

FUNGI SILVICOLAE NOVAZELANDIAE: 6

P. D. GADGIL* and MARGARET DICK

New Zealand Forest Research Institute Limited,
Private Bag 3020, Rotorua, New Zealand

(Received for publication 30 June 2005; revision 13 March 2006)

ABSTRACT

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

Corticulous Ascomycota: *Cosmospora* sp. (aff. *Cosmospora purtonii* (Greville) Rossman & Samuels) on *Myrsine australis* (A. Richard) Allan.

Caulicolous Ascomycota: *Colpoma quercinum* (Persoon) Wallroth on *Quercus* sp.; *Hysterographium fraxini* (Persoon) De Notaris on *Fraxinus* spp.

Foliicolous Coelomycetes: *Pestalotiopsis karstenii* (Saccardo & P. Sydow) Steyaert on *Banksia* sp.

Staninwardia breviuscula B. Sutton on *Eucalyptus* spp. and *Metrosideros excelsa* Solander ex Gaertner.

Keywords: fungi; New Zealand; new descriptions.

INTRODUCTION

In this sixth paper of the series, descriptions are provided for five fungi that have been recorded from New Zealand but not fully described. For examination, herbarium material was rehydrated in a damp chamber. Sections were cut using a freezing microtome, and sections and squash preparations were mounted in water.

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 data recorded on the Forest Health database maintained by the New Zealand Forest Research Institute and it is presented for each geographical region, with the number of records for that region given in parentheses. Not all records on the database are supported by voucher specimens.

*Corresponding author: peter.gadgil@ensisjv.com

DESCRIPTIONS OF FUNGI

Corticulous Ascomycota

Cosmospora sp. (aff. *Cosmospora purtonii* (Greville) Rossman & Samuels 1999, *Studies in Mycology* 42: 124 ≡ *Nectria purtonii* (Greville) Berkeley, *Outlines of British Fungology*: 394, 1860).

Anamorph: *Fusarium aquaeductuum* var. *aquaeductuum* (Radlkofer & Rabenhorst) Lagerheim, *Centralblatt für Bakteriologie und Parasitenkunde* 9: 655, 1891.

Stromata absent or very thin. Ascomata perithecial, broadly pyriform, in groups of 3–5, erumpent through bark, yellowish orange to orange, 0.3–0.4 mm wide × 0.3 mm high, wall smooth, ostiole papillate with an indistinct flat disc. Perithecial wall 30–60 µm thick; outer layer 15–25 µm thick, composed of thick-walled globose cells; inner layer 15–35 µm thick, of thin-walled elongate cells. Asci narrowly clavate, monostichous, (70)–90–(105) × (8)–9–(10.5) µm. Ascospores ellipsoidal to fusiform-ellipsoidal, 1-septate, slightly constricted at the septum, (16)–18–(21) × 6–7 µm, hyaline to subhyaline, smooth.

Cultures on potato dextrose agar salmon-pink when young, becoming reddish crimson with age, surface slimy with reddish pink conidial masses. Macroconidia curved fusoid, 0-septate to medianly 1-septate when mature, 25–40 × 3 µm, hyaline, smooth. Microconidia none.

(*Cosmospora purtonii* is illustrated by Samuels 1976 (teleomorph), Booth 1971 (anamorph)).

Habitat: Fissured galls on twigs of *Myrsine australis* (A.Richard) Allan.

Specimens examined: on a gall on twig of *Myrsine australis*, Dunedin Botanical Garden (Dunedin), 19.xii.1996, B.J.Rogan, NZFRI-M 3633; on a gall on twig of *M. australis*, Te Pukatea Bay, Abel Tasman National Park (Nelson), 11.ii.2003, B.H.Doherty, NZFRI-M 4919; on a gall on twig of *M. australis*, Lake Tarawera Perimeter Track (Bay of Plenty), 19.ix.2004, M.A.Dick, NZFRI-M 5285, culture NZFS 1752. The description given above is based on these specimens.

