

---

## Four new ascomycete species from endemic *Pandanus* of Mauritius

---

Rafic Dulymamode<sup>1</sup>, Paul F. Cannon<sup>2</sup>, Kevin D. Hyde<sup>3</sup> and Abed Peerally<sup>1</sup>

<sup>1</sup>University of Mauritius, Réduit, Mauritius, e-mail: rafic@uom.ac.mu

<sup>2</sup>CABI Bioscience, Bakeham Lane, Egham, Surrey TW20 9TY, UK

<sup>3</sup>Centre for Research for Fungal Diversity, Department of Ecology and Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong SAR, P.R. China

Dulymamode, R., Cannon, P.F., Hyde, K.D. and Peerally, A. (2001). Four new ascomycete species from endemic *Pandanus* of Mauritius. *Fungal Diversity* 8: 87-96.

Four ascomycete species collected on endemic *Pandanus* plants of Mauritius are described as new components of the mycota associated with this host genus. The new species *Ascotaiwania mauritiana*, *Lophiostoma mascarensis*, *Niesslia pandanicola* and *Ornatispora punctata* are described, illustrated and compared to similar species.

**Key words:** *Ascotaiwania*, *Lophiostoma*, *Niesslia*, *Ornatispora*, *Pandanus*.

### Introduction

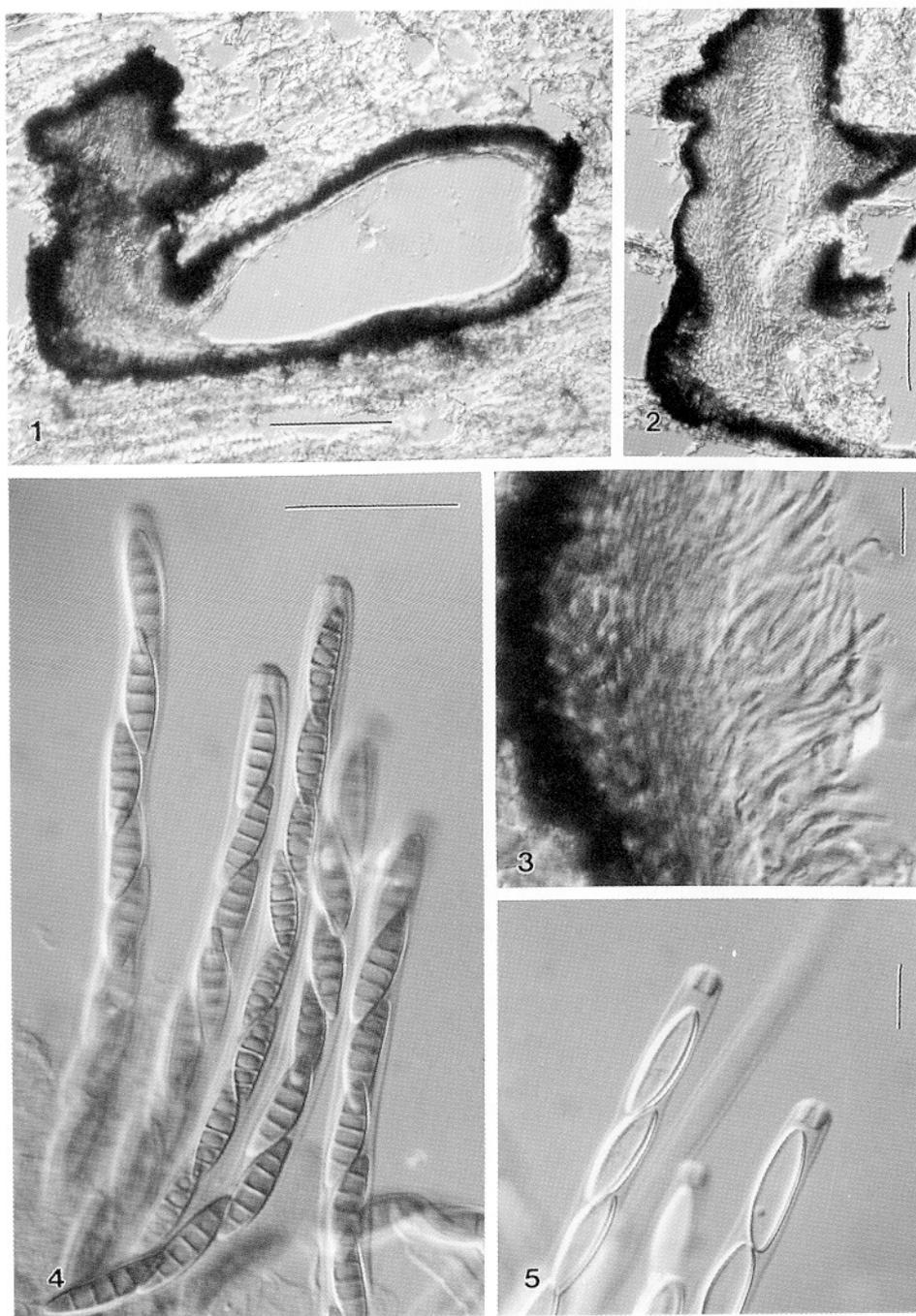
The dead leaves of *Pandanus* species are relatively good substrates for saprobic microfungi. In a review of the microfungi found on the *Pandanaceae*, McKenzie and Hyde (1997, 2001) listed over 200 ascomycete and mitosporic taxa which had been described as new species, with the *Pandanaceae* as the host. Several new taxa have also been described from *Pandanus* species in Asia, which is proving to be a rich source, in terms of new fungal species (Whitton *et al.*, 1999a,b, 2000a,b). Recent surveys of the saprobic mycota associated with endemic *Pandanus* species in Mauritius have also revealed some interesting new species (Dulymamode *et al.*, 1998a,b,c,d,e, 1999) and in this paper a further four new species are described.

