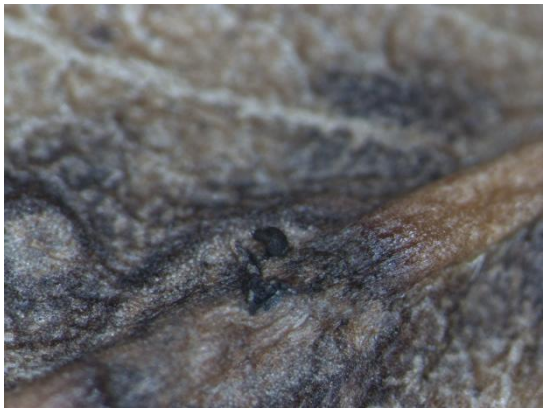
Ascomycete fungi, Cook Islands

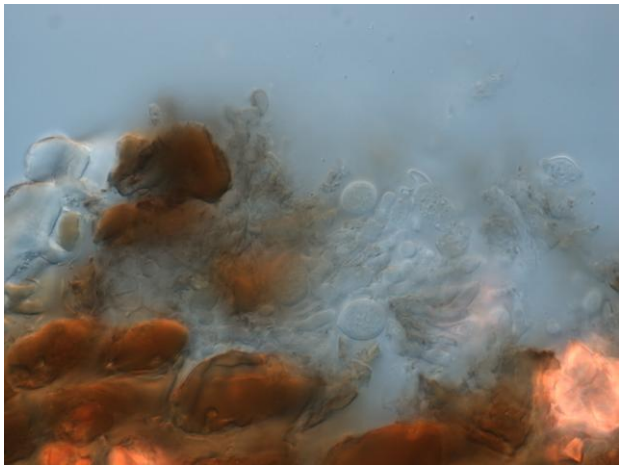
P.R. Johnston, Landcare Research, 2011

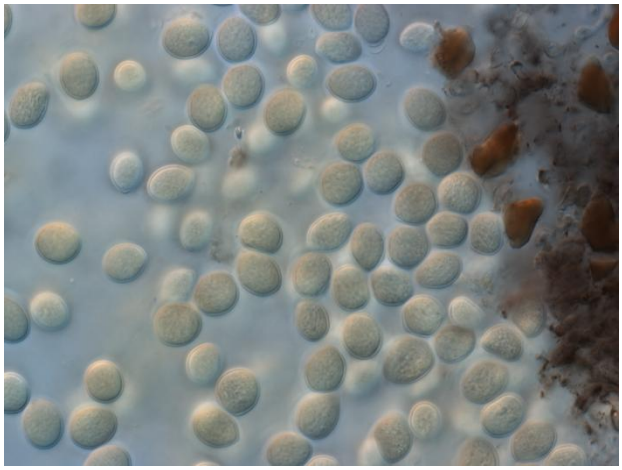
The fungi treated here are those collected from Rarotonga during two vists in 2005, supported by the Cook Island Natural Heritage Commission and Landcare Research. Brief descriptions and notes are provided for fungi associated with leaf spotting symptoms and those on fallen wood with macroscopically obvious fruiting bodies. Collections of smaller fungi, such as the leaf inhabiting cup fungi, of which there were perhaps 19 species collected during the visits in 2005, remain to be treated. A few other fungi were collected, including Hypocreales (Nectria-like species), and endophytes cultured from the living leaves of rata.

Ascomycete leaf spotting fungi

***Cryptosporiopsis* sp. "rata"**



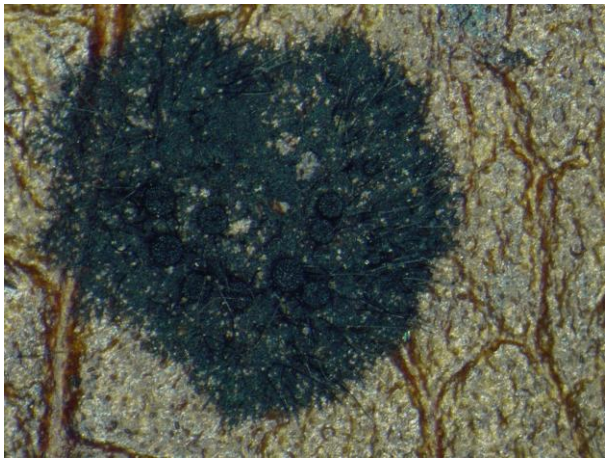




Spots on living leaves round, pale centre, broad red margin, acervuli within the spots small, dark walled at the base, the covering host tissue tearing to release hyaline conidia, conidial mass darkening when dry. This appears to be an undescribed species, with distinctively shaped spores.

Specimen: PDD 102015, RR546, on *Metrosideros collina*, Raearu summit track.

