp.).

Culture characteristics: Colonies slow growing, reaching 20 mm diam after 2 wk at 25 ºC, with sparse aerial mycelium, and folded surface with smooth, lobate margins. On OA, MEA and PDA surface and reverse buff with patches of dirty white.

Notes: The description provided by Swart (1988) for this genus is accurate. Of interest is the major difference in growth observed between the New Zealand isolate (CPC 10945; sterile) and that of the Australian epitype (CPC 19421). Based on their ITS sequences, these two isolates differ in four base pairs, and it seems probable that the New Zealand isolates represents a new species of *Macrohilum*. Phylogenetically *Macrohilum* appears to be allied to *Diaporthales*.

Author: **P.W. Crous**

Milospium D. Hawksw., *Trans. Brit. Mycol. Soc.* **65**: 228 (1975).

Classification: *incertae sedis, Pezizomycotina.*

Current generic circumscription: Lichenicolous genus of hyphomycetes. *Colonies* effuse, dark brown to black. *Mycelium* superficial to somewhat immersed; stroma, setate and hyphopodia absent. *Conidiophores* micronematous to semi-macronematous, mononematous, simple to rarely branched, flexuous, hyaline to pale brown. *Conidiogenous cells* monoblastic, integrated, terminal, determinate, hyaline to pale brown, cylindrical to ellipsoid. *Conidia* solitary, dry, acropleurogenous, irregularly subglobose to ellipsoid, but with rounded, plicate lobes, thick-walled, smooth, olivaceous-brown to dark brown.

Type species: *Milospium graphideorum* (Nyl.) D. Hawksw. 1975.

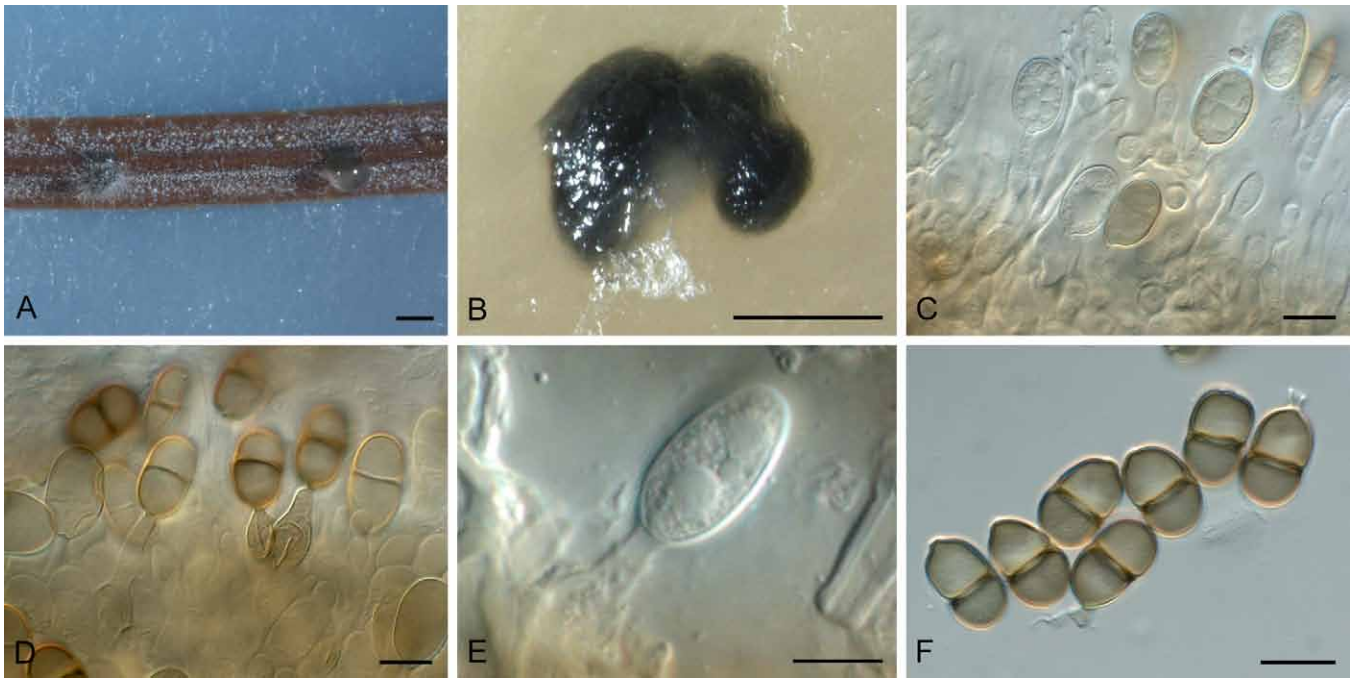

Fig. 11. *Macrohilum eucalypti* (CPC 19421). **A.** Conidiomata on PNA. **B.** Conidiomata on OA. **C–E.** Conidiogenous cells. **F.** Conidia. Bars: A = 200 µm, B = 300 µm, all others = 10 µm.

Milospium graphideorum (Nyl.) D. Hawksw., *Trans. Brit. mycol. Soc.* **65**: 233 (1975), nom. cons.

Basionym: *Spilomium graphideorum* Nyl., *Actes Soc. Linn. Bordeaux* **21**: 389 (1856).

(Fig. 12)

Synonyms in Hawksworth (1975, 1978).

Description: *Colonies* effuse, dark brown to black, forming thin, extensive, irregular patches on the thallus of the host lichen stroma, setae and hyphopodia absent. *Conidiophores* micronematous to semi-macronematous, mononematous, simple or irregularly and sparsely branched, flexuous, hyaline but sometimes with slightly brownish walls, septate, often slightly inflated, 2–4 µm diam. *Conidiogenous cells* monoblastic, integrated, terminal, determinate, hyaline to pale brown, cylindrical to ellipsoid, sometimes inflated, walls occasionally unevenly thickened, variable in size, 5–10(–15) × 3–4.5 µm. *Conidia* arising singly at the apices of condiogenous cells, dry, acrogenous, irregularly subglobose to ellipsoid, with 0–8 or more unevenly thickened plicate, rounded lobes, variable in shape and size, smooth-walled, simple, but often appearing muriform superficially in heavily lobed conidia, olivaceous brown to dark brown, almost black in mass, variable in size, 6–17(–20) × 5–10 µm.

Specimens examined: **France**: Fontainbleu, on *Lecanographa lyncea, W. Nylander* [Lich. Paris no. 72] (BM – typ. cons., Hawksworth 2006: 528, Norvell 2008: 638). – **UK**: Hampshire: New Forest National Park, grid reference SU(41)/2476.0712, *ca*. 200 ft., on *Lecanographa lyncea* on *Quercus robur* bark, 8 Jun. 2013, *D.L. Hawksworth* (CBS

Fig. 12. *Milospium graphideorum* (CBS H-22271). **A, B.** Dark brown, lichenicolous colonies. **C, D.** Conidiogenous cells giving rise to lobed conidia. Bars: A, B = 5 mm, C, D = 10 µm.

H-22271 – **epitype designated here**, MBT201552, ITS sequence ex-epitype KR873245).

Notes: *Milospium* is restricted to lichen thalli, and is distinguished from superficially similar genera of hyphomycetes (e.g. *Glarea*) by lobate, unevenly thickened, brown, aseptate conidia. Conidia of *M. graphideorum* were induced to germinate after 2–4 wk on PDA at room temperature (unsuccessful on MEA and OA). Small colonies were harvested after 2–3 mo, and subjected to DNA isolation and ITS sequencing. However, the ITS sequence was so divergent from all ITS sequences available in GenBank that it is not possible to unequivocally assign it even to a class.

The nomenclature of this species is complex, as this fungus had been given names inclusive of the host as a lichen by several authors, as far back as 1806. When the generic name was introduced for the fungus by Hawksworth (1975), such names based on the fungus and the host could be rejected as based on discordant elements, but after that provision was deleted from the *Leningrad Code* (Stafleu *et al*. 1978) lectotypification of the earlier names (Hawksworth 1984) and then conservation (Hawksworth 2006) became necessary to fix the generic name and also safeguard the generic name of the commonest host lichen of this fungus. The fungus is also reported from other lichens in *Opegraphaceae*: *Opegraph atra* on trees (Hawksworth 1975), *Dirina massiliensis* f. *sorediata* on limestone rocks (Hawksworth & Diederich 1991), and *cfr. Lecanactis dilleniana* on rocks (Hawksworth 1984). We consequently consider epitypification by sequenced material from the type host necessary to precisely fix the application of the name as it is conceivable that material from different hosts may prove not to be conspecific at the molecular level.

Several other lichenicolous fungi have been placed in *Milospium* by subsequent authors, but most of these have spores with septae and differently thickened walls and are unlikely to be revealed as congeneric by molecular data.

Authors: **D. L. Hawksworth, B. Stielow, and P.W. Crous**

Protostegia Cooke, *Grevillea* **9**: 19 (1880).

Classification: *Mycosphaerellaceae, Capnodiales, Dothideomycetes*.

Current generic circumscription: *Conidiomata* immersed, becoming somewhat erumpent, solitary, exuding a mucoid conidial cirrhus, pale brown, splitting the leaf surface, with central ostiole; wall of brown *textura intricata*. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* hyaline, smooth, lining the inner cavity, lageniform to subcylindrical, proliferating percurrently at apex. *Conidia* hyaline, smooth, scolecosporous, euseptate.

Type species: *Protostegia eucleae* Kalchbr. & Cooke 1880.

Protostegia eucleae Kalchbr. & Cooke, *Grevillea* **9**: 19 (1880).
(Fig. 13)

Synonyms: *Pilidium eucleae* (Kalchbr. & Cooke) Sacc., *Syll. Fung.* **3**: 689 (1884).
Septoria eucaleae Cejp, *Bothalia* **10**: 343 (1971).

Description: *Conidiomata* epiphyllous on living leaves, erumpent, solitary, at times associated with small, subcircular, grey-brown leaf spots, 1–3 mm diam; conidiomata exuding a mucoid conidial cirrhus that dries to a hard, dark brown crystalline droplet on the leaf surface; conidiomata to 250 µm diam, immersed, pale brown, splitting the leaf surface, with central ostiole, 10–30 µm diam; wall brown *textura textura intricata*. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* hyaline, smooth, lining the inner cavity, lageniform to subcylindrical, 8–20 × 2–3 µm, proliferating percurrently at apex. *Conidia* hyaline, smooth, curved, guttulate, apices subacutely rounded, tapering in basal cell to truncate hilum, 2 µm diam, 3–7-septate, (40–)50–75(–80) × (2–)2.5–3 µm.

Culture characteristics: Colonies erumpent, slow growing, with uneven, feathery margins and sparse to moderate aerial mycelium, reaching up to 20 mm diam on OA and 10 mm diam on MEA and PDA after 2 mo at 25 ºC. On PDA surface pale olivaceous grey, outer region olivaceous grey, reverse olivaceous grey. On MEA surface pale olivaceous grey, reverse olivaceous grey. On OA surface pale olivaceous grey, outer region olivaceous grey, reverse olivaceous grey.

Material examined: **South Africa**: *Western Cape Province*: on *Euclea undulata*, *Kalchbrenner 1340* (K – holotype of *P. eucleae*; IMI 230771 – slide ex-holotype); Cape Town, Brackenfell, Bracken Nature Reserve, on leaves of *E. racemosa*, 13 Oct. 2013, *A.R. Wood* (CBS H-22272). *North West Province*:, Magaliesberg, Hekpoort District, Shelter Rock hiking trail, off R 560, S 25º50.162 E27º39.160, on leaves of *E. undulata*, 27 July 2013, *E. van der Linde* (PREM 60879 – **epitype designated here** for *P. eucleae*, MBT201553; CPC 23549 = CBS 137232, CPC 23550 – cultures ex-epitype).

Notes: *Protostegia eucleae* has been reported from *Euclea divinorum, E. lanceolata, E. natalensis, E. racemosa*, and *E. undulata*, and thus far is only known from South Africa. However this plant genus is widespread throughout Africa and the fungus may be more widespread than currently known. Distinguishing characters for the genus include having immersed conidiomata with walls of *textura intricata*, splitting the epidermis and appearing acervular, but having a well developed ostiole (see Dyko *et al.* 1979; fig. 2). *Protostegia* clusters close to *Cytostagonospora martiniana*, which is characterised by having both percurrent and polyphialidic conidiogenous cells, and solitary to aggregated conidiomata embedded in stromatic tissue (Quaedvlieg *et al.* 2013). Furthermore, *Protostegia* also appears related to *Phaeophleospora*, though the latter genus has pigmented conidia and conidiogenous cells, and proliferates percurrently (Crous *et al*. 2009), being quite distinct from *Cytostagonospora. Pilidium*, to which genus this fungus was assigned by Saccardo, is a member of *Helotiales*.

