

## Fungi from palms. XII.\* Three new intertidal ascomycetes from submerged palm fronds

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*Aniptodera nypae*, *Carinispora velatispora* and *Nipicola selangorensis* are described from intertidal palm fronds collected in Brunei and Malaysia. The new species are illustrated and compared with related taxa.

Keywords: *Aniptodera*, *Carinispora*, intertidal fungi, *Nipicola*, *Nypa fruticans*, palm fungi.

Several recent papers (Hyde, 1988, 1992a, 1993; Hyde & Nakagiri, 1989) have described fungi from intertidal fronds of *Nypa fruticans* Wurmb. Hyde (1988, 1992a) and Hyde and Nakagiri (1989) reported 43 species from Brunei, while ten species were reported from Malaysia by Hyde (1993). The fungi include both typical terrestrial genera (e.g. *Linocarpon*, *Oxydothis*) with marine species and typical marine genera (e.g. *Helicascus*) (Hyde, 1993). In this continuing study of intertidal fungi from *Oncosperma tigillarum* and *Nypa* palm, three new ascomycetous taxa are described.

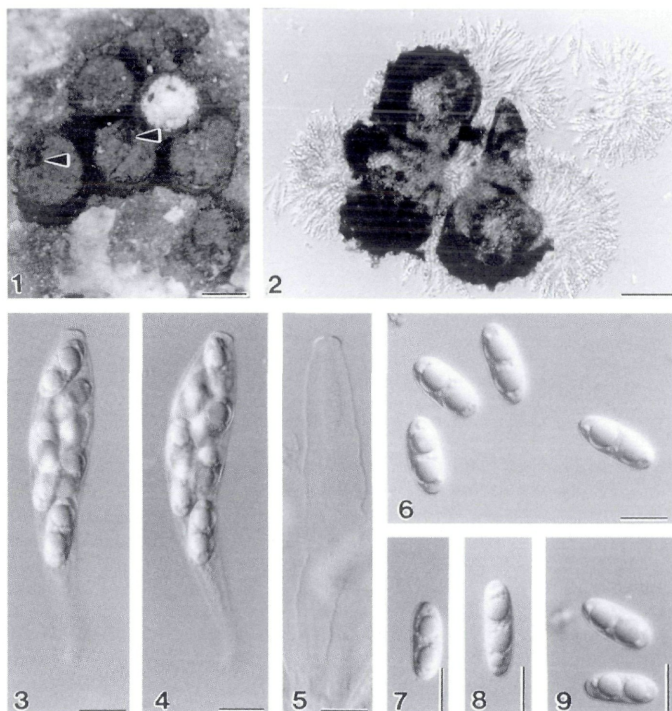
### *Aniptodera nypae* K. D. Hyde, sp. nov. – Figs. 1–9.

Ascomata 200  $\mu\text{m}$  in diametro, nigra, papillata, catenophysibus praedita. Asci 80–106  $\times$  14–18  $\mu\text{m}$ , 8–spori, clavati, unitunicati, apparato apicali praediti. Ascosporae 16–22  $\times$  5–7  $\mu\text{m}$ , bicellulares, hyalinae.

E t y m o l o g y . – From the host genus *Nypa*.

Ascomata 200  $\mu\text{m}$  diam immersed (in old fruiting bodies of *Linocarpon* sp.), subglobose, globose or pyriform, black, with a small papilla (Fig. 1, 2). – P e r i d i u m composed of a few layers of elongate angular cells in vertical section. – C a t e n o p h y s e s (*sensu* Kohlmeyer & Kohlmeyer, 1979) present. – A s c i 80–106  $\times$  14–18  $\mu\text{m}$ , 8–spored, clavate, unitunicate, persistent, apically truncate with an

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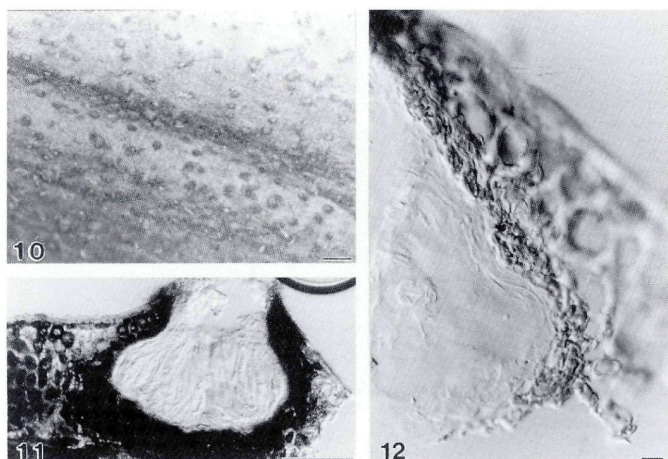


Figs. 1-9. - Interference contrast micrographs of *Aniptodera nypae*. - 1. Ascus immersed in old fruiting bodies of *Limocarpon* sp. (arrowed). - 2. Squash illustrating ascomata. - 3-5. Asci. Note the apical refractive thickening and pore. - 6-9. Ascospores. - Bars: 1 = 500  $\mu$ m, 2 = 100  $\mu$ m, 3-9 = 10  $\mu$ m.

apical refractive thickening (ring) and pore (Figs. 3-5). - Ascospores 16-22 x 5-7  $\mu$ m, bicelled, hyaline, not constricted at the septum, smooth-walled and without appendages (Figs 6-9).

