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Fungi silvicolae novazelandiae: 9

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Abstract

The fungi described in this paper have been recorded but not fully described from New Zealand. The fungi are:

Caulicolous Ascomycota: *Heptameria obesa* (Durieu & Montagne) Saccardo on *Pittosporum tenuifolium* Solander ex Gaertner; *Pseudovalsa lanciformis* (Fries) Cesati & De Notaris on *Betula pendula* Roth; *Pseudovalsa longipes* (Tulasne) Saccardo on *Quercus cerris* f. *laciniata* (Loudon) C.K.Schneider.

Corticolous coelomycetes: *Diplodia scrobiculata* J.de Wet, Slippers & M.J.Wingfield on *Pinus radiata* D.Don.

Foliicolous Ascomycota: *Guignardia* sp. (aff. *Guignardia aesculi* (Peck) Stewart) on *Macropiper excelsum* (G. Forster) Miquel.

Xylophilous hyphomycetes: *Phaeoacremonium rubrigenum* W.Gams, Crous & M.J. Wingfield on *Melia azedarach* Linnaeus.

Keywords: fungal descriptions: fungi; New Zealand.

Introduction

The purpose of this series of papers is to provide descriptions of fungi recently recorded in New Zealand. Most of these records come from specimens sent to the Forest Health Reference Laboratory at this Institute (the New Zealand Forest Research Institute trading as Scion) for identification. In this ninth paper in the series, descriptions are provided for four ascomycetous, one coelomycetous and one hyphomycetous fungi. For examination, sections were cut using a freezing microtome. Sections and squash preparations were mounted in lactophenol.

The location record of local specimens examined is followed by the name of the arbitrarily defined geographical region (Crosby et al., 1998) to which the specimen belongs. The account of the New Zealand distribution of an organism is based principally on the Forest Health database maintained by this Institute. It is presented for each geographical region, with the number of records for that region given in parentheses.

Descriptions of fungi

Caulicolous Ascomycota (found mainly on twigs but occasionally also on leaves)

Heptameria obesa (Durieu & Montagne) Saccardo (Figures 1A, B & C)
Sylloge Fungorum 2: 88, 1883.

Anamorph: Not known.

Ascomata stromatic, pseudothecial, commonly embedded in a stroma in groups of 2–3 but occasionally solitary, densely gregarious, individual locules 360 – 500 µm diam, papillate; pseudothecial wall (90) – 110 – (130) µm thick, composed of pale brown, polygonal cells. Stromata subglobose, black, developing under bark, up to 1 mm long, becoming erumpent through linear or irregularly circular fissures. Asci bitunicate, clavate, (170) – 185 – (210) × (20) – 25 – (27) µm, 8-spored, separated by filiform pseudoparaphyses. Ascospores broadly fusiform, straight, biseriata in upper part of ascus, uniseriate below, 6 – 7 septate, (50) – 60 – (70) × (11) – 12 – (14) µm, smooth; median cell brown, muriform at maturity, with 4 – 6 transverse and 1 – 3 vertical septa, large (15 – 20 µm long); other cells hyaline and tapering towards both ends.

Habitat: Small dead twigs of *Pittosporum tenuifolium* Solander ex Gaertner.

Specimen examined: On small dead twigs of *Pittosporum tenuifolium*, campsite, Kawatiri Junction, Nelson (Nelson), 5. vi. 2008, B.H. Doherty, NZFRI-M 5525.

Other specimen examined: On dead twigs of *Baccharis* sp., Gaviota, California, USA, 11.v.1939, F. Petrak, New Zealand Fungal Herbarium (PDD) 38025.

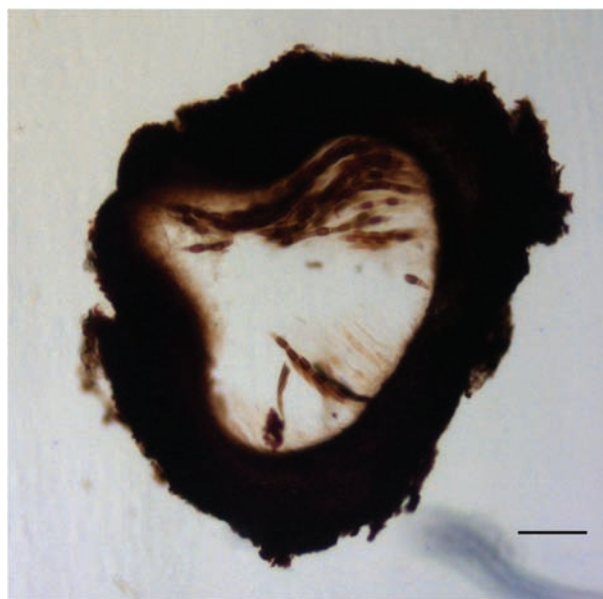
New Zealand distribution: Nelson (1).

