Fungi from palms. VI. Reflections on *Oxydothis* and related genera

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*Ceriospora, Ceriosporella, Frondispora* gen. nov., *Leiosphaerella, Oxydothis* and related genera from palms are examined and their differences highlighted. The type species of each genus is diagnosed and species included in *Leiosphaerella, Ceriospora* and *Ceriosporella* from palms are discussed.

Keywords: *Ceriospora, Ceriosporella, Frondispora, Lasiobertia, Leiosphaerella, Linocarpon, Oxydothis, Pemphidium*, palm fungi.

Fallen palm rachides and leaves are invariably colonised by fungi of the genera *Astrosphaeriella* Syd. & P. Syd., *Linocarpon* Syd. & P. Syd., *Oxydothis* Penz. & Sacc. and *Phomatospora* Sacc. (Hyde, 1988, 1992, 1993; Hyde & Nakagiri, 1989; Hyde, personal observation). The genus *Oxydothis* is closely related to *Leiosphaerella* Höhnel and *Ceriospora* Niessl and there is considerable confusion about the differences between these genera (Samuels & Rossman, 1987; Müller & von Arx, 1962). The purpose of this paper is to examine the type species of each of these genera and to clarify their differences. The common palm genera *Linocarpon* and *Pemphidium* and the generic synonyms of *Oxydothis* are included, and species of *Leiosphaerella, Ceriospora* and *Ceriosporella* from palms are also examined for completeness. Melzer’s reagent is used for the blue staining reaction of the ascus apex.

- Taxonomy


**Type species.** – *Ceriospora dubyi* Niessl.

\(^{1}\) V in Sydowia 45: 199–203.
Ascomata immersed, globose, subglobose or conical, some with flattened bases, ostiolate, appearing on the host surface as a blackened papilla, or sometimes superficial, mostly single or occasionally in small linear groups. – Peridium comprising 3–5 layers of light-brown brick-shaped cells. – Paraphyses hypha-like, filamentous, septate and hyaline. – Asci 8-spored, cylindric-clavate, thin-walled, unitunicate, short pedunculate, apically rounded, with a J+, apical, plug-like ring. – Ascospores 2–3-seriate, fusiform, hyaline, with a central septum, tapering towards both ends, with spine-like appendages.

Ceriospora is distinct from the palm inhabiting genus Oxydothis. Asci in the former are cylindric-clavate compared with long-cylindrical in Oxydothis. Furthermore in Oxydothis the ascus apex is often truncate, while the blue-staining apical apparatus is distinctly subapical (Figs. 48, 49). In Ceriospora the ascus apex is broadly rounded and the blue-staining apical apparatus is distinctly apical and plug-like (Figs. 4, 6). In Oxydothis the ascomata usually occur under a darkened clypeus and are often, but not always, horizontal to the host surface. In Ceriospora the ascomata are vertical to the host surface and lack a clypeus.

Ceriospora has greater affinity with Leiosphaerella, the type of which has a minute clypeus, cylindric-clavate asci and ascomata whose axis is vertical to the host surface. However, the type of Leiosphaerella, L. praecilavis (Rehm) Höhnel differs from Ceriospora dubyi as the ring in Leiosphaerella is subapical and ascospores lack appendages. At this stage I feel these differences are great enough to warrant two separate genera.


Ascomata 105–195 μm high, 165–285 μm diam, immersed or superficial (perhaps by shedding of the epidermis), globose, subglobose or conical, some with flattened bases (Fig. 1), appearing on the host surface as a raised blackened papilla, or superficial, mostly single, occasionally in small linear groups. – Peridium ca 20 μm thick comprising 3–5 layers of light-brown brick-shaped cells (Fig. 2). – Paraphyses up to 6 μm diam, hypha-like, filamentous, septate, hyaline, hard to locate in dried specimens. – Asci 90–120 x 18–20 μm, 8-spored, cylindric-clavate, thin-walled, unitunicate, short pedunculate,
apically rounded, with a J+, apical, plug-like ring, 4–5 μm diam, 1.2–1.6 μm high (Figs. 4–6). – Ascospores 30–38 x 7.5–10 μm excluding appendages (length 42–59 x 7.5–10 μm including appendages), 2–3-seriate, fusiform, with a central septum, slightly constricted at the septum, hyaline, straight or some curved, tapering towards both ends, with spine-like appendages (Fig. 3).

