Phylogeny, Morphology, Distribution, and Pathogenicity of Seven *Calonectria* Species from Leaf Blighted *Eucalyptus* in HaiNan Island, China

XueYing Lang[1,2], QuanChao Wang[1], ShuaiFei Chen[1,†]

[1] Research Institute of Fast-growing Trees (RIFT), Chinese Academy of Forestry (CAF), ZhanJiang 524022, GuangDong Province, China.

[2] Nanjing Forestry University (NJFU), Nanjing 210037, JiangSu Province, China.

[†]Correspondence: S. F. Chen; E-mail: shuaifei.chen@gmail.com

Abstract:

Leaf blight caused by *Calonectria* species is a major constraint to *Eucalyptus* trees in China. *Calonectria* leaf disease on *Eucalyptus* planted in China was first reported in HaiNan Island in 1985. No systematic investigation or identification of *Calonectria* species associated with diseased *Eucalyptus* in HaiNan Island have been performed to date. In order to comprehensively understand the species diversity, distribution, and pathogenicity of *Calonectria* associated with diseased *Eucalyptus* trees in HaiNan Island, 400 *Calonectria* isolates were obtained from 278 diseased *Eucalyptus* trees planted in 17 sites in five counties/regions. All 400 isolates were identified based on DNA sequence comparisons of the translation elongation factor 1-alpha (*tef1*), *β*-tubulin (*tub2*), calmodulin (*cmdA*), and histone H3 (*his3*) gene regions as well as a combination of morphological characteristics. Seven species, namely *C. acaciicola* (198 isolates, 49.5%), *C. pseudoreteaudii* (161 isolates, 40.25%), *C. reteaudii* (29 isolates, 7.25%), *C. hawksworthii* (6 isolates, 1.5%), *C. hongkongensis* (4 isolates, 1%), *C. auriculiformis* (1 isolate, 0.25%) and *C. chinensis* (1 isolate, 0.25%), were identified. This is the first report of *C. acaciicola* in China. *Calonectria acaciicola*, *C. pseudoreteaudii*, and *C. reteaudii* belong to the *C. reteaudii* species complex and were the dominant species collected, accounting for 97% of all the isolates obtained. Overlap in vesicle shape, macroconidia size, and macroconidia septa number existed among these three species in the *C. reteaudii* species complex. The geographical regions significantly influenced the distribution of *C. acaciicola* and *C. pseudoreteaudii*. Representative isolates of *C. acaciicola*, *C. pseudoreteaudii*, *C. reteaudii* and *C. hawksworthii* produced abundant macroconidia were used in conidial suspension inoculation on *Eucalyptus* seedlings. Inoculation showed that all four of the tested *Calonectria* species were highly pathogenic to the two tested *Eucalyptus* genotypes. The tolerances of two *Eucalyptus* genotypes were significantly different. This study conducted the first systematic investigation and identification of *Calonectria* species associated with *Eucalyptus* leaf blight in HaiNan Island and advanced the concept of selection of disease resistant *Eucalyptus* genotypes for managing *Eucalyptus* leaf blight caused by *Calonectria* species in China.

Keywords**:** *Cylindrocladium*, *Eucalyptus* disease, forest pathogen, leaf disease, pathogenicity, phylogeny

1. Introduction

Plantations of *Eucalyptus* species have been extensively developed in China over the course of the past three decades to meet the rapidly growing needs for wood and raw materials. In 2018, the area of *Eucalyptus* plantations in China reached 5.46 million hm^2, accounting for 2.5% of the national forest area but providing about a third of the country's total annual domestic timber production (Xie and Du 2019). At present, *Eucalyptus* trees have been planted in 18 provinces (autonomous regions, municipalities) in China. The plantations are distributed in GuangXi, GuangDong, YunNan, FuJian and HaiNan (Wu and Shang 2021).

Calonectria species are widely distributed in subtropical, tropical, and temperate regions of the world, and are usually isolated from diseased plant tissues and soils (Crous 2002; Li et al. 2022b; Lombard et al. 2010c). *Calonectria* species can infect more than 335 host plants, causing a variety of diseases (Crous 2002; Lombard et al. 2010c). Calonectria leaf blight is considered as one of the most serious diseases of plantation *Eucalyptus* in Asia and South America (Alfenas et al. 2015; Bose et al. 2020, 2022; Chen et al. 2011; Crous 2002; Li et al. 2022a; Lombard et al. 2010c;

Wang and Chen 2020a).

Calonectria leaf blight poses a serious threat to the development of the *Eucalyptus* industry in southern China (Chen et al. 2011; Wang and Chen 2020a; Wu and Chen 2021; Zhou and Wingfield 2011). Calonectria leaf blight has been frequently found in *Eucalyptus* plantations in GuangDong, GuangXi, FuJian, HaiNan, and YunNan in China (Chen et al. 2011, 2013; Deng et al. 1997; Lombard et al. 2015a; Meng 1993; Wang and Chen 2020a; Wu and Chen 2021; Xie and Du 2019). On the infected trees, the middle and lower leaves are first infected, and grey water-soaked spots appear on the leaves. Subsequently, these spots gradually expand and develop into a large area of irregular necrosis. Under the condition of high temperature and humidity, the disease spreads rapidly from the lower parts of the tree to the upper parts, resulting in leaves and branches having blight symptoms. Finally, the whole leaf becomes blighted and falls off (Chen et al. 2011; Old et al. 2003; Wang and Chen 2020a; Wu and Chen 2021).

For *Eucalyptus* in China, the disease caused by *Calonectria* species was first observed in a *Eucalyptus* nursery in BaiSha County in HaiNan Island in 1985, resulting in a large number of *Eucalyptus* seedlings dying (Feng and Zheng 1986). In HaiNan Island, *Eucalyptus* is planted in the northwestern region of the island (Deng and Wang 2018). In 1999, *Cylindrocladium scoparium* and *Cy. quinqueseptatum* were found to infect *Eucalyptus* seedlings and saplings in the DanZhou Region (Wu et al. 2000). In 2005 and 2006, *Cy. quinqueseptatum* was found to cause *Eucalyptus* leaf blight disease in the DanZhou Region (Tang and Zhou 2007). In 2008 and 2009, *C. pseudoreteaudii* was isolated from disease tissues and soil of a *Eucalyptus* plantation in HaiNan Island (Liu et al. 2020; Lombard et al. 2015a).

In HaiNan Island, the diseases caused by *Calonectria* on *Eucalyptus* trees have been reported for a long time, while previous studies were limited to a few geographical regions. The species diversity and pathogenicity of *Calonectria* in *Eucalyptus* plantations are still unclear. In 2020 and 2021, disease surveys were conducted on *Eucalyptus* trees planted in HaiNan Island. Diseased *Eucalyptus* materials with the typical symptoms caused by *Calonectria* species were collected. The aims of this study were (i) to identify the *Calonectria* species isolated from diseased

Eucalyptus trees based on a multi-gene phylogeny and morphological characteristics; (ii) to clarify the distribution characteristics of *Calonectria* species in *Eucalyptus* plantations; and (iii) to test the pathogenicity of these *Calonectria* species.

2. Materials and Methods

2.1 Disease survey sites, disease symptoms, samples and Calonectria isolation

The *Eucalyptus* trees grown in planted areas in HaiNan Island were surveyed, including DongFang Region, ChangJiang County, BaiSha County, DanZhou Region, LinGao County, ChengMai County, DingAn County, and WenChang Region (Fig. 1). Calonectria leaf blight outbreaks occurred to varying degrees on six-month-old to two-year-old *E. urophylla* hybrid trees and one- to twenty-year-old *E. exserta* trees (Fig. 2). On the two-year-old *E. urophylla* × *E. grandis* trees, the pathogens infected the middle and lower leaves of the *Eucalyptus* trees at the early stage (Fig. 2A) and spread rapidly under high temperature and humidity conditions, resulting in the whole leaves being blighted and falling off, the tree tops being withered, and the whole tree dying when the infection became serious (Fig. 2B and C). After infection, the symptoms of leaf spot and branch blight appeared in the *Eucalyptus* trees (Fig. 2D). All the leaves became blighted and dropped after two to three weeks' infection, and new twigs appeared on the infected branches (Fig. 2E). White conidia with typical characteristics of *Calonectria* could be seen on the blighted twigs (Fig. 2F).

In the six months to one-year-old *E. urophylla* × *E. grandis* trees, the leaves of the infected trees gradually blighted and fell starting from the bottom to the top and resulting in leaf blight and dead trees (Fig. 2G and H). For the infected *E. urophylla* × *E. grandis* leaves, some gray-brown round spots were observed on the leaves in the early stages (Fig. 2I). The spots increased and gradually expanded to cover the entire leaves one week after infection (Fig. 2J to L). On *E. exserta trees*, the disease occurred in the early stages, with the lower leaves becoming blighted and curled (Fig. 2M and N). In the early stages, on the leaves of the infected *E. exserta*, necrotic areas formed by gray-brown spots were observed (Fig. 2O). Under the conditions of high temperature and humidity, the necrotic areas continued to expand, causing the leaves to show blight symptoms (Fig. 2P to R).

Eucalyptus leaf blight caused by *Calonectria* species was found in five counties/regions in the western and central parts of HaiNan, including BaiSha County, DanZhou Region, and LinGao County (Fig. 1). *Eucalyptus* species infected with Calonectria leaf blight included *E. urophylla* hybrid trees and a small number of *E. exserta* trees. In the eastern part of HaiNan, including DingAn County and WenChang Region, scattered *E. exserta* trees' leaves were found blighted (Fig. 1). Samples were collected from *Eucalyptus* trees with typical Calonectria leaf blight symptoms at each site. Samples consisted of infected leaves and branches of *E. urophylla* × *E. grandis*, *E. urophylla* × *E. tereticornis*, and *E. exserta* trees, and a total of 278 samples were collected from 278 trees. The collected disease samples were transported to the laboratory for isolation and further study.

To induce *Calonectria* sporulation, the symptomatic tissues were incubated in moist chambers at 25°C for one to three days. Subsequently, white masses of conidiophores were observed on the infected tissue under the stereomicroscope. The conidiophores were picked up with sterile needles and transferred from infected tissues to 2% malt extract agar (MEA) (20 g malt extract powder and 20 g agar powder per liter of water; the malt extract powder was obtained from the Beijing Shuangxuan microbial culture medium products factory, Beijing, China; the agar powder was obtained from Beijing Solarbio Science & Technology Co., Ltd., Beijing, China). Conidia germinated after three to four hours at room temperature. Single germinated conidia were picked and placed in a new 2% MEA plate at 25°C and incubated for 7 to 10 days. The pure cultures were deposited in the culture collection (CSF) at the Research Institute of Fast-growing Trees (RIFT) of the Chinese Academy of Forestry (CAF) in ZhanJiang, GuangDong Province, China.

2.2 DNA extraction, PCR amplification, and sequencing

All isolates obtained in this study were used for DNA extraction. DNA was extracted from cultures grown on 2% MEA plates for 7 to 10 days, and the mycelia were collected using a sterilized scalpel and transferred to 2 mL Eppendorf tubes. The total genomic DNA was extracted following the CTAB protocols described by Van Burik et al. (1998). The extracted DNA was dissolved in 30 μL TE buffer (1 M Tris-HCL and 0.5 M EDTA, pH 8.0), and 2.5 μL RNase (10 mg/mL) degraded RNA was added to react at 37°C for more than 30 min. Finally, the concentration of DNA was measured by a NanoDrop2000 (Thermo Fisher Scientific, Waltham, MA, USA), and the DNA concentration was diluted to 100 ng/μL.

According to the results of previous studies, *Calonectria* species can be reliably identified by the sequences of partial regions of translation elongation factor 1-alpha (*tef1*), *β*-tubulin (*tub2*), calmodulin (*cmdA*), and histone H3 (*his3*) genes (Liu and Chen 2017; Liu et al. 2020; Lombard et al. 2010a, 2010b; Wang and Chen 2020a). Primer pairs of EF1-728F/EF2, T1/CYLTUB1R, CAL-228F/CAL-2Rd and CYLH3F/CYLH3R were used to amplify the *tef1*, *tub2*, *cmdA* and *his3* gene regions, respectively (Liu et al. 2020; Lombard et al. 2010d). The procedure of the PCR reaction referred to the method described by Liu and Chen (2017).

The PCR products were detected by agarose gel electrophoresis, and the PCR products with single and bright electrophoresis strips were sent to the Beijing Genomics Institute, Guangzhou, China for forward and reverse sequencing. All PCR products were sequenced in both directions using the same primers as for the PCR amplification. All obtained sequences in this study were read and edited using MEGA v. 7.0 software (Kumar et al. 2016). All sequences obtained were submitted to GenBank (http://www.ncbi.nlm.nih.gov).

2.3 Multi-gene phylogenetic analyses

A standard nucleotide BLAST search was conducted using the *tef1*, *tub2*, *cmdA* and *his3* sequences to preliminarily identify the *Calonectria* species. Sequences of the *tef1*, *tub2*, *cmdA* and *his3* gene regions obtained in this study were compared with sequences of type specimen strains of published species in the relevant species complexes. The sequences published by Liu et al. (2020) and sequences of recently published *Calonectria* species downloaded from NCBI (http://www.ncbi.nlm.nih.gov) were used as the database for analyses. The online version of

MAFFT v. 7 (http://mafft.cbrc.jp/alignment/server/) with the alignment strategy FFT-NS-i (Slow; interactive refinement method) were used to align each of the four gene regions. Sequence alignments were edited manually using MEGA V. 7.0 software (Kumar et al. 2016) after initial alignments.

Maximum likelihood (ML) and Bayesian inference (BI) analyses were conducted for datasets of each of the four genes and the combined dataset of all four gene regions. ML analyses were performed using RaxML v. 8.2.4 (Stamatakis 2014) on the CIPRES Science Gateway v. 3.3 with a default GTR substitution matrix and 1000 bootstrap replicates. BI analyses were conducted using MrBayes v. 3.2.6 (Ronquist et al. 2012) on the CIPRES Science Gateway v. 3.3. Four Markov Chain Monte Carlo (MCMC) chains were run from a random starting tree for five million generations, and trees were sampled every 100^{th} generation. The first 25% of trees sampled were discarded as a burn-in, and the remaining trees were used to determine the posterior probabilities. Two isolates of *Curvicladiella cignea* (CBS 109167T and CBS 109168) were used as outgroups (Liu et al. 2020). MEGA V. 7.0 (Kumar et al. 2016) and FigTree v 1.4.2 (http://tree.bio.ed.ac.uk/software/figtree/) were used to view the RaxML trees and BI trees, respectively.

2.4 Morphology

Representative isolates of each species were selected for morphological studies. The results of previous studies indicated that the morphological characteristics of macroconidia and vesicles were employed in species identification of *Calonectria* (Alfenas et al. 2015; Li et al. 2017; Liu et al. 2020; Lombard et al. 2015a). To produce the asexual structures of macroconidia and vesicles, the selected isolates were transferred onto 2% MEA in Petri dishes and cultured at 25°C for 7 to 10 days. The aerial hyphae of the cultures in the Petri dishes were scraped off using a sterile scalpel, and sterile water was added to cover the culture. The water was drained, and the dishes were placed upside down and incubated for one to three days at 25°C. This resulted in a large number of asexual structures produced on the surface of the cultures, as shown for *Calonectria* species in previous studies (Graça et al. 2009; Wang and Chen 2020a; Wu and Chen 2021). Fifty measurements of macroconidia and vesicles were performed for each isolate. Fifty measurements of microconidia were also performed for the isolates that produced microconidiophores. The measurement results were presented as follows: (minimum –) (average – standard deviation) – (average + standard deviation) (– maximum).

2.5 Pathogenicity tests

In order to test the pathogenicity of *Calonectria* species obtained in this study, representative isolates identified by phylogenetic analyses and morphological characteristics, and produced abundant macroconidia were selected for inoculation of *Eucalyptus* seedlings by a spraying conidial suspension. The conidial suspensions of each isolate were prepared using the method described by Grace et al. (2009), Wang and Chen (2020a), and Wang et al. (2022). The conidia suspensions concentration of each isolate was measured using a hemocytometer and adjusted to 5×10^4 conidia/mL.

Two *Eucalyptus* genotypes, *E. urophylla* × *E. tereticornis* genotype CEPT1898 and *E. urophylla* × *E. grandis* genotype CEPT1899, that are widely planted in southern China were selected for the inoculations. The inoculated *Eucalyptus* seedlings were three months old and approximately 40 cm tall. Each *Calonectria* isolate was inoculated to eight seedlings of each of two *Eucalyptus* genotypes. The conidial suspension was sprayed on the leaves until runoff. The conidial suspension of *C. pseudoreteaudii* isolate CSF13636, which was tested to be pathogenic to *Eucalyptus* (Wang and Chen 2020a), was sprayed on the seedlings and served as the positive control. Sterile water was sprayed on the seedlings as the negative control. After inoculation, the seedlings were covered with plastic chambers (length: 190 cm, width: 90 cm, height: 65 cm) and kept under stable climatic conditions (temperature, 24 to 26°C; humidity, 70 to 90%) for 72 hours, allowing sufficient humidity for infection. The experiment was repeated once. Inoculations were performed in May 2022 at the South China Experimental Nursery (SCEN), located in ZhanJiang, GuangDong Province in southern China.

At 72 h after the inoculation, the plastic chambers were removed. A disease index (DI = ∑

(representative rating scale × number of diseased leaves / maximum rating scale (5) × total number of leaves examined) was calculated, and the results were evaluated following the approach of Mishra et al. (2009). The "Leaf Doctor" software developed by Pethybridge and Nelson (2015) was used to evaluate the percentage of leaf area with lesions. Based on the percentage of leaf area covered by disease, the rating scale range 0 to 5 was established where 0 = 0%, 1 = 1 to 10%, 2 = 11 to 25%, 3 = 26 to 50%, 4 = 51 to 75% and 5 designated ≥ 75% leaf area with lesions.

To verify whether the disease was caused by the inoculated isolates, re-isolations were performed immediately after the lesions were evaluated. For re-isolations, small pieces of discolored leaves about 0.04 cm^2 from the edges of lesions were cut with a sterile scalpel and transferred onto fresh 2% MEA and cultured at room temperature for two to three days. For the tested *Calonectria* isolates obtained in this study, four of the eight seedlings of each *Eucalyptus* genotype inoculated with each isolate were randomly selected for re-isolation. For positive and negative controls, re-isolations were performed on all eight seedlings. The identities of the re-isolated fungi were confirmed by culture morphological comparisons with the original fungi that were used for inoculations. The results of the inoculations were analyzed using SPSS Statistics 26 software (IBM Corp., Armonk, NY, USA), and analysis of variance (ANOVA) was performed.

3. Results

3.1 Calonectria isolation

Besides *Calonectria*, the white masses of conidiophores of other fungi, such as *Fusarium*, were observed on the infected tissue after the symptomatic tissues were incubated in moist chambers. Isolates with the typical morphological characteristics of *Calonectria* were obtained from all the 278 diseased samples obtained in this study. One to two isolates were obtained from each tree for *E. urophylla* hybrids, and two to four isolates were obtained from each tree for *E. exserta*. Finally, 400 isolates were obtained from 17 sites in five counties/regions of HaiNan Island (Table 1, Fig. 1). This included 288 isolates from 226 *E. urophylla* × *E. grandis* trees in BaiSha County, DanZhou Region, and LinGao County, 20 isolates from 20 *E. urophylla* × *E. tereticornis* trees in LinGao County, and 92 isolates from 32 *E. exserta* trees in DanZhou Region, LinGao County, DingAn County and WenChang Region (Table 1, Fig. 1).

3.2 Sequencing

The *tef1* and *tub2* fragments were amplified for all 400 isolates obtained in this study (Supplementary Table S1). Based on the sequence differences for these two regions, the sampling sites, and the sampled *Eucalyptus* hybrids/species, 130 isolates were selected to amplify the *cmdA* and *his3* gene regions (Table 2). Amplicons generated for the *tef1*, *tub2*, *cmdA* and *his3* gene regions were approximately 550, 565, 685, and 440 bp, respectively.

3.3 Multi-gene phylogenetic analyses

The sequences of *tef1*, *tub2*, *cmdA* and *his3* gene regions generated in this study were used to conduct a standard nucleotide BLAST search. The results indicated that the isolates belonged to three species complexes of *Calonectria*. These were the *C. reteaudii* species complex, the *C. cylindrospora* species complex, and the *C. kyotensis* species complex. Sequences of 92 isolates (for ex-type and other strains) present in 54 *Calonectria* species in these three species complexes were downloaded from GenBank. These sequences were included in the phylogenetic analyses (Table 3).

Phylogenetic analyses based on the four individual gene regions and the concatenated dataset for these four regions were conducted using both ML and BI methods. The results showed that the overall topologies generated from the BI analyses were essentially similar to those from the ML analyses for each dataset; consequently, only the ML trees are presented (Fig. 3, Supplementary Figs. S1 to S4). The phylogenetic analyses showed that the 130 *Calonectria* isolates were clustered into seven groups (Group A, Group B, Group C, Group D, Group E, Group F, and Group G) based on combined *tef1*/*tub2*/*cmdA*/*his3* analyses (Fig. 3). Isolates in Group A, Group B, and Group C belonged to the *C. reteaudii* species complex. Group D and Group E belonged to the *C. cylindrospora* species complex. Group F and Group G were in the *C. kyotensis* species complex.

Species in the Calonectria reteaudii species complex

Isolates in Group A were clustered in three, two, and two sub-groups based on *tef1*, *cmdA*, and *his3* trees, respectively (Supplementary Figs. S1, S3 and S4); isolates in each sub-group were clustered with or were close to *C. acaciicola*, *C. pseudoreteaudii*, or *C. reteaudii* in each of the *tef1*, *cmdA*, and *his3* trees (Supplementary Figs. S1, S3 and S4). Isolates in Group A were clustered with *C. acaciicola* based on the *tub2* tree (Supplementary Fig. S2). The combined *tef1*/*tub2*/*cmdA*/*his3* tree showed that isolates in Group A were clustered with *C. acaciicola* (Fig. 3); therefore, isolates in Group A were identified as *C. acaciicola*.

Isolates in Group B were clustered with *C. pseudoreteaudii* based on the *tef1* and *his3* trees, with *C. pseudoreteaudii* and *C. strelitziae* based on the *tub2* tree, and with *C. pseudoreteaudii*, *C. reteaudii* and *C. strelitziae* based on the *cmdA* trees. The combined *tef1*/*tub2*/*cmdA*/*his3* tree showed that isolates in this group were clustered with *C. pseudoreteaudii* (Fig. 3, Supplementary Figs. S1 to S4). Thus, isolates in Group B were identified as *C. pseudoreteaudii*.

Isolates in Group C were clustered with or were close to *C. reteaudii*, *C. acaciicola*, and *C. strelitziae* based on the *tef1* tree, and closest to *C. reteaudii* based on the *tub2* tree, close to *C. reteaudii*, *C. pseudoreteaudii*, and *C. strelitziae* based on *cmdA* tree, and clustered with *C. reteaudii* based on the *his3* tree. The combined *tef1*/*tub2*/*cmdA*/*his3* tree showed that isolates in this group were clustered with *C. reteaudii* (Fig. 3, Supplementary Figs. S1 to S4). Isolates in Group C were identified as *C. reteaudii*.

Species in the Calonectria cylindrospora species complex

The isolate in Group D was clustered with *C. auriculiformis* based on the *tef1* tree, with *C. cerciana*, and close to *C. auriculiformis, C. tonkinensis* and *C. lageniformis* based on the *tub2* tree, with *C. cerciana* and *C. tonkinensis*, and close to *C. auriculiformis* in the *cmdA* tree, and with *C. auriculiformis*, *C. cerciana,* and *C. tonkinensis* in the *his3* tree. The combined *tef1*/*tub2*/*cmdA*/*his3* tree showed that the isolate in this group clustered with *C. auriculiformis* (Fig. 3, Supplementary Figs. S1 to S4). Thus, isolate in Group D was identified as *C. auriculiformis*.

Isolates in Group E were clustered with or were closest to *C. hawksworthii* based on the *tef1*, *tub2*, *cmdA*, and *his3* trees (Supplementary Figs. S1 to S4). The combined *tef1*/*tub2*/*cmdA*/*his3* tree showed that isolates in this group were clustered with *C. hawksworthii* (Fig. 3). Isolates in Group E were identified as *C. hawksworthii*.

Species in the Calonectria kyotensis species complex

Based on the *tef1*, *tub2*, *cmdA*, *his3*, and combined *tef1*/*tub2*/*cmdA*/*his3* trees, isolates in Group F and Group G were clustered with or were closest to *C. chinensis* and *C. hongkongensis*, respectively (Fig. 3, Supplementary Figs. S1 to S4). Therefore, isolate in Group F was identified as *C. chinensis*, and isolates in Group G were identified as *C. hongkongensis*.

3.4 Morphology

Based on the results of the phylogenetic analyses, 21 isolates representing seven *Calonectria* species were selected for morphological comparisons (Table 2). The size and septate number of macroconidia and microconidia, and the vesicle width of the seven *Calonectria* species identified in this study are shown in Table 4. These isolates were divided into three groups based on the shape of the vesicles. The vesicles of *C. acaciicola*, *C. pseudoreteaudii*, and *C. reteaudii* are narrowly clavate or clavate (Fig. 6B, D and F). The vesicles of *C. auriculiformis* and *C. hawksworthii* are clavate, obpyriform, or ellipsoidal (Fig. 6H and J). The vesicles of *C. chinensis* and *C. hongkongensis* are sphaeropedunculate (Fig. 6L and N). For each of the *Calonectria* species identified in this study, the septa number of macroconidia and shape of vesicles among isolates obtained in this study and the originally described strains were consistent (Table 4).

The morphological comparison results showed that significant variation exists in the size of macroconidia among isolates of each species of *C. acaciicola* and *C. pseudoreteaudii* (Table 4). For example, the macroconidia of *C. acaciicola* isolates CSF23881 and CSF23945 were much shorter than those of other tested *C. acaciicola* isolates, and the macroconidia of isolate CSF24115 were much longer than those of the nine other tested *C. acaciicola* isolates (Table 4). Significant variation also existed in the size of microconidia among isolates of *C. acaciicola* (Table 4).

The measurements showed that the macroconidia sizes of isolates obtained in this study and the originally described strains of the same *Calonectria* species were not always consistent. For example, the macroconidia of *C. acaciicola* isolates CSF23881 and CSF23945 were much shorter, and CSF24115 were much longer than the originally described strains of *C. acaciicola*, the macroconidia of *C. reteaudii* isolates obtained in this study were much longer than the originally described strains of *C. reteaudii*, and the macroconidia of *C. hawksworthii* isolates obtained in this study were much shorter than the originally described strains of *C. hawksworthii*. For each species of *C. auriculiformis* and *C. chinensis*, the macroconidia of isolates obtained in this study were similar to the originally described strains of the relevant species (Table 4).

Significant overlap of macroconidia, microconidia, and vesicle morphology existed among species of *C. acaciicola*, *C. pseudoreteaudii* and *C. reteaudii*. These three species cannot be distinguished based on their macroconidia or microconidia size. The macroconidia septa number and vesicle size of these three species were also consistent. Each of the three species produced 5-septate macroconidia. The number of macroconidia septa was up to nine. For example, *C. acaciicola* produced 4- to 9-septate macroconidia (Fig. 6O to T). Each of the three species produced microconidia. The lengths of macroconidia are about two to three times those of microconidia (Table 4).

3.5 Species and genotype diversity of Calonectria species

Based on the comparisons of *tef1*, *tub2*, *cmdA* and *his3* gene sequences, the 400 *Calonectria* isolates were identified as *C. acaciicola* (198 isolates, 49.5%), *C. pseudoreteaudii* (161 isolates, 40.25%), *C. reteaudii* (29 isolates, 7.25%), *C. hawksworthii* (six isolates, 1.5%), *C. hongkongensis* (four isolates, 1%), *C. auriculiformis* (one isolate, 0.25%), and *C. chinensis* (one isolate, 0.25%) (Supplementary Table S1). *Calonectria acaciicola* and *C. pseudoreteaudii* were the dominant species, followed by *C. reteaudii*.

Based on the sequence comparisons of *tef1*, *tub2*, *cmdA* and *his3*, 122 isolates representing seven species were identified as 19 genotypes in this study, comprising *C. acaciicola* (61 isolates, seven genotypes), *C. pseudoreteaudii* (37 isolates, two genotypes), *C. reteaudii* (12 isolates, three genotypes), *C. auriculiformis* (one isolate, one genotype), *C. hawksworthii* (six isolates, two genotypes), *C. chinensis* (one isolate, one genotype), and *C. hongkongensis* (four isolates, three genotypes) (Table 2). The dominant genotypes (genotype AAAA) of these isolates were 37.7%, 95.6%, 54.5%,100%, 66.7%, 100%, and 50%, respectively.