### Taxonomy

*Ascotaiwania mauritiana* Dulymamode, P. Cannon, K.D. Hyde and Peerally, **sp. nov.** (Figs. 1-5)

*Ascomata* 450-720 µm diam., 280-360 µm alta. *Asci* 180-315 × 8.5-9.5 µm. *Ascospores* 19-30 × 6-8 µm, brunneae, 5-7-septatae.

*Etymology:* *mauritiana*, derived from Mauritius the host country.



**Figs. 1-5.** *Ascotaiwania mauritiana* (from holotype). **1.** Section through ascoma. **2.** Section through the neck region of ascoma showing periphyses. **3.** Section through peridium. **4.** Asci and ascospores. **5.** Asci tips showing apical apparatus. Bars: 1, 2 = 100  $\mu\text{m}$ ; 3, 5 = 10  $\mu\text{m}$ ; 4 = 50  $\mu\text{m}$ .

*Ascomata* deeply immersed in dead root tissues, solitary, externally visible as dark brown circular spots representing the ostiole occasionally with jelly-like exudate oozing from the ostiole. In vertical section 450-720  $\mu\text{m}$  diam, 280-360  $\mu\text{m}$  high (480-640  $\mu\text{m}$  high in the neck region), ellipsoidal with long neck arising at one end (Figs. 1, 2). *Peridium* 20-30  $\mu\text{m}$  thick, composed of 2-3 outer layers of dark brown angular cells and 2-3 inner layers of light brown to hyaline cells, neck and ostiole lined internally with hyaline periphyses (Fig. 3). *Paraphyses* filiform, septate, deliquescing rapidly. *Asci* 180-315  $\times$  8.5-9.5  $\mu\text{m}$  ( $\bar{x}$  = 245  $\times$  9  $\mu\text{m}$ ,  $n$  = 10), 8-spored, cylindrical, unitunicate, hyaline, apex round with a non-amyloid apical apparatus, ca. 5  $\mu\text{m}$  wide and 6  $\mu\text{m}$  high, base extended into a long stalk (Figs. 4, 5). *Ascospores* 19-30  $\times$  6-8  $\mu\text{m}$  ( $\bar{x}$  = 23.4  $\times$  7.4  $\mu\text{m}$ ,  $n$  = 20), uniseriate, discoid to fusiform, hyaline when young, pale brown at maturity, smooth-walled, 5-7-septate, not constricted at the septa (Fig. 4).

*Known host: Pandanus palustris.*

*Known distribution: Mauritius.*

*Material examined:* MAURITIUS, Petrin Reserve, on prop root of *Pandanus palustris* collected in rivulet, 31 August 1995, R. Dulymamode P 85 (Mycological Herbarium of the University of Mauritius, **holotype**, designated here); Petrin Reserve, on prop root of *Pandanus palustris* collected in rivulet, 31 August 1995, R. Dulymamode P85a, P85b (Mycological Herbarium of the University of Mauritius).

*Notes:* This fungus features the characteristics of *Ascotaiwania* Sivan. and H.S. Chang, a freshwater inhabiting genus comprising nine species (Sivanesan and Chang, 1992; Chang *et al.*, 1998; Ranghoo and Hyde, 1998; Fröhlich and Hyde, 2000; Wong and Hyde, 2001). Genera with similar characteristics are *Savoryella* E.B.G. Jones and R.A. Eaton and *Ascolacicola* Ranghoo and K.D. Hyde, but due to the relatively massive apical ring, this taxon is best accommodated in *Ascotaiwania*. The present fungus is not similar to any of the accepted species in *Ascotaiwania* (Chang *et al.*, 1998; Ranghoo and Hyde, 1998). Its ascospores are similar to those of *A. hsilio* in size and septation, but differ in being uniformly pale brown. Furthermore the asci are much longer, measuring 180-315  $\times$  8.5-9.5  $\mu\text{m}$  in the Mauritian collections versus 120-140  $\times$  12.3-13.4  $\mu\text{m}$  for *A. hsilio*.