Material examined. – Switzerland, near Geneva, in stems of Humulus lupulus L., Duby, 1850 (STR, Holotype).


Ceriospora arecae Menon was described from India by Menon (1960) associated with yellow leaf disease of Areca catechu L. However, no holotype was designated nor was any location of type material indicated. The name has thus not been validly published under article 37 of the International Code of Botanical Nomenclature. From illustrations provided by Menon (1960), the fungus is almost certainly an Oxydothis species.

Ceriospora bicalcarata (Cesati) Sacc., Sylloge Fungorum 2: 186. 1883.

See under Ceriosporella Berlese and Frondispora Hyde.

Ceriospora palmicola (Bat. & Maia) Müller, Beiträge zur Kryptogamenflora der Schweiz 11: 677. 1962.


Despite lengthy efforts it has not been possible to obtain the holotype of Microcyclephaeria palmicola. This species is involved in a nomenclature tangle and the name is illegitimate (Ponnappa & Shaw, 1978). Although this species was considered to be a Ceriospora by Müller & von Arx (1962), it is more likely that it belongs in Oxydothis. See section on Microcyclephaeria.

Ceriosporella Berlese, Icones Fungorum 1:121. 1894.

Ceriosporella Berlese (1894) was established for two species, C. patouillardii (Let.) Berlese (formerly Ceriospora patouillardii Let. ap. Pat., Tab. Anal. Fung. 5, 492. 1886) and C. bicalcarata (Cesati) Berlese. Characteristics included fusiform, septate ascospores with polar se-

tae, clavate 8-spored asci and papillate ascomata immersed under the host epidermis (Berlese, 1894), both species having unisepitate ascospores. Although Berlese (1894) lists C. patouillardii first, he did not designate a holotype. Saccardo (1905) in excepting Ceriosporella, also did not designate a lectotype, while Clements & Shear (1931) designated C. patouillardii as the lectotype of Ceriosporella. Müller & von Arx (1962) synonymised Ceriosporella patouillardii with Lophiosphaera ulicis (Pat.) Müller and Ceriosporella with Lophiosphaera Trev. Ceriosporella bicalcarata was also retained as Ceriospora bicalcarata (Cesati) Sacc. by these authors. Later von Arx & Müller (1975) placed
Lophiosphaera in Lophiostoma, Cesati & De Not., so Ceriosporella was also synonymised here. These changes were apparently accepted as Ceriosporella Berlese is listed as a synonym of Lophiostoma in Hawksworth & al. (1983) and Eriksson & Hawksworth (1991).

Ceriosporella Cavalier (1966) was established to include two marine fungi, C. calyprata (Kohlm.) Cavaliere and C. longissima (Kohlm.) Cavaliere. However, as this name is a later hononym of that used by Berlese (1894), it is invalid. Both species are united as Ceriosporopsis calyprata Kohlm. (Kohlmeyer & Kohlmeyer, 1979).

**Frondispora** K. D. Hyde, gen. nov.

Type species: Frondispora bicalcarata (Cesati) K. D. Hyde.


Ascomata immersed under darkened blotches on the host surface; in section subglobose, stromatic, ostiolute and gregarious. – Stromata in epidermal layer, comprising host cells and brown fungal hyphae. – Peridium comprising hyaline or brown elongate cells. Palisade-like cells fill the area between ascomata. – Asci 8–spored, cylindric–clavate, unitunicate, apically rounded, with J–apical ring. – Ascospores 2–3–seriate, fusiform, hyaline, uniseptate, tapering at both ends to spine–like appendages (setae).

