

# CHAPTER 5

## Proposal to conserve the name *Cryphonectria* (*Diaporthales*) with a conserved type



Gryzenhout M, Glen HF, Wingfield BD, Wingfield MJ (2005). Proposal to conserve the generic name *Cryphonectria* (Sacc.) Sacc. (*Diaporthales*) with a changed type. *Taxon* **54**: 539–540.



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**(1686) Proposal to conserve the name *Cryphonectria* (*Diaporthales*)  
with a conserved type**

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(1686) *Cryphonectria* (Sacc.) Sacc. in *Sylloge Fungorum* 17: 783. 1905, *nom. cons. prop.*

Typus: *C. parasitica* (Murrill) M. E. Barr (*Diaporthe parasitica* Murrill), *typ. cons. prop.*

The typification of *Cryphonectria* is problematic because the widely accepted choice of *C. gyrosa* (Berk. & Broome) Sacc. as type of the name is not in accord with Art. 7.4 of the ICBN (Greuter *et al.*, *Regnum Veg.* 138. 2000). *Cryphonectria* was first described as a subgenus of *Nectria* (Fr.) Fr. in 1883 by Saccardo (*Syll. Fung.* 2: 507. 1883), with two species, *N. abscondita* Sacc. and *N. variicolor* Fuckel, included in this group. Saccardo (in Saccardo & Saccardo, *Syll. Fung.* 17: 780–781. 1905) raised the subgenus to generic level as *Cryphonectria* (Sacc.) Sacc., including the aforementioned two species as well as *C. gyrosa* (Berk. & Broome) Sacc., *C. moriformis* (Starbäck) Sacc., *C. caraganae* (Höhn.) Sacc. and *C. xanthostroma* (Penz.



& Sacc.) Sacc. Saccardo (l.c., 1905) did not designate a type for *Cryphonectria* but placed *C. gyrosa* first. Von Höhnel (Fragmente zur Mykologie 118: 1479–1481. 1909) designated *C. gyrosa* as the lectotype of *Cryphonectria* specifically because it had been placed first in the list of species recognised by Saccardo & Saccardo (l.c.) (“Als Typus ... muß die zuerst angeführte Art ... aufgestellt wurden”). This selection is evidently mechanical (Art. 10.5 (b) and \*Ex. 7 of the ICBN, Greuter *et al.*, l.c.). Furthermore, it is also incorrect because the species selected was not one of the two original members of *Nectria* subgen. *Cryphonectria* Sacc. When Barr (Mycol. Mem. no. 7: 143. 1978) accepted *C. gyrosa* as the type, she did not treat the two original species of *Nectria* subgen. *Cryphonectria*, namely *N. variicolor* and *N. abscondita*.

Neither of the two original species of *Nectria* subgen. *Cryphonectria* have been examined in recent years. Indeed the type material of *C. abscondita* (Sacc.) Sacc. (PAD, *Wisteria sinensis*) does not contain structures that could be used in morphological studies. The morphology and generic placement of this fungus is thus unknown. Fruiting structures on the type specimens, G 843, FH 843 and B (*Salix triandra*, Oestrich), of *C. variicolor* (Fuckel) Sacc. do not resemble those for *Cryphonectria* species or any other member of the *Diaporthales*, since the ascomata are not stromatic and the perithecia are minute, globose, orange and superficial with striated ascospores. Since the appropriate placement of *C. abscondita* is unknown and *C. variicolor* does not reside in the *Diaporthales*, they are best viewed as taxa of uncertain position and unsuitable as sources of a type. As these are, however, the only candidates for type of *Cryphonectria*, it is, therefore, appropriate (Art. 48 note 2) to propose that the name be conserved with a new type.

Results of a recent taxonomic study (Gryzenhout *et al.*, in Taxon 54: 1009–1021. 2005/ Chapter 6 in this thesis) demonstrate that *C. gyrosa* (Barr, in Mycol.



Mem. no. 7: 143. 1978), widely, though incorrectly, cited as the type of *Cryphonectria*, is generally distinct from most of species currently included in *Cryphonectria*. Furthermore, *C. gyrosa* (K 109807, K 109809, BPI 614797) and its recently recognized allies from New Zealand differ in important characters (cf. Art. 9.17 of the Code) from those in the original description of the genus by Saccardo & Saccardo (l.c.). A separate clade (Myburg *et al.*, in *Mycologia*: 96: 990–1001. 2004) that includes *C. gyrosa* and a new New Zealand species, is being described separately as a new genus (Gryzenhout *et al.*, l.c.). It would not, therefore, be appropriate to establish *C. gyrosa* as type of *Cryphonectria* by conservation.

By contrast, the proposed type, *C. parasitica* (Murrill) M. E. Barr (in *Mycol. Mem. no. 7: 143. 1978*) based on *Diaporthe parasitica* Murrill (*Torreyia* 6: 189. 1906), falls within the phylogenetic clade that includes most species of the genus as currently understood (Myburg *et al.*, l.c.). *Cryphonectria parasitica* is one of the most important forest pathogens and has been the subject of intensive studies by scientists including forest pathologists as well as chestnut growers. The name *Cryphonectria* has also been assigned to three important hypoviruses that infect *C. parasitica*, and the condition of reduced virulence caused by these viruses has been most widely studied in *C. parasitica* by virologists and scientists outside plant pathology and mycology. *Cryphonectria parasitica* has been thoroughly characterised based on its phylogenetic relationships and world-wide population structure. Furthermore, ample isolates and herbarium specimens exist for this species, although none of the isolates are directly linked to the type specimen (NY, *Castanea dentata*, Bronx Park, New York, USA, 1905, coll. W. A. Murrill). Its morphological characteristics correspond with those traditionally defined for the genus, and it can thus be chosen instead of one of the alternatives, *C. abscondita* or *C. variicolor*, as type (Art. 10.5). Conservation of



*Cryphonectria* with *C. parasitica* as type is also strongly justified by the importance of this fungus. Conserving *Cryphonectria* in this way would restrict the usage of the name *Cryphonectria* (Ex. 9 Art. 14.9) to this fungus and close relatives, thus avoiding future changes of its name.

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# CHAPTER 6

*Amphilogia* gen. nov.  
for *Cryphonectria*-like  
fungi from *Elaeocarpus*  
spp. in New Zealand and  
Sri Lanka



Gryzenhout M, Glen HF, Wingfield BD, Wingfield MJ (2005). *Amphilogia* gen. nov. for *Cryphonectria*-like fungi from *Elaeocarpus* spp. in New Zealand and Sri Lanka. *Taxon* **54**: 1009–1021.



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***Amphilogia* gen. nov. for *Cryphonectria*-like fungi from *Elaeocarpus* spp. in New Zealand and Sri Lanka**

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**Abstract.** The ascomycete genera *Cryphonectria* and *Endothia* are closely related members of the *Diaporthales*. Recent DNA sequence comparisons have shown that isolates from *Elaeocarpus* spp. in New Zealand, previously identified as *Cryphonectria radicalis* and *Cryphonectria gyrosa*, represent a phylogenetic group distinct from those including other species of *Cryphonectria* and *Endothia*. *Cryphonectria gyrosa* applies to a species that occurs on *Elaeocarpus glandulifer* in Sri Lanka, the same host genus but a different species from which the New Zealand collections were made. The aim of this study was to provide a name for the fungi residing in the phylogenetic group from New Zealand. Morphological characters that define these fungi include superficial conical conidiomata, conidia of variable size and ascospores with one to three septa. These characteristics are not found in other species of *Cryphonectria*. We also recognise a second species in the group from New Zealand that has distinctly larger ascospores. Herbarium specimens of *C. gyrosa* exhibit the same primary characteristics as the specimens from New Zealand and *C. gyrosa* is regarded as conspecific with one of the species in the New Zealand collections. A new



genus, *Amphilogia*, is described for the collections of *C. gyrosa* from Sri Lanka and New Zealand, which also contains the second species from New Zealand, *Amphilogia major* sp. nov.

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**Taxonomic novelties:** *Amphilogia* Gryzenh., Glen & M. J. Wingf. gen. nov., *Amphilogia gyrosa* (Berk. & Broome) Gryzenh., Glen & M. J. Wingf. comb. nov., *Amphilogia major* Gryzenh., Glen & M. J. Wingf. sp. nov.

**Key words:** *Amphilogia gyrosa*, *Amphilogia major*, *Cryphonectria*, *Cryphonectria gyrosa*, *Diaporthales*, *Elaeocarpus*, New Zealand, Sri Lanka.

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## INTRODUCTION

The fungal genus *Cryphonectria* (Sacc.) Sacc., as outlined by Barr (1978), includes *Cryphonectria parasitica* (Murrill) M. E. Barr, which is one of the world's most important plant pathogens. This fungus causes the devastating disease known as chestnut blight that completely changed the composition of hardwood forests in the eastern part of Northern America during the first half of the 20<sup>th</sup> Century (Brewer 1995), and also caused extensive damage in Europe (Anagnostakis 1987, Heiniger & Rigling 1994). Most other species of *Cryphonectria* are either known to be saprobic or their pathogenicity has not been tested. *Cryphonectria radicalis* (Schwein. : Fr.) M. E. Barr occurs in North America, Europe (Shear *et al.* 1917, Roane 1986) and Japan (Kobayashi 1970) primarily on *Fagaceae* (*Fagales*). *Cryphonectria macrospora* (T. Kobay. & Kaz. Itô) M. E. Barr and *Cryphonectria nitschkei* (G. H. Otth) M. E. Barr occur mainly on *Fagaceae* in Japan





(Kobayashi 1970, Roane 1986). *Cryphonectria havanensis* (Bruner) M. E. Barr was first described from *Eucalyptus* spp. in Cuba (Bruner 1916). Reports of this fungus from Japan on *Fagaceae* (Kobayashi 1970, Roane 1986) represent *C. nitschkei*, although it is unclear whether the fungus in Japan and Cuba are the same (Myburg *et al.* 2004a). *Cryphonectria coccolobae* (Vizioli) Micales & Stipes occurs on stems of seagrape (*Coccoloba uvifera* – *Polygonaceae, Polygonales*) in the Caribbean (Vizioli 1923).

