New species and new records of biotrophic micromycetes from Australia, Fiji, New Zealand and Thailand

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The following new species of biotrophic fungi were found on leaves of various hosts and are described: *Cladosporium arthropodii*, *C. oncobae*, *Distocercospora livistonae*, *Pseudocercospora arecacearum*, *P. gunnerae*, *P. pandoreae*, *Ramularia subtilis*, *R. tenella* and *Stenella anthuriicola*. In addition, some other biotrophic fungi are recorded from Australia, Fiji and New Zealand for the first time. *Cladosporium idesiae* is reduced to synonymy with *C. herbarum* var. *macrocarpum*.

Key words: *Cladosporium*, *Distocercospora*, distribution, host range, hyphomycetes, new taxa, *Pseudocercospora*, *Ramularia*, *Stenella*, synonymy

Introduction

This paper is a continuing contribution to a better understanding of biotrophic micromycetes (e.g. Braun and Freire, 2004; Braun *et al*., 2005; Schubert and Braun, 2005) and particularly cercosporoid fungi in New Zealand and follows a series by Braun and Hill (2002, 2004), Braun and Dick (2002) and Braun *et al*. (2003b). As in the previous contributions, most new species and new records are from New Zealand, but some are based on diseased leaves intercepted at the Auckland International Airport, originating from Australia, Fiji or Thailand. Several new species of fungi are described, and some new disease records are reported. The present host range and distribution of fungi in New Zealand has been determined by reference to the papers cited above as well as Dingley (1969), Pennycook (1989) and the NZ Plant Diseases Database (http://www.landcareresearch.co.nz/databases).

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Materials and methods

Herbarium specimens and fresh collections were examined by standard light microscopy (Olympus BX 50, Hamburg, Germany). Measurements were carried out in distilled water and lactic acid using oil immersion. Colourless structures were stained by cotton blue. SEM micrographs were prepared at the Institute of Zoology, Martin-Luther-University, Halle. Specimens were coated with a thin layer of gold, using a sputter coater SCD 004 (200 seconds in an argon atmosphere of 20 mA, 30 mm distant from the electrode) and examined by a HITACHI S-2400 scanning electron microscope with integrated camera (ILFORD PLUS 125). All collections concerned are deposited at HAL (Herbarium, Martin-Luther-University, Institute of Geobotany and Botanical Garden, Halle, Germany) and some are also in PDD (Herbarium, Landcare Research, Auckland, New Zealand). Cultures of some of these species have been deposited at CBS (Centraalbureau voor Schimmelcultures, Utrecht, The Netherlands) and ICMP (International Collection of Microorganisms from Plants, Landcare Research, Auckland, New Zealand). The new species are registered in MycoBank (MB).

Results

Botryotinia sphaerosperma (P.H. Greg.) N.F. Buchw.

Anamorph: *Botrytis sphaerosperma* F.W. Buchw.

On *Allium triquetrum* Hort. ex Schrad. (*Alliaceae*, *Liliaceae s. lat.*), New Zealand, Auckland, Grey Lynn, Western Springs, 11 September 2005, C.F. Hill 1248 (PDD 83465).

Notes: New to New Zealand. This fungus was originally found on *A. triquetrum* in the Scilly Isles, UK in 1937.

Cercospora althaeina Sacc.

On *Althaea rosea* L. (*Malvaceae*), New Zealand, Auckland, Grey Lynn, Great North Road, 14 April 2005, C.F. Hill 1178 (culture at CBS 118411).

Notes: Host new to New Zealand.

Cercospora apii Fresen. *s. lat.* (*emend.* Crous & Braun 2003)

On *Archontophoenix cunninghamii* H. Wendl. & Drude (*Arecaceae*), New Zealand, Northland, Whangarei, Whangarei Heads Road, Waikaraka Nursery, 10 February 2004, H. Pearson [C.F. Hill 984].

Notes: New host.

On *Capsicum annuum* L. (*Solanaceae*), New Zealand, intercepted at Auckland International Airport (from Fiji), 17 August 2005, P. Taylor [C.F. Hill 1236] (culture at CBS 118712).

Notes: Previously recorded from Fiji, as *Cercospora capsici* (McKenzie, 1989).

On *Gunnera tinctoria* (Molina) Mirbel (*Gunneraceae*), New Zealand, Auckland, Mt. Albert, Carrington Road, UNITEC Campus, 29 February 2004, C.F. Hill 997-A.

Notes: New host.

On *Helianthus annuus* L. (*Asteraceae*), New Zealand, Auckland, Mt. Albert, Carrington Road, UNITEC Campus 14 April 2005, C.F. Hill 1172.

Notes: Host new to New Zealand.

On *Lupinus polyphyllus* Lindl. (*Fabaceae*), New Zealand, Auckland, Mt. Albert, Carrington Road, UNITEC Campus, 17 August 2005, C.F. Hill 1171 (culture at CBS 117749).

Notes: Host new to New Zealand.

Cercospora carotae (Pass.) Kazn. & Siemaszko

On *Daucus carota* L. (*Apiaceae*), New Zealand, Auckland, Mt. Albert, Carrington Road, 7 August 2005, C.F. Hill 1233 (PDD 83850).

Cercospora resedae Fuckel

On *Reseda odorata* L. (*Resedaceae*), New Zealand, Manurewa, Auckland Botanic gardens, 10 September 2005, C.F. Hill 1246.

Notes: New to New Zealand.

Cladosporium arthropodii K. Schub. & C.F. Hill, **sp. nov.** (Fig. 1 and Pl. 1)

MycoBank number: MB 500523.

Differt a *C. allii* conidiophoris semper fasciculatis, locis conidiogenis 1.5-2.5(-3.5) µm latis et 0.5-1 µm altis, conidiis (5-)7-12 µm latis.

Material examined: on *Arthropodium cirratum* A. Br. (*Anthericaceae*, *Liliaceae s. lat.*), New Zealand, Auckland, Glen Innes, University of Auckland, Tamaki Campus, 1 July 2004, C.F. Hill 1054, mixed infection with *Alternaria* sp. (HAL 1828 F; **holotype**). **Paratypes:** on *Arthropodium cirratum*, New Zealand, East Tamaki, Auckland University Campus, 4 September 2003, E.H.C. McKenzie (PDD 78376) and Little Huia, 3 December 1963, J.M. Dingley (PDD 23039).

Etymology: epithet derived from the host plant.

Leaf spots amphigenous, oval to oblong-irregular, at first visible as small, whitish, shiny discolorations, later forming larger spots, up to 30 mm long, finally confluent, covering large areas of the leaves, on the upper leaf surface whitish, whitish grey to somewhat rose-coloured, shiny, often with slightly rose- to purple-coloured, irregular discolorations in the centre of pale spots, somewhat zonate, surrounded by a narrow or broader, irregular margin or halo, yellowish brown to dark reddish brown, rarely purple or greenish, on the lower leaf surface darker, greyish to grey-green. *Caespituli* hypophyllous, scattered, effuse, loose to dense, short caespitose, olivaceous-brown to brown or even blackish. *Mycelium* internal, subcuticular; hyphae branched, 3-5(-7.5) µm wide, pale olivaceous to pale olivaceous-brown, smooth, walls unthickened or