Heptameria obesa has previously been recorded in Europe and the southern United States of America on dead fibrous and woody stems of plants in the Asteraceae (Lucas & Sutton, 1971), Dipsacaceae and Scrophulariaceae (Saccardo, 1883). There are no records of this fungus as a pathogen so it is regarded as a saprophyte.

Pseudovalsa lanciformis (Fries) Cesati & De Notaris (Figures 2A & B)

Commentario della Società Crittogamologica Italiana 1(4): 206, 1863.

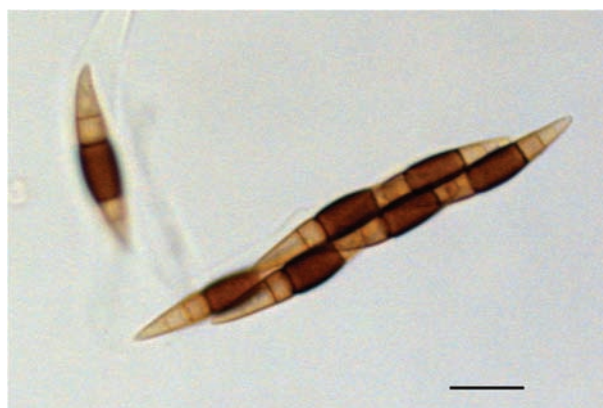
Anamorph: *Coryneum brachyurum* Link, *Linné Species Plantarum* 6(2): 124, 1825.



A. L.S. Ascoma (Bar = 100 µm)

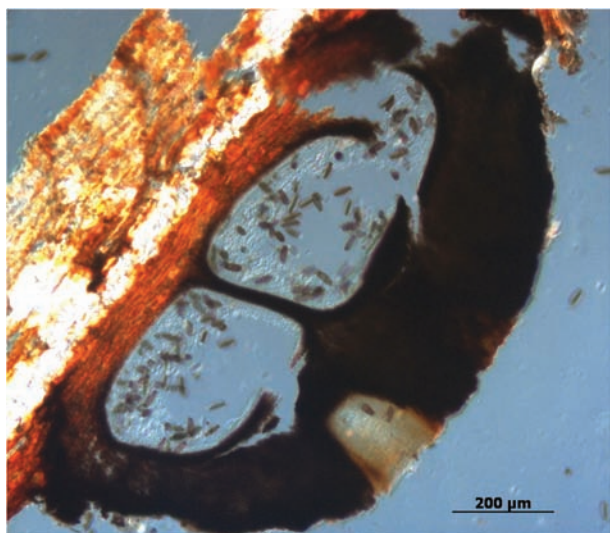


B. Asci (Bar = 20 µm)



C: Ascospores (Bar = 20 µm)

FIGURE 1: *Heptameria obesa*



A. Stroma (Bar = 200 µm)



B. Ascospores (Bar = 20 µm)

FIGURE 2: *Pseudovalsia lanciformis*

Ascomata stromatic, pseudothecial, embedded in a common stroma in groups of 4 – 5, individual locules 350 – 500 µm diameter. Stromata oval to lens-shaped, dark brown to black, composed of cushion-shaped prosenchyma, 0.5 – 1.5 mm long, developing under bark, becoming erumpent through a slit in the bark exposing a black disc on which the ostioles open without projecting. Asci bitunicate, cylindric-clavate, (135) – 140 – (150) × (23) – 27 – (29) µm, 8-spored. Ascospores narrowly fusiform, biseriate, 5 – 6 distoseptate, (35) – 42 – (46) × (13) – 16 – (20) µm, smooth, pale brown with hyaline ends. Conidiomata acervular, scattered, subepidermal, becoming erumpent through bark, dark brown, composed of cushion-shaped, vertically arranged pseudoparenchyma, 0.8 – 1.2 mm long. Conidiophores arising from upper cells of pseudoparenchyma, erect, branched, pale brown. Conidia narrowly fusiform, straight or slightly curved, 4 – 6-distoseptate, (35) – 50 – (60) × (12) – 16 – (20) µm, smooth, pale brown, apex obtuse with a hyaline tip, base truncate often with a part of the conidiogenous cell attached,

many septa greatly thickened, considerably reducing the cell lumen.