Authors: **E.J. van der Linde, A.R. Wood, and P.W. Crous**

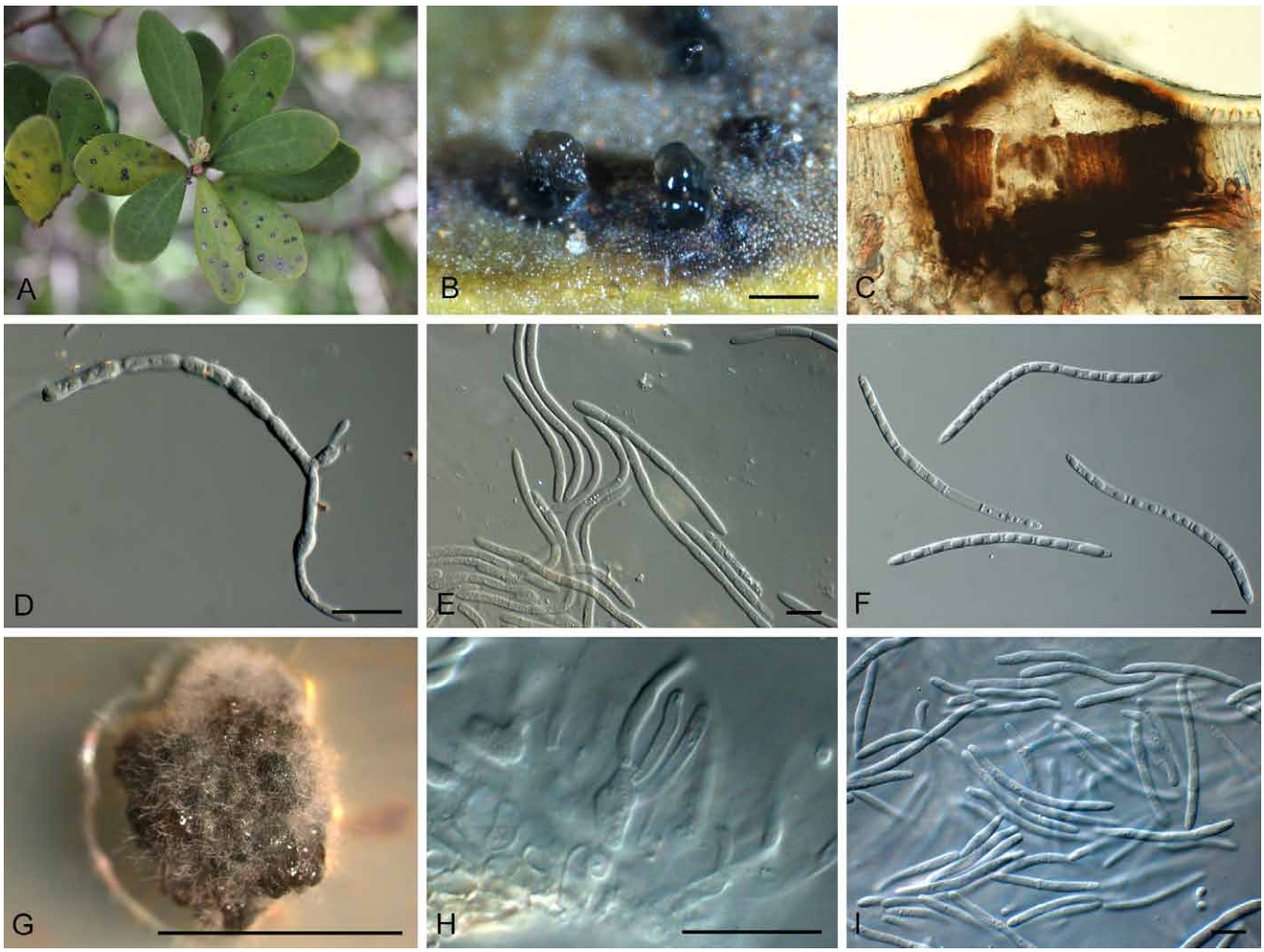

Fig. 13. *Protostegia eucleae* (CPC 23549). **A.** Leaf symptoms. **B.** Close-up of conidiomata *in vivo*. **C.** Vertical section through conidioma. **D–F.** Conidia. **G.** Colony on MEA. **H.** Conidiogenous cells. **I.** Conidia *in vitro*. Bars: B = 250 µm, C = 60 µm, G = 5 mm, all others = 10 µm.

Pyricularia Sacc., *Michelia* **2**: 20 (1880).

Classification: *Pyriculariaceae, Magnaporthales, Sordariomycetes*.

Current generic circumscription: *Conidiophores* solitary or in fascicles, subcylindrical, erect, brown, smooth, rarely branched, with sympodial growth. *Conidiogenous cells* terminal and intercalary, pale brown, with phialidic, denticulate conidiogenous loci. *Conidia* single, formed sympodially, pyriform to obclavate, narrowed toward tip, rounded at the base, 2-septate, hyaline to pale brown, with a distinct protruding basal hilum. *Ascomata* perithecial, solitary to gregarious, subspherical, brown to black, base immersed in host tissue, with long neck protruding above plant tissue; wall of several layers of brown *textura angularis*. *Asci* 8-spored, hyaline, subcylindrical to clavate, unitunicate, short-stipitate, with prominent apical ring. *Paraphyses* intermingled among asci, unbranched, septate. *Ascospores* bi- to multiseriate in asci, hyaline, guttulate, smooth-walled, fusiform, curved with rounded ends, transversely 3-septate, slightly constricted at septa.

Type species: *Pyricularia grisea* Sacc. 1880.

Pyricularia grisea Sacc., *Michelia* **2**: 20 (1880); as "(Cooke sub *Trichothecio*) Sacc."
(Fig. 14)

Synonyms: *Trichothecium griseum* Cooke, *Grevillea* **8**: 12 (1879); nom. inval. (Art. 38.1).
Trichothecium griseum (Sacc.) Cooke, *in* Ravenel, *Fungi Amer. Exs.* no. 580 (1881).
Ceratosphaeria grisea T.T. Hebert, *Phytopathology* **61**: 86 (1971).
Magnaporthe grisea (T.T. Hebert) M.E. Barr, *Mycologia* **69**: 954 (1977).
Phragmoporthe grisea (Hebert) Monod, *Beih. Sydowia* **9**: 153 (1983).

Description and illustration: Ellis (1971).

Materials examined: **Brazil**: on *Digitaria horizontalis*, date and collector unknown, Br33; Goias, Goiana, on *Digitaria sanguinalis*, 1989, *J.-L. Nottéghem* (BR0029). – **Japan**: on *Digitaria smutsii*, date and collector unknown (JP0034 = NI980). – **Korea**: Woanju, on *Echinochloa crus-galli* var. *frumentacea*, date unknown, *H.K. Sim* (CBS 128304 = KACC 41641). – **Philippines**: on *Digitaria ciliaris*, date unknown, International Rice Research Institute (PH0055). – **South Korea**: Suwon, on *Lolium perenne*, 1991, *C.K. Kim* (CR0024). – **USA**: *New*

Fig. 14. *Pyricularia grisea* (US0043). **A–C.** Conidiogenous cells giving rise to conidia. **D.** Conidia. Bars = 10 µm.

Jersey: Newfield, on living leaves of *Panicum sanguinale*, Aug. 1878 [Ellis & Everhart, *N. Amer. Flora* no. 374 (1880), as *Trichothecium griseum*] (BPI undistributed set – lectotype of *Pyricularia grisea* designated in Rossman *et al.* 1990; BPI general herbarium, FH, NY [two specimens] – isolectotypes). *Delaware*: on *Digitaria* sp., 1991, *B. Valent* (CBS H-22280 – **epitype designated here**, MBT201554; US0043 = CBS 138707 – culture ex-epitype).

Note: Although *Pyricularia* has until recently been treated as a member of the *Magnaporthales*, Klaubauf *et al*. (2014) revealed pyricularia-like species to represent a generic complex in the newly introduced family *Pyriculariaceae.* To fix the application of the name *Pyricularia s. str.*, we herewith designate an epitype for *P. grisea* based on material occurring on *Digitaria* from the USA.

Authors: **M.-H. Lebrun and P.W. Crous**

Robillardaceae Crous, **fam. nov.**
MycoBank MB812796

Description: *Conidiomata* stromatic, pycnidial to pycnidioid or indeterminate, unilocular to convoluted, dehiscing by an ostiole or by an irregular split in the apical wall and overlying host tissue; wall thick of *textura angularis* to *textura prismatica. Conidiophores* reduced to conidiogenous cells or with 1–2 supporting cells lining the inner cavity. *Coniodiogenous cells* discrete, ampulliform to lageniform, hyaline, smooth; proliferating sympodially or percurrently near apex. *Conidia* composed of a conidium body and a separate apical cell modified into a branched appendage; conidium body ellipsoid or fusiform, euseptate, hyaline to pale brown; apical cell dividing into appendages.

Type genus: *Robillarda* Sacc. 1880.

Robillarda Sacc., *Michelia* **2**: 8 (1880), nom cons.

Classification: *Robillardaceae, Xylariales, Sordariomycetes*.

Current generic circumscription: *Conidiomata* stromatic, pycnidial to pycnidioid or indeterminate, immersed to partly erumpent, unilocular to variably loculate with the locule often convoluted, glabrous, dehiscing by an ostiole or by an irregular split in the apical wall and overlying host tissue; wall thick of *textura angularis* to *textura prismatica. Conidiophores* reduced to conidiogenous cells or with 1–2 supporting cells lining the cavity of the locule, invested in mucus. *Coniodiogenous cells* discrete, ampulliform to lageniform, hyaline, smooth; proliferating sympodially or percurrently near apex. *Conidia* composed of a conidium body and a separate apical cell modified into a branched appendage; conidium body ellipsoid or fusiform, 1-euseptate, wall smooth and occasionally constricted at the septum, hyaline to pale brown, often guttulate; apical cell short-cylindrical at base, then dividing into 2–5 branches, branches thin-walled, tubular, ends pointed or swollen, flexuous, divergent, smooth, hyaline, devoid of contents.

Type species: *Robillarda sessilis* (Sacc.) Sacc. 1880.

Robillarda africana Crous & Giraldo, **sp. nov.**
MycoBank MB812797
(Fig. 15)

Etymology: Named after the continent in which it was collected, Africa.

Diagnosis: *Conidia* fusiform, straight or slightly curved, wall smooth, often slightly constricted at the median septum, hyaline to pale brown, (10–)11–12(–13) × 2.5–3(–3.5) µm.

Type: **South Africa**: location and substrate unknown, Aug. 1974, *W. Jooste* (CBS H-17860 – holotype; CBS 122.75 = BCC 38220 – culture ex-type).

Description: *Conidiomata* stromatic, pycnidioid, scattered, immersed to partly erumpent, unilocular, ovoid, globose, 100–200 µm diam, glabrous, dark brown to black, ostiolate; ostiole papillate or not, circular or oval, 10–20 µm diam; wall to 30 µm thick, of an outer *textura angularis*, cells thick-walled, dark brown to brown in the outer layers, becoming progressively

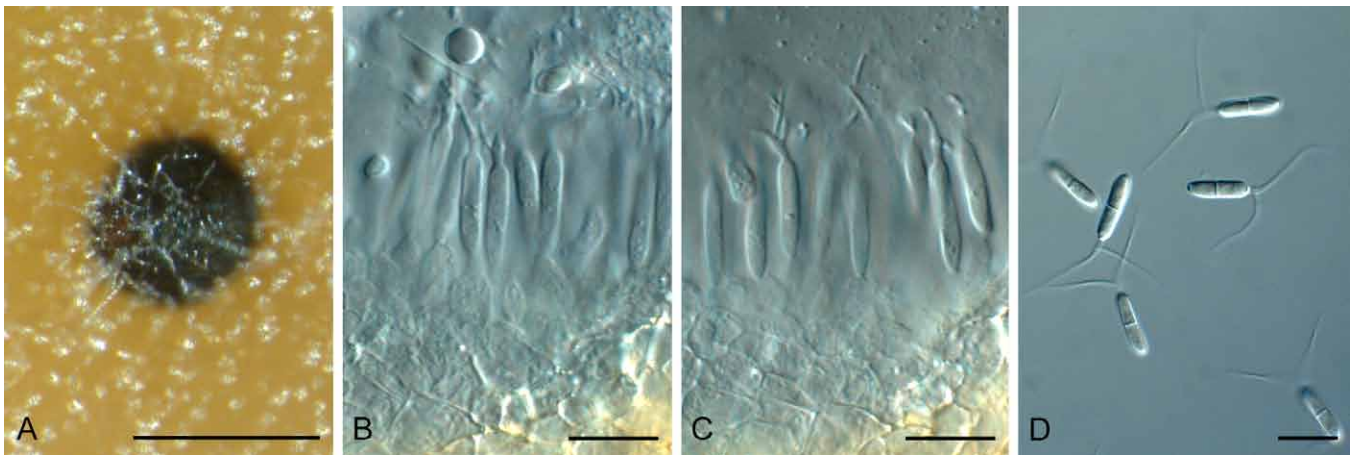

Fig. 15. *Robillarda africana* (CBS 122.75). **A.** Conidioma on OA. **B, C.** Conidiogenous cells. **D.** Conidia. Bars: A = 200 µm, all others = 10 µm.

thin-walled and paler toward an inner, thin-walled, hyaline, *textura prismatica. Conidiophores* reduced to conidiogenous cells lining the cavity of the conidioma, invested in mucus. *Conidiogenous cells* ampulliform to subcylindrical, hyaline, thin-walled, smooth, guttulate, 3–10 × 2–4 µm, proliferating sympodially at apex. *Conidia* composed of a 1-septate conidium body and a separate apical cell modified into a branched appendage; conidium body fusiform, straight or slightly curved, wall smooth and often slightly constricted at the median septum, hyaline to pale brown, (10–)11–12(–13) × 2.5–3(–3.5) µm; apical cell cylindrical for 1–2.5 µm then dividing into 2–3 divergent branches, devoid of cell contents; attenuated toward the apex, flexuous, 15–18 µm long and less than 1.5 µm wide at the broadest point.

Culture characteristics: Colonies flat, spreading, with even, smooth margins, and sparse aerial mycelium. On OA surface ochreous, reverse salmon. On PDA surface ochreous, reverse ochreous in centre, saffron in outer region.