3.6 Distribution of Calonectria species in different geographic regions and different Eucalyptus species

In this study, 400 *Calonectria* isolates were isolated from 17 sampling sites in five counties/regions of HaiNan Island (Fig. 4). With regards to geographical location, these 17 sites were distributed in western, central, and eastern regions in North HaiNan Island (Figs. 1 and 4). Ninety-nine, 265, and 36 *Calonectria* were obtained in western, central, and eastern HaiNan Island, respectively. *Calonectria acaciicola* and *C. pseudoreteaudii* were dominant in HaiNan Island. *Calonectria pseudoreteaudii* and *C. acaciicola* accounted for 93.94% and 100% of the *Calonectria* isolates obtained in western and eastern HaiNan Island, respectively. In the central region, both *C. acaciicola* and *C. pseudoreteaudii* were dominant (Fig. 4).

For the 400 *Calonectria* isolates obtained in this study, 308 were isolated from *E. urophylla* hybrid trees, and 92 isolates were isolated from *E. exserta* trees. *Calonectria acaciicola* and *C. pseudoreteaudii* were the dominant species both in *E. urophylla* hybrid trees and *E. exserta* trees (Fig. 5).

3.7 Pathogenicity tests

For inoculations using conidia suspensions, 13 isolates representing four *Calonectria* species (*C. acaciicola*: CSF23872, CSF23938, CSF23941, CSF23945 and CSF23992; *C. pseudoreteaudii*: CSF23939, CSF24054, CSF24073 and CSF24116; *C. reteaudii*: CSF23883 and CSF23970; *C. hawksworthii*: CSF23909 and CSF23911) that produced abundant macroconidia were selected to inoculate on seedlings of two *Eucalyptus* genotypes CEPT1898 and CEPT1899. A conidia suspension of *C. pseudoreteaudii* isolate CSF13636 and sterile water were inoculated on the seedlings to serve as positive and negative controls, respectively. The results of inoculation showed that all seedlings inoculated with each of the 13 *Calonectria* isolates obtained in this study and the positive control isolate CSF13636 developed leaf lesion symptoms (Fig. 7A to J), while no disease symptoms were observed on the leaves of the negative control seedlings (Fig. 7K and L). The fungi that had the same colony morphology as the originally inoculated fungi were reisolated successfully from diseased tissues on the *Calonectria* inoculated leaves, whereas no *Calonectria* were isolated from leaves of negative control seedlings.

SPSS Statistics 26 software was used to analyze the data. According to the Explore test, the disease index was not normally distributed ($P < 0.05$). Thus, all the data were transformed by Rank Cases, and the transformed data followed the normal distribution ($P = 0.200$). There were significant differences ($P < 0.05$) between the two experiments. Thus, the data of each experiment were analyzed separately.

The results of two experiments consistently showed the average disease indexes generated from each of 13 *Calonectria* isolates obtained in this study were higher than 20% (Figs. 8 and 9). Overall, the average disease indexes generated from three species, *C. acaciicola*, *C. pseudoreteaudii* and *C. reteaudii*, were close to the positive control isolate CSF13636 (Figs. 8 and 9). The disease indexes generated from *C. hawksworthii* were lower than those of *C. acaciicola*, *C. pseudoreteaudii*, and *C. reteaudii*, with the exception of *C. hawksworthii* CSF23911 being higher than *C. reteaudii* CSF23883 in experiment Two (Figs. 8 and 9).

In both experiments, the ANOVA results consistently showed that the average disease indexes generated from all *Calonectria* isolates on *Eucalyptus* genotype CEPT1898 were significantly higher than those on *Eucalyptus* genotype CEPT1899 (Figs. 7C, D, G, H, 8 and 9). *Eucalyptus* genotype CEPT1899 was relatively more tolerant than CEPT1898 to *Calonectria* isolates tested in this study.

4. Discussion

In this study, *Eucalyptus* trees with typical Calonectria leaf blight symptoms were observed in HaiNan Island in southern China. A total of 400 *Calonectria* isolates were obtained from 278 diseased trees of *E. urophylla* hybrids and *E. exserta*. Multilocus phylogenetic inferences and phylogenetic characteristics identified seven *Calonectria* species. This is the first report of *C. acaciicola* in China, and the first report of *C. chinensis* from diseased plant tissues. The phylogenetic analyses showed that *C. acaciicola*, *C. pseudoreteaudii*, and *C. reteaudii* were in the *C. reteaudii* species complex, *C. auriculiformis* and *C. hawksworthii* were in the *C. cylindrospora* species complex, and *C. chinensis* and *C. hongkongensis* were in the *C. kyotensis* species complex. Pathogenicity tests showed that the inoculated *Calonectria* species *C. acaciicola*, *C. pseudoreteaudii*, *C. reteaudii*, and *C. hawksworthii* were all pathogenic to the two tested *Eucalyptus* genotypes.

The identification of the *Calonectria* isolates obtained in this study was based on DNA sequence comparisons of multiple gene regions. The sequences of partial regions of *tef1*, *tub2*, *cmdA* and *his3* genes have often been used for species delimitation in *Calonectria* (Li et al. 2022b; Liu et al. 2021; Wang and Chen 2020a; Wu and Chen 2021). Phylogenetic analyses in this study indicated that the three species *C. acaciicola*, *C. pseudoreteaudii*, and *C. reteaudii* in the *C. reteaudii* species complex could not be distinguished well by sequences of single gene *tef1*, *tub2*, *cmdA* and *his3*. These three species were clearly delineated based on the combination of four gene sequences. The results of morphological comparison in this study indicated that morphological characteristics can only be simply divided into different *Calonectria* species complex by vesicles morphology, but can not sufficient to distinguish *Calonectria* species. For the species in the same species complex, for example, *C. acaciicola*, *C. pseudoreteaudii*, and *C. reteaudii* in the *C. reteaudii* species complex, overlapped in vesicle shape, macroconidia septa number, and macroconidia size existed among these species. The morphological comparisons in this study demonstrated that *Calonectria* species could not be accurately identified only by morphological characteristics. These results are consistent with the results in previous studies (Wang and Chen 2020a; Wu and Chen 2021).

The results of this study suggested that species in the *C. reteaudii* species complex were the main causal agents of *Eucalyptus* leaf blight in China. The dominant species collected in this study were *C. acaciicola* and *C. pseudoreteaudii*, followed by *C. reteaudii*. The three species accounted for 97% of the isolates. Each belonged to the *C. reteaudii* species complex. Combining the results in this study, five species in the *C. reteaudii* species complex were isolated from diseased *Eucalyptus* trees in China: *C. acaciicola*, *C. crousiana*, *C. pseudoreteaudii*, *C. queenslandica* and *C. reteaudii* (Chen et al. 2011; Li et al. 2022b; Liu et al. 2020; Wang and Chen 2020a; Wu and Chen 2021). All five species were isolated from blighted *Eucalyptus*, and the inoculation results indicated they were all pathogenic to the tested *Eucalyptus* genotypes (Chen et al. 2011; Li et al. 2022b; Wang and Chen 2020a; Wu and Chen 2021). This study reports *C. acaciicola* in China for the first time and showed that this species was widely distributed on multiple *Eucalyptus* genotypes in a large number of sampled sites. This study also expanded the geographic distribution range of *C. reteaudii* from diseased *Eucalyptus*, as this species was previously isolated from the mainland China (Li et al. 2022b). Species in the *C. reteaudii* species complex may have a wider geographic range and *Eucalyptus* host genotype range in southern China.

Besides three species in the *C. reteaudii* species complex, *C. auriculiformis*, *C. hawksworthii*, *C. chinensis*, and *C. hongkongensis* were also collected from diseased *Eucalyptus* trees in HaiNan Island. Previous research results indicated that *C. hawksworthii*, *C. chinensis* and *C. hongkongensis* were frequently isolated from soils under *Eucalyptus* plantations in different regions in southern China (Li et al. 2017; Liu et al. 2021, 2022; Lombard et al. 2015a; Wu and Chen 2021). *Calonectria auriculiformis*, *C. hawksworthii* and *C. hongkongensis* were occasionally isolated from diseased *Eucalyptus* tissues (Lombard et al. 2015a; Liu et al. 2020; Zhang et al. 2022). The inoculations in this study and previous studies indicated that all four species, *C. auriculiformis* (Wu and Chen 2021), *C. hawksworthii* (this study), *C. chinensis* (Liu and Chen 2022), and *C. hongkongensis* (Liu and Chen 2022; Wu and Chen 2021), caused disease symptoms to the tested *Eucalyptus* seedlings. We need to monitor these four species carefully, as they may pose threats to *Eucalyptus* plantations when the climate conditions are appropriate.

Results in this study expended our understanding on geographic distribution regions of *Calonectria* from *Eucalyptus* trees in China. Thirteen *Calonectria* species were reported from diseased *Eucalyptus* trees in China prior to this study. These include *C. pseudoreteaudii* from FuJian, GuangDong, GuangXi and HaiNan Provinces (Chen et al. 2013; Li et al. 2017, 2022b; Lombard et al. 2015a; Wang and Chen 2020a; Wu and Chen 2021), *C. eucalypti* from FuJian and YunNan Provinces (Chen et al. 2011; Li et al. 2017), *C. pauciramosa* from FuJian and GuangXi Provinces (Chen et al. 2011; Lombard et al. 2015a), *C. crousiana* and *C. fujianensis* from FuJian Province (Chen et al. 2011), *C. aciculata* from YunNan Province (Li et al. 2017), other seven species, *C. aconidialis*, *C. auriculiformis*, *C. cerciana*, *C. hawksworthii*, *C. hongkongensis*, *C. queenslandica* and *C. reteaudii* from GuangDong Province (Li et al. 2022b; Lombard et al. 2015a; Zhang et al. 2022). For the seven *Calonectria* species obtained in this study, with the exception of *C. pseudoreteaudii*, which had been isolated from diseased *Eucalyptus* in HaiNan Province in previous studies (Liu et al. 2020; Lombard et al. 2015a), the other six *Calonectria* species were all isolated from diseased *Eucalyptus* trees for the first time in HaiNan Province. This study conducted the first systematic investigation of *Eucalyptus* disease caused by *Calonectria* species in HaiNan Province. We hypothesize that more *Calonectria* species will be isolated from diseased *Eucalyptus* trees in other provinces in southern China after systematic disease investigation and research.

The geographical regions influenced the distribution of the two most dominant *Calonectria* species, *C. acaciicola*, and *C. pseudoreteaudii*, to a greater extent than the *Eucalyptus* species. In western HaiNan Island, *C. pseudoreteaudii* accounted for more than 90% of the *Calonectria* obtained. In eastern HaiNan Island, all the isolates obtained were *C. acaciicola*. Both species are widely distributed in the central region of the island. *Calonectria acaciicola* and *C. pseudoreteaudii* were dominant species both in *E. urophylla* hybrid trees and *E. exserta* trees. These results clearly indicated that their distributions were significantly associated with their geographic regions, but not with their isolation resources of *Eucalyptus* species.

The inoculation results showed that all four tested *Calonectria* species were highly pathogenic to the two tested *Eucalyptus* genotypes. There were no clear differences in pathogenicity between the four tested species. These results were consistent with the previous inoculation results of *C. pseudoreteaudii* and *C. reteaudii* (Wang and Chen 2020a; Wu and Chen 2021). The results showed that *E. urophylla* × *E. grandis* genotype CEPT1899 was consistently more tolerant than *E. urophylla* × *E. tereticornis* genotype CEPT1898 to all the inoculated *Calonectria* isolates. This was consistent with previous studies showing that differences in tolerance existed among various *Eucalyptus* genotypes to *Calonectria* species (Alfenas et al. 2016; Chen et al. 2011; Li et al. 2014a, 2014b; Rodas et al. 2005; Wang and Chen 2020b; Wu and Chen 2021). These findings suggest that it may be possible to select disease-tolerant *Eucalyptus* genotypes to control leaf blight caused by *Calonectria* species in the future.

In conclusion, this study conducted the first systematic investigation and identification of *Calonectria* species associated with *Eucalyptus* leaf blight in HaiNan Island. This study expended our understanding of species diversity, morphological characteristics, geographical distribution characteristics, and pathogenicity of *Calonectria* species from leaf blighted *Eucalyptus* in HaiNan Island. The results of this study illustrate the importance of clarifying the species identification, geographic distribution, and *Eucalyptus* host range of *Calonectria.* The results have provided valuable information on managing *Eucalyptus* leaf blight caused by *Calonectria* species.

Acknowledgements

This study was initiated through the bilateral agreement between the Governments of South Africa and China and supported by The National Key R&D Program of China (China-South Africa Forestry Joint Research Centre Project; project No. 2018YFE0120900), the special fund for basic scientific research of State Key Laboratory of Tree Genetics and Breeding (SKLTGB) of China (project No. TGB2017001), the National Ten-thousand Talents Program (Project No. W03070115) and the GuangDong Top Young Talents Program in China (Project No. 20171172).

We thank Ms. LinFang Liu for her assistance in collecting diseased samples. We thank Ms. WenXia Wu, Ms. LingLing Liu, and Dr. FeiFei Liu for their assistance in laboratory work and analyzing the data. We thank Ms. WenXia Wu, Ms. Ying Liu, Ms. LinQin Lu, and Mr. BingYin Chen for their assistance in pathogenicity tests.

Literature Cited

Alfenas, R. F., Lombard, L., Pereira, O. L., Alfenas, A. C., Crous, P. W. 2015. Diversity and potential impact of *Calonectria* species in *Eucalyptus* plantations in Brazil. Studies in Mycology 80: 89-130.

Alfenas, R. F., Freitas, R. G., Pereira, O. L., Coutinho, M. M., Zarpelon, T. G., Cândido, T. S., Alfenas, A.C. 2016. Screening of *Corymbia* and *Eucalyptus* species for resistance to *Calonectria pteridis* leaf blight. Forest Pathology 46: 76-81.

Batista, A. C. 1951. *Cylindrocladium scoparium* Morgan var. *brasiliensis* Batista & Ciferri, a new fungus on *Eucalyptus*. Boletim da Secretaria de agricultura, industria e comercio do Estado de Pernambuco 18: 188-191.

Boedijn, K. B., Reitsma, J. 1950. Notes on the genus *Cylindrocladium* (Fungi: Mucedineae). Reinwardtia 1: 51-60.

Bose, R., Pandey, S., Joshi, P., Banerjee, S., Pandey, A., Bhandari, M.S. 2020. First report of *Calonectria cerciana* causing leaf blight of *Eucalyptus* in northern India. Forest Pathology 51: 1-5.

Bose, R., Banerjee, S., Pandey, A., Bhandari, M. S., Barthwal, S., Pandey, S. 2022. Calonectria leaf blight of *Eucalyptus*: A global review. Annals of Applied Biology 181: 1-23.

Chen, Q. Z., Guo, W. S., Ye, X. Z., Huang, X. P., Wu, Y. Z. 2013. Identification of *Calonectria* associated with *Eucalyptus* leaf blight in Fujian Province. Journal of Fujian College of Forestry 33: 176-182. (In Chinese)

Chen, S. F., Lombard, L., Roux, J., Xie, Y. J., Wingfield, M. J., Zhou, X. D. 2011. Novel species of *Calonectria* associated with *Eucalyptus* leaf blight in Southeast China. Persoonia 26: 1-12.

Crous, P. W., Janse, B. J. H., Victor, D., Marais, G. F., Alfenas, A. C. 1993. Characterization of some *Cylindrocladium* species with three-septate conidia using morphology, isozyme banding patterns and DNA polymorphisms. Systematic and Applied Microbiology 16: 266-273.

Crous, P. W., Wingfield, M. J., Mohammed, C., Yuan, Z. Q. 1998. New foliar pathogens of *Eucalyptus* from Australia and Indonesia. Mycological Research 102: 527-532.

Crous, P. W. 2002. Taxonomy and pathology of *Cylindrocladium* (*Calonectria*) and allied genera. St Paul, Minnesota, USA: APS Press.

Crous, P. W., Groenewald, J. Z., Risède, J. M., Hyweljones, N. 2004. *Calonectria* species and their *Cylindrocladium* anamorphs: species with sphaeropedunculate vesicles. Studies in Mycology 50: 415-430.

Crous, P. W., Groenewald, J. Z., Risede, J. M., Simoneau, P., Hyde, K. D. 2006. *Calonectria* species and their *Cylindrocladium* anamorphs: species with clavate vesicles. Studies in Mycology 55: 213-226.

Crous, P. W., Hernández-Restrepo, M., Schumacher, R. K., Cowan, D. A., Maggs-Kölling, G., Marais, E., Wingfield, M. J., Yilmaz, N., Adan, O. C. G., Akulov, A., Álvarez Duarte, E., Berraf-Tebbal, A., Bulgakov, T. S., Carnegie, A. J., Beer, Z. W., Decock, C., Dijksterhuis, J., Duong, T. A., Eichmeier, A., Hien, L. T., Houbraken, J. A. M. P., Khanh, T. N., Liem, N. V., Lombard, L., Lutzoni, F. M., Miadlikowska, J. M., Nel, W. J., Pascoe, I. G., Roets, F., Roux, J., Samson, R. A., Shen, M., Spetik, M., Thangavel, R., Thanh, H. M., Thao, L. D., Nieuwenhuijzen, E. J., Zhang, J. Q., Zhang, Y., Zhao, L. L., Groenewald, J. Z. 2021. New and Interesting Fungi. 4. Fungal Systematics and Evolution 7: 255-343.

Decock, C., Crous, P. W. 1998. *Curvicladium* gen. nov., a new hyphomycete genus from French Guiana. Mycologia 90: 276-281.

Deng, L. H., Wang, P. Z. 2018. Investigation and analysis of *Eucalyptus* germplasm resources distribution in Hainan Province. Tropical forestry 46: 47-51. (In Chinese)

Deng, Y. S., Chen, X., Lin, S. Y., Cen, B. Z., Yu, Q. Z., Gan, W. Y., Deng, R. L. 1997. Characteristics of *Eucalyptus* leaf blight pathogen. Guangdong Forestry Science and Technology 13: 30-35. (In Chinese)

Feng, S. F., Zheng, J. H. 1986. A new disease occurs on nursery seedlings of *Eucalyptus parvula* in HaiNan Island. Tropical Agricultural Science 1: 59-61. (In Chinese)

Gadgil, P., Dick, M. 2004. Fungi silvicolae novazelandiae: 10. New Zealand Journal of Forestry Science 44: 1-7.

Graça, R. N., Alfenas, A. C., Maffia, L. A., Titon, M., Alfenas, R. F., Lau, D., Rocabado, J. M. A. 2009. Factors influencing infection of eucalypts by *Cylindrocladium pteridis*. Plant Pathology 58: 971-981.

Kang, J. C., Crous, P. W., Old, K. M., Dudzinski, M. J. 2001a. Non-conspecificity of *Cylindrocladium quinqueseptatum* and *Calonectria quinqueseptata* based on a *β*-tubulin gene phylogeny and morphology. Canadian Journal of Botany 79: 1241-1247.

Kang, J. C., Crous, P. W., Schoch, C. L. 2001b. Species concepts in the *Cylindrocladium floridanum* and *Cy. spathiphylli* complexes (Hypocreaceae) based on multi-allelic sequence data, sexual compatibility and morphology. Systematic and Applied Microbiology 24: 206-217.

Kumar, S., Stecher, G., Tamura, K. 2016. MEGA7: Molecular Evolutionary Genetics Analysis Version 7.0 for Bigger Datasets. Molecular Biology and Evolution 33: 1870-1874.

Lechat, C., Crous, P. W., Groenewald, J. Z. 2010. The enigma of *Calonectria* species occurring on leaves of Ilex aquifolium in Europe. IMA Fungus 1: 101-108.

Li, G. Q., Chen, S. F., Wu, Z. H., Zhou, X. D., Xie, Y. J. 2014a. Preliminary analysis on species diversity and pathogenicity of pathogens causing *Eucalyptus* blight in China. Chinese Journal of Tropical Crops 35: 1183-1191. (In Chinese)

Li, G. Q., Li, J. Q., Liu, F. F., Li, T. H., Chen, S. F. 2014b. Preliminary analysis on the pathogenicity of 12 pathogens causing *Eucalyptus* blight to 10 *Eucalyptus* clones. Eucalypt Science & Technology 31: 1-7. (In Chinese)

Li, J. Q., Wingfield, M. J., Liu, Q. L., Barnes, I., Roux, J., Lombard, L., Crous, P. W., Chen, S. F. 2017. *Calonectria* species isolated from *Eucalyptus* plantations and nurseries in South China. IMA Fungus 8: 259-286.

Li, J. Q., Wingfield, M. J., Barnes, I., Chen, S. F. 2022a. *Calonectria* in the age of genes and genomes: Towards understanding an important but relatively unknown group of pathogens. Molecular Plant Pathology 23: 1060-1072.

Li, W. W., Chen, S. F., Wingfield, M. J., Duong, T. A. 2022b. *Calonectria queenslandica*: Causal agent of *Eucalyptus* leaf blight in Southern China. Plant Disease https://doi.org/10.1094/PDIS-01-22-0196-RE.

Liu, L. L., Wu, W. X., Chen, S. F. 2021. Species Diversity and Distribution Characteristics of *Calonectria* in Five Soil Layers in a *Eucalyptus* Plantation. Journal of Fungi 7: 857.

Liu, L. L., Chen, S. F. 2022. Pathogenicity of six *Calonectria* species isolated from five soil layers in a *Eucalyptus* plantation. Journal of Phytopathology 170: 445-452.

Liu, Q. L., Chen, S. F. 2017. Two novel species of *Calonectria* isolated from soil in a natural forest in China. Mycokeys 26: 25-60.

Liu, Q. L., Li, J. Q., Wingfield, M. J., Duong, T. A., Wingfield, B. D., Crous, P. W., Chen, S. F. 2020. Reconsideration of species boundaries and proposed DNA barcodes for *Calonectria*. Studies in Mycology 97: 100106.

Liu, Q. L., Wingfield, M. J., Duong, T. A., Wingfield, B. D., Chen, S. F. 2022. Diversity and Distribution of *Calonectria* Species from Plantation and Forest Soils in FuJian Province, China. Journal of fungi 8: 811.

Lombard, L., Crous, P. W., Wingfield, B. D., Wingfield, M.J. 2010a. Multigene phylogeny and mating tests reveal three cryptic species related to *Calonectria pauciramosa*. Studies in Mycology 66: 15-30.

Lombard, L., Crous, P. W., Wingfield, B. D., Wingfield, M. J. 2010b. Phylogeny and systematics of the genus *Calonectria*. Studies in Mycology 66: 31-69.

Lombard, L., Crous, P. W., Wingfield, B. D., Wingfield, M. J. 2010c. Species concepts in *Calonectria* (*Cylindrocladium*). Studies in Mycology 66: 1-13.

Lombard, L., Zhou, X. D., Crous, P. W., Wingfield, B. D., Wingfield, M. J. 2010d. *Calonectria* species associated with cutting rot of *Eucalyptus*. Persoonia 24: 1-11.

Lombard, L., Chen, S. F., Mou, X., Zhou, X. D., Crous, P. W., Wingfield, M. J. 2015a. New species, hyper-diversity and potential importance of *Calonectria* spp. from *Eucalyptus* in South China. Studies in Mycology 80: 151-188.

Lombard, L., Merwe van der, N. A., Groenewald, J. Z., Crous, P. W. 2015b. Generic concepts in Nectriaceae. Studies in Mycology 80: 189-245.

Lombard, L., Wingfield, M. J., Alfenas, A. C., Crous, P. W. 2016. The forgotten *Calonectria* collection: pouring old wine into new bags. Studies in Mycology 85: 159-198.

Marin-Felix, Y., Groenewald, J.Z., Cai, L., Chen, Q., Marincowitz, S., Barnes, I., Bensch, K., Braun, U., Camporesi, E., Damm, U., Beer de, Z. W., Dissanayake, A., Edwards, J., Giraldo, A., Hernández-Restrepo, M., Hyde, K. D., Jayawardena, R. S., Lombard, L., Luangsa-ard, J., McTaggart, A. R., Rossman, A. Y., Sandoval-Denis, M., Shen, M., Shivas, R. G., Tan, Y. P., Linde van der, E. J., Wingfield, M. J., Wood, A. R., Zhang, J. Q., Zhang, Y., Crous, P. W. 2017. Genera of phytopathogenic fungi: GOPHY 1. Studies in Mycology 86: 99-216.

Meng, M. Q. 1993. A severe diseases of *Eucalyptus* leaf blight in China. Guangxi Forestry 6: 20-22. (In Chinese)

Mishra, K. K., Kolte, S. J., Nashaat, N. I., Awasthi, R. P. 2009. Pathological and biochemical changes in *Brassica juncea* (mustard) infected with *Albugo candida* (white rust). Plant Pathology 58: 80-86.

Old, K. M., Wingfield, M. J., Yuan, Z. Q. 2003. A manual of diseases of *Eucalyptus* in South East Asia. Center for International Forestry Research: Jakarta, Indonesia.

Pethybridge, S. J., Nelson, S. C. 2015. Leaf Doctor: A new portable application for quantifying plant disease severity. Plant disease 99: 1310-1316.

Pham, N. Q., Barnes, I., Chen, S. F., Liu, F. F., Dang, Q. N., Pham, T. Q., Lombard, L., Crous, P. W., Wingfield, M. J. 2019. Ten new species of *Calonectria* from Indonesia and Vietnam. Mycologia 111: 78-102.

Pham, N. Q., Marincowitz, S., Chen, S. F., Yaparudin, Y., Wingfield, M. J. 2022. *Calonectria* species, including four novel taxa, associated with *Eucalyptus* in Malaysia. Mycological Progress 21: 181-197.

Rodas, C. A., Lombard, L., Gryzenhout, M., Slippers, B., Wingfield, M. J. 2005. *Cylindrocladium* blight of *Eucalyptus grandis* in Colombia. Australasian Plant Pathology 34: 143-149.

Ronquist, F., Teslenko, M., Van Der Mark, P., Ayres, D., Darling, A., Höhna, S., Larget, B., Liu, L., Suchard, M., Huelsenbeck, J. 2012. MrBayes 3.2: efficient Bayesian phylogenetic inference and model choice across a large model space. Systematic Biology 61: 539-542.

Schoch, C. L., Crous, P. W., Wingfield, B. D., Wingfield, M.J. 1999. The *Cylindrocladium candelabrum* species complex includes four distinct mating populations. Mycologia 91: 286-298.

Stamatakis, A. 2014. RAxML version 8: a tool for phylogenetic analysis and post-analysis of large phylogenies. Bioinformatics 30: 1312-1313.

Tang, Z. Z., Zhou, S. P. 2007. Occurrence and control strategies of main diseases and insect pests of *Eucalyptus* in Danzhou city, Hainan Province. Tropical Forestry 3: 42-44. (In Chinese)

Terashita, T. 1968. A new species of *Calonectria* and its conidial state. Transactions of the Mycological Society of Japan 8: 124-129.

Tubaki, K. 1958. Studies on the Japanese Hyphomycetes. V. Leaf & stem group with a discussion of the classification of Hyphomycetes and their perfect stages. The Journal of the Hattori Botanical Laboratory 20: 142-244.

Van Burik, J. A. H., Schreckhise, R. W., White, T. C., Bowden, R. A., Myerson, D. 1998. Comparison of six extraction techniques for isolation of DNA from filamentous fungi. Medical mycology 36: 299-303.

Victor, D., Crous, P. W., Janse, B. J. H., Wingfield, M. J. 1997. Genetic variation in *Cylindrocladium floridanum* and other morphologically similar *Cylindrocladium* species. Systematic and Applied Microbiology 20: 268-285.

Wang, Q. C., Chen, S. F. 2020a. *Calonectria pentaseptata* causes severe leaf disease of cultivated *Eucalyptus* on the Leizhou peninsula of southern China. Plant Disease 104: 493-509.

Wang, Q. C., Chen, S. F. 2020b. Resistance of eight *Eucalyptus* genotypes to *Calonectria pentaseptata* in South China. Eucalypt Science & Technology 37: 1-9. (In Chinese)

Wang, Q. C., Liu, F. F., Liu, Q. L., Wu, W. X., Wingfield, M. J., Chen, S. F. 2022. Comparison of hyphal fragments and spores to evaluate the pathogenicity of the *Eucalyptus* leaf and shoot pathogen *Calonectria pseudoreteaudii*. Plant Disease 106: 3145-3153.

Wu, W. X., Chen, S. F. 2021. Species Diversity, Mating strategy and pathogenicity of *Calonectria* species from diseased leaves and soils in the *Eucalyptus* plantation in southern China. Journal of Fungi 7: 73.

Wu, M. K., Zhou, S. P., Li, L. X., Tang, Z. Z. 2000. Report on general survey of forest plant quarantine objects in Danzhou City, Hainan Province. Tropical agricultural sciences 5: 30-33. (In Chinese)

Wu, Z. H., Shang, X. H. 2021. Cultivation technology and management of *Eucalyptus* plantation. BeiJing: China Forestry Publishing House. (In Chinese)

Xie, Y. J., Du, A. P. 2019. *Eucalyptus* in South China. Party School of the CPC Central Committee Press. (In Chinese)

Zhang, Y. X., Chen, C. T., Chen, C., Chen, J. W., Xiang, M.M., Wanasinghe, D. N., Hsiang, T., Hyde, K. D., Manawasinghe, I. S. 2022. Identification and Characterization of *Calonectria* Species Associated with Plant Diseases in Southern China. Journal of Fungi 8: 719.