*Holotypus*. - Malaysia, Kuala Selangor, intertidal fronds of *Nypa fruticans*, Oct 1991, K. D. Hyde 1824, BRIP 21394.

*Aniptodera nypae* is characteristic of *Aniptodera* Shearer & Miller as ascospores are two-celled and lack appendages, while the unitunicate asci are persistent and provided with an apically

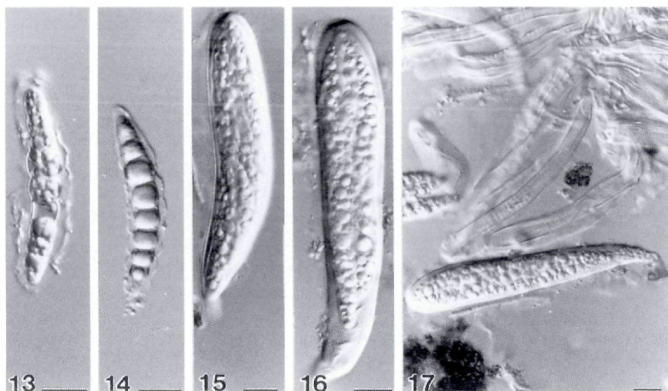


Figs. 10–12. – *Carinispora nypae*. – 10. Appearance of ascomata on host surface. – 11. Section of ascoma. – 12. Peridium. – Bars: 10 = 500  $\mu\text{m}$ , 11 = 100  $\mu\text{m}$ , 12 = 10  $\mu\text{m}$ .

thickened ring and pore (Shearer, 1989). It differs from previously described *Aniptodera* species in having smaller, particularly narrower ascospores. It is closest to *Aniptodera margaritum* Shearer, but this freshwater species has wider ascospores (15–22 x 8.8–13.2  $\mu\text{m}$ , vs 16–22 x 5–7  $\mu\text{m}$ ), which differs in shape. The asci in *A. margaritum* are also thin-walled throughout, lack an apical thickening, a distinguishable pore and the subapical retraction of the plasmalemma characteristic of all other *Aniptodera* species (Hyde & al., 1986; Shearer, 1989). The ascomata in *A. nypae* provide the only taxonomic problem, since they are black. In most other *Aniptodera* species the ascomata are hyaline (Shearer & Miller, 1977; Hyde & al., 1986; Shearer, 1989). However, this single characteristic alone cannot warrant separate generic status, especially since the ascomata in *A. chesapeakeensis* Shearer & Miller become greyish-brown with age (Shearer & Miller, 1977).

***Carinispora velatispora* K. D. Hyde, sp. nov. – Figs. 10–17.**

Ascomata 200–300  $\mu\text{m}$  in diametro, 200  $\mu\text{m}$  alta, sub clypeo immersa, globosa vel ellipsoidea. Asci 90–110 x 18–24  $\mu\text{m}$ , 8-spori cylindraceo-clavati, pedunculati, fissitunicati, apparato apicali praediti. Ascosporae 43–54 x 8–9  $\mu\text{m}$ , 2–3-seriatae, hyalinae, 6–7-septatae, tunica gelatinosa praeditae.



