
Fungi from palms. XLIX. *Astrocystis*, *Biscogniauxia*, *Cyanopulvis*, *Hypoxyton*, *Nemania*, *Guestia*, *Rosellinia* and *Stilbohypoxylon*

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The xylariaceous genera *Astrocystis*, *Biscogniauxia*, *Cyanopulvis*, *Guestia* gen. et sp. nov., *Hypoxyton*, *Nemania*, *Rosellinia* and *Stilbohypoxylon* from palms are discussed and 16 species are described and illustrated. Three new species of *Astrocystis* and one new species each of *Guestia* and *Nemania* are described, and two species of *Hypoxyton* are transferred to *Nemania*.

Key words: new genus, palm fungi, taxonomy, *Xylariaceae*.

Introduction

The xylariaceous genera *Astrocystis*, *Biscogniauxia*, *Cyanopulvis*, *Hypoxyton*, *Kretzschmaria*, *Nemania*, *Rosellinia*, *Stilbohypoxylon* and *Xylaria* have been recorded on palms (Fröhlich and Hyde, 2000). In this paper rosellinoid and hypoxyloid members are treated based on herbarium specimens and fresh material collected mainly by the senior author. *Xylaria* and *Kretzschmaria* will be dealt with in other contributions. One species could not be accommodated in any existing xylariaceous genus and is introduced as a new monotypic genus *Guestia*.

Palm litter is a major component of many lowland rainforests, but despite this, comparatively few xylariaceous fungi, at least based on the literature record, seem to utilise this substrate. The genera *Anthostomella*, *Fasciatispora* and *Nipicola* are exceptions to the rule (Hyde, 1996; Lu and Hyde, 2000). These genera are, however, mostly confined to monocotyledonous hosts. San Martín González and Rogers (1993, 1995) did not record a single member of *Biscogniauxia* or *Rosellinia* from palm material in Mexico, whilst Rogers *et al.* (1987) only reported three species of *Hypoxyton* and one species of *Kretzschmaria* from North Sulawesi.

Collections of *Astrocystis*, *Hypoxyton* and *Rosellinia*-like species on palms were made in Australia, Brunei, Ecuador, Indonesia (Irian Jaya and Java), Malaysia, Papua New Guinea and The Philippines. The type material of taxa

within these genera, which have been described from palms, were also examined. Six species of *Astrocystis* and three species of *Hypoxyton*, four species of *Nemania* and one species of *Rosellinia* recorded from palms are accepted, including three new *Astrocystis* species and one new species of *Nemania*. One species each of *Biscogniauxia*, *Cyanopulvis*, *Guestia* gen. nov., and *Stilbohypoxyton* from palms are also accepted.

Materials and methods

Field collections of *Hypoxyton*-like species on palms were made in Australia, Brunei, Ecuador, Indonesia, Malaysia, Papua New Guinea and The Philippines. Herbarium material was borrowed from CP, CUP, FH, GA, HKU(M), IMI, K, PC and S. All measurements cited in this paper were made in water.

Taxonomy

Astrocystis Berk. and Broome, Journal of the Linnean Society, Botany 14: 123 (1873).

For a diagnosis of this genus and a key to species see Læssøe and Spooner (1994).

Type species: Astrocystis mirabilis Berk. and Broome.

Anamorph: Acanthodochium.

Habitat: Saprobic on various monocotyledonous plants.

Distribution: Mostly pantropical (also France, Japan and UK).

Astrocystis is a typical member of the *Xylariaceae*, and is only likely to be confused with other genera therein. *Rosellinia* is the most similar genus in overall morphology. *Astrocystis* is treated by Petrini (1992) and Læssøe and Spooner (1994) as being distinct from *Rosellinia*, although this stance is not followed by Ju and Rogers (1990, 1996), who treat both *Astrocystis* and *Helicogermis* as synonyms of *Rosellinia*. Læssøe and Spooner (1994) considered the differences in ascus apparatus, ascus stipe length, and the form of the anamorph to be the most striking differences between *Astrocystis* and *Rosellinia*. The ascus apparatus of *Astrocystis* is small, with parallel or tapered sides, whereas in *Rosellinia* the ascus apparatus is massive and generally barrel-shaped (Læssøe and Spooner, 1994). Also, in *Rosellinia*, the asci typically have a long, tapered stipe, whereas in *Astrocystis* the ascus stipe is comparatively short (Læssøe and Spooner, 1994). Of greater importance, however, is the form of the anamorphs of the two genera, which is considered to be of great importance in generic delimitation of the *Xylariaceae* (Ju and Rogers, 1996). The anamorphs of *Astrocystis* can be assigned to the form genus *Acanthodochium* (Samuels *et al.*,

1987) which is unique among the *Xylariaceae* (Ju and Rogers, 1990; Læssøe, 1994; Læssøe and Spooner, 1994), while the anamorphs of *Rosellinia* are referable to the form genera *Dematophora* and *Geniculosporium* (Petrini, 1992; Læssøe, 1994; Læssøe and Spooner, 1994; Ju and Rogers, 1999). With these differences in anamorphs, it is curious that Ju and Rogers (1990) chose to synonymise *Astrocystis* with *Rosellinia* given that the same authors reinstated the monotypic genus *Kretzschmariella* from *Hypoxylon*, based primarily on the form of the anamorph (Ju and Rogers, 1994). Ju and Rogers (1990) also observed a pattern of development in *Astrocystis* that is different to that observed in *Rosellinia*. As such, we prefer to maintain *Astrocystis* as a separate entity from *Rosellinia*.

Astrocystis is a genus confined to monocotyledons and is characterised by uni-, few or rarely multi-peritheciate stromata which are erumpent through the host epidermis or alternatively, which develop beneath the host cuticle and appear superficial. The stromata, like those of most members of the *Xylariaceae*, can be divided into an outer ectostroma, which normally functions in producing conidia, and an inner entostroma which develops under the ectostroma and bears the perithecia at its periphery (Martin, 1967; Hawksworth and Lodha, 1983). In *Astrocystis* the stromata surface may be smooth or the ectostroma may split into lobes forming a star-like pattern. There is no subiculum of hyphae around the fruiting bodies and the entostroma is sparse and carbonised throughout (Læssøe, 1994).

Astrocystis species have cylindrical-clavate asci that are rounded at the apex and taper downwards to a short stipe, less than 1/2 the length of the spore bearing part (Læssøe, 1994). The ascus ring is relatively small, amyloid, and may have parallel sides or taper towards the base (Læssøe and Spooner, 1994). Ascospores are ellipsoidal or beaked at one or both ends, inequilateral, dark brown, and unicellular, but in most (all?) cases unequally bicellular when immature (the smaller cell is called the "primary appendage") (Læssøe and Spooner, 1994). The ascospores are usually surrounded by a thin gel sheath, and sometimes have secondary appendages. The germ slit is straight, of various lengths and typically on the flattened side of the ascospore (Læssøe and Spooner, 1994).

Astrocystis species have conical or mammiform, black, erumpent structures, which bear conidia at the apex. The perithecial stromata develop beneath these structures and grow up through them (Læssøe and Spooner, 1994).

Astrocystis mirabilis Berk. and Broome, the type of the genus, was described from bamboo, as was the second accepted species, *A. sublimata* (Durieu and Mont.) S. Hughes (Læssøe and Spooner, 1994). Twelve more

species have been added to the genus by Læssøe and Spooner (1994), and a further three by Dulyamode *et al.* (1998).

Key to taxa of *Astrocystis* treated

- 1. Stromata splitting stellately 2
- 1. Stromata not splitting stellately 3

- 2. Ascospores (13-21 × 5-10 µm) with thin mucilaginous sheath and pad-like polar appendages *A. cocoës*
- 2. Ascospores (8.4-9.6 × 3.3-4.5 µm) lacking thin mucilaginous sheath and appendages *A. nypae*

- 3. Ascospores less than 4 µm wide, ellipsoidal, with germ slit c. 4/5 total length..... *A. rachidis*
- 3. Ascospores greater than 4 µm wide 4

- 4. Ascospores greater than 15 µm long, inequilaterally ellipsoidal, slightly convex on flattened side, a minute hyaline germ pore at one end, with full length germ slit on flattened side..... *A. selangorensis*
- 4. Ascospores less than 15 µm long 5

- 5. Ascospores (12.5-15 × 6.5-8.5 µm) slightly inequilaterally ellipsoidal, with full length germ slit on flattened side..... *A. palmarum*
- 5. Ascospores (10-12.5 × 5-6.7 µm) slightly inequilaterally ellipsoidal or not, with full length germ slit..... *A. rudis*

Species recorded from palms

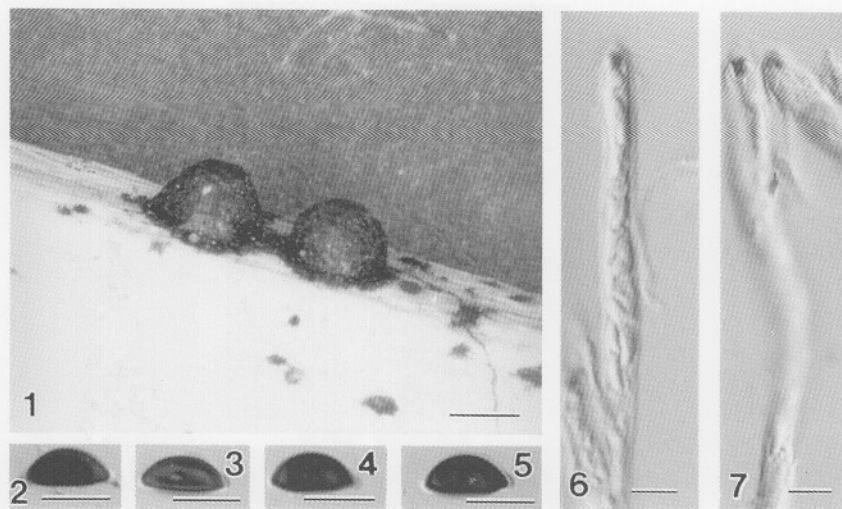
Astrocystis cocoës (Henn.) Læssøe and Spooner, Kew Bulletin 49: 27 (1994)

(Figs. 1-25)

≡ *Rosellinia cocoës* Henn., Hedwigia 47: 256 (1908).

= *Rosellinia sanctacruciana* Ferd. and Winge, Botanisk Tidsskrift 29: 16 (1908).

Stromata erumpent, with 1 ascoma, solitary or gregarious, not or somewhat confluent, black, almost conical with a round apex, 510-800 × 700-980 µm, with or without a discoid base (up to 1300 µm diam.), stromatic wall layer thick and strongly carbonised, with an outer stellate layer; surface scurfy and with adhering persistent pale squamules from host cuticle, apex smooth and sometimes almost annulate with a minutely papillate ostiole; young erumpent stromata with host surface splitting into a star-like pattern with c. 10 rays; ascomata spherical in outline, c. 800 µm diam. *Paraphyses* to 3.5 µm diam. hypha-like, remotely septate, irregular and embedded in a gelatinous matrix. *Asci* 8-spored, spore bearing part cylindrical, 107-116 × 8-9.2 µm, stipe short and tapering, up to 43 µm long, apically rounded, with a discoid, subapical, J+ ring, 2.5-3.1 (-3.8) µm high, 2.5-3.1 µm diam, with sides tapering to the base. *Ascospores* 13-17.5 (-21) × 5-6.25 (-10) µm, overlapping uniseriate, dark reddish-brown, inequilaterally



Figs. 1-7. Micrographs of *Astrocystis cocoës* (from holotype). **1.** Stromata on host surface. **2-5.** Ascospores with polar pads. **6, 7.** Asci with J+ ring. Bars: 1 = 500 μm ; 2-7 = 10 μm .

fusiform, with one or both ends beaked, flattened side slightly convex, germ slit on flattened side, c. 4/5 of total length, with thin mucilaginous sheath and pad-like polar appendages.

Anamorph: Unknown.

Known distribution: Australia, Philippines, Virgin Islands (and possibly Brazil and India, Læssøe and Spooner, 1994).

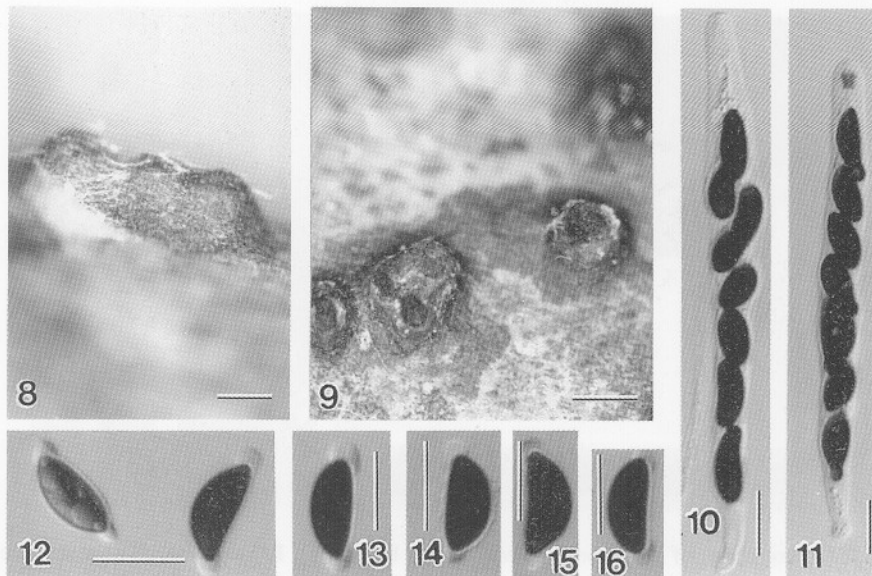
Known palm hosts: *Calamus*, *Cocos*.

