Fungi from palms. XIII. The genus Oxydothis, a revision

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The genus *Oxydothis* is monographed and 41 species illustrated. *Oxydothis* is characterised by long cylindrical asci, with a J+ (rarely J–), subapical ring and ascospores that are long fusiform to filiform, bicelled and taper from the centre to spine-like, pointed or rounded processes. The ascoma is thin-walled, usually developing within a darkened stroma, in some beneath a raised blistering area, with the axis parallel, oblique or perpendicular to the host surface. A *Selenosporella* anamorph has been reported in one species. *Oxydothis* species are mostly saprophytic or probably endophytic on leaves or petioles of palms or leaves of *Pandanus* species, although one is a palm leaf pathogen.

Keywords: *Oxydothis*, palm fungi.

Within the Amphisphaeriaceae (*sensu* Eriksson & Hawksworth, 1991) three genera are recognised in which ascospores are two-celled, hyaline and fusiform with drawn out, often spine-like ends (Müller & von Arx, 1962). The three genera (*Ceriospora* Niessl., *Leiosphaerella* Höhnel, *Oxydothis* Penzig & Sacc.) were mainly distinguished by ascomatal orientation and whether ascospores were attenuated to a spine at each end, or tapered to rounded ends from the middle. Samuels & Rossman (1987) found the only consistent difference between *Oxydothis* and *Leiosphaerella* to be ascomatal orientation. Hyde (1994a) examined the type species of *Ceriospora*, *Oxydothis* and *Leiosphaerella* and found each to represent a distinct genus. *Oxydothis* was characterised by having long cylindrical asci with a J+ subapical apparatus and long fusiform to filiform hyaline bicelled ascospores which taper from the centre to spine-like, pointed or rounded processes.

Oxydothis was described from Cibodas, Java, Indonesia by Penzig & Saccardo (1897) with three species *O. grisea* Penzig & Sacc., *O. nigricans* Penzig & Sacc. and *O. maculosa* Penzig & Sacc. Several species were later added to the genus and by 1970 eighteen species had been described or transferred (Rehm, 1907; Spegazzini, 1908; Sydow & Sydow, 1917; Trotter, 1926; Saccardo, 1928; Sydow 1930; Petrak & Deighton, 1952; Müller & von Arx, 1962; Huguenin, 1964;

Sivanesan, 1970). Samuels & Rossman (1987) added two further species from New Zealand, while Hyde & Nakagiri (1989) described *Oxydothis nypae* K. D. Hyde & A. Nakagiri, an intertidal species, from *Nypa* palm in Brunei. In recent publications Hyde (1994b) and Fröhlich & Hyde (1994) have described 8 additional species. With the large number of *Oxydothis* species described it is considered timely to monograph the genus. In this paper each *Oxydothis* species so far described is critically examined, illustrated and briefly diagnosed. A pictorial key to the accepted *Oxydothis* species is provided.

Material and Methods

The fungi examined in this study were borrowed from various herbaria or collected in tropical locations. Single spore isolations were made where possible, but due to Australian Quarantine regulations and difficult field conditions this was rarely the case. Sections were cut on a freezing microtome. Ascomatal shape is expressed as seen in section in all cases and all measurements given refer to water mounts.

Taxonomy

Oxydothis Penzig & Sacc., Malpighia 11: 505. 1897.

= *Merrilliopeltis* Hennings, Hedwigia 47: 261. 1908.
= *Plagiothecium* Schrantz, Bull. Soc. Myc. France 76: 335. 1960.
= *Plagiolagynion* Schrantz, Bull. Soc. Myc. France 78: 218. 1962.

Ascomata forming under slightly raised, light or darkened discs, or under raised light or darkened blistering areas, singly or in groups (Plates 1a, 2a, 3a, 4e), in section lenticular, cylindrical, or subglobose, long axis parallel, oblique or perpendicular to the host surface (Plates 1b, 2b, 4g, 5e), surrounded by variable amounts of dark stromatic tissue, papilla periphysate, at one end curving upwards and piercing the host cuticle, occasionally protruding, or central (Plate 5f). – Stromata variable, comprising palisade-like brown-walled cells and/or host cells filled with brown-walled fungal tissue (Plates 3c, 4h, 9d). – Peridium thin, of flattened brown thin-walled cells (Plates 8b) or occasionally integrated with stroma. – Paraphyses hypha-like, filamentous, irregular, septate, persisting between asci, but often fragmenting in dried material (amphisphaeriaceous, see Fig. 23; Hyde, 1994c). – Asci 8–spored, cylindrical, thin-walled, unitunicate, pedunculate, with a J+ (occasionally J–), subapical ring, wedge-shaped or discoid, with a faint canal leading to the apex (Plates 2e, 3e, 4d). – Ascospores long–fusiform or filiform, 2–celled, septate centrally,

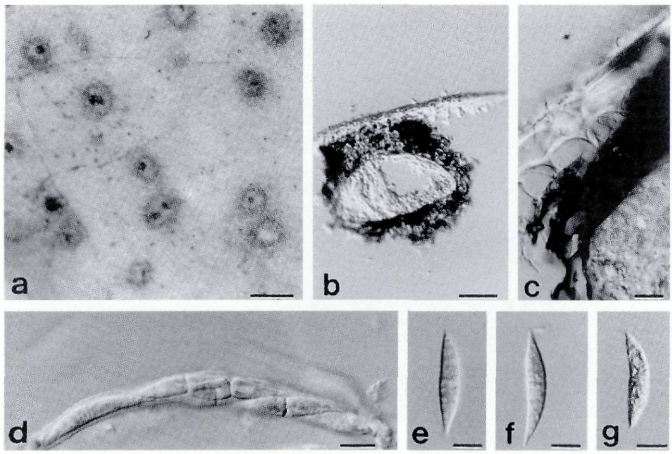


Plate 1a–g. *Oxydothis acutata* (from holotype). – a. Appearance of ascomata on host surface. – b. Section of ascoma. – c. Peridium. – d. Ascus. e–g. Ascospores. – Bars: a = 1 mm; b = 50 µm; c–g = 10 µm.

smooth-walled, hyaline, gradually tapering from the centre to pointed processes, which may be spine-like, or with rounded ends, often with small amounts of mucilage (Plates 1e–f, 2c,d, 3c,d).

Anamorph. – *Selenosporella* sp. (described for only one species).

Habitat. – Saprobic, endophytic or parasitic on dead petioles or leaves of members of the Palmae or Pandanaceae with one species on bamboo and one on *Rhipogonium*.

Distribution. – Tropical and sub-tropical.

Type species. – *Oxydothis grisea* Penzig & Sacc.

Oxydothis is a distinct genus occurring on petioles and leaves mostly of Arecaceae and Pandanaceae, with one species on *Rhipogonum* (Liliaceae) and another on bamboo (Gramineae). The ascomata occur within the hypodermis beneath darkened raised lesions on the host surface, each lesion comprising individual or clustered ascomata (Plates 3a, 4e). Individual lesions may have a darkened margin. In some species the ascomata form under raised

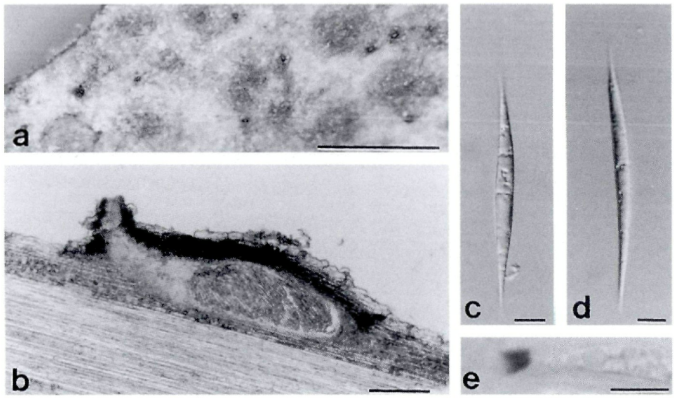


Plate 2a–e. *Oxydothis aequalis* (from holotype). – a. Appearance of ascomata on host surface. – b. Section of ascomata. – c, d. Ascospores. – e. Ascus with J+ subapical ring. – Bars: a = 1 mm; b = 100 µm; c–e = 10 µm.

blistering areas within the hypodermis, which may be darkened. In section the ascomata are often cylindrical with their long axis parallel to the host surface; each ascoma has an ostiole at one end, which bends upwards to pierce the host surface (Plates 2b, 5e). In *O. nigra* K. D. Hyde the ostiole slightly protrudes. In some species, especially those forming under raised blistering areas, the ascomata may be oblique or even perpendicular to the host surface with central necks, the necks often pushing through fissures at the sides of the blister. Paraphyses are persistent amongst the asci, hypha-like, filamentous, irregular, branched and septate (amphisphaeriaceous), although they can be difficult to be located in rehydrated specimens. The most distinctive characteristic of *Oxydothis* species are the long cylindrical asci with rounded or truncate ends (Plate 6e–g) that are provided with wedge-shaped or discoid, J+ (occasionally J–), subapical ring and faint canal leading to the apex (Plates 2e, 3e, 4d). Ascospores are hyaline, long fusiform to filiform, 2–celled, tapering from the centre to form pointed processes (Plates 1e–g, 2c,d, 3c,d), which may be spine-like (Plate 6a–d) or rounded and then often with mucilage (Plate 5b).

The criteria on which the taxonomy of the genus *Oxydothis* is based is confused (Müller & von Arx, 1962; Samuels & Rossman, 1987). Previous authors have used stromata and ascomatal characteristics and orientation as a basis for distinguishing taxa. Müller & von Arx (1962) have used the orientation of the axis of the ascoma as an important characteristic to distinguish *Oxydothis* from

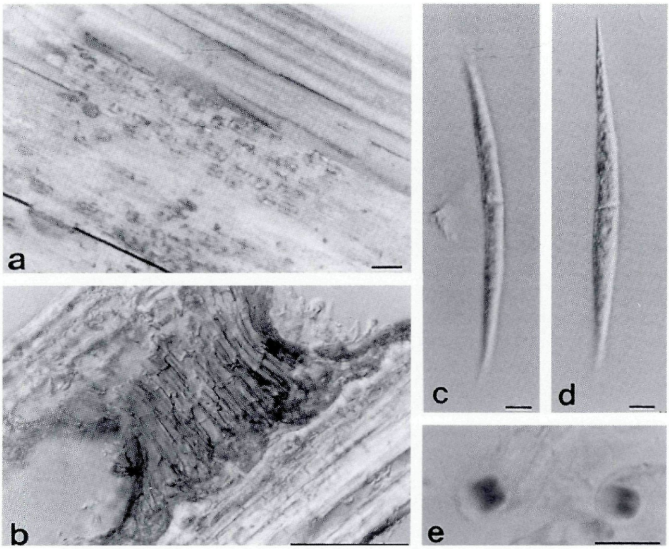


Plate 3a–e. *Oxydothis daemonoropis* (from holotype). – a. Appearance of ascomata on host surface. – b. Peridium and vertically orientated palisade-like cells between ascomata. – c, d. Ascospores. – e. Ascus with J+ subapical ring. – Bars: a = 1 mm; b = 100 µm; c–e = 10 µm .

Leiosphaerella. I have found that ascoma orientation is species dependent, in some being parallel to the host surface (e.g. *O. grisea*), while in others it can be oblique or perpendicular (e.g. *O. nypae*). There are two ascomatal types. In the first ascomata are cylindrical with the axis parallel to the host surface and papilla at one end, curving upwards and piercing the host cuticle. These form under non-blistering, dome-shaped stromata. Ascomata of the second type are pyriform, with their axis oblique or perpendicular to the host surface and the papilla is central, extending directly through the host epidermis. These form under raised blistering areas. Often these two types of ascoma form on a single palm sample, but examination of ascospores will reveal two separate species. Ascoma orientation is therefore only useful as a characteristic at species level. The amount of stromatic development is also variable, both within and between species and is therefore of little taxonomic value. In *O. nigra* a dark black disc occurs above the ascoma, in *O. tabayensis* (H.S. Yates)

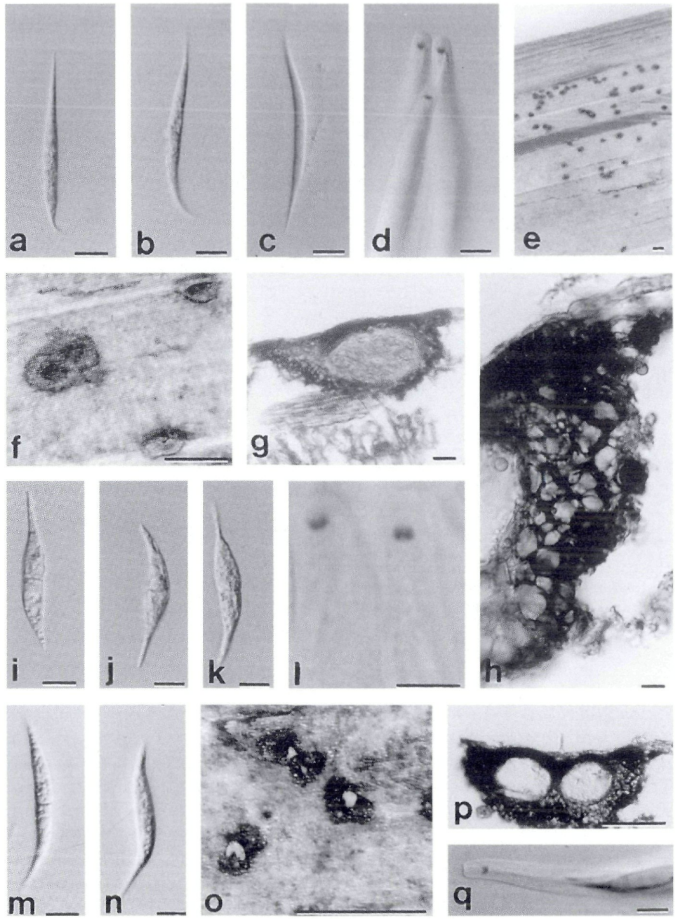


Plate 4a–q. *Oxydothis* spp. (all from holotype) – a–c. Ascospores of *O. elaeicola*. – d. Ascus of *O. elaeicola* with J+ subapical ring. – e, f. Appearance of ascomata of *O. elaeidis* on host surface. – g. Section of ascoma of *O. elaeidis*. – h. Peridium and stroma of *O. elaeidis*. – i–k. Ascospores of *O. elaeidis*. – l. Ascus of *O. elaeidis* with J+ subapical ring. – m, n. Ascospores of *O. froehlichii*. – o. Appearance of ascomata of *O. froehlichii* on host surface. – p. Section of ascomata of *O. froehlichii*. – q. Ascus of *O. froehlichii* with J+ subapical ring. – Bars: e, f, o = 1 mm; g, p = 100 µm; a–d, h–n, q = 10 µm.