**Frondispora bicalcarata** (Cesati) Hyde, comb. nov. – Figs. 7–16.

= Ceriosporella bicalcarata (Cesati) Berlese, Icones Fungorum 1: 121. 1894.
= Ceriospora bicalcarata (Cesati) Sacc., Sylloge Fungorum 2: 186. 1883.
= Sphaerella bicalcarata Cesati, Hedwigia 11: 181. 1872.

Ascomata under weakly raised darkened blotches on the host surface (Fig. 7), in section to 390 μm diam, 200 μm high, subglobose, immersed, solitary or gregarious, stromatic, stromata covering 1–several ascomata (Fig. 9). – Ostiole central, in a minute crater–like area on host surface. – Stromata in epidermal cell layer only comprising host cells filled with brown interwoven hyphae (Fig. 9). – Peridium ca 15 μm wide, comprising several layers of hyaline or brown thin–walled elongate cells, dark–brown near the outside (Figs. 8, 10). Between ascomata are vertically orientated, hyaline, angular, elongate cells (Fig. 10). – Paraphyses embedded in a gel, hyphal–like and filamentous. – Asci 85–140 x 14–16 μm, 8–spored, cylindric–
Figs. 7-9. *Frondispora bicalcarata*. 7. Dark stromata on host surface. 8. Peridium comprising several layers of hyaline thin-walled elongate cells. 9. Vertical section through ascomata. Bars: 7 = 1 mm; 8 = 10 μm; 9 = 100 μm.
clavate, thin-walled, unitunicate, short pedunculate, apically rounded, with a J- ring-like apical apparatus (Figs. 11, 12). – Ascospores 30-39 x 5-7 μm (length 48-65 μm inclusive of spines), 2-3-seriate, fusiform, hyaline, in mature specimens with a central septum, not constricted at the septum, tapering at both ends to spine-like appendages (Figs. 13-16).

Material examined. – Italy, Horto Botanico Neopolitani, in rachis of Chamaerops humilis, 1872, Rabenhorst, Fungi Europaei 1561 (K, holotype); Horto Botanico Pisae, on Chamaerops humilis, Oct 1881, Mori (RO).

Ceriosporella bicalcarata cannot be used as the lectotype of Ceriosporella, since C. patouillardii was proposed as lectotype (Clements & Shear, 1937), and the genus subsequently synonymised with Lophiostoma (von Arx & Müller, 1975). Therefore, a new genus Frondispora is erected to accommodate Ceriosporella bicalcarata, which cannot be placed elsewhere.

Frondispora bicalcarata is similar to Ceriospora dubyi in ascospore form, ascus structure, and orientation of the ascomata. However, there are important differences which warrant separation at the generic level. Unlike ascomata of Ceriospora dubyi, those of Frondispora bicalcarata form under a dark-brown stroma and the peridium comprises several layers of thin-walled cells. Asci of Frondispora lack a blue staining apical apparatus and vertically oriented, elongate, angular cells fill the area between ascomata. In the description given above, ascus measurements are approximate since it was not possible to separate intact asci from the preserved material. Paraphyses were also poorly preserved. Frondispora bicalcarata cannot be included in Oxydothis. The asci are not long-cylindrical as in other Oxydothis species and the ring is non-amyloid.


Type species. – Lasiobertia africana Sivanesan.

Ascomata superficial, globose with a conical apex, uniloculate, tuberculate, dark-brown to black, single or aggregated. – Peridium comprising 4-5 layers of thick-walled, dark-brown globose large outer cells, and 3-4 layers of thinner, smaller and paler inner cells, at the base comprising thick-walled brown vertically orientated palisade-like cells. – Paraphyses hypha-like, filamentous, numerous, septate and hyaline. – Asci 8-spored, cylindrical, pedunculate, unitunicate, apically rounded with a J+ discoid subapical ring and faint canal leading to the tip. – Ascospores 1-2 seriate, fusiform,
hyaline, straight or slightly curved, septate in the middle and gradually tapering to pointed processes.


