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Article

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Differentiation of species complexes in *Phyllosticta* enables better species resolution

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Abstract

Phyllosticta species have worldwide distribution and are pathogens, endophytes, and saprobes. Taxa have also been isolated from leaf spots and black spots of fruits. Taxonomic identification of *Phyllosticta* species is challenging due to overlapping morphological traits and host associations. Herein, we have assembled a comprehensive dataset and reconstructed a phylogenetic tree. We introduce six species complexes of *Phyllosticta* to aid the future resolution of species. We also introduce a new species, *Phyllosticta rhizophorae* isolated from spotted leaves of *Rhizophora stylosa* in mangrove forests of Taiwan. Phylogenetic analysis based on combined sequence data of ITS, LSU, *ef1α*, *actin* and *gapdh* loci coupled with morphological evidence support the establishment of the new species. We synonymize strains of *P. capitalensis* (CPC 20508 and CPC20509) under the new species. Six strains (CBS 173.77, CBS 119720, CPC 17748, CPC 20252, CPC 20269, and CBS 123404) are unnamed species based on phylogenetic analyses and nucleotide polymorphisms and probably represent new species. The phylogenetic relationships of *Phyllosticta* species are reappraised and suggestions are given for future work.

Key words – 1 New Species – Microfungi – Morphology – Phylogenetic Analysis – Phyllostictaceae – Rhizophoraceae – Synonym – Taxonomy

Introduction

Mangroves are forests situated in intertidal zones in tropical and subtropical backwaters, estuaries, deltas, and lagoons. They are important for wetland ecosystems providing numerous valuable services to the marine environment. Mangroves provide protection to coastal communities against natural hazards such as cyclones, tsunamis, and shoreline erosion (Saenger 2002, FAO 2007). Mangroves are found in Africa, North and Central America and Asia, including Taiwan (Alias & Jones 2009, Alias et al. 2010). The fungi in mangoves are important in nutrient cycling helping to provide detritus and nutrients for mangrove inhabitants (Hyde & Jones 1988, Hyde &

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Lee 1998, Hyde et al. 1998, Thatoi et al. 2012). However, there have been no detailed diversity studies of terrestrial mangrove ecosystems in comparison to other environments (Beger et al. 2010). Previous studies have reported endophytic fungi on mangrove trees (Doilom et al. 2017, Rashmi et al. 2019). For example, Thatoi et al. (2013) reported more than 200 species of endophytic fungi from mangroves in India, Kumar et al. (2019) described *Neopestalotiopsis alpapicalis* on *Rhizophora apiculata* and *R. mucronata* from Thailand, and Norphanphoun et al. (2019) established new species of *Neopestalotiopsis*, *Pestalotiopsis*, and *Pseudopestalotiopsis* species from leaf spot and asymptomatic leaves from mangrove plants in Thailand. Several studies have also reported on fungal pathogens of mangroves. For example, leaf spots disease caused by pathogenic fungi include *Anthostomella* on *Rhizophora mangle* in Puerto Rico (Stevens 1920), *Cercospora* on *R. mangle* in Florida (McMillan 1964), *Pestalotiopsis* sp., *Colletotrichum* sp., and *Polystigma sonneratiae* on *Rhizophora* sp. (Hyde & Cannon 1992, Xu et al. 2009), and *Pseudocercospora avicenniae* on *Avicennia marina* (Shivas et al. 2009). Other diseases include heart and butt rot disease caused by *Heterobasidion annosum*, *Ganoderma*, *Phellinus* sp., and *Inonotus* sp. on *Rhizophora* sp. (Ryvarden 2000, Fox 2001, Sakayaroj et al. 2012), canker and dieback caused by *Phytophthora cinnamomi* on *Rhizophora* sp. (Vollbrecht et al. 1995, Barnard 2000, Kinge & Mih 2011). *Cytospora* species have been associated with dead branches of *Lumnitzera racemosa*, *Xylocarpus granatum* and *X. moluccensis* in Thailand (Norphanphoun et al. 2018).

In 1995, mangrove areas in Taiwan covered 287 ha, which represents only a tiny proportion of the total area of mangroves worldwide (Hsueh 1995). Four mangrove plant species are found in Taiwan, all of which have been declared endangered. These are *Avicennia marina*, *Lumnitzera racemose*, *Kandelia candel* and *Rhizophora stylosa* (Fan 2002, Pang et al. 2011). Previous restoration efforts of mangroves in Taiwan have been only partially successful and deforestation continues with annual declines of mangrove cover. One of the reasons for the decline is ineffective disease management (Hsueh 1995, Fan 2002, Pang et al. 2011). Several organisms are responsible for causing diseases of mangrove plants, including fungi. Fungi associated with the intertidal part of mangroves in Taiwan are relatively poorly studied and data on diseases of mangroves are sparse. The taxa collected from mangrove areas in Taiwan have mostly been saprobic marine fungi (Pang et al. 2011). Since mangroves in Taiwan represent a negligible proportion of the total mangrove area worldwide, therefore, very few authors have focused on mangrove research in the area (Fan 2002, Pang et al. 2011).

Phyllosticta was introduced by Persoon (1818) and belongs to Phyllostictaceae in Botryosphaeriales (Hongsanan et al. 2020, Wijayawardene et al. 2020). *Phyllosticta* is an earlier name of the asexual morph *Guignardia* introduced by Viala & Ravaz (1892). The earlier name takes precedence based on the International Code for Nomenclature of Algae, Fungi and Plants (http://www.iapttaxon.org/nomen/main.php?page=title). Currently, the number of records of *Phyllosticta* in search engines is higher than that of *Guignardia* (Google Scholar, Index Fungorum, Species Fungorum, MycoBank and GenBank). *Phyllosticta* species are endophytes but are also associated with leaf spots of numerous plants and have a worldwide distribution on a wide range of plants (Okane et al. 2003, Glienke et al. 2011, Wikee et al. 2011, 2013b, Rashmi et al. 2019). There are 3,210 epithets of *Phyllosticta* listed in Index Fungorum 2020 (April 18, 2020). van der Aa (1973) described 46 species of *Phyllosticta* with 12 sexual and 17 spermatial morphs. van der Aa & Vanev (2002) revised all species of *Phyllosticta* and accepted 190 epithets. Wikee et al. (2013b) recognized 170 species names based on multi-locus analysis and introduced Phyllostictaceae to accommodate *Phyllosticta*. Previously, many examined isolates of *Phyllosticta* were identified based on a combination of morphological data and phylogenetic analysis (Guarnaccia et al. 2017, Tran et al. 2019). However, sequence data from type material is not available for many species of *Phyllosticta*, and thus additional research studies focusing on neo- or epitypification are required in order to clarify their taxonomic placement. Evolutionary relationships within *Phyllosticta* are also unclear, despite intensive study (Delsuc et al. 2005). Thus, further analyses using larger datasets in terms of both taxa and loci are necessary to improve phylogenetic resolution within *Phyllosticta.* These approaches have been used successfully for other fungal taxa (Rokas & Carroll 2005).

Herein, we have assembled a comprehensive dataset of five loci containing all species denoted as *Phyllosticta* in GenBank. Based on the resulting phylogenetic tree, we introduce six workable species complex clades. A new species, *Phyllosticta rhizophorae* is also introduced from Taiwan. Two published strains of *P. capitalensis* are synonymized under the new species. Six strains of *P. capitalensis* are treated as unnamed species based on nucleotide polymorphisms and phylogenetic evidence. Seventeen strains are excluded from *Phyllosticta* based on BLAST searches and phylogenetic placement.

Materials & methods

Sample collection and specimen examination

Fresh leaf samples were collected in 2018, from *Rhizophora stylosa* from Shicao, Taiwan. Fresh specimens were taken to the laboratory in paper bags, examined and described following the methods in Norphanphoun et al. (2017). Morphological characters of conidiomata were examined using a Zeiss Axioskop 2 *plus* compound microscope (Carl Zeiss Microscopy, LLC, NY, USA). Micro-morphology was studied using a Zeiss Axioskop 2 mot *plus* compound microscope (Carl Zeiss Microscopy, LLC, NY, USA). All image measurements were made with the ZEN2 (blue edition) software. Photo-plates were made using Adobe Photoshop CC 2019 version: 20.0.1 20181029.r.41 2018/010/29: 1197484 × 64 (Adobe Systems, CA, USA).

Cultures were obtained using the tissue isolation method outlined in Norphanphoun et al. (2018). Single hyphal tips were transferred onto 2% potato agar (PA) plates and flasks at room temperature (25°C ± 2) throughout a two-week period: 24hr dark for asexual morph, and 24hr light for sexual morph. Culture characteristics were examined and recorded after 5, 7, 14 and 30 days. Morphological characters in culture were examined throughout the cultivation period. Pure cultures were maintained on PA for further studies. Dried and living cultures have been deposited in the Department of Plant Medicine, National Chiayi University, Taiwan (NCYU) and duplicates in culture collection at Mae Fah Luang University (MFLUCC), Chiang Rai, Thailand. Facesoffungi numbers were obtained as in Jayasiri et al. (2015).

Pathogenicity testing

Healthy leaves (leaves attached on branches) of *Rhizophora stylosa* were washed with distilled water, wiped with 70% ethanol, dried with sterile tissue paper, and covered with sterile wet cotton at the base of branch stalks. To test Koch's postulates, we followed the inoculation methods of Than et al. (2008). Eight experiments with three replications each were designed for this study. Of these, four were conducted using wounded leaves by pricking them with a pin, and another four using unwounded leaves. Mycelium plugs (0.7 mm diam) of 14-day-old colonies on PDA were used for experiment 1: wounded leaves + mycelium plugs; experiment 2: unwounded leaves + mycelium plugs; experiment 3: spore suspension (5×10^4/ml) from 14-day-old colonies on PA was used for wounded + spores suspension; and experiment 4: unwounded + spores suspension. Sterile water and PDA agar plugs served as control treatments as follows; experiment 5: wounded + PDA agar; experiment 6: unwounded + PDA agar; experiment 7: wounded + sterile water; and experiment 8: unwounded + sterile water. All experiments were kept individually in moist chambers for 1 week and observed for symptom expression every other day. After 7 days, if positive, the fungus was re-isolated from any tissue showing lesions and the isolate was considered to be pathogenic; absence of symptoms on leaves classified the isolate as non-pathogenic.

DNA extraction, PCR amplification and sequencing

Genomic DNA was extracted from fresh fungal mycelia growing on PA at room temperature (25°C ± 2) for two weeks using an E.Z.N.A ® Fungal DNA Mini Kit, D3390-02, (Omega Bio-tek, Inc., GA) following the manufacturer's protocols. Polymerase chain reactions (PCR) were carried out using the following primer pairs: ITS1/ITS4 to amplify the internal transcribed spacer region (ITS) (White et al. 1990), LROR/LR5 for the 28S large subunit ribosomal RNA gene (LSU) (White et al. 1990), act512F/act738R for *actin* (Carbone & Kohn 1999), Gpd1-LM/Gpd2-LM for partial glyceraldehyde-3-phosphate dehydrogenase region (*gapdh*) (Myllys et al. 2002).

The amplification reactions were carried out using the following protocol: 50 µL reaction volume containing 2 µl of DNA template, 2 µL (10 µM stock concentration) of each forward and reverse primers, 25 µl of 2 × Power Taq PCR MasterMix (Tri-I Biotech, Taipei, Taiwan) and 19 µl of double-distilled water (ddH_2O). The PCR thermal cycling program for each locus is described in Table 1. PCR products were analysed using 1.5% agarose gels containing the Safeview DNA stain (GeneMark, Taipei, Taiwan) to confirm presence of amplicons at the expected molecular weight. Purification and sequencing of PCR products with the amplification primers mentioned above were carried out at Tri-I Biotech, Taipei, Taiwan.

Table 1 Polymerase chain reactions (PCR) thermal cycling programs for each locus.

Gene	Primers	PCR thermal cycle protocols*
ITS	ITS1/ ITS4	ID 95°C for 3 min, 40 cycles of D at 95°C for 30 s, A at 55°C for 50 s, E at 72°C for 1 min, FE at 72°C for 7 min
LSU	LROR/ LR5	ID 95°C for 3 min, 34 cycles of D at 95°C for 30 s, A at 51°C for 50 s, E at 72°C for 1 min, FE at 72°C for 10 min
actin	act512F/ act738R	ID 95°C for 5 min, 40 cycles of D at 95°C for 40 s, A at 58°C for 30 s, E at 72 °C for 1 min, FE at 72 °C for 5 min
gapdh	Gpd1-LM/ Gpd2-LM	ID 94°C for 5 min, 40 cycles of D at 94°C for 30 s, A at 52°C for 30 s, E at 72°C for 30s, FE at 72°C for 7 min

*ID: initial denaturation; D = denaturation; A = annealing; E = elongation; FE = final extension

Phylogenetic analysis

Raw reads were edited and assembled into contigs using Geneious® version 11.1.5 (http://www.geneious.com). The new sequences were used as queries to perform BLASTn against the nr database in GenBank. Similar sequences were retrieved, and multiple alignments were built. GenBank taxonomy browser was also used to check all sequences assigned as *Phyllosticta* in the database. ITSx 1.1, a Perl based software tool was used to extract ITS1, 5.8S and ITS2 sequences (Bengtsson-Palme et al. 2013). BioEdit version 7.2.3 (Hall 1999) was used to assign open reading frames of protein coding sequence of β-tubulin, and *ef1α*, according to reference sequences in GenBank database. Combined sequence data of all loci were used to perform maximum parsimony (MP), maximum likelihood (ML) and Bayesian inference analysis (BI). Two datasets were created. Dataset one consisted of 195 taxa (outgroup: *Botryosphaeria obtusa* strain CMW 8232 and *B. stevensii* strain CBS 112553), while dataset two was a subset of dataset one containing 74 strains (outgroup: *P. cordylinophila* strain MFLUCC 10-0166 and *P. cordylinophila* strain MFLUCC 12-0014). Outgroup sequences were selected based on preliminary analysis and results from the multigene phylogeny of dataset one. All taxa used for these analyses can be found in Table 3. *Phyllosticta abietis* (AF312012) was not included in the analyses because only the ITS locus was available.

Sequences were aligned for each locus separately using the MAFFT v.7.110 online program (http://mafft.cbrc.jp/alignment/server/; Katoh & Standley 2013). TrimAl (available on Phylemon 2.0 platform, Sánchez et al. 2011) was used to trim ambiguously aligned positions. BioEdit v. 7.0.5.3 was used for further manual adjustments wherever necessary (Hall 1999). A partition homogeneity test (PHT) was performed with PAUP* 4.0b10 to determine congruency of genes and whether they could be combined (Swofford 2002). The combined sequence alignments were obtained from MEGA v. 7.0.14 and v. 10.1.0 (Kumar et al. 2018). Geneious Prime® 2019.2.1 was used to convert file format to NEXUS for MP and BI analyses (http://www.geneious.com).

Maximum parsimony analysis was performed using the CIPRES Science Gateway web server (PAUP on XSEDE; Miller et al. 2010), with 1000 bootstrap replicates using heuristic search with random stepwise addition and tree-bisection reconnection (TBR) algorithm. Maximum trees were set to 1000 and branches of zero length were collapsed. The following descriptive tree statistics were calculated: parsimony tree length (TL), consistency index (CI), retention index (RI), rescaled consistency index (RC) and homoplasy index (HI). For ML and BI analyses, the data were partitioned as follows: ITS1+ITS2, 5.8S, LSU, *ef1α*-exon, *actin*-exon, *gapdh*, *ef1α*-intron, *actin*-intron. The software RAxML-HPC2 on XSEDE (Miller et al. 2010) was used to run ML analysis as implemented in the CIPRES Science Gateway web server, 1000 rapid bootstrap replicates were run using the GTRGAMMA model of nucleotide evolution. Bayesian inference analysis was performed using the Markov Chain Monte Carlo (MCMC) algorithm as implemented in CIPRES Science Gateway web server (MrBayes on XSEDE; Miller et al. 2010). The best-fit nucleotide substitution model for each partition was separately determined using MrModeltest version 2.2 (Table 2, Nylander 2004). Posterior probabilities were computed by running two runs with four chains each starting from random tree topology. 20,000,000 and 2,500,000 generations were run for dataset one and two, respectively. Trees were sampled every 100 generations. 25% of the trees were discarded as burn-in value with average standard deviation of split frequencies converged under 0.01 (Ronquist et al. 2012).

Table 2 The best-fit nucleotide substitution model for each dataset, selected by AIC in MrModeltest 2.2.

Models \ Genes	**ITS1+ ITS2**	**5.8S**	**LSU**	***ef1α* (exon)**	***actin* (exon)**	***gapdh***	***ef1α* (intron)**	***actin* (intron)**
F81					●			●
F81+I			●					
GTR						●		
GTR+G					○			
GTR+I+G	○		○			○	○	
HKY							●	
HKY+G								○
JC		●						
K80				●				
SYM	●							
SYM+G		○		○				

○ Best-fit nucleotide substitution model for Fig. 1
● Best-fit nucleotide substitution model for Fig. 2

The phylogram was visualized in FigTree v1.4.0 (http://tree.bio.ed.ac.uk/software /figtree/; Rambaut 2014) and made in Adobe Illustrator CC version 23.0.1 (64-bit) and Adobe Photoshop CC version 20.0.1 release (Adobe Systems, CA, the USA). Newly generated sequences in this study are deposited in GenBank (Table 3). The finalized alignments and trees were deposited in TreeBASE, Figure 1: submission ID: 26535, Figure 2: submission ID: 26536.

Results

Phylogenetic analysis

The results from the partition homogeneity tests (PHT) were not significant (level ≤95%) for either phylogenetic tree, indicating that the individual datasets were congruent and could be combined. Phylogenetic trees from single loci were also generated (Supplementary figures 1–5) to examine topology and clade support. In this study, we introduce six clades as species complexes containing extant species of *Phyllosticta*.

Table 3 GenBank Accession numbers of the sequences used for phylogenetic analysis in this study.

Species	Strain no.*	Host	Country	GenBank no.				
				ITS	LSU	*ef1α*	*actin*	*gapdh*
Botryosphaeria obtusa	CMW 8232	Conifers	South Africa	AY972105	-	DQ280419	AY972111	-
B. stevensii	CBS 112553	culture from isotype of *Diplodia mutila*	Not given	AY259093	AY928049	AY573219	-	-
Phyllosticta abieticola	CBS 112067	*Abies concolor*	Canada	KF170306	EU754193	-	KF289238	-
P. acaciigena	CPC 28295 [T]	*Acacia suaveolens*	Australia	KY173433	KY173523	-	KY173570	-
P. aloeicola	CPC 21020 [T]	*Aloe ferox*	South Africa	KF154280	KF206214	KF289193	KF289311	KF289124
P. aloeicola	CPC 21021	*Aloe ferox*	South Africa	KF154281	KF206213	KF289194	KF289312	KF289125
P. ardisiicola	NBRC 102261 [T]	*Ardisia crenata*	Japan	AB454274	-	-	AB704216	-
P. aristolochiicola	BRIP 53316 [T]	*Aristolochia acuminata*	Australia	JX486129	-	-	-	-
P. aspidistricola	NBRC 102244 [T]	*Aspidistra elatior*	Japan	AB454314	-	-	AB704204	-
P. aucubae-japonicae	MAFF 236703 [T]	*Aucuba japonica*	Japan	KR233300	-	KR233310	KR233305	-
P. austroafricana	CBS 144593 [T]	leaf spots of unidentified deciduous tree	South Africa	MK442613	MK442549	MK442704	MK442640	-
P. azevinhi	MUCC0088	*Ilex pedunculosa*	Japan	AB454302	-	-	AB704226	-
P. beaumarisii	CBS 535.87	*Muehlenbekia adpressa*	Australia	NR_145235	NG_058040	KF766429	KF306232	KF289074
P. bifrenariae	CBS 128855 [T]	*Bifrenaria harrisoniae*	Brazil	JF343565	KF206209	JF343586	JF343649	JF343744
P. bifrenariae	CPC 17467	*Bifrenaria harrisoniae*	Brazil	KF170299	KF206260	KF289207	KF289283	KF289138
P. brazilianiae	LGMF 330 [T]	*Mangifera indica*	Brazil	JF343572	KF206217	JF343593	JF343656	JF343758
P. brazilianiae	LGMF 334	*Mangifera indica*	Brazil	JF343566	KF206215	JF343587	JF343650	JF343752
P. camelliae	MUCC0059	*Camellia japonica*	Japan	AB454290	-	-	AB704223	-
P. capitalensis	CBS 226.77	*Paphiopedilum callosum*	Germany	FJ538336	KF206289	FJ538394	FJ538452	JF343718
P. capitalensis	CBS 356.52	*Ilex* sp.	Not given	FJ538342	KF206300	FJ538400	FJ538458	KF289087
P. capitalensis	CBS 100175	*Citrus* sp.	Brazil	FJ538320	KF206327	FJ538378	FJ538436	JF343699
P. capitalensis	CBS 101228	*Nephelium lappaceum*	Hawaii	FJ538319	KF206325	FJ538377	FJ538435	KF289086
P. capitalensis	CBS 114751	*Vaccinium* sp.	New Zealand	EU167584	EU167584	FJ538407	FJ538465	KF289088

Table 3 Continued.

Species	Strain no.*	Host	Country	GenBank no.				
				ITS	LSU	*ef1α*	*actin*	*gapdh*
P. capitalensis	CBS 115047	*Aspidosperma polyneuron*	Brazil	FJ538323	KF206318	FJ538381	FJ538439	KF289077
P. capitalensis	CBS 115049	*Bowdichia nitida*	Brazil	FJ538324	KF206317	FJ538382	FJ538440	KF289084
P. capitalensis	CBS 117118	*Musa acuminata*	Indonesia	FJ538339	JQ743603	FJ538397	FJ538455	KF289090
P. capitalensis	CBS 120428	*Sansevieria* sp.	Netherlands	JN692544	KF206315	JN692532	JN692520	JN692509
P. capitalensis	CBS 123373	*Musa paradisiaca*	Thailand	FJ538341	JQ743604	FJ538399	FJ538457	JF343703
P. capitalensis	CBS 128856 [T]	*Stanhopea* sp.	Brazil	JF261465	KF206304	JF261507	JF343647	JF343776
P. capitalensis	CPC 11867	*Acacia crassicarpa*	Thailand	KF206181	KF206283	KF289184	KF289260	KF289108
P. capitalensis	CPC 13987	*Protea repens*	Portugal	KF206183	KF206281	KF289176	KF289263	KF289083
P. capitalensis	CPC 14609	*Zyzygium* sp.	Republic of Madagascar	KF206184	KF206280	KF289175	KF289264	KF289081
P. capitalensis	CPC 16590	*Citrus limon*	Argentina	KF206185	KF206272	KF289177	KF289271	KF289091
P. capitalensis	CPC 16591	*Citrus limon*	Argentina	KF206186	KF206271	KF289179	KF289272	KF289093
P. capitalensis	CPC 16592	*Citrus limon*	Argentina	KF206187	KF206270	KF289178	KF289273	KF289092
P. capitalensis	CPC 17468	*Cymbidium* sp.	Brazil	KF206188	KF206259	KF289189	KF289284	KF289120
P. capitalensis	CPC 20251	Wild plant	Thailand	KC291333	KF206252	KC342553	KC342530	KF289101
P. capitalensis	CPC 20253	*Scheffera venulosa*	Thailand	KF206192	KF206250	KF289181	KF289293	KF289102
P. capitalensis	CPC 20254	*Saccharum officinarum*	Thailand	KC291335	KF206249	KC342555	KC342532	KF289103
P. capitalensis	CPC 20255	Arecaceae	Thailand	KC291336	KF206248	KC342556	KC342533	KF289115
P. capitalensis	CPC 20256	*Ophiopogon japonicus*	Thailand	KC291337	KF206247	KC342557	KC342534	KF289089
P. capitalensis	CPC 20257	*Ficus benjamina*	Thailand	KC291338	KF206246	KC342558	KC342535	KF289099
P. capitalensis	CPC 20258	*Ophiopogon japonicus*	Thailand	KC291339	KF206245	KC342559	KC342536	KF289094
P. capitalensis	CPC 20259	Orchidaceae	Thailand	KC291340	KF206244	KC342560	KC342537	KF289104
P. capitalensis	CPC 20263	Magnoliaceae	Thailand	KC291341	KF206241	KC342561	KC342538	KF289085
P. capitalensis	CPC 20265	Euphobiaceae	Thailand	KF206194	KF206239	KF289182	KF289297	KF289105
P. capitalensis	CPC 20266	*Polyscias* sp.	Thailand	KC291342	KF206238	KC342562	KC342539	KF289109
P. capitalensis	CPC 20267	*Baccaurea ramiflora*	Thailand	KF206195	KF206237	KF289173	KF306233	KF289078
P. capitalensis	CPC 20268	*Hibiscus syriacus*	Thailand	KC291343	KF206236	KC342563	KC342540	KF289117
P. capitalensis	CPC 20270	*Tectona grandis*	Thailand	KC291345	KF206234	KC342565	KC342542	KF289110
P. capitalensis	CPC 20271	*Crinum asiaticum*	Thailand	KF206196	KF206233	KF289183	KF289298	KF289106
P. capitalensis	CPC 20272	Orchidaceae	Thailand	KC291346	KF206232	KC342566	KC342543	KF289079

Table 3 Continued.

Species	Strain no.*	Host	Country	GenBank no.				
				ITS	LSU	*ef1α*	*actin*	*gapdh*
P. capitalensis	CPC 20274	*Mangifera indica*	Thailand	KF206197	KF206231	KF289188	KF289299	KF289119
P. capitalensis	CPC 20275	*Polyalthia longifolia*	Thailand	KC291347	KF206230	KC342567	KC342544	KF289107
P. capitalensis	CPC 20278	*Euphorbia milii*	Thailand	KC291348	KF206227	KC342568	KC342545	KF289113
P. capitalensis	CPC 20423	*Philodendron* sp.	Thailand	KC291349	KF206226	KC342569	KC342546	KF289116
P. capitalensis	CPC 20510	*Pyrrosia adnascens*	Thailand	KF206200	KF206223	KF289174	KF289304	KF289080
P. capitalensis	LGMF 219	*Citrus sinensis*	Brazil	KF206202	KF206220	JF261490	KF289306	JF343737
P. capitalensis	LGMF 220	*Citrus sinensis*	Brazil	KF206203	KF206219	JF261488	KF289307	JF343735
P. capitalensis	LGMF 222	*Citrus sinensis*	Brazil	KF206204	KF206218	JF261492	KF289308	JF343739
P. carissicola	CPC 25665 [T]	*Carissa macrocarpa*	South Africa	KT950849	KT950863	KT950879	KT950872	KT950876
P. carochlae	CGMCC 3.17317 [T]	*Caryota ochlandra*	China	K J847422	-	KF289178	KF289273	KF289092
P. carochlae	CGMCC 3.17318	*Caryota ochlandra*	China	KJ847423	-	KJ847444	KJ847430	KJ847438
P. catimbauensis	URM 7672 [T]	*Mandevilla catimbauensis*	Brazil	MF466160	MF466163	MF466155	MF466157	-
P. catimbauensis	URM 7674	*Mandevilla catimbauensis*	Brazil	MF466161	MF466164	MF466153	MF466158	-
P. cavendishii	BRIP 57384	*Musa* cv. Lady Finger	Australia	KC117644	KU697330	KF009695	KF014059	KU716085
P. cavendishii	BRIP 57383	*Musa* cv. Lady Finger	Australia	KC117643	KU697329	KF009694	KF014058	KU716084
P. citriasiana	CBS 120486 [T]	*Citrus maxima*	Thailand	FJ538360	KF206314	FJ538418	FJ538476	JF343686
P. citriasiana	CBS 120487	*Citrus maxima*	China	FJ538361	KF206313	FJ538419	FJ538477	JF343687
P. citribraziliensis	CBS 100098 [T]	*Citrus limon*	Brazil	FJ538352	KF206221	FJ538410	FJ538468	JF343691
P. citribraziliensis	CPC 17466	*Citrus* sp.	Brazil	KF170302	KF206261	KF289226	KF289282	KF289161
P. citricarpa	CBS 127454 [T]	*Citrus limon*	Australia	JF343583	KF206306	JF343604	JF343667	JF343771
P. citricarpa	CBS 127455	*Citrus sinensis*	Australia	JF343584	KF206305	JF343605	JF343668	JF343772
P. citrichinaensis	ZJUCC 200956 [T]	*Citrus reticulata*	China	JN791620	-	JN791459	JN791533	-
P. citrichinaensis	ZJUCC 2010150	*Citrus maxima*	China	JN791662	-	JN791514	JN791582	-
P. citrimaxima	MFLUCC 10-0137 [T]	*Citrus maxima*	Thailand	KF170304	KF206229	KF289222	KF289300	KF289157
P. concentrica	CBS 937.70	*Hedera helix*	Italy	FJ538350	KF206291	FJ538408	KF289257	JF411745
P. concentrica	CPC 18842 [T]	*Hedera* sp.	Italy	KF170310	KF206256	KF289228	KF289288	KF289163
P. conjac	MUCC0410	*Amorphophallus rivieri*	Japan	AB454342	-	-	AB704239	-
P. cordylinophila	MFLUCC 10-0166 [T]	*Cordyline fruticosa*	Thailand	KF170287	KF206242	KF289172	KF289295	KF289076
P. cordylinophila	MFLUCC 12-0014	*Cordyline fruticosa*	Thailand	KF170288	KF206228	KF289171	KF289301	KF289075
P. cornicola	CBS 111639	*Cornus florida*	USA	KF170307	-	-	KF289234	-

Table 3 Continued.