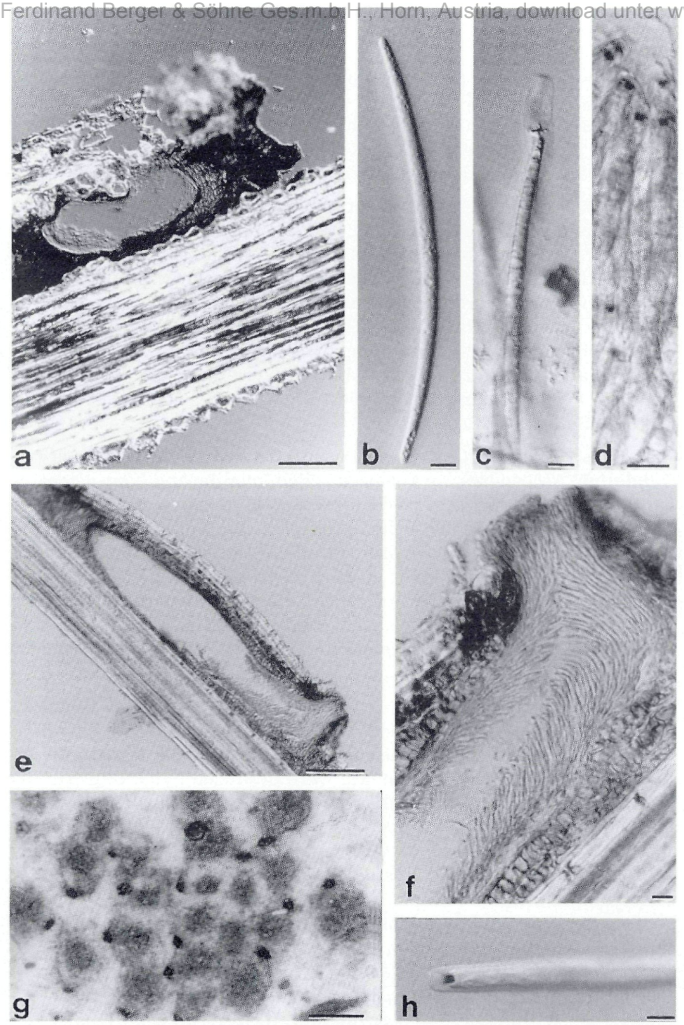


Plate 5a–h. *Oxydothis* spp. (all from holotype) – a. Section of ascoma of *O. gigantea*. – b. Ascospore of *O. gigantea*. – c. Ascus of *O. gigantea* with J+ subapical ring. – d. Ascus of *O. grisea* with J+ subapical ring. – e, f. Section of ascoma, with periphysate papilla. – g. Appearance of ascomata of *O. hoehnelii* on host surface. – h. Ascus of *O. hoehnelii* with J+ subapical apparatus. – Bars: g = 1 mm; e = 100 µm; a–d, f, h = 10 µm.

Trotter perpendicular palisade-like cells occur between ascoma, while in *O. australiensis* K. D. Hyde very little stromatal development occurs. Ascomata of *Oxydothis* may be solitary, in small groups or clustered in large spreading areas. The variations in a single species, however, are large and this characteristic is of little taxonomic value.

The nature of the ascus is consistent throughout the genus. The asci are long cylindrical and have a rounded or truncate apex with a subapical ring that stains blue in Melzer's reagent. The ring occurs quite far from the apex and a faint canal leading to the apex can be observed with interference contrast microscopy (Plate 6f). Ascospores may be 2– to multiseriate. I have found the ascus ring one of the most reliable characteristics when comparing species. The shape (discoid, wedge-shaped) and size appear to be consistent with each species and therefore are important for delimitation of species. This was already noted by Samuels & Rossman (1987).

Ascospore characters are also useful for distinguishing species of *Oxydothis*. Ascospores are always 2 celled, hyaline and have a central septum; the ends, however, are characteristic. In some species (e.g. *O. aequalis* H. Syd. & P. Syd.) the ascospores taper gradually from the centre to form pointed processes; in others they taper abruptly near the ends to form long or short spine-like processes (e.g. *O. sabalensis* (Cooke) Petr.), while in a third type the ends are rounded, tapering only slightly from the centre, and these are usually provided with noticeable mucilage (e.g. *O. nypae*).

Most species of *Oxydothis* do not form anamorphs in pure culture, with the exception of *O. selenosporellae* Samuels & Rossman which has formed a *Selenosporella* anamorph (Samuels & Rossman, 1987). I have grown several species in culture and no anamorphs were produced, even if mature ascomata were produced by *O. linospadicis* J. Fröhl. & K. D. Hyde. In comparison with other amphisphaeriaceous species (e.g. *Broomella* Sacc. with a *Pestalotiopsis* Steyaert anamorph) the anamorph of *O. selenosporellae* differs considerably and places doubt on the inclusion of these genera in the same family. Unfortunately, no anamorph is known for *Amphisphaeria umbrina* Ces. & De Not. and it is therefore impossible to judge with any certainty whether *Broomella, Oxydothis* or either of these genera have close affinities with *Amphisphaeria*. Barr (1990) includes *Oxydothis* alongside *Linocarpon* in the Hyponectriaceae. Although similarities within these genera include filiform ascospores and the palm host, they differ in the nature of the asci, the paraphyses and ascoma orientation. *Oxydothis* has greater affinity with *Pemphidium* Mont., *Leiosphaerella* and *Ceriospora* and the genus should therefore be retained in the Amphisphaeriaceae (*sensu* Eriksson & Hawksworth, 1991) until more information is available.

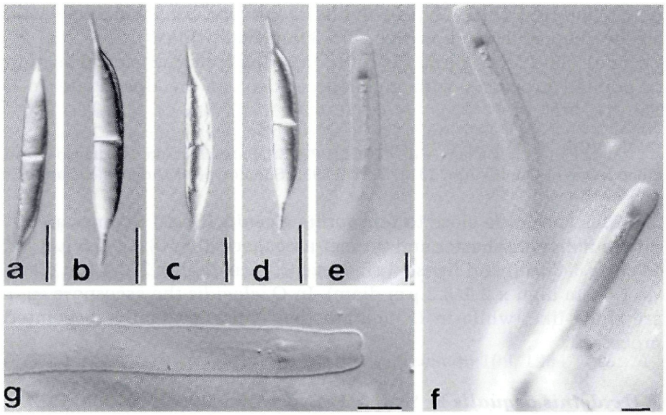


Plate 6a–g. *Oxydothis hoehnelii* (from KDH 1837). – a–d. Ascospores. – e–g. Asci. Note the J+ subapical ring in e, f and faint canal leading to the apex in g. – Bars: 10 µm.

Most *Oxydothis* species are saprotrophs on leaves and petioles of palms and leaves of *Pandanus* sp., while one species is found on *Rhipogonium* stems and another on bamboo culms. *O. parasitica* J. Fröhl. & K. D. Hyde is a pathogen, causing leaf spots of *Licuala ramseyi* in north Queensland (Fröhlich & Hyde, 1994). Many *Oxydothis* species may be endotrophs, as when cut living leaves of palms are incubated in moist chambers, their existing colonies quickly become apparent. Separate palm species are often colonised by different *Oxydothis* species and may be that many *Oxydothis* species are genus, or even host specific.

In this paper forty one species are recognised in the genus *Oxydothis*. The species are separated on ascospore size and morphology and the size and shape of the ascus ring.

1. ***Oxydothis acutata*** (Syd. & P. Syd.) K. D. Hyde, comb. nov. – Plates 1a–g; Tab. 1.

= *Didymella acutata* Syd. & P. Syd., Phil. J. Science C. Bot. 9: 164. 1914.

Ascomata forming under flattened, darkened oval areas, on the host surface, surrounded by an outer darkened rim, inner region light-coloured, solitary or clustered (Plate 1a); in section 130–185 µm diam, 100–130 µm high, globose or subglobose, long axis perpendicular to that of the host surface, papilla central (Plate 1b,c). –

Asci 80–108 x 10–12 µm, cylindric-clavate, ring subapical, J+, wedge-shaped, 1.5–2 µm high, 2.5–3 µm diam (Plate 1d). – Ascospores 36–42 x 5–6 µm, fusiform, tapering from the central septum to pointed processes with mucilage evident at the tips (Plate 1e–f; Tab. 1).

Material examined. – PHILIPPINES: Palawan, Lake Maguao, on dead fallen leaves of *Orania*, Apr. 1913, Merrill 8953, S (holotype of *Didymella acutata*).

This species is close to *Oxydothis elaeidis* (Beeli) Sivanesan, but differs in having shorter and thinner ascospores (36–48 x 4–5.6 µm, vs. 44–56 x 6–8 µm) and in ascal ring size (1.6 µm high x 2–2.4 µm diam, vs. 1.6 µm high x 2.4–3.2 µm diam). In *O. elaeidis* the ascospore ends are spine-like, while in *O. acutata* they taper gradually to pointed processes.

2. ***Oxydothis aequalis*** H. Syd. & P. Syd., Ann. Mycol. 15: 208. 1917. – Plate 2a–e; Tab. 1.

Ascomata forming under slightly raised darkened areas on the host surface, clustered (Plate 2a); in section ellipsoidal, long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing the host cuticle (Plate 2b). – Asci 100 x 12 µm (single measurement as few intact asci were seen), long cylindrical, ring subapical, J+, wedge-shaped, 3.5–5 µm high, 2.4–3.2 µm diam (Plate 2e). – Ascospores 74–90 x 4–6.5 µm, fusiform, tapering from the central septum to pointed processes (Plate 2c,d; Tab. 1).

Material examined. – PHILIPPINES: Biliran, on bamboo, Jun. 1914, R.C. McGregor, Phil. Bur. Sc. No. 18394, BPI (holotype).- MALAYSIA: „Old Gombak", mile 19, bamboo, Oct. 1991, K. D. Hyde 835, BRIP 21918.

Oxydothis aequalis is close to *O. grisea* from which it differs in having clustered ascomata and narrow ascospores (4–6.5 µm vs. 6.3–7.6 µm) and in its host, a bamboo.

3. ***Oxydothis alexandrarum*** K. D. Hyde, Sydowia 45: 106. 1994. – Tab. 1.

Ascomata forming under raised blistering, maze-like, blackened regions on the host surface, or occasionally superficial, solitary or mostly clustered, seated on a cushion of host and fungal cells; in section globose or subglobose, with long axis parallel, oblique or perpendicular to that of the host surface, papillae small and central. – Asci 120–144 x 8–10 µm, long cylindrical, ring subapical,

J+, wedge-shaped, 2.5 µm high, 2 µm diam. – Ascospores 80–92 x 3–4 µm, filiform, tapering gently from the central septum to apical rounded processes with mucilage (Tab. 1).

Material examined. – AUSTRALIA: north Queensland, Cairns, Freshwater Creek State Forest, on decaying petiole of *Archontophoenix alexandrae* (F. v. Mueller) H. A. Wendland & Drude, Feb. 1992, K. D. Hyde 1060, BRIP 20846 (holotype).

Oxydothis alexandrarum is distinct from other *Oxydothis* species, because of the maze-like areas under which ascomata develop, and the ascospore size and morphology. For illustrations see Hyde (1994b).

4. ***Oxydothis australiensis*** K. D. Hyde, Sydowia 45:109. 1994. – Tab. 1.

Ascomata forming under raised blister-like areas covered with brown hair-like hyphae on the host surface, clustered; in section subglobose, long axis oblique or perpendicular to that of the host surface, papilla central. – Asci 120–180 x 11–16 µm, long cylindrical, ring subapical, J+, wedge-shaped, 2.5–3 µm high, 2–2.5 µm diam. – Ascospores 100–120 x 3–4 µm, filiform, slightly tapering from the central septum towards the rounded ends with mucilage (Tab. 1).

Material examined. – AUSTRALIA: north Queensland, Bamaga, Lockerbie, "4-mile scrub", on petiole of *Archontophoenix* sp. in litter on forest floor, Mar. 1991, K. D. Hyde 617, BRIP 20847 (holotype).

Illustrations are provided by Hyde (1994b).

5. ***Oxydothis calami*** (Henn.) H. Syd. & P. Syd., Ann. Mycol. 15: 206. 1917. – Tab. 1.

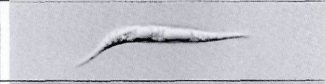
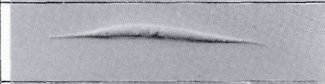
≡ *Merrilliopeltis calami* Henn., Hedwigia 47: 262. 1908.

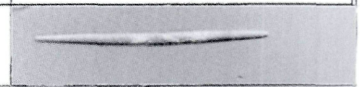
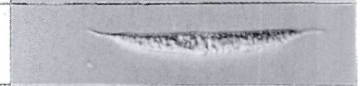
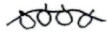
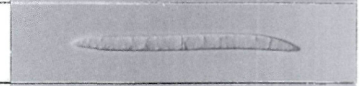
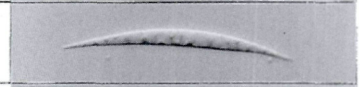
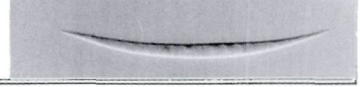
≡ *Oxydothis calami* (Henn.) E. Müll., Beitr. Kryptogamenfl. Schweiz 11(2): 680. 1962.