Habitat: Small branches and twigs of *Betula pendula* Roth.

Specimens examined: Teleomorph: on small dead branches of *Betula pendula*, Top Valley Road, Wairau North (Marlborough), 22.vi.2007, B.H.Doherty, NZFRI-M 5428.

Anamorph: on dead twigs of *B. pendula*, Central Park, Wellington (Wellington), 19.ix.2001, B.J.Rogan, NZFRI-M 4527; on dead twigs of *B. pendula*, Alexander Park, Napier (Hawkes Bay), 19.x.2001, B.J.Rogan, NZFRI-M 4554; on dead twigs of *B. pendula*, Pukaki Road, Auckland International Airport, Auckland (Auckland), 1.v.2003, B.J.Rogan, NZFRI-M 5082.

New Zealand distribution: Auckland (1), Hawkes Bay (1), Wellington (1), Marlborough (1).

Pseudovalsia lanciformis is regarded as a saprophyte as there are no records of this fungus as a pathogen

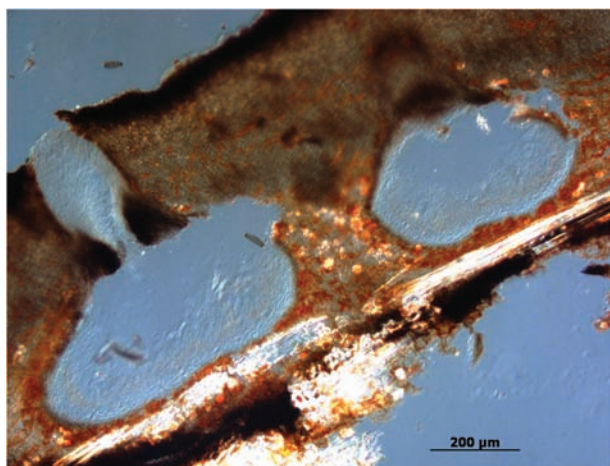
Pseudovalsia longipes (Tulasne) Saccardo (Figures 3A & B)

Atti della Società Veneto-Trentino di Scienze Naturali in Padova 4: 120, 1875.

Anamorph: *Coryneum umbonatum* Nees, *Das System der Pilze und Schwämme* 34, 1816-1817.

Ascomata stromatic, pseudothecial, embedded in a common stroma in groups of 3 – 6, individual locules 200 – 600 µm diam. Stromata elongate oval, cushion-shaped, dark brown to black, composed of irregularly globose cells, 2 – 3 mm long, developing under bark, becoming erumpent through a slit in the bark exposing a black disc in which the ostioles open without projecting. Asci unitunicate, cylindric-clavate, (85) – 105 – (120) × (10) – 12 – (16) µm, 8-spored. Ascospores narrowly fusiform, straight or slightly curved, 4 – 7-pseudoseptate, (40) – 55 – (90) × (10) – 15 – (20) µm, smooth, pale brown with hyaline ends. Conidiomata acervular, scattered, elongate-oval to effuse, dark brown, composed of cushion-shaped pseudoparenchyma. Conidiophores hyaline to pale brown, (10) – 27 – (47) µm long. Conidia narrowly fusiform, straight or slightly curved, 5 – 7-distoseptate, (47) – 58 – (70) × (10) – 13 – (16) µm, smooth, pale brown, apex with a hyaline tip, base truncate. For a full description of the anamorph, see Gadgil and Dick (2007).

Habitat: Teleomorph found on dead twigs of *Quercus cerris* f. *laciniata* Loudon (C.K.Schneider). The anamorph has been found on small branches of



A. Stroma (Bar = 200 µm)



B. Ascus and ascospores (Bar = 20 µm)

FIGURE 3: *Pseudovalsa longipes*

Castanea sativa Miller and *Quercus robur* Linnaeus.
Specimen examined: Teleomorph: on dead twigs of *Quercus cerris* f. *laciniata*, Memorial Avenue, Christchurch Airport, Christchurch (Mid Canterbury), 25.ii.2008, B.H.Doherty, NZFRI-M 5466.

Anamorph: collected from Marylands Reserve, Christchurch (Mid Canterbury). See Gadgil and Dick (2007) for details of specimens.

New Zealand distribution: Mid Canterbury (3).