Material examined: AUSTRALIA, north Queensland, near Mossman, Rex Range, on dead rattan of *Calamus* sp., July 1992, K.D. Hyde [HKU(M) 1052]; PHILIPPINES, Mindanao, Davao, on dead leaves of *Cocos nucifera* L., March 1904 (1906 in Hennings), E.B. Copeland 456 [K, **isotype** of *Rosellinia cocoës*]; VIRGIN ISLANDS, St Croix, Jolly Hill, on rachis of *Cocos nucifera*, Raunkiaer, 21 January 1906 [CP, **holotype** of *Rosellinia sanctacruciana*].

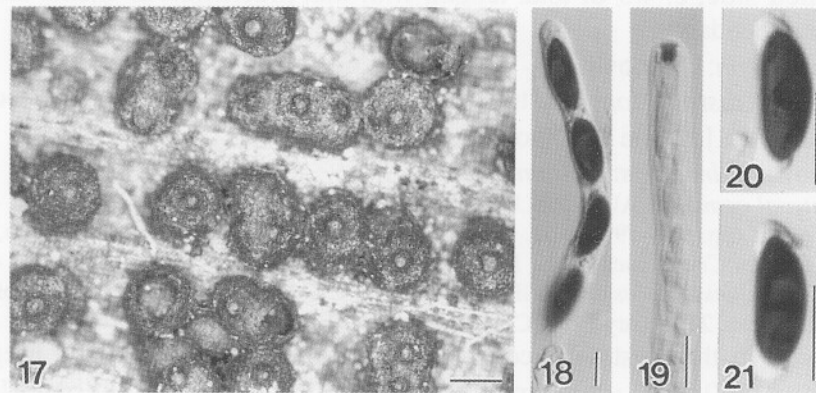
Notes: In the Australian collection the stromata differ in being irregularly mammiform, 850-2000 μm diam. 300-420 μm high with a discoid base (Figs. 8, 9). Asci are 120-160 \times 9-12 μm (total length), with a J+ ring, 4-5 μm high and 3-3.5 μm diam. (Figs. 15, 16). Ascospores are 16-21 \times 7-10 μm (Figs. 10-14). In type material of *Rosellinia sanctacruciana* ascospores are 15-19 \times 6-7 μm (Figs. 17-25). However, as the ascial ring, ascospore shape and appendage morphology are similar, we consider these taxa to be conspecific. For further collections and notes on this species see Læssøe and Spooner (1994).

Astrocystis nypae G.J.D. Smith and K.D. Hyde, **sp. nov.** (Figs. 26-34)

Astrocystis cocoës (Henn.) Læssøe and Spooner similis sed ascosporae 8.4-9.6 \times 3.3-4.5 μm differt.



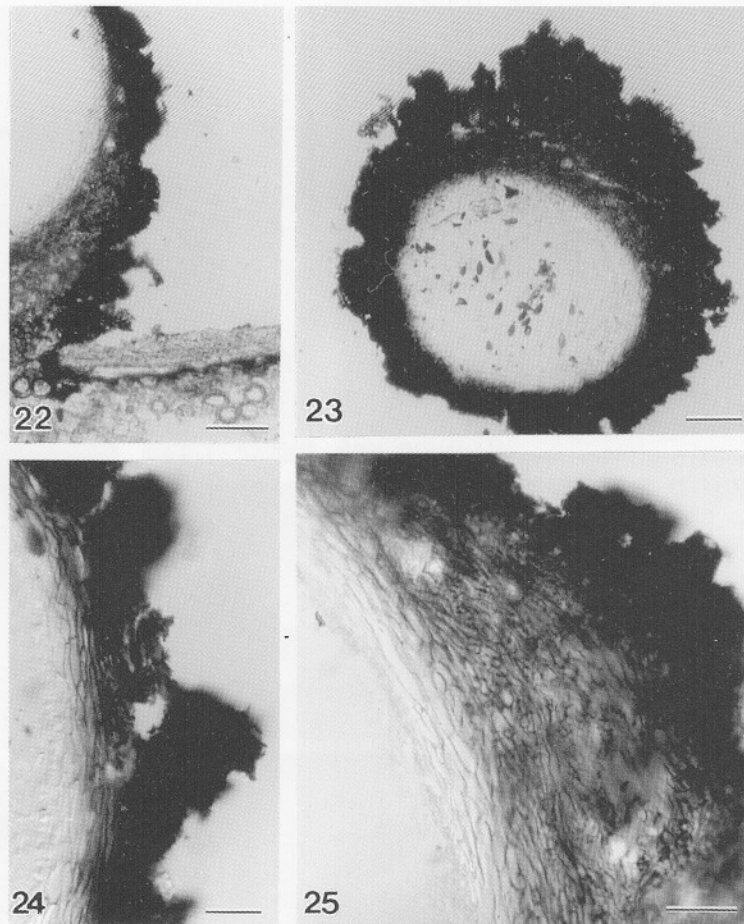
Figs. 8-16. Micrographs of *Astrocystis cocoës* (from HKU(M) 1052). **8, 9.** Stromata on host surface. **10, 11.** Asci. **12-16.** Ascospores with polar pads. Bars: 8, 9 = 500 μ m; 10-16 = 10 μ m.



Figs. 17-21. Micrographs of *Astrocystis cocoës* (from holotype of *Rosellinia santa-cruciana*). **17.** Stromata on host surface. **18, 19.** Asci. **20, 21.** Ascospores with polar pads. Bars: 17 = 500 μ m; 18-21 = 10 μ m.

Etymology: In reference to the host of the type specimen, *Nypa fruticans*.

Stromata erumpent, with 1 ascoma, solitary or gregarious, not or somewhat confluent, black, mammiform, 300-400 μ m high \times 400-600 μ m diam., with a discoid base (up to 900 μ m diam.), stromatic wall layer thick and strongly carbonised, with an outer stellate layer; surface smooth, apex smooth with a minutely papillate ostiole; ascomata subglobose to spherical in outline, c. 400 μ m



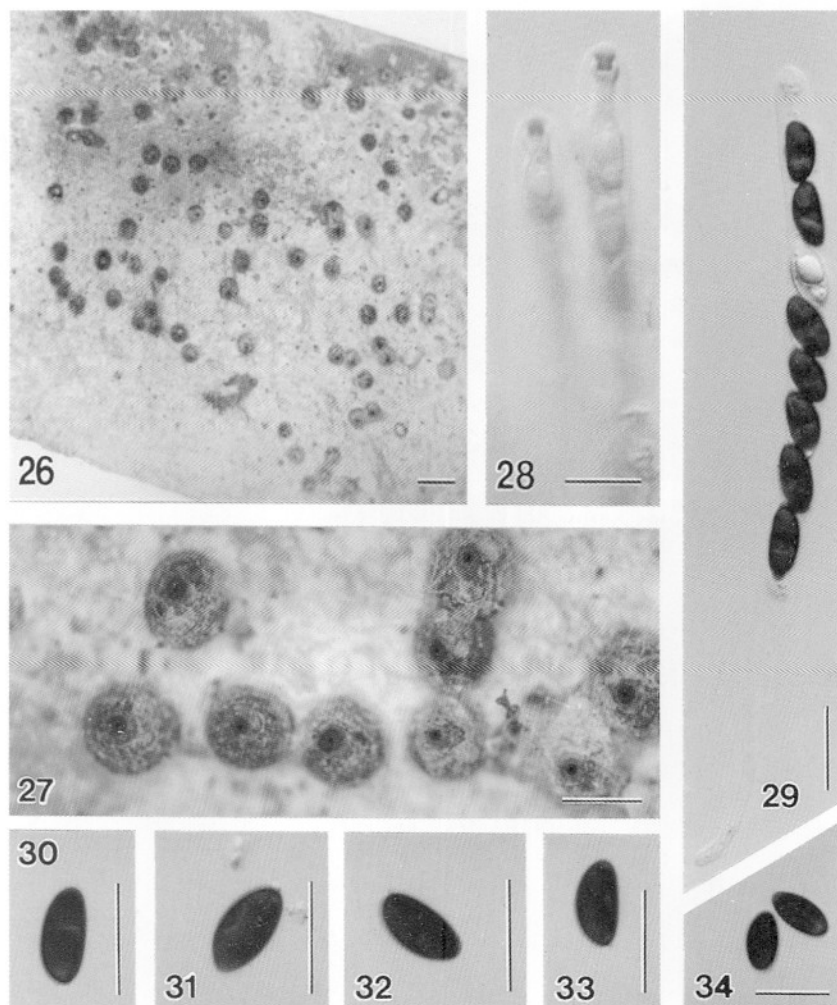
Figs. 22-25. Micrographs of *Astrocystis cocoës* (from holotype of *Rosellinia santa-cruciana*). Sections of stroma. Bars: 22, 23 = 100 μm ; 24, 25 = 50 μm .

diam. *Paraphyses* to 3-4.5 μm diam. hypha-like, remotely septate, irregular and embedded in a gelatinous matrix. *Asci* 8-spored, spore bearing part cylindrical, 100-120 \times 5-7.2 μm , stipe short and tapering, up to 30 μm long, apically rounded, with a stopper-shaped, subapical, J+ ring, 0.8-1.2 μm high, 2.5-3.1 μm diam. *Ascospores* 8.4-9.6 \times 3.3-4.5 μm , overlapping uniseriate, golden-brown, ellipsoidal, germ slit c. 4/5 of total length, apparently lacking a mucilaginous sheath and appendages.

Anamorph: Unknown.

Known distribution: Malaysia.

Known palm hosts: *Nypa*.



Figs. 26-34. Micrographs of *Astrocystis nypae* (from holotype). **26, 27.** Stromata on host surface. **28, 29.** Ascii. **30-34.** Ascospores. Bars: 26 = 1000 μm ; 27 = 500 μm ; 28-34 = 10 μm .

Material examined: MALAYSIA, Kuala Selangor, on intertidal frond of *Nypa fruticans*, October 1991, K.D. Hyde [HKU(M) 1626, here designated the **holotype**].

Notes: This species is well placed in *Astrocystis* due to the possession of a small J+ apical ring with sides tapering to the base, a short tapering ascial stipe, and a carbonised stromatal discoid base. It also lacks the subiculum of *Rosellinia*.

Astrocystis nypae is characterised by small ascospores combined with the shape and size of the apical apparatus and the lack of a mucilaginous sheath or appendages on the ascospores. The ascospores of *A. nypae* are much smaller than those of any of the accepted species, being most similar to *A. bambusae* (Henn.) Læssøe and Spooner (10.5-15 \times 4-6 μm). There is little difference in gross ascus morphology within the genus. The apical ring of *A. nypae* however, is distinctive

as the apical rings of the accepted species are apically flared, with the exception of *A. cocoës*. The apical apparatus of *A. cocoës* ($2.5-3.8 \times 2.5-3.1 \mu\text{m}$) is much larger than that of *A. nypae*. *Astrocystis hughesii* Læssøe and Spooner, *A. rachidis* J. Fröhl. and K.D. Hyde and *A. smilacicola* (Schwein. in Fr.:Fr.) Læssøe and Spooner are the only taxa additional to *A. nypae* that lack both a hyaline sheath and any appendages on the ascospores. This however, is the

only similarity that exists between the three taxa. *Astrocystis cocoës* is the most similar to *A. nypae* in gross morphology and it also occurs on members of *Palmae*. The ascospores of *A. cocoës* are also inequilateral, but are broadly fusiform with beaked ends and larger ($15-21 \times 6.5-8.5 \mu\text{m}$), quite distinct from *A. nypae*.

Of the remaining five taxa that Læssøe and Spooner (1994) provisionally placed in *Astrocystis*, *Hypoxylon culmorum* has been transferred to *Kretzschmariella culmorum* (Cooke) Y.-M. Ju and Rogers (Ju and Rogers, 1994), and 'Hypoxylon' *kurzianum* Currey has been synonymised with *A. bambusae* (Ju and Rogers, 1996, as *Rosellinia bambusae* Henn.). The remaining taxa are of uncertain taxonomy and differ substantially from *A. nypae*.

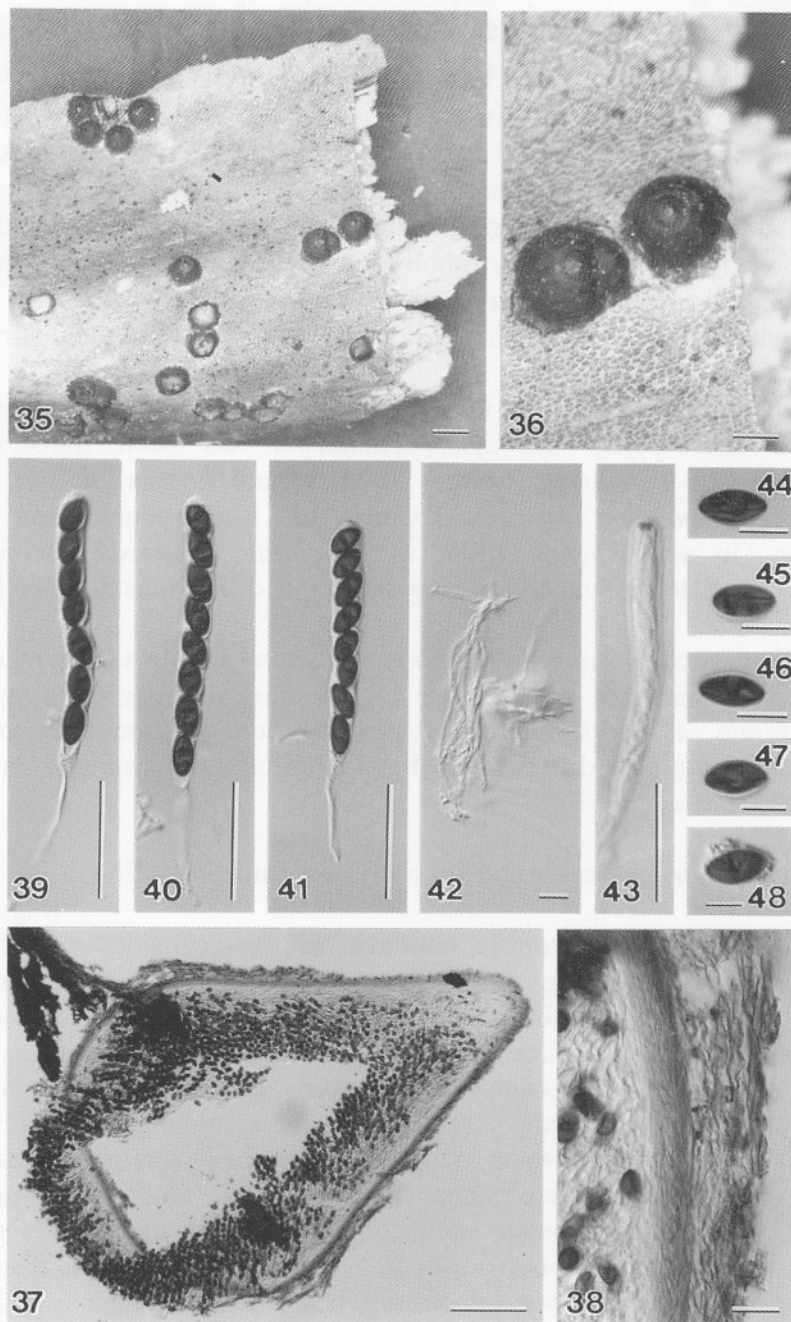
Of three species described on *Pandanus* from Mauritius (Dulymamode *et al.*, 1998), *A. fimbrata* possesses a conical mucous appendage, while *A. rarissima* and *A. cepiformis* differ primarily on ascospore morphology. *Astrocystis nypae* also differs from these three taxa on stromatic characters (Dulymamode *et al.*, 1998).