Species	Strain no.*	Host	Country	GenBank no.				
				ITS	LSU	*ef1α*	*actin*	*gapdh*
P. cruenta	CBS 858.71	*Polygonatum odoratum*	Czech Republic	MG934458	-	MG934501	MG934465	MG934474
P. cruenta	MUCC0206	*Polygonatum odoratum* var. *pluriflorum*	Japan	AB454331	-	-	AB704237	-
P. cryptomeriae	KACC 48643	*Juniperus chinensis* var. *sargentii*	Not given	MK396559	-	-	-	-
P. cryptomeriae	MUCC0028	*Cryptomeria japonica*	Japan	AB454271	-	-	AB704213	-
P. cussonia	CPC 14873 [T]	*Cussonia* sp.	South Africa	JF343578	KF206279	JF343599	JF343662	JF343764
P. cussonia	CPC 14875	*Cussonia* sp.	South Africa	JF343579	KF206278	JF343600	JF343663	JF343765
P. elongata	CBS 126.22 [T]	*Oxycoccus macrocarpos*	USA	FJ538353	-	FJ538411	FJ538469	KF289164
P. ericarum	CBS 132534 [T]	*Erica gracilis*	South Africa	KF206170	KF206253	KF289227	KF289291	KF289162
P. eugeniae	CBS 445.82 [T]	*Eugenia aromatica*	Indonesia	AY042926	KF206288	KF289208	KF289246	KF289139
P. fallopiae	MUCC0113 [T]	*Fallopia japonica*	Japan	AB454307	-	-	AB704228	-
P. fallopiae	ISOJ61	-	Not given	MF164545	-	-	-	-
P. foliorum	CBS 174.77	*Cryptomeria japonica*	USA	KF170308	KF206290	KF289200	KF289245	KF289131
P. foliorum	CBS 447.68 [T]	*Taxus baccata*	Netherlands	KF170309	KF206287	KF289201	KF289247	KF289132
P. gardeniicola	MUCC0117	*Gardenia jasminoides*	Japan	AB454310	-	-	AB704230	-
P. gardeniicola	MUCC0089	*Gardenia jasminoides*	Japan	AB454303	-	-	-	-
P. gaultheriae	CBS 447.70 [T]	*Gaultheria humifusa*	USA	JN692543	KF206298	JN692531	KF289248	JN692508
P. hagahagaensis	CBS 144592 [T]	*Carissa bispinosa*	South Africa	MK442614	MK442550	MK442705	MK442641	MK442657
P. hakeicola	CBS 143492 [T]	*Hakea* sp.	Australia	MH107907	MH107953	MH108025	MH107984	MH107999
P. hamamelidis	MUCC149	*Hamamelis japonica*	Japan	KF170289	-	-	KF289309	-
P. harai	MUCC0038	*Aucuba japonica*	Japan	AB454277	-	-	AB704218	-
P. harai	MUCC0043	*Aucuba japonica*	Japan	AB454281	-	-	AB704219	-
P. hostae	CGMCC 3.14355 [T]	*Hosta plantaginea*	China	JN692535	-	JN692523	JN692511	JN692503

Table 3 Continued.

Species	Strain no.*	Host	Country	GenBank no.				
				ITS	LSU	*ef1α*	*actin*	*gapdh*
P. hostae	CGMCC 3.14356	*Hosta plantaginea*	China	JN692536	-	JN692524	JN692512	JN692504
P. hubeiensis	CGMCC 3.14986 [T]	*Viburnum odoratissimim*	China	JX025037	-	JX025042	JX025032	JX025027
P. hubeiensis	CGMCC 3.14987	*Viburnum odoratissimim*	China	JX025038	-	JX025043	JX025033	JX025028
P. hymenocallidicola	CBS 131309 [T]	*Hymenocallis littoralis*	Australia	JQ044423	JQ044443	KF289211	KF289242	KF289142
P. hymenocallidicola	CPC 19331	*Hymenocallis littoralis*	Australia	KF170303	KF206254	KF289212	KF289290	KF289143
P. hypoglossi	CBS 101.72	*Ruscus aculeatus*	Italy	FJ538365	KF206326	FJ538423	FJ538481	JF343694
P. hypoglossi	CBS 434.92 [T]	*Ruscus aculeatus*	Italy	FJ538367	KF206299	FJ538425	FJ538483	JF343695
P. ilicis-aquifolii-aquifolii	CGMCC 3.14358 [T]	*Ilex aquifolium*	China	JN692538	-	JN692526	JN692514	-
P. ilicis-aquifolii-aquifolii	CGMCC 3.14359	*Ilex aquifolium*	China	JN692539	-	JN692527	JN692515	-
P. illicii	24-1-1 [T]	*Illicium verum*	China	MF198235	MF198240	MF198237	MF198243	-
P. illicii	16-16-1	*Illicium verum*	China	MF198234	MF198239	MF198236	MF198242	-
P. iridigena	CBS 143410 [T]	*Iris* sp.	South Africa	MG934459	-	MG934502	MG934466	-
P. kerriae	MAFF 240047 [T]	*Kerria japonica*	Japan	AB454266	-	-	-	-
P. kobus	MUCC0049	*Magnolia kobus*	Japan	AB454286	-	-	AB704221	-
P. leucothoicola	MUCC553 [T]	*Leucothoe catesbaei*	Japan	AB454370	AB454370	-	KF289310	-
P. ligustricola	MUCC0024 [T]	*Ligustrum obtusifolium*	Japan	AB454269	-	-	AB704212	-
P. maculata	CPC 18347 [T]	*Musa* cv. Golygoly pot-pot	Australia	JQ743570	-	KF009700	KF014016	-
P. maculata	BRIP 46622	*Musa* cv. Golygoly pot-pot	Australia	JQ743567	-	KF009692	KF014013	-
P. mangiferae	IMI 260576 [T]	*Mangifera indica*	India	JF261459	KF206222	JF261501	JF343641	JF343748
P. mangiferae	CPC 20260	Arecaceae	Thailand	KF206193	KF206243	KF289187	KF289294	KF289114
P. mangifera-indicae	MFLUCC 10-0029 [T]	*Mangifera indica*	Thailand	KF170305	KF206240	KF289190	KF289296	KF289121

Table 3 Continued.

Species	Strain no.*	Host	Country	GenBank no.				
				ITS	LSU	*ef1α*	*actin*	*gapdh*
P. mimusopisicola	CBS 138899 [T]	*Mimusops zeyheri*	South Africa	KP004447	MH878626	-	-	-
P. minima	CBS 585.84 [T]	*Acer rubrum*	USA	KF206176	KF206286	KF289204	KF289249	KF289135
P. miurae	MUCC0065	*Lindera praecox*	Japan	AB454291	-	-	AB704224	-
P. musaechinensis	GZAAS 6.1247	*Musa*.sp.	China	KF955294	-	KM816639	KM816627	KM816633
P. musaechinensis	GZAAS 6.1384	*Musa*.sp.	China	KF955295	-	KM816640	KM816628	KM816634
P. musarum	BRIP 57803	*Musa* sp	Malaysia	JX997138	-	KF009737	KF014055	-
P. musarum	BRIP 58028	*Musa* sp	Australia	KC988377	-	KF009738	KF014054	-
P. neopyrolae	CPC 21879 [T]	*Pyrola asarifolia*	Japan	AB454318	AB454318	-	AB704233	-
P. ophiopogonis	KACC 47754	*Ophiopogon japonicus*	South Korea	KP197057	-	-	-	-
P. ophiopogonis	LrLF11	Leaf of *Lycoris radiata*	China	MG543713	-	-	-	-
P. owaniana	CBS 776.97 [T]	*Brabejum stellatifolium*	South Africa	FJ538368	KF206293	FJ538426	KF289254	JF343767
P. owaniana	CPC 14901	*Brabejum stellatifolium*	South Africa	JF261462	KF206303	JF261504	KF289243	JF343766
P. pachysandricola	MUCC124 [T]	*Pachysandra terminalis*	Japan	AB454317	AB454317	-	AB704232	-
P. paracapitalensis	CPC 26517 [T]	*Citrus floridana*	Italy	KY855622	KY855796	KY855951	KY855677	KY855735
P. paracapitalensis	CPC 26518	*Citrus floridana*	Italy	KY855623	KY855797	KY855952	KY855678	KY855736
P. paracapitalensis	CPC 26700	*Citrus floridana*	Italy	KY855624	KY855798	KY855953	KY855679	KY855737
P. paracapitalensis	CPC 26701	*Citrus floridana*	Italy	KY855625	KY855799	KY855954	KY855680	KY855738
P. paracapitalensis	CPC 26805	*Citrus floridana*	Italy	KY855626	KY855800	KY855955	KY855681	KY855739
P. paracapitalensis	CPC 26806	*Citrus floridana*	Italy	KY855627	KY855801	KY855956	KY855682	KY855740
P. paracapitalensis	CPC 28120	*Citrus limon*	Spain	KY855628	KY855802	KY855957	KY855683	KY855741
P. paracapitalensis	CPC 28121	*Citrus limon*	Spain	KY855629	KY855803	KY855958	KY855684	KY855742
P. paracapitalensis	CPC 28122	*Citrus limon*	Spain	KY855630	KY855804	KY855959	KY855685	KY855743
P. paracapitalensis	CPC 28123	*Citrus limon*	Spain	KY855631	KY855805	KY855960	KY855686	KY855744
P. paracapitalensis	CPC 28127	*Citrus limon*	Spain	KY855632	KY855806	KY855961	KY855687	KY855745

Table 3 Continued.

Species	Strain no.*	Host	Country	GenBank no.				
				ITS	LSU	*ef1α*	*actin*	*gapdh*
P. paracapitalensis	CPC 28128	*Citrus limon*	Spain	KY855633	KY855807	KY855962	KY855688	KY855746
P. paracapitalensis	CPC 28129	*Citrus limon*	Spain	KY855634	KY855808	KY855963	KY855689	KY855747
P. paracitricarpa	CPC 27169 T	*Citrus limon*	Greece	KY855635	KY855809	KY855964	KY855690	KY855748
P. paracitricarpa	ZJUCC 200933	*Citrus sinensis*	China	JN791626	KY855813	JN791468	JN791544	KY855752
P. parthenocissi	CBS 111645 T	*Parthenocissus quinquefolia*	USA	EU683672	-	JN692530	JN692518	-
P. partricuspidatae	NBRC 9466 T	*Parthenocissus tricuspidata*	Japan	KJ847424	-	KJ847446	KJ847432	KJ847440
P. partricuspidatae	NBRC 9757	*Parthenocissus tricuspidata*	Japan	KJ847425	-	KJ847447	KJ847433	KJ847441
P. paxistimae	CBS 112527 T	*Paxistima mysinites*	USA	KF206172	KF206320	KF289209	KF289239	KF289140
P. philoprina	CBS 587.69	*Ilex aquifolium*	Spain	KF154278	KF206297	KF289206	KF289250	KF289137
P. philoprina	CBS 616.72	*Ilex aquifolium*	Germany	KF154279	KF206296	KF289205	KF289251	KF289136
P. podocarpi	CBS 111646	*Podocarpus falcatus*	South Africa	AF312013	KF206323	KC357671	KC357670	KF289169
P. podocarpi	CBS 111647	*Podocarpus lanceolata*	South Africa	KF154276	KF206322	KF289232	KF289235	KF289168
P. podocarpicola	CBS 728.79 T	*Podocarpus maki*	USA	KF206173	KF206295	KF289203	KF289252	KF289134
P. pseudotsugae	CBS 111649	*Pseudotsuga menziesii*	USA	KF154277	KF206321	KF289231	KF289236	KF289167
P. pyrolae	IFO 32652	*Erica carnea*	Not given	AB041242	-	-	-	-
P. rhizophorae	CPC 20508	*Ixora chinensis*	Thailand	KF206198	KF206225	KF289185	KF289302	KF289111
P. rhizophorae	CPC 20509	*Cordyline fruticosa*	Thailand	KF206199	KF206224	KF289186	KF289303	KF289112
P. rhizophorae	**NCYUCC 19-0352 T**	***Rhizophora stylosa***	**Taiwan**	**MT360030**	**MT360039**	**-**	**MT363248**	**MT363250**
P. rhizophorae	**NCYUCC 19-0358**	***Rhizophora stylosa***	**Taiwan**	**MT360031**	**MT360040**	**-**	**MT363249**	**MT363250**
P. rhodorae	CBS 901.69	*Rhododendron* sp.	Netherlands	KF206174	KF206292	KF289230	KF289256	KF289166
P. rubella	CBS 111635 T	*Acer rubrum*	USA	KF206171	EU754194	KF289198	KF289233	KF289129
P. schimae	CGMCC 3.14354 T	*Schima superba*	China	JN692534	-	JN692522	JN692510	JN692506
P. schimicola	CGMCC 3.17319 T	*Schima superba*	China	KJ847426	-	KJ847448	KJ847434	KJ854895
P. schimicola	CGMCC 3.17320	*Schima superba*	China	KJ847427	-	KJ847449	KJ847435	KJ854896

Table 3 Continued.

Species	Strain no.*	Host	Country	GenBank no.				
				ITS	**LSU**	***ef1α***	***actin***	***gapdh***
P. speewahensis	BRIP 58044 [T]	Orchids	Australia	KF017269	-	KF017268	-	-
P. sphaeropsoidea	CBS 756.70	*Aesculus hippocastanum*	Germany	AY042934	KF206294	KF289202	KF289253	KF289133
P. spinarum	CBS 292.90	*Chamaecyparis pisifera*	France	JF343585	KF206301	JF343606	JF343669	JF343773
P. styracicola	CGMCC3.14985 [T]	*Styrax grandiflorus*	China	JX025040	-	JX025045	JX025035	JX025030
P. styracicola	CGMCC3.14989	*Styrax grandiflorus*	China	JX025041	-	JX025046	JX025036	JX025031
P. telopeae	CBS 777.97 [T]	*Telopea speciosissima*	Tasmania	KF206205	KF206285	KF289210	KF289255	KF289141
P. vaccinii	ATCC 46255 [T]	*Vaccinium macrocarpon*	-	KC193585	-	KC193582	KC193580	KC193583
P. vaccinii	LC 2795	*Vitis macrocarpon*	USA	KR233323	-	-	-	-
P. vacciniicola	CPC 18590 [T]	*Vaccinium macrocarpum*	USA	KF170312	KF206257	KF289229	KF289287	KF289165
P. vitis-rotundifoliae	CGMCC 3.17322 [T]	*Vitis rotundifolia*	USA	KJ847428	-	KJ847450	KJ847436	KJ847442
P. vitis-rotundifoliae	CGMCC 3.17321	*Vitis rotundifolia*	USA	KJ847429	-	KJ847451	KJ847437	KJ847443
P. yuccae	CBS 112065	*Yucca elephantipes*	USA	KF206175	-	-	KF289237	-
P. yuccae	CBS 117136	*Yucca elephantipes*	New Zealand	JN692541	KF766385	JN692529	JN692517	JN692507
Phyllosticta sp.	CPC 11336	*Eucalyptus globulus*	Spain	KF206177	KF206284	KF289199	KF289258	KF289130
Phyllosticta sp.	MUCC147	*Rhododendron keiskei*	Japan	AB454319	AB454319	-	AB704234	-
Phyllosticta sp.	CPC 20269	*Ophiopogon japonicus*	Thailand	KC291344	KF206235	KC342564	KC342541	KF289118
Phyllosticta sp.	CBS 173.77	*Citrus aurantiifolia*	New Zealand	KF206179	KF306231	FJ538393	KF289244	KF289100
Phyllosticta sp.	CBS 123404	*Musa paradisiaca*	Thailand	FJ538333	JQ743601	FJ538391	FJ538449	KF289095
Phyllosticta sp.	CPC 17748	*Heliconia* sp.	Thailand	KF206190	KF206258	KF289180	KF289286	KF289096
Phyllosticta sp.	CPC 20252	*Punica granatum*	Thailand	KC291334	KF206251	KC342554	KC342531	KF289097
Phyllosticta sp.	CBS 119720	*Musa acuminata*	USA	KF206178	KF206316	FJ538398	KF289240	KF289098

* [T] = ex-type strain

Phylogenetic analysis using ITS (479 bp) – most species clades were recovered as in the combined gene tree, except for *Phyllosticta mimusopisicola*, which grouped within *P. capitalensis* species complex (Supplementary Fig. 1).

Phylogenetic analysis using LSU (763 bp) – species complex clades of *P. rhodorae* and *P. vaccinii* clustered within the *P. capitalensis* species complex. Some members of *P. cruenta* species complex clustered within the *P. capitalensis* species complex. *Phyllosticta concentrica* species complex clade was a well-resolved clade and sister to a clade consisting of the *P. capitalensis*, *P. cruenta*, *P. vaccinii*, and *P. rhodorae* species complexes. *Phyllosticta owaniana* species complex was paraphyletic (Supplementary Fig. 2).

Phylogenetic analysis using *ef1α* (285 bp) – most species in *P. capitalensis* species complex clustered together, except for *P. brazilianiae*, *P. ilicis-aquifolii*, *P. philoprina*, *P. brazilianiae*, and *P. mangifera-indicae*. Species grouping in *P. cruenta* species complex were dispersed throughout the tree, and clustered with species from other clades. Members of clades *P. concentrica*, *P. owaniana*, *P. rhodorae*, and *P. vaccinii* formed a well-resolved cluster (Supplementary Fig. 3).

Phylogenetic analysis using *actin* (223 bp) – *P. capitalensis* species complex was recovered as in the combined gene tree and included species of *P. vaccinii* species complex (*P. vaccinii*, and *P. vacciniicola*). The *P. rhodorae, P. concentrica,* and *P. owaniana* species complexes were well-resolved and clustered together. Species of *P. cruenta* species complex did not cluster together (Supplementary Fig. 4).

Phylogenetic analysis using *gapdh* (623 bp) – Members of *P. capitalensis* species complex dispersed in the tree. However, *Phyllosticta capitalensis*, *P. paracapitalensis*, and *P. rhizophorae* clustered within the same clade as in other single gene trees. *Phyllosticta cruenta* species complex was paraphyletic with some species grouping with *P. capitalensis* species complex (*P. folliorum*), *P. vaccinii* species complex (*P. vaccinii*, and *P. vacciniicola*) and *P. rhodorae* species complex (*P. rhodorae*). *Phyllosticta podocarpicola* did not cluster within the clade. *Phyllosticta concentrica* species complex formed a well-resolved clade (Supplementary Fig. 5).

Phylogenetic analysis using the five-gene combined dataset 1 – consisted of 195 strains and *Botryosphaeria obtusa* (CMW 8232) and *B. stevensii* (CBS 112553) sequences were used as outgroup. The total length of the dataset was 2373 characters including alignment gaps, ITS1+ITS2: 1–321, 5.8S: 322–479, LSU: 480–1242, *ef1α* (exon): 1243–1296, *actin* (exon): 1297–1372, *gapdh*: 1373–1995, *ef1α* (intron): 1996–2226, and *actin* (intron): 2227–2373. The combined dataset contained 1493 constant, 156 parsimony uninformative and 724 parsimony informative characters. The combined dataset was analyzed using MP, ML and BI. The trees generated under different optimality criteria were similar in topology and did not differ (data not shown). Descriptive statistics generated from MP analysis based on the combined dataset were TL = 3451, CI = 0.402, RI = 0.839, RC = 0.337, HI = 0.598. The best scoring likelihood tree for the combined dataset had a final value of -20730.513137 (Fig. 1). The new species grouped within *P. capitalensis* species complex clade along with two other sequences that are denoted as *P. capitalensis* in GenBank. Statistical support for the *P. capitalensis* species complex was 52% ML/0.94 PP. Maximum parsimony (MP), maximum likelihood (ML) and Bayesian inference analysis (BI) of five loci produced a phylogenetic tree that contained six supported clades (Fig. 1). This study proposes to place all currently and newly described species clades of *Phyllosticta* to six species complexes based on molecular phylogenetic analyses of ITS, LSU, *ef1α*, *actin* and *gapdh* loci as follows: 1) *Phyllosticta capitalensis* species complex consisted of 27 species, 2) *Phyllosticta cruenta* species complex comprised 21 species (74% ML /0.94 PP), 3) *Phyllosticta vaccinii* species complex comprised two species (67% MP/ 84% ML/ 0.99 PP), 4) *Phyllosticta rhodorae* species complex consisted of two species and an unnamed species (61% ML/0.96 PP), 5) *Phyllosticta concentrica* species complex included 25 species and was strongly supported (96% MP/ 99% ML/1.0 PP) and 6) *Phyllosticta owaniana* species complex included six species and was strongly supported (100% MP/ 99% ML/1.0 PP).

Phylogenetic analysis using five-gene combined dataset 2 – constructed using the 74 strains from *P. capitalensis* species complex and *Phyllosticta cordylinophila* sequences (MFLUCC 10-

0166 and MFLUCC 12-0014) were used as outgroup taxa. The total length of the dataset was 2434 characters including alignment gaps, ITS1+ITS2: 1–392, 5.8S: 393–550, LSU: 551–1382, *ef1α* (exon): 1383–1417, *actin* (exon): 1418–1527, *gapdh*: 1528–2150, *ef1α* (intron): 2151–2349, and *actin* (intron): 2350–2496 (Fig. 2). The combined dataset contained 2357 constant, 50 parsimony uninformative and 89 parsimony informative characters. The combined dataset was analyzed using MP, ML and BI. The trees generated under different optimality criteria were similar in topology and did not differ (data not shown). Descriptive statistics generated from MP analysis based on the combined dataset were TL = 167, CI = 0.850, RI = 0.930, RC = 0.791, HI = 0.150. The best scoring likelihood tree selected for the combined dataset had a final value of -4603.349843 (Fig. 2).

Phyllosticta paracapitalensis formed a species clade, including the ex-type sequence data (CPC 26517). *Phyllosticta paracapitalensis* species were sister to the *Phyllosticta capitalensis sensu stricto*, within *P. capitalensis* species complex clade based on single-locus and combined gene trees (Figs 1, 2, Supplementary Figs 1–5). *Phyllosticta capitalensis* strains CBS 173.77 and CBS 119720 formed a separate clade from the other strains of *P. capitalensis* and *P. paracapitalensis* (Figs 1, 2). Nucleotide polymorphism comparisons of *P. capitalensis* (CBS 128856, ex-type) and *P. paracapitalensis* (CPC 26517, ex-type) with strain CBS 173.77 showed the following differences: 2bp ITS, 4bp *ef1α*, 3bp *actin* and 0bp *gapdh* between *P. capitalensis* and CBS 173.77; and 4bp ITS, 1bp *ef1α*, 0bp *actin* and 2bp *gapdh* between *P. paracapitalensis* and CBS 173.77. CBS 119720 has 0bp ITS, 4bp *ef1α*, 3bp *actin* and 0bp *gapdh* differences from *P. capitalensis*, and 2bp ITS, 1bp *ef1α*, 0bp *actin* and 2bp *gapdh* differences from *P. paracapitalensis*. Hence, these two strains could be unnamed species of *Phyllosticta* rather than *P. paracapitalensis*. However, because there are no intervening species, these twostrains could also be divergent of *P. paracapitalensis*. Additional data are needed to definitively resolve this issue.

Phyllosticta camelliae strain MUCC0059 and *P. fallopiae* strain ISOJ61 have unstable placements in the phylogenetic trees (Figs 1, 2). Based on the polymorphic nucleotide comparison of ITS, *ef1α*, *actin* and *gapdh* with *P. capitalensis* (CBS 128856, ex-type) and *P. paracapitalensis* (CPC 26517, ex-type), strain ISOJ61 has 2bp ITS differences from *P. paracapitalensis,* and 0bp ITS differences from *P. capitalensis*. The strain MUCC0059 has 1bp ITS and 0bp *actin* differences from *P. capitalensis,* and 3bp ITS and 5bp *actin* differences from *P. paracapitalensis*. However, more DNA sequence data are needed for future study to resolve those problematic strains.

Phyllosticta capitalensis sequences formed a large cluster in the tree, which included the ex-type strain (CBS 128856). The newly described taxa (NCYUCC 19-0352 and NCYUCC 19-0358) formed a distinct clade, which grouped with *P. capilalensis* (CPC 20508 and CPC 20509) (Figs 1, 2). The strains CPC 20508 and CPC 20509 were synonymized under the new species based on phylogenetic analysis and nucleotide comparisons of ITS, *ef1α*, *actin* and *gapdh*. Strain CPC 20508 has 2bp ITS, 0bp *ef1α*, 3bp *actin*, 0bp *gapdh* differences from *P. capitalensis* (CBS 128856, ex-type) and 4 bp ITS, 5bp *ef1α*, 2bp *actin*, 2bp *gapdh* differences from *P. paracapitalensis* (CPC 26517, ex-type). Strain CPC 20509 has 2 bp ITS, 0bp *ef1α*, 3bp *actin*, 0bp *gapdh* differences from *P. capitalensis* (CBS 128856, ex-type), and 4 bp ITS, 5bp *ef1α*, 2bp *actin*, 2bp *gapdh* differences from *P. paracapitalensis* (CPC 26517, ex-type). Three strains previously named as *P. capitalensis* (CBS 123404, CPC 20252, CPC 17748) are proposed as unnamed species based on phylogenetic analysis (Figs 1, 2) and nucleotide comparisons of ITS, *ef1α*, *actin* and *gapdh* with the ex-type of *P. capitalensis* (CBS 128856) and *P. paracapitalensis* (strain CBS 123404). Strain CBS 123404 has 0bp ITS, 1bp *ef1α*, 3bp *actin*, 3bp *gapdh* differences from *P. capitalensis*, and 2bp ITS, 4bp *ef1α*, 2bp *actin*, 5bp *gapdh* from *P. paracapitalensis*; CPC 17748 has 0bp ITS, 1bp *ef1α*, 3bp *actin*, 4bp *gapdh* differences from *P. capitalensis*, and 2bp ITS, 4bp *ef1α*, 2bp *actin*, 6bp *gapdh* from *P. paracapitalensis*; CPC 20252 has 1 bp ITS, 0bp *ef1α*, 3bp *actin*, 0bp *gapdh* differences from *P. capitalensis*, and 3bp ITS, 5bp *ef1α*, 2bp *actin*, 2bp *gapdh* differed from *P. paracapitalensis*. *Phyllosticta capitalensis* strain CPC 20269 formed a distinct lineage from other strains of *P. capitalensis* with high bootstrap support (Fig. 2). It has 4bp ITS, 7bp *ef1α*, 5bp *actin*, and 2bp *gapdh* differences from *P. paracapitalensis* (CPC 26517, ex-type), and 2bp ITS, 2bp *ef1α*, 6bp *actin*, and 0bp *gapdh* differences from *P. capitalensis* (CBS 128856, ex-type). Hence, we leave it as an unnamed species based on phylogenetic analysis. Nonetheless, in the figure 1, the sequence grouped in a different position, thus further analysis with additional phylogenetic markers is needed to determine exact placement.

Taxonomy

Phyllostictaceae

See Hongsanan et al. (2020) and Wikee et al. (2013b) for descriptions and illustrations.

Phyllosticta Pers.

For genus description see Wikee et al. (2013b) and Hongsanan et al. (2020). Herein we introduce six species complexes (*Phyllosticta capitalensis*, *P. concentrica*, *P. cruenta*, *P. owaniana*, *P. rhodorae*, and *P. vaccinii*), which form distinct clades.