Ascomata 340–510 μm high, 250–370 μm diam, dark–brown to black, coarsely tuberculate, uniloculate, ostiolate, immersed, becoming erumpent by shedding of the host epidermis or some apparently always superficial, but with basal region of the sterile stalk partly embedded in a thin subiculum of richly branched, anastomosing, thick–walled, brown hyphae, solitary or clustered (Figs. 17, 20). The basal sterile stalk 100–140 μm high, 180–230 μm diam, composed of vertically arranged, thick–walled, brown angular palisade–like cells. – Peridium 45–48 μm thick, comprising 4–5 layers of thick–walled, dark–brown, globose, large, up to 21 μm wide, outer cells and 3–4 layers of thinner, smaller and paler inner cells (Fig. 18). – Paraphyses hypha–like, filamentous, numerous, septate and hyaline. – Asci 140–175 x 9–11 μm, 8–spored, cylindrical, unitunicate, apically rounded, with a J+, discoid, subapical ring, 3 μm diam, 2 μm high, with a faint canal leading to the tip (Figs. 25, 26). – Ascospores 55–74 x 4.5–6 μm, 1–2 seriate, fusiform, hyaline, septate in the middle and tapering gradually to pointed processes (Figs. 21–24).

**Holotype.** – Ghana, Bunsu, in indet. palm stem, 7 June 1949, S. J. Hughes, (IMI 38816).

This taxon from palms has ascospores, asci and paraphyses characteristic of the genus *Oxydothis*, while ascomata form under the host which sloughs off, resulting in superficial ascomata. The taxon is obviously closely related to *Oxydothis*, but differs in 1) the basal stalk with vertical rows of cells, 2) lack of periphysate ostiole (Fig. 19) and 3) tuberculate covering of ascomata (Figs. 17, 18, 20). The nature of the ostiole is confusing as the ascomata are reported to be non–ostiolate by Sivanesan (1978). In the dried material the apex was clearly beaked, due to the inward collapse of the dried walls and in some specimens there was a clear ostiole. Sivanesan (1978) reports that in fresh material the apex is not visible externally due to the wall tuberculations, but in median vertical sections can be seen as a small region filled with thin–walled hyaline cells which presumably break open at the apex to discharge asci and ascospores (Fig. 19). *Lasioberta* is retained as a monotypic genus closely related to *Oxydothis*. A hyphomycete similar to the genus *Melanographium* was found in association with the ascomycete (Sivanesan 1978). However, this did
Figs. 17-26. - Interference contrast micrographs (except 20) of *Lasiobertia africana*.
not form in culture and it is not known whether or not it is the ana-
morph of *Lasiobertia*.


Type species. – *Leiosphaerella praeclara* (Rehm) Höhnel.

Ascomata immersed, becoming weakly erumpent, ostiolate, papillate, clypeate, lenticular or rounded, or some with flattened ba-
ses, appearing as a raised area on the host surface, mostly single or in 
groups of 2 or 3. – **Peridium** thin, comprising several layers of hya-
line flattened cells. – **Paraphyses** embedded in a gel, numerous, hypha-like, filamentous, septate. – **Asci** 8-spored, cylindric-clavate, thin-walled, unitunicate, short pedunculate, apically rounded, with a 
J+, subapical, discoid ring. – **Ascospores** triseriate, fusiform, hya-
line, with a central septum, weakly tapering to a rounded apex at both 
ends, without appendages.

