

Reconsideration of species boundaries and proposed DNA barcodes for *Calonectria*

Q.L. Liu^{1,2,3,5}, J.Q. Li^{1,2,3,5}, M.J. Wingfield³, T.A. Duong³, B.D. Wingfield³, P.W. Crous^{3,4}, and S.F. Chen^{1,2*}

¹China Eucalypt Research Centre (CERC), Chinese Academy of Forestry (CAF), ZhanJiang, 524022, GuangDong Province, China; ²State Key Laboratory of Tree Genetics and Breeding (SKLTGB), Chinese Academy of Forestry (CAF), Haidian District, 100091, Beijing, China; ³Department of Biochemistry, Genetics and Microbiology (BGM), Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria, 0028, South Africa; ⁴Westerdijk Fungal Biodiversity Institute, Uppsalaalaan 8, 3584, CT Utrecht, the Netherlands

*Correspondence: S.F. Chen, shuaifei.chen@gmail.com

⁵These authors contributed equally to this work.

Abstract: *Calonectria* represents a genus of phytopathogenic ascomycetous fungi with a worldwide distribution. In recent years, there has been an increase in the number of taxonomic studies on these fungi. Currently, there are 169 described species of *Calonectria* based on comparisons of DNA sequence data, combined with morphological characteristics. However, for some of these species, the sequence data utilised at the time of their description were relatively limited. This has justified an urgent need to reconsider the species boundaries for *Calonectria* based on robust genus-wide phylogenetic analyses. In this study, we utilised 240 available isolates including the ex-types of 128 *Calonectria* species, and re-sequenced eight gene regions (*act*, *cmdA*, *his3*, ITS, LSU, *rpb2*, *tef1* and *tub2*) for them. Sequences for 44 *Calonectria* species, for which cultures could not be obtained, were downloaded from GenBank. DNA sequence data of all the 169 *Calonectria* species were then used to determine their phylogenetic relationships. As a consequence, 51 species were reduced to synonymy, two new species were identified, and the name *Ca. lauri* was validated. This resulted in the acceptance of 120 clearly defined *Calonectria* spp. The overall data revealed that the genus includes 11 species complexes, distributed across the Prolate and Sphaero-Naviculate Groups known to divide *Calonectria*. The results also made it possible to develop a robust set of DNA barcodes for *Calonectria* spp. To accomplish this goal, we evaluated the outcomes of each of the eight candidate DNA barcodes for the genus, as well as for each of the 11 species complexes. No single gene region provided a clear identity for all *Calonectria* species. Sequences of the *tef1* and *tub2* genes were the most reliable markers; those for the *cmdA*, *his3*, *rpb2* and *act* gene regions also provided a relatively effective resolution for *Calonectria* spp., while the ITS and LSU failed to produce useful barcodes for species discrimination. At the species complex level, results showed that the most informative barcodes were inconsistent, but that a combination of six candidate barcodes (*tef1*, *tub2*, *cmdA*, *his3*, *rpb2* and *act*) provided stable and reliable resolution for all 11 species complexes. A six-gene combined phylogeny resolved all 120 *Calonectria* species, and revealed that *tef1*, *tub2*, *cmdA*, *his3*, *rpb2* and *act* gene regions are effective DNA barcodes for *Calonectria*.

Key words: *Cylindrocladium*, DNA barcoding, Multi-gene phylogeny, Plant pathogens, Taxonomy.

Taxonomic novelties: New species: *Calonectria lauri* Lechat & Crous, *Ca. lombardiana* Q.L. Liu & S.F. Chen, *Ca. pauciphialidica* Q.L. Liu & S.F. Chen.

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INTRODUCTION

The genus *Calonectria* (*Hypocreales*, *Nectriaceae*) includes many aggressive plant pathogens and species that are broadly distributed in sub-tropical and tropical regions of the world. These species have a wide host range that includes more than 335 plant species (Crous 2002) and they are commonly collected from soils, leaves, stems, roots and fruits (Lombard *et al.* 2010a, 2015a, Chen *et al.* 2011, Alfenas *et al.* 2015, Gehesquiere *et al.* 2015, Li *et al.* 2017, Lopes *et al.* 2017, Marin-Felix *et al.* 2017, Jiang *et al.* 2019, Pham *et al.* 2019). A total of 169 species have been described in *Calonectria* (*Ca.*) using DNA sequence-based phylogenetic inference and morphological comparisons (Li *et al.* 2017, Marin-Felix *et al.* 2017, Pham *et al.* 2019).

Many species of *Calonectria* are well-known causal agents of important diseases on various agricultural, horticultural and forestry crops. Species such as *Ca. pseudonaviculata* and *Ca. henricotiae* are important agents of boxwood (*Buxus* spp.) blight in Germany, the Netherlands, Slovenia, UK and USA (Henricot & Culham 2002, Brand 2005, Gehesquiere *et al.* 2015, Daughtrey 2019, Freitas *et al.* 2019). Many species such as *Ca. pentaseptata* (in China and Vietnam, Crous *et al.* 2012, Li *et al.* 2017),

Ca. pteridis (in Brazil, Freitas *et al.* 2019), *Ca. reteaudii* (in Australia, India and Vietnam, Old *et al.* 2003) and *Ca. spathulata* (in Colombia, Rodas *et al.* 2005) are important causal agents of *Calonectria* leaf blight (CLB) in *Eucalyptus* plantations. *Calonectria illicicola* is known as a common pathogen responsible for the red crown rot of soybeans in China, Japan and USA (Gai *et al.* 2017, Yamamoto *et al.* 2017, Kleczewski *et al.* 2019), causing significant yield losses.

The importance of *Calonectria* spp. has justified many taxonomic studies on these fungi in recent years. Lombard *et al.* (2010a) provided a genus-wide phylogeny for the 66 available *Calonectria* spp. That study included sequence data for seven gene regions including *act* (actin), *cmdA* (calmodulin), *his3* (histone H3), ITS (the internal transcribed spacer regions 1 and 2 and the 5.8S gene of the ribosomal RNA), LSU (28S large subunit RNA gene), *tef1* (translation elongation factor 1- α) and *tub2* (β -tubulin). Subsequently, a polyphasic approach, including combined DNA sequence data for the *cmdA*, *tef1* and *tub2* gene regions together with morphological comparisons was used to resolve the taxonomy of 141 *Calonectria* species (Lombard *et al.* 2016). A year later, Marin-Felix *et al.* (2017) provided *rpb2* sequence data for 68 *Calonectria* species and

Jayawardena *et al.* (2019) reconstructed the phylogeny of *Calonectria* based on sequence data for *cmdA*, *his3*, *tef1* and *tub2* gene regions. A problem has, however, arisen due to a lack of uniformity of sequence data in different studies, and particularly the *his3* and *rpb2*. Furthermore, some other gene regions are not consistently available for all of 169 species of *Calonectria*. This calls to question the strength and relevance of the phylogenetic backbone for an important group of plant pathogens as well as the reliability of species boundaries that must define plant disease diagnoses and management.

DNA barcoding provides an effective and widely used tool for fungal species identification (Schoch *et al.* 2012, Stielow *et al.* 2015, Vu *et al.* 2019). Various molecular markers have been utilised for species recognition in *Calonectria* (Lombard *et al.* 2010a, 2016, Li *et al.* 2017, Marin-Felix *et al.* 2017, Jayawardena *et al.* 2019). But there is a lack of consistency in the markers used in different studies. There remains a need for a standard suite of DNA barcodes to distinguish among all species in *Calonectria*. This can be a complex goal given that barcodes for a particular species complex in a genus is not necessarily best suited to other species complexes, as has been seen in *Fusarium* (Lombard *et al.* 2019, Maryani *et al.* 2019, Sandoval-Denis *et al.* 2019, Wang *et al.* 2019, Xia *et al.* 2019). Under these circumstances, it has become necessary to explore whether a similar situation also applies to *Calonectria*.

The aim of this study was to produce a comprehensive suite of DNA sequence data for all 169 currently recognised species of *Calonectria* using eight gene regions. These data were then utilised to construct a genus-wide phylogeny and to reconsider the phylogenetic relationships and species boundaries for *Calonectria*. Furthermore, the resolution power of each of these eight gene regions was evaluated for the genus as a whole and the species complexes that define it. This made it possible to identify an optimal suite of DNA barcodes that can be used to reliably identify *Calonectria* species.

MATERIALS AND METHODS

Isolates

Sequence data for all the 169 described *Calonectria* species (including data for the ex-type isolates) were included in the phylogenetic analyses. Of these, 240 isolates representing 128 species (Supplementary Table S1) were obtained from culture collections, including those of the Westerdijk Fungal Biodiversity Institute (CBS), Utrecht, The Netherlands, the culture collection of the Forestry Agricultural and Biotechnology Institute, University of Pretoria, Pretoria (CMW), South Africa, and the Culture Collection of the China Eucalypt Research Centre (CERC), Chinese Academy of Forestry (CAF), ZhanJiang, Guangdong Province, China. Isolates from these culture collections were plated onto 2 % malt extract agar (MEA: 20 g malt extract and 20 g agar per litre water) and subsequently single hyphal-tips were transferred to fresh MEA plates and incubated at 25 °C for 7 d. It was not possible to obtain cultures for 76 isolates representing 44 of the described *Calonectria* species (Supplementary Table S2). In this case, sequences were downloaded from GenBank (<http://www.ncbi.nlm.nih.gov>) and included in the analyses. For three species (*Ca. angustata*, *Ca. pini* and *Ca. metrosideri*), isolates were sequenced and data

were also downloaded from GenBank. They are consequently included in both Supplementary Tables S1 and S2. The fungarium specimens for the novel taxa represented by dried sporulating cultures were deposited in the Herbarium Mycologicum, Academiae Sinicae (HMAS), Beijing, China.

DNA extraction, PCR and sequencing

For the 240 *Calonectria* isolates representing 128 species obtained from culture collections (Supplementary Table S1) and used in this study, mycelium was harvested from 7-d-old cultures on MEA using a sterile scalpel, and genomic DNA was extracted using the CTAB method “5” described by Van Burik *et al.* (1998). Eight different loci were amplified and sequenced, including *act*, *cmdA*, *his3*, ITS, LSU, *rpb2*, *tef1* and *tub2*. Primers ACT-512F and ACT-783R (Carbone & Kohn 1999) were used to amplify the *act* gene region; CAL-228F and CAL-2Rd (Carbone & Kohn 1999, Quaedvlieg *et al.* 2011) for the *cmdA* gene region; CYLH3F and CYLH3R (Crous *et al.* 2004) for the *his3* gene region; V9G (De Hoog & van den Ende 1998) and ITS4 (White *et al.* 1990) for the ITS region; LR0R (Moncalvo *et al.* 1995) and LR5 (Vilgalys & Hester 1990) for the LSU region; fRpb2-5F and fRpb2-7cR (Liu *et al.* 1999, Reeb *et al.* 2004) for the *rpb2* gene region; EF1-728F (Carbone & Kohn 1999) and EF2 (O'Donnell *et al.* 1998) for the *tef1* gene region and primers pairs T1 (O'Donnell & Cigelnik 1997) and CYLTUB1R (Crous *et al.* 2004) were used to amplify the *tub2* gene region.

The PCR reaction mixtures consisted of 17.5 µL TopTaq™ Master Mix, 1 µL of each primer, 2 µL DNA samples and nuclease-free H₂O were made up to the final volume of 35 µL. The PCR conditions for the seven regions (with the exception of *rpb2*) were as follows: an initial denaturation step at 95 °C for 5 min; then 35 amplification cycles at [95 °C for 30 s; annealing 61 °C (*act*) / 55 °C (*cmdA*, *his3*, ITS, LSU) / 52 °C (*tef1* and *tub2*) for 30 s; 72 °C for 1 min], and the final extension step at 72 °C for 10 min. For the *rpb2* gene region, a touchdown PCR protocol was used: an initial denaturation step at 95 °C for 5 min, then (95 °C for 30 s, 58 °C for 30 s, 72 °C for 90 s) × 10 cycles, (95 °C for 30 s, 58 °C for 45 s, 72 °C for 90 s + 5 s/cycle increase) × 30 cycles, and final extension step at 72 °C for 10 min.

All the PCR products were sequenced in both directions using the same primers used for amplification. Raw sequences for each gene region were edited and consensus sequences were generated using Geneious v. 9.1.4 (Kearse *et al.* 2012).

Phylogenetic analyses

Sequence data for eight gene regions of 316 *Calonectria* isolates were used in the phylogenetic analyses. These were derived from 240 isolates representing 128 species obtained from culture collections and sequenced in this study (Supplementary Table S1). For the 76 isolates representing 44 species that we were unable to obtain, available sequence data were downloaded from GenBank (Supplementary Table S2). Sequence data for *Curviciadiella cigneae* (CBS 109167 and CBS 109168) were used as the outgroup taxa in the analyses following the example of Pham *et al.* (2019). Multiple sequences were aligned using the online version of MAFFT v. 7 (Katoh & Standley 2013) and the alignment was trimmed at both ends where necessary with MEGA v. 6.0.5 (Tamura *et al.* 2013). For some of the 316 isolates, not all the eight gene regions were available, and here

all of the available sequences were used in the individual analyses. In the case of the eight gene region combined analyses, missing sequence data were replaced with “N”.

Two phylogenetic approaches were used in this study. These included Maximum Parsimony (MP) analyses performed with PAUP v. 4.0 b10 (Swofford 2003) and Maximum Likelihood (ML) analyses performed with PhyML v. 3.0 (Guindon & Gascuel 2003). The sequence datasets for the eight individual gene regions and a concatenated dataset for those regions were used to determine the phylogenetic relationships among species. A partition homogeneity test (PHT) (Farris *et al.* 1994) was conducted to determine whether the datasets for the eight gene regions could be combined.

For the MP analyses, all characters were unordered and equally weighted. Gaps were regarded as a fifth character, phylogenetic trees were obtained using a heuristic tree search criterion, including 1 000 random stepwise additions and tree-bisection-reconstruction (TBR) branch swapping. Branches of zero-length were collapsed. Statistical supports for tree-branch points were determined using bootstrap analyses with 1 000 replicates (Felsenstein 1985). Tree length (TL), retention index (RI), consistency index (CI), rescaled consistency index (RC) and homoplasy index (HI) (Supplementary Table S3) were calculated for parsimony trees.

For the ML analyses, the best substitution model for each dataset was selected by JModeltest v. 2.1.7 (Posada 2008). All sequences generated in this study were submitted to GenBank (www.ncbi.nlm.nih.gov) (Supplementary Table S1) and final alignments were deposited in TreeBASE (<http://treebase.org>).

Individual *Calonectria* species were recognised based on concordance of multiple gene genealogies. Two criteria were applied in determining species boundaries based on phylogenetic analyses and sequence comparisons. These were (i) when isolate(s) formed a distinct lineage that differentiated them from other isolates in at least two of the eight individual gene regions sequenced and where these groupings did not contradict those for other loci; (ii) when the isolates formed independent lineages supported by high bootstrap values in the combined tree based on the eight-gene concatenated dataset, and where they had fixed Single Nucleotide Polymorphisms (SNPs) that differentiated them from their phylogenetically closest relatives. These phylogenetically defined taxa were then also considered in terms of their morphology and mating type. To avoid confusion, in Supplementary Tables S1 and S2, the code “A” was used to represent the *Calonectria* species before the taxonomic reconsideration of species boundaries in the present study. The code “B” was used for the 120 species names that have been accepted after revision and as presented in the Taxonomy section of this study.

Morphology, mating system and geographic distribution

Depending on their availability, isolates representing the novel *Calonectria* spp. were selected for morphological study. Synthetic nutrient-poor agar (SNA, Nirenburg 1981) was used to induce the asexual morphs in culture. Agar plugs from axenic cultures were transferred to five replicate plates of SNA and incubated at 25 °C for 7 d. Fungal structures were transferred to a drop of 85 % lactic acid on microscope slides. Gross

morphological characteristics were examined with a Zeiss Axio Imager A1 microscope (Carl Zeiss Ltd., Germany).

For isolates selected as the holotype of novel taxa, each characteristic morphological structure was measured with 50 replicates, and 30 replicate measurements were made for additional isolates. Minimum, maximum and average (mean) measurements were recorded as (minimum–) (average–standard deviation)–(aver+standard deviation) (–maximum).

Optimal growth temperatures for each of the novel *Calonectria* spp. were determined on MEA. Agar plugs were transferred from the actively growing edges of 7-d-old cultures with a 5 mm diam cork borer and inoculated at the centres of 90 mm Petri dishes containing MEA. Cultures were grown at seven different temperatures ranging from 5 °C to 35 °C, at 5 °C intervals (each isolate with five replicates). Colony diameters were measured after seven days. Colony colours were described based on the colour charts of Rayner (1970) and using 7-d-old cultures on MEA incubated at 25 °C.

Morphological characteristics of all *Calonectria* species were re-evaluated in comparison to multilocus DNA sequence phylogenetic analyses. The important morphological features include vesicle shape and diameter, macroconidial septation and dimensions, perithecial colour, number of ascospores in the asci, ascospore septation and dimensions. In addition, ex-type isolate location and the mating system (heterothallic or homothallic) were also considered where this was known.

Selection of DNA barcodes for species recognition

The analyses of DNA sequences for eight gene regions made it possible to identify clear boundaries between putative *Calonectria* species. These data formed the basis to test the success of each of these gene regions to distinguish species. This Identification Success Rate (ISR) was calculated by dividing the number of identified species for each gene region by the total number of species of *Calonectria* recognised in the phylogenetic analyses of eight gene regions.

The ISR of each candidate DNA barcode was computed based on the eight individual gene phylogenetic trees and the eight-gene combined phylogenetic tree. For each candidate DNA barcode, the ISRs were calculated both for the entire genus *Calonectria*, as well for each of the recognised species complexes.

RESULTS

Phylogenetic analyses

Sequence data generated for the eight gene regions of the 240 isolates representing 128 of the 169 described species of *Calonectria* were deposited in GenBank (Supplementary Table S1). Amplicons generated for *act*, *cmdA*, *his3*, ITS, LSU, *rpb2*, *tef1* and *tub2* gene regions were approximately 300, 750, 500, 700, 870, 860, 560, 650 bp, respectively. Sequence data for the 76 isolates representing 44 species for which cultures could not be obtained were downloaded from GenBank and included in the final datasets (Supplementary Table S2).

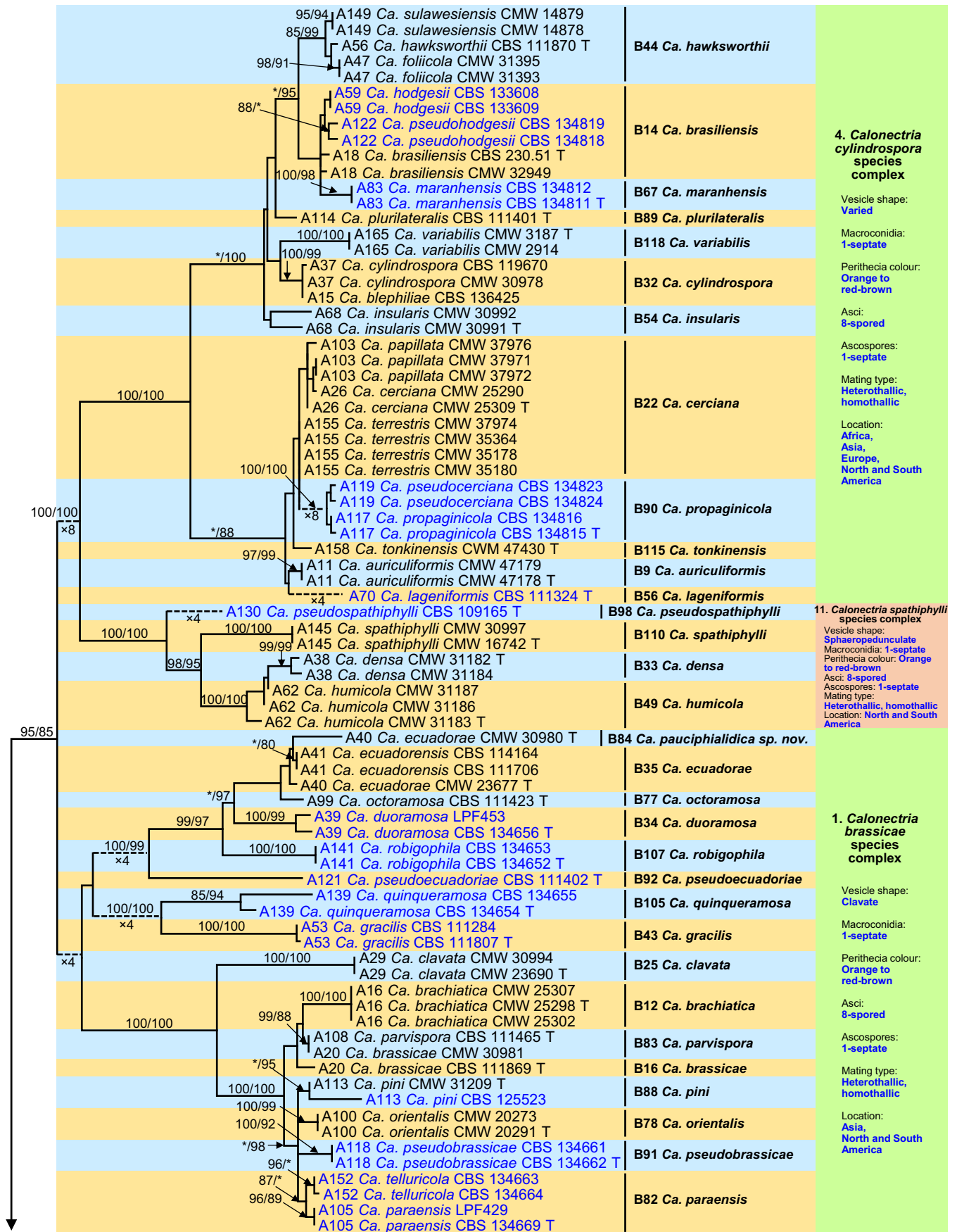
act+cmdA+his3+ITS+LSU+rpb2+tef1+tub2

Fig. 1. Phylogenetic tree of the genus *Calonectria* based on maximum likelihood (ML) analyses of combined DNA dataset of *act*, *cmdA*, *his3*, ITS, LSU, *rpb2*, *tef1* and *tub2* gene sequences. Codes A1 to A169 showed the 169 *Calonectria* species before their taxonomic reconsideration in this study, codes B1 to B120 indicated the 120 accepted *Calonectria* species after the revision emerging from this study. Seventy-six isolates unable to obtain in this study were marked in blue, their sequences were downloaded from NCBI. Bootstrap values $\geq 80\%$ for ML and MP analyses are presented at the branches. Bootstrap values lower than 80% are marked with "*", and absent analyses values are marked with "-". Ex-type isolates of *Calonectria* species after revision are marked with "T". The tree is rooted to *Curviadiella cigna* (CBS 109167, and CBS 109168). *Calonectria* species grouped in 11 species complexes. Typical morphological characteristics, mating type and location (geographic regions where isolates have been identified) of the 11 species complexes are shown at the right side of the phylogenetic tree.

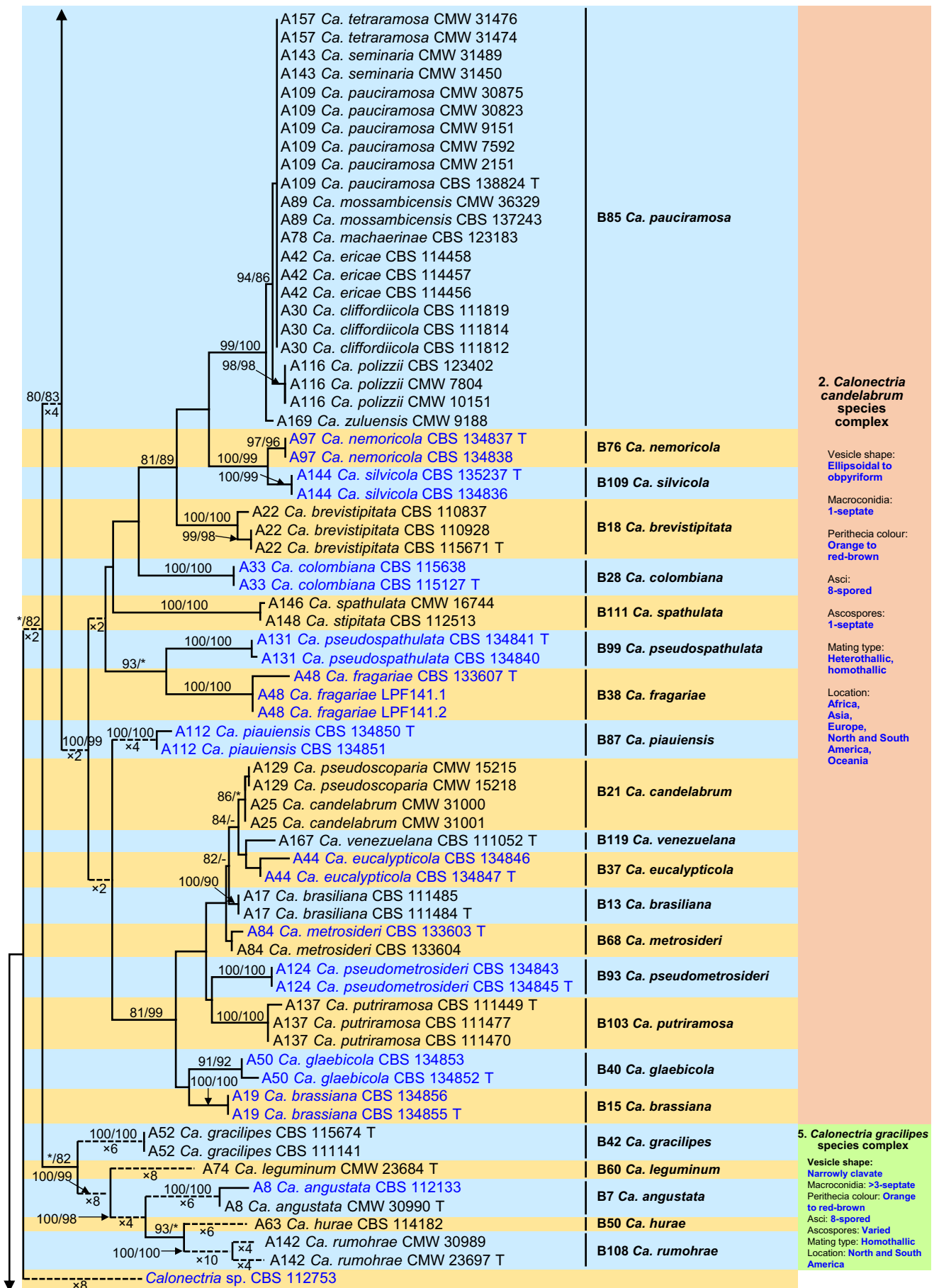
act+cmdA+his3+ITS+LSU+rpb2+tef1+tub2

Fig. 1. (Continued).

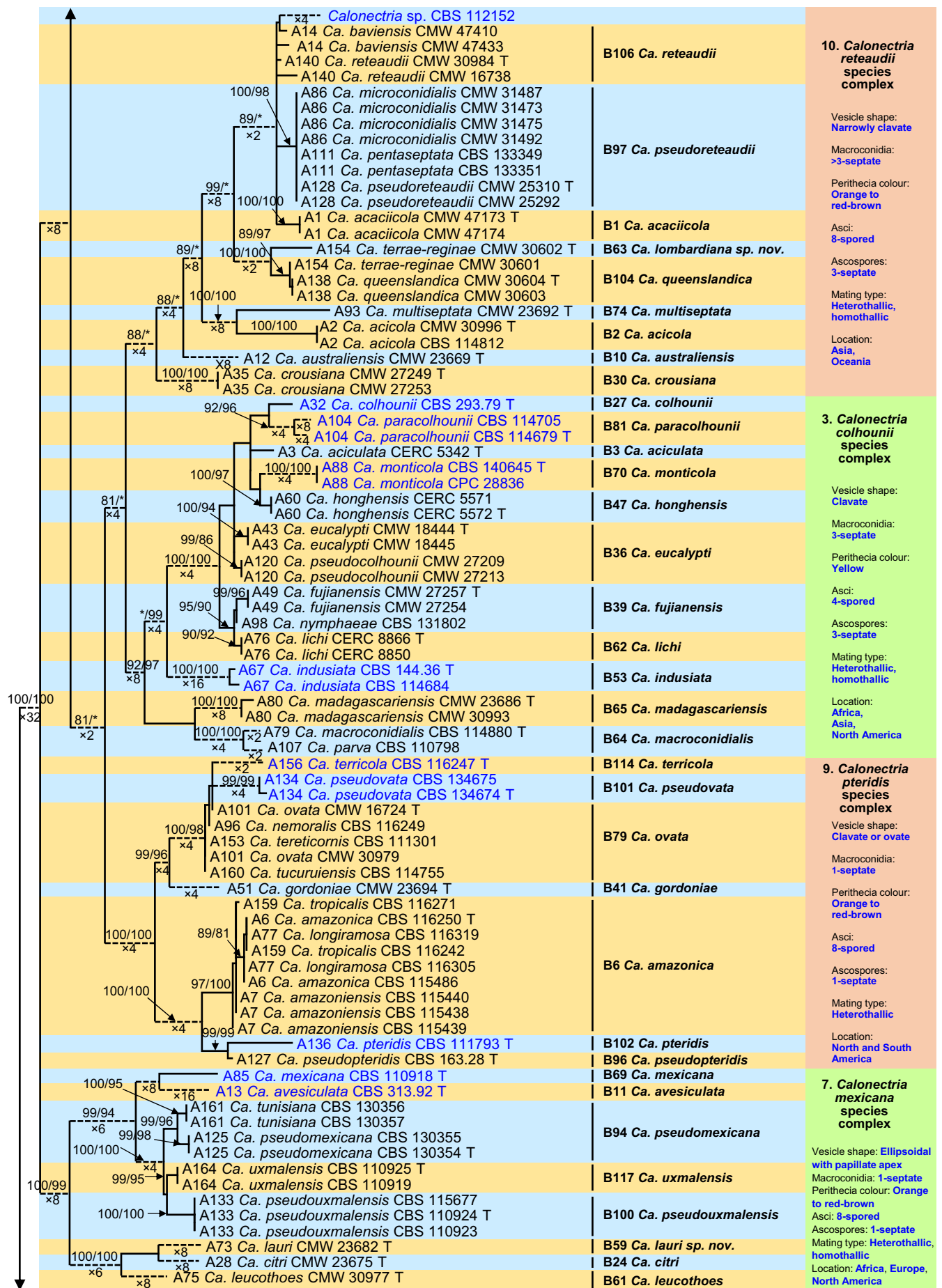
act+cmdA+his3+ITS+LSU+rpb2+tef1+tub2

Fig. 1. (Continued).

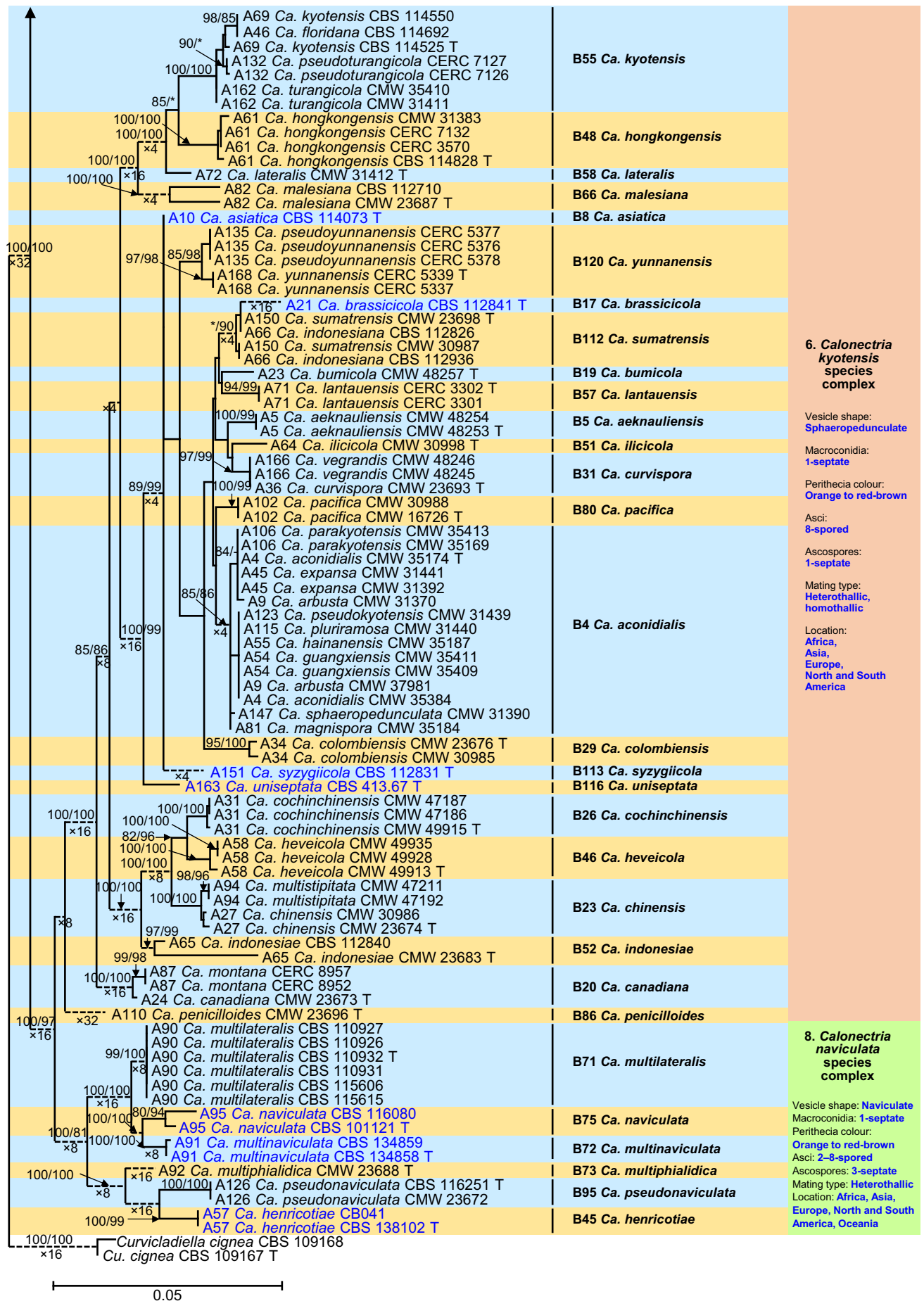
act+cmdA+his3+ITS+LSU+rpb2+tef1+tub2

Fig. 1. (Continued).

Alignments for each of the gene regions and for the combined datasets were as follows: *act* (246 isolates, 286 characters), *cmdA* (314 isolates, 721 characters), *his3* (305 isolates, 498 characters), ITS (268 isolates, 705 characters), LSU (267 isolates, 866 characters), *rpb2* (234 isolates, 863 characters), *tef1* (316 isolates, 563 characters), *tub2* (285 isolates, 652 characters) and combined (318 isolates, 5 154 characters). The partition homogeneity test (PHT) performed on the concatenated dataset of eight gene regions yielded a P-value of 0.01. This suggested some incongruence in the datasets for the eight regions, and the accuracy of the combined data could have suffered relative to the individual partitions (Cunningham 1997). Although the P-value was low, the datasets for multiple gene regions were combined for phylogenetic analyses, as has been done in a number of previous studies (Lombard et al. 2016, Marin-Felix et al. 2017, Pham et al. 2019).

Phylogenetic analyses based on the eight individual gene regions and the combined sequence datasets were conducted using both the ML and MP methods (TreeBASE No. 26083). Tree topologies derived from the ML and MP analyses of the six individual gene regions (*act*, *cmdA*, *his3*, *rpb2*, *tef1* and *tub2*) and the combined datasets were essentially congruent with each other and they formed well-supported lineages generally matching the morphological features of the purported species. The non-coding gene regions (ITS and LSU) are known to have poor ability to discriminate between *Calonectria* species (Lombard et al. 2010a) and several species resided in a single clade even though they had clearly different morphological characteristics (Supplementary Figs S4, S5). Only the ML trees are presented in this study, and bootstrap support values from ML and MP analyses are indicated above the tree branches (Fig. 1, Supplementary Figs S1–8). Statistical results and important parameters emerging from the phylogenetic analyses were provided in Supplementary Table S3.

The combined datasets for the eight sequenced gene regions comprised 5 154 characters, including alignment gaps. Of these, 3 472 were parsimony-uninformative and 1 682 were parsimony-informative. The eight-gene phylogenetic tree (Fig. 1) divided the *Calonectria* spp. into 11 well-supported clades and these reside in two major groups, the Prolate Group and the Sphaero-Naviculate Group. In the Prolate Group, species are characterised by their clavate to pyriform to ellipsoidal vesicles. Nine well-supported clades reside in the Prolate Group. This group includes nine species complexes including the *Ca. brassicae*, *Ca. candelabrum*, *Ca. colhounii*, *Ca. cylindrospora*, *Ca. gracilipes*, *Ca. mexicana*, *Ca. pteridis*, *Ca. reteaudii* and *Ca. spathiphylli* species complexes (Fig. 1). The remaining two well-supported clades reside in the Sphaero-Naviculate Group. The Sphaero-Naviculate Group is defined by vesicles having sphaeropedunculate or naviculate morphology. The two clades in this group accommodate two species complexes, those defined by *Ca. kyotensis* and *Ca. naviculata* (Fig. 1).

The *Calonectria* species before their taxonomic reconsideration in this study (codes A1 to A169) and after the revision emerging from this study (codes B1 to B120) are presented (Supplementary Tables S1 and S2, Fig. 1, Supplementary Figs S1–8). Based on the results of this study and a reconsideration of species boundaries, all accepted species are listed in Table 1. These species are also presented in the Taxonomy section below together with the taxonomic synonyms.

Morphology, mating system and geographic distribution

The key morphological characteristics of all *Calonectria* species were summarised, listing all species in the 11 species complexes (Supplementary Table S4). Based on the typical/dominant vesicle shape of species in each species complex, the 11 species complexes were separated into six groups: (1) clavate or narrowly clavate vesicle group (*Ca. brassicae*, *Ca. colhounii*, *Ca. gracilipes* and *Ca. reteaudii* species complexes); (2) naviculate vesicle group (*Ca. naviculata* species complex); (3) ellipsoidal to obpyriform vesicle group (*Ca. candelabrum* species complex); (4) ellipsoidal vesicle with papillate apex group (*Ca. mexicana* species complex); (5) sphaeropedunculate vesicle group (*Ca. kyotensis* and *Ca. spathiphylli* species complexes); (6) varied shapes vesicle group (*Ca. cylindrospora* and *Ca. pteridis* species complexes) (Table 2, Fig. 1). Other than vesicle shape, differences in other key morphological features including macroconidial septation, perithecial colour, number of ascospores in the asci and ascospore septation are presented in Table 2, Supplementary Table S4 and Fig. 1. Differences in mating type and geographic distribution for the species in all 11 species complexes are documented in Table 2, Supplementary Table S4 and Fig. 1.

Species in four species complexes (*Ca. brassicae*, *Ca. colhounii*, *Ca. gracilipes* and *Ca. reteaudii*) have vesicles that are clavate or narrowly clavate. The *Ca. brassicae* species complex generally produces 1-septate macroconidia and 1-septate ascospores, distinguishing them from taxa in the *Ca. colhounii*, *Ca. gracilipes* and *Ca. reteaudii* species complexes. The *Ca. colhounii* species complex typically has yellow perithecia and 4-spored asci, rare in all the other species complexes. Species in both the *Ca. gracilipes* and *Ca. reteaudii* species complexes generally produce macroconidia with more than three septa (Table 2, Supplementary Table S4). Species in the *Ca. naviculata* species complex typically have naviculate vesicles and those in the *Ca. mexicana* species complex generally produces ellipsoidal vesicles with papillate apices, morphological features rarely found in other species complexes (Table 2, Supplementary Table S4). Ellipsoidal to obpyriform vesicles are typical of species in the *Ca. candelabrum* species complex (Table 2, Supplementary Table S4) and those in the *Ca. kyotensis* and *Ca. spathiphylli* species complexes generally produce sphaeropedunculate vesicles and have 1-septate macroconidia. Perithecial colour, and number of ascospores in the asci of *Ca. kyotensis* species complex taxa are generally similar to those in the *Ca. spathiphylli* species complex (Table 2, Supplementary Table S4). Species in the *Ca. cylindrospora* and *Ca. pteridis* species complexes do not have vesicles that are morphologically characteristic, those the former have vesicles of variable shape, while those in the latter are generally clavate or ovate (Table 2, Supplementary Table S4).

Morphological comparisons showed that most of the *Calonectria* species can be distinguished based on vesicle shape and diameter, macroconidial septation and dimensions, perithecial colour, number of ascospores in the asci, ascospore septation and dimensions (Supplementary Table S4). Some species were difficult to distinguish solely based on morphological characteristics. For example, the *Ca. pseudospathulata* (*Ca. candelabrum* species complex) and *Ca. auriculiformis* (*Ca. cylindrospora*

Table 1. Accepted *Calonectria* species emerging from the results of this study.

Code B ¹	Accepted species name ²	Isolates representing the species ^{3,4,5}	Other collection number ⁵	Hosts	Area of occurrence	Collector	GenBank accession Numbers ⁶ <i>act</i> ; <i>cmdA</i> ; <i>his3</i> ; ITS; LSU; <i>rpb2</i> ; <i>tef1</i> ; <i>tub2</i>	References or source of data
B1	<i>Calonectria acaciicola</i>	CMW 47173 ^T	CBS 143557	Soil (<i>Acacia auriculiformis</i> plantation)	Do Luong, Nghe An, Vietnam	N.Q. Pham & T.Q. Pham	MT334933 ⁷ ; MT335160; MT335399; MT359620; MT359380; MT412474; MT412690; MT412930	Pham <i>et al.</i> (2019), this study
		CMW 47174	CBS 143558	Soil (<i>A. auriculiformis</i> plantation)	Do Luong, Nghe An, Vietnam	N.Q. Pham & T.Q. Pham	MT334934; MT335161; MT335400; MT359621; MT359381; MT412475; MT412691; MT412931	Pham <i>et al.</i> (2019), this study
B2	<i>Ca. acicola</i>	CMW 30996 ^T	–	<i>Phoenix canariensis</i>	Northland, New Zealand	H. Pearson	MT334935; MT335162; MT335401; MT359622; MT359382; MT412476; MT412692; MT412932	Gadgil & Dick (2004), Lombard <i>et al.</i> (2010a), this study
		CBS 114812	CMW 51216	<i>P. canariensis</i>	Northland, New Zealand	H. Pearson	MT334936; MT335163; MT335402; MT359623; MT359383; MT412477; MT412693; MT412933	Gadgil & Dick (2004), Lombard <i>et al.</i> (2010a), this study
B3	<i>Ca. aciculata</i>	CERC 5342 ^T	CBS 142883; CMW 47645	<i>Eucalyptus urophylla</i> × <i>E. grandis</i>	YunNan, China	S.F. Chen & J.Q. Li	MT334937; MT335164; MT335403; MT359624; MT359384; MT412478; MT412694; MT412934	Li <i>et al.</i> (2017), this study
B4	<i>Ca. aconidialis</i>	CMW 35174 ^T	CBS 136086; CERC 1850	Soil (<i>Eucalyptus</i> plantation)	HaiNan, China	X. Mou & S.F. Chen	MT334938; MT335165; MT335404; MT359625; MT359385; MT412479; MT412695; N/A ⁸	Lombard <i>et al.</i> (2015a), this study
		CMW 35384	CBS 136091; CERC 1886	Soil (<i>Eucalyptus</i> plantation)	HaiNan, China	X. Mou & S.F. Chen	MT334939; MT335166; MT335405; MT359626; MT359386; N/A; MT412696; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 31370	CBS 136079; CERC 1705	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334940; MT335167; MT335406; MT359627; MT359387; MT412480; MT412697; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 31390	CBS 136081; CERC 1725	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334952; MT335179; MT335418; MT359639; MT359399; MT412485; MT412709; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 31392	CBS 136247; CERC 1727	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334942; MT335169; MT335408; MT359629; MT359389; MT412481; MT412699; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 31439	CBS 137332; CERC 1774	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334951; MT335178; MT335417; MT359638; MT359398; N/A; MT412708; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 31440	CBS 136976; CERC 1775	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334950; MT335177; MT335416; MT359637; MT359397; N/A; MT412707; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 35169	CBS 136085; CERC 1845	Soil (<i>Eucalyptus</i> plantation)	GuangDong, China	X. Mou & R. Chang	MT334948; MT335175; MT335414; MT359635; MT359395; MT412483; MT412705; N/A	Lombard <i>et al.</i> (2015a), this study
CMW 35184	CBS 136249; CERC 1860	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Mou & R. Chang	MT334947; MT335174; MT335413; MT359634; MT359394; N/A; MT412704; N/A	Lombard <i>et al.</i> (2015a), this study		

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Table 1. (Continued).

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B5	<i>Ca. aeknauliensis</i>	CMW 35187	CBS 136248; CERC 1863	Soil (<i>Eucalyptus</i> plantation)	HaiNan, China	X. Mou & S.F. Chen	MT334946; MT335173; MT335412; MT359633; MT359393; N/A; MT412703; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 35409	CBS 136092; CERC 1900	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Mou & R. Chang	MT334944; MT335171; MT335410; MT359631; MT359391; N/A; MT412701; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 48253 ^T	CBS 143559	Soil (<i>Eucalyptus</i> plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT334953; MT335180; MT335419; MT359640; MT359400; MT412486; MT412710; N/A	Pham <i>et al.</i> (2019), this study
		CMW 48254	CBS 143560	Soil (<i>Eucalyptus</i> plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT334954; MT335181; MT335420; MT359641; MT359401; MT412487; MT412711; N/A	Pham <i>et al.</i> (2019), this study
B6	<i>Ca. amazonica</i>	CBS116250 ^T	CMW 51234; CPC 3534	<i>E. tereticornis</i>	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334955; MT335182; MT335421; MT359642; MT359402; MT412488; MT412712; MT412935	Lombard <i>et al.</i> (2016), this study
		CBS 115486	CMW 51223; CPC 3894	<i>E. tereticornis</i>	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334956; MT335183; MT335422; MT359643; MT359403; MT412489; MT412713; MT412936	Lombard <i>et al.</i> (2016), this study
		CBS 115440	CMW 51222; CPC 3885	<i>E. tereticornis</i>	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334957; MT335184; MT335423; MT359644; MT359404; N/A; MT412714; MT412937	Lombard <i>et al.</i> (2016), this study
		CBS 116271	CMW 51236; CPC 3559	<i>Eucalyptus</i> sp.	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT335148; MT335385; MT335625; MT359846; MT359606; MT412677; MT412916; MT413123	Lombard <i>et al.</i> (2016), this study
		CBS 116319	CMW 51832; CPC 3761	<i>Eucalyptus</i> sp.	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334960; MT335187; MT335426; MT359647; MT359407; MT412490; MT412717; MT412940	Marin-Felix <i>et al.</i> (2017), this study
B7	<i>Ca. angustata</i>	CMW 30990 ^T	CBS 114544; CPC 2347; P99-0454	<i>Tillandsia capitata</i>	Sarasota nursery, Florida, USA	R.M. Leahy	MT334963; N/A; MT335429; MT359650; MT359410; MT412493; MT412720; MT412943	Crous <i>et al.</i> (2000, 2006), Lombard <i>et al.</i> (2010a), this study
		CBS 112133	CMW 30983; CPC 3152; P99-1321	<i>Tillandsia capitata</i>	USA	R.M. Leahy	GQ280427; GQ267362; DQ190695; GQ280549; GQ280670; KY653360; FJ918552; DQ190593	Crous <i>et al.</i> (2000, 2006), Lombard <i>et al.</i> (2010a), Marin-Felix <i>et al.</i> (2017)
B8	<i>Ca. asiatica</i>	CBS 114073 ^T	CMW 23782; CPC 3900	Debris (leaf litter)	Prathet Thai, Thailand	N.L. Hywel- Jones	GQ280428; AY725741; AY725658; GQ280550; GQ280672; N/A; AY725705; AY725616	Crous <i>et al.</i> (2004), Lombard <i>et al.</i> (2010a)
B9	<i>Ca. auriculiformis</i>	CMW 47178 ^T	CBS 143561	Soil (<i>A. auriculiformis</i> plantation)	Hau Loc, Thanh Hoa, Vietnam	N.Q. Pham & T.Q. Pham	MT334964; MT335190; MT335430; MT359651; MT359411; MT412494; MT412721; MT412944	Pham <i>et al.</i> (2019), this study
		CMW 47179	CBS 143562	Soil (<i>A. auriculiformis</i> plantation)	Hau Loc, Thanh Hoa, Vietnam	N.Q. Pham & T.Q. Pham	N/A; MT335191; MT335431; MT359652; MT359412; MT412495; MT412722; MT412945	Pham <i>et al.</i> (2019), this study
B10	<i>Ca. australiensis</i>	CMW 23669 ^T	CBS 112954; CPC 4714	<i>Ficus pleurocarpa</i>	Queensland, Australia	C. Pearce & B. Paulus	MT334965; MT335192; MT335432; MT359653; MT359413; MT412496; MT412723; MT412946	Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study

Table 1. (Continued).

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B11	<i>Ca. avesticulata</i>	CBS 313.92 ^T	ATCC 38226; CMW 23670; CPC 2373	<i>Ilex vomitoria</i>	Cairo, Georgia, USA	S.A. Alfieri	GQ280431; GQ267364; DQ190620; GQ280553; GQ280675; N/A; GQ267294; AF333392	Schubert <i>et al.</i> (1989), Crous (2002), Lombard <i>et al.</i> (2010a)
B12	<i>Ca. brachiatica</i>	CMW 25298 ^T	CBS 123700	<i>Pinus maximinoi</i>	Buga, Colombia	M.J. Wingfield	N/A; MT335195; MT335435; MT359656; MT359416; MT412499; MT412726; MT412948	Lombard <i>et al.</i> (2009), this study
		CMW 25302	–	<i>Pi. tecunumanii</i>	Buga, Colombia	M.J. Wingfield	N/A; MT335196; MT335436; MT359657; MT359417; MT412500; MT412727; MT412949	Lombard <i>et al.</i> (2009), this study
		CMW 25307	–	<i>Pi. tecunumanii</i>	Buga, Colombia	M.J. Wingfield	N/A; MT335197; MT335437; MT359658; MT359418; MT412501; MT412728; MT412950	Lombard <i>et al.</i> (2009), this study
B13	<i>Ca. brasiliana</i>	CBS 111484 ^T	CMW 51187; CPC 1924	Soil	Brazil	A.C. Alfenas	MT334968; MT335198; MT335438; MT359659; MT359419; MT412502; MT412729; MT412951	Lombard <i>et al.</i> (2016), this study
		CBS 111485	CMW 51188; CPC 1929	Soil	Brazil	A.C. Alfenas	MT334969; MT335199; MT335439; MT359660; MT359420; MT412503; MT412730; MT412952	Lombard <i>et al.</i> (2016), this study
B14	<i>Ca. brasiliensis</i>	CBS 230.51 ^T	IMI 299576	<i>Eucalyptus</i> sp.	Ceara state, Brazil	T.R. Ciferri	MT334970; MT335200; MT335440; MT359661; MT359421; MT412504; MT412731; MT412953	Batista (1951), Crous (2002), Lombard <i>et al.</i> (2010b), this study
		CMW 32949	CBS 114257; CPC 1944	<i>Eucalyptus</i> sp.	Aracruz, Brazil	A.C. Alfenas	MT334971; MT335201; MT335441; MT359662; MT359422; MT412505; MT412732; MT412954	Lombard <i>et al.</i> (2010a), this study
		CBS 133609	LPF245	<i>Anadenanthera peregrina</i>	Viçosa, Minas Gerais, Brazil	R.F. Alfenas	N/A; KC491222; N/A; N/A; N/A; N/A; N/A; N/A; KC491228	Alfenas <i>et al.</i> (2013b, 2015)
		CBS 134818	LPF262	<i>Azadirachta indica</i> (leaf)	Viçosa, Minas Gerais, Brazil	R.F. Alfenas	N/A; KM395991; KM396079; N/A; N/A; N/A; KM395817; KM395905	Alfenas <i>et al.</i> (2015)
B15	<i>Ca. brassiana</i>	CBS 134855 ^T	LPF378	Soil (<i>Eucalyptus brassiana</i> plantation)	Teresina, Piauí, Brazil	R.F. Alfenas	N/A; KM396056; KM396139; N/A; N/A; N/A; KM395882; KM395969	Alfenas <i>et al.</i> (2015)
		CBS 134856	LPF379	Soil (<i>E. brassiana</i> plantation)	Teresina, Piauí, Brazil	R.F. Alfenas	N/A; KM396057; KM396140; N/A; N/A; N/A; KM395883; KM395970	Alfenas <i>et al.</i> (2015)
B16	<i>Ca. brassicae</i>	CBS 111869 ^T	CPC 2409	<i>Argyrea splendens</i>	Indonesia	F. Bugnicourt	MT334972; MT335202; MT335442; MT359663; MT359423; MT412506; MT412733; MT412955	Crous (2002), Lombard <i>et al.</i> (2010a, 2016), this study
B17	<i>Ca. brassicola</i>	CBS 112841 ^T	CMW 51206; CPC 4552	Soil (<i>Brassica</i> sp.)	Indonesia	M.J. Wingfield	N/A; KX784561; N/A; N/A; N/A; N/A; N/A; N/A; KX784619	Lombard <i>et al.</i> (2016)
B18	<i>Ca. brevistipitata</i>	CBS 115671 ^T	CMW 51226; CPC 949	Soil	Mexico	P.W. Crous	MT334973; MT335203; MT335443; MT359664; MT359424; MT412507; MT412734; MT412956	Lombard <i>et al.</i> (2016), this study
		CBS 110928	CMW 51170; CPC 951	Soil	Mexico	P.W. Crous	MT334974; MT335204; MT335444; MT359665; MT359425; MT412508; MT412735; MT412957	Lombard <i>et al.</i> (2016), this study

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B19	<i>Ca. bumicola</i>	CBS 110837	CMW 51163; CPC 913	Soil	Mexico	P.W. Crous	MT335057; MT335289; MT335529; MT359750; MT359510; MT412586; MT412820; MT413034	Lombard <i>et al.</i> (2016), this study
		CMW 48257 ^T	CBS 143575	Soil (<i>Eucalyptus</i> plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT334975; MT335205; MT335445; MT359666; MT359426; MT412509; MT412736; N/A	Pham <i>et al.</i> (2019), this study
B20	<i>Ca. canadiana</i>	CMW 23673 ^T	CBS 110817; STE-U 499	<i>Picea</i> sp.	Canada	S. Greifenhagen	MT334976; MT335206; MT335446; MT359667; MT359427; MT412510; MT412737; MT412958	Kang <i>et al.</i> (2001b), Crous (2002), Lechat <i>et al.</i> (2010), this study
B21	<i>Ca. candelabrum</i>	CERC 8952	–	Soil	HeNan, China	S.F. Chen	MT335058; MT335290; MT335530; MT359751; MT359511; MT412587; MT412821; MT413035	Liu & Chen (2017), this study
		CMW 31000	CPC 1675; UFV 117	<i>Eucalyptus</i> sp.	Amazonas, Brazil	A.C. Alfenas	MT334977; MT335207; MT335447; MT359668; MT359428; MT412511; MT412738; MT412959	Crous (2002), Lombard <i>et al.</i> (2010a, 2015b), this study
		CMW 31001	STE-U 1679; UFV 126	<i>Eucalyptus</i> sp.	Amazonas, Brazil	A.C. Alfenas	MT334978; MT335208; MT335448; MT359669; MT359429; MT412512; MT412739; MT412960	Crous (2002), Lombard <i>et al.</i> (2010a, 2015b), this study
B22	<i>Ca. cerciana</i>	CMW 15218	CBS 125257	<i>E. grandis</i>	Las Golondrinas, Pichincha, Ecuador	M.J. Wingfield	MT334979; MT335209; MT335449; MT359670; MT359430; MT412513; MT412740; MT412961	Lombard <i>et al.</i> (2010a), this study
		CMW 25309 ^T	CBS 123693	<i>E. urophylla</i> × <i>E. grandis</i> hybrid cutting	CERC nursery, GuangDong, China	M.J. Wingfield & X.D. Zhou	MT334981; MT335211; MT335451; MT359672; MT359432; MT412515; MT412742; MT412963	Lombard <i>et al.</i> (2010c), this study
		CMW 25290	CBS 123695	<i>E. urophylla</i> × <i>E. grandis</i> hybrid cutting	CERC nursery, GuangDong, China	M.J. Wingfield & X.D. Zhou	MT334982; MT335212; MT335452; MT359673; MT359433; MT412516; MT412743; MT412964	Lombard <i>et al.</i> (2010c), this study
		CMW 35180	CBS 136642; CERC 1856	Soil (<i>Eucalyptus</i> plantation)	GuangDong, China	X. Mou & R. Chang	MT334986; MT335216; MT335456; MT359677; MT359437; MT412520; MT412747; MT412968	Lombard <i>et al.</i> (2015a), this study
		CMW 37976	CBS 136097; CERC 1939; CPC 23517	Soil (<i>Eucalyptus</i> plantation)	GuangDong, China	X. Mou & R. Chang	MT334983; MT335213; MT335453; MT359674; MT359434; MT412517; MT412744; MT412965	Lombard <i>et al.</i> (2015a), this study
B23	<i>Ca. chinensis</i>	CMW 23674 ^T	CBS 114827; CPC 4101	Soil	Hong Kong, China	E.C.Y. Liew	MT334990; MT335220; MT335460; MT359681; MT359441; MT412524; MT412751; MT412972	Crous <i>et al.</i> (2004), Lombard <i>et al.</i> (2010a), this study
		CMW 30986	CBS 112744; CPC 4104	Soil	Hong Kong, China	E.C.Y. Liew	MT334991; MT335221; MT335461; MT359682; MT359442; MT412525; MT412752; MT412973	Crous <i>et al.</i> (2004), Lombard <i>et al.</i> (2010a), this study
		CMW 47192	CBS 143573	Soil (<i>Acacia</i> hybrid plantation)	Tuyen Quang, Vietnam	N.Q. Pham & T.Q. Pham	MT335068; MT335300; MT335540; MT359761; MT359521; MT412597; MT412831; MT413045	Pham <i>et al.</i> (2019), this study

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B24	<i>Ca. citri</i>	CMW 23675 ^T	CBS 186.36	<i>Citrus sinensis</i>	Florida, USA	H.S. Fawcett	MT334992; MT335222; MT335462; MT359683; MT359443; MT412526; MT412753; MT412974	Fawcett & Klotz (1937), Crous (2002), this study
B25	<i>Ca. clavata</i>	CMW 23690 ^T	ATCC 66389; CBS 114557; CPC 2536; P078-1543	<i>Callistemon viminalis</i>	Lake Placid, Florida, USA	C.P. Seymour & E.L. Barnard	MT334993; MT335223; MT335463; MT359684; MT359444; MT412527; MT412754; MT412975	El-Gholl <i>et al.</i> (1993b), Crous (2002), Lombard <i>et al.</i> (2010a), this study
		CMW 30994	CBS 114666; CPC 2537; P078-1261	Root debris in peat	Lee County, Florida, USA	D. Ferrin	MT334994; MT335224; MT335464; MT359685; MT359445; MT412528; MT412755; MT412976	El-Gholl <i>et al.</i> (1993b), Crous (2002), Lombard <i>et al.</i> (2010a), this study
B26	<i>Ca. cochinchinensis</i>	CMW 49915 ^T	CBS 143567	Soil (<i>Hevea brasiliensis</i> plantation)	Duong Minh Chau, Tay Ninh, Vietnam	N.Q. Pham, Q.N. Dang & T.Q. Pham	MT334995; MT335225; MT335465; MT359686; MT359446; MT412529; MT412756; MT412977	Pham <i>et al.</i> (2019), this study
		CMW 47186	CBS 143568	Soil (<i>A. auriculiformis</i> plantation)	Song May, Dong Nai, Vietnam	N.Q. Pham & T.Q. Pham	MT334996; MT335226; MT335466; MT359687; MT359447; MT412530; MT412757; MT412978	Pham <i>et al.</i> (2019), this study
		CMW 47187	CBS 143569	Soil (<i>A. auriculiformis</i> plantation)	Song May, Dong Nai, Vietnam	N.Q. Pham & T.Q. Pham	MT334997; MT335227; MT335467; MT359688; MT359448; MT412531; MT412758; MT412979	Pham <i>et al.</i> (2019), this study
B27	<i>Ca. colhounii</i>	CBS 293.79 ^T	CMW 30999	<i>Camellia sinensis</i>	Mauritius	A. Peerally	GQ280443; GQ267373; DQ190639; GQ280565; GQ280687; KY653376; GQ267301; DQ190564	Peerally (1973), Crous (2002), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a)
B28	<i>Ca. colombiana</i>	CBS 115127 ^T	CMW 30871; CPC 1160	Soil	La Selva, Colombia	M.J. Wingfield	GQ280538; GQ267455; FJ972442; GQ280660; GQ280782; N/A; FJ972492; FJ972423	Schoch <i>et al.</i> (1999), Crous (2002), Lombard <i>et al.</i> (2010a, b)
		CBS 115638	CMW 30766; CPC 1161	Soil	La Selva, Colombia	M.J. Wingfield	GQ280539; GQ267456; FJ972441; GQ280661; GQ280783; N/A; FJ972491; FJ972422	Schoch <i>et al.</i> (1999), Crous (2002), Lombard <i>et al.</i> (2010a, b)
B29	<i>Ca. colombiensis</i>	CMW 23676 ^T	CBS 112220; CPC 723	Soil (<i>E. grandis</i> trees)	La Selva, Colombia	M.J. Wingfield	MT334998; MT335228; MT335468; MT359689; MT359449; MT412532; MT412759; MT412980	Crous <i>et al.</i> (2004), this study
		CMW 30985	CBS 112221; CPC 724	Soil (<i>E. grandis</i> trees)	La Selva, Colombia	M.J. Wingfield	MT334999; MT335229; MT335469; MT359690; MT359450; MT412533; MT412760; MT412981	Crous <i>et al.</i> (2004), this study
B30	<i>Ca. crousiana</i>	CMW 27249 ^T	CBS 127198	<i>E. grandis</i>	Fujian, China	M.J. Wingfield	MT335000; MT335230; MT335470; MT359691; MT359451; MT412534; MT412761; MT412982	Chen <i>et al.</i> (2011), this study
		CMW 27253	CBS 127199	<i>E. grandis</i>	Fujian, China	M.J. Wingfield	MT335001; MT335231; MT335471; MT359692; MT359452; MT412535; MT412762; MT412983	Chen <i>et al.</i> (2011), this study

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Table 1. (Continued).

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B31	<i>Ca. curvispora</i>	CMW 23693 ^T	CBS 116159; CPC 765	Soil	Tamatave, Madagascar	P.W. Crous	MT335002; MT335232; MT335472; MT359693; MT359453; MT412536; MT412763; N/A	Victor <i>et al.</i> (1997), Crous (2002), Lombard <i>et al.</i> (2010a, 2015a), this study
		CMW 48245	CBS 143565	Soil (<i>Eucalyptus</i> plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT335003; MT335233; MT335473; MT359694; MT359454; MT412537; MT412764; N/A	Pham <i>et al.</i> (2019), this study
B32	<i>Ca. cylindrospora</i>	CBS 119670	CMW 51310; CPC 12766	<i>Pistacia lentiscus</i>	Italy	N/A	MT335006; MT335236; MT335476; MT359697; MT359457; MT412540; MT412767; MT412985	Lombard <i>et al.</i> (2015a,b, 2016), this study
		CMW 30978	CBS 110666; P90.1479; STE- U 497	<i>Ilex vomitoria</i>	Florida, USA	N.E. El-Gholl	MT335007; MT335237; MT335477; MT359698; MT359458; MT412541; MT412768; MT412986	Crous (2002), Lombard <i>et al.</i> (2010a, 2015b), this study
		CBS 136425	CMW 51321; CPC 21859	<i>Blephilia ciliata</i>	Ellerbe, North Carolina, USA	T. Sharp	MT335005; MT335235; MT335475; MT359696; MT359456; MT412539; MT412766; MT412984	Crous <i>et al.</i> (2013), this study
B33	<i>Ca. densa</i>	CMW 31182 ^T	CBS 125261	Soil	Las Golondrinas, Pichincha, Ecuador	M.J. Wingfield	MT335008; MT335238; MT335478; MT359699; MT359459; N/A; MT412769; MT412987	Lombard <i>et al.</i> (2010a), this study
		CMW 31184	CBS 125249	Soil	Las Golondrinas, Pichincha, Ecuador	M.J. Wingfield	MT335009; MT335239; MT335479; MT359700; MT359460; N/A; MT412770; MT412988	Lombard <i>et al.</i> (2010a), this study
B34	<i>Ca. duoramosa</i>	CBS 134656 ^T	LPF434	Soil (tropical rainforest)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396027; KM396110; N/A; N/A; N/A; KM395853; KM395940	Alfenas <i>et al.</i> (2015)
		LPF453	–	Soil (<i>Eucalyptus</i> plantation)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396028; KM396111; N/A; N/A; N/A; KM395854; KM395941	Alfenas <i>et al.</i> (2015)
B35	<i>Ca. ecuadorae</i>	CMW 23677 ^T	CBS 111406; CPC 1635	Soil	Ecuador	M.J. Wingfield	MT335012; MT335242; MT335482; MT359703; MT359463; MT412544; MT412773; MT412991	Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study
		CBS 111706	CMW 51821; CPC 1636	Soil	Ecuador	M.J. Wingfield	MT335010; MT335240; MT335480; MT359701; MT359461; MT412542; MT412771; MT412989	Marin-Felix <i>et al.</i> (2017), this study
B36	<i>Ca. eucalypti</i>	CMW 18444 ^T	CBS 125275	<i>E. grandis</i>	Aek Nauli, Sumatra Utara, Indonesia	M.J. Wingfield	MT335013; MT335243; MT335483; MT359704; MT359464; MT412545; MT412774; MT412992	Lombard <i>et al.</i> (2010a), this study
		CMW 18445	CBS 125276	<i>E. grandis</i>	Aek Nauli, Sumatra Utara, Indonesia	M.J. Wingfield	MT335014; MT335244; MT335484; MT359705; MT359465; MT412546; MT412775; MT412993	Lombard <i>et al.</i> (2010a), this study
		CMW 27209	CBS 127195	<i>E. dunnii</i>	FuJian, China	M.J. Wingfield	MT335108; MT335341; MT335581; MT359802; MT359562; MT412634; MT412872; MT413084	Chen <i>et al.</i> (2011), this study
B37	<i>Ca. eucalypticola</i>	CBS 134847 ^T	LPF124	<i>Eucalyptus</i> sp. (seedling)	Santa Barbara, Minas Gerais state, Brazil	A.C. Alfenas	N/A; KM396051; KM396134; N/A; N/A; N/A; KM395877; KM395964	Alfenas <i>et al.</i> (2015)

Table 1. (Continued).

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B38	<i>Ca. fragariae</i>	CBS 134846	LPF121	<i>Eucalyptus</i> sp. (leaf)	Eunapolis, Bahia, Brazil	A.C. Alfenas	N/A; KM396050; KM396133; N/A; N/A; N/A; KM395876; KM395963	Alfenas <i>et al.</i> (2015)
		CBS 133607 ^T	LPP040	<i>Fragaria</i> × <i>ananassa</i>	Santa Maria do Jetibá, Espírito Santo, Brazil	U.P. Lopes	N/A; KM998966; KM998964; N/A; N/A; N/A; KM998963; KM998965	Lopes <i>et al.</i> (2017)
		LPF141.1	–	<i>Fragaria</i> × <i>ananassa</i>	Santa Maria do Jetibá, Espírito Santo, Brazil	U.P. Lopes	N/A; KX500191; KX500194; N/A; N/A; N/A; KX500197; KX500195	Lopes <i>et al.</i> (2017)
		LPF141.2	–	<i>Fragaria</i> × <i>ananassa</i>	Santa Maria do Jetibá, Espírito Santo, Brazil	U.P. Lopes	N/A; KX500192; KX500193; N/A; N/A; N/A; KX500198; KX500196	Lopes <i>et al.</i> (2017)
B39	<i>Ca. fujianensis</i>	CMW 27257 ^T	CBS 127201	<i>E. grandis</i>	Fujian, China	M.J. Wingfield	MT335019; MT335249; MT335489; MT359710; MT359470; MT412551; MT412780; MT412998	Chen <i>et al.</i> (2011), this study
		CMW 27254	CBS 127200	<i>E. grandis</i>	Fujian, China	M.J. Wingfield	MT335020; MT335250; MT335490; MT359711; MT359471; MT412552; MT412781; MT412999	Chen <i>et al.</i> (2011), this study
		CBS 131802	CMW 51317; HGUP 100003	<i>Nymphaea tetragona</i>	Guiyang, Guizhou, China	S.Y. Qin	MT335070; MT335302; MT335542; MT359763; MT359523; MT412599; MT412833; MT413047	Xu <i>et al.</i> (2012), this study
B40	<i>Ca. glaebicola</i>	CBS 134852 ^T	LPF406	Soil (<i>Eucalyptus</i> plantation)	Martinho Campos, Minas Gerais, Brazil	A.C. Alfenas	N/A; KM396053; KM396136; N/A; N/A; N/A; KM395879; KM395966	Alfenas <i>et al.</i> (2015)
		CBS 134853	LPF407	<i>Eucalyptus</i> sp. (leaf)	Tocantins, Bico do Papagaio, Brazil	R.F. Alfenas	N/A; KM396054; KM396137; N/A; N/A; N/A; KM395880; KM395967	Alfenas <i>et al.</i> (2015)
B41	<i>Ca. gordoniae</i>	CMW 23694 ^T	ATCC 201837; CBS 112142; P97-2567; STE-U 3136	<i>Gordonia lasianthus</i>	Florida, USA	D. Chiappini	MT335021; MT335251; MT335491; MT359712; MT359472; MT412553; MT412782; MT413000	Leahy <i>et al.</i> (2000), Crous (2002), Lombard <i>et al.</i> (2010a), this study
B42	<i>Ca. gracilipes</i>	CBS 115674 ^T	CMW 51227; STE-U 1153	Soil	La Selva, Colombia	M.J. Wingfield	MT335022; MT335252; MT335492; MT359713; MT359473; MT412554; MT412783; MT413001	Crous <i>et al.</i> (1997a, 2006), Crous (2002), this study
		CBS 111141	CMW 51174; CPC 1211	Soil	La Selva, Colombia	M.J. Wingfield	MT335023; MT335253; MT335493; MT359714; MT359474; MT412555; MT412784; MT413002	Crous (2002), Crous <i>et al.</i> (2006), this study
B43	<i>Ca. gracilis</i>	CBS 111807 ^T	AR2677; CMW 51189; PPRI 4176; STE-U 2634	<i>Manilkara zapota</i>	Pará, Brazil	F. Carneiro de Albuquerque	GQ280488; GQ267407; DQ190646; GQ280610; GQ280732; KY653390; GQ267323; AF232858	Crous <i>et al.</i> (1993c, 2006), Crous (2002), Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
		CBS 111284	CMW 51175; CPC 1483	Soil	Imbrapa, Brazil	P.W. Crous	GQ280489; GQ267408; DQ190647; GQ280611; GQ280733; KY653389; GQ267324; DQ190567	Crous <i>et al.</i> (1993c, 2006), Crous (2002), Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)

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B44	<i>Ca. hawksworthii</i>	CBS 111870 ^T	CMW 51194; CPC 2405	<i>Nelumbo nucifera</i>	Pamplemousses garden, Mauritius	A. Peerally	MT335024; MT335254; MT335494; MT359715; MT359475; MT412556; MT412785; MT413003	Crous (2002), this study
		CMW 14878	CBS 125277	<i>Eucalyptus</i> sp.	Sulawesi, Indonesia	M.J. Wingfield	MT335141; MT335378; MT335618; MT359839; MT359599; MT412670; MT412909; MT413119	Lombard <i>et al.</i> (2010a), this study
		CMW 31393	CBS 136641	<i>E. urophylla</i> × <i>E. grandis</i>	GuangXi, China	X. Zhou & G. Zhao	MT335017; MT335247; MT335487; MT359708; MT359468; MT412549; MT412778; MT412996	Lombard <i>et al.</i> (2015a), this study
B45	<i>Ca. henricotiae</i>	CBS 138102 ^T	CB045	<i>Buxus sempervirens</i>	Lokeren, East Flanders, Belgium	B. Gehequiere & K. Heungens	N/A; KF815157; KF815185; JX535322; N/A; N/A; N/A; A; JX535308	Gehequiere <i>et al.</i> (2015)
		CB041	–	<i>B. sempervirens</i>	Lokeren, East Flanders, Belgium	B. Gehequiere & K. Heungens	N/A; KF815156; KF815184; N/A; N/A; N/A; N/A; KF815129	Gehequiere <i>et al.</i> (2015)
B46	<i>Ca. heveicola</i>	CMW 49913 ^T	CBS 143570	Soil (<i>Hevea brasiliensis</i> plantation)	Bau Bang, Binh Duong, Vietnam	N.Q. Pham, Q.N. Dang & T.Q. Pham	MT335025; MT335255; MT335495; MT359716; MT359476; N/A; MT412786; MT413004	Pham <i>et al.</i> (2019), this study
		CMW 49928	CBS 143571	Soil	Bu Gia Map National Park, Binh Phuoc, Vietnam	N.Q. Pham, Q.N. Dang & T.Q. Pham	MT335048; MT335280; MT335520; MT359741; MT359501; MT412577; MT412811; MT413025	Pham <i>et al.</i> (2019), this study
		CMW 49935	CBS 143572	Soil	Bu Gia Map National Park, Binh Phuoc, Vietnam	N.Q. Pham, Q.N. Dang & T.Q. Pham	MT335049; MT335281; MT335521; MT359742; MT359502; MT412578; MT412812; MT413026	Pham <i>et al.</i> (2019), this study
B47	<i>Ca. honghensis</i>	CERC 5572 ^T	CBS 142885; CMW 47669	Soil (<i>Eucalyptus</i> plantation)	HongHe, YunNan, China	S.F. Chen & J.Q. Li	MT335026; MT335256; MT335496; MT359717; MT359477; MT412557; MT412787; MT413005	Li <i>et al.</i> (2017), this study
		CERC 5571	CBS 142884; CMW 47668	Soil (<i>Eucalyptus</i> plantation)	HongHe, YunNan, China	S.F. Chen & J.Q. Li	MT335027; MT335257; MT335497; MT359718; MT359478; MT412558; MT412788; MT413006	Li <i>et al.</i> (2017), this study
B48	<i>Ca. hongkongensis</i>	CBS 114828 ^T	CMW 51217; CPC 4670	Soil	Hong Kong, China	M.J. Wingfield	MT335028; MT335258; MT335498; MT359719; MT359479; MT412559; MT412789; MT413007	Crous <i>et al.</i> (2004), this study
		CERC 7132	CMW 47499	Soil	Fujian, China	S.F. Chen	MT335031; MT335261; MT335501; MT359722; MT359482; MT412562; MT412792; MT413010	Li <i>et al.</i> (2017), this study
B49	<i>Ca. humicola</i>	CMW 31183 ^T	CBS 125251	Soil	Las Golondrinas, Pichincha, Ecuador	M.J. Wingfield	MT335032; MT335262; MT335502; MT359723; MT359483; N/A; MT412793; MT413011	Lombard <i>et al.</i> (2010a), this study
		CMW 31186	CBS 125252	Soil	Las Golondrinas, Pichincha, Ecuador	L. Lombard	MT335033; MT335263; MT335503; MT359724; MT359484; N/A; MT412794; MT413012	Lombard <i>et al.</i> (2010a), this study
		CMW 31187	CBS 125269	Soil	Las Golondrinas, Pichincha, Ecuador	L. Lombard	MT335034; MT335264; MT335504; MT359725; MT359485; N/A; MT412795; MT413013	Lombard <i>et al.</i> (2010a), this study
B50	<i>Ca. hurae</i>	CBS 114182	CMW 51823; CPC 1714; UFV 216	<i>Rumohra adiantiformis</i>	Brazil	A.C. Alfenas	MT335035; MT335265; MT335505; MT359726; MT359486; MT412563; MT412796; MT413014	Crous (2002), Crous <i>et al.</i> (2006), this study

Table 1. (Continued).

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							<i>act</i> ; <i>cmdA</i> ; <i>his3</i> ; ITS; LSU; <i>rpb2</i> ; <i>tef1</i> ; <i>tub2</i>		
B51	<i>Ca. ilicicola</i>	CMW 30998 ^T	CBS 190.50; IMI 299389; STE-U 2482	<i>Solanum tuberosum</i>	Bogor, Java, Indonesia	K.B. Boedijn & J. Reitsma	MT335036; MT335266; MT335506; MT359727; MT359487; MT412564; MT412797; N/A		Boedijn & Reitsma (1950), Crous (2002), Lombard <i>et al.</i> (2010a), this study
B52	<i>Ca. indonesiae</i>	CMW 23683 ^T	CBS 112823; CPC 4508	<i>Syzygium aromaticum</i>	Warambunga, Indonesia	M.J. Wingfield	MT335037; MT335267; MT335507; MT359728; MT359488; MT412565; MT412798; MT413015		Crous <i>et al.</i> (2004), this study
		CBS 112840	CMW 51205; CPC 4554	<i>S. aromaticum</i>	Warambunga, Indonesia	M.J. Wingfield	MT335038; MT335268; MT335508; MT359729; MT359489; MT412566; MT412799; MT413016		Crous <i>et al.</i> (2004), this study
B53	<i>Ca. indusiata</i>	CBS 144.36 ^T	CMW 23699	<i>Camellia sinensis</i>	Sri lanka	N/A	GQ280536; GQ267453; GQ267262; GQ280658; GQ280780; KY653396; GQ267332; GQ267239		Crous (2002), Lombard <i>et al.</i> (2010a, 2016), Marin-Felix <i>et al.</i> (2017)
		CBS 114684	CMW 51213; CPC 2446; UFV16	<i>Rhododendron</i> sp.	Florida, USA	N.E. El-Gholl	GQ280537; GQ267454; DQ190653; GQ280659; GQ280781; N/A; GQ267333; AF232862		Crous <i>et al.</i> (1999, 2006), Crous (2002)
B54	<i>Ca. insularis</i>	CMW 30991 ^T	CBS 114558; CPC 768	Soil	Tamatave, Madagascar	P.W. Crous	N/A; MT335269; MT335509; MT359730; MT359490; MT412567; MT412800; MT413017		Schoch <i>et al.</i> (1999), Lombard <i>et al.</i> (2010a, 2016), this study
		CMW 30992	CBS 114559; CPC 954	Soil	Conejos, Veracruz, Mexico	M.J. Wingfield	N/A; MT335270; MT335510; MT359731; MT359491; MT412568; MT412801; MT413018		Lombard <i>et al.</i> (2010a, 2016), this study
B55	<i>Ca. kyotensis</i>	CBS 114525 ^T	ATCC 18834; CMW 51824; CPC 2367	<i>Robinia pseudoacacia</i>	Japan	T. Terashita	MT335039; MT335271; MT335511; MT359732; MT359492; MT412569; MT412802; MT413019		Terashita (1968), Crous (2002), Lombard <i>et al.</i> (2016), this study
		CBS 114550	CMW 51825; CPC 2351	Soil	China	M.J. Wingfield	MT335016; MT335246; MT335486; MT359707; MT359467; MT412548; MT412777; MT412995		Lombard <i>et al.</i> (2016), this study
		CBS 114692	ATCC18882; CMW 51826	<i>Prunus persica</i>	Georgia, USA	N/A	MT335015; MT335245; MT335485; MT359706; MT359466; MT412547; MT412776; MT412994		Sobers (1969), Crous (2002), Marin-Felix <i>et al.</i> (2017), this study
		CERC 7126	CBS 142890; CMW 47496	Soil	FuZhou, Fujian, China	S.F. Chen	MT335121; MT335356; MT335596; MT359817; MT359577; MT412649; MT412887; MT413098		Li <i>et al.</i> (2017), this study
		CMW 31411	CBS 136077	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT335151; MT335388; MT335628; MT359849; MT359609; N/A; MT412919; MT413126		Lombard <i>et al.</i> (2015a), this study
B56	<i>Ca. lageniformis</i>	CBS 111324 ^T	CMW 51177; CPC 1473	<i>Eucalyptus</i> sp. (leaf)	Rivière Noire, Mauritius	H. Smith	N/A; KX784574; N/A; KY653256; KY653312; KY653400; KX784702; KX784632		Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)

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Table 1. (Continued).

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B57	<i>Ca. lantauensis</i>	CERC 3302 ^T	CBS 142888; CMW 47252	Soil	LiDao, Hong Kong, China	M.J. Wingfield & S.F. Chen	MT335040; MT335272; MT335512; MT359733; MT359493; MT412570; MT412803; N/A	Li <i>et al.</i> (2017), this study
		CERC 3301	CBS 142887; CMW 47251	Soil	LiDao, Hong Kong, China	M.J. Wingfield & S.F. Chen	MT335041; MT335273; MT335513; MT359734; MT359494; N/A; MT412804; N/A	Li <i>et al.</i> (2017), this study
B58	<i>Ca. lateralis</i>	CMW 31412 ^T	CBS 136629	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT335042; MT335274; MT335514; MT359735; MT359495; MT412571; MT412805; MT413020	Lombard <i>et al.</i> (2015a), this study
B59	<i>Ca. lauri sp. nov.</i>	CMW 23682 ^T	CBS 749.70	<i>Ilex aquifolium</i>	Vijlen, Vijlenerbos, South-East Limburg, Netherlands	H.A. van der Aa	MT335043; MT335275; MT335515; MT359736; MT359496; MT412572; MT412806; MT413021	Lechat <i>et al.</i> (2010), Lombard <i>et al.</i> (2010a), this study
B60	<i>Ca. leguminum</i>	CMW 23684 ^T	CBS 728.68	<i>Annona squamosa</i>	Sao Paulo, Brazil	M.B. Figueiredo	MT335044; MT335276; MT335516; MT359737; MT359497; MT412573; MT412807; MT413022	Figueiredo & Namekata (1967), Crous (2002), Lombard <i>et al.</i> (2010a), this study
B61	<i>Ca. leucothoes</i>	CMW 30977 ^T	ATCC 64824; CBS 109166; CPC 2385; P88-490	<i>Leucothoe axillaris</i>	Florida, USA	N.E. El-Gholl	MT335045; MT335277; MT335517; MT359738; MT359498; MT412574; MT412808; N/A	El-Gholl <i>et al.</i> (1989), Crous (2002), Lombard <i>et al.</i> (2015a), this study
B62	<i>Ca. lichi</i>	CERC 8866 ^T	–	Soil	HeNan, China	S.F. Chen	MT335046; MT335278; MT335518; MT359739; MT359499; MT412575; MT412809; MT413023	Liu & Chen (2017), this study
		CERC 8850	–	Soil	HeNan, China	S.F. Chen	MT335047; MT335279; MT335519; MT359740; MT359500; MT412576; MT412810; MT413024	Liu & Chen (2017), this study
B63	<i>Ca. lombardiana sp. nov.</i>	CMW 30602 ^T	CBS 112634; CPC 4233; Lynfield 417	<i>Xanthorrhoea australis</i>	Victoria, Australia	T. Baigent	MT335156; MT335395; MT335635; MT359856; MT359616; MT412686; MT412926; MT413133	Crous (2002), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010c), this study
B64	<i>Ca. macroconidialis</i>	CBS 114880 ^T	CMW 51219; CPC 307; PPRI 4000	<i>E. grandis</i>	Sabie, Mpumalanga, South Africa	P.W. Crous	MT335050; MT335282; MT335522; MT359743; MT359503; MT412579; MT412813; MT413027	Crous <i>et al.</i> (1993c), Crous (2002), Lombard <i>et al.</i> (2010a), this study
		CBS 110798	CMW 51817; CPC 410	<i>E. grandis</i> (roots)	Sabie, Mpumalanga, South Africa	P.W. Crous	MT335051; MT335283; MT335523; MT359744; MT359504; MT412580; MT412814; MT413028	Lombard <i>et al.</i> (2016), this study
B65	<i>Ca. madagascariensis</i>	CMW 23686 ^T	CBS 114572; CPC 2252	Soil	Rona, Madagascar	J.E. Taylor	MT335052; MT335284; MT335524; MT359745; MT359505; MT412581; MT412815; MT413029	Crous (2002), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study
		CMW 30993	CBS 114571; CPC 2253	Soil	Rona, Madagascar	J.E. Taylor	MT335053; MT335285; MT335525; MT359746; MT359506; MT412582; MT412816; MT413030	Crous (2002), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study

Table 1. (Continued).