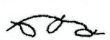
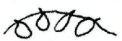
Ascomata forming under slightly raised, dark or light coloured areas, up to 1 mm diam, on the host surface, centre irregularly darkened, surrounded by a raised darkened rim, single or in groups of 2–3; in section lenticular, long axis parallel to that of the host surface with papilla at one end, curving upwards and piercing the host cuticle. – Asci 256–350 x 8–11 µm, long cylindrical, ring subapical, J+, wedge-shaped, 2 µm high, 4 µm diam. – Ascospores

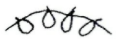
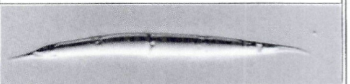
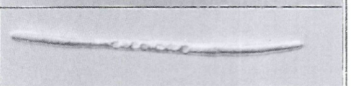
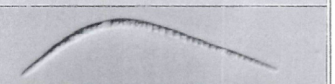
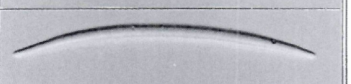
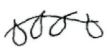
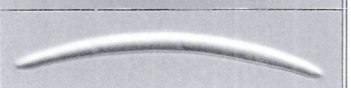
Tab. 1. – Diagrammatic key to species of *Oxydothis*.

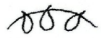
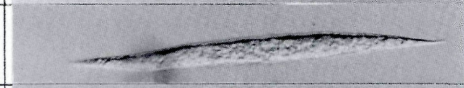
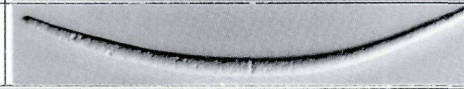
Species	Ascomata orientation	Ascal ring size	Ascospore size	Ascospore shape
33) *O. parasitica*		2.5-3 x 1.75-2.25 µm	25-42.5 x 5-9 µm	
1) *O. acutata*		1.5-2 x 2.5-3 µm	36-42 x 5-6 µm	
27) *O. obducens*		1.6 x 2-2.4 µm	36-48 x 4-5.6 µm	
38) *O. sabalensis*		0.8-1 x 2.6-4 µm	44-56 x 4-6 µm	
8) *O. elaeidis*		1.6 x 2.4-3.2 µm	44-56 x 6-8 µm	
32) *O. pandanicola*		1-1.2 x 2.8-3.2 µm	44-56 x 6-8 µm	
15) *O. linospadicis*		1.2-1.6 x 2.8-3.2 µm	40-60 x 6.25-7.5 µm	

Species	Ascomata orientation	Ascal ring size	Ascospore size	Ascospore shape
34) *O. parvula*		1-1.6 x 2-2.8 µm	49-62 x 4-6 µm	
9) *O. froehlichii*		1.2-1.6 x 2.4-2.8 µm	48-56 x 4.2-5.6 µm	
30) *O. oraniopsis*		1-1.5 x 2.5 µm	57.5-77.5 x 5.5-8 µm	
31) *O. pandani*		0.8-1.6 x 3.6-4.8 µm	56-60 x 6-7.5 µm	
7) *O. elaeicola*		1.5-2 x 2.4-3.2 µm	58-68 x 4-6 µm	
5) *O. calami*		2 x 4 µm	69-80 x 5-7 µm	
40) *O. selenosporelle*		1-1.5 x 2-2.5 µm	55-64 x 3.5-4 µm	

Species	Ascomata orientation	Ascal ring size	Ascospore size	Ascospore shape
21) *O. maquilingiana*		2.6-3.5 x 1.6-2.4 µm	85-95 x 5-6 µm	
13) *O. hoehnelii*		4-5.6 x 3.6-4 µm	72-86 x 7-10 µm	
14) *O. licualae*		2-2.5 x 2.5-3 µm	56-82 x 5-6 µm	
26) *O. nypicola*		3 x 4-5 µm	74-92 x 6-7.5 µm	
20) *O. maculosa*		2-2.5 x 2-3 µm	66-89 x 4-5 µm	
2) *O. aequalis*		3.5-5 x 2.4-3.2 µm	74-90 x 4-6.5 µm	
10) *O. frondicola*		1.75-2.25 x 2-2.5 µm	65-94 x 2.5-3.75 µm	

Species	Ascomata orientation	Ascal ring size	Ascospore size	Ascospore shape
29) *O. opaca*		0.8 x 3.6-4 µm	70-83 x 5-7 µm	
41) *O. tabayensis*		2.8-3.4 x 2-4 µm	80-96 x 4.5-7 µm	
39) *O. saltuensis*		0.8-1.2 x 2-2.4 µm	86-92 x 2.8-3.6 µm	
17) *O. livistonicola*		1.2-1.6 x 2.4-3.2 µm	74-96 x 6-8 µm	
35) *O. poliothea*		1.6-2 x 3.6-4 µm	62-86 x 5-6 µm	
19) *O. luteaspora*		2-4 x 2.5-4 µm	84-100 x 6.5-8.5 µm	
18) *O. livistonica*		1.5-2 x 3-4 µm	86-105 x 5-6.5 µm	

Species	Ascomata orientation	Ascal ring size	Ascospore size	Ascospore shape
37) *O. rubella*		5-6.5 x 4-5 µm	94-102 x 7-8.5 µm	
22) *O. manokwariensis*		3-3.5 x 2.25-2.5 µm	74-98 x 4-5 µm	
12) *O. grisea*		2.7 x 3.6-4.5 µm	83-99 x 6.3-7.6 µm	
28) *O. oedema*		1-1.2 x 3.2-4.4 µm	84-110 x 3.5-5 µm	
3) *O. alexandrarum*		2.5 x 2 µm	80-92 x 3-4 µm	
36) *O. ragai*		4-5 x 2 µm	96-120 x 3.5-4.5 µm	
25) *O. nypae*		1.6-2.2 x 1-1.6 µm	82-113 x 2.5-4.1 µm	

Species	Ascomata orientation	Ascal ring size	Ascospore size	Ascospore shape
24) *O. nonamyloidea*		J-	94-115 x 3.5-4.5 µm	
4) *O. australiensis*		2.5-3 x 2-2.5 µm	100-120 x 3-4 µm	
23) *O. nigra*		2-3.6 x 3.6-4 µm	94-110 x 5-6 µm	
6) *O. daemonoropis*		4-5.6 x 3.6-4.8 µm	116-134 x 8-10 µm	
16) *O. livistonae*		J-?	150-170 x 4-5.5 µm	
11) *O. gigantea*		5 x 3.5-4 µm	100-150 x 6.5-7.5 µm	

69–80 x 5–7 µm, fusiform, tapering from the central septum to pointed processes (Tab. 1).

Material examined. – AUSTRALIA: north Queensland, Cairns, Freshwater Creek State Forest, on *Calamus* sp., Feb. 1992, K. D. Hyde & J. Fröhlich, KDH 1009, BRIP 20848.- INDONESIA: Java, Hortus Bogoriensis, on trunk of *Calamus* sp., Oct. 1956, Sri Sabani, L. – PHILLIPINES: Mindoro, Mt. Halcon, on trunk of *Calamus* sp., Nov. 1906, E.D. Merrill 6113, L. (holotype).

Oxydothis calami was originally described as the type of *Merrilliopeltis* Henn. (Hennings, 1908), but was considered to be synonymous with *Oxydothis* (Sydow & Sydow, 1917; Müller & von Arx, 1962). Material borrowed from L contained three different taxa scattered amongst three samples. The most obvious was an unidentified coelomycete with filiform conidia, while one piece contained a *Linocarpon* species. A small portion supported several ascomata identified as *O. calami*. The original description by Hennings (1908) is clearly an *Oxydothis*, although his interpretation of the ascospores becoming 3–multiseptate is wrong. The large raised darkened areas containing 1–3 ascomata and the ascospore dimensions separate this species from other *Oxydothis* taxa. I also examined material deposited in K by Hennings. This sample contained an immature ascomycete with bitunicate asci, but no *Oxydothis* ascomata. *Oxydothis calami* is illustrated by Hyde (1994b).

6. ***Oxydothis daemonoropis*** (Syd. & P. Syd.) Syd. & P. Syd., Ann. Mycol. 15: 208. 1917. – Plate 3a–e; Tab. 1.
   ≡ *Merrilliopeltis daemonoropis* H. Syd. & P. Syd., Phil. J. Sci. C. Bot. 8: 484. 1913.

Ascomata forming under slightly raised areas, 1–3 cm long, on the host surface, surrounded by darkened rims, clustered (Plate 3a); in section ellipsoidal, palisade-like cells present between adjacent ascomata, long axis parallel to that of the host surface, papilla at one end curving upwards and piercing the host cuticle (Plate 3b). – Asci (not intact) long cylindrical, ring subapical, J+, wedge-shaped, 4–5.6 µm high, 3.6–4.8 µm diam (Plate 3e). – Ascospores 116–134 x 8–10 µm, fusiform, tapering from the central septum to pointed processes (Plate 3c,d; Tab. 1).

Material examined. – PHILIPPINES: Luzon, Laguna Province, Mt. Maquiling, on dead petiole of *Daemonorops*, Nov. 1912, E.D. Merrill 4828, BPI (holotype).

Oxydothis daemonoropis is distinguished by its very long ascospores.

7. ***Oxydothis elaeicola*** Petr. apud Petrak & Deighton, Sydowia 6: 314. 1952. – Plate 4a–d; Tab. 1.

Ascomata forming under darkened areas on the host surface, individually slightly raised, numerous, clustered; in section ellipsoidal, immersed beneath a darkened stroma, long axis parallel to the host surface with neck at one end, curving upwards and piercing the host surface. – Asci 130–182 x 8–11 µm, long cylindrical, ring subapical, J+, wedge-shaped, 1.5–2 µm high, 2.4–3.2 µm diam (Plate 4d). – Ascospores 58–68 x 4–6 µm, fusiform, tapering from the centre to pointed processes (Plate 4a–c; Tab. 1).

Material examined. – SIERRA LEONE: Njala, Kori, on leaf petiole of *Elaeis guineensis* Jacq. 29 Jul. 1949, F.C. Deighton, IMI 37516 (holotype).

Oxydothis elaeicola is similar to *O. selenosporellae*, but differs in having wider ascospores, numerous clumped ascomata, and a differently shaped ring in the ascus. Batista & al. (1964) have recorded *O. elaeicola* in Brazil with smaller ascospores (40–55 x 5–6 µm). I have been unable to obtain this material to verify the identification.

8. ***Oxydothis elaeidis*** (Beeli) Sivanesan, Trans. Br. Mycol. Soc. 54: 496. 1970. – Plate 4e–l; Tab. 1.

≡ *Sphaerella elaeidis* Beeli, Rev. Zool. Afr. II, 2, Suppl. Bot: B10. 1923.

≡ *Mycosphaerella elaeidis* (Beeli) Hendrickx, Publs. Inst. Nat. Étude Agron Congo Belge, Sér. Sci. 35: 7. 1948.

Ascomata forming under slightly raised blackened areas on the host surface, solitary or clustered in groups of 2–3 (Plate 4e, f); in section subglobose, with papilla at one end, curving upwards and piercing the host cuticle (Plate 4g, h). – Asci 95–130 x 14–16 µm, long cylindrical, ring subapical, J+, wedge-shaped, 1.6 µm high, 2.4–3.2 µm diam (Plate 4l). – Ascospores 44–56 x 6–8 µm, fusiform, tapering from the central septum to pointed spine-like processes (Plate 4i–k; Tab. 1).

Material examined. – ZAIRE: Leopoldville, Bomo, on leaves of *Elaeis* sp., 1922, J. Ghesquière 1124, BR (holotype).

Sivanesan (1970) discussed the placement of this taxon in *Oxydothis*. *O. elaeidis* is similar to *O. sabalensis*, but differs in its wider ascospores (6–8 µm vs. 4–6 µm) and in having raised subglobose ascomata (Plate 4f).

9. ***Oxydothis froehlichii*** K. D. Hyde, sp. nov. – Plate 4m–q; Tab. 1.

Ascomata 80–100 µm diam, 60–70 µm alta, subglobosa, immersa, ostiolata, papillata. Asci 100–130 x 10–14 µm, cylindracei, apparato subapicali iodo

coerulescenti, 1.2–1.6 µm alto, 2.4–2.8 µm diam praediti. Ascosporae 48–56 x 4.2–5.6 µm, fusiformes, hyalinae, bicellulares, angustatae.

Etymology. – Named after the collector.

Ascomata forming under slightly raised blackened dome-shaped areas on the host surface, 260–320 µm diam, solitary or occasionally clustered (Plate 4o); in section 80–100 µm long, 60–70 µm high, subglobose, long axis parallel to that of the host surface and neck at one end curving upwards and piercing the host cuticle (Plate 4p). – Asci 100–130 x 10–14 µm, cylindrical, ring subapical, J+, wedge-shaped, 1.2–1.6 µm high, 2.4–2.8 µm diam (Plate 4q). – Ascospores 48–56 x 4.2–5.6 µm, fusiform, curved, tapering gradually from the central septum and then abruptly to form blunt spines (Plate 4m,n; Tab. 1).

Material examined. – AUSTRALIA, north Queensland, Cairns, Flecker Botanical Gardens, swamp 'board walk', on living leaves of *Calamus radicalis*, following incubation for 7 days in a moist chamber, Jul. 1992, J. Fröhlich, KDH 1432, BRIP 21919 (holotype). Mossman Gorge National Park, on living leaf of *Linospadix* sp., 28 July 1992, R.G. Shivas, PERTH 727075.

The taxon is close to *Oxydothis elaeidis*, but the ascospores are curved and thinner.

10. ***Oxydothis frondicola*** K. D. Hyde, Sydowia 45: 112. 1994. – Tab. 1.