Astrocystis palmarum Læssøe and Spooner, Kew Bulletin 49: 28 (1994).

(Figs. 35-48)

Stromata with 1-2 ascomata, clustered, with vertical sides and subconical apex, 1200-1500 μm diam., ca.1000 μm high, outer carbonised ectostroma forming a discoid base; with relatively conspicuous papillate ostiole, with a \pm raised annulate area, ascomata 700-900 μm diam. \times 600 μm high, pyriform. *Peridium* to 20 μm wide, composed of several layers of light brown-walled flattened cells, hyaline inwardly. Asci and paraphyses forming from the base and sides of the ascomata. *Paraphyses* to 5 μm diam. hypha-like, remotely septate and irregular. *Asci* 8-spored, spore bearing part cylindrical, $86-96 \times 8-9 \mu\text{m}$, stipe tapering, 33-52 μm long, apically rounded with a discoid, subapical J+ ring, 1.6 μm high, 2.4-2.8 μm diam. *Ascospores* $12.5-15 \times 6.5-7.5$ (-8.5) μm , overlapping uniseriate, dark reddish-brown, subopaque, (slightly) inequilaterally ellipsoidal, germ slit on flattened side, full length, a thin mucilaginous sheath noted on some ascospores, appendages not observed.

Anamorph: Unknown.



Figs. 35-48. Micrographs of *Astrocystis palmarum* (from holotype). 35, 36. Stromata on host surface. 37, 38. Sections of stroma. 39-41, 43. Asci. 42. Paraphyses. 44-48. Ascospores. Bars: 35 = 1000 μm; 36 = 500 μm; 37 = 100 μm; 38-48 = 10 μm.

Known distribution: Bermuda.

Known palm hosts: Unidentified palm.

Material examined: BERMUDA, Warwick, Fruitlands, on fallen palm petiole, 1 August 1921, H.H. Whetzel, Bermuda fungi 106 [FH and K, **isotypes**].

Notes: This specimen is undoubtedly *A. palmarum*. For a discussion on affinities see Læssøe and Spooner (1994). See also notes under *A. rudis*.

Astrocystis rachidis (Pat.) J. Fröhl. and K.D. Hyde, Palm Microfungi, p. 306 (2000). (Figs. 49-59)

≡ *Rosellinia rachidis* Pat., Bulletin. Société Mycologique de France 22: 57 (1906).

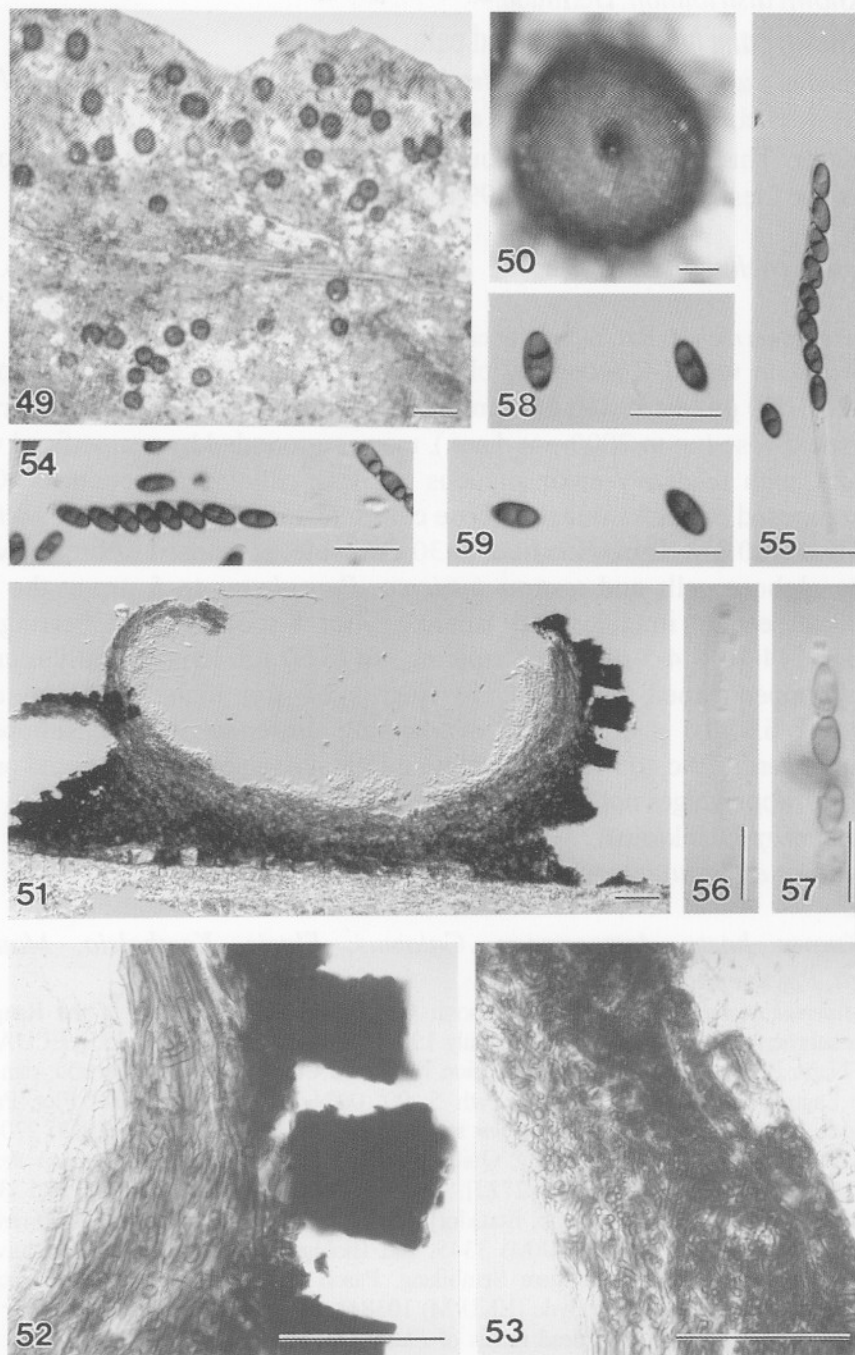
Stromata with 1-2 ascomata, clustered, with vertical sides and subconical apex, 520-1000 µm diam. 280-500 µm high, outer carbonised ectostroma forming a +/- discoid base (up to 2000 µm diam.), many surrounded by a superficial white mycelium, with relatively inconspicuous papillate ostiole; in section to 40 µm wide, composed of black-walled globose cells interspersed with *textura intricata*; ascomata c. 400 µm diam. *Peridium* to 30 µm wide, composed of brown-walled elongate globose cells and *textura intricata*. *Paraphyses* to 5 µm at the base, hypha-like, septate, irregular and tapering. *Asci* 8-spored, spore bearing part cylindrical, 44-70 × 4-5 µm, stipe tapering, up to 60 µm long, apically rounded, with a stopper-shaped, subapical, J+ ring, 1-2.5 µm high, 2-2.5 µm diam. *Ascospores* 6.25-10 × 2.5-4 µm, overlapping uniseriate, brown, subopaque, ellipsoidal, germ slit c. 4/5 total length, no thin mucilaginous sheath noted on any ascospores, appendages not observed.

Anamorph: Unknown.

Known distribution: Australia, Ecuador, Malaysia, Philippines, Papua New Guinea.

Known hosts: *Astrocaryum*, *Calamus*, *Elaeis*, *Korthalsia*, *Mauritia*, *Pinanga*, *Phytelephas*.

Material examined: AUSTRALIA, north Queensland, Kuranda, Top of the Range, on *Calamus* submerged in a freshwater stream, July 1992, K.D. Hyde [HKU(M) 1553]; ECUADOR, Oriente, Napo Province, Reserva de Produccion Faunistica Cuyabeno, Rio Cuyabeno, rain forest near the Laguna Grande, *Camangucho*, Path 5, 00° 00'N 76° 10'W, Botanists Plot, Path A, Camangucho, on dead rachis of *Astrocaryum* sp., August 1993, K.D. Hyde [HKU(M) 2704, and Biology Department, Catholic University, Quito, Ecuador]; on dead rachis of *Mauritia flexuosa*, August 1993, K.D. Hyde, [HKU(M) 2722]; *ibid.*, J. Fröhlich [HKU(M) 7921, and Biology Department, Catholic University, Quito, Ecuador]; "Saladera trail", on dead rachis of *Phytelephas* sp., August 1993, K.D. Hyde [HKU(M) 3345, and Biology Department, Catholic University, Quito, Ecuador]; MALAYSIA, Negara Sembilang, Pasoh Forest Reserve, on dead rachis of *Pinanga* sp., October 1991, K.D. Hyde [HKU(M) 10384]; on undetermined palm, October 1991, K.D. Hyde [HKU(M) 1565]; on dead rachis of *Elaeis guineensis*, November 1992, K.D. Hyde [HKU(M) 1641]; PHILIPPINES, Mindanao, Bukidnon, Impalutao Forest Reserve, on dead palm rachis, December 1993, K.D. Hyde [HKU(M) 1879]; PAPUA NEW GUINEA, Green River, on dead trunk of *Korthalsia brassii*, May 1992, K.D. Hyde [HKU(M) 1384a]; TAHITI, Motu, Papeete, on rachis of *Cocos nucifera*, M. Seurat [FH, **holotype**].



Figs. 49-59. Micrographs of *Astrocystis rachidis* (from holotype). **49, 50.** Stromata on host surface. **51-53.** Sections of stroma. **54-57.** Asci. **58, 59.** Ascospores. Bars: 49 = 500 μm ; 50 = 100 μm ; 51-59 = 10 μm .

Notes: *Astrocystis rachidis* was formerly in *Rosellinia* and was recently transferred by Fröhlich and Hyde (2000) which also contains a discussion of the species. In most specimens a distinct carbonaceous disc was present around the base of the ascomata (Fig. 56), although in HKU(M) 10384 the ascomata are surrounded by basal teeth-like flanges of the host. In HKU(M) 1565 the ascomata (1000-1500 μm) and ascus ring ($2 \times 2 \mu\text{m}$) is larger than in all other specimens, but was otherwise similar, and is here considered to be of the same species. There is a wide variation in stroma size between collections of this species.

***Astrocystis rudis* G.J.D. Smith and K.D. Hyde, sp. nov.** (Figs. 60-69)

Astrocystis cocoës (Henn.) Læssøe and Spooner similis sed ascosporae 10-12.5 \times 5-6.7 μm et nonappendiculatae differt.

Eymology: In reference to the remoteness of the type locality, a peat swamp.

Stromata with 1-2 ascomata, with vertical sides and subconical apex, 650-1000 μm diam. 500-750 μm high, outer carbonised ectostroma forming a +/- discoid base (up to 1750 μm diam.), with papillate ostiole conspicuous or not; in section to 40 μm wide, composed of brown-walled globose cells interspersed with *textura intricata*; ascomata c. 400 μm diam. *Peridium* to 37 μm wide, composed of brown-walled elongate globose cells and *textura intricata*. *Paraphyses* to 5 μm at the base, hypha-like, septate, irregular and tapering. *Asci* 8-spored, spore bearing part cylindrical, 68-83 \times 7.5-10 μm , stipe tapering, 20-36 μm long, apically rounded, with a stopper-shaped, subapical, J+ ring, 1.2-1.9 μm high, 2.5-2.8 μm diam. *Ascospores* 10-12.5 \times 5-6.7 μm , overlapping uniseriate, brown, ellipsoidal, slightly inequilateral or not, germ slit full length, thin mucilaginous sheath around ascospores, appendages not observed.

Anamorph: Unknown.

Known distribution: Papua New Guinea.

Known palm hosts: *Korthalsia brassi*.