Other species that have been known in *Cryphonectria* have recently been transferred to new genera. *Cryphonectria longirostris* (Earle) Micales & Stipes is now classified in *Rostraureum* Gryzenh. & M. J. Wingf. (Gryzenhout *et al.* 2005a/Chapter 7 in this thesis). *Chrysoporthe* Gryzenh. & M. J. Wingf. has been described to accommodate *Cryphonectria cubensis* (Bruner) Hodges (Gryzenhout *et al.* 2004/Chapter 1 in this thesis). *Cryphonectria eucalypti* M. Venter & M. J. Wingf. is suspected to be distinct from *Cryphonectria sensu stricto* (Myburg *et al.* 2004b) although this question has not been fully resolved.

*Endothia* Fr. is a genus that resembles *Cryphonectria* morphologically and the taxonomy of these two genera has been confused. Both *Endothia* and *Cryphonectria* have orange, well-developed stromata and similar anamorphs (Shear *et al.* 1917, Kobayashi 1970, Roane 1986), but *Endothia* has aseptate ascospores and large superficial stromata, while *Cryphonectria* has one-septate ascospores and semi-immersed stromata (Barr 1978, Micales & Stipes 1987, Venter *et al.* 2002, Myburg *et al.* 2004b). *Cryphonectria*, established in 1905 (Saccardo & Saccardo 1905), was treated as a synonym of *Endothia* from 1909 onwards (Von Höhnelt 1909, Shear *et al.* 1917, Kobayashi 1970). In 1978, Barr suggested that the two genera should be treated as distinct (Barr 1978, Micales & Stipes 1987). Recent phylogenetic studies based on DNA sequence data, have supported this



separation, but they have also shown that these two genera are closely related (Zhang & Blackwell 2001, Castlebury *et al.* 2002, Venter *et al.* 2002, Myburg *et al.* 2004a, 2004b).

*Cryphonectria* was first described as a subgenus of *Nectria* (Fr.) Fr. (Saccardo 1883), with two species, *Nectria variicolor* Fuckel and *Nectria abscondita* Sacc., listed. *Cryphonectria gyrosa* (Berk. & Broome) Sacc. was listed as *Nectria gyrosa* Berk. & Broome under another subgenus, *Nectria* “subg. *Eunectria* Sacc.” (Saccardo 1883). When *Cryphonectria* was elevated to genus level (Saccardo & Saccardo 1905), *Cryphonectria abscondita* Sacc., *Cryphonectria variicolor* (Fuckel) Sacc., *Cryphonectria gyrosa* and three other species, namely *Cryphonectria moriformis* (Starbäck) Sacc., *Cryphonectria caraganae* (Höhn.) Sacc. and *Cryphonectria xanthostroma* (Penz. & Sacc.) Sacc. were included. No type was designated, and the species were listed numerically with *C. gyrosa* placed first in the list (Saccardo & Saccardo 1905). Von Höhnel (1909) reduced *C. gyrosa* (Berk. & Broome) Sacc. to synonymy with *Endothia gyrosa* (Schwein. : Fr.) Fr., the type of *Endothia* (Fries 1849). He also chose *C. gyrosa* as type of *Cryphonectria* because it was listed first, thereby reducing *Cryphonectria* to synonymy with *Endothia*.

The lectotypification of *Cryphonectria* by Von Höhnel (1909) was “based on a largely mechanical method of selection” (Art. 10.5 & \*Ex. 7 of the ICBN, Greuter *et al.* 2000), and hence supersedable. Furthermore, it is unacceptable because *C. gyrosa* was not one of the original species of *Nectria* subg. *Cryphonectria* upon which the generic name was based. Von Höhnel’s incorrect typification was, however, accepted by Barr (1978), but his synonymy of *C. gyrosa* with *E. gyrosa* was rejected based on differences in ascospore and stromatal morphology between these two genera. It is possible that Von Höhnel based his synonymy, which confirmed observations by Petch (1907), on comparisons of *C. gyrosa* with European *C. radicalis* specimens, a species which was at that time regarded as synonymous with *E. gyrosa*, as summarised by Shear *et al.* (1917). *Cryphonectria gyrosa* has been



erroneously cited as type of the generic name *Cryphonectria*. Since the only valid candidates for type, namely *C. abscondita* and *C. variicolor*, were either unidentifiable or not diaporthalean, conservation of the generic name *Cryphonectria* with *C. parasitica* as type has been proposed (Gryzenhout *et al.* 2005b/Chapter 5 in this thesis).

*Cryphonectria gyrosa* was first described from Sri Lanka (Berkeley & Broome 1875, Shear *et al.* 1917) and is associated with *Elaeocarpus* spp. Two specimens are connected to the first description of *C. gyrosa* (Berkeley & Broome 1875), but both with hosts unknown. The type specimen (K 109807, originally #638) is from a twig from an unknown locality in Sri Lanka. The second specimen (K 109809, originally #290) was collected at 6000 feet (1850 m) in Nuwara (Mount) Eliya, Sri Lanka. A third collection of specimens (BPI 614797, BPI 614526), believed to represent the same fungus as those connected to the earlier description of *C. gyrosa*, was obtained by Shear *et al.* (1917) when they redescribed this fungus as a new species, *Endothia tropicalis* Shear & N. E. Stevens. The latter species was described to rectify, what the authors believed was an erroneous synonymy with *E. gyrosa* (Shear *et al.* 1917) introduced by Von Höhnell (1909). These specimens (BPI 614526, BPI 614797, both as number 2807) were collected from Hakgala, Sri Lanka, on *Elaeocarpus glandulifer* Mast. and were used as the type specimens for *E. tropicalis* (Shear *et al.* 1917). A report of *C. gyrosa* on *Elaeagnus* (Barr 1978) actually represents *Elaeocarpus* (Myburg *et al.* 2004b). Specimen K 109809 was mentioned by Shear *et al.* (1917) in their description of *E. tropicalis*, but the type specimen, K 109807, of *C. gyrosa* was not considered. There are no cultures linked to the original description of *C. gyrosa* or any more recent collections of the fungus from Sri Lanka.

A recent phylogenetic study including all available isolates of *Endothia* and *Cryphonectria* spp. (Myburg *et al.* 2004b), has shown that, besides the strongly resolved



clades representing *Endothia* and *Cryphonectria*, additional and distinct groups exist. One of these represents species of the newly described genus *Chrysoporthe*, which includes the *Eucalyptus* canker pathogen previously known as *C. cubensis* (Gryzenhout *et al.* 2004). Isolates from *Elaeocarpus* spp. (*Elaeocarpaceae*, *Oxalidales*) in New Zealand that were labeled as *C. radicalis* and *C. gyrosa* (= *Endothia tropicalis*), respectively, formed the other group.

The aim of this study was to provide a name for specimens linked to isolates from New Zealand, which have been shown to be distinct from *Cryphonectria* based on DNA sequence comparisons (Myburg *et al.* 2004b). The isolates from New Zealand identified as *C. gyrosa* were collected from cankers on the roots of *Elaeocarpus hookerianus* Raoul and *Elaeocarpus dentatus* Vahl (Gilmour 1966, Dingley 1969, Pennycook 1989) that occur on both the North and South Islands of New Zealand (Fig. 1). We have also considered whether specimens labeled as *C. gyrosa* from New Zealand represent the same fungus as that known as *C. gyrosa* from Sri Lanka.

## MATERIALS AND METHODS

### Morphological comparisons

Herbarium specimens, including fruiting structures linked to isolates from *Elaeocarpus* spp. in New Zealand and recognized by Myburg *et al.* (2004b) as representing a discrete species, were obtained from various herbaria (Table 1). These specimens had been collected from a number of locations in New Zealand (Fig. 1). Cultures are not available for most of these collections. Specimens from Sri Lanka representing *C. gyrosa*, as well as other species of *Cryphonectria* and *Endothia*, were also included (Table 1).



Fruiting structures and surrounding bark were removed from the specimens. These were rehydrated in boiling water for 1 min, mounted in Leica mountant (Setpoint Premier, Johannesburg, South Africa) and sectioned at 12–18  $\mu\text{m}$  thickness, with a Leica CM1100 cryostat (Setpoint Premier) at  $-20\text{ }^{\circ}\text{C}$ . The mountant was removed in water and the sections were transferred to lactophenol. Sections of perithecial bases and conidial locules were also made by hand and mounted in lactophenol or 3% KOH for further study. Twenty measurements were taken of conidia, conidiophores, asci and ascospores from each specimen, but fifty measurements were taken from the holotype specimens. Measurements were made using an HRc AxioCam digital camera and Axiovision 3.1 software (Carl Zeiss Ltd., Germany).

Colony growth of isolates CMW 10469 and CMW 10471 (Table 1), identified as *C. radicalis* and *C. gyrosa* respectively, but residing in the unique phylogenetic clade characterised by Myburg *et al.* (2004b), was studied on MEA (20 g/l malt extract, 15 g/L agar [Biolab, Merck, South Africa]). CMW is the culture collection of the Forestry & Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria, South Africa, 0002. Growth was observed in the dark at five temperatures ranging from 15 to 35  $^{\circ}\text{C}$  at 5  $^{\circ}\text{C}$  intervals. A disc 6 mm diam, taken from actively growing cultures, was placed at the center of four 90 mm plates for each isolate and at each temperature. Two diameter measurements (mm), perpendicular to each other were taken for each plate daily and the means of the eight measurements for each isolate were compared. The experiment was terminated after six days, when the colonies completely covered the plates at the optimum temperature for growth.