Zhou, X. D., Wingfield, M. J. 2011. *Eucalypt* diseases and their management in China.

Australasian Plant Pathology 40: 339-345.

Figure Legends

Fig. 1. Map of HaiNan Island showing disease survey in counties/regions, *Eucalyptus* genotypes, and the identified *Calonectria* species. The 17 sampled sites are indicated as numbers 1 to 17, followed by the *Eucalyptus* species.

Fig. 2. Disease symptoms of *Eucalyptus* trees in HaiNan Island caused by species of *Calonectria*. **A, B and C,** Symptoms of two-year-old *Eucalyptus urophylla* × *E. grandis* genotype in early (A), middle (B), and late (C) infection stages. **D,** The infected *E. urophylla* × *E. grandis* genotypes leaves became blighted. **E,** New twigs appeared on the infected branches. **F,** White mass of conidiophores of *Calonectria* species appeared on the branches and leaves. **G and H,** six-month-old to one-year-old *E. urophylla* × *E. grandis* trees were infected, and the leaves became blighted. **I to L,** One *E. urophylla* × *E. grandis* genotype showing leaf spot in different infection stages. **M,** The early infection stage of *E. exserta*. **N,** The infected *E. exserta* leaves became blighted. **O to R,** *E. exserta* showing leaf spots in different infection stages.

Fig. 3. Phylogenetic trees of *Calonectria* species based on maximum likelihood (ML) analyses of the dataset of combined *tef1*, *tub2*, *cmdA* and *his3* gene sequences. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The *Curvicladiella cignea* isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

Fig. 4. *Calonectria* species collected from HaiNan Island and different geographical regions in the island. The isolate number and the percentage of each species in HaiNan Island and different geographical regions are marked. Different species are indicated by numbers with different colors.

Fig. 5. *Calonectria* species collected from different *Eucalyptus* species in HaiNan Island. The isolate number and the percentage of each species in HaiNan Island and different *Eucalyptus* species are marked. Different species are indicated by numbers with different colors.

Fig. 6. Morphological features of asexual structures of *Calonectria* species and isolates obtained in this study. **A and B,** Macroconidia and clavate vesicle of *C. acaciicola*. **C and D,** Macroconidia and clavate vesicle of *C. pseudoreteaudii*. **E and F,** Macroconidia and clavate vesicle of *C. reteaudii*. **G and H,** Macroconidia and clavate vesicle of *C. cerciana*. **I and J,** Macroconidia and ellipsoidal vesicle of *C. hawksworthii*. **K and L,** Macroconidia and sphaeropedunculate vesicle of *C. chinensis*. **M and N,** Macroconidia and sphaeropedunculate vesicle of *C. hongkongensis*. **O to T,** 4 to 9-septate macroconidia of *C. acaciicola*, respectively. **U and V,** Macro- and microconidia of *C. acaciicola*. **W,** Macro- and microconidia of *C. pseudoreteaudii*. **X,** Macro- and microconidia of *C. reteaudii*. Scale bars: A to F, H, J, L and N to X = 20 μm, G, I, K and M = 10 μm.

Fig. 7. Symptoms on seedlings of *E. urophylla* × *E. tereticornis* genetopy CEPT 1898 and *E. urophylla* × *E. grandis* genotype CEPT 1899 inoculated by *Calonectria* conidial suspensions/sterile water. **A and E,** Lesions on leaves of *Eucalyptus* genotype CEPT1898 (A) inoculated by *C. acaciicola* CSF23945 in experiment Two, and *Eucalyptus* genotype CEPT1899 (E) inoculated by *C. acaciicola* CSF23992 in experiment One. **B and F,** *Eucalyptus* genotype CEPT1898 (B) inoculated by *C. pseudoreteaudii* CSF24054 in experiment One and *Eucalyptus* genotype CEPT1899 (F) inoculated by *C. pseudoreteaudii* CSF24116 in experiment Two. **C and G,** *Eucalyptus* genotype CEPT1898 (C) was more susceptible than CEPT1899 (G) inoculated by *C. reteaudii* CSF23970 in experiment Two. **D and H,** *Eucalyptus* genotype CEPT1898 (D) was more susceptible than CEPT1899 (H) inoculated by *C. hawksworthii* CSF23911 in experiment One. **I and J,** Disease symptoms were observed on leaves of *Eucalyptus* genotype CEPT1898 (I) and CEPT1899 (J) inoculated with *C. pseudoreteaudii* CSF13636 (positive controls) in experiment One. **K and L,** No disease symptoms on two *Eucalyptus* genotypes CEPT1898 (K) and CEPT1899 (L) inoculated by sterile water (negative controls) in experiment Two.

Fig. 8. Pathogenicity test results of experiment One. The column chart indicates the disease index (%) resulting from inoculation trials of two *Eucalyptus* hybrid genotypes inoculated with four *Calonectria* species and positive and negative controls. Vertical bars represent the standard errors of the means. Bars with different letters indicate treatment means that are significantly different ($P = 0.05$). The "*" indicates that the disease indexes of negative controls are zero.

Fig. 9. Pathogenicity test results of experiment Two. The column chart indicates the disease index (%) resulting from inoculation trials of two *Eucalyptus* hybrid genotypes inoculated with four *Calonectria* species and positive and negative controls. Vertical bars represent the standard errors of the means. Bars with different letters indicate treatment means that are significantly different ($P = 0.05$). The "*" indicates that the disease indexes of negative controls are zero.

Supplementary Materials

Supplementary Table S1. All *Calonectria* isolates obtained in this study.

Supplementary Fig. S1. Phylogenetic tree of *Calonectria* species based on Maximum Likelihood (ML) analyses of *tef1* gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The *Curvicladiella cignea* isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

Supplementary Fig. S2. Phylogenetic tree of *Calonectria* species based on Maximum Likelihood (ML) analyses of *tub2* gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The *Curvicladiella cignea* isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

Supplementary Fig. S3. Phylogenetic tree of *Calonectria* species based on Maximum Likelihood (ML) analyses of the *cmdA* gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The *Curvicladiella cignea* isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

Supplementary Fig. S4. Phylogenetic tree of *Calonectria* species based on Maximum Likelihood (ML) analyses of the *his3* gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The *Curvicladiella cignea* isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

Table 1. Sampling locations, *Eucalyptus* genotypes surveyed, species identified, and isolates obtained in this study.

Site No.	Location	GPS information	*Eucalyptus* genotype	Isolate No.	Isolate details	Identified species and isolate number
1	Gan Village, BangXi Town, BaiSha County, HaiNan Province	19º20'51.3816"N, 109º3'54.0936"E	1-year-old *E. urophylla* × *E. grandis* hybrid	2	2 isolates from leaves of one tree	*C. pseudoreteaudii* (2 isolates)
2	DaJiang Village, YaXing Town, DanZhou Region, HaiNan Province	19º35'8.4192"N, 109º10'7.6512"E	2-year-old *E. urophylla* × *E. grandis* hybrid	21	21 isolates from leaves of 20 trees	*C. pseudoreteaudii* (21 isolates)
3	DaJiang Village, YaXing Town, DanZhou Region, HaiNan Province	19º35'44.5632"N, 109º10'10.8408"E	2-year-old *E. urophylla* × *E. grandis* hybrid	40	40 isolates from leaves of 39 trees	*C. pseudoreteaudii* (40 isolates)
4	ChunHua Village, PaiPu Town, DanZhou Region, HaiNan Province	19º37'36.4296"N, 109º11'32.172"E	2-year-old *E. urophylla* × *E. grandis* hybrid	10	10 isolates from leaves of 10 trees	*C. acaciicola* (1 isolate)
						C. pseudoreteaudii (8 isolates)
						C. auriculiformis (1 isolate)
5	HeLeilao Village, BaiMajing Town, DanZhou Region, HaiNan Province	19º38'40.1172"N, 109º13'50.1204"E	2-year-old *E. exserta*	20	20 isolates from leaves of five trees	*C. pseudoreteaudii* (17 isolates)
						C. reteaudii (3 isolates)
6	RongShan Village, BaiMajing Town, DanZhou Region, HaiNan Province	19º38'50.7804"N, 109º13'58.8972"E	1-year-old *E. urophylla* × *E. grandis* hybrid	6	three isolates from leaves of three trees; three isolates from branches of two trees	*C. pseudoreteaudii* (5 isolates)
						C. hongkongensis (1 isolate)
7	BoLian Village, BoLian Town, LinGao County, HaiNan Province	19º49'6.9852"N, 109º37'25.9716"E	1-year-old *E. exserta*	30	30 isolates from leaves of 16 trees	*C. acaciicola* (10 isolates)
						C. pseudoreteaudii (4 isolates)
						C. reteaudii (16 isolates)
8	DunXiang Village, JiaLai Town, LinGao County, HaiNan Province	19º43'34.77"N, 109º42'54.4644"E	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	40	40 isolates from leaves of 25 trees	*C. acaciicola* (30 isolates)
						C. pseudoreteaudii (2 isolates)
						C. reteaudii (8 isolates)
	DunXiang Village, JiaLai Town, LinGao County, HaiNan Province	19º43'34.77"N, 109º42'54.4644"E	2 to 3-year-old *E. exserta*	6	six isolates from leaves of two trees	*C. acaciicola* (4 isolates)
						C. reteaudii (2 isolates)
9	MeiXing New Village, HuangTong Town, LinGao County, HaiNan Province	19º45'20.4696"N, 109º43'38.3376"E	1-year-old *E. urophylla* × *E. grandis* hybrid	25	25 isolates from leaves of 20 trees	*C. acaciicola* (8 isolates)
						C. pseudoreteaudii (8 isolates)

						C. hawksworthii (6 isolates)
						C. hongkongensis (3 isolates)
10	MeiXing New Village, HuangTong Town, LinGao County, HaiNan Province	19º45'45.2088"N, 109º44'28.1436"E	2-year-old *E. urophylla* × *E. tereticornis* hybrid	20	20 isolates from leaves of 20 trees	*C. acaciicola* (16 isolates)
						C. pseudoreteaudii (4 isolates)
11	WenTan Village, HuangTong Town, LinGao County, HaiNan Province	19º45'57.78"N, 109º44'56.6736"E	2-year-old *E. urophylla* × *E. grandis* hybrid	20	20 isolates from leaves of 20 trees	*C. acaciicola* (10 isolates)
						C. pseudoreteaudii (9 isolates)
						C. chinensis (1 isolate)
12	MeiXing Village, HuangTong Town, LinGao County, HaiNan Province	19º47'39.9876"N, 109º49'50.9952"E	1-year-old *E. urophylla* × *E. grandis* hybrid	54	49 isolates from leaves of 45 trees; five isolates from branches of five trees	*C. acaciicola* (21 isolates)
						C. pseudoreteaudii (33 isolates)
13	QinRen Village, HuangTong Town, LinGao County, HaiNan Province	19º52'19.596"N, 109º50'15.9108"E	2-year-old *E. urophylla* × *E. grandis* hybrid	70	70 isolates from leaves of 36 trees	*C. acaciicola* (62 isolates)
						C. pseudoreteaudii (8 isolates)
14	XiaTian Village, LeiMing Town, DingAn County, HaiNan Province	19º37'37.902"N, 110º17'15.6768"E	1-year-old *E. exserta*	20	20 isolates from leaves of five trees	*C. acaciicola* (20 isolates)
15	JiaYan Village, DingCheng Town, DingAn County, HaiNan Province	19º39'50.6628"N, 110º18'10.0764"E	1-year-old *E. exserta*	4	four isolates from leaves of one tree	*C. acaciicola* (4 isolates)
16	LuoDian Village, TanNiu Town, WenChang County, HaiNan Province	19º39'34.1928"N, 110º39'4.1004"E	over 5-year-old *E. exserta*	8	eight isolates from leaves of two trees	*C. acaciicola* (8 isolates)
17	ShiLi Village, TanNiu Town, WenChang County, HaiNan Province	19º40'28.38"N, 110º39'29.124"E	over 20-year-old *E. exserta*	4	four isolates from leaves of one tree	*C. acaciicola* (4 isolates)

Table 2. Isolates obtained in this study used for phylogenetic analyses, morphological studies, and pathogenicity tests.

Identity	Genotype[a]	Isolate No.[b]	Site No.	Sample and Isolate Information[c]	Host	Collectors	GenBank accession No.[d]			
							tef1	*tub2*	*cmdA*	*his3*
Species in *Clonectria reteaudii* species complex										
Calonectria acaciicola	AAAA	CSF21456	8	20200924-1-(10)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187818	OQ210178	OQ210577	OQ230648
C. acaciicola	AAAA	CSF21464	8	20200924-1-(15)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187819	OQ210179	OQ210578	OQ230649
C. acaciicola	AAAA	CSF21466	8	20200924-1-(16)-L1-S1-SC1	2 to 3-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187820	OQ210180	OQ210579	OQ230650
C. acaciicola	AAAA	CSF23881[e]	8	20210915-1-(10)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187821	OQ210181	OQ210580	OQ230651
C. acaciicola	AAAA	CSF23887	8	20210915-1-(13)-L4-S1-SC1	2 to 3-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187822	OQ210182	OQ210581	OQ230652
C. acaciicola	AAAA	CSF23937	10	20210915-4-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187823	OQ210183	OQ210582	OQ230653
C. acaciicola	AAAA	CSF23947	10	20210915-4-(11)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187824	OQ210184	OQ210583	OQ230654
C. acaciicola	AAAA	CSF23917	11	20210915-3-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187825	OQ210185	OQ210584	OQ230655
C. acaciicola	AAAA	CSF24075	12	20210917-2-(21)-B1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187826	OQ210186	OQ210585	OQ230656
C. acaciicola	AAAA	CSF24082	12	20210917-2-(33)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187827	OQ210187	OQ210586	OQ230657
C. acaciicola	AAAA	CSF24098	12	20210917-2-(61)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187828	OQ210188	OQ210587	OQ230658
C. acaciicola	AAAA	CSF21498	13	20200925-2-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187829	OQ210189	OQ210588	OQ230659
C. acaciicola	AAAA	CSF21516	13	20200925-2-(10)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187830	OQ210190	OQ210589	OQ230660
C. acaciicola	AAAA	CSF21561	13	20200925-2-(33)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187831	OQ210191	OQ210590	OQ230661
C. acaciicola	AAAA	CSF24119	14	20210918-1-(1)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187832	OQ210192	OQ210591	OQ230662
C. acaciicola	AAAA	CSF24127	14	20210918-1-(3)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187833	OQ210193	OQ210592	OQ230663

C. acaciicola	AAAA	CSF24137	14	20210918-1-(5)-L3-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187834	OQ210194	OQ210593	OQ230664
C. acaciicola	AAAA	CSF24144	16	20210918-3-(1)-L1-S1-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187835	OQ210195	OQ210594	OQ230665
C. acaciicola	AAAA	CSF24147	16	20210918-3-(1)-L4-S1-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187836	OQ210196	OQ210595	OQ230666
C. acaciicola	AAAA	CSF24151	16	20210918-3-(2)-L1-S4-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187837	OQ210197	OQ210596	OQ230667
C. acaciicola	AAAA	CSF24152	17	20210918-4-(1)-L1-S1-SC1	over 20-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187838	OQ210198	OQ210597	OQ230668
C. acaciicola	AAAA	CSF24153	17	20210918-4-(1)-L2-S1-SC1	over 20-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187839	OQ210199	OQ210598	OQ230669
C. acaciicola	AAAA	CSF24155	17	20210918-4-(1)-L4-S1-SC1	over 20-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187840	OQ210200	OQ210599	OQ230670
C. acaciicola	ABAA	CSF23871	8	20210915-1-(1)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187957	OQ210317	OQ210600	OQ230671
C. acaciicola	ABAA	CSF23898	9	20210915-2-(6)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187958	OQ210318	OQ210601	OQ230672
C. acaciicola	ABAA	CSF23905	9	20210915-2-(11)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187959	OQ210319	OQ210602	OQ230673
C. acaciicola	ABAA	CSF23914	9	20210915-2-(18)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187960	OQ210320	OQ210603	OQ230674
C. acaciicola	ABAA	CSF23953 [e]	10	20210915-4-(17)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187961	OQ210321	OQ210604	OQ230675
C. acaciicola	BAAA	CSF23992 [e,f]	4	20210916-3-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187972	OQ210332	OQ210605	OQ230676
C. acaciicola	BAAA	CSF23926	11	20210915-3-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187973	OQ210333	OQ210606	OQ230677
C. acaciicola	BAAA	CSF23928	11	20210915-3-(12)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187974	OQ210334	OQ210607	OQ230678
C. acaciicola	CAAA	CSF21469	7	20200924-2-(1)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187976	OQ210336	OQ210608	OQ230679
C. acaciicola	CAAA	CSF21476	7	20200924-2-(5)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187977	OQ210337	OQ210609	OQ230680
C. acaciicola	CAAA	CSF21493	7	20200924-2-(14)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187978	OQ210338	OQ210610	OQ230681
C. acaciicola	CAAA	CSF24139 [e]	15	20210918-2-(1)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187979	OQ210339	OQ210611	OQ230682
C. acaciicola	CAAA	CSF24141	15	20210918-2-(1)-L2-	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X.	OQ187980	OQ210340	OQ210612	OQ230683

				S1-SC1		Y. Liang and L. F. Liu				
C. acaciicola	CAAA	CSF24143	15	20210918-2-(1)-L2-S2-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187981	OQ210341	OQ210613	OQ230684
C. acaciicola	DAAA	CSF23945 [e,f]	10	20210915-4-(9)-L2-S2-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187991	OQ210351	OQ210614	OQ230685
C. acaciicola	DABA	CSF21441	8	20200924-1-(2)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187992	OQ210352	OQ210615	OQ230686
C. acaciicola	DABA	CSF21442	8	20200924-1-(2)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187993	OQ210353	OQ210616	OQ230687
C. acaciicola	DABA	CSF21443	8	20200924-1-(3)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187994	OQ210354	OQ210617	OQ230688
C. acaciicola	DABA	CSF21444	8	20200924-1-(3)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187995	OQ210355	OQ210618	OQ230689
C. acaciicola	DABA	CSF21445	8	20200924-1-(4)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187996	OQ210356	OQ210619	OQ230690
C. acaciicola	DABA	CSF21446	8	20200924-1-(4)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187997	OQ210357	OQ210620	OQ230691
C. acaciicola	DABA	CSF21447	8	20200924-1-(5)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187998	OQ210358	OQ210621	OQ230692
C. acaciicola	DABA	CSF21448	8	20200924-1-(5)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187999	OQ210359	OQ210622	OQ230693
C. acaciicola	DABA	CSF21449	8	20200924-1-(6)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188000	OQ210360	OQ210623	OQ230694
C. acaciicola	DABA	CSF21450	8	20200924-1-(6)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188001	OQ210361	OQ210624	OQ230695
C. acaciicola	DABA	CSF21452	8	20200924-1-(8)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188002	OQ210362	OQ210625	OQ230696
C. acaciicola	DABA	CSF21459	8	20200924-1-(11)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188003	OQ210363	OQ210626	OQ230697
C. acaciicola	DABA	CSF23872 [f]	8	20210915-1-(3)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188004	OQ210364	OQ210627	OQ230698
C. acaciicola	DABA	CSF23874 [e]	8	20210915-1-(5)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188005	OQ210365	OQ210628	OQ230699
C. acaciicola	DABA	CSF23938 [e,f]	10	20210915-4-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188006	OQ210366	OQ210629	OQ230700
C. acaciicola	DABA	CSF23941 [f]	10	20210915-4-(5)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188007	OQ210367	OQ210630	OQ230701
C. acaciicola	DABA	CSF23919 [e]	11	20210915-3-(3)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188008	OQ210368	OQ210631	OQ230702

C. acaciicola	DABA	CSF23934	11	20210915-3-(18)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188009	OQ210369	OQ210632	OQ230703
C. acaciicola	EABB	CSF23946 [e]	10	20210915-4-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188010	OQ210370	OQ210633	OQ230704
C. acaciicola	EABB	CSF24112	12	20210917-2-(87)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188011	OQ210371	OQ210634	OQ230705
C. acaciicola	EABB	CSF24113	12	20210917-2-(89)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188012	OQ210372	OQ210635	OQ230706
C. acaciicola	EABB	CSF24115 [e]	12	20210917-2-(93)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188013	OQ210373	OQ210636	OQ230707
C. acaciicola	EABB	CSF24118	12	20210917-2-(99)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188014	OQ210374	OQ210637	OQ230708
C. pseudoreteaudii	AAAA	CSF24054 [f]	1	20210917-1-(1)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188016	OQ210376	OQ210638	OQ230709
C. pseudoreteaudii	AAAA	CSF24055	1	20210917-1-(1)-L2-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188017	OQ210377	OQ210639	OQ230710
C. pseudoreteaudii	AAAA	CSF24034	2	20210916-5-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188018	OQ210378	OQ210640	OQ230711
C. pseudoreteaudii	AAAA	CSF24042	2	20210916-5-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188019	OQ210379	OQ210641	OQ230712
C. pseudoreteaudii	AAAA	CSF24051	2	20210916-5-(19)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188020	OQ210380	OQ210642	OQ230713
C. pseudoreteaudii	AAAA	CSF23993 [e]	3	20210916-4-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188021	OQ210381	OQ210643	OQ230714
C. pseudoreteaudii	AAAA	CSF24008	3	20210916-4-(16)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188022	OQ210382	OQ210644	OQ230715
C. pseudoreteaudii	AAAA	CSF24029	3	20210916-4-(36)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188023	OQ210383	OQ210645	OQ230716
C. pseudoreteaudii	AAAA	CSF23983	4	20210916-3-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188024	OQ210384	OQ210646	OQ230717
C. pseudoreteaudii	AAAA	CSF23987	4	20210916-3-(5)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188025	OQ210385	OQ210647	OQ230718
C. pseudoreteaudii	AAAA	CSF23990	4	20210916-3-(8)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188026	OQ210386	OQ210648	OQ230719
C. pseudoreteaudii	AAAA	CSF23963	5	20210916-2-(5)-L2-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188027	OQ210387	OQ210649	OQ230720
C. pseudoreteaudii	AAAA	CSF23968	5	20210916-2-(6)-L2-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188028	OQ210388	OQ210650	OQ230721
C. pseudoreteaudii	AAAA	CSF23979	5	20210916-2-(9)-L1-	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X.	OQ188029	OQ210389	OQ210651	OQ230722

				S1-SC1		Y. Liang and L. F. Liu				
C. pseudoreteaudii	AAAA	CSF23957	6	20210916-1-(1)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188030	OQ210390	OQ210652	OQ230723
C. pseudoreteaudii	AAAA	CSF23959	6	20210916-1-(3)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188031	OQ210391	OQ210653	OQ230724
C. pseudoreteaudii	AAAA	CSF23961	6	20210916-1-(5)-B1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188032	OQ210392	OQ210654	OQ230725
C. pseudoreteaudii	AAAA	CSF21474	7	20200924-2-(4)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188033	OQ210393	OQ210655	OQ230726
C. pseudoreteaudii	AAAA	CSF21475	7	20200924-2-(4)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188034	OQ210394	OQ210656	OQ230727
C. pseudoreteaudii	AAAA	CSF21496	7	20200924-2-(16)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188035	OQ210395	OQ210657	OQ230728
C. pseudoreteaudii	AAAA	CSF21460	8	20200924-1-(13)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188036	OQ210396	OQ210658	OQ230729
C. pseudoreteaudii	AAAA	CSF21461	8	20200924-1-(13)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188037	OQ210397	OQ210659	OQ230730
C. pseudoreteaudii	AAAA	CSF23888 [e]	9	20210915-2-(1)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188038	OQ210398	OQ210660	OQ230731
C. pseudoreteaudii	AAAA	CSF23903	9	20210915-2-(10)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188039	OQ210399	OQ210661	OQ230732
C. pseudoreteaudii	AAAA	CSF23913	9	20210915-2-(17)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188040	OQ210400	OQ210662	OQ230733
C. pseudoreteaudii	AAAA	CSF23939[f]	10	20210915-4-(3)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188041	OQ210401	OQ210663	OQ230734
C. pseudoreteaudii	AAAA	CSF23943	10	20210915-4-(7)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188042	OQ210402	OQ210664	OQ230735
C. pseudoreteaudii	AAAA	CSF23952	10	20210915-4-(16)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188043	OQ210403	OQ210665	OQ230736
C. pseudoreteaudii	AAAA	CSF23918	11	20210915-3-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188044	OQ210404	OQ210666	OQ230737
C. pseudoreteaudii	AAAA	CSF23921	11	20210915-3-(5)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188045	OQ210405	OQ210667	OQ230738
C. pseudoreteaudii	AAAA	CSF23931	11	20210915-3-(15)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188046	OQ210406	OQ210668	OQ230739
C. pseudoreteaudii	AAAA	CSF24073[f]	12	20210917-2-(17)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188047	OQ210407	OQ210669	OQ230740
C. pseudoreteaudii	AAAA	CSF21522	13	20200925-2-(13)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188048	OQ210408	OQ210670	OQ230741

C. pseudoreteaudii	AAAA	CSF21531	13	20200925-2-(18)-L 1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188049	OQ210409	OQ210671	OQ230742
C. pseudoreteaudii	AAAA	CSF21543	13	20200925-2-(24)-L 1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188050	OQ210410	OQ210672	OQ230743
C. pseudoreteaudii	BAAA	CSF24064 [e]	12	20210917-2-(1)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188170	OQ210529	OQ210673	OQ230744
C. pseudoreteaudii	BAAA	CSF24116[f]	12	20210917-2-(95)-L 1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188171	OQ210530	OQ210674	OQ230745
C. reteaudii	AAAA	CSF21439 [e]	8	20200924-1-(1)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188177	OQ210536	OQ210675	OQ230746
C. reteaudii	AAAA	CSF21454	8	20200924-1-(9)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188178	OQ210537	OQ210676	OQ230747
C. reteaudii	AAAA	CSF21462	8	20200924-1-(14)-L 1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188179	OQ210538	OQ210677	OQ230748
C. reteaudii	AAAA	CSF23883 [e,f]	8	20210915-1-(12)-L 1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188180	OQ210539	OQ210678	OQ230749
C. reteaudii	AAAA	CSF23884	8	20210915-1-(13)-L 1-S1-SC1	2 to 3-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188181	OQ210540	OQ210679	OQ230750
C. reteaudii	AAAA	CSF23886	8	20210915-1-(13)-L 3-S1-SC1	2 to 3-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188182	OQ210541	OQ210680	OQ230751
C. reteaudii	AB-A	CSF21473	7	20200924-2-(3)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188198	OQ210557	N/A	OQ230754
C. reteaudii	ABAA	CSF21478	7	20200924-2-(6)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188196	OQ210555	OQ210681	OQ230752
C. reteaudii	ABAA	CSF21495	7	20200924-2-(15)-L 1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188197	OQ210556	OQ210682	OQ230753
C. reteaudii	BAAA	CSF23967 [e]	5	20210916-2-(6)-L1-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188203	OQ210562	OQ210683	OQ230755
C. reteaudii	BAAA	CSF23969	5	20210916-2-(6)-L3-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188204	OQ210563	OQ210684	OQ230756
C. reteaudii	BAAA	CSF23970[f]	5	20210916-2-(6)-L4-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188205	OQ210564	OQ210685	OQ230757
Species in *Calonectria cylindrospora* species complex										
C. auriculiformis	AAAA	CSF23984 [e]	4	20210916-3-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188206	OQ210565	OQ210686	OQ230758
C. hawksworthii	AAAA	CSF23901 [e]	9	20210915-2-(9)-L1-S2-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188207	OQ210566	OQ210687	OQ230759
C. hawksworthii	AAAA	CSF23902	9	20210915-2-(9)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188208	OQ210567	OQ210688	OQ230760

C. hawksworthii	AAAA	CSF23909[f]	9	20210915-2-(14)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188209	OQ210568	OQ210689	OQ230761
C. hawksworthii	AAAA	CSF23911[f]	9	20210915-2-(16)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188210	OQ210569	OQ210690	OQ230762
C. hawksworthii	AAAB	CSF23891[e]	9	20210915-2-(4)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188211	OQ210570	OQ210691	OQ230763
C. hawksworthii	AAAB	CSF23892	9	20210915-2-(4)-L1-S2-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188212	OQ210571	OQ210692	OQ230764
Species in *Calonectria kyotensis* species complex										
C. chinensis	AAAA	CSF23930[e]	11	20210915-3-(14)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188213	OQ210572	OQ210693	OQ230765
C. hongkongensis	AAAA	CSF23962	6	20210916-1-(5)-B1-S1-SC2	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188214	OQ210573	OQ210694	OQ230766
C. hongkongensis	AAAA	CSF23907	9	20210915-2-(12)-L2-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188215	OQ210574	OQ210695	OQ230767
C. hongkongensis	AAAB	CSF23894[e]	9	20210915-2-(5)-L1-S2-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188216	OQ210575	OQ210696	OQ230768
C. hongkongensis	ABAA	CSF23904	9	20210915-2-(10)-L1-S2-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188217	OQ210576	OQ210697	OQ230769

[a.] Genotype within each *Calonectria* species, determined by sequences of the *tef1*, *tub2*, *cmdA*, and *his3* regions; "N/A" means not available.

