

Linocarpon angustatum sp. nov., and *Neolinocarpon nypicola* sp. nov. from petioles of *Nypa fruticans*, and a list of fungi from aerial parts of this host

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Two new ascomycetes, *Linocarpon angustatum* sp. nov. and *Neolinocarpon nypicola* sp. nov., are described from petioles of *Nypa fruticans* in Malaysia. *Linocarpon angustatum* differs from species in the genus in having needle-shaped ascospores. *Neolinocarpon nypicola* differs from species in the genus in having filiform ascospores which gradually taper towards the ends, and ascomata developing within well developed stromata. These new species are compared with existing species and illustrated with interference light micrographs. The fungi known from aerial parts of *Nypa fruticans* are listed.

Key Words—Lasiosphaeriaceae; *Linocarpon*; mangrove fungi; *Neolinocarpon*.

There have been several studies on the intertidal fungi occurring on *Nypa fruticans* (Hyde, 1992a), however, there is very little information on the fungi on the aerial parts of this mangrove palm (Table 1). The first record of a fungus from *Nypa* was *Sphaeria beccariana* Ces. (Cesati, 1880). This species was later described as *Gibberidea nypae* Henn., and has subsequently been shown to be an intertidal species and named *Tirisporella beccariana* (Ces.) E. B. G. Jones, K. D. Hyde & Alias (Jones et al., 1996). The first record of an aerial fungus from *Nypa* was *Melanopsamma nypicola* (as *nypaeicola*) Cooke & Masee (Cooke, 1888). This was later found to be a species of *Astrosphaeriella* and transferred to *A. nypicola* (as *nypaeicola*) (Cooke & Masee) K. D. Hyde & J. Fröhlich (Hyde and Fröhlich, 1998). Since this time only one other species, *Rhipidocarpon javanicum* (Pat.) Theiss. & Syd. (Patouillard, 1897) has been described from aerial parts of the palm. With this in mind, we have conducted a study in Malaysia to examine the fungi occurring on *N. fruticans*. In this paper we list the fungi occurring on aerial parts of this palm.

We also describe a new species, *Neolinocarpon nypicola*,

with characteristic deeply immersed ascomata, from aerial petioles, and a new intertidal species, with ascomata occurring under raised dome-shaped regions, in the closely related genus *Linocarpon* (Hyde, 1992a, b).

Taxonomy

Linocarpon angustatum K. D. Hyde & Alias, sp. nov.