**Leiosphaerella praeclara** (Rehm) Höhnel, Sitzungsber. K. Ak. Wiss. 


Ascomata 50–100 µm high, 195–240 µm diam, immersed, be-
coming weakly erumpent, ostiolate, papillate, clypeate, with papilla 
pushing through host surface, in section lenticular or rounded, or so-
me with flattened bases, appearing as a raised area on the host surfa-
cce, with a central blackened raised papilla, mostly single or occa-
ioinally in groups of 2 or 3 (Figs. 27, 28). – **Peridium** 10–20 µm thick, 
at the base and sides comprised of 4–6 layers of brown, thick-walled, 
weakly flattened (brick-shaped) cells (Figs. 29, 30), while above near 
the ostiole are several layers of hyaline flattened cells. – **Neck** ca 240 
µm diam, central, short, brown or black, piercing host surface and 
surrounded by a small clypeus (Figs. 28, 31). – **Paraphyses** up to 5 
µm diam, embedded in a gel, numerous, persistent, hypha-like, septa-
te, amongst and fusing with periphyses in the neck. – **Asci** 80–100 x 
10–14 µm ( = 89.75 x 12.25 µm, n = 15), cylindric-clavate, thin-walled, 
unitunicate, short pedunculate, apically rounded, with a J+, subapi-
cal, discoid ring, 2.8 – 3.2 µm diam, 0.8 –1.2 µm high (Figs. 32–34). – 
**Ascospores** 34–40 x 4.5–6 µm ( = 37.5 x 5.3 µm, n = 15), triseriate, 
fusiform, hyaline, with a central septum, not constricted at the sep-
tum, weakly tapering to a round apex at both ends, straight or some 
curved, some ends curved in opposite directions, without appendages 
(Figs. 35–38).
Material examined.—Germany, Königstein, on twigs of Vaccinium myrtillus L., July 1902, W. Krieger, Rehm (S, Holotype).

Leiosphaerella praeclara occurs on Vaccinium myrtillus (Ericaceae) twigs in Europe where the host is common in hilly districts (Other members of Vaccinium are found in tropical forests). The ascomata develop in the cortex beneath the epidermis of twigs, but not in the xylem tissue.

Leiosphaerella was thought to be similar to Oxydothis by Samuels & Rossman (1987), who concluded that the only difference between the two genera was the orientation of the ascomata. They transferred Metasphaeria cocoës Petch to Leiosphaerella, which in most aspects was also similar to Oxydothis. In L. cocoës the axis of the ascomata is vertical to the host surface, but the asci differ quite markedly from those of L. praeclara. Metasphaeria cocoës is better placed in the genus Oxydothis. Leiosphaerella livistonae Hino & Katumoto in Katumoto (1966) described from Livistona subglobosa Mart. is also better placed in Oxydothis.

The main differences between Leiosphaerella and Oxydothis lie in the nature of the ascus. In Leiosphaerella this is cylindric-clavate (Figs. 32, 33) with a subapical discoid ring (Fig. 34). In Oxydothis, asci are long-cylindrical, while the ring is subapical, some distance from the ascus tip with a faint canal-like structure to the tip (Figs. 44, 48, 49). The ascospores in Leiosphaerella are ellipsoidal to fusiform (Figs. 35–38), while in Oxydothis they are cylindrical or filiform and mostly with pointed apical processes (Figs. 45–47). Oxydothis is found mostly on palms in the tropics. Differences between Leiosphaerella and Ceriospora are discussed under Ceriospora.


Type species.—L. pandani (Syd. & P. Syd.) Syd. & P. Syd.

This genus is one of the most common colonisers of dead palm material and has recently been reviewed by Hyde (1992). The genus is superficially similar to Pemphidium and differences are discussed by Hyde (1993). Linocarpon is included in Tab. 1 for comparison with other palm inhabiting genera.

Merrilliopeltis Henn., Hedwigia 47: 261. 1908.

Merrilliopeltis Henn. was erected for M. calami Henn., a saprophyte on trunks of Calamus sp. in the Philippines (Hennings, 1908). The genus was synonymised with Oxydothis by Müller & von Arx
I have examined type material of *M. calami* which contains a mixture of three fungal specimens on three separate palm samples. However, one specimen is an *Oxydothis* and agrees well with the description of *M. calami* of Hennings. *Merrilliopeltis* is therefore retained in *Oxydothis*.