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B66	<i>Ca. malesiana</i>	CMW 23687 ^T	CBS 112752; CPC 4223	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT335054; MT335286; MT335526; MT359747; MT359507; MT412583; MT412817; MT413031	Crous et al. (2004) , this study
		CBS 112710	CMW 51199; CPC 3899	Leaf litter	Prathet, Thailand	N.L. Hywel-Jones	MT335055; MT335287; MT335527; MT359748; MT359508; MT412584; MT412818; MT413032	Crous et al. (2004) , this study
B67	<i>Ca. maranhensis</i>	CBS 134811 ^T	LPF142	<i>Eucalyptus</i> sp. (leaf)	Açailandia, Maranhao, Brazil	A.C. Alfenas	N/A; KM396035; KM396118; N/A; N/A; N/A; KM395861; KM395948	Alfenas et al. (2015)
		CBS 134812	LPF143	<i>Eucalyptus</i> sp. (leaf)	Açailandia, Maranhao, Brazil	A.C. Alfenas	N/A; KM396036; KM396119; N/A; N/A; N/A; KM395862; KM395949	Alfenas et al. (2015)
B68	<i>Ca. metrosideri</i>	CBS 133603 ^T	LPF101	<i>Metrosideros polymorpha</i>	Viçosa, Minas Gerais state, Brazil	R.F. Alfenas	N/A; KC294304; KC294307; N/A; N/A; N/A; KC294310; KC294313	Alfenas et al. (2013a, 2015)
		CBS 133604	CMW 51320; LPF103	<i>Metrosideros polymorpha</i>	Viçosa, Minas Gerais state, Brazil	R.F. Alfenas	MT335056; MT335288; MT335528; MT359749; MT359509; MT412585; MT412819; MT413033	Alfenas et al. (2013a, 2015), this study
B69	<i>Ca. mexicana</i>	CBS 110918 ^T	CMW 9055; STE-U 927	Soil	Uxmal, Yucatan, Mexico	M.J. Wingfield	GQ280474; GQ267396; FJ972460; GQ280596; GQ280718; KY653412; FJ972526; AF210863	Schoch et al. (1999) , Crous (2002) , Lombard et al. (2010a) , Marin-Felix et al. (2017)
B70	<i>Ca. monticola</i>	CBS 140645 ^T	CPC 28835	Soil	Chiang Mai, Thailand	P.W. Crous	N/A; KT964771; N/A; KT964775; KT983443; N/A; KT964773; KT964769	Crous et al. (2015)
		CPC 28836	–	Soil	Chiang Mai, Thailand	P.W. Crous	N/A; KT964772; N/A; KT964776; KT983444; N/A; KT964774; KT964770	Crous et al. (2015)
B71	<i>Ca. multilateralis</i>	CBS 110932 ^T	CMW 51171; CPC 957	Soil	Uxmal, Mexico	P.W. Crous	MT335060; MT335292; MT335532; MT359753; MT359513; MT412589; MT412823; MT413037	Lombard et al. (2016) , this study
		CBS 110926	CMW 51168; CPC 947	Soil	Uxmal, Mexico	P.W. Crous	MT335061; MT335293; MT335533; MT359754; MT359514; MT412590; MT412824; MT413038	Lombard et al. (2016) , this study
		CBS 110927	CMW 51169; CPC 948	Soil	Uxmal, Mexico	P.W. Crous	MT335062; MT335294; MT335534; MT359755; MT359515; MT412591; MT412825; MT413039	Lombard et al. (2016) , this study
B72	<i>Ca. multinaviculata</i>	CBS 134858 ^T	LPF233	Soil (<i>Eucalyptus</i> plantation)	Mucuri, Bahia, Brazil	E. Zauza	N/A; KM396072; KM396155; N/A; N/A; N/A; KM395898; KM395985	Alfenas et al. (2015)
		CBS 134859	LPF418	Soil (<i>Eucalyptus</i> plantation)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396073; KM396156; N/A; N/A; N/A; KM395899; KM395986	Alfenas et al. (2015)
B73	<i>Ca. multiphialidica</i>	CMW 23688 ^T	Cam 13; CBS 112678	Soil (roots of <i>Musa</i> sp.)	Cameroon	Abadie	MT335066; MT335298; MT335538; MT359759; MT359519; MT412595; MT412829; MT413043	Crous et al. (2004) , Lombard et al. (2010a) , this study (continued on next page)

Table 1. (Continued).

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B74	<i>Ca. multiseptata</i>	CMW 23692 ^T	CBS 112682; CPC 1589	<i>E. grandis</i>	North Sumatra, Indonesia	M.J. Wingfield	MT335067; MT335299; MT335539; MT359760; MT359520; MT412596; MT412830; MT413044	Crous <i>et al.</i> (1998, 2006), Crous (2002), this study
B75	<i>Ca. naviculata</i>	CBS 101121 ^T	CMW 30974	Leaf litter	Joao Pessoa, Brazil	R.F. Castaneda	GQ280478; GQ267399; GQ267252; GQ280600; GQ280722; KM232309; GQ267317; GQ267211	Lombard <i>et al.</i> (2010a, 2015b)
		CBS 116080	CMW 16723; STE-U 627	Soil	Manaus, Amazonas, Brazil	M.J. Wingfield	GQ280477; GQ267398; GQ267251; GQ280599; GQ280721; KY653417; GQ267316; AF333409	Crous <i>et al.</i> (1997a), Crous (2002), Lombard <i>et al.</i> (2010a), Marin- Felix <i>et al.</i> (2017)
B76	<i>Ca. nemoricola</i>	CBS 134837 ^T	LPF085	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396066; KM396149; N/A; N/A; N/A; KM395892; KM395979	Alfenas <i>et al.</i> (2015)
		CBS 134838	LPF090	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396067; KM396150; N/A; N/A; N/A; KM395893; KM395980	Alfenas <i>et al.</i> (2015)
B77	<i>Ca. octoramosa</i>	CBS 111423 ^T	CMW 51819; CPC 1650	Soil	Ecuador	M.J. Wingfield	MT335071; MT335303; MT335543; MT359764; MT359524; MT412600; MT412834; MT413048	Marin-Felix <i>et al.</i> (2017), this study
B78	<i>Ca. orientalis</i>	CMW 20291 ^T	CBS 125260	Soil	Langam, Indonesia	M.J. Wingfield	MT335072; MT335304; MT335544; MT359765; MT359525; MT412601; MT412835; MT413049	Lombard <i>et al.</i> (2010a), this study
		CMW 20273	CBS 125259	Soil	Teso East, Indonesia	M.J. Wingfield	MT335073; MT335305; MT335545; MT359766; MT359526; MT412602; MT412836; MT413050	Lombard <i>et al.</i> (2010a), this study
B79	<i>Ca. ovata</i>	CMW 16724 ^T	CBS 111299; ATCC 76225; UFV 89	<i>E. urophylla</i>	Monte Dourado, Pará, Brazil	N.E. El-Gholl	MT335075; MT335307; MT335547; MT359768; MT359528; N/A; MT412838; MT413052	El-Gholl <i>et al.</i> (1993a), Crous (2002), Marin- Felix <i>et al.</i> (2017), this study
		CMW 30979	CBS 111307; UFV 90	<i>E. tereticornis</i>	Tucuruí, Pará, Brazil	P.W. Crous	MT335076; MT335308; MT335548; MT359769; MT359529; N/A; MT412839; MT413053	Crous (2002), Lombard <i>et al.</i> (2010a), this study
		CBS 111301	CMW 51176; CPC 1429	<i>E. tereticornis</i>	Tucuruí, Pará, Brazil	P.W. Crous	MT335077; MT335309; MT335549; MT359770; MT359530; N/A; MT412840; MT413054	Lombard <i>et al.</i> (2016), this study
		CBS 114755	CMW 51827; CPC 1403	<i>E. tereticornis</i>	Tucuruí, Pará, Brazil	P.W. Crous	MT335078; MT335310; MT335550; MT359771; MT359531; N/A; MT412841; MT413055	Marin-Felix <i>et al.</i> (2017), this study
		CBS 116249	CMW 51829; CPC 3533	Soil (<i>Eucalyptus</i> plantation)	Brazil	P.W. Crous	MT335074; MT335306; MT335546; MT359767; MT359527; MT412603; MT412837; MT413051	Marin-Felix <i>et al.</i> (2017), this study
B80	<i>Ca. pacifica</i>	CMW 16726 ^T	A1568; CBS 109063; IMI 354528; STE-U 2534	<i>Araucaria heterophylla</i>	Hawaii, USA	M. Aragaki	MT335079; MT335311; MT335551; MT359772; MT359532; MT412604; MT412842; N/A	Kang <i>et al.</i> (2001b), Crous (2002), Crous <i>et al.</i> (2004), this study

Table 1. (Continued).

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		CMW 30988	CBS 114038	<i>Ipomoea aquatica</i>	Auckland, New Zealand	C.F. Hill	MT335080; MT335312; MT335552; MT359773; MT359533; MT412605; MT412843; N/A	Crous (2002), Crous <i>et al.</i> (2004), Lombard <i>et al.</i> (2010a), this study
B81	<i>Ca. paracolhouinii</i>	CBS 114679 ^T	CMW 51212; CPC 2445	N/A	USA	A.Y. Rossman	N/A; KX784582; N/A; KY653268; KY653324; KY653423; KX784714; KX784644	Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
		CBS 114705	CMW 51215; CPC 2423	<i>Annona reticulata</i> (fruit)	Australia	D. Hutton	N/A; N/A; N/A; KY653269; KY653325; KY653424; KX784715; KX784645	Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
B82	<i>Ca. paraensis</i>	CBS 134669 ^T	LPF430	Soil (<i>Eucalyptus</i> plantation)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396011; KM396094; N/A; N/A; N/A; KM395837; KM395924	Alfenas <i>et al.</i> (2015)
		LPF429	–	Soil (tropical rainforest)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396015; KM396098; N/A; N/A; N/A; KM395841; KM395928	Alfenas <i>et al.</i> (2015)
		CBS 134664	LPF217	Soil (tropical rainforest)	Mucuri, Bahia, Brazil	E. Zauza	N/A; KM396017; KM396100; N/A; N/A; N/A; KM395843; KM395930	Alfenas <i>et al.</i> (2015)
B83	<i>Ca. parvispora</i>	CBS 111465 ^T	CPC 1902	Soil	Brazil	A.C. Alfenas	MT335082; MT335314; MT335554; MT359775; MT359535; MT412607; MT412845; MT413057	Marin-Felix <i>et al.</i> (2017), this study
		CMW 30981	CBS 111478; CPC 1921	Soil	Brazil	A.C. Alfenas	MT335081; MT335313; MT335553; MT359774; MT359534; MT412606; MT412844; MT413056	Lombard <i>et al.</i> (2010a, 2016), this study
B84	<i>Ca. pauciphialidica sp. nov.</i>	CMW 30980 ^T	CBS 111394; CPC 1628	Soil	Ecuador	M.J. Wingfield	MT335083; MT335315; MT335555; MT359776; MT359536; MT412608; MT412846; MT413058	Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study
B85	<i>Ca. pauciramosa</i>	CBS 138824 ^T	CMW 5683; CPC 971	Soil	Knysna, South Africa	P.W. Crous	MT335093; MT335325; MT335565; MT359786; MT359546; MT412618; MT412856; MT413068	Schoch <i>et al.</i> (1999), Crous (2002), Lombard <i>et al.</i> (2010a), this study
		CMW 9151	–	<i>A. mearnsii</i>	South Africa	L. Lombard	MT335096; MT335328; MT335568; MT359789; MT359549; MT412621; MT412859; MT413071	Lombard <i>et al.</i> (2010b), this study
		CBS 111812	CMW 51190; CPC 2631	<i>Cliffordia feruginea</i>	George, Western Cape Province, South Africa	P.W. Crous	MT335084; MT335316; MT335556; MT359777; MT359537; MT412609; MT412847; MT413059	Lombard <i>et al.</i> (2016), this study
		CBS 114458	CMW 51211; CPC 2019	<i>Erica capensis</i>	California, USA	S.T. Koike	MT335087; MT335319; MT335559; MT359780; MT359540; MT412612; MT412850; MT413062	Lombard <i>et al.</i> (2016), this study
		CBS 123183	CMW 51311; CPC 15378	<i>Machaerina sinclairii</i>	Auckland University Campus, Auckland, New Zealand	C.F. Hill	MT335090; MT335322; MT335562; MT359783; MT359543; MT412615; MT412853; MT413065	Lombard <i>et al.</i> (2016), this study

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Table 1. (Continued).

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		CBS 123402	CMW 30872	<i>Arbutus unedo</i>	Carrubba, Sicily, Italy	G. Polizzi	MT335099; MT335331; MT335571; MT359792; MT359552; MT412624; MT412862; MT413074	Lombard <i>et al.</i> (2010b), this study
		CBS 137243	CMW 36327	<i>E. grandis</i> × <i>E. camaldulensis</i>	Bandula, Manica, Mozambique	J. Roux & S. Maússe-Sitoe	MT335091; MT335323; MT335563; MT359784; MT359544; MT412616; MT412854; MT413066	Crous <i>et al.</i> (2013), Lombard <i>et al.</i> (2016), this study
		CMW 9188	CBS 125268	<i>E. grandis</i>	Kwambonambi, KwaZulu-Natal, South Africa	L. Lombard	MT335159; MT335398; MT335638; MT359859; MT359619; MT412689; MT412929; MT413136	Lombard <i>et al.</i> (2010b), this study
		CMW 31450	CBS 136632; CERC 1785	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335102; MT335334; MT335574; MT359795; MT359555; MT412627; MT412865; MT413077	Lombard <i>et al.</i> (2015a), this study
		CMW 31474	CBS 136635; CERC 1809	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335104; MT335336; MT335576; MT359797; MT359557; MT412629; MT412867; MT413079	Lombard <i>et al.</i> (2015a), this study
B86	<i>Ca. penicilloides</i>	CMW 23696 ^T	CBS 174.55; STE-U 2388	<i>Prunus</i> sp.	Hatizyo Island, Japan	M. Ookubu	MT335106; MT335338; MT335578; MT359799; MT359559; MT412631; MT412869; MT413081	Tubaki (1958), Crous (2002), this study
B87	<i>Ca. piuiensis</i>	CBS 134850 ^T	LPF377	Soil (<i>Eucalyptus</i> plantation)	Teresina, Piauí, Brazil	R.F. Alfenas	N/A; KM396060; KM396143; N/A; N/A; N/A; KM395886; KM395973	Alfenas <i>et al.</i> (2015)
		CBS 134851	LPF381	Soil (tropical rainforest)	Teresina, Piauí, Brazil	R.F. Alfenas	N/A; KM396061; KM396144; N/A; N/A; N/A; KM395887; KM395974	Alfenas <i>et al.</i> (2015)
B88	<i>Ca. pini</i>	CMW 31209 ^T	CBS 123698	<i>Pinus patula</i>	Buga, Valle del Cauca, Colombia	C.A. Rodas	MT335107; MT335339; MT335579; MT359800; MT359560; MT412632; MT412870; MT413082	Lombard <i>et al.</i> (2010a), this study
		CBS 125523	CMW 31210	<i>Pinus patula</i>	Buga, Valle del Cauca, Colombia	C.A. Rodas	GQ280518; GQ267437; GQ267274; GQ280640; GQ280762; N/A; GQ267345; GQ267225	Lombard <i>et al.</i> (2010a)
B89	<i>Ca. plurilateralis</i>	CBS 111401 ^T	CMW 51178; CPC 1637	Soil	Ecuador	M.J. Wingfield	N/A; MT335340; MT335580; MT359801; MT359561; MT412633; MT412871; MT413083	Lombard <i>et al.</i> (2016), this study
B90	<i>Ca. propaginicola</i>	CBS 134815 ^T	LPF220	<i>Eucalyptus</i> sp. (seedling)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396040; KM396123; N/A; N/A; N/A; KM395886; KM395953	Alfenas <i>et al.</i> (2015)
		CBS 134816	LPF222	<i>Eucalyptus</i> sp. (seedling)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396041; KM396124; N/A; N/A; N/A; KM395887; KM395954	Alfenas <i>et al.</i> (2015)
		CBS 134824	LPF367	<i>Eucalyptus</i> sp. (seedling)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396049; KM396132; N/A; N/A; N/A; KM395875; KM395962	Alfenas <i>et al.</i> (2015)
B91	<i>Ca. pseudobrassicae</i>	CBS 134662 ^T	LPF280	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396023; KM396106; N/A; N/A; N/A; KM395849; KM395936	Alfenas <i>et al.</i> (2015)
		CBS 134661	LPF260	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396022; KM396105; N/A; N/A; N/A; KM395848; KM395935	Alfenas <i>et al.</i> (2015)

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B92	<i>Ca. pseudoecuadoriae</i>	CBS 111402 ^T	CMW 51179; CPC 1639	Soil	Ecuador	M.J. Wingfield	N/A; KX784589; N/A; KY653273; KY653329; KY653432; KX784723; KX784652	Lombard et al. (2016) , Marin-Felix et al. (2017)
B93	<i>Ca. pseudometrosideri</i>	CBS 134845 ^T	LPF210	Soil (<i>Eucalyptus</i> plantation)	Maceió, Alagoas, Brazil	M.M. Coutinho	N/A; KM395995; KM396083; N/A; N/A; N/A; KM395821; KM395909	Alfenas et al. (2015)
		CBS 134843	LPF100	<i>Metrosideros polymorpha</i>	Viçosa, Minas Gerais, Brazil	A.C. Alfenas	N/A; KM395993; KM396081; N/A; N/A; N/A; KM395819; KM395907	Alfenas et al. (2015)
B94	<i>Ca. pseudomexicana</i>	CBS 130354 ^T	CMW 51313; DISTEF- TCROU1	<i>Callistemon</i> sp.	Tunis, Carthage, Tunisia	G. Polizzi	MT335110; MT335343; MT335583; MT359804; MT359564; MT412636; MT412874; MT413086	Lombard et al. (2011) , this study
		CBS 130355	CMW 51314; DISTEF- TCROU3	<i>Callistemon</i> sp.	Tunis, Carthage, Tunisia	G. Polizzi	MT335111; MT335344; MT335584; MT359805; MT359565; MT412637; MT412875; MT413087	Lombard et al. (2011) , this study
		CBS 130357	CMW 51316; DISTEF-TCL1	<i>Ca. laevis</i>	Tunis, Carthage, Tunisia	G. Polizzi	MT335149; MT335386; MT335626; MT359847; MT359607; MT412678; MT412917; MT413124	Lombard et al. (2011) , this study
B95	<i>Ca. pseudonaviculata</i>	CBS 116251 ^T	CMW 51235; CPC 3399; Lynfield 824	<i>Buxus sempervirens</i>	Kumeu, West Auckland, New Zealand	R. MacDiarmid	N/A; MT335345; MT335585; MT359806; MT359566; MT412638; MT412876; MT413088	Crous et al. (2002) , Lombard et al. (2016) , this study
		CMW 23672	CBS 114417; CPC 10926	<i>B. sempervirens</i>	New Zealand	C. Crepel	N/A; MT335346; MT335586; MT359807; MT359567; MT412639; MT412877; MT413089	Lombard et al. (2010a) , 2016), this study
B96	<i>Ca. pseudopteridis</i>	CBS 163.28 ^T	CMW 51159; IMI 299579	<i>Washingtonia robusta</i>	USA	C.D. Sherbakoff	MT335112; MT335347; MT335587; MT359808; MT359568; MT412640; MT412878; N/A	Sherbakoff (1928) , Alfenas et al. (2015) , Lombard et al. (2016) , this study
B97	<i>Ca. pseudoreteaudii</i>	CMW 25310 ^T	CBS 123694	<i>E. urophylla</i> × <i>E. grandis</i>	GuangDong, China	M.J. Wingfield & X.D. Zhou	MT335119; MT335354; MT335594; MT359815; MT359575; MT412647; MT412885; MT413096	Lombard et al. (2010c) , this study
		CMW 25292	CBS 123696	<i>E. urophylla</i> × <i>E. grandis</i>	GuangDong, China	M.J. Wingfield & X.D. Zhou	MT335120; MT335355; MT335595; MT359816; MT359576; MT412648; MT412886; MT413097	Lombard et al. (2010c) , this study
		CMW 31487	CBS 136638; CERC 1822	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335113; MT335348; MT335588; MT359809; MT359569; MT412641; MT412879; MT413090	Lombard et al. (2015a) , this study
		CBS 133349	CMW 51318	<i>Eucalyptus</i> hybrid	Hanoi, Bavi, Vietnam	P.Q. Thu	MT335117; MT335352; MT335592; MT359813; MT359573; MT412645; MT412883; MT413094	Crous et al. (2012) , this study
B98	<i>Ca. pseudospathiphylli</i>	CBS 109165 ^T	CMW 30976; CPC 1623	Soil	Ecuador	M.J. Wingfield	GQ280493; GQ267412; AF348241; GQ280615; GQ280737; KY653435; FJ918562; FJ918513	Kang et al. (2001b) , Crous (2002) , Lombard et al. (2010a, c) , Marin-Felix et al. (2017)

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Table 1. (Continued).

Code B ¹	Accepted species name ²	Isolates representing the species ^{3,4,5}	Other collection number ⁵	Hosts	Area of occurrence	Collector	GenBank accession Numbers ⁶ <i>act</i> ; <i>cmdA</i> ; <i>his3</i> ; ITS; LSU; <i>rpb2</i> ; <i>tef1</i> ; <i>tub2</i>	References or source of data
B99	<i>Ca. pseudospathulata</i>	CBS 134841 ^T	LPF072	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396070; KM396153; N/A; N/A; N/A; KM395896; KM395983	Alfenas et al. (2015)
		CBS 134840	LPF066	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396069; KM396152; N/A; N/A; N/A; KM395895; KM395982	Alfenas et al. (2015)
B100	<i>Ca. pseudouxmalensis</i>	CBS 110924 ^T	CMW 51166; CPC 942	Soil	Mexico	P.W. Crous	MT335123; MT335358; MT335598; MT359819; MT359579; MT412651; MT412889; MT413100	Lombard et al. (2016) , this study
		CBS 110923	CMW 51165; CPC 941	Soil	Mexico	P.W. Crous	MT335124; MT335359; MT335599; MT359820; MT359580; MT412652; MT412890; MT413101	Lombard et al. (2016) , this study
		CBS 115677	CMW 51228; CPC 943	Soil	Mexico	P.W. Crous	MT335125; MT335360; MT335600; MT359821; MT359581; MT412653; MT412891; MT413102	Lombard et al. (2016) , this study
B101	<i>Ca. pseudovata</i>	CBS 134674 ^T	LPF267	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396032; KM396115; N/A; N/A; N/A; KM395858; KM395945	Alfenas et al. (2015)
		CBS 134675	LPF285	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396033; KM396116; N/A; N/A; N/A; KM395859; KM395946	Alfenas et al. (2015)
B102	<i>Ca. pteridis</i>	CBS 111793 ^T	ATCC 34395; CMW 16736; CPC 2372	<i>Arachniodes adiantiformis</i>	USA	F. Schickedanz	GQ280494; GQ267413; DQ190679; GQ280616; GQ280738; KY653438; FJ918563; DQ190578	Crous et al. (1993c, 2006) , Crous (2002) , Lombard et al. (2010a) , Marin-Felix et al. (2017)
B103	<i>Ca. putriramosa</i>	CBS 111449 ^T	CMW 51181; CPC 1951	<i>Eucalyptus</i> cutting	Brazil	A.C. Alfenas	MT335129; MT335364; MT335604; MT359825; MT359585; MT412657; MT412895; MT413105	Lombard et al. (2016) , this study
		CBS 111470	CMW 51182; CPC 1940	Soil	Brazil	A.C. Alfenas	MT335130; MT335365; MT335605; MT359826; MT359586; MT412658; MT412896; MT413106	Lombard et al. (2016) , this study
		CBS 111477	CMW 51183; CPC 1928	Soil	Brazil	A.C. Alfenas	MT335131; MT335366; MT335606; MT359827; MT359587; MT412659; MT412897; MT413107	Lombard et al. (2016) , this study
B104	<i>Ca. queenslandica</i>	CMW 30604 ^T	CBS 112146; CPC 3213	<i>E. urophylla</i>	Lannercost, Queensland, Australia	B. Brown	MT335132; MT335367; MT335607; MT359828; MT359588; MT412660; MT412898; MT413108	Kang et al. (2001a) , Lombard et al. (2010c) , this study
		CMW 30603	CBS 112155; CPC 3210	<i>E. pellita</i>	Lannercost, Queensland, Australia	P.Q. Thu & K.M. Old	MT335133; MT335368; MT335608; MT359829; MT359589; MT412661; MT412899; MT413109	Kang et al. (2001a) , Lombard et al. (2010c) , this study
		CMW 30601	CBS 112151; CPC 3202; DFRI00150	<i>E. urophylla</i>	Cardwell, Queensland, Australia	C. Hanwood	MT335134; MT335369; MT335609; MT359830; MT359590; MT412662; MT412900; MT413110	Crous (2002) , Crous et al. (2006) , Lombard et al. (2010c) , this study
B105	<i>Ca. quinquerosa</i>	CBS 134654 ^T	LPF065	Soil (<i>Eucalyptus</i> plantation)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396029; KM396112; N/A; N/A; N/A; KM395855; KM395942	Alfenas et al. (2015)

Table 1. (Continued).

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B106	<i>Ca. reteaudii</i>	CBS 134655	LPF281	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396030; KM396113; N/A; N/A; N/A; KM395856; KM395943	Alfenas et al. (2015)
		CMW 30984 ^T	CBS 112144; CPC 3201	<i>E. camaldulensis</i>	Chon Thanh, Binh Phuoc, Vietnam	M.J. Dudzinski & P.Q. Thu	MT335135; MT335370; MT335610; MT359831; MT359591; MT412663; MT412901; MT413111	Kang et al. (2001a) , Crous (2002) , Crous et al. (2006) , this study
		CMW 16738	CBS 112143; CPC 3200	<i>Eucalyptus</i> sp. (leaves)	Binh Phuoc, Vietnam	M.J. Dudzinski & P.Q. Thu	MT335136; MT335371; MT335611; MT359832; MT359592; MT412664; MT412902; MT413112	Kang et al. (2001a) , Crous (2002) , Crous et al. (2006) , this study
B107	<i>Ca. robigophila</i>	CMW 47410	CBS 143563	<i>E. urophylla</i> (leaf)	Bavi, Hanoi, Vietnam	N.Q. Pham & T.Q. Pham	MT334966; MT335193; MT335433; MT359654; MT359414; MT412497; MT412724; N/A	Pham et al. (2019) , this study
		CBS 134652 ^T	LPF192	<i>Eucalyptus</i> sp. (leaf)	Açailandia, Maranhao, Brazil	R.F. Alfenas	N/A; KM396024; KM396107; N/A; N/A; N/A; KM395850; KM395937	Alfenas et al. (2015)
		CBS 134653	LPF193	<i>Eucalyptus</i> sp. (leaf)	Açailandia, Maranhao, Brazil	R.F. Alfenas	N/A; KM396025; KM396108; N/A; N/A; N/A; KM395851; KM395938	Alfenas et al. (2015)
B108	<i>Ca. rumohrae</i>	CMW 23697 ^T	CBS 111431; CPC 1716; UFV 218	<i>Rumohra adiantiformis</i>	Volcan, Panama	J.W. Miller & R.M. Leahy	MT335137; MT335372; MT335612; MT359833; MT359593; N/A; MT412903; MT413113	El-Gholl et al. (1997) , Crous (2002) , Crous et al. (2006) , this study
		CMW 30989	CBS 109062; CPC 1603	<i>Adiantum</i> sp.	The Netherlands	R. Pieters	MT335138; MT335373; MT335613; MT359834; MT359594; MT412665; MT412904; MT413114	El-Gholl et al. (1997) , Crous (2002) , Crous et al. (2006) , this study
B109	<i>Ca. silvicola</i>	CBS 135237 ^T	LPF081	Soil (tropical rainforest)	Mucuri, Bahia, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396065; KM396148; N/A; N/A; N/A; KM395891; KM395978	Alfenas et al. (2015)
		CBS 134836	LPF079	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396062; KM396145; N/A; N/A; N/A; KM395888; KM395975	Alfenas et al. (2015)
	<i>Calonectria</i> sp.	CBS 112152	CPC 3203	<i>E. camaldulensis</i>	Vietnam	N/A	N/A; KX784602; N/A; KY653291; KY653347; KY653463; KX784745; KX784672	Lombard et al. (2016) , Marin-Felix et al. (2017)
	<i>Calonectria</i> sp.	CBS 112753	CPC 4225	N/A	Indonesia	N/A	N/A; KX784598; N/A; KY653292; KY653348; KY653464; KX784740; KX784667	Lombard et al. (2016) , Marin-Felix et al. (2017)
B110	<i>Ca. spathiphylli</i>	CMW 16742 ^T	ATCC 44730; CBS 114540; STE-U 2185	<i>Spathiphyllum</i> sp.	Florida, USA	C.L. Schoulties	N/A; MT335374; MT335614; MT359835; MT359595; MT412666; MT412905; MT413115	El-Gholl et al. (1992) , Crous (2002) , Lombard et al. (2010a, 2016) , this study

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Table 1. (Continued).

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		CMW 30997	CBS 116168; CPC 789	<i>Spathiphyllum</i> sp.	Switzerland	L. Petrini	N/A; MT335375; MT335615; MT359836; MT359596; MT412667; MT412906; MT413116	El-Gholl <i>et al.</i> (1992), Crous (2002), Lombard <i>et al.</i> (2016), this study
B111	<i>Ca. spathulata</i>	CMW 16744 ^T	CBS 555.92	<i>E. viminalis</i>	Brazil	N.E. El-Gholl	MT335139; MT335376; MT335616; MT359837; MT359597; MT412668; MT412907; MT413117	Crous & Kang (2001), Crous (2002), Lombard <i>et al.</i> (2016), this study
		CBS 112513	CMW 51197; CPC 3851	<i>Eucalyptus</i> sp.	Colombia	M.J. Wingfield	MT335140; MT335377; MT335617; MT359838; MT359598; MT412669; MT412908; MT413118	Lombard <i>et al.</i> (2016), this study
B112	<i>Ca. sumatrensis</i>	CMW 23698 ^T	CBS 112829; CPC 4518	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT335145; MT335382; MT335622; MT359843; MT359603; MT412674; MT412913; N/A	Crous <i>et al.</i> (2004), this study
		CMW 30987	CBS 112934; CPC 4516	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT335146; MT335383; MT335623; MT359844; MT359604; MT412675; MT412914; N/A	Crous <i>et al.</i> (2004), this study
		CBS 112936	CMW 51207; CPC 4504	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT335143; MT335380; MT335620; MT359841; MT359601; MT412672; MT412911; N/A	Lombard <i>et al.</i> (2016), this study
B113	<i>Ca. syzygiicola</i>	CBS 112831 ^T	CMW 51204; CPC 4511	<i>Syzygium aromaticum</i>	Sumatra, Indonesia	M.J. Wingfield	N/A; N/A; N/A; N/A; N/A; N/A; KX784736; KX784663	Lombard <i>et al.</i> (2016)
B114	<i>Ca. terricola</i>	CBS 116247 ^T	CMW 51232; CPC 3583	Soil (<i>Eucalyptus</i> plantation)	Brazil	P.W. Crous	N/A; N/A; N/A; N/A; N/A; N/A; KX784738; KX784665	Lombard <i>et al.</i> (2016)
B115	<i>Ca. tonkinensis</i>	CMW 47430 ^T	CBS 143576	Soil (<i>Eucalyptus</i> plantation)	Bavi, Hanoi, Vietnam	N.Q. Pham & T.Q. Pham	MT335147; MT335384; MT335624; MT359845; MT359605; MT412676; MT412915; MT413122	Pham <i>et al.</i> (2019), this study
B116	<i>Ca. uniseptata</i>	CBS 413.67 ^T	CMW 23678; CPC 2391; IMI 299577	<i>Paphiopedilum callosum</i>	Celle, Germany	W. Gerlach	GQ280451; GQ267379; GQ267248; GQ280573; GQ280695; N/A; GQ267307; GQ267208	Lombard <i>et al.</i> (2016)
B117	<i>Ca. uxmalensis</i>	CBS 110925 ^T	CMW 51167; CPC 945	Soil	Uxmal, Mexico	P.W. Crous	MT335153; MT335390; MT335630; MT359851; MT359611; MT412681; MT412921; MT413128	Lombard <i>et al.</i> (2016), this study
		CBS 110919	CMW 51164; CPC 928	Soil	Uxmal, Mexico	P.W. Crous	MT335154; MT335391; MT335631; MT359852; MT359612; MT412682; MT412922; MT413129	Lombard <i>et al.</i> (2016), this study
B118	<i>Ca. variabilis</i>	CMW 3187 ^T	AR2675; CBS 114677; CPC 2436	<i>Schefflera morototoni</i>	Pará, Brazil	F.C. de Albuquerque	N/A; MT335392; MT335632; MT359853; MT359613; MT412683; MT412923; MT413130	Crous <i>et al.</i> (1993b), Crous (2002), Lombard <i>et al.</i> (2010a, 2016), this study
		CMW 2914	CBS 112691; CPC 2506	<i>Theobroma grandiflorum</i>	Pará, Brazil	F. Carneiro	N/A; MT335393; MT335633; MT359854; MT359614; MT412684; MT412924; MT413131	Crous <i>et al.</i> (1993b), Crous (2002), Lombard <i>et al.</i> (2010a, 2016), this study

Table 1. (Continued).

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B119	<i>Ca. venezuelana</i>	CBS 111052 ^T	CMW 51173; CPC 1183	Soil	Acarigua, Venezuela	M.J. Wingfield	MT335155; MT335394; MT335634; MT359855; MT359615; MT412685; MT412925; MT413132	Lombard <i>et al.</i> (2016), this study
B120	<i>Ca. yunnanensis</i>	CERC 5339 ^T	CBS 142897; CMW 47644	Soil (<i>Eucalyptus</i> plantation)	YunNan, China	S.F. Chen & J.Q. Li	MT335157; MT335396; MT335636; MT359857; MT359617; MT412687; MT412927; MT413134	Li <i>et al.</i> (2017), this study
		CERC 5337	CBS 142895; CMW 47642	Soil (<i>Eucalyptus</i> plantation)	YunNan, China	S.F. Chen & J.Q. Li	MT335158; MT335397; MT335637; MT359858; MT359618; MT412688; MT412928; MT413135	Li <i>et al.</i> (2017), this study
		CERC 5376	CBS 142892; CMW 47655	Soil (<i>Eucalyptus</i> plantation)	PuEr, YunNan, China	S.F. Chen & J.Q. Li	MT335126; MT335361; MT335601; MT359822; MT359582; MT412654; MT412892; MT413103	Li <i>et al.</i> (2017), this study
	<i>Curviciadiella cigneae</i>	CBS 109167 ^T	CPC 1595; MUCL 40269	Decaying leaf	French Guiana	C. Decock	KM231122; KM231287; KM231461; AF220973; AY793431; KM232311; KM231867; KM232002	Decock & Crous (1998), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2015b)
		CBS 109168	CPC 1594; MUCL 40268	Decaying seed	French Guiana	C. Decock	KM231121; KM231286; KM231460; KM231745; JQ666074; KM232312; KM231868; KM232003	Decock & Crous (1998), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2015b)

¹ Codes (B1 to B120) of the 120 accepted *Calonectria* species resulting from the present study.

² One hundred and twenty accepted species resulting from the present study.

³ Key isolates of the 120 *Calonectria* species after revision.

⁴ T: ex-type isolates of the *Calonectria* species after revision.

⁵ AR: Amy Y. Rossman working collection; ATCC: American Type Culture Collection, Virginia, USA; CBS: Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands; CERC: China Eucalypt Research Centre, ZhanJiang, GuangDong Province, China; CMW: Culture collection of the Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria, South Africa; CPC: Pedro Crous working collection housed at Westerdijk Fungal Biodiversity Institute; HGUP: Plant Pathology Herbarium of Gui Zhou University, GuiYang 550025, China; IMI: International Mycological Institute, CABI Bioscience, Egham, Basingstoke, UK; LPF: Laboratório de Patologia Florestal, Universidade Federal de Viçosa, Viçosa, Brazil; MUCL: Mycotheque, Laboratoire de Mycologie Systematique st Appliquee, l'Universite, Louvain-la-Neuve, Belgium; PPRI: Plant Protection Research Institute, Pretoria, South Africa; STE-U: Department of Plant Pathology, University of Stellenbosch, South Africa; UFV: Universidade Federal de Viçosa, Viçosa, Brazil.

⁶ *act*: actin; *cmdA*: calmodulin; *his3*: histone H3; ITS: the internal transcribed spacer regions 1 and 2 and the 5.8S gene of the ribosomal RNA; LSU: 28S large subunit RNA gene; *rpb2*: the second largest subunit of RNA polymerase; *tef1*: translation elongation factor 1-alpha; *tub2*: beta-tubulin.

⁷ GenBank accession number obtained in this study are in bold.

⁸ N/A: information are not available.

Table 2. Morphological characteristics, thallism and area of occurrence of the 11 *Calonectria* species complexes.

Species complex	Vesicle shape		Macroconidia septation		Perithecial colour		Ascospore numbers in asci		Ascospores septation		Thallism ⁶	Area of occurrence
	Typical or dominant ¹	Additional or minor	Typical or dominant ²	Additional or minor	Typical or dominant ³	Additional or minor	Typical or dominant ⁴	Additional or minor	Typical or dominant ⁵	Additional or minor		
1. <i>Calonectria brassicae</i> species complex	Clavate	Acicular, broadly clavate, narrowly clavate	1	1(-2), 1(-3)	Orange to red-brown	Brown, red	8		1	1(-3), (1-3)	Heterothallic or homothallic	Asia, North and South America
3. <i>Calonectria colhouinii</i> species complex	Clavate	Acicular, broadly clavate, narrowly clavate	3	(1-3), (1-3)(-4), 3-4	Yellow	Bright yellow, brown, dull yellow, orange, red, red-brown	4	(2-4), 8	3	(1-3), 2-3	Heterothallic or homothallic	Africa, Asia, North America
5. <i>Calonectria gracilipes</i> species complex	Narrowly clavate	Clavate	>3	1, 3, up to 12	Orange to red-brown	Brown, orange-brown	8		Varied	1, (1-3), 3-6(-9)	Homothallic	North and South America
10. <i>Calonectria rebaudii</i> species complex	Narrowly clavate	Clavate	>3	(1-3), up to 8	Orange to red-brown	Orange-red, red	8		3	(1-3), (1-3)(-5), 3-4, (1-3)6(-9)	Heterothallic or homothallic	Asia, Oceania
8. <i>Calonectria naviculata</i> species complex	Naviculate	Clavate, ellipsoidal, sphaeropedunculate	1	1(-3)	Orange to red-brown		2-8		3		Heterothallic	Africa, Asia, Europe, North and South America, Oceania
2. <i>Calonectria candelabrum</i> species complex	Ellipsoidal to obpyriform	Broadly ellipsoidal, clavate, fusiform, narrowly obpyriform, ovoid, spatulate	1	(1-3)(-6)	Orange to red-brown	Red	8	4-8	1	(1-3)	Heterothallic or homothallic	Africa, Asia, Europe, North and South America, Oceania
7. <i>Calonectria mexicana</i> species complex	Ellipsoidal with papillate apex	Acicular, clavate, fusiform, narrowly ellipsoidal, obpyriform, obovoid, pyriform, sphaeropedunculate	1	1(-3), (1-3), (1-3)(-6)	Orange to red-brown	Brownish-yellow, red, yellow	8		1	1(-3), 3	Heterothallic or homothallic	Africa, Europe, North America
6. <i>Calonectria kyotensis</i> species complex	Sphaeropedunculate	Globose, pyriform	1	1(-3), (1-3), 3	Orange to red-brown	Orange-brown, red, reddish brown	8		1	1(-3), 2-3	Heterothallic or homothallic	Africa, Asia, Europe, North and South America
11. <i>Calonectria spathiphylli</i> species complex	Sphaeropedunculate	Globose, ovoid, ellipsoidal, obpyriform	1	1(-3)	Orange to red-brown	Red	8	2-8	1	1(-3)	Heterothallic or homothallic	North and South America
4. <i>Calonectria cylindrospora</i> species complex	Clavate, ellipsoidal, ellipsoidal with papillate apex, fusiform, obpyriform, ovoid, pyriform, sphaeropedunculate		1	(1-3)(-4)	Orange to red-brown	Orange-brown, red, yellow	8	(2-8)	1	1(-3)	Heterothallic or homothallic	Africa, Asia, Europe, North and South America
9. <i>Calonectria pteridis</i> species complex	Clavate or ovate	Fusiform, narrowly clavate, ellipsoidal	1	1(-3)	Orange to red-brown		8		1	1(-3), 1-3(-7)	Heterothallic	North and South America

¹ Typical vesicle shape for each species complex were marked in different colour: clavate or narrowly clavate vesicle/light green, naviculate vesicle/green, ellipsoidal to obpyriform vesicle/dark green, ellipsoidal vesicle with papillate apex/yellow, sphaeropedunculate vesicle/orange; species complexes with varied vesicle shapes were not marked in any colour.

² Typical macroconidial septation number for each species complex were marked in different colour: 1-septate/light green, 3-septate/green, > 3-septate/dark green.

³ Typical perithecial colour for each species complex were marked in different colour: orange to red-brown perithecia/light green, yellow perithecia/green.

⁴ Typical ascospores number produced in the ascus for each species complex were marked in different colour: 4-spored ascus/light green, 8-spored ascus/green, not 4-spored or 8-spored asci were not marked in any colour.

⁵ Typical ascospores septation number for each species complex were marked in different colour: 1-septate/light green, 3-septate/green, varied number of ascospores septation were not mark in any colour.

⁶ Different mating system for each species complex were marked in different colour: heterothallic/light green, homothallic/green, heterothallic or homothallic/dark green.

species complex) all produce obpyriform vesicles, and 1-septate macroconidia with overlapping dimensions (Supplementary Table S4). Some species in the same species complex shared a similar morphology; for example, *Ca. pseudobrassicae* and *Ca. paraensis* (both in the *Ca. brassicae* species complex) both produce clavate vesicles, and 1-septate macroconidia with overlapping dimensions (Supplementary Table S4).

Species in the *Ca. naviculata* and *Ca. pteridis* species complexes are heterothallic, while those in the *Ca. gracilipes* species complex are homothallic. *Calonectria* species in the remaining eight complexes include both heterothallic and homothallic mating systems (Table 2, Supplementary Table S4).

A summary of species distribution globally, showed that species in the *Ca. candelabrum* and *Ca. naviculata* species complexes occur on all the continents other than Antarctica. In contrast, species in the *Ca. gracilipes*, *Ca. pteridis* and *Ca. spathiphylli* species complexes were from North and South America and those in the *Ca. reteaudii* species complex were from Asia and Oceania. Species in other species complexes occurred on between three and five continents (Table 2, Supplementary Table S4).

Species reduced to synonymy

Based on the criteria decided upon for species delimitation, 51 previously identified species were found to represent synonyms of other known species (Supplementary Tables S1 and S2). Justification for reducing these 51 previously accepted taxa to synonymy with earlier names is provided in the taxonomy section.

Novel taxa

Based on phylogenetic placement in the individual gene phylogenies as well as in the multi-gene phylogenetic trees (Fig. 1, Supplementary Figs S1–8), two isolates (CMW 30602 and CMW 30980) formed two distinct lineages. These lineages were clearly distinct from those representing any of the other described species and they are recognised here as two novel taxa described in the Taxonomy section. In the *Ca. brassicae* species complex, a single isolate (CMW 30980), treated as *Ca. ecuadorae* in the earlier studies (Crous *et al.* 2006), formed a distinct lineage in the *rpb2*, *tef1*, *tub2* and in the combined gene tree. This fungus clustered close to but separate from *Ca. ecuadorae* (ex-type CMW 23677, CBS 111706, and CBS 114164) and *Ca. octoramosa* (ex-type CBS 111423) (Fig. 1, Supplementary Figs S6–8). Isolate CMW 30980 is thus considered to represent a novel species. Isolate CMW 30602 in the *Ca. reteaudii* species complex was identified as *Ca. terrae-reginae* by Lombard *et al.* (2010c), and formed a distinct lineage in the ITS, *tef1* and *tub2* analyses as well as in the combined phylogenetic tree (Fig. 1, Supplementary Figs S4, S7, S8). This isolate represents an undescribed species closely related to but separate from *Ca. queenslandica* (ex-type CMW 30604, CMW 30601, and CMW 30603) (Fig. 1, Supplementary Figs S4, S7).

Calonectria lauri (Vanderw.) Lechat & Crous was proposed as the sexual morph of *Cylindrocladium ilicicola* by Lechat in 2010. The basionym *Tetracytum lauri* is invalid and thus the name *Ca. lauri* is invalid. The results of the present study have shown that *Ca. lauri* represents a well-defined species and its name is consequently validated in the taxonomy section.

Taxonomy (Species listed in alphabetical order)

Following the results of the multi-gene phylogenetic analyses and consideration of the morphological characteristics of the 169 described *Calonectria* spp. (codes A1 to A169 in Supplementary Tables S1 and S2), 51 species are reduced to synonymy and three novel *Calonectria* species (*Calonectria lauri* was validated and it is treated as a valid species in the current study) are recognised. This results in 120 *Calonectria* spp. now accepted and these are listed in Table 1 (codes B1 to B120 in Supplementary Tables S1 and S2). Morphological characteristics of the *Calonectria* spp. identified in this study and their closest relatives are summarised (Supplementary Table S4). The 120 accepted *Calonectria* species emerging from this study and their synonymies are presented below.

acaciicola *Calonectria* N.Q. Pham *et al.*, Mycologia 111: 88. 2019.

In: *Calonectria reteaudii* species complex.

Typus: PREM 62105 holotype.

Ex-type culture: CBS 143557 = CMW 47173.

Type locality: Vietnam, Nghe An, Do Luong.

Type substrate: Soil in *Acacia auriculiformis* plantation.

Barcodes: *act* = MT334933; *cmdA* = MT335160; *his3* = MT335399; *rpb2* = MT412474; *tef1* = MT412690; *tub2* = MT412930 (alternative markers: ITS = MT359620; LSU = MT359380).

Notes: *Calonectria acaciicola* is phylogenetically closely related to *Ca. pseudoreteaudii* and *Ca. reteaudii*. The sequences of *cmdA*, *his3*, *rpb2*, *tef1* and *tub2* gene regions can differentiate *Ca. acaciicola* from these two species. The macroconidia of *Ca. acaciicola* [(av. 94 × 7 µm); Pham *et al.* 2019] are smaller than those of *Ca. pseudoreteaudii* [(av. 104 × 8 µm); Lombard *et al.* 2010c] but larger than those of *Ca. reteaudii* [(av. 84 × 6.5 µm); Kang *et al.* 2001a] (Supplementary Table S4).

acicola *Calonectria* Gadgil & M.A. Dick, N.Z. J. For. Sci. 34: 316. 2004.

Synonym: *Cylindrocladium acicola* Gadgil & M.A. Dick, N.Z. J. For. Sci. 34: 316. 2004.

In: *Calonectria reteaudii* species complex.

Typus: NZFRI-M 5213 holotype.

Ex-type culture: CMW 30996.

Type locality: New Zealand, Northland.

Type substrate: *Phoenix canariensis*.

Barcodes: *act* = MT334935; *cmdA* = MT335162; *his3* = MT335401; *rpb2* = MT412476; *tef1* = MT412692; *tub2* = MT412932 (alternative markers: ITS = MT359622; LSU = MT359382).

Notes: *Calonectria acicola* is phylogenetically closely related to *Ca. multiseptata*. They can be distinguished from each other by the formation of megaconidiophores and megaconidia, a feature not observed in *Ca. acicola* but typical in *Ca. multiseptata* (Crous 2002, Gadgil & Dick 2004). *Calonectria acicola* is homothallic (Gadgil & Dick 2004) (Supplementary Table S4).

aciculata *Calonectria* J.Q. Li *et al.*, IMA Fungus 8: 273. 2017.

In: *Calonectria colhounii* species complex.

Typus: PREM 61941 holotype.

Ex-type culture: CBS 142883 = CMW 47645 = CERC 5342.

Type locality: China, YunNan Province.

Type substrate: *Eucalyptus urophylla* × *E. grandis*.

Barcodes: *act* = MT334937; *cmdA* = MT335164; *his3* = MT335403; *rpb2* = MT412478; *tef1* = MT412694; *tub2* = MT412934 (alternative markers: ITS = MT359624; LSU = MT359384).

Notes: *Calonectria aciculata* is closely related to *Ca. colhounii* and *Ca. honghensis*, but can be distinguished from these two species by its macroconidial dimensions. The macroconidia of *Ca. aciculata* [(av. 69 × 5.5 µm); Li et al. 2017] are longer than those of *Ca. colhounii* [(av. 65 × 5 µm); Peerally 1973] and *Ca. honghensis* [(av. 54 × 5.5 µm); Li et al. 2017]. *Calonectria aciculata* is homothallic (Li et al. 2020) (Supplementary Table S4).

aconidialis *Calonectria* L. Lombard et al., Stud. Mycol. 80: 162. 2015.

Synonyms: *Calonectria arbusta* L. Lombard et al., Stud. Mycol. 80: 162. 2015.

Calonectria expansa L. Lombard et al., Stud. Mycol. 80: 167. 2015.

Calonectria guangxiensis L. Lombard et al., Stud. Mycol. 80: 169. 2015.

Calonectria hainanensis L. Lombard et al., Stud. Mycol. 80: 170. 2015.

Calonectria magnispora L. Lombard et al., Stud. Mycol. 80: 174. 2015.

Calonectria parakyotensis L. Lombard et al., Stud. Mycol. 80: 176. 2015.

Calonectria pluriramosa L. Lombard et al., Stud. Mycol. 80: 178. 2015.

Calonectria pseudokyotensis L. Lombard et al., Stud. Mycol. 80: 178. 2015.

Calonectria sphaeropedunculata L. Lombard et al., Stud. Mycol. 80: 180. 2015.

In: *Calonectria kyotensis* species complex.

Typus: CBS H-21481 holotype.

Ex-type culture: CBS 136086 = CMW 35174 = CERC 1850.

Type locality: China, HaiNan Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334938; *cmdA* = MT335165; *his3* = MT335404; *rpb2* = MT412479; *tef1* = MT412695 (alternative markers: ITS = MT359625; LSU = MT359385).

Notes: *Calonectria aconidialis* is phylogenetically closely related to *Ca. pacifica* and can be differentiated from that species by the sequences of *act*, *cmdA*, *his3*, *rpb2*, ITS, LSU and *tef1* gene regions. The asexual structures of *Ca. aconidialis* failed to develop (Lombard et al. 2015a). This species is homothallic (Lombard et al. 2015a) (Supplementary Table S4).

aeknauliensis *Calonectria* N.Q. Pham & M.J. Wingf., Mycologia 111: 93. 2019.

In: *Calonectria kyotensis* species complex.

Typus: PREM 62107 holotype.

Ex-type culture: CBS 143559 = CMW 48253.

Type locality: Indonesia, Northern Sumatra, Aek Nauli.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334953; *cmdA* = MT335180; *his3* = MT335419; *rpb2* = MT412486; *tef1* = MT412710; (alternative markers: ITS = MT359640; LSU = MT359400).

Notes: *Calonectria aeknauliensis* is closely related to *Ca. curvispora* and *Ca. illicicola*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. aeknauliensis* [(av. 47 × 5 µm); Pham et al. 2019] are shorter than those of *Ca. curvispora* [(av. 60 × 5 µm); Victor et al. 1997] and smaller than those of *Ca. illicicola* [(av. 62 × 6 µm); Boedijn & Reitsma 1950] (Supplementary Table S4).

amazonica *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 171. 2016.

Synonyms: *Calonectria amazoniensis* L. Lombard & Crous, Stud. Mycol. 85: 173. 2016.

Calonectria tropicalis L. Lombard & Crous, Stud. Mycol. 85: 192. 2016.

Calonectria longiramosa L. Lombard & Crous, Stud. Mycol. 86: 114. 2017.

In: *Calonectria pteridis* species complex.

Typus: CBS H-22750 holotype.

Ex-type culture: CBS 116250 = CMW 51234 = CPC 3534.

Type locality: Brazil, Amazon.

Type substrate: *Eucalyptus tereticornis*.

Barcodes: *act* = MT334955; *cmdA* = MT335182; *his3* = MT335421; *rpb2* = MT412488; *tef1* = MT412712; *tub2* = MT412935 (alternative markers: ITS = MT359642; LSU = MT359402).

Notes: *Calonectria amazonica* is closely related to *Ca. pteridis* and *Ca. pseudopteridis*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. amazonica* [(av. 79 × 5 µm); Lombard et al. 2016] are smaller than those of *Ca. pteridis* [(av. 82 × 5.5 µm); Crous et al. 1993c] and *Ca. pseudopteridis* [(av. 87.5 × 5.7 µm); Sobers 1968, Alfenas et al. 2015]. *Calonectria amazonica* is heterothallic (Li et al. 2020) (Supplementary Table S4).

amazoniensis *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 173. 2016.

(see ***Calonectria amazonica***)

In: *Calonectria pteridis* species complex.

Typus: CBS H-22751 holotype.

Ex-type culture: CBS 115440 = CMW 51222 = CPC 3885.

Type locality: Brazil, Amazon.

Type substrate: *Eucalyptus tereticornis*.

Barcodes: *act* = MT334957; *cmdA* = MT335184; *his3* = MT335423; *tef1* = MT412714; *tub2* = MT412937 (alternative markers: ITS = MT359644; LSU = MT359404).

Notes: *Calonectria amazoniensis* was treated as a synonym of *Ca. amazonica* in this study. In comparisons of DNA sequences for seven available gene regions, there were only three base differences in the *tub2* gene sequences between ex-type isolate of *Ca. amazoniensis* (CBS 115440) and the ex-type isolate of *Ca. amazonica* (CBS 116250). Both species produce clavate vesicles of similar dimensions (*Ca. amazoniensis*: 5–7 µm; *Ca. amazonica*: 5–6 µm) and 1-septate macroconidia. The macroconidia of *Ca. amazoniensis* (av. 69 × 4 µm) are smaller than those of *Ca. amazonica* (av. 79 × 5 µm) (Lombard et al. 2016), which was considered to represent intraspecific variation (Supplementary Table S4).

angustata *Calonectria* (Crous & El-Gholl) L. Lombard et al., Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium angustatum* Crous & El-Gholl, Mycoscience 41: 522. 2000.

In: *Calonectria gracilipes* species complex.

Typus: PREM 56546 holotype.

Ex-type culture: CBS 114544 = CMW 30990 = CPC 2347 = P99-0454.

Type locality: USA, Florida, Sarasota nursery.

Type substrate: *Tillandsia capitata*.

Barcodes: *act* = MT334963; *his3* = MT335429; *rpb2* = MT412493; *tef1* = MT412720; *tub2* = MT412943 (alternative markers: ITS = MT359650; LSU = MT359410).

Notes: *Calonectria angustata* is phylogenetically closely related to *Ca. hurae* and *Ca. leguminum*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. angustata* [(av. 110 × 10 µm); Crous *et al.* 2000] are shorter than those of *Ca. hurae* [(av. 120 × 7.5 µm); Crous 2002] but larger than those of *Ca. leguminum* [(av. 60 × 5 µm); Figueiredo & Namekata 1967, Crous 2002] (Supplementary Table S4).

arbusta *Calonectria* L. Lombard *et al.*, Stud. Mycol. 80: 162. 2015.

(see *Calonectria aconidialis*)

In: *Calonectria kytensis* species complex.

Typus: CBS H-21482 holotype.

Ex-type culture: CBS 136079 = CMW 31370 = CERC 1705.

Type locality: China, GuangXi Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334940; *cmdA* = MT335167; *his3* = MT335406; *rpb2* = MT412480; *tef1* = MT412697 (alternative markers: ITS = MT359627; LSU = MT359387).

Notes: *Calonectria arbusta* was treated as a synonym of *Ca. aconidialis* in this study. In comparisons of DNA sequences for seven available gene regions, the only differences between the ex-type isolate of *Ca. arbusta* (CMW 31370) and the ex-type isolate of *Ca. aconidialis* (CMW 35174) was in the *his3* and *tef1* sequences, where there were two base differences in the *his3* and one base difference in the *tef1* sequences. Both species are homothallic and produce orange to orange-brown perithecia, 8-spored asci and 1-septate ascospores, and share the similar ascospores dimensions (*Ca. arbusta*: av. 38 × 7 µm; *Ca. aconidialis*: av. 36 × 6 µm) (Lombard *et al.* 2015a, Li *et al.* 2020; Supplementary Table S4).

asiatica *Calonectria* Crous & Hywel-Jones, Stud. Mycol. 50: 419. 2004.

Synonym: *Cylindrocladium asiaticum* Crous & Hywel-Jones, Stud. Mycol. 50: 419. 2004.

In: *Calonectria kytensis* species complex.

Typus: CBS 9889 holotype.

Ex-type culture: CBS 114073 = CMW 23782 = CPC 3900.

Type locality: Thailand, Prathet Thai.

Type substrate: Leaf litter.

Barcodes: *act* = GQ280428; *cmdA* = AY725741; *his3* = AY725658; *tef1* = AY725705; *tub2* = AY725616 (alternative markers: ITS = GQ280550; LSU = GQ280672).

Notes: *Calonectria asiatica* is closely related to *Ca. yunnanensis*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. asiatica* [(av. 53 × 5 µm); Crous *et al.* 2004] are larger than those of *Ca.*

yunnanensis [(av. 43 × 4.5 µm); Li *et al.* 2017], and the vesicles of *Ca. asiatica* (12–17 µm) are wider than those of *Ca. yunnanensis* (2–4.5 µm). *Calonectria asiatica* is homothallic (Crous *et al.* 2004) (Supplementary Table S4).

auriculiformis *Calonectria* N.Q. Pham *et al.*, Mycologia 111: 85. 2019.

In: *Calonectria cylindrospora* species complex.

Typus: PREM 62109 holotype.

Ex-type culture: CBS 143561 = CMW 47178.

Type locality: Vietnam, Thanh Hoa, Hau Loc.

Type substrate: Soil in *Acacia auriculiformis* plantation.

Barcodes: *act* = MT334964; *cmdA* = MT335190; *his3* = MT335430; *rpb2* = MT412494; *tef1* = MT412721; *tub2* = MT412944 (alternative markers: ITS = MT359651; LSU = MT359411).

Notes: *Calonectria auriculiformis* is closely related to *Ca. lageniformis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. auriculiformis* (av. 43 × 4 µm) are longer than those of *Ca. lageniformis* (av. 40 × 5 µm). Furthermore, *Ca. auriculiformis* has five tiers of branches in its conidiogenous apparatus in comparison to three in *Ca. lageniformis* (Lombard *et al.* 2016, Pham *et al.* 2019).

australiensis *Calonectria* (Crous & K.D. Hyde) L. Lombard *et al.*, Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium australiense* Crous & K.D. Hyde, Stud. Mycol. 55: 221. 2006.

In: *Calonectria reteaudii* species complex.

Typus: CBS H-17872 holotype.

Ex-type culture: CBS 112954 = CMW 23669 = CPC 4714.

Type locality: Australia, Queensland.

Type substrate: *Ficus pleurocarpa*.

Barcodes: *act* = MT334965; *cmdA* = MT335192; *his3* = MT335432; *rpb2* = MT412496; *tef1* = MT412723; *tub2* = MT412946 (alternative markers: ITS = MT359653; LSU = MT359413).

Notes: Phylogenetically, *Ca. australiensis* forms a distinct lineage separate from other species in this species complex.

avesiculata *Calonectria* T.S. Schubert *et al.*, Canad. J. Bot. 67: 2415. 1989.

Synonym: *Cylindrocladium avesiculatum* D.L. Gill *et al.*, Phytopathology 61: 60. 1971.

In: *Calonectria mexicana* species complex.

Typus: FLAS F55193 (holotype of *Ca. avesiculata*; Schubert *et al.* 1989), BPI 414546 (isotype of *Cy. avesiculatum*; Gill *et al.* 1971).

Ex-type culture: CBS 313.92 = CMW 23670 = CPC 2373 = ATCC 38226 (Lombard *et al.* 2010a).

Type locality: USA, Georgia, Cairo.

Type substrate: *Ilex vomitoria*.

Barcodes: *act* = GQ280431; *cmdA* = GQ267364; *his3* = DQ190620; *tef1* = GQ267294; *tub2* = AF333392 (alternative markers: ITS = GQ280553; LSU = GQ280675).

Notes: *Calonectria avesiculata* is closely related to *Ca. mexicana*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. avesiculata* [(av. 64 × 5 µm); Schubert *et al.* 1989] are larger

than those of *Ca. mexicana* [(av. 45 × 4 µm); Schoch et al. 1999], and the vesicles of *Ca. avesculata* (1–4 µm) are narrower than those of *Ca. mexicana* (7–12 µm). Furthermore, *Ca. avesculata* is characterised by producing a thick-walled stipe extension (Crous 2002), a feature not observed for *Ca. mexicana*. *Calonectria avesculata* is heterothallic (Schubert et al. 1989) (Supplementary Table S4).

baviensis *Calonectria* N.Q. Pham et al., Mycologia 111: 90. 2019. (see *Calonectria reteaudii*)

In: *Calonectria reteaudii* species complex.

Typus: PREM 62111 holotype.

Ex-type culture: CBS 143563 = CMW 47410.

Type locality: Vietnam, Hanoi, Bavi.

Type substrate: *Eucalyptus urophylla*.

Barcodes: *act* = MT334966; *cmdA* = MT335193; *his3* = MT335433; *rpb2* = MT412497; *tef1* = MT412724; (alternative markers: ITS = MT359654; LSU = MT359414).

Notes: *Calonectria baviensis* was treated as a synonym of *Ca. reteaudii* in this study. In comparisons of DNA sequences for the seven available gene regions, a single base difference in each of the *cmdA*, *rpb2* and *tef1* sequences was found between the ex-type isolate of *Ca. baviensis* (CMW 47410) and the ex-type isolate of *Ca. reteaudii* (CMW 30984). Both species produce clavate vesicles with similar dimensions (*Ca. baviensis*: 3–6 µm; *Ca. reteaudii*: 3–6 µm) and 5-septate macroconidia. Macroconidia of *Ca. baviensis* (av. 96 × 6.5 µm) are longer than those of *Ca. reteaudii* (av. 84 × 6.5 µm) (Kang et al. 2001a, Pham et al. 2019), which was considered to represent intraspecific variation (Supplementary Table S4).

blephiliae *Calonectria* Crous & Hodges, Persoonia 31: 225. 2013.

(see *Calonectria cylindrospora*)

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-21434 holotype.

Ex-type culture: CBS 136425 = CMW 51321 = CPC 21859.

Type locality: USA, North Carolina, Ellerbe.

Type substrate: *Blephilia ciliata*.

Barcodes: *act* = MT335005; *cmdA* = MT335235; *his3* = MT335475; *rpb2* = MT412539; *tef1* = MT412766; *tub2* = MT412984 (alternative markers: ITS = MT359696; LSU = MT359456).

Notes: *Calonectria blephiliae* was treated as a synonym of *Ca. cylindrospora* in this study. In comparisons of DNA sequences for eight gene regions, all sequences for the ex-type isolate of *Ca. blephiliae* (CBS 136425) were 100 % identical to those for the isolate of *Ca. cylindrospora* (CMW 30978); the only differences between the ex-type isolate of *Ca. blephiliae* (CBS 136425) and the isolate of *Ca. cylindrospora* (CBS 119670) was found in the *act* gene sequences where only one base difference was observed. *Calonectria cylindrospora* and *Ca. blephiliae* both produce clavate to ellipsoidal vesicles with overlapping dimensions (*Ca. blephiliae*: 7–10 µm; *Ca. cylindrospora*: 6–8 µm) and 1-septate macroconidia. The macroconidia of *Ca. blephiliae* (av. 50 × 4.5 µm) are larger than those of *Ca. cylindrospora* (av. 45 × 4 µm) (Crous 2002, Crous et al. 2013, Lombard et al. 2015b), which was considered to represent intraspecific variation (Supplementary Table S4).

brachiatica *Calonectria* L. Lombard et al., Persoonia 23: 44. 2009.

In: *Calonectria brassicae* species complex.

Typus: PREM 60197 holotype.

Ex-type culture: CBS 123700 = CMW 25298.

Type locality: Colombia, Buga.

Type substrate: *Pinus maximinoi*.

Barcodes: *cmdA* = MT335195; *his3* = MT335435; *rpb2* = MT412499; *tef1* = MT412726; *tub2* = MT412948 (alternative markers: ITS = MT359656; LSU = MT359416).

Notes: *Calonectria brachiatica* is closely related to *Ca. parvispora*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. brachiatica* [(av. 44 × 5 µm); Lombard et al. 2009] are larger than those of *Ca. parvispora* [(av. 29 × 4 µm); Marin-Felix et al. 2017] (Supplementary Table S4).

brasiliana *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 174. 2016.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-22752 holotype.

Ex-type culture: CBS 111484 = CMW 51187 = CPC 1924.

Type locality: Brazil.

Type substrate: Soil.

Barcodes: *act* = MT334968; *cmdA* = MT335198; *his3* = MT335438; *rpb2* = MT412502; *tef1* = MT412729; *tub2* = MT412951 (alternative markers: ITS = MT359659; LSU = MT359419).

Notes: *Calonectria brasiliana* is closely related to *Ca. metrosideri*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. brasiliana* [(av. 53 × 4 µm); Lombard et al. 2016] are longer than those of *Ca. metrosideri* [(av. 45 × 4 µm); Alfenas et al. 2013a] (Supplementary Table S4).

brasiliensis *Calonectria* (Bat. & Cif.) L. Lombard et al., Stud. Mycol. 66: 19. 2010.

Basionym: *Cylindrocladium scoparium* var. *brasiliensis* Bat. & Cif., (as *brasiliense*) Boletim de SA.I.C. Pernambuco 18: 188. 1952.

Synonyms: *Cylindrocladium brasiliense* (Bat. & Cif.) Peerally, (as *braziliensis*) CMI Descriptions of Pathogenic Fungi and Bacteria 427. 1974.

Calonectria hodgesii R.F. Alfenas et al., Trop. Plant. Pathol. 38: 517. 2013.

Calonectria pseudohodgesii R.F. Alfenas et al., Stud. Mycol. 80: 118. 2015.

In: *Calonectria cylindrospora* species complex.

Typus: IMI 43688 holotype.

Ex-type culture: CBS 230.51 = IMI 299576.

Type locality: Brazil, Ceara State.

Type substrate: *Eucalyptus* spp.

Barcodes: *act* = MT334970; *cmdA* = MT335200; *his3* = MT335440; *rpb2* = MT412504; *tef1* = MT412731; *tub2* = MT412953 (alternative markers: ITS = MT359661; LSU = MT359421).

Notes: *Calonectria brasiliensis* is closely related to *Ca. maranhensis*, and can be distinguished from that species by the

dimensions of its macroconidia. The macroconidia of *Ca. brassiliensis* [(av. 38 × 3.5 µm); [Batista 1951](#)] are smaller than those of *Ca. maranhensis* [(av. 57 × 5 µm); [Alfenas et al. 2015](#)] ([Supplementary Table S4](#)).

brassiana *Calonectria* R.F. Alfenas et al., Stud. Mycol. 80: 100. 2015.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-21376 holotype.

Ex-type culture: CBS 134855 = LPF378.

Type locality: **Brazil**, Piauí state, Teresina.

Type substrate: Soil in *Eucalyptus brassiana* plantation.

Barcodes: *cmdA* = KM396056; *his3* = KM396139; *tef1* = KM395882; *tub2* = KM395969.

Notes: *Calonectria brassiana* is closely related to *Ca. glaebicola*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. brassiana* (av. 53 × 4 µm) are longer than those of *Ca. glaebicola* (av. 50 × 4 µm) ([Alfenas et al. 2015](#)) ([Supplementary Table S4](#)).

brassicae *Calonectria* (Pamwar & Bohra) L. Lombard et al., Persoonia 23: 45. 2009.

Basionym: *Cylindrocladium brassicae* Panwar & Bohra, Indian Phytopathol. 27: 425. 1974.

Synonyms: *Cylindrocarpon gracile* Bugnic., Encycl. Mycologique 11: 162. 1939.

Cylindrocladium gracile (Bugnic.) Boesew., Trans. Brit. Mycol. Soc. 78: 554. 1982.

Cylindrocladium clavatum Hodges & L.C. May, Phytopathology 62: 900. 1972.

In: *Calonectria brassicae* species complex.

Typus: PREM 51032 holotype.

Ex-type culture: CBS 111869 = CPC 2409.

Type locality: **Indonesia**.

Type substrate: *Argyrea splendens*.

Barcodes: *act* = MT334972; *cmdA* = MT335202; *his3* = MT335442; *rpb2* = MT412506; *tef1* = MT412733; *tub2* = MT412955 (alternative markers: ITS = MT359663; LSU = MT359423).

Notes: *Calonectria brassicae* is closely related to *Ca. brachiatica* and *Ca. parvispora*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. brassicae* [(av. 53 × 4.5 µm); [Crous 2002](#)] are longer than those of *Ca. brachiatica* [(av. 44 × 5 µm); [Lombard et al. 2009](#)] and *Ca. parvispora* [(av. 29 × 4 µm); [Marin-Felix et al. 2017](#)] ([Supplementary Table S4](#)).

brassicicola *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 174. 2016.

In: *Calonectria kytensis* species complex.

Typus: CBS H-22753 holotype.

Ex-type culture: CBS 112841 = CMW 51206 = CPC 4552.

Type locality: **Indonesia**.

Type substrate: Soil under *Brassica* sp.

Barcodes: *cmdA* = KX784561; *tef1* = KX784689; *tub2* = KX784619.

Notes: *Calonectria brassicicola* is closely related to *Ca. sumatrensis*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. brassicicola* [(av. 42 × 5 µm); [Lombard et al. 2016](#)] are

shorter than those of *Ca. sumatrensis* [(av. 58 × 5 µm); [Crous et al. 2004](#)], and the vesicles of *Ca. brassicicola* (3–5 µm) are narrower than those of *Ca. sumatrensis* (8–13 µm) ([Crous et al. 2004](#), [Lombard et al. 2016](#)) ([Supplementary Table S4](#)).

brevistipitata *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 175. 2016.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-22754 holotype.

Ex-type culture: CBS 115671 = CMW 51226 = CPC 949.

Type locality: **Mexico**.

Type substrate: Soil.

Barcodes: *act* = MT334973; *cmdA* = MT335203; *his3* = MT335443; *rpb2* = MT412507; *tef1* = MT412734; *tub2* = MT412956 (alternative markers: ITS = MT359664; LSU = MT359424).

Notes: *Calonectria brevistipitata* is closely related to *Ca. nemoricola*, *Ca. pauciramosa* and *Ca. silvicola*, and can be distinguished from these three species by the dimensions of its macroconidia. The macroconidia of *Ca. brevistipitata* [(av. 31 × 3.5 µm); [Lombard et al. 2016](#)] are smaller than those of *Ca. nemoricola* [(av. 45 × 4 µm); [Alfenas et al. 2015](#)], *Ca. pauciramosa* [(av. 50 × 4.5 µm); [Crous 2002](#)] and *Ca. silvicola* [(av. 41 × 4.5 µm); [Alfenas et al. 2015](#)]. *Calonectria brevistipitata* is heterothallic ([Li et al. 2020](#)) ([Supplementary Table S4](#)).

bumicola *Calonectria* N.Q. Pham & M.J. Wingf., Mycologia 111: 94. 2019.

In: *Calonectria kytensis* species complex.

Typus: PREM 62123 holotype.

Ex-type culture: CBS 143575 = CMW 48257.

Type locality: **Indonesia**, Northern Sumatra, Aek Nauli.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334975; *cmdA* = MT335205; *his3* = MT335445; *rpb2* = MT412509; *tef1* = MT412736 (alternative markers: ITS = MT359666; LSU = MT359426).

Notes: *Calonectria bumicola* is phylogenetically closely related to *Ca. lantauensis* and can be differentiated from that species by the sequences of *act*, *cmdA*, *his3*, *rpb2* and *tef1* gene regions. The asexual and sexual morphs of *Ca. bumicola* could not be induced by [Pham et al. \(2019\)](#). This species was shown to be homothallic by [Li et al. \(2020\)](#).

canadiana *Calonectria* (J.C. Kang et al.) L. Lombard et al., IMA Fungus 1: 106. 2010.

Basionym: *Cylindrocladium canadense* J.C. Kang et al., Syst. Appl. Microbiol. 24: 210. 2001.

Synonyms: *Calonectria canadensis* (J.C. Kang et al.) L. Lombard et al., Stud. Mycol. 66: 56. 2010. *Nom. inval.*, Art. 53.1.

Calonectria montana Q.L. Liu & S.F. Chen, Mycokeys 26: 48. 2017.

In: *Calonectria kytensis* species complex.

Typus: PREM 57195 holotype.

Ex-type culture: CBS 110817 = CMW 23673 = STE-U 499.

Type locality: **Canada**.

Type substrate: *Picea* sp.

Barcodes: *act* = MT334976; *cmdA* = MT335206; *his3* = MT335446; *rpb2* = MT412510; *tef1* = MT412737; *tub2* = MT412958 (alternative markers: ITS = MT359667; LSU = MT359427).

Notes: Phylogenetically, *Ca. canadiana* forms a distinct lineage separate from other species in this species complex.

candelabrum *Calonectria* (Viégas) Rossman *et al.*, (as *candelabra*), *Stud. Mycol.* 80: 210. 2015.

Basionym: *Cylindrocladium candelabrum* Viégas, *Bragantia* 6: 370. 1946.

Synonyms: *Calonectria scoparia* Ribeiro & Matsuoka, In: Ribeiro, M.Sc. Thesis, Heterotalismo em *C. scoparium* Morgan: 28. 1978 (nom. inval., Art. 29).

Calonectria scoparia Peeraly, *Mycotaxon* 40: 341. 1991.

Calonectria pseudoscoparia L. Lombard *et al.*, *Stud. Mycol.* 66: 53. 2010.

In: *Calonectria candelabrum* species complex.

Typus: PREM 51044 (neotype of *Cy. candelabrum*; Crous 2002).

Ex-type culture: Not available.

Key cultures: CMW 31000 = CPC 1675 = UFV 117, CMW 31001 = STE-U 1679 = UFV 126 (Alfenas *et al.* 2015).

Key culture locality: **Brazil**, Amazonas (locality of CMW 31000 and CMW 31001; Alfenas *et al.* 2015).

Key culture substrate: *Eucalyptus* sp. (substrate of CMW 31000 and CMW 31001; Alfenas *et al.* 2015).

Barcodes: Culture CMW 31000: *act* = MT334977; *cmdA* = MT335207; *his3* = MT335447; *rpb2* = MT412511; *tef1* = MT412738; *tub2* = MT412959 (alternative markers: ITS = MT359668; LSU = MT359428); culture CMW 31001: *act* = MT334978; *cmdA* = MT335208; *his3* = MT335448; *rpb2* = MT412512; *tef1* = MT412739; *tub2* = MT412960 (alternative markers: ITS = MT359669; LSU = MT359429)

Notes: *Calonectria candelabrum* is closely related to *Ca. eucalypticola* and *Ca. venezuelana*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. candelabrum* [(av. 60 × 4.5 μm); Crous 2002] are longer than those of *Ca. eucalypticola* [(av. 50 × 4 μm); Alfenas *et al.* 2015] and *Ca. venezuelana* [(av. 58 × 5 μm); Lombard *et al.* 2016]. *Calonectria candelabrum* is heterothallic (Crous 2002, Li *et al.* 2020) (Supplementary Table S4).

cerciana *Calonectria* L. Lombard *et al.*, *Persoonia* 24: 7. 2010.

Synonyms: *Calonectria papillata* L. Lombard *et al.*, *Stud. Mycol.* 80: 175. 2015.

Calonectria terrestris L. Lombard *et al.*, *Stud. Mycol.* 80: 182. 2015.

In: *Calonectria cylindrospora* species complex.

Typus: PREM 60241 holotype.

Ex-type culture: CBS 123693 = CMW 25309.

Type locality: **China**, Guangdong, CERC nursery.

Type substrate: *E. urophylla* × *E. grandis* hybrid cutting.

Barcodes: *act* = MT334981; *cmdA* = MT335211; *his3* = MT335451; *rpb2* = MT412515; *tef1* = MT412742; *tub2* = MT412963 (alternative markers: ITS = MT359672; LSU = MT359432).

Notes: *Calonectria cerciana* is closely related to *Ca. tonkinensis*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. cerciana* (av. 44 × 5 μm) are larger than those of *Ca. tonkinensis* (av. 41.5 × 4 μm), and the vesicles of *Ca. cerciana* (8–13 μm) are wider than those of *Ca. tonkinensis* (3–7 μm) (Lombard *et al.* 2010c, Pham *et al.* 2019) (Supplementary Table S4).

chinensis *Calonectria* (Crous) L. Lombard *et al.*, *Stud. Mycol.* 66: 56. 2010.

Basionym: *Cylindrocladium chinense* Crous, *Stud. Mycol.* 50: 420. 2004.

Synonym: *Calonectria multistipitata* N.Q. Pham *et al.*, *Mycologia* 111: 98. 2019.

In: *Calonectria kyotensis* species complex.

Typus: PREM 62118 holotype.

Ex-type culture: CBS 114827 = CMW 23674 = CPC 4101.

Type locality: **China**, Hong Kong.

Type substrate: Soil.

Barcodes: *act* = MT334990; *cmdA* = MT335220; *his3* = MT335460; *rpb2* = MT412524; *tef1* = MT412751; *tub2* = MT412972 (alternative markers: ITS = MT359681; LSU = MT359441).

Notes: *Calonectria chinensis* is phylogenetically closely related to *Ca. cochinchinensis* and *Ca. heveicola*, it can be distinguished from these two species by the sequences of *cmdA*, *his3*, *rpb2*, *tef1* and *tub2* gene regions.

citri *Calonectria* (H.S. Fawc. & Klotz) L. Lombard *et al.*, *Stud. Mycol.* 66: 56. 2010.

Basionym: *Candelospora citri* H.S. Fawc. & Klotz, *Mycologia* 29: 213. 1937.

Synonym: *Cylindrocladium citri* (H.S. Fawc. & Klotz) Boedijn & Reitsma, *Reinwardtia* 1: 57. 1950.

In: *Calonectria mexicana* species complex.

Typus: K (isotype; Crous 2002).

Ex-type culture: CBS 186.36 = CMW 23675 (Lombard *et al.* 2010a).

Type locality: **USA**, Florida.

Type substrate: *Citrus sinensis*.

Barcodes: *act* = MT334992; *cmdA* = MT335222; *his3* = MT335462; *rpb2* = MT412526; *tef1* = MT412753; *tub2* = MT412974 (alternative markers: ITS = MT359683; LSU = MT359443).

Notes: *Calonectria citri* is closely related to *Ca. lauri*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. citri* [(av. 58 × 4 μm); Crous 2002] are smaller than those of *Ca. lauri* [(av. 60 × 5.5 μm); Lechat *et al.* 2010] (Supplementary Table S4).

clavata *Calonectria* Alfieri *et al.*, *Mycotaxon* 48: 206. 1993.

Synonym: *Cylindrocladium flexuosum* Crous, *Syst. Appl. Microbiol.* 18: 248. 1995.

In: *Calonectria brassicae* species complex.

Typus: FLAS F55430 [holotype of *Ca. clavata*; El-Gholl *et al.* 1993b], PREM 51721 (holotype of *Cy. flexuosum*; Crous *et al.* 1995).

Ex-type culture: CBS 114557 = CMW 23690 = CPC 2536 = P078-1543 = ATCC 66389 (Crous 2002, Lombard *et al.* 2010a).

Type locality: **USA**, Florida, Lake Placid.

Type substrate: *Callistemon viminalis*.

Barcodes: *act* = MT334993; *cmdA* = MT335223; *his3* = MT335463; *rpb2* = MT412527; *tef1* = MT412754; *tub2* = MT412975 (alternative markers: ITS = MT359684; LSU = MT359444).

Notes: Phylogenetically, *Ca. clavata* forms a distinct lineage separate from other species in this species complex. *Calonectria clavata* is heterothallic (El-Gholl *et al.* 1993b, Li *et al.* 2020).

cliffordiicola *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 177. 2016.

(see *Calonectria pauciramosa*)

In: *Calonectria candelabrum* species complex.

Typus: CBS H-22755 holotype.

Ex-type culture: CBS 111812 = CMW 51190 = CPC 2631.

Type locality: **South Africa**, Western Cape Province, George.

Type substrate: *Cliffordia feruginea*.

Barcodes: *act* = MT335084; *cmdA* = MT335316; *his3* = MT335556; *rpb2* = MT412609; *tef1* = MT412847; *tub2* = MT413059 (alternative markers: ITS = MT359777; LSU = MT359537).

Notes: *Calonectria cliffordiicola* was treated as a synonym of *Ca. pauciramosa* in this study. In comparisons of DNA sequences for eight gene regions, all the sequences of the isolates of *Ca. cliffordiicola* (ex-type CBS 111812, CBS 111814, and CBS 111819) were 100 % identical to those of the isolates of *Ca. pauciramosa* (ex-type CBS 138824, CMW 2151, CMW 7592, CMW 9151, CMW 30823, and CMW 30875). Both species produce obpyriform to ellipsoidal vesicles with overlapping dimensions (*Ca. cliffordiicola*: 7–9 µm; *Ca. pauciramosa*: 5–11 µm) and 1-septate macroconidia, the macroconidia of *Ca. cliffordiicola* (av. 40 × 4 µm) are smaller than those of *Ca. pauciramosa* (av. 50 × 4.5 µm) (Crous 2002, Lombard *et al.* 2016), which was considered to represent intraspecific variation (Supplementary Table S4).

cochinchinensis *Calonectria* N.Q. Pham *et al.*, Mycologia 111: 95. 2019.

In: *Calonectria kytensis* species complex.

Typus: PREM 62115 holotype.

Ex-type culture: CBS 143567 = CMW 49915.

Type locality: **Vietnam**, Tay Ninh, Duong Minh Chau.

Type substrate: Soil in *Hevea brasiliensis* plantation.

Barcodes: *act* = MT334995; *cmdA* = MT335225; *his3* = MT335465; *rpb2* = MT412529; *tef1* = MT412756; *tub2* = MT412977 (alternative markers: ITS = MT359686; LSU = MT359446).

Notes: *Calonectria cochinchinensis* is phylogenetically closely related to *Ca. heveicola* and can be differentiated from *Ca. heveicola* by sequence data of *act*, *cmdA*, *his3*, ITS, *tef1* and *tub2* gene regions. In addition, *Ca. cochinchinensis* produces longer stipe extensions [(147–208 µm); Pham *et al.* 2019] than those of *Ca. heveicola* [(138–189 µm); Pham *et al.* 2019] (Supplementary Table S4).

colhounii *Calonectria* Peerally, Mycol. Res. 61: 92. 1973.

Synonym: *Cylindrocladium colhounii* Peerally, Mycol. Res. 61: 92. 1973.

In: *Calonectria colhounii* species complex.

Typus: IMI 167581 holotype.

Ex-type culture: CBS 293.79 = CMW 30999.

Type locality: **Mauritius**.

Type substrate: *Camellia sinensis*.

Barcodes: *act* = GQ280443; *cmdA* = GQ267373; *his3* = DQ190639; *rpb2* = KY653376; *tef1* = GQ267301; *tub2* = DQ190564 (alternative markers: ITS = GQ280565; LSU = GQ280687).