[b.] CSF: Culture collection located at Research Institute of Fast-growing Trees (RIFT), Chinese Academy of Forestry, ZhanJiang, GuangDong Province, China.

[c.] Information associated with sample point and isolate, for example, "20200924-1-(10)-L1-S1-SC1" indicated sample number "20200924-1-(10), leaf1 (L1), conidia mass spot1 (S1), single conidia1 (SC1)"'; "20210917-2-(21)-B1-S1-SC1" indicated sample number "20210917-2-(21), branch1 (B1), conidia mass spot1 (S1), single conidia1 (SC1)"'.

[d.] *tef1* = translation elongation factor 1-alpha; *tub2* =*β*-tubulin; *cmdA* = calmodulin; *his3* = histone H3.

[e.] Isolates used for measuring macroconidia and vesicles in the current study.

[f.] Isolates used for pathogenicity tests.

Table 3. Isolates from other studies used for phylogenetic analyses in this study.

Species Code[a]	Species	Isolate No.[b,c]	Other collection number[c]	Hosts	Area of occurrence	Collector	GenBank accession Numbers[d]				References or source of data
							tef1	*tub2*	*cmdA*	*his3*	
B1	*Calonectria acaciicola*	CMW 47173[T]	CBS 143557	Soil (*Acacia auriculiformis* plantation)	Do Luong, Nghe An, Vietnam	N.Q. Pham and T.Q. Pham	MT412690	MT412930	MT335160	MT335399	Pham et al. 2019; Liu et al. 2020
		CMW 47174	CBS 143558	Soil (*A. auriculiformis* plantation)	Do Luong, Nghe An, Vietnam	N.Q. Pham and T.Q. Pham	MT412691	MT412931	MT335161	MT335400	Pham et al. 2019; Liu et al. 2020
B2	*C. acicola*	CMW 30996[T]	–	*Phoenix canariensis*	Northland, New Zealand	H. Pearson	MT412692	MT412932	MT335162	MT335401	Gadgil and Dick 2004; Lombard et al. 2010b; Liu et al. 2020
		CBS 114812	CMW 51216	*P. canariensis*	Northland, New Zealand	H. Pearson	MT412693	MT412933	MT335163	MT335402	Gadgil and Dick 2004; Lombard et al. 2010b; Liu et al. 2020
B4	*C. aconidialis*	CMW 35174[T]	CBS 136086; CERC 1850	Soil (*Eucalyptus* plantation)	HaiNan, China	X. Mou and S.F. Chen	MT412695	N/A[e]	MT335165	MT335404	Lombard et al. 2015a; Liu et al. 2020
		CMW 35384	CBS 136091; CERC 1886	Soil (*Eucalyptus* plantation)	HaiNan, China	X. Mou and S.F. Chen	MT412696	N/A	MT335166	MT335405	Lombard et al. 2015a; Liu et al. 2020
B5	*C. aeknauliensis*	CMW 48253[T]	CBS 143559	Soil (*Eucalyptus* plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT412710	N/A	MT335180	MT335419	Pham et al. 2019; Liu et al. 2020
		CMW 48254	CBS 143560	Soil (*Eucalyptus* plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT412711	N/A	MT335181	MT335420	Pham et al. 2019; Liu et al. 2020
B8	*C. asiatica*	CBS 114073[T]	CMW 23782; CPC 3900	Debris (leaf litter)	Prathet Thai, Thailand	N.L. Hywel-Jones	AY725705	AY725616	AY725741	AY725658	Crous et al. 2004; Lombard et al. 2010b
B9	*C. auriculiformis*	CMW 47178[T]	CBS 143561	Soil (*A. auriculiformis* plantation)	Hau Loc, Thanh Hoa, Vietnam	N.Q. Pham and T.Q. Pham	MT412721	MT412944	MT335190	MT335430	Pham et al. 2019; Liu et al. 2020
		CMW 47179	CBS 143562	Soil (*A. auriculiformis* plantation)	Hau Loc, Thanh Hoa, Vietnam	N.Q. Pham and T.Q. Pham	MT412722	MT412945	MT335191	MT335431	Pham et al. 2019; Liu et al. 2020

B10	*C. australiensis*	CMW 23669[T]	CBS 112954; CPC 4714	*Ficus pleurocarpa*	Queensland, Australia	C. Pearce and B. Paulus	MT412723	MT412946	MT335192	MT335432	Crous et al. 2006; Lombard et al. 2010b; Liu et al. 2020
B14	*C. brasiliensis*	CBS 23051[T]	IMI 299576	*Eucalyptus* sp.	Ceara state, Brazil	T.R. Ciferri	MT412731	MT412953	MT335200	MT335440	Batista 1951; Crous 2002; Lombard et al. 2010a; Liu et al. 2020
		CMW 32949	CBS 114257; CPC 1944	*Eucalyptus* sp.	Aracruz, Brazil	A.C. Alfenas	MT412732	MT412954	MT335201	MT335441	Lombard et al. 2010b; Liu et al. 2020
B17	*C. brassicicola*	CBS 112841[T]	CMW 51206; CPC 4552	Soil (*Brassica* sp.)	Indonesia	M.J. Wingfield	KX784689	KX784619	KX784561	N/A	Lombard et al. 2016
B19	*C. bumicola*	CMW 48257[T]	CBS 143575	Soil (*Eucalyptus* plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT412736	N/A	MT335205	MT335445	Pham et al. 2019; Liu et al. 2020
B20	*C. canadiana*	CMW 23673[T]	CBS 110817; STE-U 499	*Picea* sp.	Canada	S. Greifenhagen	MT412737	MT412958	MT335206	MT335446	Kang et al. 2001b; Crous 2002; Lechat et al. 2010; Liu et al. 2020
		CERC 8952	–	Soil	HeNan, China	S.F. Chen	MT412821	MT413035	MT335290	MT335530	Liu and Chen 2017; Liu et al. 2020
B22	*C. cerciana*	CMW 25309[T]	CBS 123693	*E. urophylla* × *E. grandis* hybrid cutting	CERC nursery, GuangDong, China	M.J. Wingfield and X.D. Zhou	MT412742	MT412963	MT335211	MT335451	Lombard et al. 2010d; Liu et al. 2020
		CMW 25290	CBS 123695	*E. urophylla* × *E. grandis* hybrid cutting	CERC nursery, GuangDong, China	M.J. Wingfield and X.D. Zhou	MT412743	MT412964	MT335212	MT335452	Lombard et al. 2010d; Liu et al. 2020
B23	*C. chinensis*	CMW 23674[T]	CBS 114827; CPC 4101	Soil	Hong Kong, China	E.C.Y. Liew	MT412751	MT412972	MT335220	MT335460	Crous et al. 2004; Lombard et al. 2010b; Liu et al. 2020
		CMW 30986	CBS 112744; CPC 4104	Soil	Hong Kong, China	E.C.Y. Liew	MT412752	MT412973	MT335221	MT335461	Crous et al. 2004; Lombard et al. 2010b; Liu et al. 2020
B26	*C. cochinchinensis*	CMW 49915[T]	CBS 143567	Soil (*Hevea brasiliensis* plantation)	Duong Minh Chau, Tay Ninh, Vietnam	N.Q. Pham, Q.N. Dang and T.Q. Pham	MT412756	MT412977	MT335225	MT335465	Pham et al. 2019; Liu et al. 2020

		CMW 47186	CBS 143568	Soil (*A. auriculiformis* plantation)	Song May, Dong Nai, Vietnam	N.Q. Pham and T.Q. Pham	MT412757	MT412978	MT335226	MT335466	Pham et al. 2019; Liu et al. 2020
B29	*C. colombiensis*	CMW 23676^{T}	CBS 112220; CPC 723	Soil (*E. grandis* trees)	La Selva, Colombia	M.J. Wingfield	MT412759	MT412980	MT335228	MT335468	Crous et al. 2004; Liu et al. 2020
		CMW 30985	CBS 112221; CPC 724	Soil (*E. grandis* trees)	La Selva, Colombia	M.J. Wingfield	MT412760	MT412981	MT335229	MT335469	Crous et al. 2004; Liu et al. 2020
B30	*C. crousiana*	CMW 27249^{T}	CBS 127198	*E. grandis*	FuJian, China	M.J. Wingfield	MT412761	MT412982	MT335230	MT335470	Chen et al. 2011; Liu et al. 2020
		CMW 27253	CBS 127199	*E. grandis*	FuJian, China	M.J. Wingfield	MT412762	MT412983	MT335231	MT335471	Chen et al. 2011; Liu et al. 2020
B31	*C. curvispora*	CMW 23693^{T}	CBS 116159; CPC 765	Soil	Tamatave, Madagascar	P.W. Crous	MT412763	N/A	MT335232	MT335472	Victor et al. 1997; Crous 2002; Lombard et al. 2010b, 2015b; Liu et al. 2020
		CMW 48245	CBS 143565	Soil (*Eucalyptus* plantation)	Aek Nauli, North Sumatra, Indonesia	M.J. Wingfield	MT412764	N/A	MT335233	MT335473	Pham et al. 2019; Liu et al. 2020
B32	*C. cylindrospora*	CBS 119670	CMW 51310; CPC 12766	*Pistacia lentiscus*	Italy	N/A	MT412767	MT412985	MT335236	MT335476	Lombard et al. 2015a, b, 2016; Liu et al. 2020
		CMW 30978	CBS 110666; P90.1479; STE-U 497	*Ilex vomitoria*	Florida, USA	N.E. El-Gholl	MT412768	MT412986	MT335237	MT335477	Crou 2002; Lombard et al. 2010b, 2015a; Liu et al. 2020
B44	*C. hawksworthii*	CBS 111870^{T}	CMW 51194; CPC 2405	*Nelumbo nucifera*	Pamplemousses garden, Mauritius	A. Peerally	MT412785	MT413003	MT335254	MT335494	Crous 2002; Liu et al. 2020
		CMW 31393	CBS 136641	*E. urophylla* × *E. grandis*	GuangXi, China	X. Zhou and G. Zhao	MT412778	MT412996	MT335247	MT335487	Lombard et al. 2015a; Liu et al. 2020
B46	*C. heveicola*	CMW 49913^{T}	CBS 143570	Soil (*Hevea brasiliensis* plantation)	Bau Bang, Binh Duong, Vietnam	N.Q. Pham, Q.N. Dang and T.Q. Pham	MT412786	MT413004	MT335255	MT335495	Pham et al. 2019; Liu et al. 2020
		CMW 49928	CBS 143571	Soil	Bu Gia Map National Park, Binh Phuoc, Vietnam	N.Q. Pham, Q.N. Dang and T.Q. Pham	MT412811	MT413025	MT335280	MT335520	Pham et al. 2019; Liu et al. 2020
B48	*C. hongkongensis*	CBS 114828^{T}	CMW 51217; CPC 4670	Soil	Hong Kong, China	M.J. Wingfield	MT412789	MT413007	MT335258	MT335498	Crous et al. 2004; Liu et al. 2020

		CERC 3570	CMW 47271	Soil (*Eucalyptus* plantation)	BeiHai, GuangXi, China	S.F. Chen, J.Q. Li and G.Q. Li	MT412791	MT413009	MT335260	MT335500	Li et al. 2017; Liu et al. 2020
B51	*C. ilicicola*	CMW 30998^{T}	CBS 190.50; IMI 299389; STE-U 2482	*Solanum tuberosum*	Bogor, Java, Indonesia	K.B. Boedijn and J. Reitsma	MT412797	N/A	MT335266	MT335506	Boedijn and Reitsma 1950; Crous 2002; Lombard et al. 2010b; Liu et al. 2020
B52	*C. indonesiae*	CMW 23683^{T}	CBS 112823; CPC 4508	*Syzygium aromaticum*	Warambunga, Indonesia	M.J. Wingfield	MT412798	MT413015	MT335267	MT335507	Crous et al. 2004; Liu et al. 2020
		CBS 112840	CMW 51205; CPC 4554	*S. aromaticum*	Warambunga, Indonesia	M.J. Wingfield	MT412799	MT413016	MT335268	MT335508	Crous et al. 2004; Liu et al. 2020
B54	*C. insularis*	CMW 30991^{T}	CBS 114558; CPC 768	Soil	Tamatave, Madagascar	P.W. Crous	MT412800	MT413017	MT335269	MT335509	Schoch et al. 1999; Lombard et al. 2010b, 2016; Liu et al. 2020
		CMW 30992	CBS 114559; CPC 954	Soil	Conejos, Veracruz, Mexico	M.J. Wingfield	MT412801	MT413018	MT335270	MT335510	Lombard et al. 2010b, 2016; Liu et al. 2020
B55	*C. kyotensis*	CBS 114525^{T}	ATCC 18834; CMW 51824; CPC 2367	*Robinia pseudoacacia*	Japan	T. Terashita	MT412802	MT413019	MT335271	MT335511	Terashita 1968; Crous 2002; Lombard et al. 2016; Liu et al. 2020
		CBS 114550	CMW 51825; CPC 2351	Soil	China	M.J. Wingfield	MT412777	MT412995	MT335246	MT335486	Lombard et al. 2016; Liu et al. 2020
B56	*C. lageniformis*	CBS 111324^{T}	CMW 51177; CPC 1473	Leaf of *Eucalyptus* sp.	Rivière Noire, Mauritius	H. Smith	KX784702	KX784632	KX784574	N/A	Lombard et al. 2016; Marin-Felix et al. 2017
B57	*C. lantauensis*	CERC 3302^{T}	CBS 142888; CMW 47252	Soil	LiDao, Hong Kong, China	M.J. Wingfield and S.F. Chen	MT412803	N/A	MT335272	MT335512	Li et al. 2017; Liu et al. 2020
		CERC 3301	CBS 142887; CMW 47251	Soil	LiDao, Hong Kong, China	M.J. Wingfield and S.F. Chen	MT412804	N/A	MT335273	MT335513	Li et al. 2017; Liu et al. 2020
B58	*C. lateralis*	CMW 31412^{T}	CBS 136629	Soil (*Eucalyptus* plantation)	GuangXi, China	X. Zhou, G. Zhao and F. Han	MT412805	MT413020	MT335274	MT335514	Lombard et al. 2015a; Liu et al. 2020
B63	*C. lombardiana*	CMW 30602^{T}	CBS 112634; CPC 4233; Lynfield 417	*Xanthorrhoea australis*	Victoria, Australia	T. Baigent	MT412926	MT413133	MT335395	MT335635	Crous 2002; Crous et al. 2006; Lombard et al. 2010d
B66	*C. malesiana*	CMW 23687^{T}	CBS 112752; CPC 4223	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT412817	MT413031	MT335286	MT335526	Crous et al. 2004; Liu et al. 2020

		CBS 112710	CMW 51199; CPC 3899	Leaf litter	Prathet, Thailand	N.L. Hywel-Jones	MT412818	MT413032	MT335287	MT335527	Crous et al. 2004; Liu et al. 2020
B67	*C. maranhensis*	CBS 134811^T	LPF142	*Eucalyptus* sp. (leaf)	Açailandia, Maranhao, Brazil	A.C. Alfenas	KM395861	KM395948	KM396035	KM396118	Alfenas et al. 2015
		CBS 134812	LPF143	*Eucalyptus* sp. (leaf)	Açailandia, Maranhao, Brazil	A.C. Alfenas	KM395862	KM395949	KM396036	KM396119	Alfenas et al. 2015
B74	*C. multiseptata*	CMW 23692^T	CBS 112682; CPC 1589	*E. grandis*	North Sumatra, Indonesia	M.J. Wingfield	MT412830	MT413044	MT335299	MT335539	Crous et al. 1998, 2006; Crous 2002; Liu et al. 2020
B80	*C. pacifica*	CMW 16726^T	A1568; CBS 109063;IMI 354528;STE-U 2534	*Araucaria heterophylla*	Hawaii, USA	M. Aragaki	MT412842	N/A	MT335311	MT335551	Kang et al. 2001b; Crous 2002; Crous et al. 2004; Liu et al. 2020
		CMW 30988	CBS 114038	*Ipomoea aquatica*	Auckland, New Zealand	C.F. Hill	MT412843	N/A	MT335312	MT335552	Crous 2002; Crous et al. 2004; Lombard et al. 2010b; Liu et al. 2020
B86	*C. penicilloides*	CMW 23696^T	CBS 174. 55; STE-U 2388	*Prunus* sp.	Hatizyo Island, Japan	M. Ookubu	MT412869	MT413081	MT335338	MT335578	Tubaki 1958; Crous 2002; Liu et al. 2020
B89	*C. plurilateralis*	CBS 111401^T	CMW 51178; CPC 1637	Soil	Ecuador	M.J. Wingfield	MT412871	MT413083	MT335340	MT335580	Lombard et al. 2016; Liu et al. 2020
B90	*C. propaginicola*	CBS 134815^T	LPF220	*Eucalyptus* sp. (seedling)	Santana, Pará, Brazil	A.C. Alfenas	KM395866	KM395953	KM396040	KM396123	Alfenas et al. 2015
		CBS 134816	LPF222	*Eucalyptus* sp. (seedling)	Santana, Pará, Brazil	A.C. Alfenas	KM395867	KM395954	KM396041	KM396124	Alfenas et al. 2015
B97	*C. pseudoreteaudii*	CMW 25310^T	CBS 123694	*E. urophylla* × *E. grandis*	GuangDong, China	M.J. Wingfield and X.D. Zhou	MT412885	MT413096	MT335354	MT335594	Lombard et al. 2010d; Liu et al. 2020
		CMW 25292	CBS 123696	*E. urophylla* × *E. grandis*	GuangDong, China	M.J. Wingfield and X.D. Zhou	MT412886	MT413097	MT335355	MT335595	Lombard et al. 2010d; Liu et al. 2020
B104	*C. queenslandica*	CMW 30604^T	CBS 112146; CPC 3213	*E. urophylla*	Lannercost, Queensland, Australia	B. Brown	MT412898	MT413108	MT335367	MT335607	Kang et al. 2001a; Lombard et al. 2010d; Liu et al. 2020
		CMW 30603	CBS 112155; CPC 3210	*E. pellita*	Lannercost, Queensland, Australia	P.Q Thu and K.M. Old	MT412899	MT413109	MT335368	MT335608	Kang et al. 2001a; Lombard et al. 2010d; Liu et al. 2020

B106	*C. reteaudii*	CMW 30984^{T}	CBS 112144; CPC 3201	*E. camaldulensis*	Chon Thanh, Binh Phuoc, Vietnam	M.J. Dudzinski and P.Q. Thu	MT412901	MT413111	MT335370	MT335610	Kang et al. 2001a; Crous 2002; Crous et al. 2006; Liu et al. 2020
		CMW 16738	CBS 112143; CPC 3200	*Eucalyptus* leaves	Binh Phuoc, Vietnam	M.J. Dudzinski and P.Q. Thu	MT412902	MT413112	MT335371	MT335611	Kang et al. 2001a; Crous 2002; Crous et al. 2006; Liu et al. 2020
B112	*C. sumatrensis*	CMW 23698^{T}	CBS 112829; CPC 4518	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT412913	N/A	MT335382	MT335622	Crous et al. 2004; Liu et al. 2020
		CMW 30987	CBS 112934; CPC 4516	Soil	Northern Sumatra, Indonesia	M.J. Wingfield	MT412914	N/A	MT335383	MT335623	Crous et al. 2004; Liu et al. 2020
B113	*C. syzygiicola*	CBS 112831^{T}	CMW 51204; CPC 4511	*Syzygium aromaticum*	Sumatra, Indonesia	M.J. Wingfield	KX784736	KX784663	N/A	N/A	Lombard et al. 2016
B115	*C. tonkinensis*	CMW 47430^{T}	CBS 143576	Soil (*Eucalyptus* plantation)	Bavi, Hanoi, Vietnam	N.Q. Pham and T.Q. Pham	MT412915	MT413122	MT335384	MT335624	Pham et al. 2019; Liu et al. 2020
B116	*C. uniseptata*	CBS 41367^{T}	CMW 23678; CPC 2391; IMI 299577	*Paphiopedilum callosum*	Celle, Germany	W. Gerlach	GQ267307	GQ267208	GQ267379	GQ267248	Lombard et al. 2016
B118	*C. variabilis*	CMW 3187^{T}	AR2675; CBS 114677; CPC 2436	*Schefflera morototoni*	Pará, Brazil	F.C. de Albuquerque	MT412923	MT413130	MT335392	MT335632	Crous et al. 1993; Crous 2002; Lombard et al. 2010b, 2016; Liu et al. 2020
		CMW 2914	CBS 112691; CPC 2506	*Theobroma grandiflorum*	Pará, Brazil	F. Carneiro	MT412924	MT413131	MT335393	MT335633	Crous et al. 1993; Crous 2002; Lombard et al. 2010b, 2016; Liu et al. 2020
B120	*C. yunnanensis*	CERC 5339^{T}	CBS 142897; CMW 47644	Soil (*Eucalyptus* plantation)	YunNan, China	S.F. Chen and J.Q. Li	MT412927	MT413134	MT335396	MT335636	Li et al. 2017; Liu et al. 2020
		CERC 5337	CBS 142895; CMW 47642	Soil (*Eucalyptus* plantation)	YunNan, China	S.F. Chen and J.Q. Li	MT412928	MT413135	MT335397	MT335637	Li et al. 2017; Liu et al. 2020
	C. singaporensis	CBS 146715^{T}	MUCL 048320	leaf litter submerged in a small stream	Mac Ritchie Reservoir, Singapore	C. Decock	MW890086	MW890124	MW890042	MW890055	Crous et al. 2021
		CBS 146713	MUCL 048171	leaf litter submerged in a small stream	Mac Ritchie Reservoir, Singapore	C. Decock	MW890084	MW890123	MW890040	MW890053	Crous et al. 2021

C.borneana	CMW 50782[T]	CBS144553	Soil (*Eucalyptus* plantation)	Tawau, Sabah, Malaysia	M.R.B.A. Rauf	OL635019	N/A	OL635067	OL635043	Pham et al. 2022
	CMW 50832	CBS144551	Soil (*Eucalyptus* plantation)	Tawau, Sabah, Malaysia	M.R.B.A. Rauf	OL635017	N/A	OL635065	OL635041	Pham et al. 2022
C. ladang	CMW 50776[T]	CBS144550	Soil (*Eucalyptus* plantation)	Tawau, Sabah, Malaysia	M.R.B.A. Rauf	OL635027	N/A	OL635075	OL635051	Pham et al. 2022
	CMW 50775	CBS144549	Soil (*Eucalyptus* plantation)	Tawau, Sabah, Malaysia	M.R.B.A. Rauf	OL635026	N/A	OL635074	OL635050	Pham et al. 2022
C. pseudomalesiana	CMW 50821[T]	CBS144563	Soil (*Eucalyptus* plantation)	Tawau, Sabah, Malaysia	M.J. Wingfield	OL635028	OL635137	OL635076	OL635052	Pham et al. 2022
	CMW 50779	CBS144668	Soil (*Eucalyptus* plantation)	Tawau, Sabah, Malaysia	M.J. Wingfield	OL635029	OL635138	OL635077	OL635053	Pham et al. 2022
C. cassiae	ZHKUCC 210011[T]	–	Stem of *Cassia surattensis*	GuangDong, China	Y.X. Zhang	MZ516860	MZ516863	ON260790	N/A	Zhang et al. 2022
C. cassiae	ZHKUCC 210012	–	Stem of *Cassia surattensis*	GuangDong, China	Y.X. Zhang	MZ516861	MZ516864	ON260791	N/A	Zhang et al. 2022
C. guangdongensis	ZHKUCC 210062[T]	–	Leaf of *Heliconia metallica*	GuangDong, China	Y.X. Zhang	MZ491149	MZ491171	MZ491127	N/A	Zhang et al. 2022
	ZHKUCC 210063	–	Leaf of *Heliconia metallica*	GuangDong, China	Y.X. Zhang	MZ491150	MZ491172	MZ491128	N/A	Zhang et al. 2022
C. melaleucae	ZHKUCC 210066[T]	–	Leaf of *Melaleuca bracteata*	GuangDong, China	Y.X. Zhang	MZ491132	MZ491154	MZ491110	N/A	Zhang et al. 2022
	ZHKUCC 210067	–	Leaf of *Melaleuca bracteata*	GuangDong, China	Y.X. Zhang	MZ491133	MZ491155	MZ491111	N/A	Zhang et al. 2022
C. strelitziae	ZHKUCC 210019[T]	–	Leaf of *Strelitzia reginae*	GuangDong, China	Y.X. Zhang and C.T. Chen	MZ491129	MZ491151	MZ491105	N/A	Zhang et al. 2022

	ZHKUCC 210047	–	Leaf of *Strelitzia reginae*	GuangDong, China	Y.X. Zhang and C.T. Chen	MZ491130	MZ491152	MZ491106	N/A	Zhang et al. 2022
Curvicladiella cignea	CBS 109167[T]	CPC 1595; MUCL 40269	Decaying leaf	French Guiana	C. Decock	KM231867	KM232002	KM231287	KM231461	Decock and Crous 1998; Crous et al. 2006; Lombard et al. 2015a
	CBS 109168	CPC 1594; MUCL 40268	Decaying seed	French Guiana	C. Decock	KM231868	KM232003	KM231286	KM231460	Decock and Crous 1998; Crous et al. 2006; Lombard et al. 2015a

[a] Codes (B1 to B120) of the 120 accepted *Calonectria* species resulting from Liu et al. (2020).

[b] T: ex-type isolates of the species.

[c] 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; IMI: International Mycological Institute, CABI Bioscience, Egham, Bakeham Lane, UK; MUCL: Mycotheque, Laboratoire de Mycologie Systematique st Appliqee, I'Universite, Louvian-la-Neuve, Belgium; STE-U: Department of Plant Pathology, University of Stellenbosch, South Africa; ZHKUCC: Zhongkai University of Agriculture and Engineering Culture Collection; –: no other collection number.

[d] *tef1*: translation elongation factor 1-alpha; *tub2*: *β*-tubulin; *cmdA*: calmodulin; *his3*: histone H3.

[e] N/A: information is not available.

Table 4. Morphological comparisons of Calonectria isolates and species obtained in the current study.