***Meliola* sp. "rata"**



Forms black colonies about 1.5-4 mm diam. on living leaves, flat plate of black hyphae against cuticle with black setae and superficial, black, globose perithecia; ascospores dark brown, 4-septate, constricted at septa, about 50-55 x 15-20 µm. This is probably an undescribed species, no species of *Meliola* have been reported from *Metrosideros*.

Specimen examined: PDD 102035, RR638, on *Metrosideros collina*, Ikurangi.

Meliolina cookii S. Hughes, Mycological Papers166: 59 (1993).

Spots on upper surface of living leaves with dense black hyphal mat, with small, black, globose periethicia in some of the spots, lower surface of leaf chlorotic leaf below the hypae. Endemic to the Cook Islands.

Specimens examined: PDD 102036, RR303, on *Metrosideros collina*, Ikurangi. PDD 102037, RR342, on *Metrosideros collina*, Raemaru. PDD xxxxx, RR359, on *Metrosideros collina*, Te Kou. PDD 82312, RR573, on *Metrosideros collina*, Te Rua Manga. PDD 102039, RR574, on *Metrosideros collina*, Te Rua Manga. PDD 102014, RR637, on *Metrosideros collina*, Ikurangi.

Pseudocercospora melastomobia (W. Yamam.) Deighton, Transactions of the British Mycological Society 88: 388 (1987).

Spots on living leaves, smallish pale brown with red edge, tiny black fruiting bodies within the pale parts of the spots.

Specimens examined: PDD 102044, RR364, on *Melastoma denticulatum*, Te Kou summit track. PDD 102045, RR396, on *Melastoma denticulatum*, Te Manga track.

Pseudocercospora metrosideri U. Braun, Fungal Diversity 8: 44 (2001).

First described from New Zealand from *Metrosideros excelsa* and *M. parkinsonii*. The two Cook Island collections referred to this species both have typical conidia for this fungus, but are associated with rather different symptoms. Although the symptom of distinct, round, pale spots does not match the description of this fungus well, there are specimens from New Zealand identified by Braun *as P. metrosideri* that look very similar.

Specimens examined: PDD 102046, RR304, on *Metrosideros collina*, Ikurangi. PDD 102047, RR305, on *Metrosideros collina*, Ikurangi.

Ascomycete fungi on fallen wood

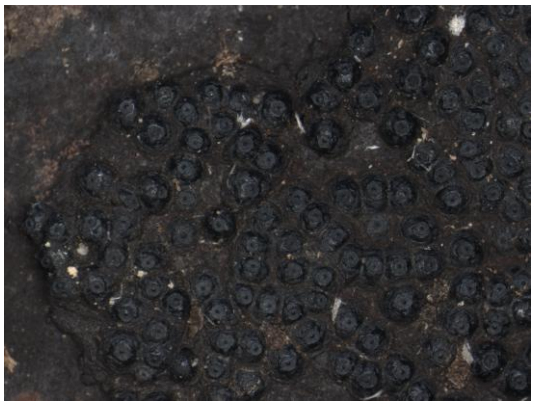
Xylariaceae

The majority of the macroscopically obvious species belong in the family Xylariaceae, most of which are found fruiting on fallen wood. Most genera have hard, dark stromatic fruiting bodies that contain numerous individual perithecia, the openings of these visible as tiny dots on the surface of the fruiting body. A few genera such as *Rosellinia* and some *Nemania* spp. have uniperitheciate fruiting bodies but with these often develop in close groups. Most species have brown to dark brown ascospores with a germ slit. Genera are distinguished by differences in the macroscopic fruit body appearance and by microscopic features associated with the anamtomy of the fruiting body, ascus apex structure, and ascospores.

Annulohypoxylon

Annulohypoxylon species have thin, extensive, crust-like fruiting bodies containing of a single layer of numerous perithecia, the individual perithecia often visible as small lumps across the surface of the fruiting body. The ostioles are characteristically surrounded by a small flattened area (the annulate disc).

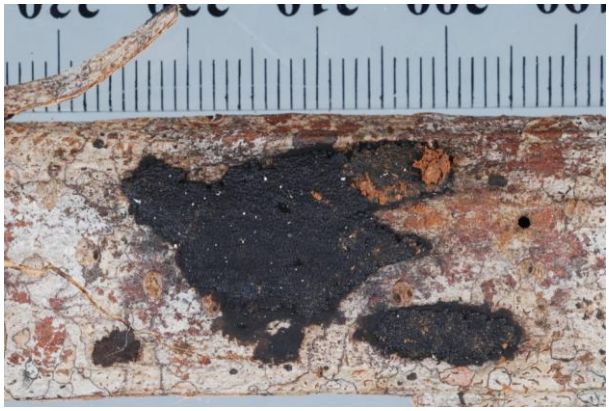
Annulohypoxylon ? moriforme (Henn.) Y.M. Ju, J.D. Rogers & H.M. Hsieh, Mycologia 97: 859 (2005).