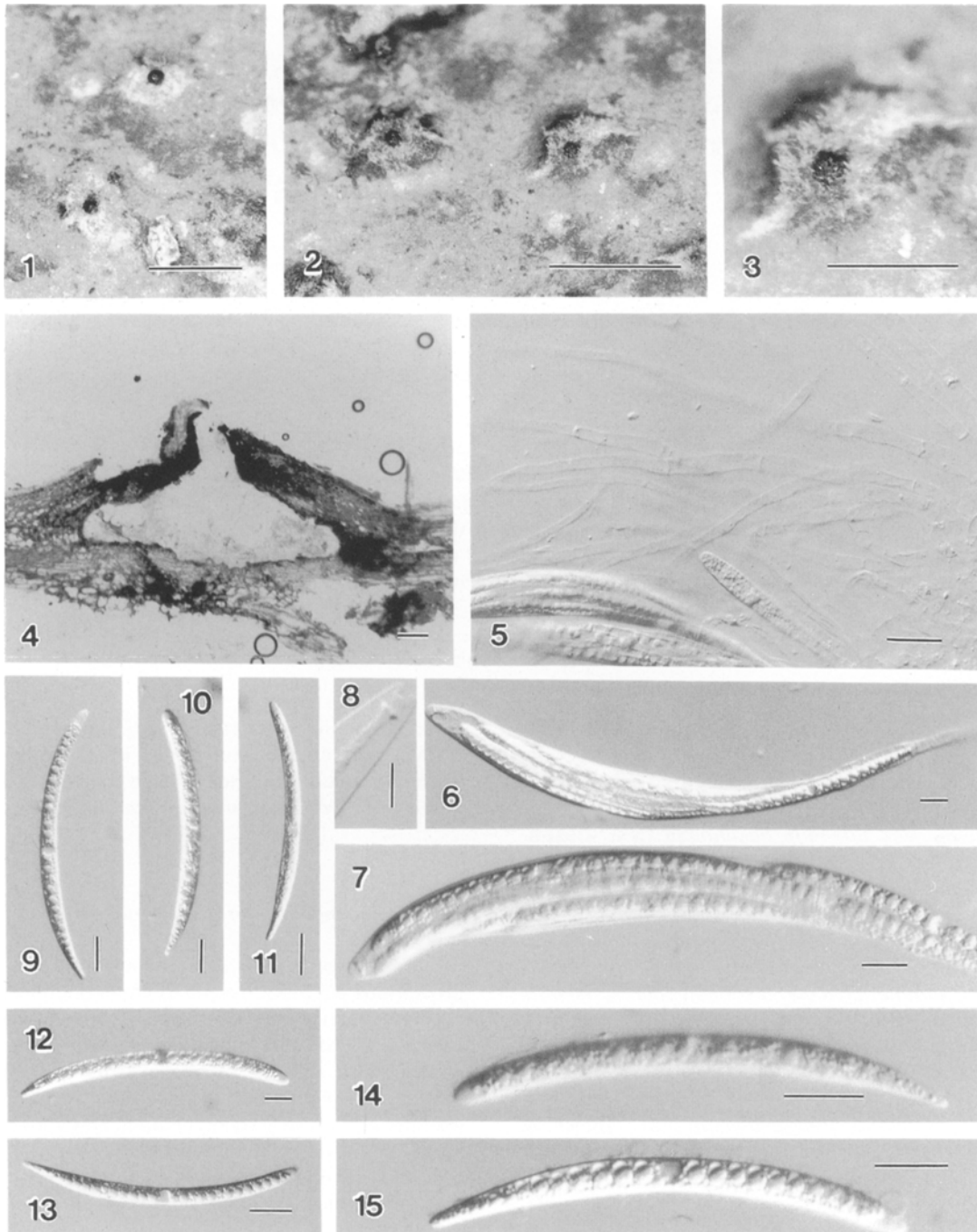
Figs. 1–15

Linocarpon nypae K. D. Hyde simile sed ascosporis brevioribus $57.5\text{--}87.5 \times 3.5\text{--}6 \mu\text{m}$ et angustatus differt.

Fruiting bodies raised, black, circular dome-shaped regions up to $900 \mu\text{m}$ in diam, with a central black papilla, with star-like cracks extending outwards from the papilla (Figs. 1–3), developing beneath the host epidermis, with overlaying clypeus and variable development of stromatic tissue laterally (Fig. 4). Ascumata one per stroma, lenticular, $400\text{--}448 \mu\text{m}$ high, $800\text{--}944 \mu\text{m}$ in diam, ostiolar canal with periphyses (Fig. 4). Peridium $8\text{--}40 \mu\text{m}$ wide, comprising several layers of brown walled compressed cells, layers not distinct (Fig. 4). Paraphyses $2\text{--}3 \mu\text{m}$ wide, hypha-like, septate, un-

Table 1. Fungi known from aerial parts of *Nypa fruticans*.

Fungus	Host part	Country	Reference
<i>Astrosphaeriella nypicola</i>	Rachid	Brunei, Indonesia, Malaysia	Cooke, 1888; Hyde and Fröhlich, 1998
<i>Fasciatispora petrakii</i>	Rachid	Malaysia	Unpublished
<i>Neolinocarpon nypicola</i>	Rachid	Malaysia	This paper
<i>Oxydothis nypicola</i>	Rachid	Brunei	Hyde, 1994
<i>Rhipidocarpon javanicum</i>	Leaves	Indonesia, Philippines	Patouillard, 1897



Figs. 1–15. Interference contrast micrographs of *Linocarpon angustatum* (from holotype).