Phyllosticta capitalensis species complex

Species included in *Phyllosticta capitalensis* species complex – *P. acaciigena*, *P. aloeicola*, *P. ardisiicola, P. aristolochiicola, P. azevinhi, P. beaumarisii, P. brazilianiae, P. capitalensis, P. carochlae, P. cavendishii*, *P. cordylinophila*, *P. eugeniae, P. fallopiae*, *P. ilicis-aquifolii, P. maculata*, *P. mangiferae*, *P. mangifera-indicae*, *P. musaechinensis*, *P. musarum*, *P. paracapitalensis*, *P. parthenocissi*, *P. partricuspidatae*, *P. philoprina*, *P. rhizophorae*, *P. schimae*, *P. schimicola*, *P. styracicola*, *P. vitis-rotundifoliae.*

Notes – 28 species are included in *Phyllosticta capitalensis* species complex based on molecular analyses and morphological characters. Members of this section are mostly reported as pathogenic and endophytic fungi from a broad range of hosts (Supplementary Table 1). Species of this complex are characterized by conidia that are ellipsoid or ellipsoid to obovoid, ovoid, obpyriform with a mucoid sheath with apical mucoid appendage; ascospores are limoniform with obtuse ends, with distinct hyaline gelatinous caps at both ends, (Supplementary Table 2). Sexual morphs of six species have been reported in this group (*P. cavendishii*, *P. maculata*, *P. musarum*, *P. paracapitalensis*, *P. philoprina*, and *P. rhizophorae*). *Phyllosticta capitalensis* and *P. azevinhi*, most wildly distributed species of *Phyllosticta* was included here. This species complex is recovered in the multilocus tree, as well as in the single locus ITS and *actin* trees (Fig. 1, Supplementary Figs 1, 4). *Phyllosticta capitalensis* is used to describe this species complex name based on publication year.

Hennings (1908) described *Phyllosticta capitalensis* on *Stanhopea* sp. (Orchidaceae) from Brazil. The species is commonly isolated as an endophyte and has worldwide distribution (Glienke-Blanco et al. 2002, Silva & Pereira 2007, Silva et al. 2008, Rashmi et al. 2019). Wikee et al. (2013a) reported that *P. capitalensis* was found in more than 70 plant families. Many factors affect host infection with *P. capitalensis*, such as environmental conditions, host and non-host organisms, and plant defence mechanisms (Wikee et al. 2013a). Guarnaccia et al. (2017) introduced *Phyllosticta paracapitalensis* from asymptomatic living leaves of *Citrus* sp. from Italy. *Phyllosticta paracapitalensis* is sister species to *P. capitalensis* based on molecular analyses of ITS, *act*, *ef1α*, *gapdh*, LSU and *rpb2* (Guarnaccia et al. 2017).

Phyllosticta concentrica species complex

Species included in the *Phyllosticta concentrica* species complex – *P. aspidistricola*, *P. aucubae-japonicae, P. bifrenariae, P. catimbauensis, P. citriasiana, P. citribrasiliensis, P. citricarpa*, *P. citrichinensis*, *P. citri-maxima*, *P. concentrica*, *P. cussonia*, *P. elongata*, *P. ericarum, P. gardeniicola*, *P. harai*, *P. hostae*, *P. hymenocallidicola*, *P. hypoglossi*, *P. iridigena*, *P. kerriae*, *P. kobus*, *P. ophiopogonis*, *P. paracitricarpa, P. speewahensis*, *P. spinarum.*

Figure 1 – Maximum likelihood phylogenetic tree inferred from combined ITS, LSU, *ef1α*, *actin* and *gapdh* sequence data from 195 strains of the genus *Phyllosticta*. The tree is artificially rooted to *Botryosphaeria obtusa* strain CMW 8232 and *B. stevensii* strain CBS 112553. Maximum parsimony and maximum likelihood bootstrap values ≤50%, and Bayesian posterior probabilities ≤0.90 are given at the nodes in this order. The species obtained in this study are in blue and species synonymized are in green. Ex-type taxa are in bold.

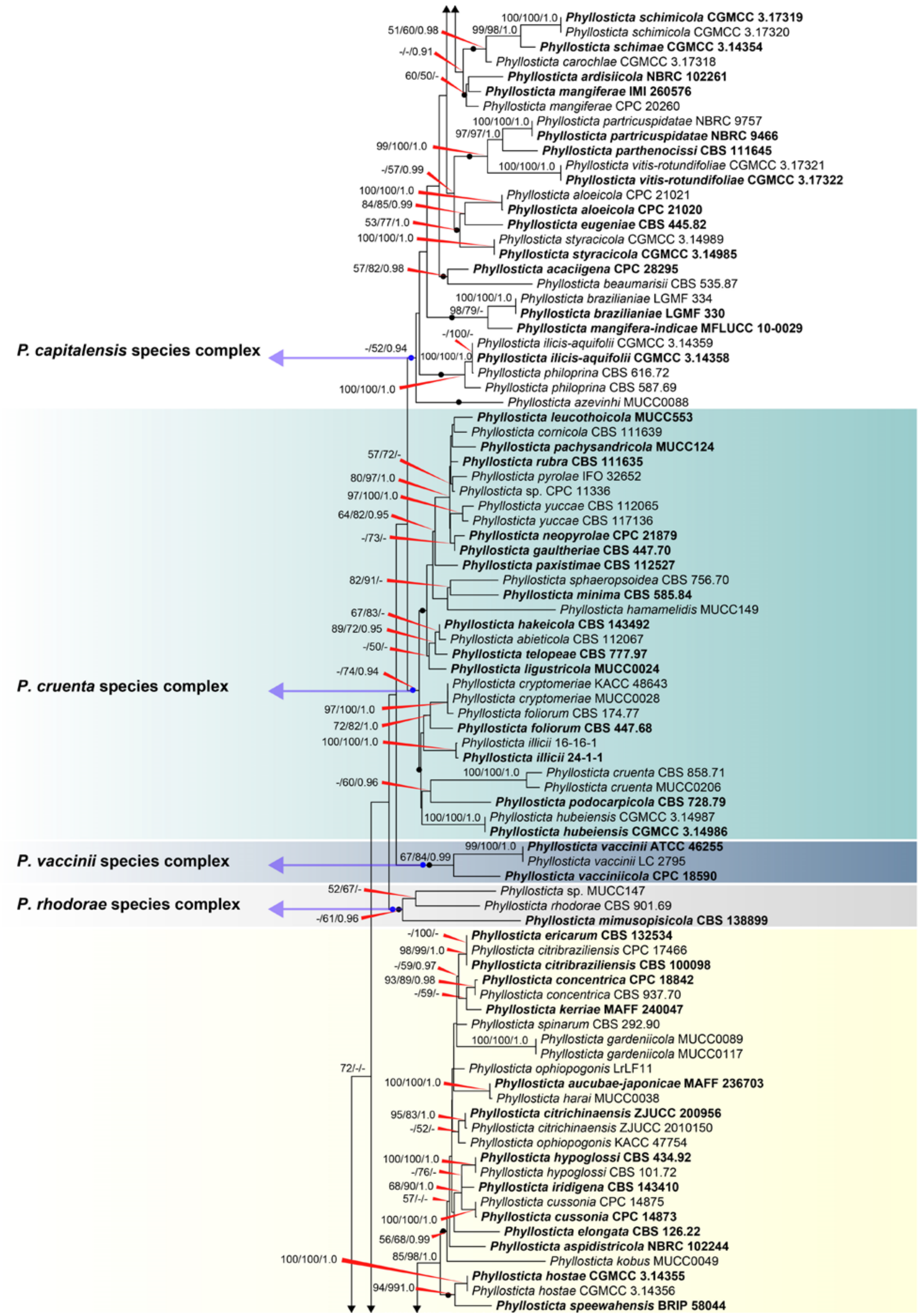

Figure 1 – Continued.

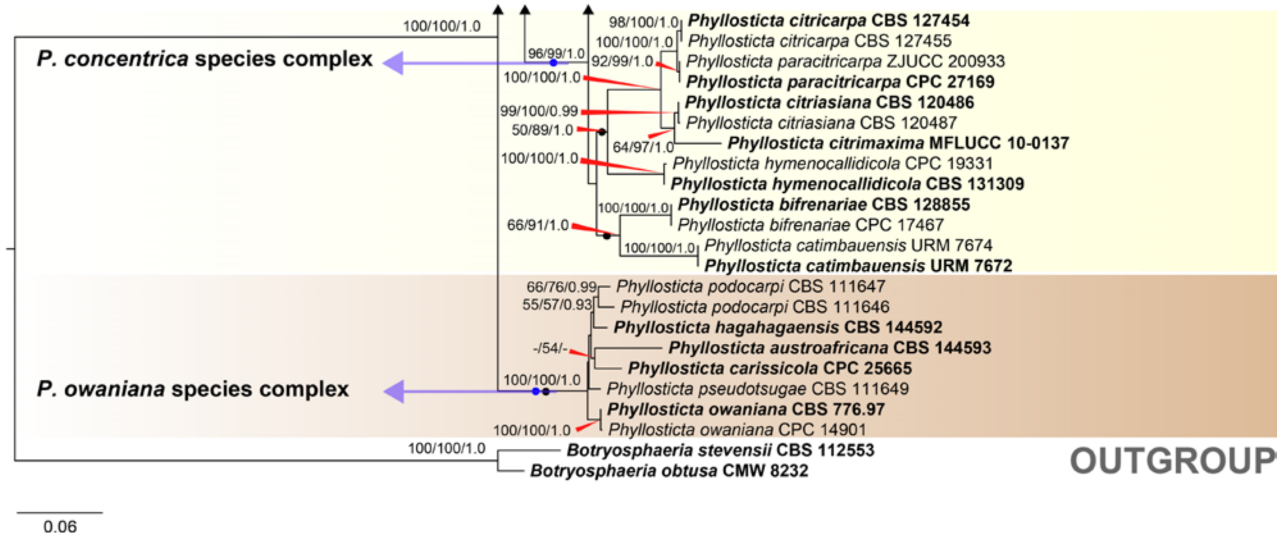

Figure 1 – Continued.

Notes – 25 species are included in the *P. concentrica* species complex. Members of this species complex have mostly been reported as pathogenic and endophytic fungi from a wide range of hosts (Supplementary Table 1). *Phyllosticta citricarpa*, an important pathogenic fungus causing leaf spot and citrus black spot disease on *Citrus*, *Poncirus*, *Fortunella* and their hybrids are included in this clade (van der Aa 1973, Guarnaccia et al. 2017, Boughalleb-M'Hamdi et al. 2020). *Phyllosticta concentrica* is used to describe this species complex based on publication year. Species of this complex are characterized by conidia that are globose or ellipsoid to obvoid enclosed in a thin persistent sheath with apical mucoid appendage; ascospore are fusiform to ellipsoid, wider at the mid region, both ends rounded with gelatinous caps (Supplementary Table 2). The sexual morph of *P. citrichinensis* has been reported in this group. The clade for this species complex is robust and recovered in all analyses (Fig. 1, Supplementary Figs 1–5).

Phyllosticta concentrica was introduced by Saccardo for fungi on leaves of *Hedera helix* in Italy (Wikee et al. 2013b). Later, the species was introduced from withering, leaf litter, and living leaves in a wide range of hosts (Supplementary Table 1).

Phyllosticta cruenta species complex

Species included in the *Phyllosticta cruenta* species complex – *P. abieticola*, *P. cornicola*, *P. cruenta*, *P. cryptomeriae*, *P. foliorum*, *P. gaultheriae*, *P. hakeicola*, *P. hamamelidis*, *P. hubeiensis*, *P. illicii*, *P. leucothoicola*, *P. ligustricola*, *P. minima*, *P. neopyrolae*, *P. pachysandricola*, *P. paxistimae*, *P. podocarpicola*, *P. paviae*, *P. pyrolae*, *P. rubella*, *P. telopeae.*

Notes – This species complex consists of 21 species, which have mostly been reported as pathogenic and endophytic from a wide range of hosts (Supplementary Table 1). *Phyllosticta cruenta* is used to describe this species complex name based on the publication year. Species of this complex are characterized by conidia that are globose or elongate, ellipsoid to obovoid with mucoid sheath or some species with mucous sheath (*P. pachysandricola*) with or without apical mucoid appendage; ascospores limoniform with obtuse ends, rarely curved (Supplementary Table 2). Sexual morphs of two species have been reported in this group (*P. abieticola*, *P. rubella*). This clade was not resolved based on single-locus trees of LSU, *ef1α*, and *gapdh*, while ITS and *actin* topologies provided better resolution for this species complex as combined gene tree (Fig. 1, Supplementary Figs 1–5).

Phyllosticta owaniana species complex

Species included in the *Phyllosticta owaniana* species complex – *P. austroafricana*, *P. carissicola*, *P. hagahagaensis*, *P. owaniana*, *P. podocarpi*, *P. pseudotsugae.*

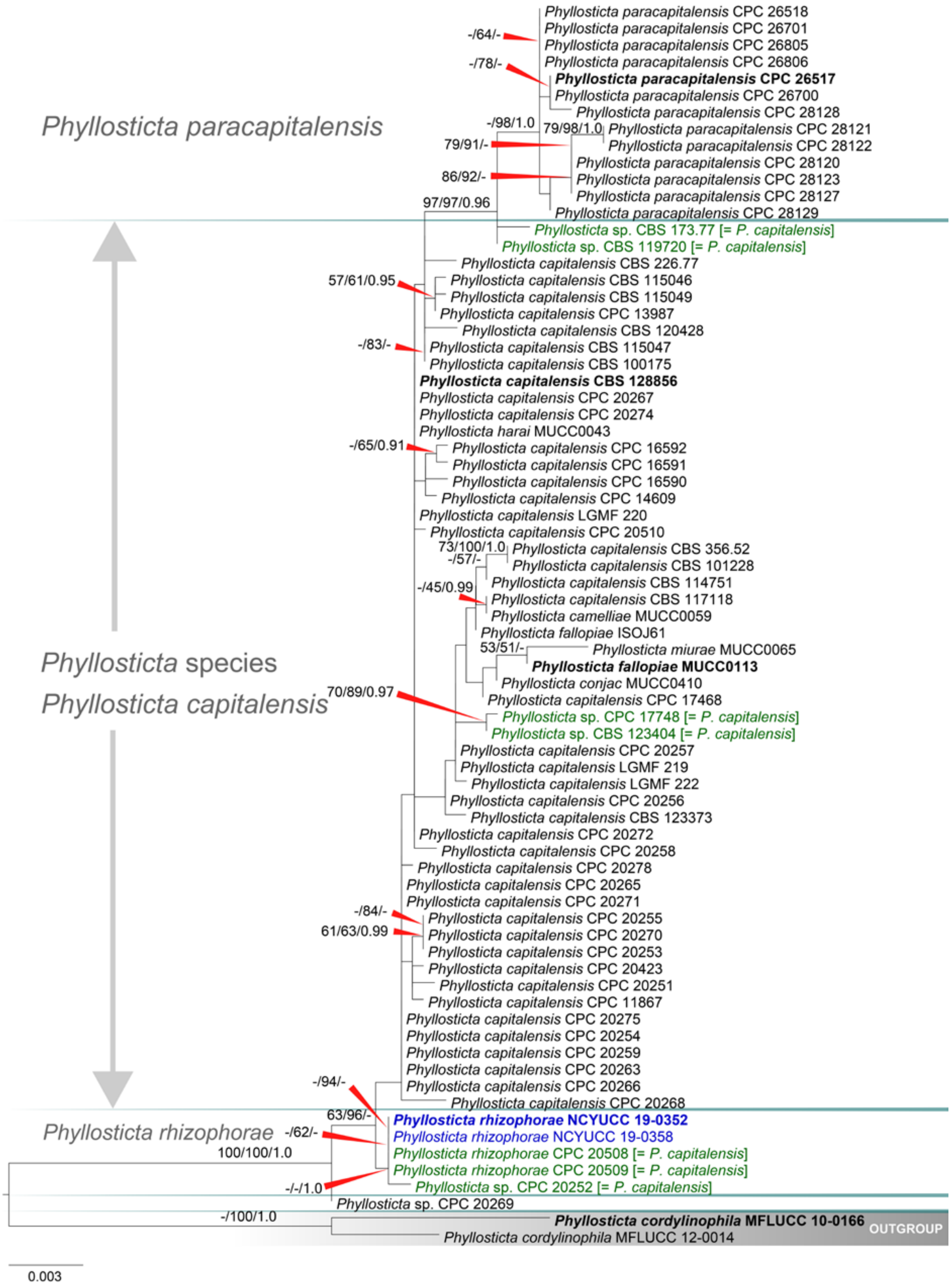

Figure 2 – Phylogenetic tree generated from maximum likelihood analysis based on combined ITS, LSU, *ef1α*, *actin* and *gapdh* sequence data from 74 strains of *Phyllosticta*. The tree is rooted to *P. cordylinophila* strain MFLUCC 10-0166 and MFLUCC 12-0014. Maximum parsimony and maximum likelihood bootstrap values ≤50%, and Bayesian posterior probabilities ≤0.90 are given at the nodes in this order. The species obtained in this study are in blue and species synonymized are in green. Ex-type taxa from other studies are in bold.

Notes – Six species are included in the *P. owaniana* species complex. Members of this species complex are mostly reported as pathogenic causing leaf spots on *Carissa* spp., *Brabejum* sp., *Podocarpus* spp., and endophytic fungi on *Cryptomeria* sp., and *Pseudotsuga* spp. (Supplementary Table 1). *Phyllosticta owaniana* is used to describe this species complex based on the publication year. Species of this complex are characterized by conidia that are ellipsoid to obovoid, tapering towards a narrow truncate base, coarsely guttulate, or with a single large central guttule, enclosed in a thin persistent mucoid sheath and with or without apical mucoid appendage; ascospores are fusiform to ellipsoid, with hyaline gelatinous caps at both ends (Supplementary Table 2). The sexual morph of *P. podocarpi* has been reported in this group. The complex is recovered in the multilocus and single locus (except for LSU) trees (Supplementary Figs 1–5).

Winter (1885) introduced *Phyllosticta owaniana*, which is a pathogenic fungus causing serious leaf spot disease on *Brabejum stellatifolium* in South Africa. The species was mentioned as being a specific species for this host (Doidge 1950, Swart et al. 1998, Crous et al. 2000, Wulandari et al. 2009, Sultan et al. 2011, Glienke et al. 2011, Wikee et al. 2011, 2013a, b, Miles et al. 2013, Zhou et al. 2015, Hyde et al. 2014).

***Phyllosticta rhodorae* species complex**

Species included in the *Phyllosticta rhodorae* species complex – *P. mimusopisicola*, *P. rhodorae.*

Notes – Two species were included in the *P. rhodorae* species complex. Crous et al. (2014) introduced *Phyllosticta mimusopisicola*, a pathogen causing leaf spot disease on *Mimusops zeyheri* in Aflica. *Phyllosticta rhodorae* is found on *Rhododendron* spp., which was recombined by Tassi (1902) (≡ *Phoma rhodorae* Cooke). *Phyllosticta rhodorae* is used to describe this species complex based on publication year. Species of this complex are characterized by conidia that are ellipsoid to obovoid, tapering towards a narrow truncate base, coarsely guttulate, or with a single large central guttule, persistent mucoid sheath and apical mucoid appendage (Supplementary Table 2). The sexual morph has not been reported for this species complex. The complex is recovered in the mulitlocus and LSU trees.

***Phyllosticta vaccinii* species complex**

Species included in the *Phyllosticta vaccinii* species complex – *P. vaccinii*, *P. vacciniicola.*

Notes – Two species are included in the *P. vaccinii* species complex. Members of this species complex have mostly been reported as pathogenic and endophytic on *Vaccinium* spp. (Supplementary Table 1). *Phyllosticta vaccinii* is used to describe this species complex based on publication year. Earle (1897) introduced *P. vaccinii* from leaf spot of *Vaccinium arboretum* in Alabama. This species has been isolated from a wide range of *Vaccinium* (Hyde et al. 2014, Zhou et al. 2015). Detailed host information and distribution is provided in Supplementary table 1. This species complex is characterized by conidia that are ellipsoid to obovoid, obpyriform, tapering towards a narrow truncate base, enclosed in a thin persistent mucoid sheath with a mucoid appendage (Supplementary Table 2). The sexual morph has not been reported for this species complex. The complex is robust and recovered in the multi- and single locus trees (Fig. 1, Supplementary Figs 1–5).

Phyllosticta rhizophorae Norph. & Hyde K.D. sp. nov. Fig. 3

Index Fungorum number: IF557808, Facesoffungi number: FoF08021

Etymology – refers to the host, *Rhizophora stylosa,* of the type strain.

Holotype – NCYUCC 19-0352

Associated with leaf spots of *Rhizophora stylosa*. *Symptoms* irregular to subcircular shape, brown, slightly sunken spots appear on adaxial surface leaves of *R. stylosa*, which later expand outwards on the surface of the leaves (Fig. 3b). Small auburn spots appeared initially and then gradually enlarged, changing to tawny circular ring spots with a dark mahogany border and jagged edge. They were usually >5 circulars, which occurred on a single affected leaf. In severe cases, lesions spread evenly on the leaves (Fig. 3c). Sexual morph: *Ascomata* similar to conidiomata in general anatomy, long neck. *Asci* 33–55 × 4–6.5 µm, bitunicate, clavate to broadly fusoid-ellipsoid, with visible apical chamber, 1–2 µm diam. *Ascospores* (12.5–)14–19(–21.5) × 4.1–7.7 µm, (mean ± SD = 16 ± 2.9 × 6.1 ± 1.2 µm), bi-seriate, hyaline, smooth, aseptate, granular to guttulate, straight and slightly curved, widest in the middle, limoniform with obtuse ends, with distinct hyaline gelatinous caps at both ends, 3.5–5.5 × 1.5–3 µm. Asexual morph: *Conidiomata* pycnidial up to 700 µm diam., solitary, black, erumpent, globose including colorless to opaque conidial masses. *Conidiomata* pycnidial up to 200 µm diam., solitary, black, erumpent, globose to pyriform, including colorless to opaque conidial masses in PA. *Pycnidial wall* of several layers, composed of cells of *textura angularis*, thick, inner wall of hyaline *textura angularis* cells. *Central ostiole*, up to 10 µm diam. *Conidiophores* reduced to conidiogenous cells, 13–25 × 3–5 µm, subcylindrical to ampulliform, or with 1–2 supporting cell, that can be branched at the base. *Conidiogenous cells* 10–17 × 3–5 µm, terminal, subcylindrical, hyaline, smooth, proliferating several times percurrently near apex. *Conidia* (13–)15–17(–19.5) × 6–7(–8) µm, (mean ± SD = 16.7 ± 0.5 × 7.3 ± 1.6 µm), solitary, hyaline, aseptate, thin and smooth walled, coarsely guttulate, or with a single large central guttulate, broadly ellipsoid or ellipsoid to obovoid, tapering towards a narrow truncate base, enclosed in a persistent mucoid sheath, 1–8 µm thick, and bearing a hyaline, apical mucoid appendage, (5–)9–11(–16) × 6–8(–12) µm, flexible, unbranched, tapering towards an acutely rounded tip, rarely with a short apical appendage. *Spermatia* hyaline, smooth, guttulate to granular, bacilliform, 7.5–11.5 × 1–2 µm, occurring in conidioma with conidia.

Material examined – TAIWAN, Tainan, Shicao, on leaf spot of *Rhizophora stylosa*, July 15, 2018, Chada Norphanphoun SC0 (NCYUCC 19-0352 dried culture, holotype; MFLU, isotype), ex-type living culture NCYUCC 19-0352, NCYUCC 19-0358, MFLUCC.

Distribution – *Cordyline fruticosa* (Thailand), *Heliconia* sp. (Thailand), *Ixora chinensis* (Thailand), *Musa paradisiaca* (Thailand), *Punica granatum* (Thailand), *Rhizophora stylosa* (Taiwan).

Notes – *Phyllosticta rhizophorae* is closely related to *P. capitalensis* based on DNA sequence data in BLAST searches and phylogenetic analysis (Fig. 1). However, phylogenetic analyses of selected strains in Fig. 2 indicate that the new taxon groups with five published strains of *P. capitalensis* (CPC 20508, CPC20509, CPC 20252, CBS 123404 and CPC 17748) as a distinct clade, and is separate from *P. capitalensis* species group, which contains the ex-type strain (Fig. 2). The morphology of *P. rhizophorae* is different from that of *P. capitalensis* (Table 4). Hence, *P. rhizophorae* is established based on morphological and molecular data. Two strains of *P. capitalensis* (CPC 20508, CPC20509) are synonymized under *P. rhizophorae* based on phylogenetic analyses (Fig. 2). The new collection is designated as the type material. Strains CPC 20252, CBS 123404 and CPC 17748 are treated as unnamed species as they form a separate clade from our new collection in both phylogenetic trees (Figs 1, 2).

Pathogenicity testing – The ability of *Phyllosticta rhizophorae* strains isolated from leaf spots of *Rhizophora stylosa* in Taiwan to induce leaf spot symptoms on *Rhizophora stylosa* was tested through inoculating a spore suspension and mycelial plugs onto wounded and unwounded living leaves. In all cases there was no symptoms on the young healthy plant leaves.

Discussion

The taxonomy of *Phyllosticta* is challenging. *Phyllosticta* species have overlapping morphological traits, making it difficult to pinpoint taxonomically relevant characters. Reliance on host association for traditional identification of *Phyllosticta* species has further complicated matters. Collectivelly, these issues have led to taxonomic confusion. Molecular phylogenetic tools have greatly facilitated identification of species and establishment of species complexes (Baayen et al. 2002, Okane et al. 2003, Motohashi et al. 2009, Wikee et al. 2012, Wulandari et al. 2009, Glienke et al. 2011). In this study, both combined and single locus data were considered.

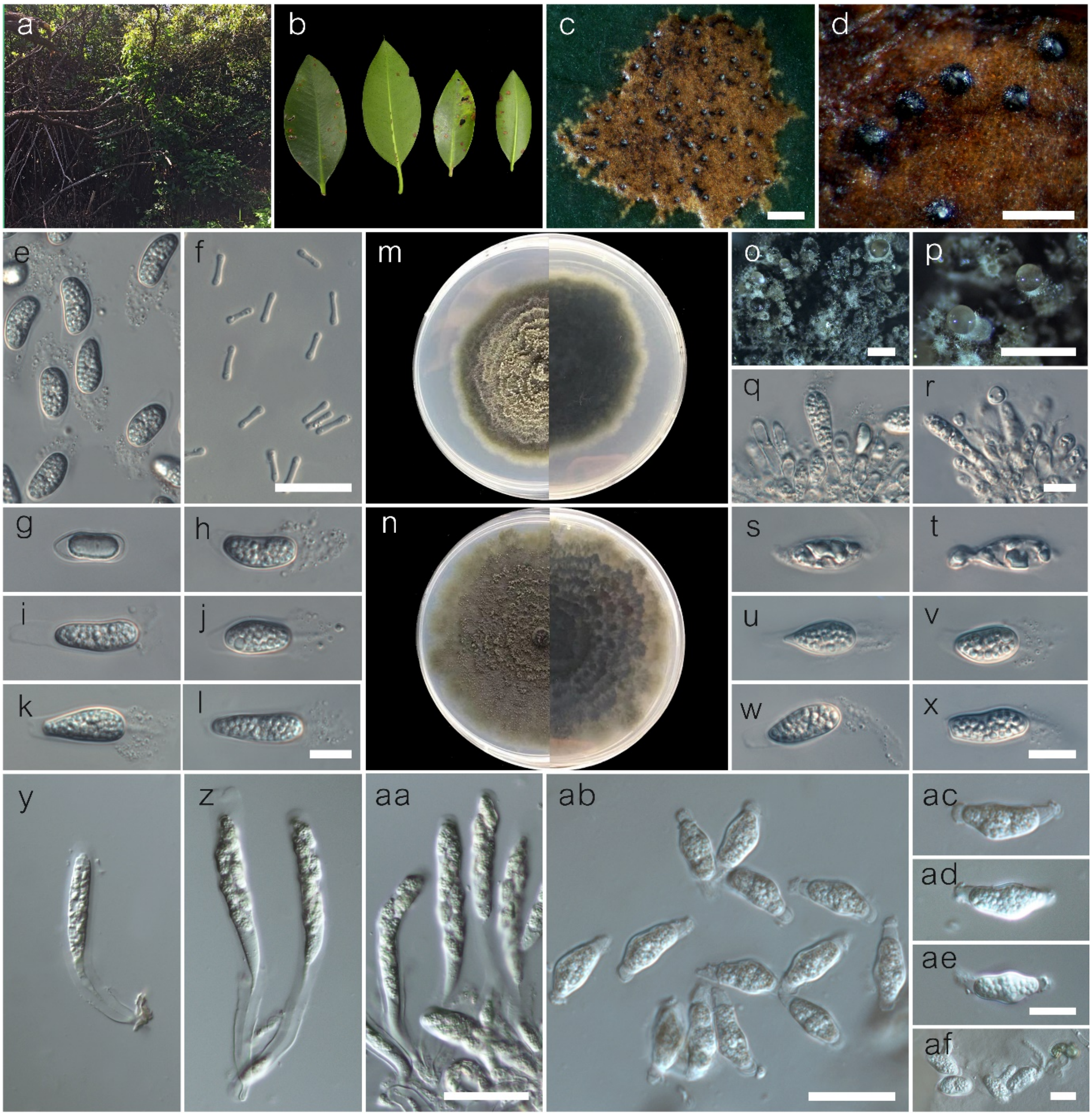

Figure 3 – *Phyllosticta rhizophorae* (NCYUCC19-0352). a Habitat. b Leaf spots on *Rhizophora stylosa*. c–d Surface of leaf spot with fruiting bodies. e, g–l, s–x Conidia. f Spermatia. m, o–p Colony of asexual morph on PDA. n Colony of sexual morph on PA (left-above, right-reverse). q–r Conidiophore with Conidia developing on conidiogenous cells. y–aa Asci. ab–ae Ascospores. af Ascospores germinating on WA. (a–l morphology from leaf spot, m–af morphology from culture). Scale bars: c, o–p = 1 mm, d= 500 µm, e–f, g–l, q–r, s–x, ac–af = 10 µm, y–aa =15 µm, ab = 20 µm.

