Mycosphere 12(1): 519–669 (2021) www.mycosphere.org ISSN 2077 7019

Article

Doi 10.5943/mycosphere/12/1/7

Colletotrichum: lifestyles, biology, morpho-species, species complexes and accepted species

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Jayawardena RS, Bhunjun CS, Hyde KD, Gentekaki E, Itthayakorn P 2021 – *Colletotrichum:* lifestyles, biology, morpho-species, species complexes and accepted species. Mycosphere 12(1), 519–669, Doi 10.5943/mycosphere/12/1/7

Abstract

Colletotrichum is an important plant pathogenic genus that has undergone tremendous taxonomic changes. Species of *Colletotrichum* also occur as endophytes, saprobes and rarely entomopathogens. The current understanding of *Colletotrichum* taxonomy and application of various techniques in defining species within the genus is discussed in this paper. Here we provide a review of lifestyles, infection mechanisms, life cycle, host-specificity, classification history and techniques defining *Colletotrichum* species and the relation to speciation. Misidentifications and mistakes during species introduction are discussed and recommendations are provided for valid species publication. We provide an account of 248 currently accepted species with molecular data, which falls into 14 species-complexes and 13 singleton species. An updated account of *Colletotrichum* species is provided. Species are listed alphabetically in each species complex and annotated with their habitat, host, geographic distribution, phylogenetic position and typification details. Tables of host specific (152 species) and geographically endemic *Colletotrichum* species (19 species) are provided. A table of 450 morpho-species is provided for the first time gathering all data to one place, allowing mycologists to check before publishing a new species. Phylogenetic trees are provided for the whole genus and each species complex. Genes and combinations of genes that can be used for the identification of the species complexes are suggested. Future directions for the advancement of this genus are discussed.

Keywords – Host-specificity – Morpho-species – Pathogens – Singleton – Taxonomy

Introduction

Colletotrichum is the sole member of *Glomerellaceae* (Glomerellales, Sordariomycetes), and was introduced by Corda (1831) (Réblová et al. 2011, Maharachchikumbura et al. 2015, 2016, Hyde et al. 2020). Many species of this genus are important pathogens, while some are endophytes and saprobes (Cannon et al. 2012, Hyde et al. 2014, 2020, Jayawardena et al. 2016a, 2020). At the time of the first monographic treatment of *Colletotrichum* (von Arx 1957b), around 750 names existed (Cannon et al. 2012). von Arx (1957b) reduced this to 11 taxa based on morphological characters. Sutton (1980) accepted 22 species, while Sutton (1992) accepted 39 species based on

Submitted 16 January 2021, Accepted 29 March 2021, Published 7 May 2021
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morphological and cultural characteristics. Misidentification of *Colletotrichum* species occurs frequently due to only a few distinctive morphological characters being available for identification (Hyde et al. 2009a, Cannon et al. 2012, Jayawardena et al. 2016a). Hyde et al. (2009b) provided the first comprehensive overview of this genus with 66 names in common use and 19 doubtful names and also highlighted the need to revise this genus by using molecular methods (Hyde et al. 2009a). This study laid the foundation for the ongoing polyphasic research approaches on *Colletotrichum* (Cannon et al. 2012, Damm et al. 2012a, b, 2013, 2014, 2019, Weir et al. 2012, Liu et al. 2014, Jayawardena et al. 2016a, 2020).

Here we provide a review of lifestyles, infection mechanisms, life cycle, host-specificity, classification history and techniques for defining *Colletotrichum* species. We also discuss whether the scientific community has introduced too many species based on examples. This study uses Jayawardena et al. (2016a) as the starting point for accepted species, and also includes published records since that study. An overview of the currently accepted species in the genus along with their hosts, geographic distribution, phylogenetic position and sexual morphs are provided. Updated phylogenetic trees for the whole genus and the species complexes are also provided. When possible, the use of specific gene regions necessary to distinguish the species within the different species complexes is mentioned.

Lifestyles

Plant pathogenic fungi may have different lifestyles and infection mechanisms to colonise their hosts (Agrios 2005). Lifestyle patterns in *Colletotrichum* can be broadly categorised as endophytic, hemibiotrophic, necrotrophic, latent or quiescent (Perfect et al. 1999, Peres et al. 2005, Cannon et al. 2012, Barimani et al. 2013, de Silva et al. 2017). Hemibiotrophy is the most common among the above lifestyles (Cannon et al. 2012, Jayawardena et al. 2016a, de Silva et al. 2017). Being a complex genus, *Colletotrichum* has different lifestyles that vary between groups of species, many of which can switch between lifestyles (Promputtha et al. 2007, O’Connell et al. 2012). Most plant pathogenic taxa can change their relationships with the host at different stages of their life cycle. The physiological maturity and resistance of the hosts, environmental factors and virulence genes of the fungal taxa underpin the change (O’Connell et al. 2012, Stergiopoulos & Gordon 2014). Species of *Colletotrichum* undergo major transformations in cell morphology and infection mode when switching lifestyles (O’Connell et al. 2012).

Specific gene families and biochemical interactions, such as the production of enzymes and secondary metabolites (Gan et al. 2016), regulate the lifestyle patterns of *Colletotrichum* species. Genomic- and transcriptomic-based research during the past decade has provided valuable insights into the relationship between genetics and lifestyles of *Colletotrichum* (Gan et al. 2013, 2016, 2019, Zeilinger et al. 2016). These studies have uncovered information on the evolution of lifestyles and their functional relationships and have also identified potential targets for control and management (Crouch et al. 2014). The available genomic data of *Colletotrichum* species comes from representatives of six independent species complexes (acutatum, destructivum, gloeosporioides, graminicola, orbiculare and spaethianum) and include endophytes, foliar and fruit pathogens (Liang et al. 2018). Comparative analyses of these genomes have revealed that *Colletotrichum* species may tailor their plant cell wall degrading enzymes and proteinases according to their lifestyle (O’Connell et al. 2012, Baroncelli et al. 2016, Hacquard et al. 2016). These genomes are also recorded to code for enzymes that catalyse the biosynthesis of secondary metabolites and are expressed in a phase-specific fashion (O’Connell et al. 2012).

Understanding different lifestyles of *Colletotrichum* and interactions with their hosts is important for plant biosafety and quarantine purposes (Bourget et al. 2013). However, changes in lifestyle patterns during the life cycle of a *Colletotrichum* species make detection and control difficult (de Silva et al. 2017). It is important to realize that export/import provide venues for species of *Colletotrichum* to disperse in asymptomatic plant materials over long distances and may result in the introduction of a completely new disease to a country. Therefore, understanding the lifestyles of this genus is important when considering quarantine measures and world trade

(Newton et al. 2010, de Silva et al. 2017). In this section, we review the different lifestyles in *Colletotrichum* with examples.

Biotrophic and hemibiotrophic lifestyles

In a biotrophic lifestyle, the pathogen remains inside the living plant tissue and actively absorbs nutrients without killing the plant cells (Mendgen & Hahn 2002). Different strategies to avoid defence responses of the host, such as masking of invading hyphae or active suppression of the defence, are essential for a biotrophic parasitic lifestyle (Münch et al. 2008). Without a biotrophic phase, the initial death of host cells could lead to recognition and initiation of host defence responses that could inhibit fungal growth (Münch et al. 2008). Even though *Colletotrichum* is not considered a true biotroph, many species do have a biotrophic stage in their life cycle, which is followed by a necrotrophic lifestyle, and is referred to as hemibiotrophic. This strategy may also contribute to the prominence of *Colletotrichum* species as symptomless endophytes in living plant tissues (Rojas et al. 2010, Cannon et al. 2012). Nascent colonies of many species of *Colletotrichum* enter a biotrophic phase, while infected tissues remain externally symptomless. This period may be short (1-3 days) or extended (probably dormant) (Prusky & Plumbley 1992, Cannon et al. 2012). When *Colletotrichum* enters the necrotrophic stage, it results in the death of a significant number of plant cells, which is followed by the emergence of symptoms (Cannon et al. 2012, Jayawardena et al. 2016a).

Depending on host development stage and environmental conditions, the degree of hemibiotrophy varies among *Colletotrichum* species based on their lifestyle pattern and the timing of the switch from biotrophy to necrotrophy (Arroyo et al. 2005, Peres et al. 2005, Crouch et al. 2009b, da Silva et al. 2020).

Endophytic lifestyle

Endophytes are plant-inhabiting fungi that live within the host plant cells without causing any apparent disease symptoms (Rodriguez & Redman 2000, Vieira et al. 2014). Depending on the physiological condition of the host plant, genotype and environmental conditions, the interaction between the plant and the endophyte can switch from mutualistic to antagonistic or pathogenic (Photita et al. 2004, Promputtha et al. 2007, Hardoim et al. 2015, da Silva et al. 2020). Phylogenetic analyses focusing on fungal interactions and lifestyles revealed that in most fungal lineages endophytic species were phylogenetically closer to species with typical necrotrophic lifestyles (Delaye et al. 2013). This suggested that the switch between endotrophy and necrotrophy has occurred multiple times in the evolutionary time scale. These findings support the idea that the breakdown of early mutualistic interactions lead to a pathogenic lifestyle (Stukenbrock & McDonald 2008, Kiers et al. 2010, Eaton et al. 2011). Freeman & Rodriguez (1993) genetically converted the phytopathogenic fungus *C. magnum* to a non-pathogenic endophytic fungus by knocking down a single gene. Abang et al. (2002) showed that an asymptomatic endophytic isolate of *C. gloeosporioides* was unable to produce a toxic metabolite, which is produced only by pathogenic strains and induces symptoms of disease in the host plant. Liu et al. (2015) identified six species from both symptomatic and asymptomatic leaf tissues, all of which belonged to gloeosporioides species complex namely *C. camelliae*, *C. fructicola*, *C. gloeosporioides*, *C. jiangxiense*, *C. karstii* and *C. siamense* providing convincing evidence that these species could switch their lifestyle from endophytic to pathogenic (Photita et al. 2001).

Many *Colletotrichum* species are symptomless endophytes in living plant tissues (Cannon et al. 2012, Jayawardena et al. 2016a, Ma et al. 2018). Infact *Colletotrichum* species are some of the most commonly identified endophytes (Tao et al. 2013, Jayawardena et al. 2016a, Marlin-Felix 2017, de Silva et al. 2021). Pathogenic *Colletotrichum* species have mutualistic interactions with their plant hosts providing disease resistance, drought tolerance and growth enhancements (Redman et al. 2001, Busby et al. 2016). The majority of *Colletotrichum* species within the boninense, gloeosporioides and graminicola species complexes are endophytes (Damm et al. 2012b, Weir et al. 2012, Vieira et al. 2014, Jayawardena et al. 2016a). Lu et al. (2004) identified endophytic strains of

Colletotrichum from leaves of 12 forest tree species in Guyana, belonging mostly to the boninense and gloeosporioides complexes. Manamgoda et al. (2013) isolated and identified four endophytic species in the gloeosporioides complex. Ma et al. (2018) identified nine endophytic species from *Dendrobium*, of which two species belong to the gloeosporioides complex and four species in the boninense complex.

Necrotrophic lifestyle

Most of the species of *Colletotrichum* develop a necrotrophic stage in their life cycles (Cannon et al. 2012, O'Connell et al. 2012, de Silva et al. 2017). During this stage, the fungus actively infects and colonises the plant cells leading to death, and the appearance of disease symptoms (van Kan 2006, Cannon et al. 2012). Secondary hyphae start emerging from the primary hyphae invading the neighbouring cells (O'Connell et al. 2012). Necrotrophs typically secrete cell wall degrading enzymes, phytotoxins that kill the plant tissues and other extracellular enzymes into host tissues both before and during colonization (Laluk & Mengiste 2010). Necrotrophic infection generally involves several stages: conidial attachment, germination, host penetration, primary lesion formation, lesion expansion, and tissue maceration, followed by sporulation (Prins et al. 2000). The pathogen subsequently survives on the contents of dead or dying cells and completes its life cycle (Laluk & Mengiste 2010, Gan et al. 2013).

Quiescent lifestyle

Quiescence or latency is precluded as a major lifestyle, but as a transition phase towards the other phases of the life cycle (de Silva et al. 2017). Latency is defined as an extended period in the life cycle of a fungal pathogen, during which the fungus is dormant within the host before it switches to an active phase (Prusky et al. 2013). This lifestyle is important for species causing postharvest diseases, where the pathogen remains dormant inside the plant tissue before symptoms appear (Prusky 1996, Ranathunge et al. 2012). Physiological and biochemical changes during fruit ripening maintain or facilitate the transition from quiescent to necrotrophic lifestyle (Prusky et al. 2013). *Colletotrichum gloeosporioides* in avocado (Prusky 1996) and *C. acutatum* in almond (Adaskaveg & Förster 2000) have a quiescent period in their lifestyle, before causing post-harvest disease. Ranathunge et al. (2012) reported a quiescent stage in *C. truncatum* after the initial infection of *Capsicum annuum* fruit.

Infection mechanisms

The infection mechanisms of fungi can provide insightful details to plant pathologists concerning the conditions required for a successful infection. Species of *Colletotrichum* can survive on a broad range of hosts and can develop unique relationships with them. Endophytic species have developed different abilities that aid them to be pathogenic or overwinter as saprobes. These asymptomatic infections may serve as inoculum sources for infection of other plants or the same plant (Freeman et al. 2001, Peres et al. 2005, Udayanga et al. 2013). The infection cycle of a *Colletotrichum* species can be reviewed mainly in two parts: pre-infection and post-infection.

Pre-infection

Penetration and colonisation with species of *Colletotrichum* generally starts with the germination of conidia and the formation of specialised infection structures called appressoria. These structures facilitate the entry of the fungus through the host cuticle and epidermal cell walls with the aid of a narrow penetration peg (Perfect et al. 1999, Latunde-Dada 2001, Wharton & Schilder 2008, de Silva et al. 2017). There are rare cases recorded when the fungus infects through *stromata* or wounds, without forming appressoria, which is referred to as indirect penetration (Latunde-Dada et al. 1996, Latunde-Dada 2001). Species of *Colletotrichum* show forcible entry during direct penetration of host surfaces. Though conidial and appressorial adhesion are important in host penetration by forcible means; melanin and osmolytes are also required (Latunde-Dada 2001). Howard & Ferrari (1989) mentioned that melanization is the result of selective permeability of the cell wall and in combination with the osmolytes in the appressorium the two generate enormous turgor pressure. Latunde-Dada (2001) noted that melanized appressoria of non-quiescent *Colletotrichum* species appear to be quite capable of non-enzymatic forcible penetration of intact host surfaces.

Post-infection

Colletotrichum species adopt either intracellular hemibiotrophy or subcuticular, intramural necrotrophy (Wharton & Diéguez-Uribeondo 2004, Münch et al. 2008, O'Connell et al. 2012, de Silva et al. 2017).

Intracellular hemibiotrophy

This has an early stage of the symptomless biotrophic phase. During this phase, the penetration peg invades the epidermal cells and the primary hyphae produce enlarged infection vesicles inside epidermal and mesophyll cells. This is followed by the necrotic phase, in which secondary hyphae that secrete cell wall degrading enzymes, grow intracellularly killing the host cells (O'Connell et al. 2012). Latunde-Dada (2001) called this as 'stealth' and 'transient confinement' and summarized the avoidance mechanism of quiescent and endophytic *Colletotrichum* species through molecular and biochemical data showing that it is governed by many different co-related factors. Based on the behaviour of *Colletotrichum* species on cowpea and soybean, four assumptions were made by Latunde-Dada (2001). Formation of melanised appressoria readily occurs on leaf and stem surfaces by endophytic *Colletotrichum* species, followed by an extensive epiphytic colonisation. These melanised appressoria remain quiescent however, indirect penetration of young leaves through stromata occurs. With the subdivision of endophytic mycelium, asymptomatic extensive colonization of Sub-stomatal cavities and intercellular spaces of leaf mesophyll tissue, stem epidermis and cortex occur. During the final stage symptoms appear.

Subcuticular, intramural necrotrophy

In this phase, the fungus grows under the cuticle within the periclinal and anticlinal walls of the epidermal cells without penetrating the protoplasts (Moraes et al. 2013). There may also be a very short biotrophic phase before intramural hyphae aggressively initiate the destruction of the colonised host tissues (Curry et al. 2002, Arroyo et al. 2005, Peres et al. 2005, Ranatunge et al. 2012).

Most of the *Colletotrichum* species belong to different species complexes that are closely related to each other and have similar infection and colonization behaviour (Sanders & Korsten 2003, Jayawardena et al. 2016a). However, the transition from one phase to another can vary depending on the host plant, host maturity and the particular species of *Colletotrichum* (de Silva et al. 2017). Species in the acutatum complex commonly start their life cycle with a short biotrophic phase and then switch to a necrotrophic phase (Freeman et al. 2001, Peres et al. 2005, Damm et al. 2012a). In the graminicola complex, species may have an extended biotrophic phase before switching to a necrotrophic phase (Münch et al. 2008, Freeman et al. 2001). In *C. gloeosporioides*, both intracellular hemibiotrophic and intramural necrotrophic infections were observed (Moraes et al. 2013). *Colletotrichum truncatum* was able to colonise chilli fruits through primary intramural hyphae fruit tissue without producing secondary biotrophic infection structures, before switching to the necrotrophic phase (Montri et al. 2009). Ranathunge et al. (2012) identified direct leaf cuticle penetration of *C. truncatum* followed by intramural, quiescent and necrotrophic phases of colonization. Species in the destructivum complex have a localized hemibiotrophic infection stage, in which the intracellular biotrophic phase is entirely confined within a single epidermal cell without extending into adjacent cells (Damm et al. 2014).

Understanding the infection mechanisms of this genus allows plant pathologists and plant breeders to develop better control strategies and plant varieties that are resistant against diseases.

Life cycle

Understanding the life cycle of a fungus could lead to understanding of the fungus itself. Species of *Colletotrichum* have asexual and sexual morphs in their life cycle, which occur on the host plant or plant debris (Sutton 1992, Cannon et al. 2012, Jayawardena et al. 2016a). The asexual morph of *Colletotrichum* is well-studied compared to their *Glomerella* sexual morphs counterparts, as the former are most commonly associated with disease symptoms (Cannon et al. 2012, Jayawardena et al. 2016a). To complete the life cycle, the asexual morph will produce an acervulus, a structure formed intracuticularly in the plant tissue (Khan & Hsiang 2003). The tension on the cuticle increases, once the fungal mycelium grows between the plant epidermis and cuticle. This leads to the breaking of the cuticle and exposure of the mature acervulus to the environment (Sutton 1992). Conidia are generated from the conidiophores arising from the stroma in the acervulus (Curry et al. 2002) and are wrapped in a water-soluble mucilaginous matrix. The mucilaginous matrix is composed of glycoprotein and germinating inhibitors that protect conidia against desiccation and toxins produced by the host defence mechanism (Leite & Nicholson 1992). Upon contact with water (dew, irrigation and raindrops) and wind, conidia are disseminated to new locations, new hosts or the same host plant, and act as the primary inoculum for the new infection cycle (Ntahimpera et al. 1997). Sexual morph formation can be observed if the conditions are favourable (Sutton & Shane 1983). The sexual morph of many *Colletotrichum* species is rarely observed in the natural environment, but readily occurs in cultures of species in boninense (*C. annellatum*, *C. boninense*, *C. brassicola*, *C. constrictum*, *C. cymbidiicola*, *C. karstii*, *C. parsonsiae*, *C. petchii*: Damm et al. 2012b, *C. chiangraiense*, *C. citricola*, *C. doitungense*: Ma et al. 2018), dracaenophilum (*C. yunnanense*: Damm et al. 2019, *C. Parallelophorum*: Ma et al. 2018), gloeosporioides (*C. alienum*, *C. ciggaro*, *C. clidemiae*, *C. fructicola*, *C. salsolae*, *C. queenslandicum*, *C. ti*, *C. xanthorrhoeae*: Weir et al. 2012), graminicola (*C. graminicola*: Vaillancourt & Hanau 1991, 1992), magnum (*C. cacao*, *C. magnum*: Damm et al. 2019) and orchidearum (*C. musicola*, *C. orchidearum*, *C. plurivorum*, *C. sojae*, *C. vittalense*: Damm et al. 2019) complexes. *Colletotrichum lentis* and *C. tanaceti* in the destructivum complex produce sexual morphs by artificial crossing of isolates (Barimani et al. 2013). The life cycle of *C. higginsianum* when infecting *Arabidopsis thaliana* is given in Fig. 1.

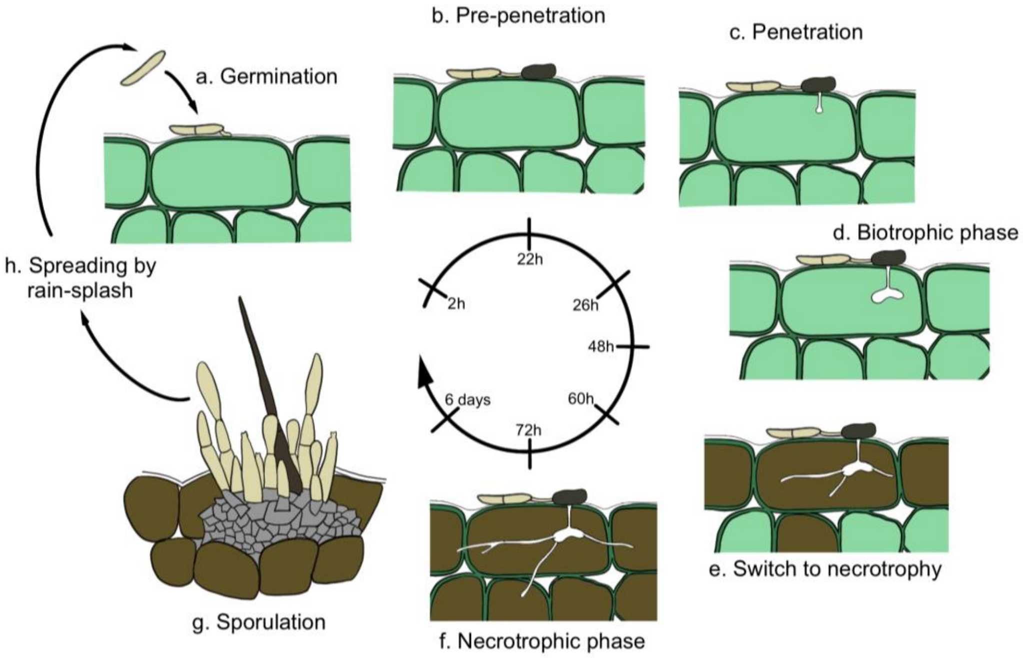

Figure 1 – Life cycle of *Colletotrichum higginsianum* when infecting *Arabidopsis thaliana* (Redrawn from https://www.pilotunit.com (2020)).

Genetic variation among species can be achieved through sexual reproduction. Perithecia can also act as survival structures, which help pathogens to overwinter or survive periods when a susceptible host is not available (Rodriguez-Guerra et al. 2005, Pinto et al. 2012). The size and shape of ascospores can be useful in the species-level diagnosis of *Colletotrichum* (de Silva et al. 2017). Sometimes the cultured isolates lose the ability to form perithecia due to storage conditions, nutrients in medium and frequent sub-culturing (Cannon et al. 2012, Jayawardena et al. 2016a). Therefore, reports mentioning species not producing their sexual morphs should be treated with caution.

Many studies have been conducted on *Colletotrichum* species as model organisms to understand their biological functions such as infection process, asexual-sexual relationships (Cannon et al. 2012). However, we conclude that more research is needed to understand the life cycle of the species of this genus.

Are *Colletotrichum* species host-specific? Or does one species infect many hosts?

In this section, we review host-specificity in *Colletotrichum* species. Previously, *Colletotrichum* species were assumed to be host-specific, leading to a large number of taxa being described from various hosts with little or no morphological variation (Hyde et al. 2009a, b, Cannon et al. 2012, Jayawardena et al. 2016a). Our understanding of host-specificity in *Colletotrichum* is rudimentary due to incomplete sampling, data mainly focusing on economically important crops and poor knowledge on the effect of pathogens (Cannon et al. 2012). The extent of the gene pool being sampled is significantly reduced, as most of the studies are restricted to understanding the species associated with a single crop (Gazis et al. 2011). Mackenzie et al. (2007) have demonstrated gene flow between populations of *C. acutatum* from native plants and those from adjacent strawberry crops. The infection strategy of *Colletotrichum* species is relevant to pathogenicity and host-specificity (see discussion above). Biotrophic fungi are usually host-specific, while necrotrophs usually have broad host-specificity, but are vulnerable to non-specific host defence mechanisms (Vargas et al. 2012). Hemibiotrophic fungi combine both strategies: they have an initial biotrophic phase (which establishes host-specificity) followed by a virulent necrotrophic phase leading to the quick death of the target plants (Koek et al. 2011), making them especially destructive to their hosts. This makes hemibiotrophic fungi specifically qualified as biological control agents if they are host-specific (Goodwin 2001).

Some *Colletotrichum* species complexes contain taxa that exhibit some degree of host-specificity (Weir et al. 2012, Jayawardena et al. 2016a). This may be due to limited sampling or to species concepts that assume specificity (Cannon et al. 2012). Damm et al. (2013) identified taxa in the orbiculare species complex that appeared to be restricted to specific herbaceous host species/genera (*Asteraceae*, *Cucurbitaceae*, *Fabaceae* and *Malvaceae*). *Colletotrichum lindemuthianum* appears to be restricted to *Phaseolus vulgaris* and *P. coccineus* in *Fabaceae*. *Colletotrichum orbiculare* causes diseases of several genera in *Cucurbitaceae* (*Citrullus*, *Cucumis*, *Cucurbita*, *Lagenaria*, *Momordica* and *Trichosanthes*) and some plant genera in *Asteraceae* (*Xanthium* sp.) and *Malvaceae* (*Althaea* sp.). *Colletotrichum trifolii* is recorded on *Medicago* and *Trifolium* (*Fabaceae*), while *C. malvarum*, *C. tebeestii* and *C. sidae* seem to be restricted to only one or few host species in *Malvaceae*. *Colletotrichum bidentis* and *C. spinosum* occur on *Asteraceae*. Taxa in the orbiculare species complex that establish hemibiotrophic relationships are distinctly host-specific. The reason for this is probably the close interactions that have developed during the initial, biotrophic phase of infection between the plant and the pathogen (Bailey et al. 1992).

Some species in the gloeosporioides complex also appear to be host-specific. *Colletotrichum kahawae* is recorded only from *Coffea* species in the African continent (Waller et al. 1993, Weir et al. 2012). *Colletotrichum horii*, *C. nupharicola*, *C. ti* and *C. xanthorrhoeae* also appear to be host-specific. *Colletotrichum ciggario, C. fructicola, C. siamense* and *C. theobromicola* however are known to have a wider host range (Weir et al. 2012, Jayawardena et al. 2016a). Weir et al. (2012) pointed out that not all species with a wide host range are found everywhere. *Colletotrichum* *alienum* is commonly associated with cultivated fruit crops in New Zealand. However, *C. fructicola* and *C. siamense,* which are common on the same hosts in other parts of the world, are not found in New Zealand. *Colletotrichum artocarpicola* was isolated as a saprobe from *Artocarpus heterophyllus* in Thailand (Bhunjun et al. 2019). When the authors conducted cross pathogenicity studies, they found out that this species can be a pathogen not only of *Artocarpus heterophyllus,* but also of *Carica papaya* and *Capsicum* sp. (Shown in Figs 2a-2c).

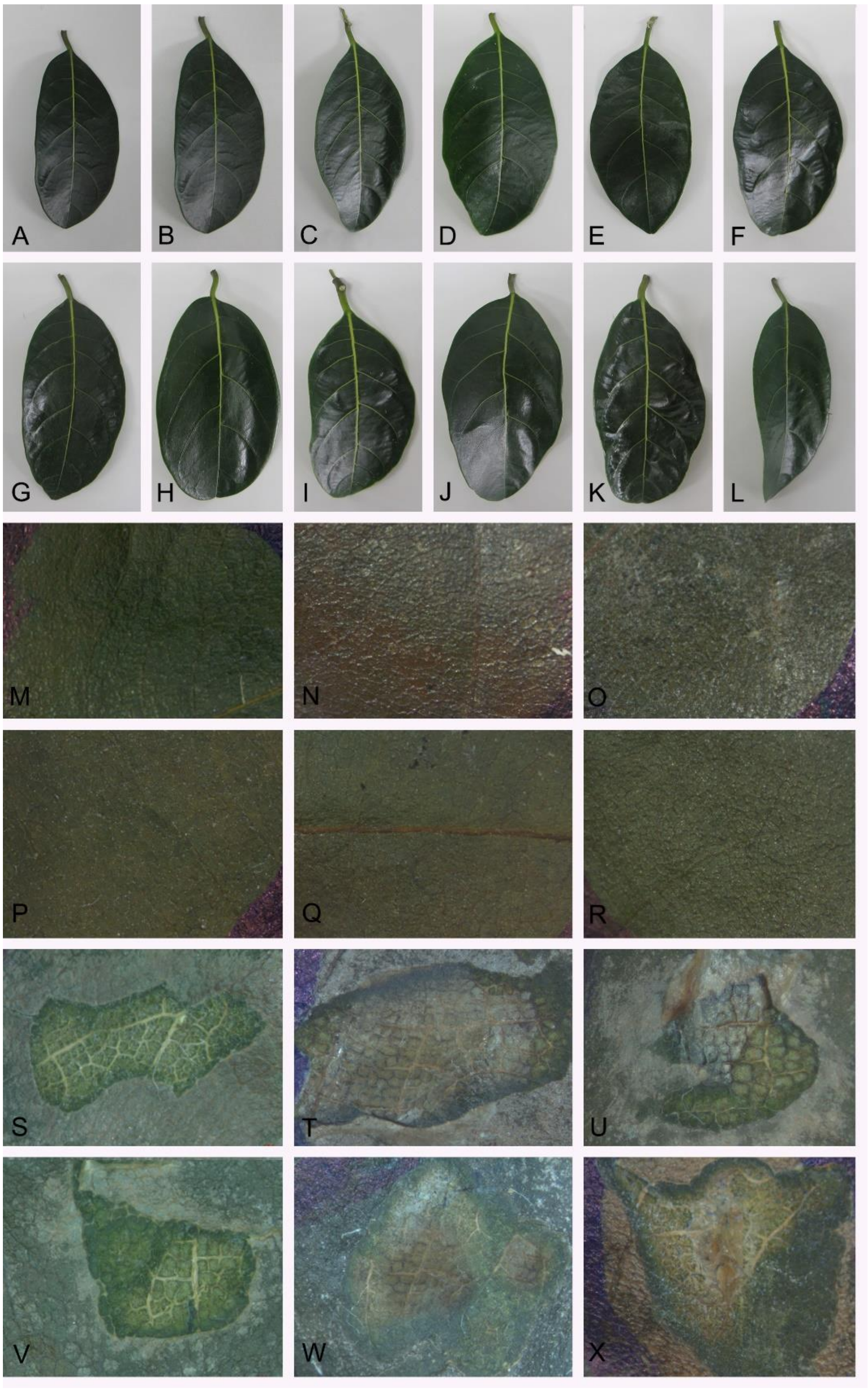

Figure 2a – Pathogenicity assay results of *Colletotrichum artocarpicola* on Jackfruit. A-L Jackfruit leaves selected for pathogenicity test. M, P Non-wounded negative control (conidial suspension and mycelium plug). N-O Non-wounded leaves inoculated with conidial suspension. Q-R Non-wounded leaves inoculated with colonised mycelium plug. S, V Wounded negative control (conidial suspension and mycelium plug). T-U Wounded leaves inoculated with conidial

suspension showing sign of necrosis after 7 days. W-X *Wounded leaves inoculated with colonised mycelium plug showing* sign of necrosis after 7 days.

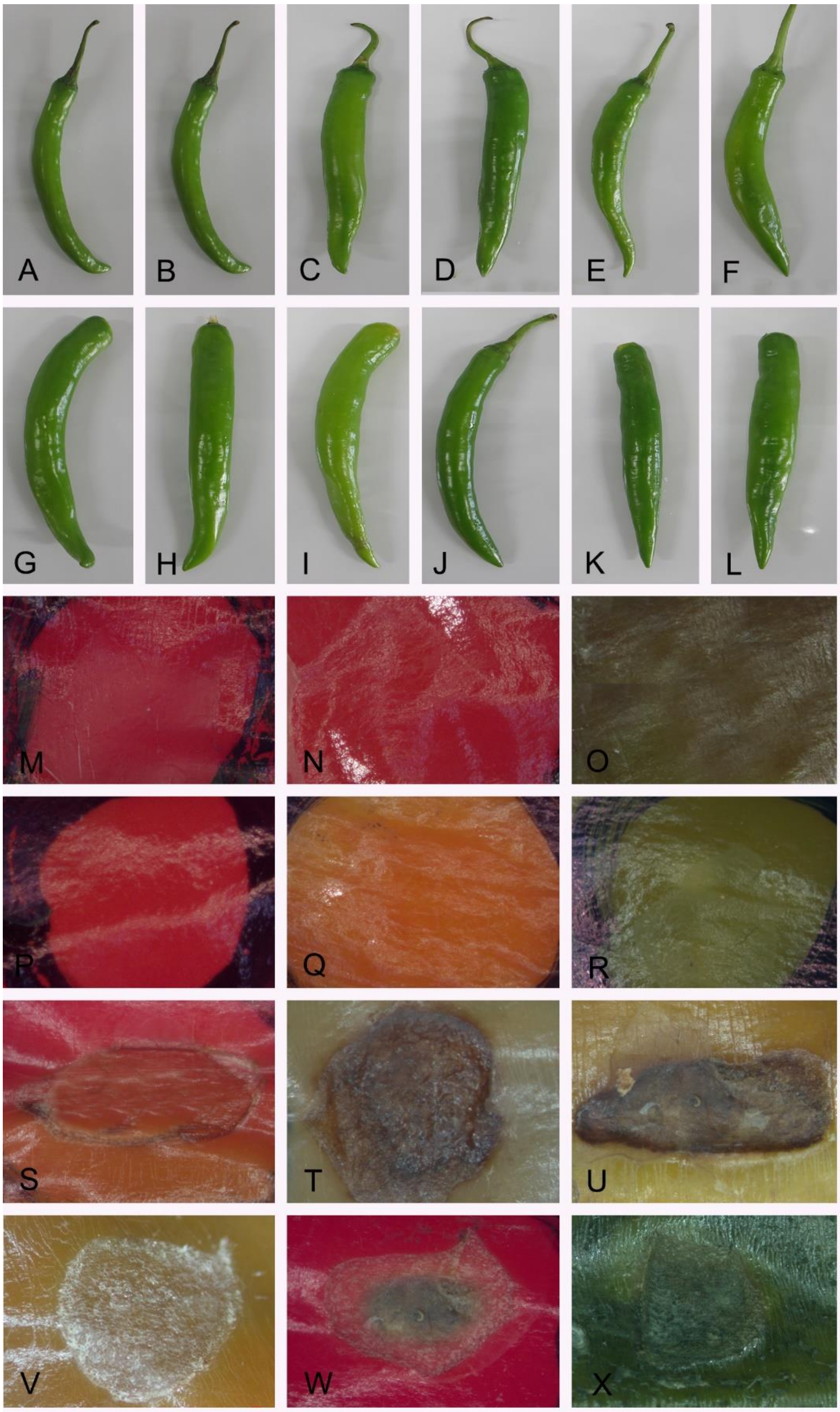

Figure 2b – Pathogenicity assay results of *Colletotrichum artocarpicola* on Chilli. A-L Chillies selected for pathogenicity test. M, P Non-wounded negative control (conidial suspension and mycelium plug). N-O Non-wounded chillies inoculated with conidial suspension. Q-R Non-wounded *chillies* inoculated with colonised mycelium plug. S, V Wounded negative control (conidial suspension and mycelium plug). T-U Wounded chillies inoculated with conidial suspension showing sign of necrosis after 7 days. W-X Wounded chillies inoculated with colonised mycelium plug showing sign of necrosis after 7 days.

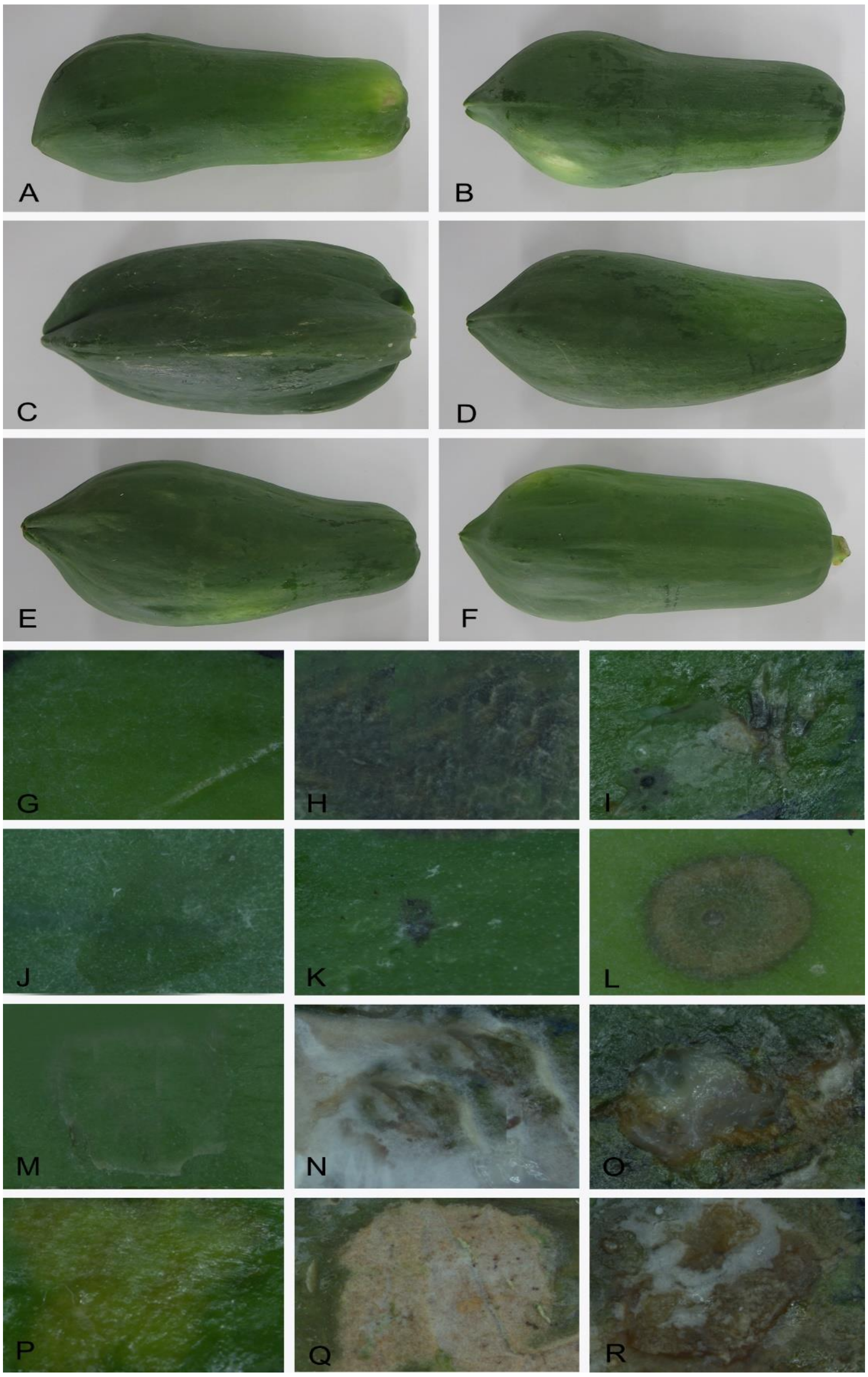

Figure 2c – Pathogenicity assay result of *Colletotrichum artocarpicola* on Papaya. A-F Papayas selected for pathogenicity test. G, J Non-wounded negative control (conidial suspension and mycelium plug). H-I Non-wounded papayas inoculated with conidial suspension. K-L Non-wounded papayas inoculated with colonised mycelium plug. M, P Wounded negative control (conidial suspension and mycelium plug). N-O Wounded papayas inoculated with conidial suspension showing sign of necrosis after 14 days. Q-R Wounded papayas inoculated with colonised mycelium plug showing sign of necrosis after 14 days.

Species of the caudatum and graminicola complexes appear to be restricted to single host species or genera in *Poaceae* (Crouch et al. 2009, Crouch 2014). *Colletotrichum truncatum*, an intramural pathogen grows only in cell walls and has wide host range (Roberts & Snow 1990, Jayawardena et al. 2016a). In the destructivum species complex, some species appear to be specific to certain genera or families of herbaceous plants (Damm et al. 2014). *Colletotrichum fuscum* is recorded only on *Digitalis*, while *C. higginsianum* is recorded on genera of *Brassicaceae*. In contrast, other species can be considered as generalists occurring on taxonomically diverse plant families. Damm et al. (2014) revealed that *C. destructivum* occurs on *Asteraceae*, *Fabaceae* and *Polygonaceae*, while *C. lini* occurs on *Asteraceae*, *Brassicaceae*, *Fabaceae*, *Lamiaceae*, *Linaceae* and *Ranunculaceae*. In their study, they also highlighted several host species that can be infected by more than one taxon of the destructivum complex. For example, *Medicago* and *Trifolium* are infected by three species in the destructivum complex, while *Raphanus* and *Pisum* are infected by two species.

Following in-vitro infection studies, Whitelaw-Weckert et al. (2007) revealed the low specificity among isolates assigned to *C. acutatum*, *C. simmondsii* and *C. fioriniae*. Damm et al. (2012a) mentioned that the lack of perceived host-specificity in the *C. acutatum* complex rests with poor identification practices in pathology studies. *Colletotrichum acutatum* has been recorded as a pathogen of countless host plants with a wide geographical distribution (Farr & Rossman 2021). However, Sreenivasaprasad & Talhinhas (2005) found that *C. acutatum* occurs only on certain hosts, mostly in the southern hemisphere. Damm et al. (2012a) confirmed that species of the acutatum complex do occur on multiple hosts, but the known host spectrum is much smaller than previously thought. Species of the acutatum complex have rarely been found in Europe, and mostly on ornamental plants (Damm et al. 2012a). Hosts that are infected by more than one species of the acutatum species complex include apple, citrus, olive, cranberry, blueberry and strawberry. For example, five species of *Colletotrichum* are associated with *Malus* (*C. acerbum*, *C. fioriniae*, *C. godetiae*, *C. nymphaeae* and *C. salicis*). Talhinhas et al. (2005) found five groups, (now recognised as species within the acutatum species complex) occurring on olives in Portugal (*C. acutatum*, *C. fioriniae*, *C. godetiae*, *C. nymphaeae* and *C. rhombiforme*).

Within the boninense species complex, some species are host-specific, or at least show a preference for hosts from particular plant groups (Damm et al. 2012b). Based on ITS1 sequence data, Morikawi et al. (2003) detected four molecular subgroups within *C. boninense*. In their analyses, strains from monocotyledonous and dicotyledonous plant hosts were separated. The monocotyledonous clade consisted of three subclades. Of these subclades, one is restricted to *Orchidaceae* and the other two contain strains from *Amaryllidaceae*. However, the dicotyledonous clade did not show any clear host-linked substructure. *Colletotrichum karstii* while occurring on a wide range of dicotyledons was also described on *Orchidaceae* and also occurs on other monocotyledons (Damm et al. 2012b). Damm et al. (2012b) recognised *C. dracaenae* and *C. hippeastri* to be specific at the host genus level. However, the number of strains that were examined was insufficient to confirm this.

Damm et al. (2019) mentioned that many species in the dracaenophilum, magnum and orchidearum complexes are possibly host-specific. Some species occur only on monocotyledons, while others occur across a broad spectrum of plant hosts. Most species in these complexes have predominantly been isolated from plants in tropical or subtropical regions (mainly from Asia and Latin America), while there are a few collections from ornamental plants in temperate climates (in Central-Europe: Damm et al. 2019). A few host-specific species are found in the dracaenophilum complex. However, this can be a result of insufficient sampling. In the orchidearum species complex *C. orchidearum*, *C. plurivorum* and *C. sojae* are very common and occur in many host species. *Colletotrichum cliviicola*, *C. musicola*, *C. cattleyicola* and *C. piperis* are less common species that seem to be either host-specific or restricted to a specific country and region (*C. vittalense*: Damm et al. 2019). With the exception of *C. brevisporum* and an undescribed taxon, species in the magnum complex are recorded only from a single host. However, this can be a result of insufficient sampling as these species have been introduced based only on a single strain.

The interpretation of host-specificity in *Colletotrichum* species may be more appropriately addressed using the information on their ability to cause disease rather than occurrence. This is important in the case of endophytic strains, where the identity of the host may be incidental (Lu et al. 2004). The ability to infect and the degree of virulence are determined by rapidly evolving secreted effector proteins that facilitate infection, thus suppressing plant immunity (Schulze-Lefert & Panstruga 2011). Comparative genomic analyses of the effector repertoires of “specialist” and "generalist" members of *Colletotrichum* could accordingly provide important insights into the molecular basis of their ability of infection and degree of and virulence within the genus. For example, O'Connell et al. (2012) uncovered major differences in the gene complement of *C. higginsianum* and *C. graminicola* using comparative genomics, despite their similar morphologies. They proposed that the diversification of functions required for host interaction, particularly, the secretion of small-molecule and protein effectors and the degradation of plant polymers, allows *C. higginsianum* to colonize a wider range of plant species (generalist). In contrast, *C. graminicola*, a pathogen that is adapted to a narrow range of hosts, has maintained a more targeted arsenal of virulence factors (specialist). Gene family contractions are evident in *Colletotrichum* and are associated with narrow host ranges (Baroncelli et al. 2016), suggesting that host-specificity may be linked to gene function loss (Stajich 2017). Gan et al. (2016) sequenced the genome of a strain of *C. incanum* (in the spaethianum complex) and showed that it can infect both monocotyledons and dicotyledons, providing a new and unique model for studying host-specificity in *Colletotrichum*. The genome was characterized by potential pathogenic lifestyle-specific expansions and contractions of gene families, particularly those encoding carbohydrate-degrading enzymes. This study indicated that gene family losses were more common than gene family expansions during the evolution of *Colletotrichum* species. The study also suggested that the ancestor of *Colletotrichum* already had the genes required and that the observed losses occurred after host specialization. Gan et al. (2016) proposed that the reduced number of myo-inositol transporters in monocot-specific *Colletotrichum* might have occurred during host specialization. However, this is yet to be explored.

Here, we provide tables with host-specific *Colletotrichum* species (Table 1) and endemic/native *Colletotrichum* species (Table 2). In Table 1, we considered the species that even have only one strain and are recorded from one location as host-specific. More collections are needed to confirm whether they are true host-specific species. However, for Table 2, we considered only the species that are recorded from several hosts from a specific country as endemic/native *Colletotrichum* species.

History of classification

Corda (1831) introduced the generic name *Colletotrichum* for *C. lineola.* According to the code of nomenclature, *Vermicularia* is considered a synonym of *Colletotrichum* (Duke 1928, Sutton 1992, Damm et al. 2009). Corda (1837, 1840) added two more species to the genus. However, this group of fungi became prominent in the 19th century with the publication of *Sylloge Fungorium*. Between 1880 and 1900, approximately 50 new taxa were described based on the assumption that *Colletotrichum* species are strongly host-specific, approximately 750 names existed at the time of the first formal monographic treatment (von Arx 1957b, Hyde et al. 2009a, Cannon et al. 2012, Jayawardena et al. 2016a). von Arxs' approach was based on morphological characteristics, which led to the reduction in the accepted number of species from approximately 750 to 11 (within 23 accepted specific and infraspecific taxa). It was clear that he regarded the 11 accepted species as broadly circumscribed aggregates rather than individual taxa. However, von Arxs' approach to classifying *Colletotrichum* is crude as his evaluations were based on descriptions from the literature rather than on the type material (Sutton 1992, Cannon et al. 2000, 2012). Even so, his work laid the foundation for all subsequent taxonomic work on *Colletotrichum*.

Table 1 Host-specific *Colletotrichum* species

***Colletotrichum* species**	**Host**	**Country**	**Reference**
Colletotrichum acidae	*Phyllanthus acidus*	Thailand	Samarakoon et al. (2018)
C. acerbum	*Malus domestica*	New Zealand	Damm et al. (2012b)
C. alatae	*Dioscorea alata*	Barbardos, Guadeloupe, India, Nigeria	Weir et al. (2012)
C. annellatum	*Hevea brasiliensis*	Colombia	Damm et al. (2012a)

Table 1 Continued.

***Colletotrichum* species**	**Host**	**Country**	**Reference**
C. anthrisci	*Anthriscus sylvestris*	Netherlands	Damm et al. (2009)
C. antirrhinicola	*Antirrhinum majus*	New Zealand	Damm et al. (2014)
C. arboricola	*Fuchsia magellanica*	Chile	Crous et al. (2018)
C. arecicola	*Areca catechu*	China	Cao et al. (2020)
C. artocarpicola	*Artocarpus heterophyllus*	Thailand	Bhunjun et al. (2019)
C. atractylodicola	*Atractylodes chinensis*	China	Xu et al. (2018a)
C. axonopodi	*Axonopus fissifolius*	Australia	Crouch et al. (2009)
C. baltimorense	*Sorghastrum nutans*	USA	Crouch (2014)
C. beeveri	*Brachyglottis repanda*	New Zealand	Damm et al. (2012a)
C. bidentis	*Bidens subalternans*	Brazil	Damm et al. (2013)
C. bletillum	*Bletilla ochracea*	China	Tao et al. (2013)
C. brasiliense	*Passiflora edulis*	Brazil	Damm et al. (2012a)
C. brassicicola	*Brassica oleraceae*	New Zealand	Damm et al. (2012a)
C. brisbanense	*Capsicum annuum*	Australia	Damm et al. (2012b)
C. bryoniicola	*Bryonia dioica*	Netherlands	Damm et al. (2014)
C. cacao	*Theobroma cacao*	Costa Rica	Damm et al. (2019)
C. cairnsense	*Capsicum annuum*	Australia	de Silva et al. (2017)
C. camellia-japonicae	*Camellia japonica*	Japan	Hou et al. (2016)
C. cariniferi	*Dendrobium cariniferum*	Thailand	Ma et al. (2018)
C. catinaense	*Citrus* sp.	Italy, Portugal	Guarnaccia et al. (2017)
C. cattleyicola	*Cattleya* sp.	Belgium, Japan	Damm et al. (2019)
C. caudatum	*Sorghastrum nutans*	USA	Crouch (2014)
C. caudisporum	*Bletilla ochracea*	China	Tao et al. (2013)
C. changpingense	*Fragaria × ananassa*	China	Jayawardena et al. (2016b)
C. chiangraiense	*Dendrobium* sp.	Thailand	Ma et al. (2018)
C. chrysophilum	*Musa* sp.	Brazil	Vieira et al. (2017)
C. circinans	*Allium cepa*	Temperate region	Damm et al. (2009), Jayawardena et al. (2016a)
C. citricola	*Citrus* sp.	China	Huang et al. (2013), Fu et al. (2019)
C. cobbittiense	*Cordyline* sp.	Australia	Crous et al. (2018)
C. coelogynes	*Coelogyne* sp.	Germany	Damm et al. (2019)
C. colombiense	*Passiflora edulis*	Colombia	Damm et al. (2012a)
C. condaoense	*Ipomoea psecaprae*	Vietnam	Crous et al. (2018)
C. cosmic	*Cosmos* sp.	Netherlands	Damm et al. (2012b)
C. costaricense	*Coffea* sp.	Costa Rica	Damm et al. (2012b)
C. curcumae	*Curcuma* sp.	India	Damm et al. (2009)
		China	Li et al. (2016)
C. cuscutae	*Cuscuta* sp.	Dominica	Damm et al. (2012b)
C. dacrycarpi	*Dacrycarpus* sp.	New Zealand	Damm et al. (2012a)
C. doitungense	*Dendrobium* sp.	Thailand	Ma et al. (2018)
C. dracaenophilum	*Dracaena* sp.	Bulgaria, China	Damm et al. (2019)
C. duyunensis	*Bletilla ochracea*	China	Tao et al. (2013)
C. echinocholae	*Echinochola* sp.	Japan	Moriwaki & Tsukiboshi (2009)
C. eleusines	*Elusines* sp.	Japan, USA	Crouch et al. (2009)
C. endophytica	*Pennisetum purpureum*	Thailand	Manamgoda et al. (2013)
C. endophytum	*Bletilla ochracea*	China	Tao et al. (2013)
C. eremochloae	*Eremochloae ophiuroides*	China, USA	Crouch & Tomaso-Peterson (2012)
C. eriobotryae	*Eriobotrya japonica*	Taiwan (China)	Damm et al. (2020)
C. eryngiicola	*Eryngium campestre*	Russia	Buyck et al. (2017)
C. excelsum-altitudinum	*Bletilla ochracea*	China	Tao et al. (2013)
C. falcatum	*Saccharum officinarum*	Australia, Indonesia, Japan, Netherlands, Thailand	Prihastuti et al. (2010)
C. feijoicola	*Acca sellowiana*	Portugal	Crous et al. (2019)
C. graminicola	*Zea mays*	Worldwide	Farr & Rossman (2021)
C. grevilleae	*Grevillea* sp.	Italy	Liu et al. (2013)

Table 1 Continued.

***Colletotrichum* species**	**Host**	**Country**	**Reference**
C. guizhouensis	*Bletilla ochracea*	China	Tao et al. (2013)
C. hanaui	*Digitaria ciliaris*	China, Japan, USA	Crouch et al. (2009)
C. hainanense	*Axonopus compressus*	China	Zhang et al. (2020)
C. hebeiense	*Vitis vinifera*	China	Yan et al. (2015)
C. hederiicola	*Hedera helix*	Italy	Hyde et al. (2020)
C. hemerocallidis	*Hemerocallis fulva*	Canada, China	Yang et al. (2012a)
C. higginsianum	genera of *Brassicaceae*	Worldwide	Damm et al. (2014)
C. hippeastri	*Hippeastrum* sp.	China, Netherland	Damm et al. (2012a)
C. horii	*Diospyros kaki*	Brazil, China, Japan, Korea, New Zealand, South Korea	Farr & Rossman (2021)
C. hsienjenchang	*Phyllostachys*	Japan	Sato et al. (2012)
C. hystricis	*Citrus hystrix*	Italy	Guarnaccia et al. (2017)
C. incanum	*Glycine max*	USA	Yang et al. (2014)
C. indonesiense	*Eucalyptus* sp.	Indonesia	Damm et al. (2012b)
C. insertae	*Parthenocissus inserta*	Russia	Hyde et al. (2016)
C. jacksonii	*Echinochloa esculenta*	Japan	Crouch et al. (2009)
C. jasminigenum	*Jasminum sambac*	Vietnam	Wikee et al. (2011)
C. javanense	*Capsicum annuum*	Indonesia	de Silva et al. (2019)
C. jiangxiense	*Camellia sinensis*	China	Liu et al. (2015)
C. jinshuiense	*Pyrus pyrifolia*	China	Fu et al. (2019)
C. jishouense	*Nothapodytes pittosporoides*	China	Zhou et al. (2019)
C. kakivorum	*Diospyrus kaki*	Korea	Lee & Jung (2018)
C. kinghornii	*Phormium* sp.	UK	Damm et al. (2012b)
C. laticiphilum	*Hevea brasiliensis*	Inida, Colombia, Sri Lanka, China	Damm et al. (2012b) Hunupolagama et al. (2017) Shi et al. (2019)
C. lauri	*Laurus nobilis*	Italy	Hyde et al. (2017)
C. lilii	*Lillium* sp.	Japan	Damm et al. (2009)
C. ledebouriae	*Ledebouria floridunda*	South Africa	Crous et al. (2016)
C. liaoningense	*Capsicum annuum*	China	Diao et al. (2017)
C. limonicola	*Citrus limon*	Malta	Guarnaccia et al. (2017)
C. lindemuthianum	*Phaseolus* sp.	Worldwide	Jayawardena et al. (2016a)
C. magnum	*Citrullus lanatus*	USA	Damm et al. (2019)
C. malvarum	Genera of *Malvaceae*	Germany, Korea, UK	Damm et al. (2013)
C. makassarense	*Capsicum annuum*	Indonesia	de Silva et al. (2019)
C. menispermi	*Menispermum dauricum*	Russia	Li et al. (2016)
C. merremiae	*Merremia umbellata*	Panama	Damm et al. (2019)
C. musae	*Musa* sp.	Worldwide	Weir et al. (2012)
C. navitas	*Panicum* sp.	USA	Crouch et al. (2009b)
C. neosansevieriae	*Sansevieria trifasciata*	South Africa	Crous et al. (2015)
C. nicholsonii	*Paspalum dilatatum*	Japan, New Zealand	Crouch et al. (2009a)
C. ocimi	*Ocimum basilicum*	Italy Australia	Damm et al. (2014) Shivas et al. (2016)
C. orchidis	*Orchis* sp.	Italy	Hyde et al. (2020)
C. okinawense	*Carica papaya*	Japan Brazil	Damm et al. (2019) Dias et al. (2020)
C. ochraceae	*Bletilla ochracea*	China	Tao et al. (2013)
C. oncidii	*Oncidium* sp.	Germany	Damm et al. (2012a)
C. orbiculare	genera of *Cucubitaceae*	Worldwide	Damm et al. (2013), Farr & Rossman (2021)
C. orchidophilum	*Orchidaceae*	Panama, UK, USA, France	Damm et al. (2012b), Charron et al. (2018)
C. panacicola	*Panax* sp.	China, Japan, Korea, Russia	Damm et al. (2014)
C. panamense	*Merremia umbellate*	Panama	Damm et al. (2019)

Table 1 Continued.

***Colletotrichum* species**	**Host**	**Country**	**Reference**
C. parallelophorum	*Dendrobium* sp.	Thailand	Ma et al. (2018)
C. parthenocissicola	*Parthenocissus quinquefolia*	Russia	Yuan et al. (2020)
C. paspali	*Paspalum notatum*	Japan	Crouch et al. (2009a)
C. pandanicola	*Pandanus* sp.	Thailand	Tibpromma et al. (2018)
C. paxtonii	*Musa* sp.	West Indies	Damm et al. (2012b)
C. persea	*Persea americana*	Israel	Sharma et al. (2017)
C. petchii	*Dracaena* sp.	China, Germany, Italy, Netherlands, Sri Lanka, Australia	Damm et al. (2012a), Shivas et al. (2016)
C. phormii	*Phormium* sp.	Germany, Netherlands, New Zealand, South Africa, UK	Farr et al. (2006), Damm et al. (2012b), Serdani et al. (2013)
C. piperis	*Piper nigrum*	Malaysia	Damm et al. (2019)
C. pisicola	*Pisum* sp.	Ecuador, Mexico, USA	Damm et al. (2014)
C. pseudomajus	*Camellia sinensis*	Taiwan	Liu et al. (2014)
C. pseudotheobromicola	*Prunus avium*	China	Chethana et al. (2019)
C. psidii	*Psidium* sp.	Italy	Weir et al. (2012)
C. protea	*Protea* sp.	South Africa	Liu et al. (2013)
C. pyrifoliae	*Pyrus pyrifolia*	China	Fu et al. (2019)
C. quinquefoliae	*Parthenocissus quinquefolia*	Russia	Li et al. (2016)
C. riograndense	*Tradescantia fluminensis*	Brazil	Macedo et al. (2016)
C. salsolae	*Salsola tragus*	Hungary	Weir et al. (2012)
C. sambucicola	*Sambucus ebulus*	Italy	Tibpromma et al. (2017)
C. sansevieriae	*Sansevieria* sp.	Australia	Aldaoud et al. (2011)
		Japan	Nakamura et al. (2006)
		India	Gautam et al. (2012)
		Iran	Karimi et al. (2017)
C. sedi	*Sedum* sp.	Russia	Liu et al. (2015)
C. serranegrense	*Cattleya jongheana*	Brazil	Silva et al. (2018)
C. shisoi	*Perilla frutescens*	Japan	Gan et al. (2019)
C. sidae	*Sida spinosa*	USA	Damm et al. (2013)
C. somersetense	*Sorghastrum nutans*	USA	Crouch (2014)
C. sonchicola	*Sonchus* sp.	Italy	Jayawardena et al. (2017)
C. spinosum	*Xanthium spinosum*	Argentina, Australia	Damm et al. (2013)
C. sublineola	*Sorghum* sp.	Togo, USA	Crouch & Tomaso-Peterson (2012)
C. sydowii	*Sambucus* sp.	Taiwan (China)	Marlin-Felix et al. (2017)
C. syzygicola	*Citrus aurantifolia*, *Syzygium samarangense*	Thailand	Udayanga et al. (2013)
C. tanaceti	*Tanacetum cinerariifolium*	Australia, Tasmania	Damm et al. (2014)
C. tainanense	*Capsicum annuum*	Taiwan	de Silva et al. (2019)
C. tebeestii	*Malva pustilla*	Canada	Damm et al. (2013)
C. temperatum	*Vaccinium macrocarpon*	USA	Doyle et al. (2013)
C. ti	*Cordyline* sp.	New Zealand	Weir et al. (2012)
C. tongrenense	*Nothapodytes pittosporoides*	China	Zhou et al. (2019)
C. trichellum	*Hederea* sp.	Canada, Germany, Guatemala, Netherlands, New Zealand, UK	Damm et al. (2009)
C. utrechtense	*Trifolium pratense*	Netherlands	Damm et al. (2014)
C. verruculosum	*Crotalaria juncea*	Zimbabwe	Damm et al. (2009)
C. vietnamense	*Coffea* sp.	Vietnam	Liu et al. (2014)
C. vignae	*Vigna unguiculata*	Nigeria	Damm et al. (2014)
C. viniferum	*Vitis vinifera*	China	Peng et al. (2013)
		South Korea	Oo & Oh (2017)

Table 1 Continued.

***Colletotrichum* species**	**Host**	**Country**	**Reference**
C. walleri	*Coffea* sp.	Vietnam	Damm et al. (2012b)
C. wanningense	*Hevea brasiliensis*	China	Cao et al. (2019)
C. watpharaense	*Dendrobium* sp.	Thailand	Ma et al. (2018)
C. wuxiense	*Camellia sinensis*	China	Wang et al. (2016)
C. xanthorrhaea	*Xanthorrhoea preissii*	Australia	Shivas et al. (2009)
C. yulongense	*Vaccinium dunalianum*	China	Wang et al. (2019)
C. yunnanense	*Buxus* sp.	China	Liu et al. (2007)
C. zoysiae	*Zoysia tenuifolia*	Japan	Crouch (2014)

Table 2 Endemic/Native *Colletotrichum* species

***Colletotrichum* species**	**Country**	**Host**	**Reference**
Colletotrichum alcornii	Australia	*Bothriochloa bladhii*, *Imperata cylindrical*	Crouch (2014)
C. aotearoa	New Zealand	*Banksia marginata, Boehmeria* sp., *Bredia oldhamii, Coprosma* sp., *Dacrycarpus dacrydioides, Knightia* sp., *Musa* sp., *Podocarpus* totara, *Vitex lucens*	Weir et al. (2012)
C. carthami	Japan	*Carthamus tinctorius* *Calendula officinalis*	Uematsu et al. (2012) Baroncelli et al. (2015a)
C. constrictum	New Zealand	*Citrus limon*, *Solanum betacum*	Damm et al. (2012a)
C. fructi	USA	*Malus sylvestris*, *Pyrus malus*	Damm et al. (2009)
C. helleniense	Greece	*Citrus reticulata, Poncirus trifoliate*	Guarnaccia et al. (2017)
C. henanense	China	*Camellia sinensis*, *Cirsium japonicum* *Camellia oleifera*	Liu et al. (2015) Li et al. (2018)
C. guajavae	India	*Psidium guajava* *Elettaria cardamomum*	Damm et al. (2012b) Chethana et al. (2016)
C. johnstonii	New Zealand	*Solanum lycopersicum* *Citrus* sp.	Damm et al. (2012b)
C. kahawae	African continent	*Coffea Arabica*	Waller et al. (1993), Weir et al. (2012)
C. neosansevieriae	South Africa	*Sansevieria trifasciata*	Crous et al. (2015)
C. nupharicola	USA	*Nuphar*, *Nymphae*	Johnston et al. (1997)
C. phyllanthi	India	*Phyllanthus acidus* *Bauhinia variegate, Bougainvillea glabra*	Damm et al. (2012a) Sharma & Shenoy (2013)
C. rhexiae	USA	*Rhexia virginica*, *Vaccinium macrocarpon*	Doyle et al. (2013)
C. tamarolii	Colombia	*Solanum betaceum* (anthracnose) *Cyphomandra betacea*	Damm et al. (2012b) Baroncelli et al. (2015b)
C. torulosum	New Zealand	*Passiflora edulis*, *Solanum melongena*	Damm et al. (2012a)
C. trifolii	USA	*Medicago* sp., *Trifolium* sp.	Damm et al. (2013)
C. vittalense	India	*Calamus thwaitesii*, *Orchid* sp., *Theobroma cacao*	Damm et al. (2019)

Subsequent taxonomic treatments mainly focused on species or taxa associated with a particular crop. Simmonds (1965) recognized *C. acutatum*, Sutton (1966, 1968) made contributions in the taxonomy of graminicola complex and understanding the value of appressorial morphology in classification. Sutton (1980) provided the next comprehensive treatment, accepting 22 species. Baxter et al. (1983) contributed 11 South African species. Both of these studies mainly relied on morphological and cultural characteristics. Smith & Black (1990) identified the species associated with strawberry, while Walker et al. (1991) identified species associated with *Xanthium* based on the integration of taxonomy and pathological data. The first international workshop on *Colletotrichum* was held in late 1990 in the UK (Bailey & Jeger 1992) and marked the dawn of using molecular methods in *Colletotrichum* studies. Initial studies focused on intraspecific variation (Dale et al. 1988, Braithwaite & Manners 1989, Braithwaite et al. 1990a, b, Masel et al. 1990). Mills et al. (1992) published the first applications of DNA sequence data to distinguish between *Colletotrichum* species. Sreenivasaprasad et al. (1992) identified sequence variation in the ITS1 region of nrDNA between six species of *Colletotrichum*. This study also detected polymorphisms in the same region between strains of *C. gloeosporioides* from different hosts. Sherriff et al. (1994) presented the first bootstrapped neighbour-joining tree for *Colletotrichum* using ITS2 and LSU sequence data of 27 strains, resulting in 13 species. In that study, *C. orbiculare* was identified as a different taxonomic unit and genetic congruence was detected between the four curved-spored species studied. Sreenivasaprasad et al. (1996) using parsimony analysis of ITS1 and ITS2 sequences from 18 *Colletotrichum* species published the second phylogenetic study of the genus, which resulted in identifying six infrageneric groups. Talhinhas et al. (2002) published the first multilocus phylogenetic analyses of *Colletotrichum* species as a study of the *C. acutatum* complex associated with lupins using ITS, *tub2* and *his3*4 sequence data. Vinnere et al. (2002) provided a multilocus phylogenetic analysis using ITS, *tub2* and mtSSU sequence data in a study on the same species complex associated with *Rhododendron* in Sweden and Latvia. Talhinhas et al. (2002) found that the three loci they studied displayed broadly similar levels of phylogenetic resolution. Guerber et al. (2003) used glyceraldehyde-3-phosphate dehydrogenase (*gapdh*) and glutamine synthetase (*gs*) nucleotide sequence data in their study of the *C. acutatum* complex. Du et al. (2005) found that the HMG-box section of the mating-type genes *mat-1* was a valuable genetic marker for this genus. From around this time, multilocus analyses became the norm as sequencing costs reduced, with sequence data generated from different loci (Table 3).

Table 3 Different gene loci used in *Colletotrichum* identification

Name	**Reference**
ITS	Mills et al. (1992)
LSU	Sherriff et al. (1994)
mat2	Chen et al. (2002)
tub2	Talhinhas et al. (2002)
his34	Talhinhas et al. (2002)
mtSSU	Vinnere et al. (2002)
gapdh	Guerber et al. (2003)
gs	Guerber et al. (2003)
mat 1-2 **(**HMG marker**)**	Du et al. (2005)
sod2	Crouch et al. (2006)
Ccret2	Crouch et al. (2008)
apn2/Igs/mat1-2	Crouch et al. (2009)
act	Damm et al. (2009)
chs-1	Damm et al. (2009)
cal	Prihastuti et al. (2009)
ef1α	Rojas et al. (2010)
rpb1	Rojas et al. (2010)
apmat	Silva et al. (2012a, b)
apn15l	Silva et al. (2012a, b)
mat5L	Silva et al. (2012a, b)
apn1ex3	Silva et al. (2012a, b)
apn13l	Silva et al. (2012a, b)

The special issue of the journal Fungal Diversity in 2009, containing a group of papers presenting taxonomic revisions and review articles relevant to the genus, was a milestone in *Colletotrichum* taxonomy. Hyde et al. (2009a) accepted 66 species with an additional 20 names considered as doubtful. In his study, he highlighted the importance of using polyphasic approaches. Cannon et al. (2012) accepted 118 species based on morphological and phylogenetic data.

Jayawardena et al. (2016a) accepted 190 species with molecular data, identified one doubtful species, and excluded one species. Many revisions have since been published on the genus based on multi-locus sequence data (Damm et al. 2009, 2012a, b, 2013, 2014, 2019, Weir et al. 2012, Crouch 2014, Hyde et al. 2014, Bhunjun et al. 2021, Jayawardena et al. 2020). An updated backbone diagrammatic tree for the genus is given in Fig. 3.

Studies on *Colletotrichum* species from forest plants or plants in natural/semi-natural habitats have been much less studied (Hyde et al. 2020). There is a need to expand study of *Colletotrichum* beyond economically important plants, as these may act as a reservoir of common and novel species, thus providing a better overall understanding of the genus.

Various methods in defining *Colletotrichum* species

Currently, species delimitation in *Colletotrichum* relies solely on the use of multi locus phylogenetic analyses (Cannon et al. 2012, Hyde et al. 2014, Jayawardena et al. 2020). However, different methods can be used to provide better species delimitation.

Genealogical concordance phylogenetic species recognition (GCPSR)

This concept was proposed as an empirical method for recognizing cryptic speciation (Taylor et al. 2000). The GCPSR involves sequencing multiple genes that are then combined in phylogenetic analysis (Nguyen et al. 2015). The point of genetic isolation is identified through incongruent nodes and therefore interpreted as the species limit or the point of genetic isolation (Dettman et al. 2003, O'Donnell et al. 2008, Henk et al. 2011, Leavitt et al. 2011). This concept is important for delimitation of morphologically similar species that only exhibit their asexual morphs (Nguyen et al. 2015). Genealogical concordance phylogenetic species recognition considers phylogenetic trees of different genes that show discordance within a species due to gene flow between individuals (Liu et al. 2016c). According to the GCPSR criteria, the lack of genealogical congruence among gene trees is a signal that the sampled diversity is below species level (Taylor et al. 2000). In contrast, concordance between gene trees is strong evidence for the distinct and congruent clades to represent reproductively isolated lineages.

Colletotrichum gloeosporioides is a species complex with broad genetic and biological diversity, whose numbers have similar conidial morphology and ITS sequences (Damm et al. 2010). Weir et al. (2012) used the GCPSR concept to delimit taxa within the gloeosporioides species complex. They applied GCPSR with eight genes using the Bayesian analysis tool, BUCKy (Ané et al. 2007). The GCPSR concept worked well for species delimitation along currently recognised lines. However, *C. kahawae*, was insufficiently distinct from several genetically similar non-coffee berry disease-causing taxa (Weir et al. 2012). In their study, they suggested that this may be due to the recent emergence of *C. kahawae* as a pathogen and that insufficient time had passed for ecological niche specialisation to show polymorphisms in the genes used. Therefore, *C. kahawae* was recognised at the subspecific rank. In Weir et al. (2012), not all within species phylogenetic structures supported by multiloci phylogeny were resolved consistently in all gene trees.