Ascomata forming under dull, black, dome-shaped areas, up to 550 µm diam, on the host surface, solitary or clustered in small groups; in section cylindrical to lenticular, long axis parallel to that of the host surface, papilla at one end curving upwards and piercing the host cuticle. – Asci 165–195 x 8–9 µm, long cylindrical, ring subapical, J+, wedge-shaped, 1.75–2.25 µm high, 2–2.25 µm diam. – Ascospores 65–94 x 2.5–3.75 µm, filiform, tapering from the central septum to pointed processes (Tab. 1).

Material examined. – AUSTRALIA: north Queensland, Bamaga, Lockerbie, "4 mile scrub", on palm petiole, Feb. 1992, K. D. Hyde 1015, BRIP 20849 (holotype); 12 Mar. 1991, K. D. Hyde 532, BRIP 19324. Freshwater Creek State Forest, on petiole of *Licuala ramsayi*, Feb. 1992, K. D. Hyde 1061, BRIP 21920.

Oxydothis frondicola is close to *O. aequalis* (Sydow & Sydow, 1917), but has narrower ascospores (2.5–3.75 µm vs. 4–6.5 µm) and a shorter ascal ring (1.75–2.25 µm high). Hyde (1994b) has illustrated

this taxon. The specimen from *Licuala* has smaller ascospores (55–70 x 3–3.5 µm) and may not be conspecific.

11. ***Oxydothis gigantea*** K. D. Hyde, sp. nov. – Plate 5a–c; Tab. 1.

Ascomata 280 µm diam, 80 µm alta, subglobosa vel ellipsoidea, ostiolata. Asci 240 x 20 µm, cylindracei, apparato subapicali iodo coerulescenti, 5 µm alto, 3.5–4 µm diam praediti. Ascosporae 100–150 x 6.5–7.5 µm, filiformes, hyalinae, bicellulares.

Etymology. – In reference to the very large ascospores.

Ascomata forming under raised blister-like areas on the host surface, some areas cracking and exposing ostioles, clustered; in section ca 280 µm diam, 80 µm high, subglobose to ellipsoidal, long axis parallel or oblique to that of the host surface. – Asci 240 x 20 µm, cylindrical, ring subapical, J+, wedge-shaped, 5 µm high, 3.5–4 µm diam. – Ascospores 100–150 x 6.5–7.5 µm, filiform, tapering gradually from the central septum to rounded processes with mucilage (Tab. 1).

Material examined. – INDONESIA: Irian Jaya, Manokwari, on dead palm petiole, Apr. 1992, K. D. Hyde 1216a, BRIP 21921 (holotype).

12. ***Oxydothis grisea*** Penzig & Sacc., Malpighia 11: 505. 1897. – Plate 5d–f; Tab. 1.
= *Oxydothis nigricans* Penzig & Sacc., Malpighia 11: 505. 1897.

Ascomata forming under weakly raised, darkened areas, 500–750 µm long on the host surface, surrounded by an irregular darker outer rim, single or clustered in groups of 2–3; in section cylindrical, with long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing host cuticle (Plate 5e, f). – Asci 180 x 13–15 µm, long cylindrical, ring subapical, J+, 2.7 µm high, 3.6–4.5 µm diam (Plate 5d). – Ascospores 83–99 x 6.3–7.6 µm, fusiform, tapering from the central septum to pointed processes (Tab. 1).

Material examined. – INDONESIA: Java, Cibodas, in dead petiole of *Calamus?*, 1897, PAD (holotype). In spathe of *Ptychosperma*, Mar 1897, PAD (holotype of *Oxydothis nigricans*). Irian Jaya, Manokwari, on dead palm petiole, Apr. 1992, K. D. Hyde 1217c, BRIP 21922.- MALAYSIA, Pasoh Forest Reserve, on petiole of *Licuala* sp., Oct. 1991, K. D. Hyde 833, BRIP 21927.

Oxydothis grisea has been designated the type species of *Oxydothis* (Penzig & Saccardo, 1897; Müller & von Arx, 1962). The original identification of the host was not given although Müller & von Arx (1962) state the hosts of *O. grisea* to be Gramineae, Arecaceae

and Musaceae. I have seen the type material of *O. grisea* and the host appears to be *Calamus* sp. It was not possible to obtain measurements of the asci because the material was in poor condition and clumped together.

Oxydothis nigricans is placed in synonymy with *O. grisea*, because it is indistinguishable from *O. grisea* but for the ascomata which are covered by dark-brown sterile hyphal hairs (possibly the anamorph). These differences do not justify recognition of separate species in light of the strong similarities in ascus and ascospore morphology.

13. ***Oxydothis hoehnelii*** (Rehm) Sacc., Syll. Fung. 24: 915. 1928. – Plates 5g,h, 6a–g; Tab. 1.
≡ *Merrilliopeltis hoehnelii* Rehm, Phil. J. Sci. C. Bot. 8: 186. 1913.

Ascomata forming under individually darkened raised areas on the host surface, clustered (Plate 5g); in section cylindrical, with long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing host cuticle. – Asci 250–290 x 12–14 µm, long cylindrical, ring subapical, J+, wedge-shaped, 4–5.6 µm high, 3.6–4 µm diam (Plate 5h, 6e–g). – Ascospores 72–86 x 7–10 µm, fusiform, tapering from the central septum pointed spine-like processes (Plate 6a–d; Tab. 1).

Material examined. – PHILIPPINES: Luzon, Laguna Province, Los Banos, in dead petiole of *Arenga*, Sep. 1912, C. F. Baker 52, S (holotype of *Merrilliopeltis hoehnelii*). – BRUNEI, Sungai Jalan Akar, on petiole of *Licuala* sp., Nov. 1992, K. D. Hyde 1837, BRIP 21923.

Oxydothis hoehnelii is distinct from other taxa as the ascospores are wide with blunt apical spines (Plate 6a–d; Tab. 1.16).

14. ***Oxydothis licualae*** (Syd. & P. Syd.) K. D. Hyde, Sydowia 45: 114. 1994. – Tab. 1.
≡ *Ophiobolus licualae* Syd. & P. Syd., Phil. J. Sci. C. Bot. 9: 165. 1914.

Ascomata forming under raised, blister-like, non-blackened areas on the host surface, solitary or mostly clustered; in section ca 325 µm high, 250 µm diam, subglobose or pyriform, surrounded by stromatic tissue, long axis parallel, oblique or perpendicular to that of the host surface with papillae usually appearing through tissues at the sides of the blisters. – Asci 195–240 x 10–16 µm, long cylindrical, ring subapical, wedge-shaped, 2–2.5 µm high, 2.5–3 µm diam. – Ascospores 56–82 x 5–6 µm, filiform, gradually tapering from the

central septum particularly towards the ends, with rounded processes with mucilage (Tab. 1).

Material examined. – PHILIPPINES: Palawan, Lake Manguao, on dead petioles of *Licuala spinosa* Thunb., Apr. 1913, E. D. Merrill 8946, S (holotype). – AUSTRALIA: north Queensland, Cairns, Freshwater Creek State Forest, on decaying petiole of *Licuala ramsayi*, Feb. 1992, K. D. Hyde 1072, BRIP 20850 (Phragmotype). On dead *Calamus* trunk, Feb. 1992, K. D. Hyde & J. Fröhlich, KDH 1008, BRIP 20851.

Type material borrowed from S comprised four pieces of palm frond, two pieces with a small number of *Linocarpon*-like fruiting structures. This was probably *Linocarpon livistonae* (Hyde, 1992), while no spores or asci could be found in the *Oxydothis*-like ascomata. In the original description Sydow & Sydow (1914) describe what appears to be an *Oxydothis* species and the description matches the Australian collection.This was proposed as neotype (Hyde, 1994b) and it should now be phragmotype.

15. ***Oxydothis linospadicis*** J. Fröhl. & K. D. Hyde, Mycol. Res. 98: 215. 1994. – Tab. 1.

Ascomata forming under slightly raised darkened areas on the host surface, solitary or clustered; in section cylindrical, with long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing host cuticle. – Asci 112.5–137.5 x 10–12.5 µm, long cylindrical, ring subapical, J+, wedge-shaped, 1.2–1.6 µm high, 2.8–3.2 µm diam. – Ascospores 40–60 x 6.25–7.5 µm, fusiform, tapering gradually from the central septum to blunt processes (Tab. 1).

Material examined. – AUSTRALIA: north Queensland, Mossman River Gorge, living leaf of *Linospadix microcarya* (Domin.) Burret, Jun. 1992, J. Fröhlich, KDH 1344, BRIP 20468 (holotype).

Oxydothis linospadicis is unusual amongst the genus *Oxydothis* as it is an opportunistic pathogen on leaves. It is closest to *O. elaeidis* but differs in ascospore morphology.

16. ***Oxydothis livistonae*** H. Syd. & P. Syd., Ann. Mycol. 15: 208. 1917. – Plate 7a,b,e,f; Tab. 1.

Ascomata forming under blackened shiny dome-shaped areas, ca 1 mm diam, on the host surface, solitary or clustered (Plate 7a,b); in section cylindrical, long axis parallel to that of the host surface with papilla at one end, curving upwards and piercing the host cuticle. –

Asci 300 µm x 11–14 µm, long cylindrical, ring subapical, J–, with a faint canal leading to the apex. – Ascospores 150–170 x 4–5.5 µm, filiform, 2-celled, tapering gradually from the central septum and then more acutely near the ends to form pointed processes provided with a drop of mucilage (Plate 7e,f; Tab. 1).

Material examined. – PHILIPPINES: Luzon, Laguna Province, Mt Maquiling, in petiole of *Livistona*, Apr. 1915, Baker 568, S (lectotype), K.

I have seen type material of *Oxydothis livistonae* from both S and K. Material from S contained three distinctly separate pieces of palm petiole, with two *Oxydothis* species growing on each. However, one of the species with dark ascomata agrees well with the description of Sydow & Sydow (1917). The other species is described as new (= *O. livistonicola* K. D. Hyde) in this paper.

The sample from S was numbered 568 and labelled the holotype, but does not agree with C.F. Baker no 3188 which is recorded as being the holotype collected in April 1914 by Sydow & Sydow (1917). However, unless the original number can be located this sample contains material of *Oxydothis livistonae* similar to that described by Sydow & Sydow (1917) and can be considered the lectotype. The specimen from K contained ascomata with ascospores of the second species only.

Oxydothis livistonae is distinct from all other *Oxydothis* species in having the largest ascospores.

17. ***Oxydothis livistonicola*** K. D. Hyde sp. nov. – Plate 7c,d,g,h; Tab. 1.

Ascomata ca 400 µm diam, 100 µm high, immersa, ostiolata. Asci ca 260 x 10 µm, cylindracei, apparato subapicali iodo coerulescenti, 1.2–1.6 µm alto, 2.4–3.2 µm diam praediti. Ascosporae 74–96 x 6–8 µm, fusiformes, hyalinae, bicellulares, angustatae.

Etymology. – From the host.

Ascomata forming under slightly darkened, raised dome-shaped areas, ca 600 µm diam, on the host surface, surrounded by an outer blackened zone, mostly clustered (Plate 7a,c); in section ca 400 µm long, 100 µm high, cylindrical, immersed in a stroma, surrounded at each end by vertically oriented palisade-like cells, long axis parallel to that of the host surface with neck at one end, curving upwards and piercing the host cuticle. – Asci ca 260 x 10 µm, long cylindrical, ring subapical, J+, discoid, 1.2–1.6 µm high, 2.4–3.2 µm diam (Plate 7c). – Ascospores 74–96 x 6–8 µm, long-fusiform,

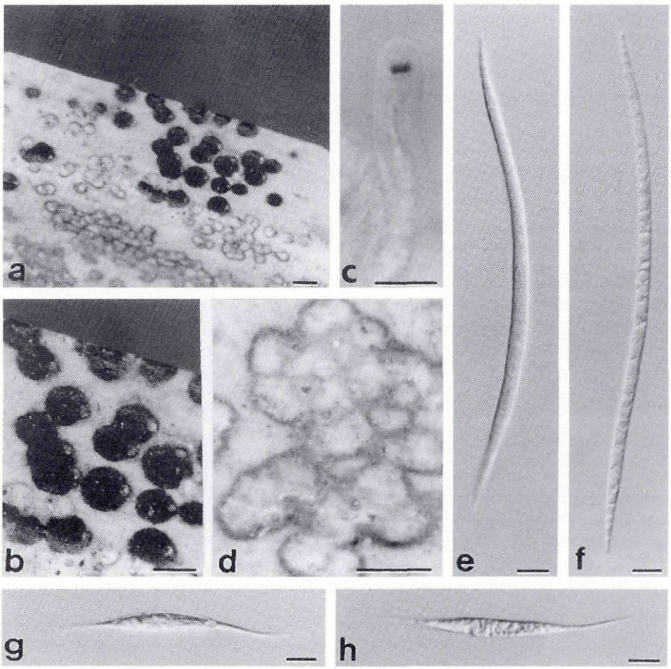


Plate 7a–h. *Oxydothis* spp. (from holotype). – a. Appearance of ascomata of *O. livistonae* (black discs) and *O. livistonicola* (discs with darkened rim) on host surface. – b. Appearance of ascomata of *O. livistonae* on host surface. – c. Appearance of ascomata of *O. livistonicola* on host surface. – d. Ascus of *O. livistonicola* with J+ subapical ring. – e, f. Ascospores of *O. livistonae*. – g, h. Ascospores of *O. livistonicola*. – Bars: a–c = 1 mm; d–h = 10 µm.

tapering gradually from the central septum, then abruptly, and narrowing out to form long spine-like processes (Plate 7g, h; Tab 1).

Material examined. – PHILIPPINES: Luzon, Laguna Province, Mt. Maquiling, Apr. 1915, Baker 568, S (holotypus, on material designated as holotype of *Oxydothis livistonae*).

Oxydothis livistonicola is different from *L. livistonae* in having shorter ascospores and morphologically distinct ascomata. Both specimens occurred on the holotype deposited by Sydow at S (see

under *O. livistonae*). The taxon is closest to *Oxydothis luteaspora* K. D. Hyde and *O. rubella* K. D. Hyde, but differs in ascospore shape.