**Material examined.** - Philippines, Mindoro, Mt Halcon, on trunk of *Calamus* sp., Nov. 1906, E. D. Merrill 6113 (L, Holotype of *Merrilliopeltis calami*).

**Microcyclephaeria** Batista, Revista de Biologia, Lisboa. 1: 301. 1958.

*Microcyclephaeria* Batista typified by *Microcyclephaeria palmicolosa* (Syd.) Batista & Maia is a nomenclatural tangle (Ponnappa & Shaw, 1978). Sydow (1937) discovered an ascomycete on a portion of a
dead rachis of *Livistona australis* collected by L. Fraser (no. 62) in New South Wales and named the taxon *Diatrypella palmicola* Syd. Later, Batista (1958), while examining another portion of Fraser's collection of *L. australis*, found a separate ascomycete, which he assigned to the monotypic genus *Microcyclephaeria*, misnaming the taxon *M. palmicola* (Syd.) Batista & Maia. Müller (Müller & von Arx, 1962) also erred in naming *Ceriospora palmicola* (Batista & Maia) Müller, comb. nov. and citing *Microcyclephaeria palmicola* Batista & Maia as a synonym. The latter binomial is illegitimate as a later homonym of *M. palmicola* (Syd.) Batista & Maia, which, in turn is an oblique synonym of its basionym, *Diatrypella palmicola* Syd. and consequently, there is no name available for the fungus described by Batista & Maia (Ponnappa & Shaw, 1978). Although Batista & Maia (Batista, 1958) described the asci as “2-tunicados”, Müller obviously considered the taxon to belong in *Ceriospora* (Müller & von Arx, 1962). Hawksworth *et al.* (1983) list *Microcyclephaeria* as a doubtful genus of the Dothideales, while Eriksson & Hawksworth (1991) include the genus as a unitunicate ascomycete of uncertain position. Despite considerable efforts, I have been unable to trace material of *Microcyclephaeria*. The illustrations of Batista & Maia (Batista, 1958) appear to illustrate an *Oxydothis* species, but without seeing original material it would be premature to make further judgement.


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

*Ascomata* occur as weakly raised light or darkened discs, or form under raised blistered areas, singly or in groups (Figs. 39, 40), cylindrical in section, with long horizontal axis parallel, oblique or vertical to the host surface (Figs. 39, 40), with a periphysate ostiolar canal at one end curving upwards and piercing the host cuticle (Figs. 39–41), or vertical, occasionally beaked, often within dark stromatic tissue. – *Peridium* thin, of flattened brown thin-walled cells (Fig. 42). – *Stromatal development* variable. – *Paraphyses* hypha-like, branched, septate, persisting between asci, but often fragmenting in dried material. – *Asci* 8-spored, cylindrical, thin-walled, unitunicate, pedunculate, with a J+, subapical, ascal ring, which is wedge-shaped or discoid and a faint canal leading to the apex (Fig. 49). – *Ascospores* fusiform, 2-celled, septate centrally, smooth-walled, gradually tapering from the centre to pointed processes, which may be spine-like, or with rounded ends, often with small amounts of mucilage (Figs. 45–47).
Figs. 39-43. – Interference contrast micrographs of *Oxydothis grisea*. – 39, 40. Section through ascomata. – 41. Neck filled with periphyses. – 42. Palisade-like cells at sides of ascomata and peridium. – 43. Stroma. – Bars: 39, 40 = 100 μm; 41-43 = μm.