Liu et al. (2016d) utilized the GCPSR concept to test the null hypothesis that '*C. siamense* is a species complex'. In their study they pointed out that supported nodes in a single gene tree might conflict with those in the concatenated multi-locus tree, as well as in other single gene trees. The combination of multiple loci, which separately do not support a clade, can often reveal support for or conflict within that clade (Gatesy & Baker 2005). In the phylogenetic analyses of *C. siamense sensu lato*, conflicts were reported between any pair of single locus phylograms, or even in concatenated gene trees (Liu et al. 2016c). Therefore, implementing GCPSR criteria lead to the rejection of the null hypothesis. The topology of the *apmat* phylogram was almost congruent with that of the 8-locus phylogram (Liu et al. 2016c). Mating-related genes evolve at a faster rate and have a higher sequence variability, which therefore dominates the topology of the multi-locus phylogram (Silva et al. 2012a, b). It should be noted that single-locus data inferred the evolutionary history of a single gene, but not that of the organisms (Frantz et al. 2013).

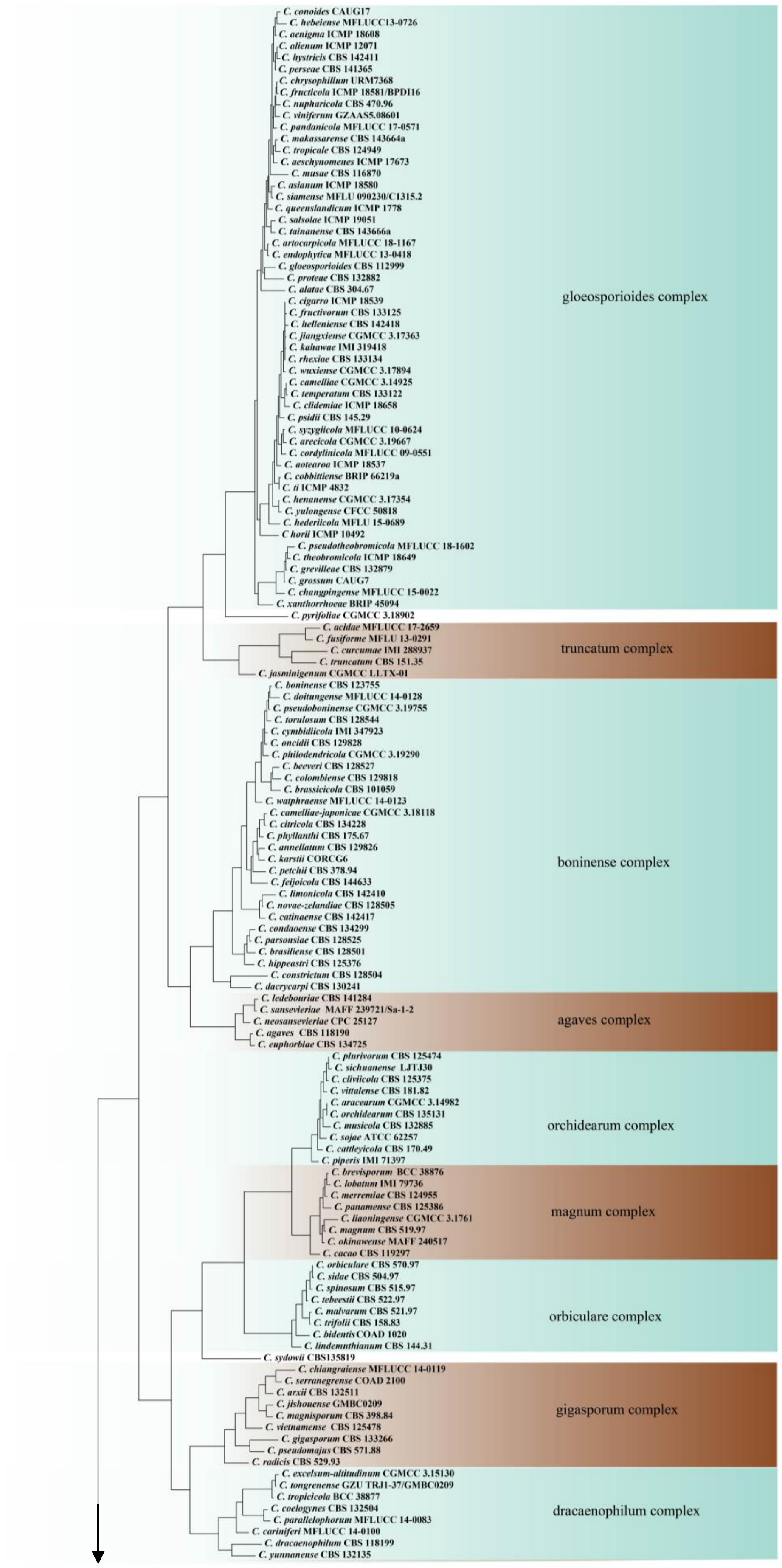

Figure 3 – Backbone diagrammatic tree of *Colletotrichum*. One of the 100 most parsimonious trees

obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The tree is rooted with *Monilochaetes camelliae* (BRIP 24607) and *M. infuscans* (CBS 869.96).

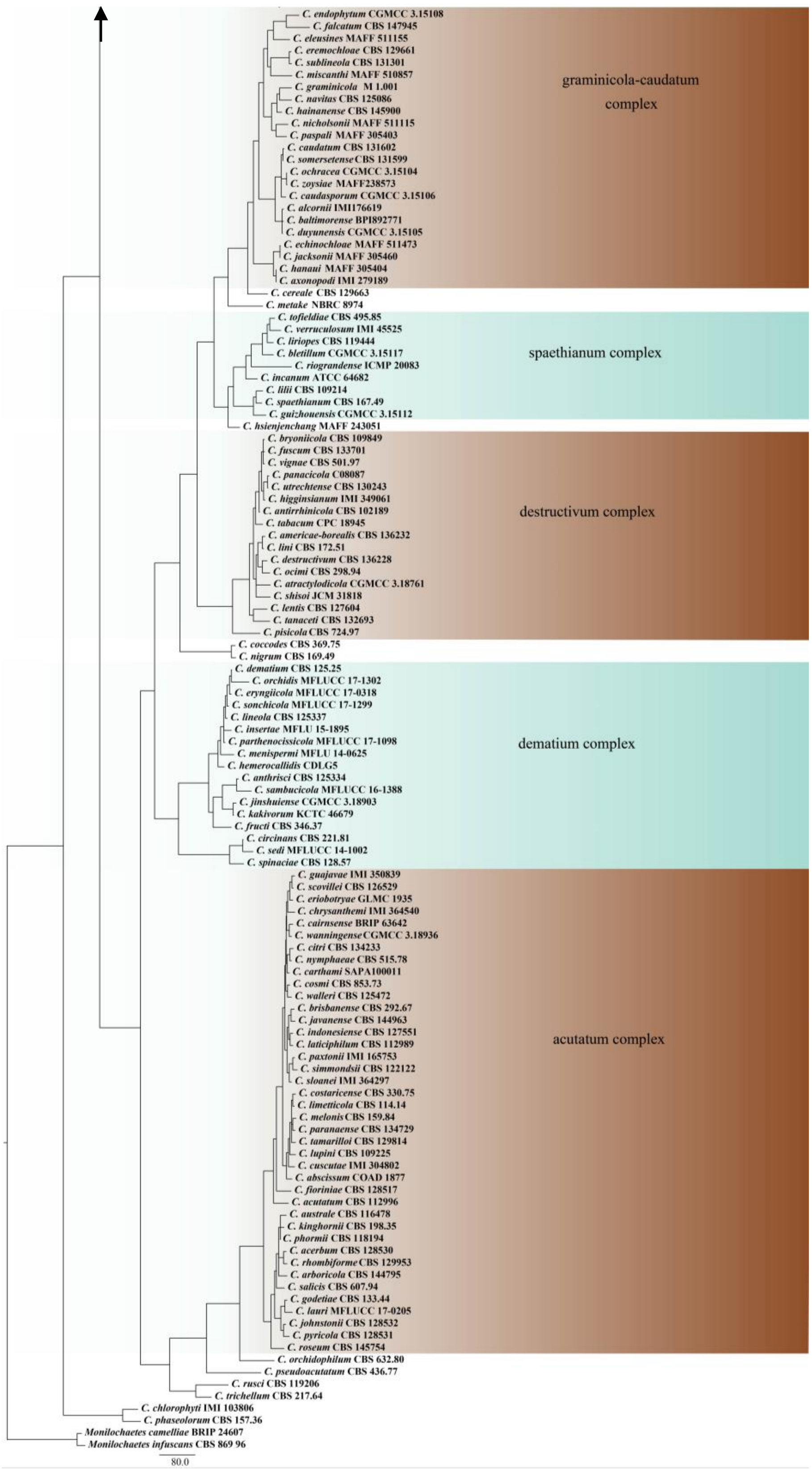

Figure 3 – Continued.

Cavalcante et al. (2019) considered a clade as an independent lineage when it met at least one of the two criteria: genealogical concordance or genealogical nondiscordance. Genealogical concordance criterion is satisfied, if the clade is present in most individual gene trees. Genealogical nondiscordance criterion is satisfied when a clade is strongly supported by at least one locus in more than one phylogenetic analyses (ML and BYPP ≥70% and ≥0.95 respectively), and not contradicted in any other individual gene tree with the same level of support. Based on these GCPSR criteria, Cavalcante et al. (2019) assigned the *Colletotrichum* sp. associated with lima bean in Brazil to four species: *C. brevisporum*, *C. lobatum*, *C. magnum* and *C. truncatum* and no discordance was observed among individual gene trees.

Pairwise homoplasy index test *(*PHI or Φw*)*

Recombination is a powerful evolutionary force that merges historically distinct genotypes. However, the extent of recombination within many organisms is unknown, and even determining its presence within a set of homologous sequences is a difficult task (Awadalla 2003). Tests for recombination based on the principle of compatibility are amongst the most powerful tools in species identification (Brown et al. 2001, Posada 2002). Bruen et al. (2006) developed a new statistical test for recombination, the PHI statistic that uses this notion of refined incompatibility. Pairwise homoplasy index test takes into account convergent or recurrent mutations (homoplasies). Sites are compared and deemed compatible, if there are no homoplasies. The presence of homoplasies indicates incompatible sites and recombination.

The GCPSR as mentioned earlier is a pragmatic tool for the assessment of species limits, as the concordance of gene genealogies is a valuable criterion for evaluating the significance of gene flow between groups within an evolutionary timescale (Quaedvlieg et al. 2014). Many studies have conducted the PHI test using the GCPSR model to determine the recombination level between taxa when describing new *Colletotrichum* species (Crouch 2014, Liu et al. 2015a, 2016d, Jayawardena et al. 2016a, 2017, Bhunjun et al. 2019). Results of PHI below a 0.05 threshold ($\Phi w < 0.05$) indicate the presence of significant recombination. This means that the species under consideration cannot be different species.

Haplotype and Phylogenetic network analysis

Phylogenetic network analysis takes reticulation events into account (such as hybridization, recombination and/or horizontal gene transfer) (Huson & Scornavacca 2011). Rogério et al. (2017) studied 51 strains of *C. truncatum* from soybean in Brazil and identified the existence of a highly efficient mechanism of pathogen dispersal over long distances, reinforcing the role of seeds as the primary source of disease inoculum. Based on this approach, Liu et al. (2016d) provided evidence to synonymise seven species in the siamense complex to *C. siamense*. Douanla-Meli et al. (2018) identified that *C. cliviicola* isolates of each geographic region were not always resolved into separate groups. The first group included the most geographically diversified group, composed of isolates from Brazil, China, Mexico and Vietnam. The second group contained isolates from Cameroon, South America (Brazil, Puerto Rico) and Vietnam. There was another group made up exclusively of isolates from different hosts in China. Crouch et al. (2008) used a four-gene nucleotide data set to diagnose the limits of population boundaries. *Colletotrichum cereale* was divided into ten highly specialized populations corresponding to the ecosystem and/or host plant, along with a single generalist population spread across multiple habitat types (Crouch et al. 2008).

Coalescent-based species delimitation (CBD)

In multi-locus analyses, incongruence between gene trees and species trees is commonly detected. Incomplete lineage is considered a common source of discordance (Kubatko et al. 2011). Incomplete lineage sorting refers to gene copies retaining ancestral polymorphisms thus resulting in discordant gene trees (Hudson & Coyne 2002). Coalescent-based delimitation involves modelling the genealogical history of samples (e.g. loci) to a common ancestor (Fujita et al. 2012). Coalescent-based species delimitation has been used in discovering a large number of cryptic species in animals and plants (Waters et al. 2010, Stewart et al. 2014). However, these approaches are seldomly applied in fungi, especially in a complex group of plant pathogens like

Colletotrichum. Liu et al. (2016d) applied several coalescent-based species delimitation methods to infer species boundaries of the ‘siamense species complex’. Douanla-Meli et al. (2018) applied CBD to identify the relationship among *C. cliviae* (now known as *C. cliviicola*), *C. sichuanensis* and *C. orchidearum*. Based on this analysis, *C. sichuanensis* was synonimized under *C. cliviicola*. Bhunjun et al. (2021) used CBD methods to elucidate species and species complex boundaries within *Colletotrichum*. Based on their findings, the sansevieriae species complex was introduced and they provided recommendations for species boundaries in the graminicola-caudatum complex.

General Mixed Yule Coalescent (GMYC) approach

The GMYC approach is designed for single-locus analysis however, it has been used for multilocus phylogeny as well (Arrigoni et al. 2016). This approach combines the neutral coalescent theory with the Yule speciation model and aims at detecting shifts in branching rates between intra- and interspecific relationships. This method requires an ultrametric tree. Liu et al. (2016d) used GMYC approach when defining the species boundaries for ‘siamense species complex’. In their analyses, all the strains used in the analyses which were identified as different species were recognized as a single species. Bhunjun et al. (2021) used GMYC approach for the whole genus which detected 97 entities based on the multi-locus dataset and all the singletons were recovered as conspecific with few exceptions.

Poisson Tree Processes *(*PTP*)* model

This method is designed for single-locus analysis, however, it has been used for multilocus phylogeny (Renner et al. 2017). The PTP method directly estimates the mean expected number of substitutions per site between two branching events. It uses the tree branch length information and then implements two independent classes of Poisson processes (intra and inter-specific branching events). This method only requires a likelihood tree. Liu et al. (2016d) used PTP model to provide more support for treating *Colletotrichum siamense* as a single species, not as a cryptic species. In Bhunjun et al. (2021) 26 entities were recovered for the whole genus based on multiloci data set.

Species validation

This method accommodates the species phylogeny as well as incomplete lineage sorting due to ancestral polymorphisms (Yang & Rannala 2010). Its use has several advantages over other alternatives and is commonly used for species delimitation (Fujita & Leache 2011). Bayesian phylogenetics and phylogeography incorporate a nearest-neighbour interchange algorithm allowing changes in the species tree topology and eliminating the need for a fixed user-specified guide tree (Yang & Rannala 2010).

Molecular clock studies

These types of studies can provide details on how species of *Colletotrichum* evolved with their hosts in nature. Only few studies have identified the examined these aspects of *Colletotrichum*.

Hacquard et al. (2016) estimated the divergence time of *Colletotrichum* based on a penalized likelihood method of genome sequence data using the crown age of Pezizomycotina, Sordariomycetes and *Cordyceps-Metarhizium* divergence as calibration points. They estimated that *C. incanum* and *C. tofieldiae* diverged approximately 8.8 MYA.

Liang et al. (2018) estimated the divergence time of several complexes based on a penalized likelihood method of genome sequence data using the crown age of *Colletotrichum*, Sordariomycetes, and Sordariomycetes-Leotiomycetes crown as the calibration points and the estimates were based on four calibration schemes. According to this study, *C. fructicola* and *C. gloeosporioides* (gloeosporioides complex) diverged approximately 3.8–5.1 MYA, *C. graminicola* and *C. sublineola* (graminicola complex) diverged approximately 11–15 MYA, *C. incanum* and *C. tofieldiae* (spaethianum complex) diverged approximately 7.5–11 MYA, *C. salicis*, *C. fioriniae*, *C. nymphaeae* and *C. simmondsii* (acutatum complex) diverged approximately 8–10.9 MYA. The most recent common ancestor (MRCA) of the acutatum, graminicola, spaethianum and destructivum complex was estimated at 37–49 MYA.

Lelwala et al. (2019) estimated the divergence time based on a penalized likelihood method of genome sequence data using the crown age of Leotiomycetes-Sordariomycetes, crown age of Sordariomycetes and *Colletotrichum* crown as the calibration points. *Colletotrichum higginsianum* and *C. tanaceti* (destructivum complex) diverged around 9.9 MYA, *C. fructicola* and *C. gloeosporioides* (gloeosporioides complex) diverged around 6.1 MYA, *C. graminicola* and *C. sublineola* (graminicola complex) diverged around 15.8 MYA, *C. fioriniae*, *C. nymphaeae*, *C. salicis* and *C. simmondsii* (acutatum complex) diverged around 10.9 MYA. The MRCA of the acutatum, graminicola, spaethianum and destructivum complex was estimated at 48.9 MYA. The MRCA of the graminicola, destructivum and spaethianum complex was estimated at 34.7 MYA.

Bhunjun et al. (2021) used all species in *Colletotrichum* and provided an estimated divergence time for all the complexes. The estimated crown age of Colletotrichum was 61-63 MYA. In his study, three singleton taxa claded in species complexes. *Colletotrichum axonopodi* was closely related to *C. hanaui* in the graminicola complex whereas *C. parallelophorum* and *C. cariniferi* claded in the dracaenophilum complex. The study strongly supported a new species complex, which comprised *C. agaves, C. euphorbiae, C. ledebouriae, C. neosansevieriae* and *C. sansevieriae* with an estimated divergence time of 9.5 MYA.

Further molecular clock studies are needed to understand the host association of *Colletotrichum* species.

Are we introducing too many species?

Ignorance of morphospecies

Every year many species are introduced in this genus (see Fig. 4). Are we introducing species that have been introduced in earlier studies that lack molecular data? As listed in Table 19 there are 450 morphospecies. If mycologists introduce new species on a host, for which there are previous records of morphospecies (species without molecular data), it is important to check the morphological descriptions to avoid this problem. For example, if a new species is introduced on rubber (*Hevea* sp.), the morphology of the species should be compared with *C. heveae* Petch. However, in some cases, the original descriptions of the morphospecies and type species are not available. Sometimes, a species is considered invalid by Index Fungorum, while it is accepted as a valid species elsewhere (e.g. *C. rubicola*). As this is very confusing, we recommend epitypification/neotypification of these species.

Taxon sampling

Taxon sampling is important when we are introducing a new species in this genus. Wrong identification or misinterpretation can occur based on the number of taxa that we use in phylogenetic analyses (Young & Gillung 2020). Theoretically, the phylogenetic species concept is based on the assumption that ‘the fixation of a particular character state in a population is diagnostic of a long history of reproductive isolation (Liu et al. 2016c). However, in practice, species recognition is carried out based on the characters of a small group of individuals. Unfortunately, within a particular species, a small sample size of individuals in a population might share one unique character, which can be polymorphic. This leads to the problem that using one or only a few individuals does not capture the intra-specific diversity of a species (Davis & Nixson 1992, Walsh 2000, Liu et al. 2016c). New species might be mistakenly described if two divergent populations present certain morphological or genetic distinctions (Goldstein et al. 2000). *Colletotrichum* being widely distributed and with little morphological diversity faces the problem of wrong identification when using the phylogenetic species concepts. One of the best examples is given in Liu et al. (2016). *Colletotrichum endomangiferae* (Viera et al. 2014), *C. hymenocallidis* (Yang et al. 2009), *C. jasmini-sambac* (Wikee et al. 2011) and *C. melanocaulon* (Doyle et al. 2013) were introduced as new species in the *C. siamense* species complex. Sharma et al. (2015) also accepted these as separate species in the siamense complex. However, Liu et al. (2016d) showed that all of the above-mentioned species were introduced based on two or three strains. Hence, by adding more strains, the analyses showed that the four species were in fact *C. siamense*. *Colletotrichum aciculare* was introduced in Ariyawansa et al. (2015) based on one strain. According to the phylogenetic analyses, it clustered in the truncatum species complex. However, Jayawardena et al. (2016a) included more strains of *C. truncatum* and concluded that *C. aciculare* is not a new species, but *C. truncatum* itself. Therefore, *C. aciculare* was synonymised under *C. truncatum* (Jayawardena et al. 2016a).

It is clear that insufficient taxon sampling is one of the main reasons that lead to ambiguous species boundaries in *Colletotrichum*. Therefore, it is highly recommended to include multiple strains from diverse origins for delimiting species or introducing novel species in *Colletotrichum*.

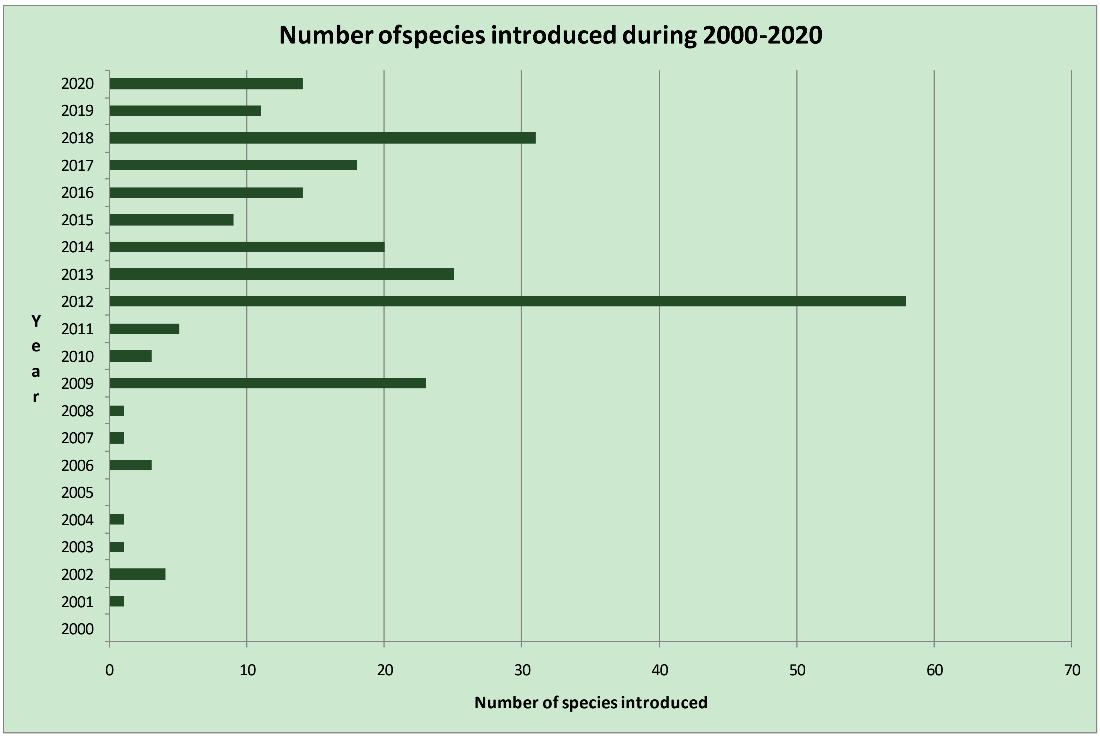

Figure 4 – Number of *Colletotrichum* species introduced from 2000-2020 (based on Index Fungorum)

Misidentification and mistakes

Colletotrichum is mainly identified based on multi-locus phylogenetic analyses. However, errors or mistakes in the sequence data can result in erroneous new species that are not present in nature. Ariyawansa et al. (2015) introduced *Colletotrichum hymenocallidicola*, a singleton species based on one strain using five loci (ITS, *gapdh*, *chs-1*, *act* and *tub2*). Damm et al. (2019) noted that the placement of the species based on *act* and *tub2* is different from the placement based on ITS, *gapdh* and *chs-1* sequence data using a BLASTn search. Closest matches of the ITS, *gapdh* and *chs-1* sequence data were 98–99% identical to strains identified as *C. cliviae* (in the orchidearum complex), while the *act* sequence was 93% identical with those of *C. pseudomajus* and *C. vietnamense* (in the gigasporum complex) and the *tub2* sequence was 100% identical with the ex-epitype strain of *C. truncatum*. There is a possibility that both *act* and *tub2* sequence data were mixed-up with those of other strains studied by the authors. Damm et al. (2019) also found that the first 22bp of *gapdh* sequence includes artefacts as it is completely different from all related species. We strongly recommend mycologists to perform a blast search of each gene region as well as to check the quality of sequences before conducting analyses.

During the past five years, a significant mistake is the exclusion of information of the holotype details in the publication. *Colletotrichum corchorum-capsularis* a pathogen on *Corchorus capsularis* in China was introduced in the truncatum complex (Niu et al. 2016). However, as the authors have not listed an authentic dried type specimen, this species is invalid. A living culture was proposed as a holotype instead of a herbarium material or an inactive material. *Colletotrichum australisinense*, *C. bannanense*, *C. ledongense* and *C. sichuanensis* are additional examples of the same mistake (Liu et al. 2016b, 2018). We recommend that authors should be more careful when defining the material examined and review the articles before publication.

Species complexes

There are 14 species complexes accepted in *Colletotrichum*. For each of the complex, accepted species, host and geographical distribution (will consider only the ones that have molecular data), information of the type/reference, importance gene in identifying and uses when available are given. The type species included in Jayawardena et al. (2020) are used as the starting point for this study. All the species that have been published until June 2020 are included in the analyses (some of the dubious ones are not included). Species of each complex are listed in alphabetical order, hosts and distributions are listed chronologically.

Acutatum species complex

This species complex consists of 39 species that include *C. acutatum* and its close relatives. Members of this species complex often cause fruit rots (Damm et al. 2012b). Most species within this complex have conidia with at least one acute end (Damm et al. 2012b). A combined gene analysis for this complex using ITS, *gapdh*, *chs-1*, *act* and *tub2* sequences data is given in Fig. 5, Table 4. Species are in alphabetical order, hosts and distributions are listed chronologically. In order to differentiate species within this complex effectively, the use of both *tub2* and *gapdh* are recommended (Damm et al. 2012b).

Colletotrichum abscissum Pinho & O.L. Pereira, Persoonia 34: 237 (2015)

Sexual morph not reported. See Crous et al. (2015) for illustrations and descriptions of asexual morph.

Type – Brazil, São Paulo, Brotas, on flowers of *Citrus sinensis* var. *Valencia* (sweet orange) with petal necrosis, 12 July 2014, A.L. Silveira, holotype VIC 42850, culture ex-type COAD 1877

Hosts/substrates – *Citrus sinensis* var. *Valencia* (Crous et al. 2015), *Psidium guajava* (Braganca et al. 2016).

Distribution – Brazil, USA (Crous et al. 2015, Braganca et al. 2016)

Notes – *Colletotrichum abscissum* is phylogenetically close but clearly distinct from *C. costaricense* by its shorter and narrower conidia. This species was identified associated with Postbloom fruit drop of *Citrus* and the pathogenicity based on Kochs' postulates has not been confirmed. Whole-genome data for this species are available (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum arboricola M. Zapata, M.A. Palma & Piont., in Crous et al., Persoonia 41: 353 (2018)

See Crous et al. (2018a) for illustrations and descriptions of asexual and sexual morphs.

Type – Chile, Los Ángeles, on leaves of *Fuchsia magellanica*, 11 July 2012, J. Jure, holotype RGM 2481, culture ex-type CBS 144795.

Hosts/substrates – *Fuchsia magellanica* (Crous et al. 2018a)

Distribution – Chile (Crous et al. 2018a)

Notes – *Colletotrichum arboricola* is separated from other species by *gapdh* and *act* sequence data, with *gapdh* as the best (Crous et al. 2018a). This species is presently recorded from *Fuchsia magellanica* from Chile. Further collections are required to determine the host range of this species.

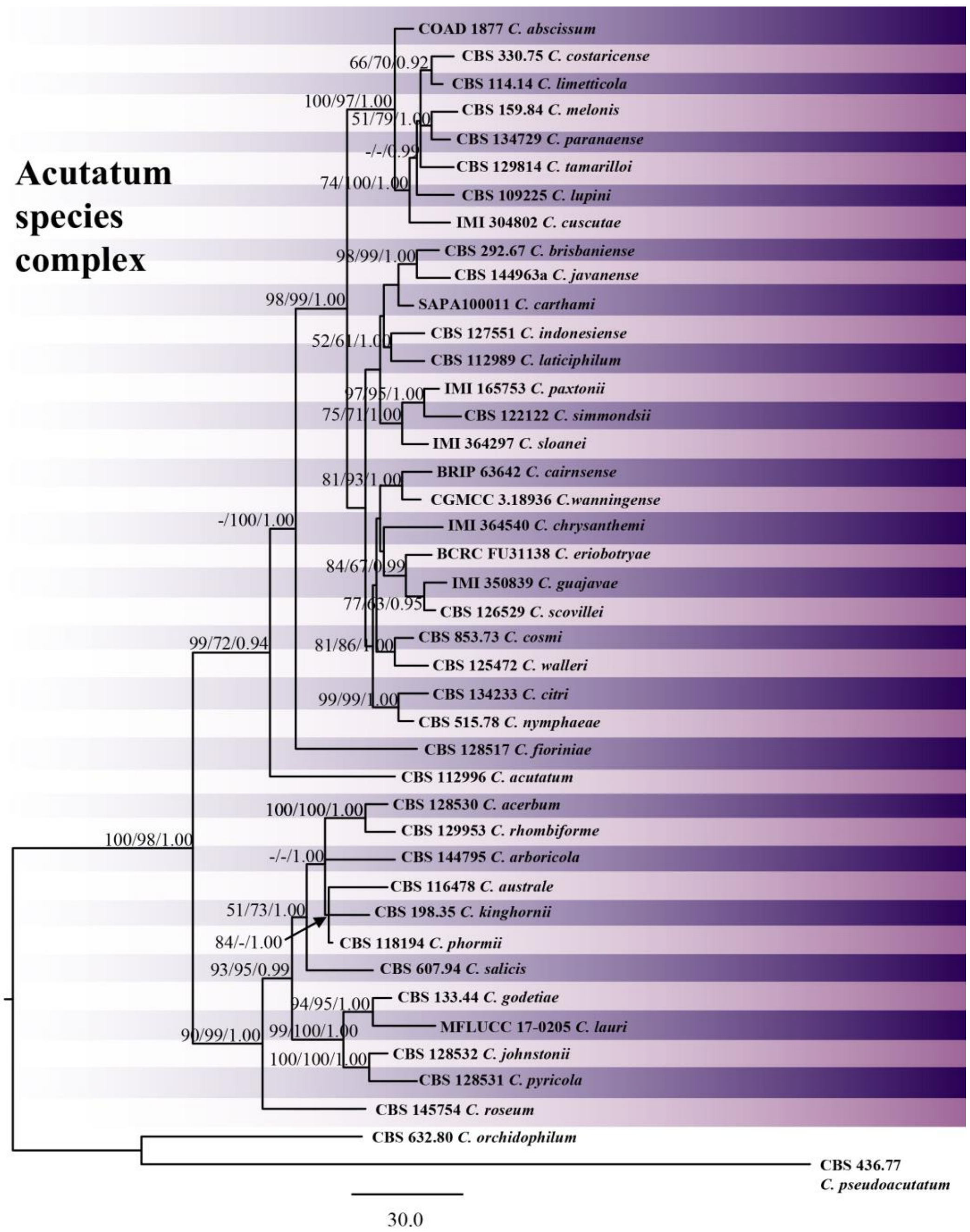

Figure 5 – The acutatum complex. One of the 10 most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP ≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. roseum* (CBS 145754) and *C. pseudoacutatum* (CBS 436.77).

Colletotrichum acerbum Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 43 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph. Type – New Zealand, Nelson, from bitter rot on fruit of *Malus domestica*,1 Aug. 1987, P.R. Johnston, holotype CBS H-20725, culture ex-type CBS 128530

Hosts/substrates – *Malus domestica* (Damm et al. 2012b)

Distribution – New Zealand (Damm et al. 2012b)

Notes – *Colletotrichum acerbum* is phylogenetically closer to *C. rhombiforme* and can be distinguished from ITS and *tub2* sequence data. Conidia of *C. acerbum* are longer and the appressoria are shorter and wider than *C. rhombiforme* (Damm et al. 2012b). This species was isolated from bitter rot of apple. However, the pathogenicity of this species on apples is not confirmed via Kochs’ postulates

Table 4 GenBank accession numbers of species in the acutatum complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. abscissum	COAD 1877	KP843126	KP843129	KP843132	KP843141	KP843135	Crous et al. (2015)
C. acerbum	CBS 128530	JQ948459	JQ948790	JQ949120	JQ949780	JQ950110	Damm et al. (2012b)
C. acutatum	CBS 112996	JQ005776	JQ948677	JQ005797	JQ005839	JQ005860	Damm et al. (2012b)
C. arboricola	CBS 144795	MH817944	MH817950		MH817956	MH817962	Crous et al. (2018)
C. australe	CBS 116478	JQ948455	JQ948786	JQ949116	JQ949776	JQ950106	Damm et al. (2012b)
C. brisbanense	CBS 292.67	JQ948291	JQ948621	JQ948952	JQ949612	JQ949942	Damm et al. (2012b)
C. cairnsense	BRIP 63642	KU923672	KU923704	KU923710	KU923716	KU923688	de Silva et al. (2017)
C. carthami	SAPA100011	AB696998				AB696992	Damm et al. (2012b)
C. chrysanthemi	IMI 364540	JQ948273	JQ948603	JQ948934	JQ949594	JQ949924	Damm et al. (2012b)
C. citri	CBS 134233	KC293581	KC293741	KY856138	KY855973	KC293661	Crous et al. (2015)
C. cosmi	CBS 853.73	JQ948274	JQ948604	JQ948935	JQ949595	JQ949925	Damm et al. (2012b)
C. costaricense	CBS 330.75	JQ948180	JQ948510	JQ948841	JQ949501	JQ949831	Damm et al. (2012b)
C. cuscutae	IMI 304802	JQ948195	JQ948525	JQ948856	JQ949516	JQ949846	Damm et al. (2012b)
C. fioriniae	CBS 128517	JQ948292	JQ948622	JQ948953	JQ949613	JQ949943	Damm et al. (2012b)
C. godetiae	CBS 133.44	JQ948402	JQ948733	JQ949063	JQ949723	JQ950053	Damm et al. (2012b)
C. guajavae	IMI 350839	JQ948270	JQ948600	JQ948931	JQ949591	JQ949921	Damm et al. (2012b)
C. indonesiense	CBS 127551	JQ948288	JQ948618	JQ948949	JQ949609	JQ949939	Damm et al. (2012b)
C. javanense	CBS 144963a	MH846576	MH846572	MH846573	MH846575	MH846574	de Silva et al. (2019)
C. johnstonii	CBS 128532	JQ948444	JQ948775	JQ949105	JQ949765	JQ950095	Damm et al. (2012b)
C. kinghornii	CBS 198.35	JQ948454	JQ948785	JQ949115	JQ949775	JQ950105	Damm et al. (2012b)
C. laticiphilum	CBS 112989	JQ948289	JQ948619	JQ948950	JQ949610	JQ949940	Damm et al. (2012b)
C. lauri	MFLUCC 17-0205	KY514347	KY514344	KY514341	KY514338	KY514350	Hyde et al. (2017)
C. limetticola	CBS 114.14	JQ948193	JQ948523	JQ948854	JQ949514	JQ949844	Damm et al. (2012b)
C. lupine	CBS 109225	JQ948155	JQ948485	JQ948816	JQ949476	JQ949806	Damm et al. (2012b)
C. melonis	CBS 159.84	JQ948194	JQ948524	JQ948855	JQ949515	JQ949845	Damm et al. (2012b)
C. nymphaeae	CBS 515.78	JQ948197	JQ948527	JQ948858	JQ949518	JQ949848	Damm et al. (2012b)
C. paranaense	CBS 134729	KC204992	KC205026	KC205043	KC205077	KC205060	Bragança et al. (2016)
C. paxtonii	IMI 165753	JQ948285	JQ948615	JQ948946	JQ949606	JQ949936	Damm et al. (2012b)
C. phormii	CBS 118194	JQ948446	JQ948777	JQ949107	JQ949767	JQ950097	Farr et al. (2006)
C. pyricola	CBS 128531	JQ948445	JQ948776	JQ949106	JQ949766	JQ950096	Damm et al. (2012b)
C. rhombiforme	CBS 129953	JQ948457	JQ948788	JQ949118	JQ949778	JQ950108	Damm et al. (2012b)
C. roseum	CBS 145754	MK903611	MK903603		MK903604	MK903607	Crous et al. (2019)
C. salicis	CBS 607.94	JQ948460	JQ948791	JQ949121	JQ949781	JQ950111	Damm et al. (2012b)
C. scovillei	CBS 126529	JQ948267	JQ948597	JQ948928	JQ949588	JQ949918	Damm et al. (2012b)
C. simmondsii	CBS 122122	JQ948276	JQ948606	JQ948937	JQ949597	JQ949927	Damm et al. (2012b)

Table 4 Continued.

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. sloanei	IMI 364297	JQ948287	JQ948617	JQ948948	JQ949608	JQ949938	Damm et al. (2012b)
C. tamarilloi	CBS 129814	JQ948184	JQ948514	JQ948845	JQ949505	JQ949835	Damm et al. (2012b)
C. walleri	CBS 125472	JQ948275	JQ948605	JQ948936	JQ949596	JQ949926	Damm et al. (2012b)
C.wanningense	CGMCC 3.18936	MG830462	MG830318	MG830302	MG830270	MG830286	Cao et al. (2019)

Colletotrichum acutatum J.H. Simmonds, Queensland J. agric. Anim. Sci. 25

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Australia, Queensland, Ormiston, Redlands Research Station, from fruit rot of *Carica papaya*, 1 Oct. 1965, J.H. Simmonds, holotype- IMI 117617

Epitype – Australia, Queensland, Brisbane, Ormiston, from fruit rot of *Carica papaya*, 5 Jul. 1965, J.H. Simmonds, epitype- CBS-H 20723, culture ex-epitype CBS 112996

Hosts/substrates – *Anemone* sp. (leaf lesion/stem spot/discoloration), *Boronia megastigma*, *Fragaria* x *ananassa* (fruit rot, *Mangifera indica* (fruit rot), *Olea europaea* (fruit spot), *Pistacia vera*, *Ranunculus* (seedling collapse) (Shivas & Tan 2009, Damm et al. 2012b), *Grevillea* sp. (Shivas et al. 2016, Damm et al. 2012b), *Aspalathus linearis* (anthracnose on stems and leaves), Water used to irrigate *Aspalathus linearis* seedlings in a nursery, *Capsicum annuum* (fruit), *Carica papaya*, *Coffea arabica* (berry lesion), *Hakea sericea*, *Hoodia* sp., *Leucadendron* sp., *Leucospermum* sp., *Lobelia* sp. (leaf spots), *Lupinus angustifolius*, *Mimetes* sp., *Nerium oleander*, *Olea europaea*, *Phlox* sp. (leaf spots), *Pinus radiata*, *Pistacia vera*, *Protea cynaroides*, *Pyrus pyrifolia*, *Statice* sp. (Damm et al. 2012b)

Distribution – Australia (Damm et al. 2012b, Shivas & Tan 2009, Shivas et al. 2016), Netherlands (Than et al. 2008, Damm et al. 2012b), Kenya, New Zealand, Portugal, South Africa, Sri Lanka, Tanzania, UK (Damm et al. 2012b).

Notes – *Colletotrichum acutatum* was first described from Redlands Horticultural Research Station, Cleveland, Queensland on papaya (*Carica papaya*) by Simmonds (1965, 1968). This species has been recognised as an important pathogen that causes anthracnose on a range of plants worldwide. Damm et al. (2012b), who designated an epitype ultimately provided taxonomic stability for this species, summarized the taxonomic history of *C. acutatum*. There are many records of *C. acutatum* identified based on morphological and cultural characteristics as well as based only on ITS sequence data in Farr & Rossman (2021). However, many of these records require verification. *Colletotrichum acutatum* can be distinguished from other species in the acutatum species complex by any of the six genes analysed in Damm et al. (2012b). Pathogenicity and virulence studies for this species are available. Whole-genome sequence and genome annotation for *C. acutatum* is available (Han et al. 2016).

Colletotrichum australe Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 57 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – South Africa, Stellenbosch, university campus, from *Trachycarpus fortunei*, 2 Jan. 1998, J.E. Taylor, holotype CBS-H 20721, culture ex-type CBS 116478.

Hosts/substrates – *Hakea* sp., *Trachycarpus fortunei* (Damm et al. 2012b)

Distribution – Australia, South Africa (Damm et al. 2012b)

Notes – In this species, setae are better developed and conidia are larger than in most other species in the acutatum species complex. *Colletotrichum australe* is distinguishable by either *gapdh, his3,* ITS or *tub2* sequence data (Damm et al. 2012b).

Colletotrichum brisbanense Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 59 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Australia, Queensland, Brisbane, Eight Mile Plains, from fruit rot of *Capsicum annuum*, 14 Jul. 1955, J.H. Simmonds, holotype IMI 117622, culture ex-type CBS 292.67

Hosts/substrates – *Capsicum annuum* (Damm et al. 2012b)

Distribution – Australia (Damm et al. 2012b)

Notes – *Colletotrichum brisbanense* is only recorded from the type specimen. This species was described from one of Simmonds' (1968) paratype specimens of *C. acutatum*, which was assigned to *C. simmondsii* by Shivas & Tan (2009). The *gapdh* and *tub2* sequences clearly separate *C. brisbanense* and *C. simmondsii* (Damm et al. 2012b). This species was isolated from fruit rot of chilli. However, the pathogenicity of this species on chilli is not confirmed via Kochs' postulates.

Colletotrichum cairnsense D.D. de Silva, R.G. Shivas & P.W.J. Taylor, in de Silva et al., Pl. Path. 66(2): 264 (2016)

Sexual morph not reported. See de Silva et al. (2017) for illustrations and descriptions of asexual morph.

Type – Australia, Queensland, Cairns, on fruit of *Capsicum annuum*, 7 June 2015, R. G. Shivas, holotype BRIP 63642, culture ex-type CBS 140847.

Hosts/substrates – *Capsicum annuum* (de Silva et al. 2017)

Distribution – Australia (de Silva et al. 2017)

Notes – This species was isolated from infected chili fruits from Australia. Pathogenicity studies are available for this species (de Silva et al. 2017). *Colletotrichum cairnsense* is only recorded from *Capsicum annuum* and from Australia. More collections are needed to conclude the host-specificity of this species.

Colletotrichum carthami (Fukui) S. Uematsu, Kageyama, Moriwaki & Toy. Sato, J. Gen. Pl. Path. 78(5): 326 (2012)

Epitype – Japan, Hokkaido, Sapporo, on leaves of *Carthamus tinctorius*, Takeo Hemmi, July 1915, epitype SAPA100011.

Hosts/substrates – *Carthamus tinctorius* (Uematsu et al. 2012), *Calendula officinalis* (Baroncelli et al. 2015a)

Distribution – Japan (Uematsu et al. 2012, Baroncelli et al. 2015a)

Notes – This species is recorded as a pathogen on *Carthamus tinctorius*, confirmed with pathogenicity studies (Uematsu et al. 2012, Baroncelli et al. 2015a). *Colletotrichum carthami* is presently recorded only from Japan.

Colletotrichum chrysanthemi (Hori) Sawada, Rep. Govt Res. Inst. Dep. Agric., Formosa 85: 81 (1943)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Reference specimen – Netherlands, Emmeloord, from twisted stem of *Carthamus* sp., unknown collection date and collector, culture CBS 126518

Hosts/substrates – *Carthamus* sp. (twisted stem), *Chrysanthemum coronarium* (vascular discoloration) (Damm et al. 2012b), *Chrysanthemum tinctorius* (Sato & Moriwaki 2013), *Carthamus tinctorius* (Baroncelli et al. 2015a), *Glebionis carinata*, *Glebionis coronaria* (Damm et al. 2012b).

Distribution – China (Damm et al. 2012b), Czech Republic, Italy (Baroncelli et al. 2015a), Japan (Sato & Moriwaki 2013), Netherlands (Damm et al. 2012b).

Notes – *Colletotrichum chrysanthemi* is separated from other species in the acutatum complex with *tub2*, *gapdh* and *his3* sequence data, and its very short acute-ended conidia (Damm et al. 2012b).

Colletotrichum citri F. Huang, L. Cai, K.D. Hyde & Hong Y. Li, in Huang et al., Fungal Diversity 61(1): 69 (2013)

Sexual morph not reported. See Huang et al. (2013) for illustrations and descriptions of asexual morph.

Type – China, Yunnan province, Ruili, on Anthracnose of a shoot of *Citrus aurantifolia*, August 2008, G. Q. Chen, holotype ZJUC41H, culture ex-type, CBS 134233

Hosts/substrates – *Citrus aurantifolia* (shoot anthracnose) (Huang et al. 2013), *Vitis vinifera* (ripe rot) (Lei et al. 2016), *Hevea brasiliensis* (leaf spot) (Hunupolagama et al. 2017)

Distribution – China (Huang et al. 2013, Lei et al. 2016), Sri Lanka (Hunupolagama et al. 2017)

Notes – This species can be differentiated from *C. nymphaeae* and *C. limetticola* by conidia shape and size. Pathogenicity studies for *C. citri* are available.

Colletotrichum cosmi Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 61 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Netherlands, Wageningen, from seed of *Cosmos* sp., collection date and collector unknown, holotype CBS H-20794, culture ex-type CBS 853.73.

Hosts/substrates – *Cosmos* sp. (Damm et al. 2012b)

Distribution – Netherlands (Damm et al. 2012b)

Notes – This species can be separated from other species by all gene sequences, but mostly with only 1bp divergence. However, *gapdh* and *his3* have more sequence divergences (Damm et al. 2012b). There is no pathogenicity or virulent studies associated with this species.

Colletotrichum costaricense Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 63 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Costa Rica, Meseta Central, from berry of *Coffea arabica* cv. ‘Typica’, collection date and collector unknown, holotype CBS H-20811, culture ex-type CBS 330.75.

Hosts/substrates – *Coffea* sp. (Damm et al. 2012b)

Distribution – Costa Rica (Damm et al. 2012b)

Notes – This species is recorded only from *Coffea* sp. from Costa Rica. *Colletotrichum costaricense* can be differentiated from the other species in the acutatum species complex by *tub2*, *gapdh* and *act* sequence data, most effectively with *tub2* (Damm et al. 2012b). There is no pathogenicity or virulent studies related to this species. Whole genomic data are available for this species (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum cuscutae Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 64 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Dominica, Castle Comfort, from *Cuscuta* sp., 1986, *C. Prior*, holotype IMI 304802, culture ex-type IMI 304802.

Hosts/substrates – *Cuscuta* sp. (Damm et al. 2012b)

Distribution – Dominican Republic (Damm et al. 2012b)

Notes – This species is recorded only from the type specimen. *Colletotrichum cuscutae* can be differentiated from *C. lupini* by longer conidia and narrower appressoria (length/width ratio). It can be separated from the other species in the acutatum species complex by *tub2* and *act* sequence data (Damm et al. 2012b). There is no pathogenicity or virulent studies related to this species. Whole-genome data are available for this species (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum eriobotryae Damm & C.J. Huang, in Damm, Sun & Huang, Mycol. Progr. 19(4): 373 (2020)

Sexual morph not reported. See Damm et al. (2020) for illustrations and descriptions of asexual morph.

Type – China, Taiwan, Taichung, Xinshe District, orchard, from fruit anthracnose of *Eriobotrya japonica*, 14 Feb. 2017, C.J. Huang, holotype GLM-F117723, culture ex-holotype BCRC FU31138.

Hosts/substrates – *Eriobotrya japonica* (Damm et al. 2020)

Distribution – Taiwan, China (Damm et al. 2020)

Notes – *Colletotrichum eriobotryae* can be identified by its unique *gapdh* and *act* sequence data, best by *gapdh* (Damm et al. 2020). Pathogenicity study for this species is available and has a higher sensitivity to azoxystrobin.

Colletotrichum fioriniae (Marcelino & Gouli) Pennycook, Mycotaxon 132(1): 150 (2017) [2016]

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – USA, New York, Ward Pound Ridge Reserve, on mummified adult *Fiorinia externa* (elongate hemlock scale, insect), 2005, J.A.P. Marcelino and S. Gouli, culture ex-type CBS 128517.

Hosts/substrates – *Magnifera indica* (stem endophyte), *Malus domestica* (fruit lesion), *Malus pumila*, *Myriophyllum spicatum* (submerged stem), *Olea europaea*, *Parthenocissus* sp., cv. 'Disci' (soft rot), *Penstemon* sp., *Persea americana* (fruit rot), *Piper nigrum*, *Primula* sp. (leaf spots), *Pyrus* sp. (fruit rot), *Rhododendron* sp., *Rubus* sp., *Solanum lycopersicum* (fruit rot), *Tulipa* sp., *Vaccinium corymbosum* (fruit rot), *Vitis vinifera* (Damm et al. 2012b), *Lycium barbarum* (Liu et al. 2016b), *Lycium chinense* (Oo et al. 2016), *Ailanthus altissima* (Hyde et al. 2017), *Pistacia vera* (Lichtemberg et al. 2017), *Litchi chinensis* (Ling et al. 2020), *Prunus persica* (Lee et al. 2018, 2020), *Solanum melongena* (Xu et al. 2018b), *Zanthoxylum armatum* (Han et al. 2020).

Distribution – Australia, Netherlands, New Zealand, Portugal, UK, USA (Damm et al. 2012b), China (Liu et al. 2016b, Han et al. 2020, Ling et al. 2020), Korea (Oo et al. 2016, Lee et al. 2018, 2020), Italy (Hyde et al. 2017), Poland (Pszczolkowska et al. 2016).

Notes – This species was originally described as an entamopathogen from a scale insect in the USA and also been reported as an endophyte in several plants (Marcelino et al. 2008). *Colletotrichum fioriniae* has been reported as the causal agent of leaf and stem blight on *Acacia acuminata* (Golzar 2009 as *C. acutatum*) and fruit rot of avocado (Shivas & Tan 2009) in Australia. *Colletotrichum fioriniae* is readily identified by any of the six genes analyzed by Damm et al. (2012b). There is pathogenicity or virulent studies related to this species. Whole-genome sequences data for this species is available (Barnocelli et al. 2014b, 2016).

Colletotrichum godetiae Neerg., Friesia 4(1-2): 72 (1950) [1949-50]

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Denmark, from seed of *Clarkia hybrida* cv. 'Kelvedon Glory' 463 C in seed disinfection experiment, 17 Jun. 1943, P. Neergaard, culture ex-type CBS 133.44.

Hosts/substrates – *Aeschynomene virginica*, *Agrimonia eupatoria* (leaf spot), Bonzai (sunken brown spots on fruit), *Ceanothus* sp., *Citrus aurantium* (fruit rot), *Clarkia hybrida* cv. 'Kelvon glory' (seed), *Fragaria × ananassa*, *Fragaria vesca*, *Juglans regia*, *Laurus nobilis*, *Mahonia aquifolium* (leaf spots), *Malus sylvestris*, Nut shell, *Olea europaea*, *Parthenocissus* sp. (leaf and stem spots), *Podocarpus* sp., *Prunus* sp., *Rubus idaeus*, *Sambucus nigra*, *Vitis* sp., *Schinus molle*, *Solanum betaceum* (fruit anthracnose), *Ugni molinae* (twig, tip necrosis), *Acer cappadocicum*, *Frangula alnus* (Alizadeh et al. 2015), Helleborus sp. (leaf spot), *Malus domestica* (fruit rot) (Shivas et al. 2016), *Cornus mas* (Tóth et al. 2017).

Distribution – Austria, Belgium, Chile, Colombia, France, Greece, Germany, Ireland, Israel, Italy, Mexico, Netherlands, Norway, Spain, South Africa, Turkey, UK, USA (Damm et al. 2012b), Iran (Alizadeh et al. 2015), Australia (Shivas et al. 2016), Hungary (Tóth et al. 2017).

Notes – *Colletotrichum godetiae* is recorded as a pathogen of fruits, leaves and stems. This species can be distinguished from other species in the acutatum species complex by any of the six genes analysed in Damm et al. (2012b). Pathogenicity or virulent studies are available for this species. Whole genomic data for this species are available (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum guajavae Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 69 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – India, Assam, Silchar, from fruit of *Psidium guajava*, collection date and collector unknown, holotype IMI 350839, culture ex-type IMI 350839.

Hosts/substrates – fruit of *Psidium guajava* (Damm et al. 2012b), *Elettaria cardamomum* (Chethana et al. 2016)

Distribution – India (Damm et al. 2012b, Chethana et al. 2016)

Notes – *Colletotrichum guajavae* cannot reliably distinguished from species in the acutatum complex using morphological characteristics. This species can be distinguished from other species using *tub2*, *gapdh* and *act* sequence data, most effectively with *gapdh* (Damm et al. 2012b). Pathogenicity or virulent studies have been carried out to prove pathogenicity of this species on *Elettaria cardamomum* (Chethana et al. 2016).

Colletotrichum indonesiense Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 71 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Indonesia: Sumatra, Tele, from leaf spots developing after herbicide treatment of *Eucalyptus* sp., 1 Jan. 2008, M.J. Wingfield, holotype CBS H-20798, culture ex-type CBS 127551.

Hosts/substrates – *Eucalyptus* sp.

Distribution – Indonesia

Notes – *Colletotrichum indonesiense* can be distinguished from other species in the acutatum species complex by *tub2*, *act*, *gapdh* and *chs-1* sequence data, and most effectively with *tub2* (Damm et al. 2012b). Even though this species was isolated from a leaf spot, no pathogenicity or virulence data are available.

Colletotrichum javanense D.D. de Silva, Crous & P.W.J. Taylor, in Silva et al., IMA Fungus 10(1): 20 (2019)

Sexual morph not reported. See de Silva et al. (2019) for illustrations and descriptions of asexual morph.

Type – Indonesia: West Java, Purwakata regency, on fruit of *Capsicum annuum*, Dec. 2014, F. Fitriyah holotype CBS H-14496, ex-type culture CBS 144963.

Hosts/substrates – *Capsicum annuum* (de Silva et al. 2019)

Distribution – Indonesia (de Silva et al. 2019)

Notes – *Colletotrichum javanense* was introduced based on a single strain. This species can be distinguished by the presence of distinct chlamydospores from its sister taxon *C. brisbanense* (de Silva et al. 2019). Pathogenicity studies for this species are available. This species is presently recorded only from its type locality and host.

Colletotrichum johnstonii Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 72 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – New Zealand, Auckland, from fruit rot of *Solanum lycopersicum*, 29 Feb. 1990, J.M. Dingley, holotype CBS H-20809, culture ex-type CBS 128532.

Hosts/substrates – *Citrus* sp. (fruit rot), *Solanum lycopersicum* (fruit rot) (Damm et al. 2012b)

Distribution – New Zealand (Damm et al. 2012b)

Notes – Based on the data available *C. johnstonii* appears to be endemic to New Zealand, but is not host-specific (Damm et al. 2012b, Jayawardena et al. 2016a). This species can be separated from other species based on *act*, *his3*, *tub2* and *gapdh* sequence data, *act* being the best (Damm et al. 2012b). There is no pathogenicity or virulence data available for this species.

Colletotrichum kinghornii Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 73 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – UK, Scotland, from *Phormium tenax*, unknown collection date, N.L. Alcock, holotype CBS H-20909, culture ex-type CBS 198.35.

Hosts/substrates – *Phormium* sp. (Damm et al. 2012b)

Distribution – UK (Damm et al. 2012b)

Notes – *Colletotrichum kinghornii* is one of the two species in the acutatum complex with larger conidia is most effectively separated from other species using *his3* sequence data (Damm et al. 2012b).

Colletotrichum laticiphilum Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 74 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – India, Kerala, Kottayam, Rubber Research Institute campus, from raised spots on leaf of *Hevea brasiliensis*, 1999, unknown collector, holotype CBS H-20799, culture ex-type CBS 112989.

Hosts/substrates – *Hevea brasiliensis* (Damm et al. 2012b, Shi et al. 2019)

Distribution – India, Colombia (Damm et al. 2012b), Sri Lanka (Hunupolagama et al. 2017), China (Shi et al. 2019)

Notes – *Colletotrichum laticiphilum* is separated from other species by its *tub2*, *gapdh* and *chs-1* sequence data, and most differentially with *tub2* (Damm et al. 2012b). Pathogenicity studies have been conducted for this species to confirm its pathogenicity.

Colletotrichum lauri Jayaward., Camporesi & K.D. Hyde, in Hyde et al., Index Fungorum 347: 1 (2017)

Sexual morph not reported. See Hyde et al. (2017) for illustrations and descriptions of asexual morph.

Type – Italy Province of Forlì-Cesena [FC], San Lorenzo in Noceto – Forlì, on dead aerial leaves of *Laurus nobilis*, 25 May 2015, E. Camporesi, IT 2505, holotype MFLU 15-1374, culture ex-type MFLUCC 17-0205.

Hosts/substrates – *Laurus nobilis* (Hyde et al. 2017)

Distribution – Italy (Hyde et al. 2017)

Notes – *Colletotrichum lauri* presently is recorded only from *Laurus nobilis* in Italy.

Colletotrichum limetticola (R.E. Clausen) Damm, P.F. Cannon & Crous [as 'limetticolum'], in Damm et al., Stud. Mycol. 73: 76 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – USA, Florida, from young twig of *Citrus aurantifolia*, collection date and collector unknown, epitype CBS H-20910, culture ex-epitype CBS114.14

Hosts/substrates – *Citrus aurantifolia* (Damm et al. 2012b), *Malus domestica* (leaf spot, Moreira et al. 2019), *Vitis vinifera* (ripe rot of grapes, Echeverrigaray et al. 2020)

Distribution – Cuba, USA (Damm et al. 2012b), Brazil (Moreira et al. 2019, Echeverrigaray et al. 2020)

Notes – *Colletotrichum limetticola* is distinguished from other species by *tub2*, *gapdh* and *his3*, most effectively with *tub2* sequence data. Pathogenicity studies for this species are available.

Colletotrichum lupini (Bondar) Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 78 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Germany, from *Lupinus albus*, unknown date, U. Feiler, culture ex-holotype of *C. lupini* var. *setosum*, CBS 109221.

Hosts/substrates – *Camellia* sp., *Cinnamomum verum*, *Lupinus albus*, *Lupinus angustifolius*, *Lupinus mutabilis*, *Lupinus polyphyllus*, *Manihot utilissima* (Damm et al. 2012b)

Distribution – Austria, Australia, Bolivia, Canada, Costa Rica, France, Germany, Netherlands, Poland, Portugal, Rwanda, South Africa, UK, Ukraine, USA (Damm et al. 2012b)

Notes – *Colletotrichum lupini* was originally described from *Lupinus albus* in the São Paulo region of Brazil, most probably introduced to South America along with its host plant, which is native to the Mediterranean region (Kurlovich 2002). This species is an economically important species on *Lupinus* worldwide and there is a significant interest in breeding of resistant varieties (Adhikari et al. 2011). *Colletotrichum lupini* can be distinguished from other species in the acutatum species complex by most of the six genes (except actin) analysed by Damm et al. (2012b), with *tub2* providing the best resolution. *Colletotrichum lupini* has been isolated from leaf spots, petiole with sunken spots (Damm et al. 2012b). Pathogenicity studies for this species have been conducted to establish the pathogenicity and virulence of the species. Whole-genome sequence is available for this species (Carbú et al. 2019). Dubrulle et al. (2020) using transcriptomic and proteomic analysis deciphered the infection process of *C. lupini*.

Colletotrichum melonis Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 80 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Brazil, from peel of fruit of *Cucumis melo*, unknown collector and collection date, holotype CBS H-20785, culture ex-type CBS 159.84

Hosts/substrates – *Cucumis melo* (Damm et al. 2012b), *Diospyros kaki* (Carraro et al. 2019), *Malus doemstica* (Velho et al. 2015)

Distribution – Brazil (Damm et al. 2012b, Velho et al. 2015, Carraro et al. 2019), Uruguay (Velho et al. 2015)

Notes – This species can be separated from other species by *gapdh*, *act* and *his3* sequence data, with *gapdh* performing best as a differential gene (Damm et al. 2012b). Pathogenicity studies are available for this species. Whole-genome sequence data of *C. melonis* is available (Grigoriev et al. 2011) https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum nymphaeae (Pass.) Aa, Netherlands Journal of Plant Pathology, Supplement 1 84(3): 110 (1978)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Netherlands, Oude Waal near Nijmegen, Gem. Ubbergen, from leaf spots of *Nymphaea alba*, 7 Aug. 1978, G. van der Velde, epitype CBS H-20787, culture ex-epitype CBS 515.78.

Hosts/substrates – *Anemone* sp. *Capsicum* sp., *Fragaria* × *ananassa* (fruit and crown rot, rrot discolouration, seeds), *Fragaria vesca*, *Leucaena* sp., Litter, *Mahonia aquifolium*, *Malus pumila*, *Nuphar* luteum (leaf spot), *Nymphaea alba* (leaf spot), *Oenothera* sp. (black staining of stem), *Olea europaea*, *Pelargonium graveolens*, *Photinia* sp., *Protea* sp., *Phaseolus* sp. (Damm et al.2012b), *Capsicum* sp. (Nasheshi et al. 2016), *Robinia pseudoacacia* (Yamagishi 2017), *Vitis* sp. (Liu et al. 2016d, *Hevea brasiliensis* (Hunupolagama et al. 2017), *Actinidia arguta* (Kim et al. 2018), *Carya illinoinensis* (Poletto et al. 2019, Zhang et al. 2019), *Diospyros kaki* (Hassan et al. 2019), *Eriobotrya japonica* (Wu et al. 2018, Damm et al. 2020), *Ilex serrata-verticillata* (Lin et al. 2018), *Juglans regia* (Da-Lio et al. 2018, Savian et al. 2019), *Punica granatum* (Xavier et al. 2019), *Pyrus pyrifolia* (Moreira et al. 2019), *Solanum lycopersicum* var. *cerasiforme* (Chechi et al. 2019), *Camellia oliferae* (Li & Li 2020)

Distribution – Australia, Brazil, Bulgaria, Canada, France, India, Indonesia, Israel, Italy, Kenya, Mexico, Netherlands, Portugal, South Africa, Spain, Switzerland, Thailand, UK, USA, Zimbabwe (Damm et al. 2012b), Kenya (Barnocelli et al. 2015), China (Jayawardena et al. 2016b, Wu et al. 2018, Zhang et al. 2019, Damm et al. 2020, Li & Li 2020), Malaysia (Nasehi et al. 2016), Sri Lanka (Hunupolagama et al. 2017), South Korea (Kim et al. 2018, Hassan et al. 2019)

Notes – *Colletotrichum nymphaeae* is well separated from other species in the acutatum species complex with *tub2* sequence data (Damm et al. 2012b). Whole-genome sequence data of *C. nymphaeae* is available (Baroncelli et al. 2016). Pathogenicity studies have been conducted on this species to confirm its pathogenicity.

Colletotrichum paranaense C.A.D. Bragança & Damm, in Bragança et al., Fungal Biology 120(4): 555 (2016)

Sexual morph not reported. See Braganca et al. (2016) for illustrations and descriptions of asexual morph.

Type – Brazil, Parana, from fruit anthracnose of *Malus domestica*, 2010, L. Mio holotype CBS H-21122, culture ex-holotype CBS 134729.

Hosts/substrates – *Caryocar brasiliense* (fruit anthracnose), *Malus domestica* (fruit rot, leaf spot), *Prunus persica* (fruit anthracnose) (Braganca et al. 2016, Moreira et al. 2019), *Coprosma* sp., *Fragaria* × *ananassa* (Moreira et al. 2019)

Distribution – Brazil (Braganca et al. 2016, Moreira et al. 2019), Australia, New Zealand (Moreira et al. 2019)

Notes – *Colletotrichum paranaense* can be distinguished from other species by *tub2* and *his3* sequence data (Braganca et al. 2016). Pathogenicity studies for this species are available. Whole genomic data for this species are available (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum paxtonii Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 85 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – St. Lucia, from *Musa* sp., 1972, P. Griffee holotype IMI 165753, culture ex-type IMI 165753

Hosts/substrates – *Musa* sp. (Damm et al. 2012b)

Distribution – St. Lucia (West Indies) (Damm et al. 2012b)

Notes – *Colletotrichum paxtonii* can be separated from other species by *tub2* and *gapdh* sequence data, with *tub2* as the best diagnostic gene. There are two strains of this species available and are from *Musa* sp. from West Indies countries (Damm et al. 2012b). This species is only recorded from *Musa* sp. from West Indies.

Colletotrichum phormii (Henn.) D.F. Farr & Rossman, Mycological Research 110 (12): 1403 (2006)

See Farr et al. (2006) for illustrations and descriptions of sexual morph. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – AP*his3* interception Port Orlando 007160, from *Phormium* sp., 6 Nov. 2000, W. Sheta, epitype CBS-H 20720, culture ex-epitype CBS 118194

Hosts/substrates – *Phormium* sp. (Farr et al. 2006, Damm et al. 2012b, Serdani et al. 2013)

Distribution – Australia, Germany, Netherlands, New Zealand, South Africa, UK (Farr et al. 2006, Golzar & Wang 2010, Damm et al. 2012b, Serdani et al. 2013)

Notes – *Colletotrichum phormii* can be separated from other species by *tub2*, *gapdh*, *his3* and *act* sequence data, and most effectively with *his3* sequence data (Damm et al. 2012b). This species is recorded only from *Phormium* sp. (Farr et al. 2006). Pathogenicity studies have been conducted to establish the pathogenicity of this species. Whole-genome sequence data of *C. phormii* is available (Grigoriev et al. 2011, https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum pyricola Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 94 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – New Zealand, WO, Waikato, from fruit rot of *Pyrus communis*, 1 Jun. 1988, unknown collector, holotype CBS H-20810, culture ex-type CBS 128531.

Hosts/substrates – *Pyrus communis* (Damm et al. 2012b), *Daphne odora* (leaf and tip dieback) (Shivas et al. 2016)

Distribution – Australia (Shivas et al. 2016), New Zealand (Damm et al. 2012b)

Notes – This fungus was first described from fruit rot of pear (*Pyrus communis*) in New Zealand. *Colletotrichum pyricola* can be distinguished from other species in the acutatum species complex with its unique *act*, *gapdh*, *chs-1* and *tub2* sequence data (Damm et al. 2012b). Pathogenicity studies for this species are not available.

Colletotrichum rhombiforme Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 95 (2012)

See Damm et al. (2012b) for illustrations and descriptions of asexual and sexual morph.

Type – Portugal, Mirandela, Torre de D. Chama, from anthracnose on fruit of *Olea europaea*, Dec. 2003, P. Talhinhas, holotype CBS H-20724, culture ex-type CBS 129953.

Hosts/substrates – *Olea europaea* (fruit rot), *Vaccinium macrocarpon* (Damm et al. 2012b), *Malus domestica* (bitter rot) (Wu et al. 2017, Grammen et al. 2019)

Distribution – Portugal, USA (Damm et al. 2012b), China (Wu et al. 2017), Belgium (Grammen et al. 2019)

Notes – *Colletotrichum rhombiforme* can be separated from other species by all loci (ITS, *gapdh*, *tub2*, *act*, *his3*) studied in Damm et al. (2012b) except the *chs-1* sequence data. Pathogenicity studies for this species are available.

Colletotrichum salicis (Auersw. ex Fuckel) Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 97 (2012)

See Damm et al. (2012b) for illustrations and descriptions of asexual and sexual morph.

Type – Netherlands, Z. Flevoland, Salix forest near Blocq van Kuffeler, from leaf spot of *Salix* sp., 11 Sep. 1994, H.A. van der Aa, epitype CBS H-20730, culture ex-epitype CBS 607.94.

Hosts/substrates – *Acer platanoides*, *Araucaria excelsa* (anthracnose and dieback), *Fragaria × ananassa* (petiole spot, fruit rot), *Malus domestica*, *Populus* sp., *Pyrus pyrifolia* (fruit rot), *Rhododendron* sp., *Salix* sp. (leaf spot, twig lesions), *Solanum lycopersicum* (Damm et al. 2012b)

Distribution – Germany, Japan, Latvia, Netherlands, New Zealand, Sweden, UK, USA (Damm et al. 2012b), Belgium (Grammen et al. 2018)

Notes – It is one of the few species to produce fertile ascomata in culture (Damm et al. 2012b). *Colletotrichum salicis* can be separated from other species by all genes (*gapdh*, *tub2*, *act*, *chs-1*, *gs*, *his3*), except for ITS (Damm et al. 2012b). Whole-genome sequence data (Baroncelli et al. 2016) and pathogenicity studies for this species are available.

Colletotrichum scovillei Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 100 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Indonesia, from *Capsicum* sp., collection date and collector unknown, holotype CBS H-20792, culture ex-type CBS 126529.

Hosts/substrates – *Capsicum annuum*, *Capsicum frutescens* (Damm et al. 2012b, Caires et al. 2014, Kanto et al. 2014, Zhao et al. 2016a, Diao et al. 2017, Noor & Zakaria 2018), *Clausena lansium* (Lin et al. 2020), *Mangifera indica* (Qin et al. 2019), *Musa* sp. (Zhou et al. 2017)

Distribution – Indonesia, Thailand (Damm et al. 2012b), Brazil (Caires et al. 2014), China (Zhao et al. 2016a, Diao et al. 2017, Zhou et al. 2017, Qin et al. 2019, Lin et al. 2020), Japan (Kanto et al. 2014), Malaysia (Noor & Zakaria 2018), South Korea (Oo et al. 2017), Taiwan (Wu et al. 2020)

Notes – *Colletotrichum scovillei* can be separated from other species by *tub2*, *gapdh* and *act* sequences data, with *gapdh* being the best (Damm et al. 2012b). Pathogenicity studies for this species are available.

Colletotrichum simmondsii R.G. Shivas & Y.P. Tan, Fungal Diversity 39: 119 (2009)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Australia, Queensland, Yandina, from fruit anthracnose of *Carica papaya*, May 1987, L.M. Coates, culture ex-holotype CBS 122122.

Hosts/substrates – *Actinidia chinensis*, *Averrhoa carambola*, *Capsicum frutescens*, *Cyphomandra betacea*, *Litchi chinensis*, *Lycopersicon esculentum*, *Nephelium lappaceum*, *Olea* sp., *Persea americana*, *Vaccinium corymbosum*, *Vitis* sp. (Shivas & Tan 2009), *Carica papaya*, *Cyclamen* sp. (deformations and brown staining of stem tip), *Fragaria × ananassa* (fruit rot), *Mangifera indica*, *Protea cynaroides* (Damm et al. 2012b).

Distribution – Australia, Netherlands, USA (Damm et al. 2012b).

Notes – *Colletotrichum simmondsii* is separable from other species by *gapdh* and *tub2* sequencing data (Damm et al. 2012b). Whole-genome sequence data for this species is available (Barnocelli et al. 2016).