New Zealand distribution: Auckland (1), Bay of Plenty (1), Nelson (1), Dunedin (1).

Other specimens examined: on dead twigs of *Pinus wallichiana* A.B.Jackson, Dungagali, (Pakistan), 20.vii.1965, S.H.Iqbal, PDD 26057 (labelled as *Nectria purtonii*); on bark of *Hoheria populnea* A.Cunningham, Titirangi (Auckland), 5.ix.1973, J.M.Dingley, PDD 32442 (labelled as *Nectria* cfr.

episphaeria (Tode) Fries); on bark of *Alnus incana* (Linnaeus) Moench, Nationalpark Hohe Tauern (Salzburg), C.Scheuer, 21.vii.1992, PDD 70218 (labelled as *Nectria purtonii*). These collections of *C. purtonii* and the published descriptions of *C. purtonii* (Booth 1959; Samuels 1976) are very similar to the fungus on *M. australis* except that the *Myrsine* fungus has larger asci and ascospores (Table 1). More collections need to be examined before the question of whether our fungus is a variety of *C. purtonii* or a distinct species can be settled.

The association of this *Cosmospora* sp. with galls on *M. australis* suggests that it may possibly have some pathogenic potential.

Caulicolous Ascomycota

Colpoma quercinum (Persoon) Wallroth 1833

Flora Cryptogamica Germaniae 2: 423.

Ascomata hysterothecial, gregarious, navicular, often sinuous, large (up to 5 mm long \times 1–1.5 mm wide), developing under bark, becoming partly erumpent later, raising the bark in straight or curved ridges to expose greyish-black fungal tissue which in turn splits, to reveal a whitish cream hymenium. Asci clavate, (100)-130-(150) \times (5)-8-(10) μ m, 8-spored. Paraphyses abundant, filiform with curved tips, 1 μ m wide, longer than the asci. Ascospores filiform, fasciculate, 0-septate when young, but becoming multiseptate, (65)-90-(95) \times 1.5 μ m, pointed at one end and rounded at the other, smooth, hyaline. (Illustrated by Breitenbach & Kränzlin 1984).

Habitat: Dead twigs of *Quercus* sp.

Specimen examined: on dead twigs of *Quercus* sp., Picton Cemetery, Picton (Marlborough Sounds), 18.ii.2005, B.H.Doherty, NZFRI-M 5255.

New Zealand distribution: Marlborough Sounds (1).

The ascomata are large and conspicuous. They occur in groups and are usually arranged more or less transversely to the long axis of the twig. *Colpoma quercinum* is a common endophyte in *Quercus* spp. Ragazzi *et al.* (2003) isolated it frequently from twigs of both healthy and declining *Quercus cerris* Linnaeus, *Q. pubescens* Willdenow, and *Q. robur* Linnaeus, and Halmschlager & Kowalski (2004) found it to be occasionally present in dead (but not in live) roots of *Q. robur*. It was one of the few fungi that were consistently associated with dying twigs and branches of *Q. robur* (Kowalski 1991). *Colpoma quercinum* is considered to be a weak pathogen that can complete its life cycle as a mutualistic or neutral endophyte but may become pathogenic if the host is weakened by adverse conditions such as drought or atmospheric pollution (Kowalski 1991; Ragazzi *et al.* 2003).