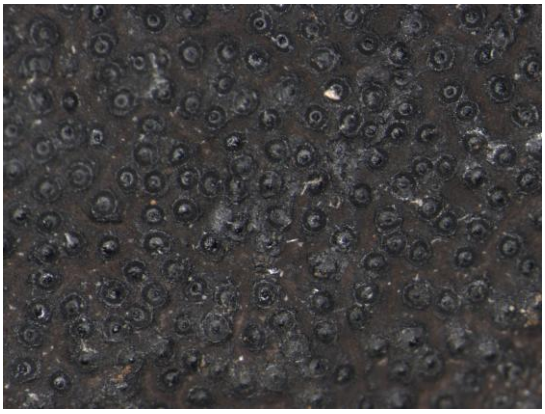


A. moriforme is widespread in tropical regions. The fruiting bodies form extensive, thin sheets across the surface of the host substrate, the tissue between the perithecial mounds reddish or red-brown. Ascospores about 7-9.5 x 3-3.5 µm, flattened on one side, germ slit on curved side of spore. The Cook Island specimen matches *A. moriforme* in most aspects, but has blackish pigment diffusing into KOH whereas *H. moriforme* has been described as having dark green diffusible pigments.

Specimen examined: PDD 102004, RR445, cross island walk, northern end.

Annulohypoxylon stygium (Lév.) Y.M. Ju, J.D. Rogers & H.M. Hsieh, Mycologia 97: 861 (2005).





A. stygium is a common and widespread tropical species. Macroscopically similar to *A. moriforme*, ascospores are smaller (5-6.5 x 2-2.5 µm) and have the germ slit on the flattened side of the spore.

Specimens examined: PDD 102010, RR538, on *Albizzia* sp., track to Raemaru. PDD 102009, RR344, on *Albizzia* sp., track to Raemaru. PDD 102008, RR309, near start of track to Ikurangi.

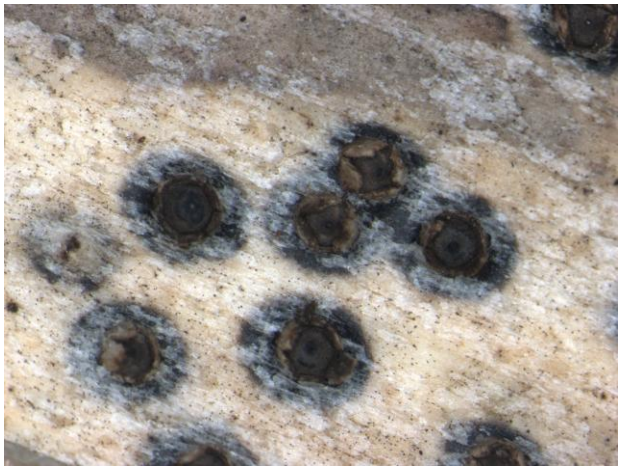
Biscogniauxia uniapiculata (Penz. & Sacc.) Whalley & Læssøe, in Whalley, Laessøe & Kile,

Mycological Research 94: 239 (1990).

Biscogniauxia species characteristically have extensive, flat fruiting bodies of this genus become erumpent from beneath host bark as they mature, and some host tissue remains overlapping the edges of the mature fruiting body. The fruiting bodies have a single layer of numerous perithecia opening through small, round ostioles, and almost no internal sterile tissue. These species often fruit on recently fallen wood, where they are likely to have been living as endophytes within the bark of the living tree. *B. uniapiculata* has ascospores with a small, hyaline cell at one end of the otherwise dark brown spore, the pale of the spore sometimes lost and then spore appearing truncate at one end. Its is common and widespread in tropical regions.

Specimen examined: PDD 102011, RR413, Turangi Stream track.

***Collodiscula* sp. "coconut"**



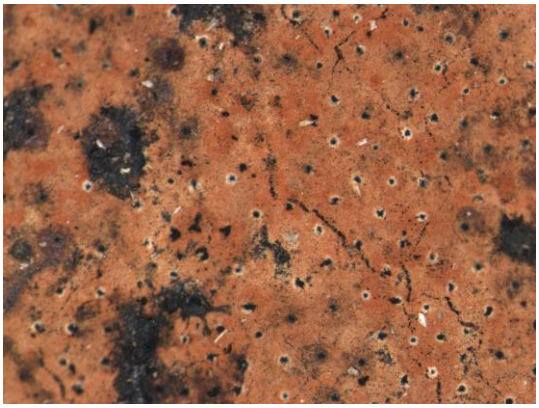

Collodiscula has unipertheciate fruiting bodies, the large, dark walled, globose perithecium erumpent from deep within the host, with the covering host tissue folding back to remain as a star-like margin. Unusual for Xylariaceae, it has 2-celled spores with both cells being of similar size and dark brown. A single species from bamboo has been described in the genus. The Cook Island specimens from coconut fronds probably represent an undescribed species, with spores larger than that described for the bamboo inhabiting species, *C. japonica*.