## RESULTS

### Morphological comparisons

Measurement of ascospores on specimens from New Zealand could be used to recognize two distinct species in this study. Herbarium specimens (NY 31874, PDD 32619) from which isolates CMW 10469, CMW 10470 and CMW 10471 originated and that formed the phylogenetic group described by Myburg *et al.* (2004b), have ascospores (9–)9.5–11.5(–12)  $\mu\text{m}$  long. The majority of specimens from *Elaeocarpus* spp. in New Zealand (Table 1) have ascospores falling within this range [(7–)8.5–11(–13.5)  $\mu\text{m}$  long]. Specimens PDD 20056 and PDD 28490, however, have distinctly longer ascospores [(10.5–)11.5–14(–15.5)  $\mu\text{m}$ ]. Ascospores of these two specimens often also have one to three septa (Figs 4E, 5C), whereas ascospores for the other specimens have only one or two septa (Figs 2E, 3C). There are no isolates connected to the specimens with larger ascospores and their phylogenetic position cannot be resolved, although they are morphologically similar to those for which isolates are available in other respects than ascospore morphology.

Myburg *et al.* (2004b) previously found that specimens from *E. dentatus* and *E. hookerianus* in New Zealand differ from *Cryphonectria* and *Endothia* spp. Ascospores of the New Zealand specimens have one to three septa in irregular positions (Figs 2E, 3C, 4E, 5C). These are different from ascospores of *Cryphonectria* species that typically have one median septum (Kobayashi 1970, Roane 1986, Myburg *et al.* 2004b). Conidia are often variable in size (Figs 2K–L, 3F, 4K–L, 5F), ranging from 3–12  $\mu\text{m}$  in length, whereas conidia of *Cryphonectria* are generally more uniform in size, ranging from 2–5  $\mu\text{m}$  (Kobayashi 1970, Roane 1986). Conidiomata of the New Zealand specimens are typically superficial, conical to fluted (Figs 2F, 3D, 4F, 5D), although conidial locules can also be observed inside stromata that contain perithecial necks. This is different from



*Cryphonectria* species, which have semi-immersed, pulvinate conidiomata (Kobayashi 1970, Venter *et al.* 2002, Myburg *et al.* 2004b). Furthermore, ascostromata on the New Zealand specimens are pulvinate and erumpent with perithecia formed in a diatrypoid orientation (Figs 2B, 3B, 4B, 5B). This is more similar to stromata of *Endothia*, but *Endothia* spp. have aseptate, cylindrical ascospores (Shear *et al.* 1917, Kobayashi 1970, Venter *et al.* 2002, Myburg *et al.* 2004b) that can easily be distinguished from those of the structures on *Elaeocarpus* spp.

Careful study of the specimens (K 109807, K 109809) linked to the original description of *C. gyrosa* from Sri Lanka, revealed that the structures originally described for *C. gyrosa* are identical to those on the specimens linked to the description of *E. tropicalis* (BPI 614797, BPI 614256, BPI 797701). The type specimen of *C. gyrosa* (K 109807), however, contains few recognizable structures, and only a few of these structures could be used. Structures on the *C. gyrosa* specimens from Sri Lanka also had a morphology identical to specimens from *Elaeocarpus* spp. in New Zealand, which have previously been assigned the name *C. gyrosa*. Ascospores of the Sri Lankan fungus were generally one-septate, but ascospores with two irregularly spaced septa were found in all three specimens (Figs 6E–F). Ascospores of the *C. gyrosa* specimens from Sri Lanka [(7–)8–9.5(–11.5)  $\mu\text{m}$  long] overlapped in size with those of the group from New Zealand with smaller ascospores [(7–)8.5–11(–13.5)  $\mu\text{m}$  long]. Specimens BPI 614797 [(4–7(–10)  $\mu\text{m}$  long] and K 109809 [4.5–10(–14)  $\mu\text{m}$  long], also had conidia (Fig. 6L) that fell within the size range [(3–)4–8.5(–12)  $\mu\text{m}$  long] of the specimens for both groups of fungi from New Zealand. Ascostromata on specimens BPI 614797 and K 109807 representing the Sri Lankan fungus (Figs 6A–B), were identical to those of structures on New Zealand specimens, and specimen BPI 614797 contained conical conidiomata (Figs 6G–H) similar to those found on New Zealand specimens. Specimens representing the Sri Lankan fungus could thus not be distinguished



from those originating in New Zealand, connected to isolates that represent a phylogenetic group separate from *Cryphonectria* (Myburg *et al.* 2004b) and with ascospores (7–)8.5–11(–13.5)  $\mu\text{m}$  long.

## DISCUSSION

Results of this study and Myburg *et al.* (2004b) show that specimens from *Elaeocarpus* spp. in New Zealand, which were previously considered to be *Cryphonectria* spp., are morphologically distinct from other species now classified in *Cryphonectria*. These specimens are connected to isolates that Myburg *et al.* (2004b) showed to be phylogenetically distinct from other *Cryphonectria* spp. Furthermore, our examination of a large collection of specimens from New Zealand indicates that the specimens from New Zealand represent two morphologically related but distinct species. Cultures are available for only one of the species and the phylogenetic relatedness of the two species cannot be considered at this time. However, based on morphology, they can justifiably be treated in the same genus.

The most obvious characteristics defining the two fungi from *Elaeocarpus* in New Zealand as distinct from *Cryphonectria* are ascospores that have up to three septa. This was previously noted for specimen PDD 20056 by Roane (1986). Conidiomata are also different from those found in species of *Cryphonectria* (Shear *et al.* 1917, Micales & Stipes 1987, Myburg *et al.* 2004b). These are typically superficial on the host tissue and are conical to fluted. In contrast, other species of *Cryphonectria* have ascospores with one septum, and conidiomata that are semi-immersed and pulvinate (Myburg *et al.* 2004b).

Specimens of *C. gyrosa* from Sri Lanka, including the type specimen and the type specimen of *E. tropicalis* previously treated as a synonym of *C. gyrosa*, were





indistinguishable from the New Zealand collections from *Elaeocarpus*. They have ascospores of the same size and with one to two septa, although this form of septation has not previously been noted for *C. gyrosa* (Berkeley & Broome 1875, Saccardo & Saccardo 1905, Shear *et al.* 1917, Barr 1978, Roane 1986, Micales & Stipes 1987). Furthermore, conidia are variable in size and fall within the same range as those of specimens from New Zealand. Conidiomata also have a conical to pyriform shape, similar to the New Zealand fungus and different from the pulvinate structures of *Cryphonectria* spp. (Myburg *et al.* 2004b). We conclude that *C. gyrosa sensu stricto* most likely will group in the distinct phylogenetic clade representing the New Zealand specimens as defined by Myburg *et al.* (2004b).

A proposal to conserve the generic name *Cryphonectria* with a conserved type (Gryzenhout *et al.* 2005b), showed that the extensive citation of *C. gyrosa* as type of *Cryphonectria* is contrary to Art. 7.4 of the ICBN (Greuter *et al.* 2000). Since *C. gyrosa* is not eligible as type, it will have no effect on the name *Cryphonectria* if *C. gyrosa* is transferred to another genus. The fungus known as *C. gyrosa* from Sri Lanka and the specimens from *Elaeocarpus* spp. in New Zealand are thus described in a new genus that is closely related to *Cryphonectria*. *Cryphonectria gyrosa* and the specimens with smaller ascospores from New Zealand are treated as one species, the name of which is designated as the type of the new generic name. A second species from *Elaeocarpus* in New Zealand with larger ascospores, is also recognized. A name is provided for this fungus even though cultures and thus DNA sequence data are not available for it. Description of the new genus for the fungus previously known as *C. gyrosa* and the second new species, are provided below. A key facilitating the identification of the new genus and the species residing in it is also provided.



***Amphilogia*** Gryzenh., Glen & M. J. Wingf., **gen. nov.**

*Etymology.* Greek, *amphi*, on both sides, and *logos*, discussion, thus the Greek personification of disputes; referring to the dispute this genus caused regarding the identity of *Cryphonectria*.

*Ascostromata* aurantiaca, erumpentia, subimmersa vel superficialia, textura stromatica bene evoluta, pulvinata, collis perithecorum papillatis vel longis. *Asci* octospori, fusoidei. *Ascosporae* hyalinae, fusoideae vel ellipsoideae, uno vel tribus septis irregulariter dispositis divisae.

*Conidiomata* aurantiaca, discreta vel super ascostromata, interdum etiam velut loculi in ascostromate videntur, superficialia, conica vel pyriformia vel striata, unilocularia. *Conidiophora* hyalina cum *cellulis conidiogenis* phialidicis apicalibus vel lateralibus in ramis sub septo oriundis. *Conidia* hyalina, aseptata, oblonga vel subfalcata, magnitudine variabili.

*Ascostromata* orange, erumpent, slightly immersed to superficial, stromatic tissue well-developed, pulvinate with papillate to long orange perithecial necks, perithecia diatrypoid. *Asci* 8-spored, fusoid. *Ascospores* hyaline, fusoid to ellipsoid, containing one to three irregularly spaced septa.

*Conidiomata* orange, separate or on top of the ascostromata, also evident occasionally as locules inside ascostroma, superficial, conical to pyriform to fluted, unilocular. *Conidiophores* hyaline with phialidic, irregular branching, determinate *conidiogenous cells* that occur apically or laterally on branches beneath a septum. *Conidia* hyaline, non-septate, oblong to slightly curved, of variable size.

*Typus:* *Amphilogia gyrosa* (Berk. & Broome) Gryzenh., Glen & M. J. Wingf. 2005.



*Amphilogia gyrosa* (Berk. & Broome) Gryzenh., Glen & M. J. Wingf., **comb. nov.**, Figs 2–3, 6.

≡ *Diatrype gyrosa* Berk. & Broome, J. Linn. Soc. London 14: 124. 1875.