The Mauritian fungus is therefore recognised as a new species, *A. mauritiana*, however the uniform pale brown ascospores are atypical of the genus. Other characteristics. However, e.g. the cylindrical ascus with a relatively massive refractive apical ring and ascoma wall structure, are characteristic of *Ascotaiwania*. We therefore prefer to include this taxon in *Ascotaiwania*. No anamorph was found for the present fungus, but Sivichai *et al.* (1998) and Ranghoo and Hyde (1998) have reported *Ascotaiwania* species producing *Monotosporella* anamorphs in culture.

***Lophiostoma mascarensis*** Dulymamode, P. Cannon, K.D. Hyde and Peeraly,  
**sp. nov.** (Figs. 6-11)

*Ascomata* 240-360  $\mu\text{m}$  diam., 220-280  $\mu\text{m}$  alta. *Asci* 76-125  $\times$  11-17  $\mu\text{m}$ . *Ascospores* 15-24  $\times$  5-6.5  $\mu\text{m}$ ,  $\pm$  fusiformes, hyalinae, 5-6  $\times$  1-2 septatae.

*Etymology*: *mascarensis*, referring to the Mascarene Islands which include the host country Mauritius.

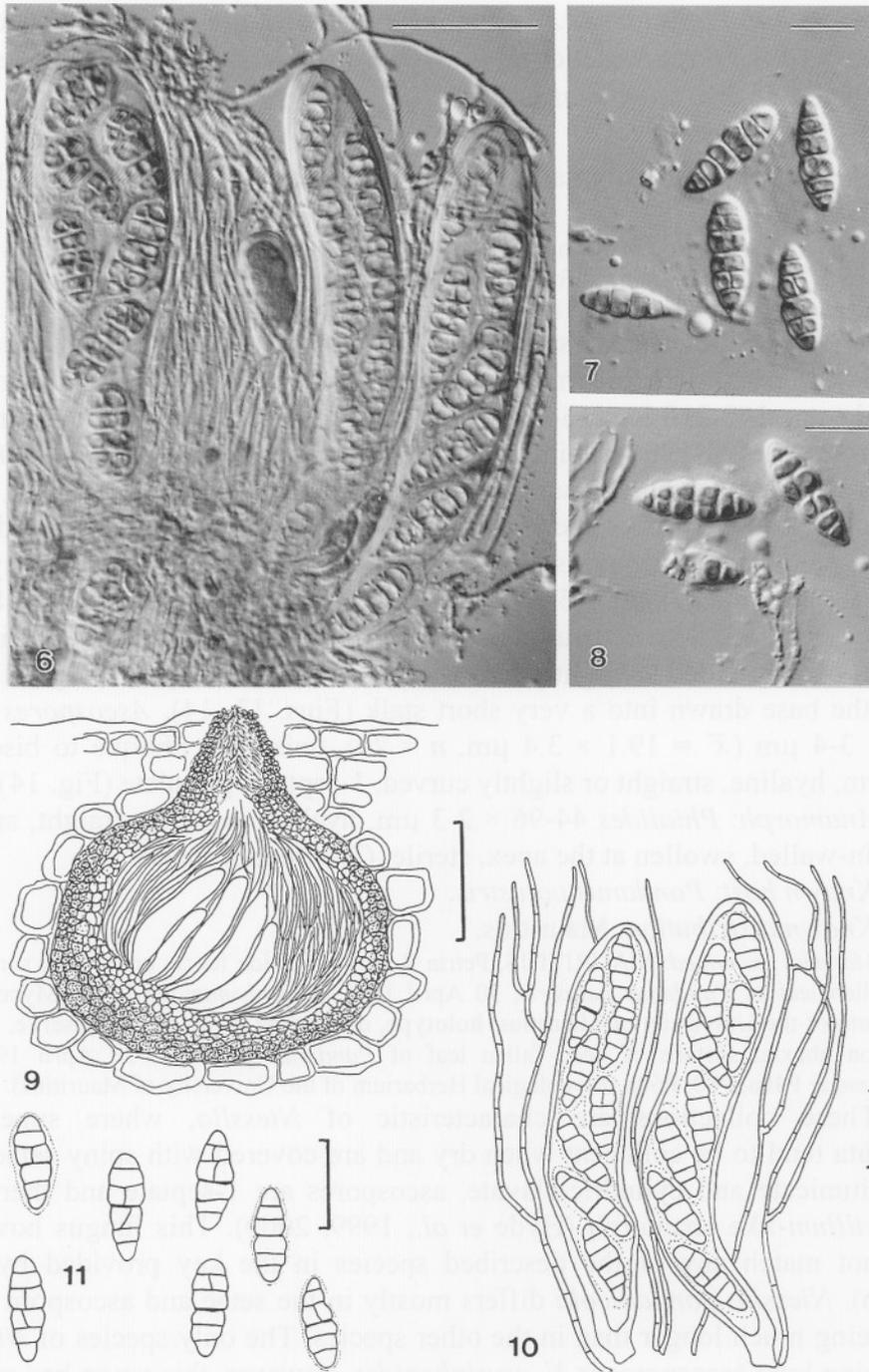
*Ascomata* immersed in the abaxial surface of dead fallen leaves, mostly in veins, externally visible as slightly elevated black circular spots marking the ostioles. In vertical section 240-360  $\mu\text{m}$  diam., 220-280  $\mu\text{m}$  high, globose to depressed globose with a short neck leading to the periphysate ostiole (Fig. 9). *Peridium* of 4-6 layers of angular brown thin-walled cells, paler towards the interior, lined internally by hyaline angular cells from which the asci and interascal tissue develop (Fig. 9). *Interascal tissue* composed of branched, septate pseudoparaphyses completely filling the locule and anastomosing above asci, ca. 1.5  $\mu\text{m}$  wide (Figs. 6, 10). *Asci* 76-125  $\times$  11-17  $\mu\text{m}$ , ( $\bar{x}$  = 109  $\times$  14.7  $\mu\text{m}$ ,  $n$  = 10), 8-spored, cylindrical to cylindrical-clavate, hyaline, bitunicate, apex rounded and base terminating in a short stalk (Figs. 6, 10). *Ascospores* 15-24  $\times$  5-6.5  $\mu\text{m}$  ( $\bar{x}$  = 19.8  $\times$  5.8  $\mu\text{m}$ ,  $n$  = 20), uniseriate to biseriate,  $\pm$  fusiform, ends rounded, hyaline, septate; 5-6 transversely, 1-2 vertically or obliquely in the middle cells, constricted at the septa, more markedly at the middle septum, covered with a thin gelatinous sheath which disappears in mature ascospores (Figs. 7, 8, 11).