Species	Isolate/species	Macroconidia (L × W)[a,b,c]	Macroconidia average (L × W)[a,b]	Macroconidia septation	Microconidia (L × W)[a,b,c,d]	Microconidia average (L × W)[a,b]	Microconidia septation	Vesicle width[a,c]	Vesicle width average[a]
Species in *Clonectria reteaudii* species complex									
C. acaciicola	Isolate CSF23874 (this study)	(77.5–)84.5–96(–108.5) × (6–)6.5–7.5(–8)	90.5 × 7	5(–6)	(39.5–)40.5–44.5(–46) × (3.5–)3.5–4(–4.5)	42.5 × 4	3	(2.5–)3.5–4.5(–5.5)	4
C. acaciicola	Isolate CSF23881 (this study)	(48–)55–79(–92.5) × (5–)5.5–7(–7.5)	67 × 6.5	(4–)5(–7)	(24–)27–34(–37.5) × (3–)4–4.5(–5.5)	30.5 × 4	1	(2.5–)3.5–5.5(–7)	4.5
C. acaciicola	Isolate CSF23919 (this study)	(67–)78.5–93(–101) × (5.5–)6.5–7(–7.5)	86 × 6.5	5(–9)	N/A[e]	N/A	N/A	(2.5–)3–4(–5)	3.5
C. acaciicola	Isolate CSF23938 (this study)	(68–)77.5–94.5(–109.5) × (5.5–)6.5–7.5(–8)	86 × 7	(3–)5(–6)	N/A	N/A	N/A	(2–)3–4(–4.5)	3.5
C. acaciicola	Isolate CSF23945 (this study)	(66–)68.5–78.5(–86) × (5.5–)6–7(–8)	73.5 × 6.5	(3–)5(–6)	N/A	N/A	N/A	(2.5–)3–4.5(–5.5)	4
C. acaciicola	Isolate CSF23946 (this study)	(85.5–)93.5–110(–126) × (6.5–)7–8(–9)	102 × 7.5	5(–7)	(29–)31.5–35(–36) × (3.5–)4–4.5(–5)	33.5 × 4	(1–)3	(3–)3.5–4.5(–6)	4
C. acaciicola	Isolate CSF23953 (this study)	(77.5–)83–96(–102) × (6–)7–8(–8.5)	90 × 7.5	5(–7)	N/A	N/A	N/A	(3–)3–4(–5)	4
C. acaciicola	Isolate CSF23992 (this study)	(79.5–)85.5–95(–98.5) × (6.5–)7–8(–9.5)	90.5 × 7.5	5	N/A	N/A	N/A	(2.5–)3–4.5(–5.5)	4
C. acaciicola	Isolate CSF24115 (this study)	(103.5–)114.5–127(–135.5) × (6.5–)7.5–8.5(–9)	121 × 8	5(–9)	(29–)30–47(–49.5) × (4.5–)4–5.5(–5.5)	38.5 × 5	3	(2–)3–4(–5.5)	3.5
C. acaciicola	Isolate CSF24139 (this study)	(74–)80.5–96(–104) × (6–)6.5–7.5(–8.5)	88.5 × 7	5	N/A	N/A	N/A	(3–)3–4.5(–6)	4
C. acaciicola	Species (this study)	(48–)73.5–105(–135.5) × (5–)6.5–8(–9.5)	89.5 × 7	(3–)5(–9)	(24–)27.5–38.5(–49.5) × (3–)3.5–4.5(–5.5)	33 × 4	(1–)3	(2–)3–4.5(–7)	4
C. acaciicola	Species (Pham et al. 2019)	(85–)90–98(–105) × (6–)6.5–7.5	94 × 7	5	N/A	N/A	N/A	4–7	N/A
C. pseudoreteaudii	Isolate CSF23888 (this study)	(77.5–)98–116(–122.5) × (5.5–)7–8(–9)	107 × 7.5	5(–8)	(35.5–)35–41.5(–43) × (4–)4–4.5(–4.5)	38.5 × 4	1–3	(2–)2–3(–4.5)	2.5
C. pseudoreteaudii	Isolate CSF23993 (this study)	(78.5–)96–111(–114.5) × (6–)7–8(–9)	103.5 × 7.5	3(–5)	N/A	N/A	N/A	(2–)2.5–3.5(–4)	3
C. pseudoreteaudii	Isolate CSF24064 (this study)	(94.5–)106.5–122.5(–132.5) × (7–)7.5–8.5(–9)	114.5 × 8	5(–9)	N/A	N/A	N/A	(2.5–)3–4(–4.5)	3.5

C. pseudoreteaudii	Species (this study)	(77.5–)99–117.5(–132.5) × (5.5–)7–8(–9)	108.5 × 7.5	(3–)5(–9)	(35.5–)35–41.5(–43) × (4–)4–4.5(–4.5)	38.5 × 4	1–3	(2–)2.5–3.5(–4.5)	3
C. pseudoreteaudii	Species (Lombard et al. 2010d)	(88–)96–112(–119) × 7–9(–10)	104 × 8	5(–8)	N/A	N/A	N/A	3–5	N/A
C. reteaudii	Isolate CSF21439 (this study)	(81.5–)94–109(–117.5) × (6.5–)7–8(–9)	101.5 × 7.5	5	N/A	N/A	N/A	(2–)3–4(–4.5)	3.5
C. reteaudii	Isolate CSF23883 (this study)	(85–)94–105(–112.5) × (6.5–)7–8(–8.5)	99.5 × 7.5	5(–6)	(24–)26–45(–54) × (3–)3.5–5.5(–6.5)	35.5 × 4.5	1(–3)	(2.5–)3.5–4.5(–5.5)	4
C. reteaudii	Isolate CSF23967 (this study)	(76.5–)90.5–104(–110) × (6.5–)7–8(–8.5)	97 × 7.5	(1–)5(–6)	(22.5–)25–40.5(–58.5) × (3–)3.5–5(–6)	32.5 × 4.5	1(–3)	(3–)3–3.5(–3.5)	3
C. reteaudii	Species (this study)	(76.5–)92.5–106(–7.5) × (6.5–)7–8(–9)	99.5 × 7.5	(1–)5(–6)	(22.5–)25.5–42(–58.5) × (3–)3.5–5(–6.5)	33.5 × 4.5	1(–3)	(2–)3–4.5(–5.5)	4
C. reteaudii	Species (Kang et al. 2001a)	(50–)75–95(–120) × (5–)6–7	84 × 6.5	(1–)5(–6)	N/A	N/A	N/A	(3–)5(–6)	N/A
Species in *Calonectria cylindrospora* species complex									
C. auriculiformis	Isolate CSF23984 (this study)	(37–)40.5–45.5(–48) × (4–)4–4.5(–5)	43 × 4.5	1(–3)	N/A	N/A	N/A	(3.5–)5.5–8.5(–10.5)	7
C. auriculiformis	Species (Pham et al. 2019)	(40–)41–45(–47) × (3–)4–5	43 × 4.5	1	N/A	N/A	N/A	6–12	N/A
C. hawksworthii	Isolate CSF23891 (this study)	(32–)35.5–41(–43) × (3.5–)4–4.5(–5)	38 × 4.5	1	N/A	N/A	N/A	(6–)6.5–7.5(–8.5)	7
C. hawksworthii	Isolate CSF23901 (this study)	(37–)39–44(–47.5) × (3.5–)4–4.5(–5)	41.5 × 4	1(–3)	N/A	N/A	N/A	(3.5–)4.5–7.5(–8.5)	6
C. hawksworthii	Species (this study)	(32–)36.5–43(–47.5) × (3.5–)4–4.5(–5)	40 × 4	1(–3)	N/A	N/A	N/A	(3.5–)5.5–7.5(–8.5)	6.5
C. hawksworthii	Species (Crous 2002)	(38–)50–60(–76) × 4(–5)	56 × 4	1	N/A	N/A	N/A	6–9	N/A
Species in *Calonectria kyotensis* species complex									
C. chinensis	Isolate CSF23930 (this study)	(38.5–)43.5–48.5(–51.5) × (3.5–)4–4.5(–5)	46 × 4	1(–3)	N/A	N/A	N/A	(4.5–)6.5–10.5(–11.5)	8.5
C. chinensis	Species (Crous et al. 2004)	(38–)41–48(–56) × (3.5–)4(–4.5)	45 × 4	1	N/A	N/A	N/A	6–9	N/A
C. hongkongensis	Isolate CSF23894 (this study)	(34.5–)38–43.5(–46.5) × (3.5–)3.5–4(–4.5)	41 × 4	1	N/A	N/A	N/A	(5–)7–11(–14.5)	9
C. hongkongensis	Species (Crous et al. 2004)	(38–)45–48(–53) × 4(–4.5)	46.5 × 4	1	N/A	N/A	N/A	8–14	N/A

[a] All measurements are in µm.

[b] L × W = length × width.

[c] Measurements are presented in the format [(minimum–) (average – standard deviation) – (average + standard deviation) (–maximum)].

[d] There are 11, 50, 10, 3, 3, 21 and 50 microconidia were measured for isolates CSF23874, CSF23881, CSF23946, CSF24115, CSF23888, CSF23883 and CSF23967, respectively.

[e] N/A represents data that is not available.

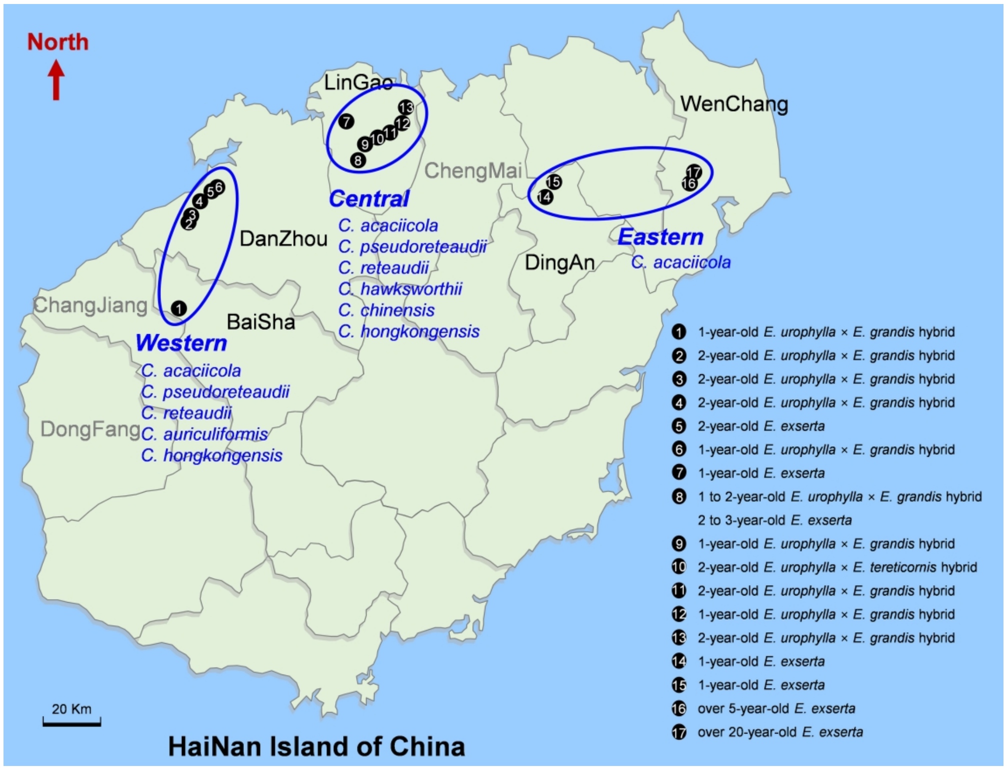


Fig. 1. Map of HaiNan Island showing disease survey in counties/regions, Eucalyptus genotypes, and the identified Calonectria species. The 17 sampled sites are indicated as numbers 1 to 17, followed by the Eucalyptus species.

178x135mm (600 x 600 DPI)

Fig. 2. Disease symptoms of Eucalyptus trees in HaiNan Island caused by species of Calonectria. A, B and C, Symptoms of two-year-old Eucalyptus urophylla × E. grandis genotype in early (A), middle (B), and late (C) infection stages. D, The infected E. urophylla × E. grandis genotypes leaves became blighted. E, New twigs appeared on the infected branches. F, White mass of conidiophores of Calonectria species appeared on the branches and leaves. G and H, six-month-old to one-year-old E. urophylla × E. grandis trees were infected, and the leaves became blighted. I to L, One E. urophylla × E. grandis genotype showing leaf spot in different infection stages. M, The early infection stage of E. exserta. N, The infected E. exserta leaves became blighted. O to R, E. exserta showing leaf spots in different infection stages.

178x245mm (600 x 600 DPI)

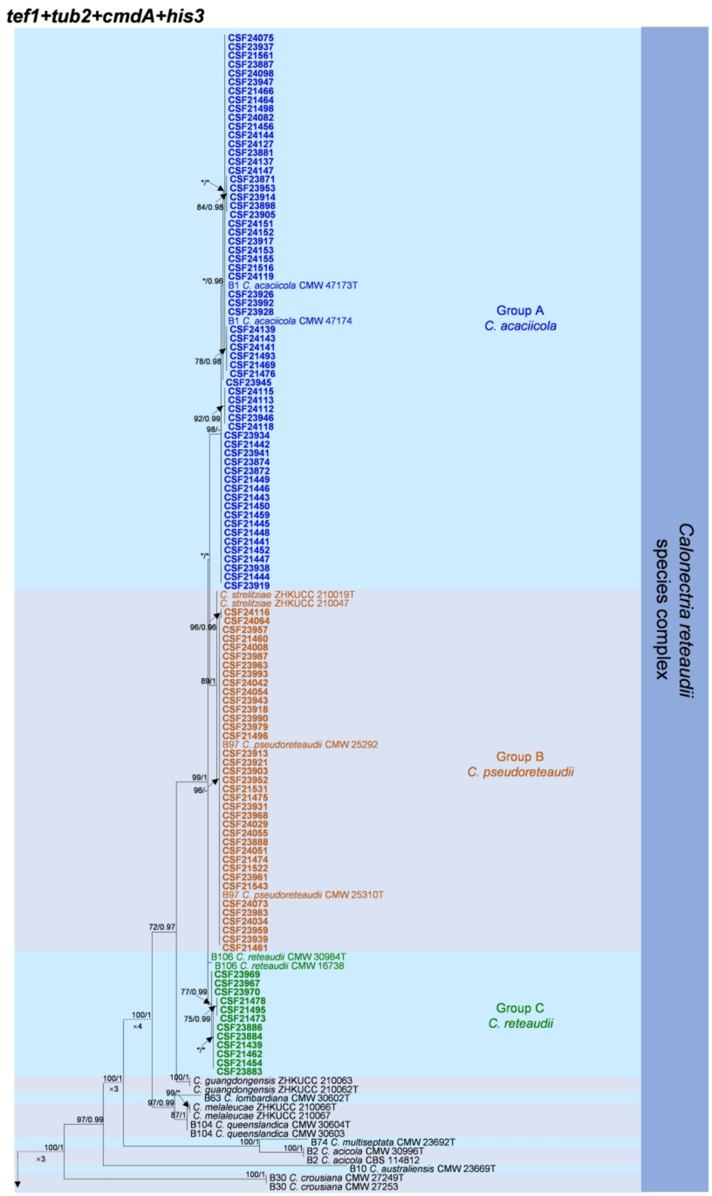


Fig. 3. Phylogenetic trees of Calonectria species based on maximum likelihood (ML) analyses of the dataset of combined tef1, tub2, cmdA and his3 gene sequences. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

178x295mm (600 x 600 DPI)

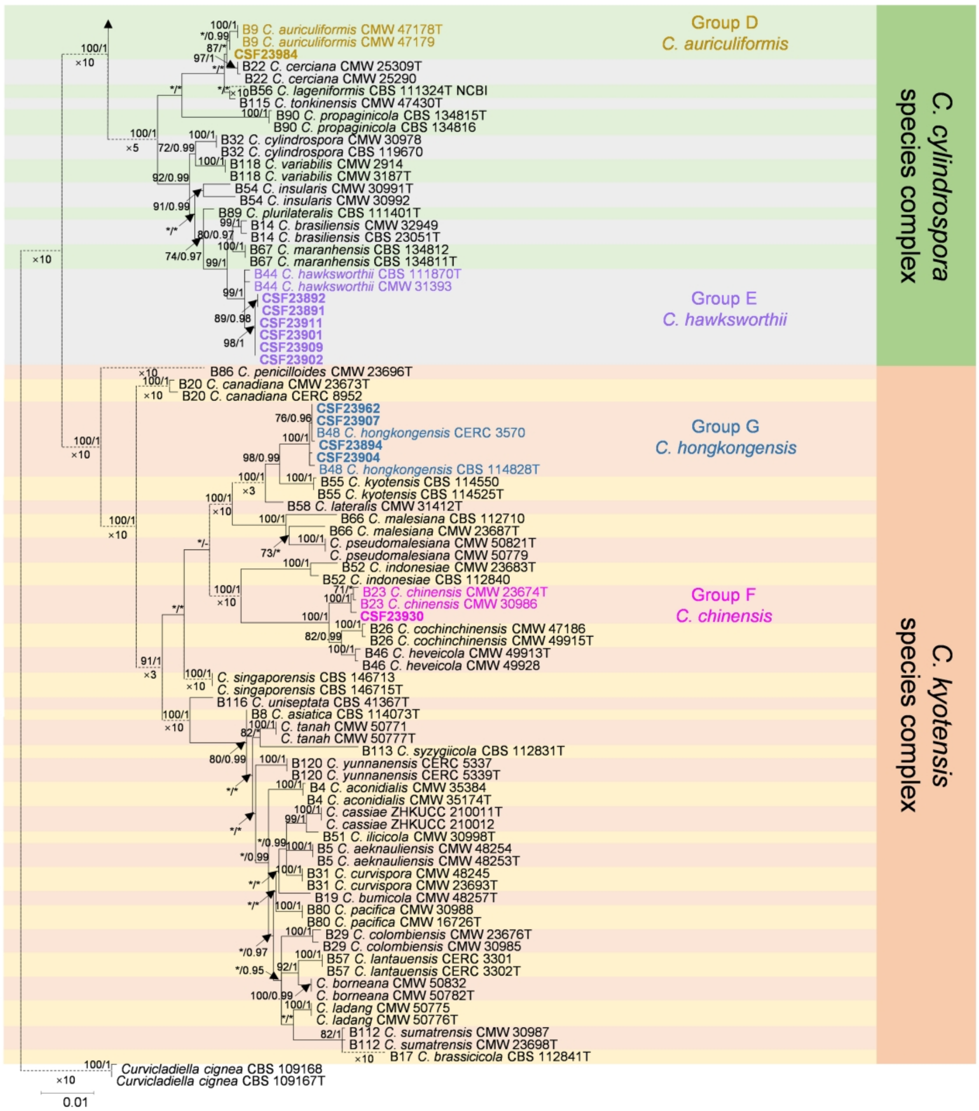


Fig. 3. Phylogenetic trees of Calonectria species based on maximum likelihood (ML) analyses of the dataset of combined tef1, tub2, cmdA and his3 gene sequences. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

178x200mm (600 x 600 DPI)

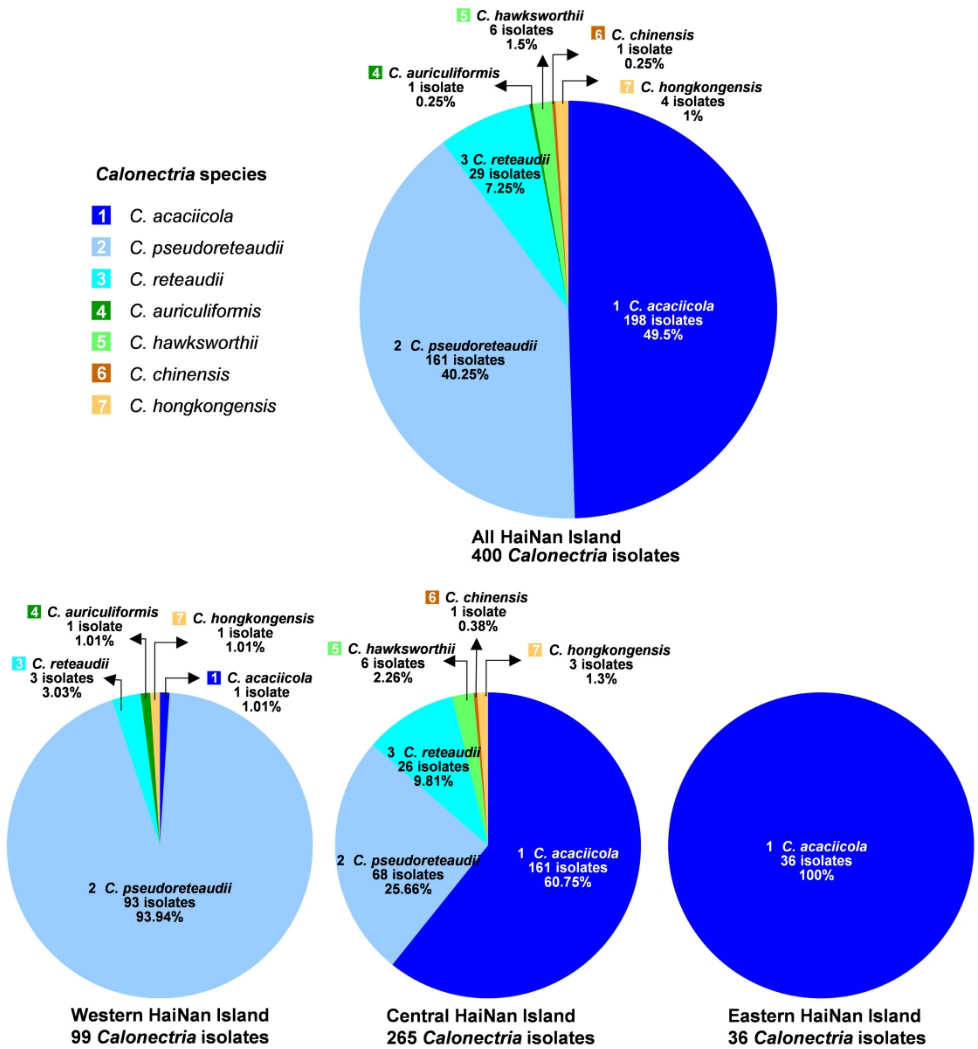


Fig. 4. Calonectria species collected from HaiNan Island and different geographical regions in the island. The isolate number and the percentage of each species in HaiNan Island and different geographical regions are marked. Different species are indicated by numbers with different colors.

178x192mm (600 x 600 DPI)

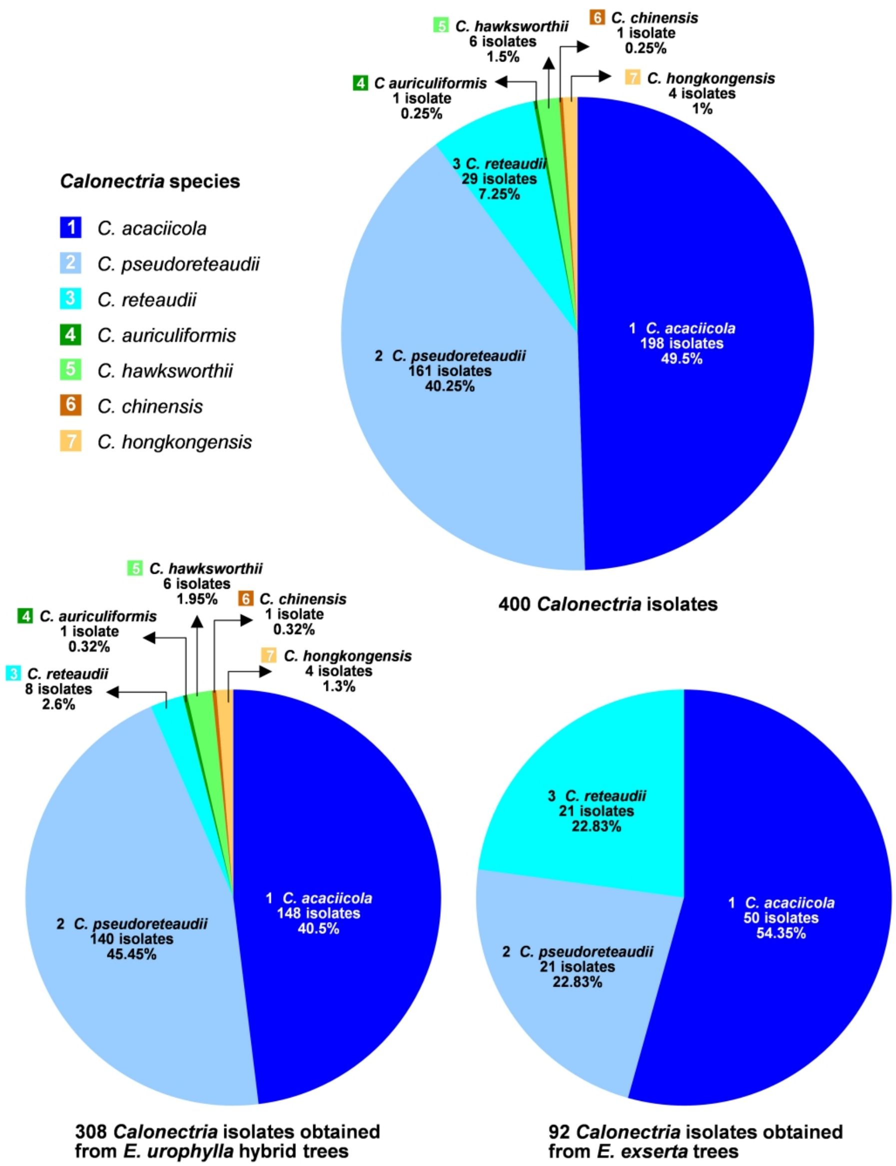


Fig. 5. Calonectria species collected from different Eucalyptus species in HaiNan Island. The isolate number and the percentage of each species in HaiNan Island and different Eucalyptus species are marked. Different species are indicated by numbers with different colors.

178x225mm (600 x 600 DPI)

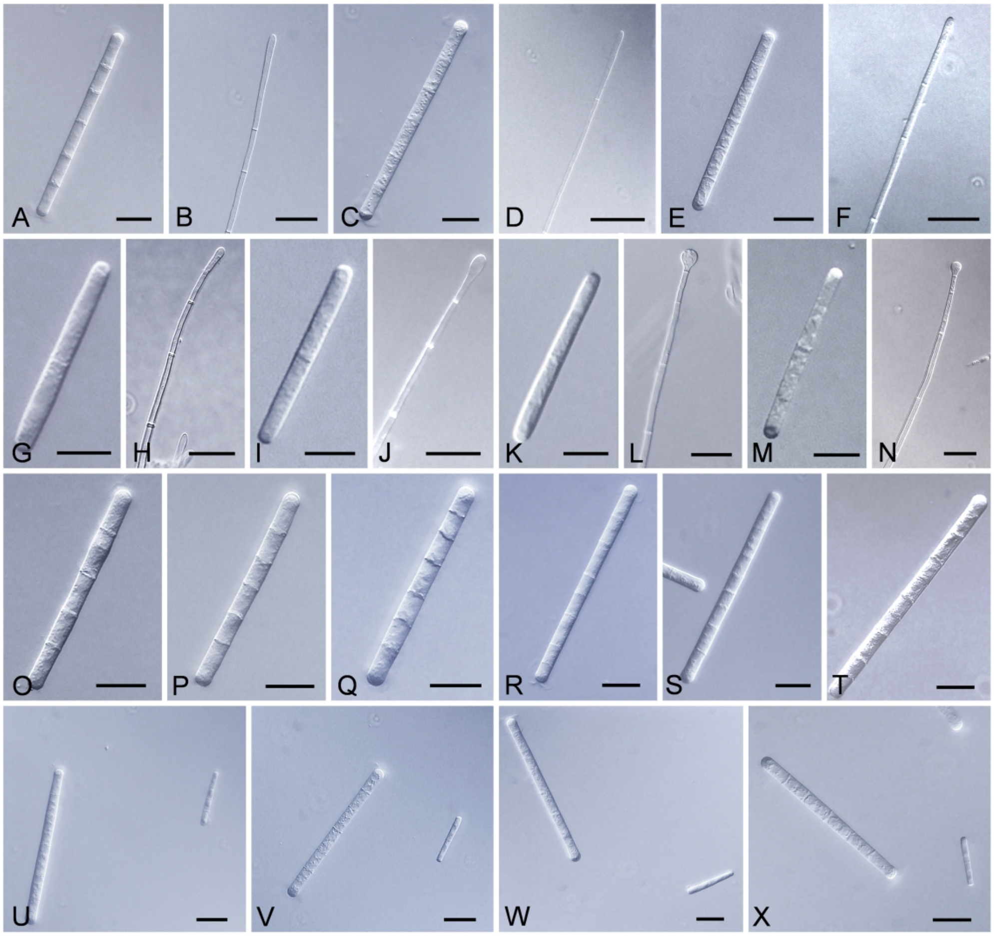


Fig. 6. Morphological features of asexual structures of Calonectria species and isolates obtained in this study. A and B, Macroconidia and clavate vesicle of C. acaciicola. C and D, Macroconidia and clavate vesicle of C. pseudoreteaudii. E and F, Macroconidia and clavate vesicle of C. reteaudii. G and H, Macroconidia and clavate vesicle of C. cerciana. I and J, Macroconidia and ellipsoidal vesicle of C. hawksworthii. K and L, Macroconidia and sphaeropedunculate vesicle of C. chinensis. M and N, Macroconidia and sphaeropedunculate vesicle of C. hongkongensis. O to T, 4 to 9-septate macroconidia of C. acaciicola, respectively. U and V, Macro- and microconidia of C. acaciicola. W, Macro- and microconidia of C. pseudoreteaudii. X, Macro- and microconidia of C. reteaudii. Scale bars: A to F, H, J, L and N to X = 20 μm, G, I, K and M = 10 μm.