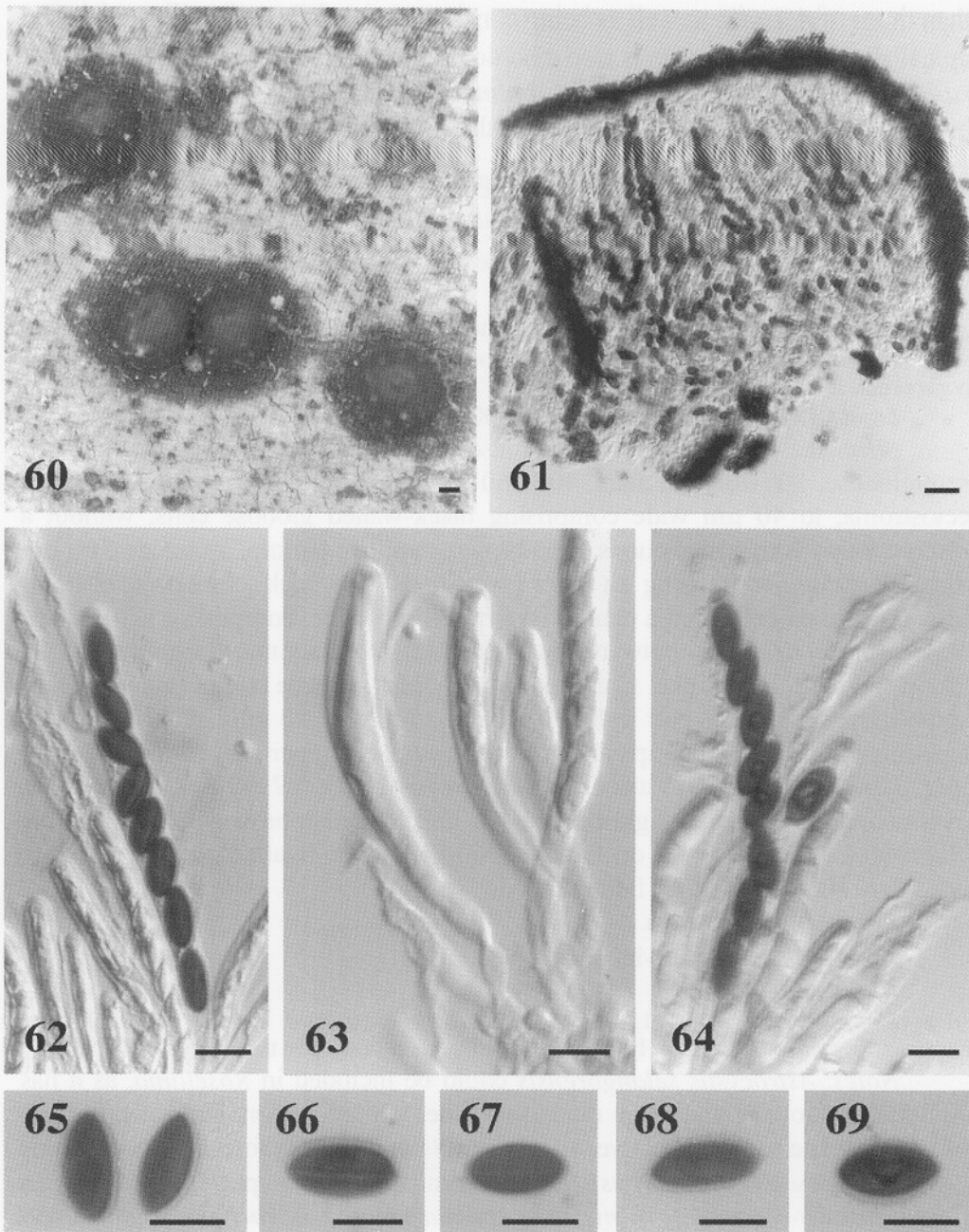
Material examined: PAPUA NEW GUINEA, Green River, on dead trunk of *Korthalsia brassii*, May 1992, K.D. Hyde [HKU(M) 1383, here designated the **holotype**].

Notes: This species is well placed in *Astrocystis* due to the possession of a small J+ apical ring with sides tapering to the base, a short tapering ascus stipe, and a carbonised stromatal discoid base. It also lacks the subiculum of *Rosellinia*.

Astrocystis rudis is distinguished from other species of the genus by ascospore size in combination with the ascospores possessing a thin mucilaginous sheath, and the size and morphology of the ascus apical ring. The apical ring of *A. rudis* is apically flared (see discussion for *A. nypae*), separating it from *A. cocoës* and *A. nypae*. Other characters also separate *A. rudis* from *A. cocoës* and *A. nypae*, notably the combination of ascospore size and having a mucilaginous sheath while lacking any appendages (see Table 1). The remaining taxa of *Astrocystis* from palms feature apically flared apical rings. Of these species, *A.*

Table 1. Synopsis of *Astrocystis*, *Guestia*, *Nemania* and *Stilbohypoxylon* species on palms.

	<i>A. cocoë</i>	<i>A. nypae</i>	<i>A. palmarum</i>	<i>A. rachidis</i>	<i>A. rudis</i>	<i>A. selangoriensis</i>	<i>G. gonetropospora</i>	<i>N. saladeranus</i>	<i>S. moelleri</i>
Stromata	1 ascomata, +/- discoid base, conical	1 ascomata, discoid base, mammiform	1-2 ascomata, discoid base, mammiform	1-2 ascomata, +/- discoid base, mammiform	1-2 ascomata, +/- discoid base, mammiform	1 ascomata, no discoid base, globose	1-4 ascomata, no discoid base, conical or hemispherical	1-many ascomata, no discoid base, mammiform	1-2 ascomata, +/- discoid base, globose to mammiform
Ascus ring	Stopper-shaped, 2.5-3.1 × 2.5-3.1 µm	Stopper-shaped, 0.8-1.2 × 2.5-3.1 µm	Discoid, 1.6 × 2.4-2.8 µm	Stopper-shaped, 1-2.5 × 2-2.5 µm	Stopper-shaped, 1.2-1.9 × 2.5-2.8 µm	Stopper-shaped, 3.5-4 × 4-4.5 µm	Vase-shaped, 5-7 × 2.5-3 µm	Barrel-shaped, 5-6 × 3-4 µm	Stopper-shaped, 3.5-4 × 2.5-3 µm
Ascospores	13-17.5 × 5-6.25 µm	8.4-9.6 × 3.3-4.5 µm	12.5-15 × 6.5-7.5 µm	6.25-10 × 2.5-4 µm	10-12.5 × 5-6.7 µm	15-19 × 7.5-9 µm	23-33 × 4.5-7 µm	16-21 × 6-7.5 µm	15-18 × 7-8 µm
Sheaths or appendages	Thin sheath and pad-like appendages	No sheath	Thin sheath on some	No sheath	Thin sheath	Minute germ pore	Thin sheath, small polar caps	No sheath, small appendages	Thin sheath, polar pads



Figs. 60-69. Micrographs of *Astrocystis rudis* (from holotype). **60.** Stromata on host surface. **61.** Section of stroma. **62-64.** Asci. **65-69.** Ascospores. Bars: 60 = 100 μm ; 61 = 50 μm ; 62-69 = 10 μm .

palmarum is the most similar to *A. rudis*, and is the only one to have a sheath surrounding the ascospores. However, the ascospores of *A. palmarum* are larger than those of *A. rudis*, as well as being consistently inequilaterally ellipsoidal. The apical ring of *A. palmarum* is also discoid, as compared to stopper-shaped in *A. rudis* (Table 1). The peridium of *A. palmarum* consists of several layers of light brown-walled flattened cells that are hyaline inwardly, while the peridium of *A. rudis* is composed of brown-walled elongate globose cells and *textura intricata*. The stromata, ascomata and asci of *A. palmarum* are also all larger than those of *A. rudis* and the paraphyses are less septate in *A. palmarum*.

***Astrocystis selangorensis* G.J.D. Smith and K.D. Hyde, sp. nov.** (Figs. 70-81)

Astrocystis cocoës (Henn.) Læssøe and Spooner similis sed ascosporae $15-19 \times 7.5-9 \mu\text{m}$ et nonappendiculatae differt.

Etymology: In reference to the type locality, Kuala Selangor.

Stromata erumpent, with 1 ascoma, solitary or clustered, black, semiglobose, $560-700 \mu\text{m}$ diam. $400-560 \mu\text{m}$ high, roughened, outer soft-walled ectostroma, to $40 \mu\text{m}$ wide comprising black-walled globose cells, without a discoid base, with conspicuous light-brown, papillate ostiole, ascomata $500 \mu\text{m}$ diam. *Peridium* comprising an inner layer, to $30 \mu\text{m}$ thick, composed of light-brown flattened cells, and a central layer to $30 \mu\text{m}$ wide, comprising light-brown *textura intricata*, fusing outwardly with the blackened stroma. *Paraphyses* to $10 \mu\text{m}$ at the base, hypha-like, filamentous, branching, septate and irregular. *Asci* 8-spored, spore bearing part cylindrical, $100-120 \times 10-13 \mu\text{m}$, stipe short and tapering, to $50 \mu\text{m}$ long, apically rounded, with a stopper-shaped subapical J+ ring, $3.5-4 \mu\text{m}$ high, $4-4.5 \mu\text{m}$ diam. *Ascospores* $15-19 \times 7.5-9 \mu\text{m}$, uniseriate or overlapping uniseriate, light-brown to dark reddish-brown, inequilaterally ellipsoidal, slightly convex on flattened side, a minute hyaline germ pore at one end, germ slit full length on flattened side.

Anamorph: Unknown.

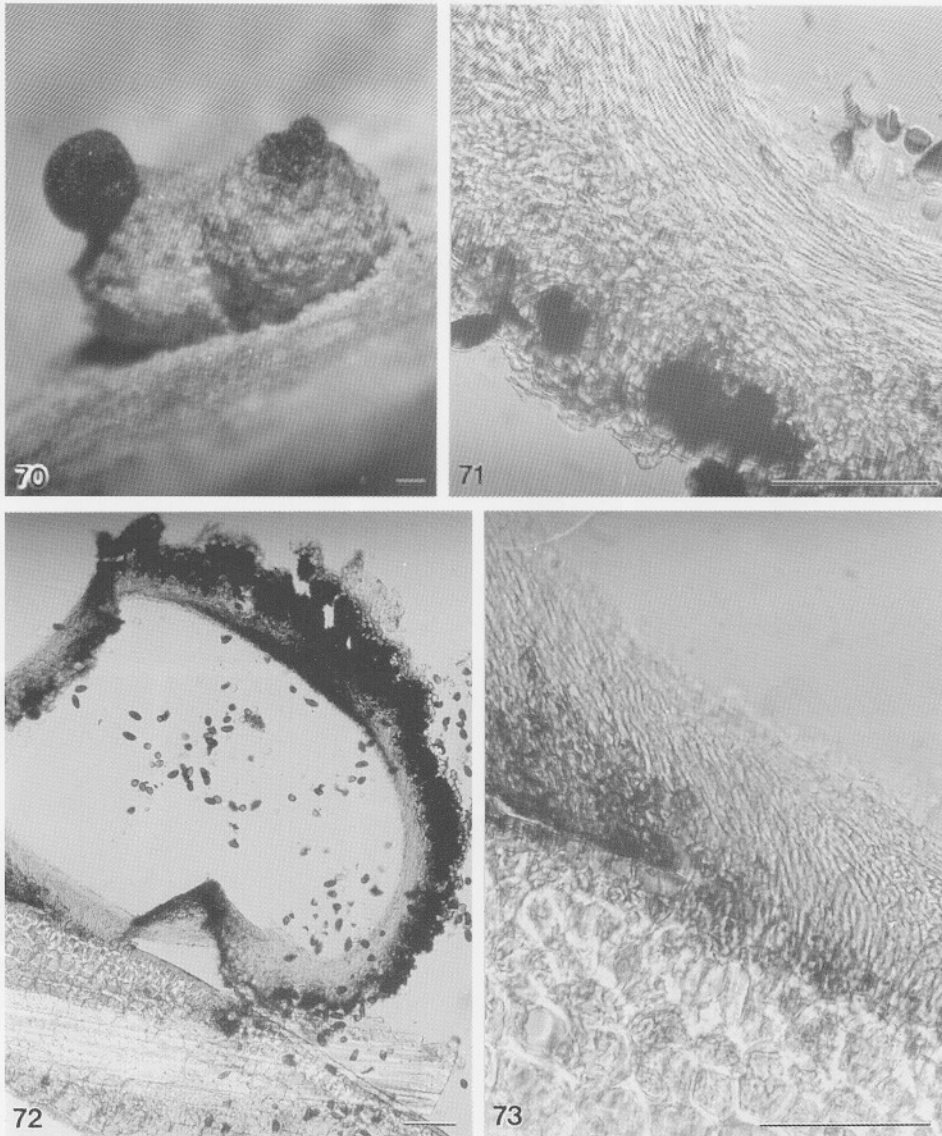
Known distribution: Malaysia.

Known hosts: *Nypa*.

Material examined: MALAYSIA, Kuala Selangor, on dead intertidal rachis of *Nypa fruticans*, November 1991, K.D. Hyde [HKU(M) 1625a, here designated the **holotype**].