≡ *Nectria gyrosa* Berk. & Broome, J. Linn. Soc. London 15: 86. 1877.

≡ *Cryphonectria gyrosa* (Berk. & Broome) Sacc., Syll. Fung. 17: 784. 1905.

≡ *Endothia gyrosa* (Berk. & Broome) Höhn., Sitzb. Kais. Akad. Wiss. Wien, Math. Naturw. Kl. 118: 1480. 1909, nom. illegit. Art. 53, non (Schwein. : Fr.) Fr.

Holotype. Sri Lanka. 1868 (K 109807).

Epitype. New Zealand. Auckland: Waitakere Ranges, Spragg's Bush, exposed roots on dead tree, 1973, R. E. Beaver (NY 31874, living cultures CMW 10469, CMW 10470 – designated here).

= *E. tropicalis* Shear & N. E. Stevens, U. S. Dept. Agric. Bull. 380: 20-21. 1917.

Holotype: Sri Lanka. Hakgala, *Elaeocarpus glandulifer*, 1913, T. Petch (BPI 614797, BPI 614526).

= *E. havanensis* Bruner, Bull. Govt. For. Exp. Station 226: 140. 1970.

Holotype: Cuba. Santiago de las Vegas, *Eucalyptus* sp., 1916, S. C. Bruner (BPI 614275).

*Etymology*: Greek, *gyrus*, circle, thus round.

*Ascostromata* gregarious on bark, often occurring in cracks, often confluent, pulvinate, erumpent, slightly immersed to superficial (Figs 2A–B, 3A–B, 6A–B), 460-500 µm high, 660-950 µm diam, orange, well-developed stromatic tissue (Figs 2C, 6C), prosenchyma at the center, pseudoparenchyma at the edges, orange. Perithecia surrounded with fungal tissue or with bases touching the host tissue, diatrypoid, globose to sub-globose (Figs 2B, 3B, 6B),



340–400  $\mu\text{m}$  diam, walls black, 17–21  $\mu\text{m}$  thick, up to 22 perithecia in a stroma. Perithecial necks periphysate, black, slender (Figs 2B, 3B, 6B), 80–120  $\mu\text{m}$  wide, breaking through the stromatal surface as papillae or long cylindrical beaks covered with orange tissue (Figs 2A–B, 3A–B, 6A), protruding necks up to 440  $\mu\text{m}$  long, 100–200  $\mu\text{m}$  wide. *Asci* (43–)46–52(–55)  $\times$  (6–)7–8(–9)  $\mu\text{m}$ , fusoid, floating freely in the perithecial cavity, stipitate only when immature, unitunicate with non-amyloid, refractive apical ring, 8-spored, biseriate (Figs 2D, 3C). *Ascospores* (9–)9.5–11.5(–12)  $\times$  (3.5–)4–5(–5.5)  $\mu\text{m}$ , oval, hyaline, containing one or two irregularly spaced septa (Figs 2E, 3C, 6E–F).

*Conidiomata* separate (Figs 2F, 3D, 6G) or above the ascostromata, also appearing as locules inside ascostromata, individual conidiomata unilocular (Figs 2G, 3E, 6H), 400–890  $\mu\text{m}$  high, 100–370  $\mu\text{m}$  diam, orange, superficial, conical to pyriform to fluted, conidiomatal tissue pseudoparenchymatous (Fig. 2H). *Conidiophores* (10.5–)13–19(–24)  $\mu\text{m}$  long, branched irregularly, cells delimited by septa or not, hyaline (Figs 2I–J, 3F, 6J–K). *Conidiogenous cells* phialidic, determinate, branches arising beneath a septum, cylindrical to flask-shaped with attenuated apices, (1–)1.5–2.5(–3)  $\mu\text{m}$  wide, collarete and periclinal thickening inconspicuous (Figs 2I–J, 3F, 6J–K). *Conidia* (3–)4–8.5(–12)  $\times$  (1.5–)2–2.5(–3.5)  $\mu\text{m}$ , non-septate, oblong to slightly curved, hyaline (Figs 2K–L, 3F, 6L).

*Cultural characteristics:* Cultures (CMW 10469, CMW 10471) on MEA white when young, often with a luteous center, becoming orange when older, flat and striate with a smooth to sinuous margin, fast growing, covering a 90 mm plate after a minimum of six days; optimum temperature 25–30 °C.

*Substrate:* Roots of *Elaeocarpus dentatus*, *E. hookerianus* and *E. glandulifer*.

*Distribution:* New Zealand, Sri Lanka.



*Specimens examined:* **Sri Lanka**, 1868, **holotype** K 109807; Nuwara (Mount) Eliya, *Elaeocarpus glandulifer*, G. H. K. Thwaites, K 109809; Hakgala, *Elaeocarpus glandulifer*, 1913, T. Petch, BPI 614797, BPI 614526. **New Zealand**, Auckland, Atanui State Forest, *E. dentatus*, 1973, G. J. Samuels, PDD 32619, living culture CMW 10471; Waitakere Ranges, Spragg's Bush, exposed roots on dead tree, 1973, R. E. Beaver, **epitype designated here** NY 31874, ex-type cultures CMW 10469 = CBS 112922, CMW 10470 = CBS 112923; Waitakere Ranges, *E. dentatus*, 1958, J. M. Dingley, PDD 18377; Titirangi, unidentified living tree, 1973, J. M. Dingley & G. J. Samuels, NY 30873; Waitakere Ranges, Fairy Falls track, *E. dentatus*, 1963, J. M. Dingley, PDD 21944; Waitakere Ranges, Waiatarua, *E. dentatus*, 1963, J. M. Dingley, PDD 25570; Waitakere Ranges, Cutty Grass track, *E. dentatus* root, 1959, S. McBeth, PDD 28497; Waitakere Dam, *E. dentatus*, 1966, J. M. Dingley, PDD 25003; Waitakere Ranges, Upper Piha Valley, *E. dentatus* fallen trunk, 1949, J. M. Dingley, PDD 28485; Upper Piha, *E. dentatus*, 1947, J. M. Dingley, PDD 28482; Waitakere Ranges, Piha, *E. dentatus*, 1948, J. M. Dingley, PDD 28484; Orere, *E. dentatus*, 1963, S. J. Hughes, PDD 20570; Orere, *E. dentatus*, 1953, J. M. Dingley, PDD 28487; Hanua Ranges, *E. dentatus*, 1953, J. M. Dingley, PDD 28488; Hanua Ranges, Moumoukai Valley, *E. dentatus*, 1932, L. M. Cranwell, PDD 3841; Henderson, off Stony Creek, *E. dentatus* root, 1948, J. M. Dingley, PDD 28483; Henderson, Walker's Bush, *E. dentatus*, 1958, S. McBeth, PDD 28494; Henderson Valley, Sharps Bush, *E. dentatus*, 1972, J. M. Dingley, PDD 29819; Northland, Omahuta State Forest, *E. dentatus*, 1963, S. J. Hughes, PDD 21242; Waipoua, *E. dentatus*, 1955, J. M. Dingley, PDD 28492; Coromandel, Camel's Back 1000', *E. dentatus* exposed root, 1934, J. M. Dingley, PDD 28489; Waikato, Taupiri Mt. 900', *E. dentatus*, 1954, J. M. Dingley, PDD 28491; Buller, Orwell Creek, Granville Forest, *E. hookerianus*, 1963, J. M. Dingley, PDD 23365.



*Amphilogia major* Gryzenh., Glen & M. J. Wingf. **sp. nov.**, Figs 4–5.

*Etymology:* Latin, *major*, greater, pointing to the ascospores that are larger than those of *A. gyrosa*.

*Ascstromata* pulvinata vel tuberculata, erumpentia, partim immersa in pulvino stromatico bene evoluto aurantiaco. Perithecia textura stromatica circumdata vel basi hospitem tangentia, globosa vel subglobosa, parietibus nigris. Colla peritheciorum periphysata, nigra, tenuia, per superficiem stromatis ut papillae vel rostra longa cylindrica textura aurantiaca tecta erumpentia. *Asci* fusoides, solum immaturi stipitati, unitunicati, annulo apicali non amyloideo, refractivo, octospori, biseriati vel uniseriati. *Ascospores* oavales, hyalinae, uno vel tribus septis irregulariter dispositis divisae.

*Conidiomata* discreta vel ascostromati insidentia, etiam ut loculi in ascostromate videntur, conidiomata singula unilocularia, aurantiaca, superficialia, conica vel pyriformia. *Conidiophora* irregulariter ramosa, septata an non, hyalina. *Cellulae conidiogenae* phialidicae, cylindricae vel ampulliformes apicibus attenuatis, collari incrassationeque periclinali inconspicuis. *Conidia* non septata, oblonga vel subfalcata, hyalina.

*Ascstromata* gregarious on bark, often confluent, pulvinate to tuberculate, erumpent, slightly immersed to superficial (Figs 4A–B, 5A–B), 1600–1750  $\mu\text{m}$  high, 1050–3050  $\mu\text{m}$  diam, orange, well-developed stromatic tissue (Figs 4C), prosenchyma at the center, pseudoparenchyma at the edges, orange. Perithecia surrounded with fungal tissue or with bases touching the host tissue, diatrypoid, base globose to sub-globose (Figs 4B, 5B), 330–660  $\mu\text{m}$  diam, walls black, 13–25  $\mu\text{m}$  thick, up to 25 perithecia in a stroma. Perithecial necks periphysate, black, slender (Figs 4B, 5B), 170–260  $\mu\text{m}$  wide, breaking through the stromatal surface as papillae or long cylindrical beaks which are covered with orange tissue (Figs 4A–B, 5A); protruding necks up to 460  $\mu\text{m}$  long, 140–510  $\mu\text{m}$  wide. *Asci* (47–)57.5–77(–87.5)  $\times$  (7.5–)9–11(–12)  $\mu\text{m}$ , fusoid, floating freely in the perithecial cavity, stipitate only when immature, unitunicate with non-amyloid, refractice apical ring, 8-spored, biseriate or



uniseriate (Figs 4D, 5C). *Ascospores* (10.5–)11.5–14(–15.5) × (4.5–)5–6(–6.5) μm, oval, hyaline, containing one to three irregularly spaced septa (Figs 4E, 5C).