Specimens examined: PDD 102013, RR322, on fallen coconut frond, southern start to cross island walk. PDD 102014, RR549, on fallen coconut frond, track to Raemaru.

Hypoxylon

Hypoxylon species have thin, extensive, crust-like fruiting bodies containing of a single layer of numerous perithecia, the individual perithecia often visible as small lumps across the surface of the fruiting body.

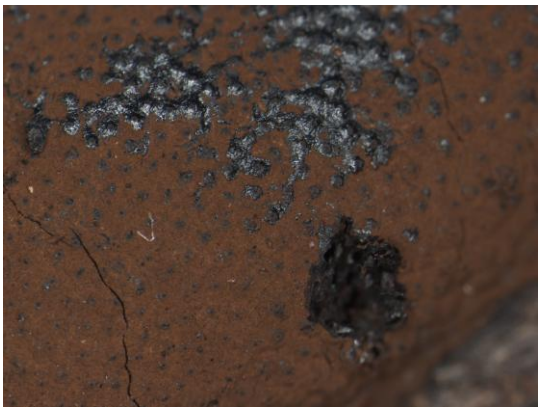
Hypoxylon cinnabarinum (Henn.) Y.M. Ju & J.D. Rogers, Mycological Memoirs 20: 99 (1996).

Common in tropical regions, the fruiting bodies are distinctively apricot-coloured. Ascospores 11-13.5 x 5-6.5 µm.

Specimen examined: PDD 102017, RR343, track to Raemaru.

Hypoxylon haematostroma Mont., in Sagra, Historia física, polirica y nayturál de la islea de Cuba 9: 344 (1845).

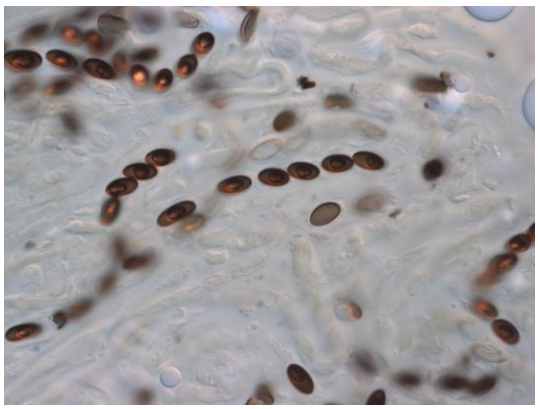
Common in tropical regions, the surface of the fruiting bodies are bright rusty-brown in colour. Ascospores larger then H. cinnabarinum, 14.5-16.5 x 7.5-8 µm.

Specimen examined: PDD 102018, RR555, track to Raemaru.

***Hypoxylon* — unidentified species**

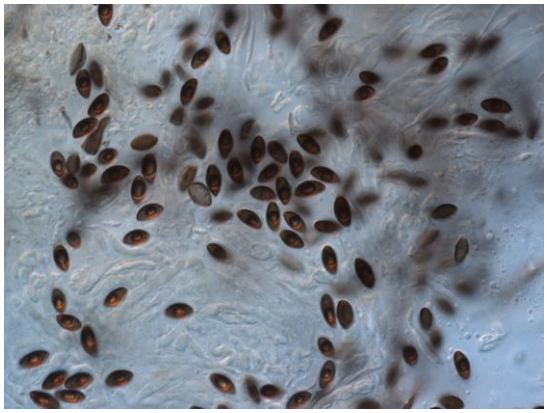
Specimens that appear to represent four morphologically distinct *Hypoxylon* spp. were collected, none of which could be reliably matched to a species using available keys.

***Hypoxylon* sp. PDD 102021, RR542,** track to Raemaru.

Fruiting body red-brown, no pigments in KOH; ascospores about 10-11 x 4.5-5.5 µm, pale brown, symmetrical, ends broadly rounded, spore-length germ slit; amyloid pore in ascus about 1 µm high.