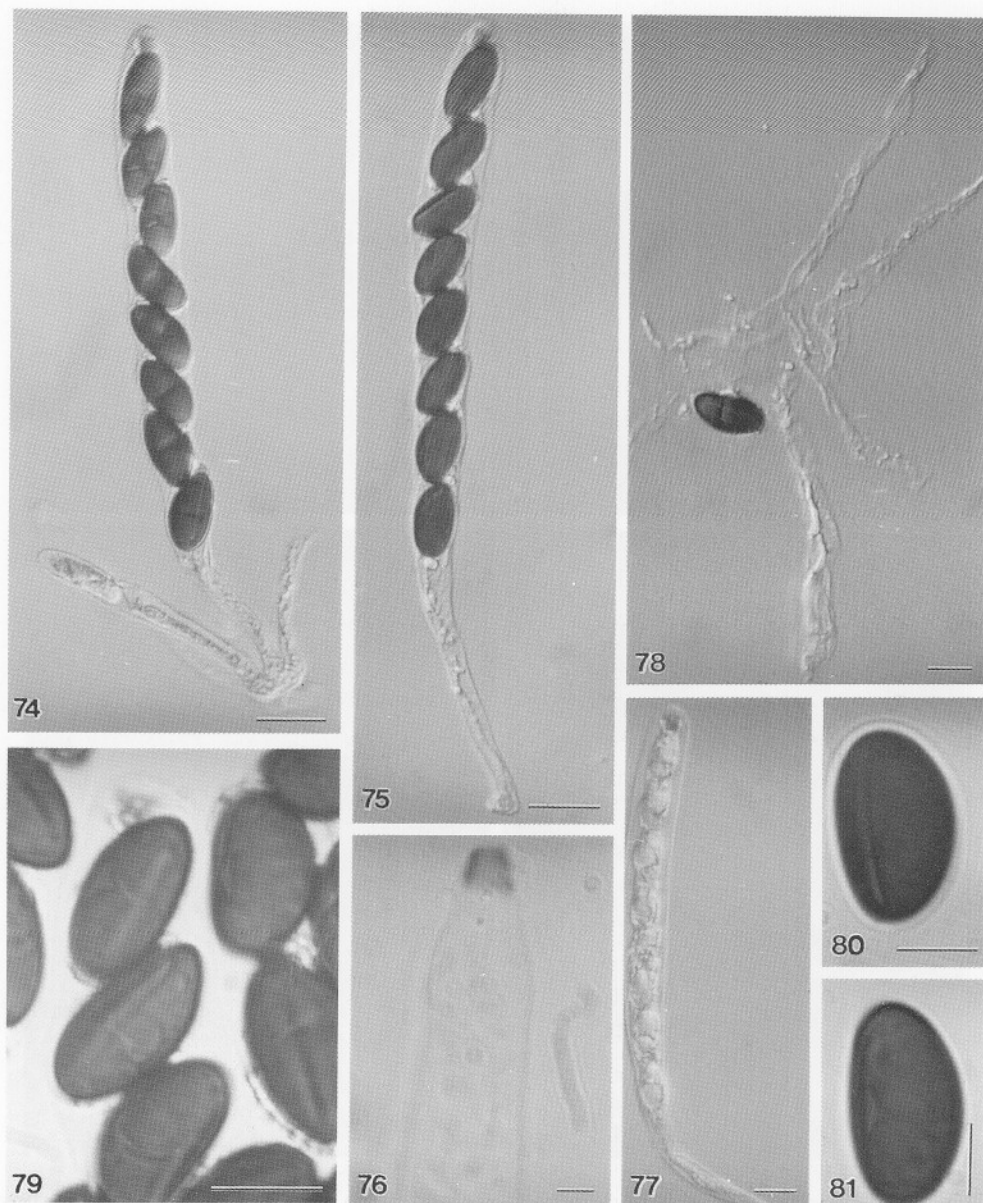
Notes: *Astrocystis selangorensis* could be included in *Rosellinia*, as it has soft-walled stromata and when cut has an inner whitish region. However, the rest of the characters are indicative of *Astrocystis* and is therefore included in this genus. *Astrocystis selangorensis* is most similar to other species occurring on palms, namely *A. cocoës*, *A. nypae*, *A. palmarum* and *A. rachidis* (Læssøe and Spooner, 1994; Dulyamamode *et al.*, 1998; Fröhlich and Hyde, 2000).

Ascospore morphology is a distinctive feature of *A. selangorensis*, the combination of the hyaline germ pore at one end and being convex distinguish it



Figs. 70-73. Micrographs of *Astrocystis selangorensis* (from holotype). **70.** Stromata on host surface. **71-73.** Sections of stroma. Bars: 70 = 100 μm ; 72 = 50 μm ; 71, 73 = 10 μm .

from other palm species. The apical ring of *A. selangorensis* is substantially larger than other species from palm, while the ascospores are similar in size only with *A. cocoës*. Yet the ascospores of *A. cocoës* possess both a thin hyaline sheath and appendages. Differences between the palm inhabiting species of *Astrocystis* are summarised in Table 1.



Figs. 74-81. Micrographs of *Astrocystis selangorensis* (from holotype). 74-77. Asci. 78. Paraphyses. 79-81. Ascospores. Bars: 74-79 = 10 μ m; 80, 81 = 5 μ m.

Biscogniauxia Kuntze, *Revisio Generum Plantarum* II: 398 (1891).

For a diagnosis of this genus and a key to species see Ju *et al.* (1998).

Type species: *Biscogniauxia nummularia* (Bull.:Fr.) Kuntze.

Anamorph: *Nodulisporium*.

Habitat: Parasitic on dicotyledonous angiosperms.

Distribution: Cosmopolitan.

Biscogniauxia has recently been monographed by Ju *et al.* (1998). The genus is defined by possession of a bipartite stroma; *Periconiella*-like anamorphs in most species; mostly internal carbonaceous locules enclosing perithecia; and short stiped asci with a J+ apical apparatus that is variously shaped, but broader than high. The genus is further defined by usually having non-ornamented, dark ascospores with a conspicuous germ slit, and in having stromata that do not produce KOH-extractable pigments (Ju *et al.*, 1998).

No species of *Biscogniauxia* were found on palms in this study. There is one record of *B. capnodes* (Berk.) Y.-M., Ju and J.D. Rogers on *Latania* Comm. from Münster, Germany (Ju *et al.*, 1998).

Cyanopulvis J. Fröhl. and K.D. Hyde, *Palm Microfungi*: 308 (2000).

For a diagnosis of this genus see Fröhlich and Hyde (2000).

Type species: *Cyanopulvis australiensis* J. Fröhl. and K.D. Hyde.

Anamorph: Unknown.

Habitat: Saprobic on *Calamus* species.

Distribution: North Queensland, Australia.

Cyanopulvis was recently erected by Fröhlich and Hyde (2000), and the genus contains only one species, *C. australiensis*. The genus is characterised by gregarious, well-developed, dark stromata, with stellate ectostroma, that lack a subiculum, but are covered with a thin dusting of whitish-blue powder; asci with short stipes, and massive, urn shaped, J+ apical rings; and brown, navicular ascospores, with straight full length germ slit, covered with a mucilaginous sheath and possessing pad-like polar appendages (Fröhlich and Hyde, 2000).

No further specimens of *Cyanopulvis* were encountered in this study. *Cyanopulvis* is only known from palm hosts, with two records from *Calamus australis* and one record from an unidentified *Calamus* species, all from North Queensland, Australia (Fröhlich and Hyde, 2000).

Guestia G.J.D. Smith and K.D. Hyde, **gen. nov.**

Pseudostromata solitaria vel gregaria, conica vel hemispherica, nigra, 1-4 ascomata praedita; ascomata erumpentes, hemispherica, tuberculata, paraphysaticum. *Asci* 8-spori, pedicelati, apparatu apicale praediti. *Ascosporae* 1-2-seriatae, atro brunneae, inequilateral-fusiformes, laevae vel curvatae.

Species typica: *Guestia gonetropospora* G.J.D. Smith and K.D. Hyde.

Etymology: In recognition of Australian plant pathologist and mycologist David Guest, for his active role in promoting mycology and training young mycologists in Australia and South-east Asia.

Pseudostromata with 1-4 ascomata, solitary or clustered, conical or hemispherical, black, without a discoid base, stromatic wall layer thin and

patchy, composed of host cells filled with compact blackened fungal hyphae; ascomata erumpent and covered with remains of host, or with papillate ostiole only protruding through star-shaped cracks on the host surface, hemispherical, with wart-like ornamentation. *Peridium* composed of brown-walled elongate globose cells inwardly and brown-walled *textura intricata* towards the outside. *Paraphyses* hypha-like, septate, flexulose, tapering and embedded in a gelatinous matrix. *Asci* 8-spored, spore bearing part cylindrical, stipe tapering, apically rounded, with a vase-shaped, subapical, J+ ring. *Ascospores* 1-2-seriate, dark-brown, inequilaterally fusiform, straight or curved, germ slit on flattened side.

Type species: Guestia gonetropospora G.J.D. Smith and K.D. Hyde

Guestia is introduced to accommodate a single specimen and species, *G. gonetropospora*. The genus is characterised by pseudostromata of one to four black ascomata, with a thin and patchy wall layer; 8-spored, unitunicate asci with amyloid apical rings, and dark, inequilateral ascospores with a germ slit. This combination of characters leads the authors to place this genus within the *Xylariaceae*.

Of the genera of the *Xylariaceae*, *Guestia* is superficially most similar to *Anthostomella sensu* Lu and Hyde (2000), due mainly to appearance on the substrate, although the paraphyses and peridium of both genera are similar. The stroma of *Anthostomella* is generally reduced to a clypeus that, in the type species, is pseudostromatic, and the ascomata are usually immersed or semi-immersed (Lu and Hyde, 2000). *Guestia*, however, has a relatively well developed pseudostroma surrounding the ascomata, and it is also erumpent through the host tissue. Microscopic characters further separate *Anthostomella* from *Guestia*. The ascospores of *Anthostomella* are generally ellipsoidal or inequilateral-ellipsoidal, the ascus stipes short, and the apical ring is usually discoid or stopper-shaped (Lu and Hyde, 2000), while *Guestia* has inequilaterally-fusiform ascospores, long ascus stipes and a highly distinctive vase-shaped apical ring.

Other genera that are somewhat similar to *Guestia* include *Astrocystis*, *Halorosellinia* and *Rosellinia* (Ju and Rogers, 1990; Læssøe and Spooner, 1994; Whalley *et al.*, 2000). *Astrocystis* species generally have a small, stopper-shaped apical ring, markedly different from that of *Guestia*. In addition, species of *Astrocystis*, with the exception of *A. cocoës*, have ellipsoidal or inequilateral-ellipsoidal ascospores that are much shorter than those of *Guestia*. The ascus stipe of *Guestia* is long, like that of *Rosellinia*, while *Astrocystis* species have short ascus stipes. The vase-shaped apical ring of *Guestia* is similar to those of *Rosellinia*, except that it is much longer than wide and tapers at the bottom. Both *Astrocystis* and *Rosellinia* are further

distinguished from *Guestia* as they have a full stroma, not the pseudostroma of *Guestia* (Petrini, 1992; Læssøe and Spooner, 1994). *Halorosellinia* is similar to *Guestia* in possessing a pseudostroma but it is not erumpent as with *Guestia* (Whalley *et al.*, 2000). Other characters of the two genera only serve to separate them further; *Halorosellinia* has a peridium of *textura porrecta*, non-flexulose paraphyses, a barrel-shaped apical ring (like *Rosellinia*) and inequilaterally ellipsoid ascospores, all unlike *Guestia* (Whalley *et al.*, 2000).

Guestia gonetropospora G.J.D. Smith and K.D. Hyde, **sp. nov.** (Figs. 82-96)

Pseudostromata 700-840 µm diam. 420 µm alta, solitaria vel gregaria, conica vel hemispherica, nigra, 1-4 ascomata praedita; ascomata c. 600 µm diam. erumpentes, hemispherica, tuberculata, paraphysaticum. *Asci* 105-130 × 7.5-12 µm, 8-spori, pedicelati, apparatu apicale praediti. *Ascospores* 23-33 × 4.5-7 µm, 1-2-seriatae, atro brunneae, inequilateral-fusiformes, laevae vel curvatae.

Species typica: *Guestia gonetropospora* G.J.D. Smith and K.D. Hyde

Etymology: In reference to the tropical origin of the type specimen.

Pseudostromata with 1-4 ascomata, solitary or clustered, conical or hemispherical, black, 700-840 µm diam. 420 µm high, without a discoid base, pseudostromatic wall layer thin and patchy, composed of host cells filled with compact blackened fungal hyphae; ascomata c. 600 µm diam. erumpent and covered with remains of host, or with papillate ostiole only protruding through star-shaped cracks on the host surface, hemispherical, with wart-like ornamentation. *Peridium* to 60 µm wide, composed of brown-walled elongate globose cells inwardly and brown-walled *textura intricata* towards the outside. *Paraphyses* to 6 µm at the base, hypha-like, septate, flexulose, tapering and embedded in a gelatinous matrix. *Asci* 8-spored, spore bearing part cylindrical, 105-130 × 7.5-12 µm, stipe tapering, up to 60 µm long, apically rounded, with a vase-shaped, subapical, J+ ring, 5-7 µm high, 2.5-3 µm diam. *Ascospores* 23-33 × 4.5-7 µm, 1-2-seriate, dark-brown, inequilaterally fusiform, straight or curved, germ slit on flattened side, full length, with a thin mucilaginous sheath, and small polar appendages.

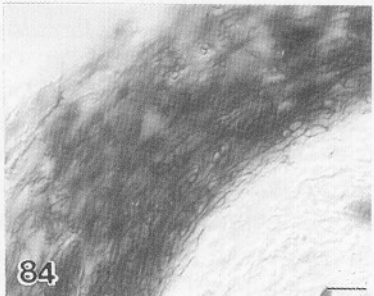
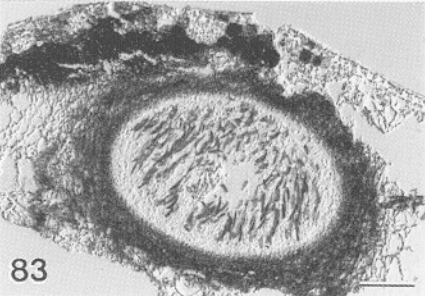
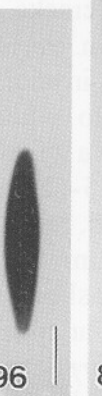
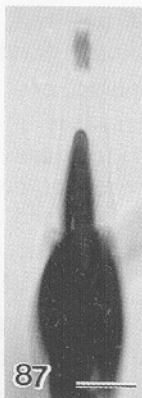
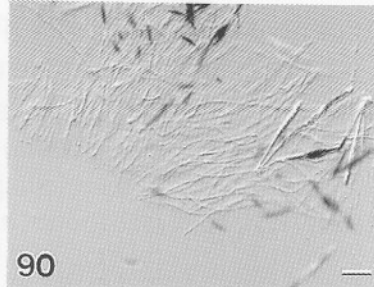
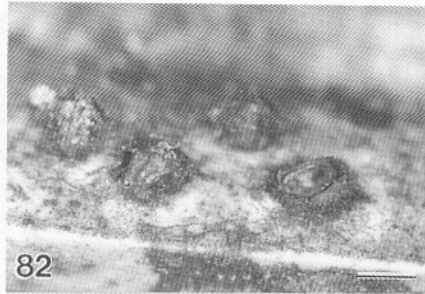
Anamorph: unknown.

Known distribution: Ecuador.