Colletotrichum sloanei Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 103 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Malaysia, Borneo, Sabah, Tuaran, from leaf of *Theobroma cacao*, 1994, A.R. Rossman and C.L. Bong, holotype IMI 364297, culture ex-type IMI 364297

Hosts/substrates – *Litchi chinensis*, *Theobroma cacao* (Damm et al. 2012b)

Distribution – Australia (Shivas et al. 2016), Malaysia (Damm et al. 2012b)

Notes – This species is most easily distinguished from other species in the acutatum species complex with *tub2*, *his3* and *act* sequence data (Damm et al. 2012b). Little is known about *C. sloanei* host association and pathogenicity.

Colletotrichum tamarilloi Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 105 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Colombia, Cundinamarca, from fruit anthracnose of *Solanum betaceum*, 13 Aug. 2010, J. Molina, holotype CBS H-20726, culture ex-type CBS 129814.

Hosts/substrates – *Solanum betaceum* (anthracnose) (Damm et al. 2012b), *Cyphomandra betacea* (Baroncelli et al. 2015b).

Distribution – Colombia (Damm et al. 2012b, Baroncelli et al. 2015b).

Notes – *Colletotrichum tamarilloi* can be separated from other species using *chs-1*, *his3*, *tub2* and *gapdh* sequence data, most effectively with *gapdh* (Damm et al. 2012b). This species is presently only recorded in Colombia. Whole genomic data for this species are available (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum walleri Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 106 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Vietnam, Buon Ma Thuot-Dak Lac, from leaf tissue of *Coffea arabica*, unknown collection date, H. Nguyen, holotype CBS H-20795, culture extype CBS 125472

Hosts/substrates – *Coffea* sp. (Damm et al. 2012b)

Distribution – Vietnam (Damm et al. 2012b)

Notes – This species can be separated from other species in this complex by using any of the genes used by Damm et al. (2012b), most effectively with ITS and *his3* sequence data. *Colletotrichum walleri* is recorded only from *Coffea* sp. in Vietnam.

Colletotrichum wanningense X.R. Cao, H.Y. Che & D.Q. Luo, in Cao et al., Pl. Dis. 103(1): 120 (2018)

Sexual morph not reported. See Cao et al. (2019) for illustrations and descriptions of asexual morph.

Type – China, Hainan province, Wanning city, on a living leaf of *Hevea brasiliensis*, 1 April 2017, X. R. Cao, holotype HMAS 247814, culture extype CGMCC 3.18936.

Hosts/substrates – *Hevea brasiliensis* (Cao et al. 2019)

Distribution – China (Cao et al. 2019)

Notes – *Colletotrichum wanningense* is phylogenetically close to *C. cairnsense* (Cao et al. 2019). It is presently recorded only from *Hevea brasiliensis* and in China. Pathogenicity studies for *C. wanningense* are available.

Agaves Species Complex

This species complex is defined as a collective of *C. agaves* and four closely related species. Bhunjun et al. (2021) established this complex based on phylogenetic and evolutionary evidence. All species in this complex appear to be host specific. However, for some of these species only a single strain is available. A combined gene analysis for this complex using ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 6, Table 5.

Colletotrichum agaves Cavara, Fung. Long. Exsicc. 3: no. 100 (1892)

Sexual morph not reported. See Farr et al. (2006) for illustrations and descriptions of asexual morph.

Type – Italy, Pavia, Ticinum, in botanical garden, on decaying leaves of cultivated *Agave americana*, 1904, Hedgcock G. holotype BPI 397108, culture ex-type CBS 118190.

Hosts/substrates – *Agave* spp. (Farr et al. 2006)

Distribution – Mexico, Netherlands (Farr et al. 2006)

Notes – Most of the records of this species are based on morphological characteristics alone. Hence we have not included them into the hosts and distribution. Based on Farr et al. (2006) this species may have a distribution from warm temperate and tropical regions including southern Europe and the Neotropics. Pathogenicity studies for this species are not available.

Colletotrichum euphorbiae Damm & Crous, in Crous et al., Persoonia 31: 203 (2013)

Sexual morph not reported. See Crous et al. (2013) for illustrations and descriptions of asexual morph.

Type – South Africa, Western Cape Province, Kirstenbosch Botanical Garden, on leaves of *Euphorbia* sp., Sept. 2012, M.J. Wingfield, holotype CBS H-21409, culture ex-type CBS 134725.

Hosts – *Euphorbia* sp. (Crous et al. 2013)

Distribution – South Africa (Crous et al. 2013)

Notes – This taxon can be distinguished from the other species from its longer conidia (Crous et al. 2013). *Colletotrichum euphorbiae* is presently recorded only from *Euphorbia* sp. in South Africa.

Colletotrichum ledebouriae Crous & M.J. Wingf., in Crous et al., Persoonia 36: 331 (2016)

Sexual morph not reported. See Crous et al. (2016) for illustrations and descriptions of asexual morph.

Type – South Africa, Eastern Cape Province, Haga Haga, on leaves of *Ledebouria floridunda*, Dec. 2014, M.J. Wingfield, holotype CBS H-22593, culture ex-type CBS 141284.

Hosts/substrates – *Ledebouria floridunda* (Crous et al. 2016)

Distribution – South Africa (Crous et al. 2016)

Notes – *Colletotrichum ledebouriae* is only recorded from its type strain. This species was isolated from diseased leaves. However, no pathogenicity study has been carried out to confirm this.

Colletotrichum neosansevieriae Crous & N.A. van der Merwe, Persoonia, Mol. Phyl. Evol. Fungi 34: 221 (2015)

Sexual morph not reported. See Crous et al. (2015) for illustrations and descriptions of asexual morph.

Type – South Africa, Gauteng, Kwalata Game Ranch, on leaves of *Sansevieria trifasciata*, 25 Sept. 2014, P.W. Crous & N.A.van der Merwe, holotype CBS H-22248, culture ex-type CBS 139918.

Hosts/substrates – *Sansevieria trifasciata* (Crous et al. 2015)

Distribution – South Africa (Crous et al. 2015)

Notes – This is similar to *C. sansevieriae*, however can be distinguished from phylogeny. *Colletotrichum neosansevieriae* was isolated as a pathogen on leaves of *Sansevieria trifasciata*. However, pathogenicity studies have not been carried out to confirm this. This species is recorded only from its type strain.

Colletotrichum sansevieriae Miho Nakam. & Ohzono, in Nakamura et al. J. Gen. Pl. Path. 72(4): 253 (2006)

Sexual morph not reported. See Nakamura et al. (2006) for illustrations and descriptions of asexual morph.

Type – Japan, Kagoshima, Yoron Island, isolated from *Sansevieria trifasciata* cv. 'Laurentii', 1997, holotype (dried culture) MAFF239721.

Hosts/substrates – *Sansevieria* sp. (Nakamura et al. 2006, Aldaoud et al. 2011, Gautam et al. 2012, Karimi et al. 2017)

Distribution – Japan (Nakamura et al. 2006), Australia (Aldaoud et al. 2011), India (Gautam et al. 2012), Iran (Karimi et al. 2017)

Notes – *Colletotrichum sansevieriae* appears to be host-specific. Pathogenicity studies for this species are available.

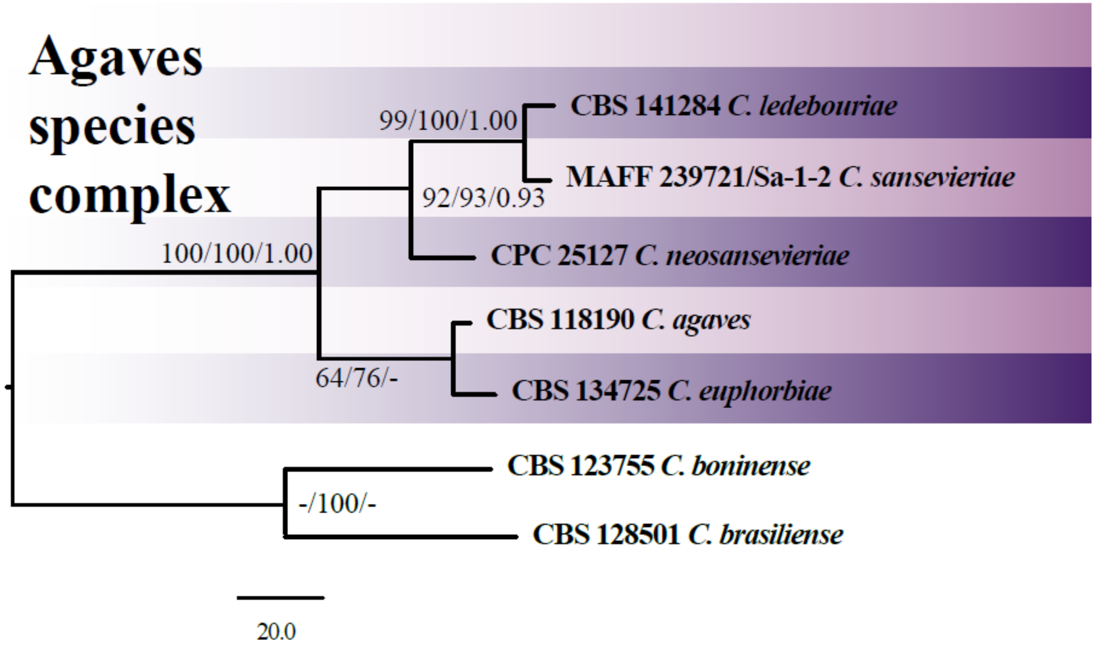

Figure 6 – The agaves complex. The most parsimonious tree obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP ≥0.90 are indicated at the nodes and branches. The tree is rooted with *Colletotrichum boninense* (CBS 123755) and *C. brasiliense* (CBS 128501).

Table 5 GenBank accession numbers of the species in the agaves complex

Species name	Type/Reference strain	ITS	*gapdh*	*chs-1*	*act*	*tub2*	References
C. agaves	CBS 118190	DQ286221					Farr et al. (2006)
C. ledebouriae	CBS 141284	KX228254			KX228357		Crous et al. (2016)
C. neosansevieriae	CPC 25127	KR476747	KR476791		KR476790	KR476797	Crous et al. (2015)
C. sansevieriae	MAFF 239721	AB212991					Nakamura et al. (2006)
C. euphorbiae	CBS 134725	KF777146	KF77713	KF777128	KF777125	KF777247	Crous et al. (2013)

Boninense Species Complex

This species complex is defined as a collective of *C. boninense* and 25 closely related species. Typical characters of species in this complex are the conidia that have a prominent basal scar as well as the conidiogenous cells with a rather prominent periclinal thickening that sometimes extends to form a new conidiogenous locus (Damm et al. 2012a). Species of this complex are pathogens or endophytes (Damm et al. 2012a). All species within this complex can be recognized with *gapdh* alone (Damm et al. 2012a). Some of the species in this complex appears to be host specific or restricted to a certain geographic area. However, for some of these species only a single strain is available. Therefore, new collections are recommended to establish the host distribution of these species. A combined gene analysis for this complex using ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 7, Table 6.

Colletotrichum annellatum Damm, P.F. Cannon & Crous, Stud. in Damm et al., Mycol. 73: 6 (2012)

See Damm et al. (2012a) for illustrations and descriptions of asexual and sexual morphs.

Type – Colombia, Meta, Villavicencio, from a leaf of *Hevea brasiliensis*, 13 Aug. 2010, Olga Castro, (CBS H-20693 holotype, culture ex-type CBS 129826

Hosts – *Hevea brasiliensis* (Damm et al. 2012a)

Distribution – Colombia (Damm et al. 2012a)

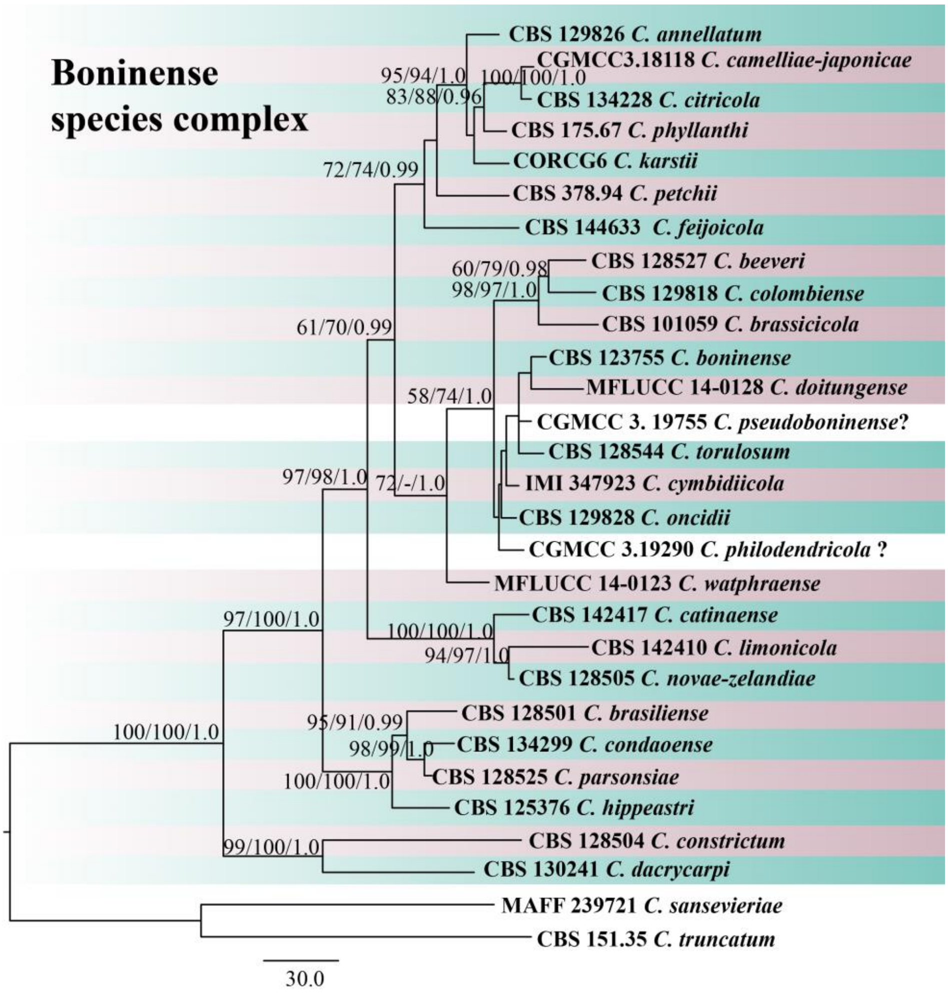

Figure 7 – The boninense complex. One of the 10 most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. sansevieriae* (MAFF 239721) and *C. truncatum* (CBS 151.35).

Table 6 GenBank accession numbers of the species in the boninense complex

Species name	Type/Reference strain	ITS	*gapdh*	*chs-1*	*act*	*tub2*	References
C. annellatum	CBS 129826	JQ005222	JQ005309	JQ005396	JQ005570	JQ005656	Damm et al. (2012a)
C. beeveri	CBS 128527	JQ005171	JQ005258	JQ005345	JQ005519	JQ005605	Damm et al. (2012a)
C. boninense	CBS 123755	JQ005153	JQ005240	JQ005327	JQ005501	JQ005588	Damm et al. (2012a)
C. brasiliense	CBS 128501	JQ005235	JQ005322	JQ005409	JQ005583	JQ005669	Damm et al. (2012a)
C. brassicicola	CBS 101059	JQ005172	JQ005259	JQ005346	JQ005520	JQ005606	Damm et al. (2012a)
C. camelliae-japonicae	CGMCC3.18118	KX853165	KX893584		KX893576	KX893580	Hou et al. (2016)
C. catinaense	CBS 142417	KY856400	KY856224	KY856136	KY855971	KY856482	Guarnaccia et al. (2017)
C. chiangraiense	MFLUCC 14-0119	MF448522			MH376383	MH351275	Ma et al. (2018)
C. citricola	CBS 134228	KC293576	KC293736	KC293792	KC293616	KC293656	Guarnaccia et al. (2017)
C. colombiense	CBS 129818	JQ005174	JQ005261	JQ005348	JQ005522	JQ005608	Damm et al. (2012a)
C. condaoense	CBS 134299	MH229914	MH229920	MH229926		MH229923	Crous et al. (2018)
C. constrictum	CBS 128504	JQ005238	JQ005325	JQ005412	JQ005586	JQ005672	Damm et al. (2012a)
C. cymbidiicola	IMI 347923	JQ005166	JQ005253	JQ005340	JQ005514	JQ005600	Damm et al. (2012a)
C. dacrycarpi	CBS 130241	JQ005236	JQ005323	JQ005410	JQ005584	JQ005670	Damm et al. (2012a)
C. doitungense	MFLUCC 14-0128	MF448524	MH049480		MH376385	MH351277	Ma et al. (2018)
C. feijoicola	CBS 144633	MK876413	MK876475		MK876466	MK876507	Crous et al. (2019)
C. hippeastri	CBS 125376	JQ005231	JQ005318	JQ005405	JQ005579	JQ005665	Damm et al. (2012a)
C. karstii	CORCG6	HM585409	HM585391	HM582023	HM581995	HM585428	Yang et al. (2011)
C. limonicola	CBS 142410	KY856472	KY856296	KY856213	KY856045	KY856554	Guarnaccia et al. (2017)
C. novae-zelandiae	CBS 128505	JQ005228	JQ005315	JQ005402	JQ005576	JQ005662	Damm et al. (2012a)
C. oncidii	CBS 129828	JQ005169	JQ005256	JQ005343	JQ005517	JQ005603	Damm et al. (2012a)
C. parsonsiae	CBS 128525	JQ005233	JQ005320	JQ005407	JQ005581	JQ005667	Damm et al. (2012a)
C. petchii	CBS 378.94	JQ005223	JQ005310	JQ005397	JQ005571	JQ005657	Damm et al. (2012a)
C. phyllanthi	CBS 175.67	JQ005221	JQ005308	JQ005395	JQ005569	JQ005655	Damm et al. (2012a)
C. torulosum	CBS 128544	JQ005164	JQ005251	JQ005338	JQ005512	JQ005598	Damm et al. (2012a)
C. watphraense	MFLUCC 14-0123	MF448523	MH049479		MH376384	MH351276	Ma et al. (2018)

Notes – This species is sister to a clade that contains *C. karstii* and *C. phyllanthi*. *Colletotrichum annellatum* has longer asci compared with *C. karstii*, wider ascospores and smaller appressoria (produce rarely) (Damm et al. 2012a). There are no strains recorded after Damm et al. (2012a) of this species.

Colletotrichum beeveri Damm, P.F. Cannon, Crous, P.R. Johnst & B. Weir, in Damm et al., Stud. Mycol. 73: 9 (2012)

Sexual morph not reported. See Damm et al. (2012a) for illustrations and descriptions of asexual morph.

Type – New Zealand, Great Barrier Island, from brown lesions on a leaf of *Brachyglottis repanda*, R.E. Beever, 23 Mar. 2006, holotype CBS H-20694, culture ex-type CBS 128527.

Hosts – *Brachyglottis repanda* (Damm et al. 2012a)

Distribution – New Zealand (Damm et al. 2012a)

Notes – This species is characterised by wide conidia and complex appressoria. It can be distinguished by any of the loci (*act*, *chs-1*, *tub2*, *his3* and *cal*) used in Damm et al. (2012a) except for ITS and *gapdh*. Even though *C. beeveri* was isolated from leaf lesions, there is no pathogenicity data available to confirm this.

Colletotrichum boninense Moriwaki, Toy. Sato & Tsuki, Mycoscience 44: 48 (2003)

See Damm et al. (2012a) for illustrations and descriptions of asexual and sexual morphs.

Type – Japan, Bonin Islands, from a diseased leaf of *Crinum asiaticum* var. *sinicum*, 1988, T. Sato, culture ex-holotype CBS 123755.

Hosts – Has a wide range of hosts (*Amaryllidaceae*, *Annonaceae*, *Bignoniaceae*, *Lauracea*, *Olivaceae*, *Orchidaceae*, *Piperaceae*, *Podocarpaceae*, *Protaceae*, *Rubiaceae*, *Rutaceae*, *Solanaceaea* and *Theaceae*) (Damm et al. 2012a, Jayawardena et al. 2016a)

Distribution – Worldwide (Damm et al. 2012a, Jayawardena et al. 2016a, Farr & Rossman 2021)

Notes – *Colletotrichum boninense* is an endophyte and a pathogen on a wide range of hosts, worldwide which was introduce by Moriwaki et al. (2003). Damm et al. (2012a) recognized a significant genetic variation in this species.

Colletotrichum brasiliense Damm, P.F. Cannon, Crous & Massola, in Damm et al., Stud. Mycol. 73: 11 (2012)

Sexual morph not reported. See Damm et al. (2012a) for illustrations and descriptions of asexual morph.

Type – Brazil, Sao Paulo, Bauru City, from fruit anthracnose of *Passiflora edulis* f. *flavicarpa*, 1 June 2006, N. Massola and H. J. Tozze Jr., holotype CBS H-20697, culture ex-type CBS 128501.

Hosts – *Passiflora edulis* (Damm et al. 2012a)

Distribution – Brazil (Damm et al. 2012a)

Notes – Even though this species was isolated as a pathogen from fruit anthracnose, no pathogenicity data is available to confirm this. This species is closely related to *C. parsonsiae* and *C. hippeastri* (Damm et al. 2012a). This taxon can be distinguished from the other species with the use of *act*, *gapdh*, ITS and *tub2* sequence data (Damm et al. 2012a). There are no records of this species after Damm et al. (2012a).

Colletotrichum brassicicola Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 14 (2012)

See Damm et al. (2012a) for illustrations and descriptions of asexual and sexual morphs.

Type – New Zealand, Manawatu-Wanganui, Ohakune, from leaf spot of *Brassica oleracea* var. *gemmifera*, unknown collection date, holotype CBS H-20698, culture ex-type CBS 101059.

Hosts – *Brassica oleracea* (Damm et al. 2012a)

Distribution – New Zealand (Damm et al. 2012a)

Notes – The conidia of *C. brassicicola* are very short, while ascospores and asci are longer than those of the other species in the boninense species complex with a known sexual morph (Damm et al. 2012a). It can be distinguished by any of the loci (*act*, *chs-1*, *tub2*, *his3* and *cal*) used in Damm et al. (2012a) except for ITS and *gapdh*. Even though it was isolated from a leaf spot, no pathogenicity data are available to confirm the pathogenicity of this species. There are no records available for this species other than type strain.

Colletotrichum camellia-japonicae L.W. Hou & L. Cai, in Hou et al., Mycosphere 7(8): 1117 (2016)

See Hou et al. (2016) for illustrations and descriptions of asexual and sexual morphs.

Type – Japan, intercepted by Ningbo Entry-Exit Inspection and Quarantine Bureau when exporting to China, on *Camellia japonica*, Weijun Duan, 25 November 2013, holotype HMAS 247042, culture ex-holotype CGMCC 3.18118.

Hosts – *Camellia japonica* (Hou et al. 2016)

Distribution – Japan (Hou et al. 2016)

Notes – This taxon is closely related to *C. citricola* and can be differentiated by its narrow ascospores and shorter conidia (Hou et al. 2016).

Colletotrichum catinaense Guarnaccia & Crous, in Guarnaccia et al., Persoonia 39: 43 (2017)

Sexual morph not reported. See Guarnaccia et al. (2017) for illustrations and descriptions of asexual morph.

Type – Italy, Mineo, Catania, from leaf lesion of *Citrus reticulata*, 23 Sept. 2015, V. Guarnaccia, holotype CBS H-23024, culture ex-type CBS 142417.

Hosts – *Citrus* sp. (Guarnaccia et al. 2017)

Distribution – Italy, Portugal (Guarnaccia et al. 2017)

Notes – *Colletotrichum catinaense* was isolated from *Citrus* in Italy and Portugal. This species is phylogenetically close to but clearly differentiated from *C. novae-zelandiae* in *cal* and *tub2* sequence data (Guarnaccia et al. 2017).

Colletotrichum chiangraiense X.Y. Ma, K.D. Hyde & Jayawardena, in Ma et al., MycoKeys 43: 34 (2018)

See Ma et al. (2018) for illustrations and descriptions of asexual and sexual morphs.

Type – Thailand, Chiang Rai, Wat Phra That Doi Tung, *Dendrobium* sp. was collected on 19 December 2013, Collector: Sureeporn Nontachaiyapoom, Natdanai Aewsakul, Xiaoya Ma, holotype MFLU 17-1201, culture ex-type MFLUCC 14-0119.

Hosts – *Dendrobium* sp. (Ma et al. 2018)

Distribution – Thailand (Ma et al. 2018)

Notes – It was isolated as an endophyte and is closely related to *C. cymbidiicola*. This species may be homothallic (Ma et al. 2018).

Colletotrichum citricola F. Huang, L. Cai, K.D. Hyde & Hong Y. Li, in Huang et al., Fungal Diversity 61(1): 67 (2013)

See Fu et al. (2019) for illustrations and descriptions of sexual morph. See Huang et al. (2013) for illustrations and descriptions of asexual morph.

Type – China, Shaanxi province, Chenggu, saprobes on leaf of *Citrus unshiu*, May 2012, F. Huang holotype ZJUC34H, culture ex-type CBS134228.

Hosts – *Citrus* sp. (Huang et al. 2013, Fu et al. 2019)

Distribution – China (Huang et al. 2013, Fu et al. 2019)

Notes – This species has been reported as a saprobe and a pathogen only from *Citrus* sp. in China (Huang et al. 2013, Fu et al. 2019). Pathogenicity data are available to for this species. Fu et al. (2019) mentioned that this taxon can be organ-specific (fruit or leaf) on *Citrus* sp.

Colletotrichum colombiense Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 16 (2012)

Sexual morph not reported. See Damm et al. (2012a) for illustrations and descriptions of asexual morph.

Type – Colombia, Cundinamarca, Tibacuy, from a leaf of *Passiflora edulis*, 22 Jan. 2010, D. Riascos, holotype CBS H-20699, culture ex-type CBS 129818.

Hosts – *Passiflora edulis* (Damm et al. 2012a)

Distribution – Colombia (Damm et al. 2012a)

Notes – *Colletotrichum colombiense* forms a sister group to *C. beeveri* and *C. brassicicola*. It differs from *C. beeveri* in morphology by setae that are verrucose and rounded, and shorter conidiogenous cells (Damm et al. 2012a). This taxon can be identified by all loci (*act, tub2*, *chs-1*, *gapdh, his3*, *cal*) used in Damm et al. (2012a) except for ITS.

Colletotrichum conodaoense J.A. Crouch, IMA Fungus 5(1):27 (2014)

See Crous et al. (2018b) for illustrations and descriptions of asexual and sexual morphs.

Type – Vietnam, Côn Đảo Islands, Côn Sơn, sea shore, from leaf spots on *Ipomoea pescaprae*, 12 Dec. 2012, U. Damm, holotype CBSH-21508, culture ex-holotype CBS 134299.

Hosts – *Ipomoea pes-caprae* (Crous et al. 2018b)

Distribution – Vietnam (Crous et al. 2018b)

Notes – This taxon is closely related to *C. parsoniae* and can be differentiated by its appresorial and ascospore shapes (Damm et al. 2012). Even though this species was isolated from a leaf spot, no data are available to confirm its pathogenicity.

Colletotrichum constrictum Damm, P.F. Cannon, Crous, P.R. Johnst & B. Weir, in Damm et al., Stud. Mycol. 73: 17 (2012)

See Damm et al. (2012) for illustrations and descriptions of asexual and sexual morphs.

Type – New Zealand, AK, Auckland, from fruit of *Citrus limon*, 1 Dec. 1988, P.R. Johnston, holotype CBS H-20701, culture ex-type CBS 128504.

Hosts – *Citrus limon* and *Solanum betacum* (Damm et al. 2012a)

Distribution – New Zealand (Damm et al. 2012a)

Notes – This taxon differs by the shape and size of the ascospores, which are broader than those of the other species (Damm et al. 2012a). Even though this species is isolated from fruit rot, no pathogenicity data are available to confirm its pathogenicity. This taxon seems to be endemic to New Zealand.

Colletotrichum cymbidiicola Damm, P.F. Cannon, Crous, P.R. Johnst. & B. Weir, in Damm et al., Stud. Mycol. 73: 19 (2012)

See Damm et al. (2012a) for illustrations and descriptions of asexual and sexual morphs.

Type – Australia, Western Australia, Perth, Fremantle, from leaf lesion of *Cymbidium* sp., 27 Mar. 1991, P.M. Wood, holotype CBS H-20703, culture extype IMI 347923.

Hosts – *Cymbidium* sp. (Damm et al. 2012a), *Bulbophyllum hirtum*, *Coelogyne elata*, *Dendrobium fimbriatum*, *Eria* sp., *Liparis longipes*, *Oncidium sphacelatum* (Chowdappa et al. 2014)

Distribution – Australia, Japan (Damm et al. 2012a), India (Chowdappa et al. 2014), China (Liu et al. 2018)

Notes – *Colletotrichum cymbidiicola* differs from *C. boninense* in the shape of the appressoria that are usually lobate with irregular shapes in *C. cymbidiicola*, while those of *C. boninense* are typically bullet-shaped to navicular with entire edge or crenate (Damm et al. 2012a). In her study Damm et al. (2012a) mentioned that this taxon seems to be host-specific at the plant genus level.

Colletotrichum dacrycarpi Damm, P.F. Cannon, Crous, P.R. Johnst. & B. Weir, in Damm et al., Stud. Mycol. 73: 19 (2012)

Sexual morph not reported. See Damm et al. (2012a) for illustrations and descriptions of asexual morph.

Type – New Zealand, Auckland, Wenderholm Regional Park, leaf endophyte from *Dacrycarpus dacrydioides*, 16 Oct. 2009, G. Carroll, holotype CBS H-20705, culture ex-type CBS 130241.

Hosts – *Dacrycarpus* sp. (Damm et al. 2012a)

Distribution – New Zealand (Damm et al. 2012a)

Notes – *Colletotrichum dacrycarpi* does not look like a typical member of *Colletotrichum*, with its slow growth and the production of conidia within closed fruit-bodies with walls that rupture (Damm et al. 2012a). It is one of the most basal members of the boninense complex. There are no records of this species other than the ex-type strain.

Colletotrichum doitungense X.Y. Ma, K.D. Hyde & Jayawardena, in Ma et al., MycoKeys 43: 37 (2018)

See Ma et al. (2018) for illustrations and descriptions of asexual and sexual morphs.

Type – Thailand, Chiang Rai, Wat Phra That Doi Tung, *Dendrobium* sp., 19 December 2013, Collector: Sureeporn Nontachaiyapoom, Natdanai Aewsakul, Xiaoya Ma, holotype MFLU 17-1200, culture ex-type MFLUCC 14-0128.

Hosts – *Dendrobium* sp. (Ma et al. 2018)

Distribution – Thailand (Ma et al. 2018)

Notes – This taxon was isolated as an endophyte from the root of a *Dendrobium* sp. It can be distinguished by its globose to sub-globose conidiogenous cell (Ma et al. 2018).

Colletotrichum feijoicola Guarnaccia & Damm, in Crous et al., Persoonia 42: 401 (2019)

Sexual morph not reported. See Crous et al. (2019) for illustrations and descriptions of asexual morph.

Type – Portugal, Azores Islands, Sao Miguel, from a leaf spot of *Acca sellowiana*, 17 July 2017, V. Guarnaccia, holotype GML-F116096, culture ex-type CBS 144633.

Hosts – *Acca sellowiana* (Crous et al. 2019)

Distribution – Portugal (Crous et al. 2019)

Notes – *Colletotrichum feijoicola* was found associated with reddish leaf spots, however no pathogenicity data are available to confirm its pathogenicity (Crous et al. 2019). This taxon can be separated from *act*, *gapdh* and *tub2* sequence data.

Colletotrichum hippeastri Yan L. Yang, Zuo Y. Liu, K.D. Hyde & L. Cai, in Yang et al., Fungal Diversity 39: 133. 2009

Sexual morph not reported. See Damm et al. (2012a) for illustrations and descriptions of asexual morph.

Type – China, Guizhou Province, Guiyang, isolated from leaf of *Hippeastrum vittatum*, 23 May 2009, Y.L. Yang, culture ex-holotype CBS 125376.

Hosts – *Hippeastrum* sp. (Damm et al. 2012a)

Distribution – China, Netherland (Damm et al. 2012a)

Notes – *Colletotrichum hippeastri* is an outlying species in the boninense clade and is distinguished from related species by its large conidia as well as elongate and complex appressoria (Damm et al. 2012a). This endophytic species can be distinguished by any of the loci (ITS, *act*, *tub2*, *chs-1*, *gapdh*, *his3* and *cal*) used in Damm et al. (2012a).

Colletotrichum karstii Y.L. Yang, Zuo Y. Liu, K.D. Hyde & L. Cai, in Yang et al., Cryptogamie Mycologie 32: 241. 2011.

See Damm et al. (2012a) for illustrations and descriptions of asexual and sexual morphs.

Type – China, Guizhou Province, Luodian, on leaf of *Vanda* sp., 15 August 2009, Y.L. Yang, holotype GZAAS 090006, culture ex-holotype CGMCC3.14194.

Hosts – wide range of hosts (including *Annona cherimola*, *Anthurium* sp., *Bletilla ochracea*, *Bombax aquaticum*, *Camellia* sp., *Capsicum annunum*, *Carica papaya*, *Citrus* sp., *Clivia miniata*, *Coffea* sp., *Cucumis melo*, *Diospyros australis*, *Eucalyptus grandis*, *Malus domestica*, *Mangifera indica*, *Olea europaea*, *Pistacia vera*, *Quercus salicifolia*, *Rubus glaucus*, *Theobroma cacao*, *Zamia oblique*) (Damm et al. 2012a, Jayawardena et al. 2016a, Farr & Rossman 2021)

Distribution – Australia, Brazil, China, Colombia, Germany, India, Italy, Japan, Mexico, New Zealand, Panama, Portugal, South Africa, Spain, Thailand, USA, Zimbabwe (Damm et al. 2012a, Jayawardena et al. 2016a, Farr & Rossman 2021)

Notes – This is the most common and geographically diverse species in the boninense complex (Damm et al. 2012a, Jayawardena et al. 2016a). Morphological and genetic variation of this species is very high, which makes identification difficult. Pathogenicity studies for this species are available.

Colletotrichum limonicola Guarnaccia & Crous, in Guarnaccia et al., Persoonia 39: 45 (2017)

Sexual morph not reported. See Guarnaccia et al. (2017) for illustrations and descriptions of asexual morph.

Type – Malta, Gozo, from wither-tip twigs of *Citrus limon*, 11 July 2016, V. Guarnaccia, holotype CBS H-23027, culture ex-type CBS 142410.

Hosts – *Citrus limon* (Guarnaccia et al. 2017)

Distribution – Malta (Guarnaccia et al. 2017)

Notes – *Colletotrichum limonicola* was isolated from leaf lesions and twigs with wither-tip symptoms. This species is phylogenetically closer to but clearly differentiated from *C. novae-zelandiae* based on *gapdh* and *tub2* sequence data.

Colletotrichum novae-zelandiae Damm, P.F. Cannon, Crous, P.R. Johnst. & B. Weir, in Damm et al., Stud. Mycol. 73: 25 (2012)

Sexual morph not reported. See Damm et al. (2012a) for illustrations and descriptions of asexual morph.

Type – New Zealand, GB, Gisborne, from ripe fruit rot of *Capsicum annuum*, 1 Mar. 1990, P.R. Johnston, holotype CBS H-20706, culture ex-type CBS 128505.

Hosts – *Capsicum* sp., *Citrus* sp. (Damm et al. 2012a, Guarnaccia et al. 2017)

Distribution – New Zealand (Damm et al. 2012a), Greece, Iran, Malta (Guarnaccia et al. 2017)

Notes – This species was thought to be endemic to New Zealand (Jayawardena et al. 2016a) until more strains from European countries were discovered. *Colletotrichum novae-zelandiae* can be distinguished by any of the loci (ITS, *act*, *tub2*, *chs-1*, *gapdh*, *his3* and *cal*) used in Damm et al. (2012a).

Colletotrichum oncidii Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 26 (2012)

Sexual morph not reported. See Damm et al. (2012a) for illustrations and descriptions of asexual morph.

Type – Germany, Munich, greenhouse, from leaf of *Oncidium* sp., 20 Nov. 2010, U. Damm, holotype, CBS H-20709, culture ex-type CBS 129828.

Hosts – *Oncidium* sp (Damm et al. 2012a)

Distribution – Germany (Damm et al. 2012a)

Notes – *Colletotrichum oncidii* differs from the closely related *C. boninense* in forming appressoria that are larger and lobate (Damm et al. 2012a). This species is only recorded from Germany. As it was isolated from a green house, the origin is unknown.

Colletotrichum parsonsiae Damm, P.F. Cannon, Crous, P.R. Johnst. & B. Weir, in Damm et al., Stud. Mycol. 73: 27 (2012)

See Damm et al. (2012a) for illustrations and descriptions of asexual and sexual morphs.

Type – New Zealand, Auckland, leaf endophyte from *Parsonsia capsularis*, 1 Dec. 2009, G. Carroll, (CBS H-20710 holotype, culture ex-type CBS 128525.

Hosts – *Parsonsia capsularis* (Damm et al. 2012a), *Bletilla ochracea* (Tao et al. 2013)

Distribution – New Zealand (Damm et al. 2012a), China (Tao et al. 2013)

Notes – This species was introduced based on a single strain (Damm et al. 2012a). Tao et al. (2013) provided another host for this taxon from China. The shape and size of conidia differ from other species in the boninense complex (Damm et al. 2012a).

Colletotrichum petchii Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 29 (2012)

See Damm et al. (2012a) for illustrations and descriptions of asexual and sexual morphs.

Type – Italy, from spotted leaves of *Dracaena fragrans*, P. Di Lenna (from Università degli Studi, Padova), deposited in June 1994, epitype CBS-H 20711, culture ex-epitype CBS 378.94.

Hosts – *Dracaena* sp. (Damm et al. 2012a, Shivas et al. 2016)

Distribution – China, Germany, Italy, Netherlands, Sri Lanka (Damm et al. 2012a), Australia (Shivas et al. 2016)

Notes – This species is recorded as a pathogen. However, no pathogenicity data are available to confirm its pathogenicity. Within the species there is only low sequence variability and can be identified by any of the loci (ITS, *act*, *tub2*, *chs-1*, *gapdh*, *his3* and *cal*) used in Damm et al. (2012a).

Colletotrichum phyllanthi (H.S. Pai) Damm, P.F. Cannon & Crous, in Damm et al., Stud. Mycol. 73: 31 (2012)

See Damm et al. (2012a) for illustrations and descriptions of asexual and sexual morphs.

Type – India, Maharashtra, Poona, isolated from anthracnose symptoms on leaves of *Phyllanthus acidus*, 10 Feb. 1966, H. Surendranath Pai, isotype CBS H-7188 (dried culture (PDA) of ascigerous stage), culture ex-isotype CBS 175.67.

Hosts – *Phyllanthus acidus* (Damm et al. 2012a), *Bauhinia variegate*, *Bougainvillea glabra* (Sharma & Shenoy 2013)

Distribution – India (Damm et al. 2012a, Sharma & Shenoy 2013)

Notes – This species is recorded as an endophyte and a pathogen from India. *Colletotrichum phyllanthi* can be distinguished by any of the loci (ITS, *act*, *tub2*, *chs-1*, *gapdh*, *his3* and *cal*) used in Damm et al. (2012a).

Colletotrichum torulosum Damm, P.F. Cannon, Crous, P.R. Johnst. & B. Weir, in Damm et al., Stud. Mycol. 73: 32 (2012)

Sexual morph not reported. See Damm et al. (2012a) for illustrations and descriptions of asexual morph.

Type – New Zealand, GB, Gisborne, Allen Park Gardens, from *Solanum melongena*, 6 Mar. 1990, P.R. Johnston, holotype CBS H-20715, culture ex-type CBS 128544.

Hosts – *Passiflora edulis*, *Solanum melongena* (Damm et al. 2012a)

Distribution – New Zealand (Damm et al. 2012a)

Notes – It has significantly longer conidia than *C. boninense* with a larger L/W ratio (Damm et al. 2012a). This species is recorded only from New Zealand. Damm et al. (2012a) mentioned that it is not clear whether this species is native to New Zealand, and has jumped onto cultivated exotic plants or has been imported on diseased plant materials.

Colletotrichum watphraense X.Y. Ma, K.D. Hyde & Jayawardena, in Ma et al., MycoKeys 43: 35 (2018)

Sexual morph not reported. See Ma et al. (2018) for illustrations and descriptions of asexual morph.

Type – Thailand, Chiang Rai, Wat Phra That Doi Tung, *Dendrobium* sp., 19 December 2013, Collector: Sureeporn Nontachaiyapoom, Natdanai Aewsakul, Xiaoya Ma, holotype MFLU 17-1202, culture ex-type 14-0123.

Hosts – *Dendrobium* sp. (Ma et al. 2018)

Distribution – Thailand (Ma et al. 2018)

Notes – It was isolated from the stem of *Dendrobium* sp. as an endophyte and can be distinguished by its closely related taxa with any of the loci (ITS, *act*, *tub2*, *chs-1*, and *gapdh*) used in Ma et al. (2018).

Graminicola-caudatum Species Complex

This species complex is defined as a collective of *C. caudatum* and *C. graminicola* species and 23 closely related species. Crouch (2014) introduced the caudatum complex based on the presence of a filiform appendage at the apex of the conidium and phylogenetic analyses (*apn2*, ITS, Sod2, Mat/*apn2*). A phylogenetic tree using ITS for the species of caudatum and graminicola species complexes was generated in Jayawardena et al. (2016a). According to this phylogenetic tree, caudatum complex appears to be a specific branch within the graminicola complex. Three species *viz. C. caudasporum*, *C. duyuensis* and *C. ochracea* which were previously identified to be in the graminicola species complex, claded with the caudatum species complex. Similar phylogenetic placement was observed in the later studies (Marin-Felix et al. 2017, Jayawardena et al. 2020). Both species complexes are from monocotyledons, mostly being from *Poaceae*. Bhunjun et al. (2021) based on phylogenetic and evolutionary analyses recommended to treat these two complexes as one and we follow this herein. Almost all of the species are either host-specific (*Poaceae*) or geographically restricted. However, for some of these species only a single strain is available. Therefore, new collections are recommended to establish the host distribution of these species. A combined gene analysis for this complex using ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 8, Table 7.

Colletotrichum alcornii J.A. Crouch, IMA Fungus 5(1):27 (2014)

Sexual morph not reported. See Crouch (2014) for illustrations and descriptions of asexual morph.

Type – Australia: Queensland: Caboolture, on leaves of *Imperata cylindrica* var. *major*, 26 March 1973, J. L. Alcorn holotype IMI 176619

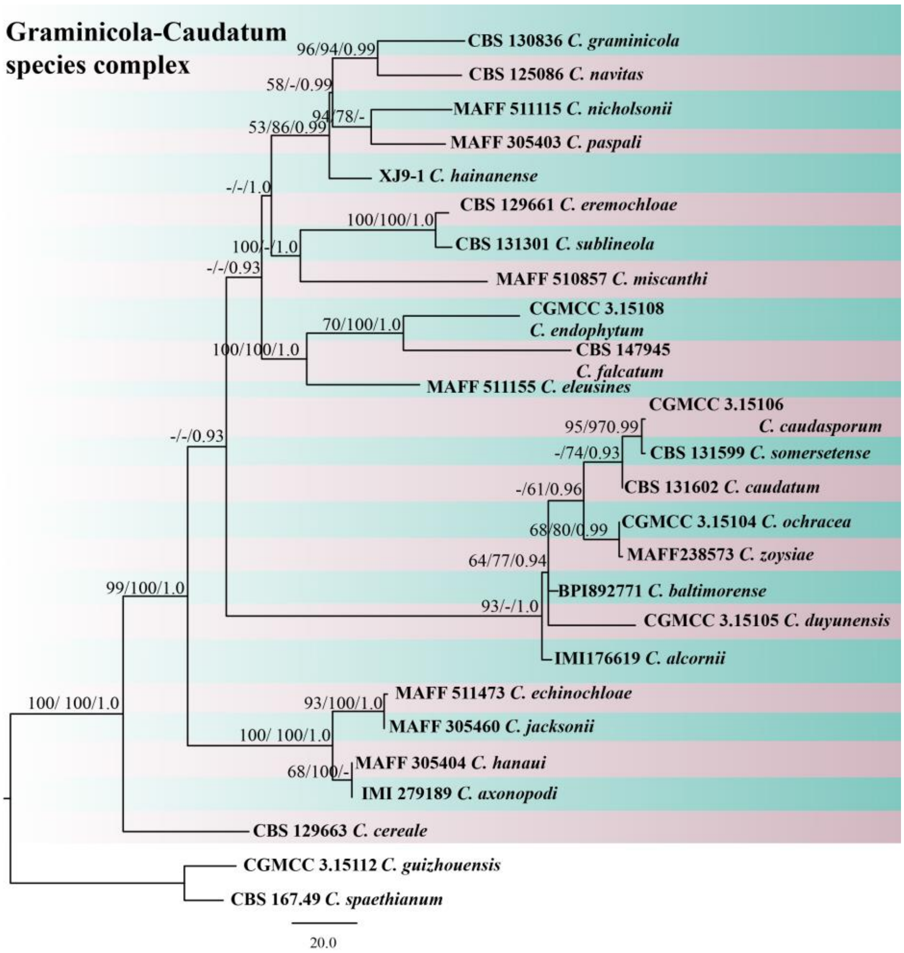

Figure 8 The graminicola-caudatum complex. One of the 10 most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and

ML bootstrap support values ≥50% and BYPP≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. guizhouensis* (CGMCC 3.15112) and *C. spaethianum* (CBS 167.49).

Table 7 GenBank accession numbers of species in the graminicola/caudatum complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. alcornii	IMI176619	JX076858					Crouch (2014)
C. axonopodi	IMI 279189	MN521699					Zhang et al. (2020)
C. baltimorense	BPI892771	JX076866					Crouch (2014)
C. caudatum	CBS 131602	JX076860					Crouch (2014)
C. caudasporum	CGMCC 3.15106	JX625162	KC843512		KC843526	JX625190	Tao et al. (2013)
C. cereale	CBS 129663			JQ005795	JQ005837	JQ005858	Crouch et al. (2006)
C. duyunensis	CGMCC 3.15105	JX625160	KC843515		KC843530	JX625187	Tao et al. (2013)
C. echinochloae	MAFF 511473	AB439811					Moriwaki & Tsukiboshi (2009)
C. eleusines	MAFF 511155	JX519218		JX519226	JX519234	JX519243	Crouch et al. (2009a)
C.endophytum	CGMCC 3.15108	JX625177	KC843521		KC843533	JX625206	Tao et al. (2013)
C. eremochloae	CBS 129661	JX519220		JX519228	JX519236	JX519245	Crouch & Tomaso-Peterson (2012)
C. falcatum	CBS 147945	JQ005772		JQ005793	JQ005835	JQ005856	Prihastuti et al. (2010)
C. graminicola	M 1.001/CBS 130836	JQ005767		JQ005788	JQ005830	JQ005851	Du et al. (2005)
C. hanaui	MAFF 305404	JX519217		JX519225		JX519242	Crouch et al. (2009a)
C. jacksonii	MAFF 305460	JX519216		JX519224	JX519233	JX519241	Crouch et al. (2009a)
C. miscanthi	MAFF 510857	JX519221		JX519229	JX519237	JX519246	Crouch et al. (2009c)
C. navitas	CBS 125086	JQ005769		JQ005790	JQ005832	JQ005853	Crouch et al. (2009a)
C. nicholsonii	MAFF 511115	JQ005770		JQ005791	JQ005833	JQ005854	Crouch et al. (2009a)
C. ochracea	CGMCC 3.15104	JX625168	KC843513		KC843527	JX625183	Tao et al. (2013)
C. paspali	MAFF 305403	JX519219		JX519227	JX519235	JX519244	Crouch et al. (2009a)
C. somersetense	CBS 131599	JX076862					Crouch (2014)
C. sublineola	CBS 131301, S3.001	JQ005771		JQ005792	JQ005834	JQ005855	Crouch et al. (2006)
C. zoysiae	MAFF238573	JX076871					Crouch (2014)

Hosts – *Bothriochloa bladhii* and *Imperata cylindrica* (Crouch 2014)

Distribution – Australia (Crouch 2014)

Notes – *Colletotrichum* alcornii was introduced in the caudatum species complex and can be distinguished by any of the loci (*apn2*, ITS, *mat* and *sod2*) used in Crouch (2014). This taxon appears to be endemic to Australia.

Colletotrichum axonopodi J.A. Crouch, B.B. Clarke, J.F. White & B.I. Hillman [as 'axonopodi'], Mycologia 101(5): 727 (2009)

Sexual morph not reported. See Crouch et al. (2009a) for illustrations and descriptions of asexual morph.

Type – Italy, Pavia, Ticinum, in botanical garden, on decaying leaves of cultivated *Agave americana*, 1904, Hedgcock G. holotype BPI 397108, culture ex-type CBS 118190.

Hosts/substrates – *Axonopus* spp. (Crouch et al. 2009a)

Distribution – Australia, USA (Crouch et al. 2009a)

Notes – *Colletotrichum axonopodi* cannot be distinguished from the majority of falcate-spored species described from graminicolous hosts (Crouch et al. 2009a). This species was listed as a singleton species in Jayawardena et al. (2016a, 2020) and Marlin-Felix et al. (2017). Bhunjun et al. (2021) based on a polyphasic approach identified that this species claded within the graminicola-caudatum complex. Therefore, we follow this herein.

Colletotrichum baltimorense J.A. Crouch, IMA Fungus 5(1): 27 (2014)

Sexual morph not reported. See Crouch (2014) for illustrations and descriptions of asexual morph.

Type – USA: Maryland: Baltimore County, Owings Mills, Natural Environment Area, on leaves of *Sorghastrum nutans*, 12 September 2011, J. A. Crouch, holotype BPI I1892771 holotype, culture ex-holotype SD-11.

Hosts – *Sorghastrum nutans* (Crouch 2014)

Distribution – USA (Crouch 2014)

Notes – *Colletotrichum* baltimorense was introduced in the caudatum species complex and can distinguish by any of the loci (*apn2*, ITS, *mat* and *sod2*) used in Crouch (2014). This taxon is only recorded from *Sorghastrum nutans* in USA.

Colletotrichum caudatum **(**Peck ex Sacc.) Peck, Bull. N.Y. State Mus. 131: 81 (1909).

Sexual morph not reported. See Crouch (2014) for illustrations and descriptions of asexual morph.

Type – USA, New York: Big Flats, Chemung Co., on the leaves of *Sorghastrum nutans* ‘Rumsey’, 2007, G. C. Bergstom, epitype BPI 892767, culture ex-epitype CBS 131602.

Hosts – *Sorghastrum nutans* (Crouch 2014)

Distribution – USA (Crouch 2014)

Notes – This taxon was introduced in the caudatum species complex and can be distinguished by any of the loci (*apn2*, ITS, *mat* and *sod2*) used in Crouch (2014). *Colletotrichum caudatum* appears to be host-specific and geographically restricted to USA. Whole-genome data are available for this species (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum caudisporum G. Tao, Zuo Y. Liu & L. Cai [as ‘caudasporum’], in Tao et al., Fungal Diversity 61: 149 (2013)

Sexual morph not reported. See Tao et al. (2013) for illustrations and descriptions of asexual morph.

Type – China, Guizhou Province, Duyun, Xiaba Mountain, isolated from healthy leaves of *Bletilla ochracea*, 13 July 2006, Gang Tao, holotype HMAS 244282 (dried culture), culture ex-holotype CGMCC 3.15106.

Hosts – *Bletilla ochracea* (Tao et al. 2013)

Distribution – China (Tao et al. 2013)

Notes – *Colletotrichum caudisporum* is introduced as an endophyte from *Bletilla ochracea* (Tao et al. 2013). This species clustered within the caudatum complex (Jayawardena et al. 2016a).

Colletotrichum cereale Manns, in Selby & Manns, Proc. Indiana Acad. Sci.: 111 (1908)

Sexual morph not reported. See Crouch et al. (2006) for illustrations and descriptions of asexual morph.

Type – USA, Kansas, on *Bromus inermis*, reference strain (KS-20BIG) CBS 12966.

Hosts – Pooideae (Crouch et al. 2006, Jayawardena et al. 2016a), *Bletilla ochracea* (Tao et al. 2013)

Distribution – Germany, Japan, New Zealand, Netherlands, USA (Crouch et al. 2006, Jayawardena et al. 2016a), China (Tao et al. 2013)

Notes – *Colletotrichum cereale* is the pathogen of grass of the subfamily Pooideae. This taxon has been identified as an endophyte from *Bletilla ochracea*, which extends its host range. Pathogenicity, evolutionary, whole-genome and infection data are available for this species.

Colletotrichum duyunensis G. Tao, Zuo Y. Liu & L. Cai, in Tao et al., Fungal Diversity 61: 149 (2013)

Sexual morph not reported. See Tao et al. (2013) for illustrations and descriptions of asexual morph.

Type – China, Guizhou Province, Duyun, Xiaba Mountain, isolated from healthy leaves of *Bletilla ochracea*, 13 July 2006, Gang Tao, holotype HMAS 244832(dried culture), culture ex-holotype CGMCC 3.15105.

Hosts – *Bletilla ochracea* (Tao et al. 2013)

Distribution – China (Tao et al. 2013)

Notes – This taxon was isolated as an endophyte from *Bletilla ochracea* and is the only existing record to date (Tao et al. 2013). Jayawardena et al. (2016a) treated this taxon in the caudatum species complex.

Colletotrichum echinochloae Moriwaki & Tsukib., Mycoscience 50(4): 275 (2009)

Sexual morph not reported. See Moriwaki & Tsukiboshi (2009) for illustrations and descriptions of asexual morph.

Type – Japan, Tsukuba, in Herbario Instituti Nationalis Agro-Environmentalis Scientiae, from leaves of *Echinochloae utilis*, Senbonmatsu, Nasushiobara-shi, Tochigi Pref., Japonia, 17 Sep. 2007, T. Tsukiboshi, holotype NIAES 20584 (dried culture), culture ex-type MAFF 511473.

Hosts – *Echinochloa* sp. (Moriwaki & Tsukiboshi 2009)

Distribution – Japan (Moriwaki & Tsukiboshi 2009)

Notes – *Colletotrichum echinocholae* is a pathogen on *Echinichloa* sp. causing leaf spots (Moriwaki & Tsukiboshi 2009). No pathogenicity data are available for this taxon. *Colletotrichum echinochloae* is characterized by its falcate and rather short conidia (Moriwaki & Tsukiboshi 2009).

Colletotrichum eleusines Pavgi & U.P. Singh [as ‘eleusinis’], Mycopath. Mycol. appl. 27: 85 (1965)

Sexual morph not reported. See Crouch et al. (2009a) for illustrations and descriptions of asexual morph.

Type – Japan, from leaves of *Elusines* sp., unknown collection date and collector, culture ex-epitype MAFF 511155.

Hosts – *Elusines* sp. (Crouch et al. 2009a)

Distribution – Japan, USA (Crouch et al. 2009a)

Notes – It is indistinguishable from the other closely related falcate-spored, grass inhabiting *Colletotrichum* species. However, any loci (*apn2*, ITS, *mat* and *sod2*) used in Crouch et al. (2009a) can be used to distinguish this taxon. *Colletotrichum eleusines* appears to be host-specific.

Colletotrichum endophytum G. Tao, Zuo Y. Liu & L. Cai, in Tao et al., Fungal Diversity 61(1): 152 (2013)

Sexual morph not reported. See Tao et al. (2013) for illustrations and descriptions of asexual morph.

Type – China, Guizhou Province, Shuicheng, Baijipo Mountain, isolated from healthy leaves of *Bletilla ochracea*, 28 June 2006, Gang Tao, holotype HMAS 244280 (dried culture), culture ex-holotype CGMCC 3.15108.

Hosts – *Bletilla ochracea* (Tao et al. 2013)

Distribution – China (Tao et al. 2013)

Notes – *Colletotrichum endophytum* is an endophyte, closely related to *C. falcatum* (Tao et al. 2013). This taxon can be separated by producing strong falcate, shorter conidia.

Colletotrichum eremochloae J.A. Crouch & Tomaso-Pet., Mycologia 104(5): 1092 (2012)

Sexual morph not reported. See Crouch & Tomaso-Peterson (2012) for illustrations and descriptions of asexual morph.

Type – USA, from diseased leaf tissue of *Eremochloa ophiuroides* in Hattiesburg, Mississippi, 29 Mar 2007, C. Hagstrom, holotype BPI882561, culture ex-type CBS 129661.

Hosts – *Eremochloae ophiuroides* (Crouch & Tomaso-Peterson 2012)

Distribution – China, USA (Crouch & Tomaso-Peterson 2012)

Notes – *Colletotrichum eremecholae* is a pathogen isolated from *Eremochloa ophiuroides*. Crouch & Tomaso-Peterson (2012) provided pathogenicity data to confirm its pathogenicity. This taxon appears to be host-specific. Whole genomic data are available for this species (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum falcatum Went, Archiv, voor de Java Suekerrind. 1: 265 (1893)

Sexual morph not reported. See Prihastuti et al. (2010) for illustrations and descriptions of asexual morph.

Type – Indonesia, Central Java, Comal, Gedheg Village on leaves of *Saccharum officinarum*, 23 March 2008, N.F. Wulandari, neo-type HMAS 240681, culture ex-neotype CGMGC 3.14187.

Hosts – *Saccharum officinarum* (Prihastuti et al. 2010)

Distribution – Australia, Indonesia, Japan, Netherlands, Thailand (Prihastuti et al. 2010)

Notes – It is a well-known pathogen on *Saccharum officinarum*. Pathogenicity studies for this species are available. This taxon is in the graminicola clade and can be identified by any of the loci (ITS, *act*, *chs-1* and *tub2*) used in Prihastuti et al. (2010). Whole-genome data for this species are available (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum graminicola (Ces.) G.W. Wilson, Phytopathology 4: 110 (1914)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – USA, from *Zea mays*, unknown collector, 1978, culture ex-epitye CBS 130836.

Hosts – *Zea mays* (Crouch et al. 2009a)

Distribution – worldwide (Farr & Rossman 2021)

Notes – *Colletotrichum graminicola* is a well-known pathogen of *Zea mays* (Crouch et al. 2009a), belonging to the graminicola clade. Whole-genome sequencing of this species has been completed (O'Connell et al. 2012). Pathogenicity and infection studies are available for this taxon.

Colletotrichum hanaui J.A. Crouch, B.B. Clarke, J.F. White & B.I. Hillman, Mycologia 101(5): 728 (2009)

Sexual morph not reported. See Crouch et al. (2009a) for illustrations and descriptions of asexual morph.

Type – Japan, Ibaraki 305-8602, Tsukuba, Kannondai, from *Digitaria ciliaris,* 1975, holotype MAFF 305404 (dried culture).

Hosts – *Digitaria ciliaris* (Crouch et al. 2009a)

Distribution – China, Japan, USA (Crouch et al. 2009a)

Notes – *Colletotrichum hanaui* is in the graminicola clade and seems to only occur on *Digitaria* sp. This species can be distinguished by any of the loci (*apn2*, ITS, *mat* and *sod2*) used in Crouch et al. (2009a), Zhao et al. (2012) showed that this species can be used as a bio-control agent on *Digitaria sanguinalis*.

Colletotrichum hainanense Wu Zhang & X.L. Niu, in Zhang et al., Pl. Dis. 104(6): 1747 (2020)

Sexual morph not reported. See Zhang et al. (2020) for illustrations and descriptions of asexual morph.

Type – China, Hainan Province, Haikou City, *Axonopus compressus* (leaf anthracnose), 18th December 2015, W. Zhang, holotype BJFC 010 (dried culture), culture extype CBS 145900.

Hosts – *Axonopus compressus* (Zhang et al. 2020)

Distribution – China (Zhang et al. 2020)

Notes: *Colletotrichum hainanense* is in the graminicola clade and can be identified by all loci (ITS, *sod2*, *apn2*, *apn2/Mat*) used in Zhang et al. (2020). This species differs from *C. axonopodi* by having white to pale gray in center and mouse gray towards the margin on PDA.

Colletotrichum jacksonii J.A. Crouch, B.B. Clarke, J.F. White & B.I. Hillman, Mycologia 101(5): 729 (2009)

Sexual morph not reported. See Crouch et al. (2009a) for illustrations and descriptions of asexual morph.

Type – Japan, a strain originally isolated from *Echinochloa esculenta* in the Tochigi Prefecture in 1980, National Institute of Agrobiological Sciences, 2-1-2 Kannondai, Tsukuba, Ibaraki 305-8602, MAFF305460.

Hosts – *Echinochloa esculenta* (Crouch et al. 2009a)

Distribution – Japan (Crouch et al. 2009a)

Notes – This species was isolated from diseased *Echinochloa esculenta*, however, no pathogenicity data are available to confirm this. This species clade in the graminicola clade and can be identified by any of the loci (*apn2*, ITS, *mat* and *sod2*) used in Crouch et al. (2009).

Colletotrichum miscanthi J.A. Crouch, B.B. Clarke, J.F. White & B.I. Hillman, Mycologia 101(5): 729 (2009)

Sexual morph not reported. See Crouch et al. (2009a) for illustrations and descriptions of asexual morph.

Type – Japan, a strain originally isolated from the Tochigi Prefecture in 1972, National Institute of Agrobiological Sciences, 2-1-2 Kannondai, Tsukuba, Ibaraki 305-8602, MAFF510857.

Hosts – *Miscanthus sinensis* (Crouch et al. 2009a), *Bletilla ochracea* (Tao et al. 2013)

Distribution – Japan (Crouch et al. 2009a), China (Tao et al. 2013)

Notes – *Colletotrichum miscanthi* is in the graminicola clade. It was initially thought to be host-specific. Tao et al. (2013) recorded this taxon as an endophyte from *Bletilla ochracea*.

Colletotrichum navitas J.A. Crouch, Mycol. Res. 113(12): 1417 (2009)

Sexual morph not reported. See Crouch et al. (2009c) for illustrations and descriptions of asexual morph.

Type – United States, from the stem of *Panicum virgatum* selection ‘Brooklyn’in Freehold, NJ, 26 Sept. 2008, holotype 9038-158a culture ex-type CBS 125086.

Hosts – *Panicum* sp. (Crouch et al. 2009c)

Distribution – USA (Crouch et al. 2009c)

Notes – *Colletotrichum navitas* is recorded as a pathogen on *Panicum* sp., and its pathogenicity has been confirmed by Kochs’ postulates (Crouch et al. 2009c). It is in the graminicola clade and can be identified using any of the loci (*apn2*, ITS, *mat* and *sod2*) in Crouch et al. (2009c). Whole genomic data for this species are available (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum nicholsonii J.A. Crouch, B.B. Clarke, J.F. White & B.I. Hillman, Mycologia 101(5): 730 (2009)

Sexual morph not reported. See Crouch et al. (2009a) for illustrations and descriptions of asexual morph.

Type – Japan, a strain originally isolated from *Paspalum dilatatum* from an unknown location, National Institute of Agrobiological Sciences, 2-1-2 Kannondai, Tsukuba, Ibaraki 305-

8602, MAFF511115.

Hosts – *Paspalum dilatatum* (Crouch et al. 2009a)

Distribution – Japan, New Zealand (Crouch et al. 2009a)

Notes – *Colletotrichum nicholsonii* causes anthracnose on *Paspalum* sp. in Japan and New Zealand (Crouch et al. 2009a). This species belongs to the graminicola clade and seems to be host-specific.

Colletotrichum ochraceae G. Tao, Zuo Y. Liu & L. Cai [as 'ochracea'], in Tao et al., Fungal Diversity 61: 156 (2013)

Sexual morph not reported. See Tao et al. (2013) for illustrations and descriptions of asexual morph.

Type – China, Guizhou Province, Duyun, Xiaba Mountain, isolated from healthy leaves of *Bletilla ochracea*, 13 July 2006, Gang Tao, holotype HMAS244831 (dried culture), culture ex-holotype CGMCC. 3.15104.

Hosts – *Bletilla ochracea* (Tao et al. 2013)

Distribution – China (Tao et al. 2013)

Notes – Being in the caudatum complex, this species is closely related to *C. duyunensis*, which was also isolated from the same host (Tao et al. 2013).

Colletotrichum paspali J.A. Crouch, B.B. Clarke, J.F. White & B.I. Hillman, Mycologia 101(5): 730 (2009)

Sexual morph not reported. See Crouch et al. (2009a) for illustrations and descriptions of asexual morph.

Type – Japan, a strain originally isolated from *Paspalum notatum* from the Yamaguchi Prefecture in 1977, National Institute of Agrobiological Sciences, 2-1-2 Kannondai, Tsukuba, Ibaraki 305-8602, MAFF305403.

Hosts – *Paspalum notatum* (Crouch et al. 2009a)

Distribution – Japan (Crouch et al. 2009a)

Notes – This species was isolated as a pathogen from *Paspalum notatum*, however no pathogenicity data are available to confirm this. *Colletotrichum paspali* is in the graminicola clade.

Colletotrichum somersetense J.A. Crouch, IMA Fungus 5(1):27 (2014)

Sexual morph not reported. See Crouch (2014) for illustrations and descriptions of asexual morph.

Type – USA: New Jersey: Somerset County, Somerset, on the leaves of *Sorghastrum nutans*, 23 Sept. 2011, J. A. Crouch, holotype BPI 892770, culture ex-type CBS131599.

Hosts – *Sorghastrum nutans* (Crouch 2014)

Distribution – USA (Crouch 2014)

Notes – This species claded in the caudatum species complex in Crouch (2014). *Colletotrichum somersetense*, was isolated as a pathogen, however no pathogenicity data are available to confirm this. Whole genomic data for this species are available (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Colletotrichum sublineola Henn., in Kaba´t and Buba´k, Fungi Imperfecti Exs. Century II: No. 186 (1904)

Sexual morph not reported. See Crouch & Tomaso-Peterson (2012) for illustrations and descriptions of asexual morph.

Type – Togo, Burkina Fasso, isolated from *Sorghum vulgare*, collection date unknown, culture ex-epitype CBS 131301.

Hosts – *Sorghum* sp. (Crouch & Tomaso-Peterson 2012)

Distribution – Togo, USA (Crouch & Tomaso-Peterson 2012)

Notes – This species is recorded only from *Sorghum* sp. and is a member of graminicola clade. It can be distinguished by any of the loci (*apn2*, ITS, *mat* and *sod2*) used in Crouch & Tomaso-Peterson (2012). Whole genomic data for this species are available (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html, Baroncelli et al. 2014a).

Colletotrichum zoysiae J.A. Crouch, IMA Fungus 5(1):27 (2014)

Sexual morph not reported. See Crouch (2014) for illustrations and descriptions of asexual morph.

Type – Japan, Yamaguchi, on leaves of *Zoysia tenuifolia*, May 1998, A. Tanaka, holotype BPI 884090–holotype, ex-holotype MAFF238573

Hosts – *Zoysia tenuifolia* (Crouch 2014)

Distribution – Japan (Crouch 2014)

Notes – *Colletotrichum zoysiae* was isolated as a pathogen. However, no data are available to confirm its pathogenicity. This taxon claded in the caudatum clade and can be identified by any of the gene loci (*apn2*, ITS, *mat* and *sod2*) used in Crouch (2014). Whole genomic data for this species are available (https://mycocosm.jgi.doe.gov/Colletotrichum/Colletotrichum.info.html).

Dematium Species Complex

The dematium species complex includes *C. dematium* and 17 closely related species. Species of this complex appear to be characteristic of temperate climates (Cannon et al. 2012). The type species of *Colletotrichum*, *C. lineola*, belongs in this species complex (Damm et al. 2009). There are two subclades within this complex. Typical characters of this complex are the conidia with an almost straight central part that bent abruptly to the apex and the truncate base, which gives them an almost angular shape (Damm et al. 2009). Some of the species are either host specific or geographically restricted. However, for some of these species only a single strain is available. Therefore, new collections are needed to confirm the host-specificity of the species. A combined multigene analysis of ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 9, Table 8.

Colletotrichum anthrisci Damm, P.F. Cannon & Crous, in Damm et al., Fungal Diversity 39: 56 (2009)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Netherlands, Utrecht, isolated from dead stems of *Anthriscus sylvestris*, 12 Sep. 2009, U. Damm, holotype CBS H-20355, culture extype CBS 125334.

Hosts – *Anthriscus sylvestris* (Damm et al. 2009)

Distribution – Netherlands (Damm et al. 2009)

Notes – *Colletotrichum anthrisci* is recorded as a saprobe only from *Anthriscus sylvestris* in the Netherlands. This species differs from other species in this complex in having a constricted base of setae and very long, navicular appressoria (Damm et al. 2009).

Colletotrichum circinans (Berk.) Voglino, Annali R. Accad. Agric. Torino 49: 175 (1907)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Serbia, Novi Sad, on *Allium cepa*, isolated 1980 by Z. KlocokarSmit, CBS H-20356 (dried culture), culture ex-epitype CBS 221.81.

Hosts – *Allium cepa* (Damm et al. 2009)

Distribution – Serbia (Damm et al. 2009), temperate regions (Jayawardena et al. 2016a)

Notes – *Colletotrichum circinans* was originally described from diseased onion bulbs grown from seed originating from the Paris area (Berkeley 1851). Epitypification of the species was carried out in Damm et al. (2009). This taxon is not restricted to a specific country or continent, but appears to be common in temperate regions (Damm et al. 2009, Jayawardena et al. 2016a). This taxon can be distinguished by its dark brown chlamydospores in chains and clades (Damm et al. 2009).

Colletotrichum dematium (Pers.) Grove, J. Bot., Lond. 56: 341 (1918)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – France, from dead leaf of *Eryngium campestre*, epitype CBS H-20357 (dried culture) culture ex-epitype CBS 125.25.

Hosts – *Bidens pilosa*, *Eryngium campestre*, *Genista tinctoria*, *Solanum tuberosum*, *Vitis vinifera* (Damm et al. 2009)

Distribution – Australia, Cuba, Czech Republic, France, South Africa, Venezuela, West Indies (Damm et al. 2009)

Notes – This taxon is recorded as a pathogen, endophyte and a saprobe. This taxon is characterized by the angular shape of its conidia, the production of red pigments in fresh cultures and by its well developed sclerotium-like conidiomata (Damm et al. 2009).

Colletotrichum eryngiicola Jayaward., Bulgakov & K.D. Hyde, in Buyck et al., Cryptog. Mycol. 38(1): 141 (2017)

Sexual morph not reported. See Buyck et al. (2017) for illustrations and descriptions of asexual morph.

Type – Russia, Rostov Region, Shakhty City, steppe slopes near Grushevsky pond, on dying leafstalks of *Eryngium campestre*, 18 February 2016, TS Bulgakov, holotype MFU16-1477, culture ex-holotype MFLUCC 17-0318.