**Oxydothis grisea** Penz. & Sacc., Malpighia 11: 505. 1897. – Figs. 39-49.

Ascomata forming under the host surface, singly or in groups of 2 or 3, slightly darker at the rim, individually slightly raised, darkened, 0.5–0.75 mm long, with eccentric ostioles. Individual ascomata with axis horizontal to the host surface, ostiolar canal at one end
curving upwards and piercing host cuticle, ostiolar openings appea-
ring as small blackened dots on the host surface, surrounded by vari-
able amounts of stromatic tissue (Figs. 39, 40). – Osiolar canal
periphysate (Fig. 41). – Peridium up to 10 μm wide, comprising 3
or 4 layers of thin-walled flattened brown cells (Fig. 42). – Para-
physes hypha-like, filamentous, septate, 2–3 μm wide, often frag-
menting in dried material. – Asci 180 x 13–15 μm, long cylindrical,
thin-walled, unitunicate, pedunculate, with a wedge-shaped, J+, sub-
apical ring, 3.6–4.5 μm diam, 2.7 μm high with a faint canal leading
to the tip (Figs. 44, 48, 49). – Ascospores 84–99 x 6–7.5 μm, fusiform,
hyaline, 2-celled, septate centrally, tapering from the centre to
pointed processes (Figs. 45–47).

Holotype. – Indonesia: Cibodas, in long culm (midrib), 1897 (PAD).

Oxydothis grisea has been designated the type species of Oxydo-
this (Penzig & Saccardo, 1897; Müller & von Arx, 1962). The original
identification of the host was not given although Müller & von Arx
(1962) state the hosts to be Gramineae, Palmae and Musaceae. I have
seen type material of Oxydothis grisea and the host appears to be
Calamus sp. It was not possible to obtain measurements of the asci, as
the material was in poor condition and clumped together. Those given
are from Penzig & Saccardo (1897).

Oxydothis is a distinct genus occurring on rachides and leaves
mostly in the Palmae and Pandanaceae, with one species on bamboo.
The ascomata usually occur in darkened raised lesions on the host
surface, each lesion comprising an individual ascoma or clusters of as-
comata. Individual ascomata or the whole lesion may have a darkened
margin. In some species the ascomata form under raised blistered
areas with may or may not be darkened. In section the ascomata are
usually cylindrical with their long axis horizontal to the host surface;
each ascoma has an eccentric ostiole which may be beaked and that
bends upwards to pierce the host surface (Figs. 39, 40). In some spe-
cies especially those forming under raised blistered areas, the ascomal
axis may be oblique or even vertical to that of the host surface. The
necks are apical and often emerge through fissures at the sides of the
blisters. The hypha-like, branched and septate paraphyses are persis-
tent amongst the asci, although they can be difficult to locate in
rehydrated specimens. Asci are long cylindrical with rounded or
truncate ends and are provided with a wedge-shaped or discoid, J+, subapical apparatus and faint canal to the tip (Figs. 44, 48, 49). Asco-
spores are hyaline, fusiform, 2-celled, tapering gradually from the
centre to form pointed processes (Figs. 45–47) which may be spine-
like or with rounded ends often with mucilage.
A review of the genus *Oxydothis* will be published separately in this series (Hyde, in prep.). Samuels & Rossman (1987) have suggested that there is little difference between *Leiosphaerella* and *Oxydothis*, but if the type species of each genus are compared, there can be little doubt that they should be retained as separate genera. The differences are discussed under *Leiosphaerella* and highlighted in Tab. 1.


*Type species.* — *P. nitidum* Montagne.
Pemphidium occurs on palms with records from South America (Hyde, 1993). The genus is superficially similar to Linocarpon and differences are discussed by Hyde (1993).


Plagiothecium was proposed by Schrantz (1960) to include Metasphaeria sabalensis Cooke. M. sabalensis is clearly an Oxydothis and therefore Plagiothecium Schrantz is synonymous with Oxydothis (Müller & von Arx, 1962; Barr, 1976).

Material examined. – USA: Georgia, Darien, on rachis of Sabal, 1878, Cooke, K.


Schrantz (1962) erected the genus Plagiolagynion Schrantz (1960), a later homonym of the name Plagiothecium Bruch & Schimper (1851), a genus of mosses. The type is Metasphaeria sabalensis Cooke which is clearly an Oxydothis, Plagiolagynion is synonymous with this genus (Barr, 1976).