Pseudovalsa longipes is regarded as a saprophyte as there are no records of this fungus as a pathogen. The anamorph was infrequently isolated by Collado et al., (1999) as an endophyte in leaves of *Quercus ilex* Linnaeus in Spain and in twigs of *Betula pubescens* Ehrhart in Switzerland (Barengo et al., 2000).

Corticulous coelomycetes (found on or in bark, usually on the main stems)

Diplodia scrobiculata J.De Wet, Slippers & M.J.Wingfield (Figure 4)

Mycological Research 107: 562, 2003.

Colonies grown on 2% malt extract agar reached an average diameter of 68 mm in 6 days at 25 °C, dark grey to black, aerial mycelium sparse, colony edge uneven. Mycelium dark, septate. Conidiomata pycnidial, immersed in the agar, covered with mycelium, papillate, (150) – 250 – (300) µm diam. Conidiophores discrete, lageniform, (10) – 12 – (16) µm long. Conidia clavate to almost cylindrical, straight or slightly curved, 0 – 3-septate, (33) – 40 – (46) × (10) – 13 – (15) µm, conidial walls thick (1.5 – 2.5 µm) and pitted, dark brown.

Habitat: Shoots, roots and stems of *Pinus radiata* D.Don.

Cultures examined: isolated from shoots of *Pinus radiata*, Tairua Forest (Coromandel), xi.2002, L.S.Bulman, NZFS 958; from shoots of *P. radiata*, cpt 0001, Tokorangi Forest (Gisborne), 30.xi.2002, W.Wheeler, NZFS 949; from roots of *P. radiata*, Tutira Forest, (Hawkes Bay), 12.xii.2002, S.K.Jones, NZFS 928; from stem of *P. radiata*, cpt. 19/A, Omahuta Forest (Northland), 11.vi.2002, M.R.Twaddle, NZFS 897; from stem of *P. radiata*, cpt. 24, Gwavas Forest (Rangitikei), 19.xii.2002, B.J.Rogan, NZFS 929; from shoots of *P. radiata*, 80 State Highway 16, Kumeu (Auckland), 19.vi.2007, M.A.Dick, NZFS 2946.

New Zealand distribution: Northland (1), Auckland (1), Coromandel (1), Gisborne (1), Hawkes Bay (1), Rangitikei (1).

Diplodia scrobiculata is a segregate from *Sphaeropsis sapinea* (Fries) Dyko & B. Sutton (= *Diplodia pinea* (Desmazières) J.Kickx f.). Three distinct morphotypes (A, B and C) have been described for *S. sapinea* (Wang et al., 1985; de Wet et al., 2003). Kay et al. (2002) showed that all three morphotypes were present in New Zealand. In addition to morphology, isolates of the three morphotypes differed in pathogenicity and molecular characteristics. These differences were, however, not initially considered major enough to justify description of separate species. A study of isolates belonging to the three morphotypes, using multiple gene genealogies inferred from partial sequences of six protein-coding genes and six microsatellite loci, consistently grouped A and C morphotypes in separate but closely related clades; isolates of the B morphotype grouped together in a clade that was equally different to the A and C morphotypes, as it was to the clade encompassing isolates of *Botryosphaeria*



Conidia (Bar = 20µm)

FIGURE 4: *Diplodia scrobiculata*

obtusa (Schweinitz) Shoemaker, a species related to *S. sapinea*. These results indicated that B morphotype isolates were only distantly related to *S. sapinea* and represented a different taxon; this taxon has been described as *Diplodia scrobiculata* by de Wet et al., (2003). A re-examination of cultures of *S. sapinea* held in the New Zealand Forest Research Institute Culture Collection (NZFS) showed that a number of isolates were of the B morphotype and belonged to *D. scrobiculata*. *Diplodia scrobiculata* has been shown to be a weak pathogen (Palmer et al., 1987).