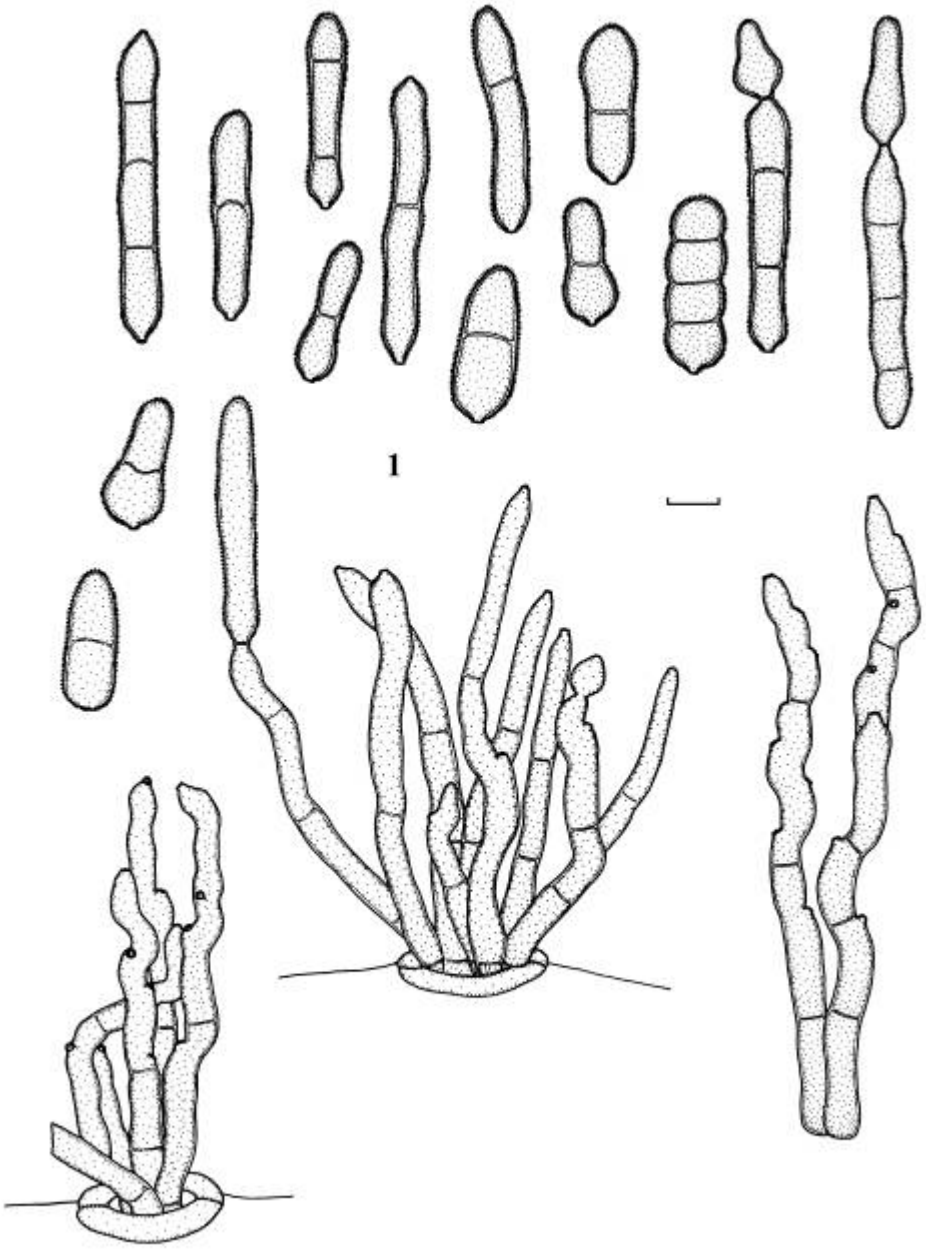


Fig. 1. *Cladosporium arthropodii* (based on type material). Conidiophore fascicles and conidia. Bar = 10 µm. K. Schubert *del*.

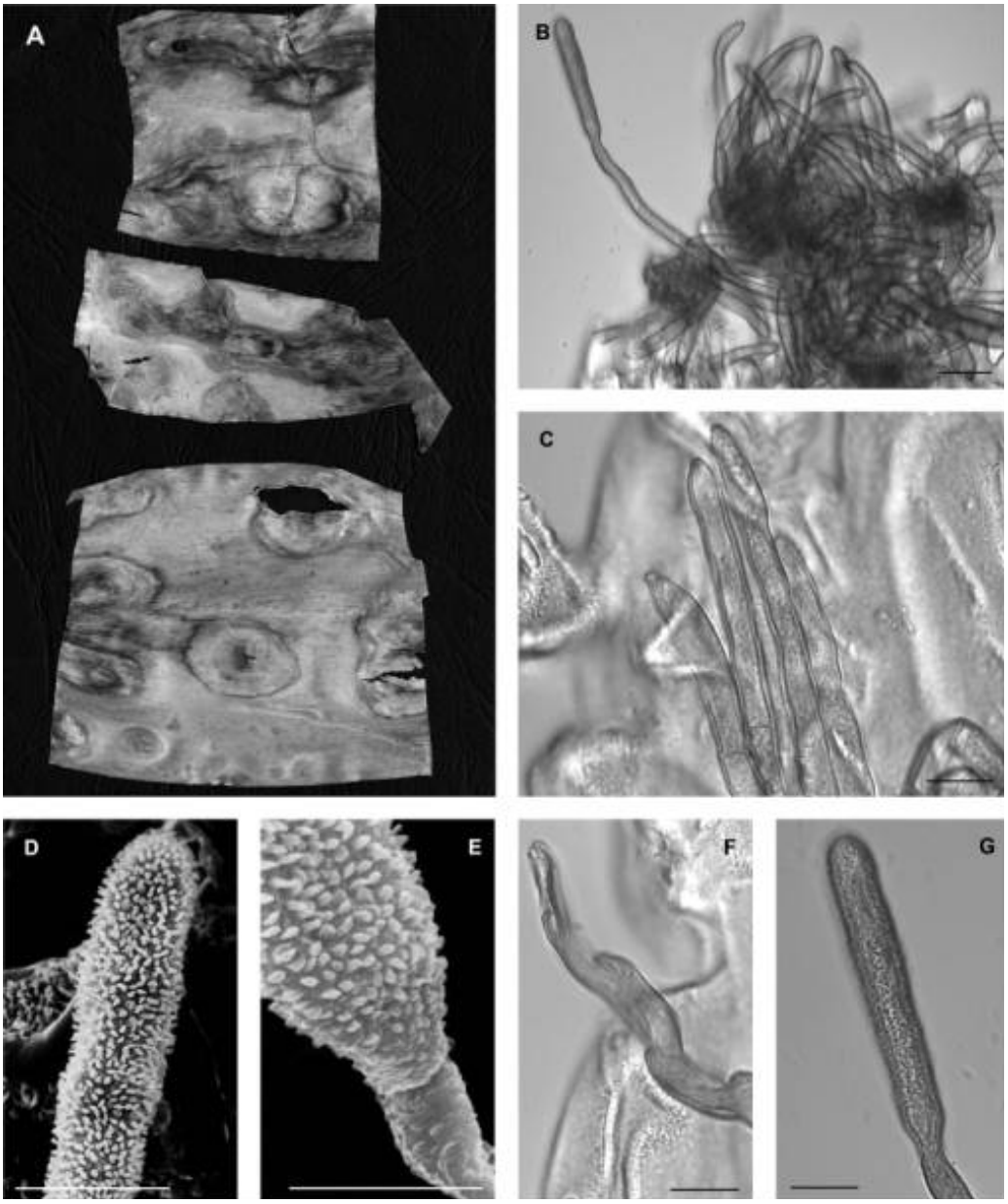


Plate 1. *Cladosporium arthropodii* (from holotype). **A.** Leaf lesions. **B.** Fascicle of conidiophores (bar = 20 µm). **C.** Conidiophores (bar = 10 µm). **D.** Conidium showing surface ornamentation (bar = 10 µm). **E.** Tip of a conidiophore with attached conidium (bar = 5 µm). **F.** Geniculate conidiophore (bar = 10 µm). **G.** Tip of a conidiophore with attached conidium (bar = 10 µm).

slightly thickened, sometimes with small swellings and constrictions, often aggregated. *Stromata* mostly substomatal, 20-50 µm diam., dense, compact, pale to medium olivaceous or olivaceous-brown. *Conidiophores* loosely to densely fasciculate, arising from stromata, usually emerging through stomata, occasionally erumpent through the cuticle, erect, straight to flexuous, cylindrical-oblong, not to somewhat geniculate-sinuous, unbranched or rarely branched, non-nodulose to subnodulose, 30-130 × (3-)4.5-8(-10) µm, 0-5-septate, not constricted at the septa, very pale olivaceous to pale brown, smooth, sometimes somewhat verruculose near the apex, walls only slightly thickened, not or only slightly attenuated towards the apex. *Conidiogenous cells* integrated, terminal and intercalary, cylindrical, 10-47 µm long, proliferation sympodial, with a single to few conidiogenous loci, often on small lateral shoulders, more or less protuberant, 1.5-2.5(-3.5) µm wide and 0.5-1 µm high, periclinal rim not distinctly raised, thickened, somewhat darkened. *Conidia* solitary or in short unbranched chains, straight to slightly curved, cylindrical-oblong, (11-)20-60 × (5-)7-12 µm, (0-)1-3(-5)-septate, not to somewhat constricted at the septa, septa not very conspicuous, pale to pale medium olivaceous-brown, echinulate (digitate under SEM), walls more or less thickened, apex usually rounded, base rounded or often somewhat attenuated, hila more or less protuberant, 1.5-2.5(-3.5) µm diam., somewhat darkened.