Known hosts: *Mauritia flexulosa*.

Material examined: ECUADOR, Oriente, Napo Province, Rio Cuyabeno, Cuyabeno rain forest, 00°00'N 76°10'W, Botanists Plot, Path A, Camangucho, on dead rachis of *Mauritia flexuosa*, August 1993, K.D. Hyde E136 [HKU(M) 3347, here designated the **holotype**, **isotype** at the Biology Department, Catholic University, Quito, Ecuador].

Guestia gonetropospora is distinguished by the possession of an erumpent pseudostroma; cylindrical asci with short tapering stipes, and a large vase-shaped, J+ apical ring that tapers at the bottom; and dark, inequilaterally fusiform ascospores, with a full length germ slit on flattened side, surrounded by a thin



Figs. 82-96. Micrographs of *Guestii gonetropospora* (from holotype). **82.** Stromata on host surface. **83, 84.** Section of stroma. **85-89.** Asci. **91-96.** Ascospores. Bars: 82 = 500 μm ; 83 = 100 μm ; 84-96 = 10 μm .

mucilaginous sheath, and with small polar appendages. The combination of these characters places the specimen firmly in the *Xylariaceae*, yet precludes it from existing genera. Only one collection of *G. gonetropospora* has been made, from Ecuador.

Hypoxylon Bull., Histoire des champignons de la France 1: 168 (1791); *non* Mentzel ex Adans. (1763) (*nom. cons.*).

Type species: Hypoxylon fragiforme (Pers.:Fr.) J. Kickx fil.

Anamorph: Nodulisporium.

Habitat: Endophytic, saprobic, or parasitic on various plants.

Distribution: Cosmopolitan.

Species of *Hypoxylon sensu stricto* (Læssøe, 1994, Van der Gucht, 1995, Ju and Rogers, 1996) develop superficial stromata with immersed ascomata. The surface or context contains bright or dark coloured granules and have KOH-extractable pigments, and somewhat brown ascospores that have germ slits on the convex side and normally a loosening perispore. The ascus apical apparatus is typically amyloid, broader than high. Anamorphs are referable to the form genus *Nodulisporium*, with four subtypes based on the complexity of branching (Ju and Rogers, 1996). Since the world monograph of *Hypoxylon* (Miller, 1961) generic concepts have developed, to the current understanding provided by Ju and Rogers (1996), and many species accepted by Miller have been transferred to other genera. Of these most have been disposed in *Biscogniauxia*, *Camillea* (Læssøe *et al.*, 1989) and *Nemania* (Pouzar, 1985a,b). All three genera have stromata that lack the bright granules and KOH-extractable pigments in *Hypoxylon*. The latter two differ in anamorph morphology, *Camillea* possessing *Xylocladium* anamorphs, and *Nemania* with *Geniculosporium* anamorphs.

Hypoxylon is a cosmopolitan genus in the *Xylariaceae* for which Ju and Rogers (1996) have accepted 118 species with 11 subspecies. It has the highest number of species recorded in the tropics and subtropics and can live as an endophyte, pathogen, and/or saprobe (Ju and Rogers, 1996). The taxon has been defined and redefined many times in the literature, and the circumscription accepted here is that suggested by Ju and Rogers (1996). The taxon has been divided into two sections, *Hypoxylon* and *Annulata*, according to characters of the stroma, the position of the ostiole, and the ornamentation of the perispore.

Hypoxylon can be distinguished from similar genera in the *Xylariaceae* through its anamorph and the structure of its stromata. *Nemania* and *Kretzschmaria* have *Geniculosporium*-like anamorphs, *Biscogniauxia* and *Camellia* have bipartite stromata (*Hypoxylon*'s is unipartite), *Daldinia* stromata has concentric rings and *Rhopalostroma* has stipitate stromata, while the stromata of *Hypoxylon* species are usually broader than they are tall (Ju and Rogers, 1996). Most of the species within these genera lack bright stromatal granules.

For an emended diagnosis see Van der Gucht (1995) and Ju and Rogers (1996).

Key to taxa of *Hypoxylon* treated

1. Stromatal pigments greenish-olivaceous or dull green in KOH.....2
1. Stromatal pigments orange to yellow in KOH, ascospores (20-25 × 8-9 μm) elongated citriform with pinched ends, full length germ slit *H. rubellum*
2. Ascospores (7-9 × 3-4 μm) inequilateral ellipsoid, full length germ slit on convex side.....
..... *H. moriforme*
2. Ascospores (5-7 × 2-3 μm) inequilateral ellipsoid, full length germ slit on flattened side.....
..... *H. stygium*

Species recorded from palms

Hypoxylon arecarium (Fr.: Fr.) Mont., Annales des Sciences Naturelles, Botanique, serie II, 13: 355 (1840).

Material examined: RÉUNION: Bourbon Island, on palm trunks, 1801-1802, Bory (PC, lectotype of *Sphaeria arecaria*).

This is probably conspecific with *Biscogniauxia divergens* var *macrospora* (Theiss.) Whalley and Læssøe, which has been synonymised with *B. philippinensis* (Ricker) Whalley and Læssøe (Ju *et al.*, 1998). For a description and illustrations of these fungi see Miller (1961).

Hypoxylon cocoinum Cooke, Grevillea 11: 76 (1882).

Material examined: MALAYSIA, Malacca, Taujong, on dead wood of *Cocos nucifera*, July 1866 (K, holotype).

This is not a *Hypoxylon* as it has bitunicate asci and can probably be referred to *Pyrenula* (Harris, 1989; Hyde, 1997; Upreti 1998).

Hypoxylon coryphae Rehm, Philippine Journal of Science, Section C, Botany 8: 400 (1913).

Material examined: PHILIPPINES, Luzon, Laguna, Los Baños, on dead petioles of *Corypha elata*, January 1913, Baker 766 [S, holotype].

Rehm (1913) described the ascospores of this species as hyaline or subfuscidulae, hardly mature, and with 6-8 ascospores in each stroma. The taxon was removed from *Hypoxylon* by Miller (1961) and made synonymous with *Xylaria frustulosa* Berk. and M.A. Curtis (as *Penzigia fructulosa* (Berk. and M.A. Curtis) J.H. Miller).

Hypoxylon deciduum Berk. and Broome, Journal of the Linnean Society, Botany 14: 120 (1873).

Material examined: SRI LANKA, Central Province, on an unidentified palm, December 1868, G.H.K. Thwaites 172 [K, holotype].

This is a synonym of *Catabotrys deciduum* (Berk. and Broome) Seaver and Waterson (Seaver and Waterson, 1946), a monotypic genus in the *Catabotrydaceae* (Hyde and Cannon, 1999).

Hypoxylon desmonci Rehm, Hedwigia 40: 142 (1901).

Type: BRAZIL: Rio de Janeiro, on leaves of *Desmunci littoralis*, Ule.

Miller (1961) considered this species to be *Dothidina palmicola* (Speg.) Theiss. and Syd., while von Arx and Muller (1954) considered it to be synonymous with *Coccostroma palmicola* (Speg.) Arx and E. Mull. Both names are synonymous with *Coccostromopsis palmicola* (Speg.) K.D. Hyde and P. Cannon (Hyde and Cannon, 1999).

Hypoxylon folicola J.H. Miller, Mycologia 32: 181 (1940).

Material examined: BRAZIL, Minas Gerais, Teixeras, Viçosa, on palm leaf, 17 October 1929, A.S. Muller [GA 2390-1, syntypes of *H. folicola*].

Material is depauperate lacking asci and ascospores. The stromata however, which are superficial on palm leaves, resemble those of *Coccostromopsis diplothemii* (Rehm.) K.D. Hyde and P. Cannon (Hyde and Cannon, 1999). Chardon *et al.*, (1940) describe the ascospores as oblong to navicular, dilute to dark brown and $16-20 \times 7-9 \mu\text{m}$, which are within the range of *C. diplothemii* and therefore *Hypoxylon folicola* is probably synonymous with *Coccostromopsis diplothemii* (Hyde and Cannon, 1999). Viegas (1961) recorded this on *Attalea* sp. from South America. Ju and Rogers (1996) regard this as a synonym of *Hypoxylon palmigena* Berk. and M.A. Curtis which is itself also a synonym of *Coccostromopsis diplothemii* (Rehm) K.D. Hyde and P. Cannon.

Hypoxylon fragillimum (Rehm) J.H. Miller, Monograph of the world species of *Hypoxylon*: 20 (1961).

Material examined: PHILIPPINES, Luzon, Laguna, Los Baños, Mt Makiling, on rattan of *Calamus* sp., 25 April 1914, C.F. Baker, Fungi Malayana 169 [S, holotype of *Nummularia fragillima*].

The taxonomic position is uncertain (Ju and Rogers, 1996). Miller (1961) placed this taxon in *Hypoxylon* section *Applanata*. Type material is in poor condition and comprises pieces of rattan with black shiny oval stromata. Only ascospores can be located within these stroma and these are cognac brown and $26.5\text{-}33.5 \times 8\text{-}9.6 \times 4\text{-}6 \mu\text{m}$. Ju and Rogers (1996) state that these ascospores are of the type more commonly found in the *Xylarioideae* than in the *Hypoxyloideae*. Because this specimen is in poor condition the species must be considered as doubtful until fresh material is obtained.

Hypoxylon mauritanicum (Durieu and Mont.) Mont., Sylloge Generum Specierumque Cryptogamarum: 211 (1856).

Material examined: Algeria, Durieu [PC, holotype].

Miller (1961) considered this to be *Penzigia mauritanica*. Material loaned from PC consisted of a single irregular dried black gelatinous mass c. 2 cm diam. No ascospores or asci were found in the specimen. Annotations by Dennis (28 February 1957) indicate he also considered this to be a *Penzigia*. In Patouilliard (1905) the asci are described as $150 \times 8 \mu\text{m}$, with paraphyses present and ascospores $18\text{-}20 \times 5\text{-}6 \mu\text{m}$, uniseriate, brown, navicular and with two guttules. Ju and Rogers (1996) consider this to be a *Xylaria*.

Hypoxylon moriforme Henn., Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 23: 287 (1896). (Figs. 97-102)

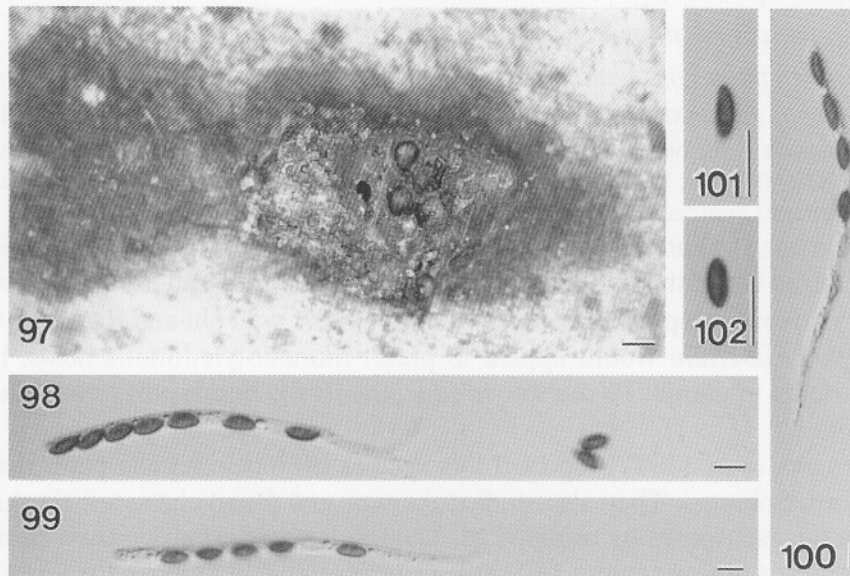
For synonyms see Ju and Rogers (1996).

Stromata erumpent, with 1-many ascomata, solitary or clustered, mammiform, black, to 20 mm long, 1000 μm high, stroma wall to 150 μm thick, composed of dark-brown-walled, *textura globosa* and *textura intricata*, with an outer amorphous layer, carbonised, with KOH-extractable pigment greenish-olivaceous, surface smooth, apex flattened, annulate, with a relatively inconspicuous papillate ostiole; ascomata ca. 500 μm diam. *Peridium* to 20 μm wide, composed of several layers of light-brown walled flattened cells, fusing with the stroma at the outside. *Paraphyses* to 4 μm , hypha-like, septate, irregular, tapering, embedded in a gelatinous matrix. *Asci* 8-spored, spore bearing part cylindrical, $60\text{-}80 \times 4.5\text{-}6.5 \mu\text{m}$, stipe tapering, up to 60 μm long, apically rounded, with a cylindrical, subapical, discoid J+ ring, 0.8-1 μm high, 2-2.5 μm diam. *Ascospores* $7\text{-}9 \times 3\text{-}4 \mu\text{m}$, uniseriate, brown, inequilaterally ellipsoidal, germ slit on convex side, full length, no mucilaginous sheath or appendages observed, but with a swelling on the flattened side.

Anamorph: *Nodulisporium*-like (Ju and Rogers 1996).

Known distribution: Cosmopolitan.

Known palm hosts: *Calamus*.



Figs. 97-102. Micrographs of *Hypoxylon moriforme* (from HKU(M) 1855). 97. Stromata on host surface. 98-100. Asci. 101, 102. Ascospores. Bars: 97 = 2 mm; 61 = 98-102 = 10 μ m.

Material examined: PHILIPPINES, Mindanao, Bukidnon, Impalutao Forest Reserve, on dead palm rachis, December 1993, K.D. Hyde [HKU(M) 1855]; *ibid.*, K.D. Hyde [HKU(M) 1905].

Hypoxylon palmigena Berk. and M.A. Curtis, *Journal of the Linnean Society, Botany* 10: 385 (1868).

Material examined: Cuba, on palm leaf, C. Wright 832 [no. 488] (K, lectotype of *H. palmigena*).