1–3. Appearance of ascomata on host surface. Note the blackened papilla and star-like cracks extending outwards from the papilla. 4. Section of ascoma. Note the stromatic tissue. 5. Squash mount illustrating paraphyses. 6–8. Asci. Note the subapical ring. 9–15. Needle-shaped ascospores. Note the mucilage associated with the spores in Figs. 14, 15. Scale bars: 1, 2=1 mm; 3=500 μm ; 4=100 μm ; 5–15=10 μm .

branching, tapering towards the ends, longer than asci, not embedded in a gelatinous matrix (Fig. 5). Asci 125–195 \times 12.5–22 μm , 8-spored, cylindric-clavate, pedicellate, ends rounded, with a refractive, wedge-shaped, subapical, J-ring, 0.5 μm high, 3.5 μm in diam (Figs. 6–8). Ascospores 57.5–87.5 \times 3.5–6 μm , fasciculate,

needle-shaped, tapering to a narrow point at the base, unicellular, hyaline, covered with inconspicuous mucilage (Figs. 9–15).

Colonies on CMA reaching 9 cm diam in 2 mo when grown in normal day light conditions at room temperature (ca 22°C), pale olivaceous grey, mycelium sparse, most-

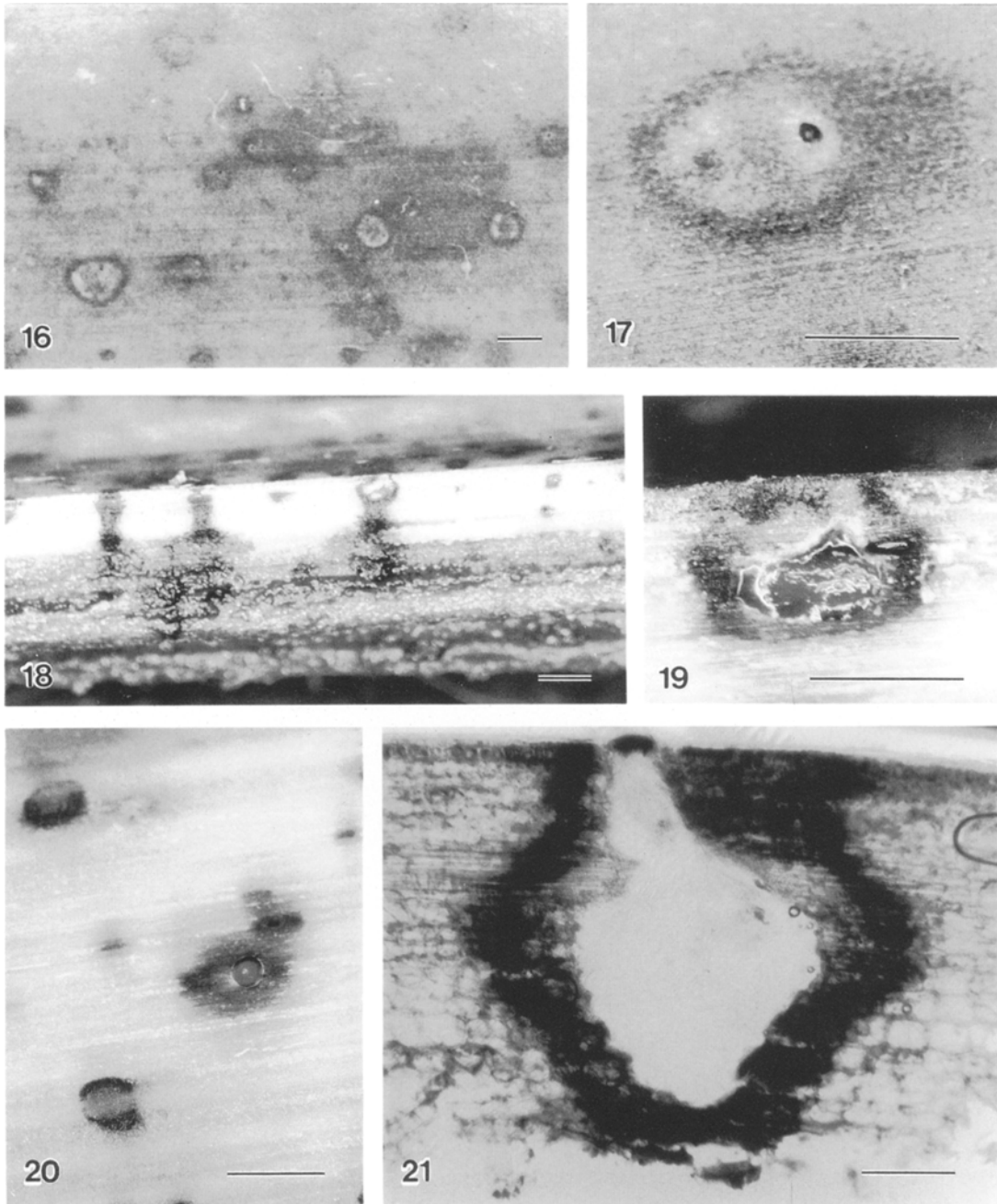
ly submerged, rarely cottony, not sporulating.