***Hypoxylon* sp. PDD 102020, RR545**, track to Raemaru

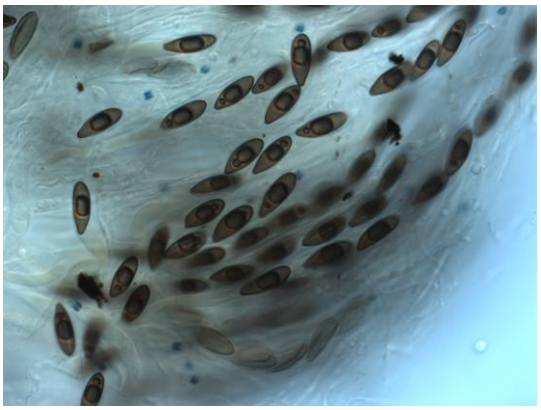



Fruiting body purplish, deep yellow-brown pigments in KOH; ascospores about 7.5-8.5 x 4-4.5 µm, more or less symmetrical to slightly flattened one side, taper to narrow rounded ends, germ slit spore-length, straight.

***Hypoxylon* sp. PDD 102019, RR346**, track to Raemaru


. Fruiting body comprising small groups of perithecia, grey-brown when immature, strong yellow-brown pigment in KOH; ascospores 10.5-13 x 4.5-6 µm, dark brown, flat one side, slightly curved, taper to small rounded ends, germ-lit straight, a little less than spore length; amyloid ring at ascus apex less than 1 µm high.

***Hypoxylon* sp. PDD 102022, RR575**, Te Rua Manga.

Fruiting body comprising small groups of perithecia, no pigment in KOH; ascospores about 12.5-14 x 4.5-5.5 µm, pale brown, distinctly more tapered to one end than the other, germ slit striaght, slitghtly less than spore length; amyloid ring at ascus apex 3 µm high.

Kretzschmaria

Four species of *Kretzschmaria* were found. The genus is characterised by the fruiting bodies being hollow when mature. In early stages the internal tissue, if present, is white. *Xylaria* also has white tissue internally, but in that genus the tissue is much more dense in structure and is persistent. There are two macroscopically distinct groups within Kretzschmaria, one with fruiting bodies made up of large numbers of small, gregarious stromata on short stalk-like bases, the other with large, spreading fruiting bodies often with a very irregular surface.

***Kretzschmaria clavus* (**Fr.) Sacc.*, Sylloge Fungorum* 2: XXIX (1883).


A common, widespread tropical species. Large numbers of small, broadly stalked stromata gathered into large crusts. The right hand image shows the hollow inside, with individual perithecia hanging down into the space from the stromatal crust. Ascospores about 26-40 x 7.5-10.5 µm with a straight, spore-length germ slit.

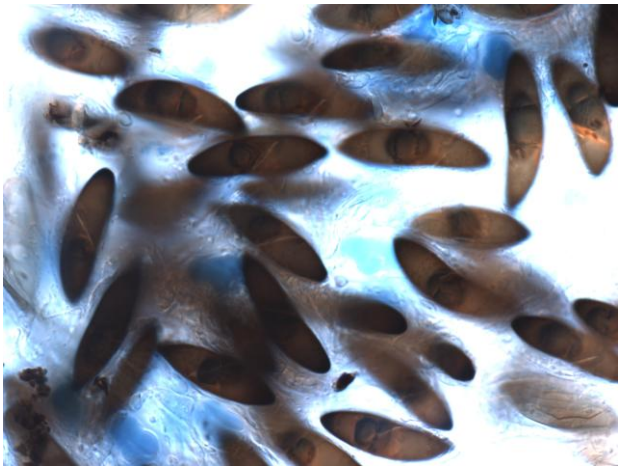
Specimens examined: PDD 102023, RR535, Raemaru. PDD 102024, RR608, Te Rua Manga.

Kretzschmaria pavimentosa (Ces.) P.M.D. Martin, Journal of South African Botany 42: 74 (1976).

A common, widespread tropical species with broad, spreading fruiting body, very uneven on the surface. Ascospores about 35-50 x 7.5-12 µm with a short, straight germ slit.

Specimens examined: PDD 102029, RR583, Te Rua Manga. PDD 102025, RR60, Takitumu Conservation Area. PDD 102026, RR72, Takitumu Conservation Area. PDD 102027, RR398, Te Rua Manga.