Notes: The genus *Robillarda* currently contains around 38 species names, four of which were treated by Nag Raj (1993), and 12 considered to belong to other genera, including *Hyalotiella*, *Pseudorobillarda, Neottiospora, Chaetoconis,* and *Pestalotiopsi*. The generic name is conserved over *Robillarda* Castange 1845, a synonym of *Pestalotiopsis* according to Nag Raj *et al.* (1972). Although Nag Raj (1993) regarded *Pseudorobillarda* a synonym of *Robillarda*, Rungjindamai *et al.* (2012) showed that they clustered distant from each other, with three species of *Pseudorobillarda* forming a separate clade in *Dothideomycetes*. Crous *et al.* (2014) also confirmed the relationship of several species of *Pseudorobillarda* with *Pleosporales*. Based on a lack of molecular and cultural data at the time, Nag Raj (1993) was forced to accept a wider circumscription of *R. sessilis*, and hence several new species need to be introduced to circumscribe the various cryptic species.

Based on conidial dimensions, *Robillarda africana* (10–13 × 2.5–3.5 µm) is very similar to *R. sessilis* (9–13 × 2.5–3.5 µm), but can be distinguished by the small, unilocular conidiomata in culture. In contrast, conidiomata of *R. sessilis* tend to be aggregated and multilocular.

Robillarda roystoneae Crous & Giraldo, **sp. nov.**
MycoBank MB812798
(Fig. 16)

Etymology: Named after the host genus from which it was collected, *Roystonea.*

Diagnosis: *Conidia* fusiform, straight or slightly curved, wall smooth and often slightly constricted at the median septum, hyaline to pale brown, (13–)14–15(–16) × 2.5–3(–3.5) µm.

Type: **Hong Kong**: Pokfulam road, on leaf of *Roystonea regia* (*Arecaceae*), 5 Nov. 2003, *D. Vijaykrishna* (CBS H-22274 – holotype; CBS 115445 = HKUCC 10134 – culture ex-type).

Description: *Conidiomata* stromatic, pycnidioid, scattered to gregarious, occasionally confluent, immersed to partly erumpent, uni- to plurilocular, ovoid, globose, or depressed globose, usually 100–200 µm diam, but to 400 µm diam when plurilocular, and to 200 µm high, glabrous, dark brown to black, ostiolate; ostiole papillate or not, circular or oval, 10–20 µm diam; wall to 30 µm thick, of an outer *textura angularis*, cells thick-walled, dark brown to brown in the outer layers, becoming progressively thin-walled and paler toward an inner, thin-walled, hyaline, *textura prismatica. Conidiophores* reduced to conidiogenous cells or with a supporting cell, 12–17 × 2.5–4 µm, lining the cavity of the conidioma, invested in mucus. *Conidiogenous cells* ampulliform to subcylindrical, hyaline, thin-walled, smooth, guttulate, 7–12 × 2–3 µm, proliferating sympodially at apex. *Conidia* composed of a 1-septate conidium body and a separate apical cell modified into a branched appendage; conidium body fusiform, straight or slightly curved, wall smooth and often slightly constricted at the median septum, hyaline to pale brown, (13–)14–15(–16) × 2.5–3(–3.5) µm; apical cell cylindrical for 1–2.5 µm then dividing into 2–3 divergent branches, devoid of cell contents; attenuated toward the apex, flexuous, 15–20 µm long and less than 1.5 µm wide at the broadest point.

Culture characteristics: Colonies flat, spreading, with even margins and moderate aerial mycelium. On MEA surface pale

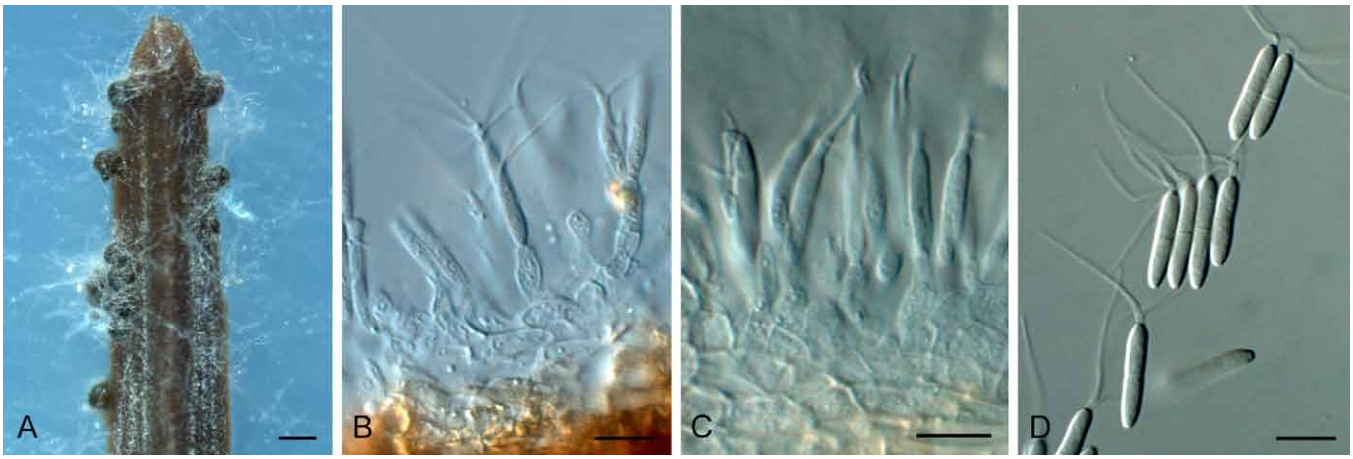

Fig. 16. *Robillarda roystoneae* (CBS 115445). **A.** Conidiomata on PNA. **B, C.** Conidiogenous cells. **D.** Conidia. Bars: A = 200 µm, all others = 10 µm.

olivaceous grey, reverse sienna. On PDA surface olivaceous grey, reverse iron grey.

Note: *Robillarda roystoneae* can be distinguished from *R. sessilis* (conidia 9–13 × 2.5–3.5 µm) by its slightly longer conidia (13–16 × 2.5–3.5 µm).

Robillarda sessilis (Sacc.) Sacc., *Michelia* **2**: 8 (1880). *Synonym*: *Pestalotia sessilis* Sacc., *Michelia* **1**: 261 (1878). (Fig. 17)

Description: *Conidiomata* stromatic, pycnidioid, scattered to gregarious, occasionally confluent, immersed to partly erumpent, uni- to plurilocular, ovoid, globose, or depressed globose, usually 110–210 µm diam but to 500 µm diam when plurilocular, and to 200 µm high, glabrous, dark brown to black, ostiolate; ostiole papillate or not, circular or oval, 10–20 µm diam; wall to 30 µm thick, of an outer *textura angularis*, cells thick-walled, dark brown to brown in the outer layers, becoming progressively thin-walled and paler toward an inner, thin-walled, hyaline, *textura prismatica;* when present, interlocular tissue hyaline, thin-walled *textura prismatica. Conidiophores* reduced to conidiogenous cells, lining the cavity of the conidioma, invested in mucus. *Conidiogenous cells* ampulliform to subcylindrical, hyaline, thin-walled, smooth, guttulate, 5–8 × 2–4 µm, proliferating sympodially at apex. *Conidia* composed of a 1-septate conidium body and a separate apical cell modified into a branched appendage; conidium body fusiform, straight or slightly curved, wall smooth and often slightly constricted at the median septum, hyaline to pale brown, (9–)11–12(–13) × (2.5–)3(–3.5) µm; apical cell cylindrical for 1–2.5 µm then dividing into 2–3

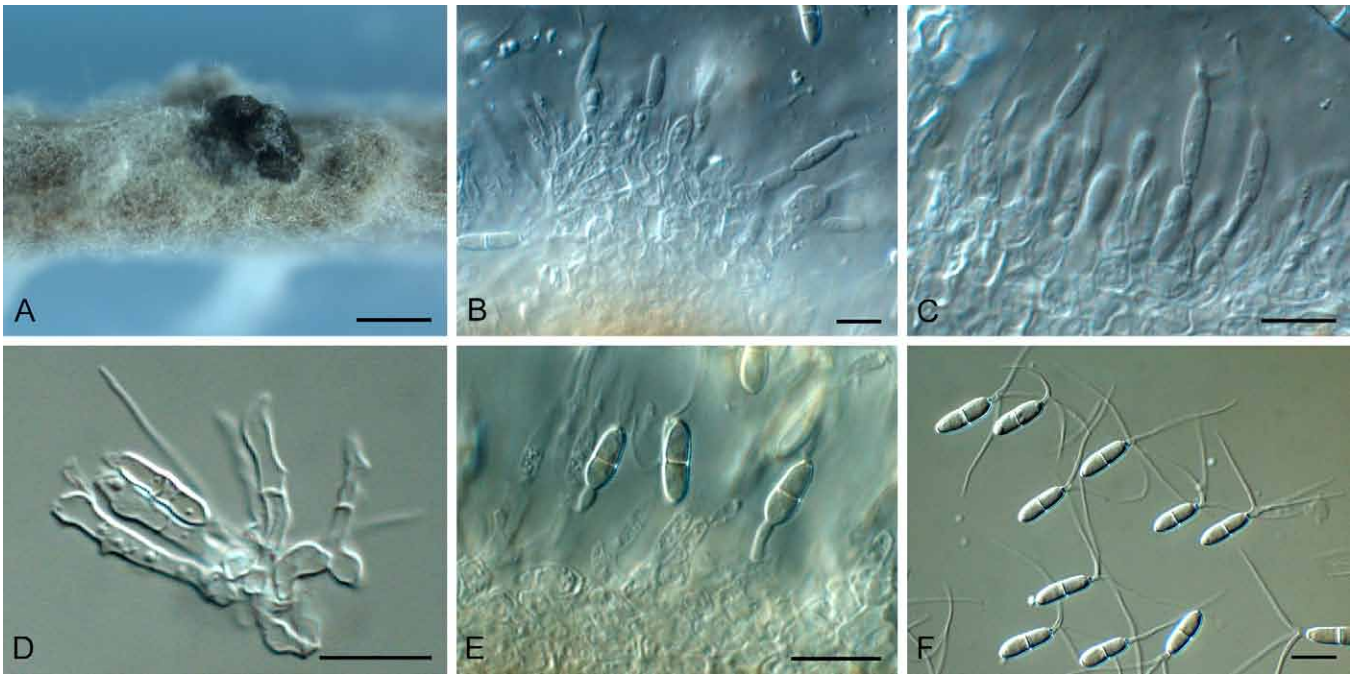

Fig. 17. *Robillarda sessilis* (CBS 114312). **A.** Conidiomata on PNA. **B–E.** Conidiogenous cells. **F.** Conidia. Bars: A = 200 µm, all others = 10 µm.

Fig. 18. *Robillarda terrae* (CBS 587.71). **A.** Colony sporulating on OA. **B–F.** Sections through conidiomata showing wall structure and conidiogenous cells. **G–J.** Conidia. Bars: A–C = 200 µm, D = 100 µm, all others = 10 µm.

divergent branches, devoid of cell contents; attenuated toward the apex, flexuous, 18–22 µm long and less than 1.5 µm wide at the broadest point.

Culture characteristics: Colonies flat, spreading, with even, smooth margins and moderate aerial mycelium. On MEA surface pale olivaceous grey, reverse sienna. On PDA surface pale olivaceous grey in centre, olivaceous grey in outer region, reverse iron grey. On OA surface smoke grey to dirty white in outer region, reverse sienna.

Material examined: **Italy**: Colfosco, on wilted leaves of *Rubus caesius* [Mycotheca Veneta no. 975] (PAD – holotype n.v.; BPI, FH – isotypes). – **Colombia**: *Dep. del Meta*: Municipio de Villavicencio, 20 km from Villavicencio to Acacías, 550 m alt., soil under *Manihot utilissima*, alt. 550 m, May 1978, *J. Veerkamp* (CBS H-17859, culture CBS 276.78). – **Germany**: Oldenburg, from dust, *S. Ammermann* (CBS H-22273 – **epitype designated here**, MBT201557; CBS 114312 – culture ex-epitype). – **South Africa**: North West Province: Potchefstroom, from leaf litter, Apr. 1965, *M.C. Papendorf* (CBS 173.65 = MUCL 8202). – **USA**: *Minnesota*: Blue Earth, from cyst nematode (*Heterodera glycines*), 1998, *F.-J. Chen* (CBS 101440 = BCC 37544).

Notes: *Robillarda sessilis* has been reported mostly from India (Nag Raj 1993) and also from Angola, Caribbean, Hungary, Italy, and the USA, growing on different hosts, including *Eryngium, Pinus, Ficus, Fragaria, Fumana, Ludwigia, Magnolia, Paeonia, Quercus, Randia, Rosa, Rubus,* and *Vitis* (Yurchenko & Belomesyatseva 2010). Ocassionally *R. sessilis* has been isolated from soil samples collected in Australia and Pakistan (Matsushima 1989, 1993).

Robillarda terrae Crous & Giraldo, **sp. nov.**
MycoBank MB812799
(Fig. 18)

Etymology: Named after the substrate from which it was isolated, soil.

Diagnosis: *Conidia* fusiform, straight or slightly curved, wall smooth and often slightly constricted at the median septum, almost hyaline to pale brown, (11.5–)12–15(–19) × 2.5–3.5 µm.

Type: **India**: Poona, from soil, Aug. 1971, *M.N. Kamat* (CBS H-17858 – holotype; CBS 587.71 – culture ex-type).