Notes: *Calonectria colhounii* is phylogenetically closely related to *Ca. aciculata* and *Ca. honghensis*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. colhounii* [(av. 65 × 5 µm); Peerally 1973] are smaller than those of *Ca. aciculata* [(av. 69 × 5.5 µm); Li *et al.* 2017], and longer than those of *Ca. honghensis* [(av. 54 × 5.5 µm); Li *et al.* 2017]. In addition, the ascospores of *Ca. colhounii* (av. 55 × 6 µm) are longer than those of *Ca. honghensis* (av. 49 × 6 µm) (Peerally 1973, Li *et al.* 2017). *Calonectria colhounii* is homothallic (Peerally 1973) (Supplementary Table S4).

colombiana *Calonectria* L. Lombard *et al.*, Stud. Mycol. 66: 23. 2010.

In: *Calonectria candelabrum* species complex.

Typus: PREM 60295 holotype.

Ex-type culture: CBS 115127 = CMW 30871 = CPC 1160.

Type locality: **Colombia**, La Selva.

Type substrate: Soil.

Barcodes: *act* = GQ280538; *cmdA* = GQ267455; *his3* = FJ972442; *tef1* = FJ972492; *tub2* = FJ972423 (alternative markers: ITS = GQ280660; LSU = GQ280782).

Notes: *Calonectria colombiana* is closely related to *Ca. brevistipitata*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. colombiana* (av. 37 × 3 µm) are longer than those of *Ca. brevistipitata* (av. 31 × 3.5 µm), and the vesicles of *Ca. colombiana* (8–12 µm) are wider than those of *Ca. brevistipitata* (5–8 µm) (Lombard *et al.* 2010b, 2016). *Calonectria colombiana* is characterised as being homothallic, while *Ca. brevistipitata* is heterothallic (Lombard *et al.* 2010b, Li *et al.* 2020) (Supplementary Table S4).

colombiensis *Calonectria* Crous, Stud. Mycol. 50: 421. 2004.
Synonym: *Cylindrocladium colombiense* Crous, Stud. Mycol. 50: 421. 2004.

In: *Calonectria kytensis* species complex.

Typus: CBS 9890 holotype.

Ex-type culture: CBS 112220 = CMW 23676 = CPC 723.

Type locality: **Colombia**, La Selva.

Type substrate: Soil under *Eucalyptus grandis*.

Barcodes: *act* = MT334998; *cmdA* = MT335228; *his3* = MT335468; *rpb2* = MT412532; *tef1* = MT412759; *tub2* = MT412980 (alternative markers: ITS = MT359689; LSU = MT359449).

Notes: Phylogenetically, *Ca. colombiensis* forms a distinct lineage separate from other species in this species complex. *Ca. colombiensis* is homothallic (Li *et al.* 2020).

crousiana *Calonectria* S.F. Chen *et al.*, Persoonia 26: 6. 2011.

In: *Calonectria reteaudii* species complex.

Typus: PREM 60453 holotype.

Ex-type culture: CBS 127198 = CMW 27249.

Type locality: **China**, Fujian Province.

Type substrate: *Eucalyptus grandis*.

Barcodes: *act* = MT335000; *cmdA* = MT335230; *his3* = MT335470; *rpb2* = MT412534; *tef1* = MT412761; *tub2* = MT412982 (alternative markers: ITS = MT359691; LSU = MT359451).

Notes: Phylogenetically, *Ca. crousiana* forms a distinct lineage separate from other species in this species complex. *Calonectria crousiana* is homothallic (Chen et al. 2011, Li et al. 2020).

curvispora *Calonectria* (Crous & D. Victor) L. Lombard et al., Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium curvisporum* Crous & D. Victor, Syst. Appl. Microbiol. 20: 283. 1997.

Synonym: *Calonectria vegrandis* N.Q. Pham & M.J. Wingfield, Mycologia 111: 99. 2019.

In: *Calonectria kyotensis* species complex.

Typus: PREM 51751 holotype.

Ex-type culture: CBS 116159 = CMW 23693 = CPC 765.

Type locality: **Madagascar**, Tamatave.

Type substrate: Soil.

Barcodes: *act* = MT335002; *cmdA* = MT335232; *his3* = MT335472; *rpb2* = MT412536; *tef1* = MT412763 (alternative markers: ITS = MT359693; LSU = MT359453).

Notes: *Calonectria curvispora* is closely related to *Ca. aeknauliensis* and *Ca. ilicicola*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. curvispora* [(av. 60 × 5 μm); Victor et al. 1997] are smaller than those of *Ca. ilicicola* [(av. 62 × 6 μm); Boedijn & Reitsma 1950] but longer than those of *Ca. aeknauliensis* [(av. 47 × 5 μm); Pham et al. 2019] (Supplementary Table S4).

cylindrospora *Calonectria* (Ellis & Everh.) Rossman et al., Stud. Mycol. 80: 210. 2015.

Basionym: *Diplocladium cylindrosporum* Ellis & Everh., Bull. Torrey Bot. Club 27: 58. 1900.

Synonyms: *Cylindrocladium scoparium* Morgan, Bot. Gaz. 17: 191. 1892.

Cylindrocladium pithecolobii Petch, Ann. Roy. Bot. Gard. (Peradeniya) 6: 244. 1917.

Cylindrocladium ellipticum Alfieri et al., Phytopathology 60: 1213. 1970.

Calonectria morganii Crous et al., Mycol. Res. 97: 706. 1993.

Calonectria blephiliae Crous & Hodges, Persoonia 31: 225. 2013.

In: *Calonectria cylindrospora* species complex.

Typus: PREM 51042 (holotype of *Ca. morganii*; Crous et al. 1993a), BPI 414576 (neotype of *Cy. scoparium*; Crous et al. 1993a).

Ex-type culture: Not available.

Key cultures: CBS 119670 = CMW 51310 = CPC 12766, CBS 110666 = CMW 30978 = STE-U 497 = P90.1479 (Crous 2002, Lombard et al. 2015a).

Key culture locality: **Italy** (locality of CBS 119670; Lombard et al. 2015a), **USA**, Florida (locality of CBS 110666; Lombard et al. 2015a).

Key culture substrate: *Pistacia lentiscus* (substrate of CBS 119670; Lombard et al. 2015a), *Ilex vomitoria* (substrate of CBS 110666; Lombard et al. 2015a).

Barcodes: Culture CBS 119670: *act* = MT335006; *cmdA* = MT335236; *his3* = MT335476; *rpb2* = MT412540; *tef1* = MT412767; *tub2* = MT412985 (alternative markers:

ITS = MT359697; LSU = MT359457); culture CBS 110666: *act* = MT335007; *cmdA* = MT335237; *his3* = MT335477; *rpb2* = MT412541; *tef1* = MT412768; *tub2* = MT412986 (alternative markers: ITS = MT359698; LSU = MT359458).

Notes: *Calonectria cylindrospora* is phylogenetically closely related to *Ca. variabilis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. cylindrospora* [(av. 45 × 4 μm); Crous et al. 1993a, Lombard et al. 2015b] are smaller than those of *Ca. variabilis* [(av. 73 × 5 μm); Crous et al. 1993b], *Ca. variabilis* readily produces a microconidial morph in culture on CLA (Crous et al. 1993b), which is not observed in *Ca. cylindrospora* (Crous 2002). *Calonectria cylindrospora* is characterised as being heterothallic, while *Ca. variabilis* is homothallic (Crous et al. 1993b).

densa *Calonectria* L. Lombard et al., Stud. Mycol. 66: 46. 2010.

In: *Calonectria spathiphylli* species complex.

Typus: PREM 60302 holotype.

Ex-type culture: CBS 125261 = CMW 31182.

Type locality: **Ecuador**, Pichincha Province, Las Golondrinas.

Type substrate: Soil.

Barcodes: *act* = MT335008; *cmdA* = MT335238; *his3* = MT335478; *tef1* = MT412769; *tub2* = MT412987 (alternative markers: ITS = MT359699; LSU = MT359459).

Notes: *Calonectria densa* is closely related to *Ca. humicola* and it can be distinguished from that species by the formation of lateral stipe extensions, a characteristic not known for *Ca. humicola*. The macroconidia of *Ca. densa* [(av. 54 × 6 μm); Lombard et al. 2010a] are larger than those of *Ca. humicola* [(av. 51 × 5 μm); Lombard et al. 2010a] (Supplementary Table S4).

duoramosa *Calonectria* R.F. Alfenas et al., Stud. Mycol. 80: 100. 2015.

In: *Calonectria brassicae* species complex.

Typus: CBS H-21380 holotype.

Ex-type culture: CBS 134656 = LPF434.

Type locality: **Brazil**, Pará state, Monte Dourado.

Type substrate: Soil.

Barcodes: *cmdA* = KM396027; *his3* = KM396110; *tef1* = KM395853; *tub2* = KM395940.

Notes: *Calonectria duoramosa* forms a single lineage closely related to *Ca. octoramosa*, and the smaller numbers (−2) of fertile branches in its conidiogenous apparatus can be distinguished from *Ca. octoramosa* (−8). Furthermore, the macroconidia of *Ca. duoramosa* [(av. 46 × 4 μm); Alfenas et al. 2015] are longer than those of *Ca. octoramosa* [(av. 36 × 4 μm); Marin-Felix et al. 2017] (Supplementary Table S4).

ecuadorae *Calonectria* (Crous & M.J. Wingf.) L. Lombard et al., Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium ecuadorae* Crous & M.J. Wingf. (as *ecuadoriae*), Stud. Mycol. 55: 222. 2006.

Synonym: *Calonectria ecuadorensis* L. Lombard & Crous, Stud. Mycol. 86: 112. 2017.

In: *Calonectria brassicae* species complex.

Typus: CBS H-17871 holotype.

Ex-type culture: CBS 111406 = CMW 23677 = CPC 1635.

Type locality: **Ecuador**.

Type substrate: Soil.

Barcodes: *act* = MT335012; *cmdA* = MT335242; *his3* = MT335482; *rpb2* = MT412544; *tef1* = MT412773; *tub2* = MT412991 (alternative markers: ITS = MT359703; LSU = MT359463).

Notes: *Calonectria ecuadorae* is closely related to *Ca. octoramosa* and *Ca. pauciphialidica*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. ecuadorae* [(av. 51 × 4.5 µm); Crous *et al.* 2006] are larger than those of *Ca. octoramosa* [(av. 36 × 4 µm); Marin-Felix *et al.* 2017] and *Ca. pauciphialidica* (av. 29.5 × 3 µm) (Supplementary Table S4).

ecuadorensis *Calonectria* L. Lombard & Crous, Stud. Mycol. 86: 112. 2017

(see *Calonectria ecuadorae*)

In: *Calonectria brassicae* species complex.

Typus: CBS H-23134 holotype.

Ex-type culture: CBS 111706 = CMW 51821 = CPC 1636.

Type locality: **Ecuador**.

Type substrate: Soil.

Barcodes: *act* = MT335010; *cmdA* = MT335240; *his3* = MT335480; *rpb2* = MT412542; *tef1* = MT412771; *tub2* = MT412989 (alternative markers: ITS = MT359701; LSU = MT359461).

Notes: *Calonectria ecuadorensis* was treated as a synonym of *Ca. ecuadorae* in this study. In comparisons of DNA sequences for eight gene regions, the only difference between the ex-type isolate of *Ca. ecuadorensis* (CBS 111706) and the ex-type isolate of *Ca. ecuadorae* (CMW 23677) was in the *act*, *cmdA* and *rpb2* sequences, where there was one base difference in the *act*, two base differences in the *cmdA* and one base difference in the *rpb2* sequences. Both species produce clavate vesicles of similar dimensions (*Ca. ecuadorensis*: 4–6 µm; *Ca. ecuadorae*: 3–5 µm). The macroconidia of *Ca. ecuadorensis* (av. 37 × 4 µm) are smaller than those of *Ca. ecuadorae* (av. 51 × 4.5 µm) (Crous *et al.* 2006, Marin-Felix *et al.* 2017), which was considered to represent intraspecific variation (Supplementary Table S4).

ericae *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 178. 2016.

(see *Calonectria pauciramosa*)

In: *Calonectria candelabrum* species complex.

Typus: CBS H-22756 holotype.

Ex-type culture: CBS 114458 = CMW 51211 = CPC 2019.

Type locality: **USA**, California.

Type substrate: *Erica capensis*.

Barcodes: *act* = MT335087; *cmdA* = MT335319; *his3* = MT335559; *rpb2* = MT412612; *tef1* = MT412850; *tub2* = MT413062 (alternative markers: ITS = MT359780; LSU = MT359540).

Notes: *Calonectria ericae* was treated as a synonym of *Ca. pauciramosa* in this study. In comparisons of DNA sequences for eight gene regions, all the sequences of the isolates of *Ca. ericae* (ex-type CBS 114458, CBS 114456, and CBS 114457) were 100 % identical to those of the isolates of *Ca. pauciramosa* (ex-type CBS 138824, CMW 2151, CMW 7592, CMW 9151, CMW 30823, and CMW 30875). Both species produce obpyriform to ellipsoidal vesicles with similar dimensions (*Ca. ericae*: 6–10 µm; *Ca. pauciramosa*: 5–11 µm) and 1-septate macroconidia. The macroconidia of *Ca. ericae* (av. 37 × 4 µm) are smaller than those of *Ca. pauciramosa* (av. 50 × 4.5 µm) (Crous

2002, Lombard *et al.* 2016), which was considered to represent intraspecific variation (Supplementary Table S4).

eucalypti *Calonectria* L. Lombard *et al.*, Stud. Mycol. 66: 47. 2010.

Synonym: *Calonectria pseudocolhounii* S.F. Chen *et al.*, Per-sonia 26: 7. 2011.

In: *Calonectria colhounii* species complex.

Typus: PREM 60298 holotype.

Ex-type culture: CBS 125275 = CMW 18444.

Type locality: **Indonesia**, Sumatra Utara, Aek Nauli.

Type substrate: *Eucalyptus grandis*.

Barcodes: *act* = MT335013; *cmdA* = MT335243; *his3* = MT335483; *rpb2* = MT412545; *tef1* = MT412774; *tub2* = MT412992 (alternative markers: ITS = MT359704; LSU = MT359464).

Notes: *Calonectria eucalypti* is closely related to *Ca. aciculata* and *Ca. honghensis*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. eucalypti* [(av. 72 × 6 µm); Lombard *et al.* 2010a] are larger than those of *Ca. aciculata* [(av. 69 × 5.5 µm); Li *et al.* 2017] and *Ca. honghensis* [(av. 54 × 5.5 µm); Li *et al.* 2017]. *Calonectria eucalypti* is homothallic (Li *et al.* 2020) (Supplementary Table S4).

eucalypticola *Calonectria* R.F. Alfenas *et al.*, Stud. Mycol. 80: 105. 2015.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-21359 holotype.

Ex-type culture: CBS 134847 = LPF124.

Type locality: **Brazil**, Minas Gerais state, Santa Barbara.

Type substrate: *Eucalyptus* seedling.

Barcodes: *cmdA* = KM396051; *his3* = KM396134; *tef1* = KM395877; *tub2* = KM395964.

Notes: *Calonectria eucalypticola* is closely related to *Ca. candelabrum* and *Ca. venezuelana*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. eucalypticola* [(av. 50 × 4 µm); Alfenas *et al.* 2015] are smaller than those of *Ca. candelabrum* [(av. 60 × 4.5 µm); Crous 2002] and *Ca. venezuelana* [(av. 58 × 5 µm); Lombard *et al.* 2016] (Supplementary Table S4).

expansa *Calonectria* L. Lombard *et al.*, Stud. Mycol. 80: 167. 2015.

(see *Calonectria aconidialis*)

In: *Calonectria kytensis* species complex.

Typus: CBS H-21483 holotype.

Ex-type culture: CBS 136247 = CMW 31392 = CERC 1727.

Type locality: **China**, GuangXi Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334942; *cmdA* = MT335169; *his3* = MT335408; *rpb2* = MT412481; *tef1* = MT412699 (alternative markers: ITS = MT359629; LSU = MT359389).

Notes: *Calonectria expansa* was treated as a synonym of *Ca. aconidialis* in this study. In comparisons of DNA sequences for seven available gene regions, only a single base difference in the *tef1* gene sequence was found between the ex-type isolate of *Ca. expansa* (CMW 31392) and the ex-type isolate of *Ca. aconidialis* (CMW 35174). Both species are homothallic and produce orange to orange-brown perithecia, 8-spored asci and 1-septate

ascospores, and share the similar ascospores dimensions (*Ca. expansa*: av. $39 \times 6 \mu\text{m}$; *Ca. aconidialis*: av. $36 \times 6 \mu\text{m}$) (Lombard et al. 2015a, Li et al. 2020; Supplementary Table S4).

floridana *Calonectria* Sobers, *Phytopathology* 59: 366. 1969. (see *Calonectria kytensis*)

In: *Calonectria kytensis* species complex.

Typus: BPI 414553 holotype.

Ex-type culture: CBS 114692 = CMW 51826 = ATCC 18882.

Type locality: USA, Georgia.

Type substrate: *Prunus persica*.

Barcodes: *act* = MT335015; *cmdA* = MT335245; *his3* = MT335485; *rpb2* = MT412547; *tef1* = MT412776; *tub2* = MT412994 (alternative markers: ITS = MT359706; LSU = MT359466).

Notes: *Calonectria floridana* was treated as a synonym of *Ca. kytensis* in this study. In comparisons of DNA sequences for eight gene regions, the only difference between the ex-type isolate of *Ca. floridana* (CBS 114692) and the ex-type isolate of *Ca. kytensis* (CBS 114525) was in the *cmdA*, *his3* and LSU sequences, where there was one base difference in the *cmdA*, two base differences in the *his3* and one base difference in the LSU sequences. Both species are homothallic and produce globose vesicles of similar dimensions (*Ca. floridana*: $8.3\text{--}17.9 \mu\text{m}$; *Ca. kytensis*: $8.8\text{--}19 \mu\text{m}$) and 1-septate macroconidia. The macroconidia of *Ca. floridana* (av. $46 \times 4.3 \mu\text{m}$) are longer than those of *Ca. kytensis* (av. $41 \times 4 \mu\text{m}$) (Terashita 1968, Sobers 1969, Crous 2002), which was considered to represent intraspecific variation (Supplementary Table S4).

foliicola *Calonectria* L. Lombard et al., *Stud. Mycol.* 80: 167. 2015.

(see *Calonectria hawksworthii*)

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-21472 holotype.

Ex-type culture: CBS 136641 = CMW 31393.

Type locality: China, GuangXi Province.

Type substrate: *Eucalyptus urophylla* \times *E. grandis* clone leaf.

Barcodes: *act* = MT335017; *cmdA* = MT335247; *his3* = MT335487; *rpb2* = MT412549; *tef1* = MT412778; *tub2* = MT412996 (alternative markers: ITS = MT359708; LSU = MT359468).

Notes: *Calonectria foliicola* was treated as a synonym of *Ca. hawksworthii* in this study. In comparisons of DNA sequences for eight gene regions, the only differences between the ex-type isolate *Ca. foliicola* (CMW 31393) and the ex-type isolate *Ca. hawksworthii* (ex-type CBS 111870) was in the *act*, *his3* and *tub2* sequences, where there was one base difference in the *act*, three base differences in the *his3*, and three base differences in the *tub2* sequences. Both species produce ellipsoidal vesicles with overlapping dimensions (*Ca. foliicola*: $6\text{--}13 \mu\text{m}$; *Ca. hawksworthii*: $6\text{--}9 \mu\text{m}$) and 1-septate macroconidia. The macroconidia of *Ca. foliicola* (av. $47 \times 5 \mu\text{m}$) are shorter than those of *Ca. hawksworthii* (av. $56 \times 4 \mu\text{m}$) (Crous 2002, Lombard et al. 2015a), which was considered to represent intraspecific variation (Supplementary Table S4).

fragariae *Calonectria* R.F. Alfenas et al., *Australas. Plant. Pathol.* 47: 6. 2017.

In: *Calonectria candelabrum* species complex.

Typus: VIC 42833 holotype.

Ex-type culture: CBS 133607 = LPP040.

Type locality: Brazil, Espírito Santo State, Santa Maria do Jetibá.

Type substrate: *Fragaria* \times *ananassa*.

Barcodes: *cmdA* = KM998966; *his3* = KM998964; *tef1* = KM998963; *tub2* = KM998965.

Notes: *Calonectria fragariae* is closely related to *Ca. pseudospathulata*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. fragariae* [(av. $39 \times 4 \mu\text{m}$); Lopes et al. 2017] are shorter than those of *Ca. pseudospathulata* [(av. $43 \times 4 \mu\text{m}$); Alfenas et al. 2015] (Supplementary Table S4).

fujianensis *Calonectria* S.F. Chen et al., *Persoonia* 26: 8. 2011. *Synonym*: *Calonectria nymphaeae* Yong Wang bis et al., *Mycotaxon* 122: 181. 2013.

In: *Calonectria colhounii* species complex.

Typus: PREM 60460 holotype.

Ex-type culture: CBS 127201 = CMW 27257.

Type locality: China, Fujian Province.

Type substrate: *Eucalyptus grandis*.

Barcodes: *act* = MT335019; *cmdA* = MT335249; *his3* = MT335489; *rpb2* = MT412551; *tef1* = MT412780; *tub2* = MT412998 (alternative markers: ITS = MT359710; LSU = MT359470).

Notes: *Calonectria fujianensis* is phylogenetically closely related to *Ca. lichii*. The sequences of ITS, *tef1* and *tub2* gene regions can differentiate *Ca. fujianensis* from that species. The macroconidia of *Ca. fujianensis* [(av. $52.5 \times 4 \mu\text{m}$); Chen et al. 2011] are smaller than those of *Ca. lichii* [(av. $65.7 \times 6 \mu\text{m}$); Liu & Chen 2017]. *Calonectria fujianensis* is homothallic (Chen et al. 2011) (Supplementary Table S4).

glaeibicola *Calonectria* R.F. Alfenas et al., *Stud. Mycol.* 80: 106. 2015.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-21378 holotype.

Ex-type culture: CBS 134852 = LPF406.

Type locality: Brazil, Minas Gerais state, Martinho Campos.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *cmdA* = KM396053; *his3* = KM396136; *tef1* = KM395879; *tub2* = KM395966.

Notes: *Calonectria glaeibicola* is closely related to *Ca. brassiana*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. glaeibicola* (av. $50 \times 4 \mu\text{m}$) are shorter than those of *Ca. brassiana* (av. $53 \times 4 \mu\text{m}$) (Alfenas et al. 2015) (Supplementary Table S4).

gordoniae *Calonectria* (Leahy et al.) L. Lombard et al., *Stud. Mycol.* 66: 56. 2010.

Basionym: *Cylindrocladium gordoniae* Leahy et al., *Mycotaxon* 76: 80. 2000.

In: *Calonectria pteridis* species complex.

Typus: FLAS F56790 holotype.

Ex-type culture: CBS 112142 = CMW 23694 = STE-U 3136 = ATCC 201837 = P97-2567.

Type locality: USA, Florida.

Type substrate: *Gordonia lasianthus*.

Barcodes: *act* = MT335021; *cmdA* = MT335251; *his3* = MT335491; *rpb2* = MT412553; *tef1* = MT412782;

tub2 = MT413000 (alternative markers: ITS = MT359712; LSU = MT359472).

Notes: *Calonectria gordoniae* is closely related to *Ca. ovata*, *Ca. pseudovata* and *Ca. terricola*, and can be distinguished from these three species by the dimensions of its macroconidia. The macroconidia of *Ca. gordoniae* [(av. 50 × 4.5 µm); Leahy *et al.* 2000] are smaller than those of *Ca. ovata* [(av. 70 × 5 µm); El-Gholl *et al.* 1993a] and *Ca. pseudovata* [(av. 69 × 5 µm); Alfenas *et al.* 2015], but longer than those of *Ca. terricola* [(av. 46 × 4.5 µm); Lombard *et al.* 2016] (Supplementary Table S4).

gracilipes Calonectria Crous & Mchau, *Mycologia* 89: 654. 1997.

Synonym: *Cylindrocladium graciloideum* Crous & Mchau, *Mycologia* 89: 654. 1997.

In: *Calonectria gracilipes* species complex.

Typus: PREM 54417 (holotype of *Ca. gracilipes*; Crous *et al.* 1997a), PREM 55299 (holotype of *Cy. graciloideum*; Crous *et al.* 1997a).

Ex-type culture: CBS 115674 = CMW 51227 = STE-U 1153 (Crous 2002, Crous *et al.* 2006).

Type locality: Colombia, La Selva.

Type substrate: Soil.

Barcodes: *act* = MT335022; *cmdA* = MT335252; *his3* = MT335492; *rpb2* = MT412554; *tef1* = MT412783; *tub2* = MT413001 (alternative markers: ITS = MT359713; LSU = MT359473).

Notes: *Calonectria gracilipes* is closely related to *Ca. angustata*, *Ca. hurae*, *Ca. leguminum* and *Ca. rumohrae*, and can be distinguished from these four species by the dimensions of its macroconidia. The macroconidia of *Ca. gracilipes* [(av. 45 × 4.5 µm); Crous *et al.* 1997a] are smaller than those of *Ca. angustata* [(av. 110 × 10 µm); Crous *et al.* 2000], *Ca. hurae* [(av. 120 × 7.5 µm); Crous 2002], *Ca. leguminum* [(av. 60 × 5 µm); Figueiredo & Namekata 1967, Crous 2002] and *Ca. rumohrae* [(av. 110 × 9 µm); El-Gholl *et al.* 1997]. *Calonectria gracilipes* is homothallic (Crous *et al.* 1997a) (Supplementary Table S4).

gracilis Calonectria Crous *et al.*, *Mycotaxon* 46: 224. 1993.

Synonym: *Cylindrocladium pseudogracile* Crous, *Mycol. Res.* 101: 213. 1997.

In: *Calonectria brassicae* species complex.

Typus: PREM 51031a (holotype of *Ca. gracilis*; Crous *et al.* 1993c), PREM 51031b (holotype of *Cy. pseudogracile*; Crous *et al.* 1997b).

Ex-type culture: CBS 111807 = CMW 51189 = STE-U 2634 = AR2677 = PPRI 4176. (Crous 2002, Lombard *et al.* 2016)

Type locality: Brazil, Pará state.

Type substrate: *Manilkara zapota*.

Barcodes: *act* = GQ280488; *cmdA* = GQ267407; *his3* = DQ190646; *rpb2* = KY653390; *tef1* = GQ267323; *tub2* = AF232858 (alternative markers: ITS = GQ280610; LSU = GQ280732).

Notes: *Calonectria gracilis* is closely related to *Ca. quinquerosa*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. gracilis* (av. 56 × 4.5 µm) are smaller than those of *Ca. quinquerosa* (av. 59 × 5 µm), while the vesicles of *Ca. gracilis* [(2–11 µm); Crous *et al.* 1993c] are wider than those of *Ca. quinquerosa* [(3–5 µm); Alfenas *et al.* 2015]. *Calonectria gracilis* is homothallic (Li *et al.* 2020) (Supplementary Table S4).

guangxiensis Calonectria L. Lombard *et al.*, *Stud. Mycol.* 80: 169. 2015.

(see ***Calonectria aconidialis***)

In: *Calonectria kyotensis* species complex.

Typus: CBS H-21484 holotype.

Ex-type culture: CBS 136092 = CMW 35409 = CERC 1900.

Type locality: China, GuangXi Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334944; *cmdA* = MT335171; *his3* = MT335410; *tef1* = MT412701 (alternative markers: ITS = MT359631; LSU = MT359391).

Notes: *Calonectria guangxiensis* was treated as a synonym of *Ca. aconidialis* in this study. In comparisons of DNA sequences for six gene regions (*rpb2* and *tub2* are not available for *Ca. guangxiensis*, *tub2* not available for *Ca. aconidialis*), all six gene sequences for isolates of *Ca. guangxiensis* (ex-type isolate CMW 35409, and CMW 35411) were 100 % identical to the ex-type isolate of *Ca. aconidialis* (CMW 35174). Both species are homothallic and produce orange to orange-brown perithecia, 8-spored asci and 1-septate ascospores, and share the similar ascospores dimensions (*Ca. guangxiensis*: av. 36 × 6 µm; *Ca. aconidialis*: av. 36 × 6 µm) (Lombard *et al.* 2015a, Li *et al.* 2020; Supplementary Table S4).

hainanensis Calonectria L. Lombard *et al.*, *Stud. Mycol.* 80: 170. 2015.

(see ***Calonectria aconidialis***)

In: *Calonectria kyotensis* species complex.

Typus: CBS H-21480 holotype.

Ex-type culture: CBS 136248 = CMW 35187 = CERC 1863.

Type locality: China, HaiNan Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334946; *cmdA* = MT335173; *his3* = MT335412; *tef1* = MT412703 (alternative markers: ITS = MT359633; LSU = MT359393).

Notes: *Calonectria hainanensis* was treated as a synonym of *Ca. aconidialis* in this study. In comparisons of DNA sequences for six available gene regions (*rpb2* and *tub2* are not available for *Ca. hainanensis*, *tub2* not available for *Ca. aconidialis*), all six gene sequences for the ex-type isolate of *Ca. hainanensis* (CMW 35187) were 100 % identical to the ex-type isolate of *Ca. aconidialis* (CMW 35174). Both species are homothallic and produce orange to orange-brown perithecia, 8-spored asci and 1-septate ascospores, and share the similar ascospores dimensions (*Ca. hainanensis*: av. 34 × 6 µm; *Ca. aconidialis*: av. 36 × 6 µm) (Lombard *et al.* 2015a; Supplementary Table S4).

hawksworthii Calonectria (Peerally) L. Lombard *et al.*, *Stud. Mycol.* 66: 56. 2010.

Basionym: *Cylindrocladium hawksworthii* Peerally, *Mycotaxon* 40: 375. 1991.

Synonyms: *Calonectria sulawesiensis* L. Lombard *et al.*, *Stud. Mycol.* 66: 53. 2010.

Calonectria foliicola L. Lombard *et al.*, *Stud. Mycol.* 80: 167. 2015.

In: *Calonectria cylindrospora* species complex.

Typus: MUCL 30866 holotype.

Ex-type culture: CBS 111870 = CMW 51194 = CPC 2405.

Type locality: Mauritius, Pamplemousses garden.

Type substrate: Leaves of *Nelumbo nucifera*.

Barcodes: *act* = MT335024; *cmdA* = MT335254; *his3* = MT335494; *rpb2* = MT412556; *tef1* = MT412785; *tub2* = MT413003 (alternative markers: ITS = MT359715; LSU = MT359475).

Notes: *Calonectria hawksworthii* is closely related to *Ca. brasiliensis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. hawksworthii* [(av. 56 × 4 μm); Crous 2002] are larger than those of *Ca. brasiliensis* [(av. 38 × 3.5 μm); Batista 1951] (Supplementary Table S4).

henricotiae *Calonectria* Gehesquière et al., Pl. Pathol. 65: 47. 2015.

In: *Calonectria naviculata* species complex.

Typus: BPI 892910 holotype.

Ex-type culture: CBS 138102 = CB045.

Type locality: **Belgium**, East Flanders, Lokeren.

Type substrate: *Buxus sempervirens*.

Barcodes: *cmdA* = KF815157; *his3* = KF815185; *tub2* = JX535308 (alternative markers: ITS = JX535322).

Notes: *Calonectria henricotiae* is closely related to *Ca. pseudonaviculata*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. henricotiae* [(av. 56 × 5.6 μm); Gehesquiere et al. 2015] are shorter than those of *Ca. pseudonaviculata* [(av. 60 × 5 μm); Crous et al. 2002]. *Calonectria henricotiae* is heterothallic (Li et al. 2020) (Supplementary Table S4).

heveicola *Calonectria* N.Q. Pham et al., Mycologia 111: 95. 2019.

In: *Calonectria kyotensis* species complex.

Typus: PREM 62118 holotype.

Ex-type culture: CBS 143570 = CMW 49913.

Type locality: **Vietnam**, Binh Duong, Bau Bang.

Type substrate: Soil in *Hevea brasiliensis* plantation.

Barcodes: *act* = MT335025; *cmdA* = MT335255; *his3* = MT335495; *tef1* = MT412786; *tub2* = MT413004 (alternative markers: ITS = MT359716; LSU = MT359476).

Notes: *Calonectria heveicola* is phylogenetically closely related to *Ca. cochinchinensis* and can be differentiated from that species by sequences of *act*, *cmdA*, *his3*, ITS, *tef1* and *tub2* gene regions. In addition, *Ca. heveicola* [(138–189 μm); Pham et al. 2019] produces shorter stipe extensions than those of *Ca. cochinchinensis* [(147–208 μm); Pham et al. 2019]. *Calonectria heveicola* is heterothallic (Li et al. 2020) (Supplementary Table S4).

hodgesii *Calonectria* R.F. Alfenas et al., Trop. Plant. Pathol. 38: 517. 2013.

(see ***Calonectria brasiliensis***)

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-21147 holotype.

Ex-type culture: CBS 133609 = LPF245.

Type locality: **Brazil**, Minas Gerais state, Viçosa.

Type substrate: *Anadenanthera peregrina*.

Barcodes: *cmdA* = KC491222; *tef1* = KC491225; *tub2* = KC491228.

Notes: *Calonectria hodgesii* was treated as a synonym of *Ca. brasiliensis* in this study. In comparisons of DNA sequences for three available gene regions, the only difference between the ex-

type isolate of *Ca. hodgesii* (CBS 133609) and the ex-type isolate of *Ca. brasiliensis* (CBS 230.51) was in the *cmdA*, *tef1* and *tub2* sequences, where there were three base differences in the *cmdA*, one base difference in the *tef1* and one base difference in the *tub2* sequences. Both species produce ellipsoidal vesicles of similar dimensions (*Ca. hodgesii*: 6–11 μm; *Ca. brasiliensis*: 7–11 μm) and 1-septate macroconidia. The macroconidia of *Ca. hodgesii* (av. 50 × 4.5 μm) are larger than those of *Ca. brasiliensis* (av. 38 × 3.5 μm) (Batista 1951, Lombard et al. 2010b, Alfenas et al. 2013b), which was considered to represent intraspecific variation (Supplementary Table S4).

honghensis *Calonectria* J.Q. Li et al., IMA Fungus 8: 273. 2017.

In: *Calonectria colhounii* species complex.

Typus: PREM 61943 holotype.

Ex-type culture: CBS 142885 = CMW 47669 = CERC 5572.

Type locality: **China**, YunNan Province, HongHe Region.

Type substrate: Soil in a *Eucalyptus* plantation.

Barcodes: *act* = MT335026; *cmdA* = MT335256; *his3* = MT335496; *rpb2* = MT412557; *tef1* = MT412787; *tub2* = MT413005 (alternative markers: ITS = MT359717; LSU = MT359477).

Notes: *Calonectria honghensis* is closely related to *Ca. aciculata* and *Ca. colhounii*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. honghensis* [(av. 54 × 5.5 μm); Li et al. 2017] are shorter than those of *Ca. aciculata* [(av. 69 × 5.5 μm); Li et al. 2017] and *Ca. colhounii* [(av. 65 × 5 μm); Peerally 1973]. In addition, the ascospores of *Ca. honghensis* (av. 49 × 6 μm) are shorter than those of *Ca. colhounii* (av. 55 × 6 μm) (Peerally 1973, Li et al. 2017). *Calonectria honghensis* is homothallic (Li et al. 2020) (Supplementary Table S4).

hongkongensis *Calonectria* Crous, Stud. Mycol. 50: 422. 2004.

Synonym: *Cylindrocladium hongkongense* Crous, Stud. Mycol. 50: 422. 2004.

In: *Calonectria kyotensis* species complex.

Typus: CBS 9886 holotype.

Ex-type culture: CBS 114828 = CMW 51217 = CPC 4670.

Type locality: **China**, Hong Kong.

Type substrate: Soil.

Barcodes: *act* = MT335028; *cmdA* = MT335258; *his3* = MT335498; *rpb2* = MT412559; *tef1* = MT412789; *tub2* = MT413007 (alternative markers: ITS = MT359719; LSU = MT359479).

Notes: *Calonectria hongkongensis* is closely related to *Ca. kyotensis*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. hongkongensis* [(av. 46.5 × 4 μm); Crous et al. 2004] are longer than those of *Ca. kyotensis* [(av. 41 × 4 μm); Terashita 1968], whereas the vesicles of *Ca. hongkongensis* (8–14 μm) are narrower than those of *Ca. kyotensis* (8.8–19 μm) (Soberos 1972, Crous et al. 2004). *Calonectria hongkongensis* is homothallic (Crous et al. 2004) (Supplementary Table S4).

humicola *Calonectria* L. Lombard et al., Stud. Mycol. 66: 49. 2010

In: *Calonectria spathiphylli* species complex.

Typus: PREM 60369 holotype.

Ex-type culture: CBS 125251 = CMW 31183.

Type locality: **Ecuador**, Pichincha Province, Las Golondrinas.

Type substrate: Soil.

Barcodes: *act* = MT335032; *cmdA* = MT335262; *his3* = MT335502; *tef1* = MT412793; *tub2* = MT413011 (alternative markers: ITS = MT359723; LSU = MT359483).

Notes: *Calonectria humicola* is phylogenetically closely related to *Ca. densa*, and can be distinguished from that species by its lack of lateral stipe extensions, a feature that is common in *Ca. densa*. The macroconidia of *Ca. humicola* [(av. 51 × 5 µm); Lombard *et al.* 2010a] are smaller than those of *Ca. densa* [(av. 54 × 6 µm); Lombard *et al.* 2010a] (Supplementary Table S4).

hurae *Calonectria* (Linder & Whetzel) L. Lombard *et al.*, Stud. Mycol. 66: 56. 2010.

Basionym: *Cercospora hurae* Linder & Whetzel, Mycologia 29: 656. 1937.

Synonyms: *Cylindrocladiopsis hurae* (Linder & Whetzel) U. Braun, Mycotaxon 51: 40. 1994.

Cylindrocladium hurae (Linder & Whetzel) Crous, In: Taxonomy and pathology of *Cylindrocladium* (*Calonectria*) and allied genera: 185. 2002.

Cylindrocladium heptaseptatum Sobers *et al.*, Phytopathology 65: 333. 1975.

Cylindrocladiopsis lagerstroemiae J.M. Yen, Mycotaxon 8: 236. 1979.

In: *Calonectria gracilipes* species complex.

Typus: Chardon No. 363 (lectotype, Crous 2002).

Ex-type culture: Not available.

Key culture: CBS 114182 = CMW 51823 = CPC 1714 = UFV 216 (Lombard *et al.* 2016).

Key culture locality: **Brazil** (Lombard *et al.* 2016).

Key culture substrate: *Rumohra adiantiformis* (Lombard *et al.* 2016).

Barcodes: Culture CBS 114182: *act* = MT335035; *cmdA* = MT335265; *his3* = MT335505; *rpb2* = MT412563; *tef1* = MT412796; *tub2* = MT413014 (alternative markers: ITS = MT359726; LSU = MT359486).

Notes: *Calonectria hurae* is phylogenetically closely related to *Ca. angustata* and *Ca. rumohrae*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. hurae* [(av. 120 × 7.5 µm); Crous 2002] are longer and narrower than those of *Ca. angustata* [(av. 110 × 10 µm); Crous *et al.* 2000] and *Ca. rumohrae* [(av. 110 × 9 µm); El-Gholl *et al.* 1997] (Supplementary Table S4).

ilicicola *Calonectria* Boedijn & Reitsma, Reinwardtia 1: 58. 1950.

Synonyms: *Calonectria theae* var. *crotalariae* Loos, Trans. Brit. Mycol. Soc. 33: 18. 1950.

Calonectria crotalariae (Loos) D.K. Bell & Sobers, Phytopathology 56: 1364. 1966.

Cylindrocladium crotalariae (Loos) D.K. Bell & Sobers, Phytopathology 56: 1364. 1966. (*nom. inval.*!, Art.36)

Cylindrocladium parasiticum Crous, M.J. Wingf. & Alfenas, Mycol. Res. 97: 892. 1993.

In: *Calonectria kytensis* species complex.

Typus: IMI 264540 holotype.

Ex-type culture: CBS 190.50 = CMW 30998 = STE-U 2482 = IMI 299389.

Type locality: **Indonesia**, Java, Bogor.

Type substrate: *Solanum tuberosum*.

Barcodes: *act* = MT335036; *cmdA* = MT335266; *his3* = MT335506; *rpb2* = MT412564; *tef1* = MT412797 (alternative markers: ITS = MT359727; LSU = MT359487).

Notes: *Calonectria ilicicola* is closely related to *Ca. aeknauliensis* and *Ca. curvispora*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. ilicicola* [(av. 62 × 6 µm); Boedijn & Reitsma 1950] are larger than those of *Ca. aeknauliensis* [(av. 47 × 5 µm); Pham *et al.* 2019] and *Ca. curvispora* [(av. 60 × 5 µm); Victor *et al.* 1997]. *Calonectria ilicicola* is homothallic (Li *et al.* 2020) (Supplementary Table S4).

indonesiae *Calonectria* (Crous) L. Lombard *et al.*, Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium indonesiae* Crous, Stud. Mycol. 50: 424. 2004.

In: *Calonectria kytensis* species complex.

Typus: CBS 9891 holotype.

Ex-type culture: CBS 112823 = CMW 23683 = CPC 4508.

Type locality: **Indonesia**, Warambunga.

Type substrate: Soil.

Barcodes: *act* = MT335037; *cmdA* = MT335267; *his3* = MT335507; *rpb2* = MT412565; *tef1* = MT412798; *tub2* = MT413015 (alternative markers: ITS = MT359728; LSU = MT359488).

Notes: *Calonectria indonesiae* is phylogenetically closely related to *Ca. chinensis*, *Ca. cochinchinensis* and *Ca. heveicola*, and can be distinguished from these three species by the dimensions of its macroconidia. The macroconidia of *Ca. indonesiae* [(av. 50.5 × 4 µm); Crous *et al.* 2004] are longer than those of *Ca. chinensis* [(av. 45 × 4 µm); Crous *et al.* 2004], *Ca. cochinchinensis* [(av. 46 × 4 µm); Pham *et al.* 2019] and *Ca. heveicola* [(av. 44.5 × 4 µm); Pham *et al.* 2019] (Supplementary Table S4).

indonesiana *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 179. 2016.

(see *Calonectria sumatrensis*)

In: *Calonectria kytensis* species complex.

Typus: CBS H-22757 holotype.

Ex-type culture: CBS 112936 = CMW 51207 = CPC 4504.

Type locality: **Indonesia**, Northern Sumatra.

Type substrate: Soil.

Barcodes: *act* = MT335143; *cmdA* = MT335380; *his3* = MT335620; *rpb2* = MT412672; *tef1* = MT412911 (alternative markers: ITS = MT359841; LSU = MT359601).

Notes: *Calonectria indonesiana* was treated as a synonym of *Ca. sumatrensis* in this study. In comparisons of DNA sequences for seven available gene regions, the only differences between the ex-type isolate of *Ca. indonesiana* (CBS 112936) and the ex-type isolate of *Ca. sumatrensis* (CMW 23698) were two base differences in the *his3* gene region. Both species produce sphaeropedunculate vesicles with overlapping dimensions (*Ca. indonesiana*: 8–10 µm; *Ca. sumatrensis*: 8–13 µm) and 1-septate macroconidia. Macroconidia of *Ca. indonesiana* (av. 43 × 5 µm) are shorter than those of *Ca. sumatrensis* (av. 58 × 5 µm), which was considered to represent intraspecific variation (Crous *et al.* 2004, Lombard *et al.* 2016) (Supplementary Table S4).

indusiata Calonectria (Seaver) Crous, Taxonomy and pathology of *Cylindrocladium* (*Calonectria*) and allied genera: 94. 2002. *Basionym*: *Nectria indusiata* Seaver, Mycologia 20: 58. 1928. *Synonyms*: *Cercospora theae* Petch, Ann. Roy. Bot. Gard. Peradeniya. 6: 246. 1917.

Candelospora theae (Petch) Wakef. ex Gadd, Monographs on Tea Production in Ceylon: 59. 1949.

Cylindrocladium theae (Petch) Subram., In: Subramnian, *Hyphomycetes, an account of Indian species, except Cercosporae*: 731. 1971.

Cylindrocladium theae (Petch) Alfieri & Sobers, Phytopathology 62: 650. 1972 (homonym).

Calonectria theae Loos, Trans. Brit. Mycol. Soc. 33: 17. 1950.

In: *Calonectria colhounii* species complex.

Typus: No. 3176 holotype.

Ex-type culture: CBS 144.36 = CMW 23699.

Type locality: **Sri Lanka**.

Type substrate: *Camellia sinensis*.

Barcodes: *act* = GQ280536; *cmdA* = GQ267453; *his3* = GQ267262; *rpb2* = KY653396; *tef1* = GQ267332; *tub2* = GQ267239 (alternative markers: ITS = GQ280658; LSU = GQ280780).

Notes: Phylogenetically, *Ca. indusiata* forms a distinct lineage separate from other species in the *Ca. colhounii* species complex. The macroconidia of *Ca. indusiata* (av. $81 \times 6 \mu\text{m}$) are smaller than those of *Ca. macroconidialis* (av. $90 \times 6.5 \mu\text{m}$), and longer than other species in the *Ca. colhounii* species complex (Supplementary Table S4).

insularis Calonectria C.L. Schoch & Crous, Mycologia 91: 293. 1999.

Synonym: *Cylindrocladium insulare* C.L. Schoch & Crous, Mycologia 91: 293. 1999.

In: *Calonectria cylindrospora* species complex.

Typus: PREM 55760 [holotype of *Ca. insularis*; Schoch et al. 1999], PREM 55758 (holotype of *Cy. insulare*; Schoch et al. 1999).

Ex-type culture: CBS 114558 = CMW 30991 = CPC 768 (Crous 2002, Lombard et al. 2015a)

Type locality: **Madagascar**, Tamatave.

Type substrate: Soil.

Barcodes: *cmdA* = MT335269; *his3* = MT335509; *rpb2* = MT412567; *tef1* = MT412800; *tub2* = MT413017 (alternative markers: ITS = MT359730; LSU = MT359490).

Notes: *Calonectria insularis* is closely related to *Ca. cylindrospora* and *Ca. variabilis*, and can be distinguished from these two species by the dimensions of its ascospores and macroconidia. The ascospores of *Ca. insularis* [(av. $33 \times 6 \mu\text{m}$); Schoch et al. 1999] are shorter than those of *Ca. cylindrospora* [(av. $37 \times 6 \mu\text{m}$); Crous et al. 1993a, Lombard et al. 2015b] and *Ca. variabilis* [(av. $42 \times 5 \mu\text{m}$); Crous et al. 1993b]. The macroconidia of *Ca. insularis* [(av. $45 \times 4 \mu\text{m}$); Schoch et al. 1999] are smaller than those of *Ca. variabilis* [(av. $73 \times 5 \mu\text{m}$); Crous et al. 1993b]. *Calonectria insularis* and *Ca. cylindrospora* are characterised as being heterothallic, while *Ca. variabilis* is homothallic (Crous et al. 1993b, Schoch et al. 1999).

kyotensis Calonectria Terash., Trans. Mycol. Soc. Japan. 8: 124. 1968.

Synonyms: *Calonectria floridana* Sobers, Phytopathology 59: 366. 1969.

Calonectria turangicola L. Lombard et al., Stud. Mycol. 80: 184. 2015.

Calonectria pseudoturangicola J.Q. Li et al., IMA Fungus 8: 279. 2017.

In: *Calonectria kyotensis* species complex.

Typus: IFO No. 11597 holotype.

Ex-type culture: CBS 114525 = CMW 51824 = CPC 2367 = ATCC 18834.

Type locality: **Japan**.

Type substrate: *Robinia pseudoacacia*.

Barcodes: *act* = MT335039; *cmdA* = MT335271; *his3* = MT335511; *rpb2* = MT412569; *tef1* = MT412802; *tub2* = MT413019 (alternative markers: ITS = MT359732; LSU = MT359492).

Notes: *Calonectria kyotensis* is closely related to *Ca. hongkongensis*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. kyotensis* [(av. $41 \times 4 \mu\text{m}$); Terashita 1968] are shorter than those of *Ca. hongkongensis* [(av. $46.5 \times 4 \mu\text{m}$); Crous et al. 2004], whereas the vesicles of *Ca. kyotensis* ($8.8\text{--}19 \mu\text{m}$) are wider than those of *Ca. hongkongensis* ($8\text{--}14 \mu\text{m}$) (Sobers 1972, Crous et al. 2004). *Calonectria kyotensis* is homothallic (Terashita 1968) (Supplementary Table S4).

lageniformis Calonectria L. Lombard & Crous, Stud. Mycol. 85: 181. 2016.

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-22758 holotype.

Ex-type culture: CBS 111324 = CMW 51177 = CPC 1473.

Type locality: **Mauritius**, Rivière Noire.

Type substrate: *Eucalyptus* sp.

Barcodes: *cmdA* = KX784574; *rpb2* = KY653400; *tef1* = KX784702; *tub2* = KX784632 (alternative markers: ITS = KY653256; LSU = KY653312).

Notes: *Calonectria lageniformis* is closely related to *Ca. auriculiformis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. lageniformis* (av. $40 \times 5 \mu\text{m}$) are shorter than those of *Ca. auriculiformis* (av. $43 \times 4 \mu\text{m}$). *Calonectria lageniformis* only produces up to three branches per conidiophore, whereas *Ca. auriculiformis* can have up to five branches per conidiophore (Lombard et al. 2016, Pham et al. 2019).

lantauensis Calonectria J.Q. Li et al., IMA Fungus 8: 277. 2017.

In: *Calonectria kyotensis* species complex.

Typus: PREM 61946 holotype.

Ex-type culture: CBS 142888 = CMW 47252 = CERC 3302.

Type locality: **China**, Hong Kong Region, LiDao District.

Type substrate: Soil.

Barcodes: *act* = MT335040; *cmdA* = MT335272; *his3* = MT335512; *rpb2* = MT412570; *tef1* = MT412803 (alternative markers: ITS = MT359733; LSU = MT359493).

Notes: *Calonectria lantauensis* is phylogenetically closely related to *Ca. bumicola*. This species can be differentiated from *Ca. bumicola* by the sequences of *act*, *cmdA*, *his3*, *rpb2* and *tef1* gene regions.

lateralis Calonectria L. Lombard et al., Stud. Mycol. 80: 173. 2015.

In: *Calonectria kyotensis* species complex.

Typus: CBS H-21469 holotype.

Ex-type culture: CBS 136629 = CMW 31412.

Type locality: **China**, GuangXi Province.

Type substrate: Soil in a *Eucalyptus* plantation.

Barcodes: *act* = MT335042; *cmdA* = MT335274; *his3* = MT335514; *rpb2* = MT412571; *tef1* = MT412805; *tub2* = MT413020 (alternative markers: ITS = MT359735; LSU = MT359495).

Notes: *Calonectria lateralis* is closely related to *Ca. hongkongensis* and *Ca. kyotensis*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. lateralis* [(av. 39 × 4 µm); Lombard *et al.* 2015a] are shorter than those of *Ca. hongkongensis* [(av. 46.5 × 4 µm); Crous *et al.* 2004] and *Ca. kyotensis* [(av. 41 × 4 µm); Terashita 1968]. *Calonectria lateralis* is homothallic (Lombard *et al.* 2015a) (Supplementary Table S4).

lauri Calonectria Lechat & Crous, *sp. nov.* MycoBank MB836241.

Synonyms: *Candelospora illicicola* Hawley, Proc. Roy. Irish Acad. 31: 11. 1912.

Cylindrocladium illicicola (Hawley) Boedijn & Reitsma, Reinwardtia 1: 57. 1950.

Tetracytium lauri Vanderw., Parasitica 1: 145. 1945. (as *laurii*).

Nom. inval., Arts 35.1, 39.1 (Melbourne)

Calonectria lauri (Vanderw.) Lechat & Crous, IMA Fungus 1: 103. 2010. *Nom. inval.*, Art. 39.1 (Melbourne)

In: *Calonectria mexicana* species complex.

Description and illustrations: Lechat *et al.* (2010).

Typus: **Netherlands**, South-East Limburg, Vijlenerbos, Vijlen, *Ilex aquifolium*, Aug. 1970, H.A. van der Aa (**holotype** CBS H-15110, *ex-type culture* CBS 749.70 = CMW 23682).

Barcodes: *act* = MT335043; *cmdA* = MT335275; *his3* = MT335515; *rpb2* = MT412572; *tef1* = MT412806; *tub2* = MT413021 (alternative markers: ITS = MT359736; LSU = MT359496).

Notes: The original description of *Ca. lauri* (Lechat *et al.* 2010) is invalid, as its basionym *Tetracytium lauri* is invalid. This issue is now addressed, and the name *Ca. lauri* validated here. *Calonectria lauri* is closely related to *Ca. citri*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. lauri* [(av. 60 × 5.5 µm); Lechat *et al.* 2010] are larger than those of *Ca. citri* [(av. 58 × 4 µm); Crous 2002]. *Calonectria lauri* is homothallic (Li *et al.* 2020) (Supplementary Table S4).

leguminum Calonectria (Rehm) Crous, Taxonomy and pathology of *Cylindrocladium* (*Calonectria*) and allied genera: 107. 2002.

Basionym: *Nectria leguminum* Rehm, Hedwigia 39: 221. 1900.

Synonyms: *Calonectria quinquesepitata* Figueiredo & Namek., Arch. Inst. Biol. (São Paulo). 34: 91. 1967.

Cylindrocladium leguminum Crous, Taxonomy and pathology of *Cylindrocladium* (*Calonectria*) and allied genera: 107. 2002.

In: *Calonectria gracilipes* species complex.

Typus: Ule 2282 (holotype of *Nectria leguminum*; Crous 2002), PREM 57208 (holotype of *Cy. leguminum*; Crous 2002).

Ex-type culture: CBS 728.68 = CMW 23684 (Crous 2002, Lombard *et al.* 2010a).

Type locality: **Brazil**, Sao Paulo.

Type substrate: *Annona squamosa*.

Barcodes: *act* = MT335044; *cmdA* = MT335276; *his3* = MT335516; *rpb2* = MT412573; *tef1* = MT412807; *tub2* = MT413022 (alternative markers: ITS = MT359737; LSU = MT359497).

Notes: *Calonectria leguminum* is phylogenetically closely related to *Ca. angustata*, *Ca. gracilipes*, *Ca. hurae* and *Ca. rumohrae*, and can be distinguished from these four species by the dimensions of its macroconidia. The macroconidia of *Ca. leguminum* [(av. 60 × 5 µm); Figueiredo & Namekata 1967, Crous 2002] are smaller than those of *Ca. angustata* [(av. 110 × 10 µm); Crous *et al.* 2000], *Ca. hurae* [(av. 120 × 7.5 µm); Crous 2002] and *Ca. rumohrae* [(av. 110 × 9 µm); El-Gholl *et al.* 1997], larger than those of *Ca. gracilipes* [(av. 45 × 4.5 µm); Crous *et al.* 1997a]. *Calonectria leguminum* is homothallic (Crous 2002) (Supplementary Table S4).

leucothoes Calonectria (El-Gholl *et al.*) L. Lombard *et al.* (as *leucothoës*), Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium leucothoes* El-Gholl *et al.*, Canad. J. Bot. 67: 2530. 1989.

Synonym: *Cylindrocladium perseae* T.S. Schub. *et al.*, Mycotaxon 73: 474. 1999.

In: *Calonectria mexicana* species complex.

Typus: FLAS F55387 holotype.

Ex-type culture: CBS 109166 = CMW 30977 = CPC 2385 = ATCC 64824 = P88-490.

Type locality: **USA**, Florida.

Type substrate: *Leucothoe axillaris*.

Barcodes: *act* = MT335045; *cmdA* = MT335277; *his3* = MT335517; *rpb2* = MT412574; *tef1* = MT412808 (alternative markers: ITS = MT359738; LSU = MT359498).

Notes: *Calonectria leucothoes* is closely related to *Ca. citri* and *Ca. lauri*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. leucothoes* [(av. 73 × 5 µm); El-Gholl *et al.* 1989] are larger than those of *Ca. citri* [(av. 58 × 4 µm); Crous 2002] and longer than those of *Ca. lauri* [(av. 60 × 5.5 µm); Lechat *et al.* 2010]. *Calonectria leucothoes* is characterised as being heterothallic, while *Ca. lauri* is homothallic (Li *et al.* 2020) (Supplementary Table S4).

lichi Calonectria Q.L. Liu & S.F. Chen, Mycokeys 26: 45. 2017.

In: *Calonectria colhounii* species complex.

Typus: CSFF 2019 holotype.

Ex-type culture: CERC 8866.

Type locality: **China**, HeNan Province.

Type substrate: Soil.

Barcodes: *act* = MT335046; *cmdA* = MT335278; *his3* = MT335518; *rpb2* = MT412575; *tef1* = MT412809; *tub2* = MT413023 (alternative markers: ITS = MT359739; LSU = MT359499).

Notes: *Calonectria lichi* is phylogenetically closely related to *Ca. fujianensis*. The sequences of the ITS, *tef1* and *tub2* gene regions can differentiate *Ca. lichi* from that species. The macroconidia of *Ca. lichi* [(av. 65.7 × 6 µm); Liu & Chen 2017] are larger than those of *Ca. fujianensis* [(av. 52.5 × 4 µm); Chen *et al.* 2011]. *Calonectria lichi* is homothallic (Li *et al.* 2020) (Supplementary Table S4).

lombardiana Calonectria Q.L. Liu & S.F. Chen, *sp. nov.* MycoBank MB835285. Fig. 2.

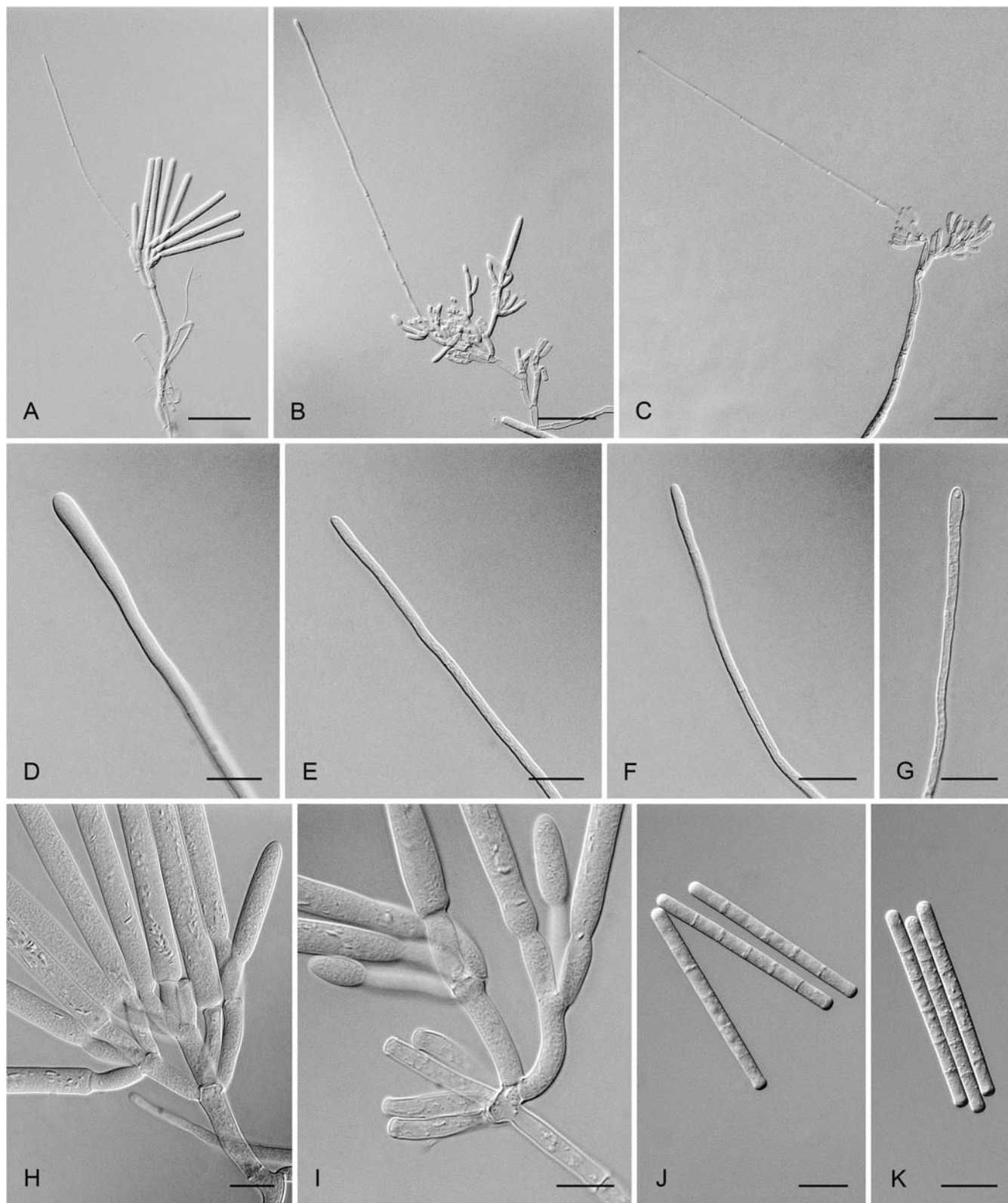


Fig. 2. *Calonectria lombardiana*. A–C. Macroconidiophore. D–G. Narrowly clavate vesicles. H, I. Conidiogenous apparatus with conidiophore branches and cylindrical to allantoid phialides. J, K. Macroconidia. Scale bars: A–C = 50 μ m, D–I = 10 μ m, J, K = 20 μ m.

In: *Calonectria reteaudii* species complex.

Etymology: Named for Dr Lorenzo Lombard, recognising his significant contribution to the taxonomy of *Calonectria*.

Sexual morph unknown. **Macroconidiophores** consisting of a stipe, a suite of penicillate arranged fertile branches, a stipe extension, and a terminal vesicle; stipe septate, hyaline, smooth,

43–139 \times 4–7 μ m; stipe extensions septate, straight to flexuous 158–216 μ m long, 2–5 μ m wide at the apical septum, terminating in a narrowly clavate vesicle, 2–4 μ m diam; lateral stipe extensions (90° to main axis) absent. **Conidiogenous apparatus** 34–80 μ m wide, and 35–76 μ m long; primary branches aseptate, 13–29 \times 3–7 μ m; secondary branches aseptate, 11–21 \times 3–5 μ m; tertiary branches aseptate, 9–19 \times 2–4 μ m,

each terminal branch producing 3–4 phialides; phialides cylindrical to allantoid, hyaline, aseptate, 9–20 × 2–5 µm, apex with minute periclinal thickening and inconspicuous collarete. *Macroconidia* cylindrical, rounded at both ends, straight, (64–) 74–86(–98) × (5–)5.5–6.5(–7.5) µm, (av. 80 × 6 µm), 5-septate, lacking a visible abscission scar, held in parallel cylindrical clusters by colourless slime. Mega- and microconidia not observed.

Culture characteristics: Colonies forming abundant white aerial mycelium at 25 °C on MEA, moderate sporulation; reverse cinnamon after 7 d. Chlamydospores extensive throughout the medium, forming microsclerotia. Optimal growth temperature 25 °C, no growth at 5 °C and 35 °C, after 7 d, colonies at 10 °C, 15 °C, 20 °C, 25 °C and 30 °C reached 11.1 mm, 20.4 mm, 41.2 mm, 59.5 mm and 55.3 mm, respectively.

Typus: **Australia**, Victoria, on *Xanthorrhoea australis*, T. Baigent (**holotype** HMAS 255718, ex-type culture CBS 112634 = CMW 30602 = CPC 4233 = Lynfield 417).

Barcodes: *act* = MT335156; *cmdA* = MT335395; *his3* = MT335635; *rpb2* = MT412686; *tef1* = MT412926; *tub2* = MT413133 (alternative markers: ITS = MT359856; LSU = MT359616).

Notes: *Calonectria lombardiana* is a new species in the *Ca. reteaudii* species complex, closely related to *Ca. queenslandica* (Fig. 1). The sequences of ITS, *tef1* and *tub2* gene regions can differentiate *Ca. lombardiana* from that species. In addition, the macroconidia of *Ca. lombardiana* (av. 80 × 6 µm) are longer than those of *Ca. queenslandica* [(av. 69 × 6 µm); Lombard et al. 2010c] (Supplementary Table S4).

longiramosa *Calonectria* L. Lombard & Crous, Stud. Mycol. 86: 114. 2017.

(see *Calonectria amazonica*)

In: *Calonectria pteridis* species complex.

Typus: CBS H-22759 holotype.

Ex-type culture: CBS 116319 = CMW 51832 = CPC 3761.

Type locality: **Brazil**, Amazon.

Type substrate: *Eucalyptus* sp.

Barcodes: *act* = MT334960; *cmdA* = MT335187; *his3* = MT335426; *rpb2* = MT412490; *tef1* = MT412717; *tub2* = MT412940 (alternative markers: ITS = MT359647; LSU = MT359407).

Notes: *Calonectria longiramosa* was treated as a synonym of *Ca. amazonica* in this study. In comparisons of DNA sequences for eight gene regions, the ex-type isolate of *Ca. longiramosa* (CBS 116319) were 100 % identical to the ex-type isolate of *Ca. amazonica* (CBS 116250). Both of the species produce clavate vesicles with overlapping dimensions (*Ca. longiramosa*: 5–8 µm; *Ca. amazonica*: 5–6 µm) and 1-septate macroconidia. The macroconidia of *Ca. longiramosa* (av. 71 × 5 µm) are shorter than those of *Ca. amazonica* (av. 79 × 5 µm) (Lombard et al. 2016), which was considered to represent intraspecific variation (Supplementary Table S4).

machaerinae *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 181. 2016.

(see *Calonectria pauciramosa*)

In: *Calonectria candelabrum* species complex.

Typus: CBS H-22760 holotype.

Ex-type culture: CBS 123183 = CMW 51311 = CPC 15378.

Type locality: **New Zealand**, Auckland, Auckland University Campus.

Type substrate: Foliar lesion of *Machaerina sinclairii*.

Barcodes: *act* = MT335090; *cmdA* = MT335322; *his3* = MT335562; *rpb2* = MT412615; *tef1* = MT412853; *tub2* = MT413065 (alternative markers: ITS = MT359783; LSU = MT359543).

Notes: *Calonectria machaerinae* was treated as a synonym of *Ca. pauciramosa* in this study. In comparisons of DNA sequences for eight gene regions, all the sequences of *Ca. machaerinae* (ex-type CBS 123183) were 100 % identical to those of *Ca. pauciramosa* (ex-type CBS 138824, CMW 2151, CMW 7592, CMW 9151, CMW 30823, and CMW 30875). Both species produce obpyriform to ellipsoidal vesicles with overlapping dimensions (*Ca. machaerinae*: 6–9 µm; *Ca. pauciramosa*: 5–11 µm) and 1-septate macroconidia. The macroconidia of *Ca. machaerinae* (av. 38 × 4 µm) are smaller than those of *Ca. pauciramosa* (av. 50 × 4.5 µm) (Crous 2002, Lombard et al. 2016), which was considered to represent intraspecific variation (Supplementary Table S4).

macroconidialis *Calonectria* (Crous et al.) Crous, Canad. J. Bot. 77: 1818. 1999.

Basionym: *Calonectria colhounii* var. *macroconidialis* Crous et al., Mycotaxon 46: 222. 1993.

Synonyms: *Cylindrocladium colhounii* var. *macroconidiale* Crous et al., Mycotaxon 46: 222. 1993.

Cylindrocladium macroconidiale (Crous et al.) Crous, Canad. J. Bot. 77: 1818. 1999.

Calonectria parva L. Lombard & Crous, Stud. Mycol. 85: 183. 2016.

In: *Calonectria colhounii* species complex.

Typus: PREM 51036 (holotype of *Ca. macroconidialis*; Crous et al. 1999), PREM 51035 (holotype of *Cy. macroconidiale*; Crous et al. 1999).

Ex-type culture: CBS 114880 = CMW 51219 = CPC 307 = PPRI 4000 (Crous 2002, Crous et al. 2006).

Type locality: **South Africa**, Mpumalanga, Sabie.

Type substrate: *Eucalyptus grandis*.

Barcodes: *act* = MT335050; *cmdA* = MT335282; *his3* = MT335522; *rpb2* = MT412579; *tef1* = MT412813; *tub2* = MT413027 (alternative markers: ITS = MT359743; LSU = MT359503).

Notes: *Calonectria macroconidialis* is closely related to *Ca. madagascariensis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. macroconidialis* [(av. 90 × 6.5 µm); Crous et al. 1999] are larger than those of *Ca. madagascariensis* [(av. 55 × 4.5 µm); Crous 2002]. Furthermore, *Ca. macroconidialis* is characterised as being heterothallic, while *Ca. madagascariensis* is homothallic (Crous et al. 1999, Crous 2002) (Supplementary Table S4).

madagascariensis *Calonectria* Crous, Taxonomy and pathology of *Cylindrocladium* (*Calonectria*) and allied genera: 112. 2002.

Synonym: *Cylindrocladium madagascariense* Crous, Taxonomy and pathology of *Cylindrocladium* (*Calonectria*) and allied genera: 112. 2002.

In: *Calonectria colhounii* species complex.

Typus: PREM 57198 (holotype of *Ca. madagascariensis*; Crous 2002), PREM 57199 (holotype of *Cy. madagascariense*; Crous 2002).

Ex-type culture: CBS 114572 = CMW 23686 = CPC 2252 (Crous et al. 2006).

Type locality: Madagascar, Rona.

Type substrate: Soil.

Barcodes: *act* = MT335052; *cmdA* = MT335284; *his3* = MT335524; *rpb2* = MT412581; *tef1* = MT412815; *tub2* = MT413029 (alternative markers: ITS = MT359745; LSU = MT359505).

Notes: *Calonectria madagascariensis* is closely related to *Ca. macroconidialis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. madagascariensis* [(av. 55 × 4.5 μm); Crous 2002] are smaller than those of *Ca. macroconidialis* [(av. 90 × 6.5 μm); Crous et al. 1999]. *Calonectria madagascariensis* is homothallic (Crous 2002) (Supplementary Table S4).

magnispora Calonectria L. Lombard et al., Stud. Mycol. 80: 174. 2015.

(see *Calonectria aconidialis*)

In: *Calonectria kyotensis* species complex.

Typus: CBS H-21471 holotype.

Ex-type culture: CBS 136249 = CMW 35184 = CERC 1860.

Type locality: China, GuangXi Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334947; *cmdA* = MT335174; *his3* = MT335413; *tef1* = MT412704 (alternative markers: ITS = MT359634; LSU = MT359394).

Notes: *Calonectria magnispora* was treated as a synonym of *Ca. aconidialis* in this study. In comparisons of DNA sequences for six available gene regions, one base difference in each of the *cmdA*, LSU and *tef1* sequences was found between the ex-type isolate of *Ca. magnispora* (CMW 35184) and the ex-type isolate of *Ca. aconidialis* (CMW 35174). Both species are homothallic and produce orange to orange-brown perithecia, 8-spored asci and 1-septate ascospores, the ascospores of *Ca. magnispora* (av. 40 × 6 μm) are longer than those of *Ca. aconidialis* (av. 36 × 6 μm) (Lombard et al. 2015a), which was considered to represent intraspecific variation (Supplementary Table S4).

malesiana Calonectria (Crous) L. Lombard et al., Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium malesianum* Crous, Stud. Mycol. 50: 425. 2004.

In: *Calonectria kyotensis* species complex.

Typus: CBS 9885 holotype.

Ex-type culture: CBS 112752 = CMW 23687 = CPC 4223.

Type locality: Indonesia, Northern Sumatra.

Type substrate: Soil.

Barcodes: *act* = MT335054; *cmdA* = MT335286; *his3* = MT335526; *rpb2* = MT412583; *tef1* = MT412817; *tub2* = MT413031 (alternative markers: ITS = MT359747; LSU = MT359507).

Notes: *Calonectria malesiana* is closely related to *Ca. lateralis*, and can be distinguished by dimensions of its macroconidia. The macroconidia of *Ca. malesiana* [(av. 47.5 × 4 μm); Crous et al. 2004] are longer than those of *Ca. lateralis* [(av. 39 × 4 μm); Lombard et al. 2015a] (Supplementary Table S4).

maranhensis Calonectria R.F. Alfenas et al., Stud. Mycol. 80: 107. 2015.

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-21360 holotype.

Ex-type culture: CBS 134811 = LPF142.

Type locality: Brazil, Maranhao state, Açailandia.

Type substrate: *Eucalyptus* leaf.

Barcodes: *cmdA* = KM396035; *his3* = KM396118; *tef1* = KM395861; *tub2* = KM395948.

Notes: *Calonectria maranhensis* is closely related to *Ca. brasiliensis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. maranhensis* [(av. 57 × 5 μm); Alfenas et al. 2015] are larger than those of *Ca. brasiliensis* [(av. 38 × 3.5 μm); Batista 1951] (Supplementary Table S4).

metrosideri Calonectria R.F. Alfenas et al., Stud. Mycol. 80: 108. 2015.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-21146 holotype.

Ex-type culture: CBS 133603 = LPF101.

Type locality: Brazil, Minas Gerais state, Viçosa.

Type substrate: *Metrosideros polymorpha*.

Barcodes: *cmdA* = KC294304; *his3* = KC294307; *tef1* = KC294310; *tub2* = KC294313.

Notes: *Calonectria metrosideri* is closely related to *Ca. brasiliiana*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. metrosideri* [(av. 45 × 4 μm); Alfenas et al. 2013a] are shorter than those of *Ca. brasiliiana* [(av. 53 × 4 μm); Lombard et al. 2016] (Supplementary Table S4).

mexicana Calonectria C.L. Schoch & Crous, Mycologia 91: 294. 1999.

Synonym: *Cylindrocladium mexicanum* C.L. Schoch & Crous, Mycologia 91: 294. 1999.

In: *Calonectria mexicana* species complex.

Typus: PREM 55763 (holotype of *Ca. mexicana*; Schoch et al. 1999); PREM 55761 (holotype of *Cy. mexicanum*; Schoch et al. 1999).

Ex-type culture: CBS 110918 = CMW 9055 = STE-U 927 (Lombard et al. 2016).

Type locality: Mexico, Yucatan, Uxmal.

Type substrate: Soil.

Barcodes: *act* = GQ280474; *cmdA* = GQ267396; *his3* = FJ972460; *rpb2* = KY653412; *tef1* = FJ972526; *tub2* = AF210863 (alternative markers: ITS = GQ280596; LSU = GQ280718).

Notes: *Calonectria mexicana* is closely related to *Ca. avesiculata*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. mexicana* [(av. 45 × 4 μm); Schoch et al. 1999] are smaller than those of *Ca. avesiculata* [(av. 64 × 5 μm); Schubert et al.

1989], and the vesicles of *Ca. mexicana* (7–12 µm) are wider than those of *Ca. avesiculata* (1–4 µm). *Calonectria mexicana* is heterothallic (Schoch *et al.* 1999) (Supplementary Table S4).

microconidialis *Calonectria* L. Lombard *et al.*, Stud. Mycol. 80: 175. 2015.

(see *Calonectria pseudoreteaudii*)

In: *Calonectria reteaudii* species complex.

Typus: CBS H-21473 holotype.

Ex-type culture: CBS 136638 = CMW 31487 = CERC 1822.

Type locality: **China**, Guangdong Province, ZhanJiang.

Type substrate: *Eucalyptus urophylla* × *grandis* clone seedling.

Barcodes: *act* = MT335113; *cmdA* = MT335348; *his3* = MT335588; *rpb2* = MT412641; *tef1* = MT412879; *tub2* = MT413090 (alternative markers: ITS = MT359809; LSU = MT359569).

Notes: *Calonectria microconidialis* was treated as a synonym of *Ca. pseudoreteaudii* in this study. In comparisons of DNA sequences, all eight gene sequences for the isolates of *Ca. microconidialis* (ex-type CMW 31487, CMW 31473, CMW 31475, and CMW 31492) were 100 % identical to the isolates of *Ca. pseudoreteaudii* (ex-type CMW 25310, and CMW 25292). Both species produce narrowly clavate vesicles with overlapping dimensions (*Ca. microconidialis*: 3–7 µm; *Ca. pseudoreteaudii*: 3–5 µm), they also produce multiple-septate (> 3) macroconidia and 1–3-septate microconidia. The macroconidia of *Ca. microconidialis* (av. 88 × 8 µm) are shorter than those of *Ca. pseudoreteaudii* (av. 104 × 8 µm) (Lombard *et al.* 2010c, 2015a), which was considered to represent intraspecific variation (Supplementary Table S4).

montana *Calonectria* Q.L. Liu & S.F. Chen, Mycokeys 26: 48. 2017.

(see *Calonectria canadiana*)

In: *Calonectria kytensis* species complex.

Typus: CSFF 2022 holotype.

Ex-type culture: CERC 8952.

Type locality: **China**, HeNan.

Type substrate: Soil under natural forest.

Barcodes: *act* = MT335058; *cmdA* = MT335290; *his3* = MT335530; *rpb2* = MT412587; *tef1* = MT412821; *tub2* = MT413035 (alternative markers: ITS = MT359751; LSU = MT359511).

Notes: *Calonectria montana* was treated as a synonym of *Ca. canadiana* in this study. In comparisons of DNA sequences for eight gene regions, the only difference between the ex-type isolate of *Ca. montana* (CERC 8952) and the ex-type isolate of *Ca. canadiana* (CMW 23673) was in the ITS, *rpb2* and *tub2* sequences, where there was one base difference in the ITS, one base difference in the *rpb2* and seven base differences in the *tub2* sequences. Both species produce pyriform to sphaeropedunculate vesicles with overlapping dimensions (*Ca. montana*: 4–12.5 µm; Liu & Chen 2017, *Ca. canadiana*: 6–10 µm; Kang *et al.* 2001b) and 1-septate macroconidia. The macroconidia of *Ca. montana* [(av. 43.2 × 4.6 µm); Liu & Chen 2017] are shorter than those of *Ca. canadiana* [(av. 50 × 4 µm); Kang *et al.* 2001b], which was considered to represent intraspecific variation (Supplementary Table S4).

monticola *Calonectria* L. Lombard & Crous, Persoonia 35: 293. 2015.

In: *Calonectria colhounii* species complex.

Typus: CBS H-22376 holotype.

Ex-type culture: CBS 140645 = CPC 28835.

Type locality: **Thailand**, Chiang Mai.

Type substrate: Soil.

Barcodes: *cmdA* = KT964771; *tef1* = KT964773; *tub2* = KT964769 (alternative markers: ITS = KT964775; LSU = KT983443).

Notes: *Calonectria monticola* is closely related to *Ca. honghensis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. monticola* [(av. 49 × 5 µm); Crous *et al.* 2015] are smaller than those of *Ca. honghensis* [(av. 54 × 5.5 µm); Li *et al.* 2017] (Supplementary Table S4).

mossambicensis *Calonectria* S. Maússe-Sitoe *et al.*, Persoonia 31: 291. 2013.

(see *Calonectria pauciramosa*)

In: *Calonectria candelabrum* species complex.

Typus: PREM 60821 holotype.

Ex-type culture: CBS 137243 = CMW 36327.

Type locality: **Mozambique**, Manica, Bandula.

Type substrate: Cutting clones of *Eucalyptus grandis* × *E. camaldulensis*.

Barcodes: *act* = MT335091; *cmdA* = MT335323; *his3* = MT335563; *rpb2* = MT412616; *tef1* = MT412854; *tub2* = MT413066 (alternative markers: ITS = MT359784; LSU = MT359544).

Notes: *Calonectria mossambicensis* was treated as a synonym of *Ca. pauciramosa* in this study. In comparisons of DNA sequences for eight gene regions, all the sequences of the isolates of *Ca. mossambicensis* (ex-type CBS 137243, and CMW 36329) were 100 % identical to those of the isolates of *Ca. pauciramosa* (ex-type CBS 138824, CMW 2151, CMW 7592, CMW 9151, CMW 30823, and CMW 30875). Both species produce obpyriform to ellipsoidal vesicles with overlapping dimensions (*Ca. mossambicensis*: 2–8 µm; *Ca. pauciramosa*: 5–11 µm) and 1-septate macroconidia. The macroconidia of *Ca. mossambicensis* (av. 42 × 4 µm) are smaller than those of *Ca. pauciramosa* (av. 50 × 4.5 µm) (Crous 2002, Crous *et al.* 2013), which was considered to represent intraspecific variation (Supplementary Table S4).

multilateralis *Calonectria* L. Lombard *et al.*, Stud. Mycol. 85: 182. 2016.

In: *Calonectria naviculata* species complex.

Typus: CBS H-22762 holotype.

Ex-type culture: CBS 110932 = CMW 51171 = CPC 957.

Type locality: **Mexico**, Uxmal.

Type substrate: Soil.

Barcodes: *act* = MT335060; *cmdA* = MT335292; *his3* = MT335532; *rpb2* = MT412589; *tef1* = MT412823; *tub2* = MT413037 (alternative markers: ITS = MT359753; LSU = MT359513).

Notes: *Calonectria multilateralis* is closely related to *Ca. multinaviculata* and *Ca. naviculata*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. multilateralis* [(av. 33 × 3 µm); Lombard *et al.* 2016] are shorter than those of *Ca. multinaviculata* [(av.

46 × 3.5 µm); *Alfenas et al.* 2015] and *Ca. naviculata* [(av. 45 × 3 µm); *Crous et al.* 1997a] (Supplementary Table S4).

multinaviculata *Calonectria* R.F. Alfenas et al., Stud. Mycol. 80: 108. 2015.

In: *Calonectria naviculata* species complex.

Typus: CBS 134858 holotype.

Ex-type culture: CBS 134858 = LPF233.

Type locality: **Brazil**, Bahia state, Mucuri.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *cmdA* = KM396072; *his3* = KM396155; *tef1* = KM395898; *tub2* = KM395985.

Notes: *Calonectria multinaviculata* is phylogenetically closely related to *Ca. naviculata*, *Ca. multinaviculata* can be distinguished from *Ca. naviculata* by its lateral stipe extensions, a feature not observed for the *Ca. naviculata* (*Crous et al.* 1997a, *Alfenas et al.* 2015) (Supplementary Table S4).

multiphialidica *Calonectria* (*Crous et al.*) L. Lombard et al., Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium multiphialidicum* *Crous et al.*, Stud. Mycol. 50: 425. 2004.

In: *Calonectria naviculata* species complex.

Typus: CBS 9887 holotype.

Ex-type culture: CBS 112678 = CMW 23688 = Cam 13.

Type locality: **Cameroon**.

Type substrate: Soil surrounding roots of *Musa* sp.

Barcodes: *act* = MT335066; *cmdA* = MT335298; *his3* = MT335538; *rpb2* = MT412595; *tef1* = MT412829; *tub2* = MT413043 (alternative markers: ITS = MT359759; LSU = MT359519).

Notes: *Calonectria multiphialidica* is closely related to *Ca. henricotiae* and *Ca. pseudonaviculata*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. multiphialidica* [(av. 53 × 4.5 µm); *Crous et al.* 2004] are smaller than those of *Ca. henricotiae* [(av. 56 × 5.6 µm); *Gehesquiere et al.* 2015] and *Ca. pseudonaviculata* [(av. 60 × 5 µm); *Crous et al.* 2002] (Supplementary Table S4). Furthermore, *Ca. multiphialidica* has eight tiers of branches in its conidiogenous apparatus in comparison to the two in *Ca. henricotiae* and four in *Ca. pseudonaviculata* (*Crous et al.* 2002, 2004, *Gehesquiere et al.* 2015).

multiseptata *Calonectria* *Crous & M.J. Wingfield*, Mycol. Res. 102: 530. 1998.

Synonym: *Cylindrocladium multiseptatum* *Crous & M.J. Wingf.*, Mycol. Res. 102: 530. 1998.

In: *Calonectria reteaudii* species complex.

Typus: PREM 55343 (holotype of *Ca. multiseptata*; *Crous et al.* 1998), PREM 55344 (holotype of *Cy. multiseptatum*; *Crous et al.* 1998)

Ex-type culture: CBS 112682 = CMW 23692 = CPC 1589 (*Crous* 2002, *Crous et al.* 2006).

Type locality: **Indonesia**, North Sumatra.

Type substrate: *Eucalyptus grandis*.

Barcodes: *act* = MT335067; *cmdA* = MT335299; *his3* = MT335539; *rpb2* = MT412596; *tef1* = MT412830; *tub2* = MT413044 (alternative markers: ITS = MT359760; LSU = MT359520).