Notes: This new species, which causes leaf spots on the endemic host species *Arthropodium cirratum*, is morphologically very close to *C. allii* (Ellis & G. Martin) P.M. Kirk & J.G. Crompton but distinct by having conidiophores consistently formed in fascicles and narrower conidia [versus (8-)10-15(-17) µm in *C. allii*] (David, 1997). Furthermore, the periclinal rim of the conidiogenous loci of *C. allii* is distinctly elongated (*ca*. 2 µm high) giving a peg-like appearance. Attempts to grow *C. arthropodii* in culture failed. *Cladosporium allii-cepae* (Ranoj.) M.B. Ellis (David, 1997) differs from the new species in having much longer conidia, (40-)60-90(-120) µm, and *C. victorialis* (Thüm.) U. Braun & H.D. Shin (Braun and Melnik, 1997) [= *C. alliicola* H.D. Shin & U. Braun] is quite distinct by its smooth conidia.

Cladosporium oncobae K. Schub. & C.F. Hill, **sp. nov.** (Fig. 2 and Pl. 2)

MycoBank number: MB 500524.

Differt a *C. cladosporioides* et *C. uredinicola* conidiophoris crassitunicatis, interdum bistratos, conidiis brevioribus, 0-3-septatis, et a *C. myrtacearum* conidiophoris non fasciculatis, locis conidiogenis aggregatos et conidiis 0-3-septatis.

Material examined: on *Oncoba spinosa* Forssk. (*Flacourtiaceae*), New Zealand, Auckland, Princes Street, Auckland University Campus, 19 September 2004, C.F. Hill 1076 (HAL 1832 F; **holotype**).

Etymology: epithet derived from the host plant.

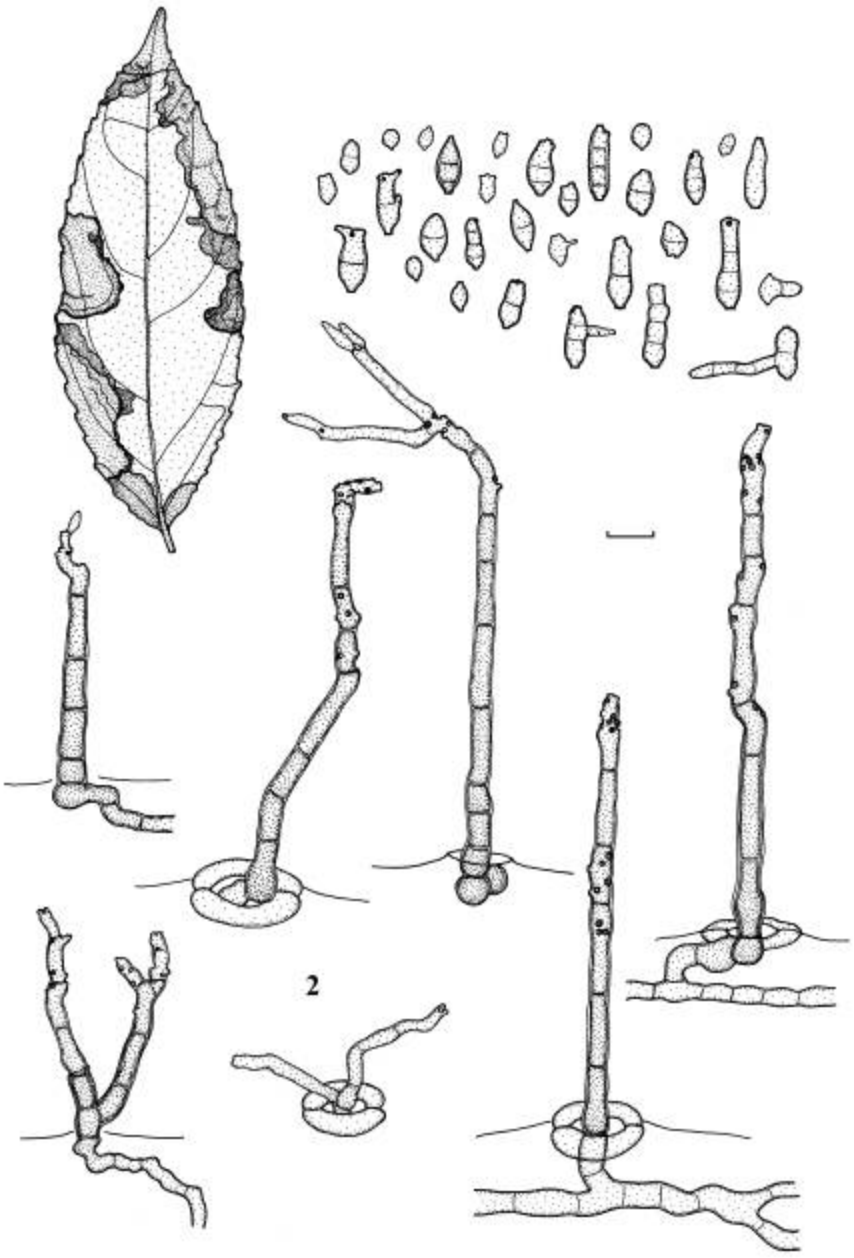


Fig. 2. *Cladosporium oncobae* (based on type material). Leaf lesions, conidiophores and conidia. Bar = 10 µm. K. Schubert *del*.

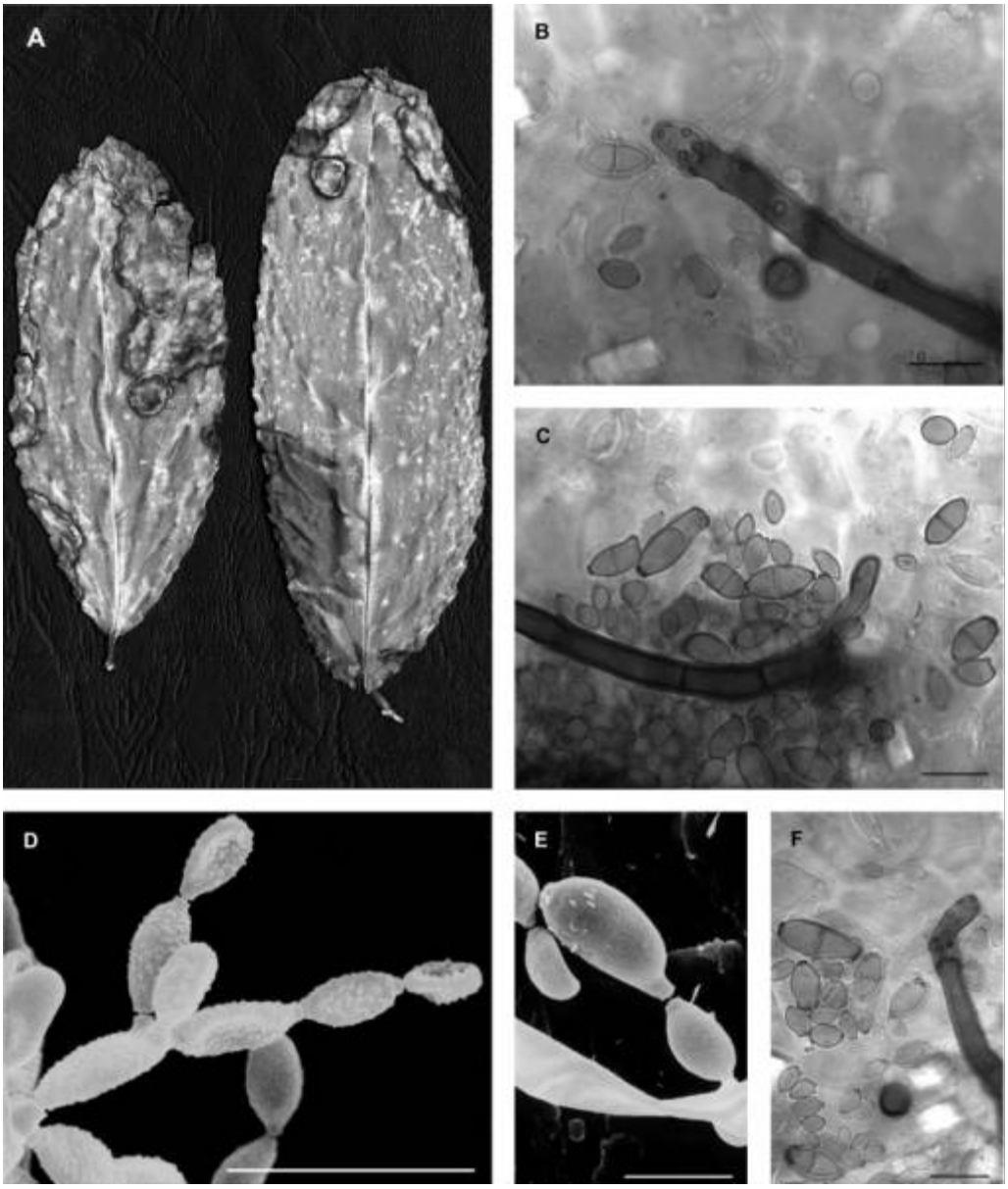


Plate 2. *Cladosporium oncobae* (from holotype). **A.** Leaf lesions. **B, F.** Tips of conidiophores with numerous, conspicuous, somewhat crowded conidiogenous loci and conidia (bar = 10 µm). **C.** Numerous conidia and base of a conidiophore with percurrent, enteroblastic proliferation and thickened, two-layered walls (bar = 10 µm). **D.** Conidial chain (bar = 10 µm). **E.** Conidiophore and conidia (bar = 5 µm).