Miller (1961) gives this as a possible earlier name for *Hypoxylon folicola* J.H. Miller. However, he reported the specimens to be old and disintegrated and could not be sure of the identity. Theissen and Sydow (1915) transferred this species to *Coccostroma palmigenum* (Berk. and M.A. Curtis) Theiss. and Syd. as it had hyaline ascospores.

Good material of this species has been found and examined and reveals that it is better placed as a synonym of *Coccostromopsis diplothemii* (Hyde and Cannon, 1999). See also the discussion of *H. folicola*.

Hypoxylon rubellum Penz. and Sacc. emend. J.D. Rogers, Callan and Samuels, *Mycotaxon* 29: 132 (1987).

Stromata pulvinate, ascomata outline very evident, context with orange to yellow pigments in KOH. *Ascospores* 20-25 \times 8-9 μ m, elongated citriform with pinched ends, germ slit full length, fragments of rather thin perispore present.

Anamorph: Unknown.

Known distribution on palms: Australia, French Guiana, Indonesia.

Known palm host: *Calamus*.

Material examined: AUSTRALIA, north Queensland, Palmerston, Palmerston National Park, Tchupaalla Falls, on dead rattan of *Calamus caryotooides*, April 1995, J. Fröhlich and R. Huwer [HKU(M) 7847]; INDONESIA, Java, Cibodas, on palm petiole [determined J. Dransfield, originally reported from "culmis purtridis"] O. Penzig 349 [PAD, **holotype**].

This Australian collection keys out to *Hypoxyton rubellum*, which is characterised by stromata filled with orange-red granules and ascospores with a narrow network of upraised veins on the ascospore wall (Ju and Rogers, 1996). *Hypoxyton rubellum* would appear to prefer monocotyledonous hosts, but is not restricted to palms. To our knowledge, this is the first report of the taxon in Australia.

Rogers *et al.* (1987) reported this species on indeterminate palm material from North Sulawesi. They also studied the type and found characteristic shallow parts on the ascospores by using SEM. They also observed an unusual germ slit. This species is unique among *Hypoxyton* species in having pits on the ascospores (Ju and Rogers, 1996).

Hypoxyton stygium (Lév.) Sacc., Sylloge Fungorum 1: 379 (1882).

This species was collected on palm in North Sulawesi (Rogers *et al.*, 1987). It has been well described by Miller (1961) and Ju and Rogers (1996).

Nemania Gray emend. Pouzar, Česká Mykologie 39: 16 (1985).

Type species: *Nemania serpens* (Pers.:Fr.) Gray.

Anamorph: *Geniculosporium*.

Habitat: Endophytic, saprobic, or parasitic on various plants.

Distribution: Cosmopolitan.

Nemania was emended and reinstated by Pouzar (1985a) to account for the *Hypoxyton serpens*-complex of *Hypoxyton* subsection *Prinocinerea* of Miller (1961), that had long been thought too broad and to contain a heterogeneous assembly of taxa (Petrini and Rogers, 1986; Læssøe and Spooner, 1994).

As emended by Pouzar (1985a,b), species of *Nemania* develop superficial stromata, lacking both a subiculum and bright pigments that are soluble in KOH, and also possess a J+, rectangular apical ring that is higher than it is broad. The apical ring is more similar to those of *Kretzschmaria* and *Xylaria* than those of *Hypoxyton*. *Nemania* is further defined by the possession of *Geniculosporium* anamorphs (Pouzar, 1985a), a feature shared with some *Anthostomella* taxa, *Rosellinia* and *Xylaria*, amongst other genera (Læssøe, 1994; Ju and Rogers, 1996). As such, the generic affinities of *Nemania* are thought to be closer to the

Xylaria-like genera of the *Xylariaceae*, than to the *Hypoxylon*-like genera (Pouzar, 1985a, b; Petrini and Rogers, 1986; Læssøe and Spooner, 1994).

Key to taxa of *Nemania* treated

1. Ascospores without appendages..... *N. maculosa*
 1. Ascospores with appendages 2
2. Ascospores (10-15 × 5-6.5 µm) inequilateral, with full length germ slit surrounded by a thin mucilaginous sheath..... *N. bipapillata*
 2. Ascospores greater than 15 µm long..... 3
3. Ascospores (17-31 × 7-9.5 µm) ellipsoid to fusoid to inequilateral, with full length germ slit
 *N. nummularioides*
 3. Ascospores (16-21 × 6-7.5 µm) inequilaterally ellipsoid, with germ slit less than full length.....
 *N. saladerana*

Species recorded from palms

Nemania bipapillata (Berk. and M.A. Curtis) Pouzar, *Ceská Mykologie* 39: 24 (1985) (Figs. 103-109)

For synonyms see Ju and Rogers (1999).

Stromata erumpent, with 1-many ascomata, solitary or clustered, irregularly conical or hemispherical, dark-brown, to 5 mm diam. 840 µm high, stromatic wall layer to 50 µm thick, composed of strongly pigmented brown, and strongly carbonised irregularly globose cells; surface tuberculate, with host adhering to and part of upper part of stroma, with a raised annulate area and conspicuous ostiole; ascomata c. 500 µm diam. hemispherical. *Peridium* to 14 µm thick, composed of pale brown flattened cells. *Paraphyses* to 5 µm at the base, hypha-like, filamentous, septate, irregular, tapering, embedded in a gelatinous matrix. *Asci* 8-spored, spore bearing part cylindrical, 70-90 × 6-8 µm, stipe tapering, to 90 µm long, apically rounded with a stopper-shaped, subapical J+ ring, 2.5-3 µm high, 2-2.5 µm diam. *Ascospores* 10-15 × 5-6.5 µm, overlapping uniseriate, dark reddish-brown, inequilateral, germ slit on flattened side, full length, surrounded by a thin mucilaginous sheath and inconspicuous polar pad-like appendages.

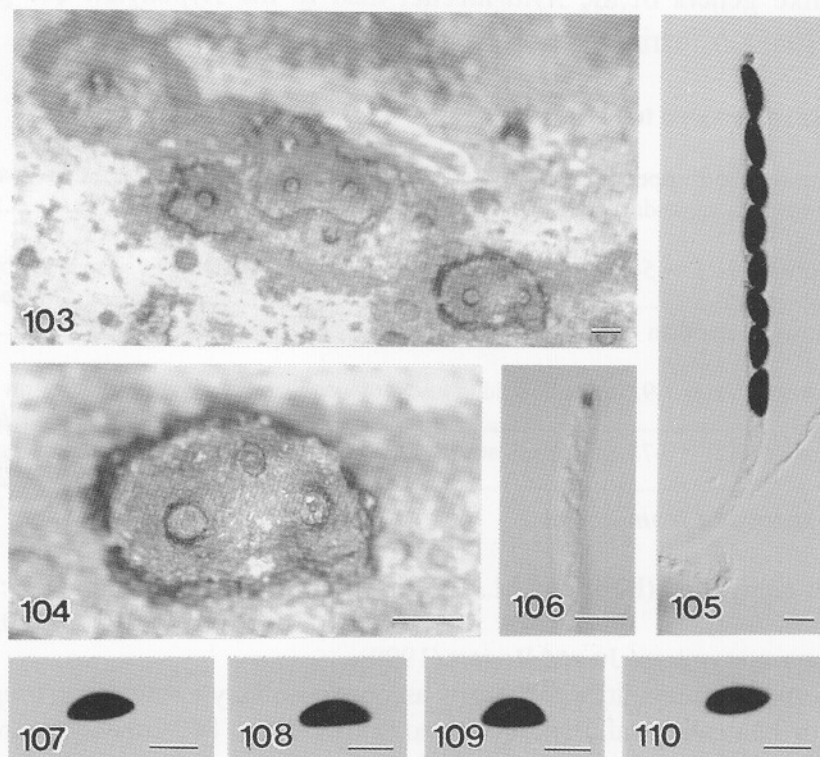
Anamorph: Geniculosporium.

Known distribution: Australia, Brunei, Europe, Mauritius, North America, Papua New Guinea and South America.

Known palm hosts: Arenga.

Material examined: BRUNEI, Temburong, Kuala Belalong, Rainforest Field Studies Centre, on dead rachis of *Arenga acutifolia*, July 1993, K.D. Hyde [HKU(M) 1707].

Nemania bipapillata has been well described by Van der Gucht (1995), and the authors do not hesitate in placing this specimen in the species.



Figs. 103-110. Micrographs of *Nemaniam bipapillata* (from HKU(M) 1707). **103, 104.** Stromata on host surface. **105, 106.** Asci. **107-110.** Ascospores. Bars: 103, 104 = 1 mm; 105-110 = 10 μ m.

Nemaniam maculosa (J.D. Rogers, Callan and Samuels) G.J.D. Smith and K.D. Hyde, **comb. nov.**

\equiv *Hypoxylosum maculosum* J.D. Rogers, Callan and Samuels, Mycotaxon 29: 12 (1987).

Stromata containing numerous ascomata, applanate to somewhat pulvinate, erumpent, dull black mottled with white, 1000 μ m high, with umbilicate, inconspicuous, papillate ostiole; ascomata, 400-6000 μ m diam. 400-650 μ m high. *Peridium* to 20 μ m wide, composed of light-brown-walled compressed cells, fusing outwardly with the stroma. *Paraphyses* hypha-like, septate, irregular, tapering, not embedded in a gelatinous matrix. *Asci* 8-spored, spore bearing part cylindrical, 130-160 \times 10-14 μ m, stalk tapering, to 60 μ m, apically rounded with an um-shaped, subapical J+ ring, 5-7 μ m high, 4-5 μ m high. *Ascospores* (17.5-) 20.5-30 \times (5-)6.5-8(-10.3) μ m, 1-2-seriate, light brown to brown, inequilaterally ellipsoid to somewhat allantoid, germ slit less than full length.

Anamorph: Unknown.

Known distribution: North Sulawesi, Indonesia.

Known palm host: Livistona.

Material examined: INDONESIA, North Sulawesi, Dumoga-Bone National Park, at the confluence of the Toraut and Tumpah Rivers, vic. Project Wallace Base Camp, 0°34'N, 123°57'E; elev. 211 m, on rachis of *Livistona* sp., Samuels 1991, September to November 1985 [NY, **isotype**].

This specimen resembles *Hypoxyylon* section *Applanata sensu* Miller (1961) that would normally suggest it is a species of *Biscogniauxia*, but the ascal plug is highly unusual. *Nemania* and *Kretzschmariella* are other possibilities. Ju and Rogers (1996) believe this to be a *Nemania* and it is formerly transferred here.

***Nemania nummularioides* (Rehm) G.J.D. Smith and K.D. Hyde, comb. nov.**

≡ *Hypoxyylon nummularioides* Rehm, Leaflets of Philippine Botany 8: 2960 (1916).

Stromata confluent, cinerous, cracking, very hard, erumpent, through outermost cuticle, with a loose, more or less well developed stromatic margin, containing 1-20(-30) ascomata, outlines hardly or just visible, seated directly on the substrate (no basal stroma) with a very loose, fluffy, white context between ascomata. *Asci* not seen. *Ascospores* 17-22.5 × 7-9.5 μm.

Anamorph: Unknown.

Known distribution on palms: Indonesia, Peru.

Known palm host: Iriartia.

Material examined: PERU: Dept. Loreto, Iquitos, Yanomono, ca. 50 km downstream Rio Amazonas above Rio Napo, on dead stilt roots of *Iriartia deltoidea*, 12 July 1987, T. Læssøe P-281 [K].

Miller (1961) described this fungus but did not provide any details regarding ascospore germ slits or asci. A collection of this fungus, differing from that described by Miller (1961), has been reported (as *H. nummularioides*) from a probable palm in North Sulawesi (Rogers *et al.*, 1987). Rogers *et al.* (1987) described *N. nummularioides* with larger ascospores (25-31 × 7-9 μm), sometimes with flaring secondary appendages and a full length germ slit. The ascus spore bearing parts were 160-200 × 11-16 μm, with 20-30 μm long stipes and a J+ apical ring 8 μm high and 5 μm in diameter. Ju and Rogers (1996) believe this to be a *Nemania* and it is formerly transferred here. *Nummularia reyesiana* Rehm is also a synonym (Ju and Rogers, 1996).

***Nemania saladerana* G.J.D. Smith and K.D. Hyde, sp. nov.** (Figs. 111-116)

Nemania aenea (Nitschke) Pouzar similis sed ascosporae 16-21 × 6-7.5 μm et appendiculatae, formae et rima germinativae differt.

Etymology: In reference to the "Saladera trail" where the type specimen was collected.

Stromata superficial, with 1-many ascomata, solitary or clustered, mammiform with subconical apex when single, otherwise effused pulvinate, grey-brown darkened around ostiole, to 10 mm long, 420 μm high, lacking a discoid base, stromatic wall to 160 μm thick, composed of dark-brown walled,

textura globosa and *textura intricata*, carbonised, surface smooth, with conspicuous perithecial mounds, and relatively inconspicuous papillate ostioles; ascomata 700 µm diam. *Peridium* to 16 µm wide, composed of several layers of light brown-walled flattened cells, fusing with the stroma at the outside. *Paraphyses* up to 13 µm at the base, hypha-like, remotely septate, irregular, tapering, embedded in a gelatinous matrix. *Asci* 8-spored, spore bearing part cylindrical, 100-120 × 7-9 µm, stipe tapering, up to 70 µm long, apically rounded, with a barrel-shaped, subapical, J+ ring, 5-6 µm high, 3-4 µm diam. *Ascospores* 16-21 × 6-7.5 µm, 1-2-seriate, golden-olive to brown, inequilaterally ellipsoidal, germ slit mostly on flattened side, straight, central (8-10 µm long), with a somewhat darkened border, 1/2-2/5 of ascospore length, no thin mucilaginous sheath noted on any ascospores, but small polar appendages observed.

Anamorph: Unknown.