Notes: *Calonectria multiseptata* is phylogenetically closely related to *Ca. acicola*. The ability of *Ca. multiseptata* to produce megaconidiophores and megaconidia in culture distinguishes it from *Ca. acicola* (*Crous* 2002, *Gadgil & Dick* 2004). *Calonectria multiseptata* is homothallic (*Crous* 2002) (Supplementary Table S4).

multistipitata *Calonectria* N.Q. Pham et al., Mycologia 111: 98. 2019.

(see ***Calonectria chinensis***)

In: *Calonectria kyotensis* species complex.

Typus: PREM 62121 holotype.

Ex-type culture: CBS 143573 = CMW 47192.

Type locality: **Vietnam**, Tuyen Quang.

Type substrate: Soil in *Acacia* hybrid plantation.

Barcodes: *act* = MT335068; *cmdA* = MT335300; *his3* = MT335540; *rpb2* = MT412597; *tef1* = MT412831; *tub2* = MT413045 (alternative markers: ITS = MT359761; LSU = MT359521).

Notes: *Calonectria multistipitata* was treated as a synonym of *Ca. chinensis* in this study. In comparisons of DNA sequences for eight gene regions, the only difference between the ex-type isolate of *Ca. multistipitata* (CMW 47192) and the ex-type isolate of *Ca. chinensis* (CMW 23674) was in the *his3*, ITS, *tef1* and *tub2* sequences, where there was one base difference in the *his3*, one base difference in the ITS, one base difference in the *tef1* and four base differences in the *tub2* sequences. Both species produce sphaeropedunculate vesicles with overlapping dimensions (*Ca. multistipitata*: 5–10 µm; *Ca. chinensis*: 6–9 µm) and 1-septate macroconidia. The macroconidia of *Ca. multistipitata* (av. 32 × 3.5 µm) are smaller than those of *Ca. chinensis* (av. 45 × 4 µm) (*Crous et al.* 2004, *Pham et al.* 2019), which was considered to represent intraspecific variation (Supplementary Table S4).

naviculata *Calonectria* *Crous & M.J. Wingf.*, Mycologia 89: 654. 1997.

Synonym: *Cylindrocladium naviculatum* *Crous & M.J. Wingf.*, Mycotaxon 50: 443. 1994.

In: *Calonectria naviculata* species complex.

Typus: PREM 54418 (holotype of *Ca. naviculata*; *Crous et al.* 1997a), PREM 51542 (holotype of *Cy. naviculatum*; *Crous et al.* 1994).

Ex-type culture: CBS 101121 = CMW 30974 (*Lombard et al.* 2010a).

Type locality: **Brazil**, Joao Pessoa.

Type substrate: Leaf litter.

Barcodes: *act* = GQ280478; *cmdA* = GQ267399; *his3* = GQ267252; *rpb2* = KM232309; *tef1* = GQ267317; *tub2* = GQ267211 (alternative markers: ITS = GQ280600; LSU = GQ280722).

Notes: *Calonectria naviculata* is phylogenetically closely related to *Ca. multinaviculata*, it can be distinguished from *Ca. multinaviculata* by its lack of lateral stipe extensions, a feature that is common in *Ca. multinaviculata* (*Crous et al.* 1997a, *Alfenas et al.* 2015). *Calonectria naviculata* is heterothallic (*Crous et al.* 1997a) (Supplementary Table S4).

nemoralis *Calonectria* L. Lombard & *Crous*, Stud. Mycol. 86: 114. 2017.

(see *Calonectria ovata*)

In: Calonectria pteridis species complex.

Typus: CBS H-23135 holotype.

Ex-type culture: CBS 116249 = CMW 51829 = CPC 3533.

Type locality: **Brazil**.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT335074; *cmdA* = MT335306; *his3* = MT335546; *rpb2* = MT412603; *tef1* = MT412837; *tub2* = MT413051 (alternative markers: ITS = MT359767; LSU = MT359527).

Notes: *Calonectria nemoralis* was treated as a synonym of *Ca. ovata* in this study. In comparisons of DNA sequences for seven available gene regions, the only difference between the ex-type isolate of *Ca. nemoralis* (CBS 116249) and the ex-type isolate of *Ca. ovata* (CMW 16724) was found in the *tub2* gene sequences where one base difference occurred. Both of the species produce ovoid vesicles and 1-septate macroconidia. The macroconidia of *Ca. nemoralis* [(av. 53 × 4 µm); Marin-Felix et al. 2017] are smaller than those of *Ca. ovata* [(av. 70 × 5 µm); Victor et al. 1997], which was considered to represent intraspecific variation (Supplementary Table S4).

nemoricola *Calonectria* R.F. Alfenas et al., (as *nemuricola*) Stud. Mycol. 80: 109. 2015.

In: Calonectria candelabrum species complex.

Typus: CBS H-21358 holotype.

Ex-type culture: CBS 134837 = LPF085.

Type locality: **Brazil**, Minas Gerais state, Araponga.

Type substrate: Soil in tropical rainforest.

Barcodes: *cmdA* = KM396066; *his3* = KM396149; *tef1* = KM395892; *tub2* = KM395979.

Notes: *Calonectria nemoricola* is closely related to *Ca. silvicola*, and can be distinguished from *Ca. silvicola* by the dimensions of its macroconidia. The macroconidia of *Ca. nemoricola* [(av. 45 × 4 µm); Alfenas et al. 2015] are longer than those of *Ca. silvicola* [(av. 41 × 4.5 µm); Alfenas et al. 2015] (Supplementary Table S4).

nymphaeae *Calonectria* Yong Wang bis et al., Mycotaxon 122: 181. 2013.

(see *Calonectria fujianensis*)

In: Calonectria colhounii species complex.

Typus: HGUPd100003 holotype.

Ex-type culture: CBS 131802 = CMW 51317 = HGUP 100003.

Type locality: **China**, Guizhou, Guiyang.

Type substrate: *Nymphaea tetragona*.

Barcodes: *act* = MT335070; *cmdA* = MT335302; *his3* = MT335542; *rpb2* = MT412599; *tef1* = MT412833; *tub2* = MT413047 (alternative markers: ITS = MT359763; LSU = MT359523).

Notes: *Calonectria nymphaeae* was treated as a synonym of *Ca. fujianensis* in this study. In comparisons of DNA sequences for eight gene regions, the only difference between the ex-type isolate of *Ca. nymphaeae* (CBS 131802) and the ex-type isolate of *Ca. fujianensis* (CMW 27257) was in the ITS, *tef1* and *tub2* sequences, where there was one base difference in the ITS, three base differences in the *tef1* and three base differences in the *tub2* sequences. Both species are homothallic and

produce clavate vesicles with similar dimensions (*Ca. nymphaeae*: 3–5 µm; *Ca. fujianensis*: 3–5 µm). The macroconidia of *Ca. nymphaeae* (av. 61 × 5.9 µm) are larger than those of *Ca. fujianensis* (av. 52.5 × 4 µm) (Chen et al. 2011, Xu et al. 2012, Li et al. 2020), which was considered to represent intraspecific variation (Supplementary Table S4).

octoramosa *Calonectria* L. Lombard & Crous, Stud. Mycol. 86: 120. 2017.

In: Calonectria brassicae species complex.

Typus: CBS H-23136 holotype.

Ex-type culture: CBS 111423 = CMW 51819 = CPC 1650.

Type locality: **Ecuador**.

Type substrate: Soil.

Barcodes: *act* = MT335071; *cmdA* = MT335303; *his3* = MT335543; *rpb2* = MT412600; *tef1* = MT412834; *tub2* = MT413048 (alternative markers: ITS = MT359764; LSU = MT359524).

Notes: *Calonectria octoramosa* is closely related to *Ca. ecuadorae*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. octoramosa* [(av. 36 × 4 µm); Marin-Felix et al. 2017] are smaller than those of *Ca. ecuadorae* [(av. 51 × 4.5 µm); Crous et al. 2006] (Supplementary Table S4).

orientalis *Calonectria* L. Lombard et al., Stud. Mycol. 66: 49. 2010.

In: Calonectria brassicae species complex.

Typus: PREM 60303 holotype.

Ex-type culture: CBS 125260 = CMW 20291.

Type locality: **Indonesia**, Langam.

Type substrate: Soil.

Barcodes: *act* = MT335072; *cmdA* = MT335304; *his3* = MT335544; *rpb2* = MT412601; *tef1* = MT412835; *tub2* = MT413049 (alternative markers: ITS = MT359765; LSU = MT359525).

Notes: *Calonectria orientalis* is closely related to *Ca. pini*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. orientalis* (av. 48 × 4 µm) are longer than those of *Ca. pini* (av. 44 × 5 µm) (Lombard et al. 2010a) (Supplementary Table S4). Furthermore, *Ca. orientalis* produces five tiers of branches in its conidiogenous apparatus in comparison to the three in *Ca. pini* (Lombard et al. 2010a).

ovata *Calonectria* D. Victor & Crous, Syst. Appl. Microbiol. 20: 282. 1997

Synonyms: *Cylindrocladium ovatum* El-Gholl et al., Canad. J. Bot. 71: 469. 1993.

Calonectria tereticornis L. Lombard & Crous, Stud. Mycol. 85: 190. 2016.

Calonectria nemoralis L. Lombard & Crous, Stud. Mycol. 86: 114. 2017.

Calonectria tucuruensis L. Lombard & Crous, Stud. Mycol. 86: 123. 2017.

In: Calonectria pteridis species complex.

Typus: PREM 51726 (holotype of *Ca. ovata*; Victor et al. 1997), FLAS F55638 (holotype of *Cy. ovatum*; El-Gholl et al. 1993a).

Ex-type culture: CBS 111299 = CMW 16724 = ATCC 76225 = UFV 89 (Lombard et al. 2010a).

Type locality: Brazil, Pará, Monte Dourado.

Type substrate: *Eucalyptus urophylla*.

Barcodes: *act* = MT335075; *cmdA* = MT335307; *his3* = MT335547; *tef1* = MT412838; *tub2* = MT413052 (alternative markers: ITS = MT359768; LSU = MT359528).

Notes: *Calonectria ovata* is phylogenetically closely related to *Ca. pseudovata* and *Ca. terricola*. The macroconidia of *Ca. ovata* [(av. 70 × 5 µm); Victor et al. 1997] are larger than those of *Ca. terricola* [(av. 46 × 4.5 µm); Lombard et al. 2016]. Furthermore, the ability of *Ca. ovata* to produce miconidiophores and microconidia in culture distinguishes it from *Ca. terricola* (Victor et al. 1997, Lombard et al. 2016). Morphologically, *Ca. ovata* shows some overlap with *Ca. pseudovata*, while the sequences of *cmdA*, *his3*, *tef1* and *tub2* gene regions can differentiate *Ca. ovata* from *Ca. pseudovata* (Victor et al. 1997, Alfenas et al. 2015). *Calonectria ovata* is heterothallic (Li et al. 2020).

pacifica Calonectria (J.C. Kang et al.) L. Lombard et al., Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium pacificum* J.C. Kang et al., Syst. Appl. Microbiol. 24: 213. 2001.

In: *Calonectria kyotensis* species complex.

Typus: PREM 57209 holotype.

Ex-type culture: CBS 109063 = CMW 16726 = IMI 354528 = STE-U 2534 = A1568.

Type locality: USA, Hawaii.

Type substrate: *Araucaria heterophylla*.

Barcodes: *act* = MT335079; *cmdA* = MT335311; *his3* = MT335551; *rpb2* = MT412604; *tef1* = MT412842 (alternative markers: ITS = MT359772; LSU = MT359532).

Notes: *Calonectria pacifica* is phylogenetically closely related to *Ca. aconidialis* and can be differentiated from that species by the sequences of *act*, *cmdA*, *his3*, *rpb2*, ITS, LSU and *tef1* gene regions.

papillata Calonectria L. Lombard et al., Stud. Mycol. 80: 175. 2015.

(see ***Calonectria cerciana***)

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-21487 holotype.

Ex-type culture: CBS 136097 = CMW 37976 = CPC 23517 = CERC 1939.

Type locality: China, Guangdong.

Type substrate: Soil in a *Eucalyptus* plantation.

Barcodes: *act* = MT334983; *cmdA* = MT335213; *his3* = MT335453; *rpb2* = MT412517; *tef1* = MT412744; *tub2* = MT412965 (alternative markers: ITS = MT359674; LSU = MT359434).

Notes: *Calonectria papillata* was treated as a synonym of *Ca. cerciana* in this study. In comparisons of DNA sequences for eight gene regions, there were differences between the ex-type isolate of *Ca. papillata* (CMW 37976) and the ex-type isolate of *Ca. cerciana* (CMW 25309) in the ITS, *rpb2* and *tub2* sequences. These included one base difference in the ITS sequences, one base difference in the *rpb2* and two base differences in the *tub2* sequences. Both species produce obpyriform vesicles and 1-septate macroconidia, and have similar vesicle dimensions (*Ca. papillata*: 8–14 µm; *Ca. cerciana*: 8–13 µm) and macroconidia (*Ca. papillata*: av. 45 × 4 µm; *Ca. cerciana*: av. 44 × 5 µm) (Lombard et al. 2010c, 2015a) (Supplementary Table S4).

paracolhounii Calonectria L. Lombard & Crous, Stud. Mycol. 85: 183. 2016.

In: *Calonectria colhounii* species complex.

Typus: CBS H-22763 holotype.

Ex-type culture: CBS 114679 = CMW 51212 = CPC 2445.

Type locality: USA.

Type substrate: Unknown.

Barcodes: *cmdA* = KX784582; *rpb2* = KY653423; *tef1* = KX784714; *tub2* = KX784644 (alternative markers: ITS = KY653268; LSU = KY653324).

Notes: *Calonectria paracolhounii* is closely related to *Ca. colhounii*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. colhounii* [(av. 65 × 5 µm); Peerally 1973] are longer than those of *Ca. paracolhounii* [(av. 41 × 5 µm); Lombard et al. 2016] (Supplementary Table S4).

paraensis Calonectria R.F. Alfenas et al., Stud. Mycol. 80: 111. 2015.

Synonym: *Calonectria telluricola* R.F. Alfenas et al., Stud. Mycol. 80: 125. 2015.

In: *Calonectria brassicae* species complex.

Typus: CBS H-21379 holotype.

Ex-type culture: CBS 134669 = LPF430.

Type locality: Brazil, Pará state, Monte Dourado.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *cmdA* = KM396011; *his3* = KM396094; *tef1* = KM395837; *tub2* = KM395924.

Notes: *Calonectria paraensis* is closely related to *Ca. orientalis*, *Ca. pini* and *Ca. pseudobrassicae*. The macroconidia of *Ca. paraensis* [(av. 42 × 5 µm); Alfenas et al. 2015] are shorter than those of *Ca. orientalis* [(av. 48 × 4 µm); Lombard et al. 2010a] and *Ca. pini* [(av. 44 × 5 µm); Lombard et al. 2010a]. *Calonectria paraensis* has two tiers of branches in its conidiogenous apparatus in comparison to the five in *Ca. orientalis*, three in *Ca. pini* and *Ca. pseudobrassicae* (Lombard et al. 2010a, Alfenas et al. 2015) (Supplementary Table S4).

parakyotensis Calonectria L. Lombard et al., Stud. Mycol. 80: 176. 2015.

(see ***Calonectria aconidialis***)

In: *Calonectria kyotensis* species complex.

Typus: CBS H-21470 holotype.

Ex-type culture: CBS 136085 = CMW 35169 = CERC 1845.

Type locality: China, Guangdong Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334948; *cmdA* = MT335175; *his3* = MT335414; *rpb2* = MT412483; *tef1* = MT412705 (alternative markers: ITS = MT359635; LSU = MT359395).

Notes: *Calonectria parakyotensis* was treated as a synonym of *Ca. aconidialis* in this study. In comparisons of DNA sequences for seven available gene regions, all seven gene sequences for the isolates of *Ca. parakyotensis* (ex-type CMW 35169, and CMW 35413) were 100 % identical to those of the ex-type isolate of *Ca. aconidialis* (CMW 35174). Both species are homothallic but no sexual morph was observed for *Ca. parakyotensis* (Lombard et al. 2015a, Li et al. 2020; Supplementary Table S4).

parva Calonectria L. Lombard & Crous, Stud. Mycol. 85: 183. 2016.

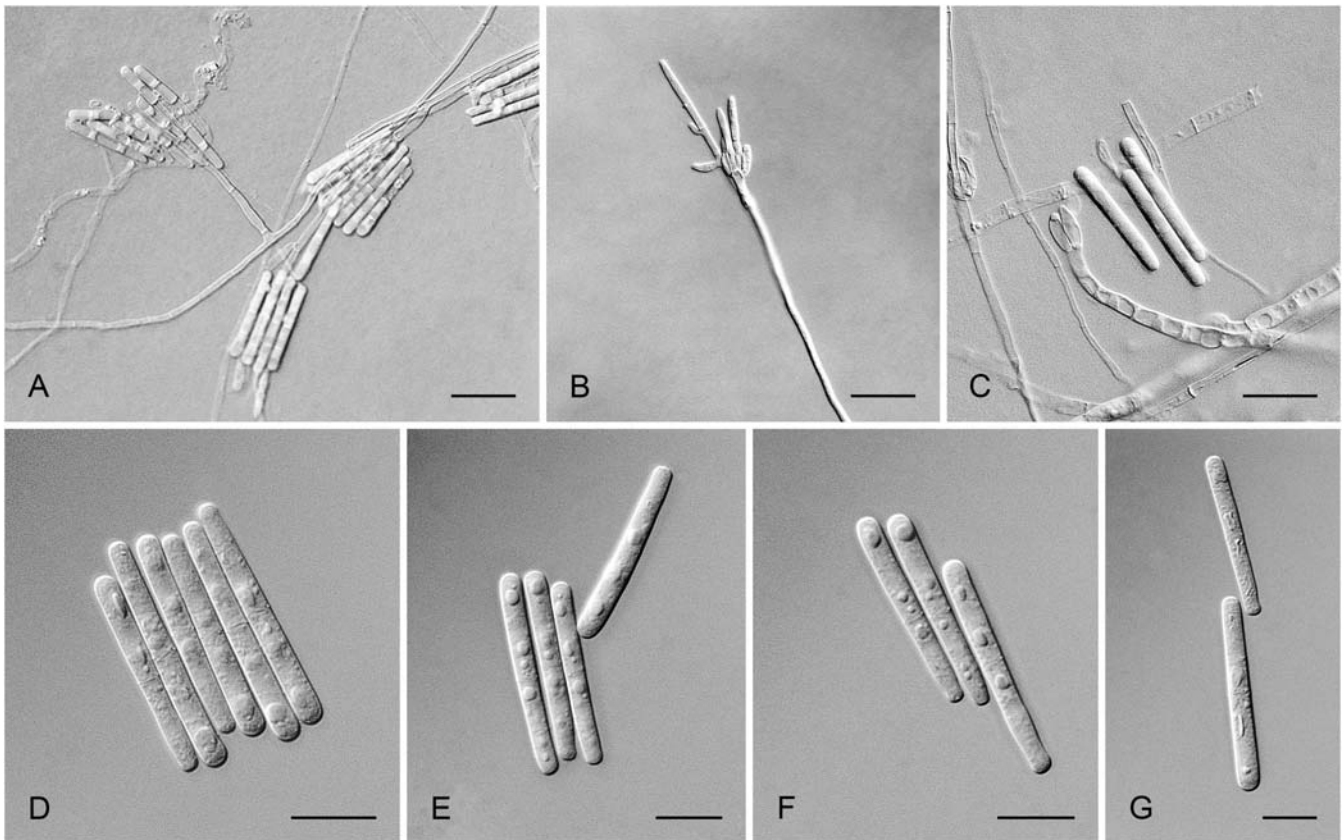


Fig. 3. *Calonectria pauciphialidica*. A–C. Macroconidiophore. D–G. Macroconidia. Scale bars: A–C = 20 μ m, D–G = 10 μ m.

(see *Calonectria macroconidialis*)

In: *Calonectria colhounii* species complex.

Typus: CBS H-22764 holotype.

Ex-type culture: CBS 110798 = CMW 51817 = CPC 410.

Type locality: **South Africa**, Mpumalanga, Sabie.

Type substrate: *Eucalyptus grandis* (roots).

Barcodes: *act* = MT335051; *cmdA* = MT335283; *his3* = MT335523; *rpb2* = MT412580; *tef1* = MT412814; *tub2* = MT413028 (alternative markers: ITS = MT359744; LSU = MT359504).

Notes: *Calonectria parva* was treated as a synonym of *Ca. macroconidialis* in this study. In comparisons of DNA sequences for eight gene regions, the only differences between the ex-type isolate of *Ca. parva* (CBS 110798) and the ex-type isolate of *Ca. macroconidialis* (CBS 114880) was found in the *tef1* gene sequences. Both species produce clavate vesicles of similar dimensions (*Ca. parva*: 3–5 μ m; *Ca. macroconidialis*: 3–5 μ m) and 3-septate macroconidia (Crous *et al.* 1999, Lombard *et al.* 2016). The macroconidia of *Ca. parva* (av. 72 \times 6 μ m) are smaller than those of *Ca. macroconidialis* (av. 90 \times 6.5 μ m) (Crous *et al.* 1999, Lombard *et al.* 2016), which was considered to represent intraspecific variation (Supplementary Table S4).

parvispora *Calonectria* L. Lombard & Crous, Stud. Mycol. 86: 120. 2017.

In: *Calonectria brassicae* species complex.

Typus: CBS H-22765 holotype.

Ex-type culture: CBS 111465 = CPC 1902.

Type locality: **Brazil**.

Type substrate: Soil.

Barcodes: *act* = MT335082; *cmdA* = MT335314; *his3* = MT335554; *rpb2* = MT412607; *tef1* = MT412845; *tub2* = MT413057 (alternative markers: ITS = MT359775; LSU = MT359535).

Notes: *Calonectria parvispora* is closely related to *Ca. brachiatica*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. parvispora* [(av. 29 \times 4 μ m); Marin-Felix *et al.* 2017] are smaller than those of *Ca. brachiatica* [(av. 44 \times 5 μ m); Lombard *et al.* 2009] (Supplementary Table S4).

pauciphialidica *Calonectria* Q.L. Liu & S.F. Chen, *sp. nov.* MycoBank MB835284. Fig. 3.

In: *Calonectria brassicae* species complex.

Etymology: Name refers to the macroconidiophores that produce few phialides.

Sexual morph unknown. *Macroconidiophores* consisting of a stipe bearing a penicillate arrangement of fertile branches, stipe extension and vesicle not observed; stipe septate, hyaline, smooth, 40–80 \times 3–4 μ m; Conidiogenous apparatus 8.6–20 μ m wide, and 14.3–25 μ m long; primary branches aseptate, 11–18 \times 2–3 μ m, each terminal produces two to four phialides, phialides doliiiform to reniform, hyaline, aseptate, 6–9 \times 2–3 μ m, apex with minute periclinal thickening and inconspicuous collarette. *Macroconidia* cylindrical, rounded at both ends, straight, (25–)27–32(–36) \times (2–)2.5–3.5(–4) μ m, (av. 29.5 \times 3 μ m), 1-septate, lacking a visible abscission scar, held in parallel

cylindrical clusters by colourless slime. Mega- and microconidia not observed.

Culture characteristics: Colonies white on the surface and buff in reverse after 7 d at 25 °C on MEA; abundant wooly aerial mycelium with moderate sporulation on the medium surface; chlamydo-spores not observed. Optimal growth temperature 25 °C, no growth at 5 °C and 35 °C, after 7 d, colonies at 10 °C, 15 °C, 20 °C, 25 °C and 30 °C reached 15.1 mm, 21.4 mm, 45.1 mm, 58.2 mm and 42.1 mm, respectively.

Typus: Ecuador, soil, 20 Jun. 1997, M.J. Wingfield (**holotype** HMAS 255717, ex-type culture CBS 111394 = CMW 30980 = CPC 1628).

Barcodes: *act* = MT335083; *cmdA* = MT335315; *his3* = MT335555; *rpb2* = MT412608; *tef1* = MT412846; *tub2* = MT413058 (alternative markers: ITS = MT359776; LSU = MT359536).

Notes: *Calonectria pauciphialidica* is a novel species in the *Ca. brassicae* species complex, closely related to *Ca. ecuadorae* (Fig. 1, Supplementary Table S4). The sequences of *cmdA*, *his3*, *rpb2*, *tef1* and *tub2* gene regions can differentiate *Ca. pauciphialidica* from that species. The smaller number of branches and phialides of *Ca. pauciphialidica* distinguish it from *Ca. ecuadorae*; in addition, macroconidia of *Ca. pauciphialidica* (av. 29.5 × 3 µm) are smaller than those of *Ca. ecuadorae* [(av. 51 × 4.5 µm); Crous et al. 2006] (Supplementary Table S4).

pauciramosa *Calonectria* C.L. Schoch & Crous, Mycologia 91: 289. 1999.

Synonyms: *Cylindrocladium pauciramsum* C.L. Schoch & Crous, Mycologia 91: 289. 1999.

Calonectria polizzii L. Lombard et al., Stud. Mycol. 66: 25. 2010.
Calonectria zuluensis L. Lombard & Crous, Stud. Mycol. 66: 25. 2010.

Calonectria mossambicensis S. Maússe-Sitoe et al., Persoonia 31: 291. 2013.

Calonectria seminaria L. Lombard et al., Stud. Mycol. 80: 179. 2015.

Calonectria tetraramosa L. Lombard et al., Stud. Mycol. 80: 183. 2015.

Calonectria cliffordiicola L. Lombard & Crous, Stud. Mycol. 85: 177. 2016.

Calonectria ericae L. Lombard & Crous, Stud. Mycol. 85: 178. 2016.

Calonectria machaerinae L. Lombard & Crous, Stud. Mycol. 85: 181. 2016.

In: *Calonectria candelabrum* species complex.

Typus: PREM 55754 [holotype of *Ca. pauciramosa*; Schoch et al. 1999], PREM 55752 (holotype of *Cy. pauciramsum*; Schoch et al. 1999).

Ex-type culture: CBS 138824 = CMW 5683 = CPC 971 (Crous 2002, Lombard et al. 2010a).

Type locality: South Africa, Knysna.

Type substrate: Soil/*Eucalyptus grandis* (Crous 2002, Lombard et al. 2015a)

Barcodes: *act* = MT335093; *cmdA* = MT335325; *his3* = MT335565; *rpb2* = MT412618; *tef1* = MT412856; *tub2* = MT413068 (alternative markers: ITS = MT359786; LSU = MT359546).

Notes: *Calonectria pauciramosa* is closely related to *Ca. nemoricola* and *Ca. silvicola*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. pauciramosa* [(av. 50 × 4.5 µm); Crous 2002] are longer than those of *Ca. nemoricola* [(av. 45 × 4 µm); Alfenas et al. 2015] and *Ca. silvicola* [(av. 41 × 4.5 µm); Alfenas et al. 2015] (Supplementary Table S4). *Calonectria pauciramosa* is heterothallic (Crous 2002, Li et al. 2020). *Calonectria pauciramosa* is an important plant pathogen that has been reported as the dominant species in many countries such as Australia, Brazil, Italy, South Africa and the USA (Koike et al. 1999, Polizzi & Crous 1999, Schoch et al. 1999, Crous 2002), while Lombard et al. (2010c) and Chen et al. (2011) also confirmed its occurrence in China. In this study, the eight species reduced to synonymy with *Ca. pauciramosa* were originally collected in different climatic zones on five continents (Africa, Asia, Europe, North America and Oceania), supporting the view that *Ca. pauciramosa* is a cosmopolitan species with the ability to exist in areas with a range of climatic conditions.

penicilloides *Calonectria* (Tubaki) L. Lombard et al., Stud. Mycol. 66: 56. 2010.

Basionym: *Candelospora penicilloides* Tubaki, Nogoa 2: 58. 1952.

Synonym: *Cylindrocladium penicilloides* (Tubaki) Tubaki, J. Hattori Bot. Lab. 20: 154. 1958.

In: *Calonectria kyotensis* species complex.

Typus: type specimen lost (Tubaki 1958).

Ex-type culture: CBS 174.55 = CMW 23696 = STE-U 2388.

Type locality: Japan, Hatizyo Island.

Type substrate: *Prunus* sp.

Barcodes: *act* = MT335106; *cmdA* = MT335338; *his3* = MT335578; *rpb2* = MT412631; *tef1* = MT412869; *tub2* = MT413081 (alternative markers: ITS = MT359799; LSU = MT359559).

Notes: Phylogenetically, *Ca. penicilloides* forms a distinct lineage separate from other species in this species complex.

pentaseptata *Calonectria* L. Lombard et al., Persoonia 29: 157. 2012.

(see *Calonectria pseudoreteauidii*)

In: *Calonectria reteaudii* species complex.

Typus: CBS H-21062 holotype.

Ex-type culture: CBS 133349 = CMW 51318.

Type locality: Vietnam, Bavi, Hanoi.

Type substrate: *Eucalyptus* hybrid.

Barcodes: *act* = MT335117; *cmdA* = MT335352; *his3* = MT335592; *rpb2* = MT412645; *tef1* = MT412883; *tub2* = MT413094 (alternative markers: ITS = MT359813; LSU = MT359573).

Notes: *Calonectria pentaseptata* was treated as a synonym of *Ca. pseudoreteauidii* in this study. In comparison of DNA sequences, all eight gene sequences for the isolates of *Ca. pentaseptata* (ex-type CBS 133349, and CBS 133351) were 100 % identical to the isolates of *Ca. pseudoreteauidii* (ex-type CMW 25310, and CMW 25292). Both species produce narrowly clavate vesicles with similar dimensions (*Ca. pentaseptata*: 2–6 µm; *Ca. pseudoreteauidii*: 3–5 µm) and multiple-septate (> 3) macroconidia. The macroconidia of *Ca. pentaseptata* (av.

98 × 7 µm) are smaller than those of *Ca. pseudoreteauidii* (av. 104 × 8 µm) (Lombard *et al.* 2010c, Crous *et al.* 2012), which was considered to represent intraspecific variation (Supplementary Table S4).

piaiensis Calonectria R.F. Alfenas *et al.*, Stud. Mycol. 80: 112. 2015.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-21375 holotype.

Ex-type culture: CBS 134850 = LPF377.

Type locality: **Brazil**, Piauí state, Teresina.

Type substrate: Soil in *Eucalyptus brassiana* plantation.

Barcodes: *cmdA* = KM396060; *his3* = KM396143; *tef1* = KM395886; *tub2* = KM395973.

Notes: Phylogenetically, *Ca. piaiensis* forms a distinct lineage separate from other species in this species complex.

pini Calonectria L. Lombard *et al.*, Stud. Mycol. 66: 52. 2010.

In: *Calonectria brassicae* species complex.

Typus: PREM 60304 holotype.

Ex-type culture: CBS 123698 = CMW 31209.

Type locality: **Colombia**, Valle del Cauca, Buga.

Type substrate: *Pinus patula*.

Barcodes: *act* = MT335107; *cmdA* = MT335339; *his3* = MT335579; *rpb2* = MT412632; *tef1* = MT412870; *tub2* = MT413082 (alternative markers: ITS = MT359800; LSU = MT359560).

Notes: *Calonectria pini* is closely related to *Ca. orientalis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. pini* [(av. 44 × 5 µm); Lombard *et al.* 2010a] are shorter than those of *Ca. orientalis* [(av. 48 × 4 µm); Lombard *et al.* 2010a] (Supplementary Table S4). Furthermore, the small number of branches (–3) in the conidiogenous apparatus also distinguishes it from *Ca. orientalis* (–5) (Lombard *et al.* 2010a).

plurilateralis Calonectria L. Lombard & Crous, Stud. Mycol. 85: 184. 2016.

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-22766 holotype.

Ex-type culture: CBS 111401 = CMW 51178 = CPC 1637.

Type locality: **Ecuador**.

Type substrate: Soil.

Barcodes: *cmdA* = MT335340; *his3* = MT335580; *rpb2* = MT412633; *tef1* = MT412871; *tub2* = MT413083 (alternative markers: ITS = MT359801; LSU = MT359561).

Notes: *Calonectria plurilateralis* is phylogenetically closely related to *Ca. brasiliensis*, *Ca. hawksworthii* and *Ca. maranhensis*, and can be distinguished from these species by the dimensions of its macroconidia. The macroconidia of *Ca. plurilateralis* [(av. 34 × 4 µm); Lombard *et al.* 2016] are shorter than those of *Ca. brasiliensis* [(av. 38 × 3.5 µm); Batista 1951], *Ca. hawksworthii* [(av. 56 × 4 µm); Lombard *et al.* 2010a] and *Ca. maranhensis* [(av. 57 × 5 µm); Alfenas *et al.* 2015] (Supplementary Table S4).

pluriramosa Calonectria L. Lombard *et al.*, Stud. Mycol. 80: 178. 2015.

(see *Calonectria aconidialis*)

In: *Calonectria kiyotensis* species complex.

Typus: CBS H-21485 holotype.

Ex-type culture: CBS 136976 = CMW 31440 = CERC 1775.

Type locality: **China**, GuangXi Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334950; *cmdA* = MT335177; *his3* = MT335416; *tef1* = MT412707 (alternative markers: ITS = MT359637; LSU = MT359397).

Notes: *Calonectria pluriramosa* was treated as a synonym of *Ca. aconidialis* in this study. In comparisons of DNA sequences for six available gene regions (*rpb2* and *tub2* are not available for *Ca. pluriramosa*, *tub2* not available for *Ca. aconidialis*), all six gene sequences for the ex-type isolates of *Ca. pluriramosa* were 100 % identical to the ex-type isolate of *Ca. aconidialis* (CMW 35174). No sexual morph has been observed for *Ca. pluriramosa* (Lombard *et al.* 2015a, Supplementary Table S4).

polizzii Calonectria L. Lombard *et al.*, Stud. Mycol. 66: 25. 2010. (see *Calonectria pauciramosa*)

In: *Calonectria candelabrum* species complex.

Typus: PREM 60297 holotype.

Ex-type culture: CBS 123402 = CMW 30872.

Type locality: **Italy**, Sicily, Carrubba.

Type substrate: *Arbutus unedo*.

Barcodes: *act* = MT335099; *cmdA* = MT335331; *his3* = MT335571; *rpb2* = MT412624; *tef1* = MT412862; *tub2* = MT413074 (alternative markers: ITS = MT359792; LSU = MT359552).

Notes: *Calonectria polizzii* was treated as a synonym of *Ca. pauciramosa* in this study. In comparisons of DNA sequences for eight gene regions, the only differences between the ex-type isolate of *Ca. polizzii* (CBS 123402) and the ex-type isolate of *Ca. pauciramosa* (CBS 138824) were five base differences in the *tub2* sequence. Both species are heterothallic and produce obpyriform to ellipsoidal vesicles with overlapping dimensions (*Ca. polizzii*: 6–9 µm; *Ca. pauciramosa*: 5–11 µm) and 1-septate macroconidia. The macroconidia of *Ca. polizzii* (av. 37 × 4 µm) are shorter than those of *Ca. pauciramosa* (av. 50 × 4.5 µm) (Crous 2002, Lombard *et al.* 2010b, Li *et al.* 2020), which was considered to represent intraspecific variation (Supplementary Table S4).

propaginicola Calonectria R.F. Alfenas *et al.*, Stud. Mycol. 80: 115. 2015.

Synonym: *Calonectria pseudocerciana* R.F. Alfenas *et al.*, Stud. Mycol. 80: 117. 2015.

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-21366 holotype.

Ex-type culture: CBS 134815 = LPF220.

Type locality: **Brazil**, Pará state, Santana.

Type substrate: *Eucalyptus* seedling.

Barcodes: *cmdA* = KM396040; *his3* = KM396123; *tef1* = KM395866; *tub2* = KM395953.

Notes: *Calonectria propaginicola* is closely related to *Ca. cerciana* and *Ca. tonkinensis*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. propaginicola* [(av. 49 × 4 µm); Alfenas *et al.* 2015] are longer than those of *Ca. cerciana* [(av. 44 × 5 µm);

Lombard *et al.* 2010c] and *Ca. tonkinensis* [(av. 41.5 × 4 µm); Pham *et al.* 2019] (Supplementary Table S4).

pseudobrassicae *Calonectria* R.F. Alfenas *et al.*, Stud. Mycol. 80: 116. 2015.

In: *Calonectria brassicae* species complex.

Typus: CBS H-21371 holotype.

Ex-type culture: CBS 134662 = LPF280.

Type locality: **Brazil**, Pará state, Santana.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *cmdA* = KM396023; *his3* = KM396106; *tef1* = KM395849; *tub2* = KM395936.

Notes: *Calonectria pseudobrassicae* is closely related to *Ca. orientalis*, *Ca. paraensis* and *Ca. pini*. The macroconidia of *Ca. pseudobrassicae* [(av. 41 × 5 µm); Alfenas *et al.* 2015] are shorter than those of *Ca. orientalis* [(av. 48 × 4 µm); Lombard *et al.* 2010a] and *Ca. pini* [(av. 44 × 5 µm); Lombard *et al.* 2010a]. *Calonectria pseudobrassicae* has three tiers of branches in its conidiogenous apparatus in comparison to the two in *Ca. paraensis* (Alfenas *et al.* 2015) (Supplementary Table S4).

pseudocerciana *Calonectria* R.F. Alfenas *et al.*, Stud. Mycol. 80: 117. 2015.

(see ***Calonectria propaginicola***)

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-21366 holotype.

Ex-type culture: CBS 134824 = LPF367.

Type locality: **Brazil**, Pará state, Santana.

Type substrate: *Eucalyptus* seedling.

Barcodes: *cmdA* = KM396049; *his3* = KM396132; *tef1* = KM395875; *tub2* = KM395962.

Notes: *Calonectria pseudocerciana* was treated as a synonym of *Ca. propaginicola* in this study. In comparisons of DNA sequences for four available gene regions, the only differences between the ex-type isolate of *Ca. pseudocerciana* (CBS 134824) and the ex-type isolate of *Ca. propaginicola* (CBS 134815) was in the *cmdA*, *his3* and *tub2* sequences, where there were eight base differences in the *cmdA*, one base difference in the *his3* and one base difference in the *tub2* sequences. Both species produce obpyriform to sphaeropedunculate vesicles with similar dimensions (*Ca. pseudocerciana*: 7–12 µm; *Ca. propaginicola*: 5–12 µm) and 1-septate macroconidia, the macroconidia of *Ca. pseudocerciana* (av. 45 × 4 µm) are shorter than those of *Ca. propaginicola* (av. 49 × 4 µm) (Alfenas *et al.* 2015), which was considered to represent intraspecific variation (Supplementary Table S4).

pseudocolhounii *Calonectria* S.F. Chen *et al.*, Persoonia 26: 7. 2011.

(see ***Calonectria eucalypti***)

In: *Calonectria colhounii* species complex.

Typus: PREM 60456 holotype.

Ex-type culture: CBS 127195 = CMW 27209.

Type locality: **China**, Fujian Province.

Type substrate: *Eucalyptus dunnii*.

Barcodes: *act* = MT335108; *cmdA* = MT335341; *his3* = MT335581; *rpb2* = MT412634; *tef1* = MT412872;

tub2 = MT413084 (alternative markers: ITS = MT359802; LSU = MT359562).

Notes: *Calonectria pseudocolhounii* was treated as a synonym of *Ca. eucalypti* in this study. In comparisons of DNA sequences for eight gene regions, the only difference between the ex-type isolate of *Ca. pseudocolhounii* (CMW 27209) and the ex-type isolate of *Ca. eucalypti* (CMW 18444) was in the *his3*, ITS and *tub2* sequences, where there were three base differences in the *his3*, one base difference in the ITS and four base differences in the *tub2* sequences. Both species are homothallic and produce clavate vesicles with similar dimensions (*Ca. pseudocolhounii*: 3.5–6 µm; *Ca. eucalypti*: 4–6 µm) and 3-septate macroconidia (Lombard *et al.* 2010a, Chen *et al.* 2011, Li *et al.* 2020). The macroconidia of *Ca. pseudocolhounii* (av. 60 × 4.5 µm) are smaller than those of *Ca. eucalypti* (av. 72 × 6 µm) (Lombard *et al.* 2010a, Chen *et al.* 2011), which was considered to represent intraspecific variation (Supplementary Table S4).

pseudoecuadoriae *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 185. 2016.

In: *Calonectria brassicae* species complex.

Typus: CBS H-22768 holotype.

Ex-type culture: CBS 111402 = CMW 51179 = CPC 1639.

Type locality: **Ecuador**.

Type substrate: Soil.

Barcodes: *cmdA* = KX784589; *rpb2* = KY653432; *tef1* = KX784723; *tub2* = KX784652 (alternative markers: ITS = KY653273; LSU = KY653329).

Notes: *Calonectria pseudoecuadoriae* forms a single lineage closely related to *Ca. robigophila*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. pseudoecuadoriae* [(av. 38 × 3.5 µm); Lombard *et al.* 2016] are smaller than those of *Ca. robigophila* [(av. 50 × 4 µm); Alfenas *et al.* 2015] (Supplementary Table S4).

pseudohodgesii *Calonectria* R.F. Alfenas *et al.*, Stud. Mycol. 80: 118. 2015.

(see ***Calonectria brasiliensis***)

In: *Calonectria cylindrospora* species complex.

Typus: CBS H-21368 holotype.

Ex-type culture: CBS 134818 = LPF262.

Type locality: **Brazil**, Minas Gerais state, Viçosa.

Type substrate: Leaf of rooted *Azadirachta indica* cutting.

Barcodes: *cmdA* = KM395991; *his3* = KM396079; *tef1* = KM395817; *tub2* = KM395905.

Notes: *Calonectria pseudohodgesii* was treated as a synonym of *Ca. brasiliensis* in this study. In comparisons of DNA sequences for four available gene regions, the only difference between the ex-type isolate of *Ca. pseudohodgesii* (CBS 134818) and the ex-type isolate of *Ca. brasiliensis* (CBS 230.51) was in the *cmdA*, *his3*, *tef1* and *tub2* sequences, where there were three base differences in the *cmdA*, two base differences in the *his3*, two base differences in the *tef1* and one base difference in the *tub2* sequences. Both species produce ellipsoidal to obpyriform vesicles of similar dimensions (*Ca. pseudohodgesii*: 4–10 µm; *Ca. brasiliensis*: 7–11 µm) and 1-septate macroconidia, the macroconidia of *Ca. pseudohodgesii* (av. 54 × 4.5 µm) are larger than those of *Ca. brasiliensis* (av. 38 × 3.5 µm) (Batista 1951, Lombard *et al.* 2010b, Alfenas *et al.* 2015), which was

considered to represent intraspecific variation (Supplementary Table S4).

pseudokyotensis *Calonectria* L. Lombard *et al.*, Stud. Mycol. 80: 178. 2015.

(see *Calonectria aconidialis*)

In: *Calonectria kyotensis* species complex.

Typus: CBS H-21774 holotype.

Ex-type culture: CBS 137332 = CMW 31439 = CERC 1774.

Type locality: **China**, GuangXi Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334951; *cmdA* = MT335178; *his3* = MT335417; *tef1* = MT412708 (alternative markers: ITS = MT359638; LSU = MT359398).

Notes: *Calonectria pseudokyotensis* was treated as a synonym of *Ca. aconidialis* in this study. In comparisons of DNA sequences for six available gene regions (*rpb2* and *tub2* are not available for *Ca. pseudokyotensis*, *tub2* not available for *Ca. aconidialis*), all six gene sequences for the ex-type isolate of *Ca. pseudokyotensis* (CMW 31439) were 100 % identical to the ex-type isolate of *Ca. aconidialis* (CMW 35174). No sexual morph was observed for *Ca. pseudokyotensis* (Lombard *et al.* 2015a, Supplementary Table S4).

pseudometrosideri *Calonectria* R.F. Alfenas *et al.*, Stud. Mycol. 80: 118. 2015.

In: *Calonectria candelabrum* species complex.

Typus: CBS 134845 (preserved as metabolically inactive culture, Alfenas *et al.* 2015).

Ex-type culture: CBS 134845 = LPF210.

Type locality: **Brazil**, Alagoas state, Maceió.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *cmdA* = KM395995; *his3* = KM396083; *tef1* = KM395821; *tub2* = KM395909.

Notes: *Calonectria pseudometrosideri* is closely related to *Ca. putriramosa*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. pseudometrosideri* (av. 51 × 4.5 µm) are longer than those of *Ca. putriramosa* (av. 43 × 5 µm), while the vesicles of *Ca. pseudometrosideri* (5–7 µm) are narrower than those of *Ca. putriramosa* (7–10 µm) (Alfenas *et al.* 2015, Lombard *et al.* 2016) (Supplementary Table S4).

pseudomexicana *Calonectria* L. Lombard *et al.*, Persoonia 27: 76. 2011.

Synonym: *Calonectria tunisiana* L. Lombard *et al.*, Persoonia 27: 77. 2011.

In: *Calonectria mexicana* species complex.

Typus: CBS H-20685 holotype.

Ex-type culture: CBS 130354 = CMW 51313 = DISTEF-TCROU1.

Type locality: **Tunisia**, Carthage, Tunis.

Type substrate: *Callistemon* sp.

Barcodes: *act* = MT335110; *cmdA* = MT335343; *his3* = MT335583; *rpb2* = MT412636; *tef1* = MT412874; *tub2* = MT413086 (alternative markers: ITS = MT359804; LSU = MT359564).

Notes: *Calonectria pseudomexicana* is closely related to *Ca. pseudouxmalensis* and *Ca. uxmalensis*, and can be distinguished from these two species by the dimensions of its

macroconidia and vesicles. The macroconidia of *Ca. pseudomexicana* (av. 45 × 5 µm) are larger than those of *Ca. pseudouxmalensis* (av. 29 × 3 µm) and *Ca. uxmalensis* (av. 30 × 3 µm), and vesicles of *Ca. pseudomexicana* (9–14 µm) are wider than those of *Ca. pseudouxmalensis* (5–9 µm) and *Ca. uxmalensis* (5–8 µm) (Lombard *et al.* 2011, 2016) (Supplementary Table S4).

pseudonaviculata *Calonectria* (Crous *et al.*) L. Lombard *et al.*, Stud. Mycol. 66: 56. 2010.

Basionym: *Cylindrocladium pseudonaviculatum* Crous *et al.*, Sydowia 54: 26. 2002.

Synonym: *Cylindrocladium buxicola* Henricot, Mycologia 94: 993. 2002.

In: *Calonectria naviculata* species complex.

Typus: PREM 57313 holotype.

Ex-type culture: CBS 116251 = CMW 51235 = CPC 3399 = Lynfield 824.

Type locality: **New Zealand**.

Type substrate: *Buxus sempervirens*.

Barcodes: *cmdA* = MT335345; *his3* = MT335585; *rpb2* = MT412638; *tef1* = MT412876; *tub2* = MT413088 (alternative markers: ITS = MT359806; LSU = MT359566).

Notes: *Calonectria pseudonaviculata* is closely related to *Ca. henricotiae*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. pseudonaviculata* [(av. 60 × 5 µm); Crous *et al.* 2002] are longer than those of *Ca. henricotiae* [(av. 56 × 5.6 µm); Gehesquiere *et al.* 2015]. *Calonectria pseudonaviculata* is heterothallic (Li *et al.* 2020) (Supplementary Table S4).

pseudopteridis *Calonectria* R.F. Alfenas *et al.*, Stud. Mycol. 80: 118. 2015.

Basionym: *Cylindrocladium macrosporum* Sherb., Phytopathology 18: 219. 1928.

In: *Calonectria pteridis* species complex.

Typus: BPI 414558 holotype.

Ex-type culture: CBS 163.28 = CMW 51159 = IMI 299579.

Type locality: **USA**.

Type substrate: *Washingtonia robusta*.

Barcodes: *act* = MT335112; *cmdA* = MT335347; *his3* = MT335587; *rpb2* = MT412640; *tef1* = MT412878; (alternative markers: ITS = MT359808; LSU = MT359568).

Notes: *Calonectria pseudopteridis* is closely related to *Ca. pteridis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. pseudopteridis* [(av. 87.5 × 5.7 µm) are longer than those of *Ca. pteridis* [(av. 82 × 5.5 µm); Sobers 1968, Crous *et al.* 1993c, Alfenas *et al.* 2015] (Supplementary Table S4).

pseudoreteaudii *Calonectria* L. Lombard *et al.*, Persoonia 24: 8. 2010.

Synonyms: *Calonectria pentaseptata* L. Lombard *et al.*, Persoonia 29: 157. 2012.

Calonectria microconidialis L. Lombard *et al.*, Stud. Mycol. 80: 175. 2015.

In: *Calonectria reteaudii* species complex.

Typus: PREM 60290 holotype.

Ex-type culture: CBS 123694 = CMW 25310.

Type locality: **China**, GuangDong.

Type substrate: *Eucalyptus urophylla* × *E. grandis* hybrid cutting.
Barcodes: *act* = MT335119; *cmdA* = MT335354; *his3* = MT335594; *rpb2* = MT412647; *tef1* = MT412885; *tub2* = MT413096 (alternative markers: ITS = MT359815; LSU = MT359575).

Notes: *Calonectria pseudoreteaudii* is phylogenetically closely related to *Ca. acaciicola* and *Ca. reteaudii*. The sequences of *his3*, ITS, *rpb2*, *tef1* and *tub2* gene regions can differentiate *Ca. pseudoreteaudii* from these two species. The macroconidia of *Ca. pseudoreteaudii* [(av. 104 × 8 μm); Lombard et al. 2010c] are larger than those of *Ca. acaciicola* [(av. 94 × 7 μm); Pham et al. 2019] and *Ca. reteaudii* [(av. 84 × 6.5 μm); Kang et al. 2001a]. *Calonectria pseudoreteaudii* is heterothallic (Li et al. 2020) (Supplementary Table S4).

pseudoscoparia Calonectria L. Lombard et al., Stud. Mycol. 66: 53. 2010.

(see *Calonectria candelabrum*)

In: *Calonectria candelabrum* species complex.

Typus: PREM 60305 holotype.

Ex-type culture: CBS 125257 = CMW 15218.

Type locality: Ecuador, Pichincha Province, Las Golondrinas.

Type substrate: *Eucalyptus grandis* cutting.

Barcodes: *act* = MT334979; *cmdA* = MT335209; *his3* = MT335449; *rpb2* = MT412513; *tef1* = MT412740; *tub2* = MT412961 (alternative markers: ITS = MT359670; LSU = MT359430).

Notes: *Calonectria pseudoscoparia* was treated as a synonym of *Ca. candelabrum* in this study. In comparisons of DNA sequences for eight gene regions, only one base difference in the *tub2* gene sequences was found between the ex-type isolate of *Ca. pseudoscoparia* (CMW 15218) and the isolates of *Ca. candelabrum* (CMW 31000, and CMW 31001). Both species produce ellipsoidal to obpyriform vesicles with overlapping dimensions (*Ca. pseudoscoparia*: 6–10 μm; *Ca. candelabrum*: 5–8 μm) and 1-septate macroconidia. The macroconidia of *Ca. pseudoscoparia* (av. 48 × 4 μm) are smaller than those of *Ca. candelabrum* (av. 60 × 4.5 μm) (Viégas 1946, Crous 2002, Lombard et al. 2010a, 2015b), which was considered to represent intraspecific variation (Supplementary Table S4).

pseudospathiphylli Calonectria J.C. Kang et al., Syst. Appl. Microbiol. 24: 215. 2001.

Synonym: *Cylindrocladium pseudospathiphylli* J.C. Kang et al., Syst. Appl. Microbiol. 24: 215. 2001.

In: *Calonectria spathiphylli* species complex.

Typus: PREM 57196 (holotype of *Ca. pseudospathiphylli*; Kang et al. 2001b), PREM 57197 (holotype of *Cy. pseudospathiphylli*; Kang et al. 2001b).

Ex-type culture: CBS 109165 = CMW 30976 = CPC 1623 (Alfenas et al. 2015, Lombard et al. 2016).

Type locality: Ecuador.

Type substrate: Soil.

Barcodes: *act* = GQ280493; *cmdA* = GQ267412; *his3* = AF348241; *rpb2* = KY653435; *tef1* = FJ918562; *tub2* = FJ918513 (alternative markers: ITS = GQ280615; LSU = GQ280737).

Notes: *Calonectria pseudospathiphylli* forms a single lineage closely related to *Ca. densa*, *Ca. humicola* and *Ca. spathiphylli*. No lateral stipe extension was observed in *Ca. pseudospathiphylli*, whereas these are common in *Ca. densa*. *Calonectria*

pseudospathiphylli produce stipe extensions (up to 250 μm) longer than those of *Ca. humicola* (up to 157 μm). The macroconidia of *Ca. pseudospathiphylli* (av. 52 × 4 μm) obviously smaller than those of *Ca. spathiphylli* (av. 70 × 6 μm) (El-Gholl et al. 1992, Kang et al. 2001b, Lombard et al. 2010a). *Calonectria pseudospathiphylli* is characterised as being homothallic, while *Ca. spathiphylli* is heterothallic (El-Gholl et al. 1992, Kang et al. 2001b) (Supplementary Table S4).

pseudospathulata Calonectria R.F. Alfenas et al., Stud. Mycol. 80: 118. 2015.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-21356 holotype.

Ex-type culture: CBS 134841 = LPF072.

Type locality: Brazil, Minas Gerais state, Araponga.

Type substrate: Soil in tropical rainforest.

Barcodes: *cmdA* = KM396070; *his3* = KM396153; *tef1* = KM395896; *tub2* = KM395983.

Notes: *Calonectria pseudospathulata* is closely related to *Ca. fragariae*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. pseudospathulata* [(av. 43 × 4 μm); Alfenas et al. 2015] are longer than those of *Ca. fragariae* [(av. 39 × 4 μm); Lopes et al. 2017] (Supplementary Table S4).

pseudoturangicola Calonectria J.Q. Li et al., IMA Fungus 8: 279. 2017.

(see *Calonectria kyotensis*)

In: *Calonectria kyotensis* species complex.

Typus: PREM 61948 holotype.

Ex-type culture: CBS 142890 = CMW 47496 = CERC 7126.

Type locality: China, Fujian Province, Fuzhou City.

Type substrate: Soil.

Barcodes: *act* = MT335121; *cmdA* = MT335356; *his3* = MT335596; *rpb2* = MT412649; *tef1* = MT412887; *tub2* = MT413098 (alternative markers: ITS = MT359817; LSU = MT359577).

Notes: *Calonectria pseudoturangicola* was treated as a synonym of *Ca. kyotensis* in this study. In comparisons of DNA sequences for eight gene regions, the only difference between the ex-type isolate of *Ca. pseudoturangicola* (CERC 7126) and the ex-type isolate of *Ca. kyotensis* (CBS 114525) was in the *cmdA*, ITS, LSU and *tub2* sequences, where there was one base difference in the *cmdA*, one base difference in the ITS, one base difference in the LSU and three base differences in the *tub2* sequences. Both species are homothallic and produce sphaeropedunculate (globose) vesicles and 1-septate macroconidia of similar dimensions (*Ca. pseudoturangicola*: av. 40 × 3.5 μm, *Ca. kyotensis*: av. 41 × 4 μm) (Terashita 1968, Li et al. 2017, 2020; Supplementary Table S4).

pseudovata Calonectria R.F. Alfenas et al., Stud. Mycol. 80: 120. 2015.

In: *Calonectria pteridis* species complex.

Typus: CBS H-21370 holotype.

Ex-type culture: CBS 134674 = LPF267.

Type locality: Brazil, Pará state, Santana.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *cmdA* = KM396032; *his3* = KM396115; *tef1* = KM395858; *tub2* = KM395945.

Notes: *Calonectria pseudovata* is phylogenetically closely related to *Ca. ovata* and *Ca. terricola*. Morphologically, *Ca. pseudovata* shows some overlap with *Ca. ovata*, while the sequences of *cmdA*, *his3*, *tef1* and *tub2* gene regions can differentiate *Ca. pseudovata* from *Ca. ovata*. The macroconidia of *Ca. pseudovata* [(av. 69 × 5 µm); [Alfenas et al. 2015](#)] are larger than those of *Ca. terricola* [(av. 46 × 4.5 µm); [Lombard et al. 2016](#)]. Furthermore, the ability of *Ca. pseudovata* and *Ca. ovata* to produce miconidiophores and microconidia in culture distinguishes it from *Ca. terricola*.

pseudouxmalensis* *Calonectria L. Lombard & Crous, Stud. Mycol. 85: 187. 2016.

In: *Calonectria mexicana* species complex.

Typus: CBS H-22769 holotype.

Ex-type culture: CBS 110924 = CMW 51166 = CPC 942.

Type locality: **Mexico**.

Type substrate: Soil.

Barcodes: *act* = MT335123; *cmdA* = MT335358; *his3* = MT335598; *rpb2* = MT412651; *tef1* = MT412889; *tub2* = MT413100 (alternative markers: ITS = MT359819; LSU = MT359579).

Notes: *Calonectria pseudouxmalensis* is closely related to *Ca. uxmalensis*, the sequences of *cmdA*, *his3*, *tef1* and *tub2* gene regions can distinguish *Ca. pseudouxmalensis* from *Ca. uxmalensis*. Morphologically, these two species are similar to each other. However, no lateral stipe extensions were observed in *Ca. pseudouxmalensis*, a feature that has been reported in *Ca. uxmalensis* ([Lombard et al. 2016](#)) ([Supplementary Table S4](#)).

pseudoyunnanensis *Calonectria* J.Q. Li et al., IMA Fungus 8: 279. 2017.

(see ***Calonectria yunnanensis***)

In: *Calonectria kiyotensis* species complex.

Typus: PREM 61950 holotype.

Ex-type culture: CBS 142892 = CMW 47655 = CERC 5376.

Type locality: **China**, YunNan, PuEr Region.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT335126; *cmdA* = MT335361; *his3* = MT335601; *rpb2* = MT412654; *tef1* = MT412892; *tub2* = MT413103 (alternative markers: ITS = MT359822; LSU = MT359582).

Notes: *Calonectria pseudoyunnanensis* was treated as a synonym of *Ca. yunnanensis* in this study. In comparisons of DNA sequences for eight gene regions, the only difference between the ex-type isolate of *Ca. pseudoyunnanensis* (CERC 5376) and the ex-type isolate of *Ca. yunnanensis* (CERC 5339) was in the *his3* and *tub2* sequences, where there were three base differences in the *his3* and four base differences in the *tub2* sequences. Both species are homothallic and produce sphaeropedunculate vesicles and 1-septate macroconidia ([Li et al. 2017, 2020](#)), and share vesicles of similar dimensions (*Ca. pseudoyunnanensis*: 2.5–5 µm; *Ca. yunnanensis*: 2–4.5 µm). The macroconidia of *Ca. pseudoyunnanensis* [(av. 47.5 × 5 µm); [Li et al. 2017](#)] are larger than those of *Ca. yunnanensis* [(av. 43 × 4.5 µm); [Li et al. 2017](#)] which was considered to represent intraspecific variation ([Supplementary Table S4](#)).

pteridis* *Calonectria Crous et al., Mycotaxon 46: 228. 1993.

Synonym: *Cylindrocladium pteridis* F.A. Wolf, J. Elisha Mitchell Sci. Soc. 42: 59. 1926.

In: *Calonectria pteridis* species complex.

Typus: PREM 51033 (holotype of *Ca. pteridis*; [Crous et al. 1993c](#)), BPI 414564 (holotype of *Cy. pteridis*; [Wolf 1926](#)).

Ex-type culture: CBS 111793 = CMW 16736 = CPC 2372 = ATCC 34395 ([Crous et al. 2006](#)).

Type locality: **USA**.

Type substrate: *Arachniodes adiantiformis*.

Barcodes: *act* = GQ280494; *cmdA* = GQ267413; *his3* = DQ190679; *rpb2* = KY653438; *tef1* = FJ918563; *tub2* = DQ190578 (alternative markers: ITS = GQ280616; LSU = GQ280738).

Notes: *Calonectria pteridis* is closely related to *Ca. pseudopteridis*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. pteridis* [(av. 82 × 5.5 µm); [Crous et al. 1993c](#)] are shorter than those of *Ca. pseudopteridis* [(av. 87.5 × 5.7 µm); [Sobers 1968, Alfenas et al. 2015](#)]. ([Supplementary Table S4](#)).

putriramosa* *Calonectria L. Lombard & Crous, Stud. Mycol. 85: 188. 2016.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-22770 holotype.

Ex-type culture: CBS 111449 = CMW 51181 = CPC 1951.

Type locality: **Brazil**.

Type substrate: *Eucalyptus* cuttings.

Barcodes: *act* = MT335129; *cmdA* = MT335364; *his3* = MT335604; *rpb2* = MT412657; *tef1* = MT412895; *tub2* = MT413105 (alternative markers: ITS = MT359825; LSU = MT359585).

Notes: *Calonectria putriramosa* is closely related to *Ca. pseudometrosideri*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. putriramosa* (av. 43 × 5 µm) are shorter than those of *Ca. pseudometrosideri* (av. 51 × 4.5 µm), while the vesicles of *Ca. putriramosa* (7–10 µm) are wider than those of *Ca. pseudometrosideri* (5–7 µm) ([Alfenas et al. 2015, Lombard et al. 2016](#)) ([Supplementary Table S4](#)).

queenslandica* *Calonectria L. Lombard et al., Persoonia 24: 8. 2010.

Synonym: *Calonectria terrae-reginae* L. Lombard et al., Persoonia 24: 8. 2010.

In: *Calonectria reteaudii* species complex.

Typus: PREM 60243 holotype.

Ex-type culture: CBS 112146 = CMW 30604 = CPC 3213.

Type locality: **Australia**, Queensland, Lannercost.

Type substrate: *Eucalyptus urophylla*.

Barcodes: *act* = MT335132; *cmdA* = MT335367; *his3* = MT335607; *rpb2* = MT412660; *tef1* = MT412898; *tub2* = MT413108 (alternative markers: ITS = MT359828; LSU = MT359588).

Notes: *Calonectria queenslandica* is phylogenetically closely related to *Ca. lombardiana* ([Fig. 1](#)). Sequences of ITS, *tef1* and *tub2* gene regions can differentiate *Ca. queenslandica* from *Ca. lombardiana*. In addition, the macroconidia of *Ca. queenslandica*

[(av. $69 \times 6 \mu\text{m}$); Lombard *et al.* 2010c] are shorter than those of *Ca. lombardiana* (av. $80 \times 6 \mu\text{m}$) (Supplementary Table S4).

quinqueramosa *Calonectria* R.F. Alfenas *et al.*, Stud. Mycol. 80: 123. 2015.

In: *Calonectria brassicae* species complex.

Typus: CBSH-21355 holotype.

Ex-type culture: CBS 134654 = LPF065.

Type locality: Brazil, Pará state, Monte Dourado.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *cmdA* = KM396029; *his3* = KM396112; *tef1* = KM395855; *tub2* = KM395942.

Notes: *Calonectria quinquerosa* is closely related to *Ca. gracilis*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. quinquerosa* (av. $59 \times 5 \mu\text{m}$) are larger than those of *Ca. gracilis* (av. $56 \times 4.5 \mu\text{m}$), while the vesicles of *Ca. quinquerosa* [(3–5 μm); Alfenas *et al.* 2015] are narrower than those of *Ca. gracilis* [(2–11 μm); Crous *et al.* 1993c]. *Calonectria quinquerosa* is homothallic (Alfenas *et al.* 2015) (Supplementary Table S4).

reteaudii *Calonectria* (Bugnic.) C. Booth, Mycol. Pap. 104: 41. 1966.

Basionym: *Neonectria reteaudii* Bugnic., Encycl. Mycol. 11: 189. 1939.

Synonyms: *Cylindrocarpon reteaudii* Bugnic., Encycl. Mycol. 11: 189. 1939.

Cylindrocladium reteaudii (Bugnic.) Boesew., Trans. Brit. Mycol. Soc. 78: 553. 1982.

Cylindrocladium quinqueseptatum Boedijn & Reitsma, Reinwardtia 1: 59. 1950.

Calonectria baviensis N.Q. Pham *et al.*, Mycologia 111: 90. 2019.

In: *Calonectria reteaudii* species complex.

Typus: PREM 57211 (neotype of *Ca. reteaudii*; Crous 2002), PREM 57212 (neotype of *Cy. reteaudii*; Crous 2002).

Ex-type culture: CBS 112144 = CMW 30984 = CPC 3201 (Crous 2002, Crous *et al.* 2006).

Type locality: Vietnam, Binh Phuoc, Chon Thanh.

Type substrate: *Eucalyptus camaldulensis*.

Barcodes: *act* = MT335135; *cmdA* = MT335370; *his3* = MT335610; *rpb2* = MT412663; *tef1* = MT412901; *tub2* = MT413111 (alternative markers: ITS = MT359831; LSU = MT359591).

Notes: *Calonectria reteaudii* is phylogenetically closely related to *Ca. acaciicola* and *Ca. pseudoreteaudii*. The sequences of the *his3*, *rpb2*, *tef1* and *tub2* gene regions can differentiate *Ca. reteaudii* from these two species. The macroconidia of *Ca. reteaudii* [(av. $84 \times 6.5 \mu\text{m}$); Kang *et al.* 2001a] are smaller than those of *Ca. acaciicola* [(av. $94 \times 7 \mu\text{m}$); Pham *et al.* 2019] and *Ca. pseudoreteaudii* [(av. $104 \times 8 \mu\text{m}$); Lombard *et al.* 2010c]. *Calonectria reteaudii* is heterothallic (Kang *et al.* 2001a) (Supplementary Table S4).

robigophila *Calonectria* R.F. Alfenas *et al.*, Stud. Mycol. 80: 123. 2015.

In: *Calonectria brassicae* species complex.

Typus: CBS H-21361 holotype.

Ex-type culture: CBS 134652 = LPF192.

Type locality: Brazil, Maranhao state, Açailandia.

Type substrate: *Eucalyptus* sp.

Barcodes: *cmdA* = KM396024; *his3* = KM396107; *tef1* = KM395850; *tub2* = KM395937.

Notes: *Calonectria robigophila* forms a single lineage closely related to *Ca. duoramosa*, and it produce six tiers of branches in its conidiogenous apparatus in comparison to the two in *Ca. duoramosa*. The macroconidia of *Ca. robigophila* [(av. $50 \times 4 \mu\text{m}$); Alfenas *et al.* 2015] are longer than those of *Ca. duoramosa* [(av. $46 \times 4 \mu\text{m}$); Alfenas *et al.* 2015] (Supplementary Table S4).

rumohrae *Calonectria* El-Gholl & Alfenas, Mycotaxon 64: 478. 1997.

Synonym: *Cylindrocladium rumohrae* El-Gholl & Alfenas, Mycotaxon 64: 478. 1997.

In: *Calonectria gracilipes* species complex.

Typus: FLAS F56116a & b (holotypes of *Ca. rumohrae* and *Cy. rumohrae*; El-Gholl *et al.* 1997).

Ex-type culture: CBS 111431 = CMW 23697 = CPC 1716 = UFV 218 (Crous 2002, Crous *et al.* 2006).

Type locality: Panama, Volcan.

Type substrate: *Rumohra adiantiformis*.

Barcodes: *act* = MT335137; *cmdA* = MT335372; *his3* = MT335612; *tef1* = MT412903; *tub2* = MT413113 (alternative markers: ITS = MT359833; LSU = MT359593).

Notes: *Calonectria rumohrae* is phylogenetically closely related to *Ca. hurae*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. rumohrae* [(av. $110 \times 9 \mu\text{m}$); El-Gholl *et al.* 1997] are shorter but wider than those of *Ca. hurae* [(av. $120 \times 7.5 \mu\text{m}$); Crous 2002]. *Calonectria rumohrae* is homothallic (El-Gholl *et al.* 1997) (Supplementary Table S4).

seminaria *Calonectria* L. Lombard *et al.*, Stud. Mycol. 80: 179. 2015.

(see ***Calonectria pauciramosa***)

In: *Calonectria candelabrum* species complex.

Typus: CBS H-21475 holotype.

Ex-type culture: CBS 136632 = CMW 31450 = CERC 1785.

Type locality: China, GuangDong Province, ZhanJiang.

Type substrate: *Eucalyptus urophylla* \times *E. grandis* clone seedling leaf.

Barcodes: *act* = MT335102; *cmdA* = MT335334; *his3* = MT335574; *rpb2* = MT412627; *tef1* = MT412865; *tub2* = MT413077 (alternative markers: ITS = MT359795; LSU = MT359555).

Notes: *Calonectria seminaria* was treated as a synonym of *Ca. pauciramosa* in this study. In comparisons of DNA sequences for eight gene regions, all the sequences of the isolates of *Ca. seminaria* (ex-type CMW 31450, and CMW 31489) were 100 % identical to those of the isolates of *Ca. pauciramosa* (ex-type CBS 138824, CMW 2151, CMW 7592, CMW 9151, CMW 30823, and CMW 30875). Both species produce obpyriform to ellipsoidal vesicles and 1-septate macroconidia, and shared the similar vesicles (*Ca. seminaria*: 6–11 μm ; *Ca. pauciramosa*: 5–11 μm) and macroconidial dimensions (*Ca. seminaria*: av. $47 \times 5 \mu\text{m}$; *Ca. pauciramosa*: av. $50 \times 4.5 \mu\text{m}$) (Crous 2002, Lombard *et al.* 2015a) (Supplementary Table S4).

silvicola *Calonectria* R.F. Alfenas *et al.*, Stud. Mycol. 80: 123. 2015.

In: Calonectria candelabrum species complex.

Typus: CBS H-21357 holotype.

Ex-type culture: CBS 135237 = LPF081.

Type locality: **Brazil**, Bahia state, Mucuri.

Type substrate: Soil in tropical rainforest.

Barcodes: *cmdA* = KM396065; *his3* = KM396148; *tef1* = KM395891; *tub2* = KM395978.

Notes: *Calonectria silvicola* is closely related to *Ca. nemoricola*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. silvicola* [(av. 41 × 4.5 µm); [Alfenas et al. 2015](#)] are shorter than those of *Ca. nemoricola* [(av. 45 × 4 µm); [Alfenas et al. 2015](#)] ([Supplementary Table S4](#)).

spathiphylli Calonectria [El-Gholl et al.](#), *Mycotaxon* 45: 296. 1992.

Synonym: *Cylindrocladium spathiphylli* [Schoult., et al.](#), *Mycotaxon* 16: 268. 1982.

In: Calonectria spathiphylli species complex.

Typus: FLAS 55655 [holotype of *Ca. spathiphylli*; [El-Gholl et al. 1992](#)], ATCC 44730 (holotype of *Cy. spathiphylli*; [Schoulties et al. 1982](#), [Crous 2002](#)).

Ex-type culture: CBS 114540 = CMW 16742 = ATCC 44730 = STE-U 2185 ([Crous 2002](#), [Alfenas et al. 2015](#)).

Type locality: **USA**, Florida.

Type substrate: *Spathiphyllum* sp.

Barcodes: *cmdA* = MT335374; *his3* = MT335614; *rpb2* = MT412666; *tef1* = MT412905; *tub2* = MT413115 (alternative markers: ITS = MT359835; LSU = MT359595).

Notes: *Calonectria spathiphylli* is closely related to *Ca. densa* and *Ca. humicola*, and can be distinguished from these two species by the dimensions of its macroconidia. Macroconidia of *Ca. spathiphylli* [(av. 70 × 6 µm); [El-Gholl et al. 1992](#)] are longer than those of *Ca. densa* [(av. 54 × 6 µm); [Lombard et al. 2010a](#)] and larger than those of *Ca. humicola* [(av. 51 × 5 µm); [Lombard et al. 2010a](#)]. *Calonectria spathiphylli* is characterised as being heterothallic ([El-Gholl et al. 1992](#)) ([Supplementary Table S4](#)).

spathulata Calonectria [El-Gholl et al.](#), *Mycotaxon* 26: 159. 1986 *emend.* [Crous](#), *Mycoscience* 42: 55. 2001.

Synonyms: *Cylindrocladium spathulatum* [El-Gholl et al.](#), *Mycotaxon* 26: 159. 1986 *emend.* [Crous](#), *Mycoscience* 42: 55. 2001. *Calonectria stipitata* [L. Lombard & Crous](#), *Stud. Mycol.* 85: 188. 2016.

In: Calonectria candelabrum species complex.

Typus: FLAS F54257a (holotype of *Ca. spathulata*; [Crous & Kang 2001](#)), FLAS F54257b (holotype of *Cy. spathulatum*; [Crous & Kang 2001](#)).

Ex-type culture: CBS 555.92 = CMW 16744 ([Lombard et al. 2010a](#)).

Type locality: **Brazil**.

Type substrate: *Eucalyptus viminalis*.

Barcodes: *act* = MT335139; *cmdA* = MT335376; *his3* = MT335616; *rpb2* = MT412668; *tef1* = MT412907; *tub2* = MT413117 (alternative markers: ITS = MT359837; LSU = MT359597).

Notes: *Calonectria spathulata* is closely related to *Ca. colombiana*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca. spathulata* (av. 80 × 6 µm) are larger than those of *Ca.*

colombiana (av. 37 × 3 µm). Furthermore, *Ca. spathulata* can produce both microconidiophores and microconidia, a feature not observed for *Ca. colombiana* ([Crous & Kang 2001](#), [Lombard et al. 2010b](#)). *Calonectria spathulata* is homothallic ([Crous & Kang 2001](#)) ([Supplementary Table S4](#)). This species is commonly associated with leaf spots and cutting rot of *Eucalyptus* cultivated in plantations and nurseries, and has a wide geographic distribution in South America (Argentina, Brazil, Colombia and Ecuador) ([El-Gholl et al. 1986](#), [Crous & Kang 2001](#), [Rodas et al. 2005](#)).

sphaeropedunculata Calonectria [L. Lombard et al.](#), *Stud. Mycol.* 80: 180. 2015.

(see ***Calonectria aconidialis***)

In: Calonectria kytensis species complex.

Typus: CBS H-21486 holotype.

Ex-type culture: CBS 136081 = CMW 31390 = CERC 1725.

Type locality: **China**, GuangXi Province.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT334952; *cmdA* = MT335179; *his3* = MT335418; *rpb2* = MT412485; *tef1* = MT412709 (alternative markers: ITS = MT359639; LSU = MT359399).

Notes: *Calonectria sphaeropedunculata* was treated as a synonym of *Ca. aconidialis* in this study. In comparisons of DNA sequences for seven available gene regions, a single base difference in the *cmdA* and two base differences in the LSU sequences occurred between the ex-type isolate of *Ca. sphaeropedunculata* (CMW 31390) and the ex-type isolate of *Ca. aconidialis* (CMW 35174). Both species are homothallic and produce orange to orange-brown perithecia, 8-spored asci and 1-septate ascospores, and share the similar ascospores dimensions (*Ca. sphaeropedunculata*: av. 37 × 6 µm; *Ca. aconidialis*: av. 36 × 6 µm) ([Lombard et al. 2015a](#), [Li et al. 2020](#); [Supplementary Table S4](#)).

stipitata Calonectria [L. Lombard & Crous](#), *Stud. Mycol.* 85: 188. 2016.

(see ***Calonectria spathulata***)

In: Calonectria candelabrum species complex.

Typus: CBS H-22771 holotype.

Ex-type culture: CBS 112513 = CMW 51197 = CPC 3851.

Type locality: **Colombia**.

Type substrate: *Eucalyptus* sp.

Barcodes: *act* = MT335140; *cmdA* = MT335377; *his3* = MT335617; *rpb2* = MT412669; *tef1* = MT412908; *tub2* = MT413118 (alternative markers: ITS = MT359838; LSU = MT359598).

Notes: *Calonectria stipitata* was treated as a synonym of *Ca. spathulata* in this study. In comparisons of DNA sequences for eight gene regions, the ex-type isolate of *Ca. stipitata* (CBS 112513) and the isolate of *Ca. spathulata* (CMW 16744) only had one base difference in the *his3* gene sequence. Both species produce ellipsoidal to obpyriform vesicles of similar dimensions (*Ca. stipitata*: 7–11 µm; *Ca. spathulata*: 6–10 µm). The macroconidia of *Ca. stipitata* (av. 32 × 4 µm) are smaller than those of *Ca. spathulata* (av. 80 × 6 µm) ([El-Gholl et al. 1986](#), [Crous & Kang 2001](#), [Lombard et al. 2016](#)), which was considered to represent intraspecific variation.

sulawesiensis Calonectria [L. Lombard et al.](#), *Stud. Mycol.* 66: 53.2010.

(see *Calonectria hawksworthii*)

In: Calonectria cylindrospora species complex.

Typus: PREM 60300 holotype.

Ex-type culture: CBS 125277 = CMW 14878.

Type locality: **Indonesia**, Sulawesi.

Type substrate: Leaf of *Eucalyptus* sp.

Barcodes: *act* = MT335141; *cmdA* = MT335378; *his3* = MT335618; *rpb2* = MT412670; *tef1* = MT412909; *tub2* = MT413119 (alternative markers: ITS = MT359839; LSU = MT359599).

Notes: *Calonectria sulawesiensis* was treated as a synonym of *Ca. hawksworthii* in this study. In comparisons of DNA sequences for eight gene regions, the only difference between the ex-type isolate of *Ca. sulawesiensis* (CMW 14878) and the ex-type isolate of *Ca. hawksworthii* (CBS 111870) was in the *act*, *tef1* and *tub2* sequences, where there were four base differences in the *act*, one base difference in the *tef1* and four base differences in the *tub2* sequences. Both species produce ellipsoidal vesicles with overlapping dimensions (*Ca. sulawesiensis*: 5–7 µm; *Ca. hawksworthii*: 6–9 µm) and 1-septate macroconidia. The macroconidia of *Ca. sulawesiensis* (av. 48 × 4 µm) are shorter than those of *Ca. hawksworthii* (av. 56 × 4 µm) (Crous 2002, Lombard et al. 2010a), which was considered to represent intraspecific variation (Supplementary Table S4).

sumatrensis *Calonectria* (Crous) L. Lombard et al., Stud. Mycol. 66: 56. 2010

Basionym: *Cylindrocladium sumatrense* Crous, Stud. Mycol. 50: 426. 2004.

Synonym: *Calonectria indonesiana* L. Lombard & Crous, Stud. Mycol. 85: 179. 2016.

In: Calonectria kyotensis species complex.

Typus: CBS 9888 holotype.

Ex-type culture: CBS 112829 = CMW 23698 = CPC 4518.

Type locality: **Indonesia**, Northern Sumatra.

Type substrate: Soil.

Barcodes: *act* = MT335145; *cmdA* = MT335382; *his3* = MT335622; *rpb2* = MT412674; *tef1* = MT412913 (alternative markers: ITS = MT359843; LSU = MT359603).

Notes: *Calonectria sumatrensis* is closely related to *Ca. brassicicola*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. sumatrensis* [(av. 58 × 5 µm); Crous et al. 2004] are longer than those of *Ca. brassicicola* [(av. 42 × 5 µm); Lombard et al. 2016], and the vesicles of *Ca. sumatrensis* (8–13 µm) are wider than those of *Ca. brassicicola* (3–5 µm) (Supplementary Table S4).

syzygiicola *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 190. 2016.

In: Calonectria kyotensis species complex.

Typus: CBS H-22772 holotype.

Ex-type culture: CBS 112831 = CMW 51204 = CPC 4511.

Type locality: **Indonesia**, Sumatra.

Type substrate: Soil under *Syzygium aromaticum*.

Barcodes: ITS = KX784736; LSU = KX784663.

Notes: *Calonectria syzygiicola* is closely related to *Ca. asiatica*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. syzygiicola* [(av. 45 × 5 µm); Lombard et al. 2016] are shorter than

those of *Ca. asiatica* [(av. 53 × 5 µm); Crous et al. 2004], and the vesicles of *Ca. syzygiicola* (3–6 µm) are narrower than those of *Ca. asiatica* (12–17 µm) (Crous et al. 2004, Lombard et al. 2016) (Supplementary Table S4).

telluricola *Calonectria* R.F. Alfenas et al., Stud. Mycol. 80: 125. 2015.

(see *Calonectria paraensis*)

In: Calonectria brassicae species complex.

Typus: CBS H-21365 holotype.

Ex-type culture: CBS 134664 = LPF217.

Type locality: **Brazil**, Bahia state, Mucuri.

Type substrate: Soil in tropical rainforest.

Barcodes: *cmdA* = KM396017; *his3* = KM396100; *tef1* = KM395843; *tub2* = KM395930.

Notes: *Calonectria telluricola* was treated as a synonym of *Ca. paraensis* in this study. In comparisons of DNA sequences for the four available gene regions, the only difference between the ex-type isolate of *Ca. telluricola* (CBS 134664) and the ex-type isolate of *Ca. paraensis* (CBS 134669) was in the *cmdA*, *his3*, *tef1* and *tub2* sequences, where there was one base difference in the *cmdA*, two base differences in the *his3*, one base difference in the *tef1* and two base differences in the *tub2* sequences. Both species produce clavate vesicles and 1-septate macroconidia, and shared the similar vesicle (*Ca. telluricola*: 3–6 µm; *Ca. paraensis*: 4–6 µm) and macroconidial dimensions (*Ca. telluricola*: av. 41 × 5 µm; *Ca. paraensis*: av. 42 × 5 µm) (Alfenas et al. 2015) (Supplementary Table S4).

tereticornis *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 190. 2016.

(see *Calonectria ovata*)

In: Calonectria pteridis species complex.

Typus: CBS H-22773 holotype.

Ex-type culture: CBS 111301 = CMW 51176 = CPC 1429.

Type locality: **Brazil**, Pará, Tucuruí.

Type substrate: *Eucalyptus tereticornis*.

Barcodes: *act* = MT335077; *cmdA* = MT335309; *his3* = MT335549; *tef1* = MT412840; *tub2* = MT413054 (alternative markers: ITS = MT359770; LSU = MT359530).

Notes: *Calonectria tereticornis* was treated as a synonym of *Ca. ovata* in this study. In comparisons of DNA sequences for seven available gene regions, the only differences between the ex-type isolate of *Ca. tereticornis* (CBS 111301) and the ex-type isolate of *Ca. ovata* (CMW 16724) was in the LSU and *tub2* sequences where there was one base difference in the LSU and one base difference in the *tub2* sequences. Both of the species produce ovoid vesicles of similar dimensions (*Ca. tereticornis*: 8–14 µm; *Ca. ovata*: 8–14 µm) and 1-septate macroconidia. The macroconidia of *Ca. tereticornis* [(av. 59 × 5 µm); Lombard et al. 2016] are shorter than those of *Ca. ovata* [(av. 70 × 5 µm); Victor et al. 1997], which was considered to represent intraspecific variation (Supplementary Table S4).

terrae-reginae *Calonectria* L. Lombard et al., Persoonia 24: 8. 2010.

(see *Calonectria queenslandica*)

In: Calonectria reteaudii species complex.

Typus: PREM 60239 holotype.

Ex-type culture: CBS 112151 = CMW 30601 = CPC 3202 = DFR100150.

Type locality: **Australia**, Queensland, Cardwell.

Type substrate: *Eucalyptus urophylla*.

Barcodes: *act* = MT335134; *cmdA* = MT335369; *his3* = MT335609; *rpb2* = MT412662; *tef1* = MT412900; *tub2* = MT413110 (alternative markers: ITS = MT359830; LSU = MT359590).

Notes: *Calonectria terrae-reginae* was treated as a synonym of *Ca. queenslandica* in this study. In comparisons of DNA sequences for eight gene regions, only a single base difference in the *tub2* gene sequence was found between the ex-type isolate of *Ca. terrae-reginae* (CMW 30601) and the ex-type isolate of *Ca. queenslandica* (CMW 30604). Both species produce narrowly clavate vesicles of similar dimensions (*Ca. terrae-reginae*: 3–5 µm; *Ca. queenslandica*: 3–4 µm) and 4–6-septate macroconidia. The macroconidia of *Ca. terrae-reginae* (av. 76 × 6 µm) are longer than those of *Ca. queenslandica* (av. 69 × 6 µm) (Lombard et al. 2010c), which was considered to represent intraspecific variation (Supplementary Table S4).

terrestris *Calonectria* L. Lombard et al., Stud. Mycol. 80: 182. 2015.

(see *Calonectria cerciana*)

In: Calonectria cylindrospora species complex.

Typus: CBS H-21478 holotype.

Ex-type culture: CBS 136642 = CMW 35180 = CERC 1856.

Type locality: **China**, Guangdong.

Type substrate: Soil in a *Eucalyptus* plantation.