On living leaves, causing dieback of leaf margins, leaf spots amphigenous, small to extended, irregular in shape, infections mostly starting at leaf margins, later enlarging and covering large areas of the leaf surface, pale to dark brown, sometimes somewhat zonate, at first without definite border, later with a distinct, small to wide, irregular, dark brown to purple-brown margin, often turning brittle at the leaf margins. *Caespituli* amphigenous, scattered, loosely caespitose, pale olivaceous-grey to dark olivaceous-brown. *Mycelium* internal, subcuticular, rarely external; hyphae emerging through stomata and growing superficially, creeping, loosely branched, 2-6 µm wide, septate, not to slightly constricted at the septa, often with small swellings, pale olivaceous, smooth, walls slightly thickened, forming a loose network, at the base of the conidiophores often somewhat swollen and darker, pale to medium olivaceous-brown. *Stromata* mostly absent to rarely well-developed, substomatal, 15-40 µm diam., forming dense stromatic aggregations composed of swollen hyphal cells, subglobose, 6-13 µm diam., pale to medium or dark olivaceous-brown, thick-walled. *Conidiophores* mostly solitary, rarely in pairs of two or three or in small groups, arising from swollen hyphal cells or from internal, rarely superficial, creeping hyphae, usually emerging through stomata, erect, straight to flexuous, often somewhat geniculate-sinuous, subnodulose, with small lateral shoulders or one-sided swellings, sometimes with somewhat head-like, swollen tips, unbranched or rarely branched, 15-162 × (2.5-)3-6(-7) µm, pluriseptate, pale olivaceous to medium or dark olivaceous-brown, often somewhat paler at the apex, smooth, walls thickened, often distinctly two-layered, walls (0.5-)1-2 µm thick, sometimes enteroblastically proliferating, often somewhat swollen at the base. *Conidiogenous cells* integrated, terminal and intercalary, 8-36 µm long, proliferation sympodial, somewhat geniculate-sinuous, with few to numerous conidiogenous loci, often crowded and situated on small lateral shoulders, protuberant, 0.5-2(-2.5) µm diam., thickened, more or less darkened-refractive. *Conidia* in branched chains, numerous, variable in shape, subglobose, obovoid, limoniform, narrowly to broadly ellipsoid to subcylindrical or somewhat irregular, 3-20(-25) × 2.5-6(-7) µm, 0-3-septate, occasionally constricted at the septa, pale olivaceous, smooth, very rarely somewhat rough-walled, walls thickened, often rounded at the ends, usually with a single or few apical protuberant hila, 0.5-2(-2.5) µm diam., thickened, more or less darkened-refractive; microcyclic conidiogenesis occurring.

Notes: *Cladosporium idesiae* Bres. (type: on *Idesia* sp., Germany, Berlin, Späth'sche Baumschule, October 1895, P. Sydow, B 70-6556 and Sydow, Mycotheca marchica 4498, HBG, re-examined), the only species of the genus *Cladosporium* hitherto described on a host belonging to the *Flacourtiaceae*, has to be reduced to synonymy with *C. herbarum* var. *macrocarpum* (Preuss)

M.H.M. Ho & Dugan. *Cladosporium oncobae* is morphologically comparable with *C. cladosporioides* (Fresen.) G.A. de Vries, *C. myrtacearum* K. Schub., U. Braun & R.G. Shivas and *C. uredinicola* Speg. However, *C. cladosporioides* differs from the new species in having somewhat longer and narrower, 0-1-septate conidia, usually terminal conidiogenous cells only with a single or few conidiogenous loci and conidiophores with only slightly thickened and usually one-layered walls (Ellis, 1971); in *C. myrtacearum* the conidiophores are often arranged in loose to somewhat denser fascicles, crowded conidiogenous loci are lacking, and the conidia are 0-1(-2)-septate (Braun *et al*., 2005); and in the hyperparasitic *C. uredinicola* the walls of the conidiophores are only slightly thickened, not two-layered, and the conidia are longer, 3-39 µm, 0-2(-3)-septate, without any constrictions (Heuchert *et al*., 2005). *Cladosporium alneum* Pass. ex K. Schub. (Schubert, 2005) is also morphologically closely allied to *C. oncobae*, but differs in its occurrence on an unrelated host (on *Alnus* spp.), distinct lesions and conidiophores with thinner walls [0.5-1 µm wide in *C. alneum* versus (0.5-)1-2 µm wide in *C. oncobae*]. Based on these differences, and since leaf-spotting *Cladosporium* species are generally confined to a single host genus or related hosts of a single plant family, *C. oncobae* is described as a new species.

Cultures of this fungus have been deposited at CBS (CPC 11663, 11664). The correct position of the new species in *Cladosporium* could be confirmed based on SEM micrographs, showing the characteristically coronate conidiogenous loci and conidial hila, and a rDNA ITS sequence analysis, carried out at the CBS in Utrecht, the Netherlands, in which *Cladosporium oncobae* clustered within the *Cladosporium s. str*. clade.

Dactylaria dimorpha Matsush.

On *Glomerella cingulata* (Ston.) Spauld. & H. Schrenk. [anamorph: *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc.] on *Cymbidium* sp. (*Orchidaceae*), New Zealand, Auckland, Mt. Albert, 6 October 2005, C.F. Hill 1261.

Notes: This species is new to New Zealand. It was described by Matsushima (1975: 49, Pl. 182) from Japan, isolated from *Glomerella* sp. on *Aucuba japonica* Thunb. de Hoog (1985) treated this species in his keys to *Dactylaria* species, discussed it briefly and provided an illustration. In the collection from New Zealand, this fungus could be observed *in vivo*. The colonies are confined to acervuli of *Colletotrichum gloeosporioides*. *Dactylaria dimorpha* is undoubtedly hyperparasitic. The new collection of this fungus agrees well with the original description and illustration, except for shorter conidiophores, up to 90 µm, and narrower conidia, (18-)22-28(-30) × 3.5-4.5 µm (conidiophores up to 200 µm long, conidia 5-6 µm wide, according to Matsushima, 1975). This is, however, not surprising since Matsushima´s

description was based on conidiophores and conidia formed *in vitro*, whereas the present measurements are derived from colonies *in vivo*. A *Verticicladiella* synanamorph, as described by Matsushima (1975) in culture, has not been observed *in vivo*.

Description based on the material from New Zealand: Colonies on acervuli. Mycelium immersed as well as superficial; hyphae 1.5-2 µm wide, septate, thin-walled, subhyaline to pale olivaceous, smooth. Conidiophores solitary, arising from hyphae, lateral or terminal, erect, filiform-subcylindrical, 40-90 × (2-)3-5(-6) µm, septate, subhyaline, pale olivaceous to olivaceous-brown, thin-walled, smooth; conidiogenous cells integrated, terminal, conidiogenous loci aggregated near the apex, numerous, denticulate, 1-2 µm diam. Conidia solitary, narrowly obovoid, subcylindrical, (18-)22-28(-30) × 3.5-4.5 µm, with a single median septum, hardly constricted, subhyaline, thin-walled, smooth, apex broadly rounded, base very short obconically truncate, occasionally almost peg-like, 1-1.5 µm wide.