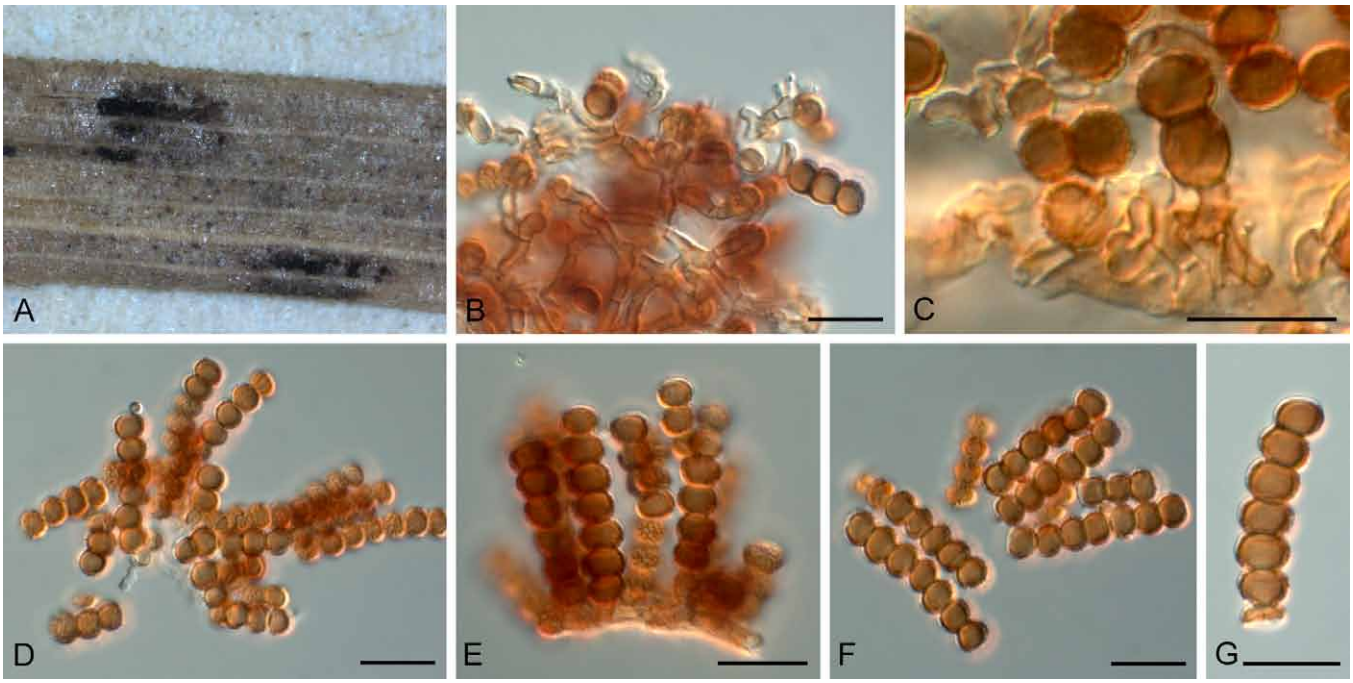

Fig. 19. *Rutola graminis* (L0054599). **A.** Colony *in vivo*. **B–G.** Conidiogenous cells and conidia. Bars = 10 µm.

Description: *Conidiomata* stromatic, pycnidioid, scattered to gregarious, occasionally confluent, immersed to partly erumpent, uni- or plurilocular with as many as six locules when caulicolous or seminicolous, ovoid, globose, or depressed globose, usually 110–210 µm diam but to 600 µm diam when plurilocular, 90–180 µm high, glabrous, dark brown to black, ostiolate; ostiole papillate or not, circular or oval, 10–20 µm diam.; wall to 30 µm thick, an outer *textura angularis*, cells thick-walled, dark brown to brown in the outer layers, becoming progressively thin-walled and paler toward an inner, thin-walled, hyaline, *textura prismatica;* when present, interlocular tissue hyaline, thin-walled *textura prismatica. Conidiophores* reduced to coniodegenous cells, lining the cavity of the conidioma, invested in mucus. *Conidiogenous cells* ampulliform to subcylindrical, colourless, thin-walled, smooth, guttulate, (3.5–)4.5–7.5(–8) × 2–4 µm, proliferating sympodially at apex. *Conidia* composed of a 1-septate conidium body and a separate apical cell modified into a branched appendage; conidium body fusiform, straight or slightly curved, wall smooth and often slightly constricted at the median septum, almost hyaline to pale brown, (11.5–)12–15(–19) × 2.4–3.5 µm; apical cell cylindrical for 1–2.5 µm then dividing into 2–4 divergent branches, devoid of cell contents; appendage branches unbranched, attenuated toward the apex, flexuous, 14.5–22 µm long and less than 1.5 µm wide at the broadest point.

Culture characteristics: Colonies flat, spreading, reaching up to 40 mm diam after 2 wk at 25 ºC, with moderate, fluffy aerial mycelium, and smooth, lobate margins. On MEA surface dirty white in outer region, olivaceous grey in centre, reverse iron grey in middle, buff in outer region. On OA surface iron-grey in middle, dirty white in outer region.

Notes: Nag Raj (1993) regarded two species described from India to be synonyms of *R. sessilis*, *R. matheranensis* (conidia 8.5–10.5 × 2.5–3 µm), and *R. indica* (conidia 10.5–13 × 2.5–3.5 µm). Both species, however, differ in their conidial dimensions from *R. terrae*.

Authors: **P.W. Crous and D.A. Giraldo López**

Rutola J.L. Crane & Schokn., *Canad. J. Bot*. **55**: 3015 (1978) [“1977”].

Classification: *incertae sedis, Pleosporales, Dothideomycetes.*

Current generic circumscription: *Colonies* oval, powdery, dry, black. *Conidiophores* appressed to substrate, micronematous, branched, septate, pale brown. *Conidiogenous cells* integrated, terminal or intercalary, monoblastic, pale brown. *Conidia* phragmosporous, composed on long, simple to branched chains of brown, verruculose acrogenous cells, constricted at septa, fragmenting into segments, 0–multiseptate.

Type species: *Rutola graminis* (Desm.) J.L. Crane & Schokn. 1977.

Rutola graminis (Desm.) J.L. Crane & Schokn., *Canad. J. Bot.* **55**: 3015 (1978) [“1977”].
(Fig. 19)
Basionym: Torula graminis Desm., *Pl. Crypt. Nord. Fr.*, fasc. 4 no. 169 (1826).

Description: See Crane & Schoknecht (1977).

Specimen examined: **France**: as *Torula graminis*, sur les feuilles sèches des graminées en mars et en avril, *Desmazières* [*Pl. Crypt. Nord. Fr.* no. 169] (L 910.267-926 = L0054599 – isotype).

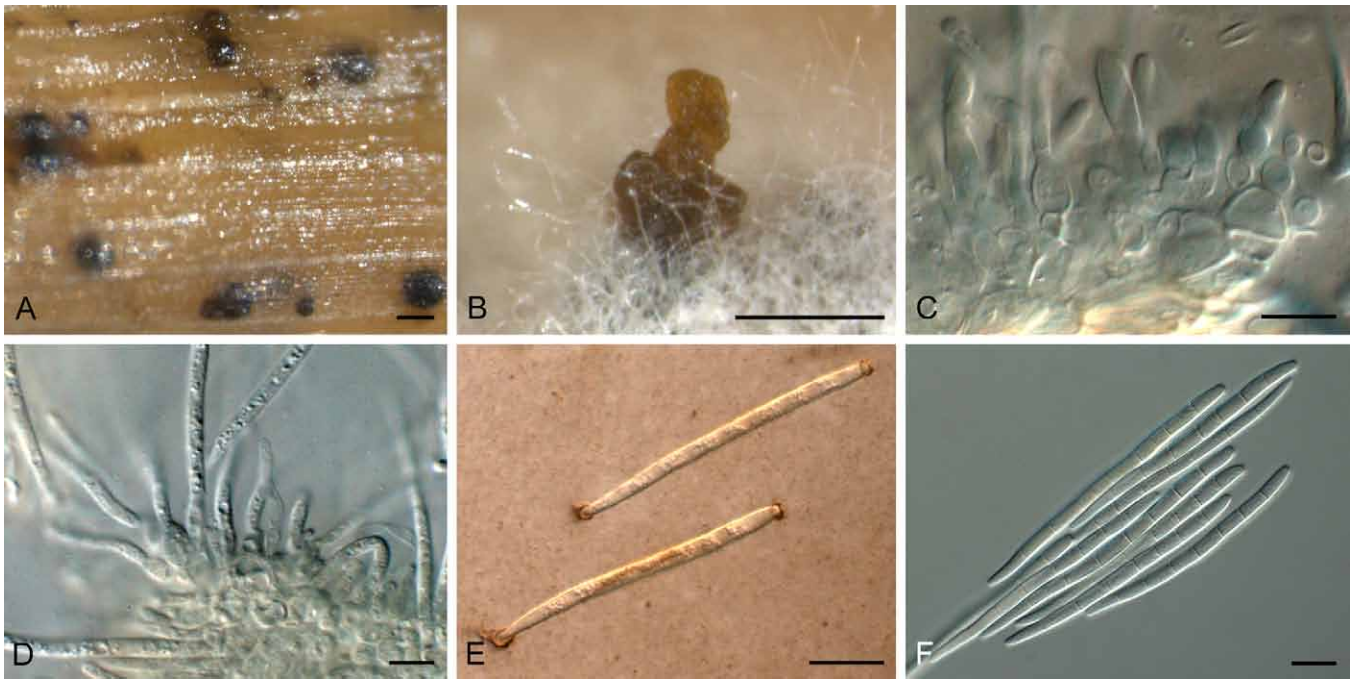

Fig. 20. *Septoriella phragmitis* (CPC 24118). **A.** Conidiomata *in vivo*. **B.** Conidial cirrhus. **C, D.** Conidiogenous cells. **E.** Conidia (note mucoid caps). **F.** Conidia. Bars: A = 300 µm, B = 350 µm, all others = 10 µm.

Notes: The description provided by Crane & Schoknecht (1977) is accurate, with the conidiogenous cells being integrated in the superficial hyphae, terminal or intercalary, brown, monoblastic. Conidia are phragmosporous, occurring in simple or branched chains, with darker conidiogenous cells as observed in *Torula* bring absent. They are also 0–10-septate, with individual cells measuring (3–)4–5(–6) × (4–)5–6 µm. Presently no cultures or DNA sequence data are available for this species, and it will have to be recollected to resolve its phylogenetic relationships. *Rotula* is included here to simplify comparison with *Torula*. Presently the genus is not known from culture or DNA sequence, and needs to be recollected.

Author: **P.W. Crous**

Septoriella Oudem., *Ned. Kruidk. Arch*. **5**: 504 (1889).

Synonymy: Unconfirmed generic synonyms include *Septosporiella* Sacc. 1892 and *Naemostroma* Höhn. 1919 (Nag Raj 1993).

Additional synonym:

Synonymy: *Wojnowicia* Sacc. 1892, *Adella* Petrak 1936 and *Guceviczia* Glezer 1959 (see below).

Classification: *Phaeosphaeriaceae, Pleosporales, Dothideomycetes*.

Generic circumscription: *Conidiomata* pycnidial, immersed, globose to subglobose, unilocular, dark brown, with central, circular ostiole; wall of brown *textura angularis*, inner layers becoming hyaline. Conidiophores lining the inner cavity, reduced to conidiogenous cells, invested in mucus. Conidiogenous cells ampulliform to lageniform, hyaline, smooth, proliferating via inconcpicuous percurrent proliferations near apex. Conidia fusiform to subcylindrical, apex obtuse to subobtuse, base truncate, straight or curved, euseptate, pale brown, thin-walled, smooth or minutely verruculose, bearing mucoid appendages at both ends (type H *sensu* Nag Raj 1993).

Type species: *Septoriella phragmitis* Oudem. 1889.

Septoriella phragmitis Oudem., *Ned. Kruidk. Arch*. **5**: 504 (1889).

(Fig. 20)

Synonyms: *Stagonospora phragmitis* (Oudem.) Leuchtm., *Sydowia* **37**: 139 (1984).

Pleospora phragmitis Hollós, *Annls hist.-nat. Mus. natn. Hung*. **8**(1): 10 (1910).

Phaeosphaeria phragmitis (Hollós) Leuchtm., *Sydowia* **37**: 139 (1984).

Description: *Conidiomata* pycnidial, immersed, globose to subglobose, unilocular, dark brown, to 350 µm diam, with central, circular ostiole, 20–40 µm diam; wall brown *textura angularis*, inner layers becoming hyaline. *Conidiophores* lining the inner cavity, reduced to conidiogenous cells, invested in mucus. *Conidiogenous cells* ampulliform to lageniform, hyaline, smooth, 4–8 × 4–5 µm, proliferating via inconspicuous percurrent proliferations near apex. *Conidia* fusiform to subcylindrical, apex subobtuse, base truncate, straight or curved, (3–)5(–7)-septate, (29–)32–40(–46) × 3(–3.5) µm, pale brown, thin-walled, smooth, not constricted at septa, bearing mucoid appendages at both ends (type H *sensu* Nag Raj 1993).

Specimens examined: **The Netherlands**: Den Haag, Loosduinen, on *Phragmites australis*, 15 Nov. 1888, *C.A.J.A. Oudemans*, (L – holotype of *S. phragmitis*; IMI 192310 – slide ex-holotype); Den Haag, Loosduinen, on *Phragmites australis*, 22 Jan. 2014, *M. Nauta* (CBS H-22281 – **epitype designated here** for *Septoriella phragmitis*, MBT201559, culture ex-type CPC 24118 = CBS 140065).

Wojnowicia Sacc., *Syll. Fung.* **10**: 328 (1892).

Synonymy: Unconfirmed generic synonyms include *Adella* Petrak 1936 and *Guceviczia* Glezer 1959 (Sutton 1980).

Generic circumscription: *Conidiomata* pycnidial, at first immersed, later appearing superficial due to decay of host tissue, separate, globose, often markedly papillate, dark brown; walls thick, composed of dark brown, thick-walled *textura angularis* becoming hyaline and thin-walled toward the inner conidiogenous region. *Ostiole* central or displaced to one side, ± papillate, circular. *Setae* formed around the ostiole or from the lateral pycnidial walls, straight or flexuous, unbranched, brown, septate, smooth. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* enteroblastic, phialidic, determinate, discrete, doliiform to ampulliform, hyaline, smooth, channel and collarette minute. *Conidia* pale brown, with several transverse eusepta, continuous, straight or curved, fusiform or cylindrical, apex and base obtuse, thin-walled, smooth, ± guttulate.