Barcodes: *act* = MT334986; *cmdA* = MT335216; *his3* = MT335456; *rpb2* = MT412520; *tef1* = MT412747; *tub2* = MT412968 (alternative markers: ITS = MT359677; LSU = MT359437).

Notes: *Calonectria terrestris* was treated as a synonym of *Ca. cerciana* in this study. In comparisons of DNA sequences for eight gene regions, the only differences between the ex-type isolate *Ca. terrestris* (CMW 35180) and the ex-type isolate of *Ca. cerciana* (CMW 25309) was in the ITS and *tef1* sequences, where there was one base difference in the ITS and three base differences in the *tef1* sequences. Both species produce obpyriform vesicles with overlapping dimensions (*Ca. terrestris*: 5–12 µm; *Ca. cerciana*: 8–13 µm) and 1-septate macroconidia. The macroconidia of *Ca. terrestris* (av. 38.5 × 4.5 µm) are smaller than those of *Ca. cerciana* (av. 44 × 5 µm) (Lombard et al. 2010c, 2015a), which was considered to represent intraspecific variation (Supplementary Table S4).

terricola *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 191. 2016.

In: Calonectria pteridis species complex.

Typus: CBS H-22774 holotype.

Ex-type culture: CBS 116247 = CMW 51232 = CPC 3583.

Type locality: **Brazil**.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *tef1* = KX784738; *tub2* = KX784665.

Notes: *Calonectria terricola* is closely related to *Ca. ovata* and *Ca. pseudovata*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. terricola* [(av. 46 × 4.5 µm); Lombard et al. 2016] are smaller

than those of *Ca. ovata* [(av. 70 × 5 µm); Victor et al. 1997] and *Ca. pseudovata* [(av. 69 × 5 µm); Alfenas et al. 2015]. In addition, no microconidiophores and microconidia were reported in *Ca. terricola*, a feature that is common in *Ca. ovata* and *Ca. pseudovata* (Victor et al. 1997, Alfenas et al. 2015, Lombard et al. 2016) (Supplementary Table S4).

tetraramosa *Calonectria* L. Lombard et al., Stud. Mycol. 80: 183. 2015.

(see *Calonectria pauciramosa*)

In: Calonectria candelabrum species complex.

Typus: CBS H-21477 holotype.

Ex-type culture: CBS 136635 = CMW 31474 = CERC 1809.

Type locality: **China**, Guangdong Province, ZhanJiang.

Type substrate: *Eucalyptus urophylla* × *E. grandis* clone seedling leaf.

Barcodes: *act* = MT335104; *cmdA* = MT335336; *his3* = MT335576; *rpb2* = MT412629; *tef1* = MT412867; *tub2* = MT413079 (alternative markers: ITS = MT359797; LSU = MT359557).

Notes: *Calonectria tetraramosa* was treated as a synonym of *Ca. pauciramosa* in this study. In comparisons of DNA sequences for eight gene regions, all the sequences of the isolates of *Ca. tetraramosa* (ex-type CMW 31474, and CMW 31476) were 100 % identical to those of the isolates of *Ca. pauciramosa* (ex-type CBS 138824, CMW 2151, CMW 7592, CMW 9151, CMW 30823, and CMW 30875). Both species produce obpyriform vesicles and 1-septate macroconidia, and shared similar vesicle (*Ca. tetraramosa*: 4–10 µm; *Ca. pauciramosa*: 5–11 µm) and macroconidial dimensions (*Ca. tetraramosa*: av. 48 × 5 µm; *Ca. pauciramosa*: av. 50 × 4.5 µm) (Crous 2002, Lombard et al. 2015a) (Supplementary Table S4).

tonkinensis *Calonectria* N.Q. Pham et al., Mycologia 111: 87. 2019.

In: Calonectria cylindrospora species complex.

Typus: PREM 62124 holotype.

Ex-type culture: CBS 143576 = CMW 47430.

Type locality: **Vietnam**, Hanoi, Bavi.

Type substrate: Soil in a *Eucalyptus* plantation.

Barcodes: *act* = MT335147; *cmdA* = MT335384; *his3* = MT335624; *rpb2* = MT412676; *tef1* = MT412915; *tub2* = MT413122 (alternative markers: ITS = MT359845; LSU = MT359605).

Notes: *Calonectria tonkinensis* is closely related to *Ca. cerciana*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. tonkinensis* (av. 41.5 × 4 µm) are smaller than those of *Ca. cerciana* (av. 44 × 5 µm), and the vesicles of *Ca. tonkinensis* (3–7 µm) are narrower than those of *Ca. cerciana* (8–13 µm) (Lombard et al. 2010c, Pham et al. 2019) (Supplementary Table S4).

tropicalis *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 192. 2016.

(see *Calonectria amazonica*)

In: Calonectria pteridis species complex.

Typus: CBS H-22776 holotype.

Ex-type culture: CBS 116271 = CMW 51236 = CPC 3559.

Type locality: **Brazil**, Amazon.

Type substrate: *Eucalyptus* sp.

Barcodes: *act* = MT335148; *cmdA* = MT335385; *his3* = MT335625; *rpb2* = MT412677; *tef1* = MT412916; *tub2* = MT413123 (alternative markers: ITS = MT359846; LSU = MT359606).

Notes: *Calonectria tropicalis* was treated as a synonym of *Ca. amazonica* in this study. In comparisons of DNA sequences for eight gene regions, the only differences between the ex-type isolate of *Ca. tropicalis* (CBS 116271) and the ex-type isolate of *Ca. amazonica* (CBS 116250) was in the ITS, *rpb2* and *tub2* sequences, where there was one base difference in the ITS, one base difference in the *rpb2* and three base differences in the *tub2* sequences. Both species produce clavate vesicles and 1(–3)-septate macroconidia, and shared similar vesicle (*Ca. tropicalis*: 5–6 µm; *Ca. amazonica*: 5–6 µm) and macroconidial dimensions (*Ca. tropicalis*: av. 80 × 5 µm; *Ca. amazonica*: av. 79 × 5 µm) (Lombard et al. 2016) (Supplementary Table S4).

tucuruensis *Calonectria* L. Lombard & Crous, Stud. Mycol. 86: 123. 2017.

(see *Calonectria ovata*)

In: *Calonectria pteridis* species complex.

Typus: CBS H-22777 holotype.

Ex-type culture: CBS 114755 = CMW 51827 = CPC 1403.

Type locality: **Brazil**, Pará, Tucuruí.

Type substrate: *Eucalyptus tereticornis*.

Barcodes: *act* = MT335078; *cmdA* = MT335310; *his3* = MT335550; *tef1* = MT412841; *tub2* = MT413055 (alternative markers: ITS = MT359771; LSU = MT359531).

Notes: *Calonectria tucuruensis* was treated as a synonym of *Ca. ovata* in this study. In comparisons of DNA sequences for seven available gene regions, there was one base difference between the ex-type isolate of *Ca. tucuruensis* (CBS 114755) and the ex-type isolate of *Ca. ovata* (CMW 16724) in each of the LSU and *tub2* sequences. Both of the species produce ovoid vesicles with overlapping dimensions (*Ca. tucuruensis*: 9–12 µm; *Ca. ovata*: 8–14 µm) and 1-septate macroconidia. The macroconidia of *Ca. tucuruensis* [(av. 63 × 5 µm); Marin-Felix et al. 2017] are shorter than those of *Ca. ovata* [(av. 70 × 5 µm); Victor et al. 1997], which was considered to represent intraspecific variation (Supplementary Table S4).

tunisiana *Calonectria* L. Lombard et al., Persoonia 27: 77. 2011. (see *Calonectria pseudomexicana*)

In: *Calonectria mexicana* species complex.

Typus: CBS H-20684 holotype.

Ex-type culture: CBS 130357 = CMW 51316 = DISTEF-TCL1.

Type locality: **Tunisia**, Carthage, Tunis.

Type substrate: *Callistemon laevis*.

Barcodes: *act* = MT335149; *cmdA* = MT335386; *his3* = MT335626; *rpb2* = MT412678; *tef1* = MT412917; *tub2* = MT413124 (alternative markers: ITS = MT359847; LSU = MT359607).

Notes: *Calonectria tunisiana* was treated as a synonym of *Ca. pseudomexicana* in this study. In comparisons of DNA sequences for eight gene regions, the only differences between the ex-type isolate of *Ca. tunisiana* (CBS 130357) and the ex-type isolate of *Ca. pseudomexicana* (CBS 130354) was in the LSU and *tef1* sequences, where there was one base difference in the

LSU and six base differences in the *tef1* sequences. Both species produce fusiform to broadly ellipsoidal vesicles with papillate apex and 1-septate macroconidia, and similar vesicles (*Ca. tunisiana*: 8–14 µm; *Ca. pseudomexicana*: 9–14 µm). The macroconidia of *Ca. tunisiana* (av. 49 × 5 µm) are longer than those of *Ca. pseudomexicana* (av. 45 × 5 µm) (Lombard et al. 2011), which was considered to represent intraspecific variation (Supplementary Table S4).

turangicola *Calonectria* L. Lombard et al., Stud. Mycol. 80: 184. 2015.

(see *Calonectria kyotensis*)

In: *Calonectria kyotensis* species complex.

Typus: CBS H-21488 holotype.

Ex-type culture: CBS 136077 = CMW 31411.

Type locality: **China**, GuangXi Province.

Type substrate: Soil in a *Eucalyptus* plantation.

Barcodes: *act* = MT335151; *cmdA* = MT335388; *his3* = MT335628; *tef1* = MT412919; *tub2* = MT413126 (alternative markers: ITS = MT359849; LSU = MT359609).

Notes: *Calonectria turangicola* was treated as a synonym of *Ca. kyotensis* in this study. In comparison of DNA sequences for seven available gene regions, the only difference between the ex-type isolate of *Ca. turangicola* (CMW 31411) and the ex-type isolate of *Ca. kyotensis* (CBS 114525) was in the LSU, *tef1* and *tub2* sequences, where there was one base difference in the LSU, two base differences in the *tef1* and two base differences in the *tub2* sequences. Both species are homothallic and produce sphaeropedunculate (globose) vesicles and 1-septate macroconidia of similar dimensions (*Ca. turangicola*: av. 44 × 4 µm, *Ca. kyotensis*: av. 41 × 4 µm) (Terashita 1968, Lombard et al. 2015a, Li et al. 2020; Supplementary Table S4).

uniseptata *Calonectria* Gerlach, Phytopathol. Z. 61: 379. 1968.

In: *Calonectria kyotensis* species complex.

Typus: No. 10759 holotype.

Ex-type culture: CBS 413.67 = CMW 23678 = CPC 2391 = IMI 299577.

Type locality: **Germany**, Celle.

Type substrate: *Paphiopedilum callosum*.

Barcodes: *act* = GQ280451; *cmdA* = GQ267379; *his3* = GQ267248; *tef1* = GQ267307; *tub2* = GQ267208 (alternative markers: ITS = GQ280573; LSU = GQ280695).

Notes: *Calonectria uniseptata* is closely related to *Ca. asiatica* and *Ca. syzygiicola*, and can be distinguished from these two species by the dimensions of its ascospores and vesicles. The ascospores of *Ca. uniseptata* [(av. 41.5 × 6.3 µm); Gerlach 1968] are longer than those of *Ca. asiatica* [(av. 33 × 6 µm); Crous et al. 2004], and the vesicles of *Ca. uniseptata* (8.2–20.4 µm) are wider than those of *Ca. syzygiicola* (3–6 µm) (Gerlach 1968, Lombard et al. 2016) (Supplementary Table S4).

uxmalensis *Calonectria* L. Lombard & Crous, Stud. Mycol. 85: 193. 2016.

In: *Calonectria mexicana* species complex.

Typus: CBS H-22761 holotype.

Ex-type culture: CBS 110925 = CMW 51167 = CPC 945.

Type locality: **Mexico**, Uxmal.

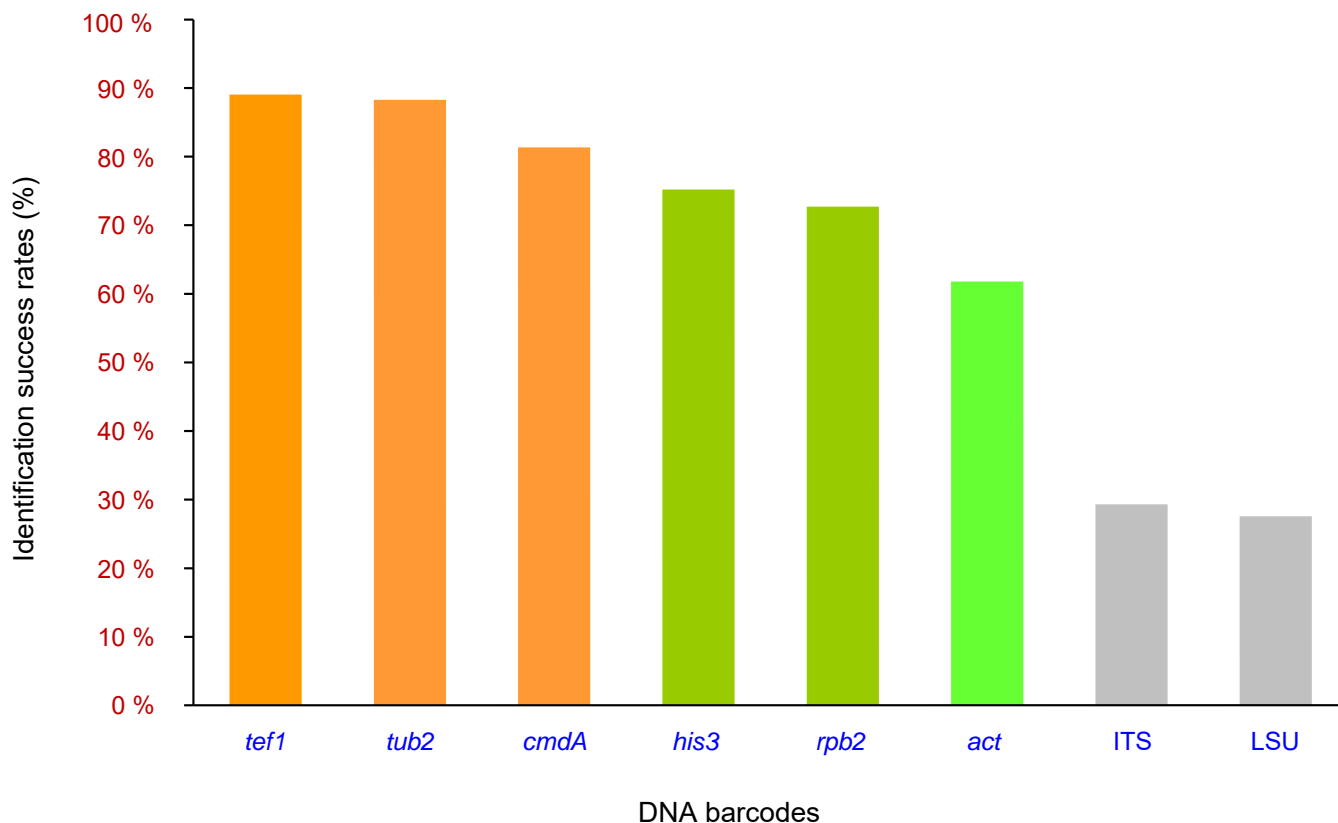


Fig. 4. The identification success rates of the eight candidate DNA barcodes for the genus *Calonectria*.

Type substrate: Soil.

Barcodes: *act* = MT335153; *cmdA* = MT335390; *his3* = MT335630; *rpb2* = MT412681; *tef1* = MT412921; *tub2* = MT413128 (alternative markers: ITS = MT359851; LSU = MT359611).

Notes: *Calonectria uxmalensis* is closely related to *Ca. pseudouxmalensis*, and sequences of *cmdA*, *his3*, *tef1* and *tub2* gene regions can distinguish *Ca. uxmalensis* from *Ca. pseudouxmalensis*. Morphologically, these two species are similar to each other, while the ability of *Ca. uxmalensis* to produce lateral stipe extensions can differentiate *Ca. uxmalensis* from *Ca. pseudouxmalensis* (Lombard *et al.* 2016) (Supplementary Table S4).

variabilis* *Calonectria Crous *et al.*, Syst. Appl. Microbiol. 16: 270. 1993.

Synonym: *Cylindrocladium variabile* Crous *et al.*, Syst. Appl. Microbiol. 16: 270. 1993.

In: *Calonectria cylindrospora* species complex.

Typus: PREM 51039 (holotype of *Ca. variabilis*; Crous *et al.* 1993b), PREM 51041 (holotype of *Cy. variabile*; Crous *et al.* 1993b).

Ex-type culture: CBS 114677 = CMW 3187 = CPC 2436 = AR2675 (Crous *et al.* 1993b, Crous 2002)

Type locality: Brazil, Pará.

Type substrate: *Schefflera morototoni*.

Barcodes: *cmdA* = MT335392; *his3* = MT335632; *rpb2* = MT412683; *tef1* = MT412923; *tub2* = MT413130 (alternative markers: ITS = MT359853; LSU = MT359613).

Notes: *Calonectria variabilis* is phylogenetically closely related to *Ca. cylindrospora*, and can be distinguished from that species by the dimensions of its macroconidia. The macroconidia of *Ca.*

variabilis [(av. $73 \times 5 \mu\text{m}$); Crous *et al.* 1993b] are larger than those of *Ca. cylindrospora* [(av. $45 \times 4 \mu\text{m}$); Crous *et al.* 1993a, Lombard *et al.* 2015b]. *Calonectria variabilis* readily produces a microconidial morph in culture on CLA (Crous *et al.* 1993b), a feature not observed for *Ca. cylindrospora* (Crous *et al.* 1993a). *Calonectria variabilis* is characterised as being homothallic, while *Ca. cylindrospora* is heterothallic (Crous *et al.* 1993b).

vegrandis *Calonectria* N.Q. Pham & M.J. Wingfield, Mycologia 111: 99. 2019.

(see ***Calonectria curvispora***)

In: *Calonectria kytotensis* species complex.

Typus: PREM 62113 holotype.

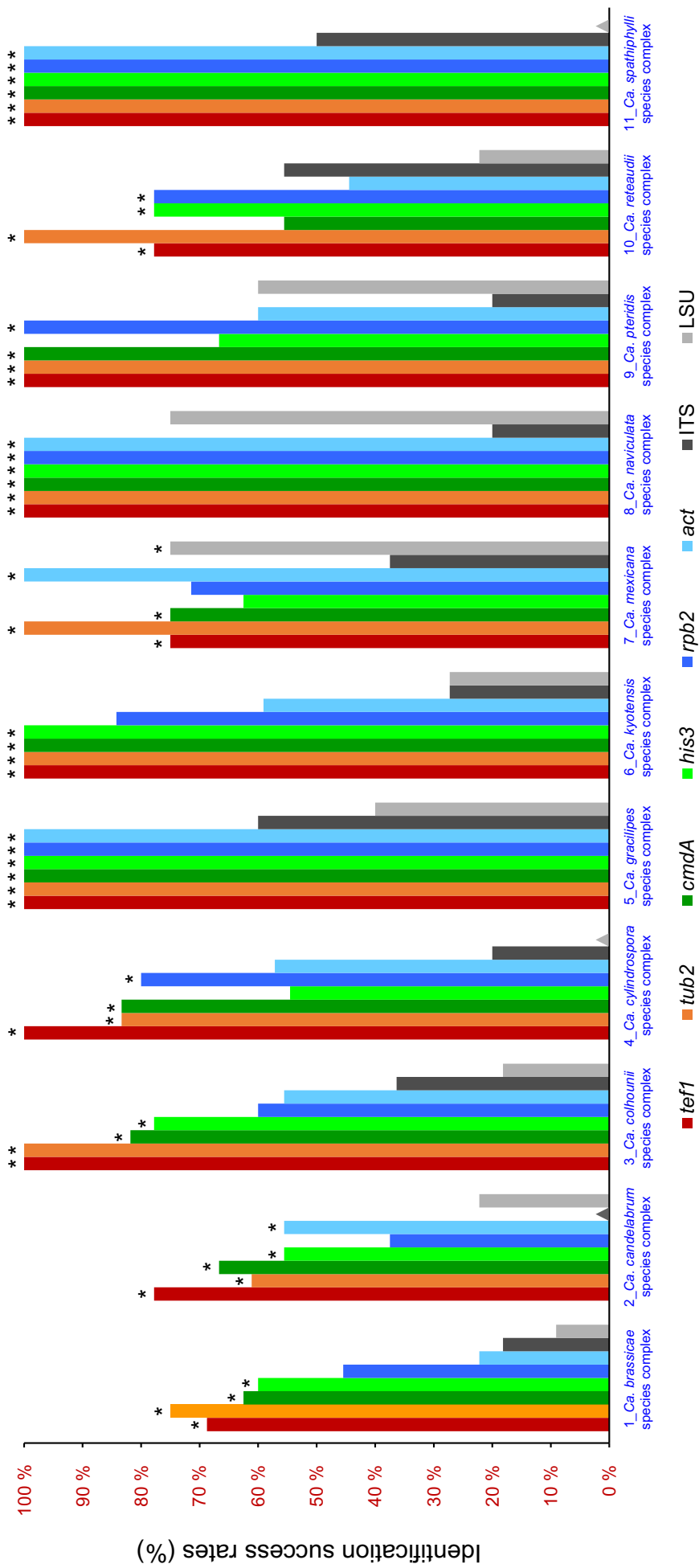
Ex-type culture: CBS 143565 = CMW 48245.

Type locality: Indonesia, North Sumatra, Aek Nauli.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT335003; *cmdA* = MT335233; *his3* = MT335473; *rpb2* = MT412537; *tef1* = MT412764 (alternative markers: ITS = MT359694; LSU = MT359454).

Notes: *Calonectria vegrandis* was treated as a synonym of *Ca. curvispora* in this study. In comparisons of DNA sequences for seven available gene regions, all seven gene sequences for the isolates of *Ca. vegrandis* (ex-type CMW 48245, and CMW 48246) were 100 % identical to the ex-type isolate of *Ca. curvispora* (CMW 23693). Both species produce sphaeropedunculate vesicles and 1-septate macroconidia, whereas *Ca. curvispora* typically produce curved macroconidia which are straight in *Ca. vegrandis* (Victor *et al.* 1997, Lombard *et al.* 2010a, Pham *et al.* 2019), suggesting that curved or straight macroconidia may be not a reliable feature to distinguish between these species. The macroconidia of *Ca. vegrandis* (av.



Species complexes and DNA barcodes

Fig. 5. The identification success rates of the eight candidate DNA barcodes for each of the 11 species complex; "*" above the histogram indicate four of the barcodes with highest identification success rates within each of the 11 species complexes; Triangle indicate the identification success rate of the candidate DNA barcodes is zero.

41 × 4.5 µm) are smaller than those of *Ca. curvispora* (av. 60 × 5 µm) (Victor *et al.* 1997, Lombard *et al.* 2010a, Pham *et al.* 2019), which was considered to represent intraspecific variation (Supplementary Table S4).

venezuelana *Calonectria* L. Lombard *et al.*, Stud. Mycol. 85: 195. 2016.

In: *Calonectria candelabrum* species complex.

Typus: CBS H-22778 holotype.

Ex-type culture: CBS 111052 = CMW 51173 = CPC 1183.

Type locality: Venezuela, Acarigua.

Type substrate: Soil.

Barcodes: *act* = MT335155; *cmdA* = MT335394; *his3* = MT335634; *rpb2* = MT412685; *tef1* = MT412925; *tub2* = MT413132 (alternative markers: ITS = MT359855; LSU = MT359615).

Notes: *Calonectria venezuelana* is closely related to *Ca. candelabrum* and *Ca. eucalypticola*, and can be distinguished from these two species by the dimensions of its macroconidia. The macroconidia of *Ca. venezuelana* [(av. 58 × 5 µm); Lombard *et al.* 2016] are shorter than those of *Ca. candelabrum* [(av. 60 × 4.5 µm); Crous 2002], and larger than those of *Ca. eucalypticola* [(av. 50 × 4 µm); Alfenas *et al.* 2015] (Supplementary Table S4).

yunnanensis *Calonectria* J.Q. Li *et al.*, IMA Fungus 8: 282. 2017.

Synonym: *Calonectria pseudoyunnanensis* J.Q. Li *et al.*, IMA Fungus 8: 279. 2017.

In: *Calonectria kytensis* species complex.

Typus: PREM 61955 holotype.

Ex-type culture: CBS 142897 = CMW 47644 = CERC 5339.

Type locality: China, YunNan.

Type substrate: Soil in *Eucalyptus* plantation.

Barcodes: *act* = MT335157; *cmdA* = MT335396; *his3* = MT335636; *rpb2* = MT412687; *tef1* = MT412927; *tub2* = MT413134 (alternative markers: ITS = MT359857; LSU = MT359617).

Notes: *Calonectria yunnanensis* is closely related to *Ca. asiatica*, and can be distinguished from that species by the dimensions of its macroconidia and vesicles. The macroconidia of *Ca. yunnanensis* [(av. 43 × 4.5 µm); Li *et al.* 2017] are smaller than those of *Ca. asiatica* [(av. 53 × 5 µm); Crous *et al.* 2004], and the vesicles of *Ca. yunnanensis* (2–4.5 µm) are narrower than those of *Ca. asiatica* (12–17 µm). *Calonectria yunnanensis* is homothallic (Li *et al.* 2020) (Supplementary Table S4).

zuluensis *Calonectria* L. Lombard & Crous, Stud. Mycol. 66: 25. 2010.

(see *Calonectria pauciramosa*)

In: *Calonectria candelabrum* species complex.

Typus: PREM 60292 holotype.

Ex-type culture: CBS 125268 = CMW 9188.

Type locality: South Africa, KwaZulu-Natal, Kwambonambi.

Type substrate: *Eucalyptus grandis* clonal cutting.

Barcodes: *act* = MT335159; *cmdA* = MT335398; *his3* = MT335638; *rpb2* = MT412689; *tef1* = MT412929; *tub2* = MT413136 (alternative markers: ITS = MT359859; LSU = MT359619).

Notes: *Calonectria zuluensis* was treated as a synonym of *Ca. pauciramosa* in this study. In comparisons of DNA sequences for eight gene regions, the only differences between the ex-type isolate of *Ca. zuluensis* (CMW 9188) and the ex-type isolate of *Ca. pauciramosa* (CBS 138824) was in the *act* and *tub2* sequences, where there were two base differences in the *act* and three base differences in the *tub2* sequences. Both species are heterothallic and produce obpyriform to ellipsoidal vesicles of similar dimensions (*Ca. zuluensis*: 6–10 µm; *Ca. pauciramosa*: 5–11 µm) and 1-septate macroconidia. The macroconidia of *Ca. zuluensis* (av. 36 × 4 µm) are smaller than those of *Ca. pauciramosa* (av. 50 × 4.5 µm) (Crous 2002, Lombard *et al.* 2010b, Li *et al.* 2020), which was considered to represent intraspecific variation (Supplementary Table S4).

Selection of DNA barcodes for species recognition

Phylogenetic analyses of sequences for eight gene regions resulted in the delineation of 120 clearly defined *Calonectria* species. These eight gene regions thus serve as putative DNA barcodes. As with most other fungi, it is not possible to use a single DNA barcode to identify species of *Calonectria*. Consequently, the Identification Success Rate (ISR) was calculated for each of the eight putative barcodes for all 120 species of *Calonectria* and also for species residing in each of the 11 well-defined species complexes (Supplementary Table S5).

For the genus as a whole, the results showed that sequence data for *tef1* and *tub2* had the strongest ability to correctly identify species (ISRs: 89.1 % and 88.3 %, respectively; Supplementary Table S5, Fig. 4). This was followed by *cmdA*, *his3*, *rpb2* and *act* gene regions which also provided relatively effective resolution of the *Calonectria* spp. (Supplementary Table S5, Fig. 4). The efficacy of the ITS and LSU regions to identify species was relatively low (ISRs: 29.3 % and 27.6 %, respectively; Supplementary Table S5, Fig. 4).

For the 11 species complexes, the results showed that the most effective barcodes could not be employed across all species complexes. The *tef1* sequences provided resolution power in the *Ca. candelabrum* and *Ca. cylindrospora* species complexes (Supplementary Table S5, Fig. 5). In contrast, *tub2* was the best DNA barcode for the *Ca. brassicae* and *Ca. reteaudii* species complexes (Supplementary Table S5, Fig. 5), *act* and *tub2* both the best for the *Ca. mexicana* species complex. The frequency of successful identification using the eight gene region data in the 11 species complexes also differed. Collectively, the six regions (*tef1*, *tub2*, *cmdA*, *his3*, *rpb2* and *act*) provided stable and reliable resolution power for species in each of the 11 species complexes. Our results suggested that all of the 120 *Calonectria* species accepted in this study could be distinguished based on the six-region (*tef1*, *tub2*, *cmdA*, *his3*, *rpb2*, and *act*) combined phylogeny, and 118 of the 120 (98 %) *Calonectria* species could be recognised based on the *tef1* and *tub2* gene region combined phylogeny.

DISCUSSION

This study represents the most comprehensive molecular phylogenetic overview of *Calonectria*, a genus that includes

many important plant pathogens. Sequence data for eight gene regions of 240 isolates representing 128 species were newly generated. In the case of 44 species for which cultures could not be obtained, sequence data were sourced from GenBank so as to consider all 169 previously described species. Phylogenetic analyses were conducted for each of the eight gene regions individually as well as for a combined dataset. The results provided clear evidence that 51 species are indistinguishable from previously described taxa and synonymies have been provided for these. Two novel taxa were recognised and described as *Ca. lombardiana* and *Ca. pauciphialidica*. Furthermore, the name *Ca. lauri* was validated. The overall result of the study is the acceptance of 120 clearly defined species of *Calonectria*. The eight sequenced gene regions were then evaluated individually to identify the most useful DNA barcodes to accurately identify these species. These analyses showed that six gene regions (*tef1*, *tub2*, *cmdA*, *his3*, *rpb2* and *act*) provide effective barcodes for the genus.

The combined eight-gene phylogenetic tree emerging from this study placed the 120 accepted *Calonectria* species in the two major groups; the Prolate Group and the Sphaero-Naviculate Group. This is consistent with the results of previous studies (Lombard et al. 2016, Jayawardena et al. 2019), showing a clear phylogenetic distinction between these two groups in *Calonectria*. The previously recognised 10 species complexes (Lombard et al. 2016) were also well resolved. Interestingly, the results of this study also revealed a new species complex, that we have defined as the *Calonectria gracilipes* species complex. Delimitation of this new species complex was supported by both phylogenetic placement and morphological characteristics.

Species in the *Ca. brassicae* species complex typically have clavate vesicles and 1-septate macroconidia, producing orange to red-brown perithecia, 8-spored asci and 1-septate ascospores. The species complex also includes both heterothallic and homothallic species, and these are primarily distributed in South America (Crous 2002, Crous et al. 2006, Lombard et al. 2009, 2010a, 2016, Alfenas et al. 2015, Marin-Felix et al. 2017, Li et al. 2020). In the present study, two species were reduced to synonymy based on phylogenetic inference; *Ca. ecuadorensis* reduced to synonymy with *Ca. ecuadorae*, and *Ca. telluricola* with *Ca. paraensis*. The description of *Ca. pauciphialidica* adds a novel species to this species complex, and it is closely related to, but morphologically distinct from *Ca. ecuadorae*. Sixteen species are now recognised in the *Ca. brassicae* species complex.

Species in the *Ca. candelabrum* species complex are characterised by ellipsoidal to obpyriform vesicles and 1-septate macroconidia, producing orange to red-brown perithecia, 8-spored asci and 1-septate ascospores. The species complex includes both heterothallic and homothallic species that are known from Africa, Asia, Europe, North and South America, Oceania (Viégas 1946, Schoch et al. 1999, Crous & Kang 2001, Crous 2002, Lombard et al. 2010a, b, 2015a, b, 2016, Alfenas et al. 2013a, 2015, Lopes et al. 2017, Li et al. 2020). The *Ca. candelabrum* species complex includes important plant pathogens some of which pose a serious threat to global forestry and agricultural industries (Schoch et al. 1999, Crous 2002, Lombard et al. 2010b, 2015a, Crous et al. 2013, Alfenas et al. 2015). In the present study, 10 species were reduced to synonymy based on phylogenetic inference, eight (*Ca. cliffordiicola*, *Ca. ericae*, *Ca. machaerinae*, *Ca. mossambicensis*, *Ca. polizzii*, *Ca. seminaria*, *Ca. tetraramosa* and *Ca. zuluensis*) of which were reduced to

synonymy with *Ca. pauciramosa*. In addition, one species (*Ca. pseudoscoparia*) was reduced to synonymy with *Ca. candelabrum*, and one species (*Ca. stipitata*) with *Ca. spathulata*. Eighteen species are now included in the *Ca. candelabrum* species complex.

Species in the *Ca. colhounii* species complex typically have clavate vesicles and 3-septate macroconidia, producing yellow perithecia, which is considered as the most characteristic feature of the species complex. They include 4-spored asci and 3-septate ascospores and both heterothallic and homothallic species. Homothallism is the dominant mating system (Crous 2002, Lombard et al. 2010a, Chen et al. 2011, Li et al. 2017, 2020) and the majority of species have been collected from Asia (Peerally 1973, Crous et al. 1999, Crous 2002, Lombard et al. 2010a, 2016, Chen et al. 2011, Xu et al. 2012, Li et al. 2017, 2020, Liu & Chen 2017). In the present study, three species were reduced to synonymy based on phylogenetic inference. These include *Ca. pseudocolhounii* reduced to synonymy with *Ca. eucalypti*, *Ca. nymphaeae* was synonymised with *Ca. fujianensis*, and *Ca. parva* with *Ca. macroconidialis*. In addition, *Ca. madagascariensis* with typical clavate vesicles was shown to reside in the *Ca. colhounii* species complex, consistent with the findings of Lombard et al. (2010a). This result is in contrast to the phylogeny presented by Jayawardena et al. (2019) who suggested that the species formed a distinct lineage apart from species in the 11 species complexes. Based on our results, 11 species reside in the *Ca. colhounii* species complex, including *Ca. madagascariensis*.

In the *Ca. cylindrospora* species complex, species have variable vesicle shapes, including clavate, ellipsoidal, fusiform, obpyriform to sphaeropedunculate, and they typically produce 1-septate macroconidia, orange to red-brown perithecia, 8-spored asci and 1-septate ascospores. The species complex includes both heterothallic and homothallic species (Crous et al. 1993b, Schoch et al. 1999, Crous 2002, Li et al. 2020). Species in the *Ca. cylindrospora* species complex exhibit a broad geographic distribution including Africa, Asia, Europe, North and South America (Crous et al. 1993c, 2013, Crous 2002, Lombard et al. 2010a, b, c, 2015a, 2016, Alfenas et al. 2013b, 2015, Pham et al. 2019, Li et al. 2020). In the present study, eight species were reduced to synonymy based on phylogenetic inference including two species (*Ca. hodgesii* and *Ca. pseudohodgesii*) as synonyms of *Ca. brasiliensis*, two species (*Ca. papillata* and *Ca. terrestris*) as synonyms of *Ca. cerciana*, two species (*Ca. foliicola* and *Ca. sulawesiensis*) as synonyms of *Ca. hawksworthii*, one species (*Ca. blephilliae*) as a synonym of *Ca. cylindrospora* and one species (*Ca. pseudocerciana*) as a synonym of *Ca. propaginicola*. As a consequence, 12 species are now accepted in the *Ca. cylindrospora* species complex.

In the *Ca. gracilipes* species complex, species are characterised by narrowly clavate vesicles and multi-septate (> 3) macroconidia, producing orange to red-brown perithecia and 8-spored asci. Species in this species complex have a homothallic mating system (Crous et al. 1997a, El-Gholl et al. 1997, Crous 2002) and they have been reported from both North and South America (Figueiredo & Namekata 1967, Crous et al. 1997a, 2000, El-Gholl et al. 1997, Crous 2002). Five species are now included in the *Ca. gracilipes* species complex.

Species in the *Ca. kytensis* species complex typically have sphaeropedunculate vesicles and 1-septate macroconidia, producing orange to red-brown perithecia, 8-spored asci and 1-septate ascospores. Both heterothallic and homothallic species

are known in the species complex and a majority of the members have been described from Asia (Boedijn & Reitsma 1950, Tubaki 1958, Sobers & Seymour 1967, Gerlach 1968, Terashita 1968, Sobers 1969, Alfieri *et al.* 1982, Victor *et al.* 1997, Kang *et al.* 2001b, Crous 2002, Crous *et al.* 2004, Lombard *et al.* 2015a, 2016, Li *et al.* 2017, 2020, Liu & Chen 2017, Pham *et al.* 2019). Results of the present study have shown that 17 species in this complex are the same as earlier described taxa. Of these, nine species (*Ca. arbusta*, *Ca. expansa*, *Ca. guangxiensis*, *Ca. hainanensis*, *Ca. magnispora*, *Ca. parakyotensis*, *Ca. pluriramosa*, *Ca. pseudokyotensis* and *Ca. sphaeropedunculata*) were reduced to synonymy with *Ca. aconidialis*, three (*Ca. floridana*, *Ca. pseudoturagicola* and *Ca. turagicola*) with *Ca. kyotensis*, one (*Ca. montana*) with *Ca. canadiana*, one (*Ca. multistipitata*) with *Ca. chinensis*, one (*Ca. vegrandis*) with *Ca. curvispora*, one (*Ca. indonesiana*) with *Ca. sumatrensis* and one (*Ca. pseudoyunnanensis*) with *Ca. yunnanensis*. Consequently, 24 species are now accommodated in the *Ca. kyotensis* species complex, making it the largest *Calonectria* species complex.

Species in the *Ca. mexicana* species complex typically have ellipsoidal vesicles with a papillate apex and 1-septate macroconidia. The species complex includes both heterothallic and homothallic species, although the heterothallic mating system is dominant (El-Gholl *et al.* 1989, Schubert *et al.* 1989, Schoch *et al.* 1999, Crous 2002). Species in the *Ca. mexicana* complex have been collected from many continents, including Africa, Europe and North America (El-Gholl *et al.* 1989, Schubert *et al.* 1989, Schoch *et al.* 1999, Crous 2002, Lechat *et al.* 2010, Lombard *et al.* 2011, 2016, Li *et al.* 2020). In the present study, *Ca. tunisiana* was reduced to synonymy with *Ca. pseudomexicana*. Consequently, eight species are now accommodated in this species complex.

In the *Ca. naviculata* species complex, species typically have naviculate vesicles and 1-septate macroconidia. Species in the species complex have a heterothallic mating system (Crous *et al.* 1997a, 2002, Gehesquiere *et al.* 2015, Li *et al.* 2020) and they have been collected from Africa, Asia, Europe, North and South America and Oceania (Crous *et al.* 1997a, 2002, 2004, Crous 2002, Alfenas *et al.* 2015, Gehesquiere *et al.* 2015, Lombard *et al.* 2016, LeBlanc *et al.* 2019, Li *et al.* 2020). In the study of Jayawardena *et al.* (2019), *Ca. pseudonaviculata* formed a distinct lineage and did not reside in any of the previously defined species complexes. Results of the present study have shown that this species resides comfortably in the *Ca. naviculata* species complex, consistent with the results of Lombard *et al.* (2010a, 2016). Currently, six species are included in the *Ca. naviculata* species complex.

In the *Ca. pteridis* species complex, species typically have clavate or ovate vesicles and 1-septate macroconidia. Species have a heterothallic mating system (El-Gholl *et al.* 1993a, Li *et al.* 2020) and have commonly been collected in North and South America (Sobers 1968, Crous *et al.* 1993c, El-Gholl *et al.* 1993a, Leahy *et al.* 2000, Crous 2002, Alfenas *et al.* 2015, Lombard *et al.* 2016, Marin-Felix *et al.* 2017, Li *et al.* 2020). Results of the present study have shown that six species in this complex are synonyms of earlier described taxa. Three species (*Ca. amazoniensis*, *Ca. longiramosa* and *Ca. tropicalis*) have thus been reduced to synonymy with *Ca. amazonica* and three species (*Ca. nemoralis*, *Ca. tereticornis* and *Ca. tucruensis*) with *Ca. ovata*. Consequently, seven species are now accommodated in the *Ca. pteridis* species complex.

In the *Ca. reteaudii* species complex, species are characterised by having narrowly clavate vesicles, multi-septate (> 3) macroconidia and they produce orange to red-brown perithecia, 8-spored asci and multi-septate (> 3) ascospores. Both heterothallic and homothallic *Calonectria* species have been described in this species complex (Kang *et al.* 2001a, Crous 2002, Gadgil & Dick 2004, Lombard *et al.* 2010c, Chen *et al.* 2011, Li *et al.* 2020) and species have been reported in Asia and Oceania (Kang *et al.* 2001a, Crous 2002, Gadgil & Dick 2004, Crous *et al.* 2006, 2012, Lombard *et al.* 2010c, 2015a, 2016, Chen *et al.* 2011, Li *et al.* 2017, 2020, Pham *et al.* 2019). Four species in this species complex were reduced to synonymy, including two species (*Ca. microconidialis* and *Ca. pentaseptata*) with *Ca. pseudoreteaudii*, one species (*Ca. terrae-reginae*) with *Ca. queenslandica* and one species (*Ca. baviensis*) with *Ca. reteaudii*. The description of *Ca. lombardiana* adds a new member to the *Ca. reteaudii* species complex and its larger macroconidial dimensions easily distinguish it from *Ca. queenslandica*, its closest phylogenetic relative. Nine species are now accepted as residing in the *Ca. reteaudii* species complex.

Calonectria species in the *Ca. reteaudii* species complex incorporate many important causal agents of plant disease, resulting in mainly leaf blights on a wide range of hosts in several countries including Australia, China, India, Laos and Vietnam (Old *et al.* 2003, Chen *et al.* 2011, Pham *et al.* 2019). *Calonectria pentaseptata*, initially described from Vietnam, has been reported from the GuangDong, GuangXi and HaiNan provinces of China (Crous *et al.* 2012, Lombard *et al.* 2015a, Li *et al.* 2017), causing severe leaf blight diseases on *Eucalyptus* in plantations and nurseries. In the present study, *Ca. pentaseptata* and *Ca. microconidialis* (Crous *et al.* 2012, Lombard *et al.* 2015a) were reduced to synonymy with *Ca. pseudoreteaudii*. *Calonectria pseudoreteaudii* was originally described by Lombard *et al.* (2010c) from stems of *E. urophylla* × *E. grandis* hybrid cuttings in GuangDong Province, China. The results of the present study suggest that this species has been in China at least for 10 yr and continues to pose a serious threat to the *Eucalyptus* industry.

In the *Ca. spathiphylli* species complex, species typically have sphaeropedunculate vesicles and 1-septate macroconidia and produce orange to red-brown perithecia, 8-spored asci and 1-septate ascospores. Both heterothallic and homothallic *Calonectria* species have been described in this species complex (El-Gholl *et al.* 1992, Kang *et al.* 2001b) and species are commonly collected in North and South America (El-Gholl *et al.* 1992, Kang *et al.* 2001b, Crous 2002, Lombard *et al.* 2010a). Four species are now accommodated in the *Ca. spathiphylli* species complex.

Results of this study have revealed interesting patterns regarding the geographic distribution of various groups of *Calonectria* spp. For example, more than 75 % of the species in the *Ca. brassicae* and *Ca. candelabrum* species complexes have been described from South American countries such as Brazil, Colombia, Ecuador and Venezuela (Alfenas *et al.* 2013a, b, 2015). Likewise, species in the *Ca. kyotensis* species complex appear to represent an Asian assemblage, with 19 of the 24 species collected in Asian countries such as China, Indonesia, Japan, Malaysia and Vietnam (Crous 2002, Crous *et al.* 2004, Lombard *et al.* 2015a, Li *et al.* 2017, Liu & Chen 2017, Pham *et al.* 2019). Of those species, 14 were isolated from soil collected in Asia, suggesting this geographic region could be their centre of origin. There are, however, few studies that have considered the centres of origin of *Calonectria* species (Wright

et al. 2010, Freitas *et al.* 2019, LeBlanc *et al.* 2019, Malapi-Wight *et al.* 2019), emphasizing a need for population biology studies on these fungi in the future.

The synonymised species in this study were generally from regions adjacent to those from which the validated taxa were originally collected. For example, *Ca. cerciana*, together with its now recognised synonyms *Ca. papillata* and *Ca. terrestris* were isolated from adjacent sites in GuangDong Province in southern China (Lombard *et al.* 2010c, 2015a). However, there were also some cases where species reduced to synonymy were from different continents where the climates differed significantly. For example, *Ca. pauciramosa* and the eight species (*Ca. cliffordicola*, *Ca. ericae*, *Ca. machaerinae*, *Ca. mossambicensis*, *Ca. polizii*, *Ca. seminaria*, *Ca. tetraramosa* and *Ca. zuluensis*) reduced to synonymy with it, thus were isolated from Africa, Asia, Europe and North America (Schoch *et al.* 1999, Crous & Kang 2001, Crous *et al.* 2013, Lombard *et al.* 2010b, 2015a, 2016, Alfenas *et al.* 2015). The present study further supports the fact that *Ca. pauciramosa* has a worldwide distribution and that it is able to exist under various climatic conditions (Schoch *et al.* 1999, Crous 2002, Lombard *et al.* 2010b, 2015a, 2016, Crous *et al.* 2013).

Results of this study showed that six loci (*act*, *cmdA*, *his3*, *rpb2*, *tef1* and *tub2*) can serve as reliable DNA barcodes for species delimitation in *Calonectria*. A similar six gene approach has been established for *Colletotrichum*, where the *act*, *chs-1*, *gapdh*, *his3*, ITS and *tub2* regions have been employed to reveal the phylogenetic relationships of species with curved conidia from herbaceous hosts (Damm *et al.* 2009). Likewise, six markers (*act*, *cmdA*, *gapdh*, *gs*, ITS and *tub2*) were utilised to characterise the species of *Colletotrichum* associated with coffee berries in northern Thailand (Prihastuti *et al.* 2009). A six gene (*act*, ITS, LSU, *rpb1*, *tef1* and *tub2*) approach has also been used for the phylogenetic analyses of *Allantonectria*, *Nectria*, and *Pleonectria* (Hirooka *et al.* 2012). The present study has revealed that optimal barcodes for taxon delimitation differs for the various *Calonectria* species complexes. This is similar to the case in *Fusarium*, where five barcodes (*cmdA*, IGS, *rpb2*, *tef1* and *tub2*) were applied to stabilise the taxonomic position of species in the *Fusarium oxysporum* species complex (Lombard *et al.* 2019). Similarly, Wang *et al.* (2019) utilised five loci (*cmdA*, ITS, *rpb1*, *rpb2* and *tef1*) to evaluate and clarify the phylogenetic relationships of the *F. incarnatum-equiseti* species complex. Although the ideal set of barcodes differed among the various species complexes in *Calonectria*, six loci (*act*, *cmdA*, *his3*, *rpb2*, *tef1* and *tub2*) served as the most phylogenetically informative markers. These are consequently recommended as the universal DNA barcodes for species delimitation in *Calonectria*.

Multi-gene phylogenetic analyses combined with morphological features provides a robust means to delimit fungal species boundaries (James *et al.* 2006, Hibbett *et al.* 2007, Liu *et al.* 2015, Chen *et al.* 2017, Woudenberg *et al.* 2017). This polyphasic approach has been widely employed in the taxonomy of *Calonectria* species (Lombard *et al.* 2010a, Chen *et al.* 2011, Crous *et al.* 2012, Alfenas *et al.* 2015, Lombard *et al.* 2016, Marin-Felix *et al.* 2017, Pham *et al.* 2019). However, a problem pertaining to the taxonomy of this group is that studies have used different markers and gene regions to identify species. This lack of consistency has resulted in confusion, and the many syno-

nymy identified in the present study also arise, at least to some extent, from an inconsistency of taxonomic approaches.

In an attempt to provide a unified taxonomic system for *Calonectria*, we have evaluated the sequence data for eight gene regions that are available for all 120 species. These results showed that sequences of *tef1* and *tub2* provide markers that can recognise the majority of *Calonectria* species. The *tef1* and *tub2* combined phylogeny made it possible to recognise 118 of the 120 (98 %) species, indicating that combinations of *tef1* and *tub2* gene sequences are suitable for preliminary identification of *Calonectria* species. Results of this study indicated that the *tef1* region provided the best barcode, which is in contrast to the study of Lombard *et al.* (2010a), who suggested that the *cmdA* region provides the best signal for species recognition in these fungi. Results of the present study also indicated that the *rpb2* region provides stable and reliable taxonomic signal for *Calonectria* identification and this is the first study where that gene region has been sequenced for a large collection of species in this genus.

Overall, the results of this study have provided a robust overview of the species boundaries in *Calonectria*. This is based largely on phylogenetic inference using DNA sequences for eight gene regions. It is evident that, over a period of approximately 10 yr (Lombard *et al.* 2010a, 2015a, 2016, Li *et al.* 2017, Marin-Felix *et al.* 2017, Pham *et al.* 2019), numerous species have been described in *Calonectria* that are synonyms of existing species. This is a common problem in many groups of fungi where species were described based on relatively limited DNA sequence data. As time has passed, new and more informative gene regions have become available to define phylogenetic species boundaries more clearly. The DNA sequence backbone emerging and reliable DNA barcodes resulting from the present study provides a robust foundation for future taxonomic studies on the group. It is recognised that in many cases, species identity in this study is based on only a single or a small number of isolates. Clearly, larger collections of isolates will help to further confirm species boundaries and provide a better understanding of species delineation. However, the framework presented here will provide an ideal basis on which to explore this further. Furthermore, the genomes of numerous *Calonectria* spp. have now been sequenced (Malapi-Wight *et al.* 2016a, b, Ye *et al.* 2018, Liu *et al.* 2019). In time, it is likely that phylogenomic studies will increase the clarity of species boundaries and provide even more robust DNA barcodes for *Calonectria*.

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APPENDIX A. SUPPLEMENTARY DATA

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.simyco.2020.08.001>.

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SUPPLEMENTARY INFORMATION

Reconsideration of species boundaries and proposed DNA barcodes for *Calonectria*

Q.L. Liu^{1,2,3,5}, J.Q. Li^{1,2,3,5}, M.J. Wingfield³, T.A. Duong³, B.D. Wingfield³, P.W. Crous^{3,4}, S.F. Chen^{1,2*}

¹China Eucalypt Research Centre (CERC), Chinese Academy of Forestry (CAF), ZhanJiang, 524022, Guangdong Province, China; ²State Key Laboratory of Tree Genetics and Breeding (SKLTGB), Chinese Academy of Forestry (CAF), Haidian District 100091, Beijing, China; ³Department of Biochemistry, Genetics and Microbiology (BGM), Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria 0028, South Africa; ⁴Westerdijk Fungal Biodiversity Institute, Uppsalalaan 8, 3584 CT Utrecht, The Netherlands

*Correspondence: S.F. Chen, shuaifei.chen@gmail.com

⁵These authors contributed equally to this work.

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Table S1. Isolates obtained, re-sequenced and used in the phylogenetic analyses in this study.

Code A ¹	Previous species name ²	Isolates numbers ^{3,4,5}	Other collection number ³	Code B ⁶	Accepted species name ⁷	Isolates after species revision ^{8,9}	Hosts	Area of occurrence	Collector	GenBank accession Numbers ¹⁰	References or source of data
A1	<i>Calonectria acaciicola</i>	CMW 47173 ^T	CBS 143557	B1	<i>Ca. acaciicola</i>	CMW 47173 ^T	Soil (<i>Acacia auriculiformis</i> plantation)	Do Luong, Nghe An, Vietnam	N.Q. Pham & T.Q. Pham	MT334933; MT335160; MT335399; MT359620; MT359380; MT412474; MT412690; MT412930	Pham <i>et al.</i> (2019), this study
		CMW 47174	CBS 143558	B1	<i>Ca. acaciicola</i>	CMW 47174	Soil (<i>A. auriculiformis</i> plantation)	Do Luong, Nghe An, Vietnam	N.Q. Pham & T.Q. Pham	MT334934; MT335161; MT335400; MT359621; MT359381; MT412475; MT412691; MT412931	Pham <i>et al.</i> (2019), this study
A2	<i>Ca. acicola</i>	CMW 30996 ^T	–	B2	<i>Ca. acicola</i>	CMW 30996 ^T	<i>Phoenix canariensis</i>	Northland, New Zealand	H. Pearson	MT334935; MT335162; MT335401; MT359622; MT359382; MT412476; MT412692; MT412932	Gadgil & Dick (2004), Lombard <i>et al.</i> (2010a), this study
		CBS 114812	CMW 51216	B2	<i>Ca. acicola</i>	CBS 114812	<i>P. canariensis</i>	Northland, New Zealand	H. Pearson	MT334936; MT335163; MT335402; MT359623; MT359383; MT412477; MT412693; MT412933	Gadgil & Dick (2004), Lombard <i>et al.</i> (2010a), this study
A3	<i>Ca. aciculata</i>	CERC 5342 ^T	CBS 142883; CMW 47645	B3	<i>Ca. aciculata</i>	CERC 5342 ^T	<i>Eucalyptus urophylla</i> × <i>E. grandis</i>	YunNan, China	S.F. Chen & J.Q. Li	MT334937; MT335164; MT335403; MT359624; MT359384; MT412478; MT412694; MT412934	Li <i>et al.</i> (2017), this study
A4	<i>Ca. aconidialis</i>	CMW 35174 ^T	CBS 136086; CERC 1850	B4	<i>Ca. aconidialis</i>	CMW 35174 ^T	Soil (<i>Eucalyptus</i> plantation)	HaiNan, China	X. Mou & S.F. Chen	MT334938; MT335165; MT335404; MT359625; MT359385; MT412479; MT412695; N/A ¹¹	Lombard <i>et al.</i> (2015a), this study
		CMW 35384	CBS 136091; CERC 1886	B4	<i>Ca. aconidialis</i>	CMW 35384	Soil (<i>Eucalyptus</i> plantation)	HaiNan, China	X. Mou & S.F. Chen	MT334939; MT335166; MT335405; MT359626; MT359386; N/A; MT412696; N/A	Lombard <i>et al.</i> (2015a), this study
A5	<i>Ca. aeknauliensis</i>	CMW 48253 ^T	CBS 143559	B5	<i>Ca. aeknauliensis</i>	CMW 48253 ^T	Soil (<i>Eucalyptus</i> plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT334953; MT335180; MT335419; MT359640; MT359400; MT412486; MT412710; N/A	Pham <i>et al.</i> (2019), this study
		CMW 48254	CBS 143560	B5	<i>Ca. aeknauliensis</i>	CMW 48254	Soil (<i>Eucalyptus</i> plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT334954; MT335181; MT335420; MT359641; MT359401; MT412487; MT412711; N/A	Pham <i>et al.</i> (2019), this study
A6	<i>Ca. amazonica</i>	CBS 116250 ^T	CMW 51234; CPC 3534	B6	<i>Ca. amazonica</i>	CBS116250 ^T	<i>E. tereticornis</i>	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334955; MT335182; MT335421; MT359642; MT359402; MT412488; MT412712; MT412935	Lombard <i>et al.</i> (2016), this study

		CBS 115486	CMW 51223; CPC 3894	B6	Ca. amazonica	CBS 115486	<i>E. tereticornis</i>	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334956; MT335183; MT335422; MT359643; MT359403; MT412489; MT412713; MT412936	Lombard <i>et al.</i> (2016), this study
A7	<i>Ca. amazoniensis</i> *	CBS 115440 ^T	CMW 51222; CPC 3885	B6	<i>Ca. amazonica</i> [#]	CBS 115440	<i>E. tereticornis</i>	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334957; MT335184; MT335423; MT359644; MT359404; N/A; MT412714; MT412937	Lombard <i>et al.</i> (2016), this study
		CBS 115438	CMW 51220; CPC 3890	B6	<i>Ca. amazonica</i> [#]	–	<i>E. tereticornis</i>	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334958; MT335185; MT335424; MT359645; MT359405; N/A; MT412715; MT412938	Lombard <i>et al.</i> (2016), this study
		CBS 115439	CMW 51221; CPC 3889	B6	<i>Ca. amazonica</i> [#]	–	<i>E. tereticornis</i>	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334959; MT335186; MT335425; MT359646; MT359406; N/A; MT412716; MT412939	Lombard <i>et al.</i> (2016), this study
A8	<i>Ca. angustata</i>	CMW 30990 ^T	CBS 114544; CPC 2347; P99-0454	B7	Ca. angustata	CMW 30990 ^T	<i>Tillandsia capitata</i>	Sarasota nursery, Florida, USA	R.M. Leahy	MT334963; N/A; MT335429; MT359650; MT359410; MT412493; MT412720; MT412943	Crous <i>et al.</i> (2000, 2006), Lombard <i>et al.</i> (2010a), this study
A9	<i>Ca. arbusta</i> *	CMW 31370 ^T	CBS 136079; CERC 1705	B4	<i>Ca. aconidialis</i> [#]	CMW 31370	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334940; MT335167; MT335406; MT359627; MT359387; MT412480; MT412697; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 37981	CBS 136098; CERC 1944	B4	<i>Ca. aconidialis</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334941; MT335168; MT335407; MT359628; MT359388; N/A; MT412698; N/A	Lombard <i>et al.</i> (2015a), this study
A11	<i>Ca. auriculiformis</i>	CMW 47178 ^T	CBS 143561	B9	Ca. auriculiformis	CMW 47178 ^T	Soil (<i>A. auriculiformis</i> plantation)	Hau Loc, Thanh Hoa, Vietnam	N.Q. Pham & T.Q. Pham	MT334964; MT335190; MT335430; MT359651; MT359411; MT412494; MT412721; MT412944	Pham <i>et al.</i> (2019), this study
		CMW 47179	CBS 143562	B9	Ca. auriculiformis	CMW 47179	Soil (<i>A. auriculiformis</i> plantation)	Hau Loc, Thanh Hoa, Vietnam	N.Q. Pham & T.Q. Pham	N/A; MT335191; MT335431; MT359652; MT359412; MT412495; MT412722; MT412945	Pham <i>et al.</i> (2019), this study
A12	<i>Ca. australiensis</i>	CMW 23669 ^T	CBS 112954; CPC 4714	B10	Ca. australiensis	CMW 23669 ^T	<i>Ficus pleurocarpa</i>	Queensland, Australia	C. Pearce & B. Paulus	MT334965; MT335192; MT335432; MT359653; MT359413; MT412496; MT412723; MT412946	Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study
A14	<i>Ca. baviensis</i> *	CMW 47410 ^T	CBS 143563	B106	<i>Ca. reteaudii</i> [#]	CMW 47410	<i>E. urophylla</i> (leaf)	Bavi, Hanoi, Vietnam	N.Q. Pham & T.Q. Pham	MT334966; MT335193; MT335433; MT359654; MT359414; MT412497; MT412724; N/A	Pham <i>et al.</i> (2019), this study
		CMW 47433	CBS 143564	B106	<i>Ca. reteaudii</i> [#]	–	<i>E. pellita</i> (leaf)	Bavi, Hanoi, Vietnam	N.Q. Pham & T.Q. Pham	MT334967; MT335194; MT335434; MT359655; MT359415; MT412498; MT412725; MT412947	Pham <i>et al.</i> (2019), this study
A15	<i>Ca. blephiliae</i> *	CBS 136425 ^T	CMW 51321; CPC 21859	B32	<i>Ca. cylindrospora</i> [#]	CBS 136425	<i>Blephilia ciliata</i>	Ellerbe, North Carolina, USA	T. Sharp	MT335005; MT335235; MT335475; MT359696; MT359456; MT412539; MT412766; MT412984	Crous <i>et al.</i> (2013), this study

A16	<i>Ca. brachiatica</i>	CMW 25298 ^T	CBS 123700	B12	<i>Ca. brachiatica</i>	CMW 25298 ^T	<i>Pinus maximinoi</i>	Buga, Colombia	M.J. Wingfield	N/A; MT335195; MT335435; MT359656; MT359416; MT412499; MT412726; MT412948	Lombard <i>et al.</i> (2009), this study
		CMW 25302	–	B12	<i>Ca. brachiatica</i>	CMW 25302	<i>Pi. tecunumanii</i>	Buga, Colombia	M.J. Wingfield	N/A; MT335196; MT335436; MT359657; MT359417; MT412500; MT412727; MT412949	Lombard <i>et al.</i> (2009), this study
		CMW 25307	–	B12	<i>Ca. brachiatica</i>	CMW 25307	<i>Pi. tecunumanii</i>	Buga, Colombia	M.J. Wingfield	N/A; MT335197; MT335437; MT359658; MT359418; MT412501; MT412728; MT412950	Lombard <i>et al.</i> (2009), this study
A17	<i>Ca. brasiliiana</i>	CBS 111484 ^T	CMW 51187; CPC 1924	B13	<i>Ca. brasiliiana</i>	CBS 111484 ^T	Soil	Brazil	A.C. Alfenas	MT334968; MT335198; MT335438; MT359659; MT359419; MT412502; MT412729; MT412951	Lombard <i>et al.</i> (2016), this study
		CBS 111485	CMW 51188; CPC 1929	B13	<i>Ca. brasiliiana</i>	CBS 111485	Soil	Brazil	A.C. Alfenas	MT334969; MT335199; MT335439; MT359660; MT359420; MT412503; MT412730; MT412952	Lombard <i>et al.</i> (2016), this study
A18	<i>Ca. brasiliensis</i>	CBS 230.51 ^T	IMI 299576	B14	<i>Ca. brasiliensis</i>	CBS 230.51 ^T	<i>Eucalyptus</i> sp.	Ceara state, Brazil	T.R. Ciferri	MT334970; MT335200; MT335440; MT359661; MT359421; MT412504; MT412731; MT412953	Batista (1951), Crous (2002), Lombard <i>et al.</i> (2010b), this study
		CMW 32949	CBS 114257; CPC 1944	B14	<i>Ca. brasiliensis</i>	CMW 32949	<i>Eucalyptus</i> sp.	Aracruz, Brazil	A.C. Alfenas	MT334971; MT335201; MT335441; MT359662; MT359422; MT412505; MT412732; MT412954	Lombard <i>et al.</i> (2010a), this study
A20	<i>Ca. brassicae</i>	CBS 111869 ^T	CPC 2409	B16	<i>Ca. brassicae</i>	CBS 111869 ^T	<i>Argyrea splendens</i>	Indonesia	F. Bugnicourt	MT334972; MT335202; MT335442; MT359663; MT359423; MT412506; MT412733; MT412955	Crous (2002), Lombard <i>et al.</i> (2010a, 2016), this study
		CMW 30981	CBS 111478; CPC 1921	B83	<i>Ca. parvispora</i> ^{&}	–	Soil	Brazil	A.C. Alfenas	MT335081; MT335313; MT335553; MT359774; MT359534; MT412606; MT412844; MT413056	Lombard <i>et al.</i> (2010a, 2016), this study
A22	<i>Ca. brevistipitata</i>	CBS 115671 ^T	CMW 51226; CPC 949	B18	<i>Ca. brevistipitata</i>	CBS 115671 ^T	Soil	Mexico	P.W. Crous	MT334973; MT335203; MT335443; MT359664; MT359424; MT412507; MT412734; MT412956	Lombard <i>et al.</i> (2016), this study
		CBS 110928	CMW 51170; CPC 951	B18	<i>Ca. brevistipitata</i>	CBS 110928	Soil	Mexico	P.W. Crous	MT334974; MT335204; MT335444; MT359665; MT359425; MT412508; MT412735; MT412957	Lombard <i>et al.</i> (2016), this study
		CBS 110837	CMW 51163; CPC 913	B18	<i>Ca. brevistipitata</i>	CBS 110837	Soil	Mexico	P.W. Crous	MT335057; MT335289; MT335529; MT359750; MT359510; MT412586; MT412820; MT413034	Lombard <i>et al.</i> (2016), this study
A23	<i>Ca. bumicola</i>	CMW 48257 ^T	CBS 143575	B19	<i>Ca. bumicola</i>	CMW 48257 ^T	Soil (<i>Eucalyptus</i> plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT334975; MT335205; MT335445; MT359666; MT359426; MT412509; MT412736; N/A	Pham <i>et al.</i> (2019), this study

A24	<i>Ca. canadiana</i>	CMW 23673 ^T	CBS 110817; STE-U 499	B20	<i>Ca. canadiana</i>	CMW 23673 ^T	<i>Picea</i> sp.	Canada	S. Greifenhagen	MT334976; MT335206; MT335446; MT359667; MT359427; MT412510; MT412737; MT412958	Kang <i>et al.</i> (2001b), Crous (2002), Lechat <i>et al.</i> (2010), this study
A25	<i>Ca. candelabrum</i>	CMW 31000	CPC 1675; UFV 117	B21	<i>Ca. candelabrum</i>	CMW 31000	<i>Eucalyptus</i> sp.	Amazonas, Brazil	A.C. Alfenas	MT334977; MT335207; MT335447; MT359668; MT359428; MT412511; MT412738; MT412959	Crous (2002), Lombard <i>et al.</i> (2010a, 2015b), this study
		CMW 31001	STE-U 1679; UFV 126	B21	<i>Ca. candelabrum</i>	CMW 31001	<i>Eucalyptus</i> sp.	Amazonas, Brazil	A.C. Alfenas	MT334978; MT335208; MT335448; MT359669; MT359429; MT412512; MT412739; MT412960	Crous (2002), Lombard <i>et al.</i> (2010a, 2015b), this study
A26	<i>Ca. cerciana</i>	CMW 25309 ^T	CBS 123693	B22	<i>Ca. cerciana</i>	CMW 25309 ^T	<i>E. urophylla</i> × <i>E. grandis</i> hybrid cutting	CERC nursery, GuangDong, China	M.J. Wingfield & X.D. Zhou	MT334981; MT335211; MT335451; MT359672; MT359432; MT412515; MT412742; MT412963	Lombard <i>et al.</i> (2010c), this study
		CMW 25290	CBS 123695	B22	<i>Ca. cerciana</i>	CMW 25290	<i>E. urophylla</i> × <i>E. grandis</i> hybrid cutting	CERC nursery, GuangDong, China	M.J. Wingfield & X.D. Zhou	MT334982; MT335212; MT335452; MT359673; MT359433; MT412516; MT412743; MT412964	Lombard <i>et al.</i> (2010c), this study
A27	<i>Ca. chinensis</i>	CMW 23674 ^T	CBS 114827; CPC 4101	B23	<i>Ca. chinensis</i>	CMW 23674 ^T	Soil	Hong Kong, China	E.C.Y. Liew	MT334990; MT335220; MT335460; MT359681; MT359441; MT412524; MT412751; MT412972	Crous <i>et al.</i> (2004), Lombard <i>et al.</i> (2010a), this study
		CMW 30986	CBS 112744; CPC 4104	B23	<i>Ca. chinensis</i>	CMW 30986	Soil	Hong Kong, China	E.C.Y. Liew	MT334991; MT335221; MT335461; MT359682; MT359442; MT412525; MT412752; MT412973	Crous <i>et al.</i> (2004), Lombard <i>et al.</i> (2010a), this study
A28	<i>Ca. citri</i>	CMW 23675 ^T	CBS 186.36	B24	<i>Ca. citri</i>	CMW 23675 ^T	<i>Citrus sinensis</i>	Florida, USA	H.S. Fawcett	MT334992; MT335222; MT335462; MT359683; MT359443; MT412526; MT412753; MT412974	Fawcett & Klotz (1937), Crous (2002), this study
A29	<i>Ca. clavata</i>	CMW 23690 ^T	ATCC 66389; CBS 114557; CPC 2536; P078-1543	B25	<i>Ca. clavata</i>	CMW 23690 ^T	<i>Callistemon viminalis</i>	Lake Placid, Florida, USA	C.P. Seymour & E.L. Barnard	MT334993; MT335223; MT335463; MT359684; MT359444; MT412527; MT412754; MT412975	Ei-Gholl <i>et al.</i> (1993b), Crous (2002), Lombard <i>et al.</i> (2010a), this study
		CMW 30994	CBS 114666; CPC 2537; P078-1261	B25	<i>Ca. clavata</i>	CMW 30994	Root debris in peat	Lee County, Florida, USA	D. Ferrin	MT334994; MT335224; MT335464; MT359685; MT359445; MT412528; MT412755; MT412976	Ei-Gholl <i>et al.</i> (1993b), Crous (2002), Lombard <i>et al.</i> (2010a), this study
A30	<i>Ca. cliffordii</i> col*	CBS 111812 ^T	CMW 51190; CPC 2631	B85	<i>Ca. pauciramosa</i> [#]	CBS 111812	<i>Cliffordia feruginea</i>	George, Western Cape Province, South Africa	P.W. Crous	MT335084; MT335316; MT335556; MT359777; MT359537; MT412609; MT412847; MT413059	Lombard <i>et al.</i> (2016), this study
		CBS 111814	CMW 51191; CPC 2617	B85	<i>Ca. pauciramosa</i> [#]	–	<i>Prunus avium</i>	Stellenbosch, South Africa	C. Linde	MT335085; MT335317; MT335557; MT359778; MT359538; MT412610; MT412848; MT413060	Lombard <i>et al.</i> (2016), this study

		CBS 111819	CMW 51192; CPC 2604	B85	<i>Ca. pauciramosa</i> [#]	–	<i>Pr. avium</i>	Stellenbosch, South Africa	C. Linde	MT335086; MT335318; MT335558; MT359779; MT359539; MT412611; MT412849; MT413061	Lombard <i>et al.</i> (2016), this study
A31	<i>Ca. cochinchinensis</i>	CMW 49915 ^T	CBS 143567	B26	<i>Ca. cochinchinensis</i>	CMW 49915 ^T	Soil (<i>Hevea brasiliensis</i> plantation)	Duong Minh Chau, Tay Ninh, Vietnam	N.Q. Pham, Q.N. Dang & T.Q. Pham	MT334995; MT335225; MT335465; MT359686; MT359446; MT412529; MT412756; MT412977	Pham <i>et al.</i> (2019), this study
		CMW 47186	CBS 143568	B26	<i>Ca. cochinchinensis</i>	CMW 47186	Soil (<i>A. auriculiformis</i> plantation)	Song May, Dong Nai, Vietnam	N.Q. Pham & T.Q. Pham	MT334996; MT335226; MT335466; MT359687; MT359447; MT412530; MT412757; MT412978	Pham <i>et al.</i> (2019), this study
		CMW 47187	CBS 143569	B26	<i>Ca. cochinchinensis</i>	CMW 47187	Soil (<i>A. auriculiformis</i> plantation)	Song May, Dong Nai, Vietnam	N.Q. Pham & T.Q. Pham	MT334997; MT335227; MT335467; MT359688; MT359448; MT412531; MT412758; MT412979	Pham <i>et al.</i> (2019), this study
A34	<i>Ca. colombiensis</i>	CMW 23676 ^T	CBS 112220; CPC 723	B29	<i>Ca. colombiensis</i>	CMW 23676 ^T	Soil (<i>E. grandis</i> trees)	La Selva, Colombia	M.J. Wingfield	MT334998; MT335228; MT335468; MT359689; MT359449; MT412532; MT412759; MT412980	Crous <i>et al.</i> (2004), this study
		CMW 30985	CBS 112221; CPC 724	B29	<i>Ca. colombiensis</i>	CMW 30985	Soil (<i>E. grandis</i> trees)	La Selva, Colombia	M.J. Wingfield	MT334999; MT335229; MT335469; MT359690; MT359450; MT412533; MT412760; MT412981	Crous <i>et al.</i> (2004), this study
A35	<i>Ca. crousiana</i>	CMW 27249 ^T	CBS 127198	B30	<i>Ca. crousiana</i>	CMW 27249 ^T	<i>E. grandis</i>	FuJian, China	M.J. Wingfield	MT335000; MT335230; MT335470; MT359691; MT359451; MT412534; MT412761; MT412982	Chen <i>et al.</i> (2011), this study
		CMW 27253	CBS 127199	B30	<i>Ca. crousiana</i>	CMW 27253	<i>E. grandis</i>	FuJian, China	M.J. Wingfield	MT335001; MT335231; MT335471; MT359692; MT359452; MT412535; MT412762; MT412983	Chen <i>et al.</i> (2011), this study
A36	<i>Ca. curvispora</i>	CMW 23693 ^T	CBS 116159; CPC 765	B31	<i>Ca. curvispora</i>	CMW 23693 ^T	Soil	Tamatave, Madagascar	P.W. Crous	MT335002; MT335232; MT335472; MT359693; MT359453; MT412536; MT412763; N/A	Victor <i>et al.</i> (1997), Crous (2002), Lombard <i>et al.</i> (2010a, 2015a), this study
A37	<i>Ca. cylindrospora</i>	CBS 119670	CMW 51310; CPC 12766	B32	<i>Ca. cylindrospora</i>	CBS 119670	<i>Pistacia lentiscus</i>	Italy	N/A	MT335006; MT335236; MT335476; MT359697; MT359457; MT412540; MT412767; MT412985	Lombard <i>et al.</i> 2015a,b, 2016), this study
		CMW 30978	CBS 110666; P90.1479; STE-U 497	B32	<i>Ca. cylindrospora</i>	CMW 30978	<i>Ilex vomitoria</i>	Florida, USA	N.E. El-Gholl	MT335007; MT335237; MT335477; MT359698; MT359458; MT412541; MT412768; MT412986	Crou (2002), Lombard <i>et al.</i> (2010a, 2015b), this study
A38	<i>Ca. densa</i>	CMW 31182 ^T	CBS 125261	B33	<i>Ca. densa</i>	CMW 31182 ^T	Soil	Las Golondrinas, Pichincha, Ecuador	M.J. Wingfield	MT335008; MT335238; MT335478; MT359699; MT359459; N/A; MT412769; MT412987	Lombard <i>et al.</i> (2010a), this study

		CMW 31184	CBS 125249	B33	<i>Ca. densa</i>	CMW 31184	Soil	Las Golondrinas, Pichincha, Ecuador	M.J. Wingfield	MT335009; MT335239; MT335479; MT359700; MT359460; N/A; MT412770; MT412988	Lombard <i>et al.</i> (2010a), this study
A40	<i>Ca. ecuadorae</i>	CMW 23677 ^T	CBS 111406; CPC 1635	B35	<i>Ca. ecuadorae</i>	CMW 23677 ^T	Soil	Ecuador	M.J. Wingfield	MT335012; MT335242; MT335482; MT359703; MT359463; MT412544; MT412773; MT412991	Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study
		CMW 30980	CBS 111394; CPC 1628	B84	<i>Ca. pauciphialidica sp. nov.</i>	CMW 30980 ^T	Soil	Ecuador	M.J. Wingfield	MT335083; MT335315; MT335555; MT359776; MT359536; MT412608; MT412846; MT413058	Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study
A41	<i>Ca. ecuadorensis</i> *	CBS 111706 ^T	CMW 51821; CPC 1636	B35	<i>Ca. ecuadorae</i> [#]	CBS 111706	Soil	Ecuador	M.J. Wingfield	MT335010; MT335240; MT335480; MT359701; MT359461; MT412542; MT412771; MT412989	Marin-Felix <i>et al.</i> (2017), this study
		CBS 114164	CMW 51822; CPC 1634	B35	<i>Ca. ecuadorae</i> [#]	–	Soil	Ecuador	M.J. Wingfield	MT335011; MT335241; MT335481; MT359702; MT359462; MT412543; MT412772; MT412990	Marin-Felix <i>et al.</i> (2017), this study
A42	<i>Ca. ericae</i> *	CBS 114458 ^T	CMW 51211; CPC 2019	B85	<i>Ca. pauciramosa</i> [#]	CBS 114458	<i>Erica capensis</i>	California, USA	S.T. Koike	MT335087; MT335319; MT335559; MT359780; MT359540; MT412612; MT412850; MT413062	Lombard <i>et al.</i> (2016), this study
		CBS 114456	CMW 51209; CPC 1984	B85	<i>Ca. pauciramosa</i> [#]	–	<i>Er. capensis</i>	California, USA	S.T. Koike	MT335088; MT335320; MT335560; MT359781; MT359541; MT412613; MT412851; MT413063	Lombard <i>et al.</i> (2016), this study
		CBS 114457	CMW 51210; CPC 1985	B85	<i>Ca. pauciramosa</i> [#]	–	<i>Er. capensis</i>	California, USA	S.T. Koike	MT335089; MT335321; MT335561; MT359782; MT359542; MT412614; MT412852; MT413064	Lombard <i>et al.</i> (2016), this study
A43	<i>Ca. eucalypti</i>	CMW 18444 ^T	CBS 125275	B36	<i>Ca. eucalypti</i>	CMW 18444 ^T	<i>E. grandis</i>	Aek Nauli, Sumatra Utara, Indonesia	M.J. Wingfield	MT335013; MT335243; MT335483; MT359704; MT359464; MT412545; MT412774; MT412992	Lombard <i>et al.</i> (2010a), this study
		CMW 18445	CBS 125276	B36	<i>Ca. eucalypti</i>	CMW 18445	<i>E. grandis</i>	Aek Nauli, Sumatra Utara, Indonesia	M.J. Wingfield	MT335014; MT335244; MT335484; MT359705; MT359465; MT412546; MT412775; MT412993	Lombard <i>et al.</i> (2010a), this study
A45	<i>Ca. expansa</i> *	CMW 31392 ^T	CBS 136247; CERC 1727	B4	<i>Ca. aconidialis</i> [#]	CMW 31392	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334942; MT335169; MT335408; MT359629; MT359389; MT412481; MT412699; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 31441	CBS 136078; CERC 1776	B4	<i>Ca. aconidialis</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334943; MT335170; MT335409; MT359630; MT359390; MT412482; MT412700; N/A	Lombard <i>et al.</i> (2015a), this study
A46	<i>Ca. floridana</i> *	CBS 114692 ^T	ATCC18882; CMW 51826	B55	<i>Ca. kyotensis</i> [#]	CBS 114692	<i>Prunus persica</i>	Georgia, USA	N/A	MT335015; MT335245; MT335485; MT359706; MT359466; MT412547; MT412776; MT412994	Sobers (1969), Crous (2002), Marin-Felix <i>et al.</i> (2017), this study

A47	<i>Ca. foliicola</i> *	CMW 31393 ^T	CBS 136641	B44	<i>Ca. hawksworthii</i> #	CMW 31393	<i>E. urophylla</i> × <i>E. grandis</i>	GuangXi, China	X. Zhou & G. Zhao	MT335017; MT335247; MT335487; MT359708; MT359468; MT412549; MT412778; MT412996	Lombard <i>et al.</i> (2015a), this study
		CMW 31395	–	B44	<i>Ca. hawksworthii</i> #	–	<i>E. urophylla</i> × <i>E. grandis</i>	GuangXi, China	X. Zhou & G. Zhao	MT335018; MT335248; MT335488; MT359709; MT359469; MT412550; MT412779; MT412997	Lombard <i>et al.</i> (2015a), this study
A49	<i>Ca. fujianensis</i>	CMW 27257 ^T	CBS 127201	B39	<i>Ca. fujianensis</i>	CMW 27257 ^T	<i>E. grandis</i>	FuJian, China	M.J. Wingfield	MT335019; MT335249; MT335489; MT359710; MT359470; MT412551; MT412780; MT412998	Chen <i>et al.</i> (2011), this study
		CMW 27254	CBS 127200	B39	<i>Ca. fujianensis</i>	CMW 27254	<i>E. grandis</i>	FuJian, China	M.J. Wingfield	MT335020; MT335250; MT335490; MT359711; MT359471; MT412552; MT412781; MT412999	Chen <i>et al.</i> (2011), this study
A51	<i>Ca. gordoniae</i>	CMW 23694 ^T	ATCC 201837; CBS 112142; P97-2567; STE-U 3136	B41	<i>Ca. gordoniae</i>	CMW 23694 ^T	<i>Gordonia lasianthus</i>	Florida, USA	D. Chiappini	MT335021; MT335251; MT335491; MT359712; MT359470; MT412553; MT412782; MT413000	Leahy <i>et al.</i> (2000), Crous (2002), Lombard <i>et al.</i> (2010a), this study
A52	<i>Ca. gracilipes</i>	CBS 115674 ^T	CMW 51227; STE-U 1153	B42	<i>Ca. gracilipes</i>	CBS 115674 ^T	Soil	La Selva, Colombia	M.J. Wingfield	MT335022; MT335252; MT335492; MT359713; MT359473; MT412554; MT412783; MT413001	Crous <i>et al.</i> (1997a, 2006), Crous (2002), this study
		CBS 111141	CMW 51174; CPC 1211	B42	<i>Ca. gracilipes</i>	CBS 111141	Soil	La Selva, Colombia	M.J. Wingfield	MT335023; MT335253; MT335493; MT359714; MT359474; MT412555; MT412784; MT413002	Crous (2002), Crous <i>et al.</i> (2006), this study
A54	<i>Ca. guangxiensis</i> *	CMW 35409 ^T	CBS 136092; CERC 1900	B4	<i>Ca. aconidialis</i> #	CMW 35409	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Mou & R. Chang	MT334944; MT335171; MT335410; MT359631; MT359391; N/A; MT412701; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 35411	CBS 136094; CERC 1902	B4	<i>Ca. aconidialis</i> #	–	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Mou & R. Chang	MT334945; MT335172; MT335411; MT359632; MT359392; N/A; MT412702; N/A	Lombard <i>et al.</i> (2015a), this study
A55	<i>Ca. hainanensis</i> *	CMW 35187 ^T	CBS 136248; CERC 1863	B4	<i>Ca. aconidialis</i> #	CMW 35187	Soil (<i>Eucalyptus</i> plantation)	HaiNan, China	X. Mou & S.F. Chen	MT334946; MT335173; MT335412; MT359633; MT359393; N/A; MT412703; N/A	Lombard <i>et al.</i> (2015a), this study
A56	<i>Ca. hawksworthii</i>	CBS 111870 ^T	CMW 51194; CPC 2405	B44	<i>Ca. hawksworthii</i>	CBS 111870 ^T	<i>Nelumbo nucifera</i>	Pamplemousses garden, Mauritius	A. Peeraly	MT335024; MT335254; MT335494; MT359715; MT359475; MT412556; MT412785; MT413003	Crous (2002), this study
A58	<i>Ca. heveicola</i>	CMW 49913 ^T	CBS 143570	B46	<i>Ca. heveicola</i>	CMW 49913 ^T	Soil (<i>Hevea brasiliensis</i> plantation)	Bau Bang, Binh Duong, Vietnam	N.Q. Pham, Q.N. Dang & T.Q. Pham	MT335025; MT335255; MT335495; MT359716; MT359476; N/A; MT412786; MT413004	Pham <i>et al.</i> (2019), this study