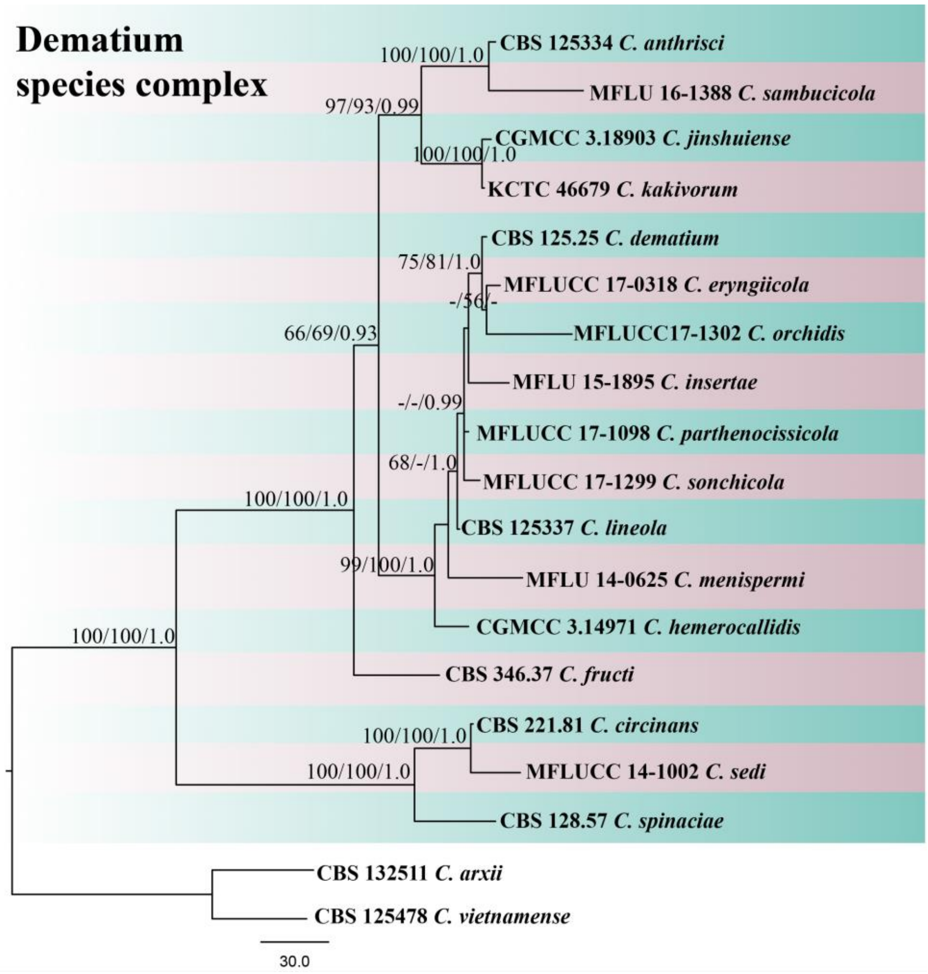

Figure 9 – The dematium complex. The most parsimonious tree obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. arxii* (CBS 132511) and *C. vietnamense* (CBS 125478).

Table 8 GenBank accession numbers of species in the dematium complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. anthrisci	CBS 125334	GU227845	GU228237	GU228335	GU227943	GU228139	Damm et al. (2009)
C. circinans	CBS 221.81	GU227855	GU228247	GU228345	GU227953	GU228149	Damm et al. (2009)
C. dematium	CBS 125.25	GU227819	GU228211	GU228309	GU227917	GU228113	Damm et al. (2009)
C. eryngiicola	MFLUCC 17-0318	KY792726	KY792723	KY792720	KY792717	KY792729	Buyck et al. (2017)
C. fructi	CBS 346.37	GU227844	GU228236	GU228334	GU227942	GU228138	Damm et al. (2009)
C. hemerocallidis	CGMCC 3.14971	JQ400005	JQ400012	Q399998	JQ399991	JQ400019	Yang et al. (2012a)
C. insertae	MFLU 15-1895	KX618686	KX618684	KX618683	KX618682	KX618685	Hyde et al. (2016)
C. jinshuiense	CGMCC 3.18903	MG748077	MG747995	MG747913	MG747767	MG748157	Fu et al. (2019)
C. kakivorum	KCTC 46679	LC324781	LC324787	LC324783	LC324785	LC324791	Jung & Lee (2018)
C. lineola	CBS 125337	GU227829	GU228221	GU228319	GU227927	GU228123	Damm et al. (2009)
C. menispermi	MFLU 14-0625	KU242357	KU242356	KU242355	KU242353	KU242354	Li et al. (2016)
C. orchidis	MFLUCC17-1302	MK502144	MK496857	MK496855	MK496853	MK496859	Hyde et al. (2020)
C. parthenocissicola	MFLUCC 17-1098	MK629452	MK639362	MK639356	MK639358	MK639360	Yuan et al. (2020)
C. quinquefoliae	MFLU 14-0626	KU236391	KU236390	-	KU236389	KU236392	Li et al. (2016)
C. sambucicola	MFLU 16-1388	KY098781	KY098780	KY098779	KY098778	KY098782	Tibpromma et al. (2017)
C. sedi	MFLUCC 14-1002	KM974758	KM974755	KM974754	KM974756	KM974757	Liu et al. (2015)
C. sonchicola	MFLUCC 17-1299	KY962757	KY962754	KY962751	KY962748		Jayawardena et al. (2017)
C. spinaciae	CBS 128.57	GU227847	GU228239	GU228337	GU227945	GU228141	Damm et al. (2009)

Hosts – *Eryngium campestre* (Buyck et al. 2017)

Distribution – Russia (Buyck et al. 2017)

Notes – Differs from other known species of the dematium complex in having conidiomata with abundant setae, as well as in producing larger conidia (L/W ratio = 6.3) (Buyck et al. 2017). This species is only recorded from its type strain.

Colletotrichum fructi (F. Stevans & J.G. Hall) Sacc. [as ‘fructus’], Syll. fung. (Abellini) 22: 1201 (1913)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – USA, Rhode Island, Kingston, on fruit of *Malus sylvestris*, epitype CBS H-20360 (dried culture), culture ex- epitype CBS 346.37.

Hosts – *Malus sylvestris*, *Pyrus malus* (Damm et al. 2009)

Distribution – USA (Damm et al. 2009)

Notes – This taxon is described as a pathogen and is very rarely mentioned in the literature. There are no records of this species other than the strains in Damm et al. (2009) and no pathogenicity data are available.

Colletotrichum hemerocallidis Yan L. Yang, Zuo Y. Liu, K.D. Hyde & L. Cai, Tropical Plant Pathology 37(3): 170 (2012)

Sexual morph not reported. See Yang et al. (2012a) for illustrations and descriptions of asexual morph.

Type – China, Guizhou Province, Guiyang, on dead stalk of *Hemerocallis fulva* var. *kwanso* Regel, 1 July 2008, Y. L. Yang, holotype GZAAS 080059, culture ex-holotype CGMCC 3.14971.

Hosts – *Hemerocallis fulva* (Yang et al. 2012a)

Distribution – Canada, China (Yang et al. 2012a)

Notes – This taxon is recorded as a saprobe. *Colletotrichum hemerocallidis* is similar to *C. anthrisci* and *C. lineola*, however differs from its wider conidia and clavate mycelia appressoria (Yang et al. 2012a).

Colletotrichum insertae Jayaward., Bulgakov & K.D. Hyde, in Hyde et al., Fungal Diversity 80: 176 (2016)

Sexual morph not reported. See Hyde et al. (2016) for illustrations and descriptions of asexual morph.

Type – Russia, Rostov region, Rostov-on-Don city, Botanical garden of Southern Federal University, High Park, dying twigs and leafstalks, on *Parthenocissus inserta*, 15 April 2015, T. S. Bulgakov (T191), holotype MFLU 15–1895.

Hosts – *Parthenocissus inserta* (Hyde et al. 2016)

Distribution – Russia (Hyde et al. 2016)

Notes – *Colletotrichum insertae* is recorded as a saprobe from *Parthenocissus inserta*. There is no culture available for this species and sequence data were gained from direct DNA sequencing of the fruiting bodies (Hyde et al. 2016).

Colletotrichum jinshuiense M. Fu & G.P. Wang, in Fu et al., Persoonia 42: 21 (2018)

Sexual morph not reported. See Fu et al. (2019) for illustrations and descriptions of asexual morph.

Type – China, Hubei Province, Wuhan City, on leaves of *Pyrus pyrifolia* cv. ‘Jinshui’, 1 Aug. 2016, M. Fu, holotype HMAS 247824, culture ex-type CGMCC 3.18903.

Hosts – *Pyrus pyrifolia* (Fu et al. 2019)

Distribution – China (Fu et al. 2019)

Notes – *Colletotrichum jinshuiense* can be distinguished by its *gapdh* and *tub2* sequence data. Fu et al. (2019) mentioned that this species did not produce asexual and sexual morphs on PDA or SNA. However, they easily developed on pear fruit and leaves. This indicates that pear tissue plays an important part in the epidemiology and life cycle of *C. jinshuiense*. Pathogenicity data are available for this taxon.

Colletotrichum kakiivorum H.Y. Jung & S.Y. Lee [as ‘kakivorum’], in Lee & Jung, Mycol. Progr. 17(10): 1118 (2018)

Sexual morph not reported. See Lee & Jung (2018) for illustrations and descriptions of asexual morph.

Type – Korea, Sangju-si, Gyeongbuk province, isolated from diseased leaves showing leaf spot on *Diospyrus kaki*, holotype KCTC 46679.

Hosts – *Diospyrus kaki* (Lee & Jung 2018)

Distribution – Korea (Lee & Jung 2018)

Notes – This taxon was isolated from leaf spots on diseased *Diospyros kaki* leaves and pathogenicity study has been carried out to confirm its pathogenicity. According to the phylogenetic analysis, *Colletotrichum kakivorum* is sister of the clade accommodating *C. anthrisci* and *C. sambucicola*.

Colletotrichum lineola Corda, in Sturm, Deutschlands Flora (Nürnberg) 3: 41 (1831)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Czech Republic, Central Bohemia, Lazne Tousen (ca 25 km E of Prague), left bank of river Labe, from dead stem of *Apiaceae* plant, 20 Sep. 2009, M. Reblová, epitype CBS H-20362, culture ex-epitype CBS 125337.

Hosts – *Anthriscus* sp., *Apiaceae*, *Allium giganteum*, *Astrantia major, Clarkia elegans Euphorbia egula*, *Heracleum* sp., *Fragaria* sp. (on petioles), *Lupinis polyphyllus, Prunus domestica* (rotten fruit), *Symplocarpus foetidus, Trillium* sp., *Tussilago farfara* (Damm et al. 2009)

Distribution – Canada, Czech Republic, Germany, Netherlands, USA, Zimbabwe (Damm et al. 2009)

Notes – *Colletotrichum lineola* is the type species of *Colletotrichum* and seems to be a widespread, primarily temperate species associated with a very wide range of plant species. This taxon is characterized by small, compressed acervuli, emerging in rows/lines (Damm et al. 2009). This species is recognized as a saprobe as well as a pathogen. In Farr & Rossman (2021) there are 44 records of this species; however, some are based on only morphology. There are no new records of this species after Damm et al. (2009).

Colletotrichum menispermi Chethana, Jayawardena, Bulgakov & K.D. Hyde, in Li et al., Fungal Diversity 78: 80 (2016)

Sexual morph not reported. See Li et al. (2016) for illustrations and descriptions of asexual morph.

Type – Russia, Rostov region, Rostov-on-Don city, Botanical Garden of Southern Federal University, introductional nursery, on dead twigs of *Menispermum dauricum*, 5 March 2014, T.S. Bulgakov, holotype MFLU 14–0625.

Hosts – *Menispermum dauricum* (Li et al. 2016b)

Distribution – Russia (Li et al. 2016b)

Notes – There is no culture available for this saprobic species; hence the sequence data were obtained from direct DNA extraction of fruiting bodies. It differs from its sister taxon *C. quinquefoliae* in having larger conidiomata with minute 2–3-septate setae which cannot be observed by unaided eye (Li et al. 2016b).

Colletotrichum orchidis Jayaward., Camporesi & K.D. Hyde, in Hyde et al., Mycosphere 11(1): 595 (2020)

Sexual morph not reported. See Hyde et al. (2020) for illustrations and descriptions of asexual morph.

Type – Italy, Province of Forlì-Cesena, near Premilcuore, on living dead aerial stem of *Orchis* sp., 5 October 2016, E. Camporesi (IT3118), holotype MFLU 16-2551, culture-extype MFLUCC 17-1302.

Hosts – *Orchis* sp. (Hyde et al. 2020)

Distribution – Italy (Hyde et al. 2020)

Notes – This species is recorded as a saprobe from *Orchis* sp. It is a sister to *C. dematium* and differs in having smaller conidia and lower L/W ratio (see Hyde et al. 2020).

Colletotrichum parthenocissicola Jayawardena, Bulgakov, Huanraleuk & K.D. Hyde, in Yuan et al., Fungal Diversity: 10.1007/s13225-020-00461-7, [88] (2020)

Sexual morph not reported. See Yuan et al. (2020) for illustrations and descriptions of asexual morph.

Type – Russia, Rostov region, Shakhty City, private garden, dying and dead twigs and leafstalks of *Parthenocissus quinquefolia*, 5 March 2016, Timur S. Bulgakov (T-1263), holotype MFLU 16-1557, culture ex-type MFLUCC 17-1098.

Hosts – *Parthenocissus quinquefolia* (Yuan et al. 2020)

Distribution – Russia (Yuan et al. 2020)

Notes – This taxon was isolated as a saprobe on *Parthenocissus quinquefolia* from Russia. It is sister to *C. insertae* and can be distinguished by its longer setae and conidia (Yuan et al. 2020).

Colletotrichum quinquefoliae Jayawardena, Bulgakov & K.D. Hyde, in Li et al., Fungal Diversity 78: 83 (2016)

Sexual morph not reported. See Li et al. (2016) for illustrations and descriptions of asexual morph.

Type – Russia, Rostov region, Rostov-on-Don city, Botanical Garden of Southern Federal University, Higher Park, underwood, on *Parthenocissus quinquefolia*, 5 March 2014, T.S. Bulgakov, holotype MFLU 14–0626.

Hosts – *Parthenocissus quinquefolia* (Li et al. 2016b)

Distribution – Russia (Li et al. 2016b)

Notes – This taxon was isolated as a saprobe from Russia. A culture is not available for this species, hence direct DNA extraction from fruiting bodies were carried out. This species differs from *C. menispermi* in having larger conidiomata, 1–5-septate, long setae, with a larger base and conidia with an acute base (Li et al. 2016b).

Colletotrichum sambucicola Jayaward., Camporesi & K.D. Hyde, in Tibpromma et al., Fungal Diversity 83: 131 (2017)

Sexual morph not reported. See Tibpromma et al. (2017) for illustrations and descriptions of asexual morph.

Type – Italy, Province of Forlì-Cesena [FC], Meldola, on dead branch of *Sambucus ebulus*, 30th March 2016, Erio Camporesi (IT 2902), holotype, MFLU 16-2675, ex-type culture, MFLUCC 16-1388.

Hosts – *Sambucus ebulus* (Tibpromma et al. 2017)

Distribution – Italy (Tibpromma et al. 2017)

Notes – This taxon is sister with *C. anthrisci* and differs in having conidiogenous cells with a distinct collarette, as well as having smaller conidia (Tibpromma et al. 2017).

Colletotrichum sedi Jayaward., Bulgakov & K.D. Hyde, in Liu et al., Fungal Diversity: 10.1007/s13225-015-0324-y, [27] (2015)

Sexual morph not reported. See Liu et al. (2015b) for illustrations and descriptions of asexual morph.

Type – Russia, Rostov region, Rostov-na-Donu city, Botanical garden of Southern Federal University, flowerbed, on *Sedum* sp., 05 March 2014, Timur Bulgakov (T94), holotype MFLU 14-0623, cultures ex-type MFLUCC 14-1002.

Hosts – *Sedum* sp. (Liu et al. 2015b)

Distribution – Russia (Liu et al. 2015b)

Notes – *Colletotrichum sedi* clades in the subclade comprising *C. circinans* and *C. spinaciae* within the dematium complex (Liu et al. 2015b). It can be distinguished by having longer setae with 1–4-septate, simple conidiophores, solitary to aggregated appressoria, in small groups or short chains and smaller conidia (Liu et al. 2015b).

Colletotrichum sonchicola Jayaward., Camporesi & K.D. Hyde, in Jayawardena et al., Phytotaxa 314(1): 58 (2017)

Sexual morph not reported. See Jayawardena et al. (2017) for illustrations and descriptions of asexual morph.

Type – Italy, Province of Forlì-Cesena [FC]: Riofreddo - Bagno di Romagna, on dead and aerial stem of *Sonchus* sp., 2 October 2016, Erio Camporesi, holotype MFLU 16-2539, ex-type culture MFLUCC 17-1299.

Hosts – *Sonchus* sp. (Jayawardena et al. 2017)

Distribution – Italy (Jayawardena et al. 2017)

Notes – *Colletotrichum sonchicola* was isolated as a saprobe. It differs from its sister taxa in having appressoria, short setae and longer conidia (Jayawardena et al. 2017).

Colletotrichum spinaciae Ellis & Halst., J. Mycol. 6(1): 34 (1890)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Reference strain – Netherlands, on *Spinacia oleracea*, isolated Dec. 1957 by G. van den Ende, living culture CBS 128.57.

Hosts – *Chenopodium album*, *Medicago sativa*, *Portulaca oleracea*, *Spinacea* sp. (Damm et al. 2009)

Distribution – Canada, Germany, Italy, the Netherlands, Turkey, USA (Damm et al. 2009)

Notes – This taxon is a well-known pathogen on Spinach and is closely related to *C. circinans* (Damm et al. 2009).

Dracaenophilum Species Complex

The dracaenophilum species complex includes *C. dracaenophilum* and five distantly related species. Damm et al. (2019) mentioned that this is not a species complex in a strict sense. All species form cylindrical conidia with round ends, some with sometimes truncate bases or with a basal scar. Except for *C. tropicicola* other species appear to be host-specific. However, for some of these species only a single strain is available (Damm et al. 2019). A combined multigene analysis of ITS, *gapdh, chs-1, act* and *tub2* sequence data is given in Fig. 10, Table 9.

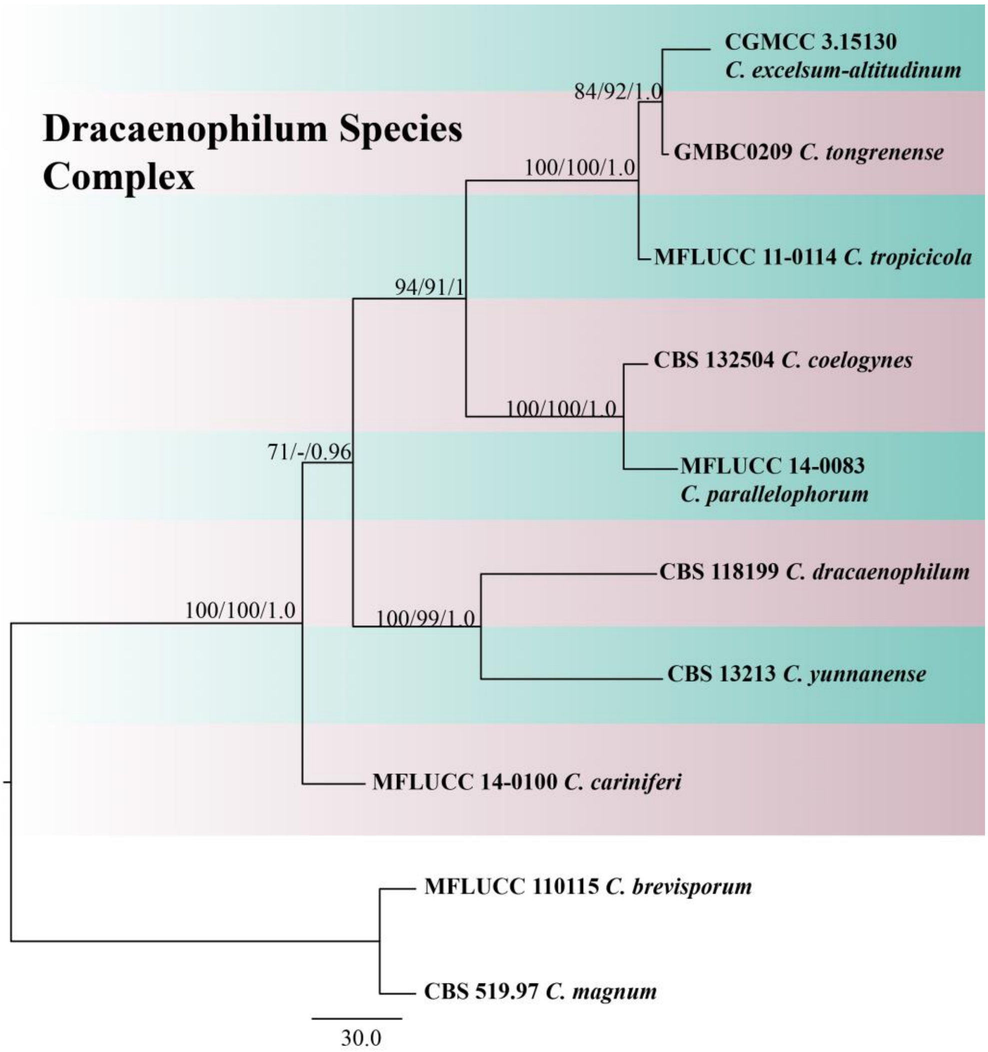

Figure 10 – The dracaenophilum complex. The most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. brevisporum* (MFLUCC 1100115) and *C. magnum* (CBS 519.97).

Table 9 GenBank accession numbers of species in the dracaenophilum complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. cariniferi	MFLUCC 14-0100	MF448521				MH351274	Ma et al. (2018)
C. coelogynes	CBS 132504	MG600713	MG600776	MG600836	MG600920	MG600980	Damm et al. (2019)
C. dracaenophilum	CBS 118199	JX519222	JX546707	JX519230	JX519238	JX519247	Farr et al. (2006)
C. excelsum-altitudinum	CGMCC 3.15130	HM751815	KC843502		KC843548	JX625211	Damm et al. (2019)
C. parallelophorum	MFLUCC 14-0083	MF448525	MK165695			MH351280	Ma et al. (2018)
C. tongrenense	GMBC0209	MH482933	MH705332		MH717074	MH729805	Zhou et al. (2019)
C. tropicicola	MFLUCC 11-0114	JN050240	JN050229		JN050218	JN050246	Damm et al. (2019)
C. yunnanense	CBS 13213	JX546804	JX546706	JX519231	JX519239	JX519248	Damm et al. (2019)

Colletotrichum cariniferi X.Y. Ma, K.D. Hyde & Jayawardena, in Ma et al., MycoKeys 43: 33 (2018)

Sexual morph not reported. See Ma et al. (2018) for illustrations and descriptions of asexual morph.

Type – Thailand, Chiang Rai, Wat Phra That Doi Tung (Temple of Doi Tung Pagodas), *Dendrobium cariniferum*, 19 December 2013, Sureeporn Nontachaiyapoom, Natdanai Aewsakul and Xiaoya Ma, holotype MFLU 17-1199, culture ex-type MFLUCC 14-0100.

Hosts/substrates – *Dendrobium cariniferum* (Ma et al. 2018)

Distribution – Thailand (Ma et al. 2018)

Notes – *Colletotrichum cariniferi* was isolated as an endophyte is closely related to the dracaenophilum species complex (Ma et al. 2018). This species appears to be host specific and restricted to Thailand.

Colletotrichum coelogynes Damm, in Damm et al., Stud. Mycol. 92: 13 (2018)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – Germany, Munich, glasshouse, from leaves of *Coelogyne* sp., 20 Nov. 2010, U. Damm, holotype CBS H-21069, culture ex-holotype CBS 132504.

Hosts – *Coelogyne* sp. (Damm et al. 2019)

Distribution – Germany (Damm et al. 2019)

Notes – *Colletotrichum coelogynes* can be identified with all loci (ITS, *gapdh*, *chs-1*, *act*, *his3* and *tub2*) studied in Damm et al. (2019). This taxon has large conidiomata and is the fastest growing species in this complex. *Colletotrichum coelogynes* seems to be host- specific and restricted to Germany.

Colletotrichum dracaenophilum D.F. Farr & M.E. Palm, in Farr et al., Mycol. Res. 110(12): 1401 (2006)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – China, intercepted in San Francisco, California, USA, from dying stems of *Dracaena sanderiana*, 25 Sep. 2002, J.R. Nelson, holotype BPI 871498, culture ex-holotype CBS 118199.

Hosts – *Dracaena* sp. (Damm et al. 2019)

Distribution – Bulgaria, China (Damm et al. 2019)

Notes – *Colletotrichum dracaenophilum* can be identified with all loci (ITS, *gapdh*, *chs-1*, *act*, *his3* and *tub2*) studied in Damm et al. (2019). This taxon has the largest conidia in the complex.

Colletotrichum excelsum-altitudinum G. Tao, Zuo Y. Liu & L. Cai [as 'excelsum-altitudum'], in Tao et al., Fungal Diversity 61: 152 (2013)

Sexual morph not reported. See Tao et al. (2013) for illustrations and descriptions of asexual morph.

Type – CHINA, Guizhou Province, Shuicheng, Baijipo mountain, isolated from healthy leaves of *Bletilla ochracea*, 28 June 2006, Gang Tao, holotype HMAS244279 (dried culture), culture ex-holotype CGMCC 3.15130.

Hosts – *Bletilla ochracea* (Tao et al. 2013)

Distribution – China (Tao et al. 2013)

Notes – This species forms shorter conidia than the other species in this complex and can be identified with sequences of all loci available (ITS, *gapdh*, *chs-1*, *act*, *his3* and *tub2*, Damm et al. 2019). *Colletotrichum excelsum-altitudinum* is only recorded from *Bletilla ochracea* as an endophyte in China.

Colletotrichum parallelophorum X.Y. Ma, K.D. Hyde & Jayawardena, in Ma et al., MycoKeys 43: 38 (2018)

See Ma et al. (2018) for illustrations and descriptions of asexual and sexual morphs.

Type – Thailand, Chiang Rai, Wat Phra That Doi Tung, *Dendrobium* sp., 19 December 2013, Collectors: Sureeporn Nontachaiyapoom, Natdanai Aewsakul, Xiaoya Ma, holotype MFLU 17-1198, culture ex-holotype MFLUCC 14-0083.

Hosts⁄substrates – *Dendrobium* sp. (Ma et al. 2018)

Distribution – Thailand (Ma et al. 2018)

Notes – This species is closely related to *C. excelsum-altitudum* and *C. tropicicola*. *Colletotrichum parallelophorum* was isolated as an endophyte. This species appears to be host specific and restricted to Thailand.

Colletotrichum tongrenense S.X. Zhou, J.C. Kang & K.D. Hyde, in Zhou et al., MycoKeys 49: 7 (2019)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – China, Guizhou province, Tongren, isolated from healthy stems of *Nothapodytes pittosporoides*, 27 May 2016, S.X. Zhou and L.J. Qiao, holotype GACP GZU-TRJ1-37 (dried culture), culture ex-type GMBC0209.

Hosts – *Nothapodytes pittosporoides* (Zhou et al. 2019)

Distribution – China (Zhou et al. 2019)

Notes – This taxon resembles *C. tropicicola* and *C. excelsum-altitudum*. However, *C. tongrenense* can be distinguished by having longer setae (Zhou et al. 2019). This taxon is an endophyte which appears to be host-specific and has restricted geography in distribution.

Colletotrichum tropicicola Phouliv., Noireung, L. Cai & K.D. Hyde, Cryptog. Mycol. 33(3): 353 (2012)

Sexual morph not reported. See Noireung et al. (2012) and Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – Thailand, Chiang Mai Province, Mae Taeng District, Phadeng village, on *Citrus maxima*, 14 March 2009, Sitthisack Phoulivong, holotype MFLU 110013), culture ex-type MFLUCC 110114.

Hosts – *Citrus maxima* (Noireung et al. 2012, Damm et al. 2019), *Paphiopedilum bellatulum* (Noireung et al. 2012)

Distribution – Thailand (Noireung et al. 2012), Mexico (Damm et al. 2019)

Notes – *Colletotrichum tropicicola* can be identified with sequences of all loci (ITS, *gapdh*, *act* and *tub2*) available (Noireung et al. 2012). This taxon was isolated from a leaf spot of *Citrus maxima* in Thailand. However, no pathogenicity data are available for this species.

Colletotrichum yunnanense Xiao Ying Liu & W.P. Wu, in Liu et al., Mycotaxon 100: 139 (2007)

See Damm et al. (2019) for illustrations and descriptions of asexual and sexual morphs.

Type – China, Yunnan, Kunming Botanical Garden, from healthy leaves of *Buxus* sp., 5 Nov. 2004, W.P. Wu, holotype WU47182, culture ex-holotype CBS 132135.

Hosts – *Buxus* sp. (Liu et al. 2007)

Distribution – China (Liu et al. 2007)

Notes – *Colletotrichum yunnanense* was isolated as an endophyte. This is the only species that the sexual morph has been recorded in dracaenophilum complex (Damm et al. 2019). This taxon can be distinguished from other species of the complex by its smallest appressoria and from any of the loci (ITS, *gapdh*, *chs-1*, *act*, *his3* and *tub2*) used in Damm et al. (2019). *Colletotrichum yunnanense* appears to be host-specific and restricted to China.

Destructivum Species Complex

The destructivum species complex is a collection of *C. destructivum* and 16 closely related species that are mainly plant pathogens (Damm et al. 2014). All species in this complex are hemibiotrophic (Damm et al. 2014). O’Connell et al. (2012) showed that the destructivum species complex is monophyletic and distinct from other *Colletotrichum* species complexes. Species of this complex are characterized by conidia that are slightly curved due to their unilaterally tapering ends and by small inconspicuous acervuli with rather effuse growth (Damm et al. 2014). Some of the species are either host specific or geographically restricted. However, for some of these species only a single strain is available (Damm et al. 2014). A combined multigene analysis of ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 11, Table 10. Species are in alphabetical order, hosts and distributions are listed chronologically. According to Damm et al. (2014) all species can be identified by a combination of *tub2* and *gapdh* sequence data.

Colletotrichum americae-borealis Damm, in Damm et al., Stud. Mycol. 79: 55 (2014)

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – USA, Utah, Bluffdale (near Salt Lake City), from stems of *Medicago sativa*, 25 Aug. 2013, U. Damm, holotype CBS H-21661, culture ex-holotype CBS 136232.

Hosts – *Medicago sativa* (Damm et al. 2014), *Glycyrrhiza uralensis* (Lyu & Li 2020)

Distribution – USA (Damm et al. 2014), China (Lyu & Li 2020)

Notes – This species can be distinguished from other species in this complex by *tub2*, *chs-1*, *his3* and *act* sequence data. *Colletotrichum americae-borealis* was thought to be host-specific in Damm et al. (2014). Lyu & Li (2020) provided the first report of this species as a pathogen on *Glycyrrhiza uralensis*.

Colletotrichum antirrhinicola Damm, in Damm et al., Stud. Mycol. 79: 56 (2014)

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – New Zealand, Auckland, Kingsland, from foliage of *Antirrhinum majus*, collection date unknown, HM Dance holotype CBS H-21647, culture ex-holotype CBS 102189.

Hosts – *Antirrhinum majus* (Damm et al. 2014)

Distribution – New Zealand (Damm et al. 2014)

Notes – *Colletotrichum antirrhinicola* can be identified by its unique *gapdh* and ITS sequence data. This taxon is recorded only from the type strain.

Colletotrichum atractylodicola R.J. Zhou & H.J. Xu, in Xu et al., Mycol. Progr. 17(3): 8 (2017)

Sexual morph not reported. See Xu et al. (2018a) for illustrations and descriptions of asexual morph.

Type – China, Shenyang, Dongling Road, Shenyang Agricultural University, Medicinal Herb Garden, on leaves of *Atractylodes chinensis* with anthracnose symptoms, 24 Jul. 2013, R.J. Zhou and H.J. Xu, holotype SYAU 130724 (dried leaf), culture ex-type CGMCC3.18761.

Hosts – *Atractylodes chinensis* (Xu et al. 2018a)

Distribution – China (Xu et al. 2018a)

Notes – *Colletotrichum atractylodicola* is a confirmed pathogen on *Atractylodes chinensis* (Xu et al. 2018a). This taxon can be identified by its unique ITS, *gapdh*, *act* and *tub2* sequence data.

Colletotrichum bryoniicola Damm, in Damm et al., Stud. Mycol. 79: 57 (2014)

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – Netherlands, Wissenkerke, Camperduin, from decaying leaves of *Bryonia dioica*, 27 Aug. 2001, G. Verkley, No. V1114, holotype CBS H-21663, culture ex-holotype CBS 109849.

Hosts – *Bryonia dioica* (Damm et al. 2014)

Distribution – Netherlands (Damm et al. 2014)

Notes – *Colletotrichum bryoniicola* can be distinguished by other species of this complex by ITS, *gapdh*, *his3* and *tub2* sequence data (Damm et al. 2014). Conidia of this taxon are broader than that of the other species in the complex.

Colletotrichum destructivum O'Gara, Mycologia 7(1): 38 (1915)

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – USA, Utah, Salt Lake City, cemetery, from small black spots on petioles of *Trifolium hybridum*, 24 Aug. 2013, U. Damm, epitype CBS H-21652, culture ex-epitype CBS 136228.

Hosts – genera of *Asteraceae*, *Convolvulaceae, Fabaceae*, *Magnoliaceae*, *Menispermaceae*, *Lamiaceae*, *Poaceae*, *Polygonacea* and *Solanaceae* (Damm et al. 2014)

Distribution – Worldwide (Damm et al. 2014, Jayawardena et al. 2016a)

Notes – *Colletotrichum destructivum* can be distinguished by ITS, *his3*, *act* and *tub2* sequence data (Damm et al. 2014). *Colletotrichum destructivum* has been extensively studied as a pathogen.

Colletotrichum fuscum Laubert, Gartenwelt 31: 675. 1927.

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – Germany, Berlin, garden, from leaf of *Digitalis lutea*, 2 Aug. 2012, U. Damm, epitype CBS H-21651, culture ex-epitype CBS 133701.

Hosts – *Digitalis* sp., *Heracleum* sp. (Damm et al. 2014)

Distribution – Germany, Netherlands (Damm et al. 2014)

Notes – This taxon can be distinguished by its complex appressoria and the ampulliform conidiogenous cells as well as from *gapdh* sequence data (Damm et al. 2014). Phytotoxin collotin was discovered in one of the strains of *C. fuscum* by Goodman (1960).

Colletotrichum higginsianum Sacc., J. Agric. Res., Washington 10: 161. 1917.

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – Trinidad and Tobago, Trinidad, Wallerfield, from leaf spot on living leaf of *Brassica rapa* subsp. *chinensis*, collection date and collector unknown epitype IMI 349061, culture ex-epitype IMI 349061.

Hosts – genera of *Brassicaceae* (Damm et al. 2014)

Distribution – Italy, Japan, Korea, Trinidad and Tobago and the USA (Damm et al. 2014)

Notes – There are many records for this species in Farr & Rossman (2021). As they are based only on morphology, new collections are needed to confirm the associations. This taxon is well-known and studies as a pathogen on cruciferous plants (O'Donell et al. 2012). *Colletotrichum higginsianum* can be identified by its ITS and *tub2* sequence data from the other species in destructivum complex (Damm et al. 2014). Whole genomic data for this species are available (Zampounis et al. 2016).

Colletotrichum lentis Damm, in Damm et al., Stud. Mycol. 79: 65 (2014)

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – Canada, Saskatchewan, North Battlefield, from seed, 2001 crop, sample 90812, of *Lens culinaris* cv. 'CDA Grandora', 2001, R.A.A. Morrall, and Discovery Seed Labs, holotype CBS H-21649, culture ex-holotype CBS 127604.

Hosts – *Lens culinaris* (Damm et al. 2014), *Vicia sativa* (Xu & Li 2015)

Distribution – Canada, Romania (Damm et al. 2014), China (Xu & Li 2015)

Notes – *Colletotrichum lentis* is characterised by its slightly curved, fusoid conidia that gradually taper to the acute ends and by the globose appressoria with an entire margin. It can be identified by all loci included in Damm et al. (2014). Hemi-biotrophic nature of this species has been studied (Forseille et al. 2009).

Colletotrichum lini (Westerd.) Tochinai, J. Coll. Agric. Hokkaido Imp. Univ. 14: 176. 1926.

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – Netherlands, from leaves and stems of *Linum* sp., collection date and collector unknown, IMI 194722 ex coll. Prof. J. van Westerdijk.

Hosts – *Linum* sp., *Medicago sativa*, *Nigella* sp., *Raphanus raphanistrum*, *Taraxacum* sp., *Teucrium scorodonia*, *Trifolium* sp. (Damm et al. 2014)

Distribution – France, Germany, Ireland, Netherlands, New Zealand, Tunisia, UK, USA (Damm et al. 2014)

Notes – *Colletotrichum lini* is distinguishable by *chs-1*, *his3*, *act* and *tub2* sequence data (Damm et al. 2014). This species is recorded as a pathogen causing leaf and stem spots of the above mentioned hosts.

Colletotrichum ocimi Damm, in Damm et al., Stud. Mycol. 79: 70 (2014)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Italy, Riviera Ligure, from a black spot on leaf of *Ocimum basilicum*, collection date and collector unknown, May 1994 by A. Garibaldi, Inst. degli studi di Torino, Depart. di Valorizzazione e Protezione delle Risore agroforestiali, holotype CBS H-21646, culture ex-holotype CBS 298.94.

Hosts – *Ocimum basilicum* (Damm et al. 2014, Shivas et al. 2016)

Distribution – Italy (Damm et al. 2014), Australia (Shivas et al. 2016)

Notes – *Colletotrichum ocimi* forms cylindrical, straight conidia with round ends, resembling species in the gloeosporioides complex. This species can be identified by its unique ITS, *chs-1*, *his3*, *act* and *tub2* sequence data (Damm et al. 2014).

Colletotrichum panacicola Uyeda & S. Takim., in Takimoto, Chosen Nokai-ho 14: 24 (1919)

Sexual morph not reported. See Damm et al. (2014) for description of asexual morph.

Type – not determined. Reference strain C08087.

Hosts – *Panax* sp. (Damm et al. 2014)

Distribution – China, Japan, Korea and Russia (Damm et al. 2014)

Notes – This species causes anthracnose on a specific host, however no pathogenicity data are available. *Colletotrichum panacicola* can be distinguished by ITS and *gapdh* sequence data (Damm et al. 2014).

Colletotrichum pisicola Damm, in Damm et al., Stud. Mycol. 79: 71 (2014)

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – USA, Wisconsin, from *Pisum sativum*, collection date unknown, H.D. van Etten, holotype CBS H-21644, culture ex-holotype CBS 724.97.

Hosts – *Pisum* sp. (Damm et al. 2014)

Distribution – Ecuador, Mexico, USA (Damm et al. 2014)

Notes – Sequence data of all loci studies by Damm et al. (2014) are unique for this species. *Colletotrichum pisicola* is characterised by its distinctly curved conidia that gradually taper to towards the acute ends.

Colletotrichum shisoi P. Gan, A. Tsushima, Kawarad., Damm & K. Shirasu, in Gan et al., Scientific Reports 9 (no. 13349): 2 (2019)

Sexual morph not reported. See Gan et al. (2019) for illustrations and descriptions of asexual morph.

Type – Japan, Osaka, Ibaraki City from lesions of cultivated *Perilla frutescens* var. *crispa* cv. *Aka-shiso*, collection date 1 August 2006, collected by M. Kawaradani, holotype TNS-F-40462, culture ex-holotype JCM 3181.

Hosts – *Perilla frutescens* (Gan et al. 2019)

Distribution – Japan (Gan et al. 2019)

Notes – This species can be identified by ITS, *act*, *chs-1*, *gapdh*, *tub2* sequence data (Gan et al. 2019). Even though this species is recorded as a pathogen, pathogenicity data are unavailable for this species.

Colletotrichum tabacum Böning, Prakt. Bl€att. Pflanzenbau Pflanzenschutz 10: 89. 1932.

Sexual morph not reported. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – France, from *Nicotiana tabacum*, collection date and collector unknown neotype CBS H-21669, culture ex-neotype CPC18945.

Hosts – *Centella asiatica*, *Nicotiana* sp. (Damm et al. 2014)

Distribution – France, India, Germany, Madagascar, Zimbabwe (Damm et al. 2014)

Notes – This taxon can be distinguished by its appressoria with a distinct penetration pore with a dark halo and almost straight long conidia (Damm et al. 2014). Any loci (ITS, *gapdh*, *chs-1*, *his3*, *act* and *tub2*) used in Damm et al. (2014) can be used to distinguish this species from the other species of the destructivum complex. Pathogenicity data are unavailable for this species.

Colletotrichum tanaceti Barimani, S.J. Pethybr., Vaghefi, F.S. Hay & P.W.J. Taylor, Pl. Path. 62(6): 1252 (2013)

See Barimani et al. (2013) for illustrations and descriptions of sexual morph. See Damm et al. (2014) for illustrations and descriptions of asexual morph.

Type – Australia, northern Tasmania, Scottsdale, from anthracnose on leaves of *Tanacetum cinerariifolium*, Aug. 2010, S.J. Pethybridge, culture ex-holotype CBS 132693.

Hosts – *Tanacetum cinerariifolium* (Damm et al. 2014)

Distribution – Australia, Tasmania (Damm et al. 2014)

Notes – *Colletotrichum tanaceti* has distinctly curved conidia (Damm et al. 2014). This taxon formed perithecia in a mating experiment and is heterothallic (Barimani et al. 2013). Intracellular hemibiotrophic infection strategy is suggested for this species (Barimani et al. 2013).

Colletotrichum utrechtense Damm, in Damm et al., Stud. Mycol. 79: 77 (2014)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Netherlands, Utrecht, from a leaf of *Trifolium pratense*, 13 Jun. 2011, U. Damm, holotype CBS H-21662, culture ex-holotype CBS 130243.

Hosts – *Trifolium pratense* (Damm et al. 2014)

Distribution – Netherlands (Damm et al. 2014)

Notes – This species can be distinguished by its unique *chs-1*, *his3* and *tub2* sequence data (Damm et al. 2014). This species appears to be host-specific and restricted to Netherlands.

Colletotrichum vignae Damm, in Damm et al., Stud. Mycol. 79: 78 (2014)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Nigeria, from *Vigna unguiculata*, collection date unknown, R.A. Skipp, holotype CBS H-21648, culture ex-type CBS 501.97.

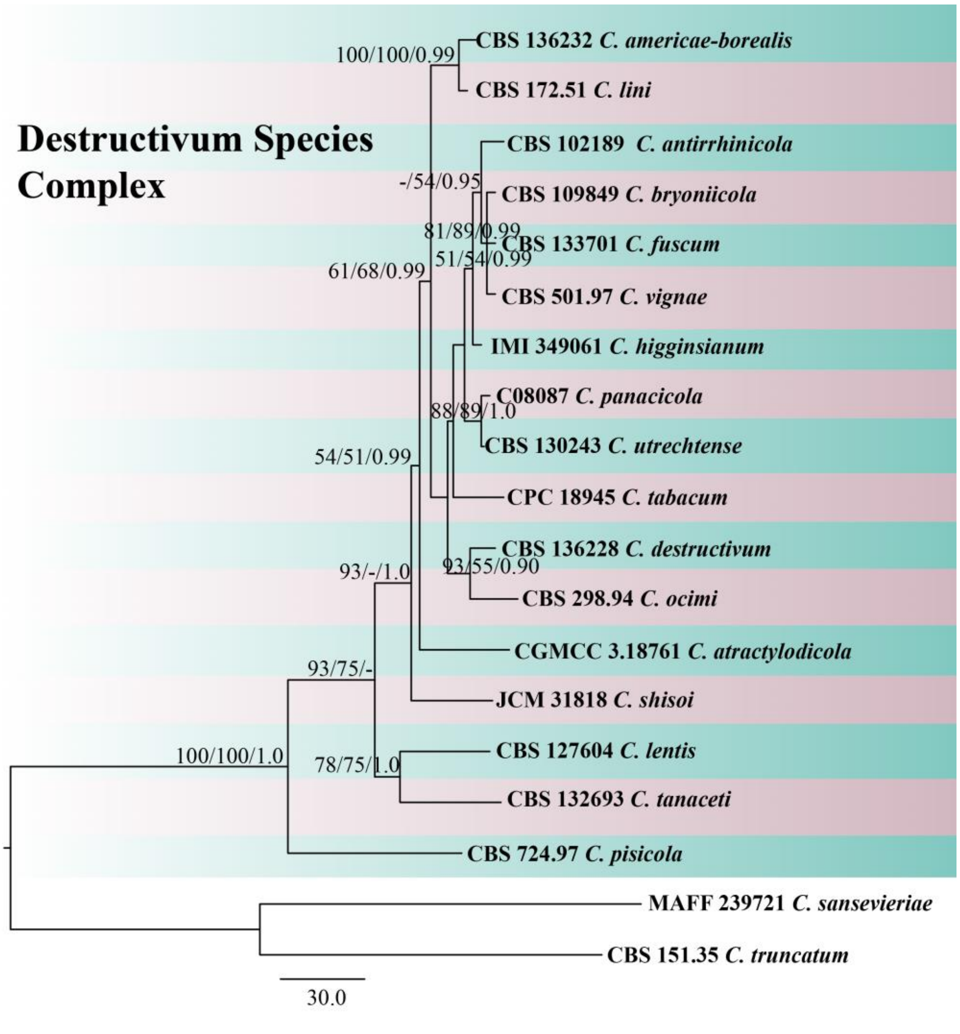

Figure 11 – The destructivum complex. One of the four most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. sansevieriae* (MAFF 239721) and *C. truncatum* (CBS 151.35).

Table 10 GenBank accession numbers of species in the destructivum complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. americae-borealis	CBS 136232	KM105224	KM105579	KM105294	KM105434	KM105504	Damm et al. (2014)
C. antirrhinicola	CBS 102189	KM105180	KM105531	KM105250	KM105390	KM105460	Damm et al. (2014)
C. atractylodicola	CGMCC 3.18761	KR149280	KR259334	KR259333	KR132243	KU058178	Xu et al. (2018a)
C. bryoniicola	CBS 109849	KM105181	KM105532	KM105251	KM105391	KM105461	Damm et al. (2014)
C. destructivum	CBS 136228	KM105207	KM105561	KM105277	KM105417	KM105487	Damm et al. (2014)
C. fuscum	CBS 133701	KM105174	KM105524	KM105244	KM105384	KM105454	Damm et al. (2014)
C. higginsianum	IMI 349061	KM105184	KM105535	KM105254	KM105394	KM105464	Damm et al. (2014)
C. lentis	CBS 127604	JQ005766	KM105597	JQ005787	JQ005829	JQ005850	Damm et al. (2014)
C. lini	CBS 172.51	JQ005765	KM105581	JQ005786	JQ005828	JQ005849	Damm et al. (2014)
C. ocimi	CBS 298.94	KM105222	KM105577	KM105292	KM105432	KM105502	Damm et al. (2014)
C. panacicola	C08087	GU935869	GU935849		GU944758	GU935889	Damm et al. (2014)
C. pisicola	CBS 724.97	KM105172	KM105522	KM105242	KM105382	KM105452	Damm et al. 2014
C. shisoi	JCM 31818	MH660930	MH660931	MH660929	MH660928	MH660932	Gan et al. (2019)
C. tabacum	CPC 18945	KM105204	KM105557	KM105274	KM105344	KM105484	Damm et al. (2014)
C. tanaceti	CBS 132693	JX218228	JX218243	JX259268	JX218238	JX218233	Damm et al. (2014)
C. utrechtense	CBS 130243	KM105201	KM105554	KM105271	KM105411	KM105481	Damm et al. (2014)
C. vignae	CBS 501.97	KM105183	KM105534	KM105253	KM105393	KM105463	Damm et al. (2014)

Hosts – *Vigna unguiculata* (Damm et al. 2014)

Distribution – Nigeria (Damm et al. 2014)

Notes – This species can be identified by its ITS, *gapdh, his3* and *act* sequence data (Damm et al. 2014). *Colletotrichum vignae* is recorded only from its type strain.

Gigasporum species complex

The gigasporum species complex consists of *C. gigasporum* and seven closely related species and is characterised by the formation of large conidia (>20 µm) (Liu et al. 2014). Species of this complex can be either pathogens or endophytes. Some of the species are either host specific or geographically restricted. However, for some of these species, only a single strain is available, and sometimes the host and the location are unknown (Liu et al. 2014). Therefore, new collections are needed to confirm the host-specificity of the species. A combined multigene analysis of ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 12, Table 11. All species within this complex can be identified by any of these five genes (Liu et al. 2014).

Colletotrichum arxii F. Liu, L. Cai, Crous & Damm, Persoonia, Mol. Phyl. Evol. Fungi 33: 87 (2014)

Sexual morph not reported. See Liu et al. (2014) for illustrations and descriptions of asexual morph.

Type – Berlin, glasshouse, on living leaves of *Paphiopedilum* sp., Dec. 2010, U. Damm, holotype CBS H-21492, culture ex-type CBS 132511.

Hosts – *Oncidium excavatum*, *Paphiopedilum* sp. (Liu et al. 2014), *Vanilla planifolia* (Charron et al. 2018)

Distribution – Germany, Netherlands (Liu et al. 2014), Reunion (Charron et al. 2018)

Notes – In the study of Liu et al. (2014), this was isolated as an endophyte. Charron et al. (2018) isolated *C. arxii* from black leaf spot of *Vanilla planifolia*. The pathogenicity studies showed this species is not pathogenic. Sequence data of ITS and *tub2* can be used to differentiate this taxon from other taxa in the complex.

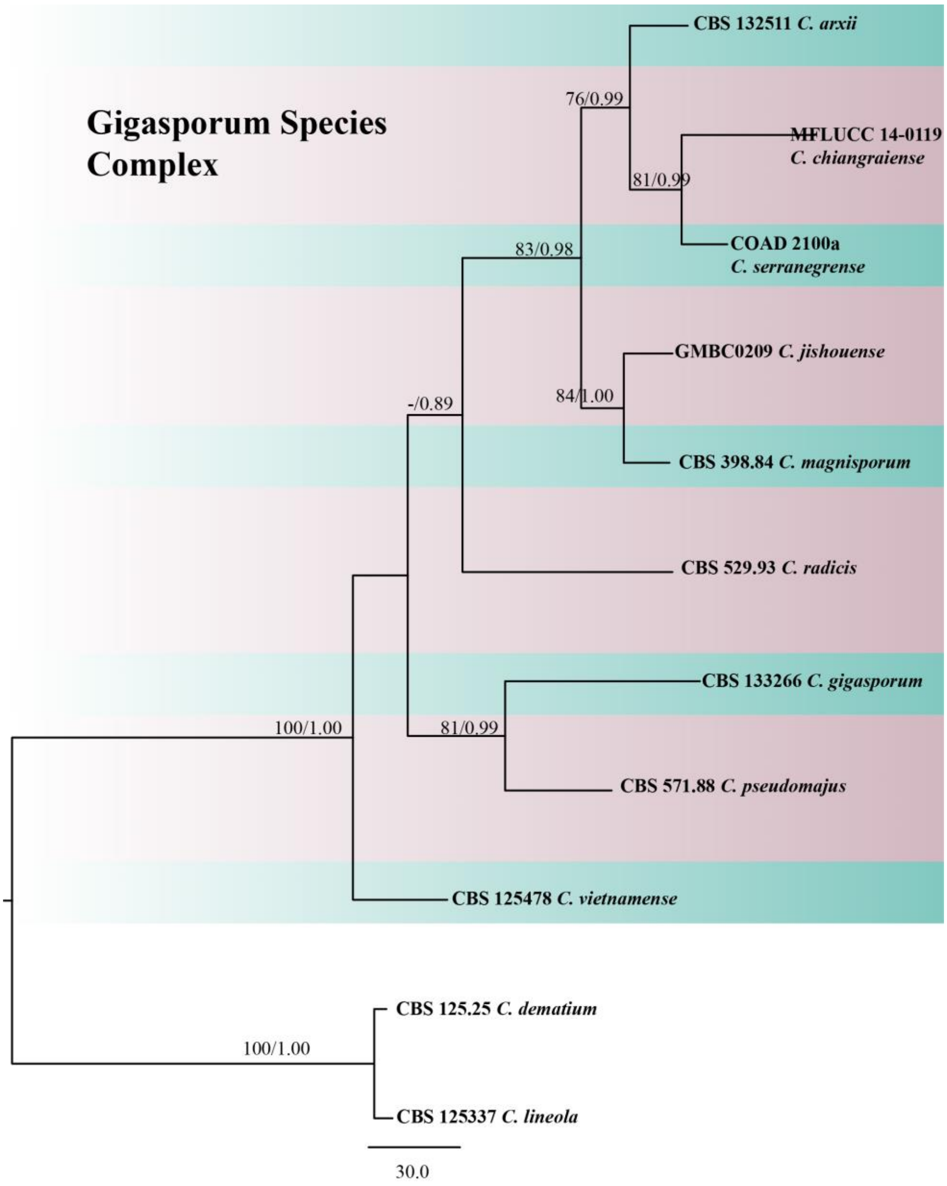

Figure 12 The gigasporum complex. The most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP bootstrap support values ≥50% and BYPP≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. dematium* (CBS 125.75) and *C. lineola* (CBS 125337).

Colletotrichum gigasporum E.F. Rakotoniriana & F. Munaut, in Rakotoniriana et al., Mycol. Progr. 12(2): 407 (2013)

See Rakotoniriana et al. (2013) for illustrations and descriptions of asexual and sexual morphs.

Type – Madagascar, Mangoro. Isolated from *Centella asiatica*, Mai 2003, E.F. Rakotoniriana, holotype MUCL 44947-H (dried culture), culture ex-holotype MUCL 44987.

Table 11 GenBank accession numbers of species in the gigasporum complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. arxii	CBS 132511	KF687716	KF687843	KF687780	KF687802	KF687881	Liu et al. (2014)
C. gigasporum	CBS 133266	KF687715	KF687822	KF687761		KF687866	Liu et al. (2014)
C. jishouense	GMBC0209	MH482929	MH681658		MH708135	MH727473	Zhou et al. (2019)
C. magnisporum	CBS 398.84	KF687718	KF687842	KF687782	KF687803	KF687882	Liu et al. (2014)
C. pseudomajus	CBS 571.88	KF687722	KF687826	KF687779	KF687801	KF687883	Liu et al. (2014)
C. radicis	CBS 529.93	KF687719	KF687825	KF687762	KF687785	KF687869	Liu et al. (2014)
C. serranegrense	COAD 2100a	KY400111		KY407894	KY407892	KY407896	Silva et al. (2018)
C. vietnamense	CBS 125478	KF687721	KF687832	KF687769	KF687792	KF687877	Liu et al. (2014)

Hosts – *Camelia sinensis* (Alizadeh et al. 2015), *Acacia auriculiformis*, *Centella asiatica*, *Coffea* sp., *Diospyros kaki*, *Homo sapiense*, *Musa* sp., *Persea americana*, *Solanum betaceum*, *Theobroma cacao*, *Trichilia tuberculata*, *Virola surinamensis* (Liu et al. 2014, Jayawardena et al. 2016a), *Dalbergia odorifera* (Wan et al. 2018), *Annona* sp. (Costa et al. 2019), *Platostoma palustre* (Hsieh et al. 2020)

Distribution – Iran (Alizadeh et al. 2015), Japan, Madagascar, New Zealand, Panama, Sri Lanka, Thailand, Vietnam (Jayawardena et al. 2016a), Mexico (Cristobal-Martinez et al. 2017), China (Wan et al. 2018), Brazil (Costa et al. 2019), Taiwan (Hsieh et al. 2020)

Notes – Rakotoniriana et al. (2013) introduced this species based on larger conidia and ITS, *tub2* sequence data. *Colletotrichum gigasporum* is not only a plant pathogen, but also a pathogen on humans causing phaeohyphomycotic cysts (Liu et al. 2014). This taxon can be distinguished by any of the loci (ITS, *gapdh*, *chs-1* and *tub2*) used in Liu et al. (2014). Pathogenicity data are available for this species.

Colletotrichum jishouense S.X. Zhou, J.C. Kang & K.D. Hyde, in Zhou et al., MycoKeys 49: 7 (2019)

Sexual morph not reported. See Zhou et al. (2019) for illustrations and descriptions of asexual morph.

Type – China, Hunan Province, Jishou City, isolated from healthy roots of *Nothapodytes pittosporoides*, 27 May 2016, S.X. Zhou, holotype GACP GZU-HJ2-G3 (dried culture), culture ex-type GMBC0209.

Hosts – *Nothapodytes pittosporoides* (Zhou et al. 2019)

Distribution – China (Zhou et al. 2019)

Notes – *Colletotrichum jishouense* is a root endophyte. This species has shorter and narrower conidiogenous cells and conidia than all the related species in the gigasporum complex (Zhou et al. 2019). It can be phylogenetically separated by ITS, *tub2*, *act* and *gapdh* sequence data.

Colletotrichum magnisporum F. Liu, L. Cai, Crous & Damm, Persoonia, Mol. Phyl. Evol. Fungi 33: 91 (2014)

Sexual morph not reported. See Liu et al. (2014) for illustrations and descriptions of asexual morph.

Type – Unknown collection details, holotype CBS H-21491, culture ex-type CBS 398.84.

Hosts – Unknown

Distribution – Unknown

Notes – *Colletotrichum magnisporum* was introduced based on a single strain and no data are available for its host or location. More collections are needed to understand the host association of this species. This taxon can be separated from its closely related taxon *C. arxii* by any of the loci (ITS, *gapdh*, *chs-1* and *tub2*) used in Liu et al. (2014).

Colletotrichum pseudomajus F. Liu, L. Cai, Crous & Damm, Persoonia, Mol. Phyl. Evol. Fungi 33: 91 (2014)

See Liu et al. (2014) for illustrations and descriptions of asexual and sexual morphs.

Type – Taiwan, on twig of *Camellia sinensis*, unknown collection date and collector, holotype CBS H-21493, culture ex-type CBS 571.88.

Hosts – *Camellia sinensis* (Liu et al. 2014)

Distribution – Taiwan (Liu et al. 2014)

Notes – This species is introduced with a single strain. *Colletotrichum pseudomajus* can be differentiated by *gapdh* and *tub2* sequence data.

Colletotrichum radicis F. Liu, L. Cai, Crous & Damm, Persoonia, Mol. Phyl. Evol. Fungi 33: 93 (2014)

Sexual morph not reported. See Liu et al. (2014) for illustrations and descriptions of asexual morph.

Type – Costa Rica, La Selva, host plant unknown (isolated from a plant root), unknown collection date and collector, holotype CBS H-21494, culture ex-type CBS 529.93.

Hosts – unknown (Liu et al. 2014)

Distribution – Costa Rica (Liu et al. 2014)

Notes – *Colletotrichum radicis* was introduced based on a single strain isolated from an undetermined plant root. This taxon can be differentiated by its closely related taxon *C. magnisporum* by its shorter conidia and any of the loci (ITS, *gapdh*, *chs-1* and *tub2*) used in Liu et al. (2014).

Colletotrichum serranegrense Meir. Silva & M.C.M. Kasuya, in da Silva et al., Phytotaxa 351(2): 167 (2018)

Sexual morph not reported. See Silva et al. (2018) for illustrations and descriptions of asexual morph.

Type – Brazil, Minas Gerais: Parque Estadual da Serra Negra, from the roots of *Cattleya jongheana*, 14 November 2015, Miranda, L., holotype VIC45136, culture ex-type COAD2100.

Hosts – *Cattleya jongheana* (Silva et al. 2018)

Distribution – Brazil (Silva et al. 2018)

Notes – This taxon was isolated as an endophyte and can be distinguished by any of the loci (ITS, *chs-1*, *act* and *tub2*) used in Silva et al. (2018).

Colletotrichum vietnamense F. Liu, L. Cai, Crous & Damm, Persoonia, Mol. Phyl. Evol.Fungi 33: 93 (2014)

Sexual morph not reported. See Liu et al. (2014) for illustrations and descriptions of asexual morph.

Type – Vietnam, Lam Dong Province, Dalat, from anthracnose on leaf of *Coffea* sp., unknown collection date, P. Nguyen & E. Lijeroth, holotype CBS H-21512, culture ex-type CBS 125478.

Hosts – *Coffea* sp. (Liu et al. 2014)

Distribution – Vietnam (Liu et al. 2014)

Notes – *Colletotrichum vietnamense* can be identified by any of the loci (ITS, *gapdh*, *chs-1* and *tub2*) used in Liu et al. (2014).

Gloeosporioides Species Complex

The gloeosporioides species complex consists of *C. gloeosporioides* and 51 closely related species. This species complex mainly consists of plant pathogens (Weir et al. 2012), but some species were isolated as endophytes (Liu et al. 2015a). Conidia of this species complex are cylindrical with rounded ends tapering slightly towards the base (Weir et al. 2012). Based on the multigene phylogeny, Weir et al. (2012) recognized two subclades within the species complex, namely kahawae and musae (Fig. 13). A combination of *apmat* and *gs* sequences can be used to distinguish the species within this complex (Liu et al. 2015a). A combined multigene analysis of ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 13, Table 12.

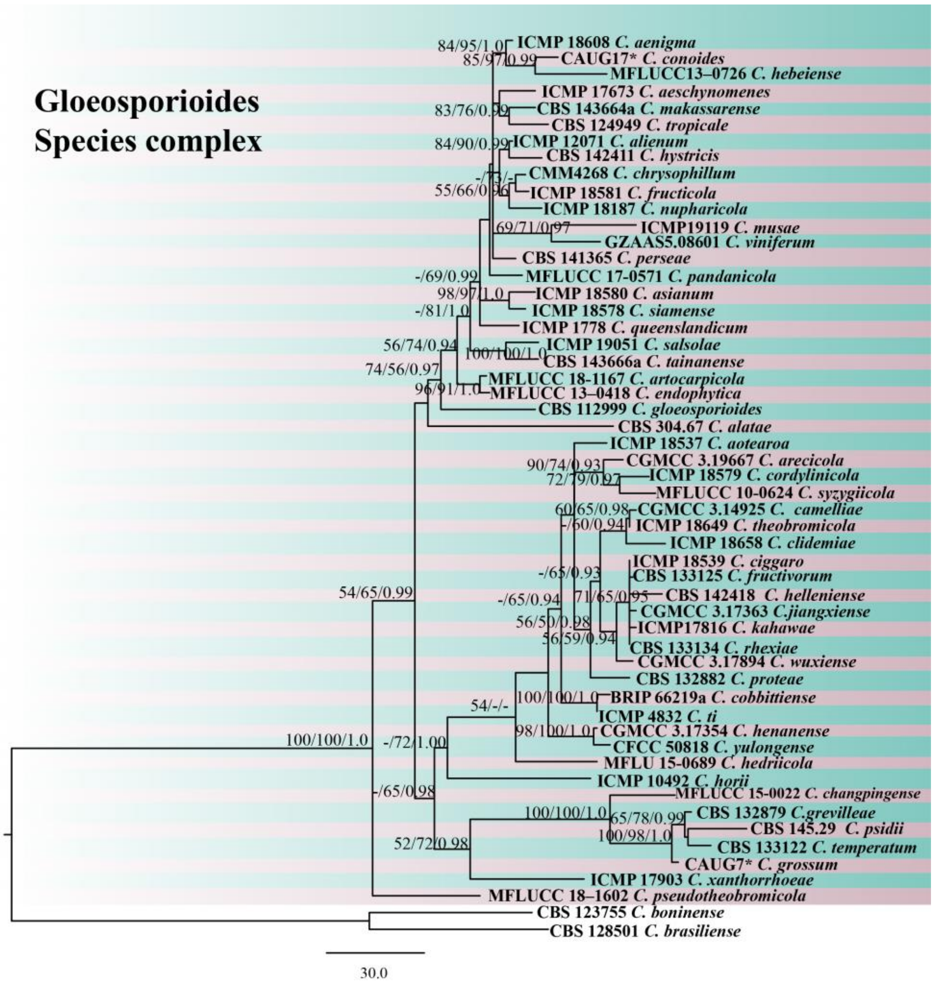

Figure 13 – The gloeosporioides complex. One of the 10 most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. boninense* (CBS 123755) and *C. brasiliense* (CBS 128501).

Colletotrichum aenigma B. Weir & P.R. Johnst., Stud. Mycol. 73: 135 (2012)

See Fu et al. (2019) for illustrations and descriptions of sexual morph. See Weir et al. (2012) for illustrations and descriptions of asexual morph.

Type – Israel, on *Persea americana*, S. Freeman Avo-37-4B, holotype PDD 102233, culture ex-holotype ICMP 18608.

Hosts – *Persea americana*, *Pyrus pyrifolia* (Weir et al. 2012), *Hylocereus undatus* (Meetum et al. 2015), *Vigna unguiculata* (Alizadeh et al. 2015), *Vitis vinifera* (Yan et al. 2015), *Sedum kamtschaticum* (Choi et al. 2017), *Actinidia argute* (Wang et al. 2019), *Camellia* sp. (Chen et al. 2019b, Yang et al. 2019b, Wang et al. 2020)

Distribution – Israel, Japan (Weir et al. 2012), China (Yan et al. 2015, Chen et al. 2019b, Wang et al. 2019, 2020, Yang et al. 2019b), Iran (Alizadeh et al. 2015), Thailand (Meetum et al. 2015), Korea (Choi et al. 2017).

Notes – *Colletotrichum aenigma* can be distinguished with the use of TUB2 or GS gene sequence data (Weir et al. 2012). This taxon has a distinctive appearance in culture with sparse, pale aerial mycelium and lacking differentiated acervuli. Pathogenicity studies for this species are available.

Table 12 GenBank accession numbers of species in the gloeosporioides complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. aenigma	ICMP 18608	JX010244	JX010044	JX009774	JX009443	JX010389	Weir et al. (2012)
C. aeschynomenes	ICMP 17673	JX010176	JX009930	JX009799	JX009483	JX010392	Weir et al. (2012)
C. alatae	CBS 304.67	JX010190	JX009990	JX009837	JX009471	JX010383	Weir et al. (2012)
C. alienum	ICMP 12071	JX010251	JX010028	JX009882	JX009572	JX010411	Weir et al. (2012)
C. aotearoa	ICMP 18537	JX010205	JX010005	JX009853	JX009854	JX010420	Weir et al. (2012)
C. arecicola	CGMCC 3.19667	MK914635	MK945455	MK935541	MK935374	MK935498	Cao et al. (2020)
C. artocarpicola	MFLUCC 18-1167	MN415991	MN435568	MN435569	MN435570	MN435567	Bhunjun et al. (2019)
C. asianum	ICMP 18580	JX010196	JX010053	JX009867	JX009584	JX010406	Weir et al. (2012)
C. camelliae	CGMCC:3.14925	KJ955081	KJ954782		KJ954363	KJ955230	Liu et al. (2015)
C. changpingense	MFLUCC 15-0022	KP683152	KP852469	KP852449	KP683093	KP852490	Jayawardena et al. (2016)
C. chrysophillum	CMM4268	KX094252	KX094183	KX094083	KX093982	KX094285	Vieira et al. (2017)
C. ciggaro	ICMP 18539	JX010230	JX009966	JX009800	JX009523	JX010434	Weir et al. (2012)
C. clidemiae	ICMP 18658	JX010265	JX009989	JX009877	JX009537	JX010438	Weir et al. (2012)
C. cobbittiense	BRIP 66219a	MH087016	MH094133	MH094135	MH094134	MH094137	Crous et al. (2018)
C.conoides	CAUG17*	KP890168	KP890162	KP890156	KP890144	KP890174	Diao et al. (2017)
C. cordylinicola	ICMP 18579	JX010226	JX009975	JX009864	HM470234	JX010440	Phoulivong et al. (2010)
C. endophytica	MFLUCC 13–0418	KC633854	KC832854		KF306258		Manamgoda et al. (2013)
C. fructicola	ICMP 18581	JX010165	JX010033	JX009866	FJ907426	JX010405	Prihastuti et al. (2009)
C. fructivorum	CBS 133125	JX145145				JX145196	Doyle et al. (2013)
C. gloeosporioides	CBS 112999	JQ005152	JQ005239	JQ005326	JQ005500	JQ005587	Weir et al. (2012)
C.grevilleae	CBS 132879	KC297078	KC297010	KC296987	KC296941	KC297102	Liu et al. (2013)
C. grossum	CAUG7*	KP890165	KP890159	KP890153	KP890141	KP890171	Diao et al. (2017)
C. hebeiense	MFLUCC13–0726	KF156863	KF377495	KF289008	KF377532	KF288975	Yan et al. (2015)
C. hederiicola	MFLU 15-0689	MN631384		MN635794	MN635795		Hyde et al. (2020)
C. helleniense	CBS 142418	KY856446	KY856270	KY856186	KY856019	KY856528	Guarnaccia et al. (2017)
C. henanense	CGMCC 3.17354	KJ955109	KJ954810		KM023257	KJ955257	Liu et al. (2015)
C. horii	ICMP 10492	GQ329690	GQ329681	JX009752	JX009438	JX010450	Weir & Johnston (2010)
C. hystricis	CBS 142411	KY856450	KY856274	KY856190	KY856023	KY856532	Guarnaccia et al. (2017)
C.jiangxiense	CGMCC 3.17363	KJ955201	KJ954902		KJ954471	KJ955348	Liu et al. (2013b)
C. kahawae	ICMP17816	JX010231	JX010012	JX009813	JX009452	JX010444	Weir et al. (2012)
C. makassarense	CBS 143664a,	MH728812	MH728820	MH805850	MH781480	MH846563	de Silva et al. (2019)
C. musae	ICMP19119	HQ596292	HQ596299	JX009896	HQ596284	HQ596280	Su et al. (2011)
C. nupharicola	ICMP 18187	JX010187	JX009972	JX009835	JX009437	JX010398	Weir et al. (2012)

Table 12 Continued.

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. pandanicola	MFLUCC 17-0571	MG646967	MG646934	MG646931	MG646938	MG646926	Tibpromma et al. (2018)
C. perseae	CBS 141365	KX620308	KX620242		KX620145	KX620341	Sharma et al. (2017)
C. pseudotheobromicola	MFLUCC 18–1602	MH817395	MH853675	MH853678	MH853681	MH853684	Chethana et al. (2019)
C. psidii	CBS 145.29	JX010219	JX009967	JX009901	JX009515	JX010443	Weir et al. (2012)
C. proteae	CBS 132882	KC297079	KC297009	KC296986	KC296940	KC297101	Liu et al. (2013)
C. queenslandicum	ICMP 1778	JX010276	JX009934	JX009899	JX009447	JX010414	Weir et al. (2012)
C. rhexiae	CBS 133134	JX145128				JX145179	Doyle et al. (2013)
C. salsolae	ICMP 19051	JX010242	JX009916	JX009863	JX009562	JX010403	Weir et al. (2012)
C. siamense	ICMP 18578	FJ972613	FJ972575	JX009865	FJ907423	FJ907438	Prihastuti et al. (2009)
C. syzygiicola	MFLUCC 10-0624	KF242094	KF242156		KF157801	KF254880	Udayanga et al. (2013)
C. tainanense	CBS 143666a	MH728818	MH728823	MH805845	MH781475	MH846558	de Silva et al. (2019)
C. theobromicola	ICMP 18649	JX010294	JX010006	JX009869	JX009444	JX010447	Rojas et al. (2010)
C. temperatum	CBS 133122	JX145159				JX145211	Doyle et al. (2013)
C. ti	ICMP 4832	JX010269	JX009952	JX009898	JX009520	JX010442	Weir et al. (2012)
C. tropicale	CBS 124949	JX010264	JX010007	JX009870	JX009489	JX010407	Rojas et al. (2010)
C. viniferum	GZAAS5.08601	JN412804	JN412798		JN412795	JN412813	Peng et al. (2013)
C. wuxiense	CGMCC 3.17894	KU251591	KU252045	KU251939	KU251672	KU252200	Wang et al. (2016)
C. xanthorrhoeae	ICMP 17903	JX010261	JX009927	JX009823	JX009478	JX010448	Shivas et al. (1998)
C. yulongense	CFCC 50818	MH751507	MK108986	MH793605	MH777394	MK108987	Wang et al. (2019)

Colletotrichum aeschynomenes B. Weir & P.R. Johnst., Stud. Mycol. 73: 135 (2012)

Sexual morph not reported. See Weir et al. (2012) for illustrations and descriptions of asexual morph.