Type species: *Wojnowicia hirta* Sacc. 1892.

Notes: Species of *Wojnowicia* are found as saprobes on different substrates (Sutton 1975, Farr & Bills 1995) or as pathogens on cereals crops and grasses. *Wojnowicia* was established by Saccardo (1892) with *W. hirta* as type species, based on *Hendersonia hirta* (Schroeter 1890). However, the nomenclature of *W. hirta* is confused since Saccardo in the protologue of this species cited no binomial for the new combination, although it is clear that *W. hirta* is based on the specimen of Schroeter. Nevertheless, the binomial *H. hirta* Schroet. is an illegitimate name being a later homonym of *H. hirta* (Fr.) Curr. 1859 (syn. *Sphaeria hirta* Fr.). In addition, Zerova & Morockovskij (1971) published another illegitimate binomial *Wojnowicia hirta* (Fr. ex Curr.) Zerova & Morockovskij referring to a species on *Sambucus racemosa*, not congeneric with *Wojnowicia* (Sutton 1975). The holotype of *W. hirta* Sacc. was described from old stems of *Setaria verticillata*, in Belgrade (Serbia). This specimen was deposited in WRSL (Wrocław University, Museum of Natural History). Unfortunately, this material could not be located in the herbarium, since some of this collection was destroyed in World War II. Sutton (1975) provided a taxonomic review of the genus *Wojnowicia.* He examined the holotypes of *H. graminis* (syn. *Wojnowicia graminis*) and *W. tenella,* but unfortunately could not study the holotypes of *H. crastophila* or *H. hirta*.

Wojnowicia is characterised by taxa with setose pycnidia, with ampulliform, enteroblastic, phialidic conidiogenous cells and septate, pale brown conidia. Sutton (1975) accepted two species, *W. hirta* and *W. ephedrae*. Since then two other species have been introduced in the genus, *W. viburni* and *W. colluvium* (Farr & Bills 1995, Wijayawardene *et al*. 2013a). Nevertheless, *W. viburni* was recently transferred to *Wojnowiciella*, which is distinguished by having non-papillate conidiomata lacking setae, dark brown conidia, and also being phylogenetically distinct (Crous *et al.* 2015).

Septoriella hirta (Sacc.) M. Hern.-Restr. & Crous, **comb. nov.**

MycoBank MB812800

(Fig. 21)

Basionym: *Wojnowicia hirta* Sacc., *Syll. Fung.* **10**: 328 (1892).

Synonyms: *Hendersonia hirta* J. Schröt., *Hedwigia* **29**: 61 (1890); nom. illegit. (Art. 53.1).

Hendersonia crastophila Sacc., *Michelia* **1**: 211 (1878).

Wojnowicia tenella Pat., *Cat. Rais. Pl. cell. Tunisie*: 122 (1897).

Hendersonia graminis McAlpine*, J. Dept. Agric. Victoria*: 9 (1904).

Wojnowicia graminis (McAlpine) Sacc. & D. Sacc., *Syll. Fung.* **18**: 367 (1906).

Non *Wojnowicia hirta* (Fr.) Zerova & Morockovskij, *Vyzn. grybiv Ukrajiny* **3**: 593 (1971); nom. illegit. (Art. 53.1).

Sporulation on CMA. Conidiomata pycnidial, superficial, solitary, dark brown to black, subglobose to obpyriform, 353–502 × 272–290 µm, with one or two papillate to rostrate necks opening to the exterior by rounded central or lateral ostiole; walls 31–69 µm thick, *textura angularis*, composed of several cell layers, towards the periphery brown to dark brown, thick-walled, pigment accumulating in irregular deposits along cell wall, the inner layers hyaline to yellowish brown, thin-walled; setae abundant, formed from the outer cells of the conidiomata, brown to dark brown, septate, 2–5 µm wide. *Conidiogenous cells* formed from the inner cells of the pycnidial wall, hyaline, smooth, enteroblastic, phialidic, ampulliform to doliiform, 5.4–8.5 × 2.5–4.5 µm. *Conidia* cylindrical to fusiform, straight or falcate often flattened on one side, yellowish brown to pale brown, smooth, guttulate, tapering towards the apex, 32–39.5 × 3–4 µm, (4–)7-septate, apical cell acute to rounded, basal cell mostly truncate, 1–2.5 µm, with a mucilaginous sheath at the apex.

Culture characteristics: Colonies with abundant aerial mycelium, variable in colour, reaching 70–80 mm after 14 d at 25 °C. On OA surface usually greyish green, becoming greyish sepia to dark mouse grey; reverse colourless. On CMA smoke-grey to olivaceous grey; reverse with ochreous diffusible pigment.

Specimens examined: **Serbia**: Belgrade: on old stems of *Setaria verticillata* (WRSL – specimen destroyed in war). – **Germany**: Göttingen-Weend, on *Agropyron repens*, 4 July 1977, *P. Reinecke* (CBS H-19423 – **neotype designated here** for *Wojnowicia hirta* Sacc., MBT201560; CBS 536.77 – culture ex-neotype).

Notes: *Septoriella hirta* is considered an economically important secondary pathogen (Sprague 1950). This fungus is often found in association with other strawbreaker (foot rot) fungi such as *Gaeumannomyces graminis* and *Oculimacula yullandae* (Johnston *et al.* 2014). Invasion of *S. hirta* occurs in the lumen of the culms through the crown, spreading upwards to 15 cm above the soil line. Symptoms are discoloured culms, leaden on the outside. Plants affected by *S. hirta* are

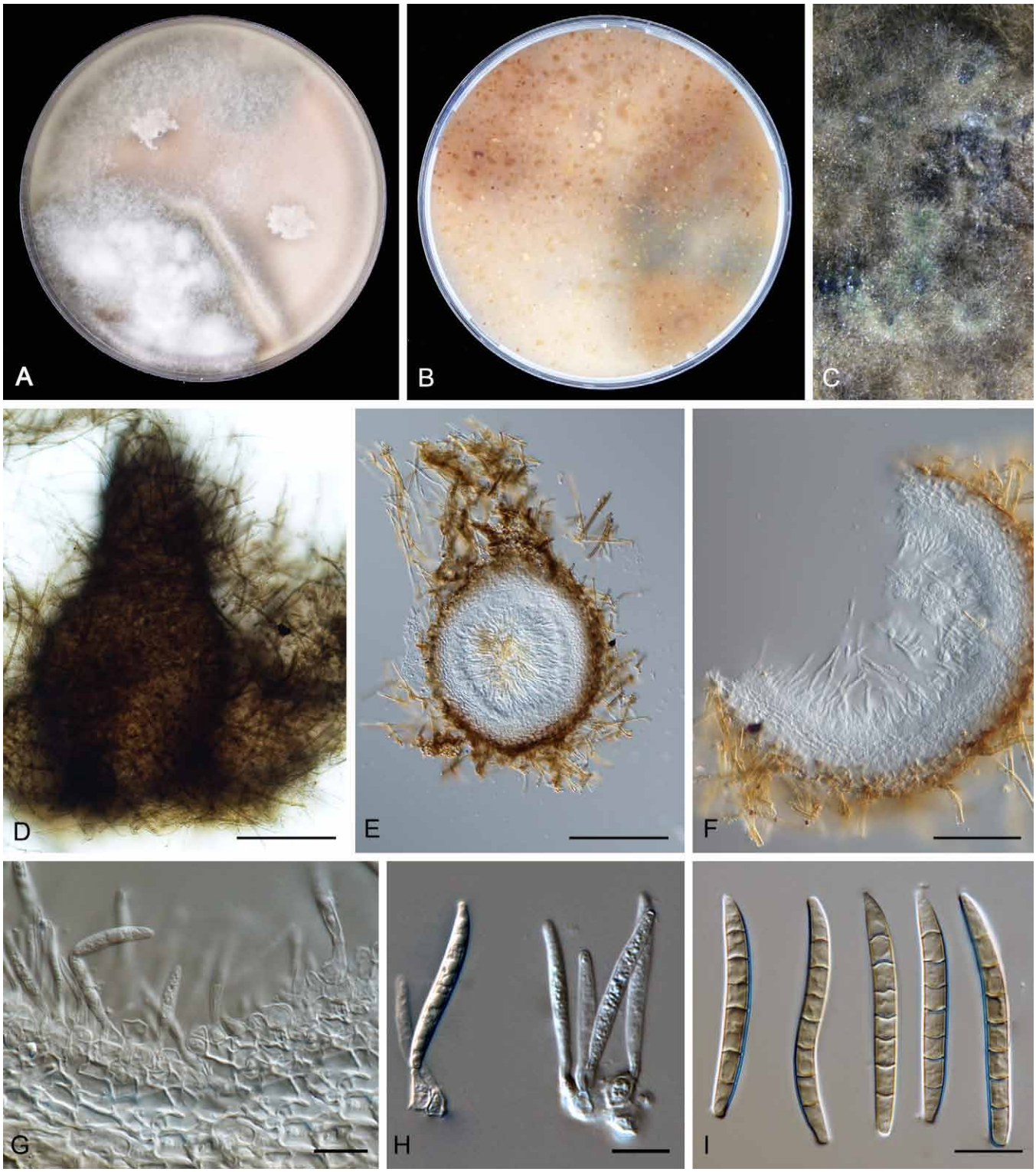

Fig. 21. *Septoriella hirta* (CBS 536.77). **A, B.** Colony on OA (surface and reverse). **C.** Close-up of conidiomata. **D.** Conidioma. **E, F.** Section through conidiomata. **G.** Conidiogenous cells. **H.** Developing conidia. **I.** Mature conidia. Bars: D, E = 100 µm, F = 50 µm, all others = 10 µm.

predisposed to premature collapse, especially in rainy and windy seasons, since this fungus produces a weakness in the culms of plants with ripe grains. These conditions increase the cost of harvesting and lower the quality of the grain (Sprague 1950).

Ex-type strains of other species that cluster in *Septoriella* are treated below:

Septoriella hubertusii M. Hern.-Restr., J.Z. Groenew. & Crous, **nom. nov.**
MycoBank MB812801

Etymology: Named after Hubertus Antonius van der Aa, who collected this specimen.

Replaced name: *Sclerostagonospora phragmiticola* Quaedvl.

et al., *Stud. Mycol.* **75**: 366 (2013).
Non *Septoriella phragmiticola* Sawada, *Sp. Publ. Coll. Agric. Nat. Taiwan Univ.* **8**: 154 (1959).

Specimen examined: **France**: Landes, Seignosse, Etang d'Hardy, on leaves of *Phragmites australis*, 11 June 1986, *H.A. van der Aa* (CBS H-21309 – holotype; CBS 338.86 – culture ex-type).

Septoriella leuchtmannii M. Hern.-Restr., J.Z. Groenew. & Crous, **nom. nov.**
MycoBank MB812802

Etymology: Named after A. Leuchtmann, who collected this specimen.

Replaced name: *Phaeosphaeria phragmiticola* Leuchtm., *Sydowia* **37**: 138 (1984).
Non *Septoriella phragmiticola* Sawada, *Sp. Publ. Coll. Agric. Nat. Taiwan Univ* **8**: 154 (1959).

Specimen examined: **Switzerland**: Zürich, Andelfingen, Husemersee, on leaves of *Phragmites australis*, May 1981, *A. Leuchtmann* (CBS H-7558 – isotype of *Phaeosphaeria phragmiticola* Leuchtm.; CBS 459.84 – culture ex-isotype)

Notes: Conidia of *S. leuchtmannii* have mucoid caps at the ends of its conidia, as in the type species, *S. phragmitis.* Nevertheless, *S. leuchtmanii* has shorter conidia (18–25 × 3.5–4 µm) and less septa (3–4), than in *S. phragmitis* (conidia (29–)32–40(–46) × 3(–3.5) µm, (3–)5(–7)-septate).

Septoriella poae (Crous & Quaedvl.) M. Hern.-Restr., J.Z. Groenew. & Crous, **comb. nov.**
MycoBank MB812803
Basionym: *Phaeosphaeria poae* Crous & Quaedvl., *Persoonia* **32**: 189 (2014).

Specimen examined: **Netherlands**: Elspeet, on *Poa* sp., 2013, *W. Quaedvlieg* (CBS H-21671 – holotype; D762 = CBS 136766 – culture ex-type).

Authors: **M. Hernández-Restrepo and P.W. Crous**

Torulaceae Corda, *Deutschlands Flora, Abt. 3. Die Pilze Deutschlands* **3**(2): 71 (1829)

Description: *Colonies* discrete, dark brown to black, effuse, dry, velvety. *Mycelium* mostly immersed. *Conidiophores* erect, or reduced to conidiogenous cells, brown, subcylindrical, with or without apical branches. *Conidiogenous cells* doliiform to ellipsoid or clavate, brown, smooth to verruculose, mono- to polyblastic. *Conidia* chiefly subcylindrical, phragmosporous, in branched chains, acrogenous, brown, dry, septate, smooth to verrucose.

Type genus: *Torula* Pers. 1794.

Genera included: *Dendryphion, Torula*.

Torula Pers., *Ann. Bot. (Usteri)* **15**: 25 (1794).

Classification: *Torulaceae, Pleosporales, Dothideomycetes.*

Current generic circumscription: *Colonies* discrete, dark brown to black, effuse, dry, velvety. *Mycelium* mostly immersed. *Conidiophores* reduced to conidiogenous cells, or with one brown supporting cell. *Conidiogenous cells* solitary on mycelium, erect, doliiform to ellipsoid or clavate, brown, smooth to verruculose, mono- to polyblastic. *Conidia* phragmosporous, in branched chains, acrogenous, brown, apex pale brown, dry, constricted at septa, smooth to verrucose, fragmenting into segments, conidiogenous cell and fertile cell in conidial chain (where branching occurs) darker brown than other cells; cells subglobose, conidia strongly constricted at the septa.