TABLE 1—Morphological characteristics of *Cosmospora* sp. on *Myrsine australis* and *Cosmospora purtonii*

Species	Ascomata	Asci	Ascospores	Conidia
<i>Cosmospora</i> sp. on <i>Myrsine australis</i>	Stroma absent or thin, ascomata yellowish orange to orange, 0.3–0.4 × 0.3 mm, wall 30–60 µm	Narrowly clavate, monostichous, 70–105 × 8–10.5 µm	Ellipsoid to fusiform-ellipsoidal, 1-septate, 16–21 × 6–7 µm.	Curved fusoid, 0–1-septate, 25–40 × 3 µm
Collections of <i>Cosmospora purtonii</i> examined	Stroma thin, ascomata yellowish orange to orange, 0.3–0.4 × 0.3 mm, wall 25–50 µm	Narrowly clavate, monostichous, 50–70 × 4–9 µm	Ellipsoid to fusiform-ellipsoidal, 1-septate, 8–14 × 3–5 µm	Not examined
<i>Nectria purtonii</i> (Booth 1959, 1971)	Stroma thin, ascomata yellow to red, 0.15–0.23 mm diameter, wall 38–42 µm	Cylindrical to narrowly clavate, monostichous, 55–70 × 6–9 µm	Almost cylindrical with obtuse ends, 1-septate, 8–11 × 3.5–4.5 µm	Curved fusoid, 0–1-septate, 15–45 × 3–3.5 µm
<i>Nectria purtonii</i> (Samuels 1976)	Stroma none, ascomata yellow, becoming dark red, 0.25–0.43 × 0.25–0.38 mm, wall 25–40 µm	Cylindrical, monostichous, 50–70 × 4–7 µm	Ellipsoid to fusiform-ellipsoidal, 1-septate, 7–17 × 3–5 µm	Straight or slightly curved, 0–3-septate, 25–30 × 2–3 µm

Hysterographium fraxini (Persoon) De Notaris 1847*Giornale Botanico Italiano, Anno 2, 2(7-8): 22.*

Ascomata hysterothecial, gregarious, elliptical, resembling smiling lips, developing under bark, becoming emergent later, black, smooth, with a longitudinal slit at the top, 0.7–1.5 × 0.5 mm. Asci clavate, short stipitate, (130)-137-(150) × (23)-30-(33) μm, 8-spored. Ascospores irregularly biseriate, elliptical, muriform, with 8–10 transverse septa and 1–3 longitudinal septa in most segments, sometimes slightly constricted in the middle, (30)-36-(45) × (13)-15-(16) μm, smooth, light brown.

(Illustrated by Breitenbach & Kränzlin 1984).

Habitat: Dead twigs of *Fraxinus* spp.

Specimens examined: on twigs of *Fraxinus excelsior* Linnaeus, Timaru Boys' High School, Timaru (South Canterbury), 6.xii.2004, B.H.Doherty, NZFRI-M 5240; on twigs of *F. angustifolia* Vahl, Wakapuaka Cemetery, Nelson (Nelson), 24.xii.2004, B.H.Doherty, NZFRI-M 5249; on twigs of *Fraxinus* sp., Avalon, Lower Hutt (Wellington), 20.i.2005, I.Veljkovic, NZFRI-M 5250; on twigs of *F. ornus* Linnaeus, Branford Park, Nelson (Nelson), 10.ii.2005, NZFRI-M 5233; on twigs of *F. excelsior*, State Highway 1, Parnassus (Kaikoura), 19.iv.2005, B.H.Doherty, NZFRI-M 5274.

New Zealand distribution: Taranaki (1), Wairarapa (1), Wellington (1), Nelson (2), Marlborough Sounds (1), Marlborough (1), Kaikoura (1), North Canterbury (1), Mid Canterbury (2), South Canterbury (4).

Hysterographium fraxini is regarded as a weak pathogen, which colonises wounds in branches and is capable of spreading to living tissue if the host is weakened by unfavourable climatic or edaphic conditions (Zogg 1943; Przbyl 2002). Although it is widely distributed on *Fraxinus* spp. in New Zealand, it has not caused any noticeable damage.

Foliicolous Coelomycetes

Pestalotiopsis karstenii (Saccardo & P. Sydow) Steyaert 1949

Bulletin du Jardin Botanique de l'État à Bruxelles 19: 305.