		CMW 49928	CBS 143571	B46	<i>Ca. heveicola</i>	CMW 49928	Soil	Bu Gia Map National Park, Binh Phuoc, Vietnam	N.Q. Pham, Q.N. Dang & T.Q. Pham	MT335048; MT335280; MT335520; MT359741; MT359501; MT412577; MT412811; MT413025	Pham <i>et al.</i> (2019), this study
		CMW 49935	CBS 143572	B46	<i>Ca. heveicola</i>	CMW 49935	Soil	Bu Gia Map National Park, Binh Phuoc, Vietnam	N.Q. Pham, Q.N. Dang & T.Q. Pham	MT335049; MT335281; MT335521; MT359742; MT359502; MT412578; MT412812; MT413026	Pham <i>et al.</i> (2019), this study
A60	<i>Ca. honghensis</i>	CERC 5572 ^T	CBS 142885; CMW 47669	B47	<i>Ca. honghensis</i>	CERC 5572 ^T	Soil (<i>Eucalyptus</i> plantation)	HongHe, YunNan, China	S.F. Chen & J.Q. Li	MT335026; MT335256; MT335496; MT359717; MT359477; MT412557; MT412787; MT413005	Li <i>et al.</i> (2017), this study
		CERC 5571	CBS 142884; CMW 47668	B47	<i>Ca. honghensis</i>	CERC 5571	Soil (<i>Eucalyptus</i> plantation)	HongHe, YunNan, China	S.F. Chen & J.Q. Li	MT335027; MT335257; MT335497; MT359718; MT359478; MT412558; MT412788; MT413006	Li <i>et al.</i> (2017), this study
A61	<i>Ca. hongkongensis</i>	CBS 114828 ^T	CMW 51217; CPC 4670	B48	<i>Ca. hongkongensis</i>	CBS 114828 ^T	Soil	Hong Kong, China	M.J. Wingfield	MT335028; MT335258; MT335498; MT359719; MT359479; MT412559; MT412789; MT413007	Crous <i>et al.</i> (2004), this study
		CMW 31383	-	B48	<i>Ca. hongkongensis</i>	-	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	N/A	MT335029; MT335259; MT335499; MT359720; MT359480; MT412560; MT412790; MT413008	Lombard <i>et al.</i> (2015a), this study
		CERC 3570	CMW 47271	B48	<i>Ca. hongkongensis</i>	-	Soil (<i>Eucalyptus</i> plantation)	BeiHai, GuangXi, China	S.F. Chen, J.Q. Li & G.Q. Li	MT335030; MT335260; MT335500; MT359721; MT359481; MT412561; MT412791; MT413009	Li <i>et al.</i> (2017), this study
		CERC 7132	CMW 47499	B48	<i>Ca. hongkongensis</i>	CERC 7132	Soil	FuJian, China	S.F. Chen	MT335031; MT335261; MT335501; MT359722; MT359482; MT412562; MT412792; MT413010	Li <i>et al.</i> (2017), this study
A62	<i>Ca. humicola</i>	CMW 31183 ^T	CBS 125251	B49	<i>Ca. humicola</i>	CMW 31183 ^T	Soil	Las Golondrinas, Pichincha, Ecuador	M.J. Wingfield	MT335032; MT335262; MT335502; MT359723; MT359483; N/A; MT412793; MT413011	Lombard <i>et al.</i> (2010a), this study
		CMW 31186	CBS 125252	B49	<i>Ca. humicola</i>	CMW 31186	Soil	Las Golondrinas, Pichincha, Ecuador	L. Lombard	MT335033; MT335263; MT335503; MT359724; MT359484; N/A; MT412794; MT413012	Lombard <i>et al.</i> (2010a), this study
		CMW 31187	CBS 125269	B49	<i>Ca. humicola</i>	CMW 31187	Soil	Las Golondrinas, Pichincha, Ecuador	L. Lombard	MT335034; MT335264; MT335504; MT359725; MT359485; N/A; MT412795; MT413013	Lombard <i>et al.</i> (2010a), this study
A63	<i>Ca. hurae</i>	CBS 114182	CMW 51823; CPC 1714; UFV 216	B50	<i>Ca. hurae</i>	CBS 114182	<i>Rumohra adiantiformis</i>	Brazil	A.C. Alfenas	MT335035; MT335265; MT335505; MT359726; MT359486; MT412563; MT412796; MT413014	Crous (2002), Crous <i>et al.</i> (2006), this study

A64	<i>Ca. ilicicola</i>	CMW 30998 ^T	CBS 190.50; IMI 299389; STE-U 2482	B51	<i>Ca. ilicicola</i>	CMW 30998 ^T	<i>Solanum tuberosum</i>	Bogor, Java, Indonesia	K.B. Boedijn & J. Reitsma	MT335036; MT335266; MT335506; MT359727; MT359487; MT412564; MT412797; N/A	Boedijn & Reitsma (1950), Crous (2002), Lombard <i>et al.</i> (2010a), this study
A65	<i>Ca. indonesiae</i>	CMW 23683 ^T	CBS 112823; CPC 4508	B52	<i>Ca. indonesiae</i>	CMW 23683 ^T	<i>Syzygium aromaticum</i>	Warambunga, Indonesia	M.J. Wingfield	MT335037; MT335267; MT335507; MT359728; MT359488; MT412565; MT412798; MT413015	Crous <i>et al.</i> (2004), this study
		CBS 112840	CMW 51205; CPC 4554	B52	<i>Ca. indonesiae</i>	CBS 112840	<i>S. aromaticum</i>	Warambunga, Indonesia	M.J. Wingfield	MT335038; MT335268; MT335508; MT359729; MT359489; MT412566; MT412799; MT413016	Crous <i>et al.</i> (2004), this study
A66	<i>Ca. indonesiae</i> *	CBS 112936 ^T	CMW 51207; CPC 4504	B112	<i>Ca. sumatrensis</i> [#]	CBS 112936	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT335143; MT335380; MT335620; MT359841; MT359601; MT412672; MT412911; N/A	Lombard <i>et al.</i> (2016), this study
		CBS 112826	CMW 51202; CPC 4519	B112	<i>Ca. sumatrensis</i> [#]	–	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT335144; MT335381; MT335621; MT359842; MT359602; MT412673; MT412912; MT413121	Lombard <i>et al.</i> (2016), this study
A68	<i>Ca. insularis</i>	CMW 30991 ^T	CBS 114558; CPC 768	B54	<i>Ca. insularis</i>	CMW 30991 ^T	Soil	Tamatave, Madagascar	P.W. Crous	N/A; MT335269; MT335509; MT359730; MT359490; MT412567; MT412800; MT413017	Schoch <i>et al.</i> (1999), Lombard <i>et al.</i> (2010a, 2016), this study
		CMW 30992	CBS 114559; CPC 954	B54	<i>Ca. insularis</i>	CMW 30992	Soil	Conejos, Veracruz, Mexico	M.J. Wingfield	N/A; MT335270; MT335510; MT359731; MT359491; MT412568; MT412801; MT413018	Lombard <i>et al.</i> (2010a, 2016), this study
A69	<i>Ca. kyotensis</i>	CBS 114525 ^T	ATCC 18834; CMW 51824; CPC 2367	B55	<i>Ca. kyotensis</i>	CBS 114525 ^T	<i>Robinia pseudoacacia</i>	Japan	T. Terashita	MT335039; MT335271; MT335511; MT359732; MT359492; MT412569; MT412802; MT413019	Terashita (1968), Crous (2002), Lombard <i>et al.</i> (2016), this study
		CBS 114550	CMW 51825; CPC 2351	B55	<i>Ca. kyotensis</i>	CBS 114550	Soil	China	M.J. Wingfield	MT335016; MT335246; MT335486; MT359707; MT359467; MT412548; MT412777; MT412995	Lombard <i>et al.</i> (2016), this study
A71	<i>Ca. lantauensis</i>	CERC 3302 ^T	CBS 142888; CMW 47252	B57	<i>Ca. lantauensis</i>	CERC 3302 ^T	Soil	LiDao, Hong Kong, China	M.J. Wingfield & S.F. Chen	MT335040; MT335272; MT335512; MT359733; MT359493; MT412570; MT412803; N/A	Li <i>et al.</i> (2017), this study
		CERC 3301	CBS 142887; CMW 47251	B57	<i>Ca. lantauensis</i>	CERC 3301	Soil	LiDao, Hong Kong, China	M.J. Wingfield & S.F. Chen	MT335041; MT335273; MT335513; MT359734; MT359494; N/A; MT412804; N/A	Li <i>et al.</i> (2017), this study
A72	<i>Ca. lateralis</i>	CMW 31412 ^T	CBS 136629	B58	<i>Ca. lateralis</i>	CMW 31412 ^T	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT335042; MT335274; MT335514; MT359735; MT359495; MT412571; MT412805; MT413020	Lombard <i>et al.</i> (2015a), this study

A73	<i>Ca. lauri</i>	CMW 23682 ^T	CBS 749.70	B59	<i>Ca. lauri sp. nov.</i>	CMW 23682 ^T	<i>Ilex aquifolium</i>	Vijlen, Vijlenerbos, South-East Limburg, Netherlands	H.A. van der Aa	MT335043; MT335275; MT335515; MT359736; MT359496; MT412572; MT412806; MT413021	Lechat <i>et al.</i> (2010), Lombard <i>et al.</i> (2010a), this study
A74	<i>Ca. leguminum</i>	CMW 23684 ^T	CBS 728.68	B60	<i>Ca. leguminum</i>	CMW 23684 ^T	<i>Annona squamosa</i>	Sao Paulo, Brazil	M.B. Figueiredo	MT335044; MT335276; MT335516; MT359737; MT359497; MT412573; MT412807; MT413022	Figueiredo & Namekata (1967), Crous (2002), Lombard <i>et al.</i> (2010a), this study
A75	<i>Ca. leucothoes</i>	CMW 30977 ^T	ATCC 64824; CBS 109166; CPC 2385; P88-490	B61	<i>Ca. leucothoes</i>	CMW 30977 ^T	<i>Leucothoe axillaris</i>	Florida, USA	N.E. El-Gholl	MT335045; MT335277; MT335517; MT359738; MT359498; MT412574; MT412808; N/A	El-Gholl <i>et al.</i> (1989), Crous (2002), Lombard <i>et al.</i> (2015a), this study
A76	<i>Ca. lichi</i>	CERC 8866 ^T	–	B62	<i>Ca. lichi</i>	CERC 8866 ^T	Soil	HeNan, China	S.F. Chen	MT335046; MT335278; MT335518; MT359739; MT359499; MT412575; MT412809; MT413023	Liu & Chen (2017), this study
		CERC 8850	–	B62	<i>Ca. lichi</i>	CERC 8850	Soil	HeNan, China	S.F. Chen	MT335047; MT335279; MT335519; MT359740; MT359500; MT412576; MT412810; MT413024	Liu & Chen (2017), this study
A77	<i>Ca. longiramosa*</i>	CBS 116319 ^T	CMW 51832; CPC 3761	B6	<i>Ca. amazonica</i> [#]	CBS 116319	<i>Eucalyptus</i> sp.	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334960; MT335187; MT335426; MT359647; MT359407; MT412490; MT412717; MT412940	Marin-Felix <i>et al.</i> (2017), this study
		CBS 116305	CMW 51831; CPC 3765	B6	<i>Ca. amazonica</i> [#]	–	<i>Eucalyptus</i> sp.	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334961; MT335188; MT335427; MT359648; MT359408; MT412491; MT412718; MT412941	Marin-Felix <i>et al.</i> (2017), this study
A78	<i>Ca. machaerinae*</i>	CBS 123183 ^T	CMW 51311; CPC 15378	B85	<i>Ca. pauciramosa</i> [#]	CBS 123183	<i>Machaerina sinclairii</i>	Auckland University Campus, Auckland, New Zealand	C.F. Hill	MT335090; MT335322; MT335562; MT359783; MT359543; MT412615; MT412853; MT413065	Lombard <i>et al.</i> (2016), this study
A79	<i>Ca. macroconidialis</i>	CBS 114880 ^T	CMW 51219; CPC 307; PPRI 4000	B64	<i>Ca. macroconidialis</i>	CBS 114880 ^T	<i>E. grandis</i>	Sabie, Mpumalanga, South Africa	P.W. Crous	MT335050; MT335282; MT335522; MT359743; MT359503; MT412579; MT412813; MT413027	Crous <i>et al.</i> (1993c), Crous (2002), Lombard <i>et al.</i> (2010a), this study
A80	<i>Ca. madagascariensis</i>	CMW 23686 ^T	CBS 114572; CPC 2252	B65	<i>Ca. madagascariensis</i>	CMW 23686 ^T	Soil	Rona, Madagascar	J.E. Taylor	MT335052; MT335284; MT335524; MT359745; MT359505; MT412581; MT412815; MT413029	Crous (2002), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study

		CMW 30993	CBS 114571; CPC 2253	B65	Ca. madagascariensis	CMW 30993	Soil	Rona, Madagascar	J.E. Taylor	MT335053; MT335285; MT335525; MT359746; MT359506; MT412582; MT412816; MT413030	Crous (2002), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a), this study
A81	<i>Ca. magnispora</i> *	CMW 35184 ^T	CBS 136249; CERC 1860	B4	<i>Ca. aconidialis</i> [#]	CMW 35184	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Mou & R. Chang	MT334947; MT335174; MT335413; MT359634; MT359394; N/A; MT412704; N/A	Lombard <i>et al.</i> (2015a), this study
A82	<i>Ca. malesiana</i>	CMW 23687 ^T	CBS 112752; CPC 4223	B66	Ca. malesiana	CMW 23687 ^T	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT335054; MT335286; MT335526; MT359747; MT359507; MT412583; MT412817; MT413031	Crous <i>et al.</i> (2004), this study
		CBS 112710	CMW 51199; CPC 3899	B66	Ca. malesiana	CBS 112710	Leaf litter	Prathet, Thailand	N.L. Hywel-Jones	MT335055; MT335287; MT335527; MT359748; MT359508; MT412584; MT412818; MT413032	Crous <i>et al.</i> (2004), this study
A84	<i>Ca. metrosideri</i>	CBS 133604	CMW 51320; LPF103	B68	Ca. metrosideri	CBS 133604	<i>Metrosideros</i> <i>polymorpha</i>	Viçosa, Minas Gerais state, Brazil	R.F. Alfenas	MT335056; MT335288; MT335528; MT359749; MT359509; MT412585; MT412819; MT413033	Alfenas <i>et al.</i> (2013a, 2015), this study
A86	<i>Ca. microconidialis</i> *	CMW 31487 ^T	CBS 136638; CERC 1822	B97	<i>Ca. pseudoreteauidii</i> [#]	CMW 31487	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335113; MT335348; MT335588; MT359809; MT359569; MT412641; MT412879; MT413090	Lombard <i>et al.</i> (2015a), this study
		CMW 31473	CBS 136634; CERC 1808	B97	<i>Ca. pseudoreteauidii</i> [#]	-	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335114; MT335349; MT335589; MT359810; MT359570; MT412642; MT412880; MT413091	Lombard <i>et al.</i> (2015a), this study
		CMW 31475	CBS 136636; CERC 1810	B97	<i>Ca. pseudoreteauidii</i> [#]	-	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335115; MT335350; MT335590; MT359811; MT359571; MT412643; MT412881; MT413092	Lombard <i>et al.</i> (2015a), this study
		CMW 31492	CBS 136640; CERC 1827	B97	<i>Ca. pseudoreteauidii</i> [#]	-	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335116; MT335351; MT335591; MT359812; MT359572; MT412644; MT412882; MT413093	Lombard <i>et al.</i> (2015a), this study
A87	<i>Ca. montana</i> *	CERC 8952 ^T	-	B20	<i>Ca. canadiana</i> [#]	CERC 8952	Soil	HeNan, China	S.F. Chen	MT335058; MT335290; MT335530; MT359751; MT359511; MT412587; MT412821; MT413035	Liu & Chen (2017), this study
		CERC 8957	-	B20	<i>Ca. canadiana</i> [#]	-	Soil	HeNan, China	S.F. Chen	MT335059; MT335291; MT335531; MT359752; MT359512; MT412588; MT412822; MT413036	Liu & Chen (2017), this study
A89	<i>Ca. mossambicensis</i> *	CBS 137243 ^T	CMW 36327	B85	<i>Ca. pauciramosa</i> [#]	CBS 137243	<i>E. grandis</i> × <i>E. camaldulensis</i>	Bandula, Manica, Mozambique	J. Roux & S. Maússe- Siteo	MT335091; MT335323; MT335563; MT359784; MT359544; MT412616; MT412854; MT413066	Crous <i>et al.</i> (2013), Lombard <i>et al.</i> (2016), this study
		CMW 36329	-	B85	<i>Ca. pauciramosa</i> [#]	-	<i>E. grandis</i> × <i>E. urophylla</i>	Bandula, Manica, Mozambique	J. Roux & S. Maússe- Siteo	MT335092; MT335324; MT335564; MT359785; MT359545; MT412617; MT412855; MT413067	Crous <i>et al.</i> (2013), this study

A90	<i>Ca. multilateralis</i>	CBS 110932 ^T	CMW 51171; CPC 957	B71	<i>Ca. multilateralis</i>	CBS 110932 ^T	Soil	Uxmal, Mexico	P.W. Crous	MT335060; MT335292; MT335532; MT359753; MT359513; MT412589; MT412823; MT413037	Lombard <i>et al.</i> (2016), this study
		CBS 110926	CMW 51168; CPC 947	B71	<i>Ca. multilateralis</i>	CBS 110926	Soil	Uxmal, Mexico	P.W. Crous	MT335061; MT335293; MT335533; MT359754; MT359514; MT412590; MT412824; MT413038	Lombard <i>et al.</i> (2016), this study
		CBS 110927	CMW 51169; CPC 948	B71	<i>Ca. multilateralis</i>	CBS 110927	Soil	Uxmal, Mexico	P.W. Crous	MT335062; MT335294; MT335534; MT359755; MT359515; MT412591; MT412825; MT413039	Lombard <i>et al.</i> (2016), this study
		CBS 110931	CPC 956	B71	<i>Ca. multilateralis</i>	–	Soil	Uxmal, Mexico	P.W. Crous	MT335063; MT335295; MT335535; MT359756; MT359516; MT412592; MT412826; MT413040	Lombard <i>et al.</i> (2016), this study
		CBS 115606	CMW 51828	B71	<i>Ca. multilateralis</i>	–	N/A	N/A	N/A	MT335064; MT335296; MT335536; MT359757; MT359517; MT412593; MT412827; MT413041	Lombard <i>et al.</i> (2016), this study
		CBS 115615	CMW 51224; CPC 915	B71	<i>Ca. multilateralis</i>	–	Soil	Uxmal, Mexico	P.W. Crous	MT335065; MT335297; MT335537; MT359758; MT359518; MT412594; MT412828; MT413042	Lombard <i>et al.</i> (2016), this study
A92	<i>Ca. multiphialidica</i>	CMW 23688 ^T	Cam 13; CBS 112678	B73	<i>Ca. multiphialidica</i>	CMW 23688 ^T	Soil (roots of <i>Musa</i> sp.)	Cameroon	Abadie	MT335066; MT335298; MT335538; MT359759; MT359519; MT412595; MT412829; MT413043	Crous <i>et al.</i> (2004), Lombard <i>et al.</i> (2010a), this study
A93	<i>Ca. multiseptata</i>	CMW 23692 ^T	CBS 112682; CPC 1589	B74	<i>Ca. multiseptata</i>	CMW 23692 ^T	<i>E. grandis</i>	North Sumatra, Indonesia	M.J. Wingfield	MT335067; MT335299; MT335539; MT359760; MT359520; MT412596; MT412830; MT413044	Crous <i>et al.</i> (1998, 2006), Crous (2002), this study
A94	<i>Ca. multistipitata</i> *	CMW 47192 ^T	CBS 143573	B23	<i>Ca. chinensis</i> [#]	CMW 47192	Soil (<i>Acacia</i> hybrid plantation)	Tuyen Quang, Vietnam	N.Q. Pham & T.Q. Pham	MT335068; MT335300; MT335540; MT359761; MT359521; MT412597; MT412831; MT413045	Pham <i>et al.</i> (2019), this study
		CMW 47211	CBS 143574	B23	<i>Ca. chinensis</i> [#]	–	Soil (<i>Acacia</i> hybrid plantation)	Tuyen Quang, Vietnam	N.Q. Pham & T.Q. Pham	MT335069; MT335301; MT335541; MT359762; MT359522; MT412598; MT412832; MT413046	Pham <i>et al.</i> (2019), this study
A96	<i>Ca. nemoralis</i> *	CBS 116249 ^T	CMW 51829; CPC 3533	B79	<i>Ca. ovata</i> [#]	CBS 116249	Soil (<i>Eucalyptus</i> plantation)	Brazil	P.W. Crous	MT335074; MT335306; MT335546; MT359767; MT359527; MT412603; MT412837; MT413051	Marin-Felix <i>et al.</i> (2017), this study
A98	<i>Ca. nymphaeae</i> *	CBS 131802 ^T	CMW 51317; HGUP 100003	B39	<i>Ca. fujianensis</i> [#]	CBS 131802	<i>Nymphaea</i> <i>tetragona</i>	Guiyang, Guizhou, China	S.Y. Qin	MT335070; MT335302; MT335542; MT359763; MT359523; MT412599; MT412833; MT413047	Xu <i>et al.</i> (2012), this study
A99	<i>Ca. octoramosa</i>	CBS 111423 ^T	CMW 51819; CPC 1650	B77	<i>Ca. octoramosa</i>	CBS 111423 ^T	Soil	Ecuador	M.J. Wingfield	MT335071; MT335303; MT335543; MT359764; MT359524; MT412600; MT412834; MT413048	Marin-Felix <i>et al.</i> (2017), this study

A100	<i>Ca. orientalis</i>	CMW 20291 ^T	CBS 125260	B78	<i>Ca. orientalis</i>	CMW 20291 ^T	Soil	Langam, Indonesia	M.J. Wingfield	MT335072; MT335304; MT335544; MT359765; MT359525; MT412601; MT412835; MT413049	Lombard <i>et al.</i> (2010a), this study
		CMW 20273	CBS 125259	B78	<i>Ca. orientalis</i>	CMW 20273	Soil	Teso East, Indonesia	M.J. Wingfield	MT335073; MT335305; MT335545; MT359766; MT359526; MT412602; MT412836; MT413050	Lombard <i>et al.</i> (2010a), this study
A101	<i>Ca. ovata</i>	CMW 16724 ^T	CBS 111299; ATCC 76225; UFV 89	B79	<i>Ca. ovata</i>	CMW 16724 ^T	<i>E. urophylla</i>	Monte Dourado, Pará, Brazil	N.E. El-Gholl	MT335075; MT335307; MT335547; MT359768; MT359528; N/A; MT412838; MT413052	El-Gholl <i>et al.</i> (1993a), Crous (2002), Marin-Felix <i>et al.</i> (2017), this study
		CMW 30979	CBS 111307; UFV 90	B79	<i>Ca. ovata</i>	CMW 30979	<i>E. tereticornis</i>	Tucuruí, Pará, Brazil	P.W. Crous	MT335076; MT335308; MT335548; MT359769; MT359529; N/A; MT412839; MT413053	Crous (2002), Lombard <i>et al.</i> (2010a), this study
A102	<i>Ca. pacifica</i>	CMW 16726 ^T	A1568; CBS 109063; IMI 354528; STE-U 2534	B80	<i>Ca. pacifica</i>	CMW 16726 ^T	<i>Araucaria heterophylla</i>	Hawaii, USA	M. Aragaki	MT335079; MT335311; MT335551; MT359772; MT359532; MT412604; MT412842; N/A	Kang <i>et al.</i> (2001b), Crous (2002), Crous <i>et al.</i> (2004), this study
		CMW 30988	CBS 114038	B80	<i>Ca. pacifica</i>	CMW 30988	<i>Ipomoea aquatica</i>	Auckland, New Zealand	C.F. Hill	MT335080; MT335312; MT335552; MT359773; MT359533; MT412605; MT412843; N/A	Crous (2002), Crous <i>et al.</i> (2004), Lombard <i>et al.</i> (2010a), this study
A103	<i>Ca. papillata</i> *	CMW 37976 ^T	CBS 136097; CERC 1939; CPC 23517	B22	<i>Ca. cerciana</i> [#]	CMW 37976	Soil (<i>Eucalyptus</i> plantation)	GuangDong, China	X. Mou & R. Chang	MT334983; MT335213; MT335453; MT359674; MT359434; MT412517; MT412744; MT412965	Lombard <i>et al.</i> (2015a), this study
		CMW 37972	CBS 136096; CERC 1935; CPC 23497	B22	<i>Ca. cerciana</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	GuangDong, China	X. Mou & R. Chang	MT334984; MT335214; MT335454; MT359675; MT359435; MT412518; MT412745; MT412966	Lombard <i>et al.</i> (2015a), this study
		CMW 37971	CBS 136251; CERC 1934; CPC 23514	B22	<i>Ca. cerciana</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Mou & R. Chang	MT334985; MT335215; MT335455; MT359676; MT359436; MT412519; MT412746; MT412967	Lombard <i>et al.</i> (2015a), this study
A106	<i>Ca. parakyotensis</i> *	CMW 35169 ^T	CBS 136085; CERC 1845	B4	<i>Ca. aconidialis</i> [#]	CMW 35169	Soil (<i>Eucalyptus</i> plantation)	GuangDong, China	X. Mou & R. Chang	MT334948; MT335175; MT335414; MT359635; MT359395; MT412483; MT412705; N/A	Lombard <i>et al.</i> (2015a), this study
		CMW 35413	CBS 136095; CERC 1904	B4	<i>Ca. aconidialis</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Mou & R. Chang	MT334949; MT335176; MT335415; MT359636; MT359396; MT412484; MT412706; N/A	Lombard <i>et al.</i> (2015a), this study
A107	<i>Ca. parva</i> *	CBS 110798 ^T	CMW 51817; CPC 410	B64	<i>Ca. macroconidialis</i> [#]	CBS 110798	<i>E. grandis</i> (roots)	Sabie, Mpumalanga, South Africa	P.W. Crous	MT335051; MT335283; MT335523; MT359744; MT359504; MT412580; MT412814; MT413028	Lombard <i>et al.</i> (2016), this study

A108	<i>Ca. parvispora</i>	CBS 111465 ^T	CPC 1902	B83	<i>Ca. parvispora</i>	CBS 111465 ^T	Soil	Brazil	A.C. Alfenas	MT335082; MT335314; MT335554; MT359775; MT359535; MT412607; MT412845; MT413057	Marin-Felix <i>et al.</i> (2017), this study
A109	<i>Ca. pauciramosa</i>	CBS 138824 ^T	CMW 5683; CPC 971	B85	<i>Ca. pauciramosa</i>	CBS 138824 ^T	Soil	Knysna, South Africa	P.W. Crous	MT335093; MT335325; MT335565; MT359786; MT359548; MT412618; MT412856; MT413068	Schoch <i>et al.</i> (1999), Crous (2002), Lombard <i>et al.</i> (2010a), this study
		CMW 2151	–	B85	<i>Ca. pauciramosa</i>	–	<i>E. nitens</i>	South Africa	M.J. Wingfield	MT335094; MT335326; MT335566; MT359787; MT359547; MT412619; MT412857; MT413069	Lombard <i>et al.</i> (2010b), this study
		CMW 7592	–	B85	<i>Ca. pauciramosa</i>	–	<i>E. grandis</i>	Uruguay	M.J. Wingfield	MT335095; MT335327; MT335567; MT359788; MT359548; MT412620; MT412858; MT413070	Lombard <i>et al.</i> (2010b), this study
		CMW 9151	–	B85	<i>Ca. pauciramosa</i>	CMW 9151	<i>A. mearnsii</i>	South Africa	L. Lombard	MT335096; MT335328; MT335568; MT359789; MT359549; MT412621; MT412859; MT413071	Lombard <i>et al.</i> (2010b), this study
		CMW 30823	CPC 416	B85	<i>Ca. pauciramosa</i>	–	<i>E. grandis</i>	South Africa	P.W. Crous	MT335097; MT335329; MT335569; MT359790; MT359550; MT412622; MT412860; MT413072	Crous (2002), Lombard <i>et al.</i> (2010a), this study
		CMW 30875	CPC 415	B85	<i>Ca. pauciramosa</i>	–	<i>Eucalyptus</i> sp.	South Africa	P.W. Crous	MT335098; MT335330; MT335570; MT359791; MT359551; MT412623; MT412861; MT413073	Crous (2002), Lombard <i>et al.</i> (2010a), this study
A110	<i>Ca. penicilloides</i>	CMW 23696 ^T	CBS 174.55; STE-U 2388	B86	<i>Ca. penicilloides</i>	CMW 23696 ^T	<i>Prunus</i> sp.	Hatizyo Island, Japan	M. Ookubu	MT335106; MT335338; MT335578; MT359799; MT359559; MT412631; MT412869; MT413081	Tubaki (1958), Crous (2002), this study
A111	<i>Ca. pentaseptata</i> *	CBS 133349 ^T	CMW 51318	B97	<i>Ca. pseudoreteauidii</i> #	CBS 133349	<i>Eucalyptus</i> hybrid	Hanoi, Bavi, Vietnam	P.Q. Thu	MT335117; MT335352; MT335592; MT359813; MT359573; MT412645; MT412883; MT413094	Crous <i>et al.</i> (2012), this study
		CBS 133351	CMW 51319	B97	<i>Ca. pseudoreteauidii</i> #	–	<i>Macadamia</i> sp.	Hanoi, Bavi, Vietnam	P.Q. Thu	MT335118; MT335353; MT335593; MT359814; MT359574; MT412646; MT412884; MT413095	Crous <i>et al.</i> (2012), this study
A113	<i>Ca. pini</i>	CMW 31209 ^T	CBS 123698	B88	<i>Ca. pini</i>	CMW 31209 ^T	<i>Pinus patula</i>	Buga, Valle del Cauca, Colombia	C.A. Rodas	MT335107; MT335339; MT335579; MT359800; MT359560; MT412632; MT412870; MT413082	Lombard <i>et al.</i> (2010a), this study
A114	<i>Ca. plurilateralis</i>	CBS 111401 ^T	CMW 51178; CPC 1637	B89	<i>Ca. plurilateralis</i>	CBS 111401 ^T	Soil	Ecuador	M.J. Wingfield	N/A; MT335340; MT335580; MT359801; MT359561; MT412633; MT412871; MT413083	Lombard <i>et al.</i> (2016), this study
A115	<i>Ca. pluriramosa</i> *	CMW 31440 ^T	CBS 136976; CERC 1775	B4	<i>Ca. aconidialis</i> #	CMW 31440	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334950; MT335177; MT335416; MT359637; MT359397; N/A; MT412707; N/A	Lombard <i>et al.</i> (2015a), this study

A116	<i>Ca. polizzii</i> *	CBS 123402 ^T	CMW 30872	B85	<i>Ca. pauciramosa</i> [#]	CBS 123402	<i>Arbutus unedo</i>	Carrubba, Sicily, Italy	G. Polizzi	MT335099; MT335331; MT335571; MT359792; MT359552; MT412624; MT412862; MT413074	Lombard <i>et al.</i> (2010b), this study
		CMW 7804	CBS 125270; CPC 2681	B85	<i>Ca. pauciramosa</i> [#]	–	<i>Ca. citrinus</i>	Sicily, Italy	G. Polizzi	MT335100; MT335332; MT335572; MT359793; MT359553; MT412625; MT412863; MT413075	Lombard <i>et al.</i> (2010b), this study
		CMW 10151	CBS 125271; CPC 2771	B85	<i>Ca. pauciramosa</i> [#]	–	<i>Ca. citrinus</i>	Sicily, Italy	G. Polizzi	MT335101; MT335333; MT335573; MT359794; MT359554; MT412626; MT412864; MT413076	Lombard <i>et al.</i> (2010b), this study
A120	<i>Ca. pseudocolhounii</i> *	CMW 27209 ^T	CBS 127195	B36	<i>Ca. eucalypti</i> [#]	CMW 27209	<i>E. dunnii</i>	FuJian, China	M.J. Wingfield	MT335108; MT335341; MT335581; MT359802; MT359562; MT412634; MT412872; MT413084	Chen <i>et al.</i> (2011), this study
		CMW 27213	CBS 127196	B36	<i>Ca. eucalypti</i> [#]	–	<i>E. dunnii</i>	FuJian, China	M.J. Wingfield	MT335109; MT335342; MT335582; MT359803; MT359563; MT412635; MT412873; MT413085	Chen <i>et al.</i> (2011), this study
A123	<i>Ca. pseudokyotensis</i> *	CMW 31439 ^T	CBS 137332; CERC 1774	B4	<i>Ca. aconidialis</i> [#]	CMW 31439	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334951; MT335178; MT335417; MT359638; MT359398; N/A; MT412708; N/A	Lombard <i>et al.</i> (2015a), this study
A125	<i>Ca. pseudomexicana</i>	CBS 130354 ^T	CMW 51313; DISTEF-TCROU1	B94	<i>Ca. pseudomexicana</i>	CBS 130354 ^T	<i>Callistemon</i> sp.	Tunis, Carthage, Tunisia	G. Polizzi	MT335110; MT335343; MT335583; MT359804; MT359564; MT412636; MT412874; MT413086	Lombard <i>et al.</i> (2011), this study
		CBS 130355	CMW 51314; DISTEF-TCROU3	B94	<i>Ca. pseudomexicana</i>	CBS 130355	<i>Callistemon</i> sp.	Tunis, Carthage, Tunisia	G. Polizzi	MT335111; MT335344; MT335584; MT359805; MT359565; MT412637; MT412875; MT413087	Lombard <i>et al.</i> (2011), this study
A126	<i>Ca. pseudonaviculata</i>	CBS 116251 ^T	CMW 51235; CPC 3399; Lynfield 824	B95	<i>Ca. pseudonaviculata</i>	CBS 116251 ^T	<i>Buxus sempervirens</i>	Kumeu, West Auckland, New Zealand	N/A	N/A; MT335345; MT335585; MT359806; MT359566; MT412638; MT412876; MT413088	Crous <i>et al.</i> (2002), Lombard <i>et al.</i> (2016), this study
		CMW 23672	CBS 114417; CPC 10926	B95	<i>Ca. pseudonaviculata</i>	CMW 23672	<i>B. sempervirens</i>	New Zealand	C. Crepel	N/A; MT335346; MT335586; MT359807; MT359567; MT412639; MT412877; MT413089	Lombard <i>et al.</i> (2010a, 2016), this study
A127	<i>Ca. pseudopteridis</i>	CBS 163.28 ^T	CMW 51159; IMI 299579	B96	<i>Ca. pseudopteridis</i>	CBS 163.28 ^T	<i>Washingtonia robusta</i>	USA	C.D. Sherbakoff	MT335112; MT335347; MT335587; MT359808; MT359568; MT412640; MT412878; N/A	Sherbakoff (1928), Alfenas <i>et al.</i> (2015), Lombard <i>et al.</i> (2016), this study
A128	<i>Ca. pseudoreteaudii</i>	CMW 25310 ^T	CBS 123694	B97	<i>Ca. pseudoreteaudii</i>	CMW 25310 ^T	<i>E. urophylla</i> × <i>E. grandis</i>	GuangDong, China	M.J. Wingfield & X.D. Zhou	MT335119; MT335354; MT335594; MT359815; MT359575; MT412647; MT412885; MT413096	Lombard <i>et al.</i> (2010c), this study
		CMW 25292	CBS 123696	B97	<i>Ca. pseudoreteaudii</i>	CMW 25292	<i>E. urophylla</i> × <i>E. grandis</i>	GuangDong, China	M.J. Wingfield & X.D. Zhou	MT335120; MT335355; MT335595; MT359816; MT359576; MT412648; MT412886; MT413097	Lombard <i>et al.</i> (2010c), this study

A129	<i>Ca. pseudoscoparia</i> *	CMW 15218 ^T	CBS 125257	B21	<i>Ca. candelabrum</i> [#]	CMW 15218	<i>E. grandis</i>	Las Golondrinas, Pichincha, Ecuador	M.J. Wingfield	MT334979; MT335209; MT335449; MT359670; MT359430; MT412513; MT412740; MT412961	Lombard <i>et al.</i> (2010a), this study
		CMW 15215	CBS 125255	B21	<i>Ca. candelabrum</i> [#]	–	<i>E. grandis</i>	Las Golondrinas, Pichincha, Ecuador	M.J. Wingfield	MT334980; MT335210; MT335450; MT359671; MT359431; MT412514; MT412741; MT412962	Lombard <i>et al.</i> (2010a), this study
A132	<i>Ca. pseudoturangicola</i> *	CERC 7126 ^T	CBS 142890; CMW 47496	B55	<i>Ca. kyotensis</i> [#]	CERC 7126	Soil	FuZhou, FuJian, China	S.F. Chen	MT335121; MT335356; MT335596; MT359817; MT359577; MT412649; MT412887; MT413098	Li <i>et al.</i> (2017), this study
		CERC 7127	CBS 142891; CMW 47497	B55	<i>Ca. kyotensis</i> [#]	–	Soil	FuZhou, FuJian, China	S.F. Chen	MT335122; MT335357; MT335597; MT359818; MT359578; MT412650; MT412888; MT413099	Li <i>et al.</i> (2017), this study
A133	<i>Ca. pseudouxmalensis</i>	CBS 110924 ^T	CMW 51166; CPC 942	B100	<i>Ca. pseudouxmalensis</i>	CBS 110924 ^T	Soil	Mexico	P.W. Crous	MT335123; MT335358; MT335598; MT359819; MT359579; MT412651; MT412889; MT413100	Lombard <i>et al.</i> (2016), this study
		CBS 110923	CMW 51165; CPC 941	B100	<i>Ca. pseudouxmalensis</i>	CBS 110923	Soil	Mexico	P.W. Crous	MT335124; MT335359; MT335599; MT359820; MT359580; MT412652; MT412890; MT413101	Lombard <i>et al.</i> (2016), this study
		CBS 115677	CMW 51228; CPC 943	B100	<i>Ca. pseudouxmalensis</i>	CBS 115677	Soil	Mexico	P.W. Crous	MT335125; MT335360; MT335600; MT359821; MT359581; MT412653; MT412891; MT413102	Lombard <i>et al.</i> (2016), this study
A135	<i>Ca. pseudoyunnanensis</i> *	CERC 5376 ^T	CBS 142892; CMW 47655	B120	<i>Ca. yunnanensis</i> [#]	CERC 5376	Soil (<i>Eucalyptus</i> plantation)	PuEr, YunNan, China	S.F. Chen & J.Q. Li	MT335126; MT335361; MT335601; MT359822; MT359582; MT412654; MT412892; MT413103	Li <i>et al.</i> (2017), this study
		CERC 5377	CBS 142893; CMW 47656	B120	<i>Ca. yunnanensis</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	PuEr, YunNan, China	S.F. Chen & J.Q. Li	MT335127; MT335362; MT335602; MT359823; MT359583; MT412655; MT412893; MT413104	Li <i>et al.</i> (2017), this study
		CERC 5378	CBS 142894; CMW 47657	B120	<i>Ca. yunnanensis</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	PuEr, YunNan, China	S.F. Chen & J.Q. Li	MT335128; MT335363; MT335603; MT359824; MT359584; MT412656; MT412894; N/A	Li <i>et al.</i> (2017), this study
A137	<i>Ca. putriramosa</i>	CBS 111449 ^T	CMW 51181; CPC 1951	B103	<i>Ca. putriramosa</i>	CBS 111449 ^T	<i>Eucalyptus</i> cutting	Brazil	A.C. Alfenas	MT335129; MT335364; MT335604; MT359825; MT359585; MT412657; MT412895; MT413105	Lombard <i>et al.</i> (2016), this study
		CBS 111470	CMW 51182; CPC 1940	B103	<i>Ca. putriramosa</i>	CBS 111470	Soil	Brazil	A.C. Alfenas	MT335130; MT335365; MT335605; MT359826; MT359586; MT412658; MT412896; MT413106	Lombard <i>et al.</i> (2016), this study
		CBS 111477	CMW 51183; CPC 1928	B103	<i>Ca. putriramosa</i>	CBS 111477	Soil	Brazil	A.C. Alfenas	MT335131; MT335366; MT335606; MT359827; MT359587; MT412659; MT412897; MT413107	Lombard <i>et al.</i> (2016), this study

A138	<i>Ca. queenslandica</i>	CMW 30604 ^T	CBS 112146; CPC 3213	B104	<i>Ca. queenslandica</i>	CMW 30604 ^T	<i>E. urophylla</i>	Lannercost, Queensland, Australia	B. Brown	MT335132; MT335367; MT335607; MT359828; MT359588; MT412660; MT412898; MT413108	Kang <i>et al.</i> (2001a), Lombard <i>et al.</i> (2010c), this study
		CMW 30603	CBS 112155; CPC 3210	B104	<i>Ca. queenslandica</i>	CMW 30603	<i>E. pellita</i>	Lannercost, Queensland, Australia	P.Q Thu & K.M. Old	MT335133; MT335368; MT335608; MT359829; MT359589; MT412661; MT412899; MT413109	Kang <i>et al.</i> (2001a), Lombard <i>et al.</i> (2010c), this study
A140	<i>Ca. reteaudii</i>	CMW 30984 ^T	CBS 112144; CPC 3201	B106	<i>Ca. reteaudii</i>	CMW 30984 ^T	<i>E. camaldulensis</i>	Chon Thanh, Binh Phuoc, Vietnam	M.J. Dudzinski & P.Q. Thu	MT335135; MT335370; MT335610; MT359831; MT359591; MT412663; MT412901; MT413111	Kang <i>et al.</i> (2001a), Crous (2002), Crous <i>et al.</i> (2006), this study
		CMW 16738	CBS 112143; CPC 3200	B106	<i>Ca. reteaudii</i>	CMW 16738	<i>Eucalyptus</i> sp. (leaves)	Binh Phuoc, Vietnam	M.J. Dudzinski & P.Q. Thu	MT335136; MT335371; MT335611; MT359832; MT359592; MT412664; MT412902; MT413112	Kang <i>et al.</i> (2001a), Crous (2002), Crous <i>et al.</i> (2006), this study
A142	<i>Ca. rumohrae</i>	CMW 23697 ^T	CBS 111431; CPC 1716; UFV 218	B108	<i>Ca. rumohrae</i>	CMW 23697 ^T	<i>Rumohra adiantiformis</i>	Volkan, Panama	J.W. Miller & R.M. Leahy	MT335137; MT335372; MT335612; MT359833; MT359593; N/A; MT412903; MT413113	El-Gholl <i>et al.</i> (1997), Crous (2002), Crous <i>et al.</i> (2006), this study
		CMW 30989	CBS 109062; CPC 1603	B108	<i>Ca. rumohrae</i>	CMW 30989	<i>Adiantum</i> sp.	The Netherlands	R. Pieters	MT335138; MT335373; MT335613; MT359834; MT359594; MT412665; MT412904; MT413114	El-Gholl <i>et al.</i> (1997), Crous (2002), Crous <i>et al.</i> (2006), this study
A143	<i>Ca. seminaria</i> *	CMW 31450 ^T	CBS 136632; CERC 1785	B85	<i>Ca. pauciramosa</i> [#]	CMW 31450	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335102; MT335334; MT335574; MT359795; MT359555; MT412627; MT412865; MT413077	Lombard <i>et al.</i> (2015a), this study
		CMW 31489	CBS 136639; CERC 1824	B85	<i>Ca. pauciramosa</i> [#]	–	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335103; MT335335; MT335575; MT359796; MT359556; MT412628; MT412866; MT413078	Lombard <i>et al.</i> (2015a), this study
A145	<i>Ca. spathiphylli</i>	CMW 16742 ^T	ATCC 44730; CBS 114540; STE-U 2185	B110	<i>Ca. spathiphylli</i>	CMW 16742 ^T	<i>Spathiphyllum</i> sp.	Florida, USA	C.L. Schoulties	N/A; MT335374; MT335614; MT359835; MT359595; MT412666; MT412905; MT413115	El-Gholl <i>et al.</i> (1992), Crous (2002), Lombard <i>et al.</i> (2010a, 2016), this study
		CMW 30997	CBS 116168; CPC 789	B110	<i>Ca. spathiphylli</i>	CMW 30997	<i>Spathiphyllum</i> sp.	Switzerland	L. Petrini	N/A; MT335375; MT335615; MT359836; MT359596; MT412667; MT412906; MT413116	El-Gholl <i>et al.</i> (1992), Crous (2002), Lombard <i>et al.</i> (2016), this study
A146	<i>Ca. spathulata</i>	CMW 16744 ^T	CBS 555.92	B111	<i>Ca. spathulata</i>	CMW 16744 ^T	<i>E. viminalis</i>	Brazil	N.E. El-Gholl	MT335139; MT335376; MT335616; MT359837; MT359597; MT412668; MT412907; MT413117	Crous & Kang (2001), Crous (2002), Lombard <i>et al.</i> (2016), this study
A147	<i>Ca. sphaeropedunculata</i> *	CMW 31390 ^T	CBS 136081; CERC 1725	B4	<i>Ca. aconidialis</i> [#]	CMW 31390	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT334952; MT335179; MT335418; MT359639; MT359399; MT412485; MT412709; N/A	Lombard <i>et al.</i> (2015a), this study
A148	<i>Ca. stipitata</i> *	CBS 112513 ^T	CMW 51197; CPC 3851	B111	<i>Ca. spathulata</i> [#]	CBS 112513	<i>Eucalyptus</i> sp.	Colombia	M.J. Wingfield	MT335140; MT335377; MT335617; MT359838; MT359598; MT412669; MT412908; MT413118	Lombard <i>et al.</i> (2016), this study

A149	<i>Ca. sulawesiensis</i> *	CMW 14878 ^T	CBS 125277	B44	<i>Ca. hawksworthii</i> [#]	CMW 14878	<i>Eucalyptus</i> sp.	Sulawesi, Indonesia	M.J. Wingfield	MT335141; MT335378; MT335618; MT359839; MT359599; MT412670; MT412909; MT413119	Lombard <i>et al.</i> (2010a), this study
		CMW 14879	CBS 125253	B44	<i>Ca. hawksworthii</i> [#]	–	<i>Eucalyptus</i> sp.	Sulawesi, Indonesia	M.J. Wingfield	MT335142; MT335379; MT335619; MT359840; MT359600; MT412671; MT412910; MT413120	Lombard <i>et al.</i> (2010a), this study
A150	<i>Ca. sumatrensis</i>	CMW 23698 ^T	CBS 112829; CPC 4518	B112	<i>Ca. sumatrensis</i>	CMW 23698 ^T	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT335145; MT335382; MT335622; MT359843; MT359603; MT412674; MT412913; N/A	Crous <i>et al.</i> (2004), this study
		CMW 30987	CBS 112934; CPC 4516	B112	<i>Ca. sumatrensis</i>	CMW 30987	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT335146; MT335383; MT335623; MT359844; MT359604; MT412675; MT412914; N/A	Crous <i>et al.</i> (2004), this study
A153	<i>Ca. tereticornis</i> *	CBS 111301 ^T	CMW 51176; CPC 1429	B79	<i>Ca. ovata</i> [#]	CBS 111301	<i>E. tereticornis</i>	Tucuruí, Pará, Brazil	P.W. Crous	MT335077; MT335309; MT335549; MT359770; MT359530; N/A; MT412840; MT413054	Lombard <i>et al.</i> (2016), this study
A154	<i>Ca. terrae-reginae</i> *	CMW 30601 ^T	CBS 112151; CPC 3202; DFR100150	B104	<i>Ca. queenslandica</i> [#]	CMW 30601	<i>E. urophylla</i>	Cardwell, Queensland, Australia	C. Hanwood	MT335134; MT335369; MT335609; MT359830; MT359590; MT412662; MT412900; MT413110	Crous (2002), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010c), this study
		CMW 30602	CBS 112634; CPC 4233; Lynfield 417	B63	<i>Ca. lombardiana sp. nov.</i>	CMW 30602 ^T	<i>Xanthorrhoea australis</i>	Victoria, Australia	T. Baigent	MT335156; MT335395; MT335635; MT359856; MT359616; MT412686; MT412926; MT413133	Crous (2002), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010c), this study
A155	<i>Ca. terrestris</i> *	CMW 35180 ^T	CBS 136642; CERC 1856	B22	<i>Ca. cerciana</i> [#]	CMW 35180	Soil (<i>Eucalyptus</i> plantation)	GuangDong, China	X. Mou & R. Chang	MT334986; MT335216; MT335456; MT359677; MT359437; MT412520; MT412747; MT412968	Lombard <i>et al.</i> (2015a), this study
		CMW 35178	CBS 136645; CERC 1854	B22	<i>Ca. cerciana</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	GuangDong, China	X. Mou & R. Chang	MT334987; MT335217; MT335457; MT359678; MT359438; MT412521; MT412748; MT412969	Lombard <i>et al.</i> (2015a), this study
		CMW 35364	CBS 136643; CERC 1868	B22	<i>Ca. cerciana</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	GuangDong, China	X. Mou & R. Chang	MT334988; MT335218; MT335458; MT359679; MT359439; MT412522; MT412749; MT412970	Lombard <i>et al.</i> (2015a), this study
		CMW 37974	CBS 136651; CERC 1937	B22	<i>Ca. cerciana</i> [#]	–	Soil	GuangDong, China	X. Mou & R. Chang	MT334989; MT335219; MT335459; MT359680; MT359440; MT412523; MT412750; MT412971	Lombard <i>et al.</i> (2015a), this study
A157	<i>Ca. tetraramosa</i> *	CMW 31474 ^T	CBS 136635; CERC 1809	B85	<i>Ca. pauciramosa</i> [#]	CMW 31474	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335104; MT335336; MT335576; MT359797; MT359557; MT412629; MT412867; MT413079	Lombard <i>et al.</i> (2015a), this study

		CMW 31476	CBS 136637; CERC 1811	B85	<i>Ca. pauciramosa</i> [#]	–	<i>E. urophylla</i> × <i>E. grandis</i>	ZhanJiang, GuangDong, China	G. Zhao	MT335105; MT335337; MT335577; MT359798; MT359558; MT412630; MT412868; MT413080	Lombard <i>et al.</i> (2015a), this study
A158	<i>Ca. tonkinensis</i>	CMW 47430 ^T	CBS 143576	B115	<i>Ca. tonkinensis</i>	CMW 47430 ^T	Soil (<i>Eucalyptus</i> plantation)	Bavi, Hanoi, Vietnam	N.Q. Pham & T.Q. Pham	MT335147; MT335384; MT335624; MT359845; MT359605; MT412676; MT412915; MT413122	Pham <i>et al.</i> (2019), this study
A159	<i>Ca. tropicalis</i> [*]	CBS 116271 ^T	CMW 51236; CPC 3559	B6	<i>Ca. amazonica</i> [#]	CBS 116271	<i>Eucalyptus</i> sp.	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT335148; MT335385; MT335625; MT359846; MT359606; MT412677; MT412916; MT413123	Lombard <i>et al.</i> (2016), this study
		CBS 116242	CMW 51231; CPC 3543	B6	<i>Ca. amazonica</i> [#]	–	<i>Eucalyptus</i> sp.	Amazon, Brazil	P.W. Crous & A.C. Alfenas	MT334962; MT335189; MT335428; MT359649; MT359409; MT412492; MT412719; MT412942	Lombard <i>et al.</i> (2016), this study
A160	<i>Ca. tucuruensis</i> [*]	CBS 114755 ^T	CMW 51827; CPC 1403	B79	<i>Ca. ovata</i> [#]	CBS 114755	<i>E. tereticornis</i>	Tucuruí, Pará, Brazil	P.W. Crous	MT335078; MT335310; MT335550; MT359771; MT359531; N/A; MT412841; MT413055	Marin-Felix <i>et al.</i> (2017), this study
A161	<i>Ca. tunisiana</i> [*]	CBS 130357 ^T	CMW 51316; DISTEF-TCL1	B94	<i>Ca. pseudomexicana</i> [#]	CBS 130357	<i>Ca. laevis</i>	Tunis, Carthage, Tunisia	G. Polizzi	MT335149; MT335386; MT335626; MT359847; MT359607; MT412678; MT412917; MT413124	Lombard <i>et al.</i> (2011), this study
		CBS 130356	CMW 51315; DISTEF- TCROU2	B94	<i>Ca. pseudomexicana</i> [#]	–	<i>Callistemon</i> sp.	Tunis, Carthage, Tunisia	G. Polizzi	MT335150; MT335387; MT335627; MT359848; MT359608; MT412679; MT412918; MT413125	Lombard <i>et al.</i> (2011), this study
A162	<i>Ca. turangicola</i> [*]	CMW 31411 ^T	CBS 136077	B55	<i>Ca. kyotensis</i> [#]	CMW 31411	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Zhou, G. Zhao & F. Han	MT335151; MT335388; MT335628; MT359849; MT359609; N/A; MT412919; MT413126	Lombard <i>et al.</i> (2015a), this study
		CMW 35410	CBS 136093	B55	<i>Ca. kyotensis</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	GuangXi, China	X. Mou & R. Chang	MT335152; MT335389; MT335629; MT359850; MT359610; MT412680; MT412920; MT413127	Lombard <i>et al.</i> (2015a), this study
A164	<i>Ca. uxmalensis</i>	CBS 110925 ^T	CMW 51167; CPC 945	B117	<i>Ca. uxmalensis</i>	CBS 110925 ^T	Soil	Uxmal, Mexico	P.W. Crous	MT335153; MT335390; MT335630; MT359851; MT359611; MT412681; MT412921; MT413128	Lombard <i>et al.</i> (2016), this study
		CBS 110919	CMW 51164; CPC 928	B117	<i>Ca. uxmalensis</i>	CBS 110919	Soil	Uxmal, Mexico	P.W. Crous	MT335154; MT335391; MT335631; MT359852; MT359612; MT412682; MT412922; MT413129	Lombard <i>et al.</i> (2016), this study
A165	<i>Ca. variabilis</i>	CMW 3187 ^T	AR2675; CBS 114677; CPC 2436	B118	<i>Ca. variabilis</i>	CMW 3187 ^T	<i>Schefflera</i> <i>morototoni</i>	Pará, Brazil	F.C. de Albuquerque	N/A; MT335392; MT335632; MT359853; MT359613; MT412683; MT412923; MT413130	Crous <i>et al.</i> (1993b), Crous (2002), Lombard <i>et al.</i> (2010a, 2016), this study

		CMW 2914	CBS 112691; CPC 2506	B118	<i>Ca. variabilis</i>	CMW 2914	<i>Theobroma grandiflorum</i>	Pará, Brazil	F. Carneiro	N/A; MT335393; MT335633; MT359854; MT359614; MT412684; MT412924; MT413131	Crous <i>et al.</i> (1993b), Crous (2002), Lombard <i>et al.</i> (2010a, 2016), this study
A166	<i>Ca. vegrandis</i> *	CMW 48245 ^T	CBS 143565	B31	<i>Ca. curvispora</i> [#]	CMW 48245	Soil (<i>Eucalyptus</i> plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT335003; MT335233; MT335473; MT359694; MT359454; MT412537; MT412764; N/A	Pham <i>et al.</i> (2019), this study
		CMW 48246	CBS 143566	B31	<i>Ca. curvispora</i> [#]	–	Soil (<i>Eucalyptus</i> plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT335004; MT335234; MT335474; MT359695; MT359455; MT412538; MT412765; N/A	Pham <i>et al.</i> (2019), this study
A167	<i>Ca. venezuelana</i>	CBS 111052 ^T	CMW 51173; CPC 1183	B119	<i>Ca. venezuelana</i>	CBS 111052 ^T	Soil	Acarigua, Venezuela	M.J. Wingfield	MT335155; MT335394; MT335634; MT359855; MT359615; MT412685; MT412925; MT413132	Lombard <i>et al.</i> (2016), this study
A168	<i>Ca. yunnanensis</i>	CERC 5339 ^T	CBS 142897; CMW 47644	B120	<i>Ca. yunnanensis</i>	CERC 5339 ^T	Soil (<i>Eucalyptus</i> plantation)	YunNan, China	S.F. Chen, J.Q. Li & G.Q. Li	MT335157; MT335396; MT335636; MT359857; MT359617; MT412687; MT412927; MT413134	Li <i>et al.</i> (2017), this study
		CERC 5337	CBS 142895; CMW 47642	B120	<i>Ca. yunnanensis</i>	CERC 5337	Soil (<i>Eucalyptus</i> plantation)	YunNan, China	S.F. Chen, J.Q. Li & G.Q. Li	MT335158; MT335397; MT335637; MT359858; MT359618; MT412688; MT412928; MT413135	Li <i>et al.</i> (2017), this study
A169	<i>Ca. zuluensis</i> *	CMW 9188 ^T	CBS 125268	B85	<i>Ca. pauciramosa</i> [#]	CMW 9188	<i>E. grandis</i>	Kwambonambi, KwaZulu-Natal, South Africa	L. Lombard	MT335159; MT335398; MT335638; MT359859; MT359619; MT412689; MT412929; MT413136	Lombard <i>et al.</i> (2010b), this study

¹Codes (A1 to A169) of the 169 *Calonectria* species before revision.

²*Calonectria* species names before revision.

³AR: Amy Y. Rossman working collection; ATCC: American Type Culture Collection, Virginia, USA; CBS: Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands; CERC: China Eucalypt Research Centre, ZhanJiang, Guangdong Province, China; CMW: Culture collection of the Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria, South Africa; CPC: Pedro Crous working collection housed at Westerdijk Fungal Biodiversity Institute; HGUP: Plant Pathology Herbarium of Gui Zhou University, GuiYang 550025, China; IMI: International Mycological Institute, CABI Bioscience, Egham, Boreham Lane, UK; LPF: Laboratório de Patologia Florestal, Universidade Federal de Viçosa, Viçosa, Brazil; MUCL: Mycotheque, Laboratoire de Mycologie Systematique et Appliquee, l'Universite, Louvain-la-Neuve, Belgium; PPRI: Plant Protection Research Institute, Pretoria, South Africa; STE-U: Department of Plant Pathology, University of Stellenbosch, South Africa; UFV: Universidade Federal de Viçosa, Viçosa, Brazil.

⁴Re-sequenced isolates were obtained from culture collections of CBS, CMW and CERC, and the isolate numbers were appeared in the phylogenetic trees in this study.

⁵T: ex-type isolates of the *Calonectria* species before revision.

⁶Codes (B1 to B120) of the 120 *Calonectria* species after revision.

⁷The 120 *Calonectria* species after revision, species link to the key isolates including the ex-types are in bold.

⁸Key isolates of the 120 *Calonectria* species after revision

⁹T: ex-type isolates of the *Calonectria* species after revision.

¹⁰*act*: actin; *cmdA*: calmodulin; *his3*: histone H3; ITS: the internal transcribed spacer regions 1 and 2 and the 5.8S gene of the ribosomal RNA; LSU: 28S large subunit RNA gene; *rpb2*: the second

largest subunit of RNA polymerase; *tef1*: translation elongation factor 1-alpha; *tub2*: β -tubulin.

¹¹N/A: information are not available.

*Species were synonymized.

#Species names after synonymizing.

⁸Species name after re-identification.

Table S2. Isolates and sequences from previous studies used in this study.

Code A ¹	Previous species name ²	Isolates number ^{3,4}	Other collection number ³	Code B ⁵	Accepted species name ⁶	Isolates after species revision ^{7,8}	Hosts	Area of occurrence	Collector	GenBank accession Numbers ⁹ <i>act</i> ; <i>cmdA</i> ; <i>his3</i> ; ITS; LSU; <i>rpb2</i> ; <i>tef1</i> ; <i>tub2</i>	References
A8	<i>Calonectria angustata</i>	CBS 112133	CMW 30983; CPC 3152; P99-1321	B7	<i>Ca. angustata</i>	CBS 112133	<i>Tillandsia capitata</i>	Sarasota nursery, Florida, USA	R.M. Leahy	GQ280427; GQ267362; DQ190695; GQ280549; GQ280670; KY653360; FJ918552; DQ190593	Crous <i>et al.</i> (2000, 2006), Lombard <i>et al.</i> (2010a), Marin-Felix <i>et al.</i> (2017)
A10	<i>Ca. asiatica</i>	CBS 114073 ^T	CMW 23782; CPC 3900	B8	<i>Ca. asiatica</i>	CBS 114073 ^T	Debris (leaf litter)	Prathet Thai, Thailand	N.L. Hywel-Jones	GQ280428; AY725741; AY725658; GQ280550; GQ280672; N/A ¹⁰ ; AY725705; AY725616	Crous <i>et al.</i> (2004), Lombard <i>et al.</i> (2010a)
A13	<i>Ca. avesiculata</i>	CBS 313.92 ^T	ATCC 38226; CMW 23670; CPC 2373	B11	<i>Ca. avesiculata</i>	CBS 313.92 ^T	<i>Ilex vomitoria</i>	Cairo, Georgia, USA	S.A. Alfieri	GQ280431; GQ267364; DQ190620; GQ280553; GQ280675; N/A; GQ267294; AF333392	Schubert <i>et al.</i> (1989), Crous (2002), Lombard <i>et al.</i> (2010a)
A19	<i>Ca. brassiana</i>	CBS 134855 ^T	LPF378	B15	<i>Ca. brassiana</i>	CBS 134855 ^T	Soil (<i>Eucalyptus brassiana</i> plantation)	Teresina, Piauí, Brazil	R.F. Alfenas	N/A; KM396056; KM396139; N/A; N/A; N/A; KM395882; KM395969	Alfenas <i>et al.</i> (2015)
		CBS 134856	LPF379	B15	<i>Ca. brassiana</i>	CBS 134856	Soil (<i>E. brassiana</i> plantation)	Teresina, Piauí, Brazil	R.F. Alfenas	N/A; KM396057; KM396140; N/A; N/A; N/A; KM395883; KM395970	Alfenas <i>et al.</i> (2015)
A21	<i>Ca. brassicicola</i>	CBS 112841 ^T	CMW 51206; CPC 4552	B17	<i>Ca. brassicicola</i>	CBS 112841 ^T	Soil (<i>Brassica</i> sp.)	Indonesia	M.J. Wingfield	N/A; KX784561; N/A; N/A; N/A; N/A; KX784689; KX784619	Lombard <i>et al.</i> (2016)
A32	<i>Ca. colhounii</i>	CBS 293.79 ^T	CMW 30999	B27	<i>Ca. colhounii</i>	CBS 293.79 ^T	<i>Camellia sinensis</i>	Mauritius	A. Peerally	GQ280443; GQ267373; DQ190639; GQ280565; GQ280687; KY653376; GQ267301; DQ190564	Peerally (1973), Crous (2002), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2010a)
A33	<i>Ca. colombiana</i>	CBS 115127 ^T	CMW 30871; CPC 1160	B28	<i>Ca. colombiana</i>	CBS 115127 ^T	Soil	La Selva, Colombia	M.J. Wingfield	GQ280538; GQ267455; FJ972442; GQ280660; GQ280782; N/A; FJ972492; FJ972423	Schoch <i>et al.</i> (1999), Crous (2002), Lombard <i>et al.</i> (2010a, b)
		CBS 115638	CMW 30766; CPC 1161	B28	<i>Ca. colombiana</i>	CBS 115638	Soil	La Selva, Colombia	M.J. Wingfield	GQ280539; GQ267456; FJ972441; GQ280661; GQ280783; N/A; FJ972491; FJ972422	Schoch <i>et al.</i> (1999), Crous (2002), Lombard <i>et al.</i> (2010a, b)
A39	<i>Ca. duoramosa</i>	CBS 134656 ^T	LPF434	B34	<i>Ca. duoramosa</i>	CBS 134656 ^T	Soil (tropical rainforest)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396027; KM396110; N/A; N/A; N/A; KM395853; KM395940	Alfenas <i>et al.</i> (2015)

		LPF453	-	B34	<i>Ca. duoramosa</i>	LPF453	Soil (<i>Eucalyptus</i> plantation)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396028; KM396111; N/A; N/A; N/A; KM395854; KM395941	Alfenas <i>et al.</i> (2015)
A44	<i>Ca. eucalypticola</i>	CBS 134847 ^T	LPF124	B37	<i>Ca. eucalypticola</i>	CBS 134847 ^T	<i>Eucalyptus</i> sp. (seeding)	Santa Barbara, Minas Gerais state, Brazil	A.C. Alfenas	N/A; KM396051; KM396134; N/A; N/A; N/A; KM395877; KM395964	Alfenas <i>et al.</i> (2015)
		CBS 134846	LPF121	B37	<i>Ca. eucalypticola</i>	CBS 134846	<i>Eucalyptus</i> sp. (leaf)	Eunapolis, Bahia, Brazil	A.C. Alfenas	N/A; KM396050; KM396133; N/A; N/A; N/A; KM395876; KM395963	Alfenas <i>et al.</i> (2015)
A48	<i>Ca. fragariae</i>	CBS 133607 ^T	LPP040	B38	<i>Ca. fragariae</i>	CBS 133607 ^T	<i>Fragaria</i> x <i>ananassa</i>	Santa Maria do Jetibá, Espírito Santo, Brazil	U.P. Lopes	N/A; KM998966; KM998964; N/A; N/A; N/A; KM998963; KM998965	Lopes <i>et al.</i> (2017)
		LPF141.1	-	B38	<i>Ca. fragariae</i>	LPF141.1	<i>Fragaria</i> x <i>ananassa</i>	Santa Maria do Jetibá, Espírito Santo, Brazil	U.P. Lopes	N/A; KX500191; KX500194; N/A; N/A; N/A; KX500197; KX500195	Lopes <i>et al.</i> (2017)
		LPF141.2	-	B38	<i>Ca. fragariae</i>	LPF141.2	<i>Fragaria</i> x <i>ananassa</i>	Santa Maria do Jetibá, Espírito Santo, Brazil	U.P. Lopes	N/A; KX500192; KX500193; N/A; N/A; N/A; KX500198; KX500196	Lopes <i>et al.</i> (2017)
A50	<i>Ca. glaebricola</i>	CBS 134852 ^T	LPF406	B40	<i>Ca. glaebricola</i>	CBS 134852 ^T	Soil (<i>Eucalyptus</i> plantation)	Martinho Campos, Minas Gerais, Brazil	A.C. Alfenas	N/A; KM396053; KM396136; N/A; N/A; N/A; KM395879; KM395966	Alfenas <i>et al.</i> (2015)
		CBS 134853	LPF407	B40	<i>Ca. glaebricola</i>	CBS 134853	<i>Eucalyptus</i> sp. (leaf)	Tocantins, Bico do Papagaio, Brazil	R.F. Alfenas	N/A; KM396054; KM396137; N/A; N/A; N/A; KM395880; KM395967	Alfenas <i>et al.</i> (2015)
A53	<i>Ca. gracilis</i>	CBS 111807 ^T	AR2677; CMW 51189; PPRI 4176; STE-U 2634	B43	<i>Ca. gracilis</i>	CBS 111807 ^T	<i>Manilkara</i> <i>zapota</i>	Pará, Brazil	F. Carneiro de Albuquerque	GQ280488; GQ267407; DQ190646; GQ280610; GQ280732; KY653390; GQ267323; AF232858	Crous <i>et al.</i> (1993c, 2006), Crous (2002), Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
		CBS 111284	CMW 51175; CPC 1483	B43	<i>Ca. gracilis</i>	CBS 111284	Soil	Imbrapa, Brazil	P.W. Crous	GQ280489; GQ267408; DQ190647; GQ280611; GQ280733; KY653389; GQ267324; DQ190567	Crous <i>et al.</i> (1993c, 2006), Crous (2002), Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
A57	<i>Ca. henricotiae</i>	CBS 138102 ^T	CB045	B45	<i>Ca. henricotiae</i>	CBS 138102 ^T	<i>Buxus</i> <i>sempervirens</i>	Lokeren, East Flanders, Belgium	B. Gehequiere & K. Heungens	N/A; KF815157; KF815185; JX535322; N/A; N/A; N/A; JX535308	Gehequiere <i>et al.</i> (2015)
		CB041	-	B45	<i>Ca. henricotiae</i>	CB041	<i>B. sempervirens</i>	Lokeren, East Flanders, Belgium	B. Gehequiere & K. Heungens	N/A; KF815156; KF815184; N/A; N/A; N/A; N/A; KF815129	Gehequiere <i>et al.</i> (2015)

A59	<i>Ca. hodgesii</i> *	CBS 133609 ^T	LPF245	B14	<i>Ca. brasiliensis</i> [#]	CBS 133609	<i>Anadenanthera peregrina</i>	Viçosa, Minas Gerais, Brazil	R.F. Alfenas	N/A; KC491222; N/A; N/A; N/A; N/A; KC491225; KC491228	Alfenas <i>et al.</i> (2013b, 2015)
		CBS 133608	LPF244	B14	<i>Ca. brasiliensis</i> [#]	–	<i>Piptadenia gonoacantha</i>	Viçosa, Minas Gerais, Brazil	R.F. Alfenas	N/A; KC491221; N/A; N/A; N/A; N/A; KC491224; KC491227	Alfenas <i>et al.</i> (2013b, 2015)
A67	<i>Ca. indusiata</i>	CBS 144.36 ^T	CMW 23699	B53	<i>Ca. indusiata</i>	CBS 144.36 ^T	<i>Camellia sinensis</i>	Sri lanka	N/A	GQ280536; GQ267453; GQ267262; GQ280658; GQ280780; KY653396; GQ267332; GQ267239	Crous (2002), Lombard <i>et al.</i> (2010a, 2016), Marin-Felix <i>et al.</i> (2017)
		CBS 114684	CMW 51213; CPC 2446; UFV16	B53	<i>Ca. indusiata</i>	CBS 114684	<i>Rhododendron</i> sp.	Florida, USA	N.E. El-Gholl	GQ280537; GQ267454; DQ190653; GQ280659; GQ280781; N/A; GQ267333; AF232862	Crous <i>et al.</i> (1999, 2006), Crous (2002)
A70	<i>Ca. lageniformis</i>	CBS 111324 ^T	CMW 51177; CPC 1473	B56	<i>Ca. lageniformis</i>	CBS 111324 ^T	<i>Eucalyptus</i> sp. (leaf)	Rivière Noire, Mauritius	H. Smith	N/A; KX784574; N/A; KY653256; KY653312; KY653400; KX784702; KX784632	Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
A83	<i>Ca. maranhensis</i>	CBS 134811 ^T	LPF142	B67	<i>Ca. maranhensis</i>	CBS 134811 ^T	<i>Eucalyptus</i> sp. (leaf)	Açailandia, Maranhao, Brazil	A.C. Alfenas	N/A; KM396035; KM396118; N/A; N/A; N/A; KM395861; KM395948	Alfenas <i>et al.</i> (2015)
		CBS 134812	LPF143	B67	<i>Ca. maranhensis</i>	CBS 134812	<i>Eucalyptus</i> sp. (leaf)	Açailandia, Maranhao, Brazil	A.C. Alfenas	N/A; KM396036; KM396119; N/A; N/A; N/A; KM395862; KM395949	Alfenas <i>et al.</i> (2015)
A84	<i>Ca. metrosideri</i>	CBS 133603 ^T	LPF101	B68	<i>Ca. metrosideri</i>	CBS 133603 ^T	<i>Metrosideros polymorpha</i>	Viçosa, Minas Gerais state, Brazil	R.F. Alfenas	N/A; KC294304; KC294307; N/A; N/A; N/A; KC294310; KC294313	Alfenas <i>et al.</i> (2013a, 2015)
A85	<i>Ca. mexicana</i>	CBS 110918 ^T	CMW 9055; STE-U 927	B69	<i>Ca. mexicana</i>	CBS 110918 ^T	Soil	Uxmal, Yucatan, Mexico	M.J. Wingfield	GQ280474; GQ267396; FJ972460; GQ280596; GQ280718; KY653412; FJ972526; AF210863	Schoch <i>et al.</i> (1999), Crous (2002), Lombard <i>et al.</i> (2010a), Marin-Felix <i>et al.</i> (2017)
A88	<i>Ca. monticola</i>	CBS 140645 ^T	CPC 28835	B70	<i>Ca. monticola</i>	CBS 140645 ^T	Soil	Chiang Mai, Thailand	P.W. Crous	N/A; KT964771; N/A; KT964775; KT983443; N/A; KT964773; KT964769	Crous <i>et al.</i> (2015)
		CPC 28836	–	B70	<i>Ca. monticola</i>	CPC 28836	Soil	Chiang Mai, Thailand	P.W. Crous	N/A; KT964772; N/A; KT964776; KT983444; N/A; KT964774; KT964770	Crous <i>et al.</i> (2015)
A91	<i>Ca. multinaviculata</i>	CBS 134858 ^T	LPF233	B72	<i>Ca. multinaviculata</i>	CBS 134858 ^T	Soil (<i>Eucalyptus</i> plantation)	Mucuri, Bahia, Brazil	E. Zauza	N/A; KM396072; KM396155; N/A; N/A; N/A; KM395898; KM395985	Alfenas <i>et al.</i> (2015)
		CBS 134859	LPF418	B72	<i>Ca. multinaviculata</i>	CBS 134859	Soil (<i>Eucalyptus</i> plantation)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396073; KM396156; N/A; N/A; N/A; KM395899; KM395986	Alfenas <i>et al.</i> (2015)

A95	<i>Ca. naviculata</i>	CBS 101121 ^T	CMW 30974	B75	<i>Ca. naviculata</i>	CBS 101121	Leaf litter	Joao Pessoa, Brazil	R.F. Castaneda	GQ280478; GQ267399; GQ267252; GQ280600; GQ280722; KM232309; GQ267317; GQ267211	Lombard <i>et al.</i> (2010a, 2015b)
		CBS 116080	CMW 16723; STE-U 627	B75	<i>Ca. naviculata</i>	CBS 116080	Soil	Manaus, Amazonas, Brazil	M.J. Wingfield	GQ280477; GQ267398; GQ267251; GQ280599; GQ280721; KY653417; GQ267316; AF333409	Crous <i>et al.</i> (1997a), Crous (2002), Lombard <i>et al.</i> (2010a), Marin-Felix <i>et al.</i> (2017)
A97	<i>Ca. nemoricola</i>	CBS 134837 ^T	LPF085	B76	<i>Ca. nemoricola</i>	CBS 134837 ^T	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396066; KM396149; N/A; N/A; N/A; KM395892; KM395979	Alfenas <i>et al.</i> (2015)
		CBS 134838	LPF090	B76	<i>Ca. nemoricola</i>	CBS 134838	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396067; KM396150; N/A; N/A; N/A; KM395893; KM395980	Alfenas <i>et al.</i> (2015)
A104	<i>Ca. paracolhounii</i>	CBS 114679 ^T	CMW 51212; CPC 2445	B81	<i>Ca. paracolhounii</i>	CBS 114679 ^T	N/A	USA	A.Y. Rossman	N/A; KX784582; N/A; KY653268; KY653324; KY653423; KX784714; KX784644	Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
		CBS 114705	CMW 51215; CPC 2423	B81	<i>Ca. paracolhounii</i>	CBS 114705	<i>Annona reticulata</i> (fruit)	Australia	D. Hutton	N/A; N/A; N/A; KY653269; KY653325; KY653424; KX784715; KX784645	Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
A105	<i>Ca. paraensis</i>	CBS 134669 ^T	LPF430	B82	<i>Ca. paraensis</i>	CBS 134669 ^T	Soil (<i>Eucalyptus</i> plantation)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396011; KM396094; N/A; N/A; N/A; KM395837; KM395924	Alfenas <i>et al.</i> (2015)
		LPF429	–	B82	<i>Ca. paraensis</i>	LPF429	Soil (tropical rainforest)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396015; KM396098; N/A; N/A; N/A; KM395841; KM395928	Alfenas <i>et al.</i> (2015)
A112	<i>Ca. piauiensis</i>	CBS 134850 ^T	LPF377	B87	<i>Ca. piauiensis</i>	CBS 134850 ^T	Soil (<i>Eucalyptus</i> plantation)	Teresina, Piauí, Brazil	R.F. Alfenas	N/A; KM396060; KM396143; N/A; N/A; N/A; KM395886; KM395973	Alfenas <i>et al.</i> (2015)
		CBS 134851	LPF381	B87	<i>Ca. piauiensis</i>	CBS 134851	Soil (tropical rainforest)	Teresina, Piauí, Brazil	R.F. Alfenas	N/A; KM396061; KM396144; N/A; N/A; N/A; KM395887; KM395974	Alfenas <i>et al.</i> (2015)
A113	<i>Ca. pini</i>	CBS 125523	CMW 31210	B88	<i>Ca. pini</i>	CBS 125523	<i>Pinus patula</i>	Buga, Valle del Cauca, Colombia	C.A. Rodas	GQ280518; GQ267437; GQ267274; GQ280640; GQ280762; N/A; GQ267345; GQ267225	Lombard <i>et al.</i> (2010a)
A117	<i>Ca. propaginicola</i>	CBS 134815 ^T	LPF220	B90	<i>Ca. propaginicola</i>	CBS 134815 ^T	<i>Eucalyptus</i> sp. (seeding)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396040; KM396123; N/A; N/A; N/A; KM395866; KM395953	Alfenas <i>et al.</i> (2015)
		CBS 134816	LPF222	B90	<i>Ca. propaginicola</i>	CBS 134816	<i>Eucalyptus</i> sp. (seeding)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396041; KM396124; N/A; N/A; N/A; KM395867; KM395954	Alfenas <i>et al.</i> (2015)

A118	<i>Ca. pseudobrassicae</i>	CBS 134662 ^T	LPF280	B91	<i>Ca. pseudorassicae</i>	CBS 134662 ^T	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396023; KM396106; N/A; N/A; N/A; KM395849; KM395936	Alfenas <i>et al.</i> (2015)
		CBS 134661	LPF260	B91	<i>Ca. pseudobrassicae</i>	CBS 134661	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396022; KM396105; N/A; N/A; N/A; KM395848; KM395935	Alfenas <i>et al.</i> (2015)
A119	<i>Ca. pseudocerciana</i> *	CBS 134824 ^T	LPF367	B90	<i>Ca. propaginicola</i> [#]	CBS 134824	<i>Eucalyptus</i> sp. (seeding)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396049; KM396132; N/A; N/A; N/A; KM395875; KM395962	Alfenas <i>et al.</i> (2015)
		CBS 134823	LPF366	B90	<i>Ca. propaginicola</i> [#]	–	<i>Eucalyptus</i> sp. (seeding)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396048; KM396131; N/A; N/A; N/A; KM395874; KM395961	Alfenas <i>et al.</i> (2015)
A121	<i>Ca. pseudoecuadoriae</i>	CBS 111402 ^T	CMW 51179; CPC 1639	B92	<i>Ca. pseudoecuadoriae</i>	CBS 111402 ^T	Soil	Ecuador	M.J. Wingfield	N/A; KX784589; N/A; KY653273; KY653329; KY653432; KX784723; KX784652	Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
A122	<i>Ca. pseudohodgesii</i> *	CBS 134818 ^T	LPF262	B14	<i>Ca. brasiliensis</i> [#]	CBS 134818	<i>Azadirachta indica</i> (leaf)	Viçosa, Minas Gerais, Brazil	R.F. Alfenas	N/A; KM395991; KM396079; N/A; N/A; N/A; KM395817; KM395905	Alfenas <i>et al.</i> (2015)
		CBS 134819	LPF265	B14	<i>Ca. brasiliensis</i> [#]	–	<i>Azadirachta indica</i> (leaf)	Viçosa, Minas Gerais, Brazil	R.F. Alfenas	N/A; KM395992; KM396080; N/A; N/A; N/A; KM395818; KM395906	Alfenas <i>et al.</i> (2015)
A124	<i>Ca. pseudometrosideri</i>	CBS 134845 ^T	LPF210	B93	<i>Ca. pseudometrosideri</i>	CBS 134845 ^T	Soil (<i>Eucalyptus</i> plantation)	Maceió, Alagoas, Brazil	M.M. Coutinho	N/A; KM395995; KM396083; N/A; N/A; N/A; KM395821; KM395909	Alfenas <i>et al.</i> (2015)
		CBS 134843	LPF100	B93	<i>Ca. pseudometrosideri</i>	CBS 134843	<i>Metrosideros polymorpha</i>	Viçosa, Minas Gerais, Brazil	A.C. Alfenas	N/A; KM395993; KM396081; N/A; N/A; N/A; KM395819; KM395907	Alfenas <i>et al.</i> (2015)
A130	<i>Ca. pseudospathiphylli</i>	CBS 109165 ^T	CMW 30976; CPC 1623	B98	<i>Ca. pseudospathiphylli</i>	CBS 109165 ^T	Soil	Ecuador	M.J. Wingfield	GQ280493; GQ267412; AF348241; GQ280615; GQ280737; KY653435; FJ918562; FJ918513	Kang <i>et al.</i> (2001b), Crous (2002), Lombard <i>et al.</i> (2010a, c), Marin-Felix <i>et al.</i> (2017)
A131	<i>Ca. pseudospathulata</i>	CBS 134841 ^T	LPF072	B99	<i>Ca. pseudospathulata</i>	CBS 134841 ^T	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396070; KM396153; N/A; N/A; N/A; KM395896; KM395983	Alfenas <i>et al.</i> (2015)
		CBS 134840	LPF066	B99	<i>Ca. pseudospathulata</i>	CBS 134840	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396069; KM396152; N/A; N/A; N/A; KM395895; KM395982	Alfenas <i>et al.</i> (2015)
A134	<i>Ca. pseudovata</i>	CBS 134674 ^T	LPF267	B101	<i>Ca. pseudovata</i>	CBS 134674 ^T	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396032; KM396115; N/A; N/A; N/A; KM395858; KM395945	Alfenas <i>et al.</i> (2015)

		CBS 134675	LPF285	B101	<i>Ca. pseudovata</i>	CBS 134675	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396033; KM396116; N/A; N/A; N/A; KM395859; KM395946	Alfenas <i>et al.</i> (2015)
A136	<i>Ca. pteridis</i>	CBS 111793 ^T	ATCC 34395; CMW 16736; CPC 2372	B102	<i>Ca. pteridis</i>	CBS 111793 ^T	<i>Arachniodes</i> <i>adiantiformis</i>	USA	F. Schickedanz	GQ280494; GQ267413; DQ190679; GQ280616; GQ280738; KY653438; FJ918563; DQ190578	Crous <i>et al.</i> (1993c, 2006), Crous (2002), Lombard <i>et al.</i> (2010a), Marin-Felix <i>et al.</i> (2017)
A139	<i>Ca. quinquerosa</i>	CBS 134654 ^T	LPF065	B105	<i>Ca.</i> <i>quinquerosa</i>	CBS 134654 ^T	Soil (<i>Eucalyptus</i> plantation)	Monte Dourado, Pará, Brazil	R.F. Alfenas	N/A; KM396029; KM396112; N/A; N/A; N/A; KM395855; KM395942	Alfenas <i>et al.</i> (2015)
		CBS 134655	LPF281	B105	<i>Ca.</i> <i>quinquerosa</i>	CBS 134655	Soil (<i>Eucalyptus</i> plantation)	Santana, Pará, Brazil	A.C. Alfenas	N/A; KM396030; KM396113; N/A; N/A; N/A; KM395856; KM395943	Alfenas <i>et al.</i> (2015)
A141	<i>Ca. robigophila</i>	CBS 134652 ^T	LPF192	B107	<i>Ca. robigophila</i>	CBS 134652 ^T	<i>Eucalyptus</i> sp. (leaf)	Açailandia, Maranhao, Brazil	R.F. Alfenas	N/A; KM396024; KM396107; N/A; N/A; N/A; KM395850; KM395937	Alfenas <i>et al.</i> (2015)
		CBS 134653	LPF193	B107	<i>Ca. robigophila</i>	CBS 134653	<i>Eucalyptus</i> sp. (leaf)	Açailandia, Maranhao, Brazil	R.F. Alfenas	N/A; KM396025; KM396108; N/A; N/A; N/A; KM395851; KM395938	Alfenas <i>et al.</i> (2015)
A144	<i>Ca. silvicola</i>	CBS 135237 ^T	LPF081	B109	<i>Ca. silvicola</i>	CBS 135237 ^T	Soil (tropical rainforest)	Mucuri, Bahia, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396065; KM396148; N/A; N/A; N/A; KM395891; KM395978	Alfenas <i>et al.</i> (2015)
		CBS 134836	LPF079	B109	<i>Ca. silvicola</i>	CBS 134836	Soil (tropical rainforest)	Araponga, Minas Gerais, Brazil	A.C. Alfenas & P.W. Crous	N/A; KM396062; KM396145; N/A; N/A; N/A; KM395888; KM395975	Alfenas <i>et al.</i> (2015)
	<i>Calonectria</i> sp.	CBS 112152	CPC 3203	–	<i>Calonectria</i> sp.	CBS 112152	<i>E.</i> <i>camaldulensis</i>	Vietnam	N/A	N/A; KX784602; N/A; KY653291; KY653347; KY653463; KX784745; KX784672	Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
	<i>Calonectria</i> sp.	CBS 112753	CPC 4225	–	<i>Calonectria</i> sp.	CBS 112753	N/A	Indonesia	N/A	N/A; KX784598; N/A; KY653292; KY653348; KY653464; KX784740; KX784667	Lombard <i>et al.</i> (2016), Marin-Felix <i>et al.</i> (2017)
A151	<i>Ca. syzygiicola</i>	CBS 112831 ^T	CMW 51204; CPC 4511	B113	<i>Ca. syzygiicola</i>	CBS 112831 ^T	<i>Syzygium</i> <i>aromaticum</i>	Sumatra, Indonesia	M.J. Wingfield	N/A; N/A; N/A; N/A; N/A; N/A; KX784736; KX784663	Lombard <i>et al.</i> (2016)
A152	<i>Ca. telluricola</i> *	CBS 134664 ^T	LPF217	B82	<i>Ca. paraensis</i> [#]	CBS 134664	Soil (tropical rainforest)	Mucuri, Bahia, Brazil	E. Zauza	N/A; KM396017; KM396100; N/A; N/A; N/A; KM395843; KM395930	Alfenas <i>et al.</i> (2015)
		CBS 134663	LPF214	B82	<i>Ca. paraensis</i> [#]	–	Soil (tropical rainforest)	Salinas, Minas Gerais, Brazil	D.B. Pinho	N/A; KM396016; KM396099; N/A; N/A; N/A; KM395842; KM395929	Alfenas <i>et al.</i> (2015)

A156	<i>Ca. terricola</i>	CBS 116247 ^T	CMW 51232; CPC 3583	B114	<i>Ca. terricola</i>	CBS 116247 ^T	Soil (<i>Eucalyptus</i> plantation)	Brazil	P.W. Crous	N/A; N/A; N/A; N/A; N/A; N/A; KX784738; KX784665	Lombard <i>et al.</i> (2016)
A163	<i>Ca. uniseptata</i>	CBS 413.67 ^T	CMW 23678; CPC 2391; IMI 299577	B116	<i>Ca. uniseptata</i>	CBS 413.67 ^T	<i>Paphiopedilum</i> <i>callosum</i>	Celle, Germany	W. Gerlach	GQ280451; GQ267379; GQ267248; GQ280573; GQ280695; N/A; GQ267307; GQ267208	Lombard <i>et al.</i> (2016)
	<i>Curviciadiella</i> <i>cignea</i>	CBS 109167 ^T	CPC 1595; MUCL 40269	–	–	–	Decaying leaf	French Guiana	C. Decock	KM231122; KM231287; KM231461; AF220973; AY793431; KM232311; KM231867; KM232002	Decock & Crous (1998), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2015b)
		CBS 109168	CPC 1594; MUCL 40268	–	–	–	Decaying seed	French Guiana	C. Decock	KM231121; KM231286; KM231460; KM231745; JQ666074; KM232312; KM231868; KM232003	Decock & Crous (1998), Crous <i>et al.</i> (2006), Lombard <i>et al.</i> (2015b)

¹Codes (A1 to A169) of the 169 *Calonectria* species before revision.