*Known host*: *Pandanus vandermeerschii*.

*Known distribution*: Mauritius.

*Material examined*: MAURITIUS, Round Island. on abaxial surface of dead fallen leaves of *Pandanus vandermeerschii*, 30 April 1996, D. Slack P56 (Mycological Herbarium of the University of Mauritius, **holotype**, designated here); Round Island. on abaxial surface of dead fallen leaves of *Pandanus vandermeerschii*, 30 April 1996, D. Slack P117, P117a (Mycological Herbarium of the University of Mauritius).

These collections are assigned to *Lophiostoma* Fr., a genus of 30 species distributed worldwide and with *Pleurophomopsis*-like anamorphs (Hawksworth *et al.*, 1995). This genus has been differentiated from closely related *Platystomum* by the colour and septation of the ascospores; *Lophiostoma* having hyaline or brown ascospores with transverse septa, while *Platystomum* has hyaline or brown ascospores with transverse and vertical septa (Chesters and Bell, 1970; Barr, 1990a). Barr (1990a) recognised *Platystomataceae* as separate family based on the genus *Platystomum*, while Eriksson and Hawksworth (1990) suggest that *Platystomum* be considered a synonym of *Lophiostoma* and *Platystomataceae* a synonym of *Lophiostomataceae*. We have adopted the position of Eriksson and Hawksworth (1990) in assigning this fungus to *Lophiostoma* in spite of its ascospores with vertical septa. However, it does not key out to any of the described species in



**Figs. 6-11.** *Lophiostoma mascarensis* (from holotype). **6,10.** Asci, ascospores and interascal tissue. **7, 8, 11** Ascospores. **9.** Section through ascoma. Bars: 6, 10, 11 = 20  $\mu\text{m}$ ; 7, 8 = 10  $\mu\text{m}$ ; 9 = 50  $\mu\text{m}$ .

*Lophiostoma* or *Platystomum*. Its hyaline ascospores are shorter and narrower than those of the three varieties of *P. compressum*, and is here recognised as a new species, *Lophiostoma mascarensis*.

***Niesslia pandanicola*** Dulymamode, P. Cannon, K.D. Hyde and Peerally, **sp. nov.** (Figs. 12-14)

*Ascomata* 110-180  $\mu\text{m}$  diam., 120-196  $\mu\text{m}$  alta, cum setae. *Asci* 72-105  $\times$  7-10  $\mu\text{m}$ . *Ascospores* 17.5-22.5  $\times$  3-4  $\mu\text{m}$  fusiformes, hyalinae, 1-septatae.

*Etymology*: *pandanicola*, derived from the host genus.