*Conidiomata* separate (Figs 4F, 5D) or on top of ascostromata (Figs 4F, 5A), also appearing as locules inside ascostromata (Figs 4B, 5B), individual conidiomata unilocular (Figs 4G, 5E), 240–820 μm high, 260–500 μm diam, orange, superficial, conical to pyriform, conidiomatal tissue pseudoparenchymatous. *Conidiophores* (4.5–)8.5–19.5(–32.5) μm long, branched irregularly, cells delimited by septa or not, hyaline (Figs 4I–J, 5F). *Conidiogenous cells* phialidic, determinate, apical or lateral on branches arising beneath a septum, cylindrical to flask-shaped with attenuated apices, (1–)1.5–2.5(–3) μm wide, colarette and periclinal thickening inconspicuous (Figs 4I–J, 5F). *Conidia* (3–)3.5–7.5(–12) × (1–)1.5–2(–2.5) μm, non-septate, oblong to slightly curved, hyaline (Figs 4K–L, 5F).

*Cultural characteristics:* No cultures are available for this fungus.

*Substrate:* Roots of *Elaeocarpus hookerianus* and *E. dentatus*.

*Distribution:* New Zealand

*Specimens examined:* **New Zealand**, Fiordland, Lake Manapouri, *Elaeocarpus hookerianus*, 1948, J. M. Dingley, **holotype** PDD 20056; Westland, Pukekura, *Elaeocarpus dentatus*, 1954, J. M. Dingley, PDD 28490.

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**The following key summarises the morphological differences between *Amphilogia*, *Cryphonectria* and *Endothia*, and should serve as an aid in the identification of unknown specimens.**

- 1a. Ascospores aseptate; conidiomata superficial, pulvinate; conidia relatively uniform in size, 3–4 μm long ..... *Endothia*
- 1b. Ascospores septate ..... 2

- 2a. Conidiomata often superficial, conical to fluted; ascospores 1–3-septate; conidia variable in size, 3–12  $\mu\text{m}$  long ..... *Amphilogia*
- 2b. Conidiomata semi-immersed, pulvinate; ascospores always 1-septate; conidia relatively uniform in size, 2–5  $\mu\text{m}$  long ..... *Cryphonectria*

*Amphilogia major* can be distinguished from *A. gyrosa* based on features of the teleomorph. Conidiomatal structures do not have explicit diagnostic characteristics. Conidiomata of *A. gyrosa* are often more slender than those of *A. major*, but this feature may be influenced by environmental conditions such as humidity. **The following key is presented to distinguish between the two species:**

- 1a. Asci up to 55  $\mu\text{m}$  long; ascospores (9–)9.5–11.5(–12)  $\mu\text{m}$  long..... *A. gyrosa*
- 1b. Asci longer than 55  $\mu\text{m}$ ; ascospores (10.5–)11.5–14(–15.5)  $\mu\text{m}$  long..... *A. major*

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## REFERENCES

- Anagnostakis SL (1987). Chestnut blight: the classical problem of an introduced pathogen. *Mycologia* **79**: 23–37.
- Barr ME (1978). The Diaporthales in North America with emphasis on *Gnomonia* and its segregates. *Mycologia Memoir* **7**: 1–232.
- Berkeley MJ, Broome CE (1875). Enumeration of the fungi of Ceylon. *Journal of the Linnean Society* **14**: 29–140.
- Brewer LG (1995). Ecology of survival and recovery from blight in American chestnut trees (*Castanea dentata* (Marsh.) Borkh.) in Michigan. *Bulletin of the Torrey Botanical Club* **122**: 40–57.
- Bruner SC (1916). A new species of *Endothia*. *Mycologia* **8**: 239–242.
- Castlebury LA, Rossman AY, Jaklitsch WJ, Vasilyeva LN (2002). A preliminary overview of the Diaporthales based on large subunit nuclear ribosomal DNA sequences. *Mycologia* **94**: 1017–1031.
- Dingley JM (1969). Records of plant diseases in New Zealand. *New Zealand Department of Scientific and Industrial Research Bulletin* **192**: 120.
- Fries EM (1849). *Summa Vegetabilium Scandinaviae*. Holmiae & Lipsiae, Uppsala: 385–386.
- Gilmour JW (1966). The pathology of forest trees in New Zealand. The fungal, bacterial, and algal pathogens. *New Zealand Forestry Research Institute, Technical Paper* **48**: 82 p.



- Greuter W, McNeill J, Barrie FR, Burdet HM, Demoulin V, Filgueiras TS, Nicolson DH, Silva PC, Skog JE, Trehane P, Turland NJ, Hawksworth DL (2000). *International Code of Botanical Nomenclature (Saint Louis Code)*. XVI International Botanical Congress, St. Louis, Missouri, July-August 2000. Koeltz Scientific Books, Königstein, Germany.
- Gryzenhout M, Glen HF, Wingfield BD, Wingfield MJ (2005b). Proposal to conserve the generic name *Cryphonectria* (Sacc.) Sacc. (*Diaporthales*) with a changed type. *Taxon* **54**: 539–540.
- Gryzenhout M, Myburg H, Van der Merwe NA, Wingfield BD, Wingfield MJ (2004). *Chrysoportha*, a new genus to accommodate *Cryphonectria cubensis*. *Studies in Mycology* **50**: 119–142.
- Gryzenhout M, Myburg H, Wingfield BD, Montenegro F, Wingfield MJ (2005a). *Rostraureum tropicale* gen. sp. nov. (*Diaporthales*) associated with dying *Terminalia ivorensis* in Ecuador. *Mycological Research* **109**: 1029–1044.
- Heiniger U, Rigling D (1994). Biological control of chestnut blight in Europe. *Annual Reviews of Phytopathology* **32**: 581–599.
- Kobayashi T (1970). Taxonomic studies of Japanese *Diaporthaceae* with special reference to their life histories. *Bulletin of the Government Forest Experimental Station* **226**: 132–147.
- Micales JA, Stipes RJ (1987). A reexamination of the fungal genera *Cryphonectria* and *Endothia*. *Phytopathology* **77**: 650–654.
- Myburg H, Gryzenhout M, Wingfield BD, Milgroom MG, Shigeru K, Wingfield MJ (2004a). DNA sequence data and morphology define *Cryphonectria* species in Europe, China, and Japan. *Canadian Journal of Botany* **82**: 1730–1743.



- Myburg H, Gryzenhout M, Wingfield BD, Stipes RJ, Wingfield MJ (2004b). Phylogenetic relationships of *Cryphonectria* and *Endothia* species, based on DNA sequence data and morphology. *Mycologia* **96**: 990–1001.
- Pennycook SR (1989). Part II. Fungal plant diseases. In: *Plant Diseases Recorded in New Zealand 2*. Plant Diseases Division, DSIR, Auckland, New Zealand: 117.
- Petch T (1907). Revisions of Ceylon fungi. *Annals of the Royal Botanical Garden, Peradeniya* **4**: 59–60.
- Roane MK (1986). Taxonomy of the genus *Endothia*. In: *Chestnut blight, other Endothia diseases, and the genus Endothia* (Roane MK, Griffin GJ, Elkins JR, eds.). APS Press, St. Paul, Minnesota, U.S.A.: 28–39.
- Saccardo PA (1883). *Sylloge Fungorum* **2**: 479–507. Patavii.
- Saccardo PA, Saccardo D (1905). *Sylloge Fungorum* **17**: 783–784. Patavii.
- Shear CL, Stevens NE, Tiller RJ (1917). *Endothia parasitica* and related species. *United States Department of Agriculture Bulletin* **380**: 1–82.
- Venter M, Myburg H, Wingfield BD, Coutinho TA, Wingfield MJ (2002). A new species of *Cryphonectria* from South Africa and Australia, pathogenic on *Eucalyptus*. *Sydowia* **54**: 98–117.
- Vizioli J (1923). Some Pyrenomycetes of Bermuda. *Mycologia* **15**: 107–119.
- Von Höhnelt F (1909). Fragmente zur Mykologie. IX. Mitteilung, Nr. 407–467. In: *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften zu Wien, Mathematisch-Naturwissenschaftliche Klasse, Abteilung 1, Bd. 118, Heft X*: 1479–1481.
- Zhang N, Blackwell M (2001). Molecular phylogeny of dogwood anthracnose fungus (*Discula destructiva*) and the Diaporthales. *Mycologia* **93**: 355–365.