²*Calonectria* species names before revision.

³AR: Amy Y. Rossman working collection; ATCC: American Type Culture Collection, Virginia, U.S.A; CBS: Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands; CMW: Culture collection of the Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria, South Africa; CPC: Pedro Crous working collection housed at Westerdijk Fungal Biodiversity Institute; IMI: International Mycological Institute, CABI Bioscience, Egham, Boreham Lane, U.K.; LPF: Laboratório de Patologia Florestal, Universidade Federal de Viçosa, Viçosa, Brazil; LPP: Culture collection of the Laboratory of Plant Protection, Department of Phytopathology, Universidade Federal de Viçosa, Brazil; MUCL: Mycothèque, Laboratoire de Mycologie Systématique et Appliquée, l'Université, Louvain-la-Neuve, Belgium; PPRI: Plant Protection Research Institute, Pretoria, South Africa; STE-U: Department of Plant Pathology, University of Stellenbosch, South Africa; UFV: Universidade Federal de Viçosa, Viçosa, Brazil.

⁴The isolate numbers were appeared in the phylogenetic trees in this study; T: ex-type isolates of the *Calonectria* species.

⁵Codes (B1 to B120) of the 120 *Calonectria* species after revision.

⁶The 120 *Calonectria* species after revision, species link to the key isolates including the ex-types are in bold.

⁷Key isolates of the 120 *Calonectria* species after revision

⁸T: ex-type isolates of the *Calonectria* species after revision.

⁹*act*: actin; *cmdA*: calmodulin; *his3*: histone H3; ITS: the internal transcribed spacer regions 1 and 2 and the 5.8S gene of the ribosomal RNA; LSU: 28S large subunit RNA gene; *rpb2*: the second largest subunit of RNA polymerase; *tef1*: translation elongation factor 1-alpha; *tub2*: β -tubulin.

¹⁰N/A: information are not available.

*Species were synonymized.

#Species names after synonymizing.

Table S3. Statistics resulting from phylogenetic analyses in this study.

Dataset	No. of taxa	No. of bp ¹	Maximum parsimony						
			PIC ²	No. of trees	Tree length	CI ³	RI ⁴	RC ⁵	HI ⁶
<i>act</i>	246	286	117	1000	424	0.45	0.948	0.427	0.55
<i>cmdA</i>	314	721	358	1000	1464	0.411	0.945	0.388	0.589
<i>his3</i>	305	498	200	1000	1488	0.275	0.901	0.248	0.725
ITS	268	705	58	1000	102	0.667	0.957	0.638	0.333
LSU	267	866	47	1000	88	0.568	0.965	0.548	0.432
<i>rpb2</i>	234	863	305	180	1451	0.331	0.927	0.307	0.669
<i>tef1</i>	316	563	292	1000	1385	0.393	0.936	0.368	0.607
<i>tub2</i>	285	652	305	1000	1422	0.411	0.921	0.378	0.589
<i>act/cmdA/his3/ITS/LSU/rpb2/tef1/tub2</i>	318	5154	1682	3000	8621	0.34	0.919	0.312	0.66

Dataset	Maximum likelihood							
	Subst. mode ⁷	NST ⁸	Rate matrix					Rates
<i>act</i>	HKY+I+G	2	–	–	–	–	–	Gamma
<i>cmdA</i>	TIM1+I+G	6	1.0000	4.4097	0.8264	0.8264	5.7643	Gamma
<i>his3</i>	TVM+I+G	6	0.7263	5.1655	1.3467	0.9374	5.1655	Gamma
ITS	TVMef+I+G	6	2.4645	3.8108	3.1850	0.0010	3.8108	Gamma
LSU	GTR+I+G	6	1.0101	2.6538	0.8767	0.0003	6.1137	Gamma
<i>rpb2</i>	K80+I+G	2	–	–	–	–	–	Gamma
<i>tef1</i>	GTR+I+G	6	1.0133	2.5411	1.1773	0.7365	3.2101	Gamma
<i>tub2</i>	TIM3+I+G	6	1.3734	5.7290	1.0000	1.3734	4.1494	Gamma
<i>act/cmdA/his3/ITS/LSU/rpb2/tef1/tub2</i>	TIM2+I+G	6	1.3999	5.0850	1.3999	1.0000	6.3778	Gamma

¹bp = base pairs.

²PIC = number of parsimony informative characters.

³CI = consistency index.

⁴RI = retention index.

⁵RC = rescaled consistency index.

⁶HI = homoplasy index.

⁷Subst. model = best fit substitution model.

⁸NST = number of substitution rate categories.

Table S4. Morphological characteristics, thallism and location of ex-types of *Calonectria* species.

Code A ¹	Code B ²	Species ³	Vesicle		Macroconidia		Perithecial	Asci	Ascospores		Thallism ¹⁰	Location of ex-type isolates ⁹	References or source of data
			Shape ⁴	Diam (µm)	Septation ⁵	Average size (µm)	Colour ⁶	Spore number ⁷	Septation ⁸	Average size (µm)			
1. <i>Calonectria brassicae</i> species complex													
A16	B12	<i>Calonectria brachiata</i>	Clavate	5–7	1(–2)	44 × 5	N/A ¹¹	N/A	N/A	N/A	Putative heterothallic	South America, Colombia	Lombard <i>et al.</i> (2009), Li <i>et al.</i> (2020)
A20	B16	<i>Ca. brassicae</i>	Clavate	2–6	1	53 × 4.5	N/A	N/A	N/A	N/A	N/A	Asia, Indonesia	Crous (2002)
A29	B25	<i>Ca. clavata</i>	Narrowly clavate	2–5	1(–3)	65 × 5	Orange	8	1(–3)	44 × 5.5	Heterothallic	North America, USA	Crous (2002), Li <i>et al.</i> (2020)
A39	B34	<i>Ca. duoramosa</i>	Acicular to clavate	4–6	1	46 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A40	B35	<i>Ca. ecuadorae*</i>	Clavate	3–5	1(–3)	51 × 4.5	N/A	N/A	N/A	N/A	N/A	South America, Ecuador	Crous <i>et al.</i> (2006)
A41	B35	<i>Ca. ecuadorensis</i>	Clavate	4–6	1	37 × 4	N/A	N/A	N/A	N/A	N/A	South America, Ecuador	Marin-Felix <i>et al.</i> (2017)
A53	B43	<i>Ca. gracilis</i>	Clavate	2–11	1(–3)	56 × 4.5	Red	8	1	37 × 5	Homothallic	South America, Brazil	Crous (2002), Li <i>et al.</i> (2020)
A99	B77	<i>Ca. octoramosa</i>	Clavate	4–8	1(–3)	36 × 4	N/A	N/A	N/A	N/A	N/A	South America, Ecuador	Marin-Felix <i>et al.</i> (2017)
A100	B78	<i>Ca. orientalis</i>	Clavate to broadly clavate	5–10	1	48 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Indonesia	Lombard <i>et al.</i> (2010a), Li <i>et al.</i> (2020)
A105	B82	<i>Ca. paraensis*</i>	Clavate	4–6	1	42 × 5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A152	B82	<i>Ca. telluricola</i>	Clavate	3–6	1	41 × 5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A108	B83	<i>Ca. parvispora</i>	Clavate	4–8	1	29 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Marin-Felix <i>et al.</i> (2017)
A41	B84	<i>Ca. pauciphialidica sp. nov.</i>	N/A	N/A	1	29.5 × 3	N/A	N/A	N/A	N/A	N/A	South America, Ecuador	Crous <i>et al.</i> (2006), this study
A113	B88	<i>Ca. pini</i>	Clavate	4–6	1	44 × 5	N/A	N/A	N/A	N/A	N/A	South America, Colombia	Lombard <i>et al.</i> (2010a)
A118	B91	<i>Ca. pseudobrassicae</i>	Clavate	5–6	1	41 × 5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A121	B92	<i>Ca. pseudoecuadoriae</i>	Clavate	4–7	1	38 × 3.5	N/A	N/A	N/A	N/A	Putative heterothallic	South America, Ecuador	Lombard <i>et al.</i> (2016), Li <i>et al.</i> (2020)
A139	B105	<i>Ca. quinqueramosa</i>	Narrowly clavate to clavate	3–5	1	59 × 5	Orange to red to brown	8	(1–)3	40 × 6	Homothallic	South America, Brazil	Alfenas <i>et al.</i> (2015)
A141	B107	<i>Ca. robigophila</i>	Acicular to clavate	4–5	1	50 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
2. <i>Calonectria candelabrum</i> species complex													
A17	B13	<i>Ca. brasiliiana</i>	Ellipsoidal to obpyriform	6–9	1	40 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	South America, Brazil	Lombard <i>et al.</i> (2016), Li <i>et al.</i> (2020)
A19	B15	<i>Ca. brassiana</i>	Ellipsoidal to narrowly obpyriform	3–7	1	53 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A22	B18	<i>Ca. brevistipitata</i>	Fusiform to obpyriform	5–8	1	31 × 3.5	N/A	N/A	N/A	N/A	Heterothallic	North America, Mexico	Lombard <i>et al.</i> (2016), Li <i>et al.</i> (2020)
A25	B21	<i>Ca. candelabrum*</i>	Ellipsoidal to narrowly obpyriform	5–8	1	60 × 4.5	Red-brown	8	1	48 × 5.5	Heterothallic	South America, Brazil	Viégas (1946), Crous (2002), Lombard <i>et al.</i> (2015b), Li <i>et al.</i> (2020)
A129	B21	<i>Ca. pseudoscoparia</i>	Obpyriform to ellipsoidal	6–10	1	48 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	South America, Ecuador	Lombard <i>et al.</i> (2010a), Li <i>et al.</i> (2020)
A33	B28	<i>Ca. colombiana</i>	Obpyriform to ellipsoidal	8–12	1	37 × 3	Orange to red to red-brown	8	1	34 × 4	Homothallic	South America, Colombia	Lombard <i>et al.</i> (2010b), Li <i>et al.</i> (2020)
A44	B37	<i>Ca. eucalypticola</i>	Ellipsoidal to obpyriform	5–7	1	50 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A48	B38	<i>Ca. fragariae</i>	Obpyriform to ellipsoidal	8–10	1	39 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Lopes <i>et al.</i> (2017)

A50	B40	<i>Ca. glaeibicola</i>	Ellipsoidal to narrowly obpyriform	3–5	1	50 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A84	B68	<i>Ca. metrosideri</i>	Spathulate to obpyriform	5–9	1	45 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2013a)
A97	B76	<i>Ca. nemoricola</i>	Obpyriform	7–13	1	45 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A109	B85	<i>Ca. pauciramosa*</i>	Obpyriform to broadly ellipsoidal	5–11	1	50 × 4.5	Orange to red-brown	8	1	35 × 6.5	Heterothallic	Africa, South Africa	Schoch <i>et al.</i> (1999), Crous (2002), Li <i>et al.</i> (2020)
A30	B85	<i>Ca. cliffordiicola</i>	Ellipsoidal to obpyriform	7–9	1	40 × 4	N/A	N/A	N/A	N/A	N/A	Africa, South Africa	Lombard <i>et al.</i> (2016)
A42	B85	<i>Ca. ericae</i>	Ellipsoidal to obpyriform	6–10	1	37 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	North America, USA	Lombard <i>et al.</i> (2016), Li <i>et al.</i> (2020)
A78	B85	<i>Ca. machaerinae</i>	Ellipsoidal to obpyriform	6–9	1	38 × 4	N/A	N/A	N/A	N/A	N/A	Oceania, New Zealand	Lombard <i>et al.</i> (2016)
A89	B85	<i>Ca. mossambicensis</i>	Obpyriform to ellipsoidal	2–8	1	42 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	Africa, Mozambique	Crous <i>et al.</i> (2013), Li <i>et al.</i> (2020)
A116	B85	<i>Ca. polizzii</i>	Obpyriform to ellipsoidal	6–9	1	37 × 4	N/A	N/A	N/A	N/A	Heterothallic	Europe, Italy	Lombard <i>et al.</i> (2010b), Li <i>et al.</i> (2020)
A143	B85	<i>Ca. seminaria</i>	Obpyriform to ellipsoidal	6–11	1	47 × 5	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A157	B85	<i>Ca. tetraramosa</i>	Obpyriform	4–10	1	48 × 5	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A169	B85	<i>Ca. zuluensis</i>	Ellipsoidal to obpyriform	6–10	1	36 × 4	Orange to red to red-brown	8	1	32 × 4	Heterothallic	Africa, South Africa	Lombard <i>et al.</i> (2010b), Li <i>et al.</i> (2020)
A112	B87	<i>Ca. piuiensis</i>	Ellipsoidal to narrowly obpyriform	3–7	1	49 × 4.5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A124	B93	<i>Ca. pseudometrosideri</i>	Ellipsoidal to obpyriform	5–7	1	51 × 4.5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A131	B99	<i>Ca. pseudospathulata</i>	Obpyriform	7–10	1	43 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A137	B103	<i>Ca. putriramosa</i>	Ellipsoidal to obpyriform	7–9	1	43 × 5	N/A	N/A	N/A	N/A	Putative heterothallic	South America, Brazil	Lombard <i>et al.</i> (2016), Li <i>et al.</i> (2020)
A144	B109	<i>Ca. silvicola</i>	Obpyriform	7–10	1	41 × 4.5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A146	B111	<i>Ca. spathulata*</i>	Ellipsoidal to obpyriform or clavate	6–10	(1–)3(–6)	80 × 6	Orange	4–8	(1–)3	50 × 5.5	Homothallic	South America, Brazil	Crous & Kang (2001), Crous (2002)
A148	B111	<i>Ca. stipitata</i>	Ellipsoidal to obpyriform	7–11	1	32 × 4	N/A	N/A	N/A	N/A	N/A	South America, Colombia	Lombard <i>et al.</i> (2016)
A167	B119	<i>Ca. venezuelana</i>	Fusiform to ovoid to ellipsoidal	5–9	1	58 × 5	N/A	N/A	N/A	N/A	N/A	South America, Venezuela	Lombard <i>et al.</i> (2016)
3. <i>Calonectria colhounii</i> species complex													
A3	B3	<i>Ca. aciculata</i>	Acicular to clavate	2–5	3	69 × 5.5	N/A	N/A	N/A	N/A	Homothallic	Asia, China	Li <i>et al.</i> (2017, 2020)
A32	B27	<i>Ca. colhounii</i>	Clavate	3–4	(1–)3	65 × 5	Bright yellow	4	(1–)3	55 × 6	Homothallic	Asia, Mauritius	Peerally (1973), Crous (2002)
A43	B36	<i>Ca. eucalypti*</i>	Broadly clavate	4–6	3	72 × 6	Yellow to orange to orange	4	(1–)3	33 × 6	Homothallic	Asia, Indonesia	Lombard <i>et al.</i> (2010a), Li <i>et al.</i> (2020)
A120	B36	<i>Ca. pseudocolhounii</i>	Clavate	3.5–6	(1–)3	60 × 4.5	Bright yellow to orange	4	(1–)3	56 × 6.5	Homothallic	Asia, China	Chen <i>et al.</i> (2011), Li <i>et al.</i> (2020)
A49	B39	<i>Ca. fujianensis*</i>	Clavate	3–5	(1–)3	52.5 × 4	Bright yellow to orange	4	(1–)3	55.5 × 6.8	Homothallic	Asia, China	Chen <i>et al.</i> (2011), Li <i>et al.</i> (2020)
A98	B39	<i>Ca. nymphaeae</i>	Clavate	3–5	3–4	61 × 5.9	Orange to red to red-brown	4	2–3	66 × 6	Homothallic	Asia, China	Xu <i>et al.</i> (2012)
A60	B47	<i>Ca. honghensis</i>	Clavate	2.5–5.5	3	54 × 5.5	Yellow to orange	4	3	49 × 6	Homothallic	Asia, China	Li <i>et al.</i> (2017, 2020)
A67	B53	<i>Ca. indusiata</i>	Narrowly clavate	3–6	(1–)3	81 × 6	Orange to red to red-brown	8	(1–)3	53 × 7	Homothallic	Asia, Sri Lanka	Crous (2002)
A76	B62	<i>Ca. lichi</i>	Clavate	3.5–5.5	3	65.7 × 6	N/A	N/A	N/A	N/A	Homothallic	Asia, China	Liu & Chen (2017), Li <i>et al.</i> (2020)

A79	B64	<i>Ca. macroconidialis*</i>	Clavate	3–5	(1–)3(–4)	90 × 6.5	Dull yellow	(2–)4	(1–)3	55 × 6	Heterothallic	Africa, South Africa	Crous <i>et al.</i> (1999); Crous (2002)
A107	B64	<i>Ca. parva</i>	Narrowly clavate	3–5	(1–)3	72 × 6	N/A	N/A	N/A	N/A	N/A	Africa, South Africa	Lombard <i>et al.</i> (2016)
A80	B65	<i>Ca. madagascariensis</i>	Clavate	3–4	(1–)3	55 × 4.5	Bright yellow	8	(1–)3	50 × 5.5	Homothallic	Africa, Madagascar	Crous (2002)
A88	B70	<i>Ca. monticola</i>	Broadly clavate	4–6	3	49 × 5	N/A	N/A	N/A	N/A	N/A	Asia, Thailand	Crous <i>et al.</i> (2015)
A104	B81	<i>Ca. paracolhouinii</i>	Narrowly clavate	3–5	3	41 × 5	N/A	N/A	N/A	N/A	N/A	North America, USA	Lombard <i>et al.</i> (2016)

4. *Calonectria cylindrospora* species complex

A11	B9	<i>Ca. auriculiformis</i>	Ellipsoidal to fusiform to obpyriform	6–12	1	43 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Vietnam	Pham <i>et al.</i> (2019), Li <i>et al.</i> (2020)
A18	B14	<i>Ca. brasiliensis*</i>	Ellipsoidal to obpyriform	7–11	1	38 × 3.5	N/A	N/A	N/A	N/A	Putative heterothallic	South America, Brazil	Lombard <i>et al.</i> (2010b), Li <i>et al.</i> (2020)
A59	B14	<i>Ca. hodgesii</i>	Pyriiform to ellipsoidal or ovoid to sphaeropedunculate	6–11	1	50 × 4.5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2013b)
A122	B14	<i>Ca. pseudohodgesii</i>	Clavate (rarely), ellipsoidal to obpyriform	4–10	1	54 × 4.5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A26	B22	<i>Ca. cerciana*</i>	Fusiform to obpyriform	8–13	1	44 × 5	N/A	N/A	N/A	N/A	N/A	Asia, China	Lombard <i>et al.</i> (2010c)
A103	B22	<i>Ca. papillata</i>	Obpyriform to ellipsoidal with papillate apex	8–14	1	45 × 4	Orange to orange-brown	8	1	36 × 6	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A155	B22	<i>Ca. terrestris</i>	Obpyriform to pyriform to broadly clavate	5–12	1	38.5 × 4.5	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A37	B32	<i>Ca. cylindrospora*</i>	Ellipsoidal to pyriform or clavate	6–8	1	45 × 4	Yellow to orange	(2–)8	1	37 × 6	Heterothallic	Europe, Italy	Crous (2002), Lombard <i>et al.</i> (2015a)
A15	B32	<i>Ca. blephilliae</i>	Clavate to ellipsoidal	7–10	1	50 × 4.5	N/A	N/A	N/A	N/A	Putative heterothallic	North America, USA	Crous <i>et al.</i> (2013), Li <i>et al.</i> (2020)
A56	B44	<i>Ca. hawksworthii*</i>	Ellipsoidal to clavate	6–9	1	56 × 4	N/A	N/A	N/A	N/A	N/A	Africa, Mauritius	Crous (2002)
A47	B44	<i>Ca. foliicola</i>	Obpyriform to ellipsoidal	6–13	1	47 × 5	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A149	B44	<i>Ca. sulawesiensis</i>	Broadly clavate to ellipsoidal	5–7	1	48 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Indonesia	Lombard <i>et al.</i> (2010a), Li <i>et al.</i> (2020)
A68	B54	<i>Ca. insularis</i>	Obpyriform to broadly ellipsoidal	4–13	1	45 × 4	Orange to red	8	1	33 × 6	Heterothallic	Africa, Madagascar	Schoch <i>et al.</i> (1999), Crous (2002)
A70	B56	<i>Ca. lageniformis</i>	Lageniform to ellipsoidal	6–10	1	40 × 5	N/A	N/A	N/A	N/A	N/A	Africa, Mauritius	Lombard <i>et al.</i> (2016)
A83	B67	<i>Ca. maranhensis</i>	Ellipsoid, obpyriform to sphaeropedunculate	7–11	1	57 × 5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A114	B89	<i>Ca. plurilateralis</i>	Obpyriform to ellipsoidal	7–11	1	34 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	South America, Ecuador	Lombard <i>et al.</i> (2016), Li <i>et al.</i> (2020)
A117	B90	<i>Ca. propaginicola*</i>	Ellipsoidal, obpyriform to sphaeropedunculate	5–12	1	49 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A119	B90	<i>Ca. pseudocerciana</i>	Obpyriform to sphaeropedunculate	7–12	1	45 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A158	B115	<i>Ca. tonkinensis</i>	Ellipsoidal to obpyriform	3–7	1	41.5 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Vietnam	Pham <i>et al.</i> (2019), Li <i>et al.</i> (2020)
A165	B118	<i>Ca. variabilis</i>	Sphaeropedunculate to ovoid or ellipsoidal to clavate	6–11	(1–)3(–4)	73 × 5	Red-brown	8	1(–)3	42 × 5	Homothallic	South America, Brazil	Crous <i>et al.</i> (1993b), Crous (2002)

5. *Calonectria gracilipes* species complex

A8	B7	<i>Ca. angustata</i>	Narrowly clavate	2–3	(1–)7–10(–12)	110 × 10	N/A	N/A	N/A	N/A	N/A	North America, USA	Crous <i>et al.</i> (2000), Crous (2002)
A52	B42	<i>Ca. gracilipes</i>	Clavate	3–4	1	45 × 4.5	Orange	8	1	35 × 6.5	Homothallic	South America, Colombia	Crous <i>et al.</i> (1997a), Crous (2002)
A63	B50	<i>Ca. hurae</i>	Narrowly clavate	3–5	(1–)7(–8)	120 × 7.5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Crous (2002)
A74	B60	<i>Ca. leguminum</i>	Narrowly clavate	2–3	(1–)3–5(–6)	60 × 5	Orange to red-brown	8	(1–)3	70 × 6.5	Homothallic	South America, Brazil	Figueiredo & Namekata (1967), Crous (2002)

A142	B108	<i>Ca. rumohrae</i>	Narrowly clavate	(3)–4–5	5(–7)	110 × 9	Orange-brown to brown	8	3–6(–9)	90 × 6.5	Homothallic	North America, Panama	El-Gholl <i>et al.</i> (1997), Crous (2002)
6. <i>Calonectria kytensis</i> species complex													
A4	B4	<i>Ca. aconidialis*</i>	N/A	N/A	N/A	N/A	Orange to orange-brown	8	1	36 × 6	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a)
A9	B4	<i>Ca. arbusta</i>	Sphaeropedunculate	7–13	1	45 × 5	Orange to orange-brown	8	1	38 × 7	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A45	B4	<i>Ca. expansa</i>	Sphaeropedunculate	8–16	1	52 × 5	Orange to orange-brown	8	1	39 × 6	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A54	B4	<i>Ca. guangxiensis</i>	Sphaeropedunculate	11–14	1	47 × 5	Orange to orange-brown	8	1	36 × 6	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A55	B4	<i>Ca. hainanensis</i>	Sphaeropedunculate	7–14	1	46 × 5	Orange to orange-brown	8	1	34 × 6	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a)
A81	B4	<i>Ca. magnispora</i>	Sphaeropedunculate	9–18	1	52 × 5	Orange to orange-brown	8	1	40 × 6	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a)
A106	B4	<i>Ca. parakyotensis</i>	Sphaeropedunculate	10–14	1	44 × 5	N/A	N/A	N/A	N/A	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A115	B4	<i>Ca. pluriramosa</i>	Sphaeropedunculate	6–13	1	47 × 5	N/A	N/A	N/A	N/A	N/A	Asia, China	Lombard <i>et al.</i> (2015a)
A123	B4	<i>Ca. pseudokyotensis</i>	Pyriiform to sphaeropedunculate	10–13	1	48 × 6	N/A	N/A	N/A	N/A	N/A	Asia, China	Lombard <i>et al.</i> (2015a)
A147	B4	<i>Ca. sphaeropedunculata</i>	Sphaeropedunculate	10–14	1	46 × 5	Orange to orange-brown	8	1	37 × 6	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A5	B5	<i>Ca. aeknauliensis</i>	Sphaeropedunculate	6–13	1	47 × 5	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Indonesia	Pham <i>et al.</i> (2019), Li <i>et al.</i> (2020)
A10	B8	<i>Ca. asiatica</i>	Sphaeropedunculate	12–17	1	53 × 5	Orange to orange-brown	8	1	33 × 6	Homothallic	Asia, Thailand	Crous <i>et al.</i> (2004)
A21	B17	<i>Ca. brassicicola</i>	Sphaeropedunculate	3–5	1	42 × 5	N/A	N/A	N/A	N/A	N/A	Asia, Indonesia	Lombard <i>et al.</i> (2016)
A23	B19	<i>Ca. bumicola</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Homothallic	Asia, Indonesia	Pham <i>et al.</i> (2019), Li <i>et al.</i> (2020)
A24	B20	<i>Ca. canadiana*</i>	Pyriiform to sphaeropedunculate	6–10	1	50 × 4	N/A	N/A	N/A	N/A	N/A	North America, Canada	Kang <i>et al.</i> (2001b), Crous (2002)
A87	B20	<i>Ca. montana</i>	Pyriiform to sphaeropedunculate	4–12.5	1	43.2 × 4.6	N/A	N/A	N/A	N/A	N/A	Asia, China	Liu & Chen (2017)
A27	B23	<i>Ca. chinensis*</i>	Sphaeropedunculate	6–9	1	45 × 4	N/A	N/A	N/A	N/A	N/A	Asia, China	Crous <i>et al.</i> (2004)
A94	B23	<i>Ca. multistipitata</i>	Sphaeropedunculate	5–10	1	32 × 3.5	N/A	N/A	N/A	N/A	N/A	Asia, Vietnam	Pham <i>et al.</i> (2019)
A31	B26	<i>Ca. cochinchinensis</i>	Sphaeropedunculate	7–11	1	46 × 4	N/A	N/A	N/A	N/A	N/A	Asia, Vietnam	Pham <i>et al.</i> (2019)
A34	B29	<i>Ca. colombiensis</i>	Sphaeropedunculate	7–12	1(–3)	53 × 4.5	Orange to orange-brown	8	1	33 × 5	Homothallic	South America, Colombia	Crous <i>et al.</i> (2004), Li <i>et al.</i> (2020)
A36	B31	<i>Ca. curvispora*</i>	Sphaeropedunculate	5–10	1(–3)	60 × 5	N/A	N/A	N/A	N/A	Putative heterothallic	Africa, Madagascar	Victor <i>et al.</i> (1997), Crous (2002), Li <i>et al.</i> (2020)
A166	B31	<i>Ca. vegrandis</i>	Sphaeropedunculate	2–4	1	41 × 4.5	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Indonesia	Pham <i>et al.</i> (2019), Li <i>et al.</i> (2020)
A58	B46	<i>Ca. heveicola</i>	Sphaeropedunculate	7–10	1	44.5 × 4	Orange to orange-brown	8	1	34 × 5	Heterothallic	Asia, Vietnam	Pham <i>et al.</i> (2019), Li <i>et al.</i> (2020)
A61	B48	<i>Ca. hongkongensis</i>	Sphaeropedunculate	8–14	1	46.5 × 4	Orange to red-brown	8	1	31 × 6	Homothallic	Asia, China	Crous <i>et al.</i> (2004), Li <i>et al.</i> (2020)
A64	B51	<i>Ca. ilicicola</i>	Sphaeropedunculate	6–12	1(–3)	62 × 6	Orange to red	8	1(–3)	45 × 6	Homothallic	Asia, Indonesia	Boedijn & Reitsma (1950), Alfieri <i>et al.</i> (1982), Crous (2002)
A65	B52	<i>Ca. indonesiae</i>	Sphaeropedunculate	7–9	1	50.5 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Indonesia	Crous <i>et al.</i> (2004), Li <i>et al.</i> (2020)
A69	B55	<i>Ca. kytensis*</i>	Globose	8.8–19	1	41 × 4	Orange to red to red-brown	8	1	29 × 6	Homothallic	Asia, Japan	Terashita (1968), Sobers (1972), Crous (2002)

A46	B55	<i>Ca. floridana</i>	Globose to subglobose	8.3–17.9	1	46 × 4.3	Orange to reddish brown	8	1	36.6 × 7.1	Homothallic	North America, USA	Sobers & Seymour (1967), Sobers (1969), Crous (2002)
A132	B55	<i>Ca. pseudoturagicola</i>	Sphaeropedunculate	4.5–12	1	40 × 3.5	Orange to orange-brown	8	1(–3)	31 × 6.5	Homothallic	Asia, China	Li <i>et al.</i> (2017, 2020)
A162	B55	<i>Ca. turagicola</i>	Sphaeropedunculate	8–12	1	44 × 4	N/A	N/A	N/A	N/A	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A71	B57	<i>Ca. lantauensis</i>	Sphaeropedunculate	7.5–17.5	1	55 × 5	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, China	Li <i>et al.</i> (2017, 2020)
A72	B58	<i>Ca. lateralis</i>	Sphaeropedunculate	9–13	1	39 × 4	N/A	N/A	N/A	N/A	Homothallic	Asia, China	Lombard <i>et al.</i> (2015a), Li <i>et al.</i> (2020)
A82	B66	<i>Ca. malesiana</i>	Sphaeropedunculate to globose	8–15	1	47.5 × 4	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Indonesia	Crous <i>et al.</i> (2004), Li <i>et al.</i> (2020)
A102	B80	<i>Ca. pacifica</i>	Sphaeropedunculate	7–15	1	55 × 4.5	N/A	N/A	N/A	N/A	N/A	North America, USA	Kang <i>et al.</i> (2001b), Crous (2002)
A110	B86	<i>Ca. penicilloides</i>	N/A	N/A	3	33–62 × 4–6	N/A	N/A	N/A	N/A	N/A	Asia, Japan	Tubaki (1958), Crous (2002)
A150	B112	<i>Ca. sumatrensis</i> *	Sphaeropedunculate	8–13	1	58 × 5	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Indonesia	Crous <i>et al.</i> (2004), Li <i>et al.</i> (2020)
A66	B112	<i>Ca. indonesiana</i>	Sphaeropedunculate	8–10	1	43 × 5	N/A	N/A	N/A	N/A	N/A	Asia, Indonesia	Lombard <i>et al.</i> (2016)
A151	B113	<i>Ca. syzygiicola</i>	Sphaeropedunculate	3–6	1	45 × 5	N/A	N/A	N/A	N/A	N/A	Asia, Indonesia	Lombard <i>et al.</i> (2016)
A163	B116	<i>Ca. uniseptata</i>	Globose	8.2–20.4	1	N/A	Orange to reddish brown	N/A	2–3	41.5 × 6.3	N/A	Europe, Germany	Gerlach (1968), Sobers (1972)
A168	B120	<i>Ca. yunnanensis</i> *	Sphaeropedunculate	2–4.5	1	43 × 4.5	Orange to orange-brown	8	1(–3)	36 × 6	Homothallic	Asia, China	Li <i>et al.</i> (2017, 2020)
A135	B120	<i>Ca. pseudoyunnanensis</i>	Sphaeropedunculate	2.5–5	1	47.5 × 5	N/A	N/A	N/A	N/A	Homothallic	Asia, China	Li <i>et al.</i> (2017, 2020)

7. *Calonectria mexicana* species complex

A13	B11	<i>Ca. avesiculata</i>	Acicular to clavate	1–4	1(–3)	64 × 5	Orange to red	8	1(–3)	40 × 6	Heterothallic	North America, USA	Schubert <i>et al.</i> (1989), Crous (2002)
A28	B24	<i>Ca. citri</i>	Narrowly ellipsoidal to pyriform or obovoid to sphaeropedunculate	4–10	1(–3)	58 × 4	N/A	N/A	N/A	N/A	N/A	North America, USA	Crous (2002)
A73	B59	<i>Ca. lauri sp. nov.</i>	Obpyriform to ellipsoidal	5–10	1(–3)	60 × 5.5	Yellow to brownish-yellow	8	3	73 × 7.5	Homothallic	Europe, Netherlands	Lechat <i>et al.</i> (2010), Li <i>et al.</i> (2020)
A75	B61	<i>Ca. leucothoes</i>	Ellipsoidal to obpyriform	6–11.5	1(–3)(–6)	73 × 5	N/A	N/A	N/A	N/A	Heterothallic	North America, USA	El-Gholl <i>et al.</i> (1989), Crous (2002), Li <i>et al.</i> (2020)
A85	B69	<i>Ca. mexicana</i>	Broadly ellipsoidal with papillate apex	7–12	1	45 × 4	Orange to red	8	1	50 × 5.5	Heterothallic	North America, Mexico	Schoch <i>et al.</i> (1999), Crous (2002)
A125	B94	<i>Ca. pseudomexicana</i> *	Fusiform to broadly ellipsoidal, with papillate apex	9–14	1	45 × 5	N/A	N/A	N/A	N/A	Putative heterothallic	Africa, Tunisia	Lombard <i>et al.</i> (2011), Li <i>et al.</i> (2020)
A161	B94	<i>Ca. tunisiana</i>	Fusiform to broadly ellipsoidal, with papillate apex	8–14	1	49 × 5	N/A	N/A	N/A	N/A	N/A	Africa, Tunisia	Lombard <i>et al.</i> (2011)
A133	B100	<i>Ca. pseudouxmalensis</i>	Obpyriform to ellipsoidal, sometimes with a papillate apex	5–9	1	29 × 3	N/A	N/A	N/A	N/A	Putative heterothallic	North America, Mexico	Lombard <i>et al.</i> (2016), Li <i>et al.</i> (2020)
A164	B117	<i>Ca. uxmalensis</i>	Obpyriform to ellipsoidal, sometimes with a papillate apex	5–8	1	30 × 3	N/A	N/A	N/A	N/A	N/A	North America, Mexico	Lombard <i>et al.</i> (2016)

8. *Calonectria naviculata* species complex

A57	B45	<i>Ca. henricotiae</i>	Naviculate	3.8–10.9	1	56 × 5.6	N/A	N/A	N/A	N/A	Heterothallic	Europe, Belgium	Ghesquiere <i>et al.</i> (2015), Li <i>et al.</i> (2020)
A90	B71	<i>Ca. multilateralis</i>	Naviculate	4–8	1	33 × 3	N/A	N/A	N/A	N/A	N/A	North America, Mexico	Lombard <i>et al.</i> (2016)

A91	B72	<i>Ca. multinaviculata</i>	Naviculate	4–7	1	46 × 3.5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A92	B73	<i>Ca. multiphialidica</i>	Clavate to sphaeropedunculate	8–16	1	53 × 4.5	N/A	N/A	N/A	N/A	N/A	Africa, Cameroon	Crous <i>et al.</i> (2004)
A95	B75	<i>Ca. naviculata</i>	Naviculate to ellipsoidal	5–11	1	45 × 3	Red-brown	2–8	3	40 × 5	Heterothallic	South America, Brazil	Crous <i>et al.</i> (1997a), Crous (2002), Li <i>et al.</i> (2020)
A126	B95	<i>Ca. pseudonaviculata</i>	Naviculate	4–8	1(–3)	60 × 5	N/A	N/A	N/A	N/A	Heterothallic	Oceania, New Zealand	Crous <i>et al.</i> (2002), Li <i>et al.</i> (2020)
9. <i>Calonectria pteridis</i> species complex													
A6	B6	<i>Ca. amazonica</i> *	Clavate	5–6	1(–3)	79 × 5	N/A	N/A	N/A	N/A	Heterothallic	South America, Brazil	Lombard <i>et al.</i> (2016), Li <i>et al.</i> (2020)
A7	B6	<i>Ca. amazoniensis</i>	Clavate	5–7	1	69 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Lombard <i>et al.</i> (2016)
A77	B6	<i>Ca. longiramosa</i>	Clavate	5–8	1	71 × 5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Marin-Felix <i>et al.</i> (2017)
A159	B6	<i>Ca. tropicalis</i>	Clavate	5–6	1(–3)	80 × 5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Lombard <i>et al.</i> (2016)
A51	B41	<i>Ca. gordoniae</i>	Narrowly clavate	3–6	1(–3)	62 × 5	N/A	N/A	N/A	N/A	N/A	North America, USA	Leahy <i>et al.</i> (2000), Crous (2002)
A101	B79	<i>Ca. ovata</i> *	Ovate	8–14	1(–3)	70 × 5	Orange to red-brown	8	1–3(–7)	60 × 5.5	Heterothallic	South America, Brazil	El-Gholl <i>et al.</i> (1993a), Crous (2002), Li <i>et al.</i> (2020)
A96	B79	<i>Ca. nemoralis</i>	Fusiform to ovoid	7–9	1	53 × 4	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Marin-Felix <i>et al.</i> (2017)
A153	B79	<i>Ca. tereticornis</i>	Fusiform to ovoid	8–14	1	59 × 5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Lombard <i>et al.</i> (2016)
A160	B79	<i>Ca. tucuruensis</i>	Fusiform to ovoid	9–12	1	63 × 5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Marin-Felix <i>et al.</i> (2017)
A127	B96	<i>Ca. pseudopteridis</i>	Clavate	5.4–7.5	1	87.5 × 5.7	N/A	N/A	N/A	N/A	Putative heterothallic	North America, USA	Sobers (1968), Alfenas <i>et al.</i> (2015), Li <i>et al.</i> (2020)
A134	B101	<i>Ca. pseudovata</i>	Fusiform, ovate to ellipsoidal	8–12	1	69 × 5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Alfenas <i>et al.</i> (2015)
A136	B102	<i>Ca. pteridis</i>	Clavate to narrowly ellipsoidal	4–6	1(–3)	82 × 5.5	Red-brown	8	1(–3)	52 × 6	N/A	North America, USA	Crous <i>et al.</i> (1993c), Crous (2002)
A156	B114	<i>Ca. terricola</i>	Fusiform to ovoid	8–12	1	46 × 4.5	N/A	N/A	N/A	N/A	N/A	South America, Brazil	Lombard <i>et al.</i> (2016)
10. <i>Calonectria reteaudii</i> species complex													
A1	B1	<i>Ca. acaciicola</i>	Narrowly clavate	4–7	5	94 × 7	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Vietnam	Pham <i>et al.</i> (2019), Li <i>et al.</i> (2020)
A2	B2	<i>Ca. acicola</i>	Narrowly clavate	N/A	5–7	75 × 7	Red to red-brown	8	3–4	70 × 6	Homothallic	Oceania, New Zealand	Gadgil & Dick (2004), Lombard <i>et al.</i> (2010a)
A12	B10	<i>Ca. australiensis</i>	Clavate	3.5–6	1(–)3	63 × 6.5	N/A	N/A	N/A	N/A	N/A	Oceania, Australia	Crous <i>et al.</i> (2006)
A35	B30	<i>Ca. crousiana</i>	Clavate	4–6	1(–)3	64 × 5	Orange to red-brown	8	1(–)3	64 × 7	Homothallic	Asia, China	Chen <i>et al.</i> (2011), Li <i>et al.</i> (2020)
A154	B63	<i>Ca. lombardiana</i> sp. nov.	Narrowly clavate	2–4	5	80 × 6	N/A	N/A	N/A	N/A	N/A	Oceania, Australia	Lombard <i>et al.</i> (2010c), this study
A93	B74	<i>Ca. multiseptata</i>	N/A	N/A	N/A	N/A	Orange to orange-red	8	1(–)3–6(–9)	70 × 6.5	Homothallic	Asia, Indonesia	Crous (2002)
A128	B97	<i>Ca. pseudoreteaudii</i> *	Narrowly clavate	3–5	5–8	104 × 8	N/A	N/A	N/A	N/A	Heterothallic	Asia, China	Lombard <i>et al.</i> (2010c), Li <i>et al.</i> (2020)
A86	B97	<i>Ca. microconidialis</i>	Narrowly clavate	3–7	4–6(–7)	88 × 8	N/A	N/A	N/A	N/A	N/A	Asia, China	Lombard <i>et al.</i> (2015a)
A111	B97	<i>Ca. pentaseptata</i>	Narrowly clavate	2–6	5(–8)	98 × 7	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Vietnam	Crous <i>et al.</i> (2012), Li <i>et al.</i> (2020)
A138	B104	<i>Ca. queenslandica</i> *	Narrowly clavate	3–4	4–6	69 × 6	N/A	N/A	N/A	N/A	N/A	Oceania, Australia	Lombard <i>et al.</i> (2010c)
A154	B104	<i>Ca. terrae-reginae</i>	Narrowly clavate	3–5	4–6	76 × 6	N/A	N/A	N/A	N/A	N/A	Oceania, Australia	Lombard <i>et al.</i> (2010c)
A140	B106	<i>Ca. reteaudii</i> *	Clavate	3–6	1(–)5(–6)	84 × 6.5	Orange to red-brown	8	1(–)3(–5)	70 × 5.5	Heterothallic	Asia, Vietnam	Kang <i>et al.</i> (2001a), Crous (2002)

A14	B106	<i>Ca. baviensis</i>	Narrowly clavate	3–6	5	96 × 6.5	N/A	N/A	N/A	N/A	Putative heterothallic	Asia, Vietnam	Pham <i>et al.</i> (2019), Li <i>et al.</i> (2020)
11. <i>Calonectria spathiphylli</i> species complex													
A38	B33	<i>Ca. densa</i>	Ovoid to ellipsoidal to sphaeropedunculate	10–12	1	54 × 6	N/A	N/A	N/A	N/A	Putative heterothallic	South America, Ecuador	Lombard <i>et al.</i> (2010a), Li <i>et al.</i> (2020)
A62	B49	<i>Ca. humicola</i>	Globose to ovoid to sphaeropedunculate	10–12	1	51 × 5	N/A	N/A	N/A	N/A	N/A	South America, Ecuador	Lombard <i>et al.</i> (2010a)
A130	B98	<i>Ca. pseudospathiphylli</i>	Sphaeropedunculate to ellipsoidal	8–12	1(–3)	52 × 4	Orange to red	8	1(–3)	42 × 5.5	Homothallic	South America, Ecuador	Kang <i>et al.</i> (2001b), Crous (2002)
A145	B110	<i>Ca. spathiphylli</i>	Globose to ellipsoidal to obpyriform	8–15	1(–3)	70 × 6	Orange to red	2–8	1(–3)	45 × 5	Heterothallic	North America, USA	El-Gholl <i>et al.</i> (1992), Crous (2002)

¹A: Represent the codes of the 169 *Calonectria* species before revision.

²B: Represent the codes of the 120 *Calonectria* species after revision.

³Synonymous species were marked in bold and blue, and the * indicated the species after synonymy.

⁴Vesicle shape within *Calonectria* genus were mainly divided into six categories and marked in different colour: clavate or narrowly clavate vesicle/light green, naviculate vesicle/green, ellipsoidal to obpyriform vesicle/dark green, ellipsoidal vesicle with papillate apex/yellow, sphaeropedunculate vesicle/orange; species complexes with varied vesicle shapes were not marked in any colour.

⁵Macroconidial septation within *Calonectria* genus were divided into three categories and marked in three colour: 1-septate/light green, 3-septate/green, > 3-septate/dark green.

⁶Perithecia colour within *Calonectria* genus were mainly divided into two categories and marked in two colour: orange to red-brown perithecia/light green, yellow perithecia/green.

⁷Number of ascospores produced in ascus within *Calonectria* genus were mainly divided into three categories and marked in different colour: 4-spored asci/light green, 8-spored asci/green, not 4-spored or 8-spored asci were not marked in any colour.

⁸Ascospores septation within *Calonectria* genus were mainly divided into three categories and marked in three colour: 1-septate/light green, 3-septate/green, > 3-septate/dark green.

⁹The ex-type isolates of *Calonectria* spp. collected from six continents were marked in six different colour: Africa/light green, Asia/green, Europe/dark green, North America/yellow, Oceania/orange, South America/dark orange.

¹⁰The mating system of *Calonectria* spp. were marked in two colour: heterothallic or putative heterothallic/light green, homothallic/green.

¹¹N/A: information are not available.

Table S5. Identification success rates based on phylogenetic analyses for separate and combined DNA barcodes.

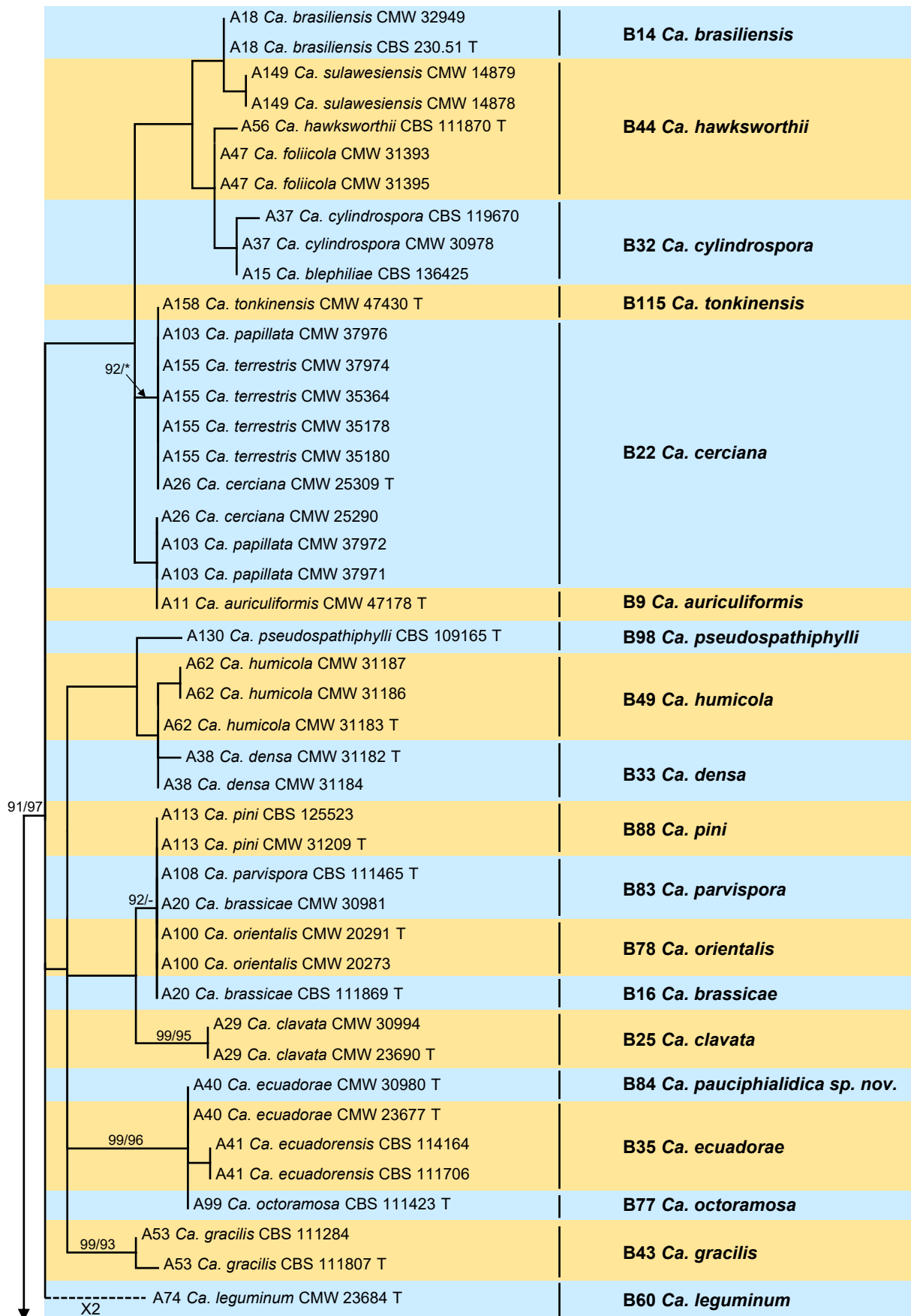
Genus or species complex code	Genus or species name	Species numbers and Identification success rates	Combination of eight genes ¹	Each of eight DNA barcodes ²							
				<i>act</i>	<i>cmdA</i>	<i>his3</i>	ITS	LSU	<i>rpb2</i>	<i>tef1</i>	<i>tub2</i>
genus	<i>Calonectria</i> genus	Number of species (A)	120	89	118	113	99	98	88	119	111
		Number of identified species (B)	120	55	96	85	29	27	64	106	98
		Identification success rates (B/A)%	100%	61.8%	81.4%	75.2%	29.3%	27.6%	72.7%	89.1%	88.3%
1	<i>Ca. brassicae</i> species complex	Number of species (A)	16	9	16	15	11	11	11	16	16
		Number of identified species (B)	16	2	10	9	2	1	5	11	12
		Identification success rates (B/A)%	100%	22.2%	62.5%	60.0%	18.2%	9.1%	45.5%	68.8%	75.0%
2	<i>Ca. candelabrum</i> species complex	Number of species (A)	18	9	18	18	9	9	8	18	18
		Number of identified species (B)	18	5	12	10	0	2	3	14	11
		Identification success rates (B/A)%	100%	55.6%	66.7%	55.6%	0.0%	22.2%	37.5%	77.8%	61.1%
3	<i>Ca. colhounii</i> species complex	Number of species (A)	11	9	11	9	11	11	10	11	11
		Number of identified species (B)	11	5	9	7	4	2	6	11	11
		Identification success rates (B/A)%	100%	55.6%	81.8%	77.8%	36.4%	18.2%	60.0%	100.0%	100%
4	<i>Ca. cylindrospora</i> species complex	Number of species (A)	12	7	12	11	10	10	10	12	12
		Number of identified species (B)	12	4	10	6	2	0	8	12	10
		Identification success rates (B/A)%	100%	57.1%	83.3%	54.5%	20.0%	0.0%	80.0%	100.0%	83.3%
5	<i>Ca. gracilipes</i> species complex	Number of species (A)	5	5	5	5	5	5	4	5	5
		Number of identified species (B)	5	5	5	5	3	2	4	5	5
		Identification success rates (B/A)%	100%	100%	100%	100%	60.0%	40.0%	100%	100%	100%
6	<i>Ca. kyotensis</i> species complex	Number of species (A)	24	22	23	22	22	22	19	24	17
		Number of identified species (B)	24	13	23	22	6	6	16	24	17
		Identification success rates (B/A)%	100%	59.1%	100.0%	100.0%	27.3%	27.3%	84.2%	100.0%	100.0%
7	<i>Ca. mexicana</i> species complex	Number of species (A)	8	8	8	8	8	8	7	8	7
		Number of identified species (B)	8	8	6	5	3	6	5	6	7
		Identification success rates (B/A)%	100%	100.0%	75.0%	62.5%	37.5%	75.0%	71.4%	75.0%	100.0%
8	<i>Ca. naviculata</i> species complex	Number of species (A)	6	3	6	6	5	4	4	5	6
		Number of identified species (B)	6	3	6	6	1	3	4	5	6
		Identification success rates (B/A)%	100%	100%	100%	100.0%	20.0%	75.0%	100%	100%	100%
9	<i>Ca. pteridis</i> species complex	Number of species (A)	7	5	6	6	5	5	4	7	6
		Number of identified species (B)	7	3	6	4	1	3	4	7	6
		Identification success rates (B/A)%	100%	60.0%	100.0%	66.7%	20.0%	60.0%	100%	100.0%	100%

10	<i>Ca. reteaudii</i> species complex	Number of species (A)	9	9	9	9	9	9	9	9	
		Number of identified species (B)	9	4	5	7	5	2	7	7	9
		Identification success rates (B/A)%	100%	44.4%	55.6%	77.8%	55.6%	22.2%	77.8%	77.8%	100%
11	<i>Ca. spathiphylli</i> species complex	Number of species (A)	4	3	4	4	4	4	2	4	4
		Number of identified species (B)	4	3	4	4	2	0	2	4	4
		Identification success rates (B/A)%	100%	100.0%	100.0%	100.0%	50.0%	0.0%	100%	100%	100%

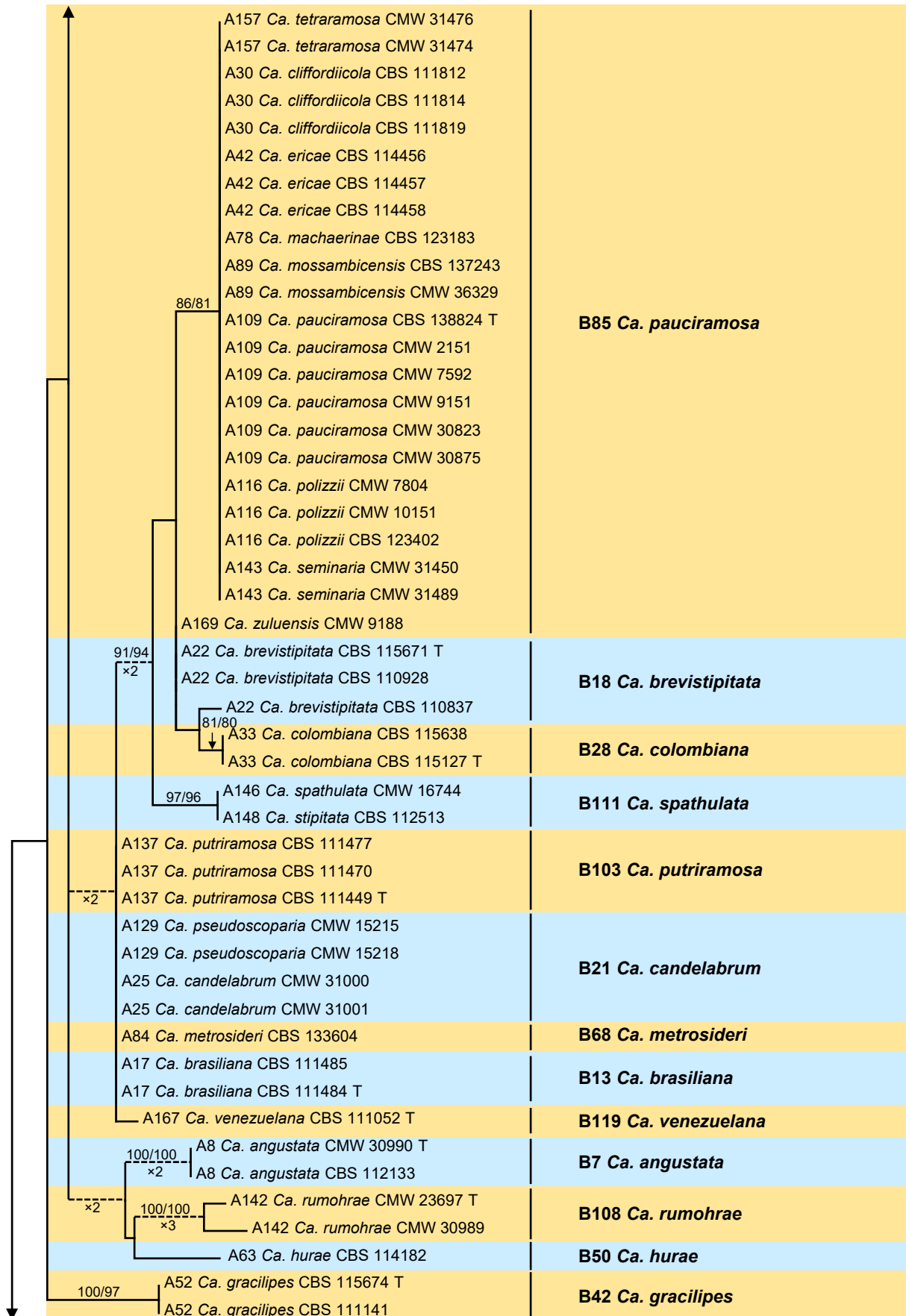
¹Combination of eight genes: *act. cmdA* . *his3* . ITS . LSU . *rpb2* . *tef1* and *tub2* .

²Four of the most successful barcodes within *Calonectria* and each species complex were marked in colour; different colours indicate identification success rates in different ranges, 80% ≤ (B/A)% in orange, 70% ≤ (B/A)% < 80% in dark green, 60% ≤ (B/A)% < 70% in light green, 50% ≤ (B/A)% < 60% in dark blue.

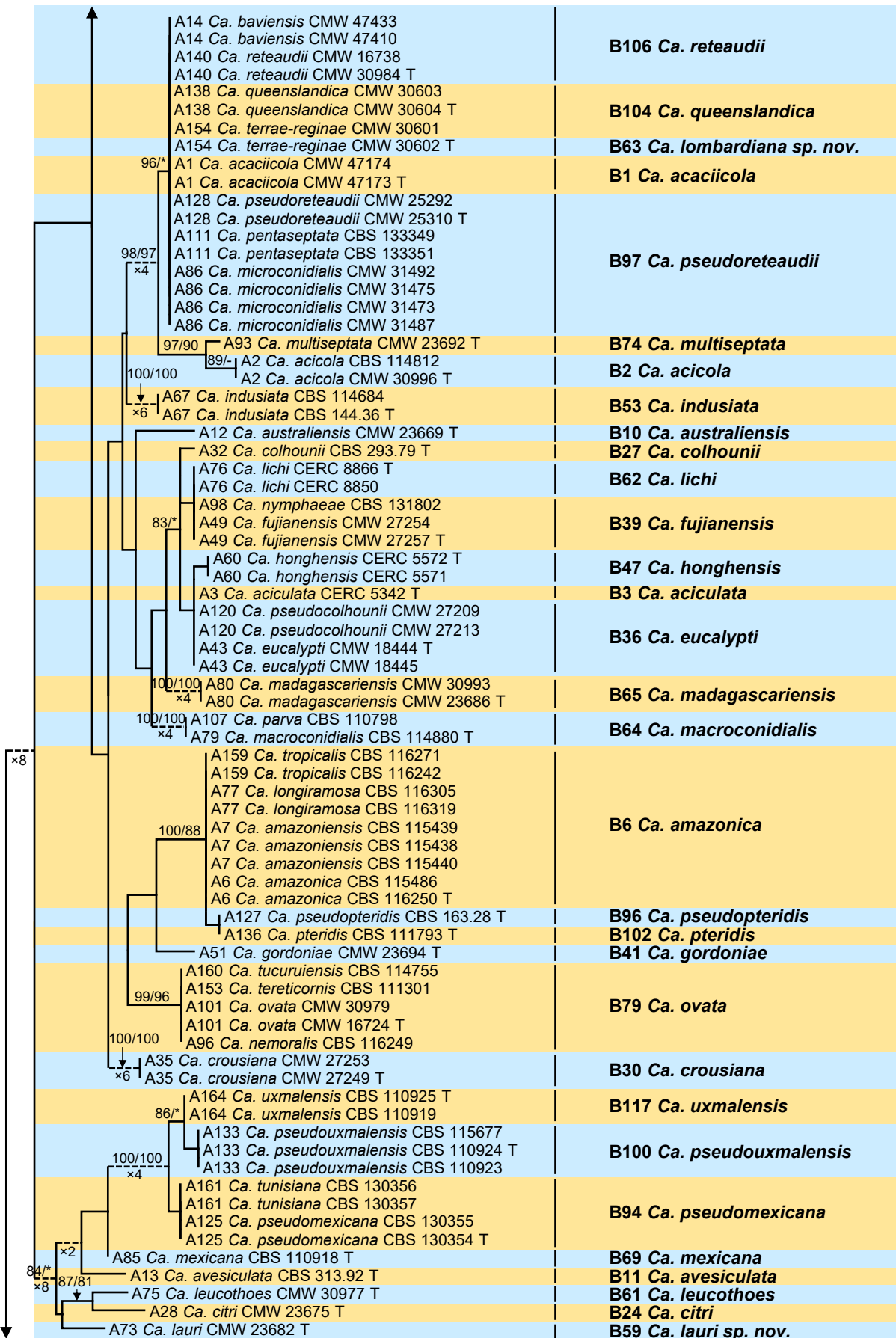
Supplementary Fig. S1 act



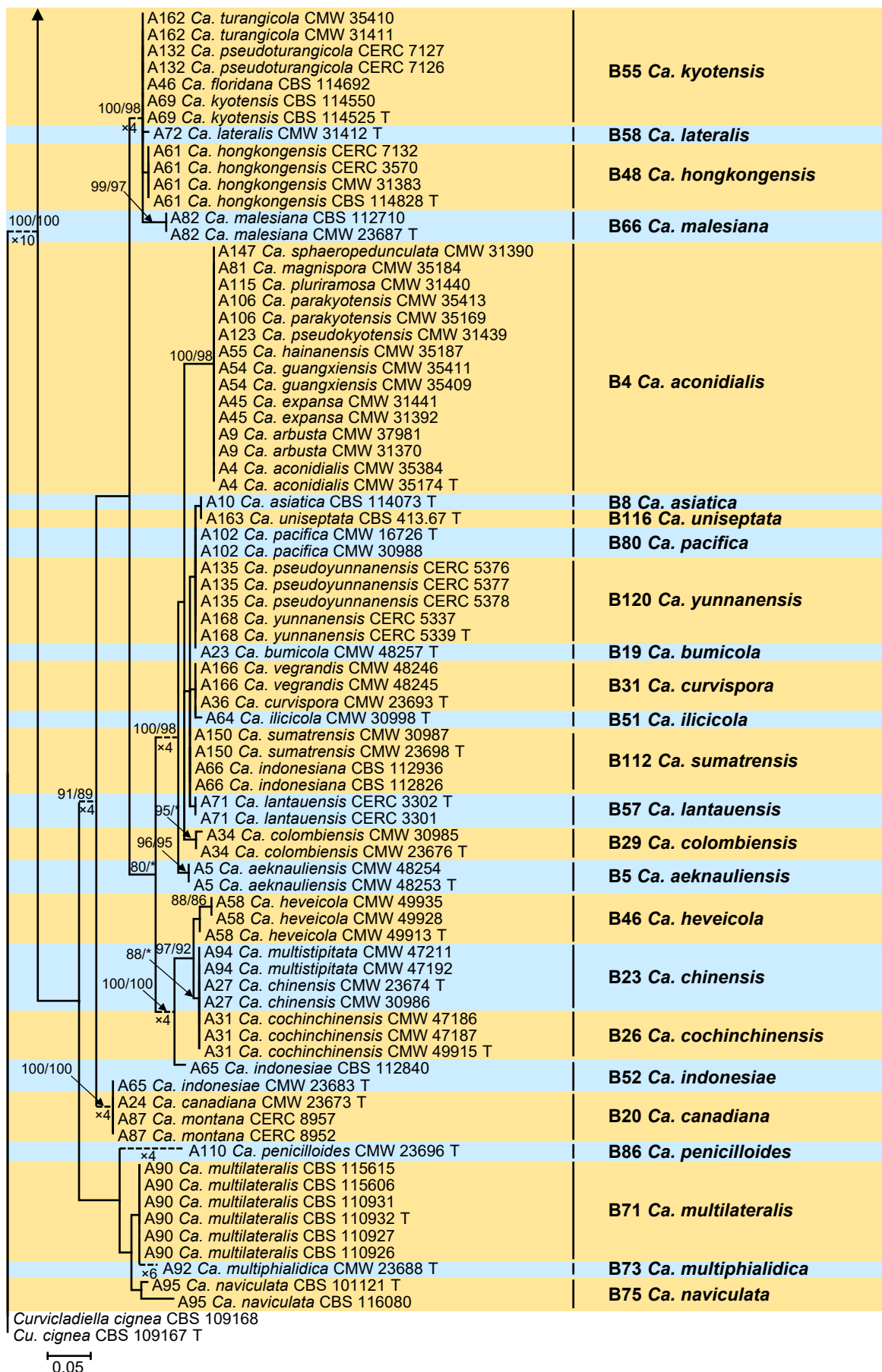
Supplementary Fig. S1 *act*



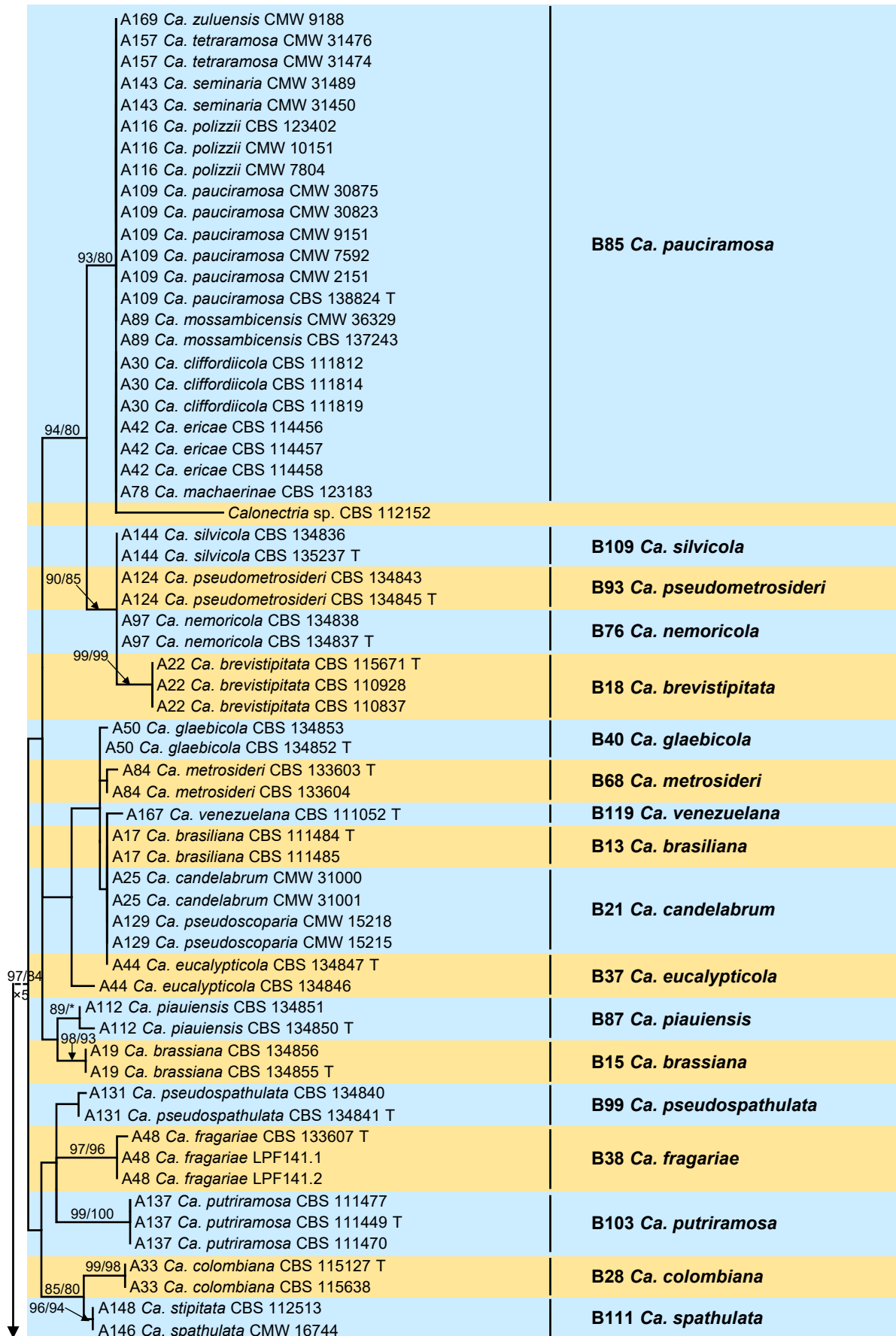
Supplementary Fig. S1 *act*



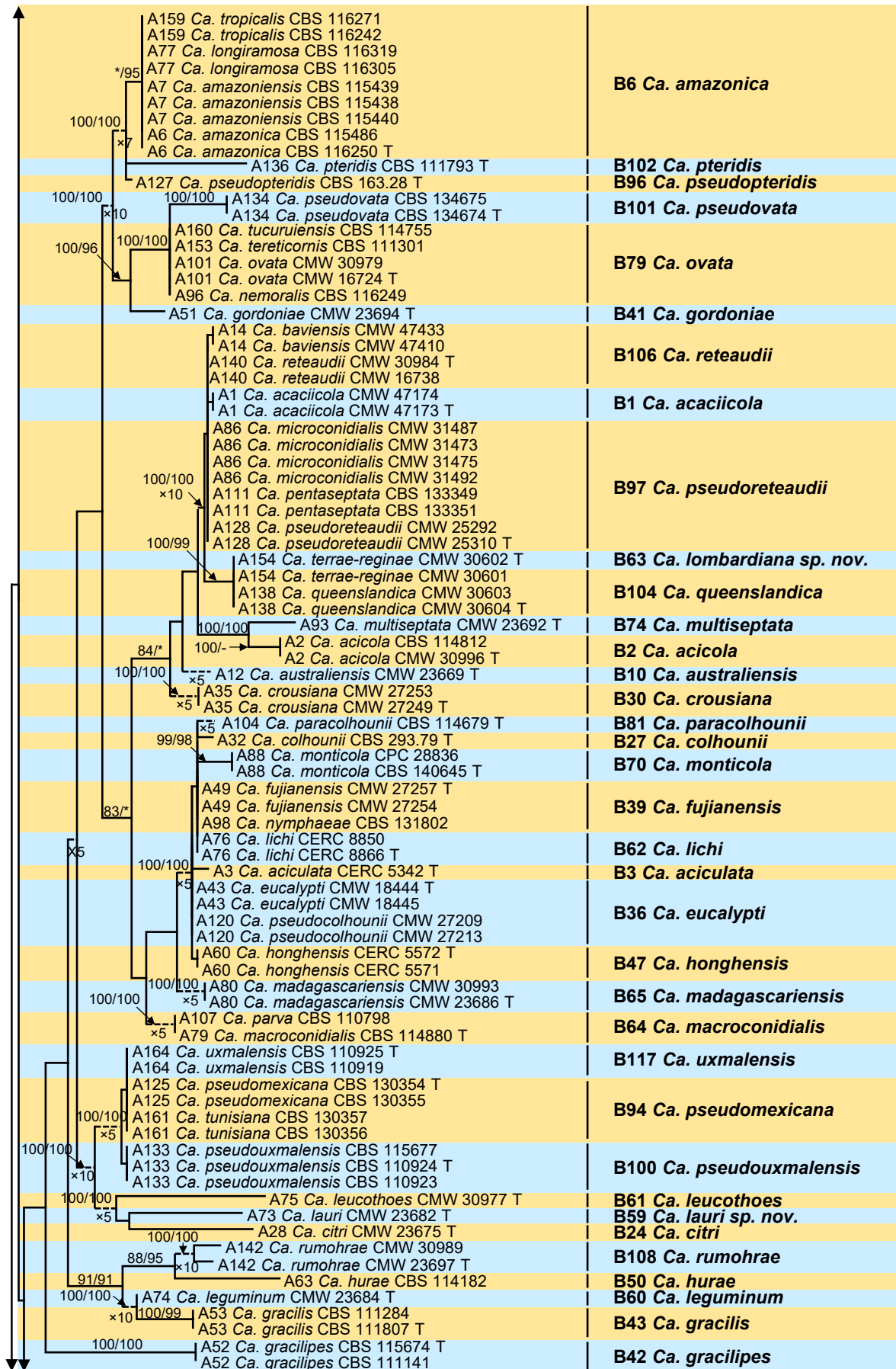
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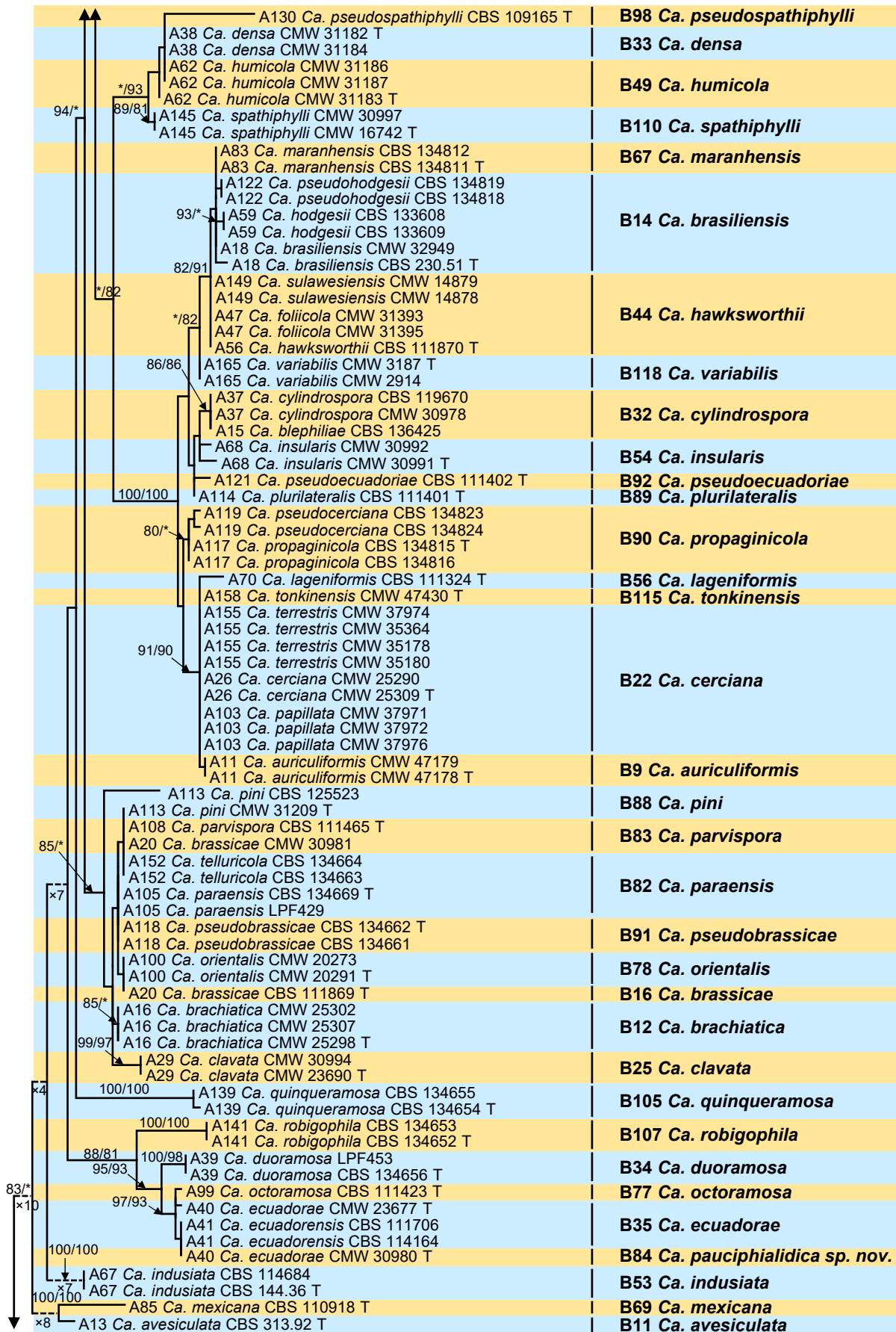
Supplementary Fig. S2 *cmdA*



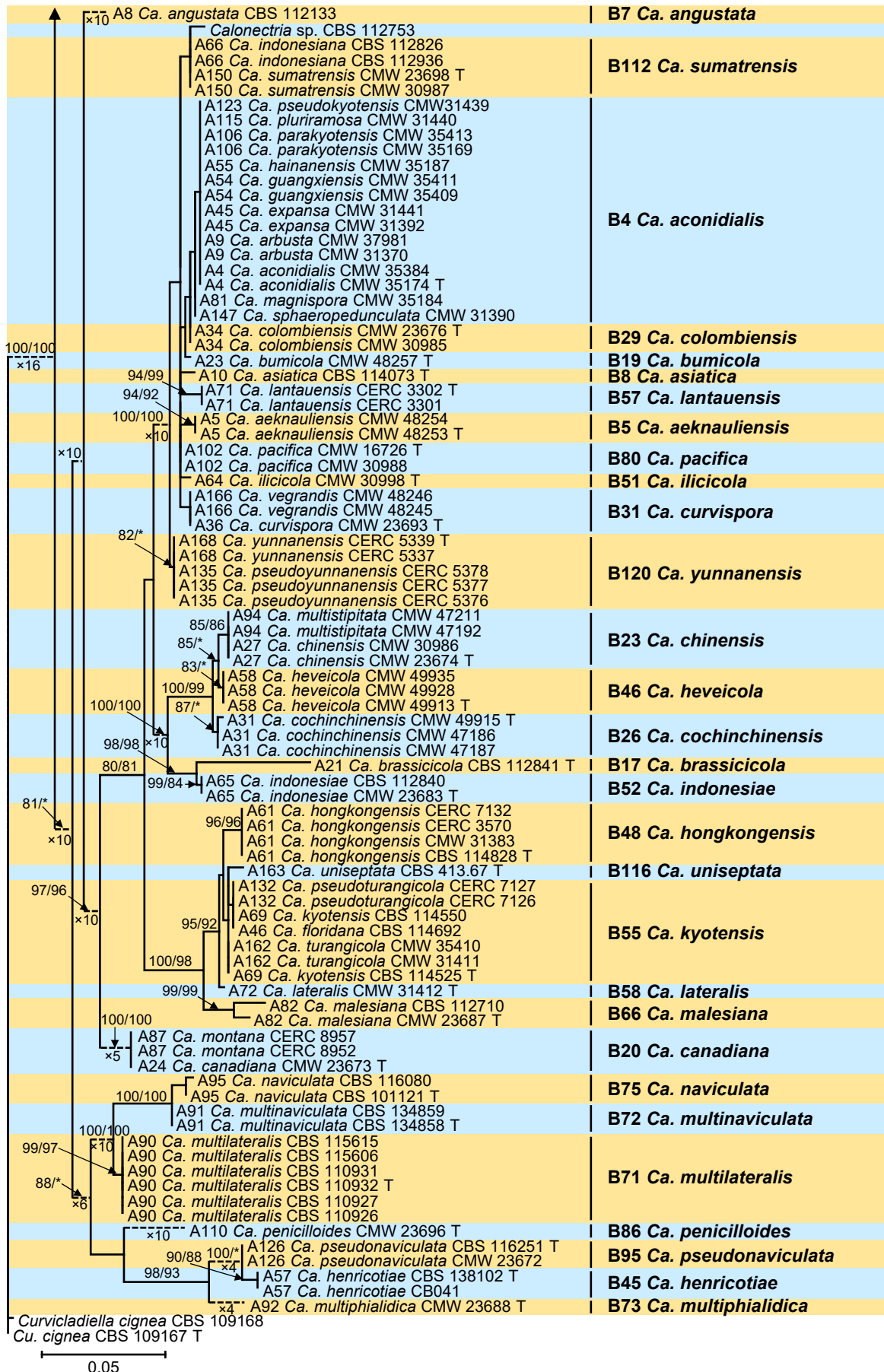
Supplementary Fig. S2 *cmdA*



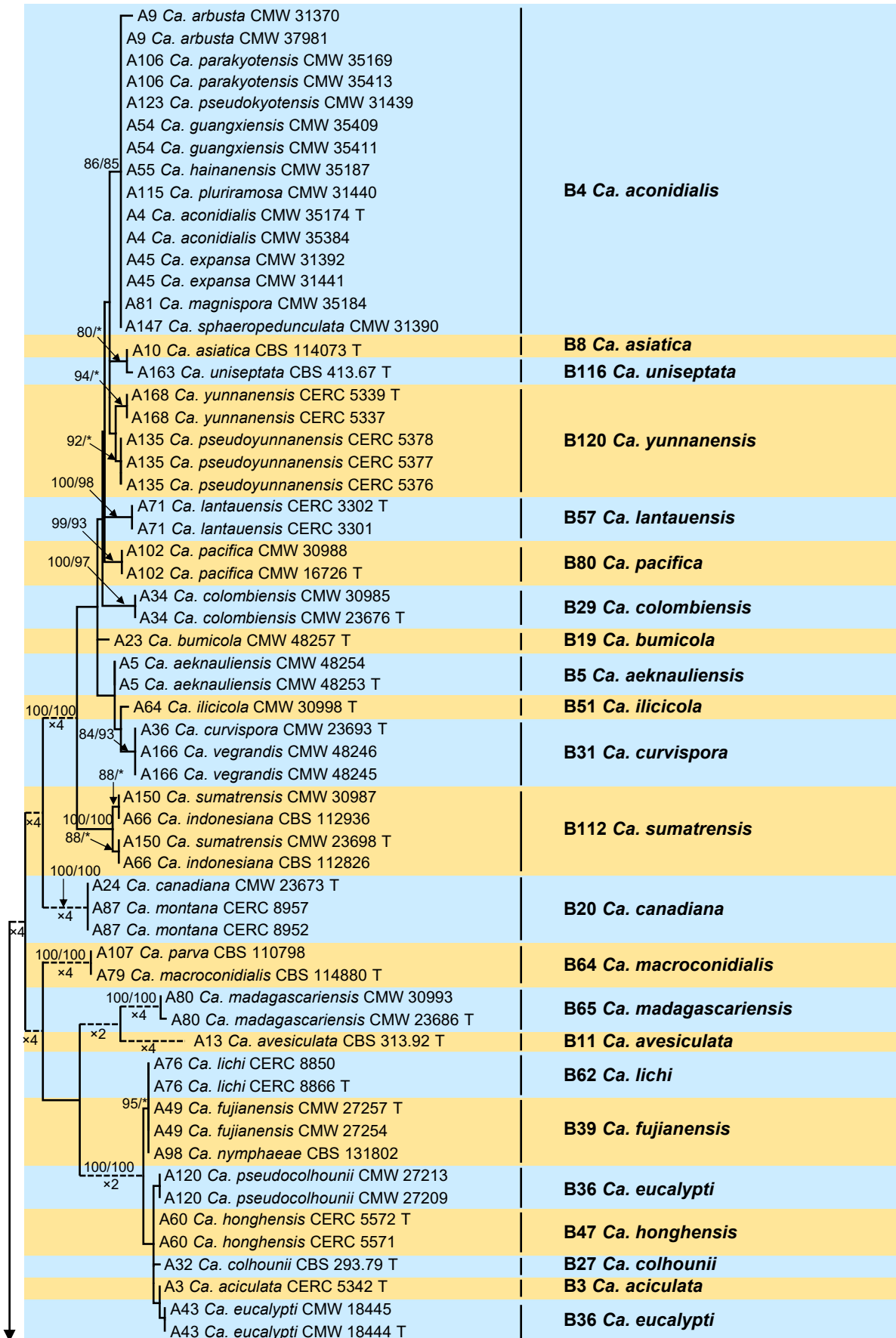
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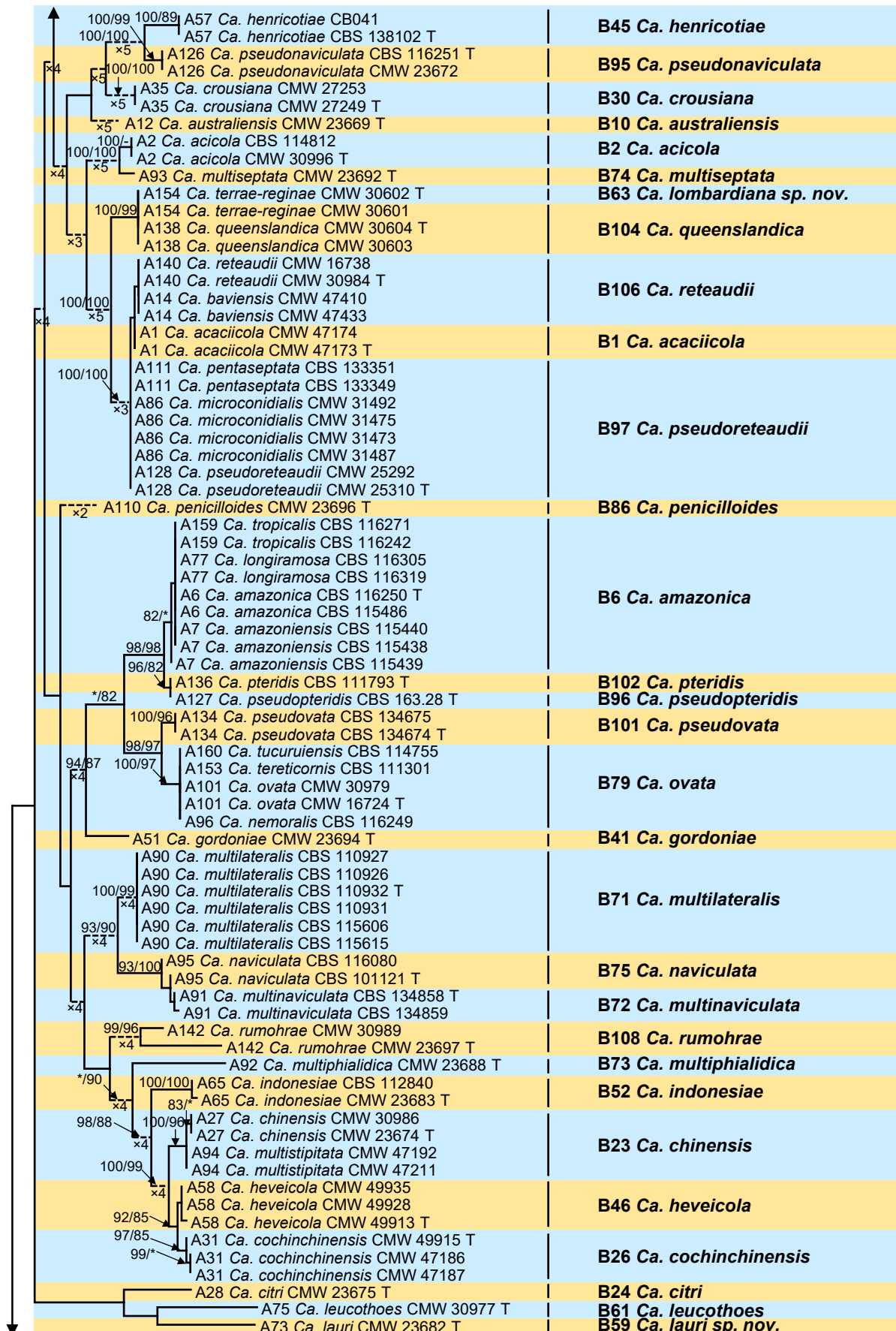
Supplementary Fig. S2 cmdA