178x167mm (600 x 600 DPI)

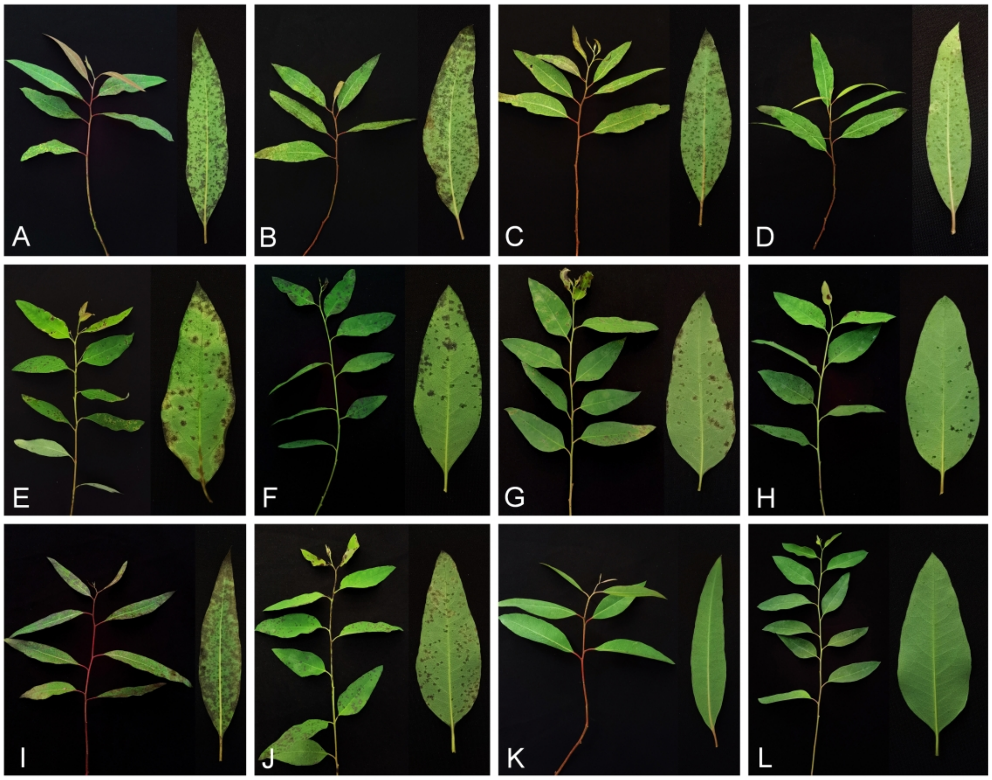


Fig. 7. Symptoms on seedlings of E. urophylla × E. tereticornis genetopy CEPT 1898 and E. urophylla × E. grandis genotype CEPT 1899 inoculated by Calonectria conidial suspensions/sterile water. A and E, Lesions on leaves of Eucalyptus genotype CEPT1898 (A) inoculated by C. acaciicola CSF23945 in experiment Two, and Eucalyptus genotype CEPT1899 (E) inoculated by C. acaciicola CSF23992 in experiment One. B and F, Eucalyptus genotype CEPT1898 (B) inoculated by C. pseudoreteaudii CSF24054 in experiment One and Eucalyptus genotype CEPT1899 (F) inoculated by C. pseudoreteaudii CSF24116 in experiment Two. C and G, Eucalyptus genotype CEPT1898 (C) was more susceptible than CEPT1899 (G) inoculated by C. reteaudii CSF23970 in experiment Two. D and H, Eucalyptus genotype CEPT1898 (D) was more susceptible than CEPT1899 (H) inoculated by C. hawksworthii CSF23911 in experiment One. I and J, Disease symptoms were observed on leaves of Eucalyptus genotype CEPT1898 (I) and CEPT1899 (J) inoculated with C. pseudoreteaudii CSF13636 (positive controls) in experiment One. K and L, No disease symptoms on two Eucalyptus genotypes CEPT1898 (K) and CEPT1899 (L) inoculated by sterile water (negative controls) in experiment Two.

178x139mm (600 x 600 DPI)

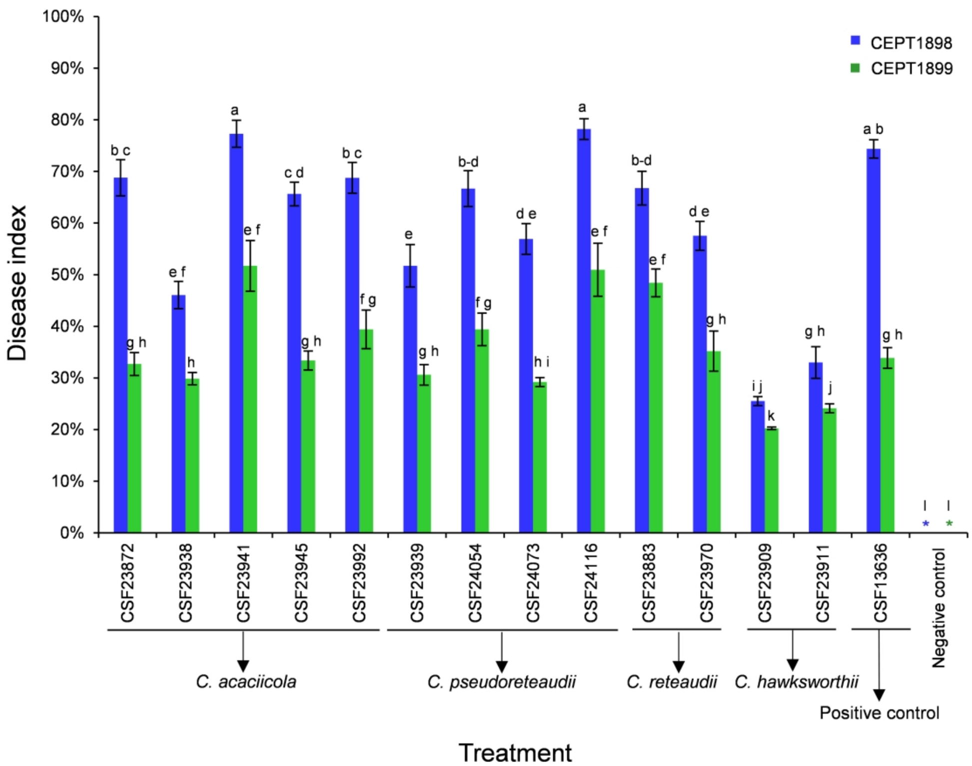


Fig. 8. Pathogenicity test results of experiment One. The column chart indicates the disease index (%) resulting from inoculation trials of two Eucalyptus hybrid genotypes inoculated with four Calonectria species and positive and negative controls. Vertical bars represent the standard errors of the means. Bars with different letters indicate treatment means that are significantly different (P = 0.05). The "*" indicates that the disease indexes of negative controls are zero.

178x141mm (600 x 600 DPI)

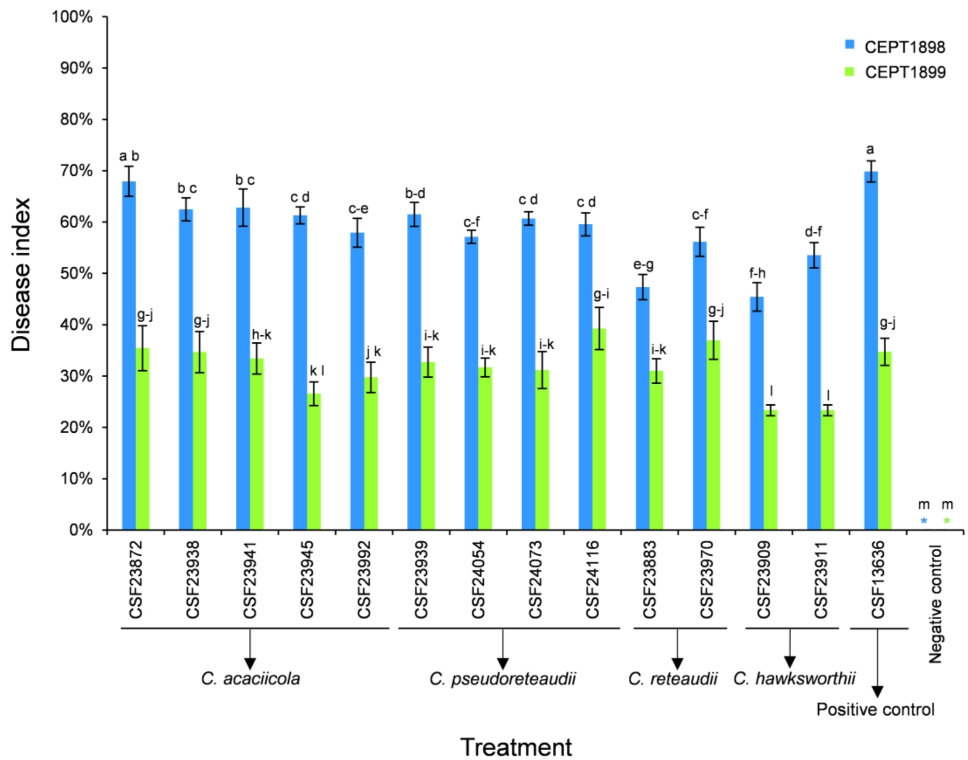


Fig. 9. Pathogenicity test results of experiment Two. The column chart indicates the disease index (%) resulting from inoculation trials of two Eucalyptus hybrid genotypes inoculated with four Calonectria species and positive and negative controls. Vertical bars represent the standard errors of the means. Bars with different letters indicate treatment means that are significantly different (P = 0.05). The "*" indicates that the disease indexes of negative controls are zero.

178x142mm (600 x 600 DPI)

TABLE S1. All *Calonectria* isolates obtained in this study.

Identity	Genotype[a]	Isolate No.[b]	Site No.	Sample and Isolate Information[c]	Host	Collectors	GenBank accession No.[d]			
							tef1	*tub2*	*cmdA*	*his3*
Species in *Clonectria reteaudii* species complex										
C. acaciicola	AAAA	CSF21456	8	20200924-1-(10)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187818	OQ210178	OQ210577	OQ230648
C. acaciicola	AAAA	CSF21464	8	20200924-1-(15)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187819	OQ210179	OQ210578	OQ230649
C. acaciicola	AAAA	CSF21466	8	20200924-1-(16)-L1-S1-SC1	2 to 3-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187820	OQ210180	OQ210579	OQ230650
C. acaciicola	AAAA	CSF23881	8	20210915-1-(10)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187821	OQ210181	OQ210580	OQ230651
C. acaciicola	AAAA	CSF23887	8	20210915-1-(13)-L4-S1-SC1	2 to 3-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187822	OQ210182	OQ210581	OQ230652
C. acaciicola	AAAA	CSF23937	10	20210915-4-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187823	OQ210183	OQ210582	OQ230653
C. acaciicola	AAAA	CSF23947	10	20210915-4-(11)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187824	OQ210184	OQ210583	OQ230654
C. acaciicola	AAAA	CSF23917	11	20210915-3-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187825	OQ210185	OQ210584	OQ230655
C. acaciicola	AAAA	CSF24075	12	20210917-2-(21)-B1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187826	OQ210186	OQ210585	OQ230656
C. acaciicola	AAAA	CSF24082	12	20210917-2-(33)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187827	OQ210187	OQ210586	OQ230657
C. acaciicola	AAAA	CSF24098	12	20210917-2-(61)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187828	OQ210188	OQ210587	OQ230658
C. acaciicola	AAAA	CSF21498	13	20200925-2-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187829	OQ210189	OQ210588	OQ230659
C. acaciicola	AAAA	CSF21516	13	20200925-2-(10)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187830	OQ210190	OQ210589	OQ230660
C. acaciicola	AAAA	CSF21561	13	20200925-2-(33)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187831	OQ210191	OQ210590	OQ230661

C. acaciicola	AAAA	CSF24119	14	20210918-1-(1)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187832	OQ210192	OQ210591	OQ230662
C. acaciicola	AAAA	CSF24127	14	20210918-1-(3)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187833	OQ210193	OQ210592	OQ230663
C. acaciicola	AAAA	CSF24137	14	20210918-1-(5)-L3-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187834	OQ210194	OQ210593	OQ230664
C. acaciicola	AAAA	CSF24144	16	20210918-3-(1)-L1-S1-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187835	OQ210195	OQ210594	OQ230665
C. acaciicola	AAAA	CSF24147	16	20210918-3-(1)-L4-S1-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187836	OQ210196	OQ210595	OQ230666
C. acaciicola	AAAA	CSF24151	16	20210918-3-(2)-L1-S4-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187837	OQ210197	OQ210596	OQ230667
C. acaciicola	AAAA	CSF24152	17	20210918-4-(1)-L1-S1-SC1	over 20-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187838	OQ210198	OQ210597	OQ230668
C. acaciicola	AAAA	CSF24153	17	20210918-4-(1)-L2-S1-SC1	over 20-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187839	OQ210199	OQ210598	OQ230669
C. acaciicola	AAAA	CSF24155	17	20210918-4-(1)-L4-S1-SC1	over 20-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187840	OQ210200	OQ210599	OQ230670
C. acaciicola	AA--	CSF21453	8	20200924-1-(8)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187841	OQ210201	N/A	N/A
C. acaciicola	AA--	CSF21457	8	20200924-1-(10)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187842	OQ210202	N/A	N/A
C. acaciicola	AA--	CSF21458	8	20200924-1-(11)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187843	OQ210203	N/A	N/A
C. acaciicola	AA--	CSF21465	8	20200924-1-(15)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187844	OQ210204	N/A	N/A
C. acaciicola	AA--	CSF21467	8	20200924-1-(16)-L1-S2-SC1	2 to 3-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187845	OQ210205	N/A	N/A
C. acaciicola	AA--	CSF23873	8	20210915-1-(4)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187846	OQ210206	N/A	N/A
C. acaciicola	AA--	CSF23875	8	20210915-1-(6)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187847	OQ210207	N/A	N/A
C. acaciicola	AA--	CSF23876	8	20210915-1-(7)-	1 to 2-year-old *E.*	S. F. Chen, Q. C. Wang, X.	OQ187848	OQ210208	N/A	N/A

				L1-S1-SC1	*urophylla* × *E. grandis* hybrid	Y. Liang and L. F. Liu				
C. acaciicola	AA--	CSF23877	8	20210915-1-(8)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187849	OQ210209	N/A	N/A
C. acaciicola	AA--	CSF23878	8	20210915-1-(9)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187850	OQ210210	N/A	N/A
C. acaciicola	AA--	CSF23879	8	20210915-1-(9)-L1-S1-SC2	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187851	OQ210211	N/A	N/A
C. acaciicola	AA--	CSF23882	8	20210915-1-(11)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187852	OQ210212	N/A	N/A
C. acaciicola	AA--	CSF23885	8	20210915-1-(13)-L2-S1-SC1	2 to 3-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187853	OQ210213	N/A	N/A
C. acaciicola	AA--	CSF23942	10	20210915-4-(6)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187854	OQ210214	N/A	N/A
C. acaciicola	AA--	CSF23948	10	20210915-4-(12)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187855	OQ210215	N/A	N/A
C. acaciicola	AA--	CSF23951	10	20210915-4-(15)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187856	OQ210216	N/A	N/A
C. acaciicola	AA--	CSF23954	10	20210915-4-(18)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187857	OQ210217	N/A	N/A
C. acaciicola	AA--	CSF23956	10	20210915-4-(20)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187858	OQ210218	N/A	N/A
C. acaciicola	AA--	CSF23932	11	20210915-3-(16)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187859	OQ210219	N/A	N/A
C. acaciicola	AA--	CSF23936	11	20210915-3-(20)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187860	OQ210220	N/A	N/A
C. acaciicola	AA--	CSF24074	12	20210917-2-(19)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187861	OQ210221	N/A	N/A
C. acaciicola	AA--	CSF24076	12	20210917-2-(23)-B1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187862	OQ210222	N/A	N/A
C. acaciicola	AA--	CSF24078	12	20210917-2-(25)-L1-S1-SC2	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187863	OQ210223	N/A	N/A
C. acaciicola	AA--	CSF24080	12	20210917-2-(29)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187864	OQ210224	N/A	N/A
C. acaciicola	AA--	CSF24081	12	20210917-2-(31)-	1-year-old *E. urophylla* ×	S. F. Chen, Q. C. Wang, X.	OQ187865	OQ210225	N/A	N/A

				L1-S1-SC1	*E. grandis* hybrid	Y. Liang and L. F. Liu				
C. acaciicola	AA--	CSF24083	12	20210917-2-(35)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187866	OQ210226	N/A	N/A
C. acaciicola	AA--	CSF24088	12	20210917-2-(45)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187867	OQ210227	N/A	N/A
C. acaciicola	AA--	CSF24089	12	20210917-2-(47)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187868	OQ210228	N/A	N/A
C. acaciicola	AA--	CSF24090	12	20210917-2-(49)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187869	OQ210229	N/A	N/A
C. acaciicola	AA--	CSF24091	12	20210917-2-(51)-B1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187870	OQ210230	N/A	N/A
C. acaciicola	AA--	CSF24097	12	20210917-2-(59)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187871	OQ210231	N/A	N/A
C. acaciicola	AA--	CSF24099	12	20210917-2-(63)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187872	OQ210232	N/A	N/A
C. acaciicola	AA--	CSF24100	12	20210917-2-(63)-L1-S1-SC2	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187873	OQ210233	N/A	N/A
C. acaciicola	AA--	CSF24102	12	20210917-2-(67)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187874	OQ210234	N/A	N/A
C. acaciicola	AA--	CSF21499	13	20200925-2-(1)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187875	OQ210235	N/A	N/A
C. acaciicola	AA--	CSF21500	13	20200925-2-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187876	OQ210236	N/A	N/A
C. acaciicola	AA--	CSF21501	13	20200925-2-(2)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187877	OQ210237	N/A	N/A
C. acaciicola	AA--	CSF21502	13	20200925-2-(3)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187878	OQ210238	N/A	N/A
C. acaciicola	AA--	CSF21503	13	20200925-2-(3)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187879	OQ210239	N/A	N/A
C. acaciicola	AA--	CSF21504	13	20200925-2-(4)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187880	OQ210240	N/A	N/A
C. acaciicola	AA--	CSF21505	13	20200925-2-(4)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187881	OQ210241	N/A	N/A
C. acaciicola	AA--	CSF21506	13	20200925-2-(5)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187882	OQ210242	N/A	N/A
C. acaciicola	AA--	CSF21507	13	20200925-2-(5)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187883	OQ210243	N/A	N/A
C. acaciicola	AA--	CSF21508	13	20200925-2-(6)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187884	OQ210244	N/A	N/A

C. acaciicola	AA--	CSF21509	13	20200925-2-(6)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187885	OQ210245	N/A	N/A
C. acaciicola	AA--	CSF21510	13	20200925-2-(7)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187886	OQ210246	N/A	N/A
C. acaciicola	AA--	CSF21511	13	20200925-2-(7)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187887	OQ210247	N/A	N/A
C. acaciicola	AA--	CSF21512	13	20200925-2-(8)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187888	OQ210248	N/A	N/A
C. acaciicola	AA--	CSF21513	13	20200925-2-(8)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187889	OQ210249	N/A	N/A
C. acaciicola	AA--	CSF21514	13	20200925-2-(9)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187890	OQ210250	N/A	N/A
C. acaciicola	AA--	CSF21515	13	20200925-2-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187891	OQ210251	N/A	N/A
C. acaciicola	AA--	CSF21517	13	20200925-2-(11)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187892	OQ210252	N/A	N/A
C. acaciicola	AA--	CSF21518	13	20200925-2-(11)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187893	OQ210253	N/A	N/A
C. acaciicola	AA--	CSF21519	13	20200925-2-(12)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187894	OQ210254	N/A	N/A
C. acaciicola	AA--	CSF21520	13	20200925-2-(12)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187895	OQ210255	N/A	N/A
C. acaciicola	AA--	CSF21523	13	20200925-2-(14)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187896	OQ210256	N/A	N/A
C. acaciicola	AA--	CSF21524	13	20200925-2-(14)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187897	OQ210257	N/A	N/A
C. acaciicola	AA--	CSF21525	13	20200925-2-(15)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187898	OQ210258	N/A	N/A
C. acaciicola	AA--	CSF21526	13	20200925-2-(15)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187899	OQ210259	N/A	N/A
C. acaciicola	AA--	CSF21527	13	20200925-2-(16)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187900	OQ210260	N/A	N/A
C. acaciicola	AA--	CSF21528	13	20200925-2-(16)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187901	OQ210261	N/A	N/A
C. acaciicola	AA--	CSF21529	13	20200925-2-(17)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187902	OQ210262	N/A	N/A
C. acaciicola	AA--	CSF21530	13	20200925-2-(17)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187903	OQ210263	N/A	N/A
C. acaciicola	AA--	CSF21533	13	20200925-2-(19)-	2-year-old *E. urophylla* ×	S. F. Chen and Q. C. Wang	OQ187904	OQ210264	N/A	N/A

				L1-S1-SC1	*E. grandis* hybrid					
C. acaciicola	AA--	CSF21535	13	20200925-2-(20)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187905	OQ210265	N/A	N/A
C. acaciicola	AA--	CSF21536	13	20200925-2-(20)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187906	OQ210266	N/A	N/A
C. acaciicola	AA--	CSF21537	13	20200925-2-(21)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187907	OQ210267	N/A	N/A
C. acaciicola	AA--	CSF21538	13	20200925-2-(21)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187908	OQ210268	N/A	N/A
C. acaciicola	AA--	CSF21539	13	20200925-2-(22)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187909	OQ210269	N/A	N/A
C. acaciicola	AA--	CSF21540	13	20200925-2-(22)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187910	OQ210270	N/A	N/A
C. acaciicola	AA--	CSF21541	13	20200925-2-(23)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187911	OQ210271	N/A	N/A
C. acaciicola	AA--	CSF21542	13	20200925-2-(23)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187912	OQ210272	N/A	N/A
C. acaciicola	AA--	CSF21545	13	20200925-2-(25)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187913	OQ210273	N/A	N/A
C. acaciicola	AA--	CSF21546	13	20200925-2-(25)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187914	OQ210274	N/A	N/A
C. acaciicola	AA--	CSF21547	13	20200925-2-(26)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187915	OQ210275	N/A	N/A
C. acaciicola	AA--	CSF21548	13	20200925-2-(26)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187916	OQ210276	N/A	N/A
C. acaciicola	AA--	CSF21549	13	20200925-2-(27)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187917	OQ210277	N/A	N/A
C. acaciicola	AA--	CSF21550	13	20200925-2-(27)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187918	OQ210278	N/A	N/A
C. acaciicola	AA--	CSF21551	13	20200925-2-(28)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187919	OQ210279	N/A	N/A
C. acaciicola	AA--	CSF21552	13	20200925-2-(28)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187920	OQ210280	N/A	N/A
C. acaciicola	AA--	CSF21553	13	20200925-2-(29)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187921	OQ210281	N/A	N/A
C. acaciicola	AA--	CSF21554	13	20200925-2-(29)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187922	OQ210282	N/A	N/A
C. acaciicola	AA--	CSF21555	13	20200925-2-(30)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187923	OQ210283	N/A	N/A

C. acaciicola	AA--	CSF21556	13	20200925-2-(30)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187924	OQ210284	N/A	N/A
C. acaciicola	AA--	CSF21557	13	20200925-2-(31)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187925	OQ210285	N/A	N/A
C. acaciicola	AA--	CSF21558	13	20200925-2-(31)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187926	OQ210286	N/A	N/A
C. acaciicola	AA--	CSF21559	13	20200925-2-(32)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187927	OQ210287	N/A	N/A
C. acaciicola	AA--	CSF21562	13	20200925-2-(33)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187928	OQ210288	N/A	N/A
C. acaciicola	AA--	CSF21563	13	20200925-2-(34)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187929	OQ210289	N/A	N/A
C. acaciicola	AA--	CSF21564	13	20200925-2-(34)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187930	OQ210290	N/A	N/A
C. acaciicola	AA--	CSF21565	13	20200925-2-(35)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187931	OQ210291	N/A	N/A
C. acaciicola	AA--	CSF21566	13	20200925-2-(35)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187932	OQ210292	N/A	N/A
C. acaciicola	AA--	CSF21568	13	20200925-2-(36)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187933	OQ210293	N/A	N/A
C. acaciicola	AA--	CSF24120	14	20210918-1-(1)-L2-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187934	OQ210294	N/A	N/A
C. acaciicola	AA--	CSF24121	14	20210918-1-(1)-L3-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187935	OQ210295	N/A	N/A
C. acaciicola	AA--	CSF24122	14	20210918-1-(1)-L4-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187936	OQ210296	N/A	N/A
C. acaciicola	AA--	CSF24123	14	20210918-1-(2)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187937	OQ210297	N/A	N/A
C. acaciicola	AA--	CSF24124	14	20210918-1-(2)-L2-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187938	OQ210298	N/A	N/A
C. acaciicola	AA--	CSF24125	14	20210918-1-(2)-L3-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187939	OQ210299	N/A	N/A
C. acaciicola	AA--	CSF24126	14	20210918-1-(2)-L4-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187940	OQ210300	N/A	N/A
C. acaciicola	AA--	CSF24128	14	20210918-1-(3)-L2-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187941	OQ210301	N/A	N/A
C. acaciicola	AA--	CSF24129	14	20210918-1-(3)-L3-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187942	OQ210302	N/A	N/A
C. acaciicola	AA--	CSF24130	14	20210918-1-(3)-	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X.	OQ187943	OQ210303	N/A	N/A

				L4-S1-SC1		Y. Liang and L. F. Liu				
C. acaciicola	AA--	CSF24131	14	20210918-1-(4)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187944	OQ210304	N/A	N/A
C. acaciicola	AA--	CSF24132	14	20210918-1-(4)-L2-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187945	OQ210305	N/A	N/A
C. acaciicola	AA--	CSF24133	14	20210918-1-(4)-L3-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187946	OQ210306	N/A	N/A
C. acaciicola	AA--	CSF24134	14	20210918-1-(4)-L4-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187947	OQ210307	N/A	N/A
C. acaciicola	AA--	CSF24135	14	20210918-1-(5)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187948	OQ210308	N/A	N/A
C. acaciicola	AA--	CSF24136	14	20210918-1-(5)-L2-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187949	OQ210309	N/A	N/A
C. acaciicola	AA--	CSF24138	14	20210918-1-(5)-L4-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187950	OQ210310	N/A	N/A
C. acaciicola	AA--	CSF24145	16	20210918-3-(1)-L2-S1-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187951	OQ210311	N/A	N/A
C. acaciicola	AA--	CSF24146	16	20210918-3-(1)-L3-S1-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187952	OQ210312	N/A	N/A
C. acaciicola	AA--	CSF24148	16	20210918-3-(2)-L1-S1-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187953	OQ210313	N/A	N/A
C. acaciicola	AA--	CSF24149	16	20210918-3-(2)-L1-S2-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187954	OQ210314	N/A	N/A
C. acaciicola	AA--	CSF24150	16	20210918-3-(2)-L1-S3-SC1	over 5-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187955	OQ210315	N/A	N/A
C. acaciicola	AA--	CSF24154	17	20210918-4-(1)-L3-S1-SC1	over 20-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187956	OQ210316	N/A	N/A
C. acaciicola	ABAA	CSF23871	8	20210915-1-(1)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187957	OQ210317	OQ210600	OQ230671
C. acaciicola	ABAA	CSF23898	9	20210915-2-(6)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187958	OQ210318	OQ210601	OQ230672
C. acaciicola	ABAA	CSF23905	9	20210915-2-(11)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187959	OQ210319	OQ210602	OQ230673
C. acaciicola	ABAA	CSF23914	9	20210915-2-(18)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187960	OQ210320	OQ210603	OQ230674
C. acaciicola	ABAA	CSF23953	10	20210915-4-(17)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187961	OQ210321	OQ210604	OQ230675

C. acaciicola	AB--	CSF23880	8	20210915-1-(9)-L1-S1-SC3	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187962	OQ210322	N/A	N/A
C. acaciicola	AB--	CSF23899	9	20210915-2-(7)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187963	OQ210323	N/A	N/A
C. acaciicola	AB--	CSF23900	9	20210915-2-(8)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187964	OQ210324	N/A	N/A
C. acaciicola	AB--	CSF23908	9	20210915-2-(13)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187965	OQ210325	N/A	N/A
C. acaciicola	AB--	CSF23910	9	20210915-2-(15)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187966	OQ210326	N/A	N/A
C. acaciicola	AB--	CSF23944	10	20210915-4-(8)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187967	OQ210327	N/A	N/A
C. acaciicola	AB--	CSF23949	10	20210915-4-(13)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187968	OQ210328	N/A	N/A
C. acaciicola	AB--	CSF23950	10	20210915-4-(14)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187969	OQ210329	N/A	N/A
C. acaciicola	AB--	CSF23955	10	20210915-4-(19)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187970	OQ210330	N/A	N/A
C. acaciicola	AB--	CSF23923	11	20210915-3-(7)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187971	OQ210331	N/A	N/A
C. acaciicola	BAAA	CSF23992	4	20210916-3-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187972	OQ210332	OQ210605	OQ230676
C. acaciicola	BAAA	CSF23926	11	20210915-3-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187973	OQ210333	OQ210606	OQ230677
C. acaciicola	BAAA	CSF23928	11	20210915-3-(12)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187974	OQ210334	OQ210607	OQ230678
C. acaciicola	BA--	CSF23929	11	20210915-3-(13)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187975	OQ210335	N/A	N/A
C. acaciicola	CAAA	CSF21469	7	20200924-2-(1)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187976	OQ210336	OQ210608	OQ230679
C. acaciicola	CAAA	CSF21476	7	20200924-2-(5)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187977	OQ210337	OQ210609	OQ230680
C. acaciicola	CAAA	CSF21493	7	20200924-2-(14)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187978	OQ210338	OQ210610	OQ230681
C. acaciicola	CAAA	CSF24139	15	20210918-2-(1)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187979	OQ210339	OQ210611	OQ230682
C. acaciicola	CAAA	CSF24141	15	20210918-2-(1)-L2-S1-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187980	OQ210340	OQ210612	OQ230683