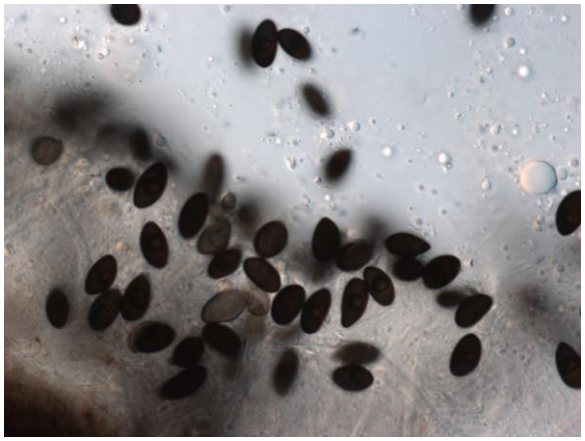
***Kretzschmaria* sp. "helico"**



Kretzschmarioid fruiting body about 1.5-3 mm diam., containing a small number of perithecia, surface distinctively cracked. Developing in gregarious groups on surafce of slightly blackened wood, and sometimes forming extensive crusts. Internally initially with some white tissue, this perhaps lost with age. Spores with a distinctive helical germ slit. Could not be identified from available keys to *Kretzschmaria*.

Specimens examined: PDD 102031, RR579, Te Manga Rua. PDD 102030, RR607, Te Manga Rua.

***Kretzschmaria* sp. "small spore"**



Fruiting bodies 5-8 mm diam, raised 3 mm above surface of wood. Internally the fruiting body has a small amount of loose, white tissue but is mostly hollow. The spores are very small for *Kretzschmaria*, 10.5-12 x 6-7 µm. The species could not be identified using available keys.

Specimens examined: PDD 102032, RR347, Raemaru. PDD 102033, RR412, Turangi Stream. PDD 102034, RR478, Avana water intake.

Rosellinia

Fruiting bodies comprising a single perithecium, but often closely crowded together and when young often collectively surrounded by fungal mycelium. Three species were found, but a lack of a modern monograph of tropical species meant none were identified to species level.

***Rosellinia* sp. "red-brown"**

Characteristically with deep red-brown pigments in the lower part of the perithecia. All specimens overmature, with very few spores seen.

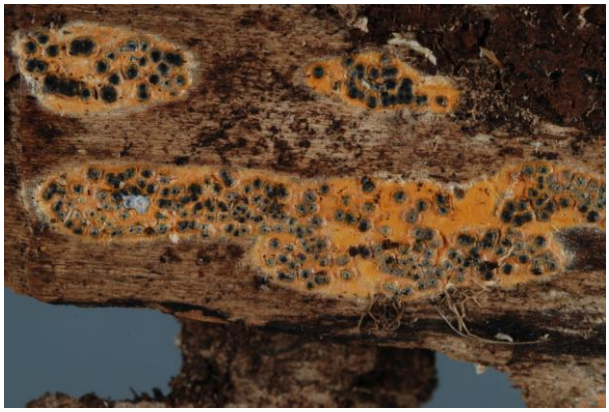
Specimens examined: PDD 102049, RR404, Te Manga. PDD 102050, RR652, start of track to Te Manga. PDD 102048, RR55, Takitumu Conservation Area.

***Rosellinia* sp. "white"**


Perithecia about 0.8 mm diam., becoming slightly wider towards the base, base partly immersed in host substrate, sparse patches of white hyphae at the base of some perithecia, ascospores about 11.5-14 x 6.5-7.5 µm, dark brown, more or less symmetrical, taper to narrow rounded ends germ slit straight, spore-length; amyloid ring at ascus apex 2-2.5 µm high.

Specimens examined: PDD 102054, RR581, on *Hibiscus* wood, northern end of cross island walk. PDD 102052, RR360. track to Te Kou. PDD 102051, RR302, near start of track to Ikurangi. PDD 102053, RR434, *Barringtonia* remnant, on coast between Avarua and Matavera.

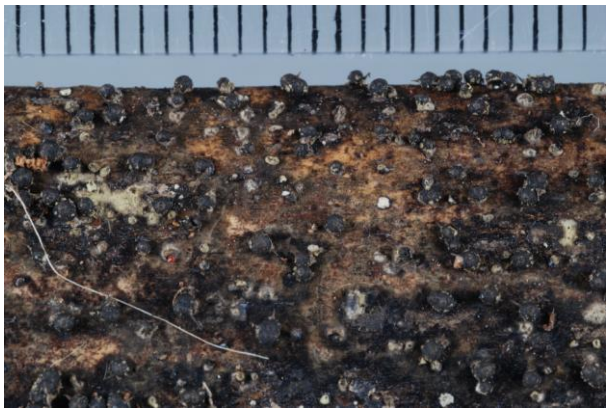
***Rosellinia* sp. "yellow"**




Perithecia about 0.7 mm diam., surrounded by bright yellow, often dense hyphae, as perithecia age hyphae becomes less dense and starts to lose yellow pigment. Ascospores 8.5-10.5 x 4-5.5 µm, symmetrical, ends rounded, germ slit straight, spore-length; amyloid ring at ascus apex 1µm high.

Specimens examined: PDD 102056, RR580, Te Rua Manga. PDD 101075, RR432, *Barringtonia* remnant, on coast between Avarua and Matavera.