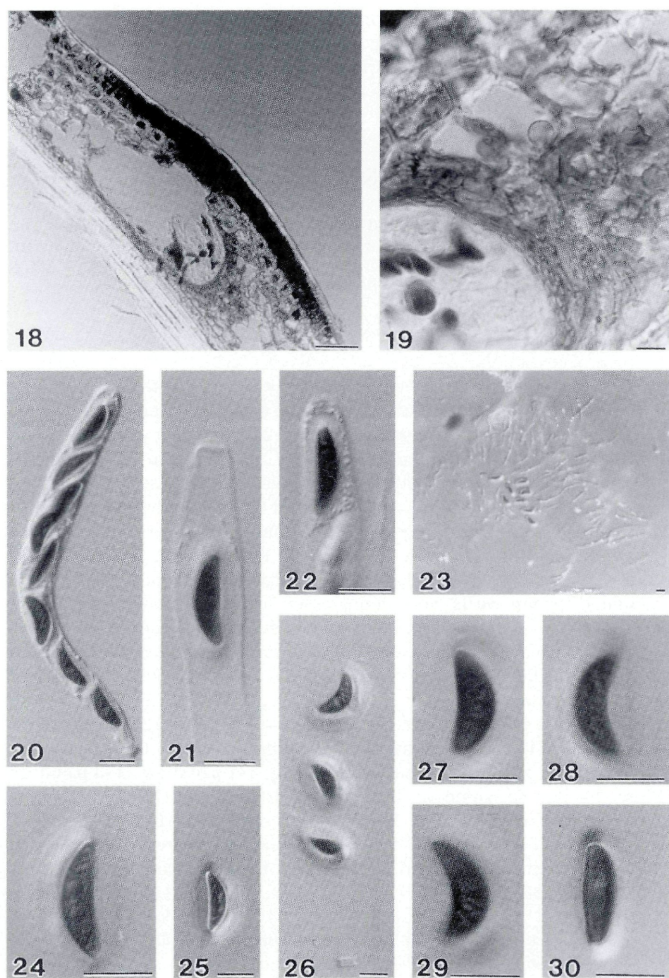
Figs. 13–17. – Interference contrast micrographs of *Carinispora nypae*. – 13, 14. Ascospores with mucilaginous sheath. – 15, 16. Asci. – 17. Squash illustrating ascus and pseudoparaphyses. – Bars = 10  $\mu$ m.

**E t y m o l o g y .** – From the Latin *velum* meaning ‘sheath’.

**A s c o m a t a** immersed under conical areas on the host surface with a slightly blackened region around the central blackened ostiole; in horizontal section globose; in vertical section 200–300  $\mu$ m diam, 200  $\mu$ m high, clypeate, conical, subglobose or ellipsoidal (Figs. 10, 11). – **C l y p e u s** a small disc to ca 120  $\mu$ m diam surrounding the ostiole, comprising host cells and brown intracellular fungal hyphae (Figs 11, 12). – **V a r i a b l e s t r o m a t i c t i s s u e** surrounds the ascoma (Fig. 12). – **P e r i d i u m** up to 20  $\mu$ m wide, comprising a few layers of globose brown-walled cells, fusing outwardly and hard to distinguish from the host cells (Fig. 12). – **P s e u d o p a r a p h y s e s** up to 3  $\mu$ m wide, hypha-like, filamentous, sheet-like, numerous, septate and embedded in a gelatinous matrix. – **A s c i** 90–110 x 18–24  $\mu$ m, 8-spored, cylindric-clavate, pedunculate, thick-walled, fissitunicate, with an ocular chamber and faint ring (Figs 15–17). – **A s c o s p o r e s** 43–54 x 8–9  $\mu$ m, 2–3-seriate, hyaline, 6–7 septate, 3rd cell from apex largest, constricted at the septa and surrounded by a mucilaginous sheath (Figs 13, 14).

**H o l o t y p u s .** – Brunei, Kampong Kanan Kapok, on rachis of *Oncosperma tigillarum* in the intertidal region, Oct 1992, K. D. Hyde 1655, BRIP 21395.

*Carinispora* K. D. Hyde (1992a) was established for *C. nypae* K. D. Hyde from intertidal *Nypa fruticans* collected in Brunei. The



Figs. 18-30. - Interference contrast micrographs of *Nipicola selangorensis*. - 18. Section of ascoma. - 19. Peridium. - 20-22. Asci. Note the lightly staining ring. - 23. Amphisphaeriaceous paraphyses. - 24-30. Ascospores with layered sheath (24-28) and germ slit (30). - Bars: 18 = 100  $\mu\text{m}$ , 19-30 = 10  $\mu\text{m}$ .

genus is considered to differ from *Phaeosphaeria* Miyake in the habit, ascoma morphology and the ascospore sheath, which is spectacular in *C. nypae* (Hyde, 1992a). *Carinispora velatispora* is similar to *C. nypae*, but differs in having a regular sheath, as compared to the keel-like sheath in *C. nypae*.

***Nipicola selangorensis* K. D. Hyde, sp. nov. – Figs. 18–30.**

Ascomata 210–280  $\mu\text{m}$  diam, 140–180  $\mu\text{m}$  alta, ellipsoidea vel subglobosa, sub clypeo immersa. Asci 78–124  $\times$  12–15  $\mu\text{m}$ , 8-sporei, cylindracei, unitunicati, pedunculati, apparato apicali iodo coerulescenti praediti. Ascosporae 16–18  $\times$  5–6  $\mu\text{m}$ , nigrae, lunatae, tunica gelatinosae praeditae.