18. ***Oxydothis livistonica*** K. D. Hyde, comb. nov. – Plate 8a–e; Tab. 1.
≡ *Leiosphaerella livistonae* I. Hino & Katum., J. Japan Bot. 41: 331. 1966.

Ascomata immersed in host tissue, visible as black ostiolar dots; in section 350–400 µm high, 60–80 µm diam, cylindrical, or irregular due to constraint by the vascular bundles, long axis oblique or perpendicular to that of the host surface and central neck (Plate 8a,b). – Asci 160–200 x 7–10 µm, cylindrical, ring subapical, J+, discoid, 1.5–2 µm high, 3–4 µm diam (Plate 8e). – Ascospores 86–105 x 5–6.5 µm, filiform, tapering gradually from the central septum to rounded processes (Plate 8c, d; Tab. 1).

Material examined. – JAPAN, Hyuga Province, Miyazaki, Aosima, in decaying petiole of *Livistona subglobosae* Mart., 2 Mar. 1955, K. Katumoto, FAUY (holotype).

Since this taxon is provided with long cylindrical asci with a blue staining subapical ascal ring and filiform bicelled ascospores, it is better placed in *Oxydothis*. It differs from other *Oxydothis* species and as the epithet „*livistonae*" has been used by Sydow & Sydow (1917) for a large spored species on *Livistona*, a new epithet „*livistonica*" is introduced.

19. ***Oxydothis luteaspora*** K. D. Hyde, Sydowia 45: 115. 1994. – Tab. 1.

Ascomata forming under raised, undarkened, dome-shaped areas on the host surface, clustered, visible as blackened ostiolar dots; in section cylindrical to lenticular, long axis parallel to that of the host surface, with neck at one end, curving upwards and piercing the host cuticle. – Asci 220–280 x 12–18 µm, long cylindrical, ring subapical, J+, wedge-shaped, 2–4 µm high, 2.5–4 µm diam. – Ascospores 84–100 x 6.5–8.5 µm, filiform, tapering from the central septum to pointed processes (Tab. 1).

Material examined. – AUSTRALIA: north Queensland, Cairns, Freshwater Creek State Forest, on petiole of *Calamus* sp., Feb. 1992, K. D. Hyde & J. Fröhlich, KDH 1055, BRIP 20852 (holotype).

Oxydothis luteaspora differs from other *Oxydothis* species in ascospore size and morphology and in ascospores being released from

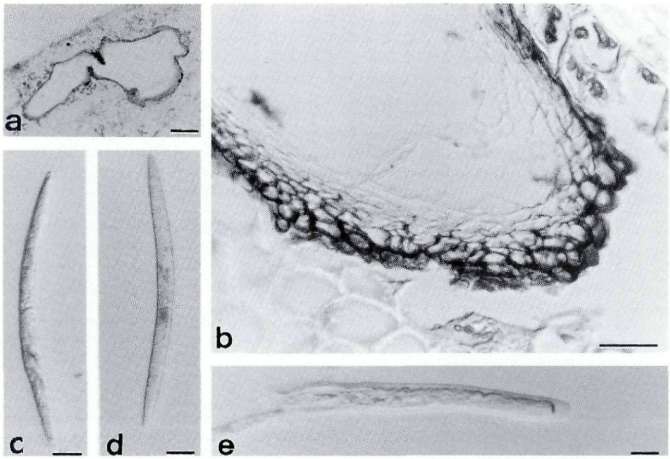


Plate 8a–e. *Oxydothis livistonica* (from holotype). – a. Section of ascomata. – b. Peridium. – c,d. Ascospores. – e. Ascus with J+ subapical ring. – Bars: a = 100 µm; b–e = 10 µm.

the ascoma as a yellow cirrus. Hyde (1994b) has illustrated this species.

20. ***Oxydothis maculosa*** Penzig & Sacc., Malpighia 11: 506. 1987. – Plates 9a–c; Tab. 1.

Ascomata forming under blackened regions on the host surface, clustered; in section ellipsoidal, long axis parallel to that of the host surface, with a neck at one end, curving upwards and piercing the host cuticle. – Asci cylindrical, ring subapical, J+, rectangular, 2–2.5 µm high, 2–3 µm diam (Plate 9a). – Ascospores 66–89 x 4–5 µm, long fusiform, tapering from the central septum to pointed processes (Plate 9b,c; Tab. 1).

Material examined. – INDONESIA: Java, Bogor, Botanical Gardens, in dead palm petiole, 8 Mar. 1897, PAD (holotype); Cibodas, Botanical Gardens, on petiole of palm, Mar 1992, K. D. Hyde 1125c, BRIP 21924.

Oxydothis maculosa is close to *O. grisea* and *O. aequalis*, but differs in ascospore and ascal ring size and morphology.

21. ***Oxydothis maquilingiana*** (Sacc.) K. D. Hyde, comb. nov. – Plate 10a–d; Tab. 1.
≡ *Ophiobolus maquilingianus* Sacc. Notae Mycol. 23: 68. 1917.

Ascomata forming under non-darkened raised blister-like regions on the host surface, visible as blackened ostiolar dots, clustered (Plate 10a); in section cylindrical or globose, long axis parallel, oblique or perpendicular to that of the host surface with a central papilla. – Asci (non intact) cylindrical, ring subapical, J+, wedge-shaped, 2.6–3.5 µm diam, 1.6–2.4 µm high. – Ascospores 85–95 x 5–6 µm, filiform, tapering gradually from the central septum to rounded processes with mucilage (Plate 10b–d; Tab. 1).

Material examined. – PHILIPPINES: Los Baños, Mt Maquiling, on dead petiole of *Daemonorops* sp., Dec. 1915, C. F. Baker 3975, PAD (holotype of *Ophiobolus maquilingianus*).

22. ***Oxydothis manokwariensis*** K. D. Hyde, sp. nov. – Plates 9d–g; Tab. 1.

Ascomata 260–460 x 90–130 µm, subglobosa vel ellipsoidea, immersa, nigra, gregaria. Asci 180–220 x 10–14 µm, cylindracei, apparato subapicali iodo coerulescenti, 3–3.5 µm alto, 2.25–2.5 µm diam praediti. Ascosporae 74–98 x 4–5 µm, filiformes, hyalinae, bicellulares, angustatae.

Etymology. – In reference to the location Manokwari.

Ascomata forming under raised blister-like regions on the host surface, occasionally cracking to reveal ascomata, clustered; in section 260–460 µm high, 90–130 µm diam, subglobose or ellipsoidal, black, long axis parallel or oblique to the that of the host surface, neck at one end, curving upwards and piercing the host cuticle (Plate 9d). – Asci 180–220 x 10–14 µm, long cylindrical, ring subapical, J+, rectangular, 3–3.5 µm high, 2.25–2.5 µm diam (Plate 9e,f). – Ascospores 74–98 x 4–5 µm, filiform, tapering from the central septum to rounded processes (Plate 9g; Tab. 1).

Material examined. – INDONESIA: Irian Jaya, Manokwari, on unidentified palm in freshwater swamp, Mar. 1992, K. D. Hyde & N. Raga, KDH 1217, BRIP 21925 (holotype).

The species is similar to *Oxydothis licualae*, but differs in ascal ring size, ascospore width and host.

23. ***Oxydothis nigra*** K. D. Hyde, sp. nov. – Plates 11a–i, 12a–k; Tab. 1.

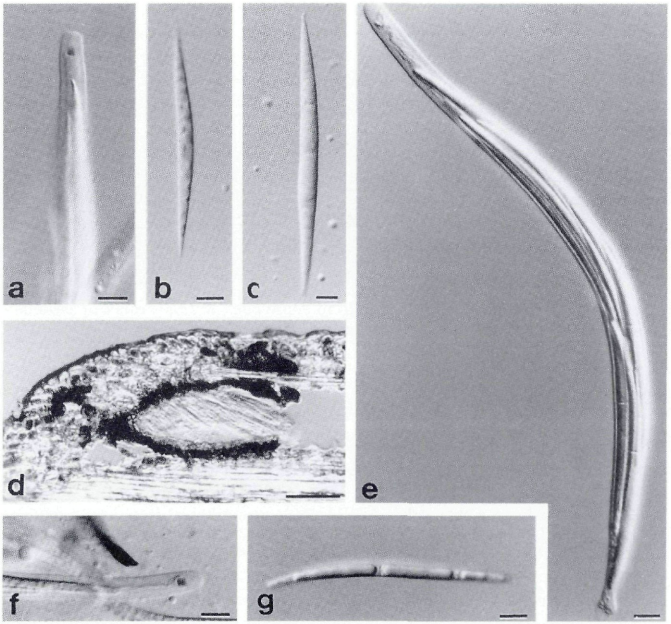


Plate 9a–g. *Oxydothis* spp. (from holotype). – a. Ascus of *O. maculosa* with J+ subapical ring. – b,c. Ascospores of *O. maculosa*. – d. Section of ascoma of *O. manokwariensis*. – e, f. Ascus of *O. manokwariensis* with J+ subapical ring. – g. Ascospore of *O. manokwariensis*. – Bars: d = 100 µm; a–c, e–g = 10 µm.

Ascomata 0.4–0.6 mm diam, cylindracea, immersa, nigra, solitaria vel gregaria. Asci 225–315 x 14–18 µm, cylindracei, apparato subapicali iodo coerulescenti, 2–3.6 µm alto, 3.6–4 µm diam praediti. Ascosporae 94–110 x 5–6 µm, fusiformes, hyalinae, bicellulatae, angustatae.

Etymology. – In reference to the shiny black stroma clearly visible on the host surface.

Ascomata forming under individually weakly raised, black dome-shaped areas, 0.4–0.6 mm diam, on the host surface, single or clustered (Plate 11a,b); in section 600 µm long, 150 µm high, cylindrical, axis parallel with that of the host surface, papilla at one end, curving upwards and piercing the host cuticle (Plate 11c–h). – Asci 225–315 x 14–18 µm, long cylindrical, ring subapical, J+,

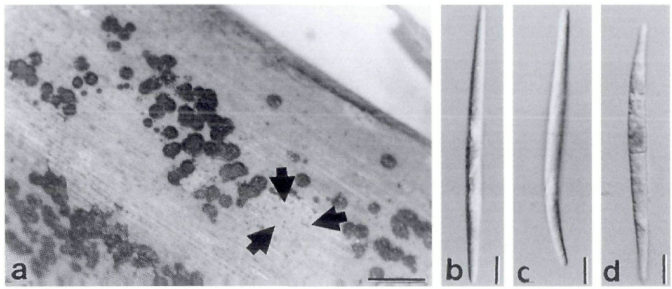


Plate 10a–d. *Oxydothis maquilingiana* (from holotype). – a. Appearance of ascomata on host surface. – b–d. Ascospores. – Bars: a = 1 mm; b–d = 10 µm.

wedge-shaped, 2–3.6 µm high, 3.6–4 µm diam (Plate 12d–f,k). – Ascospores 94–110 x 5–6 µm, fusiform, tapering from the central septum to pointed processes (Plate 12a–c, i, j; Tab. 1).

Material examined. – MALAYSIA: Pasoh Forest Reserve, on petioles of *Licuala* sp., Oct. 1991, K. D. Hyde 834, BRIP 21926 (holotype). K. D. Hyde 833, BRIP 21927 (with *O. grisea*). Nov. 1992, K. D. Hyde 1633, BRIP 21928.

Ascospores of *Oxydothis nigra* are longer than those of *O. grisea* and *O. hoehnelii* (94–110 µm, vs. 83.7–99 and 72–86 µm) and shorter and thinner than those of *O. daemonoropis* (94–110 x 5–6 µm vs. 116–134 x 8–10 µm). A *Chloridium* species encircled each stroma on the host surface (Plate 11a–f, 12g, h), but I do not believe this is the anamorph. Attempts to obtain single spore isolates of both fungi were unsuccessful. Diamond-shaped cavities indicating soft rot decay occurred beneath the ascomata (Plate 11i).

24. ***Oxydothis nonamyloidea*** K. D. Hyde, sp. nov. – Plate 13a–e; Tab. 1.

Ascomata 0.5–0.65 mm diam, nigra, solitaria vel gregaria. Asci 205–260 x 18–22 µm, cylindracei, apparato subapicali iodo non coerulescenti. Ascospores 94–115 x 3.5–4.5 µm, fusiformes, hyalinae, bicellulares, angustatae.

Etymology. – In reference to the nonamyloid apical apparatus in the ascus.

Ascomata forming under weakly raised, blackened discs 0.5–0.65 mm diam, on the host surface, singly or mostly clustered

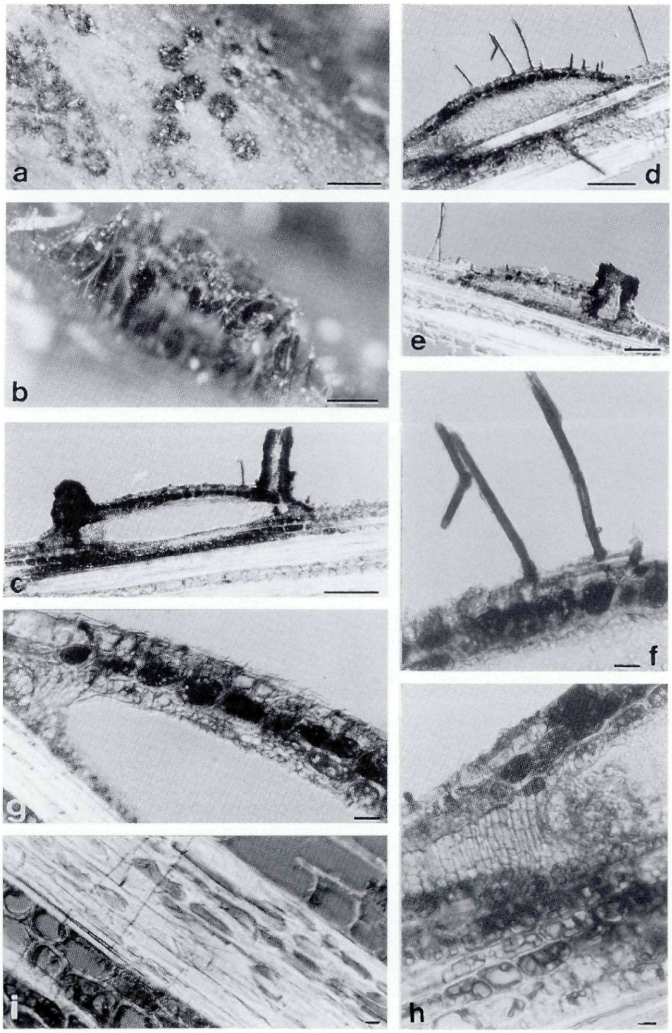


Plate 11a–i. *Oxydothis nigra* (from holotype). – a,b. Appearance of ascomata on host surface. Note the outer ring of conidiophores. – c–h. Sections of ascomata. Note the blackened stroma (g), protruding neck (e) and conidiophores (d, f) and wedge of palisade-like cells at the periphery (h). – i. Softwood cavities in palm lignocellulose beneath ascomata. – Bars: a = 1 mm; b–e = 100 µm; f–i = 10 µm.