C. acaciicola	CAAA	CSF24143	15	20210918-2-(1)-L2-S2-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187981	OQ210341	OQ210613	OQ230684
C. acaciicola	CA--	CSF21468	7	20200924-2-(1)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187982	OQ210342	N/A	N/A
C. acaciicola	CA--	CSF21477	7	20200924-2-(5)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187983	OQ210343	N/A	N/A
C. acaciicola	CA--	CSF21486	7	20200924-2-(10)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187984	OQ210344	N/A	N/A
C. acaciicola	CA--	CSF21487	7	20200924-2-(11)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187985	OQ210345	N/A	N/A
C. acaciicola	CA--	CSF21488	7	20200924-2-(11)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187986	OQ210346	N/A	N/A
C. acaciicola	CA--	CSF21489	7	20200924-2-(12)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187987	OQ210347	N/A	N/A
C. acaciicola	CA--	CSF21490	7	20200924-2-(12)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ187988	OQ210348	N/A	N/A
C. acaciicola	CA--	CSF23906	9	20210915-2-(12)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187989	OQ210349	N/A	N/A
C. acaciicola	CA--	CSF24140	15	20210918-2-(1)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187990	OQ210350	N/A	N/A
C. acaciicola	DAAA	CSF23945	10	20210915-4-(9)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ187991	OQ210351	OQ210614	OQ230685
C. acaciicola	DABA	CSF21441	8	20200924-1-(2)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187992	OQ210352	OQ210615	OQ230686
C. acaciicola	DABA	CSF21442	8	20200924-1-(2)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187993	OQ210353	OQ210616	OQ230687
C. acaciicola	DABA	CSF21443	8	20200924-1-(3)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187994	OQ210354	OQ210617	OQ230688
C. acaciicola	DABA	CSF21444	8	20200924-1-(3)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187995	OQ210355	OQ210618	OQ230689
C. acaciicola	DABA	CSF21445	8	20200924-1-(4)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187996	OQ210356	OQ210619	OQ230690
C. acaciicola	DABA	CSF21446	8	20200924-1-(4)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis*	S. F. Chen and Q. C. Wang	OQ187997	OQ210357	OQ210620	OQ230691

					hybrid					
C. acaciicola	DABA	CSF21447	8	20200924-1-(5)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187998	OQ210358	OQ210621	OQ230692
C. acaciicola	DABA	CSF21448	8	20200924-1-(5)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ187999	OQ210359	OQ210622	OQ230693
C. acaciicola	DABA	CSF21449	8	20200924-1-(6)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188000	OQ210360	OQ210623	OQ230694
C. acaciicola	DABA	CSF21450	8	20200924-1-(6)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188001	OQ210361	OQ210624	OQ230695
C. acaciicola	DABA	CSF21452	8	20200924-1-(8)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188002	OQ210362	OQ210625	OQ230696
C. acaciicola	DABA	CSF21459	8	20200924-1-(11)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188003	OQ210363	OQ210626	OQ230697
C. acaciicola	DABA	CSF23872	8	20210915-1-(3)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188004	OQ210364	OQ210627	OQ230698
C. acaciicola	DABA	CSF23874	8	20210915-1-(5)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188005	OQ210365	OQ210628	OQ230699
C. acaciicola	DABA	CSF23938	10	20210915-4-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188006	OQ210366	OQ210629	OQ230700
C. acaciicola	DABA	CSF23941	10	20210915-4-(5)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188007	OQ210367	OQ210630	OQ230701
C. acaciicola	DABA	CSF23919	11	20210915-3-(3)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188008	OQ210368	OQ210631	OQ230702
C. acaciicola	DABA	CSF23934	11	20210915-3-(18)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188009	OQ210369	OQ210632	OQ230703
C. acaciicola	EABB	CSF23946	10	20210915-4-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188010	OQ210370	OQ210633	OQ230704
C. acaciicola	EABB	CSF24112	12	20210917-2-(87)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188011	OQ210371	OQ210634	OQ230705
C. acaciicola	EABB	CSF24113	12	20210917-2-(89)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188012	OQ210372	OQ210635	OQ230706

C. acaciicola	EABB	CSF24115	12	20210917-2-(93)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188013	OQ210373	OQ210636	OQ230707
C. acaciicola	EABB	CSF24118	12	20210917-2-(99)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188014	OQ210374	OQ210637	OQ230708
C. acaciicola	EA--	CSF23922	11	20210915-3-(6)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188015	OQ210375	N/A	N/A
C. pseudoreteaudii	AAAA	CSF24054	1	20210917-1-(1)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188016	OQ210376	OQ210638	OQ230709
C. pseudoreteaudii	AAAA	CSF24055	1	20210917-1-(1)-L2-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188017	OQ210377	OQ210639	OQ230710
C. pseudoreteaudii	AAAA	CSF24034	2	20210916-5-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188018	OQ210378	OQ210640	OQ230711
C. pseudoreteaudii	AAAA	CSF24042	2	20210916-5-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188019	OQ210379	OQ210641	OQ230712
C. pseudoreteaudii	AAAA	CSF24051	2	20210916-5-(19)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188020	OQ210380	OQ210642	OQ230713
C. pseudoreteaudii	AAAA	CSF23993	3	20210916-4-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188021	OQ210381	OQ210643	OQ230714
C. pseudoreteaudii	AAAA	CSF24008	3	20210916-4-(16)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188022	OQ210382	OQ210644	OQ230715
C. pseudoreteaudii	AAAA	CSF24029	3	20210916-4-(36)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188023	OQ210383	OQ210645	OQ230716
C. pseudoreteaudii	AAAA	CSF23983	4	20210916-3-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188024	OQ210384	OQ210646	OQ230717
C. pseudoreteaudii	AAAA	CSF23987	4	20210916-3-(5)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188025	OQ210385	OQ210647	OQ230718
C. pseudoreteaudii	AAAA	CSF23990	4	20210916-3-(8)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188026	OQ210386	OQ210648	OQ230719
C. pseudoreteaudii	AAAA	CSF23963	5	20210916-2-(5)-L2-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188027	OQ210387	OQ210649	OQ230720
C. pseudoreteaudii	AAAA	CSF23968	5	20210916-2-(6)-L2-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188028	OQ210388	OQ210650	OQ230721
C. pseudoreteaudii	AAAA	CSF23979	5	20210916-2-(9)-L1-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188029	OQ210389	OQ210651	OQ230722
C. pseudoreteaudii	AAAA	CSF23957	6	20210916-1-(1)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188030	OQ210390	OQ210652	OQ230723
C. pseudoreteaudii	AAAA	CSF23959	6	20210916-1-(3)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188031	OQ210391	OQ210653	OQ230724
C. pseudoreteaudii	AAAA	CSF23961	6	20210916-1-(5)-	1-year-old *E. urophylla* ×	S. F. Chen, Q. C. Wang, X.	OQ188032	OQ210392	OQ210654	OQ230725

				B1-S1-SC1	*E. grandis* hybrid	Y. Liang and L. F. Liu				
C. pseudoreteaudii	AAAA	CSF21474	7	20200924-2-(4)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188033	OQ210393	OQ210655	OQ230726
C. pseudoreteaudii	AAAA	CSF21475	7	20200924-2-(4)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188034	OQ210394	OQ210656	OQ230727
C. pseudoreteaudii	AAAA	CSF21496	7	20200924-2-(16)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188035	OQ210395	OQ210657	OQ230728
C. pseudoreteaudii	AAAA	CSF21460	8	20200924-1-(13)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188036	OQ210396	OQ210658	OQ230729
C. pseudoreteaudii	AAAA	CSF21461	8	20200924-1-(13)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188037	OQ210397	OQ210659	OQ230730
C. pseudoreteaudii	AAAA	CSF23888	9	20210915-2-(1)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188038	OQ210398	OQ210660	OQ230731
C. pseudoreteaudii	AAAA	CSF23903	9	20210915-2-(10)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188039	OQ210399	OQ210661	OQ230732
C. pseudoreteaudii	AAAA	CSF23913	9	20210915-2-(17)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188040	OQ210400	OQ210662	OQ230733
C. pseudoreteaudii	AAAA	CSF23939	10	20210915-4-(3)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188041	OQ210401	OQ210663	OQ230734
C. pseudoreteaudii	AAAA	CSF23943	10	20210915-4-(7)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188042	OQ210402	OQ210664	OQ230735
C. pseudoreteaudii	AAAA	CSF23952	10	20210915-4-(16)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188043	OQ210403	OQ210665	OQ230736
C. pseudoreteaudii	AAAA	CSF23918	11	20210915-3-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188044	OQ210404	OQ210666	OQ230737
C. pseudoreteaudii	AAAA	CSF23921	11	20210915-3-(5)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188045	OQ210405	OQ210667	OQ230738
C. pseudoreteaudii	AAAA	CSF23931	11	20210915-3-(15)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188046	OQ210406	OQ210668	OQ230739
C. pseudoreteaudii	AAAA	CSF24073	12	20210917-2-(17)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188047	OQ210407	OQ210669	OQ230740
C. pseudoreteaudii	AAAA	CSF21522	13	20200925-2-(13)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188048	OQ210408	OQ210670	OQ230741
C. pseudoreteaudii	AAAA	CSF21531	13	20200925-2-(18)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188049	OQ210409	OQ210671	OQ230742
C. pseudoreteaudii	AAAA	CSF21543	13	20200925-2-(24)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188050	OQ210410	OQ210672	OQ230743

C. pseudoreteaudii	AA--	CSF24033	2	20210916-5-(1)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188051	OQ210411	N/A	N/A
C. pseudoreteaudii	AA--	CSF24035	2	20210916-5-(3)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188052	OQ210412	N/A	N/A
C. pseudoreteaudii	AA--	CSF24036	2	20210916-5-(4)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188053	OQ210413	N/A	N/A
C. pseudoreteaudii	AA--	CSF24037	2	20210916-5-(5)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188054	OQ210414	N/A	N/A
C. pseudoreteaudii	AA--	CSF24038	2	20210916-5-(6)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188055	OQ210415	N/A	N/A
C. pseudoreteaudii	AA--	CSF24039	2	20210916-5-(8)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188056	OQ210416	N/A	N/A
C. pseudoreteaudii	AA--	CSF24040	2	20210916-5-(9)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188057	OQ210417	N/A	N/A
C. pseudoreteaudii	AA--	CSF24041	2	20210916-5-(9)-L1-S1-SC2	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188058	OQ210418	N/A	N/A
C. pseudoreteaudii	AA--	CSF24043	2	20210916-5-(11)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188059	OQ210419	N/A	N/A
C. pseudoreteaudii	AA--	CSF24044	2	20210916-5-(12)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188060	OQ210420	N/A	N/A
C. pseudoreteaudii	AA--	CSF24045	2	20210916-5-(13)-B1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188061	OQ210421	N/A	N/A
C. pseudoreteaudii	AA--	CSF24046	2	20210916-5-(14)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188062	OQ210422	N/A	N/A
C. pseudoreteaudii	AA--	CSF24047	2	20210916-5-(15)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188063	OQ210423	N/A	N/A
C. pseudoreteaudii	AA--	CSF24048	2	20210916-5-(16)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188064	OQ210424	N/A	N/A
C. pseudoreteaudii	AA--	CSF24049	2	20210916-5-(17)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188065	OQ210425	N/A	N/A
C. pseudoreteaudii	AA--	CSF24050	2	20210916-5-(18)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188066	OQ210426	N/A	N/A
C. pseudoreteaudii	AA--	CSF24052	2	20210916-5-(20)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188067	OQ210427	N/A	N/A
C. pseudoreteaudii	AA--	CSF24053	2	20210916-5-(21)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188068	OQ210428	N/A	N/A
C. pseudoreteaudii	AA--	CSF23994	3	20210916-4-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188069	OQ210429	N/A	N/A
C. pseudoreteaudii	AA--	CSF23995	3	20210916-4-(3)-	2-year-old *E. urophylla* ×	S. F. Chen, Q. C. Wang, X.	OQ188070	OQ210430	N/A	N/A

				L1-S1-SC1	*E. grandis* hybrid	Y. Liang and L. F. Liu				
C. pseudoreteaudii	AA--	CSF23996	3	20210916-4-(4)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188071	OQ210431	N/A	N/A
C. pseudoreteaudii	AA--	CSF23997	3	20210916-4-(5)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188072	OQ210432	N/A	N/A
C. pseudoreteaudii	AA--	CSF23998	3	20210916-4-(6)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188073	OQ210433	N/A	N/A
C. pseudoreteaudii	AA--	CSF23999	3	20210916-4-(7)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188074	OQ210434	N/A	N/A
C. pseudoreteaudii	AA--	CSF24000	3	20210916-4-(8)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188075	OQ210435	N/A	N/A
C. pseudoreteaudii	AA--	CSF24001	3	20210916-4-(9)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188076	OQ210436	N/A	N/A
C. pseudoreteaudii	AA--	CSF24002	3	20210916-4-(10)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188077	OQ210437	N/A	N/A
C. pseudoreteaudii	AA--	CSF24003	3	20210916-4-(11)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188078	OQ210438	N/A	N/A
C. pseudoreteaudii	AA--	CSF24004	3	20210916-4-(12)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188079	OQ210439	N/A	N/A
C. pseudoreteaudii	AA--	CSF24005	3	20210916-4-(13)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188080	OQ210440	N/A	N/A
C. pseudoreteaudii	AA--	CSF24006	3	20210916-4-(14)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188081	OQ210441	N/A	N/A
C. pseudoreteaudii	AA--	CSF24007	3	20210916-4-(15)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188082	OQ210442	N/A	N/A
C. pseudoreteaudii	AA--	CSF24009	3	20210916-4-(17)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188083	OQ210443	N/A	N/A
C. pseudoreteaudii	AA--	CSF24010	3	20210916-4-(18)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188084	OQ210444	N/A	N/A
C. pseudoreteaudii	AA--	CSF24011	3	20210916-4-(19)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188085	OQ210445	N/A	N/A
C. pseudoreteaudii	AA--	CSF24012	3	20210916-4-(20)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188086	OQ210446	N/A	N/A
C. pseudoreteaudii	AA--	CSF24013	3	20210916-4-(21)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188087	OQ210447	N/A	N/A
C. pseudoreteaudii	AA--	CSF24014	3	20210916-4-(22)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188088	OQ210448	N/A	N/A
C. pseudoreteaudii	AA--	CSF24015	3	20210916-4-(23)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188089	OQ210449	N/A	N/A

C. pseudoreteaudii	AA--	CSF24016	3	20210916-4-(24)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188090	OQ210450	N/A	N/A
C. pseudoreteaudii	AA--	CSF24017	3	20210916-4-(25)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188091	OQ210451	N/A	N/A
C. pseudoreteaudii	AA--	CSF24018	3	20210916-4-(26)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188092	OQ210452	N/A	N/A
C. pseudoreteaudii	AA--	CSF24019	3	20210916-4-(27)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188093	OQ210453	N/A	N/A
C. pseudoreteaudii	AA--	CSF24020	3	20210916-4-(28)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188094	OQ210454	N/A	N/A
C. pseudoreteaudii	AA--	CSF24021	3	20210916-4-(29)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188095	OQ210455	N/A	N/A
C. pseudoreteaudii	AA--	CSF24022	3	20210916-4-(30)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188096	OQ210456	N/A	N/A
C. pseudoreteaudii	AA--	CSF24023	3	20210916-4-(31)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188097	OQ210457	N/A	N/A
C. pseudoreteaudii	AA--	CSF24024	3	20210916-4-(31)-L1-S1-SC2	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188098	OQ210458	N/A	N/A
C. pseudoreteaudii	AA--	CSF24025	3	20210916-4-(32)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188099	OQ210459	N/A	N/A
C. pseudoreteaudii	AA--	CSF24026	3	20210916-4-(33)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188100	OQ210460	N/A	N/A
C. pseudoreteaudii	AA--	CSF24027	3	20210916-4-(34)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188101	OQ210461	N/A	N/A
C. pseudoreteaudii	AA--	CSF24028	3	20210916-4-(35)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188102	OQ210462	N/A	N/A
C. pseudoreteaudii	AA--	CSF24030	3	20210916-4-(37)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188103	OQ210463	N/A	N/A
C. pseudoreteaudii	AA--	CSF24031	3	20210916-4-(38)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188104	OQ210464	N/A	N/A
C. pseudoreteaudii	AA--	CSF24032	3	20210916-4-(39)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188105	OQ210465	N/A	N/A
C. pseudoreteaudii	AA--	CSF23985	4	20210916-3-(3)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188106	OQ210466	N/A	N/A
C. pseudoreteaudii	AA--	CSF23986	4	20210916-3-(4)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188107	OQ210467	N/A	N/A
C. pseudoreteaudii	AA--	CSF23988	4	20210916-3-(6)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188108	OQ210468	N/A	N/A
C. pseudoreteaudii	AA--	CSF23989	4	20210916-3-(7)-	2-year-old *E. urophylla* ×	S. F. Chen, Q. C. Wang, X.	OQ188109	OQ210469	N/A	N/A

				L1-S1-SC1	*E. grandis* hybrid	Y. Liang and L. F. Liu				
C. pseudoreteaudii	AA--	CSF23991	4	20210916-3-(9)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188110	OQ210470	N/A	N/A
C. pseudoreteaudii	AA--	CSF23964	5	20210916-2-(5)-L2-S2-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188111	OQ210471	N/A	N/A
C. pseudoreteaudii	AA--	CSF23965	5	20210916-2-(5)-L3-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188112	OQ210472	N/A	N/A
C. pseudoreteaudii	AA--	CSF23966	5	20210916-2-(5)-L3-S2-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188113	OQ210473	N/A	N/A
C. pseudoreteaudii	AA--	CSF23971	5	20210916-2-(7)-L1-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188114	OQ210474	N/A	N/A
C. pseudoreteaudii	AA--	CSF23972	5	20210916-2-(7)-L2-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188115	OQ210475	N/A	N/A
C. pseudoreteaudii	AA--	CSF23973	5	20210916-2-(7)-L3-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188116	OQ210476	N/A	N/A
C. pseudoreteaudii	AA--	CSF23974	5	20210916-2-(7)-L4-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188117	OQ210477	N/A	N/A
C. pseudoreteaudii	AA--	CSF23975	5	20210916-2-(8)-L1-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188118	OQ210478	N/A	N/A
C. pseudoreteaudii	AA--	CSF23976	5	20210916-2-(8)-L2-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188119	OQ210479	N/A	N/A
C. pseudoreteaudii	AA--	CSF23977	5	20210916-2-(8)-L3-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188120	OQ210480	N/A	N/A
C. pseudoreteaudii	AA--	CSF23978	5	20210916-2-(8)-L4-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188121	OQ210481	N/A	N/A
C. pseudoreteaudii	AA--	CSF23980	5	20210916-2-(9)-L2-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188122	OQ210482	N/A	N/A
C. pseudoreteaudii	AA--	CSF23981	5	20210916-2-(9)-L3-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188123	OQ210483	N/A	N/A
C. pseudoreteaudii	AA--	CSF23982	5	20210916-2-(9)-L4-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188124	OQ210484	N/A	N/A
C. pseudoreteaudii	AA--	CSF23958	6	20210916-1-(2)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188125	OQ210485	N/A	N/A
C. pseudoreteaudii	AA--	CSF23960	6	20210916-1-(4)-B1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188126	OQ210486	N/A	N/A
C. pseudoreteaudii	AA--	CSF23889	9	20210915-2-(2)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188127	OQ210487	N/A	N/A
C. pseudoreteaudii	AA--	CSF23890	9	20210915-2-(3)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188128	OQ210488	N/A	N/A

C. pseudoreteaudii	AA--	CSF23893	9	20210915-2-(5)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188129	OQ210489	N/A	N/A
C. pseudoreteaudii	AA--	CSF23915	9	20210915-2-(19)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188130	OQ210490	N/A	N/A
C. pseudoreteaudii	AA--	CSF23916	9	20210915-2-(20)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188131	OQ210491	N/A	N/A
C. pseudoreteaudii	AA--	CSF23940	10	20210915-4-(4)-L1-S1-SC1	2-year-old *E. urophylla* × *E. tereticornis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188132	OQ210492	N/A	N/A
C. pseudoreteaudii	AA--	CSF23920	11	20210915-3-(4)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188133	OQ210493	N/A	N/A
C. pseudoreteaudii	AA--	CSF23924	11	20210915-3-(8)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188134	OQ210494	N/A	N/A
C. pseudoreteaudii	AA--	CSF23925	11	20210915-3-(9)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188135	OQ210495	N/A	N/A
C. pseudoreteaudii	AA--	CSF23927	11	20210915-3-(11)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188136	OQ210496	N/A	N/A
C. pseudoreteaudii	AA--	CSF23933	11	20210915-3-(17)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188137	OQ210497	N/A	N/A
C. pseudoreteaudii	AA--	CSF23935	11	20210915-3-(19)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188138	OQ210498	N/A	N/A
C. pseudoreteaudii	AA--	CSF24068	12	20210917-2-(9)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188139	OQ210499	N/A	N/A
C. pseudoreteaudii	AA--	CSF24069	12	20210917-2-(11)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188140	OQ210500	N/A	N/A
C. pseudoreteaudii	AA--	CSF24070	12	20210917-2-(13)-B1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188141	OQ210501	N/A	N/A
C. pseudoreteaudii	AA--	CSF24071	12	20210917-2-(15)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188142	OQ210502	N/A	N/A
C. pseudoreteaudii	AA--	CSF24077	12	20210917-2-(25)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188143	OQ210503	N/A	N/A
C. pseudoreteaudii	AA--	CSF24079	12	20210917-2-(27)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188144	OQ210504	N/A	N/A
C. pseudoreteaudii	AA--	CSF24084	12	20210917-2-(37)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188145	OQ210505	N/A	N/A
C. pseudoreteaudii	AA--	CSF24085	12	20210917-2-(39)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188146	OQ210506	N/A	N/A
C. pseudoreteaudii	AA--	CSF24086	12	20210917-2-(41)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188147	OQ210507	N/A	N/A
C. pseudoreteaudii	AA--	CSF24087	12	20210917-2-(43)-	1-year-old *E. urophylla* ×	S. F. Chen, Q. C. Wang, X.	OQ188148	OQ210508	N/A	N/A

				L1-S1-SC1	*E. grandis* hybrid	Y. Liang and L. F. Liu				
C. pseudoreteaudii	AA--	CSF24092	12	20210917-2-(53)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188149	OQ210509	N/A	N/A
C. pseudoreteaudii	AA--	CSF24093	12	20210917-2-(53)-L1-S1-SC2	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188150	OQ210510	N/A	N/A
C. pseudoreteaudii	AA--	CSF24094	12	20210917-2-(55)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188151	OQ210511	N/A	N/A
C. pseudoreteaudii	AA--	CSF24095	12	20210917-2-(55)-L1-S1-SC2	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188152	OQ210512	N/A	N/A
C. pseudoreteaudii	AA--	CSF24096	12	20210917-2-(57)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188153	OQ210513	N/A	N/A
C. pseudoreteaudii	AA--	CSF24101	12	20210917-2-(65)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188154	OQ210514	N/A	N/A
C. pseudoreteaudii	AA--	CSF24103	12	20210917-2-(69)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188155	OQ210515	N/A	N/A
C. pseudoreteaudii	AA--	CSF24104	12	20210917-2-(71)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188156	OQ210516	N/A	N/A
C. pseudoreteaudii	AA--	CSF24105	12	20210917-2-(73)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188157	OQ210517	N/A	N/A
C. pseudoreteaudii	AA--	CSF24106	12	20210917-2-(75)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188158	OQ210518	N/A	N/A
C. pseudoreteaudii	AA--	CSF24107	12	20210917-2-(77)-B1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188159	OQ210519	N/A	N/A
C. pseudoreteaudii	AA--	CSF24108	12	20210917-2-(79)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188160	OQ210520	N/A	N/A
C. pseudoreteaudii	AA--	CSF24109	12	20210917-2-(81)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188161	OQ210521	N/A	N/A
C. pseudoreteaudii	AA--	CSF24110	12	20210917-2-(83)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188162	OQ210522	N/A	N/A
C. pseudoreteaudii	AA--	CSF24114	12	20210917-2-(91)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188163	OQ210523	N/A	N/A
C. pseudoreteaudii	AA--	CSF21521	13	20200925-2-(13)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188164	OQ210524	N/A	N/A
C. pseudoreteaudii	AA--	CSF21532	13	20200925-2-(18)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188165	OQ210525	N/A	N/A
C. pseudoreteaudii	AA--	CSF21534	13	20200925-2-(19)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188166	OQ210526	N/A	N/A
C. pseudoreteaudii	AA--	CSF21544	13	20200925-2-(24)-L1-S2-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188167	OQ210527	N/A	N/A

C. pseudoreteaudii	AA--	CSF21567	13	20200925-2-(36)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188168	OQ210528	N/A	N/A
C. pseudoreteaudii	A---	CSF21497	7	20200924-2-(16)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188169	N/A	N/A	N/A
C. pseudoreteaudii	BAAA	CSF24064	12	20210917-2-(1)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188170	OQ210529	OQ210673	OQ230744
C. pseudoreteaudii	BAAA	CSF24116	12	20210917-2-(95)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188171	OQ210530	OQ210674	OQ230745
C. pseudoreteaudii	BA--	CSF24065	12	20210917-2-(3)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188172	OQ210531	N/A	N/A
C. pseudoreteaudii	BA--	CSF24066	12	20210917-2-(5)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188173	OQ210532	N/A	N/A
C. pseudoreteaudii	BA--	CSF24067	12	20210917-2-(7)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188174	OQ210533	N/A	N/A
C. pseudoreteaudii	BA--	CSF24111	12	20210917-2-(85)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188175	OQ210534	N/A	N/A
C. pseudoreteaudii	BA--	CSF24117	12	20210917-2-(97)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188176	OQ210535	N/A	N/A
C. reteaudii	AAAA	CSF21439	8	20200924-1-(1)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188177	OQ210536	OQ210675	OQ230746
C. reteaudii	AAAA	CSF21454	8	20200924-1-(9)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188178	OQ210537	OQ210676	OQ230747
C. reteaudii	AAAA	CSF21462	8	20200924-1-(14)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188179	OQ210538	OQ210677	OQ230748
C. reteaudii	AAAA	CSF23883	8	20210915-1-(12)-L1-S1-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188180	OQ210539	OQ210678	OQ230749
C. reteaudii	AAAA	CSF23884	8	20210915-1-(13)-L1-S1-SC1	2 to 3-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188181	OQ210540	OQ210679	OQ230750
C. reteaudii	AAAA	CSF23886	8	20210915-1-(13)-L3-S1-SC1	2 to 3-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188182	OQ210541	OQ210680	OQ230751
C. reteaudii	AA--	CSF21480	7	20200924-2-(7)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188183	OQ210542	N/A	N/A
C. reteaudii	AA--	CSF21481	7	20200924-2-(7)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188184	OQ210543	N/A	N/A
C. reteaudii	AA--	CSF21482	7	20200924-2-(8)-	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188185	OQ210544	N/A	N/A

				L1-S1-SC1						
C. reteaudii	AA--	CSF21483	7	20200924-2-(8)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188186	OQ210545	N/A	N/A
C. reteaudii	AA--	CSF21484	7	20200924-2-(9)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188187	OQ210546	N/A	N/A
C. reteaudii	AA--	CSF21485	7	20200924-2-(9)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188188	OQ210547	N/A	N/A
C. reteaudii	AA--	CSF21491	7	20200924-2-(13)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188189	OQ210548	N/A	N/A
C. reteaudii	AA--	CSF21492	7	20200924-2-(13)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188190	OQ210549	N/A	N/A
C. reteaudii	AA--	CSF21494	7	20200924-2-(14)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188191	OQ210550	N/A	N/A
C. reteaudii	AA--	CSF21440	8	20200924-1-(1)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188192	OQ210551	N/A	N/A
C. reteaudii	AA--	CSF21451	8	20200924-1-(7)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188193	OQ210552	N/A	N/A
C. reteaudii	AA--	CSF21455	8	20200924-1-(9)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188194	OQ210553	N/A	N/A
C. reteaudii	AA--	CSF21463	8	20200924-1-(14)-L1-S2-SC1	1 to 2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen and Q. C. Wang	OQ188195	OQ210554	N/A	N/A
C. reteaudii	ABAA	CSF21478	7	20200924-2-(6)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188196	OQ210555	OQ210681	OQ230752
C. reteaudii	ABAA	CSF21495	7	20200924-2-(15)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188197	OQ210556	OQ210682	OQ230753
C. reteaudii	AB-A	CSF21473	7	20200924-2-(3)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188198	OQ210557	N/A	OQ230754
C. reteaudii	AB--	CSF21470	7	20200924-2-(2)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188199	OQ210558	N/A	N/A
C. reteaudii	AB--	CSF21471	7	20200924-2-(2)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188200	OQ210559	N/A	N/A
C. reteaudii	AB--	CSF21472	7	20200924-2-(3)-L1-S1-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188201	OQ210560	N/A	N/A
C. reteaudii	AB--	CSF21479	7	20200924-2-(6)-L1-S2-SC1	1-year-old *E. exserta*	S. F. Chen and Q. C. Wang	OQ188202	OQ210561	N/A	N/A