Type species: *Torula herbarum* (Pers.) Link 1809.

Torula ficus Crous, **sp. nov.**
MycoBank MB812804
(Fig. 22)

Etymology: Named after the host genus from which it was collected, *Ficus*.

Diagnosis: Conidia predominantly 2–3-septate, cells subglobose, 2-septate conidia (12–)13–14(–15) × 5(–6) µm, 3-septate conidia 17–19 × 5(–6) µm.

Type: **Cuba**: on *Ficus religiosa*, June 1996, *R.F. Castañeda* (CBS H-22276 – holotype, CBS 595.96 – culture ex-type).

Description: *Mycelium* immersed to superficial, hyaline, branched, septate, 3–4 µm diam. *Conidiophores* reduced to conidiogenous cells, or with one supporting cell, to 13 µm tall. *Conidiogenous cells* solitary on mycelium, erect, doliiform to clavate, brown, (5–)6(–8) × 5(–7) µm, smooth, becoming verruculose at apex, mono- to polyblastic. *Conidia* phragmosporous, in branched chains, acrogenous, brown, apex pale brown, dry, constricted at septa, verrucose, fragmenting into segments, conidiogenous cell and fertile cell in conidial chain (where branching occurs) darker brown than other cells; conidia predominantly 2–3-septate, cells subglobose, 2-septate conidia (12–)13–14(–15) × 5(–6) µm, 3-septate conidia 17–19 × 5(–6) µm.

Culture characteristics: Colonies spreading, covering dish after 2 wk at 25 ºC, with sparse aerial mycelium, flat, spreading, with smooth, even margins. On OA surface olivaceous-grey, with diffuse buff pigment, on MEA buff on surface and in reverse.

Note: *Torula ficus* is distinct from the other species treated here, in that conidiogenous cells are frequently clavate, and 2-septate conidia are also rather common.

Torula herbarum (Pers.) Link, *Mag. Gesell. naturf. Freunde, Berlin* **3**: 21 (1809).
(Figs 23, 24)

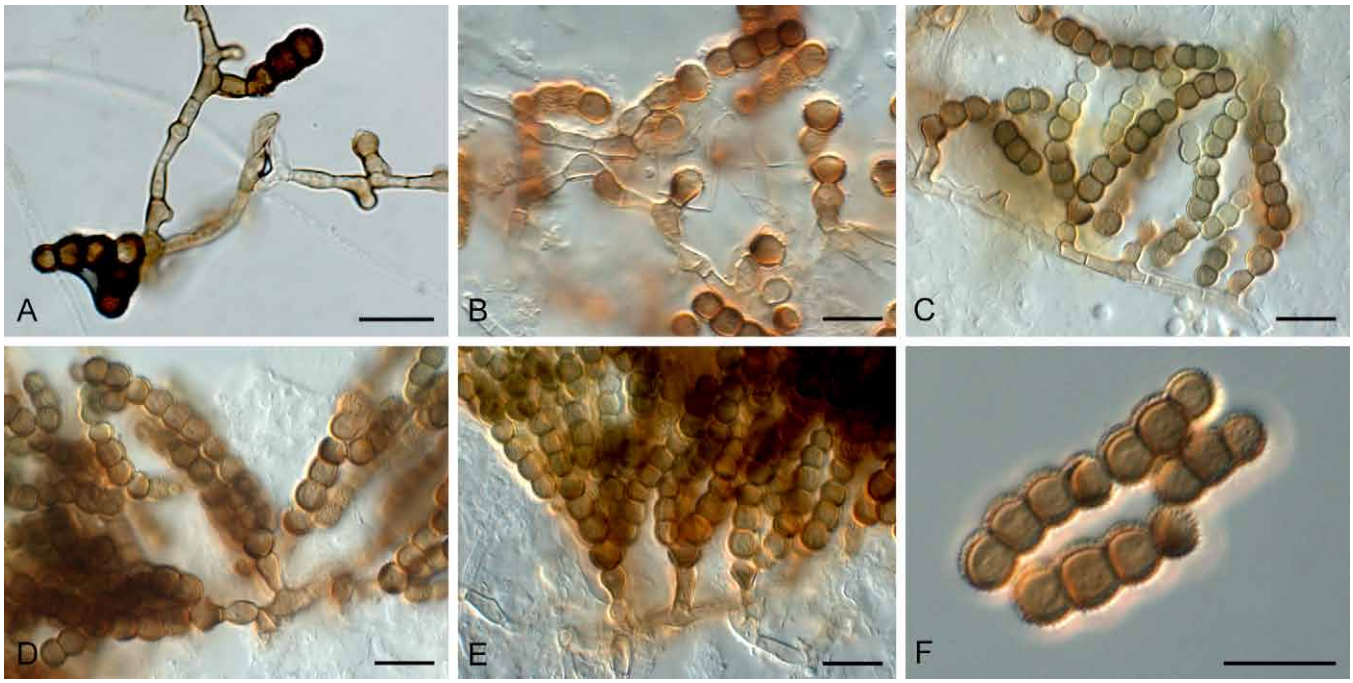

Fig. 22. *Torula ficus* (CBS 595.96). **A–E.** Conidiogenous cells giving rise to conidia. **F.** Conidia. Bars = 10 µm.

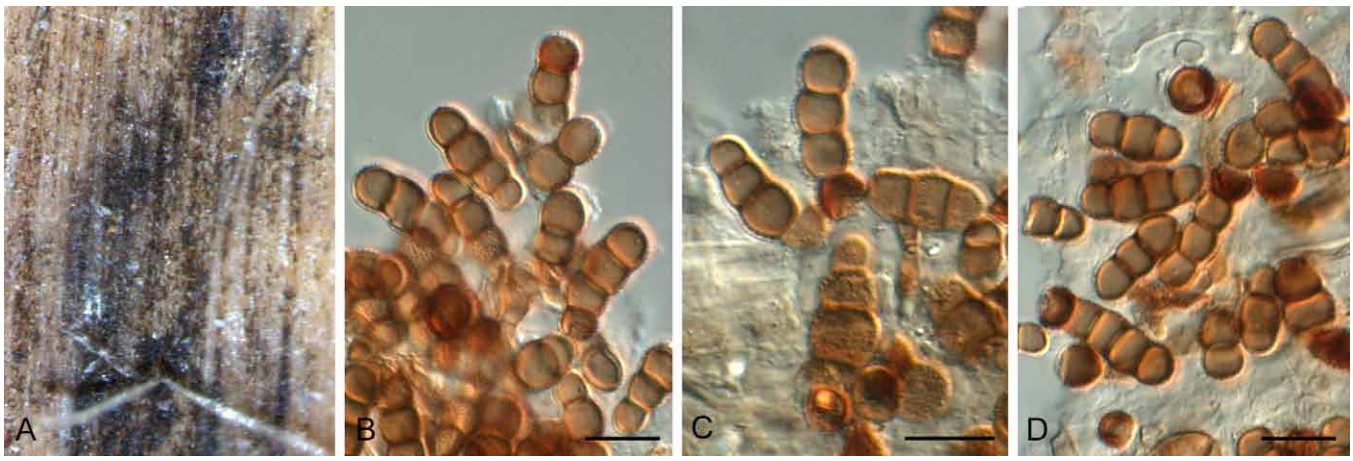

Fig. 23. *Torula herbarum* (L0118919). **A.** Colony *in vivo*. **B–D.** Conidia. Bars = 10 µm.

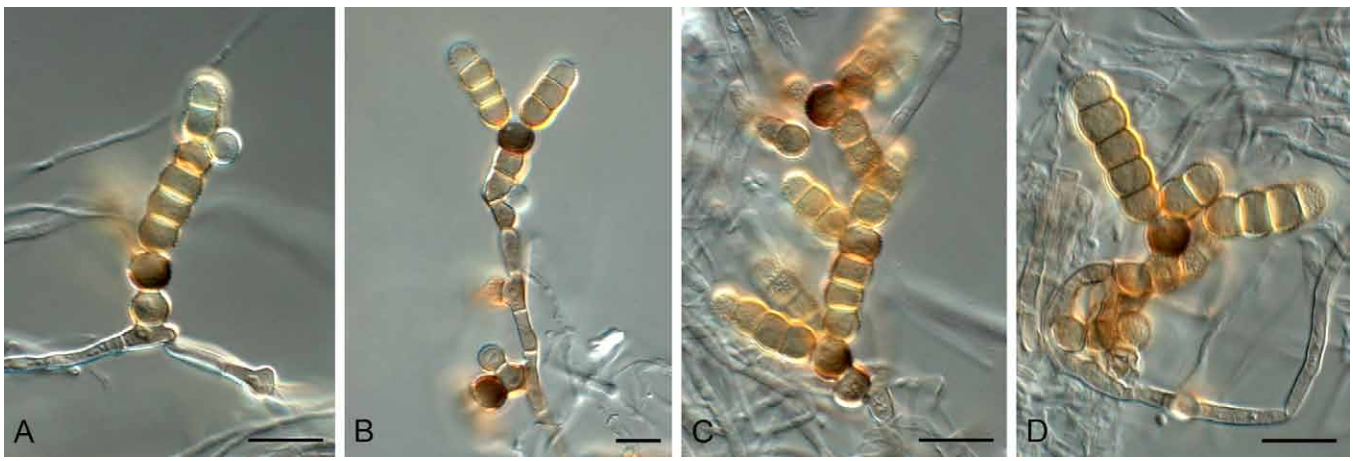

Fig. 24. *Torula herbarum* (CPC 24114). **A–D.** Conidiogenous cells and conidia. Bars = 10 µm.

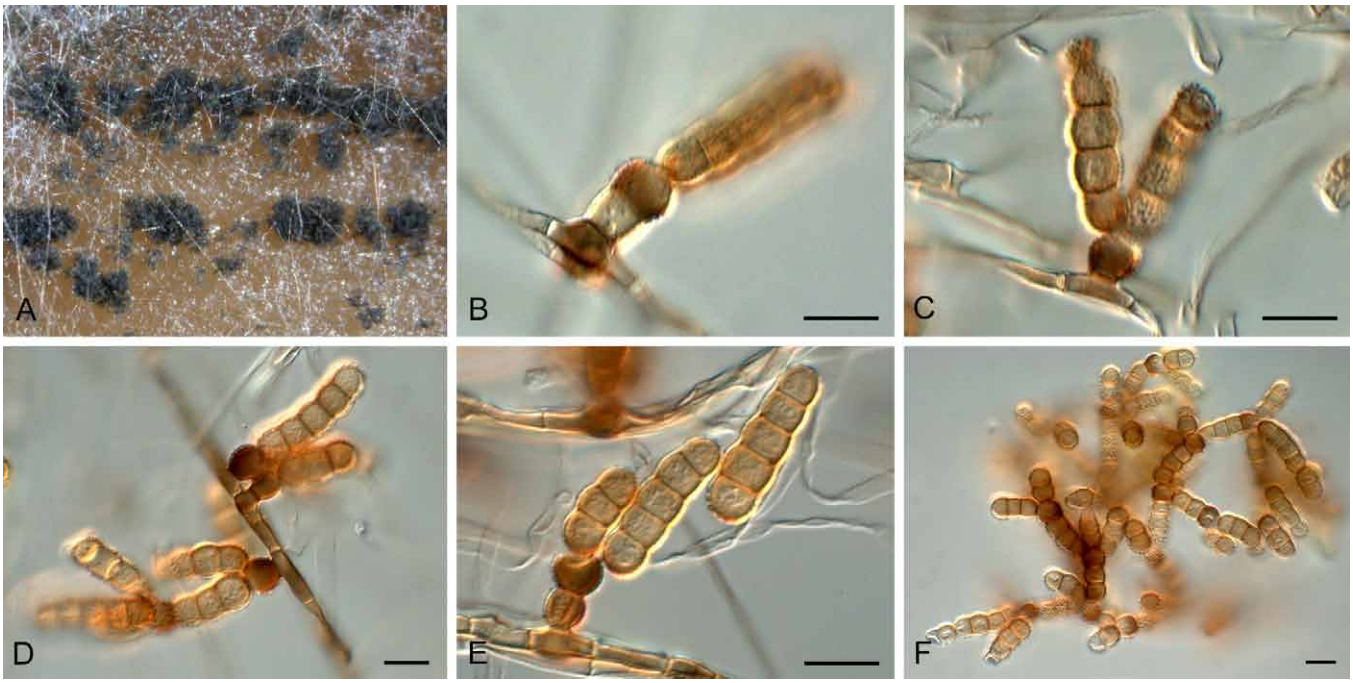

Fig. 25. *Torula hollandica* (CBS 220.69). **A.** Colony sporulating on OA. **B–F.** Conidiogenous cells and conidia. Bars = 10 µm.

Basionym: *Monilia herbarum* Pers., *Syn. meth. fung.* **2**: 693 (1801).
Synonyms: *Torula monilis* Pers., *Ann. Bot. (Usteri)* **15**: 25 (1794).

Description: *Mycelium* immersed to superficial, hyaline, branched, septate, 2–4 µm diam. *Conidiophores* reduced to conidiogenous cells, or with one brown supporting cell, to 13 µm tall. *Conidiogenous cells* solitary on mycelium, erect, doliiform to ellipsoid, brown, 5–8 × 6–8 µm, verruculose at apex, mono- to polyblastic. *Conidia* phragmosporous, in branched chains, acrogenous, brown, apex pale brown, dry, constricted at septa, verrucose, fragmenting into segments, conidiogenous cell and fertile cell in conidial chain (where branching occurs) darker brown than other cells; cells subglobose, conidia predominantly 3-septate, (15–)16–18(–20) × (5–)6(–7) µm, 4-septate conidia 22–24 × 6–7 µm.