Distocercospora livistonae U. Braun & C.F. Hill, **sp. nov.** (Fig. 3)

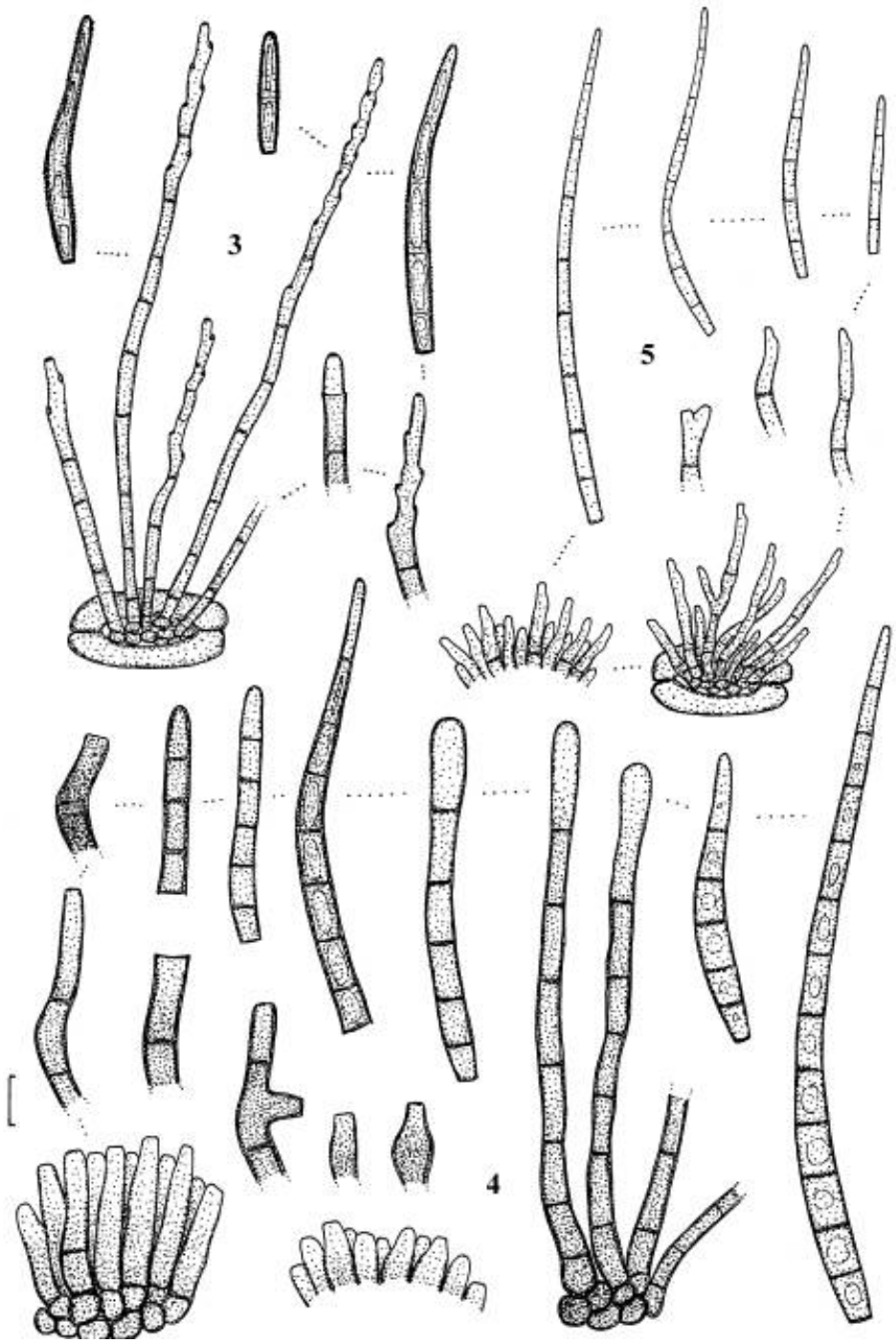
MycoBank number: MB 500525.

Differt a *D. africana* conidiophoris ad 280 µm longis, saepe valde geniculatis-sinuosis, conidiis 4-7 µm latis.

Material examined: on *Livistona chinensis* R. Br. (*Arecaceae*), New Zealand, Auckland, Manurewa, Auckland Regional Botanic Gardens, Hill Road, 10 September 2005, C.F. Hill 1247 (HAL 1875 F; **holotype**).

Etymology: epithet derived from the host plant.

Leaf spots amphigenous, subcircular to irregular, 2-15 mm wide, pale to dark brown, finally greyish brown to greyish white, margin indefinite or with a diffuse, irregular dark border. *Caespituli* hypophyllous, fine, punctiform, dark brown. *Mycelium* internal. *Stromata* lacking or small, 10-30 µm diam., brown. *Conidiophores* in small to moderately large, loose fascicles, arising from internal hyphae or stromata, emerging through stomata, erect, straight, subcylindrical-filiform, usually distinctly geniculate-sinuous, especially in the upper half, unbranched, 40-280 × 3-6 µm, septate throughout, wall somewhat thickened below, thin-walled towards the apex, pale to medium dark brown, olivaceous-brown, smooth. *Conidiogenous cells* integrated, terminal and intercalary, 10-30 µm long, proliferation sympodial, occasionally percurrent, conidiogenous loci conspicuous, somewhat thickened and darkened, 2-2.5 µm diam. *Conidia* solitary, obclavate, 20-85 × 4-7 µm, indistinctly 2-5-distoseptate, pale olivaceous, outer wall very thin, inner wall up to 2 µm wide, almost smooth to distinctly verruculose, apex obtuse or subobtuse, base short obconically truncate, 2-3 µm wide, hila somewhat thickened and darkened.



Figs. 3-5. Line drawings of conidiophore fascicles, conidiophores, conidia. **3.** *Distocercospora livistonae*. **4.** *Pseudocercospora arecacearum*. **5.** *P. gunnerae* (all based on type material). Bar = 10 µm. U. Braun *del*.

Notes: This is the third species of the genus *Distocercospora* N. Pons & B. Sutton and the first on a host belonging to the *Arecaceae*. *Distocercospora africana* Crous & U. Braun (Crous and Braun, 1994), described from South Africa on *Dioscorea sylvatica* Eckl., is morphologically similar, but differs in having usually densely fasciculate, much shorter conidiophores, 15-80 × 3-10 µm, which are non-geniculate or only slightly so. The conidia are narrower, 3-5 µm. *Distocercospora pachyderma* (Syd. & P. Syd.) N. Pons & B. Sutton, the type species known from *Dioscorea* spp., is distinct by its strongly branched conidiophores. *Cercospora palmae-amazonensis* Bat. & Cavalc. (Batista and Cavalcanti, 1964), on an unidentified palm in Brazil, seems to be similar, but has non-geniculate, much shorter conidiophores. On account of pigmented conidia, this species has to be excluded from *Cercospora* Fresen., but its taxonomy is not yet clear. Type material has been re-examined, but no trace of fructification could be found (Crous and Braun, 2003: 304). *Passalora eitenii* Medeiros and Dianese (1994), known from Brazil on the palm *Syagrus comosa* (Mart.) Mart., seems also to be close to *Distocercospora livistonae*. Distoseptation of the conidia was not described in the original paper, but the illustrations indicate its possible occurrence (Medeiros and Dianese, 1994: 511, Pl. 1, Fig. H). Percurrent proliferation is also present in *P. eitenii* (Medeiros and Dianese, 1994: 511, Pl. 1, Fig. D-E), but this species differs from *D. livistonae* by its colourless, 1(-3)-septate conidia.

Fusicladium scillae (Deighton) U. Braun & K. Schub.

≡ *Cladosporium scillae* Deighton.

On *Scilla peruviana* L. (*Hyacinthaceae*, *Liliaceae s. lat.*), New Zealand, Auckland, Manurewa, Auckland Regional Botanic Gardens, 25 April 2004, C.F. Hill 1044 (PDD 83821).

Passalora assamensis (S. Chowdhury) U. Braun & Crous

≡ *Cercospora assamensis* S. Chowdhury.

= *Phaeoramularia eupatorii-odorati* (J.M. Yen) X.J. Liu & Y.L. Guo.

On *Ageratina adenophora* (Spreng.) R. King & H. Robinson (*Asteraceae*), New Zealand, Thames, alongside path between Bela Street and Irishtown, 25 February 2004, C.F. Hill 992.

Notes: The complicated synonymy of this species has been cited in Crous and Braun (2003).

Pseudocercospora arecacearum U. Braun & C.F. Hill, **sp. nov.** (Fig. 4)

MycoBank number: MB 500526.

Differt a *P. carpentariae* et *P. roystoneae* hyphis superficialibus evolutis, stromatibus majoribus, ad 50 µm diam., conidiis non-rostratis, late cylindraceis, obclavatis, fusiformibus, subacicularibus vel subclavatis, ad 130 µm longis, ad 20-septatis.

Material examined: on *Rhopalostylis sapida* H. Wendl. & Drude (*Arecaceae*), New Zealand, Auckland, St. Johns, Morrin Road, The Atrium, 4 July 2005, C.F. Hill 1209 (HAL

1876 F; **holotype**). **Type culture:** CBS 118406. **Paratypes:** on *Howea forsteriana* Becc., New Zealand, Northland, Orewa, Hibiscus Coast Road, 18 September 2005, C.F. Hill 1249 (HAL 1880 F); *R. sapida*, New Zealand, Northland, Whangarei, Whangarei Heads Road, Waikaraka Nursery, 10 February 2004, H. Pearson [C.F. Hill 983] (HAL 1877 F); on *R. baueri* var. *cheesemanii* (Becc.) Sykes, New Zealand, Northland, Whangarei, Whangarei Heads Road, Waikaraka Nursery, 10 February 2004, H. Pearson [C.F. Hill 985] (HAL 1878 F).