Multilocus trees provided better resolution of *Phyllosticta* species than single-locus trees (Supplementary Figs 1–5). Adding protein-coding genes to the analysis greatly facilitated species level identification. Based on the results of our phylogenetic analyses we have introduced six species complexes in *Phyllosticta*: *P. capitalensis*, *P. concentrica*, *P. cruenta*, *P. owaniana*, *P. rhodorae*, and *P. vaccinii*. Splitting of *Phyllosticta* into clades will allow for easier resolution of species. Eighty-four previously described species including a new species were assigned to one of the six species complexes. Given that species delineation in *Phyllosticta* is difficult due to the above-mentioned challenges, the complexes can be used as broader descriptors of the genus.

Following the same reasoning and for the sake of communication, species complexes have been introduced successfully for *Colletotrichum* (Cannon et al. 2012, Damm et al. 2019, Jayawardena et al. 2016, da Silva et al. 2020), and *Fusarium* (O'Donnell et al. 2013, 2015, Al-Hatmi et al. 2016).

Multilocus phylogeny and at least two single locus analyses support the six individual *Phyllosticta* species complexes, some of which have strong statistical support (Fig. 1). Nonetheless, placement of some species remains problematic and additional loci are needed for taxonomic resolution. Results from this study demonstrate that both molecular phylogenetic analyses and morphological data are needed to propose and establish species of *Phyllosticta*, as the latter alone is not sufficient. The molecular boundaries of species of *Phyllosticta* will provide a better understanding of inter and intraspecific variation within the genus, particularly within the broader species complexes.

Demarcation of individual taxa within the genus is essential so that we develop a better understanding of the lifestyles, ecology, and overall biology of these individual taxa and their impact and control in various ecosystems. Hence, in this study six strains of *P. capitalensis* are unnamed species (strains CBS 173.77, CBS 119720, CPC 17748, CPC 20252, CPC 20269, and CBS 123404) based on nucleotide polymorphisms and phylogenetic analyses. Seventeen strains were excluded from *Phyllosticta*. Seventeen strains – *Phyllosticta alcides* strain P3-4 (Palomares-Rius et al. 2014), *P. artocarpina* strain B5 (Baayen et al. 2002), *P. caprifolii* strain F23 (unpublished), *P. citrullina* strain LrBF12 (unpublished), *P. citrullina* strain LrBF13 (unpublished), *P. coryli* strain CTF324 (Sun et al. 2013), *P. flevolandica* strain AFTOL-ID 1786 (unpublished), *P. flevolandica* strain CBS 998.72 (Vu et al. 2019), *P. heveae* strain NW197 (unpublished), *P. jasmini* strain TS08-19-2 (unpublished), *P. jasmini* strain 6259 (unpublished), *P. juglandis* strain H2 (unpublished), *P. ligustri* strain TS08-20-1 (unpublished), *P. papayae* strain T150 (unpublished), *P. papayae* strain 7AJ-10 (unpublished), *P. populina* strain NW584 (unpublished), and *P. sojicola* strain CBS 301.39 (Vu et al. 2019) – were excluded from *Phyllosticta* based on BLAST searches against type material (Table 6). The BLAST results for the above 17 strains denoted as *Phyllosticta* matched other genera to the exclusion of *Phyllosticta*. In the phylogenetic tree, these 17 strains were excluded from the *Phyllosticta* clade (data not shown). Sixteen of these strains were submitted to the database based on sequence data alone without accompanying morphological support. One strain, *P. coryli* CTF324, was published with only the ITS gene region and morphological characters of unicellular conidia, colorless, ovoid to oval, and from 2.4–4.5 × 1.6–2.4 μm (Sun et al. 2013). The morphology of *P. coryli* strain CTF324 corresponds more closely to species of *Didymella* and *Peyronellaea* in Didymellaceae, an observation that is also supported by the BLAST search results (Table 6). Finally, a new species, *Phyllosticta rhizophorae*, is introduced in this study. Two strains of *P. capitalensis* (CPC 20508, and CPC 20509) were synonymized under the new species.

Description of the new species is based on both morphological and molecular data. The new species was found on mangrove plants in Taiwan (leaf spot of *Rhizophora stylosa*) and isolated using tissue isolation. During the research period, a new species and new strains of previously known species from mangroves in Taiwan were reported. For example, *Pestalotiopsis kandelicola*, *P. kenyana*, *P. diploclisiae* were isolated from asymptomatic leaves of *Kandelia candel* (Hyde et al. 2020a, b), while *Alternaria* sp. was associated with leaf blight of *Ficus* sp. and leaf spot of *Kandelia candel* (Norphanphoun et al. in prep). Collectively, these results suggest that there might be a large number of undescribed species, both endophytes and pathogens, in this ecosystem. Pathogenicity testing of *P. rhizophorae* was negative. *Phyllosticta* species have only rarely been isolated from leaf spots and black spots of fruits, but they have also been found as endophytes of diverse host plants, and as saprobes (Okane et al. 2003, Glienke et al. 2011, Guarnaccia et al. 2017, Tran et al. 2019, Wikee et al. 2011, 2013b). Taken together, it seems that *Phyllosticta* species are widely distributed and appear to have different lifestyles, which ranges from pathogens, latent pathogens, and endophytes. Further studies are needed to establish whether these species are host-specific, their habitats and lifestyle, as well as the conditions under which they might switch.

Table 4 Morphological characteristics comparison of *Phyllosticta* species related to this study.

Species	Strain	Ascomata		Asci		Ascospores		Conidiomata		Conidiogenous cells		Conidia		Spermatia		Reference
		Size*	**Shape**	**Size***	**Shape**	**Size***	**Shape**	**Size***	**Shape**	**Size***	**Shape**	**Size***	**Shape**	**Size***	**Shape**	
P. capitalensis	CBS 128856 [T]	250	globose to pyriform	58–80 × 11–15	clavate	15–17 × 5–6	limoniform	300 × 250	globose to ampulliform	7–10 × 3–5	subcylindrical to ampulliform to doliiform	(10–)11–12(–14) × (5–)6–7	ellipsoid to obovoid	N/A	N/A	Hennings (1908)
P. fallopiae	MUCC0113/ NBRC 102266 [T]	N/A	N/A	N/A	N/A	N/A	N/A	63.5–98 × 61–98	subglobose to globose	5–10 × 1.2–2.5	cylindrical to subcylindrical	8.5–12.5 × 6–7.5	ellipsoid to obovoid	N/A	N/A	Motohashi et al. (2008)
P. paracapitalensis	CPC 26517 [T]	>300	globose	40–75 × 10–12	subcylindrical to clavate	16–17 × 6 (–7)	limoniform	>250	globose	7–15 × 3–4	subcylindrical	(9–)12–13(–14) × (6–)7	ellipsoid to obovoid	N/A	N/A	Guarnaccia et al. (2017)
P. rhizophorae	NCYUCC 19-0358/ 19-0352	>200	globose to pyriform	33–55 × 4–6.5	clavate to broadly fusoid-ellipsoid	16 ± 2.9 × 6.1 ± 1.2	limoniform with obtuse ends	>200	globose	10–17 × 3–5	subcylindrical	16.7 ± 0.5 × 7.3 ± 1.6	ellipsoid to obovoid	7.5–11.5 × 1–2	bacilliform	In this study

*Size was mentioned in µm; [T] Type species; N/A no morphology mentioned in publication.

Table 5 GenBank BLAST search results of *Phyllosticta* strains that clustered with *P. capitalensis* in this study.

Taxon	Strain**	Host	Country	GenBank accession no.*	GenBank BLAST search results			
					Species identified	**Strain****	**Accession no.**	**Identities (I), Query cover (QC)**
P. harai	MUCC0043 [b]	*Aucuba japonica*	Japan	AB454281▲	*Phyllosticta fallopiae*	MUCC0113 [b]	AB454307	100.00% (I), 100% (QC)
					Guignardia philoprina	MUCC0027 [b]	AB454270	100.00% (I), 100% (QC)
					Phyllosticta elongata	CBS 114751 [d]	EU167584	100.00% (I), 100% (QC)
					Phyllosticta sp.	MUCC0547 [b]	AB454364	99.92% (I), 100% (QC)
					Guignardia mangiferae	MUCC0207 [b]	AB454332	99.92% (I), 100% (QC)
				AB704219●	*Phyllosticta sphaeropsoidea*	MUCC0112 [a]	AB704227	100.00% (I), 100% (QC)
					Guignardia sawadae	MUCC0066 [a]	AB704225	100.00% (I), 100% (QC)
					Guignardia mangiferae	MUCC0030 [a]	AB704215	100.00% (I), 99% (QC)
					Guignardia mangiferae	MUCC0122 [a]	AB704231	99.6% (I), 100% (QC)
					Phyllosticta conjac	MUCC0410 [a]	AB704239	99.6% (I), 100% (QC)

Table 5 Continued.

Taxon	Strain**	Host	Country	GenBank accession no.*	GenBank BLAST search results			
					Species identified	Strain**	Accession no.	Identities (I), Query cover (QC)
P. fallopiae	MUCC0113 [b]	*Fallopia japonica*	Japan	AB454307▲	*Phyllosticta elongata*	CBS 114751 [d]	EU167584	100.00% (I), 100% (QC)
					Guignardia philoprina	MUCC0027 [b]	AB454270	100.00% (I), 99% (QC)
					Phyllosticta sp.	MUCC0547 [b]	AB454364	99.92% (I), 99% (QC)
					Guignardia mangiferae	MUCC0207 [b]	AB454332	99.92% (I), 99% (QC)
					Guignardia sp.	MUCC0041 [b]	AB454279	99.92% (I), 100% (QC)
				AB704228●	*Phyllosticta miurae*	MUCC0065 [a]	AB704224	100.00% (I), 100% (QC)
					Phyllosticta sphaeropsoidea	MUCC0112 [a]	AB704227	100.00% (I), 99% (QC)
					Guignardia philoprina	MUCC0012 [a]	AB704206	99.6% (I), 100% (QC)
					Phyllosticta conjac	MUCC0410 [a]	AB704239	99.6% (I), 100% (QC)
					Guignardia mangiferae	MUCC0122 [a]	AB704231	99.6% (I), 99% (QC)
P. conjac	MUCC0410 [b]	*Amorphophallus rivieri*	Japan	AB454342▲	*Phyllosticta fallopiae*	MUCC0113 [b]	AB454307	100.00% (I), 100% (QC)
					Guignardia philoprina	MUCC0027 [b]	AB454270	100.00% (I), 100% (QC)
					Phyllosticta elongata	CBS 114751 [b]	EU167584	100.00% (I), 100% (QC)
					Phyllosticta sp.	MUCC0547 [b]	AB454364	99.92% (I), 100% (QC)
					Guignardia mangiferae	MUCC0207 [b]	AB454332	99.92% (I), 100% (QC)
				AB704239●	*Guignardia philoprina*	MUCC0012 [a]	AB704206	100.00%(I), 100% (QC)
					Phyllosticta fallopiae	MUCC0113 [a]	AB704228	99.6% (I), 100% (QC)
					Phyllosticta sphaeropsoidea	MUCC0112 [a]	AB704227	99.6%(I), 100% (QC)
					Guignardia sawadae	MUCC0066 [a]	AB704225	99.6% (I), 100% (QC)
					Phyllosticta miurae	MUCC0065 [a]	AB704224	99.6% (I), 100% (QC)
P. fallopiae	ISOJ61 [c]			MF164545▲	*Phyllosticta capitalensis*	A788 [u]	MN121397	100.00% (I), 100% (QC)
					Phyllosticta elongata	LCM 886.01 [u]	MF495420	100.00% (I), 100% (QC)
					Phyllosticta capitalensis	LCM 826.01 [u]	MF495391	100.00% (I), 00% (QC)
					Phyllosticta capitalensis	LCM 818.01 [u]	MF495383	100.00% (I), 100% (QC)
					Phyllosticta capitalensis	VPRI41231 [u]	MH183391	100.00% (I), 100% (QC)
P. miurae	MUCC0065 [b]	*Lindera praecox*	Japan	AB454291▲	*Guignardia alliacea*	MUCC0015 [a]	AB454264	100.00% (I), 100% (QC)
					Guignardia alliacea	MUCC0014 [a]	AB454263	99.92% (I), 100% (QC)
					Guignardia philoprina	MUCC0012 [a]	AB454262	99.83% (I), 100% (QC)
					Guignardia mangiferae	MUCC0122 [a]	AB454315	99.83% (I), 100% (QC)
					Phyllosticta fallopiae	MUCC0113 [a]	AB454307	99.75% (I), 100% (QC)
				AB704224●	*Phyllosticta fallopiae*	MUCC0113 [a]	AB704228	100% (I), 100% (QC)
					Phyllosticta conjac	MUCC0410 [a]	AB704239	99.6% (I), 100% (QC)
					Guignardia mangiferae	MUCC0122 [a]	AB704231	99.6% (I), 100% (QC)
					Phyllosticta sphaeropsoidea	MUCC0112 [a]	AB704227	99.6% (I), 100% (QC)
					Guignardia sawadae	MUCC0066 [a]	AB704225	99.6% (I), 100% (QC)

Table 5 Continued.

Taxon	Strain**	Host	Country	GenBank accession no.*	GenBank BLAST search results			
					Species identified	Strain**	Accession no.	Identities (I), Query cover (QC)
P. camelliae	MUCC0059 [a]	*Camellia japonica* var. *hortensis*	Japan	AB454290▲	*Guignardia philoprina*	MUCC0012 [b]	AB454262	100% (I), 100% (QC)
					Guignardia mangiferae	MUCC0122 [b]	AB454315	99.92% (I), 100% (QC)
					Phyllosticta fallopiae	MUCC0113 [b]	AB454307	99.92% (I), 100% (QC)
					Guignardia philoprina	MUCC0027 [b]	AB454270	99.92% (I), 100% (QC)
					Guignardia alliacea	MUCC0015 [b]	AB454264	99.92% (I), 100% (QC)
				AB704223●	*Phyllosticta sphaeropsoidea*	MUCC0112 [a]	AB704227	100% (I), 100% (QC)
					Guignardia sawadae	MUCC0066 [a]	AB704225	100% (I), 100% (QC)
					Phyllosticta harai	MUCC0043 [a]	AB704219	100% (I), 100% (QC)
					Guignardia mangiferae	MUCC0030 [a]	AB704215	100% (I), 99% (QC)
					Guignardia mangiferae	MUCC0122 [a]	AB704231	99.6% (I), 100% (QC)

*Gene: ▲ITS, •*actin*
** references: [a]Ando et al. (2013), [b]Motohashi et al. (2009), [c]Rampadarath et al. (2018), [d]Simon et. al. (2009), [U] Unpublished.

Table 6 GenBank BLAST search results (top five) of 17 strains excluded from *Phyllosticta* in this study.

Taxon	Strain	Host	Country	GenBank accession no.*	GenBank BLAST search against type material			
					Species identified (top BLAST results)	Strain	GenBank accession no.	Identities (I), Query cover (QC)
P. alcides	P3-4 [s]	Indetermined	Japan	KF590155■	*Paraphoma radicina*	CBS 111.79	EU754191	I = 99.76% / QC = 100%
					Paraphoma rhaphiolepidis	CBS 142524	KY979813	I = 99.64% / QC = 100%
					Paraphoma radicina	CBS 111.79	KF251676	I = 99.76% / QC = 98%
					Neosetophoma rosarum	MFLU 17-0308	MG829036	I = 99.04% / QC = 100%
					Neosulcatispora agaves	CPC 26407	KT950867	I = 99.04% / QC = 100%
P. artocarpina	B5 [d]	*Artocarpus heterophyllus*	India	AY042930▲ (ITS2)	*Neomicrosphaeropsis alhagi-pseudalhagi*	TASM 6134	MH069664	I = 99.54% / QC = 100%
					Epicoccum proteae	CBS 114179	MH862956	I = 99.54% / QC = 100%
					Epicoccum poae	CGMCC 3.18363	NR_158266	I = 99.54% / QC = 100%
					Epicoccum layuense	CGMCC 3.18362	NR_158265	I = 99.54% / QC = 100%
					Epicoccum hordei	CGMCC 3.18360	NR_158263	I = 99.54% / QC = 100%
				AY042929▲ (ITS1)	*Epicoccum rosae*	MFLU 15-3639	NR_157517	I = 100.00 % / QC = 100%
					Epicoccum tritici	MFLUCC 16-0276	KX926426	I = 100.00 % / QC = 100%

Table 6 Continued.

Taxon	Strain	Host	Country	GenBank accession no.*	GenBank BLAST search against type material			
					Species identified (top BLAST results)	Strain	GenBank accession no.	Identities (I), Query cover (QC)
					Epicoccum dendrobii	CGMCC 3.18359	NR_158261	I = 100.00 % / QC = 100%
					Epicoccum layuense	CGMCC 3.18362	NR_158265	I = 100.00 % / QC = 100%
					Ascochyta rabiei	CBS 237.37	MG786925	I = 99.30% / QC = 100%
P. caprifolii	F23 [u]	*Ferula*		KF887044▲	*Macroventuria wentii*	CBS 526.71	MH860250	I = 99.38% / QC = 100%
					Vacuiphoma bulgarica	CBS 357.84	MH861745	I = 99.18% / QC = 100%
					Vacuiphoma oculihominis	UTHSC DI16-308	NR_158281	I = 98.98% / QC = 100%
					Didymellaceae	2 NV-2016	LT592954	I = 98.98% / QC = 100%
					Ascochyta phacae	CBS 184.55	MH857437	I = 98.77% / QC = 100%
P. citrullina	LrBF12	Bulb of *Lycoris radiata*	China	MG543730▲	*Stagonosporopsis ajacis*	CBS 177.93	NR_160049	I = 99.79% / QC = 91%
					Stagonosporopsis ajacis	CBS 177.93	GU237791	I = 99.79% / QC = 91%
					Stagonosporopsis lupini	CBS 101494	NR_160205	I = 98.40% / QC = 95%
					Stagonosporopsis valerianellae	CBS 329.67	NR_160109	I = 98.40% / QC = 95%
					Stagonosporopsis lupini	CBS 101494	MH862737	I = 98.40% / QC = 95%
P. citrullina	LrBF13	Bulb of *Lycoris radiata*	China	MG543731▲	*Stagonosporopsis ajacis*	CBS 177.93	NR_160049	I = 99.59% / QC = 93%
					Stagonosporopsis lupini	CBS 101494	NR_160205	I = 99.59% / QC = 93%
					Stagonosporopsis valerianellae	CBS 329.67	NR_160109	I = 98.22% / QC = 97%
					Stagonosporopsis lupini	CBS 101494	MH862737	I = 98.22% / QC = 97%
					Stagonosporopsis valerianellae	CBS 329.67	MH858985	I = 98.22% / QC = 97%
P. coryli	CTF324 [aa]	Hazel nut		KC196068▲	*Peyronellaea prosopidis*	CPC 21698	NR_137836	I = 99.39% / QC = 100%
					Didymella keratinophila	UTHSC DI16-200	NR_158275	I = 99.18% / QC = 100%
					Didymella sp.	UTHSC DI16-200	LT592901	I = 99.18% / QC = 100%
					Didymella pedeiae	CBS 124517	MH863383	I = 98.98% / QC = 100%
					Didymella microchlamydospora	CBS 105.95	MH862504	I = 98.98% / QC = 100%
P. flevolandica	AFTOL-ID 1786 [u]	-		DQ678090■	*Lolia dictyospora*	CBS H-22131	KU726000	I = 98.98% / QC = 100%

Table 6 Continued.

Taxon	Strain	Host	Country	GenBank accession no.*	GenBank BLAST search against type material			
					Species identified (top BLAST results)	Strain	GenBank accession no.	Identities (I), Query cover (QC)
					Lindgomyces breviappendiculatus	HHUF 28194	NG_056267	I = 98.82% / QC = 100%
					Lindgomyces breviappendiculatus	KT1399	AB521749	I = 98.82% / QC = 100%
					Lindgomyces apiculatus	KT1108	NG_055737	I = 98.74% / QC = 100%
					Lindgomyces ingoldianus	ATCC 200398	NG_042321	I = 98.66% / QC = 100%
P. flevolandica	CBS 998.72 [g]	Soil	Netherlands	DQ377927■	*Lindgomyces angustiascus*	ILL A640-1a	NG_042721	I = 98.43% / QC = 100%
					Lindgomyces lemonweirensis	ILL 40793	NG_042580	I = 98.32% / QC = 100%
					Lindgomyces pseudomadisonensis	KT 2742	LC149916	I = 98.08% / QC = 99%
					Lindgomyces madisonensis	CBS 140367	MH878155	I = 99.08% / QC = 99%
					Lolia dictyospora	CBS H-22131	KU726000	I = 99.18% / QC = 95%
P. heveae	NW197 [u]	Indetermined	China	EU520128▲	*Didymella keratinophila*	UTHSC DI16-200	NR_158275	I = 96.64%% / QC = 96%
					Didymella sp.	1 NV-2016	LT592901	I = 96.64%% / QC = 96%
					Didymella sancta	CBS 281.83	MH861588	I = 96.25% / QC = 96%
					Didymella microchlamydospora	CBS 105.95	MH862504	I = 96.07% / QC = 96%
					Epicoccum huancayense	CBS 105.80	MH861244	I = 96.07% / QC = 95%
P. jasmini	TS08-19-2 [u]	*Jasminum nudiflorum*	China	AB470839▲	*Epicoccum huancayense*	CBS 105.80	MH861244	I = 98.12% / QC = 98%
					Neodidymella thailandicum	MFLU 11-0176	NR_156400	I = 98.11% / QC = 98%
					Stagonosporopsis lupini	CBS 101494	NR_160205	I = 97.93% / QC = 97%
					Ascochyta phacae	CBS 184.55	NR_135942	I = 97.05% / QC = 100%
					Ascochyta phacae	CBS 184.55	EU167570	I = 97.05% / QC = 100%
P. jasmini	6259 [u]	*Artemisia annua*	China	JN903927▲	*Boeremia trachelospermi*	CGMCC 3.18222	NR_158252	I = 99.58% / QC = 92%
					Boeremia exigua var. *heteromorpha*	CBS 443.94	NR_158238	I = 99.58% / QC = 92%
					Boeremia exigua var. *pseudolilacis*	CBS 101207	NR_158232	I = 99.58% / QC = 92%
					Boeremia exigua var. *populi*	CBS 100167	NR_158231	I = 99.58% / QC = 92%

Table 6 Continued.

Taxon	Strain	Host	Country	GenBank accession no.*	GenBank BLAST search against type material			
					Species identified (top BLAST results)	Strain	GenBank accession no.	Identities (I), Query cover (QC)
P. juglandis	H2 [u]	Indetermined		KC168088▲	*Boeremia strasseri*	CBS 126.93	NR_135985	I = 99.37% / QC = 92%
					Didymella rosea	BRIP 50788	NR_136125	I = 99.39% / QC = 100%
					Phoma segeticola	CGMCC 3.17489	KP330443	I = 100.00% / QC = 97%
					Didymella suiyangensis	CGMCC 3.18352	NR_158260	I = 99.79% / QC = 97%
					Didymella suiyangensis	LC7439	KY742089	I = 99.79% / QC = 97%
P. ligustri	TS08-20-1 [u]	*Ligustrum* sp.	China	AB470841▲	*Didymella brunneospora*	CBS 115.58	KT389505	I = 99.37% / QC = 97%
					Ascochyta rabiei	CBS 237.37	EU167600	I = 97.79% / QC = 100%
					Ascochyta phacae	CBS 184.55	NR_135942	I = 97.61% / QC = 100%
					Epicoccum huancayense	CBS 105.80	MH861244	I = 97.94% / QC = 97%
					Didymella microchlamydospora	CBS 105.95	MH862504	I = 97.23% / QC = 99%
P. papayae	T150 [u]	Indetermined	China	FJ462748▲	*Didymella keratinophila*	UTHSC DI16-200	NR_158275	I = 97.39% / QC = 98%
					Diaporthe mahothocarpus	CGMCC 3.15181	NR_147522	I = 99.81% / QC = 91%
					Diaporthe toxicodendri	TFM FP-10740	NR_158416	I = 96.52% / QC = 98%
					Diaporthe toxicodendri	FFPRI420987	LC275192	I = 96.52% / QC = 98%
					Diaporthe alnea	CBS 146.46	NR_147525	I = 96.83% / QC = 97%
P. papayae	7AJ-10 [u]	Mulberry		KR708979▲	*Diaporthe bohemiae*	CPC 28222	NR_164425	I = 96.45% / QC = 97%
					Diaporthe mahothocarpus	CGMCC 3.15181	NR_147522	I = 99.56% / QC = 79%
					Diaporthe toxicodendri	TFM FP-10740	NR_158416	I = 96.85% / QC = 83%
					Diaporthe toxicodendri	FFPRI420987	LC275192	I = 96.85% / QC = 83%
					Diaporthe alnea	CBS 146.46	NR_147525	I = 96.80% / QC = 82%
P. populina	NW584 [u]	Indetermined	China	EU520202▲	*Diaporthe bohemiae*	CPC 28222	NR_164425	I = 97.00% / QC = 82%
					Epicoccum huancayense	CBS 105.80	MH861244	I = 96.99% / QC = 97%
					Neodidymella thailandicum	MFLU 11-0176	NR_156400	I = 96.82% / QC = 97%
					Stagonosporopsis lupini	CBS 101494	NR_160205	I = 96.85% / QC = 97%
					Boeremia trachelospermi	CGMCC 3.18222	NR_158252	I = 100.00% / QC = 88%
					Boeremia exigua var. *heteromorpha*	CBS 443.94	NR_158238	I = 100.00% / QC = 88%

Table 6 Continued.

Taxon	Strain	Host	Country	GenBank accession no.*	GenBank BLAST search against type material			
					Species identified (top BLAST results)	**Strain**	**GenBank accession no.**	**Identities (I), Query cover (QC)**
P. sojicola	CBS 301.39 [P]	Indetermined	Germany	EU573029▲	*Epicoccum proteae*	CBS 114179	NR_158240	I = 98.04% / QC = 100%
					Neodidymella thailandicum	MFLU 11-0176	NR_156400	I = 97.85%/ QC = 100%
					Epicoccum huancayense	CBS 105.80	MH861244	I = 97.84% / QC = 100%
					Stagonosporopsis lupini	CBS 101494	NR_160205	I = 97.65% / QC = 99%
					Boeremia trachelospermi	CGMCC 3.18222	NR_158252	I = 99.79% / QC = 93%
				MH867524■	*Stagonosporopsis pini*	C452	MK348019	I = 97.74% / QC = 99%
					Didymella vitalbina	CBS 123707	MH874853	I = 97.63% / QC = 99%
					Didymella anserina	CBS 285.29	MH866534	I = 97.63% / QC = 99%
					Briansuttonomyces eucalypti	CBS 114879	KU728519	I = 97.63% / QC = 99%
					Phoma tamaricicola	MFLUCC 14-0602	KM408754	I = 97.63% / QC = 99%
				EU595356○	*Boeremia exigua* var. *pseudolilacis*	CBS 101207	KY484710	I = 93.87% / QC = 88%
					Boeremia exigua var. *populi*	CBS 100167	KY484706	I = 90.84% / QC = 88%
					Boeremia exigua var. *heteromorpha*	CBS 443.94	KY484700	I = 90.84% / QC = 88%
					Boeremia strasseri	CBS 126.93	KY484735	I = 90.04% / QC = 88%
					Boeremia noackiana	CBS 101203	KY484728	I = 85.77% / QC = 88%

*Gene: ▲ITS, ■LSU, ○*ef1α*

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Supplementary Tables and Figures

Supplementary Table 1 Recorded geographic and host distributions of *Phyllosticta* species.