*Ascomata* superficial, solitary, on abaxial surface of dead fallen leaf towards the base, dark brown to black, spherical, ovoid to obpyriform with pointed setae 160-210 long, 6-7  $\mu\text{m}$  diam. at the base. In vertical section 110-180  $\mu\text{m}$  diam., 120-196  $\mu\text{m}$  high, globose to obpyriform (Fig. 12). *Peridium* of dark brown angular compressed cells, cells of the inner layer lighter, setae arising from outer cells of the peridium. *Ostiole* 14-20  $\mu\text{m}$  diam., guarded by hyaline, cylindrical periphyses ca 1  $\mu\text{m}$  in diam. *Interascal tissue* periphysoid-like, hyaline, septate, long, 1.5-2  $\mu\text{m}$  wide. *Asci* 72-105  $\times$  7-10  $\mu\text{m}$  ( $\bar{x}$  = 83.6  $\times$  8.6  $\mu\text{m}$ ,  $n$  = 10), 8-spored, unitunicate, thin-walled, cylindrical to cylindrical-clavate; apex rounded to slightly truncate with a minute J- apical ring 1-1.5  $\mu\text{m}$  wide, the base drawn into a very short stalk (Figs. 13, 14). *Ascospores* 17.5-22.5  $\times$  3-4  $\mu\text{m}$  ( $\bar{x}$  = 19.1  $\times$  3.4  $\mu\text{m}$ ,  $n$  = 20), uniseriate oblique to biseriate, fusiform, hyaline, straight or slightly curved, 1-septate, guttulate (Fig. 14).

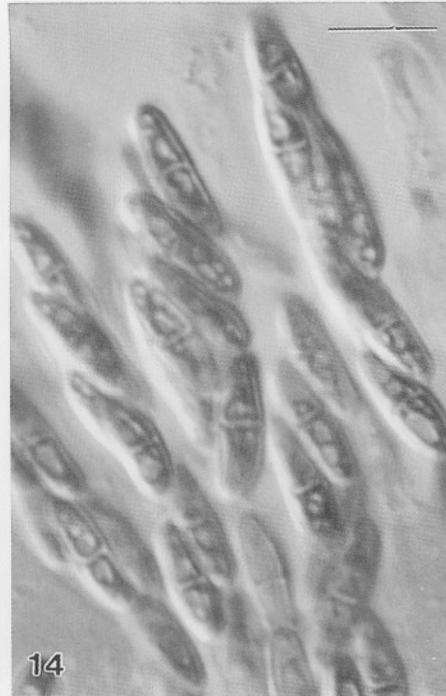
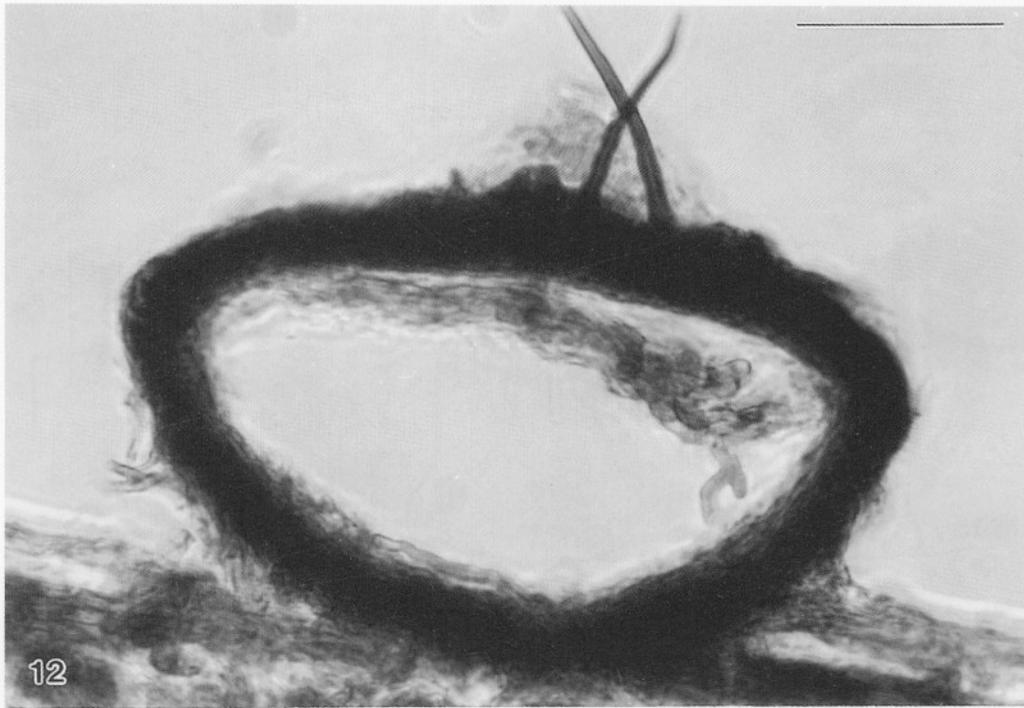
*Anamorph*: *Phialides* 44-96  $\times$  2-3  $\mu\text{m}$ , hyaline, septate, straight, smooth and thin-walled, swollen at the apex, sterile. *Conidia* not found.

*Known host*: *Pandanus palustris*.