Etymology: epithet derived from the host family.

Forming conspicuous lesions, leaf spots variable in shape and size, often oblong, covering large leaf segments or entire blades discoloured, necrotic, straw-coloured, yellowish, ochraceous, dingy brown, greyish brown, margin indefinite. *Mycelium* internal, occasionally with external, superficial hyphae emerging through stomata, branched, 1.5-3 µm wide, septate, pale olivaceous, thin-walled, smooth. *Stromata* substomatal, rarely intraepidermal, 10-50 µm diam., rarely confluent and larger, oblong, up to 90 µm, olivaceous-brown, occasionally somewhat erumpent, composed of swollen hyphal cells, 2-6 µm diam. *Conidiophores* in small, loose to moderately large and dense fascicles, arising from stromata, emerging through stomata, occasionally erumpent, erect, straight, subcylindrical-conic to moderately geniculate-sinuous, usually unbranched, rarely branched, long conidiophores sometimes subclavate, 5-100 × 2.6-6 µm, aseptate or sparingly septate, pale to medium olivaceous or olivaceous-brown, wall thin or only slightly thickened, smooth. *Conidiogenous cells* integrated, terminal or conidiophores reduced to conidiogenous cells, 5-40 µm long, mostly unilocal, determinate, occasionally sympodial, with two to three loci, truncate to convex, 2-4 µm wide, unthickened, not darkened. *Conidia* solitary, shape variable, broadly cylindrical, obclavate, fusiform to subacicular or subclavate, 20-130 × 3.5-7 µm, 2-20-septate, occasionally somewhat constricted at the septa, subhyaline to pale olivaceous or olivaceous-brown, thin-walled, smooth, fresh conidia with oil droplets, apex obtuse, base truncate, short to long obconically truncate, 2-5 µm wide, hila unthickened, not darkened.

Notes: *Pseudocercospora carpentariae* Deighton (1987), known from Australia on *Carpentaria acuminata* Becc., has similarly wide conidia, but differs in having very small stromata and consistently obclavate, rostrate conidia. *Pseudocercospora roystoneae* U. Braun & Crous (Braun *et al*., 2003a), described from Florida, USA, on *Roystonea regia* O.F. Cook, is also morphologically close to *P. arecacearum*, but superficial mycelium is lacking, and the conidia are obclavate-cylindrical, shorter, up to 100 µm, with up to 10 septa. Some other species of *Pseudocercospora* Speg., described from hosts belonging to the *Arecaceae*, are morphologically quite distinct. *Pseudocercospora copernicae* U. Braun & F. Freire and *P. manuensis* Matsush. (Matsushima, 1993; Braun and Freire, 2002), two South American species, are characterized by having very short conidiophores in sporodochial

conidiomata and short, narrow conidia. The Asian species *P. rhapisicola* (Tominaga) Goh & W.H. Hsieh (Hsieh and Goh, 1990) is easily distinguishable by its very narrow conidia, 2-3.5 µm wide.

Pseudocercospora crousii U. Braun & M. Dick

On *Eucalyptus* sp. (*Myrtaceae*), New Zealand, Auckland, St. John, Merton Road, 5 October 2005, C.F. Hill 1260.

Pseudocercospora gunnerae U. Braun & C.F. Hill, **sp. nov.** (Fig. 5)

MycoBank number: MB 500527.

Maculae amphigenae, versiformes, flavae vel ochraceae, interdum brunneae, margine indistincto vel per venas limitatae, aliquot atratiores. Caespituli hypophylli, punctiformes vel subeffusi, grisei vel olivaceo-grisei. Mycelium internum. Stromata substomatalia, raro intraepidermalia, 10-40 µm diam., olivaceo-brunnea, ex cellulis inflatis, 2-5 µm diam. composita. Conidiophora laxe vel dense fasciculata, pauca vel modice numerosa, ex hyphis immersis vel cellulis stromatibus oriunda, per stoma emergentia, raro erumpentia, erecta, recta, subcylindrica vel geniculata-sinuosa, non-ramosa vel raro ramosa, 10-50 × 2-4(-5) µm, 0-2(-4)-septata, pallide olivacea vel olivaceo-brunnea, tenuitunicata, levia vel sublevia. Cellulae conidiogenae integratae, terminales, 10-25 µm longae (vel conidiophora unicellulares); cicatrices conidiales inconspicuae. Conidia solitaria, saepe aciculares, interdum subcylindrica, raro anguste obclavata, 25-110 × 2-3.5(-4) µm, 3-15-septata, subhyalina vel pallide olivacea, tenuitunicata, levia vel sublevia, apice subacuto, basi truncata, 2 µm lata, hila non-incrassata, non-fuscata.

Material examined: on *Gunnera tinctoria* (Molina) Mirbel (*Gunneraceae*), New Zealand, Auckland, Mt. Albert, Carrington Road, UNITEC Campus, 29 February 2004, C.F. Hill 997-B (HAL 1881 F; **holotype**).

Etymology: epithet derived from the host plant.

Leaf spots amphigenous, shape and size variable, yellowish to ochraceous, later brown, margin indefinite or limited by somewhat darker veins. *Caespituli* hypophyllous, punctiform to subeffuse, greyish to olivaceous-grey. *Mycelium* internal. *Stromata* substomatal, rarely intraepidermal, 10-40 µm diam., olivaceous-brown, composed of slightly swollen hyphal cells, 2-5 µm diam. *Conidiophores* in small to moderately large, loose to moderately dense fascicles, arising from internal hyphae or stromata, emerging through stomata or occasionally erumpent through the cuticle, erect, straight, subcylindrical to geniculate-sinuous, unbranched or rarely branched, 10-50 × 2-4(-5) µm, 0-2(-4)-septate, pale olivaceous to olivaceous-brown, thin-walled, smooth or almost so. *Conidiogenous cells* integrated, terminal or conidiophores aseptate, reduced to conidiogenous cells, 10-25 µm long, conidiogenous loci inconspicuous. *Conidia* solitary, acicular, short conidia sometimes subcylindrical, rarely narrowly obclavate, 25-110 × 2-3.5(-4) µm, 3-15-septate, subhyaline to pale olivaceous, thin-walled, smooth or almost so, apex subacute, base truncate, 2 µm wide, hila unthickened, not darkened.

Notes: This is the first and only *Pseudocercospora* on a host of the *Gunneraceae*. There is no comparable species.

Pseudocercospora metrosideri U. Braun

On *Metrosideros collina* (J.R. Forst. & G. Forst.) A. Gray (*Myrtaceae*), New Zealand, Auckland, Grey Lynn, Great North Road, Western Springs, 10 July 2005, C.F. Hill 1213.

On *Metrosideros excelsa* Solander ex Gaertn., New Zealand, intercepted at Auckland International Airport (nursery stock imported from Australia), 21 May 2005, J. Allan [C.F. Hill 1151].

Notes: This species is new to Australia and *Metrosideros collina* is a new host species in New Zealand.

Pseudocercospora nandinae (Nagatomo) X.J. Liu & Y.L. Guo

On *Nandina domestica* Thunb. (*Berberidaceae*), New Zealand, intercepted at Auckland International Airport (nursery stock imported from Australia), 21 May 2005, J. Allan [C.F. Hill 1152] (culture at CBS 117745).

Notes: New to Australia.