**Table 1.** Specimens of *Amphilogia*, *Cryphonectria* and *Endothia* species examined in morphological comparisons.

Identity	Herbarium allocation <sup>a</sup>	Previous labeled name	Host	Origin	Collector	Date
<i>Amphilogia</i>	PDD 3841	<i>Endothia</i>	<i>Elaeocarpus</i>	Moumoukai Valley,	L. M.	1932
<i>gyrosa</i>		<i>tropicalis</i>	<i>dentatus</i>	Auckland	Cranwell	
	PDD 18377	<i>E. tropicalis</i>	<i>E. dentatus</i> root	Waitakere Ra., Auckland	J. M. Dingley	1958
	PDD 20570	<i>E. tropicalis</i>	<i>E. dentatus</i>	Orere, Auckland	S. J. Hughes	1963
	PDD 21242	<i>E. tropicalis</i>	<i>E. dentatus</i>	Omahuta State Forest, Auckland	S. J. Hughes	1963
	PDD 21944	<i>E. tropicalis</i>	<i>E. dentatus</i>	Waitakere Ranges, Fairy Falls Track, Auckland	J. M. Dingley	1963
	PDD 23365	<i>E. tropicalis</i>	<i>Elaeocarpus</i> <i>hookerianus</i>	Granville forest, Westland	J. M. Dingley	1963
	PDD 25003	<i>E. tropicalis</i>	<i>E. dentatus</i>	Waitakere Dam, Auckland	J. M. Dingley	1966
	PDD 25570	<i>E. tropicalis</i>	<i>E. dentatus</i>	Waitakere Ranges, Waiatarua, Auckland	J. M. Dingley	1963



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PDD 28482	<i>E. tropicalis</i>	<i>E. dentatus</i>	Waitakere Ranges, Auckland	J. M. Dingley	1947
PDD 28483	<i>E. tropicalis</i>	<i>E. dentatus</i> root	Henderson, Auckland	J. M. Dingley	1948
PDD 28484	<i>E. tropicalis</i>	<i>E. dentatus</i>	Piha, Auckland	J. M. Dingley	1948
PDD 28485	<i>E. tropicalis</i>	<i>E. dentatus</i> fallen trunk	Upper Piha Valley, Auckland	J. M. Dingley	1949
PDD 28486	<i>E. tropicalis</i>	<i>E. dentatus</i>	Waipoua, Auckland	J. M. Dingley	1949
PDD 28487	<i>E. tropicalis</i>	<i>E. dentatus</i>	Hunua Ranges, Auckland	J. M. Dingley	1953
PDD 28488	<i>E. tropicalis</i>	<i>E. dentatus</i>	Hunua Ranges, Auckland	J. M. Dingley	1953
PDD 28489	<i>E. tropicalis</i>	<i>E. dentatus</i> exposed root	Coromandel Peninsula, Auckland	J. M. Dingley	1954
PDD 28491	<i>E. tropicalis</i>	<i>E. dentatus</i>	Taupiri Mt., Auckland	J. M. Dingley	1954
PDD 28492	<i>E. tropicalis</i>	<i>E. dentatus</i>	Waipoua, Auckland	J. M. Dingley	1955
PDD 28494	<i>E. tropicalis</i>	<i>E. dentatus</i>	Henderson, Auckland	S. McBeth	1958
PDD 28497	<i>E. tropicalis</i>	<i>E. dentatus</i> root	Waitakere Ranges, Auckland	S. McBeth	1959

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	PDD 29819	<i>E. tropicalis</i>	<i>E. dentatus</i>	Henderson Valley, Waitemata County	J. M. Dingley	1972
	PDD 30873 = NY 30873	<i>Endothia</i> <i>radicalis</i>	Exposed roots of unidentified, living tree	Titirangi, Auckland	J. M. Dingley & G. J. Samuels	1973
	PDD 32619 <sup>b</sup>	<i>E. tropicalis</i>	Exposed <i>E. dentatus</i> root	Atuanui State Forest, Auckland	G. J. Samuels	1973
	NY 31874 <sup>b</sup>	<i>E. radicalis</i>	Exposed roots on dead tree	Waitakere Ranges, Spragg's Bush, Auckland	R. E. Beaver	1973
	BPI 614525	<i>E. tropicalis</i>	<i>E. dentatus</i>	Omahuta forest, Auckland	S. J. Hughes	1963
	BPI 614524	<i>E. tropicalis</i>	<i>E. dentatus</i>	Orere, Auckland	S. J. Hughes	1963
	DAOM 93506a	<i>E. tropicalis</i>	<i>E. dentatus</i>	Omahuta forest, Auckland	S. J. Hughes	1963
<i>Amphilogia</i> <i>major</i>	PDD 20056 (holotype)	<i>E. tropicalis</i>	<i>E. hookerianus</i>	L. Manapouri, Southland	J. M. Dingley	1948



	PDD 28490	<i>E. tropicalis</i>	<i>E. dentatus</i>	Pukekura, Westland	J. M. Dingley	1954
<i>Cryphonectria</i>	K 109807	<i>Nectria gyrosa</i>	Bark	Sri Lanka	n.a.	1868
<i>gyrosa</i> <sup>c</sup>	(holotype)	(#638)				
	K 109809 <sup>c</sup>	n.a. (#290)	Bark	Nuwara Eliya, Sri Lanka	G. H. K. Thwaites	n.a.
	BPI 614797 <sup>c</sup>	<i>E. tropicalis</i>	<i>Elaeocarpus</i> <i>glandulifer</i>	Hakgala, Sri Lanka	T. Petch	1913
	BPI 614526 <sup>c</sup>	<i>E. tropicalis</i>	<i>E. glandulifer</i>	Hakgala, Sri Lanka	T. Petch	1913
	BPI 797701 <sup>c</sup>	<i>E. tropicalis</i>	<i>E. glandulifer</i> (as <i>Elaeagnus</i> <i>glandulifer</i> )	Hakgala, Sri Lanka	n.a.	n.a.
<i>Cryphonectria</i>	TFM: FPH	<i>Endothia</i>	<i>Shiia siebordii</i>	Japan	T. Kobayashi	1954
<i>macrospora</i>	1057 (holotype)	<i>macrospora</i>				



<i>Cryphonectria</i>	TFM: FPH	<i>Endothia</i>	<i>Quercus</i>	Japan	T. Kobayashi	1954
<i>nitschkei</i>	1045 (holotype)	<i>nitschkei</i>	<i>grosseserrata</i>			
<i>Cryphonectria</i>	NY	<i>Diaporthe</i>	<i>Castanea dentata</i>	New York, USA	W. A. Murrill	1905
<i>parasitica</i>	(holotype)	<i>parasitica</i>				
	CUP 2926	<i>D. parasitica</i>	<i>C. dentate</i>	New York, USA	W. A. Murrill	1907
	TFM: FPH	<i>Endothia</i>	<i>Castanea crenata</i>	Koganei, Japan	T. Kobayashi	1953
	629	<i>parasitica</i>				
<i>Cryphonectria</i>	BPI 797697	<i>E. radicalis</i>	<i>Castanea sativa</i>	Locarno, Switzerland	n.a.	1862
<i>radicalis</i>						
	BPI 613739	<i>Endothia fluens</i>	<i>C. sativa</i>	Stresa, Italy	C. L. Shear	1913
<i>Endothia</i>	PREM	<i>E. gyrosa</i>	<i>Quercus phellos</i>	Raleigh, USA	L. Grand	1997
<i>gyrosa</i>	56218					

<sup>a</sup> **NY**, William and Lynda Steere Herbarium, New York Botanical Garden, Bronx, New York, USA. **PDD**, Landcare Research New Zealand Limited, Mt. Albert, Auckland, New Zealand. **BPI**, U. S. National Fungus Collections, Systematic Botany and Mycology, Beltsville, USA.



**DAOM**, National Mycological Herbarium, Eastern Cereal and Oilseed Center (ECORC), Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada. **K**, Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, U.K. **TFM: FPH**, Forestry and Forest Products Research Institute, Danchi-Nai, Ibaraki, Japan. **CUP**, Plant Pathology Herbarium, Cornell University, Ithaca, New York, USA. **PREM**, National Collection of Fungi, Pretoria, South Africa.

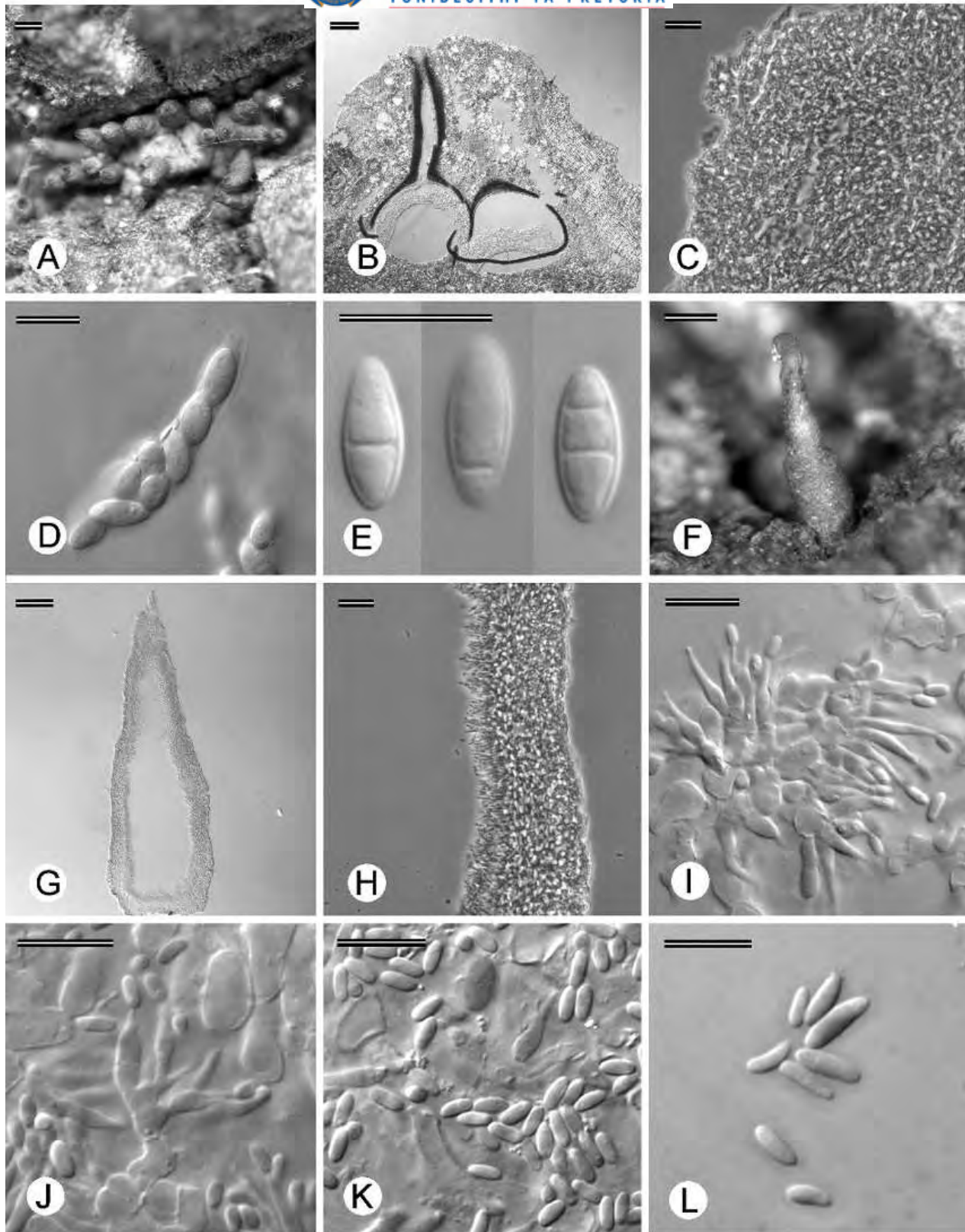
<sup>b</sup> NY 31874 is linked to isolates CMW 10469 and CMW 10470, and PDD 32619 is linked to isolate CMW 10471 (Myburg *et al.* 2004b).