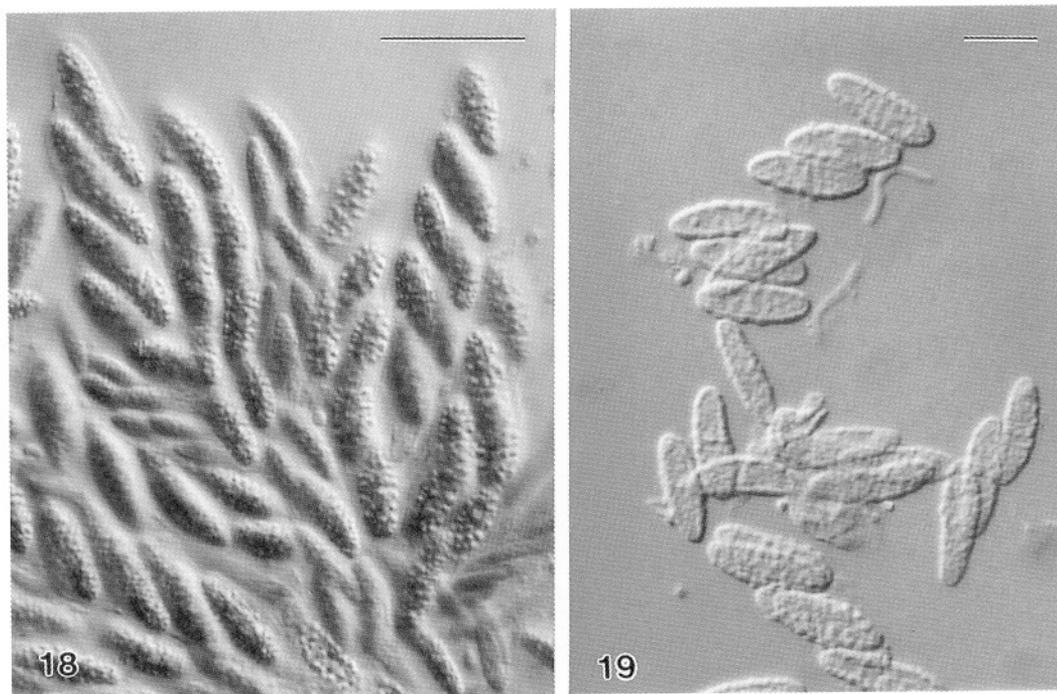
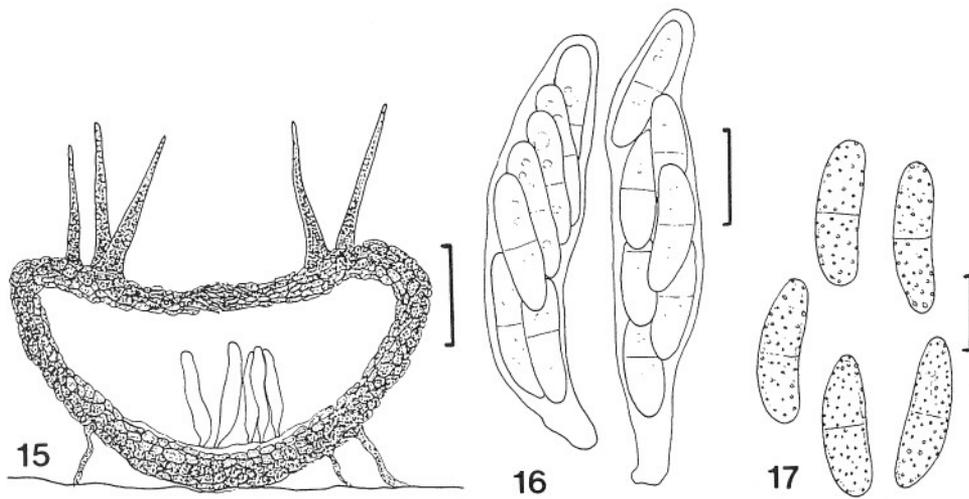
*Known distribution*: Mauritius.

*Material examined*: MAURITIUS, Petrin Reserve, outside fence, on abaxial surface of dead fallen leaf of *Pandanus palustris*, 30 April 1995, R. Dulymamode P 48 (Mycological Herbarium of the University of Mauritius, **holotype**, designated here); Petrin Reserve, outside fence, on abaxial surface of dead fallen leaf of *Pandanus palustris*, 30 April 1995, R. Dulymamode P48a, P60, P60a (Mycological Herbarium of the University of Mauritius).

These collections are characteristic of *Niesslia*, where superficial ascomata tend to be collabent when dry and are covered with spiny setae, asci are unitunicate and cylindrical-clavate, ascospores are 1-septate and there is a *Monocillium*-like anamorph (Hyde *et al.*, 1999, 2000). This fungus however, does not match any of the described species in the key provided by Barr (1990b). *Niesslia pandanicola* differs mostly in the setae and ascospore sizes; both being much longer than in the other species. The only species of *Niesslia* producing long ascospores is *N. erysipheoides*, however, this taxon has smaller asci (33-44  $\times$  7.5-9  $\mu\text{m}$ , versus 72-105  $\times$  7-10  $\mu\text{m}$ ).