Specimens examined: **Country unknown**: (on litter) (L 910.267-998 = L0118919 –authentic specimen). – **The Netherlands**: Wageningen, on culms of *Phragmites australis*, 24 Jan. 2014, *W. Quaedvlieg* (CBS H-22275 – **neotype designated here**, MBT201562, culture ex-epitype CPC 24114 = CBS 140066).

Culture characteristics: Colonies spreading, covering dish after 2 wk at 25 ºC, with moderate aerial mycelium, flat, spreading, with smooth, even margins. On PDA surface pale olivaceous-grey, on MEA surface pale olivaceous-grey, reverse olivaceous-grey.

Notes: *Torula herbarum* is morphologically closest to *T. ficus* [2-septate conidia (12–)13–14(–15) × 5(–6) µm, 3-septate conidia 17–19 × 5(–6) µm], but is distinct in that it has longer and wider conidia. *Torula hollandica* is distinguished in that it predominantly forms 4-septate conidia.

Torula hollandica Crous, **sp. nov.**
MycoBank MB812805
(Fig. 25)

Etymology: Named after The Netherlands (Holland), the country where the fungus was collected.

Diagnosis: Conidia predominantly 4-septate, cells subglobose, 2-septate conidia 13–14 × 6–7 µm, 3-septate conidia 16–20 × 6–7 µm, 4-septate conidia 21–26 × 6–7 µm.

Type: **The Netherlands**: Baarn, on *Delphinium* sp., 6 Feb. 1969, *H.A. van der Aa* (CBS H-22277 – holotype; CBS 220.69 – culture ex-type).

Description: Sporodochial *conidiomata* forming on agar surface, or sporulating in aerial mycelium. *Mycelium* immersed to superficial, hyaline, becoming brown closer to fertile region, branched, septate, 3–4 µm diam. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* solitary on mycelium, erect, doliiform, brown, 6–7 × 6–7 µm, verruculose, monoblastic. *Conidia* phragmosporous, in branched chains, acrogenous, brown, apex pale brown, dry, constricted at septa, verrucose, fragmenting into segments, branching cell in conidial chain darker brown than other cells, predominantly 4-septate, cells subglobose, 2-septate conidia 13–14 × 6–7 µm, 3-septate conidia 16–20 × 6–7 µm, 4-septate conidia 21–26 × 6–7 µm.

Culture characteristics: Colonies spreading, covering dish after 2 wk at 25 ºC, with moderate aerial mycelium, flat, spreading, with smooth, even margins. On MEA surface olivaceous-grey, reverse sienna.

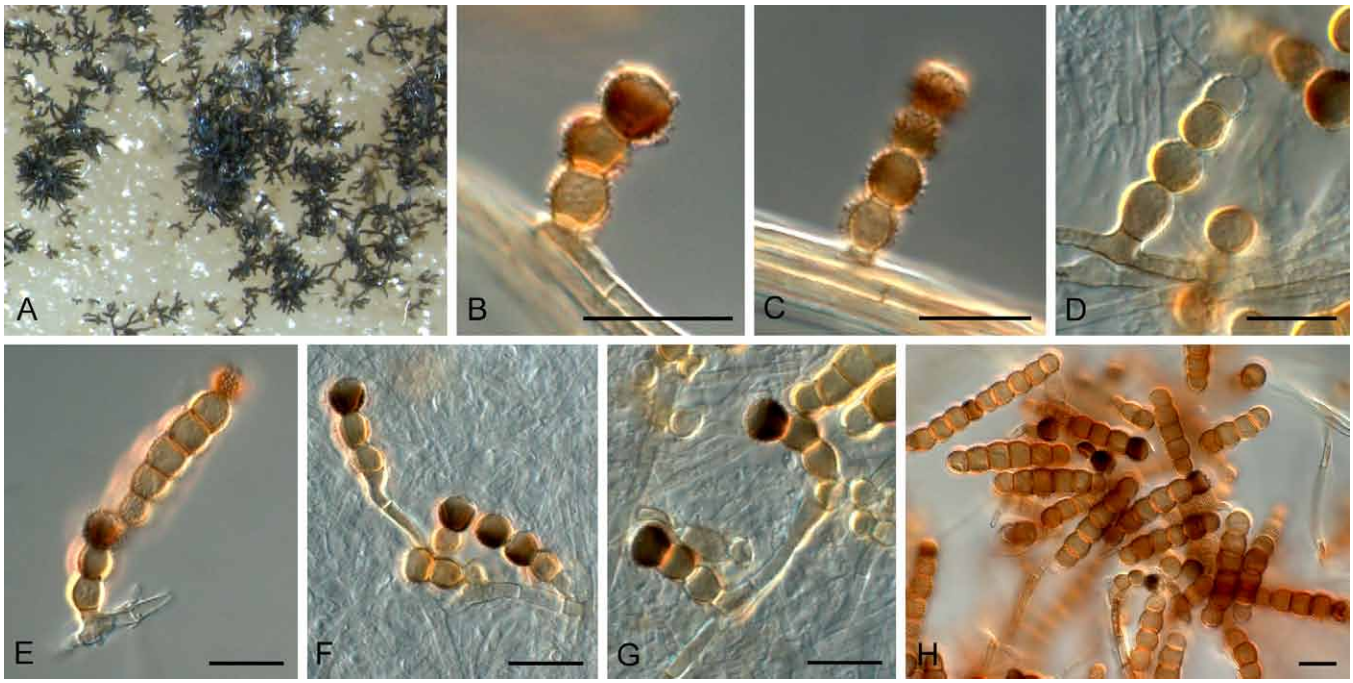

Fig. 26. *Torula masonii* (CBS 245.57). **A.** Colony sporulating on OA. **B–H.** Conidiogenous cells and conidia. Bars = 10 µm.

Note: *Torula hollandica* is distinct from the other species treated here, in that 4-septate conidia proved to be more prominent than either the 2- or 3-septate conidia.

Torula masonii Crous, **sp. nov.**
MycoBank MB812806
(Fig. 26)

Etymology: Named after Edmund W. Mason, first mycologist at the Imperial Bureau of Mycology at Kew, and a President of the British Mycological Society, who collected this species.

Diagnosis: Conidia predominantly 6-septate, but to 12-septate conidia present; 2-septate conidia 14–16 × 6–7 µm, 3-septate conidia 19–30 × 6–7 µm, 4-septate conidia 23–35 × 6–7 µm, 5-septate conidia 32–40 × 6–7 µm, 6-septate conidia 36–45 × 6–7 µm, 12-septate conidia 70–75 × 7–8 µm.

Type: **United Kingdom**: *Surrey*: Haslemere, on *Brassica* sp., 1945, *E.W. Mason* (CBS H-22278 – holotype; CBS 245.57 – culture ex-type).

Description: *Mycelium* immersed to superficial, hyaline, becoming brown closer to fertile region, branched, septate, 2–3 µm diam. *Conidiophores* straight to flexuous, subcylindrical, 2-septate, 10–25 × 4–5 µm, or reduced to conidiogenous cells, solitary on mycelium, erect, doliiform, brown, 6–7 × 5–6 µm, verruculose, monoblastic. *Conidia* phragmosporous, in branched chains, acrogenous, brown, apex pale brown, dry, constricted at septa, verrucose, fragmenting into segments, branching cell in conidial chain darker brown than other cells, predominantly 6-septate, but up to 12-septate conidia present; cells subglobose, 2-septate conidia 14–16 × 6–7 µm, 3-septate conidia 19–30 × 6–7 µm, 4-septate conidia 23–35 × 6–7 µm, 5-septate conidia 32–40 × 6–7 µm, 6-septate conidia 36–45 × 6–7 µm, 12-septate conidia 70–75 × 7–8 µm.

Culture characteristics: Colonies spreading, covering dish after 2 wk at 25 ºC, with sparse aerial mycelium, flat, spreading, with smooth, even margins. On OA surface olivaceous-grey, on MEA surface pale olivaceous-grey, dirty white in centre, reverse olivaceous-grey.

Note: *Torula masonii* is distinct from the other species treated here in that in culture 6-septate conidia tended to be more prominent, while the 12-septate conidia were widest in their middle region.

Torula monilis Pers., *Ann. Bot. (Usteri)* **15**: 25 (1794).
(Fig. 27)

Description: *Mycelium* immersed to superficial, hyaline, branched, septate, 2–4 µm diam. *Conidiophores* reduced to conidiogenous cells, or with one brown supporting cell, up to 14 µm tall. *Conidiogenous cells* solitary on mycelium, erect, doliiform to ellipsoid, brown, 5–8 × 6–8 µm, verruculose at apex, mono- to polyblastic. *Conidia* phragmosporous, in branched chains, acrogenous, brown, apex pale brown, dry, constricted at septa, verrucose, fragmenting into segments, conidiogenous cell and fertile cell in conidial chain (where branching occurs) darker brown than other cells; conidia up to 9-septate, cells subglobose, conidia predominantly 3-septate, but at times also muriformly septate in the lower part of conidial chains, (15–)17–18(–20) × (6–)7(–8) µm.

Specimen examined: **Country unknown**: (on litter) (L910.267-995 = L0118923 – authentic specimen).

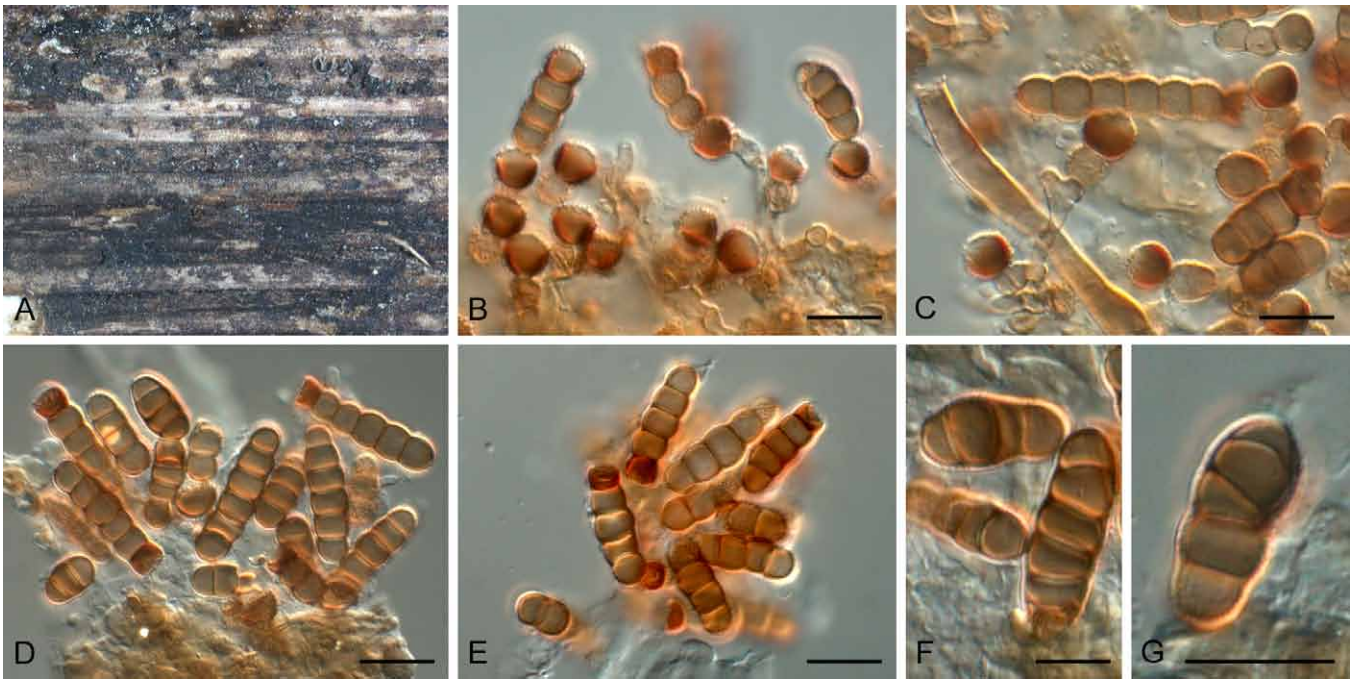

Fig. 27. *Torula monilis* (L0118923). **A.** Colony *in vivo*. **B–G.** Conidiogenous cells and conidia. Bars: B–G = 10 µm.

Notes: The present specimen is annotated by Persoon as *Torula monilis*. *Torula monilis,* as understood here, is distinguished from *T. herbarum* by having up to 9-septate conidia, and smaller conidia that are also frequently muriformly septate, features not observed in *T. herbarum*. Currently the species is not known from DNA sequence data.

Author: **P.W. Crous**

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REFERENCES

Cannon PF, Damm U, Johnston PR, Weir BS (2012) *Colletotrichum* – current status and future directions. *Studies in Mycology* **73**: 181–213.

Carris LM (1990) Cranberry black rot fungi: *Allantophomopsis cytisporea* and *Allantophomopsis lycopodina*. *Canadian Journal of Botany* **68**: 2283–2291.

Cheewangkoon R, Crous PW, Hyde KD, Groenewald JZ, To-anan C (2008) Species of *Mycosphaerella* and related anamorphs on *Eucalyptus* leaves from Thailand. *Persoonia* **21**: 77–91.

Clements FE, Shear CL (1931) *The Genera of Fungi*. New York: H.W. Wilson.

Crane JL, Schoknecht JD (1977) Revision of *Torula* species. *Rutola*, a new genus for *Torula graminis. Canadian Journal of Botany* **55**: 3013–3019.

Crous PW, Groenewald JZ (2005) Hosts, species and genotypes: opinions versus data. *Australasian Plant Pathology* **34**: 463–470.