<sup>c</sup> These specimens now represent *A. gyrosa*.

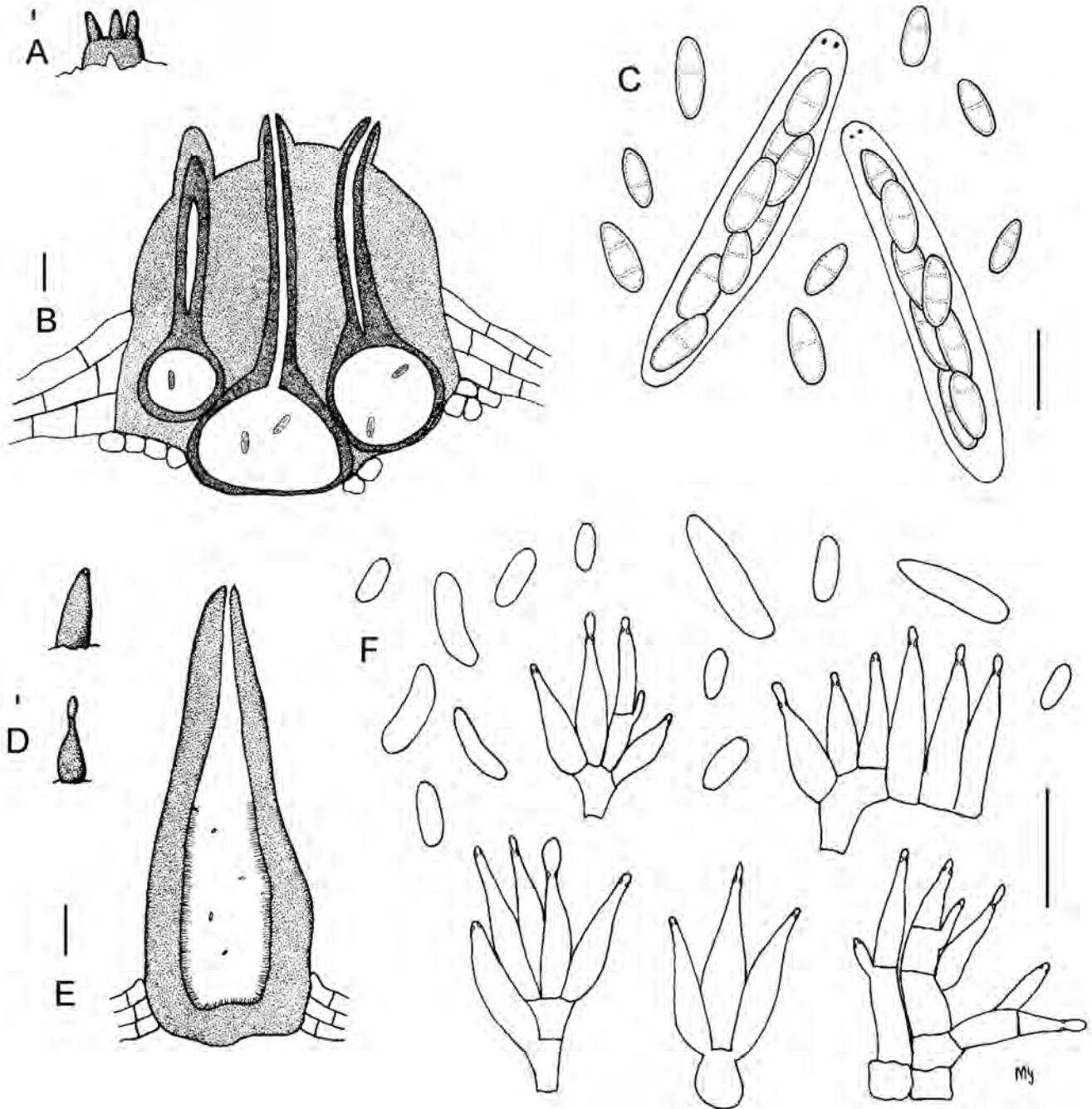




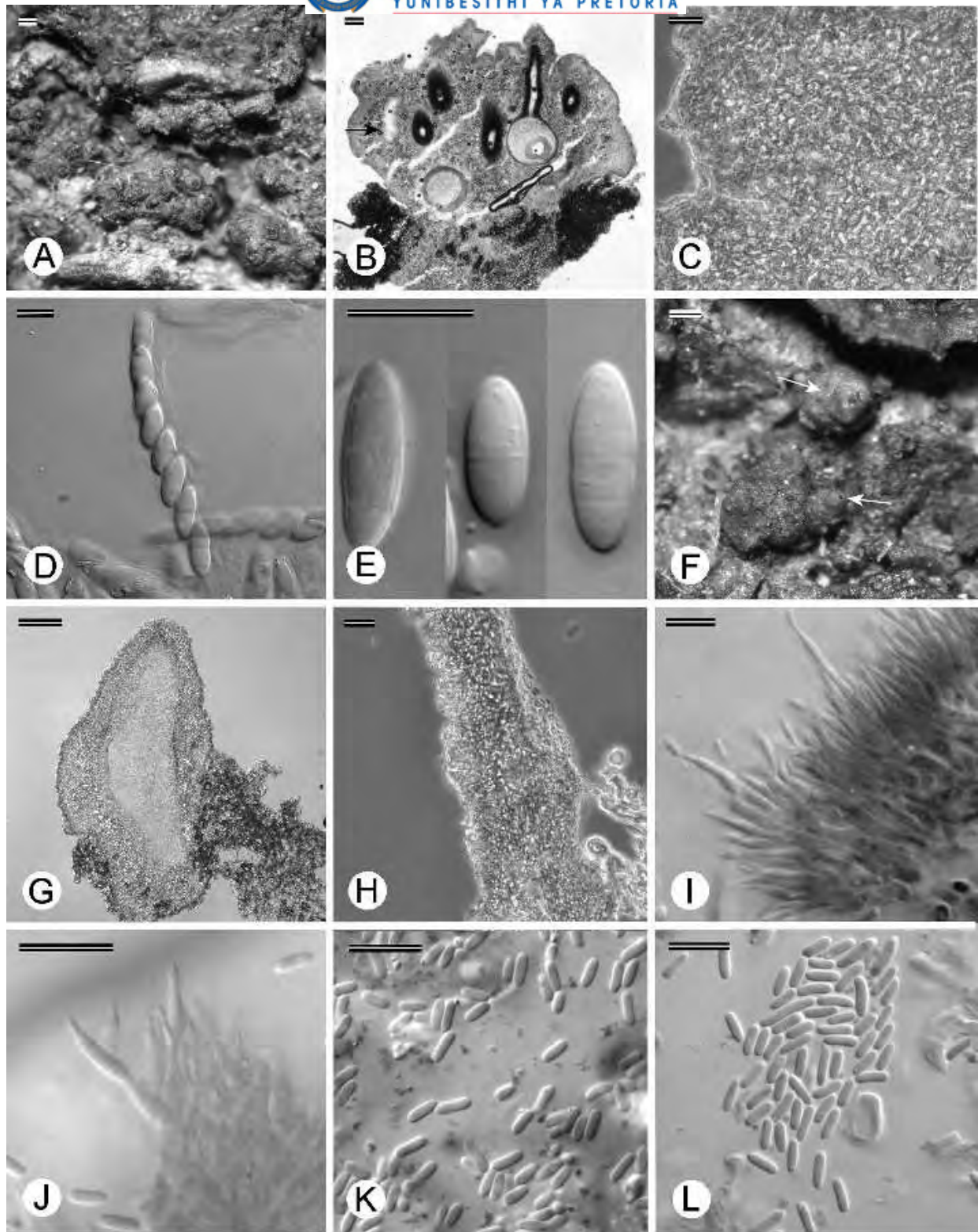
**Fig. 1.** Map of New Zealand showing the locations of herbarium specimens from *Elaeocarpus* spp.