Stilbohypoxylon moelleri Henn., Hedwigia 41: 16 (1902).




Stilbohypoxylon is characterised by the anamorph forming large, pointed, spine-like structures on the outside of the solitary perithecia. *S. moelleri* has perithecia about 0.8-1 mm diam., common in tropical America.

Specimen examined: PDD 102057, RR605, on coconut frond, northern end of the cross island walk.

Xylaria

Xylaria species have upright fruiting bodies with multiple perithecia on the outer margin, the centre of the fruiting body has copious, persistent white sterile tissue. Species are distinguished by the macroscopic shape of the fruiting body, the appearance of the surface of the fruiting body (whether cracked or not), ascospore shape and size, and shape of the germ slit on the ascospores.

Xylaria cf. apiculata

Xylaria apiculata has narrow-cylindric stromata with a characteristic short, pointed sterile tip. There are several macroscopically similar species that differ slightly in ascospore size. Two *X. apiculata*-like species were collected in the Cook Islands, neither of which could be confidently matched to a species.

***Xylaria* sp. "*apiculata leopard*"**


Fruit bodies about 15 mm tall, with small pale patches scattered across the otherwise black fruiting body; ascospores 9-10.5 x 3.5-4.5 µm, flat on one side, slightly curved, narrow rounded ends, germ slit on flat side of spore, straight, slightly less than spore length.

Specimen examined: PDD 102075, RR547, track to Raemaru.

***Xylaria* sp. "*apiculata spiral*"**

Fruiting bodies about 15 mm tall, uniformly blackish, the sterile tips often branched; ascospores 19.5-23 x 6-7.5 µm, flat one side, slightly curved, short germ slit somwhat less than spore length, oblique to spiralled.

Specimens examined: PDD 102077, RR307, track to Ikurangi. PDD 102076, RR89, Takitumu Conservation Area. PDD 102078, RR372, track to Te Kou.

Xylaria cubensis (Mont.) Fr., Nova Acta R. Soc. Scient. upsal., Ser. 3 1: 126 (1851).

A common and widespread tropical species characterised in part by the fruiting bodies of the asexual state being highly and irregularly branched, white, up to about 8 mm high. The mature form of the sexual fruiting body is regularly cylindrical, about 20-40 x 4-8 mm. In the Cook Islands both forms were often found together on the same piece of wood. The ascospores about 8.5-10 x 4-4.5 µm, with no obvious germ slit.

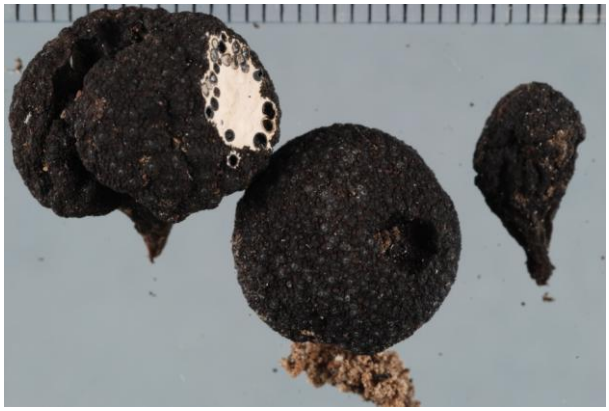
Specimens examined: PDD 102061, RR408, Turangi Stream track. PDD 102062, RR410, Turangi Stream track. PDD 102063, RR425, Turangi Stream track. RR595, Te Manga. PDD 102064, RR451, northern end of cross island walk.

Xylaria* cf. *filiformis

Xylaria filiformis has very narrow, hair-like fruiting bodies, the perithecia forming small lumps in the fertile parts. The fruiting bodies typically develop on fallen leaves, rather than wood. There are several species with similar shaped fruiting bodies, but the group is poorly understood taxonomically. The single Cook Island specimen was immature — perithecia had formed but contained no mature ascospores.

Specimen examined: PDD 102060, RR624, Ikurangi.

Xylaria schweinitzii Berk. & M.A. Curtis, Journal of the Academy of natural Sciences Philadelphia 2: 284 (1853).



A common and widespread tropical species with a stroma extremely variable in shape. Often a wide variety of shapes is present within a single collection. The ascospores characteristically have a short, oblique or somewhat coiling germ slit.

Specimens examined: PDD 102071, RR453, northern end of cross island walk. RR156, southern end of cross island walk. PDD 102070, RR362 and RR363, start of track to Te Kou. PDD 102072, RR456 and RR457, Avana water intake. PDD 102080, RR6, RR11, RR21, RR50, and RR51, Takitumu Conservation Area.