Type – USA, Arkansas, on *Aeschynomene virginica* (stem lesion), D. TeBeest 3-1-3, holotype PDD 101995, culture ex-type ICMP 17673.

Hosts – *Aeschynomene virginica* (Weir et al. 2012), *Theobroma cacao* (Nascimento et al. 2019), *Manihot esculenta* (Sangpueak et al. 2018), *Myrciaria dubia* (Matos et al. 2020)

Distribution – USA (Weir et al. 2012), Thailand (Sangpueak et al. 2018), Brazil (Nascimento et al. 2019, Matos et al. 2020)

Notes – This taxon can be distinguished by *tub2*, *gapdh*, or *gs* sequence data. Genetically close to *C. siamense* and differs in having slightly longer and narrower conidia which taper slightly toward the ends and in having larger, strongly lobed appressoria (Weir et al. 2020). Pathogenicity studies are available for this species.

Colletotrichum alatae B. Weir & P.R. Johnst., Stud. Mycol. 73: 135 (2012)

Sexual morph not reported. See Weir et al. (2012) for illustrations and descriptions of asexual morph.

Type – India, Rajasthan, Udaipur, on *Dioscorea alata* leaves and stems, K.L. Kothari & J. Abramham, 1959, holotype CBS H-6939, culture ex-type CBS 304.67.

Hosts – *Dioscorea alata* (Weir et al. 2012)

Distribution – Barbardos, Guadeloupe, India, Nigeria (Weir et al. 2012)

Notes – This species can be distinguished from other species based on ITS sequence data (Weir et al. 2012). Even though this species was recorded as a pathogen on yam, no data are available to confirm its pathogenicity.

Colletotrichum alienum B. Weir & P.R. Johnst., Stud. Mycol. 73: 139 (2012)

See Weir et al. (2012) for illustrations and descriptions of asexual and sexual morphs.

Type – New Zealand, Auckland, Kumeu research orchard, *Malus domestica* (fruit rot), P.R. Johnston C824, 14 Aug. 1987, holotype PDD 101996, culture ex-type ICMP 12071.

Hosts – wide range of hosts (including *Banksia dryandroides*, *Camellia sinensis*, *Diospyros kaki*, *Grevillea* sp., *Leucospermum* sp., *Malus domestica*, *Nerium oleander*, *Persea americana*, *Protea* sp., *Serruria* sp. *Telopea* sp. (Weir et al. 2012), *Aquilaria sinensis* (Liu et al. 2020a)

Distribution – Australia, China, Hawaii, New Zealand, Portugal, South Africa and Zimbabwe (Weir et al. 2012, Crous et al. 2013, Liu et al. 2013b, 2015a, Schena et al. 2014, Liu et al. 2020a)

Notes – This taxon is best distinguished using *cal* or *gs* sequence data (Weir et al. 2012). It is common on commercial fruits and its pathogenicity has been confirmed.

Colletotrichum aotearoa B. Weir & P.R. Johnst., Stud. Mycol. 73: 139 (2012)

Sexual morph not reported. See Weir et al. (2012) for illustrations and descriptions of asexual morph.

Type – New Zealand, Auckland, Glen Innes, Auckland University campus, on *Coprosma* sp. (incubated berries), B. Weir C1282.4,30 Apr 2009, holotype PDD 101076, culture ex-type ICMP 18537.

Hosts – *Banksia marginata*, *Boehmeria* sp., *Bredia oldhamii*, *Coprosma* sp., *Dacrycarpus dacrydioides*, *Knightia* sp., *Musa* sp., *Podocarpus totara*, *Vitex lucens* (Weir et al. 2012)

Distribution – New Zealand (Weir et al. 2012)

Notes – It is common on taxonomically diverse native plants in New Zealand as a pathogen causing fruit rot and also as an endophyte on naturalized weeds. This species seems to be restricted only to New Zealand. Sequence data of *tub2*, *cal*, *gs*, and *gapdh* sequence data can be used to differentiate this taxon from other species.

Colletotrichum arecicola X.R. Cao, H.Y. Che & D.Q. Luo, in Cao et al., Pl. Dis. 104(5): 1371 (2020)

Sexual morph not reported. See Cao et al. (2020) for illustrations and descriptions of asexual morph.

Type – China, Hainan Province, Wenchang city, on a diseased areca palm leaf (*Areca catechu*), March. 2019, X.R. Cao, holotype HMAS 248158, culture ex-type CGMCC 3.19667.

Hosts – *Areca catechu* (Cao et al. 2020)

Distribution – China (Cao et al. 2020)

Notes – *Colletotrichum arecicola* is closely related with *C. cordylinicola*, but can be separated from having longer appressoria and knobbed appressoria on PDA (see Cao et al. 2020). Pathogenicity data for this species is available.

Colletotrichum artocarpicola Bhunjun, Jayawardena, Jeewon & K.D. Hyde, in Bhunjun et al., Phytotaxa 418(3): 279 (2019)

Sexual morph not reported. See Bhunjun et al. (2019) for illustrations and descriptions of asexual morph.

Type – Thailand, Chiang Rai, on decaying root of *Artocarpus heterophyllus*, R.S. Jayawardena, 2018, holotype MFLU 18-1167, culture ex-type MFLUCC 18-1167.

Hosts – *Artocarpus heterophyllus* (Bhunjun et al. 2019)

Distribution – Thailand (Bhunjun et al. 2019)

Notes – *Colletotrichum artocarpicola* is similar to *C. endophytica*, and can be distinguished by septate germinating conidia (Bhunjun et al. 2019). Pathogenicity studies for this species are available. This taxon can be distinguished by its *gapdh* and *act* sequence data.

Colletotrichum asianum Prihastuti, L. Cai & K.D. Hyde, Fungal Diversity 39: 96 (2009)

See Prihastuti et al. (2009) for illustrations and descriptions of asexual and sexual morph.

Type – Thailand, Chiang Mai Province, Mae Taeng District, Pha Daeng Village, near Mushroom Research Centre, on berry of *Coffea arabica*, 12 December 2007, H. Prihastuti, holotype MFLU 09-0228, culture ex-type ICMP 18580.

Hosts – *Coffea arabica*, *Mangifera indica* (Weir et al. 2012)

Distribution – Australia, Colombia, Japan, Panama, Philippines, Thailand (Weir et al. 2012)

Notes – This taxon is recorded as a pathogen on mango and coffee. Its pathogenicity has been confirmed through pathogenicity studies. *Colletotrichum asianum* can be distinguished by any of the loci (ITS, *gapdh*, *cal*, *act*, *chs-1*, *gs*, *sod2* and *tub2*) used in Weir et al. (2012).

Colletotrichum camelliae Massee, Bull. Misc. Inf., Kew: 91 (1899)

Sexual morph not reported. See Liu et al. (2015a) for illustrations and descriptions of asexual morph.

Type – China, Guizhou Province, Huishui District, on *Camellia sinensis*, 11 Nov. 2010, P. Tan, epitype HMAS 243126, culture ex-epitype CGMCC 3.14925.

Hosts – *Camellia sinensis* (Liu et al. 2015a)

Distribution – China (Liu et al. 2015a)

Notes – *Colletotrichum camelliae* belongs to the kahawae clade within the gloeosporioides complex and can be distinguished with the use of *gs* and *apmat* sequence data (Liu et al. 2015). This is recorded as the causal agent of the brown blight disease of tea plants (Weir et al. 2012). The type of this species was recorded from Sri Lanka. Even though there are 36 records in Farr & Rossman (2021), only the strains used in Liu et al. (2015a) have molecular data. More collections are needed to confirm the records that were identified based on morphology alone.

Colletotrichum changpingense Guo Z. Zhang, Jayaward. & K.D. Hyde, in Jayawardena et al., Mycosphere 7(8): 1155 (2016)

Sexual morph not reported. See Jayawardena et al. (2016b) for illustrations and descriptions of asexual morph.

Type – China, Beijing City, Changping, Xingshou Town, from rhizome of *Fragaria* × *ananassa*, November 2011, Zhang Guozhen, holotype MFLU 15-0212, culture ex-type MFLUCC 15-0022.

Hosts – *Fragaria* × *ananassa* (Jayawardena et al. 2016b)

Distribution – China (Jayawardena et al. 2016b)

Notes – *Colletotrichum changpingense* is phylogenetically closely related to *C. grevilleae*, *C. grossum* and *C. theobromicola* and can be differentiate by any of the loci used on Jayawardena et al. (2016b). Its pathogenicity on strawberry fruits, leaves and rhizome has been confirmed through pathogenicity studies.

Colletotrichum chrysophilum W.A.S. Vieira, W.G. Lima, M.P.S. Câmara & V.P. Doyle, Mycologia 109(6): 927 (2017)

Sexual morph not reported. See Vieira et al. (2017) for illustrations and descriptions of asexual morph.

Type – Brazil, SÃO PAULO, Registro, a dried culture of a strain isolated from *Musa* sp. cv. 'Ouro' (fruit anthracnose), July 2013, W.G. Lima, holotype URM89949, culture ex-type CMM4268.

Hosts – *Musa* sp. (Vieira et al. 2017)

Distribution – Brazil (Vieira et al. 2017)

Notes – *Colletotrichum chrysophilum* can be distinguished from *C. fructicola* and *C. nupharicola* by *act*, *apn2*, *apn2/mat-igs*, *cal*, *gap2-igs*, *gapdh*, *gs* and *tub2* sequence data (Vieira et al. 2017).

Colletotrichum cigarro (B.S. Weir & P.R. Johnst.) A. Cabral & P. Talhinhas, in Cabral et al., Plants, (Basel) 9(4, no. 502): 12 (2020)

See Cabral et al. (2020) for illustrations and descriptions of asexual and sexual morphs.

Type – Australia, on *Olea europaea*, V. Sergeeva UWS124, 1989, holotype PDD 102232, culture ex-type ICMP 18539.

Hosts – *Olea europaea* (Cabral et al. 2020), *Persea Americana* (Fuentes-Aragon et al. 2020)

Distribution – Australia (Cabral et al. 2020), Mexico (Fuentes-Aragon et al. 2020)

Notes – Weir et al. (2012) introduced this taxon as *C. kahawae* supsp. *ciggaro*. Cabral et al. (2020) upgraded it as a species. This species is recorded as a pathogen and the pathogenicity has been confirmed by pathogenicity tests.

Colletotrichum clidemiae B.S. Weir & P.R. Johnst., in Weir et al., Stud. Mycol. 73: 148 (2012)

Sexual morph not reported. See Weir et al. (2012) for illustrations and descriptions of asexual morph.

Type – USA, Hawai'i, Aiea, on *Clidemia hirta* (leaf spot), S.A. Ferreira & K. Pitz, 14 May 2010, holotype PDD 101997, culture ex-type ICMP 18658.

Hosts – *Clidemia hirta*, *Vitis* sp., *Quercus* sp. (Weir et al. 2012)

Distribution – Panama, USA (Weir et al. 2012)

Notes – This species causes leaf spots and belongs to the kahawae clade within the gloeosporioides species complex (Weir et al. 2012). *Colletotrichum clidemiae* can be distinguished by *act*, *gapdh* or *gs* sequence data (Weir et al. 2012) as well as *apmat* (Jayawardena et al. 2016a).

Colletotrichum conoides Y.Z. Diao, C. Zhang, L. Cai & Xi L. Liu, in Diao et al., Persoonia 38: 27 (2017)

See Fu et al. (2019) for illustrations and descriptions of sexual morph. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – China, Jiangsu Province, Nanjing City, on fruits of *Capsicum annuum* var. *conoides*, Sept. 2010, Y.Z. Diao, holotype HMAS 246481, ex-type culture CGMCC 3.17615 6.

Hosts – *Capsicum annuum* (Diao et al. 2017), *Pyrus pyrifolia* (Fu et al. 2019)

Distribution – China (Diao et al. 2017, Fu et al. 2019)

Notes – *Colletotrichum conoides* is phylogenetically most closely related to *C. hebeiense*. Sequence data from *gapdh*, *act*, or *tub2* can be used to distinguish this species (Diao et al. 2017).

Colletotrichum cobbittiense S. Luo, G. Dong & P. Wong, in Crous et al., Persoonia 40: 271 (2018)

Sexual morph not reported. See Crous et al. (2018b) for illustrations and descriptions of asexual morph.

Type – Australia, New South Wales, Cobbitty, from leaf lesions of a *Cordyline* interspecific hybrid (*C. stricta* × *C. australis*), Jan. 2016, S. Luo & G. Dong, holotype BRIP 66219.

Hosts – *Cordyline* sp. (Crous et al. 2018b)

Distribution – Australia (Crous et al. 2018b)

Notes – The leaf lesions were characterised by bleached centres and diffuse brownish margins around the lesions (Crous et al. 2018b). Pathogenicity studies are needed to confirm its pathogenicity. This taxon can be distinguished by any of the loci (ITS, *gapdh*, *chs-1*, *act* and *tub2*) used in Crous et al. (2018b).

Colletotrichum cordylinicola Phoulivong, L. Cai & K. D. Hyde, Mycotaxon 114: 251 (2011)

Sexual morph not reported. See Phoulivong et al. (2010) for illustrations and descriptions of asexual morph.

Type – Panama, Gamboa, wet lowland forest, leaf endophyte of *Merremia umbellata*, Nov. 2004, S. Van Bael & Z. Maynard, D2-13, holotype CBS H-21066, culture ex-type CBS 125386.

Hosts – *Eugenia javanica* (Phoulivong et al. 2010), *Cordyline fruticose* (Weir et al. 2012), *Areca catechu* (Cao et al. 2020)

Distribution – Laos (Phoulivong et al. 2010), Thailand, USA (Weir et al. 2012), China (Cao et al. 2020)

Notes – This taxon can be identified by ITS sequence data (Weir et al. 2012). Pathogenicity data are available for this species.

Colletotrichum endophytica Manamgoda, Udayanga, L. Cai & K.D. Hyde, in Manamgoda et al., Fungal Diversity 61:110 (2013)

Sexual morph not reported. See Manamgoda et al. (2013) for illustrations and descriptions of asexual morph.

Type – Thailand, Chiang Rai Province, endophytic on healthy leaves of *Pennisetum purpureum*, 5 May 2010, Dimuthu S. Manamgoda, holotype MFLU13-0004 (dried culture), culture ex-type MFLUCC 130418.

Hosts – *Pennisetum purpureum* (Manamgoda et al. 2013)

Distribution – Thailand (Manamgoda et al. 2013)

Notes – This is an endophytic species on healthy leaves of *Pennisetum purpureum* in Thailand (Manamgoda et al. 2013). It was also found as a saprobe on an undetermined wild fruit in Thailand (Udayanga et al. 2013). *Colletotrichum endophytica* belongs to the gloeosporioides species complex and placed in between the musae and kahawae clades (Manamgoda et. al. 2013).

Colletotrichum fructicola Prihastuti, L. Cai & K.D. Hyde, Fungal Diversity 39: 96 (2009)

See Fu et al. (2019) for illustrations and descriptions of sexual morph. See Rojas et al. (2010) for illustrations and descriptions of asexual morph.

Type – Panama, Gamboa, wet lowland forest, leaf endophyte of *Merremia umbellata*, Nov. 2004, S. Van Bael & Z. Maynard, D2-13, holotype CBS H-21066, culture ex-type CBS 125386.

Hosts – wide range (Farr & Rossman 2021)

Distribution – worldwide (Farr & Rossman 2021)

Notes – *Colletotrichum fructicola* was originally reported from coffee berries in Thailand (Prihastuti et al. 2009). It has a wide host range and geographical distribution (Jayawardena et al. 2016a). These taxa are best distinguished using *gs* or *sod2* sequence data (Weir et al. 2012). It is recorded as a pathogen, endophyte and a saprobe. Pathogenicity data are available for this species.

Colletotrichum fructivorum V.P. Doyle, P.V. Oudem. & S.A. Rehner, PLoS ONE 7(12): e51392, 12 (2012)

Sexual morph not reported. See Doyle et al. (2013) for illustrations and descriptions of asexual morph.

Type – USA, New Jersey, Burlington County, *Vaccinium macrocarpon* (fruit-rot pathogen), Oct 2010, V. Doyle, P.V. Oudemans, C. Constantelos, holotype BPI 884103, culture ex-type CBS 133125.

Hosts – *Vaccinium macrocarpon*, *Rhexia virginica* (Doyle et al. 2013)

Distribution – Canada, Colombia and the USA (Doyle et al. 2013)

Notes – This taxon is pathogenic to *Vaccinium* sp. in Canada, Colombia and the USA (Doyle et al. 2013). Doyle et al. (2013) reported this species as an endophyte on *Rhexia virginica* and *Vaccinium macrocarpon* in the USA.

Colletotrichum gloeosporioides (Penz.) Penz. & Sacc., Atti Inst. Veneto Sci. lett., ed Arti, Sér. 6 (2): 670 (1884)

Sexual morph not reported. See Cannon et al. (2008) for illustrations and descriptions of asexual morph.

Type – Italy, Calabria, on *Citrus sinensis*, culture ex-epitype IMI 356878.

Hosts – *Citrus* sp., *Carya illinoinensis*, *Ficus* sp., *Mangifera* sp. *Solanum betaceum*, *Purearia* sp., *Vitis vinifera* (Weir et al. 2012)

Distribution – Australia, China, Colombia, New Zealand, South Africa, USA (Weir et al. 2012)

Notes – Weir et al. (2012) did a comprehensive study on *C. gloeosporioides* and related species, resolving most of the species under the name of *C. gloeosporioides*. Mostly it is associated with *Citrus* sp. (Weir et al. 2012). This species can be separated from all other species by ITS sequence data.

Colletotrichum grevilleae F. Liu, Damm, L. Cai & Crous, Fungal Diversity 61: 98 (2013)

Sexual morph not reported. See Liu et al. (2013b) for illustrations and descriptions of asexual morph.

Type – Italy, Catania, *Grevillea* sp. (from root and collar rot), Jan. 2000, G. Polizzi, holotype CBS H-21120, culture ex-type CBS 132879.

Hosts – *Grevillea* sp. (Liu et al. 2013b)

Distribution – Italy (Liu et al. 2013b)

Notes – This species is a pathogen. However, pathogenicity studies are not available to confirm its pathogenicity (Liu et al. 2013b). It has a close affinity with *C. theobromicola*. However, these species can be distinguished based on *cal* and *gapdh* sequence data (Liu et al. 2013b).

Colletotrichum grossum Y.Z. Diao, C. Zhang, L. Cai & X.L. Liu, Persoonia 38: 29 (2017)

Sexual morph not reported. See Diao et al. (2017) for illustrations and descriptions of asexual morph.

Type – China, Hainan Province, Haikou city, on *Capsicum annuum* var. *grossum*, Oct. 2010, Y.Z Diao, holotype HMAS 246480, culture ex-type CGMCC3.17614.

Hosts – *Capsicum annuum* (Diao et al. 2017), *Mangifera indica* (Leon et al. 2018)

Distribution – China (Diao et al. 2017), Cuba (Leon et al. 2018)

Notes – *Colletotrichum grossum* is phylogenetically most closely related to *C. theobromicola*, and can be distinguished based on *gapdh*, *act* and *tub2* sequence data. Pathogenicity studies are available for this species.

Colletotrichum hebeiense X.H. Li, Y. Wang, K.D. Hyde, M.M.R.S. Jayawardena & J.Y. Yan, in Yan et al., Fungal Diversity 71: 241 (2015)

Sexual morph not reported. See Yan et al. (2015) for illustrations and descriptions of asexual morph.

Type – China, Hebei province, Qinhuangdao City, on fruits of *Vitis vinifera* cv. 'Cabernet Sauvignon', September 2009, X.H. Li, holotype MFU14-0627, culture ex-type MFLUCC 13–0726.

Hosts – *Vitis vinifera* (Yan et al. 2015)

Distribution – China (Yan et al. 2015)

Notes – This is a pathogen on *Vitis vinifera* in China. Pathogenicity data are available for this species (Yan et al. 2015).

Colletotrichum hederiicola Jayaward. Camporesi & K.D. Hyde, in Hyde et al., Fungal Diversity 100: 193 (2020)

Sexual morph not reported. See Hyde et al. (2020) for illustrations and descriptions of asexual morph.

Type – ITALY, Province of Forlì-Cesena [FC], Fiumana di Predappio, on dead branch of *Hedera helix* (*Araliaceae*), 28 October 2014, E. Camporesi, IT 2201 (MFLU 15–0689, holotype).

Hosts – *Hedera helix* (Hyde et al. 2020)

Distribution – Italy (Hyde et al. 2020)

Notes – This species has a close affinity with *C. henanense* and can be separated from *chs-1* and *act* sequence data. Culture is not available for this species.

Colletotrichum helleniense Guarnaccia & Crous, in Guarnaccia et al., Persoonia 39: 43 (2017)

Sexual morph not reported. See Guarnaccia et al. (2017) for illustrations and descriptions of asexual morph.

Type – Greece, Arta, from wither-tip twigs of *Poncirus trifoliata*, 20 May 2015, V. Guarnaccia (CBS H-23025 holotype, culture ex-type CBS 142418.

Hosts – *Citrus reticulata*, *Poncirus trifoliate* (Guarnaccia et al. 2017)

Distribution – Greece (Guarnaccia et al. 2017)

Notes – *Colletotrichum helleniense* was isolated from fruit lesions of *Citrus reticulata* and from wither-tip twigs *Poncirus trifoliata* in Greece. Both these genera are in *Rutaceae*, which shows the ability of *C. helleniense* to colonise tissues of different genera within the *Rutaceae*. This species is phylogenetically closer to *C. kahawae* but can be differentiated based on *gapdh*, *cal* and *tub2* sequence data (Guarnaccia et al. 2017).

Colletotrichum henanense F. Liu & L. Cai, in Liu et al., Persoonia, Mol. Phyl. Evol. Fungi 35: 80 (2015)

Sexual morph not reported. See Liu et al. (2015) for illustrations and descriptions of asexual morph.

Type – China, Henan Province, Xinyang, on *Camellia sinensis*, 23 Sept. 2012, M. Zhang & R. Zang, holotype HMAS 245381, culture ex-type CGMCC 3.17354.

Hosts – *Camellia sinensis*, *Cirsium japonicum* (Liu et al. 2015a), *Camellia oleifera* (Li et al. 2018)

Distribution – China (Liu et al. 2015a, Li et al. 2018)

Notes – This species can be distinguished can be distinguished by *tub2*, *apmat* and *gs* sequence data (Liu et al. 2015a). Pathogenicity studies have been carried out to establish its pathogenicity.

Colletotrichum horii B. Weir & P.R. Johnst., Mycotaxon 111: 211 (2010)

Sexual morph not reported. See Weir & Johnston (2010) for illustrations and descriptions of asexual morph.

Type – Japan, on *Diospyros kaki*, N. Nishihara A71, 1959, neotype TNS-F-26102 (dried culture), culture neotype ICMP 10492.

Hosts – *Diospyros kaki* (Weir & Johnston 2010)

Distribution – Brazil, China, Japan, Korea, New Zealand, South Korea (Farr & Rossman 2021)

Notes – This species is recorded as associated with unripe fruits, young stem and twig lesions (Weir & Johnston 2010). Xie et al. (2010) noted minor symptoms on inoculated fruit of *Capsicum annuum*, *Musa acuminata* and *Cucurbita pepo*. However, this taxon had never been associated with disease symptoms on these hosts from the field. It can be identified based on ITS sequence data.

Colletotrichum hystricis Guarnaccia & Crous, in Guarnaccia, Groenewald, Polizzi & Crous, Persoonia 39: 43 (2017)

Sexual morph not reported. See Guarnaccia et al. (2017) for illustrations and descriptions of asexual morph.

Type – Italy, Mascali, Catania, from leaf lesion of *Citrus hystrix*, 30 Jan. 2016, V. Guarnaccia holotype CBS H-23026, culture ex-type CBS 142411.

Hosts – *Citrus hystrix* (Guarnaccia et al. 2017)

Distribution – Italy (Guarnaccia et al. 2017)

Notes – *Colletotrichum hystricis* was isolated from a leaf lesion, however there are no pathogenicity data available for this. This species differs from closely related species in *gapdh, act* and *chs-1* sequence data (Guarnaccia et al. 2017).

Colletotrichum jiangxiense F. Liu & L. Cai, in Liu et al., Persoonia 35: 82 (2015)

Sexual morph not reported. See Liu et al. (2015a) for illustrations and descriptions of asexual morph.

Type – China, Jiangxi Province, Ganzhou, Fengshan Mountain, on *Camellia sinensis*, Sept. 2013, Y. Zhang, holotype HMAS 245382, culture ex-type CGMCC 3.17363.

Hosts – *Camellia sinensis* (Liu et al. 2015a)

Distribution – China (Liu et al. 2015a)

Notes – This species is a pathogen as well as an endophyte on *Camellia sinensis* in China. It is closely related to C. *kahawae sensu lato*. *Colletotrichum jiangxiense* can be distinguished by *gs* gene sequence data (Liu et al. 2015a).

Colletotrichum kahawae J.M Waller & Bridge, Mycol. Res. 97(8): 993 (1993)

Sexual morph not reported. See Waller et al. (1993) for illustrations and descriptions of asexual morph.

Type —Kenya, on berries of *Coffea arabica*, 1987-01-29, holotype IMI 319418, culture ex-type ICMP17816.

Hosts – *Coffea arabica* (Waller et al. 1993, Weir et al. 2012)

Distribution – African continent (Waller et al. 1993, Weir et al. 2012)

Notes – This species was introduced to accommodate the species causing coffee berry disease (Waller et al. 1993). *Colletotrichum kahawae* apparently is restricted to and widespread on coffee in Africa (Weir et al. 2012). This taxon has a distinctive growth form and biology (Waller et al. 1993). *Colletotrichum kahawae* can be distinguished by its ITS and *gs* sequence data.

Colletotrichum makassarense D.D. de Silva, Crous & P.W.J. Taylor, in de Silva et al., IMA Fungus 10(1): 23 (2019)

Sexual morph not reported. See de Silva et al. (2019) for illustrations and descriptions of asexual morph.

Type – Indonesia, Makassar, from fruit lesion of *Capsicum annuum*, 7 Jun. 2015, P.W.J. Taylor & A. Nasruddin, holotype CBS H-143664, culture ex-type CBS 143664.

Hosts – *Capsicum annuum* (de Silva et al. 2019)

Distribution – Indonesia (de Silva et al. 2019)

Notes – This species is only recorded from *Capsicum annuum* and can be distinguished by *apmat* and *gs* sequence data (de Silva et al. 2019).

Colletotrichum musae (Berk. & M. A. Curtis) Arx, Verh. K. ned. Akad. Wet., tweede sect. 51(3): 107 (1957)

Sexual morph not reported. See Su et al. (2011) for illustrations and descriptions of asexual morph.

Type – USA, Florida, on *Musa* sp., isolated by M. Arzanlou, holotype CBS-H-20515 (dried-culture), culture ex-epitype CBS 116870.

Hosts – *Musa* sp. (Su et al. 2011, Weir et al. 2012)

Distribution – worldwide (Su et al. 2011, Weir et al. 2012, Jayawardena et al. 2016a)

Notes – *Colletotrichum musae* is recorded as a pathogen and an endophyte of *Musa* sp. worldwide (Su et al. 2011, Weir et al. 2012, Jayawardena et al. 2016a). This taxon can be distinguished from ITS sequence data (Weir et al 2012).

Colletotrichum nupharicola D.A. Johnson, Carris & J.D. Rogers, Mycol. Res. 101(6): 647 (1997)

Sexual morph not reported. See Johnson et al. (1997) for illustrations and descriptions of asexual morph.

Type – USA, Washington, Yakima Co., on *Nupha lutea* subsp. *polysepala,* D.A. Johnson A-2, Oct. 1993, holotype WSP 69656, culture ex-holotype CBS 470.96.

Hosts – *Nuphar, Nymphae* (Johnston et al. 1997)

Distribution – USA (Johnston et al. 1997)

Notes – This species is a pathogen recorded only in the USA, on the aquatic plants *Nuphar* and *Nymphae* sp. (Johnston et al. 1997). This species can be distinguished by all loci (*gapdh*, *cal*, *chs-1*, *act*, *gs*, *sod2* and *tub2*) used in Weir et al. (2012), except ITS.

Colletotrichum pandanicola Tibpromma & K.D. Hyde, in Tibpromma et al., MycoKeys 33: 47 (2018)

Sexual morph not reported. See Tibpromma et al. (2018) for illustrations and descriptions of asexual morph.

Type – Thailand, Chumphon, Pathio District, on healthy leaves of *Pandanus* sp., 1 December 2016, S. Tibpromma (PE09), holotype MFLU 18-0003, culture ex-type, MFLUCC 17-0571.

Hosts – *Pandanus* sp. (Tibpromma et al. 2018)

Distribution – Thailand (Tibpromma et al. 2018)

Notes – It is recorded as an endophyte and can be identified by all the loci (ITS, *gapdh*, *act*, *chs-1* and *tub2*) used in Tibpromma et al. (2018) except for ITS.

Colletotrichum persea G. Sharma & S. Freeman, in Sharma et al., Scientific Reports 7(no. 15839): 7 (2017)

See Sharma et al. (2017) for illustrations and descriptions of asexual and sexual morphs.

Type – Israel, Mikve Israel, (central Israel), on *Persea Americana* cv. 'Hass' (post-harvest ripe fruit rot), S. Freeman (GA100 1-12-2014), holotype HUJIHERB-902850-FUNGI, culture ex-holotype CBS 141365.

Hosts – *Persea Americana* (Sharma et al. 2017)

Distribution – Israel (Sharma et al. 2017)

Notes – *Colletotrichum perseae* can be well-resolved using *apmat* and *gs* markers (Sharma et al. 2017). Pathogenicity studies are available for this species.

Colletotrichum pseudotheobromicola Chethana, J.Y. Yan, X.H. Li & K.D. Hyde, in Chethana et al., Mycosphere 10(1): 518 (2019)

Sexual morph not reported. See Chethana et al. (2019) for illustrations and descriptions of asexual morph.

Type – China, Beijing, on leaf spots of *Prunus avium*, 28 September 2017, K.W.T. Chethana holotype MFLU 18–2656, culture ex-type, MFLUCC 18–1602.

Hosts – *Prunus avium* (Chethana et al. 2019)

Distribution – China (Chethana et al. 2019)

Notes – This taxon can be distinguished by *act* and *gapdh* sequence data (Chethana et al. 2019). Pathogenicity data are available for this species.

Colletotrichum protea F. Liu, Damm, L. Cai & Crous, Fungal Diversity 61: 100 (2013)

Sexual morph not reported. See Liu et al. (2013b) for illustrations and descriptions of asexual morph.

Type – South Africa, Western Cape Province, Tsitsikamma National Park, Nature's Valley, on *Protea* sp., 9 Jan. 2008, P.W. Crous, holotype CBS H-21119, culture ex-type CBS 132882.

Hosts – *Protea* sp. (Liu et al. 2013b)

Distribution – South Africa (Liu et al. 2013b)

Notes – Although the conidial morphology of this species is similar to the acutatum species complex, phylogenetically it places in the gloeosporioides complex. It is recorded only on *Protea* sp.

Colletotrichum psidii Curzi, Atti Ist. bot. R. Univ. Pavia, 3 Sér. 3(3): 207 (1927)

Sexual morph not reported. See Weir et al. (2012) for illustrations and descriptions of asexual morph.

Reference specimen – Italy, Rome, on *Psidium* sp., M. Curzi, authentic culture CBS 145.29

Hosts – *Psidium* sp. (Weir et al. 2012)

Distribution – Italy (Weir et al. 2012)

Notes – This is only recorded from its authentic strain and can be distinguished by ITS sequence data (Weir et al. 2012).

Colletotrichum queenslandicum B. Weir & P.R. Johnst., in Weir et al., Stud. Mycol. 73: 164 (2012)

Sexual morph not reported. See Weir et al. (2012) for illustrations and descriptions of asexual morph.

Type – Australia, Queensland, Brisbane, on *Carica papaya*, J.H. Simmonds 11663C, Sep. 1965, epitype PDD 28797, culture ex-epitype ICMP 1778.

Hosts – *Anacardium occidentale*, *Capsicum annuum*, *Carica papaya*, *Citrus latifolia*, *Coffea* sp., *Licania tomentosa*, *Litchi chinensis*, *Mangifera indica*, *Nephelium lappaceum*, *Olea europaea*, *Passiflora edulis*, *Persea amaericana* (Weir et al. 2012, Farr & Rossman 2021)

Distribution – Australia, Brazil, Fiji, Puerto Rico, USA (Weir et al. 2012, Farr & Rossman 2021)

Notes – This is a pathogen and pathogenicity studies are available. *Colletotrichum queenslandicum* belongs to the musae clade. It can be best distinguished with the use of *tub2*, *gapdh* and *gs* sequence data (Weir et al. 2012).

Colletotrichum rhexiae Ellis & Everh., Proc. Acad. nat. Sci. Philad. 46: 372 (1894)

Sexual morph not reported. See Doyle et al. (2013) for illustrations and descriptions of asexual morph.

Type – USA, Sussex County, Delaware, Cape Henlopen State Park, *Rhexia virginica* (stem tissue lesion), Nov 2010, V. Doyle, epitype Coll1026, culture ex-epitye CBS 133134).

Hosts – *Rhexia virginica*, *Vaccinium macrocarpon* (Doyle et al. 2013)

Distribution – USA (Doyle et al. 2013)

Notes – This species is recorded as a pathogen of *Rhexia* sp. as well as a fruit endophyte on *Vaccinium macrocarpon* in the USA (Doyle et al. 2013). It is in the kahawae clade and can be identified any of the loci (ITS and *tub2*) used in Doyle et al. (2013).

Colletotrichum salsolae Weir & P.R. Johnst., in Weir et al., Stud. Mycol. 73: 164 (2012)

Sexual morph not reported. See Weir et al. (2012) for illustrations and descriptions of asexual morph.

Type – Hungary, on *Salsola tragus*, coll. D. Berner, 1996, holotype BPI 878740, culture ex-holotype ICMP 19051.

Hosts – *Salsola tragus* (Weir et al. 2012)

Distribution – Hungary (Weir et al. 2012)

Notes – This species can be distinguished by closely related species from *gapdh* and *tub2* sequence data. There is a record of *C. salsolae* causing disease on *Carica papaya* in India. However, the analyses were carried out based on ITS, which cannot be used to identify this species accurately.

Colletotrichum siamense Phoulivong, L. Cai & K.D. Hyde, in Prihastuti et al., Fungal Diversity 39: 98 (2009)

See Fu et al. (2019) for illustrations and descriptions of sexual morph. See Prihastuti et al. (2009) for illustrations and descriptions of asexual morph.

Type – Thailand, Chiang Mai Province, Mae Taeng District, Mae Lod Village, Royal Agricultural Project Coffee, on berry of *Coffea arabica*, 16 January 2008, H. Prihastuti holotype MFLU 090230, culture ex-type ICMP 18578.

Hosts – wide host range (see Farr & Rossman 2021)

Distribution – worldwide (see Farr & Rossman 2021)

Notes – *Colletotrichum siamense* was introduced from Coffee berries in Thailand. With more collections, it is clear that this has a wide host range a geographical distribution. Pathogenicity studies are available for this species. It is better distinguished by *cal* and *tub2* sequence data (Weir et al. 2012).

Colletotrichum syzygicola Udayanga, Manamgoda & K.D. Hyde [as 'syzygicola'], in Udayanga et al., Fungal Diversity 61: 173 (2013)

Sexual morph not reported. See Udayanga et al. (2013) for illustrations and descriptions of asexual morph.

Type – Thailand, Chiang Rai Province, Nang Lae, Fah-Thai market, on fruits of *Syzygium samarangense*, 18 April 2010, Dhanushka Udayanga, holotype MFLU12-2476 (dried sporulating culture on PDA), culture ex type MFLUCC 10-0624.

Hosts – *Citrus aurantifolia*, *Syzygium samarangense* (Udayanga et al. 2013)

Distribution – Thailand (Udayanga et al. 2013)

Notes – This species is recorded as a pathogen, however no pathogenicity studies are available to confirm it. *Colletotrichum syzygicola* can be differentiated by any of the loci (ITS, *gapdh*, *act* and *tub2*) used in Udayanga et al. (2013).

Colletotrichum tainanense D.D. de Silva, Crous & P.W.J. Taylor, in de Silva et al., IMA Fungus 10(1): 23 (2019)

Sexual morph not reported. See de Silva et al. (2019) for illustrations and descriptions of asexual morph.

Type – Taiwan, Tainan: on fruit of *Capsicum annuum*, Aug. 2014, Z.M. Sheu, holotype CBS H-143666, culture ex-type CBS 143666.

Hosts – *Capsicum annuum* (de Silva et al. 2019)

Distribution – Taiwan (de Silva et al. 2019)

Notes – This taxon is recorded only from the type strain and can be distinguished by *tub2* sequence data (de Silva et al. 2019).

Colletotrichum theobromicola Delacr., Bull. Soc. mycol. Fr. 21: 191 (1905)

Sexual morph not reported. See Rojas et al. (2010) for illustrations and descriptions of asexual morph.

Type – Panama, Gamboa, wet lowland forest, leaf endophyte of *Merremia umbellata*, Nov. 2004, S. Van Bael & Z. Maynard, D2-13, holotype CBS H-21066, culture ex-type CBS 125386.

Hosts – wide range of hosts (see Farr & Rossman 2021)

Distribution – worldwide (see Farr & Rossman 2021)

Notes – *Colletotrichum theobromicola* was accepted by Weir et al. (2012) as putatively specialized pathogens. Pathogenicity studies are available for this species and can be differentiated by ITS sequence data (Weir et al. 2012).

Colletotrichum temperatum V. Doyle, P.V. Oudem. & S.A. Rehner, PLoS ONE 7(12): e51392, 17 (2012)

Sexual morph not reported. See Doyle et al. (2013) for illustrations and descriptions of asexual morph.

Type – USA, New York, Bronx County, The New York Botanical Garden, *Vaccinium macrocarpon* (rotten fruit), Nov 2009, V. Doyle & C. Mozzicato, culture ex-type CBS 133122.

Hosts – *Vaccinium macrocarpon* (Doyle et al. 2013)

Distribution – USA (Doyle et al. 2013)

Notes – *Colletotrichum temperatum* is an endophyte and a pathogen on *Vaccinium macrocarpon*. This species can be distinguished by any of the loci (ITS and *tub2*) used in Doyle et al. (2013).

Colletotrichum ti B. Weir & P.R. Johnst., in Weir et al., Stud. Mycol. 73: 171 (2012)

See Weir et al. (2012) for illustrations and descriptions of asexual and sexual morphs.

Type – New Zealand, Taupo, on *Cordyline* sp., coll. J.M. Dingley 65187, Sep. 1965, holotype PDD 24881, culture ex-holotype ICMP 4832.

Hosts – *Cordyline* sp. (Weir et al. 2012)

Distribution – New Zealand (Weir et al. 2012)

Notes – This is recorded only from the type strain. Although this was isolated from a leaf lesion, no pathogenicity data to confirm whether this species is a pathogen. *Colletotrichum ti* can be distinguished by *tub2* and *gapdh* sequence data (Weir et al. 2012).

Colletotrichum tropicale E.I. Rojas, S.A. Rehner & Samuels, Mycologia 102(6): 1331 (2010)

Sexual morph not reported. See Rojas et al. (2010) for illustrations and descriptions of asexual morph.

Type – Panama, Escobal, Chiriqui, on *Annona muricata* fruit rot, E.I. Rojas, neotype CBS 124945, ex-neotype culture CBS 124943.

Hosts – wide host range (See Farr & Rossman 2021)

Distribution – tropical region (See Farr & Rossman 2021)

Notes – It is a well-known pathogen on tropical trees. Pathogenicity studies are available for this taxon. *Colletotrichum tropicale* is best distinguished using *tub2*, *chs-1*, *gs*, or *sod2* sequence data (Weir et al. 2012).

Colletotrichum viniferum L.J. Peng, L. Cai, K.D. Hyde & Z-Y. Ying, Mycoscience 54(1): 36 (2013)

Sexual morph not reported. See Peng et al. (2013) for illustrations and descriptions of asexual morph.

Type – China, Yunnan Province, Kunming City, Ala Town, Gaopo Village, on fruits of *Vitis vinifera* cv. ‘Shuijing’, 30 July 2008, L.J. Peng holotype GZAAS5H.08601, ex-holotype culture GZAAS5.08601.

Hosts – *Vitis vinifera* (Peng et al. 2013, Yan et al. 2015, Oo & Oh 2017, Jayawardena et al. 2018)

Distribution – China (Peng et al. 2013, Yan et al. 2015, Jayawardena et al. 2018), South Korea (Oo & Oh 2017)

Notes – *Colletotrichum viniferum* was introduced to accommodate a pathogen causing leaf spot and fruit rot of grapevine. This species appears to be host-specific.

Colletotrichum wuxiense Yu Chun Wang, X.C. Wang & Y.J. Yang, in Wang et al., Scientific Reports 6(35287): 8 (2016)

See Fu et al. (2019) for illustrations and descriptions of sexual morph. See Wang et al. (2016) for illustrations and descriptions of asexual morph.

Type – China, Jiangsu Province, Wuxi City, from diseased leaves of *Camellia sinensis*, 20 Aug. 2014, Y.C. Wang, holotype HMAS 246948, culture ex-type CGMCC 3.17894.

Hosts – *Camellia sinensis* (Wang et al. 2016, Fu et al. 2019)

Distribution – China (Wang et al. 2016, Fu et al. 2019)

Notes – This species can be separated from other species in the gloeosporioides complex by concatenated *apmat* and *gs* sequence data (Wang et al. 2016). Pathogenicity data are available for this species.

Colletotrichum xanthorrhoeae R.G. Shivas, Bathgate & Podger, Mycol. Res. 102 (3): 280 (1998)

Sexual morph not reported. See Shivas et al. (1998) for illustrations and descriptions of asexual morph.

Type – Australia, Western Australia, Melville, on *Xanthorrhoea preissii* (leaf spots), F.D. Podger, Jan. 1994, holotype WAC 8358, ex-holotype culture ICMP 17903.

Hosts – *Xanthorrhoea preissii* (Weir et al. 2012)

Distribution – Australia (Weir et al. 2012)

Notes – This species is only recorded from *Xanthorrhoea preissii* and can be identified by ITS sequence data (Weir et al. 2012).

Colletotrichum yulongense C.L. Hou & X.T. Liu, in Wang et al., Phytotaxa 394(4): 293 (2019)

Sexual morph not reported. See Wang et al. (2019) for illustrations and descriptions of asexual morph.

Type – China, Yunnan Province, Yulong County, Lijiang, from the leaves of *Vaccinium dunalianum* var. *urophyllum*, alt. ca. 2400 m, 20 July 2013, coll. C.L. Hou, holotype BJTC 193, culture ex-holotype CFCC 50818.

Hosts – *Vaccinium dunalianum* (Wang et al. 2019)

Distribution – China (Wang et al. 2019)

Notes – *Colletotrichum yulongense* is closely related with *C. henanense* and can be distinguished by any of the loci (ITS, *gapdh*, *chs-1*, *act* and *tub2*) used in Wang et al. (2019).

Magnum Species Complex

The magnum species complex includes *C. magnum* and seven closely related species (Damm et al. 2019). Except for *C. brevisporum* other species appear to be host-specific. However, for some of these species only a single strain is available (Damm et al. 2019). A combined multigene analysis of ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 14, Table 13.

Colletotrichum brevisporum Noireung, Phouliv., L. Cai & K.D. Hyde, Cryptog. Mycol. 33(3): 350 (2012)

Sexual morph not reported. See Noireung et al. (2012) for illustrations and descriptions of asexual morph.

Type – Thailand, Nakhon Si Thammarat Province, Thasala District, Walailak University, on *Neoregelia* sp., 17 January 2008, Sitthisack Phoulivong holotype MFLU 110011, culture ex-type MFLUCC 110115.

Hosts – *Anthurium* sp., *Carica papaya*, *Neoregalia* sp., *Pandanus pygmaeus*, *Passiflora edulis* (Noireung et al. 2012, Damm et al. 2019)

Distribution – Australia, Japan, Thailand (Noireung et al. 2012, Damm et al. 2019)

Notes – *Colletotrichum brevisporum* can be identified based on its *gapdh* sequence data. This taxon is recorded as a pathogen and an endophyte. Pathogenicity studies are available for this species.

Colletotrichum cacao Damm, in Damm et al., Stud. Mycol. 92: 8 (2018)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – Costa Rica, endophyte of *Theobroma cacao*, collection date and collector unknown, holotype CBS H-21068, culture ex-type CBS 119297.

Hosts – *Theobroma cacao* (Damm et al. 2019)

Distribution – Costa Rica (Damm et al. 2019)

Notes – The formation of setae that function as conidiogenous loci and conidia in closed conidiomata can differentiate this species from others in the complex (Damm et al. 2019). *Colletotrichum cacao* can be phylogenetically distinguished by all the loci used in (ITS, *gapdh*, *chs-1*, *his3*, *act* and *tub2*) Damm et al. (2019).

Colletotrichum liaoningense Y.Z. Diao, C. Zhang, L. Cai & Xi L. Liu, in Diao et al., Persoonia 38: 34 (2017)

Sexual morph not reported. See Diao et al. (2017) for illustrations and descriptions of asexual morph.

Type – China, Liaoning Province, Xingcheng city on fruits of *Capsicum annuum* var. *conoides*, Oct. 2012, Y.Z. Diao, holotype HMAS 246479, culture ex-type CGMCC3.17616.

Hosts – *Capsicum annuum* (Diao et al. 2017)

Distribution – China (Diao et al. 2017)

Notes – The four strains assigned to this species by Diao et al. (2017) need further clarifications as they formed two separate clades in Damm et al. (2019). *Colletotrichum liaoningense* is recorded only from *Capsicum annuum* and seems to be restricted to China. Pathogenicity studies for this species are available.

Colletotrichum lobatum Damm, in Damm et al., Stud. Mycol. 92: 16 (2018)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – Trinidad and Tobago, from *Piper catalpaefolium*, collection date and collector unknown, holotype IMI 79736 holotype, culture ex-holotype IMI 79736.

Hosts – *Piper catalpaefolium* (Damm et al. 2019), *Phaseolus lunatus* (Cavalcante et al. 2019)

Distribution – Trinidad and Tobago (Damm et al. 2019), Brazil (Cavalcante et al. 2019)

Notes – *Colletotrichum lobatum* has lobate appressoria and can be identified by its unique *gapdh* sequence data (Damm et al. 2019). Pathogenicity studies for this taxon are available (Cavalcante et al. 2019). This species thought to be host-specific by the time it was introduced, however new collections show that it is not.

Colletotrichum merremiae Damm, in Damm et al., Stud. Mycol. 92: 21 (2018)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

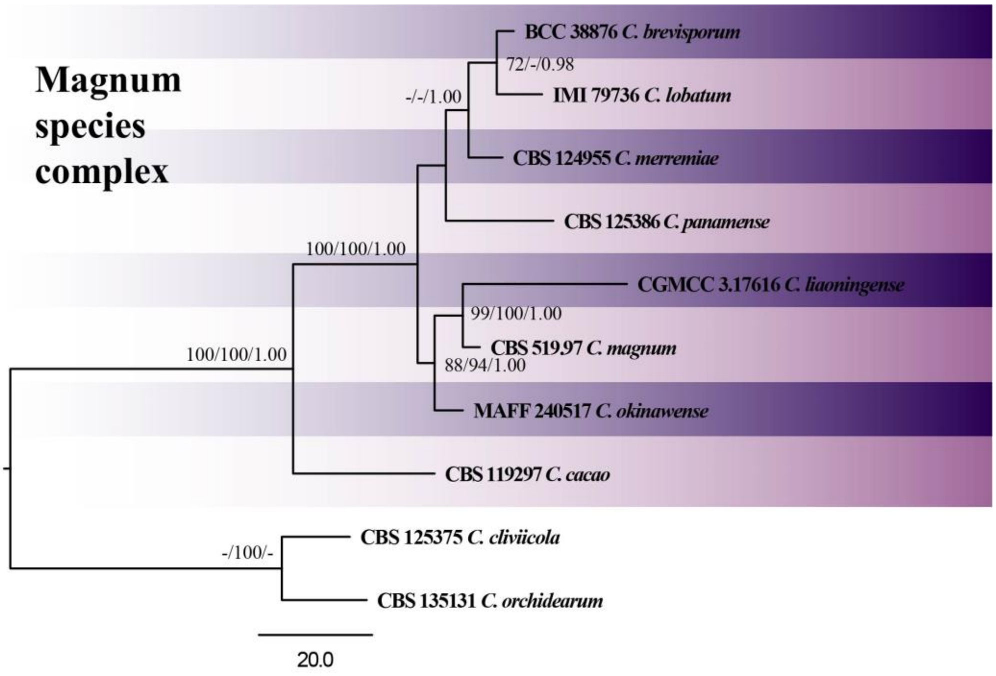

Figure 14 – The magnum complex. One of the 100 most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP ≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. cliviicola* (CBS 125375) and *C. orchidearum* (CBS 135131).

Table 13 GenBank accession numbers of species in the magnum complex

Species name	Type/Reference strain	ITS	*gapdh*	*chs-1*	*act*	*tub2*	References
C. brevisporum	BCC 38876	JN050238	JN050227		JN050216	JN050244	Damm et al. (2019)
C. cacao	CBS 119297	MG600772	MG600832	MG600878	MG600976	MG601039	Damm et al. (2019)
C. liaoningense	CGMCC 3.17616	KP890104	KP890135	KP890127	KP890097	KP890111	Damm et al. (2019)
C. lobatum	IMI 79736	MG600768	MG600828	MG600874	MG600972	MG601035	Damm et al. (2019)
C. magnum	CBS 519.97	MG600769	MG600829	MG600875	MG600973	MG601036	Damm et al. (2019)
C. merremiae	CBS 124955	MG600765	MG600825	MG600872	MG600969	MG601032	Damm et al. (2019)
C. okinawense	MAFF 240517	MG600767	MG600827		MG600971	MG601034	Damm et al. (2019)
C. panamense	CBS 125386	MG600766	MG600826	MG600873	MG600970	MG601033	Damm et al. (2019)

Type – Panama, Gamboa, wet lowland forest, leaf endophyte of *Merremia umbellata*, Nov. 2004, S. VanBael & Z. Maynard, D3-1, holotype CBS H-21065, culture ex-type CBS 124955.

Hosts – *Merremia umbellate* (Damm et al. 2019)

Distribution – Panama (Damm et al. 2019)

Notes – *Colletotrichum merremiae* can be identified based on its unique *gapdh*, *his3* and *tub2* sequence data (Damm et al. 2019).

Colletotrichum magnum (S.F. Jenkins & Winstead) Rossman & W.C. Allen, in Rossman et al., IMA Fungus 7(1): 4 (2016)

See Damm et al. (2019) for illustrations and descriptions of asexual and sexual morphs.

Type – USA, from *Citrullus lanatus*, collection date and collector unknown, epitype CBS H-21063, culture ex-epitype CBS 519.97.

Hosts – *Citrullus lanatus* (Damm et al. 2019)

Distribution – USA (Damm et al. 2019)

Notes – As a result of a laboratory crossing, a heterothallic sexual morph for this species is known (Damm et al. 2019). *Colletotrichum magnum* is difficult to differentiate based on sequence data. This species was the basis and used as a model species for a number of molecular, morphological and pathogenicity studies on appressorium formation, pathogenic and symbiotic lifestyles of fungi in plants.

Colletotrichum okinawense Damm & Toy. Sato, in Damm et al., Stud. Mycol. 92: 23 (2018)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – Japan, Okinawa prefecture, Miyakojima Island, from a petiole of *Carica papaya*, 28 Sep. 2007, S. Sato, holotype GLM-F 111630, culture ex-holotype MAFF 240517.

Hosts – *Carica papaya* (Damm et al. 2019, Dias et al. 2020)

Distribution – Japan (Damm et al. 2019), Brazil (Dias et al. 2020)

Notes – *Colletotrichum okinawense* differ from all other species in magnum species complex *gapdh*, *act* and *tub2* sequence data. This species produces predominantly clavate conidia, microcyclic conidiation and is the only fastest growing species in the complex.

Colletotrichum panamense Damm, in Damm et al., Stud. Mycol. 92: 28 (2018)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – Panama, Gamboa, wet lowland forest, leaf endophyte of *Merremia umbellata*, Nov. 2004, S. Van Bael & Z. Maynard, D2-13, holotype CBS H-21066, culture ex-type CBS 125386.

Hosts – *Merremia umbellate* (Damm et al. 2019)

Distribution – Panama (Damm et al. 2019)

Notes – *Colletotrichum panamense* differs with all loci (ITS, *gapdh*, *chs-1*, *his3*, *act* and *tub2*) studied in Damm et al. (2019) from all other species of the genus. It is closely related to *C. merremiae*. However, the conidiogenous cells of *C. panamense* are often subglobose to ellipsoidal and can be differentiated from *C. merremiae*.

Orbiculare species complex

The orbiculare species complex includes *C. orbiculare* and seven closely related species. They are plant pathogens and are restricted to specific herbaceous host genera or species (Damm et al. 2013). The lifestyle of these species has been characterized as hemibiotrophic (Damm et al. 2013). Members of the orbiculare species complex form conidia that are straight and relatively broad and short. Appressoria of these species are small and simple in outline (Damm et al. 2013). All species of this species are either host-specific or geographically restricted. However, for some of these species only a single strain is available (Damm et al. 2013). All species in this complex can be identified based on *gs* sequences alone (Damm et al. 2013). A combined multigene analysis of ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 15, Table 14.

Colletotrichum bidentis Damm, Guatim. & B.S. Vieira, in Damm et al., Fungal Diversity 61: 34 (2013)

Sexual morph not reported. See Damm et al. (2013) for illustrations and descriptions of asexual morph.

Type – Brazil, Goiás, Jataí, road to Rio Verde, abandoned gas station, from anthracnose symptoms on stems of *Bidens subalternans*, 13 Feb. 2010, B.S. Vieira, holotype VIC 31566, culture ex-holotype COAD 1020.

Hosts – *Bidens subalternans* (Damm et al. 2013)

Distribution – Brazil (Damm et al. 2013)

Notes – *Colletotrichum bidentis* is similar to *C. lindemuthianum* but can be separated from its setae and slow growing nature on medium (Damm et al. 2013). Even though this species has been isolated disease symptoms materials, no pathogenicity data are available to confirm it. This taxon is separable from all other species in this complex by any of the loci (ITS, *gapdh*, *chs-1*, *his3*, *act*, *tub2* and *gs*) used in Damm et al. (2013). There are no records of this species other than that of the type.

Colletotrichum lindemuthianum (Sacc. & Magnus) Briosi & Cavara, Funghi Parass. Piante Colt. od Utili, Fasc. 2: no. 50 (1889)

Sexual morph not reported. See Liu et al. (2013) for illustrations and descriptions of asexual morph.

Type – Germany, Bonn. on *Phaseolus vulgaris*, Aug 1931, E. Schaffnit epitype CBS H-20954, culture ex-epitype CBS 144.31.

Hosts – *Phaseolus coccineus*, *P. vulgaris* (Liu et al. 2013b)

Distribution – Worldwide (Jayawardena et al. 2016a)

Notes – This species is restricted to *Phaseolus* sp. with a worldwide distribution. *Colletotrichum lindemuthianum* is used as a model organism in understanding the hemi-biotrophic nature of this genus (Cannon et al. 2012, Jayawardena et al. 2016a).

Colletotrichum malvarum (A. Braun & Casp.) Southw., J. Mycol. 6(3): 116 (1891)

Sexual morph not reported. See Damm et al. (2013) for illustrations and descriptions of asexual morph.

Type – UK, from *Lavatera trimestris* cv. 'Mont Blanc', unknown collection date, R. Maude, epitype CBS H-20973, culture ex-epitype CBS 521.97.

Hosts – genera of *Malvaceae* (Damm et al. 2013)

Distribution – Germany, Korea, UK (Damm et al. 2013)

Notes – It is a restricted pathogen causing anthracnose and leaf spots on genera of *Malvaceae* (Damm et al. 2013). *Colletotrichum malvarum* is one of the slowest growing species in the orbiculare complex (except for *C. bidentis*). This taxon is closely related to *C. trifolii* and can be distinguished by *gs* sequence data.

Colletotrichum orbiculare Damm, P.F. Cannon & Crous, in Damm et al., Fungal Diversity 61: 39 (2013)

Sexual morph not reported. See Damm et al. (2013) for illustrations and descriptions of asexual morph.

Type – Unknown country in Europe (probably UK), from *Cucumis sativus*, collection date unknown, G.A. Carter, holotype CBSH-20976, culture ex-holotype CBS 570.97.

Hosts – genera of *Cucubitaceae* (Damm et al. 2013)

Distribution – Australia, Japan, Netherland, UK (Damm et al. 2013)

Notes – *Colletotrichum orbiculare* may have a wide distribution as there are many records in US national fungus collections (Farr & Rossman 2021). As most of those records are based on morphology alone, further collections are needed to confirm these. This taxon has been used as a model in host-pathogen interactions in *Colletotrichum* (Jayawardena et al. 2016a). This species can be separated from other species with its unique *gs*, *act* and *his3* sequence data (Damm et al. 2013). Whole genomic data for this species are available (Baroncelli et al. 2016).

Colletotrichum sidae Damm & P.F. Cannon, in Damm et al., Fungal Diversity 61: 44 (2013)

Sexual morph not reported. See Damm et al. (2013) for illustrations and descriptions of asexual morph.

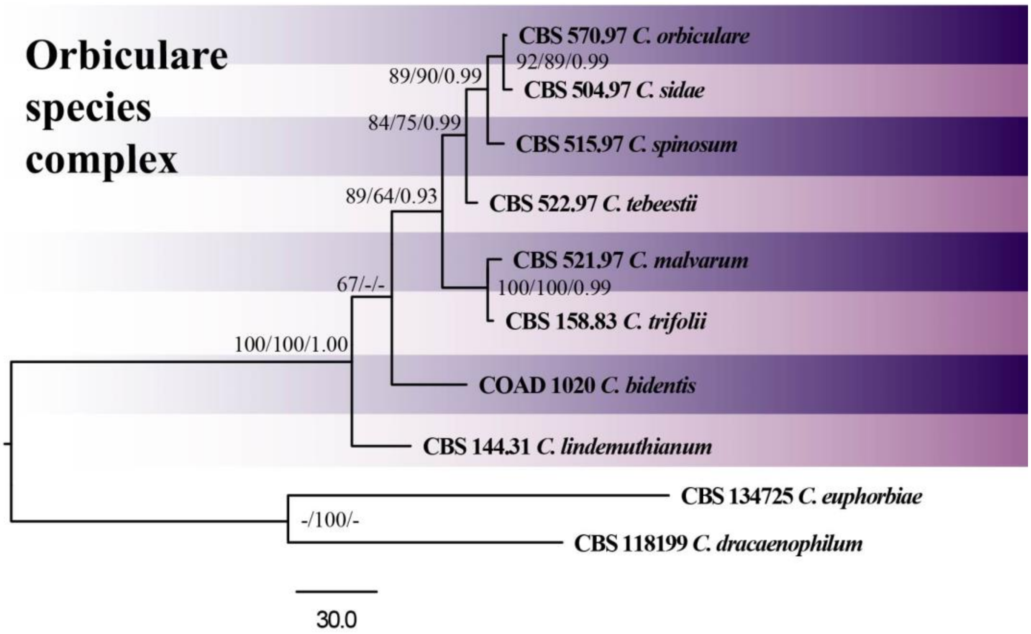

Figure 15 – Orbiculare complex. One of the 100 most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. euphorbiae* (CBS 134725) and *C. dracaenophilum* (CBS 118199).

Table 14 GenBank accession numbers of species in the orbiculare complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. bidentis	COAD 1020	KF178481	KF178506	KF178530	KF178578	KF178602	Damm et al. (2013)
C. lindemuthianum	CBS 144.31	JQ005779	JX546712	JQ005800	JQ005842	JQ005863	Damm et al. (2013)
C. malvarum	CBS 521.97	KF178480	KF178504	KF178529	KF178577	KF178601	Damm et al. (2013)
C. orbiculare	CBS 570.97	KF178466	KF178490	KF178515	KF178563	KF178587	Damm et al. (2013)
C. sidae	CBS 504.97	KF178472	KF178497	KF178521	KF178569	KF178593	Damm et al. (2013)
C. spinosum	CBS 515.97	KF178474	KF178498	KF178523	KF178571	KF178595	Damm et al. (2013)
C. tebeesti	CBS 522.97	KF178473	KF178505	KF178522	KF178570	KF178594	Damm et al. (2013)
C. trifolii	CBS 158.83	KF178478	KF178502	KF178527	KF178575	KF178599	Damm et al. (2013)

Type – USA, Arkansas, from *Sida spinosa*, 1 May 1988, D.O. TeBeest, holotype CBS H-20975, culture ex-holotype CBS 504.97.

Hosts – *Sida spinosa* (Damm et al. 2013)

Distribution – USA (Damm et al. 2013)

Notes – *Colletotrichum sidae* can be separated from its closely related taxa from ITS and *gs* sequence data (Damm et al. 2013).

Colletotrichum spinosum Damm & P.F. Cannon, in Damm et al., Fungal Diversity 61: 46 (2013)

Sexual morph not reported. See Damm et al. (2013) for illustrations and descriptions of asexual morph.

Type – Australia, New South Wales, Coolah, from stem lesion of *Xanthium spinosum*, 20 Mar. 1983, B. Auld, holotype CBS H-20977, culture ex-holotype CBS 515.97.

Hosts – *Xanthium spinosum* (Damm et al. 2013)

Distribution – Argentina, Australia (Damm et al. 2013)

Notes – *Colletotrichum spinosum* is a common pathogen (stem and leaf spots) on *Xanthium spinosum* in Australia (Walker et al. 1991), and has been tested as a mycoherbicide against this weed (Auld & Say 1999). This taxon can be effectively separated from the related taxa based on *gapdh*, *his3*, *tub2* and *gs* sequence data (Damm et al. 2013).

Colletotrichum tebeestii Damm & P.F. Cannon, in Damm et al., Fungal Diversity 61: 48 (2013)

Sexual morph not reported. See Damm et al. (2013) for illustrations and descriptions of asexual morph.

Type – Canada, Saskatchewan, Raymore, from *Malva pusilla*, unknown collection date, D.O. TeBeest, holotype CBS H-20974, culture ex-holotype CBS 522.97.

Hosts – *Malva pusilla* (Damm et al. 2013)

Distribution – Canada (Damm et al. 2013)

Notes – *Colletotrichum tebeestii* can best be differentiated from other species in the complex by its unique *gapdh* sequence data (Damm et al. 2013).

Colletotrichum trifolii Bain, in Bain & Essary, J. Mycol. 12(5): 193 (1906)

Sexual morph not reported. See Damm et al. (2013) for illustrations and descriptions of asexual morph.

Type – USA, from *Trifolium* sp., collection date and collector unknown, epitype CBS H-20978, culture ex-epitype CBS 158.83.

Hosts – *Medicago* sp., *Trifolium* sp. (Damm et al. 2013)

Distribution – USA (Damm et al. 2013)

Notes – This species has darker and often knobby setae than the other species in this complex (Damm et al. 2013). *Colletotrichum trifolli* is closely related to *C. malvarum* and can be separated best with *gs* sequence data. In Farr & Rossman (2021) there are more host associations for this taxon. However, as they are based solely on morphology further collections are needed to clarify.

Orchidearum species complex

The orchidearum species complex includes *C. orchidearum* and seven closely related species (Damm et al. 2019). Three of the species (*C. orchidearum*, *C. plurivorum*, *C. sojae*) are very common and occur on many hosts while the rest are less common (*C. cliviicola*, *C. musicola*) and some being host specific (*C. cattleyicola*) and restricted to a specific region (*C. piperis*, *C. vittalense*). In the study of Damm et al. (2019), sexual morphs were observed for many of the species in this complex. Therefore, they assumed them to be homothallic, however, this is yet to be confirmed. A combined multigene analysis of ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Fig. 16, Table 15.

Colletotrichum cattleyicola Damm & Toy. Sato, in Damm et al., Stud. Mycol. 92: 10 (2018)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – Belgium, from a root of *Cattleya* sp., collection date and collector unknown, holotype CBS H-21502 holotype, culture ex-holotype CBS 170.49.

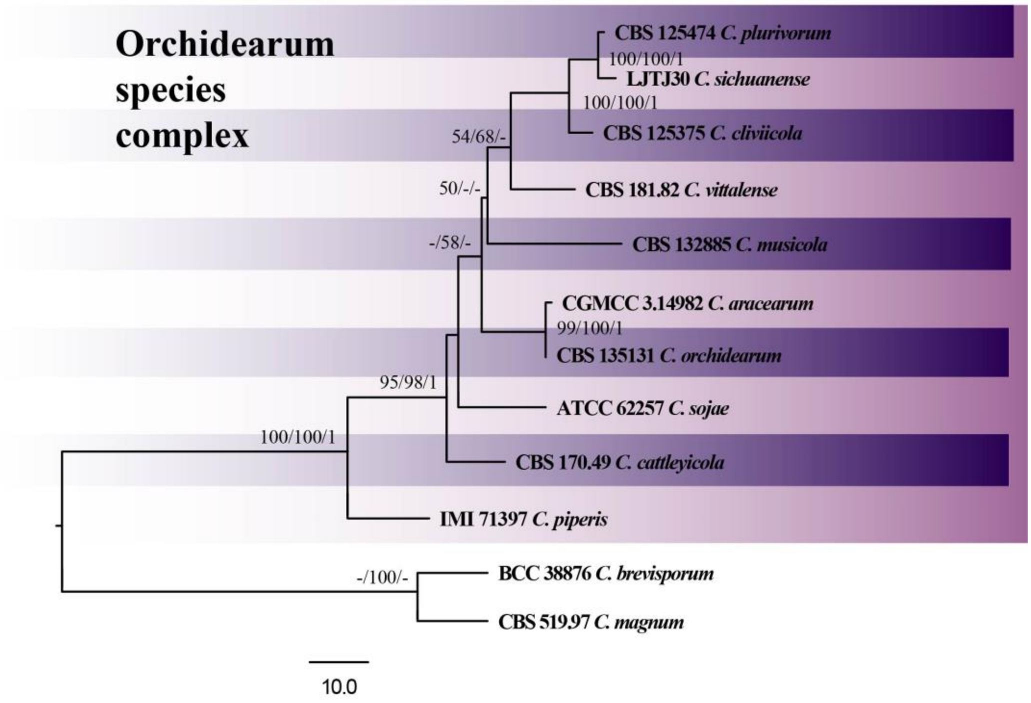

Figure 16 – The orchidearum complex. One of the 100 most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP ≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. brevisporum* (BCC 38876) and *C. magnum* (CBS 519.97).

Table 15 GenBank accession numbers of species in the orchidearum complex

Species name	Type/Reference strain	ITS	*gapdh*	*chs-1*	*act*	*tub2*	References
C. cattleyicola	CBS 170.49	MG600758	MG600819	MG600866	MG600963	MG601025	Damm et al. (2019)
C. cliviicola	CBS 125375	MG600733	MG600795	MG600850	MG600939	MG601000	Damm et al. (2019)
C. musicola	CBS 132885	MG600736	MG600798	MG600853	MG600942	MG601003	Damm et al. (2019)
C. orchidearum	CBS 135131	MG600738	MG600800	MG600855	MG600944	MG601005	Damm et al. (2019)
C. piperis	IMI 71397	MG600760	MG600820	MG600867	MG600964	MG601027	Damm et al. (2019)
C. plurivorum	CBS 125474	MG600718	MG600781	MG600841	MG600925	MG600985	Damm et al. (2019)
C. sojae	ATCC 62257	MG600749	MG600810	MG600860	MG600954	MG601016	Damm et al. (2019)
C. vittalense	CBS 181.82	MG600734	MG600796	MG600851	MG600940	MG601001	Damm et al. (2019)

Hosts – *Cattleya* sp. (Damm et al. 2019)

Distribution – Belgium, Japan (Damm et al. 2019)

Notes – This taxon can be differentiated by its unique appressoria (narrow, mostly clavate or elongate cylindrical) from other species in this complex. Phylogenetically it can be distinguished by ITS, *his3* and *tub2* sequence data (Damm et al. 2019). This species has been isolated from root and lesion on a stem sheath of *Cattleya* sp.

Colletotrichum cliviicola Damm & Crous, in Damm et al., Stud. Mycol. 92: 11 (2018)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – China, Yunnan Province, Kunming, on leaf of *Clivia miniata*, 10 Aug. 2008, Y.L. Yang, holotype GZAAS 080005, culture ex-holotype CBS 125375.

Hosts – *Clivia* sp. (Damm et al. 2019), *Pennisetum* sp. (Han et al. 2019)

Distribution – China (Damm et al. 2019, Han et al. 2019), South Africa (Damm et al. 2019)

Notes – *Colletotrichum cliviicola* differs from the closely related *C. plurivorum* in its *tub2*, *his3* and *gapdh* sequence data (Damm et al. 2019). Pathogenicity studies for this taxon are available (Han et al. 2019).

Colletotrichum musicola Damm, in Damm et al., Stud. Mycol. 92*:* 21 (2018)

See Damm et al. (2019) for illustrations and descriptions of asexual and sexual morphs.

Type – Mexico, from *Musa* sp., 16 Dec. 2008, M. de J. Yanez Morales holotype CBS H-21500, culture ex-holotype CBS 132885.

Hosts – *Musa* sp. (Damm et al. 2019), *Colocasia esculenta* (Vasquez-Lopez et al. 2019), *Phaseolus lunatus* (Cavalcante et al. 2019), *Glyzine max* (Boufleur et al. 2020)

Distribution – Mexico (Damm et al. 2019, Vasquez-Lopez et al. 2019), Brazil (Cavalcante et al. 2019, Boufleur et al. 2020)

Notes – *Colletotrichum musicola* can be identified with all loci (ITS, *gapdh*, *chs-1*, *his3*, *act* and *tub2*) studied in Damm et al. (2019). The species was introduced from *Musa* sp. from Mexico. Later it was found to be a pathogen on *Glyzine max* and *Phaseolus lunatus* in Brazil. Pathogenicity studies for this taxon are available.

Colletotrichum orchidearum Allesch., Rabenh. Krypt.-Fl., Edn 2 (Leipzig) 1(7): 563 (1902) [1903]

See Damm et al. (2019) for illustrations and descriptions of asexual and sexual morphs.

Type – Netherlands, Utrecht, from anthracnose on leaf of *Dendrobium nobile*, Apr. 2013, I. Benoit-Gelber, epitype CBS H-21910, culture ex-epitype CBS 135131.

Hosts – *Cordyline*, *Hymenocallis*, *Monstera*, *Philodendron*, *Scindapus*, *Orchidaceae* (*Cattleya*, *Cymbidium*, *Dendrobium*, *Oncidium*, *Phalaenopsis* and *Vanda*) Damm et al. (2019)

Distribution – China, Iran, Japan, Thailand, Netherland (Damm et al. 2019)

Notes – *Colletotrichum orchidearum* can be differentiated with sequence data of all loci (ITS, *chs-1*, *his3*, *act* and *tub2*) included in Damm et al. (2019), except for *gapdh*. Pathogenicity studies are available for this taxon.