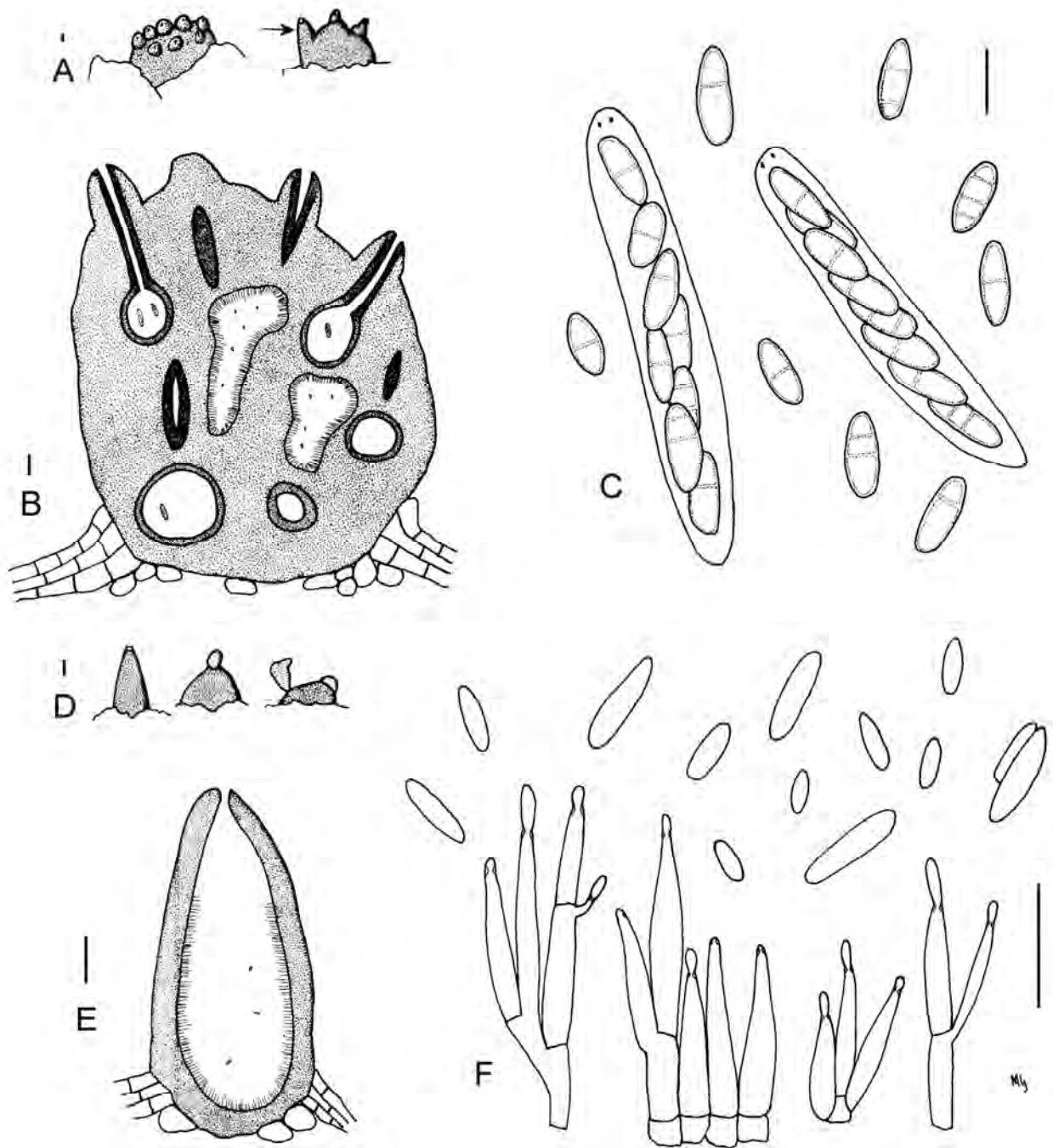
**Fig. 2.** Micrographs of specimens of *Amphilogia gyrosa* from New Zealand linked to the phylogenetic clade characterised by Myburg *et al.* (2004b). A. Ascostroma on bark with long perithecial necks. B. Vertical section through ascostroma. C. Stromatic tissue of ascostroma. D. Ascus. E. Ascospores with different septation. F. Conidioma on bark. G. Vertical section through conidioma. H. Stromatic tissue of conidioma, longitudinally sectioned. I–J. Conidiophores and conidiogenous cells. K–L. Conidia. Scale bars A, F = 200 µm; B, G = 100 µm; C, H = 20 µm; D–E, I–L = 10 µm.



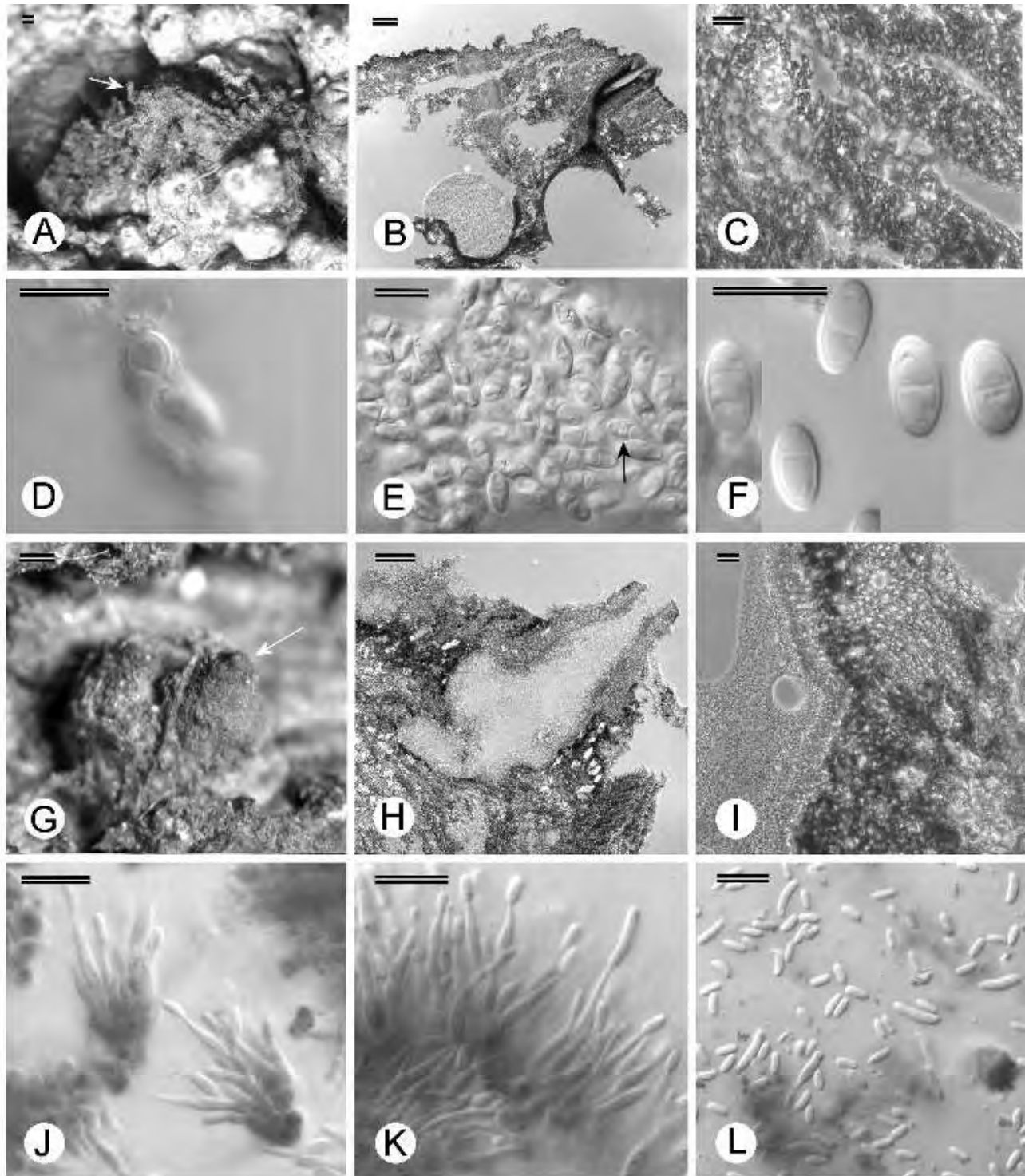
**Fig. 3.** Line drawings of *Amphilogia gyrosa*. A. Shape of ascostroma on bark. B. Vertical section through ascostroma. C. Asci and ascospores. D. Shapes of conidiomata on bark. E. Vertical section through conidioma. F. Conidiophores, conidiogenous cells and conidia. Scale bars A–B, D–E = 100  $\mu\text{m}$ ; C, F = 10  $\mu\text{m}$ .



**Fig. 4.** Micrographs of specimens of *Amphilogia major* from New Zealand. A. Ascostromata on bark with perithecial necks. B. Vertical section through ascostroma, with conidial locule indicated with arrow. C. Stromatic tissue of ascostroma. D. Ascus. E. Ascospores with different septation. F. Conidiomata on bark (arrows). G. Vertical section through conidioma. H. Stromatic tissue of conidioma, longitudinally sectioned. I–J. Conidiophores and conidiogenous cells. K–L. Conidia. Scale bars A–B, F = 200 µm; G = 100 µm; C, H = 20 µm; D–E, I–L = 10 µm.



**Fig. 5.** Line drawings of *Amphilogia major*. A. Shapes of ascostromata on bark with conidioma indicated with arrow. B. Vertical section through ascostroma. C. Asci and ascospores. D. Shapes of conidiomata on bark. E. Vertical section through conidioma. F. Conidiophores, conidiogenous cells and conidia. Scale bars A = 200  $\mu\text{m}$ ; B, D–E = 100  $\mu\text{m}$ ; C–F = 10  $\mu\text{m}$ .



**Fig. 6.** Micrographs of Sri Lankan specimens of *Amphilogia gyrosa*. A. Ascostroma on bark with long perithecial necks (arrow). B. Vertical section through ascostroma. C. Stromatal tissue of ascostroma. D. Tip of ascus. E–F. Ascospores with different septation. G. Conidioma on bark (arrow). H. Vertical section through conidioma. I. Stromatic tissue of conidioma, longitudinally sectioned. J–K. Conidiophores and conidiogenous cells. L. Conidia. Scale bars A–B, G = 200  $\mu\text{m}$ ; H = 100  $\mu\text{m}$ ; C, I = 20  $\mu\text{m}$ ; D–F, J–L = 10  $\mu\text{m}$ .