Crous PW, Gams W, Stalpers JA, Robert V, Stegehuis G (2004a) MycoBank: an online initiative to launch mycology into the 21st century. *Studies in Mycology* **50**: 19–22.

Crous PW, Groenewald JZ, Risede J-M, Hywel-Jones NL (2004b). *Calonectria* species and their *Cylindrocladium* anamorphs: species with sphaeropedunculate vesicles. *Studies in Mycology* **50**: 415–430.

Crous PW, Giraldo A, Hawksworth DL, Robert V, Kirk PM, *et al.* (2014). The Genera of Fungi: fixing the application of type species of generic names. *IMA Fungus* **5**: 141–160.

Crous PW, Hawksworth DL, Wingfield MJ (2015) Identifying and naming plant-pathogenic fungi: past, present, and future. *Annual Review of Phytopathology* **53**: doi: 10.1146/annurev-phyto-080614-120245.

Crous PW, Quaedvlieg W, Hansen K, Hawksworth DL, Groenewald JZ (2014) *Phacidium* and *Ceuthospora* (*Phacidiaceae*) are congeneric: taxonomic and nomenclatural implications. *IMA Fungus* **5**: 173–193.

Crous PW, Schoch CL, Hyde KD, Wood AR, Gueidan C, *et al.* (2009a) Phylogenetic lineages in the *Capnodiales. Studies in Mycology* **64**: 17–47.

Crous PW, Shivas RG, Quaedvlieg W, van der Bank M, Zhang Y, *et al.* (2014) Fungal Planet Description Sheets: 214–280. *Persoonia* **32**: 184–306.

Crous PW, Slippers B, Wingfield MJ, Rheeder J, Marasas WFO, *et al*. (2006) Phylogenetic lineages in the *Botryosphaeriaceae*. *Studies in Mycology* **55**: 235–253.

Crous PW, Summerell BA, Carnegie AJ, Wingfield MJ, Hunter GC, *et al.* (2009) Unravelling *Mycosphaerella*: do you believe in genera? *Persoonia* **23**: 99–118.

Crous PW, Verkley GJM, Groenewald JZ, Samson RA (eds) (2009b) *Fungal Biodiversity.* [CBS Laboratory Manual Series no.1.] Utrecht: CBS-KNAW Fungal Biodiversity Centre.

Crous PW, Wingfield MJ, Guarro J, Hernández-Restrepo M, Sutton DA, *et al.* (2015) Fungal Planet Description Sheets: 320–370. *Persoonia* **34**: 167–266.

Crous PW, Wingfield MJ, Park RF (1991) *Mycosphaerella nubilosa* a synonym of *M. molleriana*. *Mycological Research* **95**: 628–632.

DiCosmo F, Nag Raj TR, Kendrick B (1983) Prodromus for a revison of the *Phacidiaceae* and related anamorphs. *Canadian Journal of Botany* **61**: 31–44.

Dyko BJ, Sutton BC, Roquebert MF (1979) The genus *Protostegia*. *Mycologia* **71**: 918–934.

Ellis MB (1971) *Dematiaceous Hyphomycetes*. Kew: Commonwealth Mycological Institute.

Farr DF, Bills GF (1995) *Wojnowicia colluvium* sp. nov. isolated from conifer litter. *Mycologia* **87**: 518–524.

Fries EM (1823) *Systema Mycologicum.* Vol. 2. Greifswald: E. Mauritius.

Groenewald JZ. Nakashima C, Nishikawa J, Shin HD, Park JH, *et al.* (2013) Species concepts in *Cercospora*: spotting the weeds among the roses. *Studies in Mycology* **75**: 115–170.

Hawksworth DL (1975) A revision of lichenicolous fungi accepted by Keissler in *Coniothecium*. *Transactions of the British Mycological Society* **65**: 219–238.

Hawksworth DL (1984) Two interesting lichenicolous hyphomycetes from Austria. *Beihefte zur Nova Hedwigia* **79**: 373–379.

Hawksworth DL (2006) (1719) Proposal to conserve the name *Spilomium graphideorum* with a conserved type to safeguard the current usage of the generic names *Lecanographa* and *Milospium* (*Fungi*). *Taxon* **55**: 528–529.

Hawksworth DL (2015) Proposals to clarify and enhance the naming of fungi under the *International Code of Nomenclature for algae, fungi, and plants. Taxon* **64**: in press; *IMA Fungus* **6**: 199–205.

Hawksworth DL, Crous PW, Redhead SA, Reynolds DR, Samson RA, *et al.* (2011) The Amsterdam Declaration on Fungal Nomenclature. *IMA Fungus* **2**: 105–112.

Hawksworth DL, Diederich P (1991) Lichenicolous fungi from the Schwäbische Alb, Baden-Württemberg-Flechtenbewohnende Pilze von der Schwäbischen Alb. *Jahresbericht der Gesellschaft von Naturkunde in Württemberg* **146**: 85–88.

Hawksworth DL, McNeill J, de Beer ZW, Wingfield MJ (2013) Names of fungal species with the same epithet applied to different morphs: how to treat them. *IMA Fungus* **4**: 53–56.

Hibbett DS, Ohman A, Glotzer D, Nuhn M, Kirk P, *et al.* (2011) Progress in molecular and morphological taxon discovery in Fungi and options for formal classification of environmental sequences. *Fungal Biology Reviews* **25**: 38–47.

Höhnel F von (1909) Fragmente zur Mykologie: VII. Mitteilung (Nr. 289 bis 353). *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften Math.-naturw. Klasse Abt. I.* **118**: 813–904.

Hoog GS de, Gerrits van den Ende AHG (1998). Molecular diagnostics of clinical strains of filamentous Basidiomycetes. *Mycoses* **41**: 183–189.

Johnston PR, Seifert KA, Stone JK, Rossman AY, Marvanová L (2014) Recommendations on generic names competing for use in *Leotiomycetes* (*Ascomycota*). *IMA Fungus* **5**: 91–120.

Jørgensen PM (2014) Notes on the new Example 9 in Article 9.8 of the *International Code of Nomenclature for algae, fungi, and plants*. *Taxon* **63**: 132–133.

Kirk PM, Stalpers JA, Braun U, Crous PW, Hansen K, *et al.* (2013) A without-prejudice list of generic names of fungi for protection under the International Code of Nomenclature for algae, fungi and plants. *IMA Fungus* **4**: 381–443.

Klaubauf S, Tharreau D, Fournier E, Groenewald JZ, Crous PW, *et al.* (2014) Resolving the polyphyletic nature of *Pyricularia* (*Pyriculariaceae*). *Studies in Mycology* **79**: 85–120.

Leuchtmann A (1984) Über *Phaeosphaeria* Miyake und andere bitunicate Ascomyceten mit mehrfach querseptierten Ascosporen. *Sydowia* **37**: 75–194.

Matsushima T (1989) Matsushima Mycological Memoirs No. 6. Published by the author.

Matsushima T (1993) List of microfungi from Pakistan soils. In: T Nakaike, S Malik (eds). *Cryptogamic flora of Pakistan* **2**: 43–63.

Mugambi GK, Huhndorf SM (2009) Molecular phylogenetics of *Pleosporales*: *Melanommataceae* and *Lophiostomataceae* re-circumscribed (*Pleosporomycetidae, Dothideomycetes, Ascomycota*). *Studies in Mycology* **64**: 103–121

Nag Raj TR (1993) *Coelomycetous Anamorphs with appendage bearing conidia*. Waterloo, ON: Mycologue Publications.

Nag Raj TR (1983). Genera coelomycetum. XXI. *Strasseria* and two new anamorph genera: *Apostrasseria* and *Nothostrasseria*. *Canadian Journal of Botany* **61**: 1–30.

Nag Raj TR, Morgan-Jones G, Kendrick WB (1972) Genera Coelomycetarum. IV. *Pseudorobillarda* gen. nov., a generic segregate of *Robillarda* Sacc. *Canadian Journal of Botany* **50**: 861–867.

Norvell LL (2008) Report of the Nomenclature Committee for Fungi: 14. *Taxon* **57**: 637–639.

Petrak F (1925) Mykologische Notizen. VIII. *Annales Mycologici* **23**: 1–143.

Pfister DH (1985) A bibliographic account of exsiccatae containing fungi. *Mycotaxon* **23**: 1–139.

Phillips AJL, Alves A, Abdollahzadeh J, Slippers B, Wingfield MJ, *et al.* (2013) The *Botryosphaeriaceae*: genera and species known from culture. *Studies in Mycology* **76**: 51–167.

Pratibha J, Prabhugaonkar A, Hyde KD, Bhat DJ (2014) Phylogenetic placement of *Bahusandhika*, *Cancellidium* and *Pseudoepicoccum* (asexual Ascomycota). *Phytotaxa* **176**: 68–80.

Quaedvlieg W, Verkley GJM, Shin H-D, Barreto RW, Alfenas AC, *et al.* (2013) Sizing up *Septoria*. *Studies in Mycology* **75**: 307–390.

Rayner RW (1970) *A Mycological Colour Chart*. Kew: Commonwealth Mycological Institute.

Robert V, Vu D, Amor ABH, Wiele N van de, Brouwer C, *et al.* (2013) MycoBank gearing up for new horizons. *IMA Fungus* **4**: 371–379.

Rossman AY, Seifert KA, Samuels GJ, Minnis AW, Schroers HJ, *et al.* (2013) Genera in *Bionectriaceae*, *Hypocreaceae*, and *Nectriaceae* (*Hypocreales*) proposed for acceptance or rejection. *IMA Fungus* **4**: 41–51.

Rossman AY, Howard RJ, Valent B (1990) *Pyricularia grisea*, the correct name for the rice blast disease fungus. *Mycologia* **82**: 509–512.

Rungjindamaia N, Sakayaroja J, Somrithipol S, Plaingamb N, Gareth Jonesc EB (2012) Phylogeny of the appendaged coelomycete genera: *Pseudorobillarda, Robillarda*, and *Xepiculopsis* based on nuclear ribosomal DNA sequences. *Cryptogamie, Mycologie* **33**: 319–332.

Saccardo PA (1892) *Sylloge Fungorum* X: 1–964.

Schoch CL, Seifert KA, Huhndorf S, Robert V, Spouge JL, *et al.* (2012) Nuclear ribosomal internal transcribed spacer (ITS) region as a universal DNA barcode marker for Fungi. *Proceedings of the National Academy of Sciences, USA* **109**: 6241–6246.

Schroeter J (1890) Pilze Serbiens. I. *Hedwigia* **29**(2): 49–64.

Shear CL, Davidson RW (1936) The life histories of *Botryosphaeria melanops* and *Massaria platani*. *Mycologia* **28**: 476–482.

Slippers B, Crous PW, Denman S, Coutinho TA, Wingfield BD, *et al.* (2004) Combined multiple gene genealogies and phenotypic characters differentiate several species previously identified as *Botryosphaeria dothidea*. *Mycologia* **96**: 83–101.

Smith H, Wingfield MJ, Crous PW, Coutinho TA (1996) *Sphaeropsis sapinea* and *Botryosphaeria dothidea* endophytic in *Pinus* spp. and *Eucalyptus* spp. in South Africa. *South African Journal of Botany* **62**: 86–88.

Sprague R (1950) *Diseases of cereals and grasses in North America*. The Ronald Press Company, New York, USA.

Stafleu FA, Demoulin V, Greuter W, Hiepko P, Linczevski IA, *et al.* (1978) *International Code of Botanical Nomenclature adopted by the Twelfth International Botanical Congress, Leningrad, July 1975.* [Regnum Vegetabile no. 97.] Utrecht: Bohn, Scheltema & Holkema.

Sutton B (1977) Coelomycetes VI. Nomenclature of generic names proposed for Coelomycetes. *Mycological Papers* **141**: 1–253.

Sutton BC (1975) *Wojnowicia* and *Angiopomopsis*. *Ceska Mykologie* **29**: 97–104.

Sutton BC (1980) *The Coelomycetes: fungi imperfecti with pycnidia, acervuli, and stromata*. Kew: Commonwealth Mycological Institute.

Swart HJ (1988) Australian leaf-inhabiting fungi. XXVI. Some noteworthy coelomycetes on *Eucalyptus*. *Transactions of the British Mycological Society* **90**: 279–291.

Vilgalys R, Hester M (1990) Rapid genetic identification and mapping of enzymatically amplified ribosomal DNA from several *Cryptococcus* species. *Journal of Bacteriology* **172**: 4238–4246.

White TJ, Bruns T, Lee J, Taylor SB (1990) Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In: *PCR Protocols: a guide to methods and applications* (Innis MA, Gelfand DH, Sninsky JJ, White TJ, eds): 315–322. San Diego: Academic Press.

Wijayawardene DNN, Song Y, Bhat DJ, McKenzie EHC, Chukeatirote E, *et al.* (2013a) *Wojnowicia viburuni* sp. nov. from China and its phylogenetic placement. *Sydowia* **65**: 129–138.

Wijayawardene NN, Crous PW, Kirk PM, Hawksworth DL, Boonmee S, *et al.* (2014) Naming and outline of *Dothideomycetes*–2014 including proposals for the protection or suppression of generic names. *Fungal Diversity* **69**: 1–55.

Wijayawardene NN, Camporesi E, Bhat DJ, Song Y, Chethana KW, *et al.* (2013b) *Macrodiplodiopsis* in *Lophiostomataceae*, *Pleosporales*. *Phytotaxa* **176**: 192–200.

Wingfield MJ, De Beer ZW, Slippers B, Wingfield BD, Groenewald JZ, *et al.* (2012) One fungus, one name promotes progressive plant pathology. *Molecular Plant Pathology* **13**: 604–613.

Yurchenko W, Belomesyatseva D (2010). *Robillarda sessilis*, a rare coelomycete isolated from Scots pine seedlings. *Acta Mycologica* **45**: 27–32.