Figs. 12-14. *Niesslia pandanicola* (from holotype). 12. Section through ascoma. 13. Asci and ascospores. 14. Ascospores. Bars: 12 = 50  $\mu$ m; 13 = 20  $\mu$ m; 14 = 10  $\mu$ m.



Figs. 15-19. *Ornatispora punctata* (from holotype). 15. Section through ascoma. 16, 18. Asci. 17, 19. Ascospores. Bars: 15 = 50  $\mu\text{m}$ ; 16, 17, 19 = 10  $\mu\text{m}$ ; 18 = 20  $\mu\text{m}$ .

***Ornatispora punctata*** Dulymamode, P. Cannon, K.D. Hyde and Peeraly, **sp. nov.** (Figs. 15-19)

*Ascomata* 115-195  $\mu\text{m}$  diam., 95-160  $\mu\text{m}$  alta. *Asci* 48-70  $\times$  8-12  $\mu\text{m}$ . *Ascospores* 15-22  $\times$  4-6  $\mu\text{m}$ , cylindro-clavatae, hyalinae, 1-septatae, verruculosae.

*Etymology*: *punctata*, referring to the surface texture of the ascospores.

*Ascomata* superficial, solitary, on adaxial surface of dead fallen leaf towards the base, dark brown to black, depressed globose to bowl-shaped when old, with pointed septate setae (to 150  $\mu\text{m}$  long, 8-10  $\mu\text{m}$  wide at the base) on the surface. In vertical section 115-195  $\mu\text{m}$  diam, 95-160  $\mu\text{m}$  high, depressed globose with a depressed upper wall in older specimens (Fig. 15). *Peridium* of 4-6 layers of angular cells, brown to dark brown externally, lighter in colour to nearly hyaline internally, KOH- (Fig. 15). *Ostiole* 14-20  $\mu\text{m}$  wide, guarded by hyaline, cylindrical periphyses ca 1  $\mu\text{m}$  in diam. *Interascal tissue* of hyaline periphysoids, 1-1.5  $\mu\text{m}$  wide, in a mucilaginous mass. *Asci* 48-70  $\times$  8-12  $\mu\text{m}$  ( $\bar{x}$  = 59.2  $\times$  10.7  $\mu\text{m}$ ,  $n$  = 10), 8-spored, unitunicate, thin-walled, cylindrical to cylindric-clavate, apex truncate with a minute J- apical ring, the base drawn into a very short broad stalk (Figs. 16, 18). *Ascospores* 15-22  $\times$  4-6  $\mu\text{m}$  ( $\bar{x}$  = 18  $\times$  5.1  $\mu\text{m}$ ,  $n$  = 20), obliquely uniseriate to biseriate, cylindric-clavate, hyaline, straight or slightly curved, 1-septate, slightly constricted at the septum, guttulate, surface ornamented with minute tubular projections (Figs. 17, 19).

*Known hosts*: *Pandanus rigidifolius*, *P. barklyi*.

*Known distribution*: Mauritius.

*Material examined*: MAURITIUS, Petrin Reserve, outside fence, on abaxial surface of dead fallen leaves of *Pandanus rigidifolius*, 14 October 1996, *R. Dulymamode* P127 (Mycological Herbarium of the University of Mauritius, **holotype**, designated here); Petrin Reserve, outside fence, on abaxial surface of dead fallen leaves of *Pandanus rigidifolius*, 14 October 1996, *R. Dulymamode* P127a, P127b; Petrin Reserve, outside fence, on adaxial surface of dead fallen leaves of *Pandanus barklyi*, 14 October 1996, *R. Dulymamode* P136, P136a (Mycological Herbarium of the University of Mauritius).

This fungus is characteristic of *Ornatispora* (Hyde *et al.*, 1999, 2000) with its verruculose bicelled ascospores, interascal tissue of hyaline periphysoids in a mucilaginous mass and long setae. Ascospores of *O. punctata* are smaller than any other species in the genus.

## References

- Barr, M.E. (1990a). *Melanommatales (Loculoascomycetes)*. North American Flora Series II, 13: 1-129.
- Barr, M.E. (1990b). Prodrum to non-lichenised pyrenomycetous members of the class *Hymenoascomycetes*. Mycotaxon 39: 43-184.
- Chang, H.S., Hsieh, Y.S., Jones, E.B.G., Read, S.J. and Moss, S.T. (1998). Aquatic ascomycota: New freshwater species of *Ascotaiwania* and *Savoryella* from Taiwan. Mycological Research 102: 709-718.
- Chesters, C.G.C. and Bell, A. (1970). Studies in the *Lophiostomataceae* Sacc. Mycological Papers 120: 1-55.