***Xylaria* sp. "leopard"**

Fruit body about 15-30 x 7-10 mm, broad-cylindric, surface with distinct small pale patches; ascospores 9-10.5 x 3.5-4.5 µm, flat one side, slightly curved, narrow rounded ends, germ slit on flattened side, somewhat less than spore length; amyloid pore at ascus apex 2 µm high. Microscopically similar to *X*. sp. "*apiculata leopard*" but fruit bodies much larger.

Specimen examined: PDD 102079, RR539, near start of Raemaru track.

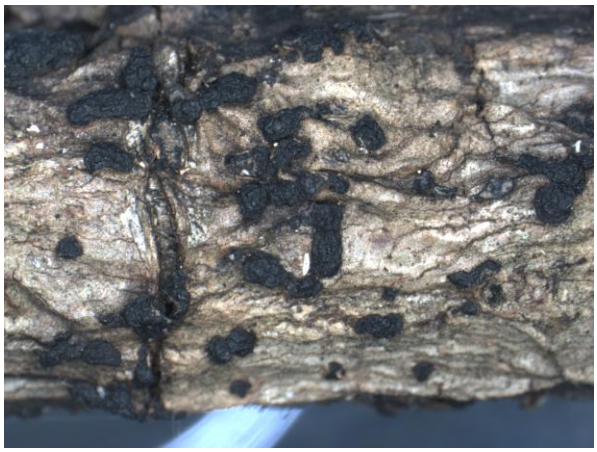
***Xylariaceae* sp.**

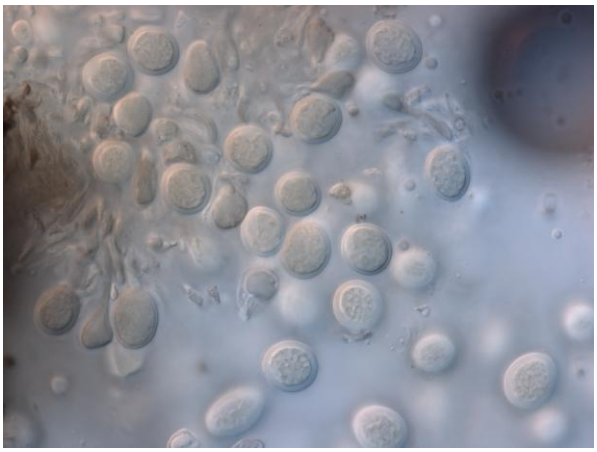
A single specimen that cannot be confidently placed in a genus. The large, cylindric fruit body, up to 6 cm tall, is hollow inside or with loose, dark sterile tissue, numerous, small, round perithecia at margins. Ascospores about 11-12.5 x 4-4.5 µm, flat one side, slightly curved, germ slit spore-length, straight, on flattened side od spore. Asci not seen.

Specimen examined: PDD 102080, RR6, Takitumu Conservation Area.

Non-xylariaceous wood inhabiting species

***Cytosphaera* sp.**

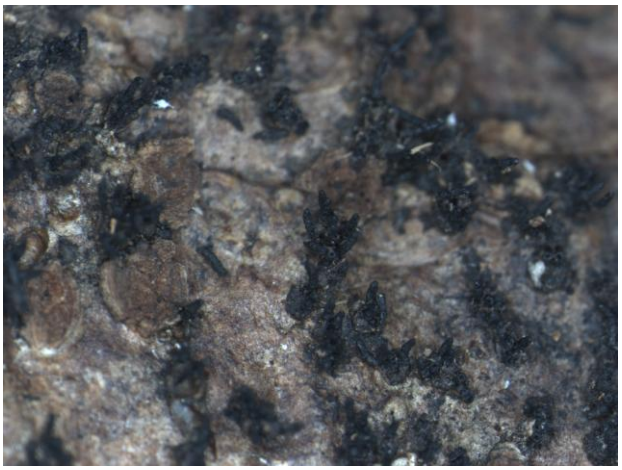




An asexual coelomycete fungus. The fruiting body about 1-1.5 mm diam., sometimes in confluent groups. The globose spores are about 13-15 µm diam., hyaline and thick-walled. The species remains unidentified in this taxonomically poorly understood genus.

Specimen examined: PDD 102016, RR566, on fallen *Barringtonia* twigs, *Barringtonia* remnant, on coast between Avarua and Matavera.

***Valsa* sp.**



Perithecia deeply immersed in woody host , the ostioles with about 1 mm long, thin, erumpent necks; ascospores about 4.5-5.5 x 1.5 µm, pale brown, sausage-shaped. The genus is poorly understood taxonomically, and lack of a modern monograph meant the species was not able to be identified.

Specimen examined: PDD 102058, RR560, on fallen *Hibiscus* wood, track to Raemaru.