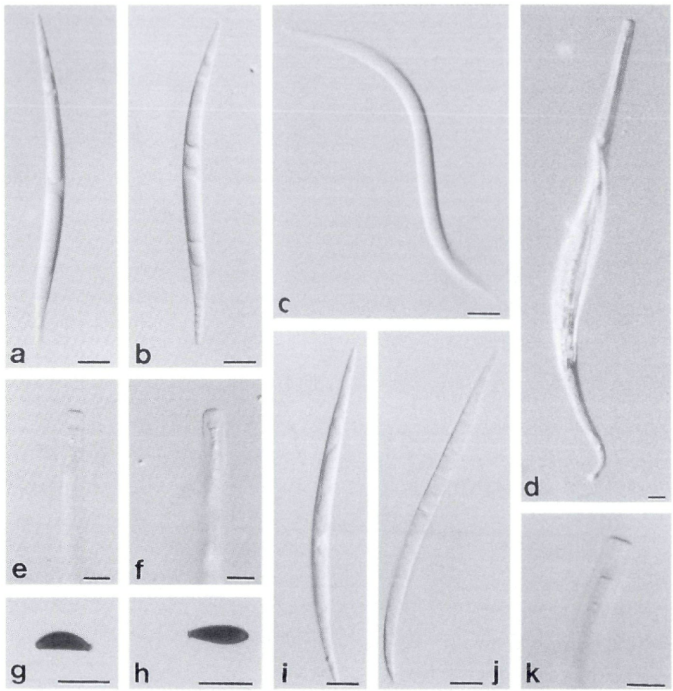


Plate 12a–h. *Oxydothis nigra* (from holotype). – a–c, i, j. Ascospores. – d–f, k. Asci with faint J+ subapical ring. – g, h. Conidia of *Chloridium* sp. associated with ascomata. – Bars: 10 µm.

(Plate 13a,b); in section cylindrical, long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing the host cuticle. – Asci 205–260 x 18–22 µm, long cylindrical, ring subapical, J– (Plate 13e). – Ascospores 94–115 x 3.5–4.5 µm, long fusiform, tapering gradually from the central septum to pointed processes (Plate 13c,d; Tab. 1).

Material examined. – INDONESIA: North Sulawesi, Eastern Dumoga–Bone National Park, Project Wallace Base Camp; 00°34'N, 123°57'E, on petiole of *Livistona* sp., Sep–Nov 1975, G.J. Samuels 2483, NY (holotype).

Oxydothis nonamyloidea is unusual because the ring in the ascus is non–amyloid. Ascospores of *O. nonamyloidea* are longer than those

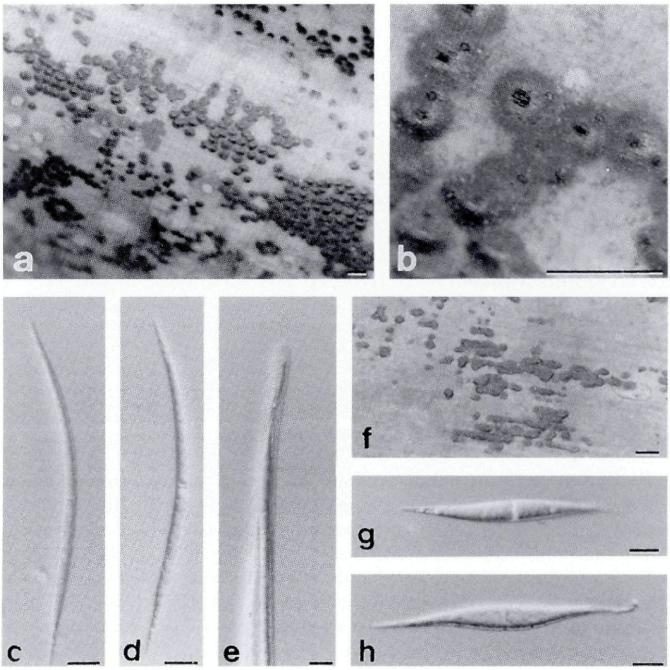


Plate 13a–h. *Oxydothis* spp. (from holotypes). – a, b. Appearance of *O. nonamyloidea* on host surface. – c, d. Ascospores of *O. nonamyloidea*. – e. Ascus of *O. nonamyloidea* with J– subapical ring. – f. Appearance of *O. nypicola* on host surface. – g, h. Ascospores of *O. nypicola*. – Bars: a, b, f = 1 mm; c–e, g, h = 10 µm.

of *O. grisea* and *O. hoehnelii* and both shorter and thinner than those of *O. daemonoropis*. It also differs from *O. oedema* (Mont.) K. D. Hyde which has a blue staining slit-like ring.

25. ***Oxydothis nypae*** K. D. Hyde & A. Nakagiri, Trans. Mycol. Soc. Japan 30: 70. 1988. – Tab. 1.

Ascomata forming under blister-like areas on the host surface, clustered; in section subglobose, long axis oblique to that of the host surface with a central papilla. – Asci 198–349 x 8.5–12 µm, long cylindrical, ring subapical, J+, wedge-shaped, 1.6–2.2 µm high,

1–1.6 µm diam. – Ascospores 82–113 x 2.5–4.1 µm, filiform, tapering gradually from the central septum to rounded ends with mucilage (Tab. 1).

Material examined. – BRUNEI: Tungit Api Api, on intertidal fronds of *Nypa fruticans* Wurmb., 14 Jun. 1987, K. D. Hyde, IMI 326619 (holotype).

Oxydothis nypae is closest to *O. oedema*. Differences are given under the latter taxon. Hyde & Nakagiri (1989) have illustrated this species.

26. ***Oxydothis nypicola*** K. D. Hyde, sp. nov. – Plate 13f–h; Tab. 1.

Ascomata 600 x 400 µm, nigra, gregarious, ostiolata. Asci 220–260 x 14–28 µm, cylindracei, apparato subapicali iodo coerulescenti, 3 µm alto, 4–5 µm diam praediti. – Ascosporae 74–92 x 6–7.5 µm, fusiformes, hyalinae, bicellulares, angustatae.

Etymology. – From the host *Nypa*.

Ascomata forming under blackened, shiny, dome-shaped discs, individually ca 600 µm long, 400 µm wide on the host surface, mostly clustered in linear or irregular groups (Plate 13f); in section lenticular, long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing the host cuticle. – Asci 220–260 x 14–28 µm, long cylindrical, ring subapical, faintly J+, discoid, 3 µm high, 4–5 µm diam. – Ascospores 74–92 x 6–7.5 µm, long fusiform, tapering from the central septum to drawn out apiculate ends (Plate 13g, h; Tab. 1).

Material examined. – BRUNEI: Tungit Api Api, on decayed petiole of *Nypa fruticans*, Dec. 1988, K. D. Hyde 739, BRIP 19328 (holotype).

27. ***Oxydothis obducens*** K. D. Hyde, sp. nov. – Plate 14a–i; Tab. 1.

Ascomata 100–140 µm diam, 70–80 µm alta, lenticulares, solitaria. Asci 94–140 x 10–12 µm, cylindracei, apparato subapicali iodo coerulescenti, cylindracei, 1.6 µm alto, 2–2.4 µm diam praediti. Ascosporae 36–48 x 4–5.6 µm, filiformes, hyalinae, bicellulatae, angustatae.

Etymology. – From the Latin *obducens* meaning covering, in reference to the ascomata on the host surface.

Ascomata forming under blackened, shiny dome-shaped discs on the host surface, surrounded by an outer blackened zone, solitary (Plate 14a, b); in section 100–140 µm long, 70–80 µm high, lenticular,

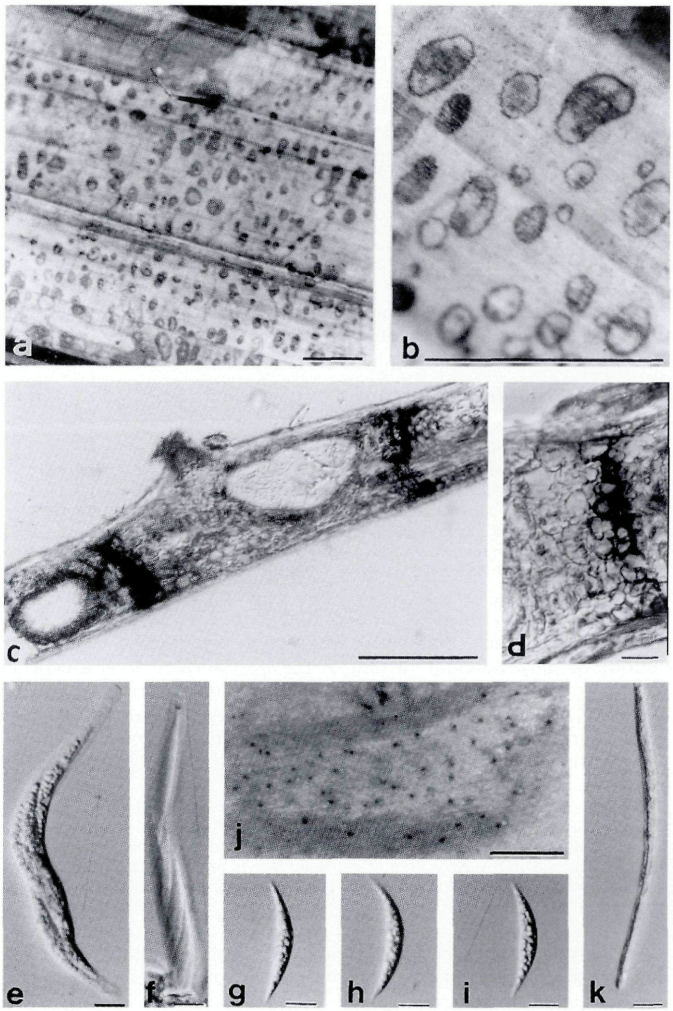


Plate 14a–k. *Oxydothis* spp. (from holotypes). – a,b. Appearance of ascomata of *O. obducens* on host surface. c, d. Section of ascoma (c) and stroma (d) of *O. obducens*. – e, f. Ascus of *O. obducens* with J+ subapical ring. – g–i. Ascospores of *O. obducens*. – j. Appearance of ascomata of *O. oedema* on host surface. – k. Ascospore of *O. oedema*. – Bars: a, b, j = 1 mm; c = 100 µm; d–i, k = 10 µm.

long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing the host cuticle (Plate 14c). – Stromata variable, occurring as an outer blackened zone through the leaf (Plate 14d). – Asci 94–140 x 10–12 µm, cylindrical, ring subapical, J+, cylindrical, 1.6 µm high, 2–2.4 µm diam (Plate 14e, f). – Ascospores 36–48 x 4–5.6 µm, fusiform, straight or curved, tapering from the central septum to drawn out apiculate ends (Plate 14g–i; Tab. 1).

Material examined. – AUSTRALIA: North Queensland, Mission Beach, rainforest 'board walk', on living leaves of *Linospadix microcarya* incubated in a moist chamber, Jul. 1992, J. Fröhlich, KDH 1452, BRIP 21929 (holotype).

This species is probably an endophyte since it developed on cut living leaves incubated in a moist chamber for seven days.

28. ***Oxydothis oedema*** (Mont.) K. D. Hyde, comb. nov. – Plate 14j, k; Tab. 1.

= *Sphaeria oedema* Mont., Syll. Gen. Sp. Crypt. n. 859. 1856.
Rhaphidospora oedema (Mont.) Ces. & De Not., Cent. II, n. 57: 326. 1863.
= *Ophiobolus oedema* (Mont.), Sacc., Syll. Fung. 2: 351. 1883.
= *Metasphaeria cocoës* Petch, Ann. Roy. Bot. Gard. Peradeniya 4: 304. 1909.
= *Leiosphaerella cocoës* (Petch) Samuels & Rossman, Mycotaxon 28: 465. 1987.
= *Leiosphaerella longispora* Sivanesan, D.E. Shaw & J. S. Brown, Trans. Brit. Mycol. Soc. 67: 531. 1976.

Ascomata forming under blister-like areas on the host surface, gregarious (Plate 14j); in section subglobose, long axis oblique or perpendicular to that of the host surface with a central papilla. – Asci 205–275 x 9–12 µm, long cylindrical, ring subapical, J+, discoid, 1–1.2 µm high, 3.2–4.4 µm diam. – Ascospores 84–110 x 3.5–5 µm, filiform, tapering gradually from the central septum towards the rounded poles, with polar mucilage (Plate 14k; Tab. 1).

Material examined. – GUIANA: on petiole of *Mauritia flexuosa* Linnaeus filius, Apr. 1889, Leprieur, P (holotype). – SRI LANKA: Kurunegala, on coconut palm petiole, Jan. 1907, Petch, K (holotype of *Metasphaeria cocoës*). – PAPUA NEW GUINEA: Aroa Plantation, Hisiu Beach, on petiole of *Cocos nucifera* L., Charles (TPNG 8369), 19 Oct. 1972, IMI 171688c (holotype of *Leiosphaerella longispora*).