- Dulymamode, R., Minter, D.W. and Peerally, A. (1998a). Fungi from Mauritius: *Rubikia splendida* sp. nov., a coelomycete with unusual features. *Mycological Research* 102: 1242-1244.
- Dulymamode, R., Cannon, P.F. and Peerally, A. (1998b). Fungi from Mauritius: *Anthostomella* species on *Pandanus*. *Mycological Research* 102: 1319-1324.
- Dulymamode, R., Cannon, P.F. and Peerally, A. (1998c). Fungi from Mauritius: Three *Astrocystis* species on *Pandanus*. *Mycological Research* 102: 1325-1330.
- Dulymamode, R., Cannon, P.F. and Peerally, A. (1998d). Fungi from Mauritius: *Linocarpon* species on *Pandanus*. *Mycological Research* 102: 1331-1337.
- Dulymamode, R., Wu, W.P. and Peerally, A. (1998e). Three new hyphomycetes on *Pandanus* leaves from Mauritius. *Mycoscience* 39: 285-291.
- Dulymamode, R., Kirk, P.M. and Peerally, A. (1999). Fungi from Mauritius: three new hyphomycetes on endemic plants. *Mycotaxon* 73: 313-323.
- Eriksson, O.E. and Hawksworth, D.L. (1990). Notes on ascomycete systematics. *Systema Ascomycetum* 10: 135-150.
- Fröhlich, J. and Hyde, K.D. (2000). *Palm Microfungi*. [Fungal Diversity Research Series 3] Fungal Diversity Press, Hong Kong SAR, P.R. China.
- Hawksworth, D.L., Kirk, P.M., Sutton, B.C. and Pegler, D.N. (1995). *Dictionary of the Fungi*. CAB International, Wallingford, UK.
- Hyde, K.D., Goh, T.K., Taylor, J.E. and Fröhlich, J. (1999). *Byssosphaeria*, *Chaetosphaeria*, *Niesslia* and *Ornatispora* gen. nov. from palms. *Mycological Research* 103: 1423-1439.
- Hyde, K.D., Taylor, J.E. and Fröhlich, J. (2000). *Genera of Ascomycetes from Palms*. [Fungal Diversity Research Series 2] Fungal Diversity Press, Hong Kong SAR, P.R. China.
- McKenzie, E.H.C. and Hyde, K.D. (1997). Microfungi on *Pandanaceae*. In: *Biodiversity of Tropical Microfungi* (ed. K.D. Hyde). Hong Kong University Press, Hong Kong SAR, P.R. China: 157-177.
- McKenzie, E.H.C., Whitton, S.R. and Hyde, K.D. (2002). The *Pandanaceae* - does it have a diverse and unique fungal biota? In: *Tropical Mycology: Volume 2, Micromycetes* (ed. R. Watling, J. Frankland, M. Ainsworth and C. Robinson) (in press).
- Ranghoo, V.M. and Hyde, K.D. (1998). Ascomycetes from freshwater habitats: *Ascolacicola aquatica* gen. et sp. nov. and a new species of *Ascotaiwania* from wood submerged in a reservoir in Kong Kong. *Mycologia* 90: 1055-1062.
- Sivanesan, A. and Chang, H.S. (1992). *Ascotaiwania*, a new amphisphaeriaceous ascomycete genus on wood from Taiwan. *Mycological Research* 96: 481-484.
- Sivichai, S., Hywel-Jones, N.J. and Jones, E.B.G. (1999). Lignicolous freshwater ascomycete from Thailand, 1. *Ascotaiwania sawada* and its anamorph state *Monotosporella*. *Mycoscience* 39: 307-311.
- Whitton, S.R., McKenzie, E.H.C. and Hyde, K.D. (1999a). Microfungi on the *Pandanaceae*. A new species of *Stictis*. *Fungal Diversity* 2: 169-174.
- Whitton, S.R., McKenzie, E.H.C. and Hyde, K.D. (1999b). Microfungi on the *Pandanaceae*. *Troposporopsis* gen. nov. *Fungal Diversity* 3: 173-177.
- Whitton, S.R., McKenzie, E.H.C. and Hyde, K.D. (2000a). Microfungi on the *Pandanaceae*. *Dictyochaeta* and *Dictyochaetopsis* species from the *Pandanaceae*. *Fungal Diversity* 4: 133-158.
- Whitton, S.R., McKenzie, E.H.C. and Hyde, K.D. (2000b). Microfungi on the *Pandanaceae*. *Acrodictys*, with two new species. *Fungal Diversity* 4: 159-169.
- Wong, M.K.M. and Hyde, K.D. (2001). Fungi on grasses: new species of *Ascotaiwania*, *Diaporthe* and *Oxydothis* (Ascomycetes) *Cryptogamie Mycologie* 22: 19-28.

(Received 20 October 2000, accepted 4 September 2001)