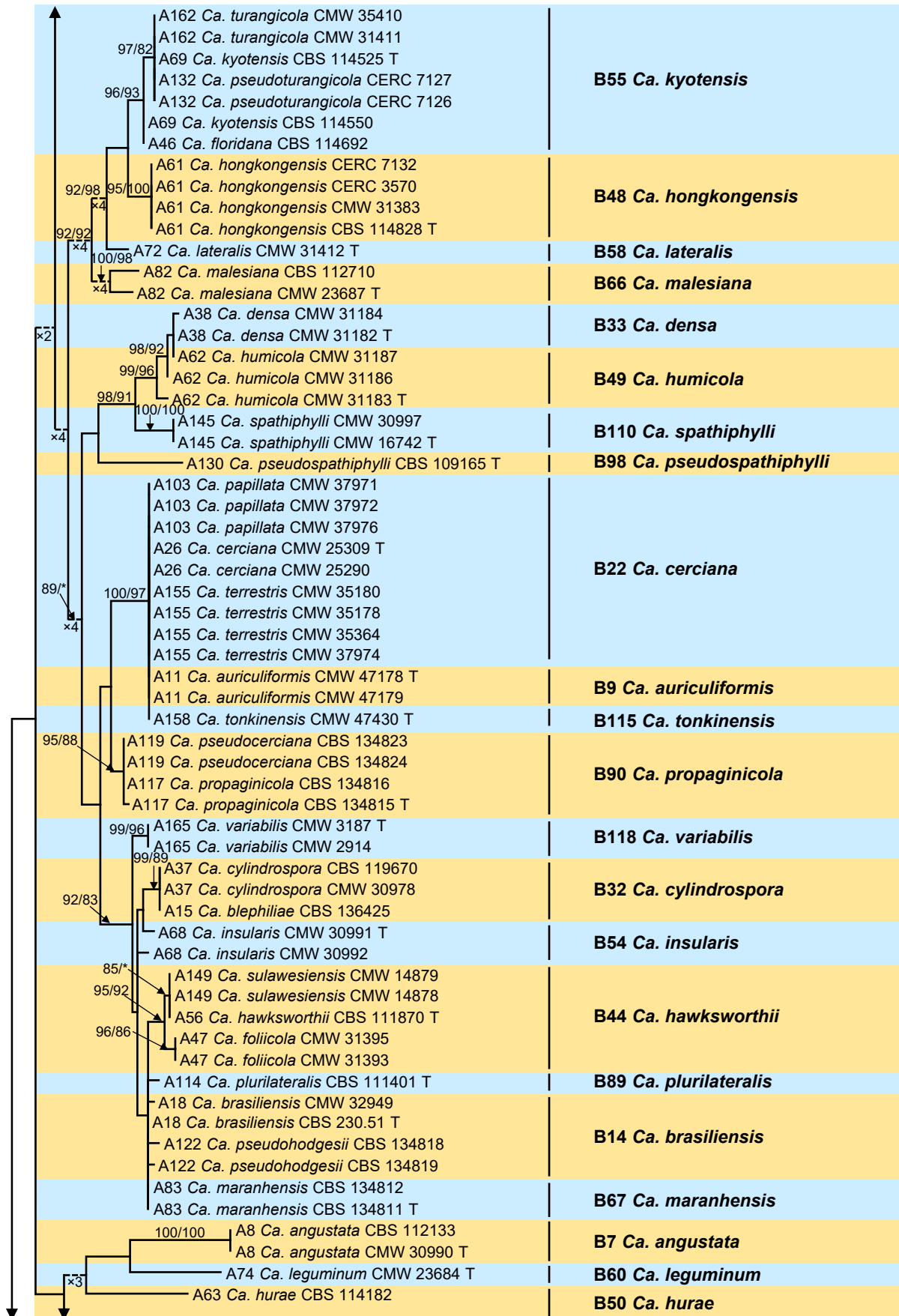
Supplementary Fig. S3 *his3*



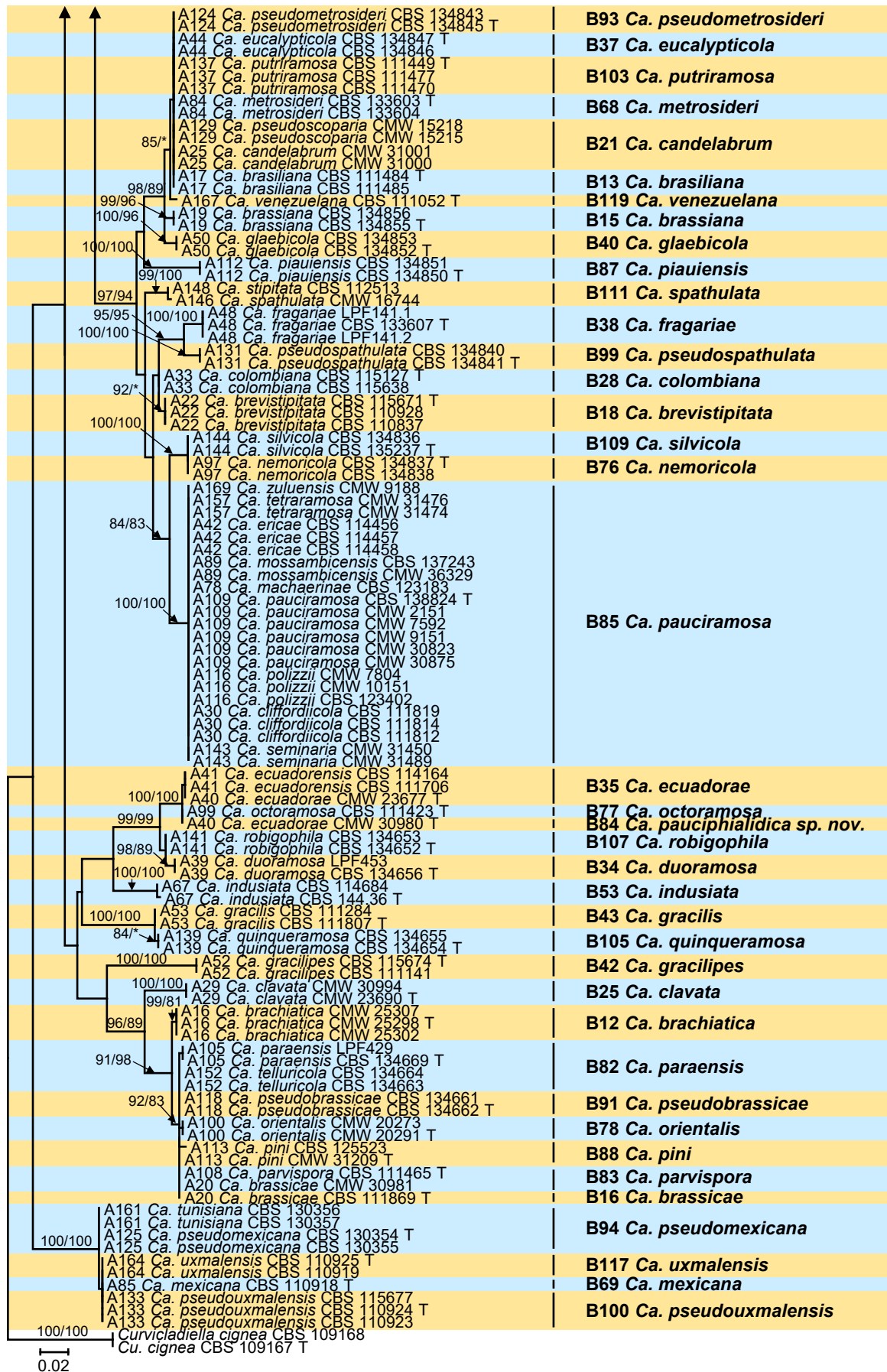
Supplementary Fig. S3 *his3*



Supplementary Fig. S3 *his3*



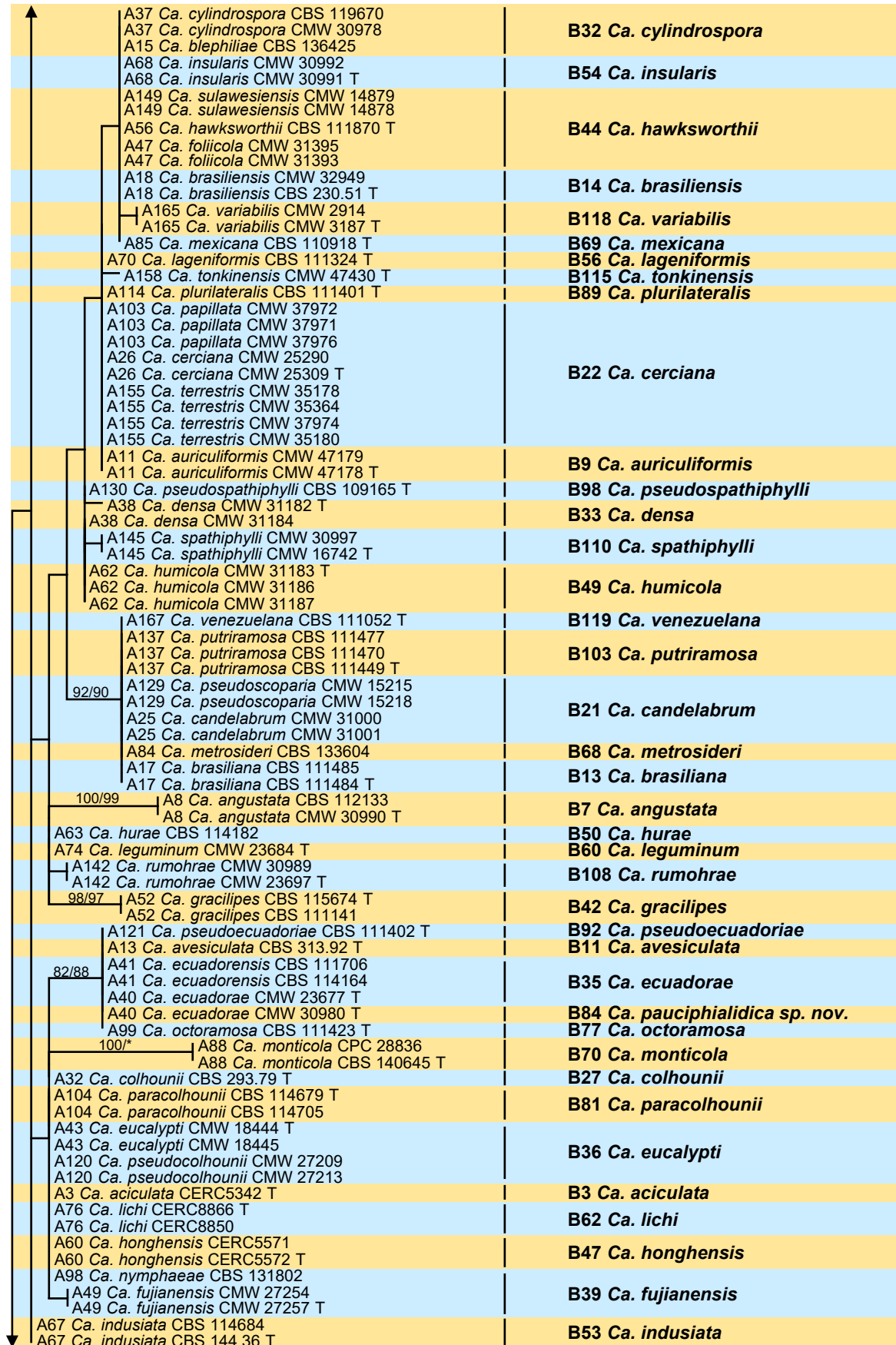
Supplementary Fig. S3 *his3*



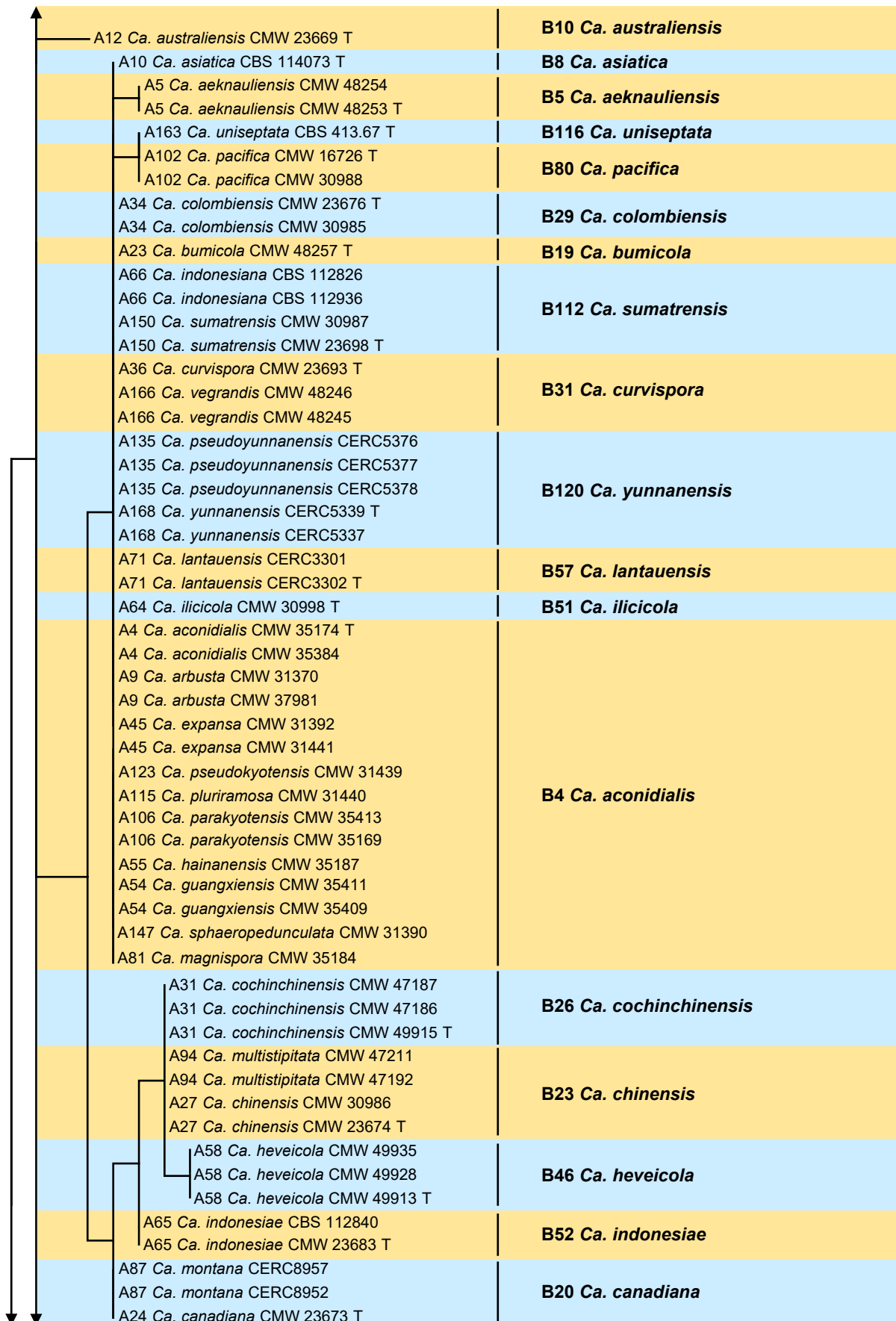
Supplementary Fig. S4 ITS

A22 <i>Ca. brevistipitata</i> CBS 115671 T A22 <i>Ca. brevistipitata</i> CBS 110837 A22 <i>Ca. brevistipitata</i> CBS 110928	B18 <i>Ca. brevistipitata</i>
A169 <i>Ca. zuluensis</i> CMW 9188 A30 <i>Ca. cliffordiicola</i> CBS 111812 A30 <i>Ca. cliffordiicola</i> CBS 111814 A30 <i>Ca. cliffordiicola</i> CBS 111819 A42 <i>Ca. ericae</i> CBS 114456 A42 <i>Ca. ericae</i> CBS 114457 A42 <i>Ca. ericae</i> CBS 114458 A78 <i>Ca. machaerinae</i> CBS 123183 A89 <i>Ca. mossambicensis</i> CBS 137243 A89 <i>Ca. mossambicensis</i> CMW 36329 A109 <i>Ca. pauciramosa</i> CBS 138824 T A109 <i>Ca. pauciramosa</i> CMW 2151 A109 <i>Ca. pauciramosa</i> CMW 7592 A109 <i>Ca. pauciramosa</i> CMW 9151 A109 <i>Ca. pauciramosa</i> CMW 30823 A109 <i>Ca. pauciramosa</i> CMW 30875 A116 <i>Ca. polizzii</i> CMW 7804 A116 <i>Ca. polizzii</i> CMW 10151 A116 <i>Ca. polizzii</i> CBS 123402 A143 <i>Ca. seminaria</i> CMW 31450 A143 <i>Ca. seminaria</i> CMW 31489 A157 <i>Ca. tetraramosa</i> CMW 31474 A157 <i>Ca. tetraramosa</i> CMW 31476	B85 <i>Ca. pauciramosa</i>
A146 <i>Ca. spathulata</i> CMW 16744 A148 <i>Ca. stipitata</i> CBS 112513	B111 <i>Ca. spathulata</i>
— <i>Calonectria</i> sp. CBS 112152 <i>Calonectria</i> sp. CBS 112753	
A138 <i>Ca. queenslandica</i> CMW 30604 T A138 <i>Ca. queenslandica</i> CMW 30603 A154 <i>Ca. terrae-reginae</i> CMW 30601 — A154 <i>Ca. terrae-reginae</i> CMW 30602 T	B104 <i>Ca. queenslandica</i> B63 <i>Ca. lombardiana</i> sp. nov.
A140 <i>Ca. reteaudii</i> CMW 30984 T A140 <i>Ca. reteaudii</i> CMW 16738 A14 <i>Ca. baviensis</i> CMW 47410 A14 <i>Ca. baviensis</i> CMW 47433	B106 <i>Ca. reteaudii</i>
A1 <i>Ca. acaciicola</i> CMW 47173 T A1 <i>Ca. acaciicola</i> CMW 47174	B1 <i>Ca. acaciicola</i>
A86 <i>Ca. microconidialis</i> CMW 31487 A86 <i>Ca. microconidialis</i> CMW 31473 A86 <i>Ca. microconidialis</i> CMW 31475 A86 <i>Ca. microconidialis</i> CMW 31492 A111 <i>Ca. pentaseptata</i> CBS 133349 A111 <i>Ca. pentaseptata</i> CBS 133351 A128 <i>Ca. pseudoreteaudii</i> CMW 25292 A128 <i>Ca. pseudoreteaudii</i> CMW 25310 T	B97 <i>Ca. pseudoreteaudii</i>
A33 <i>Ca. colombiana</i> CBS 115127 T A33 <i>Ca. colombiana</i> CBS 115638	B28 <i>Ca. colombiana</i>
A164 <i>Ca. uxmalensis</i> CBS 110925 T A164 <i>Ca. uxmalensis</i> CBS 110919	B117 <i>Ca. uxmalensis</i>
A133 <i>Ca. pseudouxmalensis</i> CBS 110923 A133 <i>Ca. pseudouxmalensis</i> CBS 110924 T A133 <i>Ca. pseudouxmalensis</i> CBS 115677	B100 <i>Ca. pseudouxmalensis</i>
A125 <i>Ca. pseudomexicana</i> CBS 130354 T A125 <i>Ca. pseudomexicana</i> CBS 130355 A161 <i>Ca. tunisiana</i> CBS 130356 A161 <i>Ca. tunisiana</i> CBS 130357	B94 <i>Ca. pseudomexicana</i>
— A75 <i>Ca. leucothoes</i> CMW 30977 T — A28 <i>Ca. citri</i> CMW 23675 T — A73 <i>Ca. lauri</i> CMW 23682 T — A93 <i>Ca. multiseptata</i> CMW 23692 T — A2 <i>Ca. acicola</i> CMW 30996 T — A2 <i>Ca. acicola</i> CBS 114812	B61 <i>Ca. leucothoes</i> B24 <i>Ca. citri</i> B59 <i>Ca. lauri</i> sp. nov. B74 <i>Ca. multiseptata</i> B2 <i>Ca. acicola</i>

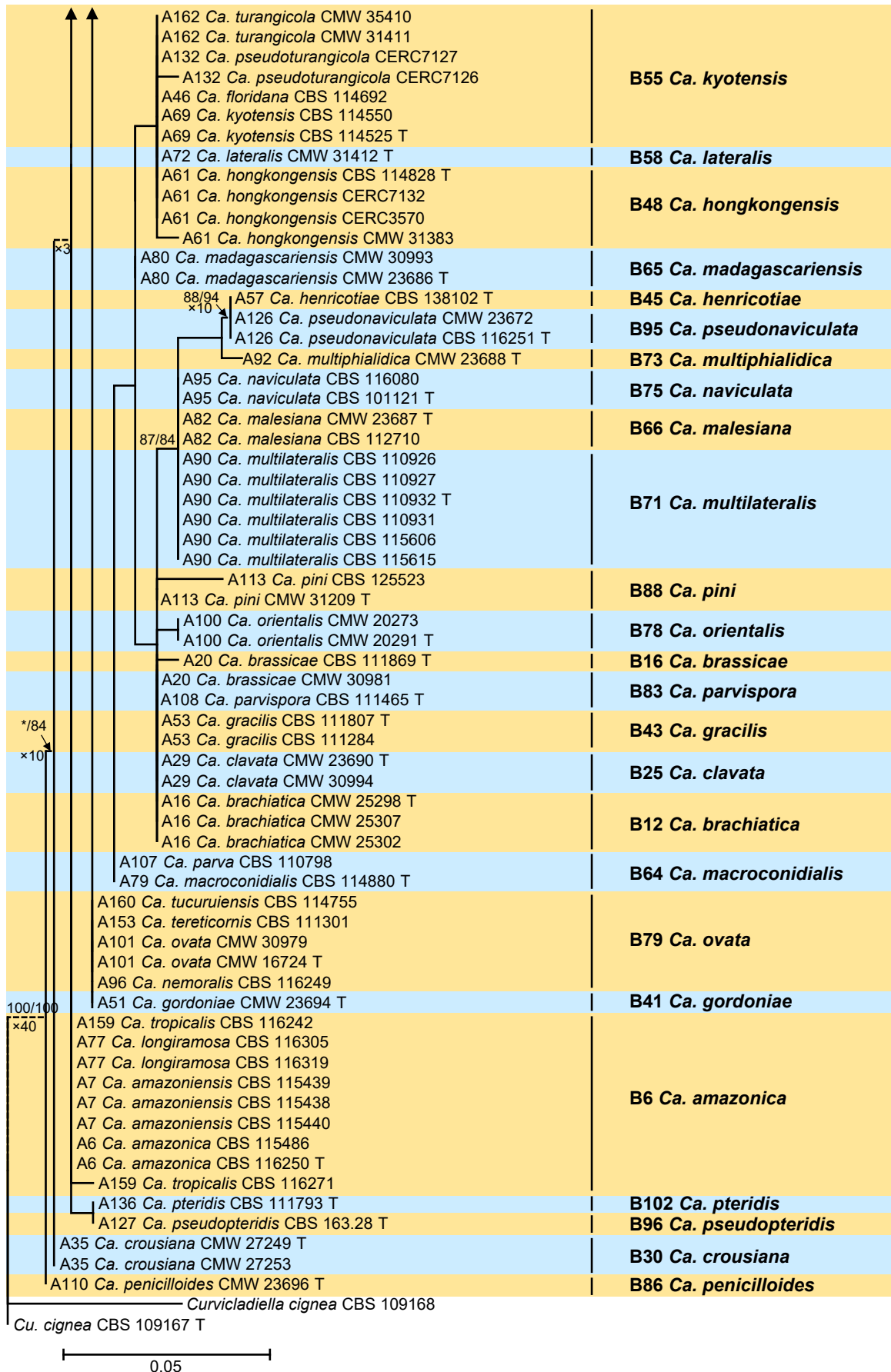
Supplementary Fig. S4 ITS



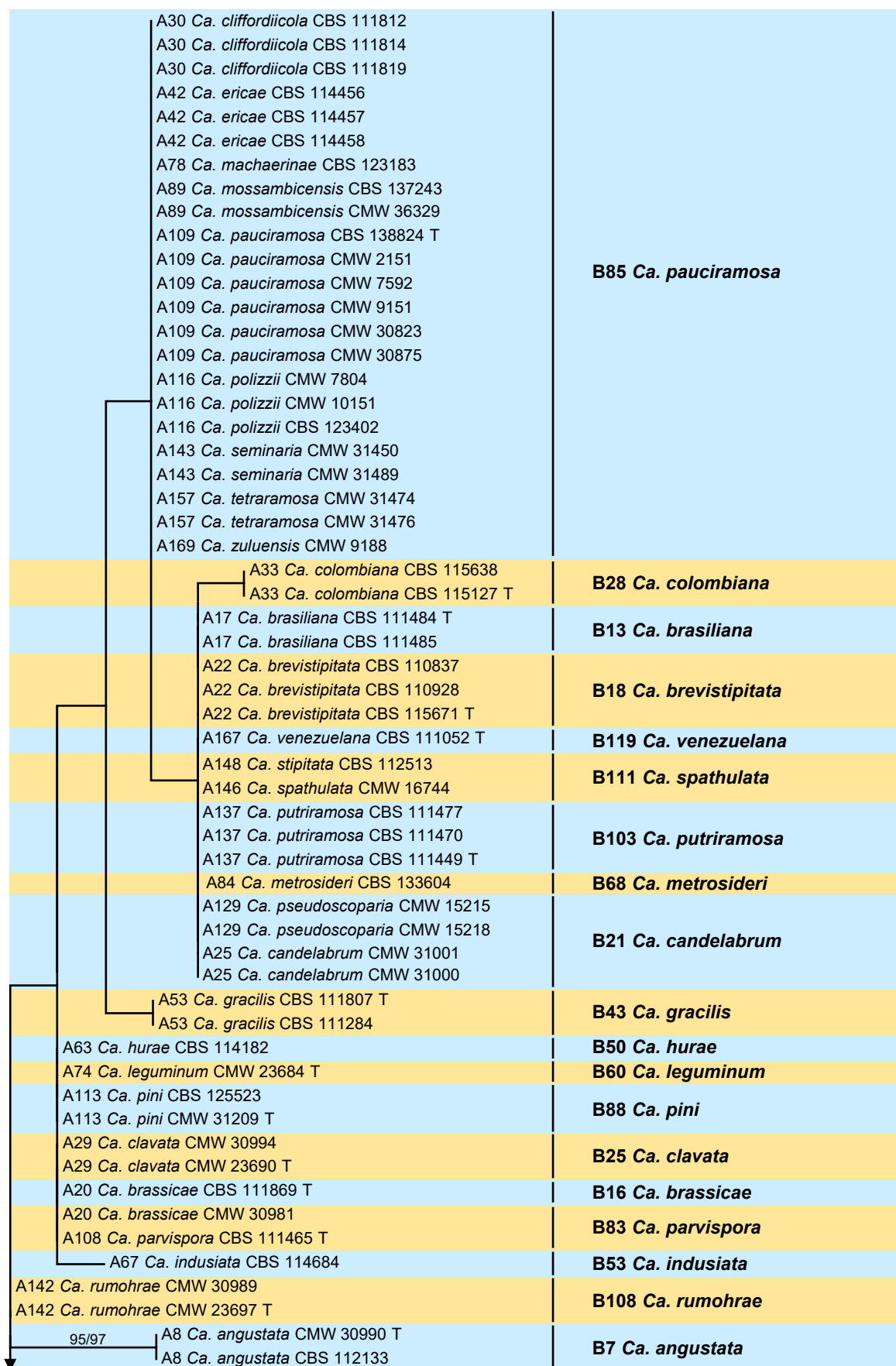
Supplementary Fig. S4 ITS



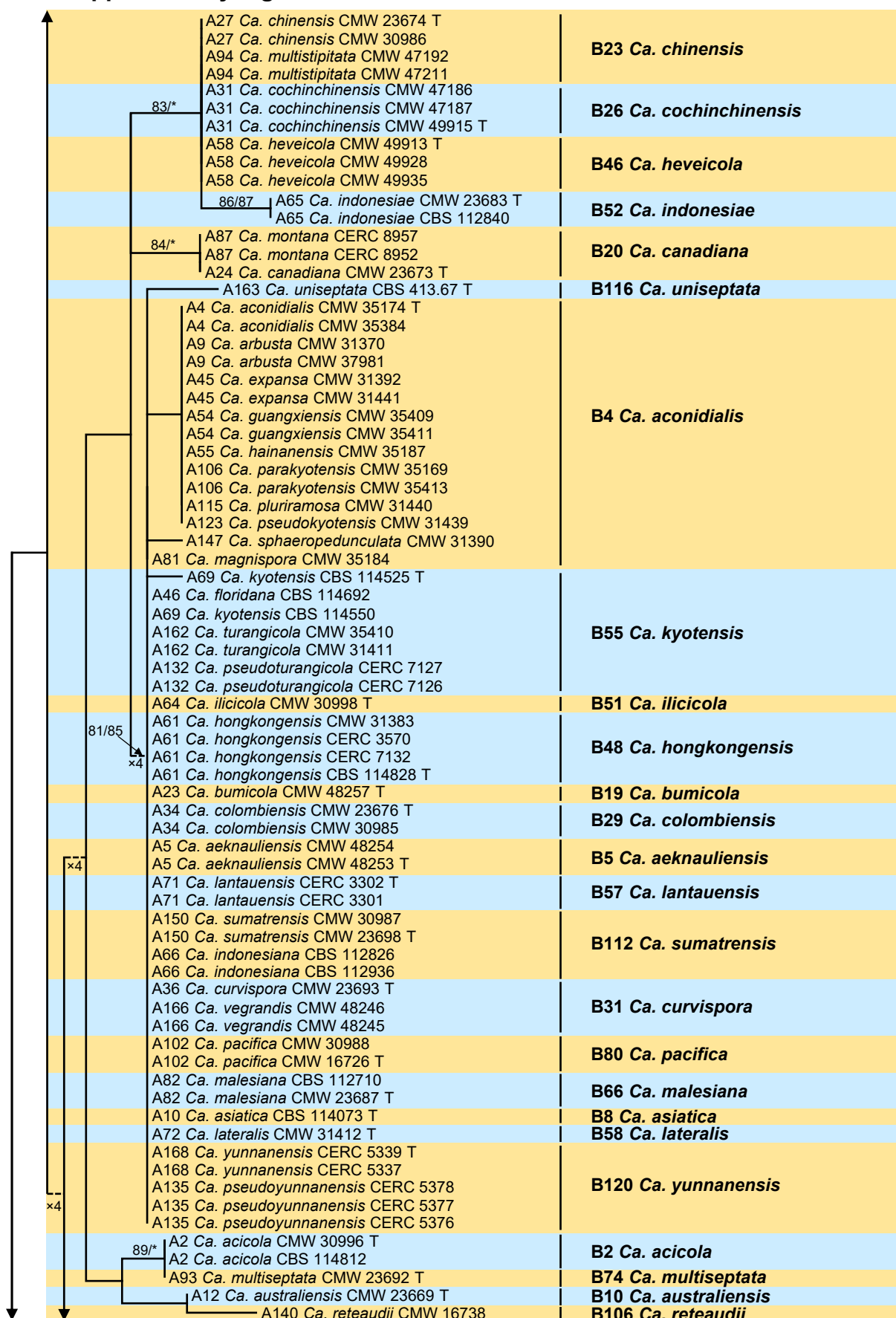
Supplementary Fig. S4 ITS



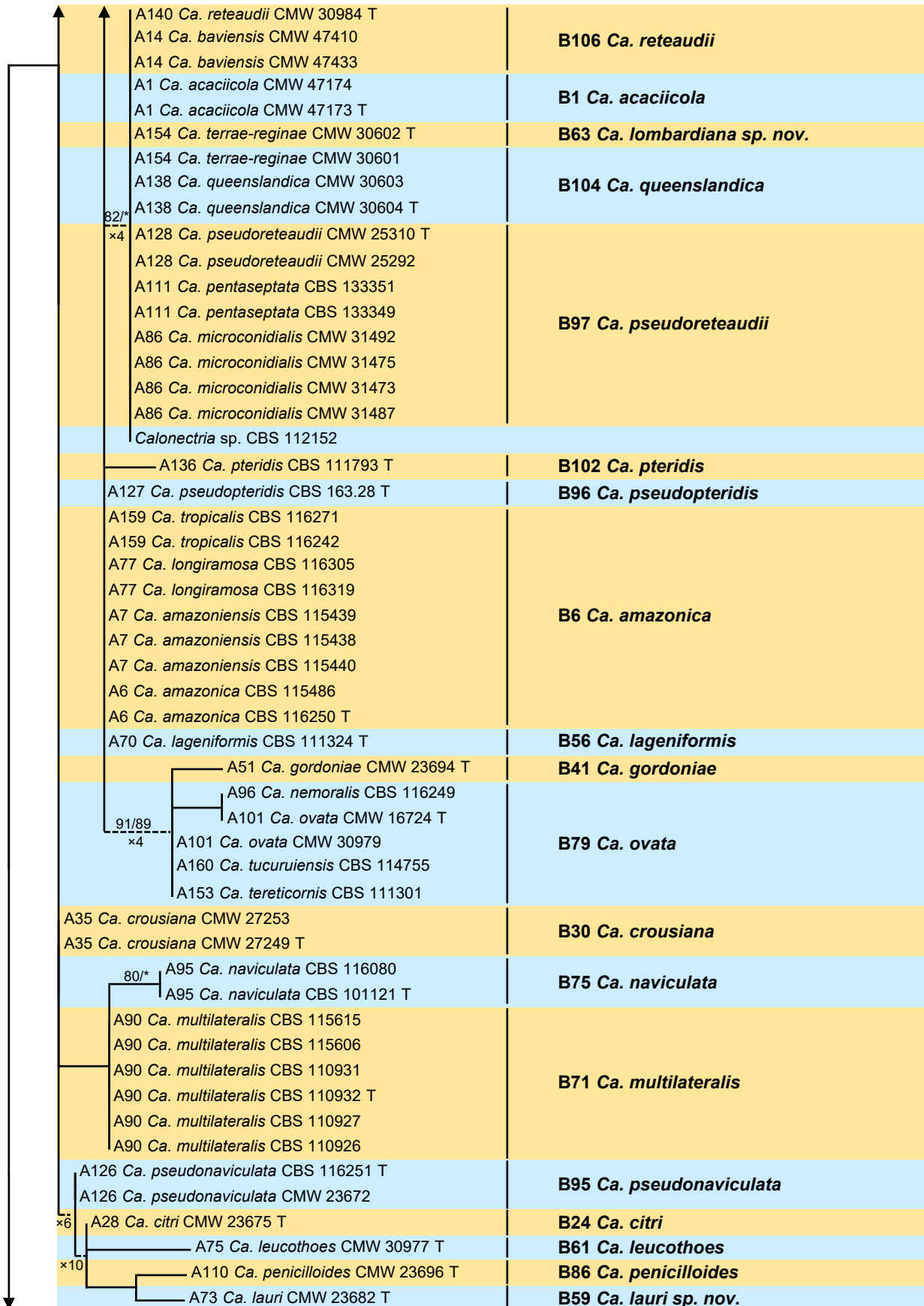
Supplementary Fig. S5 LSU



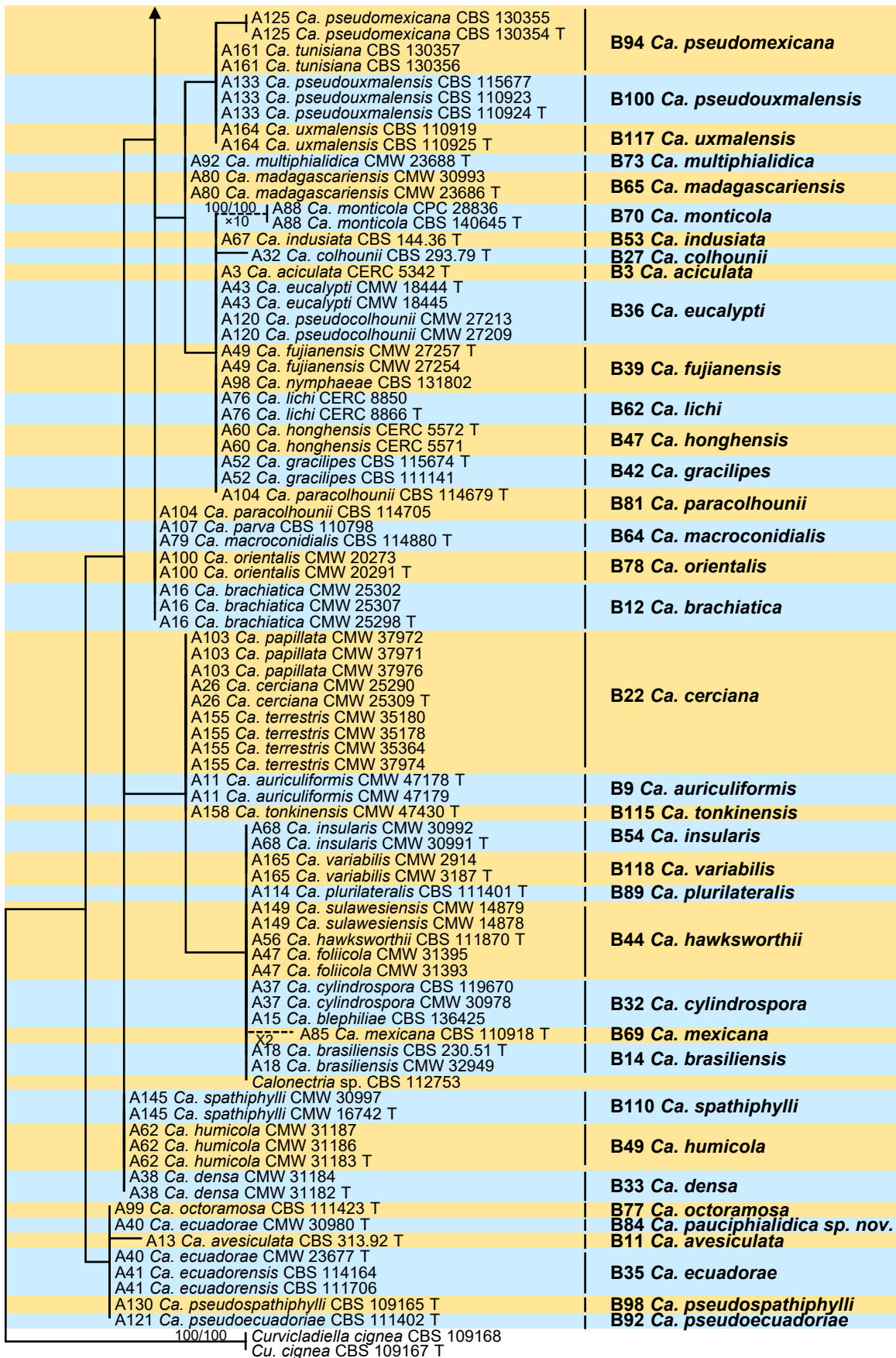
Supplementary Fig. S5 LSU



Supplementary Fig. S5 LSU

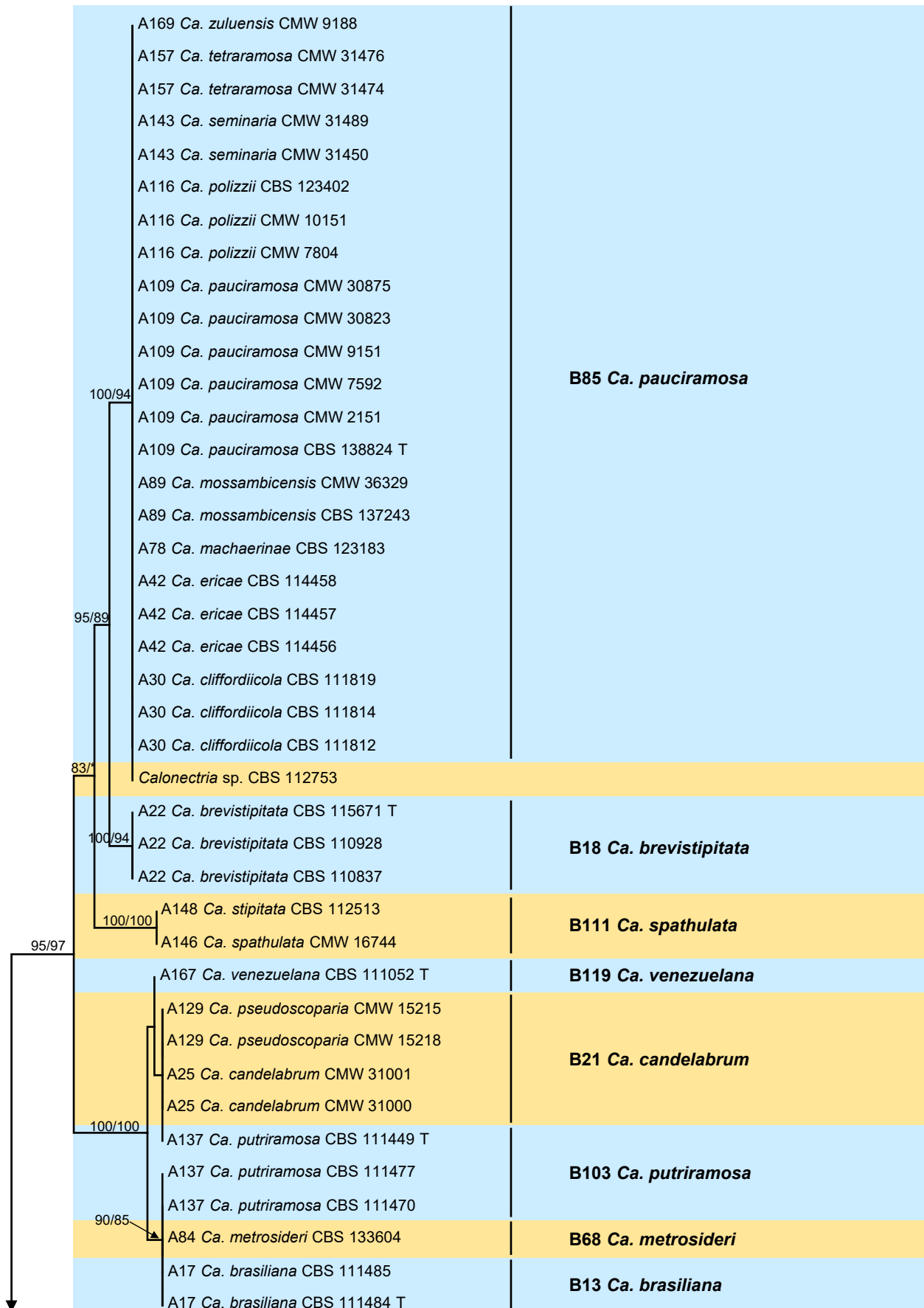


Supplementary Fig. S5 LSU

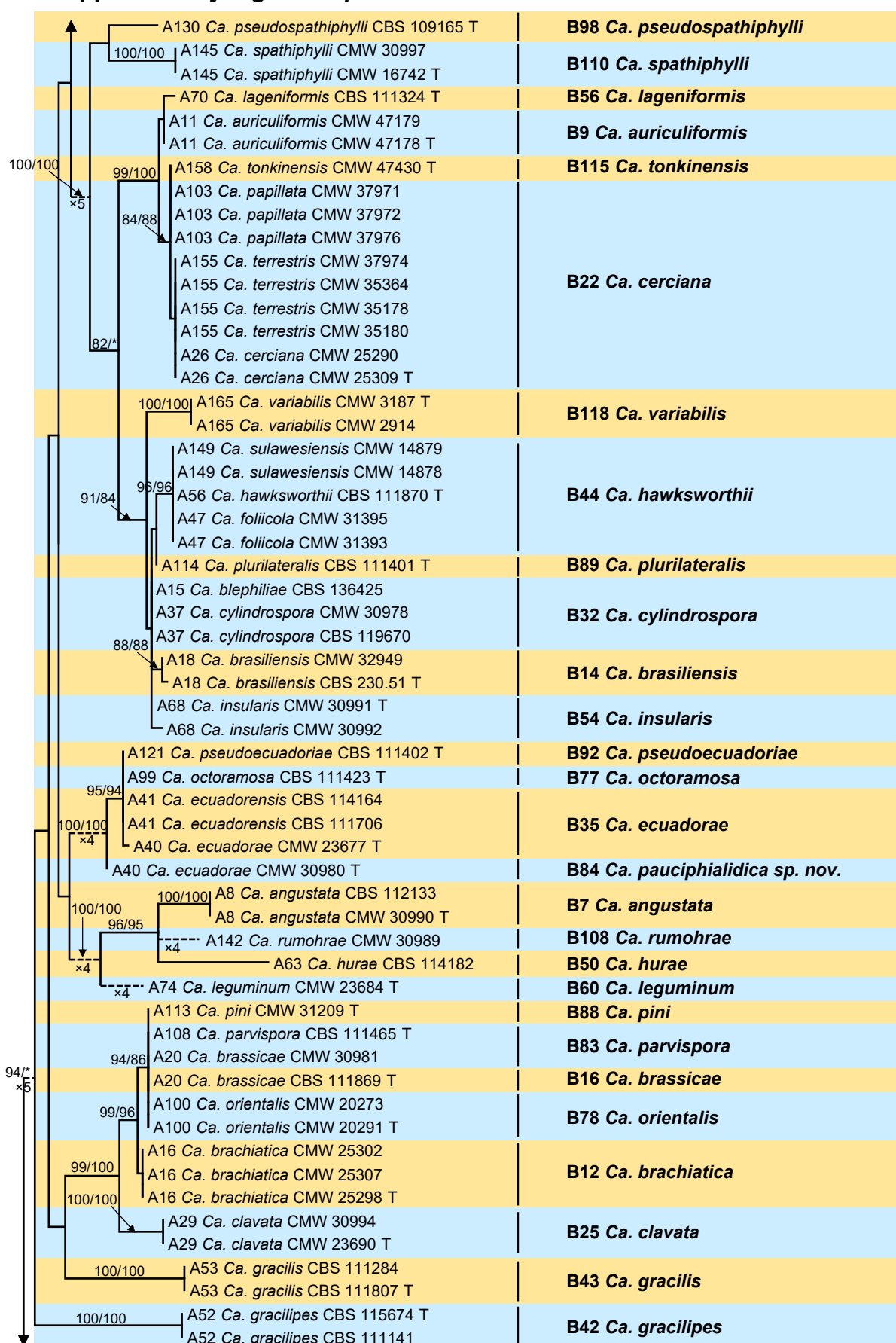


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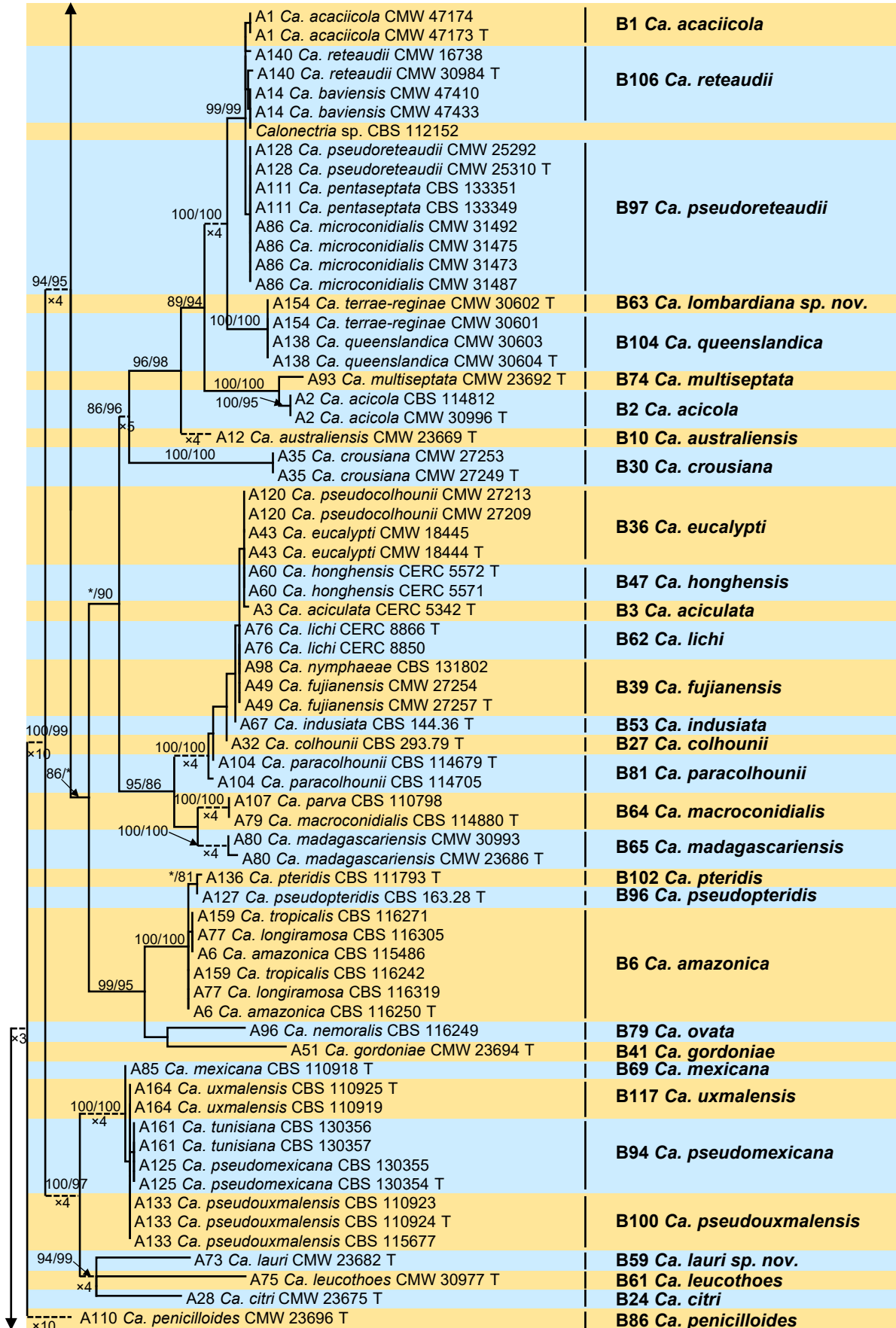
Supplementary Fig. S6 *rpb2*



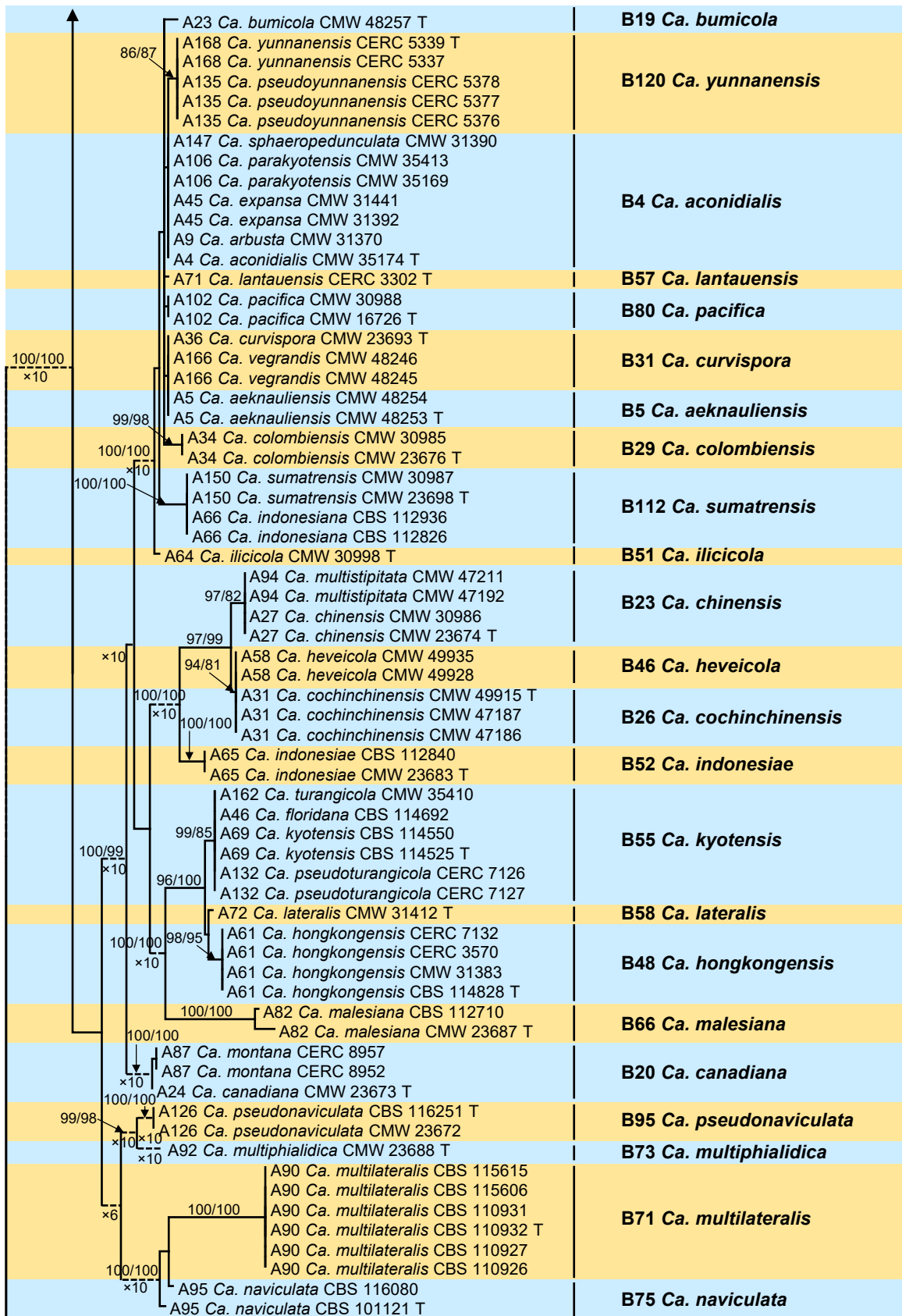
Supplementary Fig. S6 *rpb2*



Supplementary Fig. S6 *rpb2*



Supplementary Fig. S6 *rpb2*

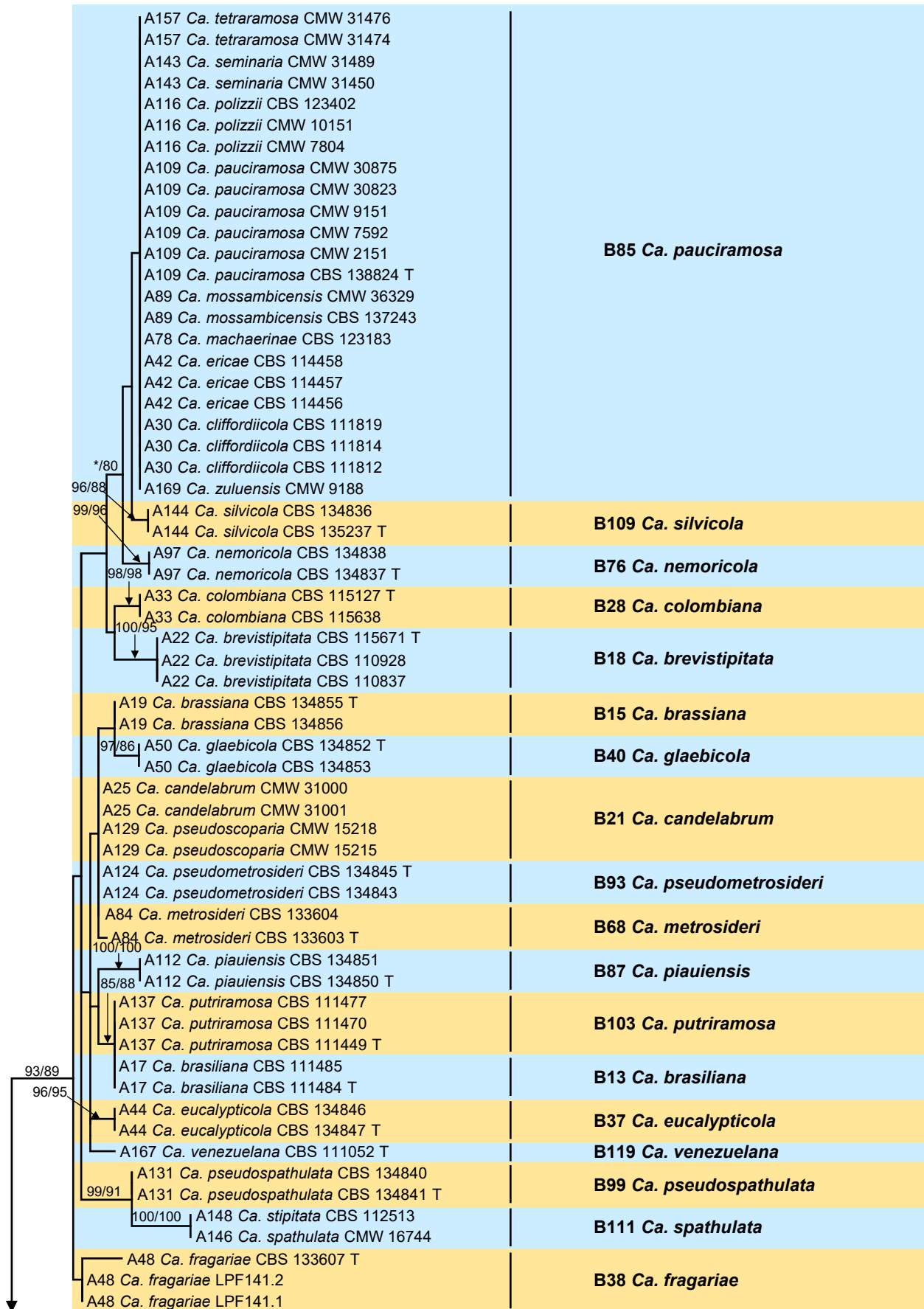


Curvcladiella cigneae CBS 109168

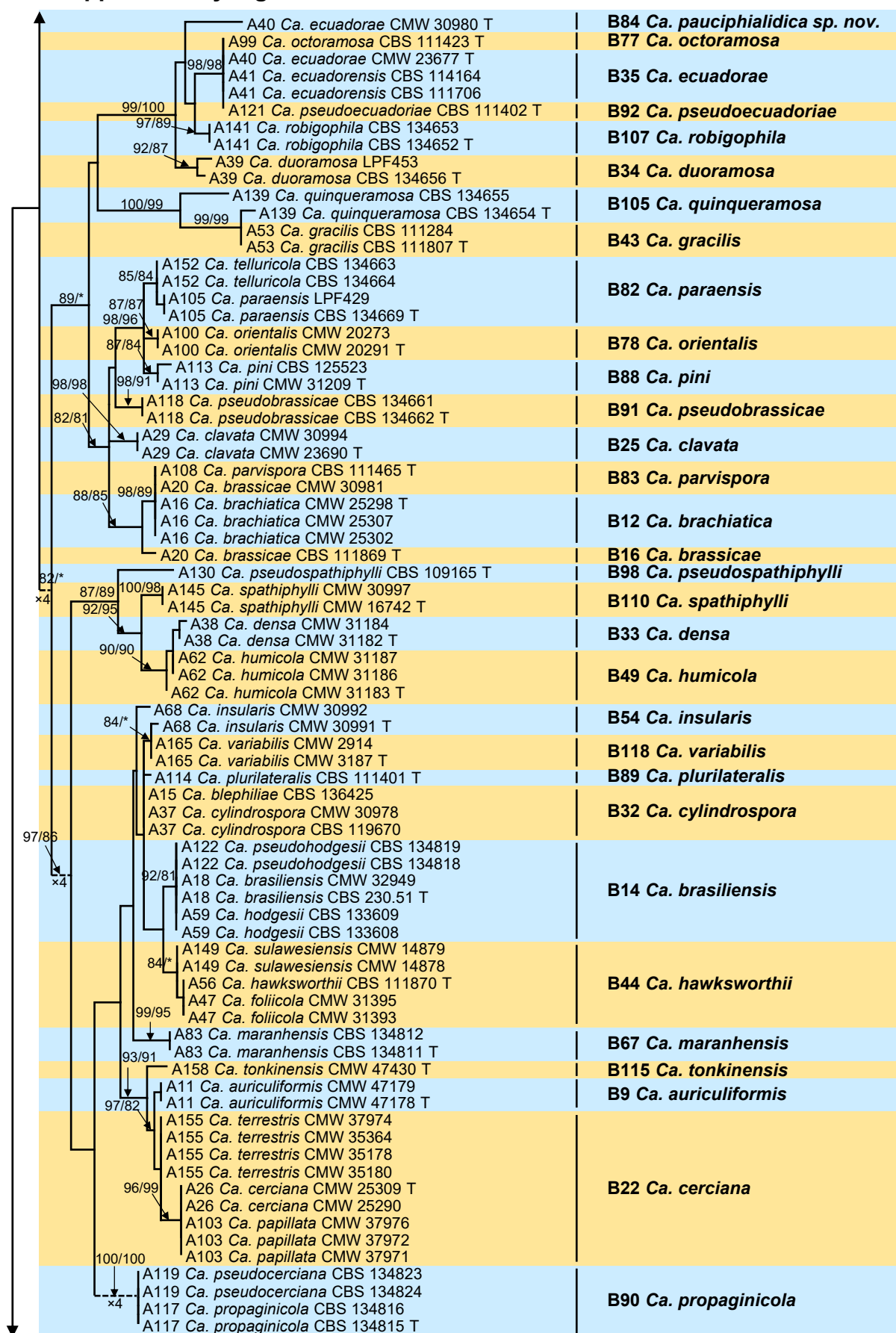
Ca. cigneae CBS 109167 T

0.1

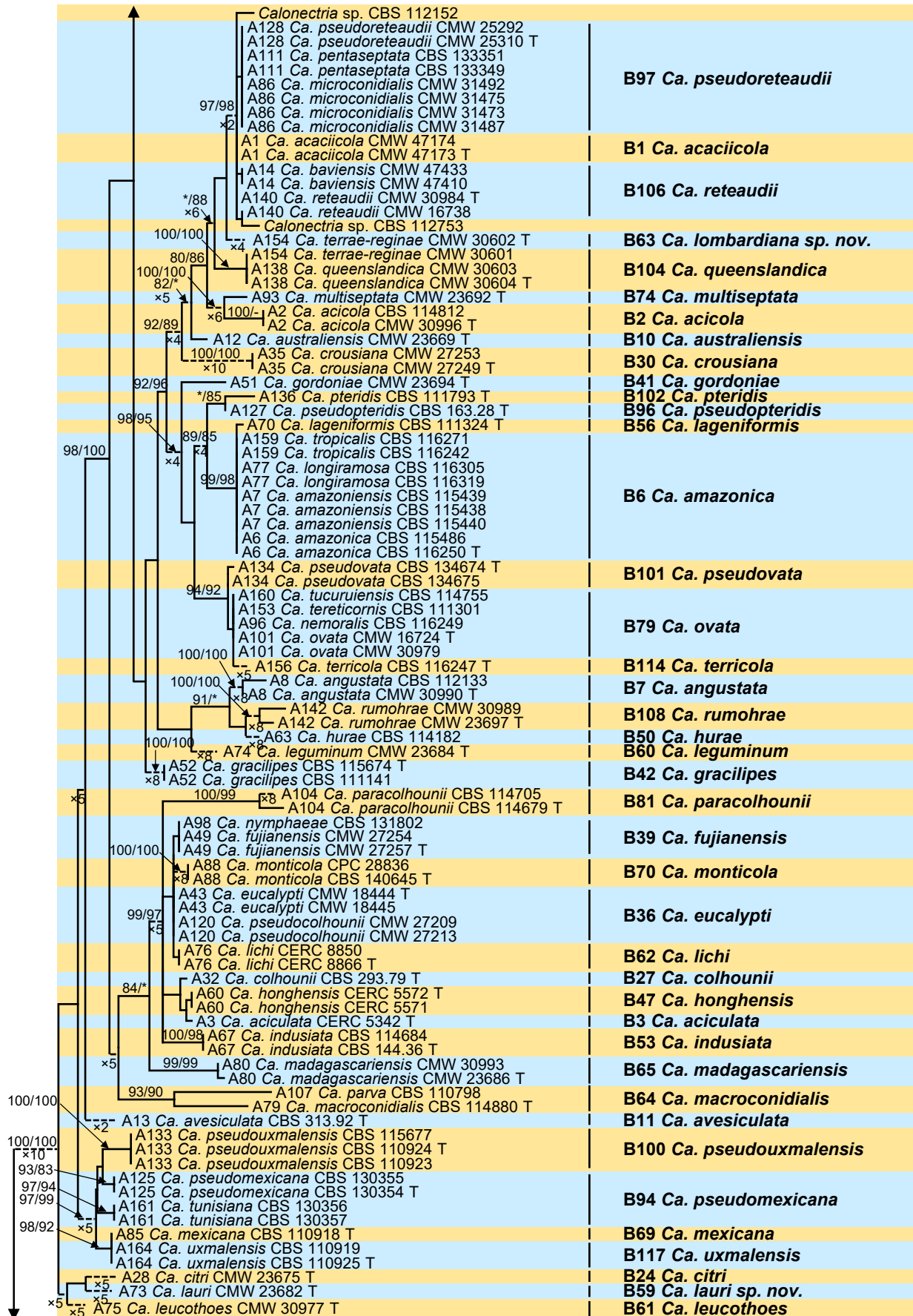
Supplementary Fig. S7 *tef1*



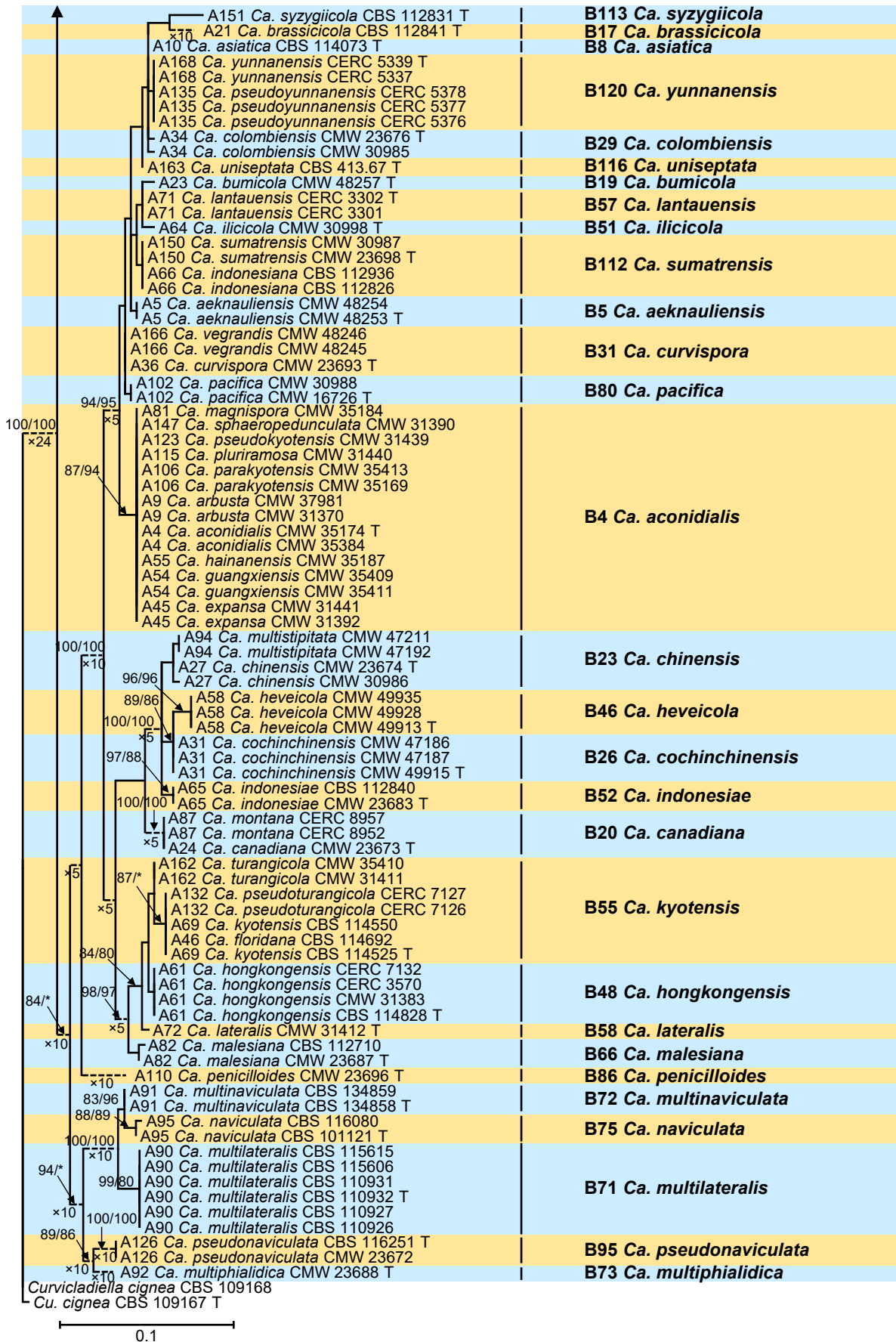
Supplementary Fig. S7 *tef1*



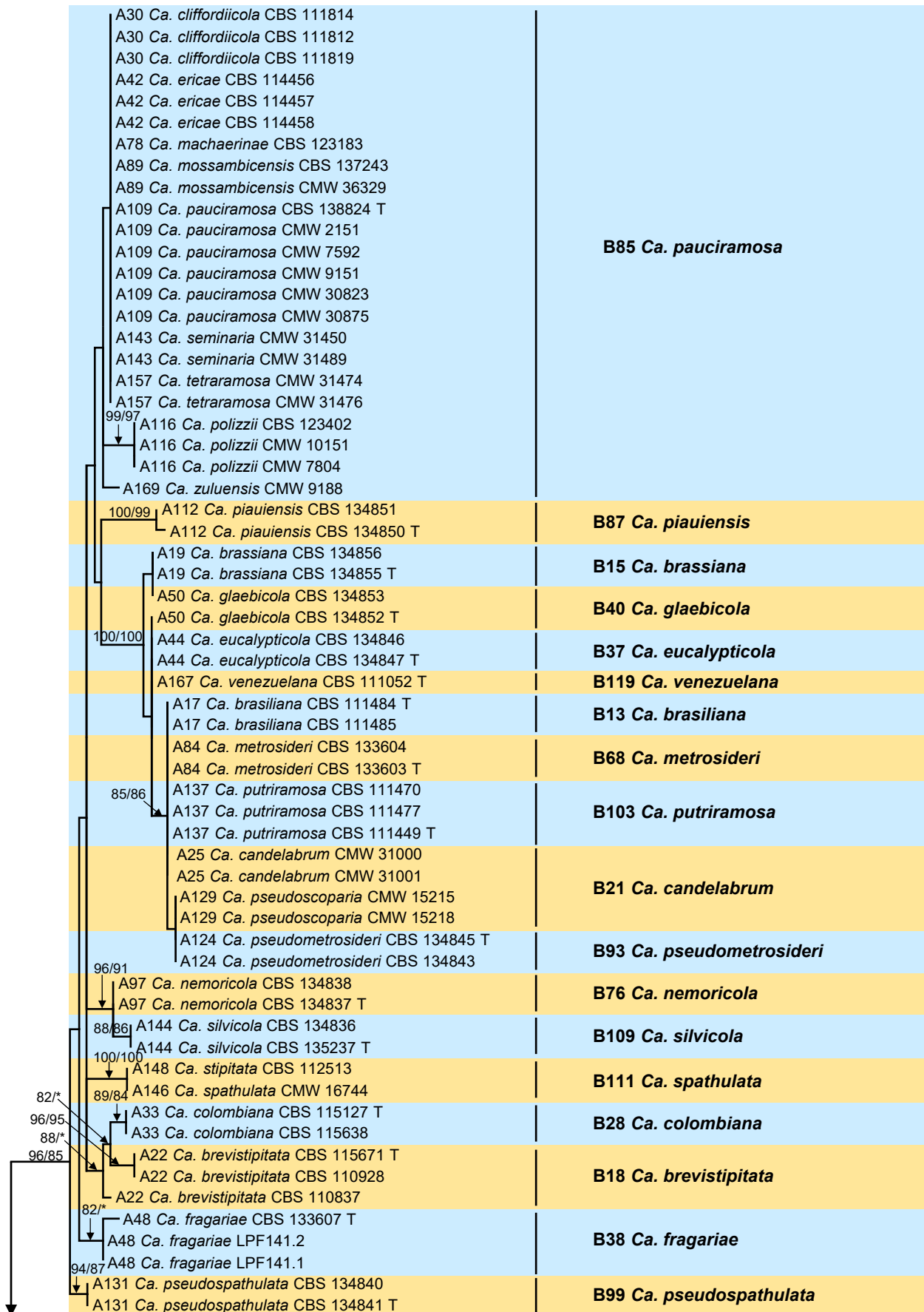
Supplementary Fig. S7 *tef1*



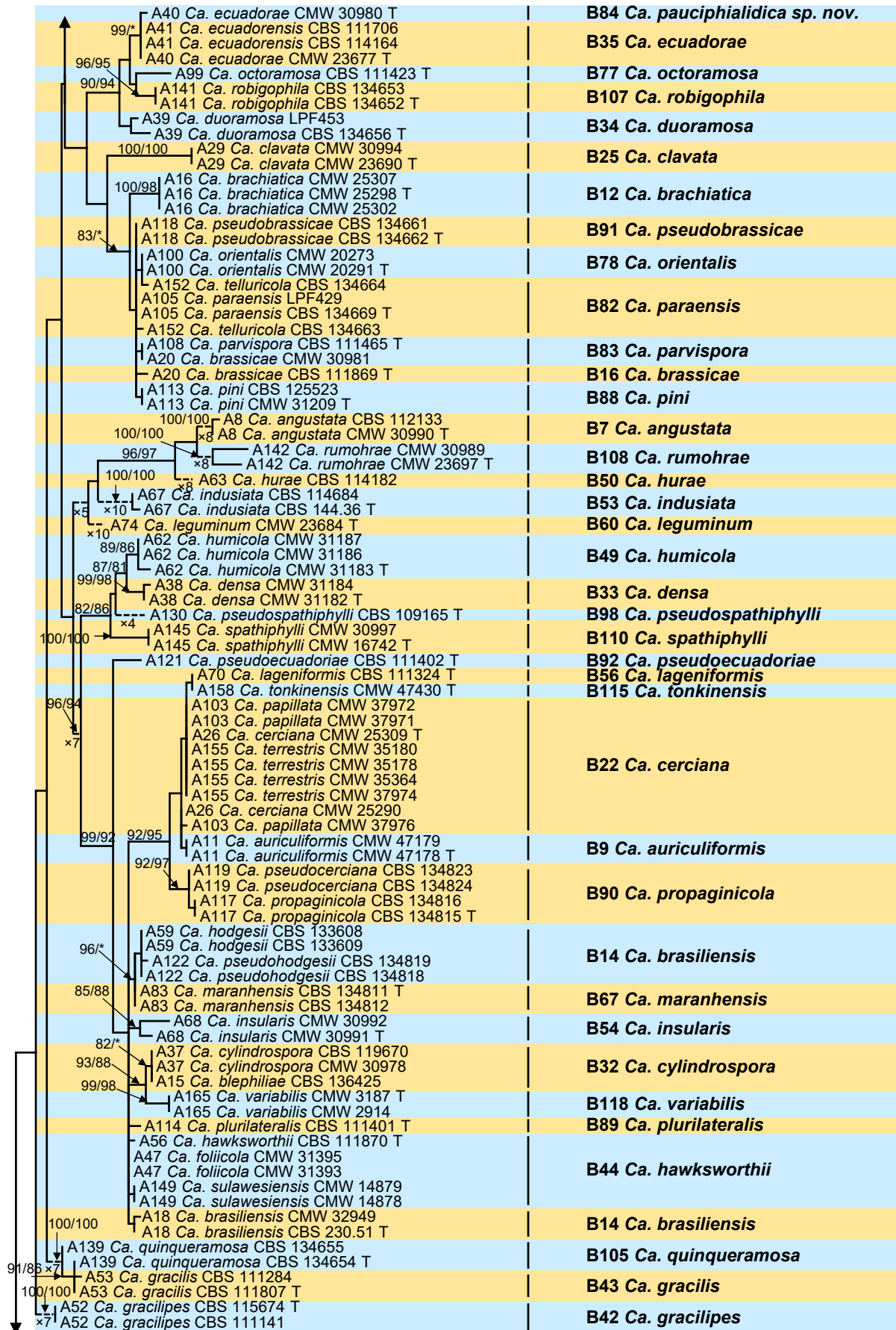
Supplementary Fig. S7 *tef1*



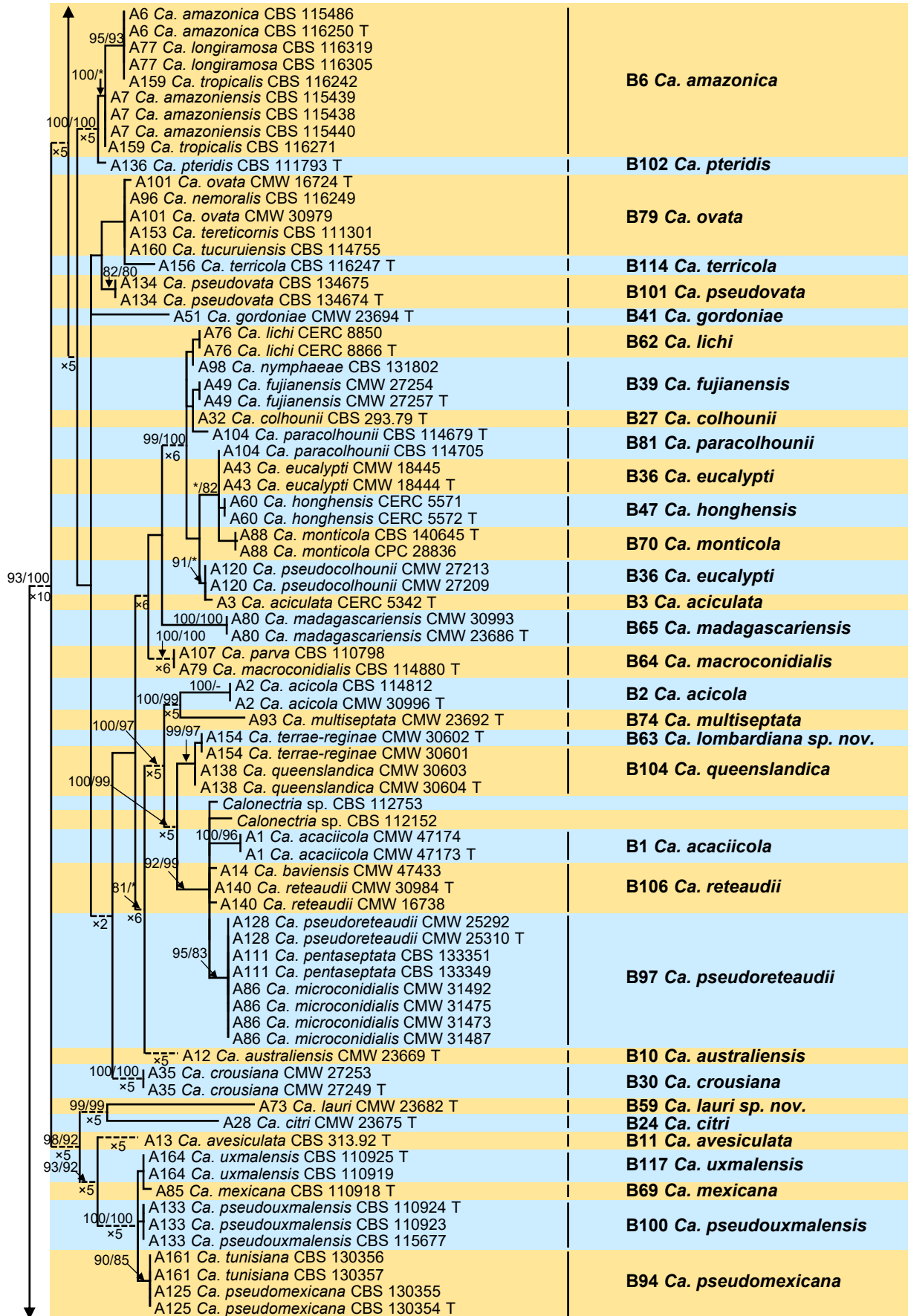
Supplementary Fig. S8 *tub2*



Supplementary Fig. S8 *tub2*



Supplementary Fig. S8 *tub2*



Supplementary Fig. S8 *tub2*