Colletotrichum piperis Petch, Ann. R. bot. Gdns Peradeniya 6(3): 239 (1917)

Sexual morph not reported. See Damm et al. (2019) for illustrations and descriptions of asexual morph.

Type – Malaysia, from *Piper nigrum*, unknown collection date and collector epitype IMI 71397, culture ex-epitype IMI 71397.

Hosts – *Piper nigrum* (Damm et al. 2019)

Distribution – Malaysia (Damm et al. 2019)

Notes – *Colletotrichum piperis* can be identified with all loci (ITS, *gapdh*, *chs-1*, *his3*, *act* and *tub2*) in Damm et al. (2019).

Colletotrichum plurivorum Damm, Alizadeh & Toy. Sato, in Damm et al., Stud. Mycol. 92: 31 (2018)

See Damm et al. (2019) for illustrations and descriptions of asexual and sexual morphs.

Type – Vietnam, Da Lat-Lam Dong, from anthracnose on leaf of *Coffea* sp., collection date unknown, P. Nguyen & E. Liljeroth, holotype CBS H-21496, culture ex-holotype CBS 125474.

Hosts – *Abelmoschus esculentus*, *Amorphophallus rivieri*, *Arundina graminifolia*, *Camellia sinensis*, *Capsicum annuum*, *Carica papaya*, *Coffea* sp., *Cymbidium hookerianum*, *Glycine max*, *Gossypium* sp., *Lycopersicon esculentum*, *Mangifera indica*, *Musa* sp., *Oncidium* sp., *Passiflora edulis*, *Phaseolus* sp., *Spathiphyllum wallisii* (Damm et al. 2019), *Pyrus bretschneideri* (Fu et al. 2019)

Distribution – Benin, Brazil, China, Iran, Japan, Vietnam (Damm et al. 2019)

Notes – *Colletotrichum plurivorum* was described as *C. sichuanensis* from *Capsicum annuum* in the Sichuan Province of China (Liu et al. 2016a) and was invalidly published. This taxon has a wide host range. Pathogenicity studies for this taxon are available. Phylogenetically this species can be distinguished by its *gapdh*, *his3* and *tub2* sequence data from its sister taxon, *C. cliviicola*. These two taxa can be distinguished by the presence of microcyclic conidiation and the formation of anastomoses in *C. cliviicola* (Damm et al. 2019)

Colletotrichum sojae Damm & Alizadeh, in Damm et al., Stud. Mycol. 92: 35 (2018)

See (Damm et al. 2019) for illustrations and descriptions of asexual and sexual morphs.

Type – USA, North Carolina, Raleigh, from anthracnose of *Glycine max*, unknown collection date and collector, holotype BPI 596658 (dried culture), culture ex-holotype CBS 195.32.

Hosts – *Arctium lappa*, *Bletilla ochracea*, *Capsicum* sp., *Glycine max*, *Medicago sativa*, *Phaseolus vulgaris*, *Vigna unguiculata* (Damm et al. 2019)

Distribution – Brazil, China, Iran, Italy, Serbia, USA (Damm et al. 2019)

Notes – *Colletotrichum sojae* can be identified by its *his3*, *act* and *tub2* sequences data (Damm et al. 2019). There are no pathogenicity studies available for this species.

Colletotrichum vittalense Damm, in Damm et al., Stud. Mycol. 92: 38 (2018)

See (Damm et al. 2019) for illustrations and descriptions of asexual and sexual morphs.

Type – India, Karnataka, Vittal, from *Theobroma cacao*, collection date and collector unknown, holotype CBS H-21498, culture ex-holotype CBS 181.82.

Hosts – *Calamus thwaitesii*, *Orchid* sp., *Theobroma cacao* (Damm et al. 2019)

Distribution – India (Damm et al. 2019)

Notes – *Colletotrichum vittalense* can be distinguished by its very short ascospores with round ends that vary between straight to strongly curved. This taxon can be identified by its unique *gapdh*, *chs-1*, *his3* and *tub2* sequence data (Damm et al. 2019). Even though the species was described as a pathogen there are no pathogenicity studies to confirm this.

Spaethianum species complex

The spaethianum species complex includes *C. spaethianum* and eight closely related species. Species in this species complex form complex appressoria (Damm et al. 2009). A combined multigene analysis of ITS, *gapdh*, *chs-1*, *act*, *his3* and *tub2* sequence data is given in Fig. 17, Table 16.

Colletotrichum bletillae G. Tao, Zuo Y. Liu & L. Cai [as 'bletillum'], in Tao et al., Fungal Diversity 61: 144 (2013)

Sexual morph not reported. See Tao et al. (2013) for illustrations and descriptions of asexual morph.

Type – China, Guizhou Province, Shuicheng, Baijipo Mountain, isolated from healthy leaves of *Bletilla ochracea*, 28 June 2006, Gang Tao, holotype HMAS 244278 (dried culture), culture ex-holotype CGMCC 3.15117.

Hosts – *Bletilla ochracea* (Tao et al. 2013)

Distribution – China (Tao et al. 2013)

Notes – *Colletotrichum bletillum* was isolated as an endophyte and phylogenetically can be distinguished by any of the loci (ITS, *act*, *gapdh* and *tub2*) used in Tao et al. (2013).

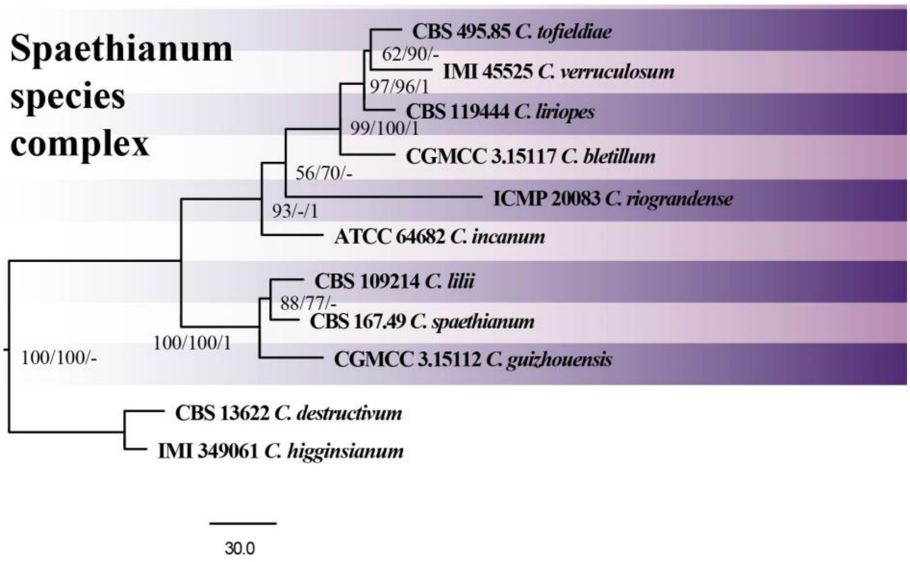

Figure 17 The spaethianum complex. One of the 100 most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. destructivum* (CBS 13622) and *C. higginsianum* (IMI 349061).

Table 16 GenBank accession numbers of species in the spaethianum complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. bletillum	CGMCC 3.15117	JX625178	KC843506		KC843542	JX625207	Tao et al. (2013)
C. guizhouensis	CGMCC 3.15112	JX625158	KC843536		KC843536	JX625185	Tao et al. (2013)
C.incanum	ATCC 64682	KC110789	KC110807		KC110825	KC110816	Yang et al. (2014)
C. lilii	CBS 109214	GU227810	GU228202	GU228300	GU227908	GU228104	Damm et al. (2009)
C. liriopes	CBS 119444	GU227804	GU228196	GU228294	GU227902	GU228098	Damm et al. (2009)
C. riograndense	ICMP 20083	KM655299	KM655298	KM655297	KM655295	KM655300	Macedo et al. (2016)
C. spaethianum	CBS 167.49	GU227807	GU228199	GU228297	GU227905	GU228101	Damm et al. (2009)
C. tofieldiae	CBS 495.85	GU227801	GU228193	GU228291	GU227899	GU228095	Damm et al. (2009)
C. verruculosum	IMI 45525	GU227806	GU228198	GU228296	GU227904	GU228100	Damm et al. (2009)

Colletotrichum guizhouensis G. Tao, Zuo Y. Liu & L. Cai, in Tao, Liu, Liu, Gao & Cai, Fungal Diversity 61: 152 (2013)

Sexual morph not reported. See Tao et al. (2013) for illustrations and descriptions of asexual morph.

Type – China, Guizhou Province, Duyun, Xiaba mountain, isolated from healthy leaves of *Bletilla ochracea*, 13 July 2006, Gang Tao, Holotype HMAS244281 (dried culture), culture ex-holotype CGMCC 3.15112.

Hosts – *Bletilla ochracea* (Tao et al. 2013)

Distribution – China (Tao et al. 2013)

Notes – This taxon is an endophyte. *Colletotrichum guizhouensis* is similar to *C. lilii* and *C. spaethianum* but differs from them in having darker and longer setae (Tao et al. 2013). Zhang et al. (2015) showed that this species is capable of producing Huperzine A.

Colletotrichum incanum H.C. Yang, J.S. Haudenshield & G.L. Hartman, Mycologia 106(1): 38 (2014)

Sexual morph not reported. See Yang et al. (2014) for illustrations and descriptions of asexual morph.

Type – USA, Illinois, Monmouth, isolated from diseased soybean (*Glycine max*) petioles collected from the soybean field, 14 Jun 2010, H.-C. Yang, J.S. Haudenshield & G.L. Hartman, holotype BPI884116, cultures ex-holotype (IL6A 5) CBS 133485.

Hosts – *Glycine max* (Yang et al. 2014)

Distribution – USA (Yang et al. 2014)

Notes – Sequence data of *act*, *tub2*, *gapdh* and *his3* genes can be used to distinguish this taxon from other species in this complex. Whole genomic data for this species are available (Gan et al. 2016).

Colletotrichum lilii Plakidas ex Boerema & Hamers, Neth. Jl Pl. Path. 94 (suppl.1): 12 (1988)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Reference specimen – Japan, unlocalised, on *Lilium* sp., deposited in CBS collection Jan. 2001 by H. Nirenberg, herbarium CBS H-20361 (dried culture), living culture CBS 109214.

Hosts – *Lillium* sp. (Damm et al. 2009)

Distribution – Japan (Damm et al. 2009)

Notes – This species is recorded as a pathogen on *Lillium* sp. causing black scale disease of bulbs.

Colletotrichum liriopes Damm, P.F. Cannon & Crous, in Damm et al., Fungal Diversity 39: 71 (2009)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Mexico, Aphis interception Houstan 057263, on *Liriope muscari*, collected 29 Nov. 2000 by M.J. Segall, isolated 2000 by A.Y. Rossman, holotype CBS H-20364, culture ex-type CBS 119444.

Hosts – *Lirope muscari* (Damm et al. 2009), *Eria coronaria*, *Pleione bulbocodioides* (Yang et al. 2011), *Bletilla ochracea* (Tao et al. 2013), *Liriope spicata* (Chen et al. 2019a), *Liriope cymbidiomorpha* (Yang et al. 2020)

Distribution – Mexico (Damm et al. 2009), China (Yang et al. 2011, Tao et al. 2013, Chen et al. 2019a, Yang et al. 2020)

Notes – This taxon can be distinguished by its appressoria with complex outlines that are similar to those of *C. lilii*. However, it differs from it by the often strongly inflated conidiogenous cells (Damm et al. 2009). *Colletotrichum liriopes* has been isolated as a pathogen as well as an endophyte. Pathogenicity studies for this species are available.

Colletotrichum riograndense D.M. Macedo, R.W. Barreto, O.L. Pereira & B.S. Weir, in Macedo et al., Australasian Plant Pathology 45: 49 (2016)

Sexual morph not reported. See Macedo et al. (2016) for illustrations and descriptions of asexual morph.

Type – Brazil, Rio Grande do Sul, São Marcos, on living leaves of *Tradescantia fluminensis*, 13 Jul. 2008, D. M. Macedo, holotype VIC 31366, culture ex-type COAD 928.

Hosts – *Tradescantia fluminensis* (Macedo et al. 2016)

Distribution – Brazil (Macedo et al. 2016)

Notes – *Colletotrichum riograndense* is similar to *C. falcatum* (Macedo et al. 2016).

Colletotrichum spaethianum (*Allesch.) Damm, P.F. Cannon & Crous, in Damm et al., Fungal Diversity 39: 74 (2009)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Germany, Berlin-Zehlendorf, on a dead stem of *Hosta sieboldiana*, isolated Oct. 1932 by H. Richter, epitype CBS H-20369 (dried culture), culture ex-epitype CBS 167.49.

Hosts – *Hosta sieboldiana*, *Lilium* sp. (diseases leaves), *Hemerocallis* sp. (leaf spot) (Damm et al. 2009), *Peucedanum praeruptorum* (Guo et al. 2013), *Allium* sp. (Santana et al. 2016, Salunkhe et al. 2018b), *Hosta plantaginea* (Cheon & Jeon 2016), *Lilium lancifolium* (Zhao et al. 2016b), *Atractylodes japonica* (Guan et al. 2018), *Anemarrhena asphodeloides* (Okorley et al. 2019), *Phaseolus vulgaris* (Yang et al. 2019a), *Paris polyphylla* (Zhong et al. 2020), *Polygonatum odoratum* (Liu et al. 2020b)

Distribution – Germany, New Zealand, South Korea (Damm et al. 2009), China (Guo et al. 2013, Zhao et al. 2016b, Guan et al. 2018, Okorley et al. 2019, Yang et al. 2019a, Liu et al. 2020b, Zhong et al. 2020), Brazil (Santana et al. 2016), Korea (Cheon & Jeon 2016), India (Salunkhe et al. 2018b)

Notes – This taxon can be distinguished from related taxa with setae that have usually acute tips and cylindrical to conical bases and by its appressoria that are irregular in outline and more or less lobed (Damm et al. 2009). Pathogenicity studies for this species are available.

Colletotrichum tofieldiae (Pat.) Damm, P.F. Cannon & Crous, in Damm et al., Fungal Diversity 39: 77 (2009)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Switzerland, Graubünden, from *Tofieldia calyculata*, isolated July1985 by J.A. von Arx, holotype CBS H-20367 (dried culture), culture ex-type CBS 495.85.

Hosts – *Dianthus* sp., *Lupinus polyphyllus*, *Tofieldia* sp. (Damm et al. 2009), *Bletilla ochracea* (Tao et al. 2013), *Arabidopsis thaliana* (Hacquard et al. 2016), *Iris* ×*germanica* (Shivas et al. 2016)

Distribution – Germany, Switzerland, UK (Damm et al. 2009), China (Tao et al. 2013), Australia (Shivas et al. 2016), Spain (Hiruma et al. 2016)

Notes – This taxon is recorded as a leaf and root endophyte (Tao et al. 2013, Hiruma et al. 2016). Pathogenicity of this species is unknown. Whole genomic data for this species are available (Hacquard et al. 2016).

Colletotrichum verruculosum Damm, P.F. Cannon & Crous, in Damm et al., Fungal Diversity 39: 81 (2009)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – Zimbabwe, *Crotalaria juncea*, 1951 holotype IMI 45525, culture ex-type IMI 45525.

Hosts – *Crotalaria juncea* (Damm et al. 2009)

Distribution – Zimbabwe (Damm et al. 2009)

Notes – *Colletotrichum verruculosum* can be distinguished by any of the six genes used by Damm et al. (2009). This species can be distinguished by its verruculose conidia. There are no pathogenicity studies on this species.

Truncatum species complex

The truncatum species complex includes *C. truncatum* and four closely related species. Among them three are pathogens and two are saprobes (Damm et al. 2009, Wikee et al. 2011, Ariyawansa et al. 2015, Samarakoon et al. 2018). This complex can be distinguished by their curved conidia with truncate base and acute, more strongly curved apex (Damm et al. 2009, Cannon et al. 2012, Jayawardena et al. 2016a). The presence of appressoria in groups and dense clades is also characteristic features of this complex (Damm et al. 2009, Jayawardena et al. 2016a). Other than *C. truncatum*, species of this complex seems to be host-specific. *Colletotrichum fusiformae* and *C. truncatum* have been identified as pathogens on humans (Hung et al. 2020). A combined analysis of ITS, *gapdh*, *chs-1*, *act*, *his3* and *tub2* sequence data is given in Fig. 18, Table 17.

Colletotrichum acidae Samarak. & K.D. Hyde, in Samarakoon et al., Mycosphere 9(3): 587 (2018)

Sexual morph not reported. See Samarakoon et al. (2018) for illustrations and descriptions of asexual morph.

Type – Thailand, Mae Fah Luang University, Mueang, Chiang Rai on dead rachis of *Phyllanthus acidus*, 18 May 2017, Milan C. Samarakoon (SAMC004), holotype-MFLU 18–0100, culture ex-type MFLUCC 17–2659.

Hosts – *Phyllanthus acidus* (Samarakoon et al. 2018)

Distribution – Thailand (Samarakoon et al. 2018)

Notes – It is closely related to *C. fusiforme*. *Colletotrichum acidae* seems to be host specific and restricted to Thailand.

Colletotrichum curcumae (Syd. & P. Syd.) E.J. Butler & Bisby, Fungi of India: 153 (1931)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Epitype – India. Maharashtra, Warora, *Curcuma longa*, 22 Aug. 1984, M.Y. Palarpawar, epitype (dried culture) IMI288937, culture ex-epitype IMI 288937.

Hosts – *Curcuma longa*, *Curcuma wenyujin* (Damm et al. 2009)

Distribution – India (Damm et al. 2009), China (Li et al. 2016a)

Notes – *Colletotrichum curcumae* can be distinguished from the species with curved conidia by big brown flattened stromata with straight setae that are aggregated in the centre and with little sporulation (Damm et al. 2009). This species is only recorded from *Curcuma* as a pathogen. Pathogenicity studies for this species are available.

Colletotrichum fusiforme Jayawardena, Bhat, Tangthirasunun & K.D. Hyde, in Ariyawansa et al., Fungal Diversity 75(1): 158 (2015)

Sexual morph not reported. See Ariyawansa et al. (2015) for illustrations and descriptions of asexual morph.

Type – Thailand, Chiang Rai, on a dead leaf, host unknown, 14 July 2012, J. Bhat NTCL98, holotype MFLU 13-0291, culture ex-type MFLUCC 12–0437.

Hosts – *Homo sapiens*

Distribution – Thailand (Ariyawansa et al. 2015), China (Hung et al. 2020)

Notes – This species was introduced as a saprobe from an undetermined host. Therefore, its host-specificity cannot be considered. So far this species has been recorded only from Thailand. There is a recent record of keratitis caused by this species in humans.

Colletotrichum jasminigenum Wikee, K.D. Hyde, L. Cai & McKenzie, in Wikee et al., Fungal Diversity 46(1): 174 (2011)

Sexual morph not reported. See Wikee et al. (2011) for illustrations and descriptions of asexual morph.

Type – Vietnam, Ho Chi Min City, 12th District, Thanh Xuan Ward, on living leaves of *Jasminum sambac*, May 2009, Hoa Nguyen Thi, LLTX–01, holotype MFLU 10–0212, ex-type culture MFLUCC 10–0273.

Hosts – *Jasminum sambac* (Wikee et al. 2011)

Distribution – Vietnam (Wikee et al. 2011)

Notes – *Colletotrichum jasminigenum* appears to be host specific and restricted to Vietnam. However, further studies are needed to confirm this. The sequence data of *act* and *gapdh* of this species seem to have a problem, as they show a higher similarity to *C. siamense*. Therefore, they were not included into our analyses. We strongly suggest redoing the sequencing for these two gene regions.

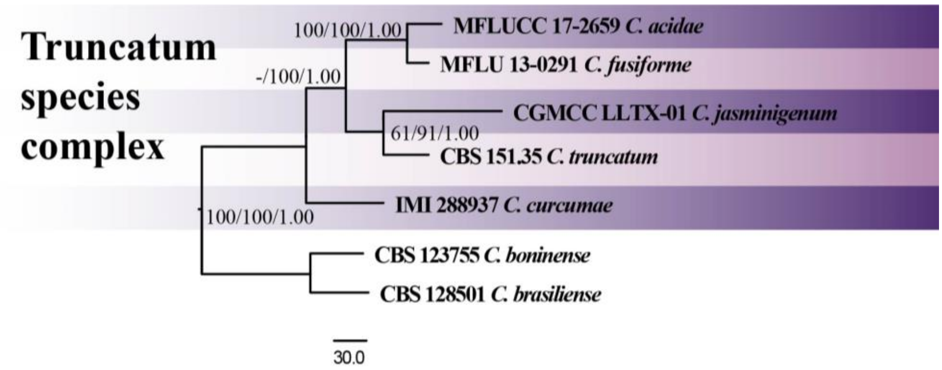

Figure 18 – The truncatum complex. One of the 100 most parsimonious trees obtained from a heuristic search of combined ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data. The MP and ML bootstrap support values ≥50% and BYPP ≥0.90 are indicated at the nodes and branches. The tree is rooted with *C. boninense* (CBS 123755) and *C. brasiliense* (CBS 128501).

Table 17 GenBank accession numbers of the species of the truncatum species complex

Species name	**Type/Reference strain**	**ITS**	***gapdh***	***chs-1***	***act***	***tub2***	**References**
C. acidae	MFLUCC 17-2659	MG996505	MH003691	MH003694	MH003697	MH003700	Samarakoon et al. (2018)
C. curcumae	IMI 288937	GU227893	GU228285	GU228383	GU227991	GU228187	Damm et al. (2009)
C. fusiforme	MFLU 13-0291	KT290266	KT290255	KT290253	KT290251	KT290256	Ariyawansa et al. (2015)
C. jasminigenum	MFLUCC 10-0273	HM131513			-	HM153770	Wikee et al. (2011)
C. truncatum	CBS 151.35	GU227862	GU228254	GU228352	GU227960	GU228156	Damm et al. (2009)

Colletotrichum truncatum (Schwein.) Andrus & W.D. Moore, Phytopathology 25: 121 (1935)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Epitype – USA, Pennsylvania, Bethlehem, on pods of *Phaseolus lunatus*, C.F. Andrus, epitype CBS H-20368 (dried culture), culture ex-epitype CBS 151.35).

Hosts – *Arachis hypogaea*, *Basella* sp., *Bougainvillea* sp., *Brassica* sp., *Capsicum* sp., *Clitoria ternatea*, *Corchorus capsularis*, *Crotalaria* sp., *Cyperus rotundus*, *Glycine max*, *Homo sapiens* (corneal ulcer), *Limonium* sp., *Medicago sativa*, *Opuntia* sp., *Peperomia magnoliifolia*, *Phaseolus* sp., *Stylosanthes hamata*, *Vigna* sp. (Damm et al. 2009), *Xanthium occidentale* (Shivas et al. 2016), *Allium* sp. (Matos et al. 2017, Salunkhe et al. 2018a), *Fragaria ×ananassa* (Bi et al. 2017), *Begonia* sp. (Zhai et al. 2018), *Vitis* sp. (Jayawardena et al. 2018, Zhang et al. 2018), *Dracaena braunii* (Liu et al. 2019), *Euphorbia hirta* (de Souza et al. 2019), *Abutilon theophrasti* (Cong et al. 2020), *Arachis hypogaea* (Yu et al. 2020)

Distribution – Australia, Bangladesh, Brazil, Burkina Faso, Denmark, Gambia, India, Indonesia, Israel, Laos, Mexico, Nepal, Netherlands, Pakistan, Sudan, Tanzania, Trinidad and Tobago, USA, Zimbabwe (Damm et al. 2009), China (Jayawardena et al. 2018, Zhang et al. 2018, Cong et al. 2020)

Notes – *Colletotrichum truncatum* has a wide distribution (Damm et al. 2009). This is an important pathogen as it causes anthracnose on many economically important plants (Damm et al. 2009, Jayawardena et al. 2016a). Pathogenicity studies for this species are available. *Colletotrichum truncatum* is also reported to cause keratitis and corneal infections of humans (Hung et al. 2020).

Singleton species

There are 13 singleton species in *Colletotrichum*. Most of these species appear to be host specific and restricted to a geographical area. Details of these singletons are provided below. Sequence data of ITS, *gapdh*, *chs-1*, *act* and *tub2* sequence data is given in Table 18.

Colletotrichum chlorophyti S. Chandra & Tandon [as ‘chlorophytumi’], Curr. Sci. 34: 565 (1965)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – India, Allahabad, Alfred Park, on leaves of *Chlorophytum* sp., Oct. 1963, S. Chandra holotype IMI 103806, culture ex-type IMI 103806

Hosts/substrates – *Chlorophytum* sp., *Stylosanthes hamata* (Damm et al. 2009), *Glycine max* (Yang et al. 2012b), *Moringa oleifera* (Cai et al. 2016), *Atractylodes chinensis* (Sun et al. 2019)

Distribution – Australia, India (Damm et al. 2009), USA (Yang et al. 2012b), China (Cai et al. 2016, Sun et al. 2019)

Notes – *Colletotrichum chlorophyti* was described as a leaf spot pathogen of *Chlorophytum* sp. from India (Damm et al. 2009). This species can be characterized by dark brown chlamydospores in chains and clades (Damm et al. 2009). Whole-genome sequence data (Gan et al. 2017) and pathogenicity studies are available for this species (Cai et al. 2016, Sun et al. 2019).

Colletotrichum citrus-medicae Qian Zhang, Yong Wang bis, Jayawardena & K.D. Hyde, in Hyde et al., Fungal Diversity: 10.1007/s13225-020-00458-2, [23] (2020)

Sexual morph not reported. See Hyde et al. (2020) for illustrations and descriptions of asexual morph.

Type – China, Kunming Botanical Gardens, Kunming, Yunnan Province, on diseased leaves of *Citrus medica*, 15 January 2018, Q. Zhang, holotype HGUP 1554, culture ex-type GUCC 1554.

Hosts – *Citrus medica* (Hyde et al. 2020)

Distribution – China (Hyde et al. 2020)

Notes – *Colletotrichum citrus-medicae* is closely related to *C. sydowii*, but differs from its relatively shorter conidia (Hyde et al. 2020). This was isolated from diseased leaves, but pathogenicity studies are needed to confirm this.

Colletotrichum coccodes (Wallr.) S. Hughes, Can. J. Bot. 36: 754 (1958)

Sexual morph not reported. See Liu et al. (2011) for illustrations and descriptions of asexual morph.

Neotype – The Netherlands, Groningen, from *Solanum tuberosum* tuber, G. Jager, July 1975, dried culture CBS H-10573, culture ex-neotype CBS 369.75.

Hosts/substrates – *Rubus coreanus* (Kim et al. 2012), *Anthurium* sp., *Beta vulgaris*, *Capsicum* sp., *Cucurbita pepo*, *Globodera rostochiensis*, *Heterodera pallida*, Soil, *Solanum* sp. (Liu et al. 2011, 2013), *Fragaria* x *ananassa* (fruit rot), *Iris* sp. (Shivas et al. 2016), *Viola tricolor* (Karamnejadi et al. 2017), *Spinacia oleracea* (Liu et al. 2020)

Distribution – Korea (Kim et al. 2012), Bulgaria, Czech Republic, Germany, Ireland, Netherlands, South Africa, Switzerland, UK, Yugoslavia (Liu et al. 2011, 2013), Australia (Shivas et al. 2016), Iran (Karamnejadi et al. 2017), USA (Fealko et al. 2019, Liu et al. 2020)

Notes – *Colletotrichum coccodes* is similar to *C. gloeosporioides* (Liu et al. 2011). However, in the multilocus phylogeny *C. coccodes* does not group within the *C. gloeosporioides* complex. This species was first isolated from potato black dot disease. There are many host records for this species in Farr & Rossman (2021), however, most of them are based on morphology alone. Further collections with molecular data are needed to prove the host distribution of this species. Pathogenicity studies for this species are available.

Colletotrichum hsienjenchang I. Hino & Hidaka, Bull. Miyazaki Coll. Agric. Forest. 6: 93-99 (1934)

Sexual morph not reported. See Sato et al. (2012) for illustrations and descriptions of asexual morph.

Type – Japan, Kanagawa Prefecture, Odawara, diseased culm of *Phyllostachys bambusoides* collected 2011, holotype IMI 103806, culture ex-type IMI 103806.

Hosts/substrates – *Phyllostachys* sp. (Sato et al. 2012)

Distribution – Japan (Sato et al. 2012)

Notes – *Colletotrichum hsienjenchang* was considered as a rare species by Sato et al. (2012). This species appears to be host-specific and restricted to Japan. There are no pathogenicity studies available for this species, even though it was recorded to cause disease.

Colletotrichum metake Sacc., Annls mycol. 6(6): 557 (1908)

Sexual morph not reported. See Sato et al. (2012) for illustrations and descriptions of asexual morph.

Reference specimen – Japan, Ibaraki Prefecture, Tsukuba, Unknown collector, 2009, culture MAFF241876.

Hosts/substrates – *Pleioblastus simoni* (Sato et al. 2012)

Distribution – Japan (Sato et al. 2012)

Notes – *Colletotrichum metake* was described in Italy on dead culms of *Arundinaria japonica* (Saccardo 1908). This species was found on another bamboo in Japan (Sato et al. 2012). This species has falcate conidia. It is a singleton species, closely related to *C. hsienjenchang* (Jayawardena et al. 2016a). Sato et al. (2012) mentioned it as a rare species. Sequence data are available only for the Japanese culture, hence considered as the reference strain for this species.

Colletotrichum nigrum Ellis & Halst., in Halsted, New Jersey Agric. Coll. Exp. Sta. Bull.: 297 (1895)

Sexual morph not reported. See Liu et al. (2013) for illustrations and descriptions of asexual morph.

Epitype – Argentina, on *Capsicum* sp., unknown collection date and collector epitype CBS H-21032, ex-epitype culture CBS 169.49.

Hosts/substrates – *Capsicum* sp., *Cichorium intybus, Fragaria* sp. *Helianthus tuberosus*, *Lens culinaris*, *Solanum lycopersicum* (Liu et al. 2013a), *Salvia gregii* (Guarnaccia et al. 2019), *Chenopodium quinoa* (Pal & Testen 2020)

Distribution – Argentina, Canada, Chile, New Zealand, Serbia and Montenegro, UK, USA (Liu et al. 2013a, Pal & Testen 2020), Italy (Guarnaccia et al. 2019)

Notes – *Colletotrichum nigrum* is a singleton species with a close affinity to *C. coccodes* and can be identified using ITS sequence data. *Colletotrichum nigrum* forms significantly longer conidia than *C. coccodes* with a larger L/W ratio (see Liu et al. 2013a). Pathogenicity studies and whole-genome sequence data for this species are available. There are many host records associated with this species. However, most of those studies lack molecular data to confirm the species (Farr & Rossman 2021).

Colletotrichum orchidophilum Damm, P.F. Cannon & Crous, in Damm, Cannon, Woudenberg, & Crous, Stud. Mycol. 73: 83 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – USA, Hawaii, Oahu, Manoa, from *Dendrobium* sp., unknown collection date and collector, holotype CBS H-20718, culture ex-type CBS 632.80

Hosts/substrates – *Ascocenda* sp., *Cycnoches aureum, Dendrobium* sp., *Phalaenopsis* sp. (Damm et al. 2012b), *Vanilla planifolia* (Charron et al. 2018)

Distribution – Panama, UK, USA (Damm et al. 2012b), France (Charron et al. 2018)

Notes – *Colletotrichum orchidophilum* is basal to the acutatum species complex. This species can be easily recognised by its very narrow, cylindrical conidia, abundantly formed setae and dark brown, uniformly shaped, pyriform to spathulate appressoria (Damm et al. 2012b). *Colletotrichum orchidophilum* appears to be specific to *Orchidaceae*. Whole-genome sequence data for this species is available (Baroncelli et al. 2018).

Colletotrichum phaseolorum S. Takim., Ann. phytopath. Soc. Japan 5: 21 (1934)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – not designated

Hosts/substrates – *Phaseolus* sp., *Vigna sinensis* Damm et al. (2009)

Distribution – Japan (Damm et al. 2009)

Notes – Due to the availability of two strains without a designated type, Jayawardena et al. (2016a) considered this species as doubtful. This species appears to be restricted to Japan. More collections are needed to confirm this and epitypification of this species is highly recommended as it is an important pathogen.

Colletotrichum pseudoacutatum Damm, P.F. Cannon & Crous, in Damm, Cannon, Woudenberg, & Crous, Stud. Mycol. 73: 91 (2012)

Sexual morph not reported. See Damm et al. (2012b) for illustrations and descriptions of asexual morph.

Type – Chile, Valdivia, San Patricio forest nursery of the Corporación Nacional Forestal near San José de la Mariquina, from seedlings of *Pinus radiata*, between Dec 1976 and Feb 1977, unknown collector, holotype CBS H-20729, culture ex-holotype CBS 436.77.

Hosts/substrates – *Pinus radiata*, *Syzygium jambos* (Damm et al. 2012b, Soares et al. 2017)

Distribution – Brazil (Soares et al. 2017), Chile (Damm et al. 2012b)

Notes – *Colletotrichum pseudoacutatum* is basal to the acutatum species complex and forms a sister group to a clade containing the acutatum complex and *C. orchidophilum*. This species can be distinguished from species in the acutatum species complex with *gapdh* sequence data and by the formation of pale brown, verruculose, irregular-shaped appressoria, and also by the more abundant formation of setae (Damm et al. 2012b).

Colletotrichum pyrifoliae M. Fu & G.P. Wang, in Fu et al., Persoonia 42: 25 (2018)

See Fu et al. (2019) for illustrations and descriptions of asexual and sexual morph.

Type – China, Hubei Province, Wuhan City, on leaves of *P. pyrifolia* cv. 'Jinshui', 1 Aug. 2016, M. Fu, holotype HMAS 247825, culture ex-type CGMCC 3.18902.

Hosts/substrates – *Pyrus pyrifolia* (Fu et al. 2019)

Distribution – China (Fu et al. 2019)

Notes – This species is a confirmed pathogen of *Pyrus pyrifolia* in China (Fu et al. 2019). However, this species seems to be host specific and restricted to China.

Colletotrichum rusci Damm, P.F. Cannon & Crous, in Damm et al., Fungal Diversity 39: 72 (2009)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Type – ITALY, intercepted JFKIA 151256, on stem of *Ruscus*, collected 26 Jul. 2002 by A. Towson, holotype CBS H-20365, culture ex-type CBS 119206.

Hosts/substrates – *Ruscus* sp. (Damm et al. 2009)

Distribution – Italy (Damm et al. 2009)

Notes – *Colletotrichum rusci* has curved conidia (Damm et al. 2009). Phylogenetically this species is closely related to *C. trichellum* (Fig. 5). *Colletotrichum rusci* appears to be host specific and restricted to Italy.

Colletotrichum sydowii Damm, in Marin-Felix et al., Stud. Mycol. 86: 152 (2017)

Sexual morph not reported. See Marlin-Felix et al. (2017) for illustrations and descriptions of asexual morph.

Type – Taiwan, from leaves of *Sambucus* sp., 18 Dec. 2011, P.W. Crous, holotype CBS H-21509, culture ex-type CBS 13581.

Hosts/substrates – *Sambucus* sp. (Marlin-Felix et al. 2017)

Distribution – Taiwan, China (Marlin-Felix et al. 2017)

Notes – Conidia of this species resemble species of acutatum, boninense and gloeosporioides species complexes. This species can be distinguished by its unique *gapdh* sequence data (Marlin-Felix et al. 2017). *Colletotrichum sydowii* appears to be host specific and restricted to Taiwan. However, more collections are needed to confirm this.

Colletotrichum trichellum (Fr.) Duke, Trans. Br. mycol. Soc. 13(3-4): 173 (1928)

Sexual morph not reported. See Damm et al. (2009) for illustrations and descriptions of asexual morph.

Epitype – UK, Berkshire, Binfield, on leaf of *Hedera helix*, B.C. Sutton, Mar 1964, epitype (dried culture) CBS 217.64.

Hosts/substrates – *Hedera* sp. (Crouch et al. 2009a, Damm et al. 2009)

Distribution – Canada, Germany, Guatemala, Netherlands, New Zealand, UK (Damm et al. 2009), USA (Crouch et al. 2009a)

Notes – *Colletotrichum trichellum* has curved conidia and is closely related to *C. rusci* (Damm et al. 2009). This species is recorded to cause leaf spot of *Hedera* sp. (Hyde et al. 2009b). However, pathogenicity data for this species is lacking.

Table 18 GenBank accession numbers of the singleton species

Species name	Type/Reference strain	ITS	*gapdh*	*chs-1*	*act*	*tub2*	References
C. citrus-medicae	GUCC 1554	MN959910	MT006331	MT006328	MT006325		Hyde et al. (2020)
C. chlorophyti	IMI 103806	GU227894	GU228286	GU228384	GU227992	GU228188	Damm et al. (2009)
C. coccodes	CBS 369.75	HM171679	HM171673	JQ005796	HM171667	JQ005859	Liu et al. (2011)
C. hsienjenchang	MAFF 243051	AB738855		AB738846	AB738845		Sato et al. (2012)
C. metake	MAFF 244029	AB738859					Sato et al. (2012)
C. nigrum	CBS 169.49	JX546838	JX546742	JX546693	JX546646	JX546885	Liu et al. (2013)
C. orchidophilum	CBS 632.80	JQ005778		JQ005799	JQ005841	JQ005862	Damm et al. (2012b)
C. phaseolorum	CBS 158.36	GU227897	GU228289	GU228387	GU227995	GU228191	Damm et al. (2009)
C. pseudoacutatum	CBS 436.77	JQ948480	JQ948811	JQ949141	JQ949801	JQ950131	Damm et al. (2012b)
C. pyrifolia	CGMCC 3.18902	MG748078	MG747996	MG747914	MG747768	MG748158	Fu et al. (2019)
C. rusci	CBS 119206	GU227818	GU228210	GU228308	GU227916	GU228112	Damm et al. (2009)
C. sydowii	CBS135819	KY263783	KY263785	KY263787	KY263791	KY263793	Marlin-Felix et al. (2017)
C. trichellum	CBS 217.64	GU227812	GU228204	GU228302	GU227910	GU228106	Damm et al. (2009)

Table 19 Morphospecies of *Colletotrichum*

Species	Typification Details	Host-Substratum	Country	Reference
Colletotrichum acaciae Gutner	N/A	On *Acacia harpophy*lla in green house	Russia	Bondartseva-Monteverde et al. (1936)
C. acalyphae G. W. Wilson	N/A	On leaves of *Acalypha ciliata*	India	Wilson (1960)
C. acanthostachydis Novoss.	N/A	On seeds of *Acanthostachys strobilaceae*	Sweden	Novosselova (1938)
C. acanthosyridis Speg.	Spegazzini, Jan. 1906	On leaves of *Acanthosyridis falcatae*	Argentina	Spegazzini (1911)
C. achilleae Dobrozr.	N/A	On leaves of *Achillea millefolii*	Russia	Dobrozrakova (1927)
C. achyrantheum (Tassi) Petr. & Syd.	N/A	On dried stems of *Achryanthis verschaffeltii*	Italy	Petrak & Sydow (1927)
C. actinidiae Togashi & Onuma	N/A	On living leaves of *Actinidia callosa* var. *arguta*	Japan	Togashi & Unuma (1934)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. adustum (Ellis & G. Martin) Ellis & Underw.	Holotype NY, Martin, Mar. 1886	On leaves of *Citrus*	US	Underwood (1891)
C. aecidiicola Negru	N/A	Around aecidia on leaves of *Berberis vulgaris* and *B. dielsiana*	Romania	Negru (1958)
C. aeciicola Tehon	Holotype ILL 22416	On aecidium of *Puccinia asterum*	USA	Tehon (1933)
C. aesculi E. Rădul. & Negru	N/A	On leaves of *Aesculus hippocastanum*	Romania	Radulescu & Negru (1963)
C. agatinum (Sacc.) Petr.	N/A	On stems of *Agati grandiflorae*	Philipines	Petrak (1929)
C. ailanthi Tognini	N/A	On petioles of *Ailanthus glandulosa*	Italy	Tognini (1895)
C. ajugae Siemaszko	N/A	On living leaves of *Ajuga repens*	Georgia, Armenia & Azerbaijan	Siemaszko (1923)
C. aletridis Henn.	Yoshinaga 27	On leaves of *Aletris japonica*	Japan	Hennings (1904a)
C. alibertiae Novoss.	N/A	On *Alibertia celtis*, in greenhouses	Russia	Bondartseva-Monteverde et al. (1936)
C. allii Av.-Saccá	N/A	N/A	N/A	Averna-Saccá (1917)
C. alni Siemaszko	N/A	On living leaves of *Alnus glutinosa*	Georgia, Armenia & Azerbaijan	Siemaszko (1923)
C. aloes Bacc.	Baldrati 21	On leaves of *Aloe abyssinica*	Eritrea	Baccarini (1917)
C. alstoniae (Sacc.) Petr.	Baker 3739	On dead leaves of *Alstonia scholaris*	Philippines	Petrak (1929)
C. althaeae Southw.	N/A	Pathogenic on leaves, petioles and stalks of *Alcea rosea*	US	Southworth (1980)
C. ampelinum Cavara	N/A	On branches of *Vitis* sp.	Italy	Cavara (1889a)
C. ampelopsidis Sawada	N/A	On *Ampelopsis heterophylla* var. *ciliate*	Taiwan	Sawada (1944)
C. anacardii Kelkar	Holotype MACS 102	On leaves of *Rhus mysorensis*	India	Kelkar & Rao (1962)
C. andropogonis Zimm.	N/A	On leaves of *Andropogonis sorghi* and *Sorghi vulgaris*	Africa	Zimmermann (1904)
C. annonicola Speg.	Spegazzini, Apr. 1906	On living leaves of *Annona cherimolia*	Argentina	Spegazzini (1911)
C. antarcticum Henn.	Werth, 26 Dec. 1901	On leaves of *Poea cookie*	Crozet Island, Antarctica	Hennings (1906)
C. anthurii Delacr.	N/A	On leaves of *Anthurii*	Germany	Neergaard (1943)
C. antirrhini F.C. Stewart	N/A	N/A	N/A	Stewart (1900)
C. aquatile R. Sprague	N/A	On leaves of *Catabrosa aquatic*	US	Sprague (1957)
C. arachidis Sawada	N/A	On leaves of *Arachis hypogaea*	Taiwan	Sawada (1959)
C. araliae Kamal & R.P. Singh	N/A	On leaves of *Aralia nobilis*	India	Kamal & Singh (1980)
C. ardisiae C.C. Chen	N/A	On leaves of *Ardisia crispa* var. *dielsii*	Taiwan	Chen (1968a)
C. arecae Syd. & P. Syd.	Merrill 8958, Merrill 8919	On dead leaf sheaths of *Areca catechu*	Philippines	Sydow & Sydow (1914a)
C. ari (Pass.) Bat.	N/A	On the drooping leaves of *Arum italicum*	Italy	Höhnel (1919)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. arisaematis H.C. Greene	Greene, 14 Jun. 1954	On leaves of *Arisaema atrorubens*	US	Greene (1955)
C. arjunae V.P. Sahni	Holotype IMI 108642	On leaves of *Terminalia arjuna*	India	Sahni (1968)
C. armeriae Nicolas & N. Aggéry	N/A	On dead stems and leaves of *Armeria plantaginea*	France	Nicolas & Aggéry (1942)
C. artabotrydis Sawada	N/A	On *Artabotrys uncinatus*	Taiwan	Sawada (1943)
C. arthraxonis (S. Ahmad) S. Ahmad	N/A	On leaves of *Arthraxon serrulatus*	Pakistan	Ahmad (1956)
C. artocarpi Delacr.	N/A	On leaves of *Artocarpi incisae*	France	Delacroix (1905)
C. asiaticum U.P. Singh & H.P. Upadhyay	N/A	On leaves of *Crinum asiaticum*	India	Pavgi & Upadhyay (1964)
C. aspleniifoliae Pavgi & U.P. Singh	N/A	On leaves of *Launaea aspleniifolia*	India	Pavgi & Singh (1965)
C. atractyli Koval	N/A	On leaves of *Atractylodes ovata*	Maritime Territory, Russian	Koval (1961)
C. atramentarium (Berk. & Broome) Taubenh.	N/A	On decaying stems of *Solanum tuberosum*	UK	Taubenhaus (1916)
C. atriplicinum Syd.	Bürgener, 12 Dec. 1929	On dead stems of *Atriplex patula*	Germany	Sydow (1930)
C. atropae Klaptzova	N/A	On leaves of *Atropa belladonna*	'Western former Soviet Union'	Klaptzova (1940)
C. aucubae Gutner	N/A	On dead leaves *Aucuba japonica*	Russia	Gutner (1933a)
C. aucubanum (Sacc.) Petr. & Syd.	Borg 508	On dead leaves of *Aucuba japonica*	Malta	Petrak & Sydow (1927)
C. aureum Corda	N/A	On *Spliaeriis* and *Scleromycetibus*	Germany	Corda (1837)
C. averrhoae Bat.	N/A	On *Averrhoa carambola*	Brazil	Batista (1952)
C. azaleae Ellis & Everh.	Holotype NY, Nash 1991	On leaves of *Azalea viscose*	US	Ellis & Everhart (1895)
C. bakeri (Syd. & P. Syd.) Mundk.	Baker 3871	On dead stems and petioles of *Ricinus communis*	Philippines	Mundkur (1938)
C. bauhiniae Gutner	N/A	On *Bauhinia rosea*, in greenhouses	Russia	Bondartseva-Monteverde et al. (1936)
C. begoniae Bat.	N/A	On *Begonia gracilis*	Brazil	Batista (1952)
C. bhandardarense Patw.	N/A	On leaves of *Arisaema murrayi*	India	Patwardhan (1966)
C. bignoniae-igneae Rangel	N/A	On leaves of *Bignoniaw igneae*	Brazil	Maublanc & Rangel (1915)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. biologicum Chaudhuri	N/A	On withering stalk of *Solanum tuberosum*	Germany	Chaudhuri (1924)
C. biscutellae Moesz	N/A	On dried petioles of *Biscutella alpestris*	former Yugoslavia	Degen (1938)
C. bixae Sawada	N/A	On leaves of *Bixa orellana*	Taiwan	Sawada (1959)
C. blighiae Gonz. Frag. & Cif.	Ciferri, Jan. 1927	On leaves of *Sapindaceae*	Dominican Republic	González & Ciferri (1927)
C. boehmeriae Sawada	N/A	On living leaves and stalks of *Boehmeria nivea*	Taiwan	Saccardo (1922)
C. boerhaviae Pavgi & U.P. Singh	N/A	On leaves of *Boerhavia diffusa*	India	Pavgi & Singh (1965)
C. bougainvilleae Novoss.	N/A	On *Bougainvillea glabra*, in green houses	Russia	Bondartseva-Monteverde et al. (1936)
C. brachytrichum Delacr.	N/A	On leaves of *Theobromae cacao*	Trinidad	Delacroix (1905)
C. brassicae Schulzer & Sacc.	N/A	On rotting stems of *Brassicae oleraceae* var. *caulocarpae*	Croatia	Schulzer & Saccardo (1884)
C. briosii Turconi	N/A	On leaves of *Cinnamomi burmanni*	Italy	Saccardo (1908)
C. bryoniae (Ferraris) Maire	N/A	On leaves of *Bryoniae dioicae*	Italy	Maire (1917)
C. burserae Novoss.	N/A	On *Bursera brasiliensis*, in greenhouses	Russia	Bondartseva-Monteverde et al. (1936)
C. cajani Rangel	N/A	On leaves of *Cajani indici*	Brazil	Rangel (1915)
C. calotropidis Rao & M.A. Salam	N/A	On leaves of *Calotropis gigantea*	India	Rao & Salam (1960)
C. canangae Koord.	N/A	On the leaves of *Cananga odorata*	Java	Koorders (1907)
C. canavaliae Gonz. Frag. & Cif.	Ciferri, Aug. 1925	On dry stems of *Canavalia maritima*	Dominican Republic	Petrak's Lists volume 3
C. canavaliicola Sawada	N/A	On pods of *Canavalia ensiformis*	Taiwan	Sawada (1959)
C. capparis Hasija	N/A	On leaves of *Capparis sepiaria*	India	Hasija (1962b)
C. caricae F. Stevens & J.G. Hall	N/A	On fruits and leaves of *Ficus caricae*	US	Stevens & Hall (1909)
C. carpophilum Kellerm. & Swingle	Kellerman & Swingle, May 1888, Kellerman & Swingle, Jun. 1888	On living fruit of *Astragalus caryocarpus*	US	Kellerman & Swingle (1888)
C. carveri Ellis & Everh.	Holotype NY, Carver s.n.	On leaves of *Thea sinensis*	US	Ellis & Everhart (1902)
C. catechu Died.	Sen, 19 Dec. 1907 (Butler 1660)	On leaves of *Areca catechu*	Bangladesh	Sydow et al. (1916)
C. catenulatum F. Stevens	Holotype ILL, Stevens 32	On living leaves of *Agave angustifolia* var. *marginata*	Guyana	Stevens (1930)
C. caulicola Heald & F.A. Wolf	Holotype BPI, Heald & Wolf, 1963	On living stems of *Phaseolus vulgaris*	US	Heald & Wolf (1911)
C. cavendishii Petr.	Schönau, 26 Jun. 1918, Schönau, 31 Jul. 1919	On living leaves of *Musa cavendishii*	Germany	Petrak (1925)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. cecropiae Viégas	N/A	On *Cecropia*	Brazil	Viégas (1946)
C. celastri-paniculatae Thite & M.S. Patil	N/A	On leaves of *Celastrus paniculatus*	India	Thite & Patil (1975)
C. cerei Earle	Tracey 7309	On dead leaves of *Cereus triangularis*	US	Earle (1902)
C. chaetomium (Wallr.) S. Hughes	N/A	On *Cucubitaceae*	US	Hughes (1958)
C. chaetostromum (Berk. & Broome) Duke	N/A	On dead seed of *Fraxinus excelsior*	UK	Duke (1928)
C. chamaeropis Ferraris & Gabotto	N/A	On leaves of *Chamaeropis excelsae*	Italy	Gabotti (1914)
C. chardonianum Nolla	N/A	On living leaves of *Allium cepa*	Puerto Rico	Nolla (1926)
C. ciliatum T.S. Ramakr. & K. Ramakr.	N/A	On *Cymbopogon polyneuros*	India	Ramakrishnan & Ramakrishnan (1947)
C. cinchonae Koord.	N/A	On leaves of *Cinchonae* sp.	Java	Koorders (1907)
C. cinctum (Berk. & M.A. Curtis) Stoneman	Ravenel 5437	On *Orchidaceae*	US	Stoneman (1898)
C. cinnamomi Tharp	Holotype BPI, Tharp, 13 Sept. 1915	On living leaves of *Cinnamomum zeylanicum*	US	Tharp (1917)
C. cirrhopetali Sawada	N/A	On leaves of *Cirrhopetalum uraiense*	Taiwan	Sawada (1959)
C. clavijae Gutner	N/A	On *Clavija riedeliana* and *C. spinosa*, in greenhouses	Russia	Bondartseva-Monteverde et al. (1936)
C. clerodendri Died.	N/A	On leaves of *Clerodendri infortunati*	India	Sydow et al. (1916)
C. clusiae Petr.	Zerny, 18 Aug. 1927	On *Clusia*	Brazil	Petrak (1947b)
C. cocae Speg.	N/A	On leaves of *Erythroxylum coca*	Argentina	Spegazzini (1920)
C. coffeanum F. Noack	N/A	On *Coffea*	Brazil	Noack (1901)
C. coffeophilum Speg.	Tonduz, Oct. 1897	On living leaves of *Coffea*	Costa Rica	Spegazzini (1918a)
C. commelinae Ellis & Everh.	Holotype NY, Nash 1798	On leaves of *Commelina angustifolia*	US	Ellis & Everhart (1895)
C. compactum T.S. Ramakr.	N/A	On *Albizzia lebbek*	India	Ramakrishnan (1951)
C. concentricum Massee	N/A	On fruit of *Trichosanthes anguina*	UK	Massee (1913)
C. consociatum J.C. Lindq.	N/A	On *Solidago chilensis*	Argentina	Lindquist (1948)
C. conspicuum Syd. & P. Syd.	Collado 6229	On living leaves of *Erythropalum scandens*	Philippines	Sydow & Sydow (1920)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. corchori Pavgi & U.P. Singh	N/A	On leaves of *Corchorus acutangulus*	India	Ikata & Yoshida (1940)
C. cordiae Allesch.	N/A	On *Cordia maritima*	Germany	Allescher (1902)
C. cordylines Pollacci	December 1894	On leaves of *Cordylinae indivisae*	Italy	Pollacci (1896)
C. corni (Woron.) Vassiljevsky	N/A	N/A	US	Vassiljevsky & Karakulin (1950)
C. corylifoliae Pavgi & U.P. Singh	N/A	On leaves of *Psoralea corylifolia*	India	Pavgi & Upadhyay (1964)
C. corynocarpi Sousa da Câmara	N/A	On dry leaves of *Corynocarpus laevigatus*	Portugal	Sousa da Câmara (1930)
C. cradwickii C.K. Bancr.	N/A	On shoots of *Theobroma cacao*	Jamaica	Bancroft (1910)
C. crassipes (Speg.) Arx	N/A	On berries of *Vitis viniferae*	Italy	von Arx (1957b)
C. crossandrae Patel, Kamat & C.B. Pande	N/A	On *Crossandra infundibuliformis*	India	Patel & Pande (1953)
C. crotalariae Petch	Holotype PDA 4946	On leaves of *Crotalaria striata*	Sri Lanka	Petch (1917)
C. crotalariae-junceae Sawada	N/A	On stem of *Crotalaria juncea*	Taiwan	Sawada (1959)
C. crotonicola Pavgi & U.P. Singh	N/A	On leaves of *Croton sparsiflorus*	India	Pavgi & Singh (1964)
C. cryptostegiae Chipl.	Holotype MACS 298	On leaves of *Cryptostegia grandiflora*	India	Chiplonkar (1969)
C. curvatum Briant & E.B. Martyn	N/A	On live stems of *Crotalaria juncea*	Trinidad-Tobago	Briant & Martyn (1929)
C. curvisetum F. Stevens	ILL, Stevens 3594, ILL, Stevens 5830	On leaves of *Hura crepitans*	Puerto Rico	Stevens (1917)
C. cyclanthis Novoss.	N/A	On *Cyclanthus cristatus* and on *C. discolor*, in greenhouses	Russia	Bondartseva-Monteverde et al. (1936)
C. cyclobalanopsidis Sawada	N/A	On young leaves of *Cyclobalanopsis glauca*	Taiwan	Sawada (1959)
C. cylindricum S.N.S. Srivast.	N/A	On *Pothos scandens*	India	Srivastava (1953)
C. cyperacearum Pavgi & U.P. Singh	N/A	On leaves of *Theropogon pallidus*	India	Pavgi & Singh (1964)
C. dahliae M.E.A. Costa & Sousa da Câmara	N/A	On *Chrysanthemum* and *Dahlia*	Portugal	Costa & Souza da Camara (1953)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. dalbergiae C.C. Chen	N/A	On leaves of *Dalbergia sissoo*	Taiwan	Chen (1968b)
C. damasonii Bond.-Mont.	N/A	On fruits and seeds of *Damasonium alismatoides*	Sweden	Bondartzeva-Monteverde (1938)
C. daphnes-ponticae Siemaszko	N/A	On dead leaves of *Daphne pontica*	Georgia, Armenia & Azerbaijan	Siemaszko (1923)
C. daphniphylli Dzhalag.	N/A	On leaves of *Daphniphyllum macropodium*	Azerbaijan	Dzhalagoniya (1962)
C. dasturii Roy bis	N/A	On *Piper betle*	India	Roy (1948)
C. decosteae (Henn.) Petr. & Syd.	Neger 24	On dead leaves of *Decostea scandens*	Chile	Petrak & Sydow (1927)
C. derridis Hoof	N/A	On *Derris elliptica*	Taiwan	Hoof (1949)
C. dianellae F. Stevens & P.A. Young	N/A	On leaves of *Dianella odorata*	Hawaii	Stevens (1925)
C. dichaeae Henn.	Behnick, 2 Dec. 1904	On dead leaves of *Dichaea vaginata*	Germany	Hennings (1905a)
C. dichorisandrae Rangel	N/A	On leaves of *Dichorisandrae thyrsiflorae*	Brazil	Maublanc & Rangel (1915)
C. dictamni Hollós	N/A	On leaves of *Dictamni fraxinella*	Hungaria	Hollós (1908)
C. digitalis (Rostr.) Moesz	N/A	On leaves of Digitalis purpurea	Spain	Moesz (1931)
C. dioscoreae Av.-Saccá	N/A	On *Dioscorea*	Brazil	Averna-Saccá (1917)
C. dominicanum Gonz. Frag. & Cif.	Bosch, Feb.-Jun. 1925	On dead fruit of *Hibiscus brasiliensis*	Dominican Republic	González & Ciferri (1925)
C. dracaenae Allesch.	Holotype, M-0090064, J.E. Weiss, ap 1895	On faded leaves of *Dracaena latifolia*	Germany	Allescher (1902)
C. dracaenae-fragrantis (H. Mori) Petr. & Syd.	N/A	On leaves of *Dracaena fragrans*	Romania	Petrak & Sydow (1925)
C. dracaenicola Sacc. & Trotter	N/A	On leaves of *Dracaena frafrantis*	Italy	Saccardo & Trotter (1913)
C. durionis Koord.	N/A	On leaves of *Durionis zibethini*	Java	Koorders (1907)
C. echinatum Massee	Holotype K(M), Johnson 131	On the bark of an unknown tree	Ghana	Massee (1906)
C. effiguratum Syd. & P. Syd.	N/A	On living leaves of *Paphiopedilum roezlii*	Germany	Sydow & Sydow (1900)
C. elaeagni Siemaszko	N/A	On living and dead leaves of *Elaeagnus*	Georgia, Armenia & Azerbaijan	Siemaszko (1923)
C. elasticae Tassi	N/A	On decaying leaves of *Fici elasticae*	Italy	Tassi (1900)
C. eleagni Siemaszko	N/A	On decaying leaves of *Elaeagni* sp.	Caucasus	Siemaszko (1923)
C. elmeri Syd.	Elmer 15663	On leaves of *Cryptosperma merkusii*	Philippines	Sydow (1925a)
C. ensetes (Sacc. & Scalia) Petr. & Syd.	N/A	On decaying leaves of *Musa ensetes*	Portugal	Petrak & Sydow (1927)
C. epiphylli Tassi	N/A	On decaying *Epiphylli ackermanni*	Italy	Tassi (1904)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. eranthemi V. Rao	Holotype IMI 103771	On leaves of *Eranthemum bicolor*	India	Kelkar & Rao (1962)
C. erumpens (Sacc.) Sacc.	N/A	On stems of *Ricinus communis*	China	Saccardo (1884)
C. eryngii (Desm.) Duke	N/A	On *Eryngium*	UK	Duke (1928)
C. erythrinae Ellis & Everh.	NY, Nash 2123	On leaves of *Erythrina herbacea*	US	Ellis & Everhart (1895)
C. eucalypti Bitanc.	N/A	N/A	N/A	N/A
C. euchroum Syd. & P. Syd.	Raimundo s.n.	On leaves of *Euphorbia neriifolia*	Philippines	Sydow & Sydow (1913)
C. euryae Sawada	N/A	On *Eurya japonica*	Taiwan	Sawada (1944)
C. eustictum (Sacc.) Petr. & Syd.	Saccardo, Nov. 1904	On leaves of *Oreodaphne foetens*	Italy	Petrak & Sydow (1924)
C. exiguum Penz. & Sacc.	N/A	On leave of *Spiraeae arunci*	Switzerland	Penzig & Saccardo (1884)
C. exoticum Pavgi & U.P. Singh	N/A	On leaves of *Murraya exotica*	India	Pavgi & Singh (1964)
C. extorre Sacc.	Borg 511	On leaves of *Sciodaphyllum digitatum*	Malta	Saccardo (1915)
C. fagopyri Sawada	N/A	On stem of *Fagopyrum tataricum*	Taiwan	Sawada (1959)
C. fici-elasticae Sacc. & D. Sacc.	N/A	On leaves of *Fici elastcae*	Italy	Saccardo (1906)
C. ficus Koord.	N/A	Pathogenic on leaves of *Ficus elastica*	Java	Koorders (1905)
C. flacourtiae Rangel	N/A	On fruit of *Flacourtia ramontchi*	Brazil	Rangel (1926)
C. fluggeae Thite & M.S. Patil	N/A	On leaves of *Flueggea leucopyrus*	India	Thite & Patil (1975)
C. foliicola (Nishida) Sawada	N/A	On living leaves of *Citrus*	Japan	Sawada (1959)
C. fructigenum (Berk.) Vassiljevsky	Holotype K(M) 110093	On fruit of *Pyrus communis*	UK	Vassiljevsky & Karakulin (1950)
C. funtumiae Petch	Holotype PDA 4201	On leaves of *Funtumia elastica*	Sri Lanka	Petch (1917)
C. fusarioides (Ellis & Kellerm.) O'Gara	Holotype NY, Kellerman, Aug. 1884	On leaves of *Asclepias cornuti*	US	Dearness (1928)
C. fuscocoriaceum (Rehm) Petr.	Reyes, Sept. 1913 (Baker 1841)	On leaves of *Antidesma*	Phillippines	Petrak (1934)
C. gangeticum Pavgi & U.P. Singh	N/A	On stems and leaves of *Crotalaria medicaginea*	India	Pavgi & Singh (1965)
C. gardeniarum Pavgi & U.P. Singh	N/A	On leaves of *Gardenia*	India	Pavgi & Singh (1964)
C. geniculatum Sawada	N/A	On leaves of *Piper betle*	Taiwan	Sawada (1959)
C. georgius-fischeri R. Sprague	Holotype WSP 42933	On leaves of *Muehlenbergia filiformis*	US	Sprague (1958)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. gliricidiae Syd. & P. Syd.	Collado 6988	On living leaves of *Gliricidia sepium*	Philippines	Sydow & Sydow (1920)
C. glochidii C.C. Chen	N/A	On leaves of *Glochidon hongkongense*	Taiwan	Chen (1967)
C. glochidiicola (Seshadri) B. Sutton	Holotype MACS 228	On leaves of *Glochidion hohenackeri*	India	Sutton (1975)
C. gloriosae Verpl. & Claess.	Holotype GENT, Verplancke s.n.	On leaves of *Yucca gloriosa*	Belgium	Verplancke & Claessens (1934)
C. glycines Hori ex Hemmi	N/A	On *Glycine soja*	Japan and Korea	Hemmi (1920)
C. gnaphalii Syd.	Sydow 137	On *Gnaphalium spicatum*	Ecuador	Sydow & Sydow (1939)
C. gomphrenae A.K. Srivast.	Holotype, IARI Crypt Herb. Orient 28202, A.K. Srivastava, sep 1963	On leaves of *Gomphrena celosioides*	India	Srivastava (1969)
C. gossypii Southw.	N/A	On *Gossypium*	US	Soothworth (1891)
C. gossypinum Edgerton	N/A	On *Gossypium*	US	Edgerton (1908)
C. griseum Heald & F.A. Wolf	Holotype BPI, Heald & Wolf, 1280	On leaves and branches of *Euonymus japonicus*	US	Heald & Wolf (1911)
C. grossulariae Jacz.	N/A	On fruits of *Ribis grossularia*	Russia	Jaczewski (1906)
C. guaiaci Syd.	Sydow 213	On living leaves of *Guajacum officinale*	Venezuela	Sydow (1930)
C. guaranicola F.C. Albuq.	Holotype IAC 8183, F.C. Albuquerque, 1959-06-30	On living leaves of *Paullinia cupana* var. *sorbilis*	Brazil	Albuquerque (1960)
C. guaraniticum (Speg.) Speg.	Holotype LPS, Balansa 3562	On living leaves of *Sapindaceae*	Paraguay	Spegazzini (1918b)
C. gymnocladi Urries	N/A	On *Gymnocladus canadensis*	Spain	Urríes (1952)
C. hederae (Pass.) Died.	N/A	On leaf spots of *Hederae helicis*	Italy	Diedicke (1915)
C. helianthi Davis	Davis, 7 Jul. 1907	On leaves of *Helianthus*	US	Davis (1915)
C. helianthicola Sousa da Câmara	N/A	On *Helianthus annuus*	Portugal	Sousa da Câmara (1936)
C. helichrysi (G. Winter) Arx	N/A	On living leaves of *Helichrysum*	South Africa	von Arx (1957a)
C. helicis (Desm.) Morgan-Jones	N/A	N/A	N/A	Morgan-Jones (1971)
C. heveae Petch	Holotype K(M) 167287	On leaves of *Hevea brasiliensis*	Sri Lanka	Petch (1906)
C. heynei P.C. Gupta	N/A	On leaves of *Vallaris heynii*	India	Gupta (1974a)
C. hibisci Pollacci	N/A	On the stems of *Hibisci palustris*	Italy	Pollacci (1896)
C. hibisci-cannabini Sawada	N/A	On leaves and stems of *Hibiscus cannabinus*	Taiwan	Sawada (1959)
C. hibiscicola Rangel	N/A	On leaves of *Hibisci tiliacei*	Brazil	Maublanc & Rangel (1915)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. himantophylli Kabát & Bubák	N/A	On leaves of *Himantophylli miniati*	Czech Republic	Kabát & Bubák (1907)
C. holci (P. Syd.) Grove	N/A	On living leaves of *Holcus lanatus*	Germany	Grove (1918)
C. holopteleae Hasija	N/A	On leaves of *Holoptelea integrifolia*	India	Hasija (1962c)
C. hortorum Av.-Saccá	N/A	On fruit of *Pimenta officinalis* and *Solanum melongena*	Brazil	Averna-Saccá (1917)
C. humuli Dearn.	N/A	On living leaves of *Humulus lupulus*	Canada	Bisby et al. (1929)
C. hydrangeae Sawada	N/A	On *Hydrangea chinensis*	Taiwan	Sawada (1965)
C. hysteriiforme (Peck) H.C. Greene	Peck s.n.	On dead stems of *Caulophyllum thalictroides*	US	Greene (1950)
C. idaeinum Syd.	N/A	On dead twigs of *Rubus idaeus*	Germany	Sydow (1932)
C. imantophylli Verpl. & Claess.	N/A	On leaves of *Clivia nobilis*	Belgium	N/A
C. imperatae Politis	N/A	On leaves of *Imperata cylindrical*	Greece	Politis (1935)
C. inamardii Lal	N/A	On *Carissa carandas*	India	Lal (1953)
C. incarnatum Zimm.	N/A	On stems of *Coffea liberiacae*	Java	Zimmermann (1901)
C. indicum Dastur	N/A	On living branch of *Gossypium*	India	Dastur (1934)
C. indigoferae Sawada	N/A	On stems of *Indigofera tinctoria*	Taiwan	Sawada (1959)
C. intermedium (Sacc.) Sawada	Roumeguère s.n.	On dead leaves of *Citrus aurantium*	France	Sawada (1959)
C. ipomoeae Sousa da Câmara	N/A	On stems of *Ipomoea batatas*	Portugal	Sousa da Câmara (1931a)
C. ipomoeicola V. Rao	N/A	On leaves of *Ipomoea batatas*	India	Rao (1963)
C. iresines F. Stevens	Holotype ILL, Stevens 139	On leaves of *Iresine*	Costa Rica	Stevens (1927)
C. iridis Kuhnh.-Lord. & J.P. Barry	N/A	On *Iris spuria* subsp. *maritime*	France	Kuhnholtz-Lordat & Barry (1949)
C. ixorae Griffon & Maubl.	T	On leaves of *Ixora stricta*	France	Griffon & Maublang (1909)
C. ixorae-parviflorae Patw. & Sathe	N/A	On leaves of *Ixora parviflora*	India	Patwardhan & Sathe (1965)
C. jahnii Syd.	Sydow 111	On living leaves of *Pithecellobium dulce*	Venezuela	Sydow (1930)
C. janczewskii Namysł.	1. KRAM F-8196, B. Namyslowski2. KRAM F-8197	On stems and leaves *Poea trivialis*	Poland	Namyslowski (1906)
C. janiphae (Thüm.) Grove	N/A	On dead stalks of *Jatrophae janiphae*	Australia	Grove (1919)
C. jasminicola Tilak	N/A	On leaves and culms of *Jasminum sambac*	US	Tilak (1960)
C. jatrophae (Speg.) E.E. Butler & Bisby	Spegazzini, Apr. 1906	On leaves of *Jatropha macrocarpa*	Argentina	Butler & Bisby (1931)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. jussiaeae Earle	Atkinson, 27 Aug. 1891	On living leaves of *Jussiaea decurrens*	US	Earle (1897)
C. kaki Maffei	N/A	On living leaves of *Diospyros kaki* var. *kiombo*	Italy	Maffei (1921)
C. kawakamii (Miyabe) Sawada	N/A	On *Paulowniae tomentosae*	Japan	Sawada (1958)
C. kickxiae Henn. ex Died.	N/A	On *Kickxia elastica*	Germany	Diedicke (1915)
C. kiotoense (Hemmi & Nojima) Petr.	N/A	On dead branch of *Aucuba japonica*	Japan	Petrak (1939)
C. kruegerianum Vassiljevsky	N/A	On fruit of *Lycopersicon esculentum*	US	Vassiljevsky & Karakulin (1950)
C. lagenaria (Pass.) Ellis & Halst.	N/A	On *Cucumeris melonis*	Japan	Halsted (1893b)
C. latium J.Yi Li & X.M. Wang	N/A	On petiole of *Ricinus communis*	China	Wang & Li 1987
C. lebbek (Syd. & P. Syd.) Petr.	Merrill S149	On legumes of *Albizia lebbek*	Philippines	Petrak (1927)
C. leguminis (Cooke & Harkn.) Negru	Harkness 1203	On *Leguminosae*	US	Negru (1959)
C. leguminum Pat.	N/A	On *Pisi sativum*	Italy	Patouillard & Lagerheim (1891)
C. ligustri Lobik	N/A	On leaves of *Ligustrum vulgare*	Russia	Lobik (1928)
C. liliacearum Ferraris	N/A	On leaves of *Hemerocallis fulva*	Italy	Duke (1928)
C. litchi Gonz. Frag. & Cif.	N/A	On leaves of *Litchi sinensis*	Dominican Republic	González & Ciferri (1927)
C. littoralis Av.-Saccá	N/A	On living roots and stems of *Solanum tuberosum*	Brazil	Averna-Saccá (1923)
C. liukiuensis Sawada	N/A	On leaves of *Musa liukiuensis*	Taiwan	Sawada (1959)
C. lobeliae F. Stevens	ILL, Stevens 776	On leaves of *Lobelia assurgens* var. *portoricensis*	Brazil	Stevens (1917)
C. lonicerae Politis	N/A	On living leaves of *Lonicera etrusca*	Greece	Politis (1935)
C. lucidae H.C. Greene	Greene, 4 Sept. 1955	On leaves of *Salix lucida*	US	Greene (1956)
C. lucumae Novoss.	N/A	On *Lucuma sellowii* in greenhouses	Russia	Bondartseva-Monteverde et al. (1936)
C. lujae Verpl. & Clem.	N/A	N/A	N/A	Saccardo (1914)
C. lussoniense Sacc.	Raimundo 1613	On dead branches of *Manihot utilissima*	Phillipines	Hall & Drost (1908)
C. luxificum C.J.J. Hall & Drost	N/A	On shoots and berries of *Theobroma cacao*	Indonesia	Hall & Drost (1908)
C. luzulae Togashi & Onuma	N/A	On living leaves of *Luzula campestris* var. *capitata*	Japan	Togashi & Onuma (1934)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. lysimachiae Duke	Duke, 20 Sept. 1925, Duke, 29 Sept. 1926, Duke, 23 Oct. 1926	On leaves, stems and fruit of *Lysimachia nemorum*	Ireland and UK	Duke (1928)
C. maculans G. Winter	N/A	On *Caulibus herbarum*	Germany	Dickson (1925)
C. madisonense H.C. Greene	Greene, 25 Jun. 1952	On *Carex lacustris*	US	Greene (1953b)
C. magnoliae Sousa da Câmara	N/A	On leaves of *Magnoliae grandiflorae*	Portugal	Sousa da Câmara (1920)
C. magnusianum Bres.	N/A	On leaves of *Malvae neglectae*	Italy	Bresadola (1892)
C. mahoniae Fabric.	N/A	On *Mahonia aquifolium*	Italy	Fabricatore (1950)
C. mali Woron.	N/A	On fallen fruit of *Piri mali*	German	Woronichin (1913)
C. malvacearum Pavgi & U.P. Singh	N/A	On leaves of *Hibiscus rosa-sinensis*	India	Pavgi & Singh (1965)
C. mangenotii Chevaug.	N/A	On *Arachis hypogaea*	Sudan	Chevaugeon (1952)
C. mangiferae Kelkar	Holotype MACS 101	On leaves of *Mangifera indica*	India	Kelkar & Rao (1962)
C. manihoticola Sawada	N/A	On dead stems of *Manihot utilissima*	Taiwan	Sawada K (1959)
C. manihotis Henn.	Ule 2632	On living leaves of *Manihot utilissima*	Brazil	Hennings (1904b)
C. marantae Sawada	N/A	On leaves of *Maranta arundinacea*	Taiwan	Sawada (1959)
C. martyniae V. Rao	Holotype MACS 105	On leaves of *Martynia diandra*	India	Kelkar & Rao (1962)
C. mathiolae Sandu	N/A	On leaves of *Matthiola incana*	Romania	Sandu (1959b)
C. medicaginis-denticulatae Sawada	N/A	On leaves of *Medicago denticulata*	Taiwan	Sawada (1933)
C. medinillae Rangel	N/A	On leaves of *Medinillae magnificae*	Brazil	Maublanc & Rangel (1915)
C. melastomacearum (Speg.) Syd.	Holotype LPS, Puiggar 2756	On living leaves of *Melastomataceae*	Brazil	Sydow (1925b)
C. meliae Sousa da Câmara	N/A	On stems of *Meliae azedarch*	Portugal	Sousa da Câmara (1920)
C. melicoccae Speg.	Spegazzini, Oct. 1920	On living leaves of *Melicoccus lepidopetalus*	Paraguay	Spegazzini (1922)
C. melongenae Av.-Saccá	N/A	On fruit of *Solanum melongena*	Brazil	Averna-Saccá (1917)
C. memecyli Narendra & V.G. Rao	Holotype MACS 1596	On leaves of *Memecylon umbellatum*	India	Narendra & Rao (1972)
C. merilli (Syd. & P. Syd.) Quimio	Holotype PNH 21350	On stems of *Ricinus communis*	Philippines	Quimio (1977)
C. microspermum Corda	N/A	N/A	N/A	Corda (1840)
C. minus Zimm	N/A	On leaves of *Palaquii oblongifolii*	Jarva	Zimmermann (1901)
C. minutum (Link) B.T. Dicks	N/A	On *Caulibus herbarum*	Germany	Dickson (1925)
C. mirabile (Bres.) S. Ahmad	Torrend 707	On stems of *Mirabilis jalapa*	Portugal	Ahmad (1956)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. moellerianum (Thüm.) Vassiljevsky	N/A	On decaying stems *Phytolacca decandra*	Italy	Vassiljevsky (1940)
C. montemartinii Tognini	N/A	On leaves of *Arum italicum*	Italy	Tognini (1892)
C. moricola Sawada	N/A	On twigs of *Morus alba*	Taiwan	Sawada (1959)
C. morina Hara	N/A	On leaves of *Morus alba*	Japan	Hara (1954)
C. morindae Kelkar	Holotype MACS 103	On leaves of *Morinda citrifolia*	India	Kelkar & Rao (1962)
C. morinum Sawada	N/A	On twigs of *Morus alba*	Taiwan	Sawada (1959)
C. necator Massee	Holotype K (M), Ridley s.n.	On fruit of *Piper nigrum*	Singapore	Massee (1912)
C. neriicola Hüseyın & Selçuk	Holotype IU, Hüseyin 0506	On leaves of cultivated *Nerium oleander*	Turkey	Hüseyin & Selçuk (2001)
C. nicotianae Av.-Saccá	N/A	On *Nicotiana tabacum*	Brazil	Averna-Saccá (1922)
C. nobile (Sacc.) Mzhavan.	Thümen, Sept. 1879	On leaves of *Laurus nobilis*	Austria	Mzhavanadze (1963)
C. nymphaeicola Kelkar	N/A	On leaves of *Nymphaea stellata*	India	Kelkar (1972)
C. obtusipes (Sacc.) P. Joly	N/A	On young stems of *Bauhinia glandulosa*	Italy	Joly (1965)
C. oca M.L. Farr	N/A	On leaves of *Oxalis tuberosa*	Bolivia	Farr (1960)
C. olacicola Muthappa	HCIO, Muthappa, MACS274, IMI, Muthappa, MACS274	On leaves of *Olax wightiana*	India	Muthappa (1967)
C. oleae Kelkar	Holotype MACS 104	On leaves of *Olea dioica*	India	Kelkar & Rao (1962)
C. oligochaetum Cavara	N/A	On young leaves of *Lagenaria vulgaris*	Italy	Cavara (1889b)
C. oligotrichum Dias & Sousa da Câmara	N/A	On *Passiflora coerulea*	Portugal	Dias & Sousa da Câmara (1952)
C. omnivorum Halst.	N/A	On leaves and petioles of *Aspirustra*	US	Halsted (1891)
C. ophiopogonis Sandu	N/A	On dead leaves of *Ophiopogon jabura*	Romania	Sandu-Ville (1962)
C. opuntiae (Ellis & Everh.) Sawada	NY, Demetrio, Jan. 1886	On dead *Opuntia brasiliensis*	US	Sawada (1959)
C. ornithogali Negru	N/A	On leaves of bulbs of *Ornithogalum longibracteatum*	Romania	Negru (1958)
C. orthianum Kostlan	N/A	On *Orchidaceae* (*Cypripedium, Cattleya, Coelogyne, Dendrobium, Vanda*)	Germany	Kostlan (1905)
C. orthosporum (Sacc. & Roum.) B.T. Dicks	N/A	On *Solani tuberosi*	Italy	Dickson (1926)
C. oryzae (Hara) Hara	N/A	On *Oryza sativa*	Japan	Hara (1959)
C. osmanthi Dzhalag.	N/A	On leaves of *Osmanthus fragrans*	Azerbaijan	Dzhalagoniya (1965)
C. padi Karak.	N/A	On living leaves of *Prunus padus*	Russia	Karakulin (1924)
C. palaquii Zimm.	N/A	On leaves of *Palaquii oblongifolii*	Java	Zimmermann (1901)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. palinhae González Fragoso	N/A	On branches of *Grevillea robusta* and *Lamproderma echinulatum*	Portugal	González (1924)
C. paludosum (Ellis & Galloway) Arx	Fairchild, Aug. 1889, Commons 977	On leaves of *Peltandra virginica*	US	von Arx (1957a)
C. pamparum Speg.	Spegazzini, May 1908	On leaves of *Panicum urvilleani*	Argentina	Spegazzini (1911)
C. pancratii Hasija	N/A	On leaves of *Pancratium*	India	Hasija (1962a)
C. pandani Syd. & P. Syd.	Merrill S33	On leaves of *Pandanus veitchii*	Philippines	Sydow & Sydow (1913)
C. papayae Henn.	Putteman 1338	On branches and petioles of *Carica papaya*	Brazil	Hennings (1908a)
C. parthenocissi (C.I. Shen) Teng	N/A	On *Parthenocissus* sp.	N/A	Teng (1936)
C. passiflorae Siemaszko	Syntype Stevens 465=BISH 145782, 499913, Stevens 914= BISH 499010, 508404	On living leaves of *Passiflora edulis* and *P. laurifolia*	Armenia & Azerbaijan, US	Siemaszko (1923)
C. paucipilum Delacr.	N/A	N/A	N/A	Delacroix (1905)
C. peckianum (Thüm.) Petr. & Syd.	N/A	On decaying shoots of *Vitis labruscana*	US	Petrak & Sydow (1924)
C. peckii (Sacc.) Davis	N/A	On leaves of *Trillii erythrocarpi*	US	Davis (1929)
C. pekinense Katsura	N/A	On *Abutilon avicennae*	China	Katsura (1951)
C. peregrinum Pass.	N/A	On leaves of *Araliae sieboldii*	Italy	Passerini (1888)
C. periclymeni (Desm.) Höhn.	N/A	On leaves of *Lonicerae periclymeni*	France	Höhnel (1957)
C. petiolicola (Brunaud) Grove	N/A	On fallen petioles of *Ailanthi glandulosae*	Gaul region	Grove (1918)
C. phalaenopsidis Sawada	N/A	On leaves of *Phalaenopsis aphrodite*	Taiwan	Sawada (1959)
C. philodendri Henn.	Ule 3053	On leaves of *Philodendron*	US	Hennings (1905b)
C. phomoides (Sacc.) Chester	N/A	On fruit epicarp of *Lycopersici esculenti*	Italy	Chester (1894)
C. phyllachoroides (Ellis & Everh.) Arx	NY, McClatchie 371	On leaves of *Artemisia vulgaris* var. *californica*	US	von Arx (1957a)
C. phyllocacti Ellis & Everh.	NY, Carver s.n	On *Phyllocactus latifrons*	US	Ellis & Everhart (1902)
C. pilcomayense Speg.	Spegazzini, Jul. 1919	On leaves of *Dolychandra cynanchoidis*	Paraguay	Spegazzini (1922)
C. pinelliae Sawada	N/A	On *Pinellia ternata*	Taiwan	Sawada (1943)
C. piperatum Ellis & Everh.	N/A	On leaves of *Capsici annui*	US	N/A
C. pithecellobii Roldan	N/A	On *Pithecolobium dulce*	Philippines	Roldan (1936)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. plantaginis Sawada	N/A	On *Plantago sawadai*	Taiwan	Sawada (1943)
C. platani Sousa da Câmara	N/A	On petioles of *Platani orientalis*	Portugal	Sousa da Câmara (1910)
C. poinsettiae (Sacc.) Petr.	N/A	On stems of *Poinsettiae pelecherrimae*	Gaul region	Ahmad (1956)
C. pollaccii Magnaghi	N/A	On leaves of *Aucubae japonicae*	Pegli, Italy	Magnaghi (1902)
C. polyptychophyllum Sousa da Câmara	N/A	On leaves of *Rhododendron*	Portugal	Sousa da Câmara (1931b)
C. pothi Koord.	N/A	On leaves of *Pothi*	Java	Koorders (1907)
C. primulae Halst.	N/A	On living leaves of *Primula* sp.	US	Saccardo & Sydow (1899)
C. pruni-domesticae Gurz.	CBS H-10669, A. Negru, 1953-08-20	On living leaves of *Prunus domestica*	Romania	Gurzitska (1950)
C. prunicola H.C. Greene	N/A	On leaves of *Prunus serotina*	US	Greene (1951)
C. psoraleae (Peck) Arx	CBS H-4241, E. Bartolomew, 1892-06-20	On leaves of *Psoralea esculenta*	US	von Arx (1957a)
C. pterocelastri Wakef.	Van der Bjl 404	On living leaves of *Pterocelastrus variabilis*	South Africa	Wakefield (1922)
C. pucciniophilum Togashi	N/A	On *Hosta sieboldiana*	Japan	Togashi (1936)
C. pyri F. Noack	N/A	On leaves of *Piri mali*	Brazil	Noack (1897)
C. pyrolae (Trel.) Parmelee	colln Trelease s.n.	On leaves of *Pyrola rotundifolia*	US	Parmelee (1958)
C. quercinum Săvul. & Negru	CBS H-4821, A. Negru, 1951-09-10	On leaves of *Quercus sessiliflora*	Romania	Savulescu & Negru (1955)
C. rayssiae Massenot	N/A	On leaves of *Asarum europaeum*	France	Massenot (1961)
C. revolutum (Ellis & Everhart) K. Ito & Kobayasi	NY, Ellis & Everhart, Aug. 1889	On living leaves of *Robinia pseudoacacia*	US	Ito & Kobayashi (1958)
C. rhamni E. Rădul. & Negru	N/A	On leaves of *Rhamnus tinctoria* and *R. infectoria*	Romania	Radulescu & Negru (1963)
C. rhodocyclum (Montagne ex Almeida & Sousa da Camara) Petrak	N/A	On leaves of *Phormium tenax*	Portugal	Petrak (1927)
C. rhoinum Tassi	N/A	On leaves of *Rhois toxicodendri*	Italy	Tassi (1899)
C. rhois-verniciferae Elisei	N/A	On *Rhus vernicifera*	Italy	Elisei (1938)
C. rhynchosiae Pavgi & U.P. Singh	N/A	On leaves of *Rhynchosia minima*	India	Pavgi & Singh (1964)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. ricini Bubák & González Fragoso	N/A	On stalk of *Ricinus communis*	Sri Lanka	Bubák & González (1915)
C. rosarum Av.-Saccá	N/A	On leaves of *Rosa* sp.	Brazil	Vassiljevsky & Karakulin (1926)
C. roseolum Henn.	Behnick, Dec. 1904	On dead bulbs of *Stanhopea oculata*	Germany	Hennings (1905a)
C. rubi Dias & Sousa da Câmara	N/A	On *Rubus idaeus*	Portugal	Dias & Sousa da Câmara (1953)
C. rubicola Ellis & Everh.	N/A	On leaves of *Rubi strigosi*	US	Peck (1902)
C. rudbeckiae Peck	Stewart s.n.	On dead stems of *Rudbeckia laciniata*	US	Peck (1902)
C. rumicicola Sawada	N/A	On leaves of *Rumex japonicus*	Japan	Sawada (1958)
C. rumicis-crispi Sawada	N/A	On leaves of *Rumex crispus*	Taiwan	Sawada (1959)
C. salmonicolor O'Gara	N/A	On the stems and leaves of *Asclepiadis speciose*	US	O'Gara (1915)
C. samararum (Allesch.) Petr.	N/A	On the fallen fruit of *Fraxini excelsioris*	Germany	Petrak (1956)
C. sanguisorbae Bres.	N/A	On leaves of *Sanguisorbae officinalis*	Limes Saxoniae	Bresadola (1894)
C. sapindi Sousa da Câmara	N/A	On *Sapindus saponaria*	Portugal	Sousa da Câmara (1936)
C. sasicola I. Hino & Katum.	N/A	On culms of *Sasa kurilensis*	Japan	Hino & Katumoto (1958)
C. sativum N.L. Horn	N/A	On *Vicia sativa*	US	Horn (1952)
C. savulescui Sandu	N/A	On leaves and fruit of *Lens culinaris*	Romania	Sandu (1959a)
C. schizanthi C.N. Jensen & V.B. Stewart	N/A	On the stems, branches, leaves and petioles of *Schizanthi* sp.	US	Jensen & Stewart (1911)
C. seguieriae Bond.-Mont.	N/A	On *Seguieria americana* in greenhouses	Russia	Bondartseva-Monteverde et al. (1936)
C. seminicola (Berk. & Broome) Petch	Holotype K(M), Gardner 1132, Dec. 1868	On seeds of *Artocarpus integrifolia*	Sri Lanka	Petch (1924)
C. septorioides Sacc.	N/A	On dead culms of *Bambusae vulgaris*	China	Saccardo (1921)
C. servazzii Gall.-Rang.	N/A	On leaves of *Cattleya*	Italy	Gallucci-Rangone (1955)
C. sesbaniae Pavgi & U.P. Singh	N/A	On stems and leaflets of *Sesbania aegyptiaca*	India	Pavgi & Singh (1965)
C. setosum F. Patt.	Holotype BPI, Werckle, 1899	On *Tillandsia*	Costa Rica	Patterson (1900)
C. sierraense R. Sprague	Holotype WSP 42900	On leaves of *Poa bolanderi*	US	Sprague (1958)
C. silphii Davis	Davis, 9 Sept. 1915	On leaves of *Silphium perfoliatum*	US	Davis (1919)
C. sinuatisetiferum Matsush.	Holotype Matsushima Fungus Collection, Kobe, 5H248	On decaying leaf of broad-leaved tree	Japan	Matsushima (1996)
C. smilacicola Speg.	Spegazzini, Jul. 1919	On leaves of *Smilax assumptionis*	Paraguay	Spegazzini (1922)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. smilacinae Tehon & E.Y. Daniels	Holotype ILL 7259	On leaves of *Smilacina racemosa*	US	Tehon & Daniels (1925)
C. smilacis Tehon	Holotype ILL 22849	On living leaves of *Smilax hispida*	US	Tehon (1933)
C. socium Syd.	Starcs 118	On living leaves of *Salix caprea*	Latvia	Sydow (1935)
C. solanicola O'Gara	N/A	On *Solani tuberosi*	US	O'Gara (1915)
C. solidaginis Pellic.	Holotype MPA, Chevassut 2196	On leaves of *Solidago virgaurea*	France	Chevassut & Pellicier (2001)
C. solitarium Ellis & Barthol.	Holotype NY, Bartholomew 2426	On leaves of *Solidago radula*	US	Ellis & Everhart (1897)
C. sophorae-japonicae Hara	N/A	On branchlets *Sophora japonica*	Japan	Hara (1930)
C. sorauerianum (Allesch.) Hori	N/A	On leaves of *Codiaeum*	US	Hori (1919)
C. sordidum Davis	Davis, 31 Jul. 1914	On leaves of *Menispermum canadense*	US	Davis (1915)
C. spartii Gutner	N/A	On living branchlets *Spartium junceum*	Russia	Gutner (1933b)
C. sphaeriiforme Pass.	N/A	On dead branches of *Menispermum canadense*	Italy	Passerini (1888)
C. stanhopeae Henn.	Baker 245	On living leaves of *Stanhopea*	Brazil	Hennings (1908b)
C. staphyleae Hulea	CBS H-6941, A. Hulea, 1948-08-04	On leaves of *Staphylea pinnata*	Romania	Hulea (1950)
C. stephaniae Sawada	N/A	On leaves of *Stephania sasakii*	Taiwan	Sawada (1959)
C. sterculiicola Speg.	Spegazzini, Jul. 1919	On leaves *Sterculia striata*	Paraguay	Spegazzini (1922)
C. stevensii Roy bis	Holotype ILL, Stevens 288	On leaves of *Piper umbellatum*	Puerto Rico	Roy (1948)
C. sumbaviae Syd. & P. Syd.	Holotype PNH S258	On living leaves of *Sumbavia rottleroides*	Philippines	Sydow & Sydow (1914b)
C. suttonii W.P. Wu	Holotype Hebei Academy of Sciences, 910123, 910124	On *Euonymus japonicus*	China	Wu (1992)
C. tabernaemontanae Pavgi	N/A	On leaves of *Tabernaemontana coronaria*	India	Pavgi & Upadhyay (1964)
C. tabificum (Hallier) Pethybr.	T#	On *Solanum tuberosum*	Germany	Pethybridge (1919)
C. taiwanense Sivan. & W.H. Hsieh	T, IMI 353024b, 1992-01-13	On stems of *Styrax formosanus*	Taiwan	Sivanesan & Hsieh (1993)
C. telles-palhinhae Dias	T#	On leaves of *Nerium oleander*	Portugal	Sousa-Dias (1958)
C. teramnicola Pavgi & U.P. Singh	N/A	On leaves of *Teramnus labialis*	India	Pavgi & Singh (1965)
C. terminaliae V.P. Sahni	T, IMI 108221, 1964-08	On leaves of *Terminalia bellirica*	India	Sahni (1968)
C. tertium (Cooke) Grove	T, Ravenel 2712,	On branches of *Ailanthus*	US	Grove (1919)
C. tetrastigmatis (Keissl.) Petr.	T*, Handel-Mazzetti, 5860	On living leaves of *Tetrastigma dubium*	China	Petrak (1947a)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. tinosporae syd.	T*, Mitter 41	On dead stems of *Tinospora cordifolia*	India	Sydow & Mitter (1933)
C. toluiferae F. Stevens & Solheim	T, ILL, Stevens 820, August 8, 1922	On leaves of *Toluifera* sp.	Trinidad and Tobago	Stevens (1930)
C. trevesiae (Keissler) Petrak	T*, Handel-Mazzetti, 5792	On living leaves of *Trevesia palmata*	China	Petrak (1947)
C. trichiliae Novoss	T#	On *Trichilia undulatifolia* in greenhouses	Russia	Bondartseva-Monteverde et al. (1936)
C. tricyrtii (Teng) Teng	N/A	On living leaves of *Tricyrtis*	China	Teng (1936)
C. trillii Tehon	T, ILL 2350, Ryder, June 23, 1922	On living leaves of *Trillium recurvatum*	US	Tehon (1924)
C. typhae H.C. Greene	T*, Greene, 7 Aug. 1954	On leaves of *Typha latifolia*	US	Greene (1955)
C. uncinatum (Berk. & M.A. Curtis) Duke	T*, Ravenel 4691	On stalks of *Desmodium nudiflorum*	US	Duke (1928)
C. uredinophilum Hulea	T#	On *Muscari botryoides*	Romania	Hulea (1939)
C. urenae Petch	T, PDA 4679, Petch T., Peradeniya, June 1915	On living leaves of *Urena lobata*	Sri Lanka	Petch (1917)
C. urmilae P.C. Gupta	T#	On leaves of *Diospyros embryopteris*	India	Gupta (1974b)
C. urticae H.C. Greene	T#	On *Urtica gracilis*	US	Greene (1953a)
C. valerianae Kwashn.	T#	On living leaves of *Valeriana officinalis*	Caucasus	Kwashnina (1928)
C. vanillae Scalia	N/A	On leaves of *Vanilla odoratae*	Belgium	Pavgi & Upadhyay (1964)
C. variegatum U.P. Singh & H.P. Upadhyay	N/A	On leaves of *Codiaeum variegatum*	India	Pavgi & Upadhyay (1964)
C. vassiljevskyi Negru	N/A	On fruits of *Cercis siliquastrum*	Romania	Negru (1961)
C. vermicularia Sacc. & Dearn.	T*, Dearness, Aug. 1910	On leaves of *Bromi ciliati* var. *leviglumis*	UK	Saccardo (1912)
C. vermicularioides Halst.	T#	On leaves and stems of *Linaria vulgaris*	US	Halsted (1893b)
C. veronicae Scaram.	T#	On living leaves of *Veronica bellidioides*	Italy	Scaramella (1932)
C. versicolor Sacc.	N/A	In the dying stalks of *Bambusae viridis-glaucescentis*	Portugal	Saccardo (1902)
C. viciae Dearn. & Overh.	T*, Orton 9335, Dearness 5627	On living leaves of *Vicia villosa*	US	Dearness (1928)
C. viciae-sativae Sawada	N/A	On leaves of *Vicia sativa*	Taiwan	Sawada (1959)
C. villaresiae Gutner	T#	In greenhouse on branches of *Villaresia*	Russia	Gutner (1933a)
C. villosum Weimer	T#	On *Vicia villosa*	US	Weimer (1945)
C. vinal (Speg.) Petr. & Syd.	T*, Spegazzini, Jan. 1901	On living leaves of *Prosopis ruscifolia*	Taiwan	Petrak & Sydow (1935)
C. vincae Speg.	T*, Spegazzini, Jul. 1905	On leaves of *Vinca major*	Argentina	Spegazzini (1911)
C. vinosum Henn.	T*, Behnick, 10 Dec. 1904	On bulbs of *Stanhopea oculata*	Germany	Hennings (1905a)
C. violae Săvul. & Sandu	T*, Săvulescu & Sandu, 2 Aug. 1931	On living leaves of *Viola hirta*	Romania	Savulescu & Sandu-Ville (1933)