Species record	Host	Locality	References
***Phyllosticta capitalensis* species complex**			
P. acaciigena	*Acacia suaveolens*	Australia	Crous et al. (2016)
P. aloeicola	*Aloe ferox*	South Africa	Wikee et al. (2013b)
P. ardisiicola	*Ardisia crenata*	Japan	Motohashi et al. (2008)
P. aristolochiicola	*Aristolochia acuminata*	Australia	Crous et al. (2012a)
	Aristolochia clematitis	Australia	Wulandari et al. (2013)
	Aristolochia sempervirens	Australia	Wulandari et al. (2013)
P. azevinhi	*Ilex azevinho*	Madeira Islands	Spaulding (1961)
	Ilex pedunculosa	Japan	Kobayashi (2007), Kobayashi & Sasaki (1975), Motohashi et al. (2009)
P. beaumarisii	*Muehlenbeckia adpressa*	Australia	Paul et al. (1986)
P. brazilianiae	*Mangifera indica*	Brazil	Glienke et al. (2011)
P. capitalensis	*Acacia crassicarpa*	Thailand	Wikee et al. (2013b)
	Acer rubrum	Japan	Okane et al. (2003)
	Acer sp.	Japan	Motohashi et al. (2009)
	Aleurites fordii	Georgia	Wulandari et al. (2013)
	Allamanda cathartica	India	Wulandari et al. (2013)
	Allophylus sp.	South Africa	Wikee et al. (2013a)
	Alnus serrulatoides	Japan	Okane et al. (2003)
	Alocasia sp.	Thailand	Wikee et al. (2013a)
	Amomum siamense	Thailand	Okane et al. (2003)
	Amomum sp.	Thailand	Okane et al. (2003), Wikee et al. (2013a)
	Amomum uliginosum	Thailand	Okane et al. (2003)
	Ampelopsis sp.	United States	Wikee et al. (2013a)
	Anacardium giganteum	Brazil	Rodrigues et al. (2004), Wulandari et al. (2009), Glienke et al. (2011)
	Anacardium sp.	Brazil	Wikee et al. (2013a)
	Anarcardium giganteum	Brazil	Sultan et al. (2011)
	Anogeissus latifolia	India	Murali et al. (2007)
	Anthocleista sp.	South Africa	Wikee et al. (2013a)
	Anthurium sp.	Thailand	Wikee et al. (2013a)
	Artocarpus sp.	Thailand	Shaw et al. (2006), Wikee et al. (2013a)
	Arundina bambusifolia	Costa Rica	Cash & Watson (1955), Thaung (2008a)
	Arundina graminifolia	Japan	Okane et al. (2003)
	Arundina sp.	Japan	Wikee et al. (2013a)
	Aspidistra elatior	Japan	Motohashi et al. (2009)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Aspidosperma polyneuron	Brazil	Rodrigues et al. (2004), Wulandari et al. (2009), Wikee et al. (2011), Glienke et al. (2011), Wikee et al. (2013a, b)
	Aspidosperma sp.	Brazil	Wikee et al. (2013a)
	Atropis distans	Georgia	Wulandari et al. (2013)
	Baccaurea ramiflora	Thailand	Wikee et al. (2013b)
	Banksia dryandroides	Hawaii	Crous et al. (2004)
	Barringtonia racemosa	South Africa, KwaZulu-Natal	Shaw et al. (2006)
	Barringtonia sp.	South Africa	Wikee et al. (2013a)
	Bauhinia racemosa	India	Murali et al. (2007)
	Berberis thunbergii	Japan	Okane et al. (2003)
	Bifrenaria harrisoniae	Brazil	Silva et al. (2008)
	Botrychium sp.	United States	Wikee et al. (2013a)
	Bowdichia nitida	Brazil	Rodrigues et al. (2004), Wulandari et al. (2009), Wikee et al. (2011), Glienke et al. (2011), Wikee et al. (2013a, b)
	Bowdichia sp.	Brazil	Wikee et al. (2013a)
	Brassolaeliocattleya sp.	Florida	Alfieri Jr. et al. (1984)
	Bumelia lycioides	Georgia, United States	Wulandari et al. (2013)
	Butea monosperma	India	Murali et al. (2007)
	Caesalpinia crista	Japan	Okane et al. (2003)
	Caesalpinia sp.	Japan	Wikee et al. (2013a)
	Calophyllum sp.	Thailand	Wikee et al. (2013a)
	Camellia sinensis	China, India, Japan, Malawi, Papua New Guinea, Taiwan	Mathur (1979), Kobayashi (2007), Wiehe (1953), Shaw (1984), Anonymous (1979), Cheng et al. (2019)
	Camellia sp.	United States	Wikee et al. (2013a)
	Canthium sp.	South Africa	Wikee et al. (2013a)
	Capsicum sp.	Dominican Republic	Wulandari et al. (2009), Glienke et al. (2011), Wikee et al. (2013a)
	Careya arborea	India	Murali et al. (2007)
	Cariniana estrellensis	Brazil	Lisboa et al. (2016)
	Cassia fistula	India	Murali et al. (2007)
	Cassia occidentalis	Brazil	Rodrigues et al. (2004)
	Cattleya skinneri	Guatemala	Cash & Watson (1955)
	Cattleya sp.	Florida	Alfieri Jr. et al. (1984)
	Cerbera manghas	Japan	Okane et al. (2003)
	Cerbera sp.	Japan	Wikee et al. (2013a)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Cercidiphyllum japonicum	Japan	Motohashi et al. (2009)
	Cercidiphyllum sp.	Japan	Wikee et al. (2013a)
	Cercis canadensis	Japan	Motohashi et al. (2009)
	Cercis sp.	Japan	Wikee et al. (2013a)
	Cinnamomum camphora	Japan	Okane et al. (2003)
	Cinnamomum japonicum	Japan	Okane et al. (2003)
	Cinnamomum sp.	Japan	Wikee et al. (2013a)
	Citrus × paradisi	Florida, South Africa, KwaZulu-Natal, South Africa, Mpumalanga	Peres et al. (2007), Meyer et al. (2006)
	Citrus × paradisi-reticulata	New Zealand	Everett & Rees-George (2006)
	Citrus aurantifolia	Italy, New Zealand	Guarnaccia et al. (2017), Tran et al. (2019), Wikee et al. (2013b), Wulandari et al. (2009), Glienke et al. (2011)
	Citrus aurantium	Australia, Brazil, Thailand	Rodrigues et al. (2004), Wulandari et al. (2009), Miles et al. (2013), Tran et al. (2019), Glienke et al. (2011), Guarnaccia et al. (2017)
	Citrus latifolia	Brazil	Glienke et al. (2011), Wikee et al. (2013a)
	Citrus limon	South Africa, Eastern Cape, Taiwan, Argentina, Australia, Greece, Italy, Malta, Portugal, Spain	Meyer et al. (2006), Wulandari et al. (2009), Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014), Miles et al. (2013), Tran et al. (2019), Guarnaccia et al. (2017)
	Citrus limonia	Brazil	Glienke et al. (2011)
	Citrus medica var. *sarcodactylis*	Italy	Guarnaccia et al. (2017)
	Citrus paradisi	Florida	Wulandari et al. (2009), Glienke et al. (2011)
	Citrus reticulata	Australia, Brazil	Miles et al. (2013), Tran et al. (2019), Glienke et al. (2011), Wikee et al. (2013a)
	Citrus sinensis	Brazil, Florida	Glienke et al. (2011), Wikee et al. (2013a, b), Guarnaccia et al. (2017)
	Citrus sp.	Argentina, Australia, Brazil, China, Hong Kong, New Zealand, South Africa, Taiwan, Thailand, United States	Wulandari et al. (2009), Wikee et al. (2011, 2013a), Glienke et al. (2011), Guarnaccia et al. (2017)
	Clethra barbinervis	Japan	Okane et al. (2003)
	Cliffortia sp.	South Africa	Wikee et al. (2013a)
	Clutia sp.	South Africa	Wikee et al. (2013a)
	Cocculus sp.	United States	Wikee et al. (2013a)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Codiaeum sp.	Thailand	Wikee et al. (2013a)
	Coelogyne sp.	Philippines, Thailand	Cash & Watson (1955), Shaw et al. (2006), Wikee et al. (2013a)
	Combretum sp.	South Africa	Wikee et al. (2013a)
	Comocladia sp.	Puerto Rico	Wikee et al. (2013a)
	Coprosma sp.	Hawaii	Wikee et al. (2013a)
	Cordia obliqua	India	Murali et al. (2007)
	Cordia sp.	South Africa	Wikee et al. (2013a)
	Cordia wallichii	India	Murali et al. (2007)
	Cordyline fruticosa	Thailand	Wikee et al. (2013b)
	Coriaria terminalis	Japan	Okane et al. (2003)
	Cornus kousa	Japan	Okane et al. (2003)
	Corylopsis sinensis	Japan	Okane et al. (2003)
	Corylus sieboldiana	Japan	Okane et al. (2003)
	Cotinus coggygria var. *cinerea*	Japan	Okane et al. (2003)
	Crinum asiaticum	Thailand	Wikee et al. (2013b)
	Crinum sp.	Thailand	Liu et al. (2012)
	Croton sp.	South Africa	Wikee et al. (2013a)
	Ctenomeria sp.	South Africa	Wikee et al. (2013a)
	Curtisia sp.	South Africa	Wikee et al. (2013a)
	Cussonia sp.	South Africa, Gauteng	Meyer et al. (2006), Wikee et al. (2013a)
	Cymbidium sp.	Brazil, Florida, India	Alfieri Jr. et al. (1984), Silva & Pereira (2007), Glienke et al. (2011), Wikee et al. (2013b)
	Cyphostemma sp.	South Africa	Wikee et al. (2013a)
	Cypripedium insigne	India	Cash & Watson (1955)
	Cypripedium sp.	Japan	Cash & Watson (1955)
	Dalbergia lanceolaria	India	Murali et al. (2007)
	Daphniphyllum teijsmanni	Japan	Okane et al. (2003)
	Davidia involucrata	Japan	Okane et al. (2003), Motohashi et al. (2009)
	Davidia sp.	Japan	Wikee et al. (2013a)
	Dendrobium canaliculatum	Australia	Cash & Watson (1955)
	Dendrobium phalaenopsis	Australia, Belgium, Philippines	Nag Raj (1993), Cash & Watson (1955)
	Dendrobium schuetzei	Philippines	Cash & Watson (1955)
	Dendrobium sp.	Brunei Darussalam, Thailand, Florida, Haiti, Samoa	Peregrine & Ahmad (1982), Wikee et al. (2013a), Alfieri Jr. et al. (1984), Benjamin & Slot (1969), Cash & Watson (1955)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Dendrobium undulatum	Australia	Cash & Watson (1955)
	Dendropanax trifidus	Japan	Motohashi et al. (2009)
	Dieffenbachia sp.	Thailand	Wikee et al. (2013a)
	Diospyros kaki	Taiwan	Duan et al. (2017)
	Diospyros montana	India	Murali et al. (2007)
	Diospyros sp.	South Africa	Wikee et al. (2013a)
	Dodonaea sp.	Hawaii	Wikee et al. (2013a)
	Dovyalis sp.	South Africa	Wikee et al. (2013a)
	Dracontomelon mangiferum	Myanmar	Thaung (2008b)
	Ekebergia sp.	South Africa	Wikee et al. (2013a)
	Elaeis guineensis	Malaysia	Nasehi et al. (2020)
	Elaeocarpus glabripetalus	China	Lou et al. (2009)
	Elaeodendron glaucum	India	Murali et al. (2007)
	Encephalartos ferox	South Africa	Glienke et al. (2011)
	Encephalartos sp.	South Africa	Wikee et al. (2013a)
	Enkianthus sp.	Japan	Wikee et al. (2013a)
	Epidendrum fragrans	Jamaica	Cash & Watson (1955)
	Epidendrum sp.	Florida, Mexico	Alfieri Jr. et al. (1984), Cash & Watson (1955)
	Eriobotrya japonica	Japan	Motohashi et al. (2009)
	Eriobotrya sp.	Japan	Wikee et al. (2013a)
	Erythroxylum monogynum	India	Murali et al. (2007)
	Eucalyptus dives	South Africa	Wulandari et al. (2013)
	Eucalyptus grandis	Brazil	Wikee et al. (2013b)
	Eucalyptus sp.	Brazil, South Africa	Wikee et al. (2013a)
	Euclea sp.	South Africa	Wikee et al. (2013a)
	Euonymus alatus	Japan	Okane et al. (2003)
	Euphorbia milii	Thailand	Wikee et al. (2013a, b), Guarnaccia et al. (2017)
	Euphorbia sp.	Thailand	Wikee et al. (2013a)
	Eurya japonica	Japan	Okane et al. (2003)
	Fagus crenata	Japan	Okane et al. (2003)
	Fagus japonica	Japan	Okane et al. (2003)
	Ficus benjamina	Thailand	Wikee et al. (2013a, b)
	Ficus sp.	Thailand	Wikee et al. (2013a)
	Forsythia koreana	Japan	Okane et al. (2003)
	Forsythia viridissima	Japan	Okane et al. (2003)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Fortunella sp.	South Africa, Mpumalanga, United States	Meyer et al. (2006), Wikee et al. (2013a)
	Gardenia jasminoides var. *radicans*	Japan	Okane et al. (2003)
	Gardenia sp.	South Africa	Wikee et al. (2013a)
	Ginkgo biloba	Japan, Taiwan	Motohashi et al. (2009), Kirschner (2018)
	Ginkgo sp.	Japan	Wikee et al. (2013a)
	Givotia rottleriformis	India	Murali et al. (2007)
	Gmelina arborea	India	Murali et al. (2007)
	Grevillea robusta	Hawaii	Crous et al. (2004, 2013)
	Grevillea sp.	Australia, Tasmania	Crous et al. (2004, 2013)
	Grewia sp.	South Africa	Wikee et al. (2013a)
	Grewia tiliifolia	India	Murali et al. (2007)
	Guzmania sp.	Florida	Alfieri Jr. et al. (1984)
	Hebe sp.	South Africa	Wikee et al. (2013a)
	Hedera helix	Italy	Wulandari et al. (2009)
	Hedera sp.	South Africa	Wikee et al. (2013a)
	Heliconia sp.	Thailand	Wikee et al. (2013b)
	Helicteres isora	India	Murali et al. (2007)
	Helicteres jamaicensis	Puerto Rico	Wulandari et al. (2013)
	Helicteres sp.	Puerto Rico	Wulandari et al. (2013)
	Heptapleurum venulosum	Pakistan	Wulandari et al. (2013)
	Hibiscus sp.	Thailand	Wikee et al. (2013a)
	Hibiscus syriacus	Thailand	Wikee et al. (2013a, b), Guarnaccia et al. (2017)
	Hydrangea quercifolia	Japan	Motohashi et al. (2009)
	Hypericum androsaemum	Japan	Okane et al. (2003)
	Ilex rotunda	Japan	Okane et al. (2003)
	Ilex serrata	Japan	Okane et al. (2003)
	Ilex sp.	United States	Wikee et al. (2013a)
	Ipomoea sp.	Malaysia	Wikee et al. (2013a)
	Itea sp.	United States	Wikee et al. (2013a)
	Ixora chinensis	Thailand	Wikee et al. (2013b), Guarnaccia et al. (2017)
	Ixora nigricans	India	Murali et al. (2007)
	Jacquiniella sp.	Panama	Cash & Watson (1955), Piepenbring (2006)
	Juglans mandshurica	Japan	Okane et al. (2003)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Kandelia candel	Japan	Okane et al. (2003)
	Kandelia sp.	Japan	Wikee et al. (2013a)
	Koelreuteria paniculata	Japan	Okane et al. (2003)
	Kydia calycina	India	Murali et al. (2007)
	Laelia anceps	Mexico	Cash & Watson (1955)
	Laelia sp.	Florida	Alfieri Jr. et al. (1984)
	Laeliocattleya sp.	Florida	Alfieri Jr. et al. (1984)
	Lagerstroemia microcarpa	India	Murali et al. (2007)
	Lagerstroemia parviflora	India	Murali et al. (2007)
	Leucadendron × *laureolum-salignum*	Hawaii	Crous et al. (2013)
	Leucadendron sp.	Australia, Hawaii, Tasmania	Crous et al. (2004, 2013)
	Leucospermum cordifolium-glabrum	Hawaii	Crous et al. (2013)
	Leucospermum cordifolium-patersonii	Hawaii	Crous et al. (2013)
	Leucospermum sp.	Australia, Hawaii, Tasmania	Wikee et al. (2013a), Crous et al. (2004, 2013)
	Ligustrum lucidum	Japan	Motohashi et al. (2009)
	Ligustrum sp.	Japan	Wikee et al. (2013a)
	Lindera strychnifolia	Japan	Okane et al. (2003)
	Lindera umbellata	Japan	Okane et al. (2003)
	Litchi sp.	South Africa	Wikee et al. (2013a)
	Lithocarpus edulis	Japan	Motohashi et al. (2009)
	Lithocarpus sp.	Japan	Wikee et al. (2013a)
	Livistona sp.	Thailand	Wikee et al. (2013a)
	Lonicera morrowii	Japan	Okane et al. (2003)
	Loxostylis sp.	South Africa	Wikee et al. (2013a)
	Macfadyena unguis-cati	Brazil	da Silva et al. (2012)
	Mackaya sp.	South Africa	Wikee et al. (2013a)
	Maerua sp.	South Africa	Wikee et al. (2013a)
	Magnolia grandiflora	Iran	Esmaeilzadeh et al. (2020)
	Magnolia liliifera	Thailand	Wulandari et al. (2009), Glienke et al. (2011), Wikee et al. (2011)
	Magnolia praecocissima	Japan	Okane et al. (2003)
	Magnolia salicifolia	Japan	Okane et al. (2003)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Magnolia sp.	Thailand, United States	Wikee et al. (2013a)
	Mangifera indica	Brazil, Florida, Japan, India, Malaysia, Mexico, Myanmar, South Africa, Mpumalanga, Taiwan	Sivanesan (1984), Watson (1971), Roy (1967), Glienke et al. (2011), Wikee et al. (2011, 2013a), Miles et al. (2013), Zhou et al. (2015), Hyde et al. (2014), Liu (1977), Thaung (2008b), Meyer et al. (2006), Sivanesan & Hsieh (1989), Nag Raj (1993), van der Aa (1973), Kobayashi (2007), Alfieri Jr. et al. (1984), McGuire & Crandall (1967)
	Mangifera sp.	Brazil, Ghana	Wikee et al. (2013a)
	Michelia fuscata	Japan	Okane et al. (2003)
	Michelia sp.	Thailand	Wikee et al. (2013a)
	Monanthotaxis sp.	South Africa	Wikee et al. (2013a)
	Morus alba	Japan	Okane et al. (2003)
	Morus latifolia	Japan	Okane et al. (2003)
	Morus sp.	Thailand	Wikee et al. (2013a)
	Musa acuminata	China, Hawaii, Indonesia, Indonesia, South Africa, KwaZulu-Natal, South Africa, Mpumalanga, Thailand	Okane et al. (2003), Meyer et al. (2006), Wulandari et al. (2009), Sun et al. (2016), Wikee et al. (2013b), Glienke et al. (2011), Wikee et al. (2013b), Miles et al. (2013)
	Musa paradisiaca	Thailand	Wulandari et al. (2009), Glienke et al. (2011), Wikee et al. (2011), Wikee et al. (2013a, b), Guarnaccia et al. (2017)
	Musa sp.	Hawaii, Indonesia, Thailand, United States	Crous et al. (2004), Glienke et al. (2011), Wikee et al. (2013a)
	Myracrodruon sp.	Brazil	Wikee et al. (2013a)
	Myracrodruon urundeuva	Brazil	Rodrigues et al. (2004), Wulandari et al. (2009), Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Miles et al. (2013)
	Myrica rubra	Japan	Okane et al. (2003)
	Nandina domestica	Japan	Okane et al. (2003)
	Nandina domestica var. *leucocarpa*	Japan	Okane et al. (2003)
	Naringi crenulata	India	Murali et al. (2007)
	Nephelium lappaceum	Hawaii	Wulandari et al. (2009), Glienke et al. (2011), Wikee et al. (2013b), Guarnaccia et al. (2017)
	Nephelium sp.	United States	Wikee et al. (2013a)
	Nerium oleander var. *indicum*	Japan	Motohashi et al. (2009)
	Nerium sp.	Japan	Wikee et al. (2013a)
	Nidularium sp.	Florida	Alfieri Jr. et al. (1984)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Ocotea sp.	South Africa	Wikee et al. (2013a)
	Odontoglossum sp.	Florida	Alfieri Jr. et al. (1984)
	Oncidium sp.	Florida, Panama	Alfieri Jr. et al. (1984), Cash & Watson (1955), Piepenbring (2006)
	Ophiopogon sp.	Thailand	Wikee et al. (2013a)
	Orchidaceae	Florida	Alfieri Jr. et al. (1984)
	Orchidaceae	Japan	Okane et al. (2003)
	Orixa japonica	Japan	Okane et al. (2003)
	Osmanthus fragrans var. *aurantiacus f. aurantiacus*	Japan	Motohashi et al. (2009)
	Ougeinia oojeinensis	India	Murali et al. (2007)
	Pandanus sp.	Thailand	Hyde et al. (2018)
	Paphiopedilum callosum	Germany	Wulandari et al. (2009), Glienke et al. (2011), Wikee et al. (2013a, b), Guarnaccia et al. (2017)
	Paphiopedilum sp.	Germany	Wikee et al. (2013a)
	Parinari sp.	South Africa	Wikee et al. (2013a)
	Paullinia cupana	Brazil	Wikee et al. (2013a)
	Pavetta sp.	South Africa	Wikee et al. (2013a)
	Persea americana	South Africa, Mpumalanga	Meyer et al. (2006)
	Phalaenopsis sp.	Florida	Alfieri Jr. et al. (1984)
	Phellodendron amurense	Japan	Okane et al. (2003)
	Philodendron sp.	Thailand	Wikee et al. (2013a, b)
	Picrasma quassioides	Japan	Okane et al. (2003)
	Piper sp.	Puerto Rico	Wulandari et al. (2013)
	Pittosporum sp.	Hawaii, Japan	Wikee et al. (2013a)
	Pittosporum tobira	Japan	Motohashi et al. (2009)
	Podocarpus macrophyllus	Japan	Okane et al. (2003)
	Podocarpus sp.	South Africa	Wikee et al. (2013a)
	Polyalthia longifolia	Thailand	Wikee et al. (2013a, b), Guarnaccia et al. (2017)
	Polyalthia sp.	Thailand	Wikee et al. (2013a)
	Polyscias sp.	Thailand	Wikee et al. (2013a, b)
	Premna tomentosa	India	Murali et al. (2007)
	Protea × compacta-susannae	Hawaii	Crous et al. (2013)
	Protea cynaroides	Hawaii	Crous et al. (2004, 2013)
	Protea repens	Portugal	Wikee et al. (2013b)
	Protea sp.	Hawaii	Wikee et al. (2013a)
	Prunus cerasoides	Thailand	Okane et al. (2003)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Prunus laurocerasus var. *angustifolia*	Japan	Okane et al. (2003)
	Prunus sp.	Japan	Wikee et al. (2013a)
	Psidium guajava	Brazil, India, Venezuela	Wulandari et al. (2009), Wikee et al. (2011), Glienke et al. (2011), Pande (2008), Gonzalez & Rondon (2005)
	Psidium sp.	Brazil	Wikee et al. (2013a)
	Punica granatum	Japan, Thailand	Okane et al. (2003), Wikee et al. (2013a, b)
	Punica granatum var. *nana*	Japan	Okane et al. (2003)
	Punica sp.	Thailand	Wikee et al. (2013a)
	Putterlickia sp.	South Africa	Wikee et al. (2013a)
	Pyrrosia adnascens	Thailand	Wikee et al. (2013b)
	Quercus dentata	Japan	Okane et al. (2003)
	Quercus variabilis	Japan	Okane et al. (2003)
	Rauvolfia sp.	South Africa	Wikee et al. (2013a)
	Rhododendron × *pulchrum*	Japan	Wulandari et al. (2013)
	Rhododendron indicum	Japan	Okane et al. (2003)
	Rhododendron simsii	Japan	Okane et al. (2003)
	Rhododendron sp.	Brazil, Japan	Rodrigues et al. (2004), Sultan et al. (2011), Wikee et al. (2013a)
	Rhoicissus sp.	South Africa	Wikee et al. (2013a)
	Rhus sp.	South Africa	Wikee et al. (2013a)
	Rhynchostylis sp.	Malaysia	Liu (1977), Wikee et al. (2013a)
	Ricinus communis	China	Tang et al. (2020)
	Robinia pseudoacacia	Japan	Motohashi et al. (2009)
	Rothmannia sp.	South Africa	Wikee et al. (2013a)
	Rubus croceacanthus	Japan	Okane et al. (2003)
	Rubus sp.	Japan	Wikee et al. (2013a)
	Saccharum officinarum	Thailand	Wikee et al. (2013a, b)
	Saccharum sp.	Thailand	Wikee et al. (2013a)
	Sambucus nigra	Japan	Okane et al. (2003)
	Sansevieria hyacinthoides	Thailand	Wikee et al. (2013a)
	Sansevieria sp.	Netherlands, Thailand	Wulandari et al. (2009), Wikee et al. (2013a, b)
	Schefflera venulosa	Thailand	Wikee et al. (2013b)
	Schomburgkia sp.	Cayman, Islands, West Indies	Cash & Watson (1955)
	Schomburgkia tibicinis	Mexico	Cash & Watson (1955)
	Schrebera sp.	South Africa	Wikee et al. (2013a)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Sclerocarya sp.	South Africa	Wikee et al. (2013a)
	Scutia sp.	South Africa	Wikee et al. (2013a)
	Secamone sp.	South Africa	Wikee et al. (2013a)
	Smilax aspera	India	Wulandari et al. (2013)
	Smilax china	Japan	Okane et al. (2003)
	Smilax kraussiana	South Africa	Glienke et al. (2011)
	Smilax sp.	South Africa	Wikee et al. (2013a)
	Sophora japonica	Japan	Okane et al. (2003)
	Sorbus commixta	Japan	Okane et al. (2003)
	Spathiphyllum sp.	Japan	Motohashi et al. (2009), Wikee et al. (2013a)
	Spondias mombin	Brazil, Indonesia	Rodrigues et al. (2004), Wulandari et al. (2009), Wikee et al. (2011), Glienke et al. (2011), Ismail et al. (2012, 2013), Miles et al. (2013)
	Spondias sp.	Brazil	Wikee et al. (2013a)
	Stangeria sp.	South Africa	Wikee et al. (2013a)
	Stanhopea graveolens	Brazil	Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Miles et al. (2013)
	Stanhopea sp.	Brazil, Costa Rica	Cash & Watson (1955), Nag Raj (1993), Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Zhou et al. (2015), Guarnaccia et al. (2017), Tran et al. (2019), Hyde et al. (2014)
	Sterculia sp.	Puerto Rico	Wikee et al. (2013a)
	Stereospermum angustifolium	India	Murali et al. (2007)
	Strychnos potatorum	India	Murali et al. (2007)
	Strychnos sp.	South Africa	Wikee et al. (2013a)
	Sumbaviopsis albicans	Puerto Rico	Wulandari et al. (2013)
	Syringa reticulata	Iran	Esmaeilzadeh et al. (2020)
	Syzygium cumini	India	Murali et al. (2007)
	Syzygium sp.	Madagascar	Wikee et al. (2013b)
	Tectona grandis	India, Thailand	Murali et al. (2007), Wikee et al. (2013a, b), Hyde et al. (2018)
	Telopea sp.	Australia, Hawaii, Tasmania, Thailand	Wikee et al. (2013a), Crous et al. (2004, 2013)
	Terminalia crenulata	India	Murali et al. (2007)
	Thea sinensis	China, USSR	Watson (1971), Jin (2011)
	Thujopsis dolabrata var. *hondai*	Japan	Okane et al. (2003)
	Tilia miqueliana	Japan	Okane et al. (2003)
	Tinospora crispa	Thailand	Wikee et al. (2013a)
	Tinospora sp.	Thailand	Wikee et al. (2013a)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Trema sp.	South Africa	Wikee et al. (2013a)
	Trichilia sp.	South Africa	Wikee et al. (2013a)
	Tsuga sieboldii	Japan	Okane et al. (2003)
	unknown, Pteridophyta	Japan	Okane et al. (2003)
	Vaccinium sp.	New Zealand	Wulandari et al. (2009), Glienke et al. (2011), Wikee et al. (2013a, b), Guarnaccia et al. (2017), Tran et al. (2019)
	Vagnera stellata	New York, United States	Wulandari et al. (2013), Wulandari et al. (2013)
	Vanda sp.	Brunei Darussalam, Florida	Peregrine & Ahmad (1982), Alfieri Jr. et al. (1984)
	Vinca minor	South Africa	Shaw et al. (2006)
	Viscum sp.	South Africa	Wikee et al. (2013a)
	Vitex agnus-castus	Japan	Okane et al. (2003)
	Vitex cannabifolia	Japan	Okane et al. (2003)
	Vitex sp.	Malaysia, South Africa	Wikee et al. (2013a)
	Xymalos sp.	South Africa	Wikee et al. (2013a)
	Zanthoxylum armatum	Japan	Okane et al. (2003)
	Zanthoxylum sp.	Japan, Puerto Rico	Wikee et al. (2013a)
	Zingiber officinale	Thailand	Okane et al. (2003)
	Ziziphus sp.	South Africa, Thailand	Wikee et al. (2013a)
	Ziziphus xylopyrus	India	Murali et al. (2007)
P. carochlae	*Caryota ochlandra*	China	Zhou et al. (2015)
P. cavendishii	*Musa* sp.	Australia	Wong et al. (2013)
P. cordylinophila	*Cordyline atropurpurea*	Japan	Wikee et al. (2013b)
	Cordyline australis	Hawaii, New Zealand	Nag Raj (1993), Pennycook (1989)
	Cordyline banksii	New Zealand	Pennycook (1989)
	Cordyline dracaenoides	Argentina	Farr (1973)
	Cordyline fruticosa	Japan, Thailand	Motohashi et al. (2009), Wikee et al. (2013b)
	Cordyline terminalis	Hawaii, India, Japan, Samoa, Tonga	Dingley et al. (1981), Mathur (1979), Raabe (1981), Kobayashi (2007)
	Crinum pedunculatum	Australia	Simmonds (1966)
	Dracaena sp.	Puerto Rico, Virgin Islands, West Indies	Stevenson (1975), Minter et al. (2001)
P. eugeniae	Eugenia aromatica	Indonesia	Sultan et al. (2011)
	Eugenia cumini	Taiwan	Anonymous (1979)
	Eugenia maleolens	Puerto Rico, Virgin Islands	Stevenson (1975)
	Eugenia sp.	Florida	Alfieri Jr et al. (1984)
	Eugenia uniflora	Florida	Alfieri Jr et al. (1984)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Syzygium cumini	Florida	Alfieri Jr et al. (1984)
	Syzygium jambos	Florida	Alfieri Jr et al. (1984)
P. fallopiae	*Fallopia japonica*	Japan	Motohashi et al. (2008, 2009), Wikee et al. (2011), Zhou et al. (2015), Hyde et al. (2014)
P. ilicis-aquifolii	*Ilex aquifolium*	China, United Kingdom	Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014), Su & Cai (2012)
P. maculata	*Musa acuminata*	Australia, Hawaii, Indonesia	Shivas (1989), Raabe et al. (1981), Wulandari et al. (2010)
	Musa sapientum	Thailand	Giatgong (1980)
	Musa sp.	Australia, Bangladesh, Bhutan, Brunei Darussalam, China, Christmas Island, Territory of, Congo, Democratic Republic of the, Cook Islands, Fiji, Hawaii, Hong Kong, India,Indonesia, Malaysia, Micronesia, Myanmar, Nepal, New Caledonia, New Guinea, New Zealand, Niue, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Taiwan, Tanzania, Thailand, Tonga, Vanuatu, Vietnam	Hyde & Alcorn (1993), Wulandari et al. (2010), Sivanesan (1984), Photita et al. (2002), Dingley et al. (1981), Meredith (1969), Raabe et al. (1981), Stevens (1925), Thaung (2008b), Shaw (1984), McKenzie (1996), Ebbels & Allen (1979)
	Musa × *paradisiaca*	Hawaii, Indonesia	Anonymous (1960), Goos & Gowing (1992), Photita et al. (2002)
	Musa × *sapientum*	Malaysia	Williams & Liu (1976)
	Musa cavendishii	Taiwan	Yen (1972), Photita et al. (2002)
	Musa acuminata	Indonesia	Wong et al. (2012), Wulandari et al. (2013)
	Musa sp.	Australia, Fiji, Indonesia, Malaysia, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands	Wong et al. (2012, 2013), Wulandari et al. (2013), Hyde et al. (2014)
P. mangiferae	*Mangifera indica*	Tanzania	Ebbels & Allen (1979)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
P. mangifera-indica	*Mangifera indica*	Thailand	Wikee et al. (2013b)
P. musaechinensis	*Musa* sp.	China	Wu et al. (2014)
P. musarum	*Camellia oleifera*	China	Yu et al. (2018)
	Lycopersicon esculentum	India	Mathur (1979)
	Musa acuminata	Hawaii	Raabe et al. (1981)
	Musa basjoo	China	Tai (1979)
	Musa cavendishii	Taiwan	Anonymous (1979)
	Musa nana	Hawaii	Anonymous (1960)
	Musa sapientum	Thailand	Giatgong (1980)
	Musa sp.	India, New Caledonia	Mathur (1979), Huguenin (1966)
	Musa textilis	Philippines	Reinking (1918, 1919)
	Musa × *paradisiaca*	Dominican Republic, Hawaii, India	Ciferri (1929), Anonymous (1960), Mathur (1979), Kamal (2010)
	Musa × *paradisiaca* var. *sapientum*	China	Tai (1979)
	Musa × *sapientum*	India, Japan, Mexico, New Caledonia, Philippines, Taiwan	Mathur (1979), Kobayashi (2007), Alvarez (1976), Huguenin (1966), Reinking (1918, 1919), Anonymous (1979)
	Musa × *sapientum* var. *paradisiaca*	Dominican Republic	Ciferri (1961)
	Erythrina variegata	Guam	Lenne (1990), Boa & Lenné (1994)
	Musa acuminata	Hawaii	Raabe et al. (1981)
	Musa sp.	France, Hawaii	Photita et al. (2002), Stevens (1925)
	Musa × *sapientum*	Dominican Republic	Ciferri (1929)
	Prosopis pallida	Hawaii	Raabe et al. (1981)
	Musa nana	China	Zhuang (2001)
	Musa paradisiaca	India, Thailand	Wong et al. (2012)
	Musa sp.	Australia, Brunei Darussalam, China, India, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand	Wulandari et al. (2010), Wong et al. (2013), Thaung (2008b)
	Musa × *paradisiaca*	India	Ali & Saikia (1997)
	Musa × *sapientum*	Brunei Darussalam	Peregrine & Ahmad (1982)
	Musa × *paradisiaca*	Dominican Republic	Ciferri (1961)
	Musa acuminata	Hawaii	Teodoro (1937)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Musa sp.	Hawaii	Meredith (1969)
	Musa × *sapientum*	Fiji, Malaysia, Philippines	Firman (1972), Johnston (1960), Williams & Liu (1976), Turner (1971), van der Aa (1973), Petrak & Sydow (1931), Teodoro (1937)
	Musa humilis	Philippines	Teodoro (1937)
	Musa sp.	Philippines	Teodoro (1937)
	Musa textilis	Philippines	Teodoro (1937)
	Musa × *paradisiaca*	India, Philippines	Teodoro (1937)
	Musa × *sapientum*	Philippines	Teodoro (1937)
	Musa × *sapientum* var. *cinerea*	Philippines	Teodoro (1937)
	Musa × *sapientum* var. *compressa*	Philippines	Teodoro (1937)
	Musa × *sapientum* var. *lacatan*	Philippines	Teodoro (1937)
P. paracapitalensis	*Citrus aurantifolia*	New Zealand	Guarnaccia et al. (2017)
	Citrus aurantiifolia	New Zealand	Tran et al. (2019)
	Citrus aurantium	Australia	Tran et al. (2019)
	Citrus australasica	Australia	Tran et al. (2019)
	Citrus floridana	Italy	Guarnaccia et al. (2017), Tran et al. (2019)
	Citrus hystrix	Australia	Tran et al. (2019)
	Citrus japonica	Australia	Tran et al. (2019)
	Citrus limon	Spain	Guarnaccia et al. (2017), Tran et al. (2019)
	Citrus maxima	Australia	Tran et al. (2019)
	Citrus maxima-reticulata	Australia	Tran et al. (2019)
	Citrus reticulata	Australia	Tran et al. (2019)
	Citrus wintersii	Australia	Tran et al. (2019)
P. parthenocissi	*Parthenocissus quinquefolia*	Missouri, United States	Zhang et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
P. partricuspidatae	*Parthenocissus tricuspidata*	Japan	Zhou et al. (2015)
P. philoprina	*Ilex aquifolium*	California, New Jersey, Washington	Shaw (1973), Anonymous (1960)
	Ilex coriacea	Florida	Alfieri Jr. et al. (1984), Anonymous (1960)
	Ilex cornuta	North Carolina	Grand (1985)
	Ilex crenata	North Carolina	Grand (1985)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Ilex opaca	North Carolina, New Jersey, New York, South Carolina, Texas, West Virginia	Anonymous (1960), Grand (1985)
	Ilex sp.	Asia, Europe, Florida, North America, United Kingdom	Alfieri Jr. et al. (1984), von Arx & Muelle (1954), Cannon et al. (1985)
	Manihot glaziovii	India	Rao & Mani Varghese (1988), Pande (2008)
	Yucca sp.	Illinois	Cooke (1969)
	Rhododendron catawbiense	Canada	Ginns (1986)
	Rhododendron sp.	California, Canada, Nova Scotia, Ontario, Massachusetts, North Carolina, New Hampshire, New York, United Kingdom	Barr (1970), Pirozynski (1974), Ginns (1986), Grand (1985), Cannon et al. (1985)
	Ilex aquifolium	California	French (1989)
	Macrophoma ilicella	Georgia	Dzhalagonia (1965)
	Cryptomeria japonica	Netherlands	Sultan et al. (2011)
	Hedera helix	Switzerland	Luginbuehl & Mueller (1980)
	Ilex aquifolium	Switzerland	Luginbuehl & Mueller (1980)
	Ilex cinerea	Hong Kong	Lu et al. (2000), Zhuang (2001)
	Ilex paraguariensis	Brazil	Takeda et al. (2003)
	Juniperus communis	Switzerland	Luginbuehl & Mueller (1980)
	Taxus baccata	Germany, Netherlands, Poland, United States	Slippers et al. (2004), Phillips et al. (2005), Phillips & Alves (2009), Begoude et al. (2010), McDonald & Eskalen (2011), Lynch et al. (2013), Adesemoye et al. (2014), Chen et al. (2014), Zhou et al. (2015), Nogueira et al. (2016), Hyde et al. (2014), Mulenko et al. (2008), Sultan et al. (2011), Nouri et al. (2018)
	Taxus baccata var. *fastigiata*	Poland	Mulenko et al. (2008)
	Taxus cuspidata	Poland	Mulenko et al. (2008)
	Rhododendron carolinianum	Connecticut, North Carolina, New Jersey, New York	Anonymous (1960)
	Rhododendron catawbiense	Connecticut, Massachusetts, Maryland, New Jersey, New York,	Anonymous (1960)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
		Pennsylvania, Virginia	
	Rhododendron macrophyllum	New Jersey, Oregon, Washington	Anonymous (1960), Shaw (1973)
	Rhododendron maximum	Connecticut, Massachusetts, Maryland, New Jersey, New York, Pennsylvania, Virginia	Anonymous (1960)
	Rhododendron sp.	California, Connecticut, Florida, Massachusetts, Maryland, Netherlands, New Zealand, New Jersey, New York, Pennsylvania, Virginia, Washington	Anonymous (1931-1970, 1960), Alfieri Jr. et al. (1984), Wikee et al. (2013b), Pennycook (1989), Eglitis et al. (1966)
	Rhododendron × hybridum	Netherlands	BPI n/a.)
	Chamaecyparis obtusa	Japan	Kobayashi (2007)
	Cryptomeria japonica	Japan	Kobayashi & Sasaki (1975), Sivanesan (1984), Kobayashi (2007), Motohashi et al. (2009)
	Larix leptolepis	Japan	Kobayashi (2007)
	Ilex aquifolium	Germany, Netherlands, Spain	Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014), Zhu et al. (2018)
	Ilex latifolia	China	Tai (1979), Chen (2002), Teng (1996)
	Ilex cornuta	China	Tai (1979), Teng (1996)
	Ilex crenata	New Jersey	Anonymous (1960)
	Ilex crenata cv. Rotundifolia	Georgia	Driver (1952)
	Ilex opaca	North Carolina, New Jersey, New York, South Carolina, Texas, West Virginia	Anonymous (1960), Williams & Hayne (1982)
	Ilex sp.	California, United Kingdom	Anonymous (1960), Cannon et al. (1985)
	Ilex verticillata	New York	Anonymous (1960)
	Hedera helix	Portugal	Unamuno (1941)
	Ilex aquifolium	Portugal	Unamuno (1941)
	Rhododendron sp.	England	Davis (1946)
	Rhododendron sp.	Austria	von Hoehnel (1931)
P. rhizophorae	*Cordyline fruticosa*	Thailand	In this study