Pseudocercospora pandoreae U. Braun & C.F. Hill, **sp. nov.** (Fig. 6)

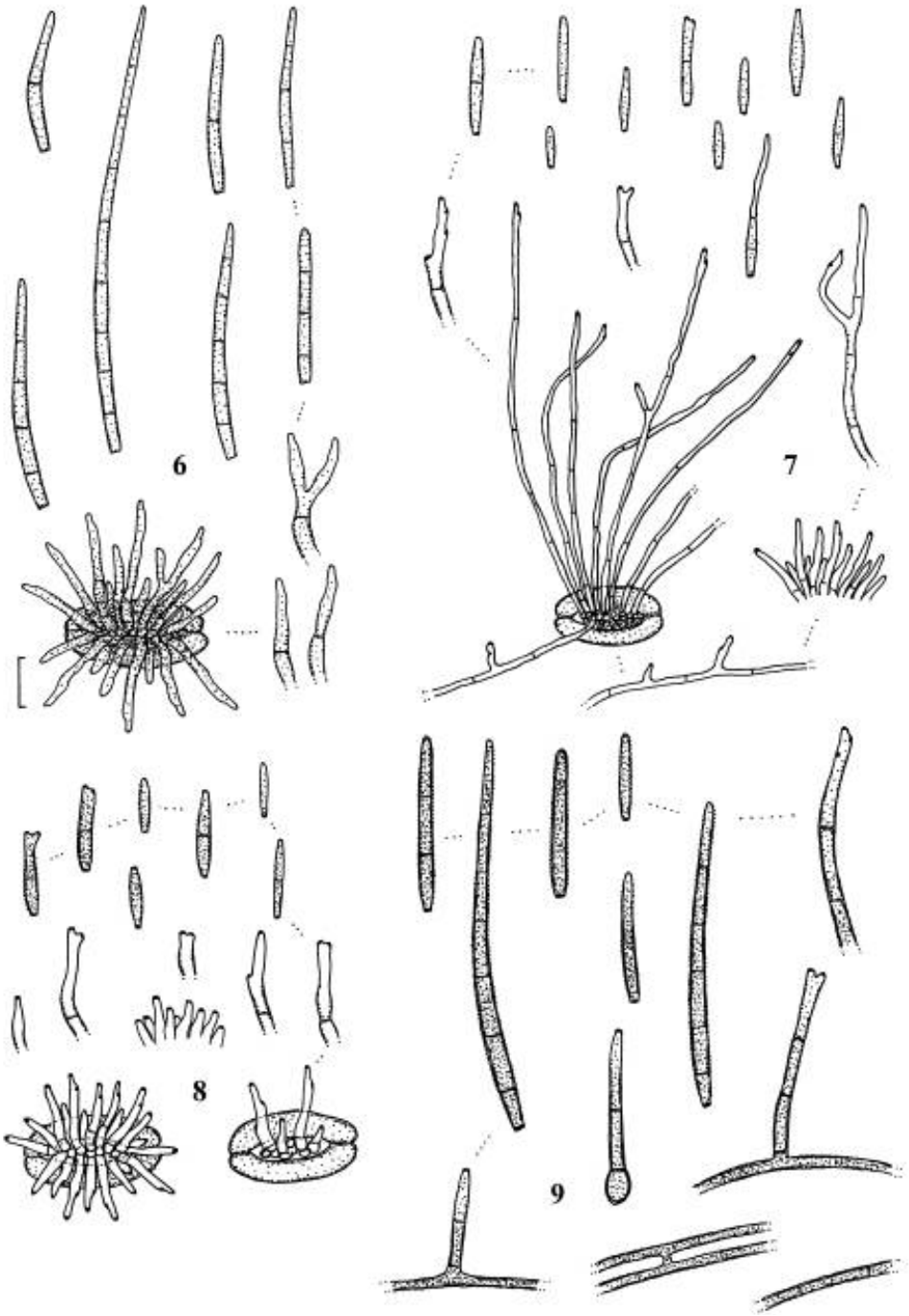
MycoBank number: MB500528.

Differt a *P. millingtoniae* et *P. pallida* lesionibus distinctis, conidiophoris longioribus, septatis, interdum ramosis.

Material examined: on *Pandorea pandorana* (Andr.) Steenis (*Bignoniaceae*), New Zealand, Auckland, Mt. Albert, Vinter Terrace, 25 April 2004, C.F. Hill 1041 (HAL 1886 F; **holotype**). Paratype: on *Pandorea pandorana*, Auckland, Mt. Albert, Carrington Road, 25 April 2004, C.F. Hill 1043 (HAL 1887 F).

Etymology: epithet derived from the host plant.

Leaf spots hypophyllous, inconspicuous, diffuse to subcircular, at first minute purple speckles, later confluent, loosely to densely aggregated, forming leaf spots, 2-8 mm wide, dingy purplish violet, margin indefinite. *Caespituli* hypophyllous, rather inconspicuous. *Mycelium* internal. *Stromata* lacking or small, 10-25 µm diam., substomatal, olivaceous to olivaceous-brown. *Conidiophores* in small to moderately large fascicles, loose to moderately dense, arising from internal hyphae or stromata, emerging through stomata, erect, straight, subcylindrical-conic to strongly geniculate-sinuous, unbranched or occasionally branched, 5-50 × 2.5-5(-6) µm, 0-3(-4)-septate, pale olivaceous to olivaceous-brown, thin-walled, smooth. *Conidiogenous cells* integrated, terminal or conidiophores reduced to conidiogenous cells, 5-20 µm long, conidiogenous loci inconspicuous, unthickened, not darkened. *Conidia* solitary, narrowly obclavate-cylindrical, 25-120 × 2.5-4 µm, 2-8-septate, subhyaline to pale olivaceous, thin-walled, smooth, apex obtuse or subacute, base short obconically truncate, 1-2 µm wide, unthickened, not darkened.



Figs. 6-9. Line drawings of conidiophore fascicles, conidiophores, conidia. **6.** *Pseudocercospora pandoreae*. **7.** *Ramularia subtilis*. **8.** *R. tenella*. **9.** *Stenella anthuriicola* (all based on type material). Bar = 10 µm. U. Braun *del*.

Notes: There are numerous species of *Pseudocercospora* on hosts belonging to the *Bignoniaceae*. *Pseudocercospora millingtoniae* Raghu Ram & Mallaiah and *P. pallida* (Ellis & Everh.) H.D. Shin & U. Braun are morphologically close to the new species, but differ in having quite distinct lesions and short, aseptate conidiophores. *Pseudocercospora dolichandrones* (Chupp) Deighton is also similar, but has distinct lesions and narrower conidia, 1.5-3 µm wide, with acute tips. Various other species on *Bignoniaceae* are clearly distinguished by their superficial hyphae with solitary conidiophores [*viz*., *Pseudocercospora brasiliensis* U. Braun & Freire, *P. catalpicola* U. Braun, *P. cybistacis* (Henn.) X.J. Liu & Y.L. Guo, *P. haplophragmatis* (Kamal & R.P. Singh) U. Braun, *P. jahnii* (Syd.) U. Braun & Crous, *P. tecomae-heterophyllae* (J.M. Yen) Y.L. Guo & X.J. Liu, *P. tecomicola* (J.M. Yen) U. Braun & Bagyan.], large stromata and sporodochial conidiomata [*viz*., *Cercospora polymera* Syd. – possibly a *Pseudocercospora*, *Pseudocercospora catalpigena* U. Braun & Crous, *P. stereospermicola* Sriskamatha & Sivan., *P. tabebuiae-roseo-albae* Inácio & Dianese and *P. zeyheriae* (Henn.) Dianese *et al*.], much wider conidia, 3-9 µm wide [*viz*., *Pseudocercospora bignoniacearum* B.K. Gupta & Kamal, *P. oroxyligena* J.M. Yen and *P. sordida* (Sacc.) Deighton] and very long conidiophores [*Pseudocercospora hansfordii* (Chupp) Deighton], respectively [Chupp, (1954), Deighton (1976), Yen and Lim (1980), Guo and Hsieh (1995), Raghu Ram and Mallaiah (1996), Inácio and Dianese (1998), Braun (1999, 2000), Braun *et al*. (2003a) and Braun and Freire (2004)].

Pseudocercospora rhabdothamni U. Braun & C.F. Hill

On *Rhabdothamnus solanderi* A. Cunn. (*Gesneriaceae*), New Zealand, Auckland, Princes Street, Auckland University Campus, 9 November 2004, C.F. Hill 935 (topotype material, distributed as U. Braun, Fungi selecti exsiccati 59).

Notes: In the original description, based on the holotype, only epiphyllous caespituli with well-developed stromata and fasciculate conidiophores were described (Braun and Hill, 2004). In the topotype material, rather inconspicuous hypophyllous colonies have been found. Thus, the description of this fungus has to be supplemented as follows: Hypophyllous colonies rather inconspicuous. Stromata lacking or almost so. Conidiophores in small, loose fascicles, emerging through stomata, and conidiophores solitary, arising from superficial hyphae, 1-2 µm wide, thin-walled, septate, pale olivaceous, smooth.

Pseudocercospora tibouchinae (Viégas) Deighton

On *Tibouchina* sp. (*Melastomataceae*), New Zealand, Auckland, Princes Street, Auckland University Campus, 9 August 2004, C.F. Hill 1061.

Notes: New to New Zealand (hitherto only known from Brazil).

Ramularia hellebori Fuckel

On *Helleborus niger* L. (*Ranunculaceae*), New Zealand, Auckland, Grey Lynn, Great North Road, 1 May 2005, C.F. Hill 1174-B (PDD 82860, culture at CBS 118408).

Notes: New host in New Zealand.