Etymology: From the Latin *angustata*, meaning "tapering," in reference to the tapering ascospores.

Materials examined: Malaysia, Kuala Selangor, on intertidal petiole base of *N. fruticans*, 13 July 1997, S. A. Alias and K. D. Hyde (HKU(M) 6520, holotype); Morib mangrove, on intertidal petiole base of *N. fruticans*, 8

July 1997, S. A. Alias and K. D. Hyde (Institute of Biological Sciences, University of Malaya).

Hyde (1997) has recently reviewed the genus *Linocarpon* Syd. & P. Syd. adding an additional eleven new species, and provided a key to the genus. *Linocarpon angustatum* differs from other species in the genus in having needle-shaped ascospores.



Figs. 16–21. Interference contrast micrographs of *Neolinocarpon nypicola* (from holotype).

16, 17. Appearance of fungus on host surface. Note the light brown circular regions with a blackened outline, with 1–4 ostiolar dots. 18, 19. Subglobose ascomata with long ostiolar canal, with variable development of stromatic tissue laterally and vertically, stromatic tissue in section appearing as blackened lines developing deep into the host tissue. 20. Vertical section of ostiole and surrounding stroma. 21. Section of ascoma. Note the stromatic tissue. Scale bars: 16, 18, 20=1 mm; 17, 19=500 μm ; 21=200 μm .

Neolinocarpon nypicola K. D. Hyde & Alias, sp. nov.

Figs. 16–28

Neolinocarpon globosicarpa (as *globosicarpum*) K. D. Hyde similis sed stromati ferum et ascosporis tenuisibus $92\text{--}117 \times 2\text{--}3.8 \mu\text{m}$ differt.

Fruiting bodies deeply immersed in wood, beneath light brown circular regions with a blackened outline, with 1–4 ostiolar dots (Figs. 16, 17). Ascromata $600\text{--}1,000 \mu\text{m}$ in diam, globose or subglobose, with a long ostiolar canal and slightly raised darkened papilla, with variable development of stromatic tissue laterally and vertically, stromatic tissue in section appearing as blackened lines developing deep into the host tissue (Figs. 18–21). Peridium $84\text{--}128 \mu\text{m}$ wide, comprising brown angular cells within the host cells, lacking a distinct cell layer or margin, cells near to the neck hyaline (Fig. 21). Paraphyses $5\text{--}8.8 \mu\text{m}$ at the base, hypha-like, septate, unbranched, tapering to $2.5 \mu\text{m}$ at the ends, longer than the asci, not in a gelatinous matrix (Fig. 22). Asci $100\text{--}164 \times 8\text{--}10 \mu\text{m}$, cylindric-clavate, pedicellate, with a refractive, J-, discoid subapical ring, $1 \mu\text{m}$ high, $4 \mu\text{m}$ in diam (Figs. 23, 24). Ascospores $92\text{--}117 \times 2\text{--}3.8 \mu\text{m}$, fasciculate, filiform, tapering gradually towards each end, unicellular, hyaline, cream colour in mass, straight or slightly curved (Figs. 25–28).