≡ *Monochaetia karstenii* (Saccardo & P. Sydow) B. Sutton, *Canadian Journal of Botany 47: 2091, 1970* ('1969').

= *Monochaetia camelliae* Miles, *Mycologia 18: 167, 1926.*

Conidiomata acervular to pycnidial, amphigenous, gregarious or scattered, intraepidermal becoming partly erumpent, black, 0.2–0.3 mm wide, wall composed of brown to dark brown angular cells, 8–15 μm thick. Conidiogenous

cells annelidic, subcylindric to lageniform, septate, up to 30 μm long, 2–3 μm wide, hyaline. Conidia fusiform, 4-septate, straight or slightly curved, (16)-18-(25) \times (5)-7-(8) μm , bearing appendages; basal cell obconic, 3–4 μm long, hyaline and often without an appendage; when present, appendage 3–4 μm long; 3 median cells subcylindrical, light brown, concolorous; apical cell conical, hyaline, 3–4 μm long, apical appendage tubular, flexuous, single and unbranched or with 1–2 branches (usually only 1) originating close to the base, primary appendage 4–25 μm long, branches 5–8 μm long. (Illustrated by Nag Raj 1993).

Habitat: On large (up to 20 \times 10 mm), pale ash-grey, dead areas on leaves of *Banksia* sp. and *Camellia* spp.

Specimens examined: on dead areas on leaves of *Camellia* sp., Point Chevalier, Auckland (Auckland), 25.ix.1981, F.C.Smith, PDD 40904 (labelled *Monochaetia camelliae*); on dead areas on leaves of *Camellia japonica* Linnaeus, Mt. Albert, Auckland (Auckland), 12.ii.2000, C.F.Hill, PDD 71539; on dead areas on leaves of *Banksia* sp., Auckland City (Auckland), 21.i.2005, M.R.Twaddle, NZFRI-M 5289.

New Zealand distribution: Auckland (3).

Pestalotiopsis karstenii is a weak pathogen of *Camellia* spp. in Europe (Smith *et al.* 1988).

***Staninwardia breviscula* B. Sutton 1971**

Transactions of the British Mycological Society 57: 541.

Conidiomata acervular, sub-epidermal, erumpent, gregarious, numerous, roughly circular, black, 0.1–0.25 mm in diameter, basal wall formed of pale brown, smooth-walled, angular cells. Conidiogenous cells cylindrical to doliiform, 5–7 \times 3–4 μm , smooth, hyaline to pale brown. Conidia in unbranched chains of up to 3 conidia, doliiform to clavate, both ends of intercalary conidia in a chain truncate, apical conidium truncate at base and rounded at the apex, 1-septate, often constricted at the septum, (6)-8-(12.5) \times (3.5)-4-(4.5) μm , smooth to verruculose, pale brown, surrounded by a mucilaginous sheath, 1–1.5 μm thick.

(Illustrated by Sutton 1971).

Habitat: On roughly circular spots on the leaves of *Eucalyptus robusta* Smith, *E. tereticornis* Smith, and *Metrosideros excelsa* Solander ex Gaertner. On the upper surface of the leaf they are dark chocolate brown with a darker (nearly black) raised margin, up to 6 \times 4 mm, with the fruit bodies clustered in the centre. On the lower surface the spots are smaller and of

a light brown to ash-grey colour. Also on leaves of *Eucalyptus ficifolia* F.Mueller, but here the spots are angular, elongated, brown, up to 10 mm long with scattered fruit bodies.