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Heliconia sp.	Thailand	In this study
	Ixora chinensis	Thailand	In this study
	Musa paradisiaca	Thailand	In this study
	Punica granatum	Thailand	In this study
	Rhizophora stylosa	Thailand	In this study
P. schimae	*Schima superba*	China	Su & Cai (2012), Zhou et al. (2015), Hyde et al. (2014)
P. schimicola	*Schima superba*	China	Zhou et al. (2015)
P. styracicola	*Styrax grandiflorus*	China, France	Zhang et al. (2013a), Wikee (2013b), Zhou et al. (2015), Hyde et al. (2014)
P. vitis-rotundifoliae	*Vitis rotundifolia*	United States	Zhou et al. (2015)
P. cruenta **species complex**			
P. abieticola	*Abies concolor*	Canada	Hyde et al. (2014)
	Aloe ferox	South Africa	Wikee et al. (2013b), Zhou et al. (2015)
P. cornicola	*Cornus alternifolia*	US, Wisconsin	Anonymous (1960)
	Cornus asperifolia	US	Anonymous (1960)
	Cornus florida	Australia, Florida, North Carolina, United States	Sampson & Walker (1982), Grand (1985), Grand et al. (1975), Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
	Cornus hemsleyi	Armenia	Simonyan (1981)
	Cornus mas	Ukraine	Dudka et al. (2004)
	Cornus occidentalis	US	Anonymous (1960)
	Cornus racemosa	US	Anonymous (1960)
	Cornus sp.	US	Anonymous (1960)
	Cornus stolonifera	US	Anonymous (1960)
	Cornus alba	Canada, Iowa, Ohio, Poland	Conners (1967), Gilman & Archer (1929), Farr (1991), Mulenko et al. (2008)
	Cornus alternifolia	Canada, Iowa, US	Conners (1967), Gilman & Archer (1929), Anonymous (1960)
	Cornus amomum	Iowa, Missouri	Farr (1991), Gilman & Archer (1929), Maneval (1937)
	Cornus asperifolia	Iowa, Kansas, Oklahoma, Range of host	Gilman & Archer (1929), Rogerson (1953), Preston (1945), Anonymous (1960)
	Cornus australis	Iran	Jorstad (1960)
	Cornus californica	California, Canada	French (1989), Ginns (1986)
	Cornus canadensis	Canada	Ginns (1986)
	Cornus controversa	Japan	Kobayashi (2007)
	Cornus coreana	China	Bai (2003)
	Cornus florida	Eastern states, Florida, Georgia, Iowa, Missouri,	Anonymous (1960), Alfieri et al. (1984), Miller et al. (1954), Anonymous (1960), Maneval (1937), Grand (1985), Preston (1947)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
		North Carolina, Oklahoma	
	Cornus hemsleyi	China	Bai (2003)
	Cornus mas	Bulgaria, Greece, Poland, Ukraine	Vanev et al. (1997), Pantidou (1973), Mulenko et al. (2008), Dudka et al. (2004)
	Cornus nuttallii	Canada	Ginns (1986)
	Cornus occidentalis	US	Anonymous (1960)
	Cornus paniculata	Iowa	Gilman & Archer (1929)
	Cornus racemosa	Canada, Iowa, Kansas, New York, Oklahoma, Range of host, Virginia, Wisconsin	Farr (1991), Mix (1954), Preston (1947), Anonymous (1960)
	Cornus sanguinea	Austria, Bulgaria, Czechoslovakia, England, France, Germany, Iran, Italy, Poland, Portugal, Romania, Sweden, United States, USSR	Farr (1991), Vanev et al. (1997), Arzanlou & Torbati (2013), Mulenko et al. (2008), de Sousa Dias et al. (1987), Ge et al. (2016)
	*Cornus sanguinea sub*sp. *australis*	Bulgaria, Iran	Vanev et al. (1997), Arzanlou & Torbati (2013)
	Cornus sericea	Canada, Italy, Missouri, Poland	Ginns (1986), Garibaldi et al. (2003), Maneval (1937), Mulenko et al. (2008)
	Cornus sp.	Bulgaria, China, Georgia, Germany, Iowa, Mississippi, Netherlands, US	Bobev (2009), Tai (1979), Chen (2002), Zhuang (2005), Guo (1997), Dzhalagonia (1965), Farr (1991), Gilman & Arche (1929), Parris (1959), Ge et al. (2016), Anonymous (1960)
	Cornus stolonifera	Canada, Canada, Quebec, Iowa, Montana, North Dakota, Oklahoma, Range of host, South Dakota, Washington, Wisconsin	Conners (1967), Parmelee (1988), Feau et al. (2005), Gilman & Archer (1929), Shaw (1973), Brenckle (1918), Preston (1945), Anonymous (1960), Mankin (1969), Greene (1942)
	Cornus stolonifera var. *aurea*	Iowa	Gilman & Archer (1929)
	Cornus stolonifera var. *lutea*	Iowa	Gilman & Archer (1929)
	Cornus walteri	China	Zhuang (2005)
	Swida australis	Ukraine	Dudka et al. (2004)
	*Swida sanguinea sub*sp. *australis*	Armenia	Simonyan (1981)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Cornus obliqua	Wisconsin	Greene (1962)
	Cornus racemosa	Wisconsin	Greene (1962)
	Cornus rugosa	Wisconsin	Greene (1962)
	Cornus sanguinea	Maryland, Netherlands	Verkley et al. (2013)
P. cruenta	*Maianthemum bifolium*	Poland	Mulenko et al. (2008)
	Polygonatum nakaiana	China	Tai (1979)
	Polygonatum odoratum var. *pluriflorum*	China	Tai (1979)
	Polygonatum	Austria	Petrak (1963)
	Lomatium suksdorfii	Washington	Shaw (1973)
	Convallaria majalis	Poland	Adamska (2001)
	Maianthemum bifolium	Poland	Adamska (2001)
	Polygonatum multiflorum	Poland	Adamska (2001)
	Polygonatum sp.	Sweden, Ukraine	Dudka et al. (2004), Eriksson (2014)
	Disporum viridescens	China	Tai (1979)
	Polygonatum humile	China	Tai (1979)
	Polygonatum odoratum var. *pluriflorum*	China	Tai (1979)
	Polygonatum officinale	China	Tai (1979)
	Smilacina japonica	China	Tai (1979)
	Tovara japonica	China	Tai (1979)
	Bambuseae	Dominican Republic	Ciferri (1961)
	Convallaria majalis	Lithuania, Poland, Russia, Scotland	Treigiene (2006), Mulenko et al. (2008), Ruszkiewicz-Michalska et al. (2012), Gasich et al. (1999), Foister (1961)
	Iris sp.	Illinois	Boewe (1964)
	Maianthemum bifolium	Poland	Mulenko et al. (2008)
	Oakesia sp.	Wisconsin	Greene (1949)
	Polygonatum biflorum	United States	Anonymous (1960)
	Polygonatum commutatum	Missouri	Maneval (1937)
	Polygonatum lasianthum	China	Tai (1979)
	Polygonatum latifolium	USSR	van der Aa (1973)
	Polygonatum macropodum	China	Bai (2000)
	Polygonatum multiflorum	India, Lithuania, Poland, Romania, Ukraine	van der Aa (1973), Treigiene (2006), Mulenko et al. (2008), Wulandari et al. (2013), Dudka et al. (2004)
	Polygonatum odoratum	Lithuania, Poland, Romania, Ukraine	Treigiene (2006), Mulenko et al. (2008), van der Aa (1973), Dudka et al. (2004)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Polygonatum odoratum var. *pluriflorum*	China, Japan	Jin (2011), Motohashi et al. (2009)
	Polygonatum officinale	Austria, China	van der Aa (1973), Tai (1979)
	Polygonatum orientale	Ukraine	Dudka et al. (2004)
	Polygonatum sewerzowii	Uzbekistan	Gafforov (2017)
	Polygonatum sibiricum	China	Tai (1979)
	Polygonatum sp.	China, India, Wisconsin	Teng (1996), Mathu (1979), Greene (1949)
	Polygonatum vulgare	Spain	Gonzalez Fragoso (1917)
	Smilacina amplexicaulis	New Mexico, United States	Anderson (1919), Anonymous (1960)
	Smilacina racemosa	Missouri, United States	Maneval (1937), Anonymous (1960)
	Smilacina stellata	North Dakota, United States	Anderson (1919), Brenckle (1918), Anonymous (1960)
	Smilax china	Japan	Kobayashi (2007)
	Smilax herbacea	China	Tai (1979)
	Smilax hispida	Missouri	Maneval (1937)
	Smilax sp.	Missouri	Maneval (1937)
	Uvularia sp.	Wisconsin	Greene (1949)
	Maianthemum dilatatum	Washington	Shaw (1973)
	Polygonatum multiflorum	Pakistan	Ahmad (1969), Ahmad et al. (1997)
	Smilacina racemosa	Idaho, Washington	Shaw (1973)
	Smilacina stellata	Idaho, Montana, Oregon, Washington	Shaw (1973)
	Maianthemum dilatatum	Alaska, Washington,	Anonymous (1960)
	Polygonatum biflorum	Connecticut, Indiana, New York, Virginia, Wisconsin,	Anonymous (1960)
	Polygonatum canaliculatum	Iowa, Ohio, Wisconsin	Anonymous (1960)
	Polygonatum commutatum	Iowa	Gilman & Archer (1929)
	Polygonum multiflorum	Greece	Pantidou (1973)
	Smilacina amplexicaulis	California, New Mexico	Anonymous (1960)
	Smilacina racemosa	Iowa, Illinois, Oklahoma, Range of host	Gilman & Archer (1929), Neely (1959), Preston (1947), Anonymous (1960)
	Smilacina stellata	Mississippi, Range of host	Parris (1959), Anonymous (1960)
	Smilax herbacea	Iowa	Anonymous (1960), Gilman & Archer (1929)
	Smilax hispida	Iowa	Gilman & Archer (1929)
	Smilax rotundifolia	Iowa	Anonymous (1960), Gilman & Archer (1929)
	Smilax tamnoides var. *hispida*	Iowa	Anonymous (1960)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Uvularia grandiflora	Iowa, Illinois, Missouri, Virginia, Wisconsin	Anonymous (1960)
	Uvularia perfoliata	Indiana	Anonymous (1960)
	Uvularia sessilifolia	Connecticut, New York, Wisconsin	Anonymous (1960)
	Polygonatum officinale	Portugal	Nag Raj (1993), Costa & Camara (1952)
P. cryptomeriae	*Cryptomeria japonica*	District of Columbia, Japan, Korea, Virginia	Brittingham & O'Brien (1978), Leuchtmann et al.1992), Shaw et al. (2006), Motohashi et al. (2009), Cho & Shin (2004)
	Cunninghamia lanceolata	China	Chen (2002)
P. foliorum	*Rhododendron ponticum*	Netherlands	Timmwemans (1957)
	Taxus baccata	England, Europe	Dennis (1978), von Arx & Mueller (1954)
	Taxus sp.	United Kingdom	Cannon et al. (1985)
	Yucca sp.	Mexico	Chacón & Carrion (1984)
	Cryptomeria japonica	United States	Wikee et al. (2013b)
	Taxus baccata	Italy, Netherlands	Wikee et al. (2013b), Zhou et al. (2015), Mayorquin et al. (2016), Hyde et al. (2014)
	Taxus baccata	Scotland	Spaulding (1961), Foister (1961)
P. gaultheriae	*Gaultheria humifusa*	Netherlands, United States	Sultan et al. (2011), Zhou et al. (2015), Hyde et al. (2014)
	Gaultheria cumingiana	Taiwan	Anonymous (1979)
	Gaultheria humifusa	United States, Washington	Wikee et al. (2013b), van der Aa (1973)
	Gaultheria procumbens	New Jersey, Range of host	van der Aa (1973), Ellis & Everhart (1878−1898), Nag Raj (1993), Cash (1953), Anonymous (1960)
	Gaultheria shallon	California, Canada, Oregon, Washington	Eglitis et al. (1966), Ginns (1986), Shaw (1973), Lambe (1960), Anonymous (1960)
	Gaultheria spp.	North America	Bissett & Darbyshir (1984a), Wulandari et al. (2013), van der Aa (1973), Van Der & Vanev (2002)
P. hakeicola	*Hakea* sp.	Australia	Crous et al. (2018)
P. hamamelidis	*Hamamelis* sp.	United States	Anonymous (1960)
	Hamamelis japonica	Japan	Kobayashi (2007), Motohashi et al. (2009), Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
	*Hamamelis japonica subs*p. *megalophylla*	Japan	Motohashi et al. (2009)
	Hamamelis japonica var. *discolor* f. *obtusata*	Japan	Motohashi et al. (2009)
	Hamamelis sp.	Eastern states, Mississippi, Tennessee, Wisconsin	Anonymous (1960)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Hamamelis virginiana	Canada, Canada, Ontario, North Carolina, South Carolina	Ginns (1986), Bissett & Darbyshir (1984b), van der Aa (1973), Nag Raj (1993)
P. hubeiensis	*Viburnum odoratissimum*	China	Hyde et al. (2014), Wikee et al. (2013b), Wulandari et al. (2013), Zhang et al. (2013a), Zhou et al. (2015)
P. illicii	*Illicium verum*	China	Lin et al. (2017)
P. leucothoicola	*Leucothoe catesbaei*	Japan	Hyde et al. (2014), Wikee et al. (2013b), Zhou et al. (2015)
P. ligustricola	*Ligustrum obtusifolium*	Japan	Hyde et al. (2014), Motohashi et al. (2009), Zhou et al. (2015)
P. minima	*Acer rubrum*	Louisiana, Mississippi, North Carolina	Overholts (1938), Parris (1959), Wolf et al. (1938)
	Acer saccharophorum	Mississippi	Parris (1959)
	Acer sp.	Alabama, Florida, New Jersey	Blain (1931), Alfieri Jr. et al. (1984), Nag Raj (1993), Cash (1953)
	Acer cinnamomifolium	China	Zhuang (2001), Bai (2000)
	Acer negundo	Alabama, China	Anderson (1919), Tai (1979), Chen (2002), Bai (2000)
	Acer campestre	Canada, Ontario, Ukraine	Bissett & Darbyshire (1984c), Dudka et al. (2004)
	Acer crataegifolium	Japan	Motohashi et al. (2009)
	Acer ginnala	Canada, Manitoba, Ontario	Ginns (1986), Bissett & Darbyshire (1984c)
	Acer glabrum	Idaho, Missouri	Anonymous (1960)
	Acer mono	China	Tai (1979), Chen (2002), Zhuang (2005)
	Acer negundo	Missouri, North Carolina, Range of host	Maneval (1937), Grand (1985), Anonymous (1960)
	Acer nigrum	United States	Anonymous (1960)
	Acer palmatum	Connecticut, North Carolina	Anonymous (1960), Grand (1985)
	Acer platanoides	Canada, Eastern states, Missouri, North Carolina, Wisconsin	Conners (1967), Anonymous (1960), Maneval (1937), Grand (1985), Greene (1958)
	Acer pseudoplatanus	Connecticut, Pennsylvania	Anonymous (1960)
	Acer pycnanthum	Japan	Motohashi et al. (2009)
	Acer rubrum	Canada, Canada, New Brunswick, Canada, Nova Scotia, Canada, Ontario, Canada, Prince Edward Island, Canada, Quebec, Florida, Massachusetts,	Conners, (1967), Ginns (1986), Bissett & Darbyshire (1984c), Miller (1991), Schubert (1991), Cooke (1978), Parris (1959), Grand (1985), Grand et al. (1975), Wikee et al. (2013b), van der Aa (1973), Mix (1954), Preston (1945), Fergus (1954), Anonymous (1960), Mankin (1969), Zhou et al. (2015), Hyde et al. (2014), Greene (1966)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
		Mississipp, North Carolina, North Dakota, New Jersey, New York, Oklahoma, Pennsylvania, Range of host, South Dakota, Tennessee, United States, Wisconsin	
	Acer saccharinum	Canada, Canada Ontario, Iowa, Missouri, Mississippi, North Carolina, Oklahoma, Range of host, Wisconsin	Conners (1967), Bissett & Darbyshire (1984c), Gilman & Archer (1929), Maneval (1937), Parris (1959), Grand (1985), Wolf et al. (1938), Preston (1947), Anonymous (1960), Anderson (1919)
	Acer saccharum	Canada, Canada, Ontario, Canada, Quebec, Mississippi, Pennsylvania, Range of host, Wisconsin	Conners (1967), Ginns (1986), Fergus (1954), Anonymous (1960), Anderson (1919)
	Acer sp.	Canada, Ontario, Canada, Prince Edward Island, China, Mississippi, New Jersey, North America	Bissett & Darbyshire (1984c), Wikee et al. (2013b), Parris (1959), van der Aa (1973), Nag Raj (1993)
	Acer spicatum	Canada, Canada, New Brunswick, Canada, Nova Scotia, New York, Wisconsin	Conners (1967), Ginns (1986), Bissett & Darbyshire (1984c), Anonymous (1960), Anderson (1919)
	Acer tartaricum	Canada, Ontario	Bissett & Darbyshire (1984c)
	Sorbus americana	Canada	Ginns (1986)
P. neopyrolae	*Pyrola asarifolia*	Japan	Zhou et al. (2015), Hyde et al. (2014)
	*Pyrola asarifolia sub*sp. *incarnata*	Japan	Wikee et al. (2013b)
P. pachysandricola	*Pachysandra terminalis*	Japan	Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
P. paxistimae	*Paxistima myrsinites*	North America	Wikee et al. (2013b)
P. podocarpicola	*Podocarpus maki*	Florida, United States	Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
P. pyrolae	*Chimaphila umbellata*	Canada, Ontario	Bissett & Darbyshire (1984d)
	Chimaphila umbellata var. *cisatlantica*	Canada	Conners (1967)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Erica carnea	Japan	Sultan et al. (2011)
	Gaultheria shallon	Canada, British Columbia	Leuchtmann et al. (1992)
	Orthilia secunda	Poland	Mulenko et al. (2008)
	Pyrola asarifolia	Canada, New Brunswick, Montana, Oregon	Bissett & Darbyshire (1984d), Shaw (1973), Shaw et al. (2006)
	Pyrola asarifolia var. *purpurea*	Alaska	Parmelee (1958)
	Pyrola bracteata	Canada, British Columbia	Bissett & Darbyshire (1984d)
	Pyrola elliptica	Wisconsin	Anonymous (1960)
	Pyrola rotundifolia	Delaware, Lithuania, Ukraine, United States	van der Aa (1973), Ellis & Everhart (1889), Nag Raj (1993), Cash (1953), Treigiene (2006), Dudka et al. (2004), Wikee et al. (2013b)
P. rubella	*Pyrola rotundifolia* var. *americana*	Delaware, Montana	Anonymous (1960)
P. paviae	*Pyrola* sp.	United States	Sultan et al. (2011)
P. telopeae	*Vaccinium myrtillus*	Lithuania	Treigiene (2006)
***P. vaccinii* species complex**			
P. vaccinii	*Gaultheria procumbens*	Eastern states	Barr (1970)
	Kalmia latifolia	Eastern states	Barr (1970)
	Kalmia sp.	Rhode Island	Goos (2010)
	Lyonia lucida	Eastern states	Barr (1970)
	Vaccinium ashei	Florida	Alfieri Jr. et al. (1984)
	Vaccinium elliottii	Florida	Alfieri Jr. et al. (1984)
	Vaccinium macrocarpon	Eastern states, Massachusetts, New Jersey, Washington, Wisconsin	Barr (1970), Weidemann & Boone (1983)
	Vaccinium sp.	Rhode Island	Goos (2010)
	Acer truncatum	China	Sun et al. (2011)
	Arctostaphylos columbiana	British Columbia, Canada	Conners (1967)
	Gaylussacia brachycera	Maryland	Anonymous (1960)
	Kalmia latifolia	Connecticut, New Jersey, New York, Virginia	Anonymous (1960)
	Oxycoccus macrocarpos	Netherlands	Sultan et al. (2011)
	Oxycoccus macrocarpus	United States	Wulandari et al. (2009), Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Vaccinium macrocarpon	New Jersey, Oregon, Range of host, Washington	Shaw (1973), Eglitis et al. (1966), Anonymous (1960)
	Vaccinium oxycoccos	United States	Anonymous (1960)
	Pieris nitida	Mississippi	Tracy & Earle (1895)
	Vaccinium ovatum	California, Washington	Anonymous (1960), French (1987), Nag Raj (1993), Bona (1928), Shaw (1973), Eglitis et al. (1966)
	Vaccinium arboreum	Alabama, Florida, Mississippi	van der Aa (1973), Anonymous (1960), Weidemann et al. (1982), Nag Raj (1993), Zhang et al. (2013b), Alfieri Jr. et al. (1984), Parris (1959)
	Vaccinium ashei	Mississippi	Parris (1959)
	Vaccinium corymbosum	Florida	Miller (1997)
	Vaccinium macrocarpon	Massachusetts, Michigan, New Jersey, United States, Wisconsin	Weidemann & Boone (1983), Zhang et al. (2013b), Polashock et al. (2009), Olatinwo et al. (2003), Waller et al. (2020), Zhou et al. (2015), Hyde et al. (2014), McManus (1998)
	Vaccinium ovatum	California	French (1989)
	Vaccinium sp.	China, North America	Wikee et al. (2013b)
	Vaccinium vitis-idaea	China	Bai (2000)
	Vaccinium ashei	Georgia, Maryland, Mississippi, North Carolina	Anonymous (1960)
	Vaccinium corymbosum	Georgia, Maryland, North Carolina	Anonymous (1960)
P. vacciniicola	*Vaccinium macrocarpon*	United States	Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
P. rhodorae **species complex**			
P. mimusopisicola	*Mimusops zeyheri*	South Africa	Crous et al. (2014)
P. rhodorae	*Rhododendron ponticum*	United Kingdom	Dennis (1986)
	Rhododendron sp.	Denmark, England, Scotland	Lind (1913), Anonymous (1928), Dennis & Foister (1942), Foister (1961)
	Rhododendron californicum	Oregon	Zeller (1934)
	Rhododendron smirnowii	Washington	Eglitis et al. (1966)
	Rhododendron sp.	England, Washington	Eglitis et al. (1966)
P. concentrica **species complex**			
P. aspidistricola	*Aspidistra elatior*	Japan	Motohashi et al. (2008, 2009), Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
P. aucubae-japonicae	*Aucuba japonica*	Japan	Hernandez-Restrepo et al. (2016)
P. bifrenariae	*Bifrenaria harrisoniae*	Brazil	Glienke et al. (2011)
P. catimbauensis	*Mandevilla catimbauensis*	Brazil	Crous et al. (2017)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
P. citriasiana	*Citrus maxima*	Thailand, China, Vietnam	Wulandari et al. (2009), Guarnaccia et al. (2017)
P. citribrasiliensis	*Citrus limon*	Brazil	Glienke et al. (2011), Wikee et al. (2011, 2013b), Zhou et al. (2015), Hyde et al. (2014)
	Citrus sp.	Brazil	Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Miles et al. (2013), Wulandari et al. (2013), Guarnaccia et al. (2017), Tran et al. (2019)
P. citricarpa	*Aegle marmelos*	Myanmar	Thaung (2008b)
	Camellia sinensis	Papua New Guinea	Shaw (1984)
	Cassia emarginata	Cuba	Urtiaga (1986)
	Cedrela mexicana	Cuba	Urtiaga (1986)
	Cedrela odorata	Cuba	Urtiaga (2004)
	Chrysanthemum × *morifolium*	Hong Kong	Lu et al. (2000), Zhuang (2001)
	Citrus × *grandis-reticulata*	New Zealand	Gadgil (2005)
	Citrus × *paradisi*	Australia, South Africa, South Africa, KwaZulu-Natal, South Africa, Mpumalanga, Swaziland	Simmonds (1966), Gorter (1977), Crous et al. (2000), Meyer et al. (2001, 2006)
	Citrus × *tangelo*	New Zealand	Pennycook (1989), Gadgil (2005)
	Citrus aurantiacum	Brazil	Sultan et al. (2011)
	Citrus aurantifolia	Cook Islands, Fiji, Niue, Samoa, Tonga	Dingley et al. (1981)
	Citrus aurantium	Australia, Brazil, China, Myanmar	Wulandari et al. (2009), Phillips et al. (2009), Minnis et al. (2012), Nouri et al. (2018), Thaung (2008b), Tai (1979), Bai (2000), Nag Raj (1993), Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Ismail et al. (2012)
	Citrus decumana	Myanmar	Thaung (2008b)
	Citrus deliciosa	Australia, Brazil	Nag Raj (1993), Mendes (1998)
	Citrus grandis	China	Tai (1979), Bai (2000)
	Citrus junos	China	Tai (1979), Bai (2000)
	Citrus limon	Argentina, Australia, Brazil, Cook Islands, Fiji, Italy, Nigeria, Niue, Samoa, South Africa, South Africa, Mpumalanga, Tonga, Tunisia, Uruguay, Zimbabwe	Simmonds (1966), Wulandari et al. (2009), Dingley et al. (1981), Meyer et al. (2001, 2006), Whiteside (1966), Wikee et al. (2011, 2013a, b), Guarnaccia et al. (2017), Glienke et al. (2011), Miles et al. (2013), Zhou et al. (2015), Tran et al. (2019), Hyde et al. (2014), Mendes et al. (1998), Boughalleb-M'Hamdi et al. (2020)
	Citrus limon	Australia	Simmonds (1966)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Citrus limonia	China, Southern Africa, Australia, Brazil	Gorter (1977), Crous et al. (2000), Tai (1979), Bai (2000), Doidge (1950), Nag Raj (1993), Glienke et al. (2011)
	Citrus maxima	Southern Africa, Philippines, Brazil	Reinking (1919, 1918, 1921), Doidge (1950), Glienke et al. (2011)
	Citrus medica	Myanmar	Thaung (2008b)
	Citrus medica var. *limonum*	Myanmar	Thaung (2008b)
	Citrus microcarpa	China	Tai (1979), Bai (2000)
	Citrus natsudaidai	Japan	Kobayashi (2007)
	Citrus nobilis	China, Philippines	Teodoro (1937), Reinking (1921), Tai (1979), Zhuang (2001), Bai (2000)
	Citrus nobilis var. *deliciosa*	Southern Africa	Doidge (1950)
	Citrus paradisi	Cook Islands	Dingley et al. (1981)
	Citrus reticulata	Australia, Cook Islands, Fiji, Hong Kong, Niue, South Africa, South Africa, Mpumalanga, Tonga	Simmonds (1966), Dingley et al. (1981), Lu et al. (2000), Gorter (1977), Crous et al. (2000), Meyer et al. (2001, 2006), Dingley et al. (1981)
	Citrus reticulata	Australia, Brazil, China, Hong Kong, India, Japan, Philippines	Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Miles et al. (2013), Guarnaccia et al. (2017), Tran et al. (2019), Wang et al. (2012), Lu et al. (2000), Zhuang (2001), Das et al. (2018), Kobayashi (2007), Tai (1979), Bai (2000), Watson (1971), Simmonds (1966), Mendes et al. (1998)
	Citrus reticulata var. *poonensis*	China	Tai (1979), Bai (2000)
	Citrus reticulata var. *suhoiensis*	China	Tai (1979), Bai (2000)
	Citrus reticulata var. *sunki*	China	Tai (1979), Bai (2000)
	Citrus reticulata var. *tankan*	China	Tai (1979), Bai (2000)
	Citrus sinensis	Australia, Brazil, China, Cook Islands, Fiji, Niue, North America, Samoa, South Africa, South Africa, Mpumalanga, Tonga, Uganda, Zimbabwe, Angola, Florida, India, Malta, Portugal, Tunisia	Bassimba et al. (2018), Shivas (1989), Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Miles et al. (2013), Wulandari et al. (2009, 2013), Tran et al. (2019), Mendes et al. (1998), Glienke et al. (2011), Guarnaccia et al. (2017), Das et al. (2018), Boughalleb-M'Hamdi et al. (2020), Simmonds (1966), Tai (1979), Bai (2000), Doidge (1950), Peres et al. (2007), Dingley et al. (1981), Schubert et al. (2012), Gorter (1977), Crous et al. (2000), Meyer et al. (2001, 2006), Reeder et al. (2008), Whiteside (1966)
	Citrus sinensis f. sehkan	Taiwan	Anonymous (1979)
	Citrus sinensis var. *sekkan*	China	Tai (1979), Bai (2000)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Citrus sp.	Angola, Argentina, Australia, Bhutan, Brazil, China, Cuba, Florida, Ghana, India, Indonesia, Italy, Japan, Kenya, Malta, Mozambique, Namibia, Nigeria, Philippines, Portugal, South Africa, Swaziland, Taiwan, Uganda, United States, Uruguay, Zambia, Zimbabwe, Africa, Asia, Australia, Fiji, Hong Kong, New Zealand, United States, West Indies	Petrak (1953), Watson (1971), Mendes et al. (1998), Firman (1972), Dingley et al. (1981), Zhuang (2001), Pennycook (1989), Bai (2000), Meyer et al. (2001, 2006), Rossman (2009), Guarnaccia et al. (2019), Wikee et al. (2013b), Guarnaccia et al. (2017), Trakunyingcharoen et al. (2015), Mendes et al. (1998), Kobayashi (2007)
	Citrus tankan	China	Zhuang (2001), Bai (2000)
	Citrus tankan f. koshotankan	China	Bai (2000)
	Citrus tankan var. *koshotankan*	China, Taiwan	Anonymous (1979), Tai (1979)
	Citrus unshiu	Japan, Korea	Kobayashi (2007), Cho & Shin (2004)
	Diospyros halesioides	Cuba, West Indies	Urtiaga (1986, 2004), Minter et al. (2001)
	Elaeis guineensis	Malaysia	Williams & Liu (1976), Turner (1971)
	Elettaria cardamomum	Tanzania	Ebbels & Allen (1979)
	Eucalyptus grandis	Malaysia, South Africa	Crous et al. (1989)
	Fortunella crassifolia	China	Tai (1979), Bai (2000)
	Jatropha podagrica	Cuba	Urtiaga (1986)
	Mangifera indica	Florida	McMillan Jr. (1986)
	Psidium guajava	Myanmar	Thaung (2008b)
	Senna bicapsularis	Cuba	Lenne (1990), Boa & Lenné (1994)
	Zea mays	Malaysia	Williams & Liu (1976)
P. citrichinansis	*Citrus maxima*	China	Wang et al. (2012)
	Citrus reticulata	China	Wang et al. (2012)
P. citrimaxima	*Citrus maxima*	Thailand	Wikee et al. (2013b)
P. concentrica	*Corynocarpus laevigatus*	New Zealand	Gadgil (2005)
	Cryptomeria japonica	District of Columbia, Japan, Korea, Virginia	Brittingham & O'Brien (1978), Petrini et al. (1991), Leuchtmann et al. (1992), Shaw et al. (2006), Motohashi et al. (2009), Cho & Shin (2004)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Cunninghamia lanceolata	China	Chen (2002)
	Fatshedera lizei	Florida	Alfieri Jr. et al. (1984)
	Hedera canariensis	California	French (1989)
	Hedera helix	Alabama, Balearic Islands, California, Canada, District of Columbia, Eastern states, Florida, France, Italy, Sicily, Mississippi, North Carolina, Nebraska, New Jersey, Southern Africa, South Carolina, Texas, Ukraine, USSR, Virginia, Washington, West Virginia, Maryland, Texas, India	Cash (1953), Jorstad (1962), Anonymous (1960, 1931-1970), French (1989), Bose et al. (1970), Mathur (1979), Ginns (1986), Alfieri Jr. et al. (1984), Nag Raj (1993), Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014), Greuter et al. (1991), Parris (1959), Grand (1985), van der Aa (1973), Dudka et al. (2004), Shaw (1973), Williams & Hayne (1982), Doidge (1950)
	Hedera nepalensis	Pakistan	Ahmad (1969), Ahmad et al. (1997)
	Hedera rhombea	Japan	Motohashi et al. (2009)
	Hedera sp.	California, Spain	French (1989), Wikee et al. (2013b)
	Ilex aquifolium	Portugal	Nag Raj (1993)
	Ilex cornuta	Florida	Miller (1990)
	Ilex opaca	Oklahoma	Preston (1945)
	Ilex sp.	Australia, New Jersey	Cash (1954), Nag Raj (1993), Cunnington (2003)
	Ilex verticillata	New York	Nag Raj (1993)
	Ilex vomitoria	Florida	Alfieri Jr. et al. (1984)
	Magnolia kobus	Japan	Nag Raj (1993), Kobayashi (2007), Motohashi et al. (2009)
	Magnolia liliiflora	Japan	Motohashi et al. (2009)
	Magnolia sp.	Iran	Esfandiari & Petrak (1950)
	Pieris floribunda	Connecticut	Anonymous (1960)
	Quercus ilex	Ukraine	Dudka et al. (2004)
	Quercus robur	Poland	Mulenko et al. (2008)
	Rhododendron carolinianum	Connecticut, North Carolina	-
	Rhododendron catawbiense	New Jersey	Seave (1922)
	Rhododendron caucasicum	Turkey	Huseyinov & Selcuk (2001)
	Rhododendron chrysanthum	USSR	Petrak (1934)
	Rhododendron indicum	Japan	Kobayashi (2007)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
	Rhododendron keiskei	Japan	Motohashi et al. (2009)
	Rhododendron macrophyllum	California, Washington	BPI n/a)
	Rhododendron maximum	Connecticut, District of Columbia, Massachusetts, New York, New Jersey, West Virginia	Clinton (1908, 1934), Ellis & Everhart (1888), Seave (1922), Davis (1946), Nag Raj (1993), Cash (1953), Eglitis et al. (1966)
	Rhododendron maximum	New Jersey, West Virginia	Eglitis et al. (1966)
	Rhododendron micranthum	China	Bai (2000)
	Rhododendron mucronatum	Japan	Kobayashi (2007)
	Rhododendron mucronulatum	Korea	Cho & Shin (2004)
	Rhododendron obtusum	Japan	Kobayashi (2007)
	Rhododendron ponticum	France, Portugal, Turkey, USSR	Vanev & van der Aa (1998), Huseyinov & Selcuk (2001), Jaczewski (1915)
	Rhododendron simsii	Japan	Kobayashi (2007)
	Rhododendron sp.	Canada, Japan, Netherlands, New Jersey, New York, Oklahoma, United States, Virginia, Washington, England, France, New Jersey, Portugal	Brunaud (1890), Martin (1931), Pirone (1939), White (1933), Seaver (1922), Camara (1930), White & Hamilton (1935), Tengwall (1924), Preston (1945), Kobayashi (2007), Motohashi et al. (2009), van der Aa (1973)
	Taxus baccata	Germany, Poland	van der Aa (1973), Lotz-Winter et al. (2011), Mulenko et al. (2008)
	Taxus brevifolia	Idaho, Montana, Washington	Anonymous (1960), Shaw (1973)
	Taxus cuspidata	Poland	Mulenko et al. (2008)
	Umbellularia californica	California	French (1989)
P. cussonia	*Cussonia* sp.	South Africa	Wikee et al. (2013b)
	Cussonia umbellifera	South Africa	Wikee et al. (2013b)
P. elongata	*Oxycoccus macrocarpos*	United States	Wikee et al. (2013b)
	Vaccinium macrocarpon	Massachusetts, Wisconsin	Weidemann et al. (1982)
P. ericarum	*Erica gracilis*	South Africa, South Africa, Western Cape	Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014), Crous et al. (2012b)
P. gardeniicola	*Gardenia jasminoides*	India, Japan, Taiwan	Sarbhoy et al. (1971), Mathur (1979), Kobayashi (2007), Kobayashi & Sasaki (1975), Motohashi et al. (2009), Anonymous (1979)
	Gardenia jasminoides var. *radicans*	Japan	Kobayashi (2007)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
P. harai	*Aucuba japonica*	Japan	Kobayashi (2007), Motohashi et al. (2009)
P. hostae	*Hosta plantaginea*	China	Su & Cai (2012), Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
P. hymenocallidicola	*Hymenocallis littoralis*	Australia	Crous et al. (2011), Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
P. hypoglossi	*Ruscus aculeatus*	Italy, Sicily, Portugal	Wulandari et al. (2009), Sultan et al. (2011), Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Zhou et al. (2015), Guarnaccia et al. (2017), Zhu et al. (2018), Hyde et al. (2014), Greuter et al. (1991), Nag Raj (1993)
	Ruscus hypoglossum	France, Italy	Wikee et al. (2011, 2013a, b), Wulandari et al. (2009), Glienke et al. (2011)
	Ruscus ponticus	Ukraine	Dudka et al. (2004)
	Ruscus sp.	France, Italy, Portugal, Turkey, Ukraine	Wikee et al. (2011), Nag Raj (1993)
	Ruscus hypoglossum	Portugal	Nag Raj (1993), Costa & Camara (1952)
P. iridigena	*Iris* sp.	South Africa	Marin-Felix et al. (2019)
P. kerriae	*Kerria japonica*	Japan	Motohashi et al. (2008, 2009), Wikee et al. (2011, 2013a), Zhou et al. (2015), Hyde et al. (2014)
P. kobus	*Magnolia kobus*	Japan	Nag Raj (1993), Motohashi et al. (2009)
P. ophiopogonis	*Ophiopogon japonicus*	South Korea, Thailand	Kwon et al. (2015), Wikee et al. (2012, 2013a, b)
P. paracitricarpa	*Citrus limon*	Greece	Guarnaccia et al. (2017), Tran et al. (2019)
	Citrus sinensis	China	Guarnaccia et al. (2017)
P. speewahensis	*Vanda* sp.	Australia	Shivas et al. (2013)
P. spinarum	*Chamaecyparis lawsoniana*	New Zealand	Gadgil (2005)
	Chamaecyparis pisifera	France	Shaw et al. (2006), Sultan et al. (2011), Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Zhou et al. (2015), Guarnaccia et al. (2017), Hyde et al. (2014)
	Cryptomeria japonica	New Zealand	Gadgil (2005)
	Cupressus arizonica	New Zealand	Gadgil (2005)
	Cupressus macrocarpa	New Zealand	Gadgil (2005)
	Hedera helix	Italy	Glienke et al. (2011), Wikee et al. (2011)
	Juniperus chinensis	New Zealand	Gadgil (2005)
	Juniperus sp.	France, Germany	Wikee et al. (2013b)
	Taxus baccata	Lithuania	Treigiene (2006)
	Thuja plicata	New Zealand	Gadgil (2005)
P. owaniana **species complex**			
P. austroafricana	*Unidentified host*	South Africa	Crous et al. (2019)
P. carissicola	*Carissa macrocarpa*	South Africa, Eastern Cape	Crous et al. (2015)
P. hagahagaensis	*Carissa bispinosa*	South Africa	Crous et al. (2019)