Table 19 Continued.

Species	Typification Details	Host-Substratum	Country	Reference
C. violae-rotundifoliae (Sacc.) Davis	N/A	On leaves of *Viola cuculata*	US	Davis (1929)
C. violae-tricoloris R.E. Sm.	N/A	Parasitic on leaves and petals of *Viola tricolor*	US	Smith (1899)
C. viticis Maire	N/A	On leaves of *Viticis trifoliae*	US	Maire (1913)
C. vitis Istv.	N/A	On shoots of *Vitis vinifera*	Hungaria	Istvanfy (1902)
C. volutella Sacc. & Malbr.	N/A	On dead stems of *Ulmariae*	France	Saccardo (1882)
C. wahlenbergiae Duke	T#	On dead leaves *Wahlenbergia*	UK	Duke (1928)
C. xanthii Halst.	T#	On stems of *Xanthium canadense*	USA	Halsted (1893a)
C. yaquense Petr. & Cif.	T*, colln Ciferri 4143	On living leaves *Acanthopanax aculeatus*	Dominican Republic	Petrak & Ciferri (1932)
C. yerbae Speg.	N/A	On drooping leaves of *Ilicis paraguariensis*	Argentina	Spegazzini (1908)
C. yoshinaoi T. Fukui	N/A	On *Perilla frutescens*	Japan	Fukui (1925)
C. yuccae Pollacci	N/A	On leaves of *Yuccae filamentosae*	Italy	Pollacci (1896)
C. zeae Lobik	T#	On *Zea mays*	Caucasus	Lobik (1933)
C. zibethinum (Sacc.) Petr.	N/A	On diseased leaves *Durionis zibethinae*	Singapore	Petrak (1929)

No details available regarding herbarium/collector/collection date
* No details available regarding herbarium

Acknowledgements

We would like to thank the National Research Council of Thailand, grant for new researcher NRCT5-TRG630010-01, entitled "Biodiversity, taxonomy, phylogeny and evolution of *Colletotrichum* in northern Thailand". Kevin D Hyde thanks, Thailand Research Fund, grant RDG6130001 entitled "Impact of climate change on fungal diversity and biogeography in the Greater Mekong Subregion". He would also like to thank Chiang Mai University for the award of a Visiting Professor. R.S. Jayawardena would like to thank Y.J. Chen, A.J. Gajanayake, N. Huanraluek and K.C. Mallikarathna for the support that they gave to make this work a success.

References

Abang MM, Winter S, Green KR, Hoffmann P et al. 2002 – Molecular identification of *Colletotrichum gloeosporioides* causing yam anthracnose in Nigeria. Plant Pathology 51, 63–71.

Adaskaveg JE, Förster H. 2000 – Occurrence andmanagement of anthracnose epidemics caused by *Colletotrichum* species on tree fruit crops in California. In: *Colletotrichum*. Host Specificity, Pathology and Host-Pathogen Interaction (eds. Prusky D, Freeman S, Dickman MB). APS Press, St Paul, Minnesota: 317–336.

Adhikari KN, Thomas G, Buirchell BJ, Sweetingham M. 2011 – Identification of anthracnose resistance in yellow lupin (*Lupinus luteus* L.) and its incorporation into breeding lines. Plant Breeding 130, 660–664.

Agrios GN. 2005 – Plant pathology, 5th edition, Academic Press, Florida, US.

Ahmad S. 1956 – Fungi of West Pakistan. Monographic Biological Society of Pakistan. 1, 1–126.

Albuquerque FC. 1960 – Antracnose do Guaraná. Boletim Tecnico do Instituto Agronomico do Norte. 40, 3–37.

Aldaoud R, de Alwis S, Salib S, Cunnington JH et al. 2011 − First record of *Colletotrichum sansevieriae* on *Sansevieria* sp. (mother – in – law's tongue) in Australia. Australasian Plant Disease Notes 6, 60–61.

Alizadeh A, Javan-Nikkhah M, Zare R, Fotouhifar KB et al. 2015 – New records of *Colletotrichum* species for the mycobiota of Iran. Mycologia Iranica 2, 95–109.

Allescher A. 1902 – Rabenhorst's Kryptogamen – Flora, Pilze – Fungi Imperfecti. 1, 385–704.

Ané C, Larget B, Baum DA, Smith SD, Rokas A. 2007 – Bayesian estimation of concordance among gene trees. Molecular Biology and Evolution 24, 412–426.

Arrigoni R, Berumen ML, Chen CA, Terraneo TI et al. 2016 – species delimitation in the reef coral genera *Echinophyllia* and *Oxypora* (*Scleractinia*, *Lobophylliidae*) with a description of two new species. Molecular Phylogenetics and Evolution 105, 146–159.

Arroyo FT, Moreno J, García-Herdugo G, Santos BDL et al. 2005 – Ultrastructure of the early stages of *Colletotrichum acutatum* infection of strawberry tissues. Canadian Journal of Botany 83, 491–500.

Auld BA, Say MM. 1999 – Comparison of isolates of *Colletotrichum orbiculare* from Argentina and Australia as potential bioherbicides for *Xanthium spinosum* in Australia. Agriculture, Ecosystems and Environment 72, 53–58.

Averna-Saccá R. 1917 – As moléstiascryptogamicas das plantashorticolas. Boletim de Agricultura São Paulo. 18, 634–654.

Averna-Saccá R. 1922 – Boletim de Agricultura São Paulo 23A, 221.

Averna-Saccá R. 1923 – Boletim de Agricultura São Paulo.

Ariyawansa HA, Hyde KD, Jayasiri SC, Buyck B et al. 2015 – Fungal diversity notes 111–252 – taxonomic and phylogenetic contributions to fungal taxa. Fungal Diversity 75, 27–274.

Awadalla P. 2003 – The evolutionary genomics of pathogen recombination. Nature Reviews Genetics 4, 50–60.

Baccarini P. 1917 – Funghietiopici. Annali di Botanica. 14, 117–140.

Bailey JA, Jeger MJ. 1992 – *Colletotrichum*. Biology, Pathology and Control. CABI, Wallingford, UK.

Bailey JA, O'Connell RJ, Pring RJ, Nash C. 1992 – Infection strategies of *Colletotrichum* species. In *Colletotrichum*. Biology, Pathology and Control (Bailey JA, Jeger MJ eds). CABI, Wallingford, UK: 88–120.

Bancroft. 1910 – West Indian Bulletines 9, 35.

Barimani M, Pethybridge SJ, Vaghefi N, Hay FS et al. 2013 – A new anthracnose disease of pyrethrum by *Colletotrichum tanaceti* sp. nov. Plant Pathology 62, 1248–1257.

Baroncelli R, Amby DB, Zapparata A, Sarrocco S et al. 2016 – Gene family expansions and contractions are associated with host range in plant pathogens of the genus *Colletotrichum*. BMC genomics 17, 555.

Baroncelli R, Sanz-Martín JM, Rech GE, Sukno SA, Thon MR. 2014a – Draft genome sequence of *Colletotrichum sublineola*, a destructive pathogen of cultivated sorghum. Genome Announcements 2, e00540-14.

Baroncelli R, Sarrocco S, Zapparata A, Tavarini S et al. 2015a – Characterization and epidemiology of *Colletotrichum acutatum sensu lato* (*C. chrysanthemi*) causing *Carthamus tinctorius* anthracnose. Plant Pathology 64, 375–384.

Baroncelli R, Sreenivasaprasad S, Sukno SA, Thon MR, Holub E. 2014b – Draft genome sequence of *Colletotrichum acutatum sensu lato* (*Colletotrichum fioriniae*). Genome Announcements 2, e00112-e00114.

Baroncelli R, SuknoSA, Sarrocco S, Cafá G et al. 2018 – Whole-genome sequence of the orchid anthracnose pathogen *Colletotruchum orchidophilum*. Molecular plant-microbe Interactions 31, 979–981.

Baroncelli R, Zapparata A, Sarrocco S, Sukno SA et al. 2015b – Molecular diversity of anthracnose pathogen populations associated with UK strawberry production suggests multiple introductions of three different *Colletotrichum* species. PLoS One 10, 129–140.

Batista AC. 1952 – Um pugilo de novos fungos imperfeitos. Boletim da Secretaria de Agricultura Indústria e Comércio do Estado de Pernambuco. 19, 143–150.

Baxter AP, Westhuizen GCA van der, Eicker A. 1983 – Morphology and taxonomy of South African isolates of *Colletotrichum*. South African Journal of Botany 2, 259–289.

Berkeley MJ. 1851 – Unnamed paper. Gardeners'Chronicle, September 20, 595.

Bhunjun CS, Jayawardena RS, Wei DP, Huanraluek N et al. 2019 – Multigene phylogenetic characterisation of *Colletotrichum artocarpicola* sp. nov. from *Artocarpus heterophyllus* in northern Thailand. Phytotaxa 418, 273–286.

Bhunjun CS, Phukhamsakda C, Jayawardena RS, Jeewon R et al. 2021 – Investigating species boundaries in *Colletotrichum*. Fungal Diversity 107, 107–127.

Bi Y, Guo W, Zhang GJ, Liu SC et al. 2017 – First report of *Colletotrichum truncatum* causing anthracnose of strawberry in China. Plant Disease 101, 832.

Bisby GR, Buller AHR, Dearness J. 1929 – The fungi of Manitoba 1–194.

Bondartseva-Monteverde VN, Gutner LS, Novoselova ED. 1936 – The parasitic fungi in the greenhouse of the Botanical Institute of the Academy of Sciences of the USSR. Trudy Botanicheskogo Instituta Akademii Nauk SSSR 2. 3, 715–801.

Bondartzeva-Monteverde VN. 1938 – *Colletotrichum damasonii*. Notul. Syst. Sec. Cryptog. Ins. Bot. Acd. Sci. USSR. 4, 43.

Boufleur TR, Castro RRL, Rogerio F, Ciampi-Guillardi M et al. 2020 – First report of *Colletotrichum musicola* causing soybean anthracnose in Brazil. Plant Disease 104, 1858.

Bourget R, Chaumont L, Sapoukhina N. 2013 – Timing of pathogen adaptation to a multicomponent treatment. PLoS One 8, e71926.

Braganca CAD, Damm U, Baroncelli R, Massola Jr NS et al. 2016 – Species of the *Colletotrichum acutatum* complex associated with anthracnose diseases of fruit in Brazil. Fungal Biology 120, 547–561.

Braithwaite KS, Irwin JAG, Manners JM. 1990a – Ribosomal DNA as a molecular taxonomic marker for the group species *Colletotrichum gloeosporioides*. Australian Systematic Botany 3, 733–738.

Braithwaite KS, Irwin JAG, Manners JM. 1990b – Restriction fragment length polymorphisms in *Colletotrichum gloeosporioides* infecting *Stylosanthes* spp. in Australia. Mycological Research 94, 1129–1137.

Braithwaite KS, Manners JM. 1989 – Human hypervariable minisatellite probes detect DNA polymorphisms in the fungus *Colletotrichum gloeosporioides*. Current Genetics 16, 473–475.

Bresadola G. 1892 – Fungi Tridentini 2, 1–46.

Bresadola G. 1894 – Fungi aliquot saxonici novi vel critici a cl. W. Krieger lecti. (Contributio III ad Floram Mycol. Saxoniae). Hedwigia 33, 206–210.

Briant AK, Martyn EB. 1929 – Diseases of cover crops. Tropical Agriculture 6, 258–260.

Brown CJ, Garner EC, Keith Dunker A, Joyce P. 2001 – The power to detect recombination using the coalescent. Molecular Biology and Evolution 18, 1421–142.

Bruen TC, Philippe H, Bryant D. 2006 – A simple and robust statistical test for detecting the presence of recombination. Genetics 172, 2665–2681.

Bubák F, González FR. 1915 – Fungi nonnulli novi Hispanici. Hedwigia 57, 1–13.

Busby PE, Ridout M, Newcombe G. 2016 – Fungal Endophytes: modifiers of plant disease. Plant Molecular Biology 90, 645–655.

Butler EJ, Bisby GR. 1931 – The fungi of India. Imperial Council of Agricultural Research Science Monogr 1, 237.

Buyck B, Duhem B, Das K, Jayawarden RS et al. 2017 – Fungal Biodiversity Profiles 21-30. Cryptogamie Mycologie 38, 101–146.

Cabral A, Azinheira HG, Talhinhas P, Batista D. 2020 – Pathological, morphological, cytogenomic, biochemical and molecular data support the distinction between *Colletotrichum cigarro* comb. et stat. nov. and *Colletotrichum kahawae*. Plants 9, 502.

Cai ZY, Yang Y, Liu YX, Zhang YM et al. 2016 – First report of *Colletotrichum chlorophyti* causing *Moringa oleifera* anthracnose in China. Plant Disease 100, 2164.

Caires NP, Pinho DB, Souza JSC, Silva MA et al. 2014 – First report of anthracnose on pepper fruit caused by *Colletotrichum scovillei* in Brazil. Plant Disease 98, 1437.

Cannon PF, Bridge PD, Monte E. 2000 – Linking the past, present, and future of *Colletotrichum* systematics. In: *Colletotrichum*: Host specificity, Pathology, and Host-pathogen interaction. (Prusky D, Freeman S, Dickman, M, eds). APS Press, St Paul, USA: 1–20.

Cannon PF, Buddie AG, Bridge PD. 2008 – The typification of *Colletotrichum gloeosporioides*. Mycotaxon 104, 189–204.

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

Cao X, Xu X, Che H, West JS et al. 2019 – Three *Colletotrichum* species, including a new species, are associated to leaf anthracnose of rubber tree in Hainan, China. Plant Disease 103, 117–124.

Cao X, Xu X, Che H, West JS et al. 2020 – Eight *Colletotrichum* species, including a novel species, are associated with areca palm anthracnose in Hainan, China. Plant Disease 104, 1369–1377.

Carbú M, Moraga J, Cantoral JM, Collado IG, Garrido C. 2019 – Recent approaches on the genomic analysis of the phytopathogenic fungus *Colletotrichum* spp. Phytochemistry Reviews 1–13.

Carraro TA, Lichtemberg PSF, Michailides TJ, Pereira WV et al. 2019 – First report of *Colletotrichum fructicola*, *C. nymphaeae* and *C. melonis* causing Persimmon anthracnose in Brazil. Plant Disease 103, 2692.

Cavalcante GR, Barguil BM, Vieira WA, Lima WG et al. 2019 – Diversity, prevalence, and virulence of *Colletotrichum* species associated with Lima Bean in Brazil. Plant Disease 103, 1961–1966.

Cavara F. 1889a – I Funghi Parassitidelle Piante Coltivateed Utili Essicati, Delineati e Descriti, 21.

Cavara F. 1889b. Matériaux de mycologie lombarde. Revue Mycologique Toulouse. 11, 173–193.

Charron C, Hubert J, Minatchy J, Wilson V et al. 2018 – Characterization of *Colletotrichum orchidophilum,* the agent of black spot disease of vanilla. Journal Phytopathology 166, 525–531.

Chaudhuri H. 1924 – A description of *Colletotrichum biologicum*, nov. sp., and observations on the occurrence of a saltation in the species. Annals of Botany 38, 735–744.

Chechi A, Stahlecker J, Dowling ME, Schnabel G. 2019 – Diversity in species composition and fungicide resistence profiles in *Colletotrichum* isolates from apples. Pesticide Biochemistry and Physiology 158, 18–24.

Chen CC. 1967 – Survey of epidemic diseases of forest trees in Taiwan III. Botanical Bulletin of the Academia Sinica (Taipei). 8, 130–148.

Chen CC. 1968a – Plant Protection Bulletin 10, 16.

Chen CC. 1968b – Plant Protection Bulletin 10, 17.

Chen F, Goodwin PH, Khan A, Hsiang T. 2002 – Population structure and matingtype genes of *Colletotrichum graminicola* from Agrostis palustris. Canadian Journal of Microbiology 48, 427–436.

Chen SY, Hou XM, Yang S, Tan LL. 2019a – First report of *Colletotrichum liriopes* causing leaf spots on *Liriope spicata* in China. Plant Disease 103, 1422–1423.

Cheon W, Jeon Y. 2016 – First report of anthracnose caused by *Colletotrichum spaethianum* on fragrant plantain lily in Korea. Plant Disease 100, 1498–1499.

Chen X, Wang T, Guo H, Zhu PK et al. 2019b – First report of anthracnose of *Camellia sasanqua* caused by *Colletotrichum aenigma* in China. Plant Disease 103, 1423.

Chester FD. 1894 – Report of mycologist. Report of the Delaware Agricultural Experimental Station 6.

Chethana CS, Chowdappa P, Biju CN, Praveena R et al. 2016 – Molecular and phenotypic characterization revealed six *Colletotrichum* species responsible for anthracnose disease of small cardamom in South India. European Journal of Plant Pathology 146, 465–481.

Chethana KWT, Jayawardene RS, Zhang W, Zhou YY et al. 2019 – Molecular characterization and pathogenicity of fungal taxa associated with cherry leaf spot disease. Mycosphere 10, 490–530.

Chevassut G, Pellicier P. 2001 – Huitespècesnouvelles de micromycetes (Fungi imperfecti) parasites des plantesspontanées, récoltesen France. Bulletin de la Société Mycologique de France. 117, 193–206.

Chevaugeon 1952 – Riv. Patol. veg. 31, 36.

Chiplonkar A. 1969 – New phytopathogenic Fungi Imperfecti from Maharashtra (India). Sydowia 23, 106–109.

Choi HW, Lee YK, Hong SK. 2017 – First report of *Colletotrichum aenigma* causing anthracnose on *Sedum kamtschaticum*in Korea. Plant Disease 101, 2150.

Chowdappa P, Chethana CS, Pant RP, Bridge PD. 2014 – Multilocus gene phylogeny reveals occurrence of *Colletotrichum cymbidiicola* and *C. Cliviae* on orchids in North East India. Journal of Plant Pathology 96, 327–334.

Cong YL, Hou J, Liu LP, Liu ZY et al. 2020 – First report of anthracnose disease caused by *Colletotrichum truncatum* on the velvetleaf (*Abutilon theophrasti*) in China. Plant Disease 104, 565.

Corda ACI. 1831 – Die Pilze Deutschlands. In: Sturm J (ed.) Deutschlands Flora in Abbildungen nach der Natur mit Beschreibungen. Sturm, Nürnberg vol. 3, Abt. 12, 33–64, tab, 21–32.

Corda ACJ. 1837 – Icones fungorum hucusque cognitorum. 1, 1–32.

Corda ACJ. 1840 – Icones fungorum hucusque cognitorum. 4, 1–53.

Costa JFO, Kamei SH, Silva JRA, Miranda ARGS. 2019 – Species diversity of *Colletotrichum* infecting *Annona* spp. in Brazil. European Journal of Plant Pathology 153, 1119–1130.

Costa ME, Souza da Camara M de. 1953 – Species aliquae mycologicae Lusitaniae. II. Portugaliae Acta Biologica 4, 162–176.

Cristobal-Martinez AL, de Jesus Yanez-Morales M, Solano-Vidal R, Segura-Leon O et al. 2017 – Diversity of *Colletotrichum* species in coffee (*Coffea arabica*) plantations in Mexico. European Journal of Plant Pathology 147, 605–614.

Crouch JA, Clarke BB, Hillman BI. 2006 – Unraveling evolutionary relationships among the divergent lineages of *Colletotrichum* causing anthracnose disease in turfgrass and maize. Phytopathology 96, 46–60.

Crouch JA, Glasheen BM, Giunta MA, Clarke BB, Hillman BI. 2008 – The evolution of transposon repeat-induced point mutation in the genome of *Colletotrichum cereale*: reconciling sex, recombination and homoplasy in an ‘asexual’pathogen. Fungal Genetics and Biology 45, 190–206.

Crouch JA, Tomaso-Peterson M. 2012 – Anthracnose disease of centipedegrass turf caused by *Colletotrichum eremochloae*, a new fungal species closely related to *Colletotrichum sublineola*. Mycologia 104, 1085–1096.

Crouch JA, Clarke BB, White JF Jr, Hillman BI. 2009a – Systematic analysis of the falcate–spored graminicolous *Colletotrichum* and a description of six new species from warm–season grasses. Mycologia 101, 717–732.

Crouch JA, Tredway LP, Clarke BB, Hillman BI. 2009b – Phylogenetic and population genetic divergence correspond with habitat for the pathogen *Colletotrichum cereale* and allied taxa across diverse grass communities. Molecular Ecology 18, 123–135.

Crouch JA, Beirn LA, Cortese LM, Bonos SA et al. 2009c – Anthracnose disease of switch grass caused by the novel fungal species *Colletotrichum navitas*. Mycological Research 113, 1411–1421.

Crouch JA, O'Connell R, Gan P, Buiate E et al. 2014 – The genomics of *Colletotrichum*. Genomics of plant–associated fungi, monocot pathogens, Springer, Berlin, Heidelberg, pp. 69–102.

Crous PW, Luangsa-Ard JJ, Wingfield MJ, Carnegie AJ et al. 2018a – Fungal Planet description sheets, 785–867. Persoonia 41, 238.

Crous PW, Wingfield MJ, Burgess TI, St J Hardy GE et al. 2018b – Fungal planet description sheets, 716–784. Persoonia 40, 240–393.

Crous PW, Wingfield MJ, Guarro J, Cheewangkoon R et al. 2013 – Fungal Planet description sheets, 154–213. Persoonia 31, 188–296.

Crous PW, Wingfield MJ, Guarro J, Hernandez-Restrepo M et al. 2015 – Fungal Planet description sheets, 320–370. Persoonia 34, 167–266.

Crous PW, Wingfield MJ, Richardson DM, Le Roux JJ et al. 2016 – Fungal Planet description sheets, 400–468. Persoonia 36, 316–458.

Crous PW, Carnegie Aj, Wingfield MJ, Sharma R et al. 2019 – Fungal Planet description sheets, 868–950. Persoonia 42, 291–473.

Curry KJ, Abril M, Avant JB, Smith BJ. 2002 – Strawberry anthracnose, Histopathology of *Colletotrichum acutatum* and *C. fragariae*. Phytopathology 92, 1055–1063.

Da-Lio D, Cobo-Díaz JF, Masson C, Chalopin M et al. 2018 – Combined metabarcoding and multi-locus approach for genetic characterization of *Colletotrichum* species associated with common walnut (*Juglans regia*) anthracnose in France. Scientific Reports 8, 1–17.

Dale JL, Manners JM, Irwin JAG. 1988 – *Colletotrichum gloeosporioides* isolates causing different anthracnose diseases on Stylosanthes in Australia carry distinct double-stranded RNAs. Transactions of the British Mycological Society 91, 671–676.

Damm U, Woudenberg JHC, Cannon PF, Crous PW. 2009 – *Colletotrichum* species with curved conidia from herbaceous hosts. Fungal Diversity 39, 45–87.

Damm U, Barroncelli R, Cai L, Kubo Y et al. 2010 – *Colletotrichum*: species, ecology and interactions. IMA Fungus 1, 161–165.

Damm U, Cannon PF, Woudenberg JHC, Johnston PR et al. 2012a – The *Colletotrichum boninense* species complex. Studies in Mycology 73, 1–36.

Damm U, Cannon PF, Woudenberg JHC, Crous PW. 2012b – The *Colletotrichum acutatum* species complex. Studies in Mycology 73, 37–113.

Damm U, Cannon PF, Liu F, Barreto RW et al. 2013 – The *Colletotrichum orbiculare* species complex: important pathogens of field and weeds. Fungal Diversity 61, 29–59.

Damm U, O'Connell RJ, Groenewald JZ, Crous PW. 2014 – The *Colletotrichum destructivum* species complex - hemibiotrophic pathogens of forage and field crops. Studies in Mycology 79, 49–84.

Damm U, Sato T, Alizadeh A, Groenewald JZ, Crous PW. 2019 – The *Colletotrichum dracaenophilum*, *C. magnum* and *C. orchidearum* species complexes. Studies in mycology 92, 1–46.

Damm U, Sun YC, Huang CJ. 2020 – *Colletotrichum eriobotryae* sp. nov. and *C. nymphaeae*, the anthracnose pathogens of loquat fruit in Central Thaiwan, and their sensitivity to azoxystrobin. Mycological Progress 19, 367–380.

da Silva LL, Moreno HLA, Correia HLN, Santana MF, de Queiroz MV. 2020 – *Colletotrichum*: Species complexes, lifestyle, and peculiarities of some sources of genetic variability. Applied Microbiology and Biotechnology 104, 1891–1904.

Dastur. 1934 – Indian Journal of Agricultural Research 4, 118.

Davis JI, Nixon KC. 1992 – Populations, genetic variation, and the delimitation of phylogenetic species. Systematic Biology 41, 421–35.

Davis JJ. 1915 – Notes on parasitic fungi in Wisconsin III. Transactions of the Wisconsin Academy of Science. 18, 251–271.

Davis JJ. 1919 – Notes on parasitic fungi in Wisconsin. IV. Transactions of the Wisconsin Academy of Science. 19, 671–689.

Davis JJ. 1929 – Notes on parasitic fungi in Wisconsin XVII. Transactions of the Wisconsin Academy of Science. 24, 295–301.

de Silva DD, Ades PK, Crous PW, Taylor PWJ. 2017 – *Colletotrichum* species associated with chili anthracnose in Australia. Plant Pathology 66, 254–267.

de Silva DD, Groenewald JZ, Crous PW, Ades PK et al. 2019 – Identification, prevalence and pathogenicity of *Colletotrichum* species causing anthracnose of *Capsicum annuum* in Asia. IMA Fungus 10, 8.

de Silva NI, Maharachchikumbura SSN, Thambugala KM, Bhat DJ et al. 2021 – Morphomolecular taxonomic studies reveal a high number of endophytic fungi from *Magnolia candolli* and *M. garrettii* in China and Thailand. Mycosphere 11, 163–237.

de Souza ESC, do Vale HMM, Carvalho RCP, Soares WRO et al. 2017 – Infection by *Uromyces euphorbiae*, a trigger for the sporulation of the endophytic *Colletotrichum truncatum* on the common host *Euphorbia hirta*. Mycological Progress 16, 941–946.

Dearness J. 1928 – New and noteworthy fungi. V. Mycologia. 20, 235–246.

Degen 1938 – Dokl. Akad. Nauk SSSR 3, 295.

Delacroix G. 1905 – Travaux de la Station de Pathologievégétale. Bulletin de la Société Mycologique de France. 21, 168–204.

Delaye L, García-Guzmán G, Heli M. 2013 – Endophytes versus biotrophic and necrotrophic pathogens–are fungal lifestyles evolutionary stable traits? Funagl Diversity 60, 125–135.

Dettman JR, Jacobson DJ, Taylor JW. 2003 – A multilocus genealogical approach to phylogenetic speciesrecognition in the model eukaryote *Neurospora*. Evolution 57, 2703–2720.

Diao YZ, Zhang C, Liu F, Wang WZ et al. 2017 – *Colletotrichum* species causing anthracnose disease of chili in China. Persoonia 38, 20–37.

Dias LRC, Brito RAS, Melo TA, Serra IMRS. 2020 – First report of papaya fruit anthracnose caused by *Colletotrichum okinawense* in Brazil. Plant Disease 104, 573.

Dias MRS, Sousa da Câmara M. 1952 – Fungi Lusitaniae. I. AgronomiaLusitana. 14, 101–125.

Dias MRS, Sousa da Câmara M. 1953 – Fungi Lusitaniae. IV. AgronomiaLusitana. 15, 17–37.

Dickson BT. 1926 – The 'black dot' disease of the potato. Phytopathology 16, 23–40.

Dickson BT. 1925 – *Colletotrichum* v. *Vermicularia*. Mycologia. 17, 213–217.

Diedicke H. 1915 – Pilze, Sphaeropsideae, Melanconieae. Kryptogamen–Flora der Mark Brandenburg. 9, 801–962.

Dobrozrakova. 1927 – Morbi plant. Leningrad 16, 202.

Douanla-Meli C, Unger JG, Langer E. 2018 – Multi-approach analysis of the diversity in *Colletotrichum cliviaesensu lato*. Antonie van Leeuwenhoek 111, 423–435.

Doyle VP, Oudemans PV, Rehner SA, Litt A. 2013 – Habitat and host indicate lineage identity in *Colletotrichum gloeosporioides*s.l. from wild and agricultural landscapes in North America. PLoS One 8, 62394.

Duke MM. 1928 – The genera *Vermicularia* Fr. and *Colletotrichum* Cda. Transactions of the British Mycological Society 13, 156–184.

Dubrulle G, Pensec F, Picot A, Rigalma K et al. 2020 – Phylogenetic diversity and effect of temperature on pathogenicity of *Colletotrichum lupini*. Plant Disease 104, 938–950.

Du M, Schardl CL, Nuckles EM, Vaillancourt LJ. 2005 – Using mating-type gene sequences for improved phylogenetic resolution of *Colletotrichum* species complexes. Mycologia 97, 641–658.

Dzhalagoniya. 1962 – Novit. Mycol. Nov. 14, 63.

Dzhalagoniya. 1965 – Parazitnye griby glavneishikh subtropicheskikh dekorativnykh rastenii Abkhazii [Parasitic fungi of the main subtropical decorative plants of Abkhazia] Tiflis, 46.

Earle FS. 1897 – New species of fungi imperfecti from Alabama. Bulletin of the Torrey Botanical Club. 24, 28–32.

Earle FS. 1902 – Mycological studies. I. Bulletin of the New York Botanical Garden. 2, 331–350.

Eaton MJ, Edwards S, Inocencio HA, Machado FJ et al. 2011 – Diversity and cross-infection potential of *Colletotrichum* causing fruit rots in mixed fruit orchards in Kentucky. Plant Disease PDIS-06.

Echeverrigaray S, Scariot FJ, Fontanella G, Favaron F et al. 2020 – *Colletotrichum* species causing grape ripe rot disease in *Vitis labrusca* and *V. vinifera* varieties in the highlands of southern Brazil. Plant Pathology 69, 1504–1512.

Edgerton 1908 – Anthacnoses. Botanical Gazette. 45, 408.

Elisei FG. 1938 – Nuovi deuteromiceti parassiti foglicoli di dicotiledoni. Atti dell'Istituto Botanico della Università e Laboratorio Crittogamico di Pavia. 10, 233–240.

Ellis JB, Everhart BM. 1895 – New species of fungi. I. Sandwich Island fungi. II. Florida fungi. III. Mexican fungi. Bulletin of the Torrey Botanical Club 22, 434–440.

Ellis JB, Everhart BM. 1897 – New species of fungi from various localities. Bulletin of the Torrey Botanical Club 24, 457–477.

Ellis JB, Everhart BM. 1902 – New Alabama fungi. Journal of Mycology 8, 62–73.

Fabricatore 1950, Atti Imp. Regia Accad. Rovereto, ser. 3, 6, 139

Farr DF, Aime MC, Rossman AY, Palm ME. 2006 – Species of *Colletotrichum* on *agavaceae*. Mycological Research 110, 1395–1408.

Farr DF, Rossman AY. 2021 – Fungal Databases, Systematic Mycology and Microbiology Laboratory, ARS, USDA. http://nt.ars-grin.gov/fungaldatabases/

Farr ML. 1960 – Mycological notes. New species, combinations, and host records. Mycopathologia et Mycologia Applicata 12, 283–288.

Fealko E, Szarka D, Lamb A, Amsden B et al. 2019 – First report of black dot root rot, caused by *Colletotrichum coccodes*, on tomato in Kentucky high tunnels. Plant Disease 103, 2126–2127.

Forseille L, Peng G, Gossen BD, Wei YD. 2009 – Further evidence for host specificity of *Colletotrichum truncatum* from scentless chamomile. Canadian Journal of Plant Pathology 31, 301–308.

Frantz LA, Schraiber JG, Madsen O, Megens HJ et al. 2013 – Genome sequencing reveals fine scale diversification and reticulation history during speciation in Sus. Genome Biology 14, 1–12.

Freeman S, Minz D, Maymon M, Zveibil A. 2001 – Genetic diversity within *Colletotrichum acutatum* sensu Simmonds. Phytopathology 91, 586–592.

Freeman S, Rodriguez RJ. 1993 – Genetic conversion of a fungal plant pathogen to a non-pathogenic endophytic mutualist. Science 260, 75–78.

Fu M, Crous PW, Bai Q, Zhang PF et al. 2019 – *Colletotrichum* species associated with anthracnose of *Pyrus* spp. in China. Persoonia 42, 1–35.

Fuentes-Aragon D, Silva-Rojas HV, Guarnaccia V, Mora-Aguilera JA et al. 2020 – *Colletotrichum* species causing anthracnose on avocado fruit in Mexico, current status. Plant Pathology 69, 1513–1528.

Fujita MK, Leache AD. 2011 – A coalescent perspective on delimiting and naming species, a reply to Baueret al. Proceedings of the Royal Society B, Biological Sciences 278,493–495.

Fujita MK, Leache AD, Burbrink FT, McGuire JA, Mortiz C. 2012 – Coalescent-based species delimitation in an integrative taxonomy. Trends in Ecology and Evolution 27, 480–488.

Fukui T. 1925 – Journal of Plant Protection 12.

Gabotti. 1914 – Bol. Soc. Bot. Ital., 103.

Gallucci-Rangone. 1955 – Annali Sper. agr. 9 (3, Suppl.), 14.

Gan P, Ikeda K, Irieda H, Narusaka M et al. 2013 – Comparative genomic and transcriptomic analyses reveal the hemibiotrophic stage shift of *Colletotrichum* fungi. New Phytologist 197, 1236–1249.

Gan P, Narusaka M, Kumakura N, Tsushima A et al. 2016 – Genus-wide comparative genome analyses of *Colletotrichum* species reveal specific gene family losses and gains during adaptation to specific infection lifestyles. Genome Biology and Evolution 8, 1467–1481.

Gan P, Narusaka M, Tsushima A, Narusaka Y et al. 2017 – Draft genome assembly of *Colletotrichum chlorophyti*, a pathogen of herbaceous plants. Genome Announcements 5, 01733–16 PMID, 28280027.

Gan P, Tsushima A, Narusaka M, Narusaka Y et al. 2019 – Genome sequence resources for four phytopathogenic fungi from the *Colletotrichum orbiculare* species complex. Molecular Plant-Microbe Interactions 32, 1088–1090.

Gazis R, Rehner S, Chaverri P. 2011 – Species delimitation in fungal endophyte diversity studies and its implications in ecological and biogeographic inferences. Molecular Ecology 20, 3001–3013.

Gatesy J, Baker RH. 2005 – Hidden likelihood support in genomic data, can forty–five wrongs make a right?. Systematic Biology 54, 483–492.

Gautam AK, Avasthi S, Bhadauria R. 2012 – *Colletotrichum sansevieriae* on *Sansevieria trifasciata*– a report from Madhya Pradesh, India. Plant Pathology & Quarantine 2, 190–192.

Goldstein PZ, Desalle R, Amato G, Vogler AP. 2000 – Conservation genetics at the species boundary. Conservation Biology 14, 120–31.

Golzar H. 2009 – First report of anthracnose of *Acacia* in Australia. Australasian Plant Disease Notes 4, 70–71.

Golzar H, Wang C. 2010 – First report of *Colletotrichum phormii* the cause of anthracnose on *Phormium tenax* in Australia. Australasian Plant Disease Notes 5, 110–112.

González FR. 1924 – Contribución a la flora micológica lusitánica. Boletim da Sociedade Broteriana. 2, 3–83.

González FR, Ciferri R. 1925 – Hongos parásitos y saprofitos de la República Dominicana (1a serie). Boletín de la Real Sociedad Española de Historia Natural 25, 356–368.

González FR, Ciferri R. 1927 – Boln de la Real Soc. Españ. Hist. Nat., Madrid 27, 330.

Goodman RN. 1960 – Observation on the production, physiological activity and chemical nature of Colletotin, a toxin from *Colletotrichum fuscum* Laub. Journal of Phytopathology 37, 187–194.

Goodwin PH. 2001 – A molecular weed-mycoherbicide interaction: *Colletotrichum gloeosporioides* f. sp. *malvae* and round-leaved mallow, *Malva pusilla*. Canadian Jouranl of Plant Pathology 23, 28–35.

Grammen A, Wenneker M, Van Campenhout J, Pham KTK et al. 2019 – Identification and pathogenicity assessment of *Colletotrichum* isolates causing bitter rot of apple fruit in Belgium. European Journal of Plant Pathology 153, 47–63.

Greene HC. 1950 – Notes on Wisconsin parasitic fungi. XIV. The American Midland Naturalist. 44, 630–642.

Greene HC. 1951 – In, Am. Midl. Nat. 44, 640.

Greene HC. 1953a – Notes on Wisconsin parasitic fungi. XIX. The American Midland Naturalist. 50, 501–508.

Greene HC. 1953b – Notes on Wisconsin parasitic fungi. XVIII. Transactions of the Wisconsin Academy of Science. 42, 69–81.

Greene HC. 1955 – Notes on Wisconsin parasitic fungi. XXI. Transactions of the Wisconsin Academy of Science. 44, 29–43.

Greene HC. 1956 – Notes on Wisconsin parasitic fungi. XXII. Transactions of the Wisconsin Academy of Science. 45, 177–191.

Griffon MM, Maublanc 1909 – Notes de Mycologie et de Pathologie végétale. Bulletin trimestriel de la Socíété mycologique de France. 25, 59.

Grigoriev IV, Cullen D, Goodwin SB, Hibbett D et al. 2011 – Fueling the future with fungal genomics. Mycology 2, 192–209.

Grove WB. 1918 – New or noteworthy fungi. VI [part 3]. Journal of Botany, British and Foreign. 56, 340–346.

Grove WB. 1919 – Species placed by Saccardo in the genus *Phoma*. Part 1. Bulletin of Miscellaneous Informations of the Royal Botanical Gardens Kew 1919, 177–201.

Guan YM, Liu ZB, Li MJ, Wang QX et al. 2018 – First report of *Colletotrichum spaethianum* causing anthracnose in *Atractylodes japonica* in China. Plant Disease 102, 239.

Guarnaccia V, Gilardi G, Martino I, Garibaldi A et al. 2019 – Species diversity in *Colletotrichum* causing anthracnose of aromatic and ornamental *Lamiaceae* in Italy. Agronomy 9, 613.

Guarnaccia V, Groenewald JZ, Polizzi G, Crous PW. 2017 – High species diversity in *Colletotrichum* associated with citrus diseases in Europe. Persoonia 39, 32–50.

Guerber JC, Liu B, Correll JC, Johnston PR. 2003 – Characterization of diversity in *Colletotrichum acutatum* sensu lato by sequence analysis of two gene introns, mtDNA and intron RFLPs, and mating compatibility. Mycologia 95, 872–895.

Guo M, Pan YM, Dai YL, Gao ZM. 2013 – First report of leaf spot caused by *Colletotrichum spaethianum* on *Peucedanum praeruptorum* in China. Plant Disease 97, 1380.

Gupta PC. 1974a – Z. PflKrankh. PflPath. PflSchutz 81, 90.

Gupta PC. 1974b – Z. PflKrankh. PflPath. PflSchutz 81, 91.

Gurzitska 1950 – Parasitnie Nesov. Grib. 2, 304.

Gutner LS. 1933a – Gribi-parasitioranñereynikhrastenii Leningradai Detskogo Selo. Trudy Botanicheskogo Instituta Akademii Nauk SSSR 2. 1, 285–323.

Gutner LS. 1933b – Diseases pests of new cultivated textile plants (Inst. New Bast Raw Material Vaskhnil, Moscow), 71–72.

Hacquard S, Kracher B, Hiruma K, Münch PC et al. 2016 – Survival trade-offs in plant roots during colonization by closely related beneficial and pathogenic fungi. Nature Communications 7, 1–13.

Hall CJJ, Drost 1908 – Recueil des Travaux botaniques Neerlandais 4, 243.

Halsted BD. 1891 – Report of the New Jersey State Agricultural Experimental Station, 293.

Halsted BD. 1893a – Some new weed fungi. Bulletin of the Torrey Botanical Club 20, 250–252.

Halsted BD. 1893b – Identity of anthracnose of the bean and watermelon. Bulletin of the Torrey Botanical Club 20, 246–250.

Han S, Jiang Y, Yi J, Li S et al. 2020 – First report of *Colletotrichum fioriniae* infection on *Zanthoxylum armatum*in China. Plant Disease 104, 2292.

Han YZ, Fan ZW, Wu CF, Wang JH et al. 2019 – First report of leaf anthracnose caused by *Colletotrichum cliviicola* on hybrid *Pennisetum* in China. Plant Disease 103, 2472.

Han YC, Zeng XG, Xiang FY, Ren L et al. 2016 – Distribution and characteristics of *Colletotrichum* spp. Associated with anthracnose of strawberry in Hubei China. Plant Disease 100, 996–1006.

Hara K.1930 – Rept. Siduokaken Agric. Soc. 34, 49–52.

Hara K. 1954 – A list of Japanese fungi hitherto known. 1–447.

Hara K. 1959 – A Monograph of Rice Diseases.

Hardoim PR, Van Overbeek LS, Berg G, Pirttilä AM et al. 2015 – The hidden world within plants: ecological and evolutionary considerations for defining functioning of microbial endophytes. Microbiology and Molecular Biology Reviews 79, 293–320.

Hasija SK. 1962a – Proc. natn. Acad. Sci. India 32, 413.

Hasija SK. 1962b – A new species of *Colletotrichum*. Current Science 31, 107.

Hasija SK. 1962c – Additions to the fungi of Jabalpur. (Madhya Pradesh) – I. Mycopathologia et Mycologia Applicata. 18, 84–92.

Hassan O, Lee DW, Chang T. 2019 – First report of anthracnose of persimmon caused by *Colletotrichum nymphaeae* in Korea. Plant Disease 103, 1172.

Heald FD, Wolf FA. 1911 – New species of Texas fungi. Mycologia. 3, 5–22.

Hemmi. 1920 – Journal of the Sapporo agric. Coll. 9, 22.

Henk DA, Eagle CE, Brown K, Van Den Berg MA et al. 2011 – Speciation despite globally overlapping distributions in *Penicillium chrysogenum*, the population genetics of Alexander Fleming'slucky fungus. Molecular Ecology 20, 4288–4301.

Hennings P. 1908a – Fungi S. Paulensis IV a cl. Puttemanscollecti. Hedwigia 48, 1–20.

Hennings P .1908b – Fungi paraënses III. Hedwigia. 48, 101–117.

Hennings P. 1904a – Einigeneue Pilzeaus Japan. Hedwigia 43, 140–146.

Hennings P. 1904b – Fungi fluminenses a. cl. E. Ulecollecti. Hedwigia 43, 78–95.

Hennings P. 1905a – Einige Schädliche Parasitische Pilze auf exotischen Orchideenunserer Gewachshauser. Hedwigia 44, 168–178.

Hennings P. 1905b – Fungi Amazonici IV. a cl. Ernesto Ulecollecti. Hedwigia 44, 57–71.

Hennings P. 1906 – Deutsche Südpolar-Exped., Bd. (extr.) 8, 15.

Hino I, Katumoto K. 1958 – Illustrationes fungorum bambusicolorum. VI. Bulletin of the Faculty of Agriculture Yamaguchi University. 9, 877–908.

Hiruma K, Gerlach N, Sacristán S, Nakano RT et al. 2016 – Root endophyte *Colletotrichum tofieldiae* confers plant fitness benefits that are phosphate status dependent. Cell 165, 464–474.

Höhnel F von. 1919 – Fünftevorläufige Mitteilungmykologische Ergebnisse (Nr. 300–500). Berichte der Deutschen Botanischen Gesellschaft 37, 153–161.

Höhnel F von. 1957 – Rev. Derzu Gloeosporium gestellten Pilze, 48

Hollós L. 1908 – Új gombák Kecskemét vidékérol. V. Annales Historico–Natureles Musei Nationalis Hungarici. 6, 527–536.

Hoof 1949 – Annales of phytopathological Society of Japan 13, 8.

Hori 1919 – Special Bulletin Agricultural Experiment Station Formosa 19, 583.

Horn NL. 1952 – A comparative study of two species of *Colletotrichum* on vetch. Phytopathology 42, 670–674.

Hou LW, Liu F, Duan WJ, Cai L. 2016 – *Colletotrichum aracearum* and *C. camelliae–japonicae*, two holomorphic new species from China and Japan. Mycosphere 7, 1111–1123.

Howard RJ, Ferrari MA. 1989 – Role of melanin in appressorium function. Experimental Mycology 13, 403–418.

Hsieh CW, Chuang YY, Lee MZ, Kirschner R. 2020 – First inventory of fungi in symptomless and symptomatic Chinese Mesona indicates phytopathological threat. Plant Disease 104, 2391–2397.

Huang F, Chen Gq, Hou X, Fu YS et al. 2013 – *Colletotrichum* species associated with cultivated citrus in China. Fungal Diversity 61, 61–74.

Hudson RR, Coyne JA. 2002 – Mathematical consequences of the genealogical species concept. Evolution 56, 1557–65.

Hughes SJ. 1958 – Revisiones Hyphomycetum aliquot cum appendice de nominibus rejiciendis. Canadian Journal of Botany. 36, 727–836.

Hulea A. 1939 – Acad. Roum. Bull. Sect. Scient. 22, 212.

Hulea A. 1950 – Herb. Mycologicum Romanicum fasc. 30, no. 1480.

Hung N, Hsiao CH, Yang CS, Lin HC et al. 2020 – *Colletotrichum keratitis*, a rare yet important fungal infection of human eyes. Mycoses 63, 407–415.

Hunupolagama DM, Chandrasekharan NV, Wijesundera WSS, Kathriarachchi HS et al. 2017 – Unveiling members of *Colletotrichum acutatum* species complex causing *Colletotrichum* leaf disease of *Hevea brasiliensis* in Sri Lanka. Current Microbiology 74, 747–756.

Hüseyin, Selçuk. 2001 – Lidia 5, 149.

Huson DH, Scornavacca C. 2011 – A survey of combinatorial methods for phylogenetic networks. Genome Biological Evolution 3, 23–35.

Hyde KD, Cai L, McKenzie EHC, Yang YL et al. 2009a – *Colletotrichum*: a catalogue of confusion. Fungal Diversity 39, 1–17.

Hyde KD, Cai L, Cannon PF, Crouch JA et al. 2009b – *Colletotrichum*–names in current use. Fungal Diversity 39, 147–182.

Hyde KD, Nilsson RH, Alias SA, Ariyawansa HA et al. 2014 – One stop shop: backbones trees for important pytopathogenic genera: I. Fungal Diversity 67, 21–125.

Hyde KD, Hongsanan S, Jeewon R, Bhat DJ et al. 2016 – Fungal diversity notes 367–491: taxonomic and phylogenetic contributions to fungal taxa. Fungal Diversity 80, 1–270.

Hyde KD, Norphanphoun C, Abreu VP, Bazzicalupo A et al. 2017 – Fungal Diversity notes 603–708, taxonomic and phylogenetic notes on genera and species. Fungal Diversity 87, 1–235.

Hyde KD, Norphanphoun C, Maharachchikumbura SSN, Bhat DJ et al. 2020 – Refined families of Sordariomycetes. Mycosphere 11, 305–1059.

Ikata S, Yoshida M. 1940 – A new anthracnose of jute-plant. Annals of the Phytopathological Society of Japan 10, 141–149.

Istvanfy. 1902 – Mitt. K. Ungar. ampel. Central-Anstalt. 2.

Ito K, Kobayashi T. 1958 – Studies on some anthracnoses of woody plants – V. Anthracnose fungi of black locust. Bulletin of the Government Forest Experimental Station Meguro 108, 1–29.

Jaczewski ALA. 1906 – Notes phytopathologiques – *Alternaria grossulariae* n. sp. et *Colletotrichum grossulariae* n. sp. Bulletin de la Société Mycologique de France 22, 121–124.