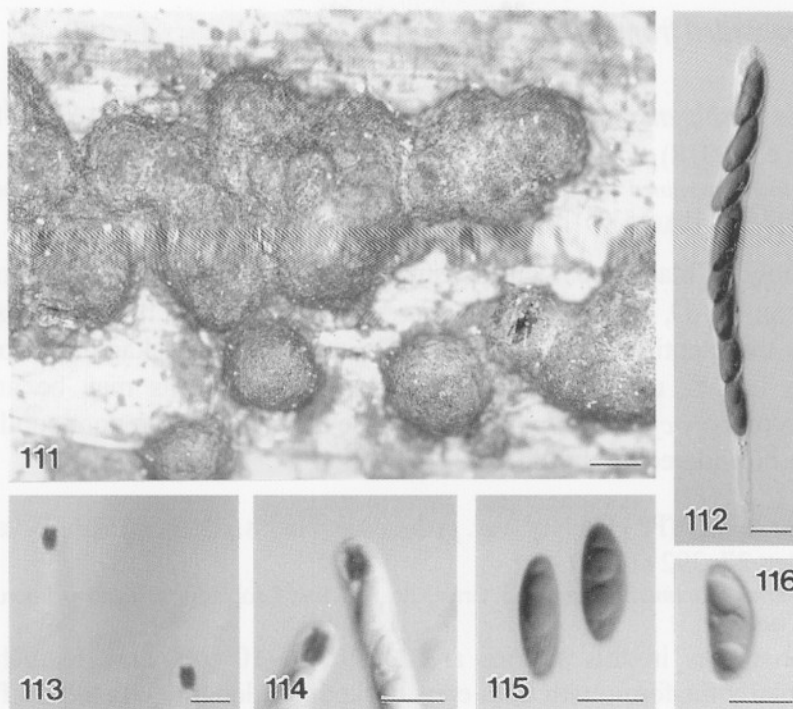
Known distribution: Ecuador.

Known palm hosts: *Astrocaryum*.

Material examined: ECUADOR, Cuyabeno, Rio Cuyabeno, "Saladera trail" on dead rachis of *Astrocaryum* sp., August 1993, K.D. Hyde E149 [HKU(M) 3348, here designated the **holotype**].

This species fits well in *Nemania* due to the pulvinate, superficial and multiperithecial stromata, the large barrel-shaped J+ apical ring, the long tapering ascus stipe and the lack of a hyaline sheath surrounding the ascospores (Pouzar, 1985a; Petrini, 1992).

Nemania saladerana is distinguished from other species in the genus by a combination of ascospore size, possession of polar appendages on the ascospores and stromatal morphology. The ascospores of *N. saladerana* are within the size range of *N. aenea* (Nitschke) Pouzar (13-21 × 5.2-7 µm), but in *N. aenea* they lack polar appendages, are elongately ellipsoid to allantoid with a straight germ slit that is not present in all ascospores and is only 1/4 to 1/2 of ascospore length (Pouzar, 1985b). The apical ring of *N. aenea* is also in the same size range (3.5-5.5 µm high, 3-4 µm diam.) of *N. saladerana*, but its apical ring is cylindrical and taper downwards, i.e. not barrel-shaped (Pouzar, 1985b). The stromata of *N. aenea* are also flattened while those of *N. saladerana* are pulvinate (Pouzar, 1985b). Other large spored species of *Nemania* have less in common with *N. saladerana*. *Nemania gwyneddii* (Whalley, R.L. Edwards and S.M. Francis) Pouzar differs from *N. saladerana* in having larger ascospores (19-29 × 7-9.5 µm) that are somewhat curved or allantoid and lack polar appendages (Whalley *et al.*, 1983, as *Hypoxyton gwyneddii*). Although *Nemania nummularioides* also possesses ascospore appendages, differences in ascospore, ascus and apical ring size, presence of a full length germ slit, and stromatal morphology clearly distinguish it from *N. saladerana* (Miller, 1961; Rogers *et al.*, 1987). *Nemania serpens* var. *macrospora* (J.H. Mill.) Pouzar differs from *N. serpens* in having



Figs. 111-116. Micrographs of *Nemania saladerana* (from holotype). **111.** Stromata on host surface. **112-114.** Asci. **115, 116.** Ascospores. Bars: 111 = 1 mm; 112-116 = 10 μ m.

larger ascospores ($13-22 \times 5-8 \mu$ m) and asci (spore bearing part $90-100 \times 35-55 \mu$ m, stipe $35-55 \mu$ m) (Miller, 1961; Petrini and Rogers, 1986). The ascospore sizes are similar to those of *N. saladerana* but the germ slit of *N. serpens* var. *macrospora* is much less than 1/2 ascospore length, ascospores lack appendages and stromatal characters also differ (Miller, 1961; Petrini and Rogers, 1986). Ju and Rogers (1999) described an unnamed species of *Nemania* (*Nemania* sp. 80082010) with ascospores $17-22 \times 6-7 \mu$ m, however, ascospores lack appendages and have a short germ slit on the convex side. The perithecial mounds of this species are inconspicuous, differing from *N. saladerana*.

Rosellinia De Not., Giornale Botanico Italiano 1: 334 (1844).

Type species: Rosellinia aquila (Fr.: Fr) De Not.

Anamorph: Dematophora and *Geniculosporium*.

Habitat: Endophytic, parasitic or saprobic on various plants.

Distribution: Cosmopolitan.

Differences between *Astrocystis* and *Rosellinia* are discussed earlier by the authors. This genus was treated in part by Petrini (1992), but no comprehensive monograph exists.

Species recorded from palms

Rosellinia ambigens Sacc., *Bulletino dell' orto Botanico della regia Università Napoli* 6: 43 (1918).

Material examined SINGAPORE, Botanical Gardens, on pinnae of *Daemonorops* sp., October 1917, C.F. Baker 5395 (PAD, **holotype**).

A row of black erumpent ascomata cover the surface of the palm leaves loaned from PAD, but these lack contents and therefore it is not possible to conclude the identity of the specimen. On the original package ascospores are drawn as brown, unicellular and $9-10 \times 4.5-5 \mu\text{m}$. This may be an earlier collection of *Astrocystis rachidis*, but because the material is in poor condition the species is considered doubtful.

Rosellinia aquila (Fr.) De Not. var. ***palmicola*** Theiss., *Beihefte zum Botanischen Centralblatt* 27: 392 (1910).

Material examined: Brazil, Rio Grand do Sul, Sao Leopoldo, in ligno palmarum, 1906, Rick? [FH, **isotype**].

Ascospores in this species are $21-28 \times 8-10 \mu\text{m}$, dark reddish-brown, inequilaterally fusiform, with both ends beaked, full length germ-slit on flattened side and with no mucilage. Ascomata develop on an orange-brown hyphal mat and are 750-1000 μm diam., black, globose, papillate and brittle. However, in the two specimens loaned from FH the specimens were depauperate.

Rosellinia calami Henn., *Hedwigia* 42: 79 (1903).

Hennings (1903) described *R. calami* with brown oblong-ellipsoidal ascospores, $7-9 \times 3.5 \mu\text{m}$. We have been unable to locate material of this taxon which is not available at B, K or S.

Rosellinia cocoës Henn., *Hedwigia* 47: 256 (1908).

See *Astrocystis cocoës* (Henn.) Læssøe and Spooner.

Rosellinia diderma (Schwein.) Ellis and Everh., *North American Pyrenomycetes*: 175 (1892).

Material examined: BERMUDA: Warwick, Fruitland, on fallen petioles of palms, 1 August 1921, Whetzel [CUP 11922].

Two specimens loaned from CUP were *Astrocystis palmarum*. The collection details are identical to the type of *A. palmarum* and they probably represent isotypes.

Rosellinia elaeicola Henn., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 22: 77 (1895).

Material examined: TANZANIA, Kigowa, on dead rachis of *Elaeis guineensis*, 23 March 1964, K. Pirozynski [IMI 107137b].

The holotype is no longer available. Pirozynski (1972) reports this taxon from *Elaeis*, but we could not locate any intact ascomata on IMI 107137b.

Rosellinia euterpes Rehm, *Hedwigia* 44: 3 (1905).

Material examined: BRAZIL: Blumenau, on *Euterpe* sp., 1888, E. Ule 839 [S, **holotype**].

The black carbonaceous erumpent ascomata of *R. euterpes* develop on a white subiculum. Unfortunately, this specimen is in poor condition, lacking asci or ascospores and it is not possible to establish its true identity. Rehm (1905) gave a brief description with no details of asci or ascospores. This species should be considered as doubtful.

Rosellinia lakshadweepensis Pande and V.G. Rao, *Ceská Mykologie* 48: 180 (1995).

Type: INDIA, Lakshadweep, Kavaratti Island, on pericarps of *Cocos nucifera*, 2 January 1988, V.D. Ranade [AMH 7601, **holotype** not seen].

Despite several requests it has been impossible to locate the type of this species. It must therefore be considered as doubtful.

Rosellinia lamprostoma Syd. and P. Syd., *Philippine Journal of Science* 8: 273 (1913).

This species has been recorded on *Daemonorops* sp. by Rehm (1916). We could not locate the specimen. A description of this fungus can be found in Ju and Rogers (1999).

Rosellinia marginatoclypeata Penz. and Sacc., *Malpighia* 11: 393 (1897).

Material examined: INDONESIA, Java, Depok, in dead palm rachis, 11 December 1896 [PAD, **holotype**].

This type specimen is in poor condition and it is not possible to establish its true identity. It may be *Anthostomella lucens* Sacc. (Hyde 1996), as evident from the description, diagram and annotations provided by Penzig and Saccardo (1897). It is considered doubtful.

Rosellinia sanctacruciana Ferd. and Wingess, *Botanisk Tidsskrift* 29: 16 (1908).

See *Astrocystis cocoës*.

Rosellinia sepulta (Berk. and M.A. Curtis) Sacc., *Sylloge Fungorum* 1: 256 (1882).

Material examined: CUBA, on stem of palm, C. Wright n. 845 [K, **holotype**].

Type material is covered in a dark-brown hyphal mat, accommodating a small number of black, globose, papillate ascomata. Asci are long cylindrical and

unitunicate with a thickening at the apex, containing long cylindrical, c. 6-septate, hyaline ascospores.

This does not belong in the *Xylariaceae*, and is probably better assigned to the *Lasiosphaeriaceae*.

Stilbohypoxylon Henn., Hedwigia 41: 16 (1902), non Theiss.

Type species: Stilbohypoxylon moelleri Henn.

Anamorph: Gencilosporium-like.

Habitat: Saprobic on various plants.

Distribution: Africa, Australia, China, Malaysia, Philippines, Puerto Rico, South America, Taiwan.

Stilbohypoxylon was introduced by Hennings (1902) to accommodate a single lignicolous species from Brazil. The type material based on the literature is immature, possessing immature asci and no ascospores, but with a prominent stilboid anamorph present (Læssøe and Spooner, 1994). Höhnel (1910) studied the type and found it to be "poor" and "completely immature". He further stated that two species were involved. He concluded that the genus should be rejected. Martin (1967) proposed the invalid combination *Kretzschmaria* sect. *Stilbohypoxylon* (Höhn.) Martin. A second species *S. rehmsii* Theiss. was described by Theissen (1908).

Very recently, material believed to be the holotype of *S. moelleri* was re-examined and a case made for preserving *Stilbohypoxylon* as a genus (Rogers and Ju, 1997). The holotype of *S. rehmsii* Theiss. was also re-examined, but this was found to contain a *Xylaria* species. The original description of *S. moelleri* did not include ascospore measurements. Rogers and Ju (1997) have deposited an epitype of the species, and provided ascospore measurements which reveal that many genuine *Stilbohypoxylon* collections which were placed in *S. rehmsii* actually belong in *S. moelleri*.

Stilbohypoxylon now contains three species (*S. moelleri*, *S. samuelsii* J.D. Rogers and Y.-M. Ju and *S. quisquiliarum* (Mont.) J.D. Rogers and Y.-M. Ju), all of which have superficial, spherical stromata, with a smooth or delicately wrinkled surface which is usually overlain with yellow, greenish yellow or ochraceous scales at an early stage, unitunicate asci with a large, amyloid apical ring which is greater in height than breadth, and brown, unicellular ascospores with a straight or sigmoid germ slit (Rogers and Ju 1997). Rogers and Ju (1997) also emphasise the frequent presence of a synnematosus anamorph on the outside of the stromata, although this was not observed on the collections made during the present study.

Species recorded from palms

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

This species has been well described by Rogers and Ju (1997).

Anamorph: *Geniculosporium*-like (Rogers and Ju, 1997).

Known distribution: Australia, Brazil, Ecuador, French Guiana, Grenada, Philippines, Puerto Rico.

Known palm hosts: *Astrocaryum*, *Elaeis*, *Euterpe*, *Iriartia*, *Jessenia*, *Mauritia*, *Oraniopsis*, *Phytelephas*, *Prestoea* and unidentified palms.

Material examined: AUSTRALIA, north Queensland, Mt. Lewis, rainforest, on rachis of *Oraniopsis*, August 1992, K.D. Hyde [HKU(M) 1521]; ECUADOR, Oriente, Reserva de Produccion Faunistica Cuyabeno, Rio Cuyabeno, Forest near the Laguna Grande, Camangucho, Path 5, on dead petiole of *Mauritia flexuosa*, July 1993, J. Fröhlich [HKU(M) 7700]; Path A5Z5, on dead petiole of *Jessenia bataua*, August 1993, J. Fröhlich [HKU(M) JF165]; "Saladera trail", on dead rachis of *Phytelephas* sp., August 1993, K.D. Hyde [HKU(M) 3344]; Botanists Plot, on dead rachis of *Jessenia bataua* sp., August 1993, K.D. Hyde [HKU(M) 2643]; on dead rachis of *Astrocaryum* sp., August 1993, K.D. Hyde [HKU(M) 2670]; MALAYSIA, Pasoh Forest Reserve, on dead rachids of *Elaeis guineensis*, November 1992, K.D. Hyde [HKU(M) 1914]; PHILIPPINES, Mindanao, Bukidnon, Impalutao Forest Reserve, on dead palm rachis, December 1993, K.D. Hyde [HKU(M) 1891].

These are the first reports of *S. moelleri* from a host which could be identified, and is also the first collection from Australia.

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