The type material of *Sphaeria oedema* contains both *Linocarpon* and *Oxydothis* ascomata. However, a diagram included in the package apparently drawn by Montagne illustrates an *Oxydothis* species. *Oxydothis oedema* is close to *O. nypae*, but differs in having wider ascospores (3.5–5 µm vs. 2.5–4.1 µm) and a longer ring (3.2–4.4 µm vs. 1.6–2.2 µm). *Metasphaeria cocoës* has similarly sized

ascospores and a similarly sized ascus ring and is proposed as a synonym of *O. oedema*.

29. ***Oxydothis opaca*** (Berk.) K. D. Hyde, comb. nov. – Plate 15g–i; Tab. 1.
≡ *Pemphidium opacum* Berk., Fl. N. Zel. 2: 207. 1860.
= *Oxydothis rhopalostylidis* Samuels & Rossman, Mycotaxon 28: 467. 1987.

Ascomata forming under individually weakly raised, black areas, 300–600 µm diam, on the host surface, surrounded by a darkened margin, single or clustered (Plate 15g,h); in section cylindrical, long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing the host cuticle. – Asci (not intact) long cylindrical, ring subapical, J+, discoid, 0.8 µm high, 3.6–4 µm diam. – Ascospores 70–83 x 5–7 µm, fusiform, tapering from the central septum to form pointed processes (Plate 15i; Tab. 1).

Material examined. – NEW ZEALAND: Titiokura, on dead stem of *Rhipogonum*, 1860, M. J. Berkeley, K (holotype). Northland, Hokianga County, vic. Mangamuka Bridge, Omahuta State Forest, at forest headquarters, on *Rhopalostylis sapida* H. A. Wendland & Drude, Samuels 83–507, May 1983, PDD 45779 (holotype of *Oxydothis rhopalostylidis*).

30. ***Oxydothis oraniopsis*** J. Fröhl. & K. D. Hyde, Mycological Research 98: 215. 1994. – Tab. 1.

Ascomata forming under slightly raised dome-shaped regions on the host surface, solitary or in small groups; in section subglobose to cylindrical, long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing the host cuticle. – Asci 162.5–217.5 x 10–17.5 µm, long cylindrical, ring subapical, J+, discoid, 1–1.5 µm high, 2.5 µm diam. – Ascospores 57.5–77.5 x 5.5–8 µm, fusiform, gradually tapering from the central septum to long narrow processes (Tab. 1).

Material examined. – AUSTRALIA: north Queensland, Julatten, Mount Lewis, living leaf of *Oraniopsis appendiculata*, Aug. 1992, J. Fröhlich & K. D. Hyde, KDH 1509, BRIP 20422 (holotype). Jul. 1992, J. Fröhlich & C. Pearce, KDH 1462. Living leaf of *Laccospadix australasicus* H. A. Wendland & Drude, Aug. 1992, J. Fröhlich & K. D. Hyde, KDH 1513b.

31. ***Oxydothis pandani*** Huguenin, Bull. Soc. Mycol. France 80: 173. 1964. – Plate15a–c; Tab. 1.
= *Schizochora pandani* Stevens, Bern. P. Bishop Mus. Bull. 19: 20. 1925.

Ascomata forming under rounded blackened areas on the host surface, solitary or groups of 2–3 coalescing (Plate 15a); in section ellipsoidal, long axis parallel to that of the host surface, with a neck at

one end, curving upwards and piercing the host cuticle. – Asci (not intact) cylindrical, ring subapical, J+, discoid, 0.8–1.6 µm high, 3.6–4.8 µm diam. – Ascospores 56–60 x 6–7.5 µm, fusiform, tapering from the central septum to pointed processes (Plate 15b,c; Tab. 1).

Material examined. – TUBUAI IS. (South Pacific): Rurutu, in leaves of *Pandanus tectorius*, Oct. 1962, B. Huguenin, IMI 113480 (isotype). USA: Hawaii, Oahu, Kalihi valley, on leaf of *Pandanus odoratissimus*, June 2 1921, F. Stevens, BISH (holotype of *Schizochora pandani*).

32. ***Oxydothis pandanicola*** (H. Syd. & P. Syd.) Petr., Sydowia 6: 367. 1952. – Plate 15d–f; Tab. 1.

≡ *Didymella pandanicola* H. Syd. & P. Syd., Phil. J. Sci. C. Bot. 9: 164. 1913.

Ascomata forming under slightly raised blackened discs on the host surface, singly or mostly clustered (Plate 15d); in section cylindrical, long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing the host cuticle. – Asci long cylindrical, ring subapical, J+, discoid, 1–1.2 µm high, 2.8–3.2 µm diam (Plate 15f). – Ascospores 48–56 x 5.5–8 µm, fusiform, tapering from the central septum to draw out apiculate ends (Plate 15e; Tab. 1.6).

Material examined. – PHILIPPINES: Palawan, Silanga, on dead *Pandanus* leaves, May 1913, E. D. Merrill 8918, S (holotype of *Didymella pandanicola*). – INDONESIA: Java, Cibodas, on dead *Pandanus* leaf, Mar. 1992, K. D., Hyde 1123b, BRIP 21930.

33. ***Oxydothis parasitica*** J. Fröhl. & K. D. Hyde, Mycological Research 98: 214. 1994. – Tab. 1.

Ascomata forming under raised, dome-shaped areas in the centre of leaf spots, on both surfaces of host pinnae, clustered or solitary; in section subglobose, long axis perpendicular to that of the host surface with a central neck. – Asci 92.5–137.5 x 7.5–12.5 µm, cylindrical to fusiform, ring subapical, J+, wedge-shaped, 2.5–3 µm high, 1.75–2.25 µm diam. – Ascospores 25–42.5 x 5–9 µm, filiform, tapering abruptly from the central septum to form wide blunt processes (Tab. 1).

Material examined. – AUSTRALIA: north Queensland, Fresh Water Creek State Forest, on leaf spot on living leaf of *Licuala ramsayi* (F. Muell.) Domin., Feb. 1992, J. Fröhlich & K. D. Hyde, KDH 1001, BRIP 20469 (holotype).

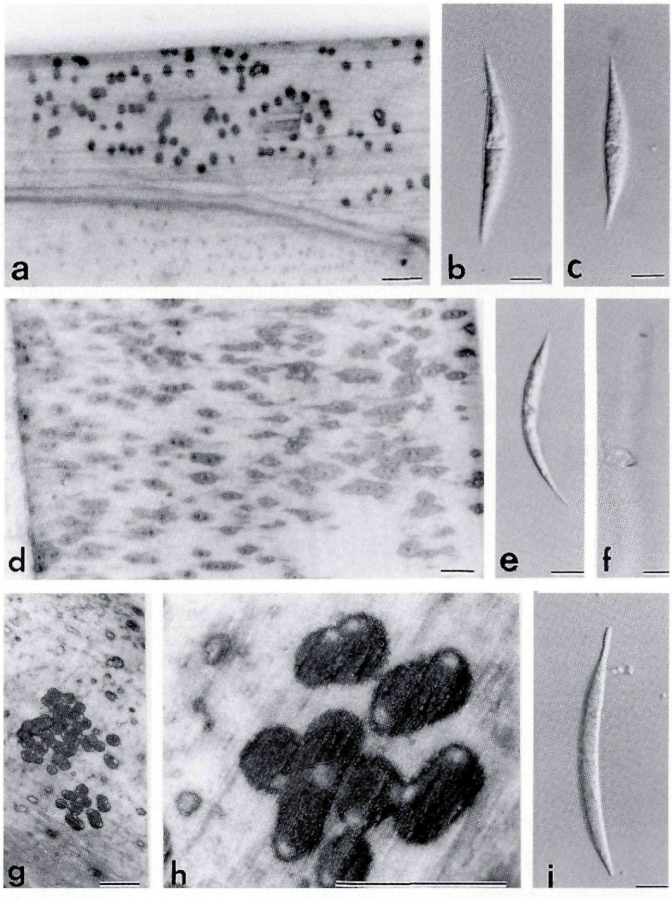


Plate 15a–i. *Oxydothis* spp. (from holotypes). – a. Appearance of ascomata of *O. pandani* on host surface. – b, c. Ascospores of *O. pandani*. – d. Appearance of ascomata of *O. pandanicola* on host surface. – e. Ascospore of *O. pandanicola*. – f. Ascus of *O. pandanicola* with J+ subapical apparatus. – g, h. Appearance of ascomata of *O. opaca* on host surface. – i. Ascospore of *O. opaca*. – Bars: a, d, g, h = 1 mm; b, c, e, f, i = 10 µm.

Oxydothis parasitica is a pathogen of *Licuala ramsayi*. The ascospores are distinct having wide blunt apices (compare Plates 1–12 in Fröhlich & Hyde 1994).

34. ***Oxydothis parvula*** (H. Syd. & P. Syd.) Petr., Sydowia 6: 314. 1952. – Plate 16a–e; Tab. 1.
≡ *Merrilliopeltis parvula* H. Syd. & P. Syd., Phil. J. Sci. C. Bot. 9: 164. 1913.

Ascomata forming under raised darkened dome-shaped areas, up to 200 µm diam on the host surface, mostly solitary (Plate 16a); in section lenticular, long axis parallel to that of the host surface, with a neck at one end curving upwards and piercing the host cuticle. – Asci 110–130 x 8–10 µm, long cylindrical, ring subapical, J+, wedge-shaped, 1–1.6 µm high, 2–2.8 µm diam (Plate 16e). – Ascospores 49–62 x 4–6 µm, long fusiform, tapering gradually from the central septum and then more quickly near the ends to form spine-like processes (Plate 16b–d; Tab. 1).

Material examined. – PHILIPPINES: Palawan, Lake Manguao, on dead fallen petiole of *Orania*, Apr. 1913, E. D. Merrill 8961, K (holotype).

35. ***Oxydothis poliothea*** H. Syd., Ann. Mycol. 28: 91. 1930. – Plate 16f–i; Tab. 1.

Ascomata forming under blister-like areas on the host surface, clustered; in section subglobose, long axis oblique to that of the host surface with a central papilla (Plate 16f). – Asci 190–240 x 12–15 µm, long cylindrical, ring subapical, J+, discoid, 1.6–2 µm high, 3.6–4 µm diam (Plate 16i). – Ascospores 62–86 x 5–6 µm, filiform, tapering gradually from the central septum towards the rounded poles with mucilage (Plate 16g, h; Tab. 1).

Material examined. – VENEZUELA: Puerto La Cruz, on palm petiole, Dec 1927, H. Sydow, 174c, BPI (holotype).

Oxydothis poliothea is similar to *Oxydothis nypae* but differs in having shorter ascospores which are 2-celled, sometimes 3-septate in older specimens.

36. ***Oxydothis ragai*** K. D. Hyde, sp. nov. – Plate 17a–f; Tab. 1.

Ascomata ca 170 µm diam, 80 µm alta, subglobosa vel pyriformia, ostiolata, solitaria. Asci 160–190 x 10–12 µm, cylindracei, apparato subapicali iodo coerulescenti, 4–5 µm alto, 2 µm diam praediti. Ascosporae 96–120 x 3.5–4.5 µm, filiformes, hyalinae, bicellulares, angustatae.

Plate 16a–i. *Oxydothis* spp. (from holotypes). – a. Appearance of ascomata of *O. parvula* on host surface. – b–d. Ascospores of *O. parvula*. – e. Ascus of *O. parvula* with J+ subapical apparatus. – f. Section of ascoma of *O. poliothea*. – g, h. Ascospores of *O. poliothea*. – i. Asci of *O. poliothea* with J+ subapical ring. – Bars: a = 1 mm; f = 100 µm; b–e, g–i = 10 µm.

Etymology. – Named after the collector Mr. N. Raga.

Ascomata forming under weakly raised, slightly darkened dome-shaped regions up to 300 µm diam, on the host surface, clustered; in section ca 170 µm long, 80 µm high, subglobose or pyriform, long axis parallel to that of the host surface, neck at one end, curving upwards and piercing the host cuticle (Plate 17a). – Asci 160–190 x 10–12 µm, cylindrical, ring subapical, J+, cylindrical, 4–5 µm high, 2 µm diam (Plate 17b,c). – Ascospores 96–120 x 3.5–4.5 µm, filiform, tapering gradually from the central septum to form rounded processes with mucilage (Plate 17d–f; Tab. 1).

Material examined. – INDONESIA: Irian Jaya, Manokwari, in freshwater swamp, on decaying petiole of indet. palm, Mar. 1992, N. Raga, KDH 1210, BRIP 21931.

37. ***Oxydothis rubella*** K. D. Hyde, Sydowia 45: 116. 1994. – Tab. 1.

Ascomata forming under raised, blister-like areas on the host surface, solitary or in small clusters or irregular rows; in section ellipsoidal, long axis parallel to that of the host surface, neck at one end, curving upwards and piercing the host cuticle at the sides of the blister-like areas. – Asci 256–320 x 13–20 µm, long cylindrical, ring subapical, J+, wedge-shaped, 5–6.5 µm high, 4–5 µm diam. – Ascospores 94–102 x 7–8.5 µm, fusiform, tapering from the central septum to pointed processes (Tab. 1).

Material examined. – AUSTRALIA: north Queensland, Cairns, Freshwater Creek State Forest, on trunk of dead *Calamus* sp., Feb. 1992, K. D. Hyde & J. Fröhlich, KDH 1006, BRIP 20853 (holotype).

Oxydothis rubella differs in forming red, raised, blister-like areas under which the ascomata develop, in having a distinctive large apical apparatus and in ascus and ascospores dimensions.

38. ***Oxydothis sabalensis*** (Cooke) Petr., Sydowia 6: 403. 1952. – Plate 18f, g; Tab. 1.
≡ *Sphaeria sabalensis* Cooke, Grevillea 7: 53. 1878.
≡ *Dilophia sabalensis* (Cooke) Sacc., Syll. Fung. 2: 358. 1883.
≡ *Metasphaeria sabalensis* (Cooke) Cooke, Grevillea 18: 16. 1889.