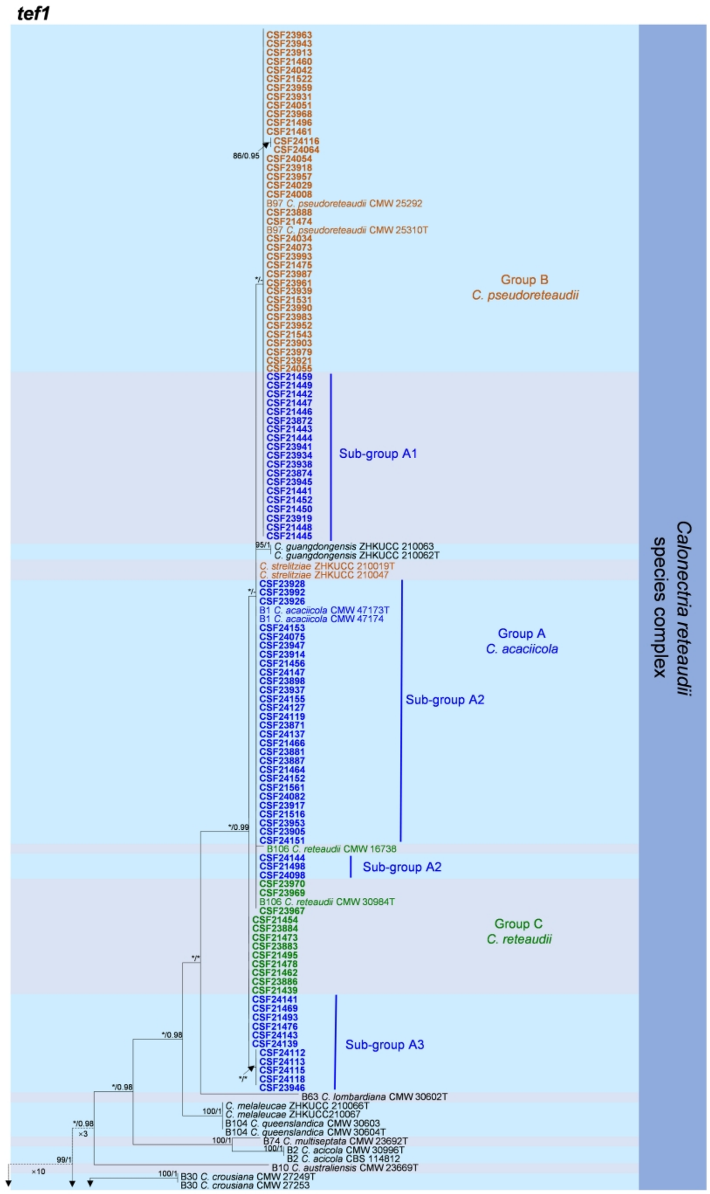
C. reteaudii	BAAA	CSF23967	5	20210916-2-(6)-L1-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188203	OQ210562	OQ210683	OQ230755
C. reteaudii	BAAA	CSF23969	5	20210916-2-(6)-L3-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188204	OQ210563	OQ210684	OQ230756
C. reteaudii	BAAA	CSF23970	5	20210916-2-(6)-L4-S1-SC1	2-year-old *E. exserta*	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188205	OQ210564	OQ210685	OQ230757
Species in *Calonectria cylindrospora* species complex										
C. auriculiformis	AAAA	CSF23984	4	20210916-3-(2)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188206	OQ210565	OQ210686	OQ230758
C. hawksworthii	AAAA	CSF23901	9	20210915-2-(9)-L1-S2-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188207	OQ210566	OQ210687	OQ230759
C. hawksworthii	AAAA	CSF23902	9	20210915-2-(9)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188208	OQ210567	OQ210688	OQ230760
C. hawksworthii	AAAA	CSF23909	9	20210915-2-(14)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188209	OQ210568	OQ210689	OQ230761
C. hawksworthii	AAAA	CSF23911	9	20210915-2-(16)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188210	OQ210569	OQ210690	OQ230762
C. hawksworthii	AAAB	CSF23891	9	20210915-2-(4)-L1-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188211	OQ210570	OQ210691	OQ230763
C. hawksworthii	AAAB	CSF23892	9	20210915-2-(4)-L1-S2-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188212	OQ210571	OQ210692	OQ230764
Species in *Calonectria kyotensis* species complex										
C. chinensis	AAAA	CSF23930	11	20210915-3-(14)-L1-S1-SC1	2-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188213	OQ210572	OQ210693	OQ230765
C. hongkongensis	AAAA	CSF23962	6	20210916-1-(5)-B1-S1-SC2	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188214	OQ210573	OQ210694	OQ230766
C. hongkongensis	AAAA	CSF23907	9	20210915-2-(12)-L2-S1-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188215	OQ210574	OQ210695	OQ230767
C. hongkongensis	AAAB	CSF23894	9	20210915-2-(5)-L1-S2-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188216	OQ210575	OQ210696	OQ230768
C. hongkongensis	ABAA	CSF23904	9	20210915-2-(10)-L1-S2-SC1	1-year-old *E. urophylla* × *E. grandis* hybrid	S. F. Chen, Q. C. Wang, X. Y. Liang and L. F. Liu	OQ188217	OQ210576	OQ210697	OQ230769

[a.] Genotype within each *Calonectria* species, determined by sequences of the *tef1*, *tub2*, *cmdA*, and *his3* regions; "N/A" means not available.

[b.] CSF: Culture collection located at Research Institute of Fast-growing Trees (RIFT), Chinese Academy of Forestry, ZhanJiang, GuangDong Province, China.

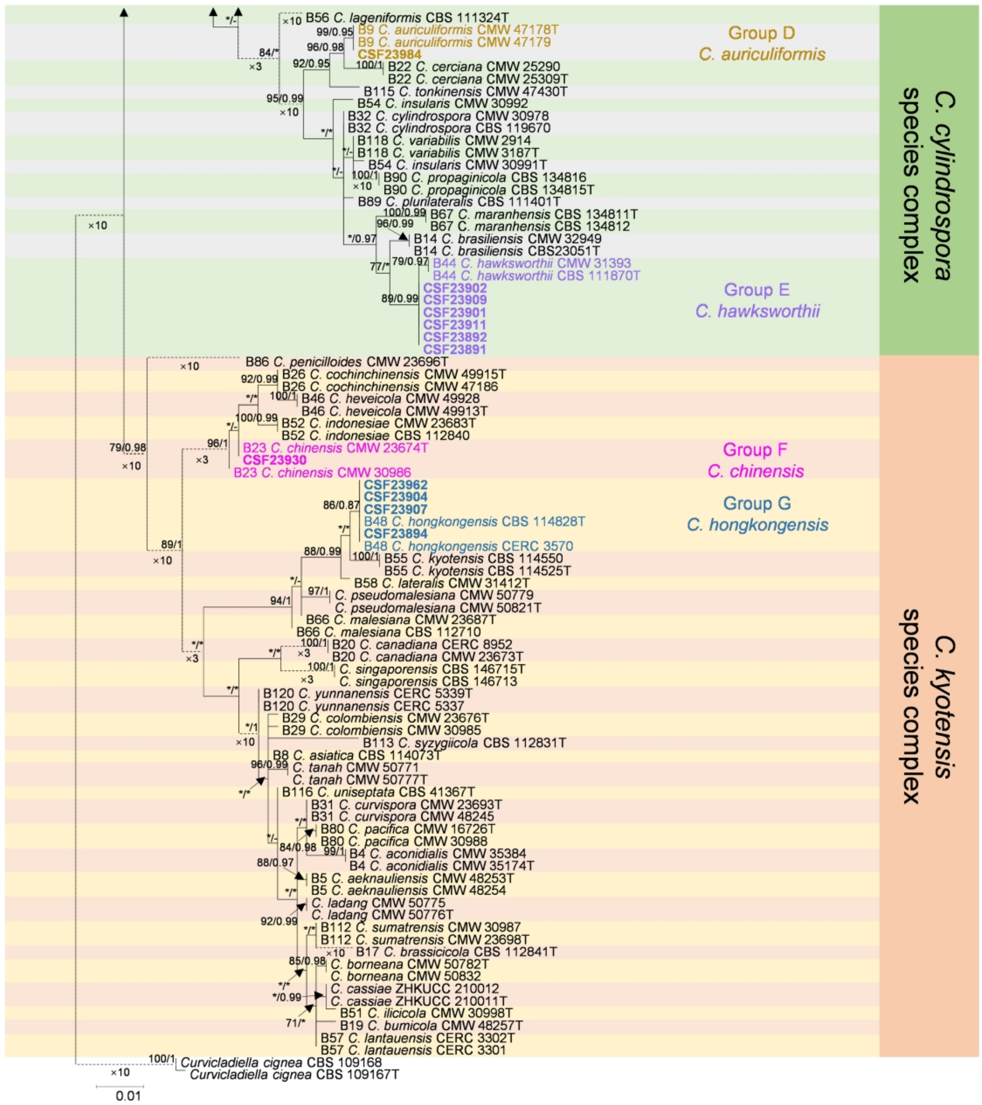
[c.] Information associated with sample point and isolate, for example, "20200924-1-(10)-L1-S1-SC1" indicated sample number "20200924-1-(10), leaf1 (L1), conidia mass spot1 (S1), single conidia1 (SC1)"'; "20210917-2-(21)-B1-S1-SC1" indicated sample number "20210917-2-(21), branch1 (B1), conidia mass spot1 (S1), single conidia1 (SC1)"'.

[d.] *tef1* = translation elongation factor 1-alpha; *tub2* =*β*-tubulin; *cmdA* = calmodulin; *his3* = histone H3.



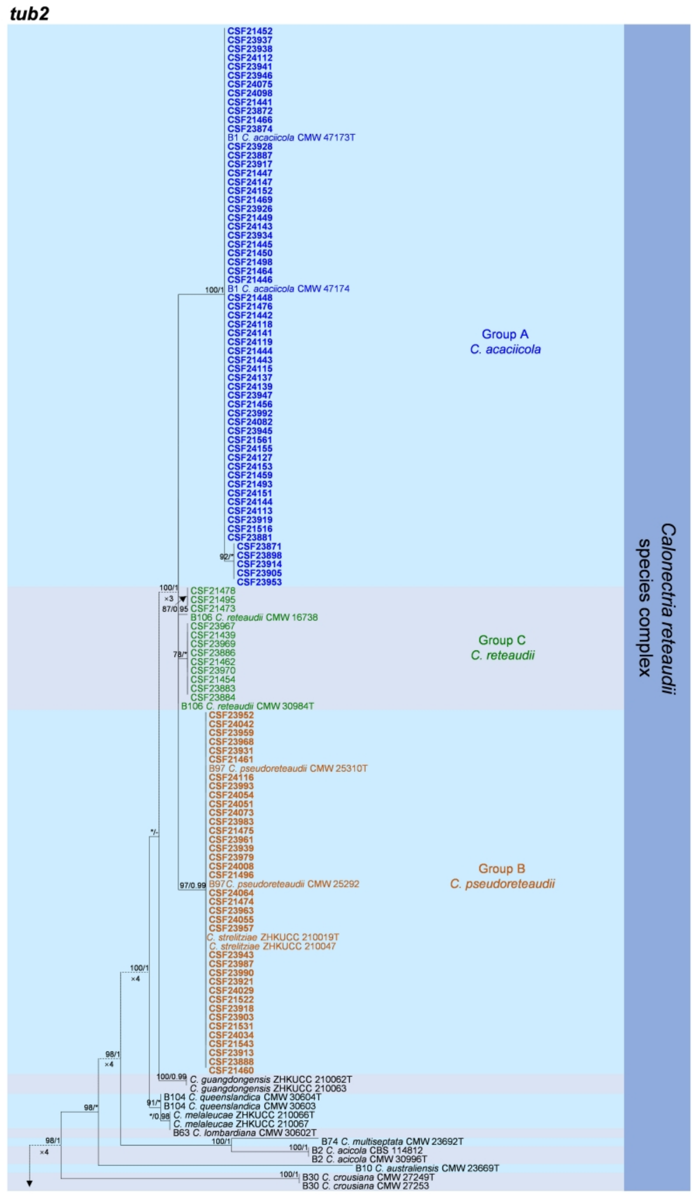
Supplementary Fig. S1. Phylogenetic tree of Calonectria species based on Maximum Likelihood (ML) analyses of tef1 gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

178x295mm (600 x 600 DPI)



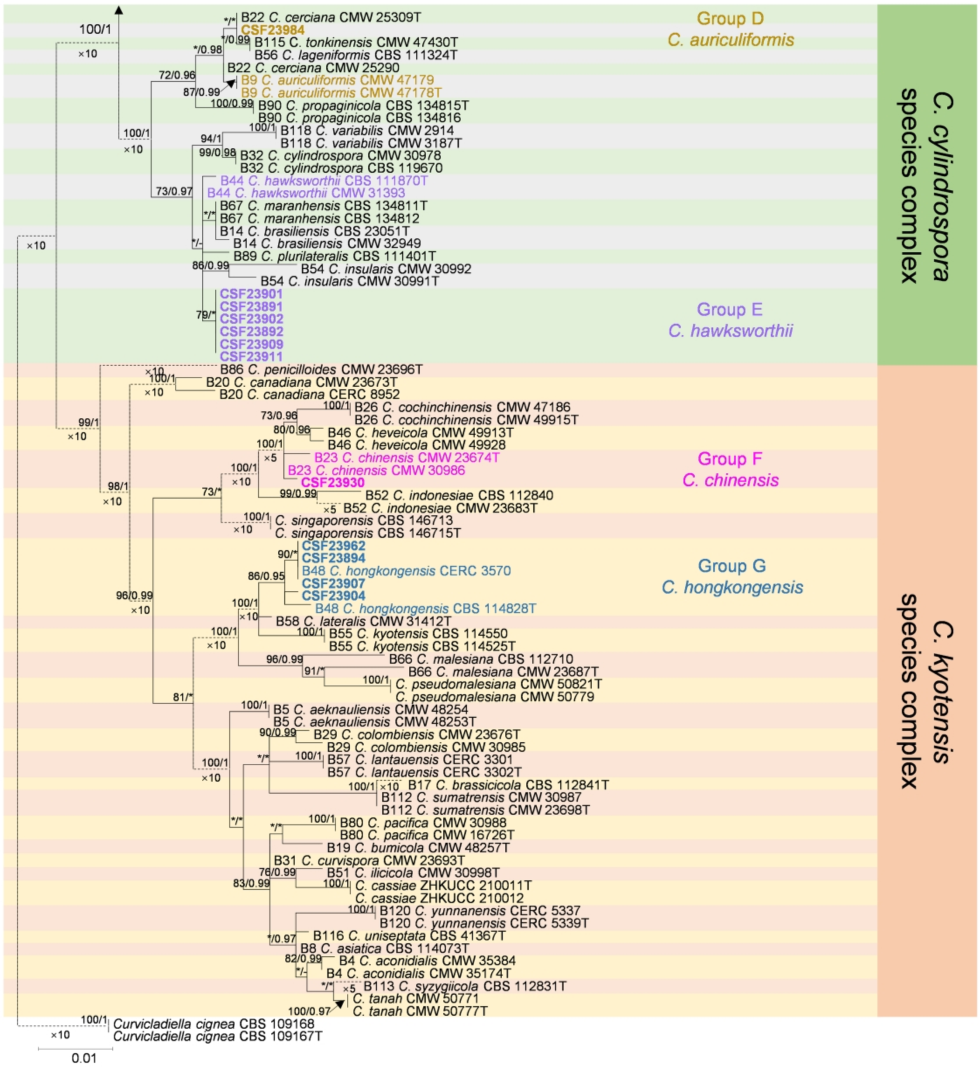
Supplementary Fig. S1. Phylogenetic tree of Calonectria species based on Maximum Likelihood (ML) analyses of tef1 gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

178x200mm (600 x 600 DPI)



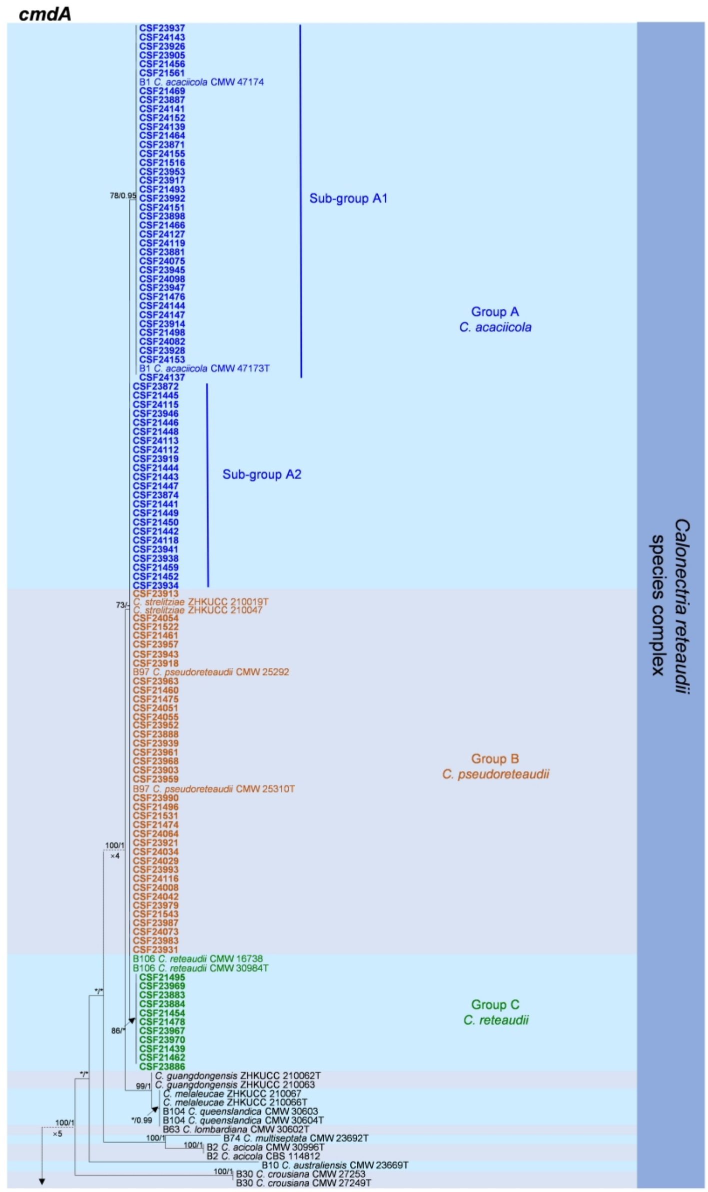
Supplementary Fig. S2. Phylogenetic tree of Calonectria species based on Maximum Likelihood (ML) analyses of tub2 gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

178x300mm (600 x 600 DPI)



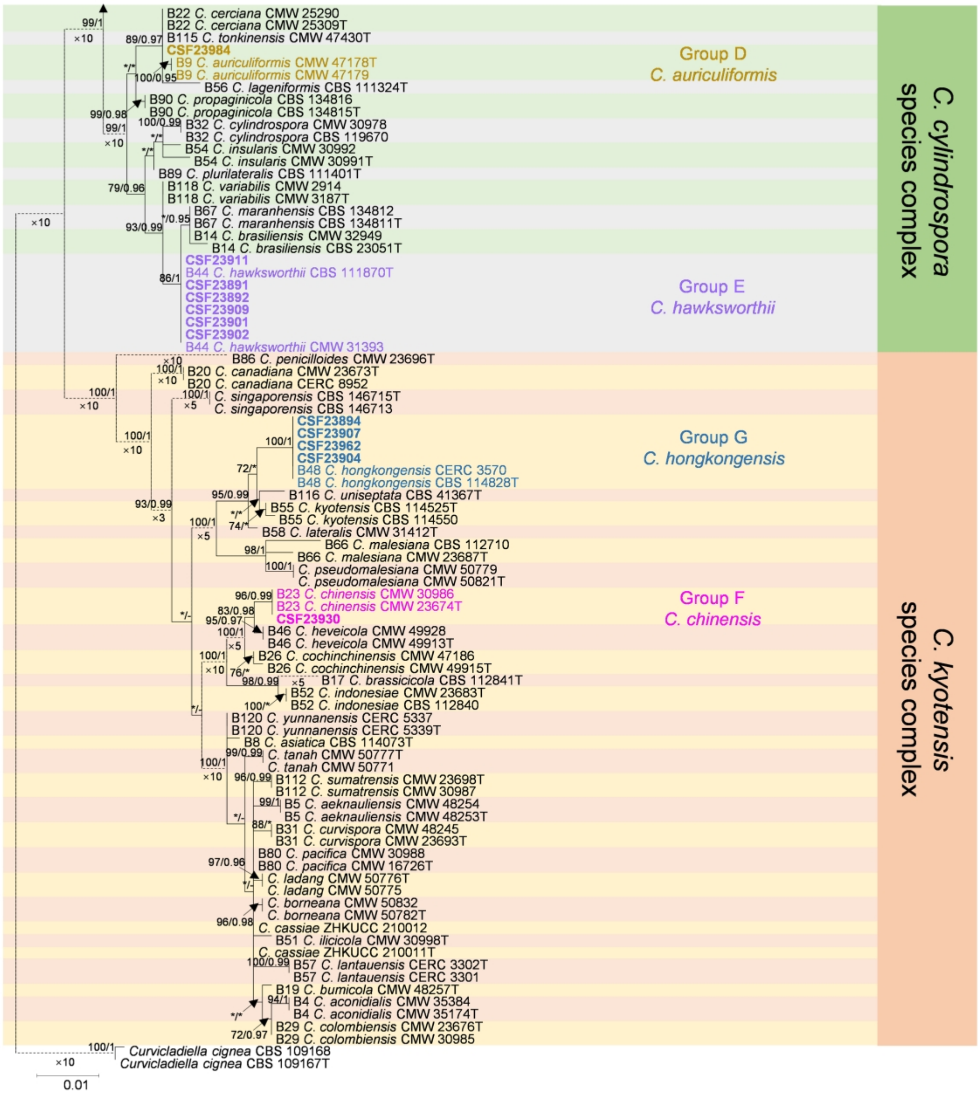
Supplementary Fig. S2. Phylogenetic tree of Calonectria species based on Maximum Likelihood (ML) analyses of tub2 gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

178x193mm (600 x 600 DPI)



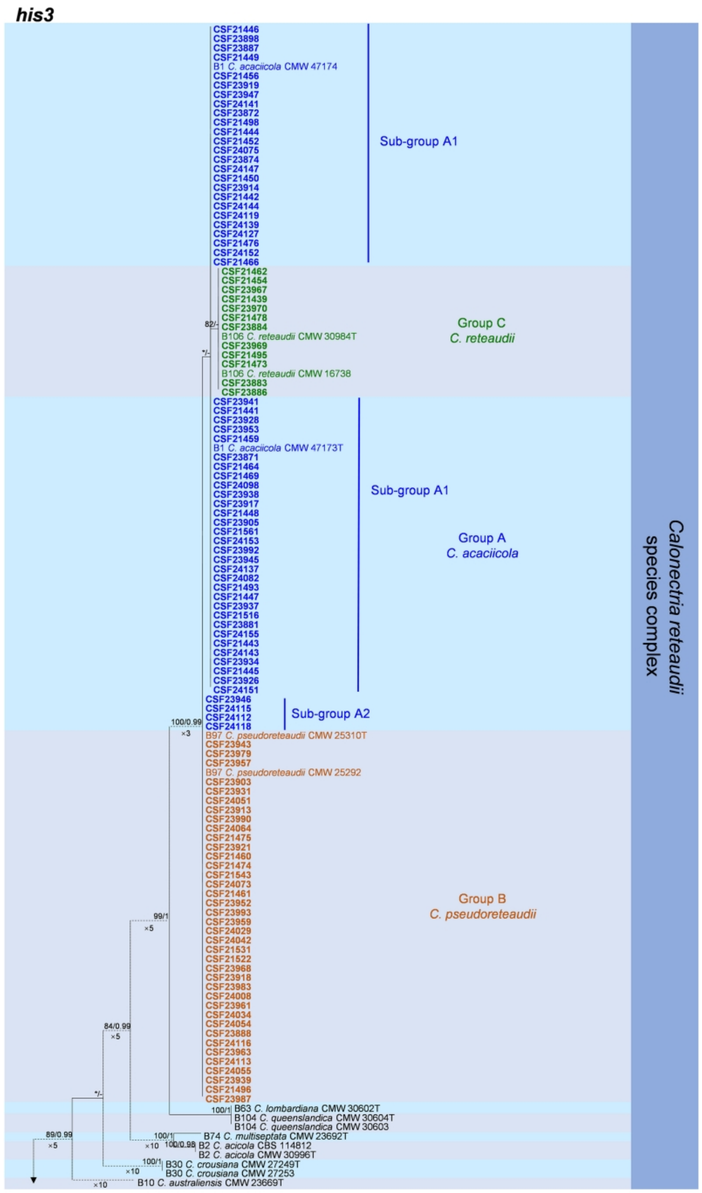
Supplementary Fig. S3. Phylogenetic tree of Calonectria species based on Maximum Likelihood (ML) analyses of the cmdA gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

178x293mm (600 x 600 DPI)



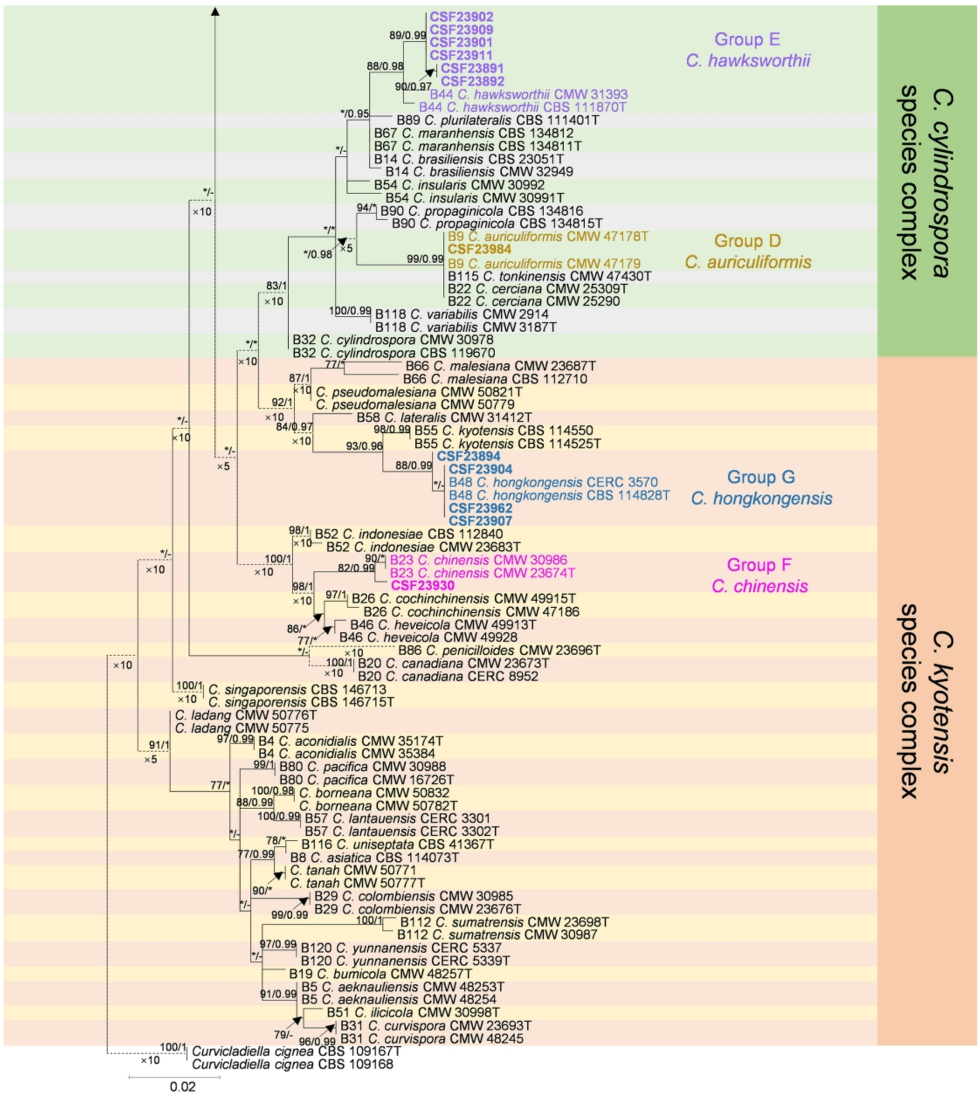
Supplementary Fig. S3. Phylogenetic tree of Calonectria species based on Maximum Likelihood (ML) analyses of the cmdA gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

178x196mm (600 x 600 DPI)



Supplementary Fig. S4. Phylogenetic tree of Calonectria species based on Maximum Likelihood (ML) analyses of the his3 gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

177x295mm (300 x 300 DPI)



Supplementary Fig. S4. Phylogenetic tree of Calonectria species based on Maximum Likelihood (ML) analyses of the his3 gene region. Bootstrap support values ≥ 70% for ML analyses and posterior probabilities values ≥ 0.95 obtained from Bayesian inference (BI) are presented above the branches as follows: ML/BI. Bootstrap values < 70% or probabilities values < 0.95 are marked with "*", and nodes lacking the support values are marked with "-". Isolates highlighted in seven different colors and bold were obtained in this study. Ex-type isolates are marked with "T". The "B" species codes are consistent with the recently published results in Liu et al. (2020). The Curvicladiella cignea isolates CBS 109167 and CBS 109168 were used as outgroup taxa.

177x196mm (300 x 300 DPI)