Supplementary Table 1 Continued.

Species record	Host	Locality	References
P. owaniana	*Brabejum stellatifolium*	South Africa	Swart et al. (1998), Crous et al. (2000), Wulandari et al. (2009), Sultan et al. (2011), Glienke et al. (2011), Wikee et al. (2011, 2013a, b), Miles et al. (2013), Zhou et al. (2015), Hyde et al. (2014), Doidge (1950)
P. podocarpi	*Podocarpus falcatus*	South Africa	Wikee et al. (2013a, b)
	Podocarpus lanceolata	South Africa	Sultan et al. (2011), Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
	Podocarpus latifolia	South Africa, Mpumalanga	Shaw et al. (2006)
P. pseudotsugae	*Cryptomeria japonica*	Japan	Petrini et al. (1991), Leuchtmann et al. (1992)
	Pseudotsuga brevifolia	China	Petrini et al. (1991), Leuchtmann et al. (1992)
	Pseudotsuga gaussenii	China	Petrini et al. (1991), Leuchtmann et al. (1992)
	Pseudotsuga japonica	Japan	Petrini et al. (1991), Leuchtmann et al. (1992)
	Pseudotsuga menziesii	United States	Wikee et al. (2013b), Zhou et al. (2015), Hyde et al. (2014)
	Pseudotsuga sinensis	China	Petrini et al. (1991), Leuchtmann et al. (1992)

Supplementary Table 2 Size of ascospores, conidia, and spermatia of *Phyllosticta* recored species.

Species	Ascospores (μm)	Conidia size (μm)	Spermatia (μm)	Reference
Phyllosticta cruenta **species complex**				
P. acaciigena	-	7–15 × 3–5	-	Crous et al. (2016)
P. aloeicola	-	5–13 × 3–4	-	Wikee et al. (2013b)
P. ardisiicola	-	7–11 × 5–7.5	-	Motohashi et al. (2008)
P. aristolochiicola	-	7–16 × 6.5–11	-	Crous et al. (2012b)
P. azevinhi	-	8–10 × 4–5	-	Brotéria (1908)
P. beaumarisii	-	7.5–15 × 6.5–8.75	-	Paul & Blackburn (1986)
P. brazilianiae	-	(8–)10–11(–12.5) × (5–)6(–7)	-	Glienke et al. (2011)
P. capitalensis	-	(10–)11–12(–14) × (5–)6–7	-	Glienke et al. (2011)
P. carochlae	-	6–8.5 × (9–) 10–12 (−13)	-	Zhou et al. (2015)
P. cavendishii	(12–)14–17(–18) × (7–)8–9(–10)	(12–)13–16(–17) × 8–9 (–10)	6–7(–8) × (1–)2	Wong et al. (2012)
P. cordylinophila	-	10–17 × 3–6	-	Wikee et al. (2013b)
P. eugeniae	-	12.4–14.8 × 4.3–7.1	-	Chen (1967)
P. fallopiae	-	8.5–12.5 × 6–7.5	-	Motohashi et al. (2008)
P. ilicis-aquifolii	-	10–18 × 6–9	5–8 × 1.5–2.5	Su & Cai (2012)
P. maculata	(17–)19–23(–24) × (8–)9–11(–13)	(15–)16–19(–21) × (9–)10–12(–13)	(10–)11–13(–14) × (1–)2	Wong et al. (2012)
P. mangiferae	-	(8–)10–12 × (5–)6–7	-	Glienke et al. (2011)

Supplementary Table 2 Continued.