Follicolous Ascomycota (found mainly on leaves but occasionally also on twigs)

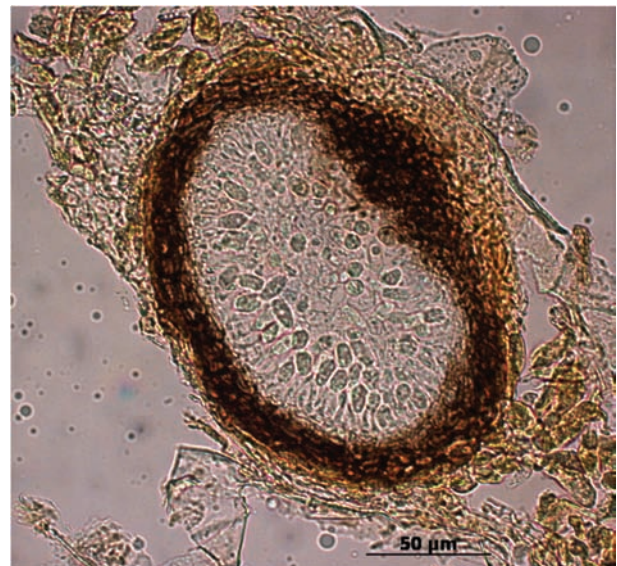
***Guignardia* sp.** (Figures 5A, B & C) (aff. *Guignardia aesculi* (Peck) Stewart
Phytopathology 6: 9, 1916.

Anamorph: *Phyllosticta sphaeropoidea* Ellis & Everhart., *Bulletin of the Torrey Botanical Club* 10: 97, 1883 \equiv *Phyllostictina sphaeropoidea* (Ellis & Everhart) Petrak, *Sydowia* 10: 265, (1957).

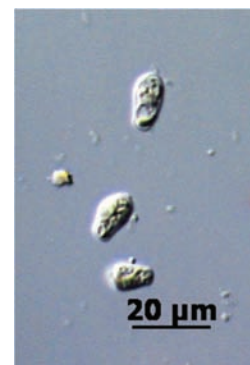
Leaf spots pale grey to straw-coloured with a dark brown margin, roughly circular to elongate, up to 30 mm (usually 12 – 15 mm) long \times 5 – 10 mm wide, limited by veins, dotted with ascomata and conidiomata



A. Pseudothecium (Bar = 50 µm)



B. Conidioma (Bar = 50 µm)



C. Conidia (Bar = 20 µm)

FIGURE 5: *Guignardia* sp.

TABLE 1: Morphological characteristics of *Guignardia* sp. from *Macropiper excelsum* and *Guignardia aesculi*

Species	Ascomata	Asci	Ascospores	Conidiomata	Conidia
<i>Guignardia</i> sp. on <i>Macropiper excelsum</i>	Depressed globose to oval, dark brown, 115 – 170 × 80 – 165 µm.	Subclavate, 35 – 55 × 16 – 20 µm.	Ellipsoidal, 0-septate, 11 – 17 × 7 – 10 µm, with greenish guttules.	Depressed globose, dark brown, 140 – 180 × 105 – 160 µm.	Obovate to ellipsoidal, 0-septate, 13 – 17 × 7 – 10 µm, with a mucilaginous coat.
Collections of <i>Phyllosticta sphaeropsoidea</i> examined (mean of 2 collections)				Depressed globose, dark brown, 110 – 135 × 80 – 115 µm.	Obovate to ellipsoidal, 0-septate, 11 – 15 × 6 – 8 µm, with a mucilaginous coat.
<i>Guignardia aesculi</i> / <i>Phyllosticta</i> <i>sphaeropsoidea</i> (Data from van der Aa, 1973)	Depressed globose, diameter 100 – 150 µm.	Subclavate, 55 – 70 × 14 – 18 µm.	Ellipsoidal, 0-septate, 12 – 18 × 7 – 9 µm, with greenish guttules.	Depressed globose, diameter up to 160 µm.	Obovate to ellipsoidal, 0-septate, 10 – 20 × 9 – 13 µm, with a mucilaginous coat and apical appendage (only on fresh specimens).
<i>Guignardia aesculi</i> (data from Ellis & Ellis, 1997)			12 – 18 × 7 – 9 µm, hyaline with granular contents.	Small, black.	9 – 16 × 6 – 10 µm, hyaline.

on upper surface of leaves. Ascomata pseudothecial, scattered, flattened globose to oval, subepidermal, dark brown, (115) – 145 – (170) × (80) – 120 – (165) µm, papillate. Wall thin, (13) – 14 – (16) µm thick, composed of 2 layers of compressed dark brown cells with inner layer of flattened, thin-walled, hyaline cells. Asci bitunicate, subclavate, (35) – 50 – (55) × (16) – 18 – (20) µm. Ascospores ellipsoidal, 0-septate, (11) – 15 – (17) × (7) – 8 – (10) µm, smooth, hyaline, containing numerous greenish guttules. Conidiomata pycnidial, scattered, depressed globose, subepidermal, dark brown, (140) – 165 – (180) × (105) – 130 – (160) µm, similar in composition to ascomata. Conidiogenous cells cylindrical, hyaline, (4) – 6 – (8) µm long. Conidia obovate to ellipsoidal, 0-septate, (13) – 14 – (17) × (7) – 9 – (10) µm, smooth, hyaline, containing numerous greenish guttules, surrounded by a mucilaginous coat, 1.0 – 1.5 µm thick, no apical appendage seen.