Ascomata forming under weakly raised, darkened areas on the host surface, single or clustered in groups of 2–3 (Plate 18f); in section ellipsoidal, long axis parallel to that of the host surface, neck at one end, curving upwards and piercing the host cuticle. – Asci 95–130 x 14–16 µm, long cylindrical, ring subapical, J+, discoid, 0.8–1 µm high, 2.6–4 µm diam. – Ascospores 44–56 x 4–6 µm, fusiform, tapering from the central septum to spine-like processes (Plate 18g; Tab. 1).

Material examined. – USA: Georgia, Darien, on petiole of *Sabal*, 1878, Cooke, K (holotype).

Oxydothis sabalensis is close to *O. elaeicola*, but differs in having shorter ascospores (44–56 x 4–6 µm, vs. 58–68 x 4–6 µm) and asci.

39. ***Oxydothis saltuensis*** K. D. Hyde, sp. nov. – Plate 18a–e; Tab. 1.

Ascomata 80–140 µm diam, 70–120 µm alta, subglobosa, immersa, ostiolata. Asci 108–126 x 9–11 µm, cylindracei, apparato subapicali iodo coerulescenti,

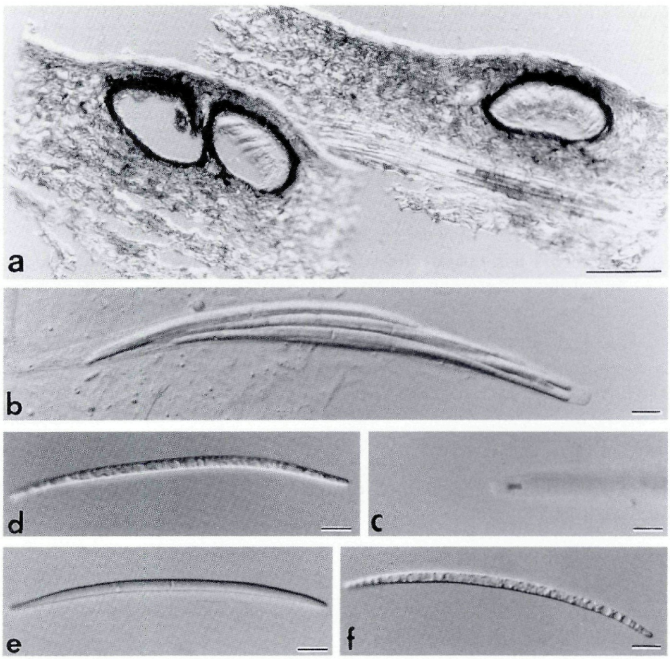


Plate 17a–f. *Oxydothis ragai* (from holotype). – a. Sections of ascomata. – b, c. Asci with J+ subapical ring. – d–f. Ascospores. – Bars: a = 100 µm; b–f = 10 µm.

0.8–1.2 µm alto, 2–2.4 µm diam praediti. Ascosporae 86–92 x 2.8–3.6 µm, filiformes, hyalinae, angustatae.

Etymology. – From the Latin *saltuensis* meaning 'belonging to a forest', in reference to the habitat.

Ascomata forming under raised blister-like areas on the host surface with necks protruding through the cracks at the sides (Plate 18a); in section 80–140 µm diam, 70–120 µm high, subglobose, often irregular in shape, long axis parallel or oblique to that of the host surface (Plate 18e). – Asci 108–126 x 9–11 µm, broad cylindrical, ring subapical, J+, discoid, 0.8–1.2 µm high, 2–2.4 µm diam (Plate 18d). – Ascospores 86–92 x 2.8–3.6 µm, filiform, tapering

gradually from the central septum to pointed processes (Plate 18b,c; Tab. 1).

Material examined. – INDONESIA: Irian Jaya, Manokwari, on unidentified palm petiole, Mar. 1992, K. D. Hyde & N. Raga, KDH 1211, BRIP 21933. – PAPUA NEW GUINEA, Western Province, Bensbach, on dead terrestrial frond of *Livistona* sp., May 1992, K. D. Hyde 1365e, BRIP 21932 (holotype).

40. ***Oxydothis selenosporellae*** Samuels & Rossman, Mycotaxon 28: 467. 1987 – Plate 18h–j; Tab. 1.

Ascomata forming under raised, black areas on the host surface, clustered, in section subglobose, long axis parallel to that of the host surface, papilla at one end, curving upwards and piercing the host surface (Plate 18h). – Asci 150–180 x 6.5–7.5 µm diam, long cylindrical, ring subapical, J+, wedge-shaped, 1–1.5 µm high, 2–2.5 µm. – Ascospores 55–64 x 3.5–4 µm, narrowly fusiform, tapering from the central septum to pointed spine-like processes (Plate 18i, j; Tab. 1).

Material examined. – NEW ZEALAND: Auckland, Waitakere Ranges, Waitemata City, Huia, Mill Bay, on *Rhopalostylis sapida*, 3 May 1983, Samuels 83–60, Matsushima & Peterson, PDD 46266 (holotype).

Oxydothis selenosporellae is very close to *O. elaeicola*. It differs in having asci with differing ring dimensions (1–1.5 µm high, 2–2.5 µm diam vs. 2.4–3.2 µm high, 1.5–2.0 µm diam) and narrower ascospores (3.5–4 µm vs 4–6 µm diam). With the differences in host (*Rhopalostylis* vs. *Elaeis*) and continents (New Zealand vs. Africa) I prefer to keep these species separate.

The anamorph of *Oxydothis selenosporellae* is reported to be a *Selenosporella* sp. (Samuels & Rossman, 1987). Samuels & Rossman (1987) describe the conidiophores produced in culture as macronematous, mononematous, 30–45 x 4–6 µm wide at the base, with (1–) 2–3 septa, unbranched or one branched, brown olivaceous and thick-walled below, thin-walled and nearly colourless above; according to the same authors, the conidiogenous cells are 10–15 µm long, finely denticulate, with a minute, refractive scar remaining after conidial dehiscence and the conidia are (17–) 23–27(–29) x 1–1.5(–2) µm, arcuate, without obviously differentiated apex or base, unicellular and colorless.

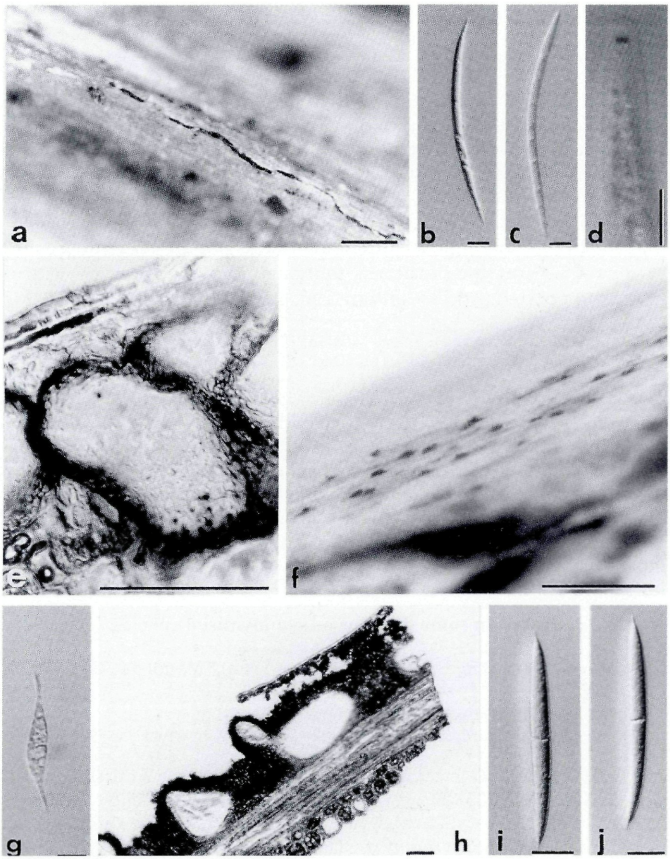


Plate 18a–j. *Oxydothis* spp. (from holotypes). – a. Appearance of *O. saltuensis* on the host surface. – b, c. Ascospores of *O. saltuensis*. – d. Ascus of *O. saltuensis* with J+ subapical ring. – e. Section of ascoma of *O. saltuensis*. – f. Appearance of *O. sabalensis* on the host surface. – g. Ascospore of *O. sabalensis*. – h. Section of ascomata of *O. selenosporellae*. – i, j. Ascospores of *O. selenosporellae*. – Bars: a, f = 1 mm; e, h = 100 µm; b–d, g, i, j = 10 µm.

41. ***Oxydothis tayabensis*** (H.S. Yates) Trotter, Syll. Fung. 24: 916. 1926. – Plate 19a–g; Tab. 1.
≡ *Merrilliopeltis tayabensis* H.S. Yates, Phil. J. Sci. C. Bot. 7: 377. 1917.

Ascomata forming under light coloured conical regions on the host surface, erumpent through star-shaped cracks, clustered (Plate 19a); in section conical with a flattened base, surrounded by vertically orientated elongate palisade-like brown cells, long axis perpendicular to that of the host with a central erumpent papilla (Plate 19b, c). – Asci 160–220 x 10–12 µm, cylindrical, ring subapical, J+, wedge-shaped, 2.8–3.4 µm high, 2–4 µm diam (Plate 19f, g). – Ascospores 80–96 x 4.5–7 µm, long fusiform, tapering gradually from the central septum to pointed processes (Plate 19d, e; Tab. 1).

Material examined. – PHILIPPINES: Luzon, Tayabas province, Basiad, on dead petioles of *Calamus* sp., Dec. 1916, Yates 25607, BPI (holotype).

This taxon has two-celled, long fusiform ascospores, characteristic of *Oxydothis* and long cylindrical asci with a subapical apparatus staining blue in iodine. The ascomata, however, are peculiar since they are erumpent through star-shaped cracks in the cortex of the host. The papilla is central and the stroma is well developed, composed of vertically orientated elongate brown cells. These cells cover numerous ascomata and completely surround and separate them.

Notes on some dubious or synonymised species

Oxydothis circularis Bres. apud Rick – Ann. Mycol. 4: 311. 1906. (nom. nud.)
≡ *Ophiodothella circularis* (Bres.) Petrak – Sydowia 5: 40. 1951.
≡ *Scolecodothis circularis* (Bres.) Theiss. & Syd. – Ann. Mycol. 12: 277. 1914.

A specimen of *O. circularis* Bres. was located at NY (Missouri Bot. Garden Herb. 152335). Material was examined and although no spores or asci were seen, this was not an *Oxydothis*. The fungus was transferred to *Ophiodothella* by Theissen & Sydow (1915). It causes tar spots on leaves of *Myrsine* sp. (Myrsinaceae). A discussion of this species is given by Hanlin & al. (1992).

Material examined. – BRAZIL: Rio Grande do Sul, São Leopoldo, on leaf of *Myrsine*, 1905, J. Rick, Missouri Bot. Garden Herb. 152335, NY (holotype).

Oxydothis insignis Speg., Revista del Museo de la Plata 15: 26. 1908.

This fungus described from *Eugenia* sp. by Spegazzini (1908) is not an *Oxydothis*. Type material contained leaves of *Eugenia* sp.? with

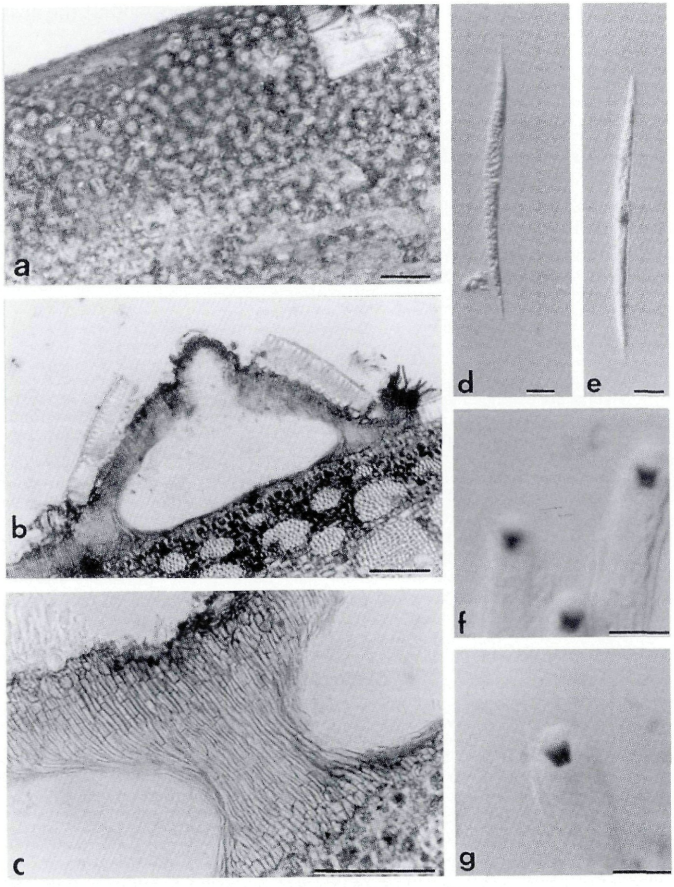


Plate 19a–g. *Oxydothis tabayensis* (from holotype). – a. Appearance of ascomata on host surface. – b. Section of ascoma. – c. Palisade-like cells between ascomata. – d, e. Ascospores. – f, g. Asci with J+ subapical rings. – Bars: a = 1 mm; b, c = 100 µm; d–g = 10 µm.

black raised tar spots. No asci or ascospores were located but the host and tar spot are not characteristic of *Oxydothis*.

Material examined. – BRAZIL: San Pablo, Ipiranga, Moca, on leaf of *Eugenia* sp. (tar spot), 1905, Usteri No 104, Spegazzini No 397, LPS (holotype).

Oxydothis pertusarioides Rehm, Ann. Mycol., 5: 530. 1907.

I was unable to locate type material of this taxon, but it seems unlikely to be an *Oxydothis*, because ascospores are described as unicellular, wide and with rounded ends, while the asci are clavate and thick-walled (Rehm, 1907).

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(Manuscript accepted 31st May 1994)

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