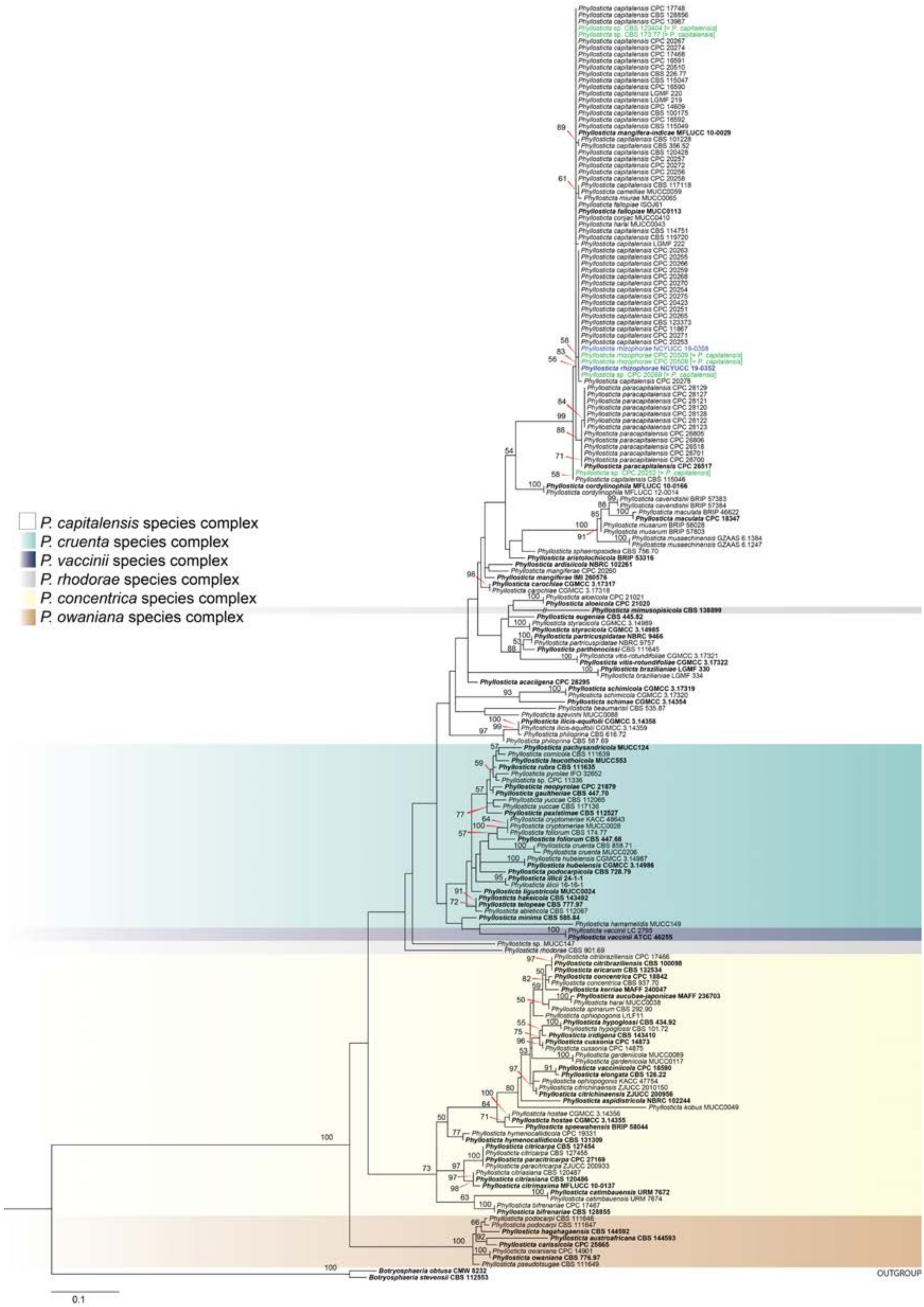
Species	Ascospores (μm)	Conidia size (μm)	Spermatia (μm)	Reference
P. mangifera-indicae	-	3–5 × 3–4	-	Wikee et al. (2013b)
P. musaechinensis	-	14–18 × 8–12	-	Wu et al. (2014)
P. musarum	(14–)16–18(–21) × 7–8(–9)	(12–)13–16(–20) × (7–)9–10(–11)	(6–)7–8(–9) × (1–)2	Wong et al. (2012)
P. paracapitalensis	16–17 × 6 (–7)	(9–)12–13(–14) × (6–)7	-	Guarnaccia et al. (2017)
P. parthenocissi	-	7.5–10 × 6–9	-	Zhang et al. (2013b)
P. partricuspidatae	-	5–8.5 × 8–12	3–5 (−7) × 1–2.5	Zhou et al. (2015)
P. philoprina	16–20 × 6–9	10–15 × 7–10	6−15 × 1.5−3	van der Aa (1973)
P. rhizophorae	(12.5–)14–19(–21.5) × 4.1–7.7	(13–)15–17(–19.5) × 6–7(–8)	7.5–11.5 × 1–2	In this study
P. schimae	-	7–13 × 4–7	7–11 × 1–2.5	Su & Cai (2012)
P. schimicola	-	5–8 × 8–11 (−12)	-	Zhou et al. (2015)
P. styracicola	-	9.5–13 × 6.5–9	-	Zhang et al. (2013a)
P. vitis-rotundifoliae	-	6–9.5 × 9–13	-	Zhou et al. (2015)
***P. cruenta* species complex**				
P. abieticola	(15–)16–18(–20) × (6–)7	(11−)13−16(−18) × (7−)8	-	Wikee et al. (2013b)
P. cornicola	-	(6−)7−8 × (5.5−)6(−7)	-	Wikee et al. (2013b)
P. cruenta	-	12−21 × 5−10, mostly 16−19 × 8−10	4–9(–15) × 1–2	van der Aa (1973)
P. cryptomeriae	-	9−13.5 × 6.3−10.5	-	Petrini et al. (1991)
P. foliorum	-	(12−)13−14(−15) × (9−)10(−11)	-	Wikee et al. (2013b)
P. gaultheriae	-	5−7 × 4−5	-	Ellis et al. (1885)
P. hakeicola	-	(9–)10–13(–15) × (6.5–)7	-	Crous et al. (2018)
P. hamamelidis	-	8.4−16.2 × 6.0−10.3	-	Bissett & Darbyshire (1984b)
P. hubeiensis	-	10–14.5 × 6–9	5.5–10 × 1.2–2.3	Zhang et al. (2013a)
P. illicii	-	(12–)13–15(–17) × 7(–9)	7–13 × 2–3	Lin et al. (2017)
P. leucothoicola	-	(6−)7−8(−9) × 6(−7)	5–7 × 2–3	Wikee et al. (2013b)
P. ligustricola	-	7.4–14.7 × 4.9–7.4	-	Motohashi et al. (2008)
P. minima	-	(9−)10−11(−12) × (6−)7(−8)	-	Wikee et al. (2013b)
P. neopyrolae	-	(6−)7(−8) × (5−)6(−7)	-	Wikee et al. (2013b)
P. pachysandricola	-	5.5−8.5 × 4.5−7.5	-	Wikee et al. (2013b)
P. paxistimae	-	(10−)12−14(−16) × 6−7(−8)	-	Wikee et al. (2013b)
P. podocarpicola	-	12−13(−16) × 8−9(−9.5)	-	Wikee et al. (2013b)
P. pyrolae	-	4.5−7.5 × 4−9	4–6 × 1.5–2	van der Aa (1973)
P. rubella	(8–)9–10(–12) × (4–)5	(6−)6.5−7(−8) × (4−)5(−5.5)	-	Wikee et al. (2013b)
P. paviae	-	11–15 × 7–9	-	Jagiełło et al. (2019)

Supplementary Table 2 Continued.

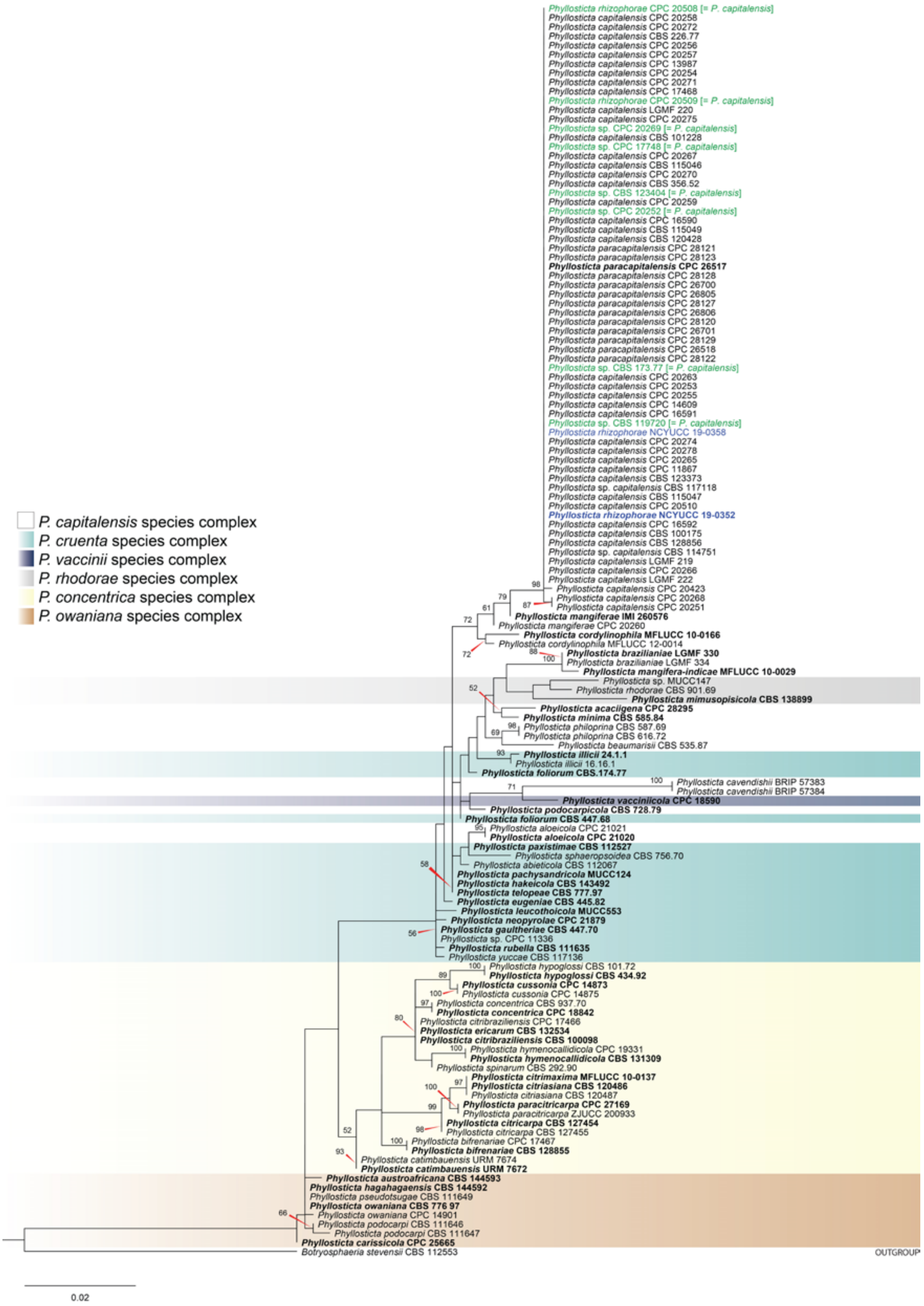
Species	Ascospores (μm)	Conidia size (μm)	Spermatia (μm)	Reference
P. telopeae	-	14−16.5 × 8 − 9.5	-	Yip (1989)
***P. vaccinii* species complex**				
P. vaccinii	-	7–11 × 4.5–7	-	Zhang et al. (2013b)
P. vacciniicola	-	(9−)10−12(−13) × (6−)7(−8)	-	Wikee et al. (2013b)
***Phyllosticta rhodorae* species complex**				
P. mimusopisicola	-	10–11(–12) × (5.5–)6–6.5(–7)	7–15 × 1.5–2	Crous et al. (2014)
P. rhodorae	-	10−14 × 7−8.7	5.0–8.5 × 1–1.5	Davis (1946)
***P. concentrica* species complex**				
P. aspidistricola	-	9.5–12.5 × 8.5–10	-	Motohashi et al. (2008)
P. aucubae-japonicae	-	10–13 × 5–8.5	-	Hernandez-Restrepo et al. (2016)
P. bifrenariae	-	(10–)11–13(–16) × (7–)8–9	5–10 × 1.5–2	Glienke et al. (2011)
P. catimbauensis	-	(8.5–)9.5(–10.5) × 5.5–6	5.5–9.5 × 1.5–2	Crous et al. (2017)
P. citriasiana	-	(10–)12–14(–16) × (5–)6–7(–8)	3–5 × 1–2	Wulandari et al. (2009)
P. citribrasiliensis	-	(8–)10–12(–13) × 6–7(–8)	-	Glienke et al. (2011)
P. citricarpa	-	6–13 × 5–9	5–8 × 0.5–1	van der Aa (1973)
P. citrichinensis	(13–)14–20 (−21) × (6–)7–8(−9)	(7–)8–12(−13) × 6–9	7–9 × 1–2	Wang et al. (2012)
P. citri-maxima	-	5(–8) × (3–)4(–7)	-	Wikee et al. (2013b)
P. concentrica	-	(10–)11–13(–14) × (6–)8(–9)	-	Wikee et al. (2013b)
P. cussonia	-	(10–)12–15(–17) × (6–)7(–8)	7–10 × 2–3	Wikee et al. (2013b)
P. elongata	-	9–14 × 5–8	-	Weidemann et al. (1982)
P. ericarum	-	(8−)9–10(−12) × (6−)7	-	Crous et al. (2012a)
P. gardeniicola	-	3.6–6.0 × 1.5–2.7	-	Mhaiskar (1968)
P. harai	-	-	-	Motohashi et al. (2009) *in valid
P. hostae	-	8–15 × 5–9	-	Su & Cai (2012)
P. hymenocallidicola	-	(8–)9–10(–11) × (6–)6.5–7	-	Crous et al. (2011)
P. hypoglossi	-	8–15(−18) × 6–10	-	Aa (1973)
P. iridigena	-	(10–)12–13(–15) × (7–)8(–9)	-	Marin-Felix et al. (2019)
P. kerriae	-	9.5–12.5 × 6–7.5	-	Motohashi et al. (2008)
P. kobus	-	9–12 × 6–8	-	Hennings (1905)
P. ophiopogonis	-	10–14 × 7–8	6.7–8.3 × 1.3–1.6	Wikee et al. (2013b)
P. paracitricarpa	-	(9–)11–13(–15) × 7–8(–9)	-	Guarnaccia et al. (2017)

Supplementary Table 2 Continued.

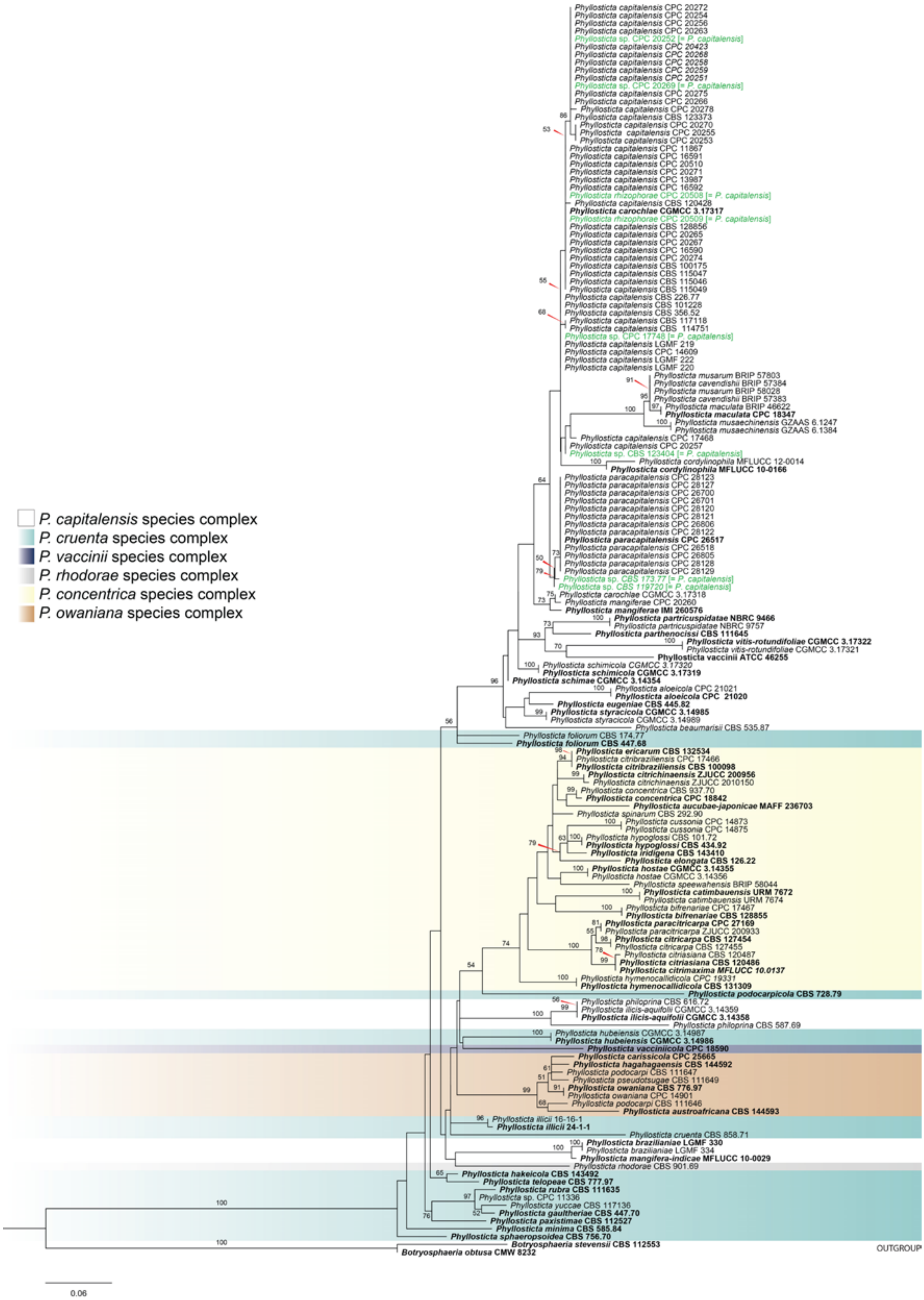
Species	Ascospores (µm)	Conidia size (µm)	Spermatia (µm)	Reference
P. speewahensis	-	10–13.5 × 7.5–9	-	Shivas et al. (2013b)
P. spinarum	-	(10–)12–14(–15) × (7–)7.5(–8)	-	Wikee et al. (2013b)
P. owaniana **species complex**				
P. austroafricana	-	(11–)14–17(–23) × (6–)8–10(–11)	6–8 × 2–3	Crous et al. (2019)
P. carissicola	-	(11–)12–14(–15) × (9–) 10(–11)	-	Crous et al. (2015)
P. hagahagaensis	-	(11–)13–14(–15) × (7–) 8(–9)	-	Crous et al. (2019)
P. owaniana	-	(10–)11–12(–13) × (7–)8(–9)	-	Wikee et sl. (2013b)
P. podocarpi	(19–)20(–23) × (7–)8(–9)	(10–)14(–17) × (8–)9(–10)	(6–)10(–11) × (2–)2.5(–3)	Crous et al. (1996)
P. pseudotsugae	-	6.7–13.5 × 5–9	-	Petrini et al. (1991)



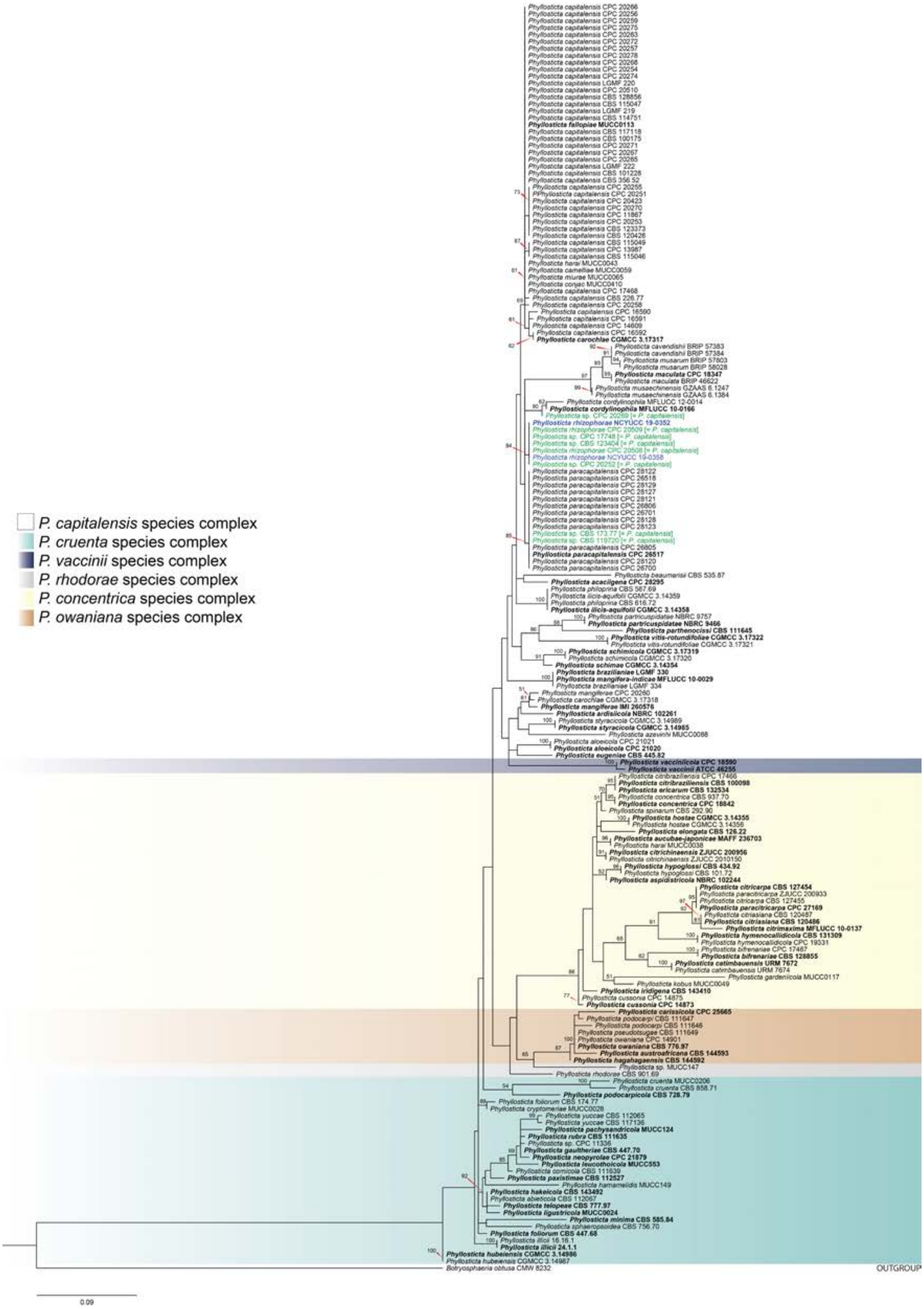
Supplementary Figure 1 – Phylogram generated using maximum likelihood analysis based on ITS sequence data from 195 strains. The tree is artificially rooted to *Botryosphaeria obtusa* strain CMW 8232 and *Botryosphaeria stevensii* strain CBS 112553. Maximum likelihood bootstrap values ≤50% are given at the nodes in this order. Species in six species complexes clades were kept hightlighted according to *P. capitalensis* species complex: White, *P. cruenta* species complex: Green, *P. vaccinii* species complex: Blue, *P. rhodorae* species complex: Gray, *P. concentrica* species complex: Yellow, and *P. owaniana* species complex: Brown. The species obtained in this study are in blue and species synonymized are in green. Ex-type taxa are in bold.



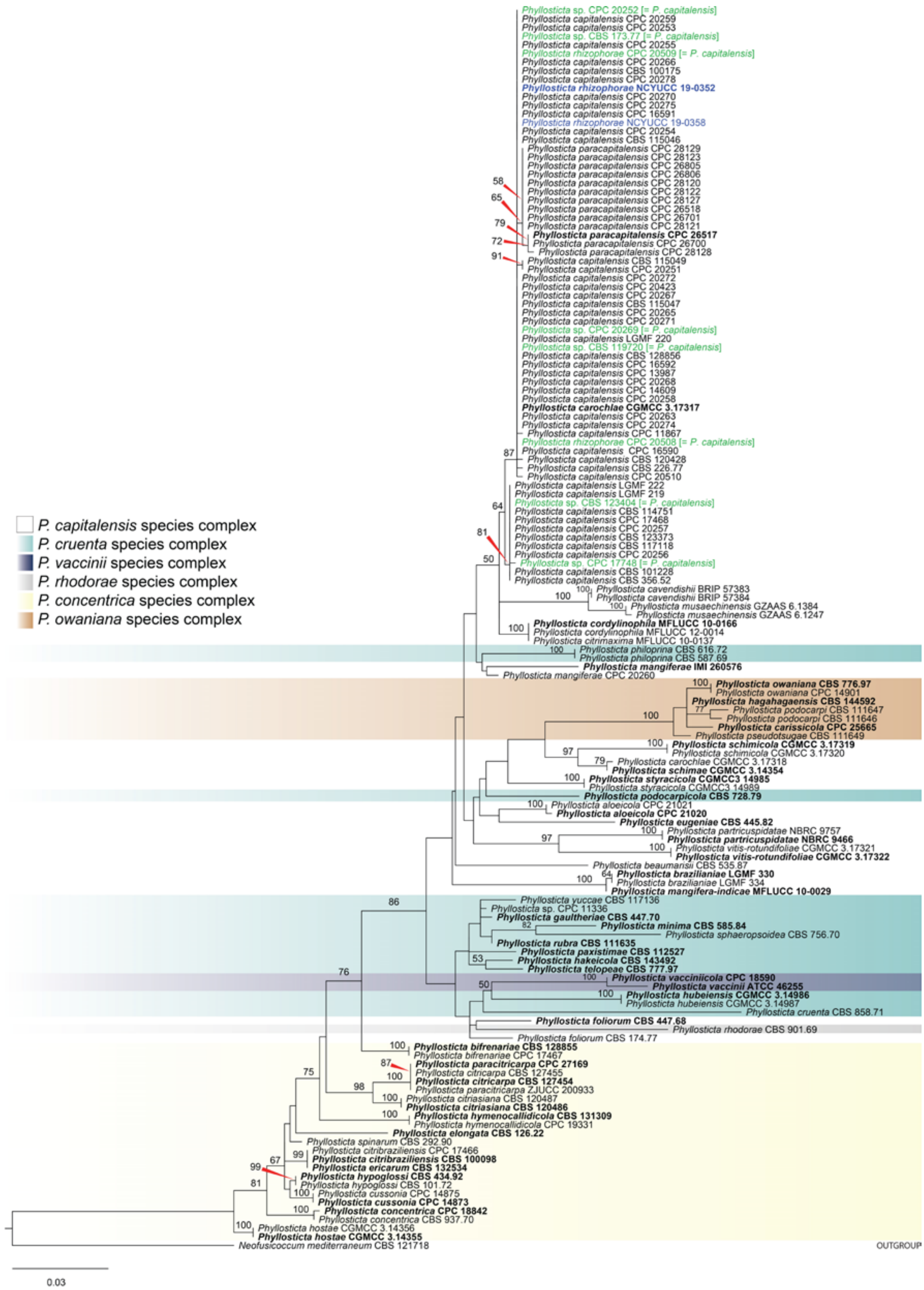
Supplementary Figure 2 – Phylogram generated using maximum likelihood analysis based on LSU sequence data from 136 strains. The tree is artificially rooted to *Botryosphaeria stevensii* strain CBS 112553. Maximum likelihood bootstrap values ≤50% are given at the nodes in this order. Species in six species complexes clades were kept hightlighted according to *P. capitalensis* species complex: White, *P. cruenta* species complex: Green, *P. vaccinii* species complex: Blue, *P. rhodorae* species complex: Gray, *P. concentrica* species complex: Yellow, and *P. owaniana* species complex: Brown. The species obtained in this study are in blue and species synonymized are in green. Ex-type taxa are in bold.



Supplementary Figure 3 – Phylogram generated using maximum likelihood analysis based on *ef1α* sequence data from 160 strains. The tree is artificially rooted to *Botryosphaeria obtusa* strain CMW 8232 and *Botryosphaeria stevensii* strain CBS 112553. Maximum likelihood bootstrap values ≤50% are given at the nodes in this order. Species in six species complexes clades were kept hightlighted according to *P. capitalensis* species complex: White, *P. cruenta* species complex: Green, *P. vaccinii* species complex: Blue, *P. rhodorae* species complex: Gray, *P. concentrica* species complex: Yellow, and *P. owaniana* species complex: Brown. The species obtained in this study are in blue and species synonymized are in green. Ex-type taxa are in bold.



Supplementary Figure 4 – Phylogram generated using maximum likelihood analysis based on *actin* sequence data from 183 strains. The tree is artificially rooted to *Botryosphaeria obtusa* strain CMW 8232. Maximum likelihood bootstrap values $\leq$50% are given at the nodes in this order. Species in six species complexes clades were kept hightlighted according to *P. capitalensis* species complex: White, *P. cruenta* species complex: Green, *P. vaccinii* species complex: Blue, *P. rhodorae* species complex: Gray, *P. concentrica* species complex: Yellow, and *P. owaniana* species complex: Brown. The species obtained in this study are in blue and species synonymized are in green. Ex-type taxa are in bold.



Supplementary Figure 5 – Phylogram generated using maximum likelihood analysis based on *gapdh* sequence data from 144 strains. The tree is artificially rooted to *Neofusicoccum mediterraneum* CBS 121718. Maximum likelihood bootstrap values ≤50% are given at the nodes in this order. Species in six species complexes clades were kept hightlighted according to *P. capitalensis* species complex: White, *P. cruenta* species complex: Green, *P. vaccinii* species complex: Blue, *P. rhodorae* species complex: Gray, *P. concentrica* species complex: Yellow, and *P. owaniana* species complex: Brown. The species obtained in this study are in blue and species synonymized are in green. Ex-type taxa are in bold.