Jayawardena RS, Hyde KD, Damm U, Cai L et al. 2016a – Notes on currently accepted species of *Colletotrichum*. Mycosphere 7, 1192–1260.

Jayawardena RS, Huang J, Jin B, Yan JY et al. 2016b – Morphology and molecular phylogeny updated *Colletotrichum* species associated with strawberry anthracnose in China. Mycosphere 7, 1147–1163.

Jaywardena RS, Camporesi E, Elgorban AM, Bahkali AH et al. 2017 – A new species of *Colletotrichum* from *Sonchus* sp. in Italy. Phytotaxa 314, 55–63.

Jayawardena RS, Hyde KD, Chethana KWT, Daranagama DA et al. 2018 – Mycosphere notes 102–168, Saprotrophic fungi on *Vitis* in China, Italy, Russia and Thailand. Mycosphere 9, 1–114.

Jayawardena RS, Hyde KD, Chen YJ, Papp V et al. 2020 – One stop shop IV: taxonomic update with molecular phylogeny for important phytopathogenic genera: 76–100 (2020). Fungal Diversity 103, 87–218.

Jensen, Stewart. 1911 – Phytopathology 1, 125.

Johnson DA, Carris LM, Rogers JD. 1997 – Morpological and molecular characterization of *Colletotrichum nymphaeae* and *C. nupharicola* sp. nov. on water lilies (*Nymphaea* and *Nuphar*). Mycological Research 101, 641–649.

Joly P. 1965 – Flore Du Vietnam. Bulletin de la Société Mycologique de France 81, 269–287.

Kabát F, Bubák JE. 1907 – Mykologische Beiträge IV. Hedwigia 46, 297.

Kamal, Singh RP. 1980 – Indian Phytopath. 33, 594.

Kanto T, Uematsu S, Tsukamoto T, Moriwaki J et al. 2014 – Anthracnose of sweet pepper caused by *Colletotrichum scovillei* in Japan. Journal of Genetics and Plant Pathology 80, 73–78.

Karakulin. 1924 – Morbi plant**.** Leningrad 13, 133.

Karamnejadi T, Solhizadeh A, Shenavar O, Tajick-Ghanbari MA. 2017 – First report of leaf spot caused by *Colletotrichum coccodes* on *Viola tricolor* in Iran. Journal of Plant Pathology 99, 536.

Karimi O, Tajick Ghanbari MA, Bagherabadi S, Moradi Amirabad Y. 2017 – First report of *Colletotrichum sansevieriae* causing anthracnose on *Sansevieria trifasciata* in Iran. Journal of Plant Pathology 99, 302.

Katsura 1951 – Forsch. PflKr., Tokyo 4, 105.

Kelkar 1972 – Maharashtra Vidnyan Mandir, Patrika 7, 47.

Kelkar PV, Rao VG. 1962 – Some new records of *Colletotrichum* species from Bombay – Maharashtra (India). Sydowia 16, 101–105.

Kellerman WA, Swingle WT. 1888 – New species of Kansas Fungi. Journal of Mycology. 4, 93–95.

Khan A, Hsiang T. 2003 – The infection process of *Colletotrichum graminicola* and relative aggressiveness on four turfgrass species. Canadian Journal of Microbiology 49, 433–442.

Kiers TE, Palmer TM, Ives AR, Bruno JF, Bronstein JL. 2010 – Mutualism in a changing worl: an evolutionary perspective. Ecology Letters 13, 1459–1474.

Kim JH, Jeong US, Cheong SS, Lee KK et al. 2012 – Anthracnose of black raspberry caused by *Colletotrichum gloeosporioides*, *C. coccodes* and *C. acutatum* in Korea. Phytotaxa 18, 62–64.

Kim CO, Hassan O, Lee D, Chang T. 2018 – First report of anthracnose of Apple caused by *Colletotrichum fructicola* in Korea. Plant Disease 102, 2563.

Klaptzova. 1940 – Notulae Syst. Sect. Crypt. Inst. Bot. Acad. Sci. U.S.S.R. 5, 8.

Koek MM, Jellema RH, van der Greef J, Tas AC, Hankemeier T. 2011 – Quantitative metabolomics based on gas chromatography mass spectrometry: status and perspectives. Metabolomics 7, 307–328.

Koorders SH. 1907 – Botanische Untersuchungen. Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde. 13, 1–264.

Koorders Z. 1905 – Over enige ziekten en plagen van Ficus elastica. Bulletin van het Proefstation in Salatiga (Java). 3, 6–13.

Kostlan 1905 – Festschr. 70. Geburtstage A. Orth., 113.

Koval 1961 – Journal of Botanical Academy of Science Ukraine 18, 79.

Kubatko LS, Gibbs HL, Bloomquist EW. 2011 – Inferring species-level phylogenies and taxonomic distinctiveness using multilocus data in *Sistrurus* rattlesnakes. Systematic Biology 60, 393–409.

Kuhnholtz-Lordat G, Barry JP. 1949 – Quelques micromycètes parasites intéressants du sud de la France. Bulletin de la Société Mycologique de France 65, 121–131.

Kurlovich BS. 2002 – (ed.) *Lupins*: geography, classification, genetic resources and breeding. Bougouslav Kourlovitch.

Kwashnina. 1928 – Mitteil. Nord-Kaukas. Stat. Pflanzenschutz 4.

Lal. 1953 – Journal of Indian botanical Society 32, 88.

Laluk K, Mengiste T. 2010 – Necrotroph attacks on plants, wanton destruction or covert extortion?. The *Arabidopsis* Book/American Society of Plant Biologists, p 8.

Latunde-Dada AO. 2001 – *Colletotrichum*: tales of forcible entry, stealth, transient confinement and breakout. Molecular Plant Pathology 2, 187–198.

Latunde-Dada AO, O’Connell RJ, Nash C, Pring RJ et al. 1996 – Infection process and identity of the hemibiotrophic anthracnose fungus (*Colletotrichum destructivum*) from cowpea (*Vigna unguiculata*) Mycological Research 100, 1133–1141.

Leavitt SD, Johnson LA, Goward T, St Clair LL. 2011 – Species delimitation in taxonomically difficult lichen–forming fungi, an example from morphologically and chemically diverse *Xanthoparmelia* (*Parmeliaceae*) in North America. Molecular Phylogenetics and Evolution 60, 317–332.

Lee D, Hassan O, Kim C, Chang T. 2018 – First report of peach (*Prunus persica*) anthracnose caused by (*Colletotrichum fioriniae*) in Korea. Plant Disease 102, 2650–2651.

Lee DM, Hassan O, Chang T. 2020 – Identification, characterization, and pathogenicity of *Colletotrichum* species causing anthracnose of peach in Korea. Mycobiology 48, 210–218.

Lee SY, Jung HY. 2018 – *Colletotrichum kakivorum* sp. nov, a new leafspot pathogen of persimmon in Korea. Mycological Progress 17, 1113–1121.

Leite B, Nicholson RL. 1992 – Mycosporine-alanine: A self-inhibitor of germination from the conidial mucilage of *Colletotrichum graminicola*. Experimental Mycology 16, 76–86.

Lelwala RV, Korhonen PK, Young ND, Scott JB et al. 2019 – Comparative genome analysis indicates high evolutionary potential of pathogenicity genes in *Colletotrichum tanaceti*. PLoS One 14, e.0212248.

Leon AMM, Hernandez WS, Perez LG, Crespo K et al. 2018 – First report of leaf anthracnose caused by *Colletotrichum grossum* on mango (*Mangifera indica*) in Cuba. Journal of Plant Pathology 100, 329.

Liang X, Wang B, Dong Q, Li L et al. 2018 – Pathogenic adaptations of *Colletotrichum* fungi revealed by genome wide gene family evolutionary analyses. PloS one 13, e0196303.

Li H, Zhou GY, Qi XY, Jiang SQ. 2018 – First report of *Colletotrichum henanense* causing anthracnose on tea–oil trees in China. Plant Disease 102, 1040.

Li Q, Mo J, Guo T, Huang S et al. 2016a – First report of leaf spot of *Curcuma wenyujin* caused by *Colletotrichum curcumae* in China. Plant Disease 100, 521–522.

Li GJ, Hyde KD, Zhao RL, Hongsanan S et al. 2016b – Fungal diversity notes 253–366: taxonomic and phylogenetic contributions to fungal taxa. Fungal Diversity 78, 1–237.

Li SZ, Li H. 2020 – *Colletotrichum numphaeae* causing anthracnose on *Camellia oleifera* in China. Plant Disease 104, 1860.

Lichtemberg PSF, Moral J, Morgan DP, Felts DG et al. 2017 – First report of anthracnose caused by *Colletotrichum fioriniae* and *C. karstii* in California pistachio orchards. Plant Disease 101, 1320.

Lin CH, Long XP, Li ZP, Zhang Y et al. 2020 – First report of anthracnose of *Clausena lansium* caused by *Colletotrichum scovillei* in China. Plant Disease 104, 1557.

Lin CH, Wu WQ, Liao XM, Liu WB et al. 2018 – First report of leaf anthracnose caused by *Colletotrichum alatae* on water yam (*Dioscorea alata*) in China. Plant Disease 102, 248.

Lindquist JC. 1948 – Notas Del Museo de La Plata 13, 40.

Ling JF, Peng A, Jiang Z, Xi P et al. 2020 – First Report of Anthracnose Fruit Rot Caused by *Colletotrichum fioriniae* on Litchi in China. Plant Disease. Doi 10.1094/PDIS–07–20–1539–PDN

Liu B, Stein L, Cochran K, du Toit LJ et al. 2020 – Characterization of leaf spot pathogens from several spinach production areas in the United States. Plant Disease 104, 1994–2004.

Liu F, Cai L, Crous PW, Damm U. 2013a – Circumscription of the anthracnose pathogens *Colletotrichum lindemuthianum* and *C. nigrum*. Mycologia 105, 844–860.

Liu F, Cai L, Crous PW, Damm U. 2014 – The *Colletotrichum gigasporum* species complex. Persoonia 33, 83–97.

Liu F, Damm U, Cai L, Crous PW. 2013b – Species of the *Colletotrichum gloeosporioides* complex associated with anthracnose diseases of *Proteacea*. Fungal Diversity 61, 89–105.

Liu F, Hyde KD, Cai L. 2011 – Neotypification of *Colletotrichum coccodes*, the causal agent of potato black dot disease and tomato anthracnose. Mycology 2, 248–254.

Liu F, Tang G, Zheng X, Li Y et al. 2016a – Molecular and phenotypic characterization of *Colletotrichum* species associated with anthracnose disease in peppers from Sichuan Province, China. Scientific Reports 6, 1–17.

Liu F, Wang M, Damm U, Crous PW, Cai L. 2016c – Species boundaries in plant pathologenic fungi: a *Colletotrichum* case study. BMC Evolutionary Biology 16, 1–4.

Liu F, Weir BS, Damm U, Crous PW et al. 2015a – Unravelling *Colletotrichum* species associated with *Camellia*, employing *apmat* and *gs* loci to resolve species in the *C. gloeosporioides* complex. Persoonia 35, 63.

Liu HN, Liu JA, Zhou GY. 2020a – First report of *Colletotrichum alienum* causing anthracnose on *Aquilaria sinensis* in China. Plant Disease 104, 283.

Liu JK, Hyde KD, Jones EBG, Ariyawansa HA et al. 2015b – Fungal diversity notes 1–110: taxonomic and phylogenetic contributions to fungal species. Fungal Diversity 72, 1–197.

Liu L, Zhang L, Qiu P, Wang Y et al. 2020b – Leaf spot of *Polygonatum odoratum* caused by *Colletotrichum spaethianum*. Journal of Genetics in Plant Pathology 86, 157–161.

Liu LP, Yang LY, Liu YN, Lu BH et al. 2016b – First report of anthracnose disease caused by *Colletotrichum fioriniae* on barbary wolfberry in China. Plant Disease 100, 2534.

Liu M, Zhang W, Zhou Y, Liu Y et al. 2016d – First report of twig anthracnose on grapevine caused by *Colletotrichum nymphaeae* in China. Plant Disease 100, 2530.

Liu X, Xie X, Duan J. 2007 – *Colletotrichum yunnanense* sp. nov., a new endophytic species from *Buxus* sp. Mycotaxon 100, 137–144.

Liu YL, Lu JN, Zhou YH. 2019 – First report of *Colletotrichum truncatum* causing anthracnose of lucky bamboo in Zhanjiang, China. Plant Disease 103, 2947–2948.

Liu YN, Mao FR, Zhang H, Wang LB et al. 2018 – *Colletotrichum cymbidiicola* causes leaf spot of *Cymbidium ensifolium* in Jilin Province, China. Plant Disease 102, 1462–1463.

Lobik AI. 1928 – Materialy k mikologicheskoj flore Terskogo okruga [Material to the mycological flora of the Tersk Region]. Bolezni Rastenij. 17, 157–208.

Lobik AI. 1933 – Trudy severo-kavkazskogo Instituta Zashchity Rastenii 1, 39.

Lu GZ, Cannon PF, Reid A, Simmons CM. 2004 – Diversity and molecular relationships of endophytic *Colletotrichum* isolates from the Iwokrama Forest Reserve, Guyana. Mycological Research 108, 53–63.

Lyu H, Li C. 2020 – First report of anthracnose caused by *Colletotrichum americae – borealis* on greenhouse-grown licorice in China. Plant Disease 104, 1559.

Ma X, Nontachaiyapoom S, Jayawardena RS, Hyde KD et al. 2018 – Endophytic *Colletotrichum* species from *Dendrobium* spp. in China and Northern Thailand. MycoKeys 43, 23–57.

Macedo DM, Pereira OL, Hora Junior BT, Weir BS et al. 2016 – Mycobiota of the weed *Tradescantia fluminensis* in its native range in Brazil with particular reference to classical biological control. Australasian Plant Pathology 45, 45–56.

MacKenzie SJ, Seijo TE, Legard DE, Timmer PW, Peres NA. 2007 – Selection for pathogenicity to strawberry in populations of *Colletotrichum gloeosporioides* from native plants. Phytopathology 97, 1130–1140.

Maffei. 1921 – Riv. Patol. veget. 11, 116.

Magnaghi. 1902 – Atti Reale Ist. Bot. Univ. Pavia 8, 11.

Maharachchikumbura SSN, Hyde KD, Jones EBG, McKenzie EHC et al. 2015 – Towards a natural classification and backbone tree for Sodariomycetes. Fungal Diversity 72, 199–301.

Maharachchikumbura SN, Hyde KD, Jones EBG, McKenzie EHC et al. 2016 – Families of Sordariomycetes. Fungal Diversity 79, 1–317.

Maire RCJE. 1913 – Études Mycologiques, Fasc. 1. Annales Mycologici 11, 331–358.

Maire RCJE. 1917 – Champignons nord-Africains nouveaux ou peu connus. Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord. 8, 134–200.

Manamgoda DS, Udayanga D, Cai L, Chukeatirote E et al. 2013 – Endophytic *Colletotrichum* from tropical grasses with a new species *Colletotrichum endophytica*. Fungal Diversity 61, 107–115.

Marcelino J, Giordano R, Gouli S, Gouli V et al. 2008 – *Colletotrichum acutatum* var. *foriniae* (teleomorph: *Glomerella acutata* var. *foriniae* var. nov.) infection of a scale insect. Mycologia 100, 353–374.

Marin-Felix Y, Groenewald JZ, Cai L, Chen Q et al. 2017 – Genera of phytopathogenic fungi, GOPHY 1. Studies in Mycology 86, 99–216.

Masel A, Braithwaite K, Irwin J, Manners J. 1990 – Highly variable molecular karyotypes in the plant pathogen *Colletotrichum gloeosporioides*. Current Genetics 18, 81–86.

Massee GE. 1906 – Fungi exotici, V. Bulletin of Miscellaneous Informations of the Royal Botanical Gardens Kew, 256–258.

Massee GE. 1912 – Fungi exotici, XIII. Bulletin of Miscellaneous Informations of the Royal Botanical Gardens Kew, 189–191.

Massee GE. 1913 – Kew Bulletin of Miscellaneous Information, 198.

Massenot. 1961 – Bulletin Res. Counc. Israel, 10D 10, 194.

Matos KS, Machado JF, Chagas PC, Siqueira RHS et al. 2020 – First report of *Colletotrichum aeschynomenes* and *C. tropicale* causing anthracnose on *Myrciaria dubia* in Brazil. Plant Disease 104, 2517.

Matos KS, Santana KFA, Catarino AM, Hanada RE et al. 2017 – First report of anthracnose on welsh onion (*Allium fistulosum*) in Brazil caused by *Colletotrichum theobromicola* and *C. truncatum*. Plant Disease101, 1055–1056.

Matsushima T. 1996 – Matsushima Mycological Memoirs 9. Matsushima Mycological Memoirs. 9, 1–30.

Maublanc A, Rangel E. 1915 – Alguns fungos do Brasil, novos ou mal conhecidos. Boletim de Agricultura São Paulo. 16, 310–328.

Meetum P, Leksomboon C, Kanjanamaneesathian M. 2015 – First report of *Colletotrichum aenigma* and *C. siamense*, the causal agents of anthracnose disease of dragon fruit in Thailand. Journal of Plant Pathology 97, 402.

Mendgen K, Hahn M. 2002 – Plant infection and the establishment of fungal biotrophy. Trends in Plant Science 7, 352–356.

Mills PR, Hodson A, Brown AE. 1992 – Molecular differentiation of *Colletotrichum gloeosporioides* isolates infecting tropical fruits. In: *Colletotrichum*: Biology, Pathology and Control (Bailey JA, Jeger MJeds). CABI, Wallingford, UK: 269–288.

Moesz G. 1931 – Mykológiai közlemények. VIII. közlemény. Botanikai Kölzlemények 28, 161–174.

Montri P, Taylor PWJ, Mongkolporn O. 2009 – Pathotypes of *Colletotrichum capsici*, the causal agent of chilli anthracnose in Thailand. Plant Disease 93, 17–20.

Moraes SRG, Tanaka FAO, Massola Júnior NS. 2013 – Histopathology of *Colletotrichum gloeosporioides* on guava fruits (*Psidium guajava* L.). Rev Bras Frutic 35, 657–664.

Moreira RR, Peres NA, May De Mio LL. 2019 – *Colletotrichum acutatum* and *C. gloeosporioides* species complexes associated with apple in Brazil. Plant Disease 103, 268–275.

Morgan-Jones G. 1971 – Conidium ontogeny in Coelomycetes. II. Some Melanconiales which possess phialides. Canadian Journal of Botany 49, 1931–1937.

Moriwaki J, Tsukiboshi T. 2009 – *Colletotrichum echinochloae*, a new species on Japanese barnyard millet (*Echinochloa utilis*). Mycoscience 50, 273–280.

Moriwaki J, Sato T, Tsukiboshi T. 2003 – Morphological and molecular characterization of *Colletotrichum boninense* sp. nov. from Japan. Mycoscience 44, 47–53.

Mundkur. 1938 – Sci. Monogr. Coun. Agric. Res. India 12, 38.

Münch S, Lingner U, Floss DS, Ludwig N et al. 2008 – The hemibiotrophic lifestyle of *Colletotrichum* species. Journal of Plant Physiology 165, 41–51.

Muthappa BN. 1967 – Fungi of Coorg (lndia). II. Sydowia 21, 154–158.

Mzhavanadze. 1963 – Soobshch. Akad. Nauk. Gruz. SSR 31, 146.

Nakamura M, Ohzono M, Kei-Arai HS. 2006 – Anthracnose of *Sansevieria trifasciata* caused by *Colletotrichum sansevieriae* sp. nov. Journal of General Plant Pathology 72, 253–256.

Namyslowski B. 1906 – Zapiski mykologiczne. Sprawozdanie Komisji Fizjograficznej 39, 70–86.

Narendra DV, Rao VG. 1972 – Some additions to the fungi of India. Sydowia 26, 282–284.

Nascimento AD, Lima MO, Feijo FM, Junior JH et al. 2019 – First report of *Colletotrichum aeschynomenes* causing anthracnose in cacao (*Theobroma cacao*) in Brazil. Plant Disease 103, 3284.

Nasheshi A, Kadir J, Rashid TS, Awla HK et al. 2016 – Occurrence of anthracnose fruit rot caused by *Colletotrichum nymphaeae* on pepper (*Capsicum annuum*) in Malaysia. Plant Disease 100, 1244.

Neergaard. 1943 – Aarsberetn. J. E. Ohlens Enkesplantepatol. Lab. 1 April 1942–31 Marts 8.

Negru. 1958 – Stud. Cercet. Biol. Acad. romana 9, 34.

Negru. 1959 – Stud. Cercet. Biol. Acad. romana 11, 384.

Negru. 1961 – Notulae Syst. Sect. Crypt. Inst. Bot. Acad. Sci. U.S.S.R. 14, 186.

Newton AC, Fitt BD, Atkins SD, Walters DR, Daniell TJ. 2010 – Pathogenesis, parasitism and mutualism in the trophic space of microbe-plant interactions. Trends in Microbiology 18, 365–373.

Nguyen HDT, JančičS, Meijer M, Tanney JB et al. 2015 – Application of the phylogenetic species concept to *Wallemia sebi* from house dust and indoor air revealed by multi-locus genealogical concordance. PLoS One 10, 120894.

Nicolas, Aggéry N. 1942 – Bull. Mém. Soc. Med. Hôp. Paris 37.

Niu X, Gao H, Qi J, Chen M et al. 2016 – *Colletotrichum* species associated with jute (*Corchorus capsularis* L.) anthracnose in southeastern China. Scientific Reports 6, 1–9.

Noack F. 1897 – Bol. Inst. Agron. Estado Sao Paulo 9, 80.

Noack F. 1901 – Die Krankheiten des Kaffeebaumes in Brasilien. III. *Colletotrichum coffeanum* n. sp. Zeitschrift für Pflanzenkrankheiten und Pflanzenschutz. 2, 196–203.

Noireung P, Phoulivong, Liu F, Cai L et al. 2012 – Novel species of *Colletotrichum* revealed by morphology and molecular analysis. Cryptogamie Mycology 33, 347–362.

Nolla JAB. 1926 – Onion–leaf anthracnose. Journal of the Department of Agriculture of Porto Rico 10, 245–256.

Noor NM, Zakaria L. 2018 – Identification and characterization of *Colletotrichum* spp. associated with chili anthracnose in peninsular Malaysia. European Journal of Plant Pathology 151, 961–973.

Novosselova. 1938 – *Colletotrichum acanthostachydis*. Notul. Syst. Sec. Cryptog. Ins. Bot. Acd. Sci. USSR. 4, 39.

Ntahimpera N, Madden LV, Wilson LL. 1997 – Effect of rain distribution alteration on splash dispersal of *Colletotrichum acutatum*. Phytopathology 87, 649–655.

O'Connell RJ, Thon MR, Hacquard S, Amyotte SG et al. 2012 – Lifestyle transitions in plant pathogenic *Colletotrichum* fungi deciphered by genome and transcriptome analyses. Nature Genetics 44, 1060–1065.

O'Donnell K, Sutton DA, Fothergill A, McCarthy D et al. 2008 – Molecular phylogenetic diversity, multilocus haplotype nomenclature, and in vitro antifungal resistance within the *Fusarium solani* species complex. Journal of Clinical Microbiology 46, 2477–2490.

O'Gara PJ. 1915 – New species of *Colletotrichum* and *Phoma*. Mycologia 7, 38–41.

Okorley BA, Sossah FL, Dan D, Li Y et al. 2019 – First report of *Colletotrichum spaethianum* causing anthracnose on *Anemarrhena asphodeloides* in China. Plant Disease 103, 1414–1415.

Oo MM, Lim GT, Jang HA, Oh SK. 2017 – Characterization and pathogenicity of new record of anthracnose on various chili varieties caused by *Colletotrichum scovillei* in Korea. Mycobiology 45, 184–191.

Oo MM, Oh SK. 2017 – Identification and characterization of new record of grape ripe rot disease caused by *Colletotrichum viniferum* in Korea. Mycobiology 45, 421–425.

Oo MM, Tweneboah S, Oh SK. 2016 – First report of anthracnose caused by *Colletotrichum fioriniae* on Chinese matrimony vine in Korea. Mycobiology 44, 325–329.

Pal N, Testen AL. 2020 – First report of quinoa anthracnose caused by *Colletotrichum nigrum* and *C. truncatum* in the United States. Plant Disease. Doi 10.1094/PDIS–07–20–1568–PDN

Parmelee JA. 1958 – Some foliicolous fungi of the *Pyrolaceae*. Canadian Journal of Botany 36, 865–881.

Passerini G. 1888 – Diagnosi di funghinuovi. Nota IV. Attidella Reale Accademiadei Lincei. Rendiconti di classe di Scienze Fisiche, Matematiche e Naturale. Ser. 4, 95–105.

Patel K, Pande CB. 1953 – Indian Phytopath. 5, 136.

Patouillard NT, Lagerheim G de. 1891 – Champignons de l'Equateur (Pugillus I). Bulletin de la Société Mycologique de France 7, 158–184.

Patterson W. 1900 – New species of fungi. Bulletin of the Torrey Botanical Club 27, 282–286.

Patwardhan PG. 1966 – A new species of *Colletotrichum* and its associated ascigerous stage. Mycopathologia et Mycologia Applicata 29, 365–368.

Patwardhan PG, Sathe AV. 1965 – Some new records of Fungi Imperfecti from India. Sydowia 19, 150–155.

Pavgi MS, Singh UP. 1964 – Parasitic fungi from north India. III. Mycopathologia et Mycologia Applicata 24, 355–361.

Pavgi MS, Singh UP. 1965 – Parasitic fungi from North India IV. Mycopathologia et Mycologia Applicata 27, 81–88.

Pavgi MS, Upadhyay HP. 1964 – Parasitic fungi from north India. II. Mycopathologia et Mycologia Applicata 24, 347–354.

Peck CH. 1902 – Report of the State Botanist (1901). Annual Report on the New York State Museum of Natural History 54, 929–984.

Peng LJ, Sun T, Yang YL, Cai L et al. 2013 – *Colletotrichum* species on grape in Guizhou and Yunnan provinces, China. Mycoscience 54, 29–41.

Penzig, Saccardo. 1884 – Atti Inst. Veneto Sci. lett., ed Arti 2, 577.

Perfect SE, Hughes HB, O'Connell RJ, Green JR. 1999 – *Colletotrichum*: a model genus for studies on pathology and fungal-plant interactions. Fungal Genetics and Biology 27, 186–198.

Petch T. 1906 – Descriptions of new Ceylon fungi. Annals of the Royal Botanic Gardens Peradeniya 3, 1–10.

Petch T. 1917 – Additions to Ceylon fungi. Annals of the Royal Botanic Gardens Peradeniya 6, 195–256.

Petch T. 1924 – Revisions of Ceylon fungi (Part VII). Annals of the Royal Botanic Gardens Peradeniya 9, 119–184.

Pethybridge GH. 1919 – Notes on some saprophytic species of fungi associated with diseased potato plants and tubers. Transactions of the British Mycological Society 6, 104–120.

Peres NA, Timmer LW, Adaskaveg JE, Correll JC. 2005 – Lifestyles of *Colletotrichum acutatum*. Plant Disease 89, 784–796.

Petrak F. 1925 – Mykologische Notizen. VIII. Annales Mycologici 23, 1–143.

Petrak F. 1927 – Mykologische Notizen. IX. Annales Mycologici 25, 193–343.

Petrak F. 1929 – Mykologische Notizen. X. Annales Mycologici 27, 324–410.

Petrak F. 1934 – Mykologische Notizen. XII. Annales Mycologici 32, 317–447.

Petrak F. 1939 – Just's Bot. Jahresber. 56, 355.

Petrak F. 1947a – Kritische Studienüber Chinesische Pilze. Sydowia 1, 332–377.

Petrak F. 1947b – Sudamerikanische Mikromyzeten. Sydowia 1, 289–308.

Petrak F. 1956 – Mykologische Bemerkungen. Sydowia 10, 296–305.

Petrak F, Ciferri R. 1932 – Fungi Dominicani. II. Annales Mycologici 30, 149–353.

Petrak F, Sydow H. 1924 – Kritisch-systematische Originaluntersuchungen über Pyrenomyzeten, Sphaeropsideen und Melanconieen. Annales Mycologici 22, 318–386.

Petrak F, Sydow H. 1925 – Kritisch-systematische Originaluntersuchungen über Pyrenomyzeten, Sphaeropsideen und Melanconieen. Annales Mycologici 23, 209–294.

Petrak F, Sydow H. 1926 – Die Gattungen der Pyrenomyzeten, Sphaeropsideen und Melanconieen.1. Die phaeosporen Sphaeropsideen und die Gattung *Macrophoma*. Feddes Repertorium Spec. Nov. Regni Vegetabilum Beihefte 42, 1–551.

Petrak F, Sydow H. 1934 – Kritisch-systematische Originaluntersuchungen über Pyrenomyceten, Sphaeropsideen und Melanconieen. VI. Annales Mycologici 33, 157–193.

Photita W, Lumyong S, Lumyong P, Hyde KD. 2001 – Endophytic fungi of wild banana (*Musa acuminata*) at Doi Suthep Pui National Park, Thailand. Mycological Research 105, 1508–1513.

Photita W, Lumyong S, Lumyong P, McKenzie EHC, Hyde KD. 2004 – Are some endophytes of *Musa acuminata* latent pathogens? Fungal Diversity 16, 131–140.

Phoulivong S, Cai L, Parinn N, Chen H et al. 2010 – A new species of *Colletotrichum* from *Cordyline fruticosa* and *Eugenia javanica* causing anthracnose disease. Mycotaxon 114, 247–257.

Pinto JMA, Pereira R, Mota SF, Ishikawa FH et al. 2019 – Investigating phenotypic variability in *Colletotrichum lindemuthianum* populations. Phytopathology 102, 490–497.

Poletto T, Muniz MFB, Blume E, Fantinel VS et al. 2019 – First report of *Colletotrichum numphaeae* causing anthracnose on *Carya illinoinensis* in Brazil. Plant Disease 103, 3277.

Politis JC. 1935 – Contribution à l'étude des champignons de l'Attique. Pragmateiai tes Akademias Athenon. 4, 1–44.

Pollacci. 1896 – Atti dell'Istituto Botanico della R. Universita di Pavia, II 5, 16.

Posada D. 2002 – Evaluation of methods for detecting recombination from DNA sequences, empirical data. Molecular Biology and Evolution 19, 708–717.

Prihastuti H, Cai L, Chen H, McKenzie EHC et al. 2009 – Characterization of *Colletotrichum* species associated with coffee berries in northern Thailand. Fungal Diversity 39, 89–109.

Prihastuti H, Cai L, Crouch JA, Phoulivong S et al. 2010 – Neotypification of *Colletotrichum falcatum*, the causative agent of red-rot disease in sugarcane. Sydowia 62, 283–293.

Prins TW, Tudzynski P, von Tiedemann A, Tudzynski B. 2000 – Infection strategies of *Botrytis cinerea* and related necrotrophic pathogens. Fungal pathology, Springer, Dordrecht 33–64.

Promputtha I, Lumyong S, Vijaykrishna D, McKenzie EHC et al. 2007 – A phylogenetic evaluation of whether endophytes become saprotrophs at host senescence. Microbial Ecology 53, 579–590.

Prusky D. 1996 – Pathogen quiescence in postharvest diseases. Annual Reviews of Phytopathology 34, 413–434.

Prusky D, Alkan N, Mengiste T, Fluhr R. 2013 – Quiescent and nectrophic lifestyle choice during postharvest disease development. Annual Reviews of Phytopathology 51, 155–176.

Prusky D, Plumbley RA. 1992 – Quiescent infections of *Colletotrichum* in tropical and subtropical fruits. CAB International, Wallington, UK.

Pszczolkowska A, Okorski A, Paukszto L, Jastrzebski J. 2016 – First report of anthracnose disease caused by *Colletotrichum fioriniae* on blueberry in Western Poland. Plant Disease 100, 2167.

Qin LP, Zhang Y, Su Q, Chen YL et al. 2019 – First report of anthracnose of *Mangifera indica* caused by *Colletotrichum scovillei* in China. Plant Disease 103, 1043–1044.

Quaedvlieg W, Binder M, Groenewald JZ, Summerell BA et al. 2014 – Introducing the Consolidated Species Concept to resolve species in the *Teratosphaeriaceae*. Persoonia 33, 1–40.

Quimio TH. 1977 – Species of *Colletotrichum* in the Philippines. Nova Hedwigia 28, 543–553.

Radulescu E, Negru. 1963 – Studii si Cercetari de Biololie. 15, 390.

Rakotoniriana EF, Scauflaire J, Rabemanantsoa C, Urveg-Ratsimamanga S et al. 2013 – *Colletotrichum gigasporum* sp. nov., a new species of *Colletotrichum* producing long straight conidia. Mycological Progress 12, 403–412.

Ramakrishnan TS. 1951 – Additions to fungi of Madras – X. Proceedings of the Indian Academy of Sciences Section B 34, 63–72.

Ramakrishnan TS, Ramakrishnan K. 1947 – Additions to fungi of Madras – II. Proceedings of the Indian Academy of Sciences Section B 25, 178–186.

Ranathunge NP, Mongkolporn O, Ford R, Taylor PWJ. 2012 – *Colletotrichum truncatum* pathosystems on *Capsicum* spp: infection, colonization and defence mechanisms. Australasians Plant Pathology 41, 463–473.

Rangel. 1915 – International Agriculture.–technology. Rundschau 6, 1213.

Rangel. 1926 – Instituto Geral de Perícias de Santa Catarina 2, 3–34.

Rao V. 1963 – Bulletin of botanical Society of Collage of Science, Nagpur 4, 56.

Rao, Salam MS. 1960 – Journal of Indian botanical Society 39, 324.

Réblová M, Gams W, Seifert KA. 2011 – *Monilochaetes* and allied genera of the Glomerellales, and a reconsideration of families in the Microascales. Studies in Mycology 68, 163–191.

Redman RS, Dunigan DD, Rodriguez RJ. 2001 – Funagl symbiosis from mutualism to parasitism: who controls the outcome, host or invader?. New Phytologist 151, 705–716.

Renner MA, Heslewood MM, Patzak SD, Schäfer-Verwimp A, Heinrichs J. 2017 – By how much do we underestimate species diversity of liverworts using morphological evidence? An example from Australasian *Plagiochila* (*Plagiochilaceae*: Jungermanniopsida). Molecular Phylogenetics and Evolution 107, 576–593.

Roberts RG, Snow JP. 1990 – Morphological and pathological studies of *Colletotrichum capsici* and *C. indicum*. Mycologia 82, 82–90.

Rodriguez RJ, Redman RS. 2000 – *Colletotrichum* as a model system for defining the genetic basis of fungal symbiotic lifestyles. In: *Colletotrichum*. Host Specificity, Pathology and Host-Pathogen Interaction (Prusky D, Freeman S, Dickman MB eds). APS Press, St Paul, USA: 114–130.

Rodriguez-Guerra R, Ramírez-Rueda MT, Cabral-Enciso M, García-Serrano M et al. 2005 – Heterothallic mating observed between Mexican isolates of *Glomerella lindemuthiana*. Mycologia 97, 793–803.

Rogério F, Ciampi-Guillardi M, Barbieri MCG, Bragança CAD et al. 2017 – Phylogeny and variability of *Colletotrichum truncatum* associated with soybean anthracnose in Brazil. Journal of Applied Microbiology 122, 402–415.

Rojas EI, Rehner SA, Samuels GJ, Van Bael SA et al. 2010 – *Colletotrichum gloeosporioides sl* associated with *Theobroma cacao* and other plants in Panama: multilocus phylogenies distinguish host-associated pathogens from asymptomatic endophytes. Mycologia 102, 1318–1338.

Roldan. 1936 – Philippine Journal of Science 60, 120.

Roy. 1948 – Journal of Indian botanical Society 27, 101.

Saccardo PA. 1882 – Fungi Gallicilecti a Cl. viris P. Brunaud, C.C. Gillet, Abb.Letendre, A. Malbranche, J. Therry & Dom. Libert. Series IV. Michelia 2, 583–648.

Saccardo PA. 1884 – Sylloge Fungorum, Sylloge Sphaeropsidearum et Melanconiearum. Sylloge Fungorum. 3, 1–840.

Saccardo PA. 1902 – Florae MycologicaeLusitanicae. Contributioduodecima. Boletim da Sociedade Broteriana. 19, 156–171.

Saccardo PA. 1908 – Sylloge Fungorum XIX, 369.

Saccardo PA. 1906 – Sylloge Fungorum (Abellini) 18, 466.

Saccardo PA. 1912 – Notaemycologicae. Series XIV. Annales Mycologici 10, 310–322.

Saccardo PA. 1914 – Notaemycologicae. Series XVIII. Annales Mycologici 12, 282–314.

Saccardo PA. 1915 – Fungi ex insula Melita (Malta) lecti a Doct. Caruana-Gatto et Doct. G. Borg annis MCMXIII et MCMIV. Nuovo Giornale Botanico Italiano 22, 24–76.

Saccardo PA. 1921 – Notaemycologicae. Ser. XXVII. Fungi sinenses aliquot a cl. Prof. Otto A. Reinkingcollecti et communicati. Philippine Journal of Science Section C Botany 18, 595–605.

Saccardo PA. 1922 – Sylloge Fungorum XXV, 578

Saccardo PA, Sydow P. 1899 – Sylloge Fungorum 14, 1016

Saccardo PA, Trotter A. 1913 – Supplementum Universale, Pars IX. Sylloge Fungorum 22, 1–1612.

Sahni VP. 1968 – Deuteromycetes from Jabalpur. III. Mycopathologia et Mycologia Applicata. 36, 267–288.

Salunkhe VN, Anandhan S, Gawande SJ, Ikkar RB et al. 2018a – First report of *Colletotrichum truncatum* causing anthracnose of mouse garlic (*Allium angulosum*) in India. Plant Disease 102, 240.

Salunkhe VN, Anandhan S, Gawande SJ, Ikkar RB et al. 2018b – First report of anthracnose caused by *Colletotrichum spaethianum* on *Allium ledebourianum* in India. Plant Disease 102, 2031.

Samarakoon MC, Persoh D, Hyde KD, Bulgakov TS et al. 2018 – *Colletotrichum acidae* sp. nov. from northern Thailand and a new record of *C. dematium* on *Iris* sp. Mycosphere 9, 583–597.

Sanders GM, Korsten L. 2003 – Comparison of cross inoculation potential of South African avocado and mango isolates of *Colletotrichum gloeosporioides*. Microbiological Research 158, 143–150.

Sandu. 1959a – Lejeunia Mém., 838

Sandu. 1959b – Lejeunia Mém., 840

Sandu-Ville C. 1962 – Stud. Cercet Stiint. Iasi, Biol. Stiinte agric. 13, 266.

Sangpueak R, Phansak P, Buensanteai N. 2018 − Morphological and molecular identification of *Colletotrichum* species associated with cassava anthracnose in Thailand. Journal of Phytopathology 166, 129–142.

Santana KFA, Garcia CB, Matos KS, Hanada RE et al. 2016 − First report of anthracnose caused by *Colletotrichum spaethianum* on *Allium fistulosum* in Brazil. Plant Disease 100, 224–225.

Sato T, Moriwaki J. 2013 – Molecular re-identification of strains in NIAS Genebank belonging to phylogenetic groups A2 and A4 of the *Colletotrichum acutatum* species complex. Microbial Resources and Systematics (Microbiology and Culture Collections) 29, 13–23.

Sato T, Moriwaki J, Uzuhashi S, Degawa Y et al. 2012 – Molecular phylogenetic analyses and morphological re-examination of strains belonging to three rare *Colletotrichum* species in Japan. Microbiology and Culture Collections 28, 121–134.

Savian LG, Muniz MFB, Poletto T, Maculan LG et al. 2019 – First report of *Colletotrichum nymphaeae* causing anthracnose on *Juglans regia* fruits in sourthern Brazil. Plant Disease 103, 3287.

Savulescu T, Negru. 1955 – Herb. mycologicum Romanicum 31, no. 1539.

Savulescu T, Sandu-Ville C. 1933 – Beitragzur Kenntnis der Micromyceten Rumäniens. Hedwigia. 73, 71–132.

Sawada K. 1933 − Descriptive catalogue of the Formosan fungi VI. Report of the Department of Agriculture Government Research Institute of Formosa. 61, 1–117.

Sawada K. 1943 − Descriptive catalogue of the Formosan fungi. Part VIII. Report of the Department of Agriculture Government Research Institute of Formosa. 85, 1–130.

Sawada K. 1944 − Descriptive catalogue of Formosan fungi. Report of the Department of Agriculture Government Research Institute of Formosa. 87, 1–96.

Sawada K. 1958 − Researches on fungi in Tohoku District of Japan. (IV). Fungi Imperfecti. Bulletin of the Government Forest Experimental Station Meguro. 105, 35–140.

Sawada K. 1959 – Descriptive catalogue of Taiwan (Formosan) fungi. Part XI. Special Publication College of Agriculture National Taiwan University. 8, 1–268.

Sawada K. 1965 – Lich. Foliic. Leg. Beccari, 45.

Scaramella. 1932 – *Colletotrichum veronicae* Malpighia 32, 219.

Schena L, Mosca S, Cacciola SO, Faedda R et al. 2014 – Species of the *Colletotrichum gloeosporioides* and *C. boninense* complexes associated with olive anthracnose. Plant Pathology 63, 437–446

Schulzer S, Saccardo PA. 1884 – Micromycetes Slavonicinovi V (69–84). Hedwigia 23, 125–128.

Schulze-Lefert P, Panstruga R. 2011 – A molecular evolutionary conceptconnecting non host resistance, pathogen host range and pathogen association. Trends in Plant Science 16, 117–125.

Serdani M, Rooney-Latham S, Wallis KM, Blomquist CL. 2013 – First report of *Colletotrichum phormii* causing anthracnose on New Zealand Flax in the United States. Plant Disease 97, 1115.

Sharma G, Maymon M, Freeman S. 2017 – Epidemiology, pathology and identification of *Colletotrichum* including a novel species associated with avocado (*Persea americana*) anthracnose in Israel. Scientific Report 1, 11–16.

Sharma G, Pinnaka AK, Shenoy BD. 2015 – Resolving *Colletotrichum siamense* species complex using *apmat* marker. Fungal Diversity 71, 247–264.

Sharma G, Shenoy BD. 2013 − Multigene sequence-based identification of *Colletotrichum cymbidiicola*, *C. Karstii* and *C. Phyllanthi* from India. Czech Mycology 65, 79–88.

Sherriff C, Whelan MJ, Arnold GM, Lafay JF et al. 1994 − Ribosomal DNA sequence analysis reveals new species groupings in the genus *Colletotrichum*. Experimental Mycology 18, 121–138.

Shi YP, Liu YX, Li LL, Dai LM et al. 2019 – First report of *Colletotrichum laticiphilum* causing anthracnose of Rubber tree in China. Plant Disease 103, 579.

Shivas RG, Bathgate J, Podger FD. 1998 – *Colletotrichum xanthorrhoeae* sp. nov. on *Xanthorrhoea* in Western Australia. Mycological Research 102, 280–282.

Shivas RG, Tan YP. 2009 – A taxonomic re-assessment of *Colletotrichum acutatum*, introducing *C. fioriniae* comb.et stat. nov. and *C. simmondsii* sp. nov. Fungal Diversity 39, 111–122.

Shivas RG, Tan YP, Edwards J, Dinh Q et al. 2016 – *Colletotrichum* species in Australia. Australasian Plant Pathology 45, 447–464.

Siemaszko W. 1923 – Badaniamykologiczne wgórachKaukazu. Arch. Nauk. Biol. Towarz. Nauk. Warszawa. 1, 1–54.

Simmonds JH. 1965 – A study of the species of *Colletotrichum* casuing ripe fruit rots in Queensland. Queensland Journal of Agricultural and Animal Science 25, 437–459.

Simmonds JH. 1968 – Type specimens of *Colletotrichum gloeosporioides* var. *minor* and *Colletotrichum acutatum*. Queensland Journal of Agricultural and Animal Science 25, 178A.

Silva DN, Talhinhas P, Várzea V, Cai L et al. 2012a – Application of the *apn2/mat* locus to improve the systematics of the *Colletotrichum gloeosporioides* complex: an example from coffee (*Coffea* spp.) hosts. Mycologia 104, 396–409.

Silva DN, Talhinhas P, Cai L, Manuel L et al. 2012b – Host-jump drives rapid and recent ecological speciation of the emergent fungal pathogen *Colletotrichum kahawae*. Molecular Ecology 21, 2655–2670.

Silva MD, Cruz ES, Veloso TG, Miranda L et al. 2018 – *Colletorichum serranegrense* sp. nov., a new endophytic species from the roots of the endangered Brazilian epiphytic orchid *Cattleya jongheana*. Phytotaxa 351, 163–170.

Sivanesan A, Hsieh WH. 1993 – A new ascomycete, *Glomerella septospora* sp. nov. and its coelomycete anamorph, *Colletotrichum taiwanense* sp. nov. from Taiwan. Mycological Research 97, 1523–1529.

Smith RE. 1899 – A new *Colletotrichum* disease of the pansy. Botanical Gazette Crawfordsville 27, 203–204.

Smith BJ, Black LL. 1990 – Morphological, cultural and pathogenic variation among *Colletotrichum* species isolated from strawberry. Plant Disease 74, 69–76.

Soares WRO, Quitania ACR, Miller RNG, Café-Filho AC et al. 2017 – First worldwide report of *Colletotrichum pseudoacutatum* causing anthracnose on *Syzygium jambos*. Plant Disease 101, 1322.

Soothworth EA.1891 – Antracnose of cotton. Journal of Mycology 6, 100–105.

Sousa da Câmara M. 1910 – Contributiones ad mycofloram Lusitaniae. Centuria VI. Boletim da Sociedade Broteriana. 25, 5–25.

Sousa da Câmara M. 1920 – Myc. novi mycofl. Lusitan, Revista agronomy Lisboa IV, 8.

Sousa da Câmara M. 1930 – Ann. Inst. Sup. Agron. Lisbosa. 3, 121.

Sousa da Câmara M. 1931a – Anais Inst. Super. Agron. Lisb. 4, 6 (extr.)

Sousa da Câmara M. 1931b –Revta agron., Lisb. 17, 10 [extr.]

Sousa da Câmara M. 1936 – Contributiones ad mycofloram Lusitaniae. Centuria XI. Boletim de Agricultura Lisboa. 2, 1–80.

Sousa-Dias de MR. 1958 – *Colletotrichum tells-palhinhae* n. sp. Boletim da Sociedade Broteriana. 32, 265–266.

Southworth EA. 1890 – A new hollyhock disease. Journal of Mycology 6, 45–50.

Spegazzini C. 1908 – Hongos de la yerba mate. Anales del Museo Nacional de Historia Natural Buenos Aires. 17, 111–141.

Spegazzini C. 1911 – Mycetes Argentinenses (Series V). Anales del Museo Nacional de Historia Natural Buenos Aires series 3 13, 329–467.

Spegazzini C. 1918a – Fungi Costaricensesnonnulli. Boletín de la Academia Nacional de Cienciasen Córdoba. 23, 541–609.

Spegazzini C. 1918b – Reliquiaemycologicaetropicae. Boletín de la Academia Nacional de Cienciasen Córdoba. 23, 365–541.

Spegazzini C. 1920 – Algunas observacion es relativas a las hojas de coca (Erythroxylon coca Lam.). Anales de la Sociedad Científica Argentina. 90, 23–32.

Spegazzini C. 1922 – Fungi Paraguayenses. Anales del Museo Nacional de Historia Natural Buenos Aires. 31, 355–450.

Sprague R. 1957 – Some leafspot fungi on Western Gramineae – XI. Mycologia 49, 837–853.

Sprague R. 1958 – Some leafspot fungi on western Gramineae – XII. Mycologia 50, 814–830.

Srivastava AK. 1969 – A new species of *Colletotrichum* on *Gomphrena celosioides* Mart. Sydowia 23, 118–119.

Srivastava SNS. 1953 – On the occurence of a new species of *Colletotrichum* on *Pothos scandens* L. Current Science 22, 244–244.

Sreenivasaprasad S, Brown AE, Mills PR. 1992 – DNA sequence variation and inter-relationship among *Colletotrichum* species causing strawberry anthracnose. Physiological and Molecular Plant Pathology 41, 265–281

Sreenivasaprasad S, Mills PR, Meehan BM, Brown AE. 1996 – Phylogeny and systematic of 18 *Colletotrichum* species based on ribosomal DNA spacer sequences. Genome 39, 499–512.

Sreenivasaprasad S, Talhinhas P. 2005 – Genotypic and phenotypic diversity in *Colletotrichum acutatum,* a cosmopolitan pathogen causing anthracnose on a wide range of hosts. Molecular Plant Pathology 6, 361–378.

Stajich JE. 2017 – Fungal genomes and insights into the evolution of the kingdom. The Fungal Kingdom 619–633.

Stergiopoulos I, Gordon TR. 2014 – Cryptic fungal infections: the hidden agenda of plant pathogens. Frontiers in Plant Science 5, article 506.

Stevens FL. 1917 – Porto Rican fungi, old and new. Transactions of the Illinois Academy of Science 10, 162–218.

Stevens FL. 1925 – Hawaiian fungi. Bulletin of the Bernice Bishop Museum 19, 1–189.

Stevens FL. 1927 – Fungi from Costa Rica and Panama. Illinois Biology Monographs 11, 157–255.

Stevens FL. 1930 – Parasitic fungi of British Guiana, Trinidad and Costa Rica. Annales Mycologici 28, 364–371.

Stevens FL, Hall JG. 1909 – Z. PflKrankh. PflSchutz 19, 68.

Stewart FC. 1900 – New York Agricultural Experiment Station Bulletin 179, 106.

Stewart JE, Timmer LW, Lawrence CB, Pryor BM et al. 2014 – Discord between morphological and phylogenetic species boundaries, incomplete lineage sorting and recombination results in fuzzy species boundaries in an asexual fungal pathogen. BMC Evolutionary Biology 14, 38.

Stoneman. 1898 – Botanical Gazzet 26, 106.

Stukenbrock EH, McDonald BA. 2008 – The origins of plant pathogens in agro-ecosystems. Annual Review of Phytopathology 46, 75–100.

Sun WM, Wen XL, Qi HX, Feng LN et al. 2019 – First report of anthracnose of *Atractylodes chinensis* caused by *Colletotrichum chlorophyti* in China. Plant Disease 103, 764.

Sutton BC. 1966 – Development of fruitifications in *Colletotrichum graminicola* (Ces.) Wils. and related species. Canadian Journal of Botany 44, 887–897.

Sutton BC. 1968 – The appressoria of *Colletotrichum graminicola* and *C. falcatum*. Canadian Journal of Botany 46, 873–876.

Sutton BC. 1975 – Coelomycetes V. *Coryneum*. Mycological Papers. 138, 1–224.

Sutton BC. 1980 – The Coelomycetes. Fungi Imperfecti with Pycnidia, Acervuli and Stromata. Commonwealth Mycological Institute, Kew, Surrey, England, 1–696.

Sutton BC. 1992 – The genus *Glomerella* and its anamorph *Colletotrichum*. In: *Colletotrichum*: Biology, Pathology and Control (Bailey JA, Jeger MJ eds). CABI, Wallingford, UK: 1–26.

Sutton TB, Shane WW. 1983 – Epidemiology of the perfect stage of *Glomerella cingulata* on apples. Phytopathology 73, 1179–1183.

Su YY, Noireung P, Liu F, Hyde KD et al. 2011 – Epitypification of *Colletotrichum musae,* the causative agent of banana anthracnose. Mycoscience 52, 376–382.

Sydow H. 1925a − Fungi from the province of Sorsogon. Leaflets of Philippine Botany. 9, 3113–3138.

Sydow H. 1925b − Fungi in itinerecostaricensicollecti. Pars prima. Annales Mycologici. 23, 308–429.

Sydow H. 1930 – Novae fungorum species – XX. Annales Mycologici. 28, 432–447.

Sydow H. 1932 – Annals mycology 30, 397.

Sydow H. 1935 – Novae fungorum species – XXIII. Annales Mycologici. 33, 367–384.

Sydow H, Mitter JH. 1933 – Fungi indici. I. Annales Mycologici. 31, 84–97.

Sydow H, Sydow P, Butler EJ. 1916 − Fungi Indiaeorientalis pars V. Annales Mycologici. 14,177–220.

Sydow H, Sydow P. 1900 − Beiträgezur Kenntnis der Pilzflora der Mark Brandenburg. III. Hedwigia Beiblätter. 39, 1–6.

Sydow H, Sydow P. 1913 − Enumeration of Philippine fungi with notes and descriptions of new species, I, micromycetes. Philippine Journal of Science Section C Botany. 8, 265–285.

Sydow H, Sydow P. 1914a – Fungi from northern Palawan. Philippine Journal of Science Section C Botany 9, 157–189.

Sydow H, Sydow P. 1914b – Diagnose Neuer Philippinischer Pilze. Annales Mycologici 12, 545–576.

Sydow H, Sydow P. 1939 – Fungi aequatorienses. Annales Mycologici. 37, 275–438.

Sydow P, Sydow H. 1920 − Weitereneue Micromyceten der Philippinen-Inseln. Annales Mycologici. 18, 98–104.

Talhinhas P, Sreenivasaprasad S, Neves-Martin J, Oliveira H. 2002 – Genetic and morphololological characterization of *Colletotrichum acutatum* causing anthracnose of lupins. Phytopathology 92, 986–996.

Talhinhas P, Sreenivasaprasad S, Neves-Martin J, Oliveira H. 2005 − Molecular and phenotypic analyses reveal association of diverse *Colletotrichum acutatum* groups and a low level of *C. gloeosporioides* with olive anthracnose. Applied and Environmental Microbiology 71, 2987–2998.

Tao G, Liu Zy, Liu F, Gao YH et al. 2013 − Endophytic *Colletotrichum* speciess from *Bletilla ochracea* (*Orchidaceae*), with descriptions of seven new species. Fungal Diversity 61, 139–164.

Tassi F. 1899 – Novae micromycetum species descriptae et iconibus illustratae. VI [concl.]. Bollettino del Laboratorio de Orto Botanico Reale Universita Siena. 2, 231–232.

Tassi F. 1900 – Novae micromycetum species descriptae et iconibus illustratae. Bollettino del Laboratorio de Orto Botanico Reale Universita Siena. 3, 14–21.

Tassi F. 1904 – Nuovi Micromiceti. Bollettino del Laboratorio de Orto Botanico Reale Universita Siena. 6, 125–127.

Taubenhaus. 1916 – A contribution to our knowledge of silver scurf (*Spondylocladiumatro virens* Harz) of the white potato. Memoirs of the New York Botanical Garden. 6, 549–560.

Taylor JW, Jacobson DJ, Kroken S, Kasuga T et al. 2000 – Phylogenetic species recognition and species concepts in fungi. Fungal Genetics and Biology 31, 21–32.

Tehon LR, Daniels EY. 1925 – Notes on the parasitic fungi of Illinois. II. Mycologia. 17, 240–249.

Tehon LR. 1924 – Notes on the parasitic fungi of Illinois. Mycologia 16, 135–142.

Tehon LR. 1933 – Notes on the parasitic fungi of Illinois. Mycologia 25, 237–257.

Teng SC. 1936 – Additional fungi from China IV. Sinensia. 7,752–823

Than PP, Shivas RG, Jeewon R, Pongsupasamit S et al. 2008 – Epitypification and phylogeny of *Colletotrichum acutatum* J.H. Simmonds. Fungal Diversity 28, 97–108.

Tharp BC. 1917 – Texas parasitic fungi. Mycologia. 9, 105–124.

Thite, Patil MS. 1975 – Botanique Nagpur 6, 114.

Tibpromma S, Hyde KD, Jeewon R, Maharachchikumbura SS et al. 2017 – Fungal Diversity Notes 491–602: taxonomic and phylogenetic contributions to fungal taxa. Fungal Diversity 83, 1–261.

Tibpromma S, Hyde KD, Bhat JD, Mortimer PE et al. 2018 – Identification of endophytic fungi from leaves of *Pandanaceae* based on their morphotypes and DNA sequence data from southern Thailand. MycoKeys 33, 25.

Tilak ST. 1960 – A new species of *Colletotrichum* from an economic host. Current Science. 29, 147–147.

Togashi K. 1936 – New species of parasitic fungi – I. Transactions of the Sapporo Natural History Society 14, 280–285.

Togashi, Onuma. 1934 – Bulletin of of the Imperial College of Agriculture and Forestry Morioka 17, 47.

Tognini. 1892 – *Colletotrichum montemartinii* Atti dell'Istituto Botanico della R. Universita di Pavia 3, 15 (extr.)

Tognini. 1895 – *Colletotrichum ailanthi* AttiIst. bot. 'Giovanni Briosi', ser. II (extr.), 16 (extr.)

Tóth A, Petróczy M, Palkovics L. 2017 – First report of *Colletotrichum acutatumsensu lato* through the occurrence of *C. godetiae* on Cornelian Cherry (*Cornus mas*) in Europe. Plant Disease 101, 841–841.

Udayanga D, Manamgoda DS, Liu X-Z, Chukeatirote E et al. 2013 – What are the common anthracnose pathogens of tropical fruits?. Fungal Diversity 61, 165–179.

Uematsu S, Kageyama K, Moriwaki J, Sato T. 2012 – *Colletotrichum carthami* comb. nov., an anthracnose pathogen of safflower, garland chrysanthemum and pot marigold, revived by molecular phylogeny with authentic herbarium specimens. Journal of General Plant Pathology 78, 316–330.

Underwood. 1891 – *Colletotrichum adustum* Journal of Mycology 7, 35.

Urríes MJ. 1952 – Notas micológicas. Anales del Jardín Botánico de Madrid. 10, 193–228.

van Kan JA. 2006 – Licensed to kill: the lifestyle of a necrotropic plant pathogen. Trends in Plant Science 11, 247–253.

Vaillancourt LJ, Hanau RM. 1991 – A method for genetic analysis of *Glomerella graminicola* (*Colletotrichum graminicola*) from maize. Phytopathology 81, 530–534.

Vaillancourt LJ, Hanau RM. 1992 – Genetic and morphological comparison of *Glomerella* (*Colletotrichum*) isolates from maize and from sorghum. Experimental Biology 16, 219–229.

Vargas WA, Martín JMS, Rech GE, Rivera LP et al. 2012 – Plant defense mechanism are activated during biotrophic and nectrotrophic development of *Colletotrichum graminicola* in maize. Plant Physiology 158, 1342–1358.

Vasquez-Lopez A, Palacios-Torres RE, Camacho-Tapia M, Granados-Echegoyen C et al. 2019 – *Colletotrichum brevisporum* and *C. musicola* causing leaf anthracnose of taro (*Colocasia esculenta*) in Mexico. Plant Disease 103, 2963.

Vassiljevsky NI. 1940 – Notulae Syst. Sect. Crypt. Inst. Bot. Acad. Sci. U.S.S.R. 5, 17.

Vassiljevsky NI, Karakulin BP. 1950 – Fungi imperfecti Parasitici, Pars II. Melanconiales. ,1–680.

Vassiljevsky NI, Karakulin BP. 1926 – Fungi Imperfecti Parasitici 2, 303.

Velho AC, Alaniz S, Casanova L, Mondino P, Stadnik MJ. 2015 – New insights into the characterization of *Colletotrichum* species associated with apple diseases in southern Brazil and Uruguay. Fungal Biology 119, 229–244.

Verplancke, Claessens. 1934 – *Colletotrichum gloriosae*. Natuurwet. Tijdschr., 16, 17.

Viégas AP. 1946 – Alguns fungos do Brasil XII. Fungi Imperfecti. Bragantia. 6, 1–37.

Vieira WA, Lima WG, Nascimento ES, Michereff SJ et al. 2017 – The impact of phenotypic and molecular data on the inference of *Colletotrichum* diversity associated with *Musa*. Mycologia 109, 912–934.

Vieira WA, Michereff SJ, Jr de Morais MA, Hyde KD et al. 2014 – Endophytic species of *Colletotrichum* associated with mango in northeastern Brazil. Fungal Diversity 67, 181–202.

Vinnere O, Fatehi J, Wright SA, Gerhardson B. 2002 – The causal agent of anthracnose of *Rhododendron* in Sweden and Latvia. Mycological Research 106, 60–69.

von Arx JA. 1957a – Revision der zu *Gloeosporium gestellten* Pilze. Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde. 51, 1–153.

von Arx JA. 1957b – Die Arten der Gattung *Colletotrichum* Cda. Phytopathologische Zeitschrift 29, 413–468.

Wakefield EM. 1922 – Fungi exotici. XXVI. Bulletin of Miscellaneous Informations of the Royal Botanical Gardens Kew. 5, 161–165.

Walker J, Nikandrow A, Millar GD. 1991 – Species of *Colletotrichum* on *Xanthium* (*Asteraceae*) with comments on some taxonomic and nomenclatural problems in *Colletotrichum*. Mycological Research 95, 1175–1193.

Walsh PD. 2000 – Sample size for the diagnosis of conservation units. Conservation Biology 14, 1533–1537.

Waller JM, Bridge PD, Black R, Hakiza G. 1993 – Characterization of the coffee berry disease pathogen *Colletotrichum kahawae* sp. nov. Mycological Research 97, 989–994.

Wan Z, Liu JA, Zhou GY. 2018 – First report of *Colletotrichum gigasporum* causing anthracnose on *Dalbergia odorifera* in China. Plant Disease 102, 679.

Wang Y, Chen JY, Xu X, Cheng J et al. 2020 – Identification and characterization of *Colletotrichum* species associated with anthracnose disease of *Camellia oleifera* in China. Plant Disease 104, 474–482.

Wang Y, Qin HY, Liu YX, Fan ST et al. 2019 – First report of anthracnose caused by *Colletotrichum aenigma* on *Actinidia arguta* in China. Plant Disease 103, 372–373.

Wang YC, Hao XY, Wang L, Xiao B et al. 2016 – Diverse *Colletotrichum* species cause anthracnose of tea plants (*Camellia sinensis* (L.) O. Kuntze) in China. Scientific Reports 6, 1–13.

Wang XM, Li JY. 1987 – Studies on species of *Colletotrichum* in Shaanxi Province, China. Acta Mycological Sinica 6, 211–218.

Waters JM, Rowe DL, Burridge CP, Wallis GP. 2010 – Gene trees versus species trees, reassessing life–history evolution in a freshwater fish radiation. Systematic Biology 59, 504–517.

Weimer. 1945 – *Colletotrichum villosum*. Phytopathology 35, 988.

Weir BS, Johnston PR. 2010 – Characterisation and neotypification of *Gloeosporium kaki* Hori as *Colletotrichum horii* nom. nov. Mycotaxon 111, 209–219.

Weir BS, Johnston PR, Damm U. 2012 – The *Colletotrichum gloeosporioides* species complex. Studies in Mycology 73, 115–180.

Wharton PS, Diéguez-Uribeondo J. 2004 – The biology of *Colletotrichum acutatum*. In Anales del jardín botánico de Madrid 61, 3–22.

Wharton PS, Schilder AC. 2008 – Novel infection strategies of *Colletotrichum acutatum* on ripe blueberry fruit. Plant pathology 57, 122–134.

Whitelaw-Weckert MA, Curtin SJ, Huang R, Steel CC et al. 2007 – Phylogenetic relationship and pathogenicity of *Colletotrichum acutatum* isolates from grape in subtropical Australia. Plant Pathology 56, 448–463.

Wikee S, Cai L, Pairin N, McKenzie EHC et al. 2011 – *Colletotrichum* species from Jasmine (*Jasminum sambac*). Fungal Diversity 46, 171–82.

Wilson GW. 1960 – *Colletotrichum acalyphae* Scientific Cultue 26, 87.

Woronichin NN. 1913 – Mycoflorae Caucasicae novitates. Vestnik Tiflissk. Botanicheskii Sada. 28, 16–25.

Wu CJ, Chen HK, Ni HF. 2020 – Identification and characterization of *Colletotrichum* species associated with mango anthracnose in Taiwan. European Journal of Plant pathology 157, 1–15.

Wu WP. 1992 – Notes on some coelomycetes on *Euonymus japonicas* I. Melanconiales. Journal of the Hebei Academy of Sciences 1, 65–74.

Wu WX, Huang XQ, Liu Y, Zhang L. 2017 – First report of apple bitter rot caused by *Colletotrichum rhombiforme* in China. Plant Disease 101, 1033.

Wu WX, Liu Y, Huang XQ, Zhang L. 2018 – First report of anthracnose caused by *Colletotrichum nymphaeae* on loquat fruit in China. Plant Disease 102, 243.

Xavier KV, An Kc, Peres NA, Deng Z et al. 2019 – Characterization of *Colletotrichum* species causing anthracnose of pomegranate in South-eastern United States. Plant Disease 103, 2771–2780.

Xie L, Zhang JZ, Wang Y, Hu DW. 2010 – Identification of *Colletotrichum* spp. Isolated from strawberry in Zhejiang Province and Shanghai City, China. Journal of Zhejiang University Science B 11, 61–70.

Xu H, Zhou R, Fu J, Yuan Y et al. 2018a – *Colletotrichum atractylodicola* sp. nov., the anthracnose pathgen of *Atractylodes chinensis* in China. Mycological Progress 17, 393–402.

Xu S, Li YZ. 2015 – First report of common vetch anthracnose caused by *Colletotrichum lentis* in China. Plant Disease 99, 1859.

Xu SJ, Aktaruzzaman M, Kim BS, Kim JY et al. 2018b – First report of anthracnose caused by *Colletotrichum fioriniae* on eggplant fruits in Korea. Plant Disease 102, 2642.

Yamagishi N. 2017 – Studies on disease cycle and control of celery stunt anthracnose caused by *Colletotrichum nymphaeae*. Journal of General Plant Pathology 83, 429–430.

Yan JY, Jayawardena MMRS, Goonasekara ID, Wang Y et al. 2015 – Diverse species of *Colletotrichum* associated with grapevine anthracnose in China. Fungal Diversity 71, 233–246.

Yang B, Jin X, Feng Q, Xiao K et al. 2020 – *Colletotrichum* species causing leaf spot diseases of *Liriope cymbidiomorpha* (ined.) in China. Australasian Plant pathology 49, 137–139.

Yang HC, Haudenshield JS, Hartman GL. 2012b – First report of *Colletotrichum chlorophyti* causing soybean anthracnose. Plant Disease 96, 1699.

Yang HC, Haudenshield JS, Hartman GL. 2014 – *Colletotrichum incanum* sp. nov., a curved-conidial species causing soybean anthracnose in USA. Mycologia 106, 32–42.

Yang L, Lu XH, Jing YL, Li SD et al. 2019a – First report of common bean (*Phaseolus vulgaris*) stem rot caused by *Colletotrichum spaethianum* in China. Plant Disease 103, 151–152.

Yang S, Wang HX, Yi YJ, Tan LL. 2019b – First report that *Colletotrichum aenigma* causes leaf spots on *Camellia japonica* in China. Plant Disease 103, 2127.

Yang Y, Cai L, Liu Z, Hyde KD et al. 2011 – *Colletotrichum* species on *Orchidaceae* in southwest China. Cryptogamie Mycology 32, 229–253.

Yang Y, Liu Z, Cai L, Hyde KD. 2012a – New species and notes of *Colletotrichum* on daylilies (*Hemerocallis* spp.). Tropical Plant Pathologyogy 37, 165–174.

Yang YL, Liu ZY, Cai L, Hyde KD et al. 2009 – *Colletotrichum* anthracnose of *Amaryllidaceae*. Fungal Diversity 39, 123–46.

Yang ZH, Rannala B. 2010 – Bayesian species delimitation using multilocus sequence data. Proceeding of the National Academy of Sciences USA. 107, 9264–9.

Young A, Gillung JP. 2020 – Phylogenomics–principles, opportunities and pitfalls of big-data phylogenetics. Systematic Entomology 45, 225–247.

Yuan HS, Lu X, Dai YC, Hyde KD et al. 2020 – Fungal Diversity Notes 1277–1386: taxonomic and phylogenetic contributions to fungal taxa. Fungal Diversity 104, 1–266.

Yu J, Wu J, Guo Z, Zhang X et al. 2020 – First report of peanut anthracnose caused by *Colletotrichum truncatum* in China. Plant Disease 104, 1555.

Zampounis A, Pigné S, Dallery JF, Wittenberg AH et al. 2016 – Genome sequence and annotation of *Colletotrichum higginsianum*, a causal agent of crucifer anthracnose disease. Genome announcements 4, article 4.

Zeilinger S, Gupta VK, Dahms TE, Silva RN et al. 2016 – Friends or foes? Emerging insights from fungal interactions with plants. FEMS microbiology reviews 40, 182–207.

Zhai YX, Zhang BQ, Cao H, Hao XJ. 2018 – First report of *Colletotrichum truncatum* causing anthracnose of begonia in China. Plant Disease 102, 1177–1178.

Zhang FF, Wang MZ, Zheng YX, Liu HY et al. 2015 – Isolation and characterzation of endophytic Huperzine – A producing fungi from *Phlegmariurus phlegmaria*. Microbiology 84, 701–709.

Zhang Y, Xu H, Jiang S, Wang F et al. 2018 − First report of *Colletotrichum truncatum* causing anthracnose on the berry stalk and the rachis of kyoho grape (*Vitis labruscana* x *V. vinifera*) clusters in Hebei, China. Plant Disease 102, 2040.

Zhang YB, Meng K, Shu JP, ZhangW, Wang HJ. 2019 − First report of anthracnose on Pecan (*Carya illinoensis*) caused by *Colletotrichum nymphaeae* in China. Plant Disease 103, 1432.

Zhang W, Damm U, Crous PW, Groenewald JZ et al. 2020 − Anthracnose disease of carpet grass (*Axonopus compressus*) caused by *Colletotrichum hainanense* sp. nov. Plant Disease 104, 1744–1750.

Zhao M, Qiu H, Jiang H, Zhang Z et al. 2012 – Optimization of fermentation conditions of biocontrol strain Col-68 *Colletotrichum hanaui* against *Digitaria sanguialis*. Acta Agriculturae Zhejiangensis 24, 459–463.

Zhao W, Wang T, Chen QQ, Chi YK et al. 2016a – First report of *Colletotrichum scovillei* causing anthracnose fruit rot on pepper in Anhui Province, China. Plant Disease 100, 2168.

Zhao W, Wang T, Chen QQ, Chi YK et al. 2016b − First report of leaf spot caused by *Colletotrichum spaethianum* on *Lilium lancifolium* in China. Plant Disease 100, 2328.

Zhong J, Li CX, Zhong SY, Hu Z. 2020 − First report of leaf spot caused by *Colletotrichum spaethianum* on *Paris polyphylla* in China. Plant Disease 104, 972.

Zhou S, Qiao L, Jayawardena RS, Hyde KD et al. 2019 − Two new endophytic *Colletotrichum* species from *Nothapodytes pittosporoides* in China. MycoKeys 49, 1–14.

Zhou Y, Huang JS, Yang LY, Wang GF et al. 2017 – First report of banana anthracnose caused by *Colletotrichum scovillei* in China. Plant Disease 101, 381–382.

Zimmermann A. 1901 – Die thierischen und pflanzlichen Feinde der Kautschuk-und Guttapercha-Pflanzen. Bulletin de I'lnstitut Botanique de Buitenzorg. 10, 1–27.

Zimmermann A. 1904 – UntersuchungenübertropischePflanzenkrankheiten. Mitteilung I. Berichtüber Land-und Forstwirtschaft in Deutsch-Ostafrika. 2, 11–36.