**E t y m o l o g y.** – From the location ‘Selangor’.

**A s c o m a t a** forming beneath slightly raised darkened dull areas on the host surface, to 650  $\mu\text{m}$  diam, with a minute blackened central ostiole and clustered; in vertical section 210–280  $\mu\text{m}$  diam, 140–180  $\mu\text{m}$  high, ellipsoidal or subglobose, base flattened, immersed beneath a clypeus, with variable stromatic tissue at the sides (Fig. 18). – **C l y p e u s** to 650  $\mu\text{m}$  diam, a disc around the ostiole which is thinner at the periphery, comprising host epidermal or hypodermal cells, with brown intracellular hyphae (Fig. 18). – **P e r i d i u m** up to 20  $\mu\text{m}$  wide, comprising several layers of compressed angular cells with thickened brown walls, very compressed at the thinner base (12  $\mu\text{m}$ ) (Fig. 19). – A wedge of sparse fungal tissue and collapsed host cells forms a **s t r o m a** in the raised area between the hypodermis and vascular bundles of the host. – **P a r a p h y s e s** up to 2.5  $\mu\text{m}$  wide, hypha-like, filamentous, irregular, branching, septate, hyaline and embedded in a gelatinous matrix (Fig. 23). – **A s c i** 78–124  $\times$  12–15  $\mu\text{m}$ , (4–)8-spored, broad cylindrical, unitunicate, pedunculate, apically rounded, with a discoid, subapical, J<sup>+</sup> ring, 3–4  $\mu\text{m}$  diam, 1–3  $\mu\text{m}$  high (Figs. 20–22). In some asci a rather diffuse lightly stained area occurred in the apex (Fig. 22). – **A s c o s p o r e s** 16–18  $\times$  5–6  $\mu\text{m}$ , dark-brown-black, lunate, thinner in one plane, with a germ-slit along the entire length and surrounded by a layered mucilaginous sheath (Figs. 24–30).

**H o l o t y p u s.** – Malaysia, Kuala Selangor, on intertidal frond of *Nypa fruticans*, Oct 1991, K. D. Hyde 1825, BRIP 21396.

*Nipicola selangorensis* is quite similar to *Anthostomella* species in having brown ascospores with a germ slit, asci with a blue staining apical ring and irregular paraphyses. A clypeus is also found in many *Anthostomella* species on palms (K. D. Hyde, personal observation).

However, the structured nature of the ascospore sheath (Figs. 24-30) is unlike most species found in *Anthostomella* and quite different from the type species *Anthostomella tomicoides* (Francis, 1975; K. D. Hyde, personal observations). The ascospores are, however, like those of *Nipicola carbospora* which are also dark brown-black with a structured mucilaginous sheath (Hyde, 1992b). Hyde (1992b) did not observe a germ-slit in *N. carbospora*. The ascospore wall, however, is thinner in one plane. The ascus apparatus did also not stain and there was no distinct clypeus, only a small amount of stromatic development around the neck. Hyde (1992b) used these differences to separate *N. carbospora* from *Anthostomella*.

*Nipicola selangorensis* is best included in this genus, and kept distinct from *Anthostomella* on the basis of its lunate brown-black spores and structured mucilaginous sheath. The two genera are obviously closely related and *Nipicola* can be accommodated in the Xylariales. Studies on the anamorphic stages of these taxa are presently in progress. A comparison of *Anthostomella tomicoides*, *Nipicola carbospora* and *N. selangorensis* is provided in Tab. 1.

Tab. 1. – A comparison of *Anthostomella tomicoides*, *Nipicola carbospora* and *Nipicola selangorensis*.

|                   | <i>Anthostomella tomicoides</i>   | <i>Nipicola carbospora</i>   | <i>Nipicola selangorensis</i>   |
|-------------------|---|--|---|
| <b>Ascomata</b>   | Immersed under a clypeus<br>Lenticular  | Immersed under a minute clypeus<br>Subglobose  | Immersed under a clypeus<br>Ellipsoidal or subglobose                             |
| <b>Paraphyses</b> | Amphisphaeriaceous  | Amphisphaeriaceous   | Amphisphaeriaceous  |
| <b>Asci</b>       | Broad cylindrical<br>J+, ring   | Broad cylindrical<br>J-, refractive ring   | Broad cylindrical<br>J+, discoid ring   |
| <b>Ascospores</b> | Inequilateral or ovoid, unicellular, brown, some with a hyaline dwarf cell<br>Germ slit<br>Appendages or sheath | Lunate, dark-brown, unicellular<br>Germ slit not seen<br>Surrounded by a structured sheath, drawn out at the poles | Lunate, dark-brown, unicellular<br>Germ slit<br>Surrounded by a structured sheath |

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