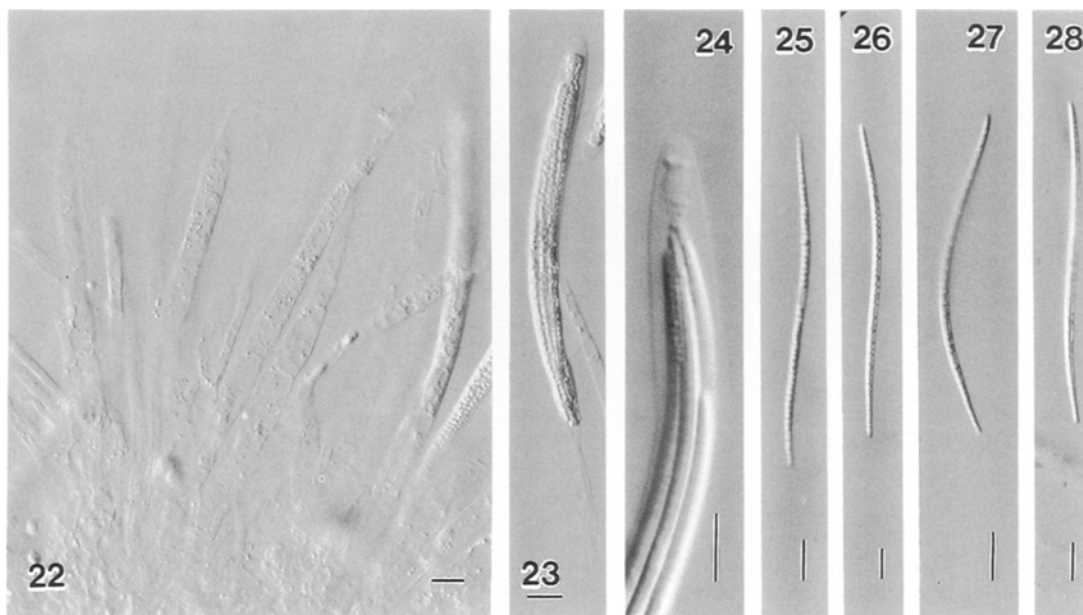
Etymology: In reference to the host.

Materials examined: Malaysia, Kuala Selangor, on intertidal petiole base of *N. fruticans*, 13 July 1997, S. A. Alias and K. D. Hyde (HKU(M) 6518, holotype); *ibid.*, (HKU(M) 6505); *ibid.*, (Institute of Biological Sciences, University of Malaya); Morib mangrove, on intertidal petiole base of *N. fruticans*, 8 July 1997, S. A. Alias and K. D. Hyde (Institute of Biological Sciences, University of Malaya).

Neolinocarpon nypicola, having ascospores which are rounded at one end, and have an irregular mucilaginous appendage at the other end, differs from other species of *Neolinocarpon* (Hyde, 1992a; Hyde et al., 1998). In the key provided by Hyde et al. (1998) this taxon is most similar to *N. globosicarpa* and *N. australiense* K. D. Hyde, J. E. Taylor & J. Fröhl. The form of the stromata and appearance on the host surface, however, differs greatly from these species, which lack notable stromatal development. *Neolinocarpon nypicola* occurs beneath light brown circular regions with a blackened outline, with 1–4 ostiolar dots (Figs. 16, 17), while in *N. globosicarpa* ascromata are solitary and form beneath a small blackened clypeus (Hyde, 1992a). In *N. australiense* the clypeus is relatively well developed, but unlike the extensive pseudostroma found in *N. nypicola*. *Neolinocarpon nypicola* differs from species of *Lino-*
carpon, as its ascromata are deeply immersed.

Neolinocarpon nypicola was collected on recently dead aerial rachids of *Nypa*, which supported few other developing fungi and were very dry. It is probable that this species was an endophyte as it was one of the first fungi to develop on the fronds, probably utilising the carbohydrates and moisture from the recently dead fronds. Several fungi that were isolated as endophytes from palms have been shown to occur as common saprobes (Guo et al., 1998).

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Figs. 22–28. Interference contrast micrographs of *Neolinocarpon nypicola* (from holotype).

22. Squash mount illustrating paraphyses. 23, 24. Asci. Note the subapical ring. 25–28. Filiform ascospores. Scale bars = $10 \mu\text{m}$.

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