Habitat: Necrotic leaf spots on living, green leaves of *Macropiper excelsum* (G.Forster) Miquel.

Specimens examined: On leaf spots on leaves of *Macropiper excelsum*, Nikau Reserve, Chatham Island (Chatham Islands), 13.x.2007, P.M. Bradbury, NZFRI-M 5490; on leaf spots on leaves of *Macropiper excelsum*, Nikau Reserve, Chatham Island (Chatham Islands), 27.v.2009, M. Hansen, NZFRI-M 5533.

New Zealand distribution: Chatham Islands (2).

Other specimens examined: on leaf spots on leaves of *Aesculus hippocastanum* Linnaeus, Lainzer Tiergarten, Wien, Austria, F.Petrak, PDD 38061 (as *Phyllostictina sphaeropsoides* ≡ *Phyllosticta sphaeropsoides*); on spots on leaves of *A. hippocastanum*, Steiermark, Bad Gleichenberg, Kurpark, Austria, 22.vii.1956, F.Petrak, PDD 39710 (as *Phyllostictina sphaeropsoides*).

The collections of *P. sphaeropsoides* noted above and published descriptions of *Guignardia aesculi* (van der Aa, 1973, Ellis & Ellis, 1997) are very similar to the fungus on *M. excelsum* (Table 1). The two fungi, however, are probably not conspecific. *Guignardia aesculi* is widespread in Europe and North America and occasionally causes a severe leaf blotch of *Aesculus* spp. (Smith et al., 1988, Sinclair & Lyon, 2005). Stewart (1916) noted that the fungus was host-specific and isolates from different *Aesculus* species were unable to attack species other than the original host. No trees of any species of *Aesculus* exist near the area where our *Guignardia* sp. was found (Paul Bradbury, Brent Rogan, pers. comm.). Molecular analysis did not yield a close match with any other fungus.

Association of the *Guignardia* sp. with necrotic leaf spots on living leaves indicates that the fungus is probably a pathogen. Pathogenicity tests using seedlings of *M. excelsum* and *A. hippocastanum* are planned.

Xylophilous hyphomycete (found in the sapwood of living trees)

Phaeoacremonium rubrigenum W.Gams, Crous & M.J.Wingfield

Mycologia 85: 795, 1996.

Colonies on 2% malt extract agar reached an average diameter of 8 mm in 8 days at 30 °C, reverse vinaceous red. Mycelium medium brown with darker septa and walls, hyphae tuberculate to verrucose, septate. Conidiophores arising from aerial or submerged hyphae, erect, simple or branched in the lower part, medium brown becoming lighter towards the tip, septate, variable in length. Conidiogenous cells terminal or lateral, phialidic, 5 – 35 µm long, with a funnel-shaped collarette, pale brown to hyaline, tuberculate to verrucose. Conidia ellipsoidal to allantoid, straight, (3) – 4 – (6) × 1 – 2 µm, smooth, hyaline, collecting in slimy heads.

Habitat: wood of dying branches of *Melia azedarach* Linnaeus.

Cultures examined: isolated from reddish stain in wood of *Melia azedarach*, Bluff Hill, Napier (Hawkes Bay), 21.x.2008, B.J. Rogan, NZFS 3107; isolated from wood of *M. azedarach*, Terrace End cemetery, Palmerston North (Wanganui), 21.iv.2009, B.J. Rogan, NZFS 3122.

New Zealand distribution: Hawkes Bay (1), Wanganui (1).

Phaeoacremonium species have been associated with wilt and decline diseases of various woody plants as well as infection in humans (Crous et al., 1996). *Phaeoacremonium rubrigenum* has been isolated from human patients and also from bark beetles and their galleries in *Quercus* and *Fraxinus* (Kubátová et al., 2004) in Czechia (formerly Czech Republic). In the Northern Hemisphere it has also been associated with Esca disease of grapevines and with a disease of kiwifruit vines (Essakhi et al., 2008).

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