Schizochora was described from the Philippines from leaves of Ficus guyeri Elmer and is presently included in the Phyllachoraceae (Eriksson & Hawksworth, 1990). A second species, S. pandani Stevens (1925) was reduced to synonymy under Oxydothis pandanicola (Syd. & P. Syd.) Petrak by Petrak (1952). I have also examined type material of S. pandani from BISH! and agree that the taxa are synonymous.

Disposition of genera into families

The first placement of genera into families in Tab. 1 is based on Eriksson & Hawksworth (1991), with the exception of Lasiobertia. Barr (1990) prefers to arrange Linocarpon in the Hyponectriaceae. Ceriospora, Lasiobertia, Leiosphaerella, Oxydothis and Pemphidium may also be characteristic of the Hyponectriaceae in ascus, ascospore and peridium structure (Barr, personal communication), as Höhnel (1919) observed when he arranged them in the Physosporileen, an invalid name for the Hyponectriaceae. Thus, an alternative and perhaps better scheme, would be to place all of the genera discussed in this paper in the Hyponectriaceae (second placement Tab. 1).
Tab. 1 - Differences between *Ceriospora*, *Frondispora*, *Lasiobertia*, *Linocarpon*, *Oxydothis*, *Pemphidium* and *Leiosphaerella*.

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<th>Ceriospora</th>
<th>Frondispora</th>
<th>Lasiobertia</th>
<th>Linocarpon</th>
<th>Oxydothis</th>
<th>Pemphidium</th>
<th>Leiosphaerella</th>
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<tr>
<td><strong>Ascomata</strong></td>
<td>Immersed, no clypeus</td>
<td>Immersed under large stroma</td>
<td>Erumpent</td>
<td>Dome-shaped clypeus</td>
<td>Dome-shaped clypeus</td>
<td>Dome-shaped clypeus</td>
<td>Small clypeus</td>
</tr>
<tr>
<td><strong>Peridium</strong></td>
<td>3–5 layers of light-brown brick-shaped cells</td>
<td>Hyaline or brown elongate cells</td>
<td>Large dark-brown outer globose cells, smaller paler inner cells</td>
<td>Thin layer of brown thin-walled cells</td>
<td>Thin layer of hyaline thin-walled elongate cells</td>
<td>Thin layer of hyaline elongate cells</td>
<td>Comprising of inner thin-walled pallid cells and outer brown angular cells</td>
</tr>
<tr>
<td><strong>Asci</strong></td>
<td>J+, cylindrical clavate</td>
<td>J–, cylindrical clavate</td>
<td>J+, cylindrical clavate</td>
<td>J–, cylindrical clavate</td>
<td>J+(–), long cylindrical</td>
<td>J–, long cylindrical</td>
<td>J+, cylindrical clavate</td>
</tr>
<tr>
<td><strong>Ascospores</strong></td>
<td>Fusiform with spine-like appendages</td>
<td>Fusiform with apical setae</td>
<td>Fusiform tapering to pointed processes</td>
<td>Filiform, with septum-like refringent bands, some with appendages</td>
<td>Long fusiform or filiform with apiculate or spine-like poles, some with rounded ends with mucilage</td>
<td>Long-fusiform with tapering poles and polar appendages</td>
<td>Fusiform with rounded poles</td>
</tr>
<tr>
<td></td>
<td>2-celled</td>
<td>2-celled</td>
<td>2-celled</td>
<td>1-celled</td>
<td>2-celled</td>
<td>1(-2) celled</td>
<td>2-celled</td>
</tr>
<tr>
<td><strong>Family</strong></td>
<td>Amphiphaeria-ceae</td>
<td>Amphiphaeria-ceae</td>
<td>Amphiphaeria-ceae</td>
<td>Valsaceae</td>
<td>Amphiphaeria-ceae</td>
<td>Amphiphaeria-ceae</td>
<td>Amphiphaeria-ceae</td>
</tr>
</tbody>
</table>
Acknowledgments

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References


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