Ramularia inaequalis (Preuss) U. Braun *s. lat.*

= *Ramularia picridis* Fautrey & Roum.

= *R. picridicola* Lindr.

= *R. helminthiae* Bremer & Petr.

On *Picris echioides* L. (*Asteraceae*), New Zealand, Auckland, Mt. Albert, Taylors Road, 17 July 2005, C.F. Hill 1221.

Ramularia rubella (Bonord.) Nannf.

On *Rumex obtusifolius* L. (*Polygonaceae*), New Zealand, Auckland, Mt. Albert, Carrington Road, 7 August 2005, C.F. Hill 1231.

Ramularia spiraeae Peck

On *Spiraea japonica* L. (*Rosaceae*), New Zealand, Auckland, Grey Lynn, Great North Road, Western Springs Gardens, 4 July 2004, C.F. Hill 1056.

Notes: New to New Zealand. On the leaves, traces of *Pseudocercosporella spiraeigena* U. Braun & C.F. Hill and an *Asteromella* state (spermogonia 30-80 µm diam., spermatia bacilliform, 2-4 × 1 µm) have also been found.

Ramularia subtilis U. Braun & C.F. Hill, **sp. nov.** (Fig. 7)

MycoBank number: MB 500529.

Differt a *R. filaris* hyphis superficialibus cum conidiophoris solitariis, conidiis angustioribus, 4-18 × (1-)2-3(-3.5) µm.

Material examined: on *Ligularia clivorum* Maxim. (*Asteraceae*), New Zealand, Auckland, Grey Lynn, Great North Road, Western Springs Gardens, 6 June 2005, C.F. Hill 1193 (HAL 1882 F; **holotype**), mixed with *Alternaria cinerariae* Hori & Enjoji.

Etymology: *subtilis* = delicate (referring to the conidia).

Lesions medium to dark brown, shape and size variable, usually forming large patches, large leaf segments becoming necrotic, margin indefinite. *Caespituli* amphigenous, rather inconspicuous, greyish white. *Mycelium* internal and external; superficial hyphae sparingly branched, 1-2.5 µm wide, septate, hyaline, thin-walled, smooth to faintly rough-walled. *Stromata* lacking or only with small, loose to moderately dense substomatal hyphal aggregations, hyaline. *Conidiophores* in small to moderately large, mostly loose fascicles, arising from internal hyphae or hyphal aggregations, emerging though stomata, or solitary, arising from superficial hyphae, erect, straight, subcylindrical-

filiform to slightly geniculate-sinuous, unbranched or branched, 5-100 × 1.5-4 µm, 0-4-septate, hyaline, thin-walled, smooth. *Conidiogenous cells* integrated, terminal or conidiophores reduced to conidiogenous cells, 5-30 µm long, conidiogenous loci conspicuous, somewhat thickened and darkened, about 1 µm diam. *Conidia* catenate, occasionally in branched chains, subcylindrical-fusiform, narrowly ellipsoid-ovoid, 4-18 × (1-)2-3(-3.5) µm, 0-1-septate, hyaline, thin-walled, smooth to faintly rough-walled, ends rounded to attenuated, hila 0.5-1 µm diam., slightly thickened and darkened.

Notes: *Ramularia filaris* Fresen. var. *filaris* is morphologically allied to *Ramularia subtilis* but differs in having much wider conidia, (2.5-)3-6(-7) µm, and lacking superficial hyphae (Braun, 1998).

Ramularia tenella U. Braun & C.F. Hill, **sp. nov.** (Fig. 8)

MycoBank number: MB 500530.

Differt a *R. australis* conidiophoris ad 40 µm longis, conidiis saepe ramicatenatis, interdum cylindraceis et 1-septatis.

Material examined: on *Lupinus polyphyllus* Lindl. (*Fabaceae*), New Zealand, Auckland, Mt. Albert, Carrington Road, 17 April 2005, C.F. Hill 1171 (HAL 1883 F; **holotype**).

Etymology: *tenellus* = delicate (referring to the conidia).

Leaf spots amphigenous, subcircular to irregular, 5-10 mm wide, olivaceous, brown, greyish brown, margin indefinite. *Caespituli* hypophyllous, finely punctiform, greyish white. *Mycelium* internal. *Stromata* substomatal, 10-40 µm diam., hyaline, somewhat erumpent. *Conidiophores* in small to moderately large, loose to mostly dense fascicles, arising from stromata, emerging through stomata, erect, straight, subcylindrical-conic to geniculate-sinuous, unbranched, 5-40 × 1.5-4 µm, 0-1-septate, hyaline, thin-walled, smooth. *Conidiogenous cells* integrated, terminal or conidiophores often reduced to conidiogenous cells, 5-25 µm long, conidiogenous loci slightly thickened and darkend, 0.5-1 µm diam. *Conidia* catenate, occasionally in branched chains, subcylindrical-fusoid, narrowly ellipsoid-ovoid, 4-18 × 1.5-3 µm, 0(-1)-septate, hyaline, thin-walled, almost smooth to rough-walled, ends rounded to attenuated, hila 0.5-1 µm diam., slightly thickened and darkened.

Notes: *Ramularia australis* Sacc., only known from the type collection on *Ceratonia siliqua* L. in Italy, is the only morphologically comparable species with similar conidiophores and small, narrow conidia. However, it differs from *R. tenella* in having very short conidiophores, up to 20 µm long, and consistently fusiform, aseptate conidia, formed in simple chains (Braun, 1998).

Ramularia veronicae Fuckel

On *Veronica persica* Poir. (*Scrophulariaceae*), New Zealand, Auckland, St. John, Merton Road, 10 October 2005, C.F. Hill 1257.

Notes: New to New Zealand.

Stenella anthuriicola U. Braun & C.F. Hill, **sp. nov.** (Fig. 9)

MycoBank number: MB 500531.

Differt a *S. alocasiae*, *S. deightoniana* et *S. colocasiae* conidiis solitariis, 2-3 µm latis, stromatibus nullis, hyphis non-nodulosis, conidiophoris semper solitariis.

Material examined: on *Anthurium* sp. (*Araceae*), imported from Thailand (intercepted at Auckland International Airport, New Zealand), 3 August 2005, C.F. Hill 1235 (HAL 1870 F; **holotype**). **Type culture:** CBS 118742.

Etymology: derived from the host plant.

Isolated from sharply delineated brown lesions on leaves, up to 5 mm wide, aerial mycelium abundant, effuse. *In vitro* (prune extract agar): *Colonies* olivaceous-grey (top), olivaceous-black (bottom), with regular to slightly irregular, smooth margin. *Mycelium* effuse; hyphae sparingly branched, mostly straight, occasionally anastomosing, 1-3 µm wide, sometimes up to 5 µm (but not distinctly nodulose), septate, subhyaline to pale medium brown or olivaceous-brown, thin-walled, verruculose. Stromatic structures not observed. *Conidiophores* solitary, arising from plagiotrophous hyphae, lateral, occasionally terminal, erect, straight, neither geniculate nor sinuous, subcylindrical or slightly attenuated towards the apex, occasionally swollen at the very base, 10-60 × 2-4 µm, 0-3(-4)-septate, pale olivaceous to olivaceous-brown, often paler towards the apex, thin-walled, smooth to verruculose, especially in the lower half. *Conidiogenous cells* integrated, terminal or conidiophores reduced to conidiogenous cells, 10-30 µm long, conidiogenous loci conspicuous, 0.75-1.5 µm diam., slightly thickened and darkened. *Conidia* solitary, narrowly obclavate-cylindrical, filiform, 10-90 × 2-3 µm, 0-6-septate, subhyaline to pale olivaceous, thin-walled, verruculose, apex obtuse to subacute, base short obconically truncate, 1 µm wide, hila slightly thickened and darkened.

Notes: There are three species of *Stenella* Syd. described from hosts belonging to the *Araceae*. *Stenella deightoniana* U. Braun (≡ *S. cercestidis* (Deighton) U. Braun, *nom. illeg.*) (Braun, 2000; Braun and Crous, 2005), on *Cercestis congensis* Engl. in Sierra Leone, is easily distinguishable from *S. anthuriicola* by its much smaller, 0-1-septate, catenate conidia, 4-20 × 2-3 µm. The conidia of *Stenella alocasiae* Sarbajna & Chattopadh. and *S. colocasiae* Sarbajna & Chattopadh. (Sarbajna and Chattopadhyay, 1991) are solitary or catenate, well-developed stromata and fasciculate conidiophores are formed, and the hyphae in the latter species are distinctly nodulose. Stromata,

conidiophore fascicles and nodulose hyphae have not been observed in *Stenella anthuriicola*, neither *in vivo* nor *in vitro*.

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