Specimens examined: on leaves of *Metrosideros excelsa*, Houputo, Motu River mouth (Bay of Plenty), 10.vi.1988, M.A.Dick, NZFRI-M 4472; on leaves of *M. excelsa*, State Highway 2, Matata (Bay of Plenty), 6.x.1998, I.A.Hood, NZFRI-M 3893; on leaves of *Eucalyptus tereticornis*, Cornwall Park, Auckland (Auckland), 4.xii.1999, C.Barr, NZFRI-M 4063; on leaves of *E. robusta*, Cornwall Park, Auckland (Auckland), 20.ix.2002, P.M.Bradbury, NZFRI-M 4936; on leaves of *M. excelsa*, Windsor Reserve, Devonport (Auckland), 21.ix.2002, P.M.Bradbury, NZFRI-M 4850; on leaves of *M. excelsa*, Messenger Park, Greymouth (Buller), 26.v.2003, B.H.Doherty, NZFRI-M 5051; on leaves of *E. ficifolia*, Harris St. cemetery, Gisborne (Gisborne), 12.ii.2004, C.J.Kay, NZFRI-M 5149.

New Zealand distribution: Northland (1), Auckland (10), Bay of Plenty (8), Gisborne (1), Hawke's Bay (1), Taranaki (2), Wanganui (3), Wellington (11), Nelson (1), Buller (1), Dunedin (1).

Staninwardia breviuscula was first described from a single collection of leaves of an unidentified species of *Eucalyptus* from Mauritius (Sutton 1971). It is common on *M. excelsa* and *Eucalyptus* spp. in New Zealand but appears to cause little damage.

ACKNOWLEDGMENTS

We thank Judy Gardner for technical help and the Curator of PDD (Eric McKenzie) for loan of specimens. We are very grateful to Shaun Pennycook, Tod Ramsfield, and Pat Crane for their helpfully critical comments.

REFERENCES

- BOOTH, C. 1959: Studies of Pyrenomycetes: IV. Nectria (Part I). *Mycological Papers* 73.
———1971: "The Genus Fusarium". Commonwealth Mycological Institute, Kew.
- BREITENBACH, J.; KRÄNZLIN, L.F. 1984: "Fungi of Switzerland, Volume 1, Ascomycetes", Verlag Mykologia, Lucerne.
- CROSBY, T.K.; DUGDALE, J.S.; WATT, J.C. 1998: Area codes for recording specimen localities in the New Zealand subregion. *New Zealand Journal of Zoology* 25: 175–183.
- HALMSCHLAGER, E.; KOWALSKI, T. 2004: The mycobiota in nonmycorrhizal roots of healthy and declining oaks. *Canadian Journal of Botany* 82: 1446–1458.
- KOWALSKI, T. 1991: Oak decline: I. Fungi associated with various disease symptoms on overground portions of middle-aged and old oak (*Quercus robur* L.). *European Journal of Forest Pathology* 21: 136–151.

- NAG RAJ, T.R. 1993: "Coelomycetous Anamorphs with Appendage-bearing Conidia". Mycologue Publications, Waterloo.
- PRZBYL, K. 2002: Fungi associated with necrotic apical parts of *Fraxinus excelsior* shoots. *Forest Pathology* 32: 387–394.
- RAGAZZI, A.; MORICCA, S.; CAPRETTI, P.; DELLAVALLE, I.; TURCO, E. 2003: Differences in composition of endophytic mycobiota in twigs and leaves of declining *Quercus* species in Italy. *Forest Pathology* 33: 31–38.
- SAMUELS, G.J. 1976: A revision of fungi formerly classified as *Nectria*, subgenus *Hyphonectria*. *Memoirs of the New York Botanical Garden* 26: 102–104.
- SMITH, I.M.; DUNEZ, J.; PHILLIPS, D.H.; LELLIOTT, R.A.; ARCHER, S.A. 1988: "European Handbook of Plant Diseases". Blackwell, Oxford.
- SUTTON, B.C. 1971: *Staninwardia* gen. nov. (Melanconiales) on *Eucalyptus*. *Transactions of the British Mycological Society* 57: 539–542.
- ZOGG, H. 1943: Untersuchungen über die Gattung *Hysterographium* Corda, insbesondere über *Hysterographium fraxini* (Pers.) de Not. *Phytopathologische Zeitschrift* 14: 310–384.