

## Two new species of *Pseudohalonestria* from palms

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**Abstract:** Two new species, *Pseudohalonestria eubenangeensis* and *P. palmicola*, are described from palms in rainforests in north Queensland, Australia. The new species are compared with the known species in the genus, all of which occur in freshwater habitats. This is the first record of species in this genus from terrestrial habitats and from monocotyledonous hosts.

**Key Words:** Australia, Lasiosphaeriaceae, palm fungi, systematics

We are investigating the fungi on palms in Australasian and Asian regions and have reported several new species (e.g., Hyde 1996, Hyde et al 1997, 1998). The purpose of this paper is to describe two new species of *Pseudohalonestria* Minoura & T. Muroi from palms in Australia.

*Pseudohalonestria* was introduced to accommodate a single species, *P. lignicola* Minoura & T. Muroi, which was found on balsa wood submerged in a lake in Japan (Minoura and Muroi 1978). Shearer (1989) added another five species to the genus, also from wood in aquatic habitats. *Pseudohalonestria* is characterized by colored (bright yellow to brown) ascospores with erumpent, cylindrical, periphysate necks. Asci are unitunicate, cylindrical to clavate, with a nonamyloid, thimble-shaped, refractive apical apparatus. Ascospores are cylindrical, smooth, hyaline to slightly colored and usually multi-septate (Shearer 1989). *Pseudohalonestria phialidica* Shearer has been

linked to a hyphomycetous, phialidic anamorph (Shearer 1989).

Shearer (1989) and Chen et al (1995) discussed the placement of *Pseudohalonestria* at the ordinal level and concluded that it was related to the Sordariales. *Pseudohalonestria* is similar to *Ophioceras* Sacc., the latter being placed in the Sordariales (Lasiosphaeriaceae), based on its peridium structure and hypersaprobic habit (Conway and Barr 1977). *Pseudohalonestria* is also similar to *Mycomedusispora* (Rick) Carroll & Munk (Lasiosphaeriaceae), which also has colored ascospores, but fragmenting ascospores and ventricose asci with a subapical refractive globule (Shearer 1989). The placement of *Pseudohalonestria* and *Ophioceras* in the Sordariales was supported based on phylogenetic analysis of rDNA restriction and sequence data, although equally weighted phylogenetic analysis of morphological characters produced equivocal results (Chen et al 1995). Molecular data showed that the two genera are clearly separated.

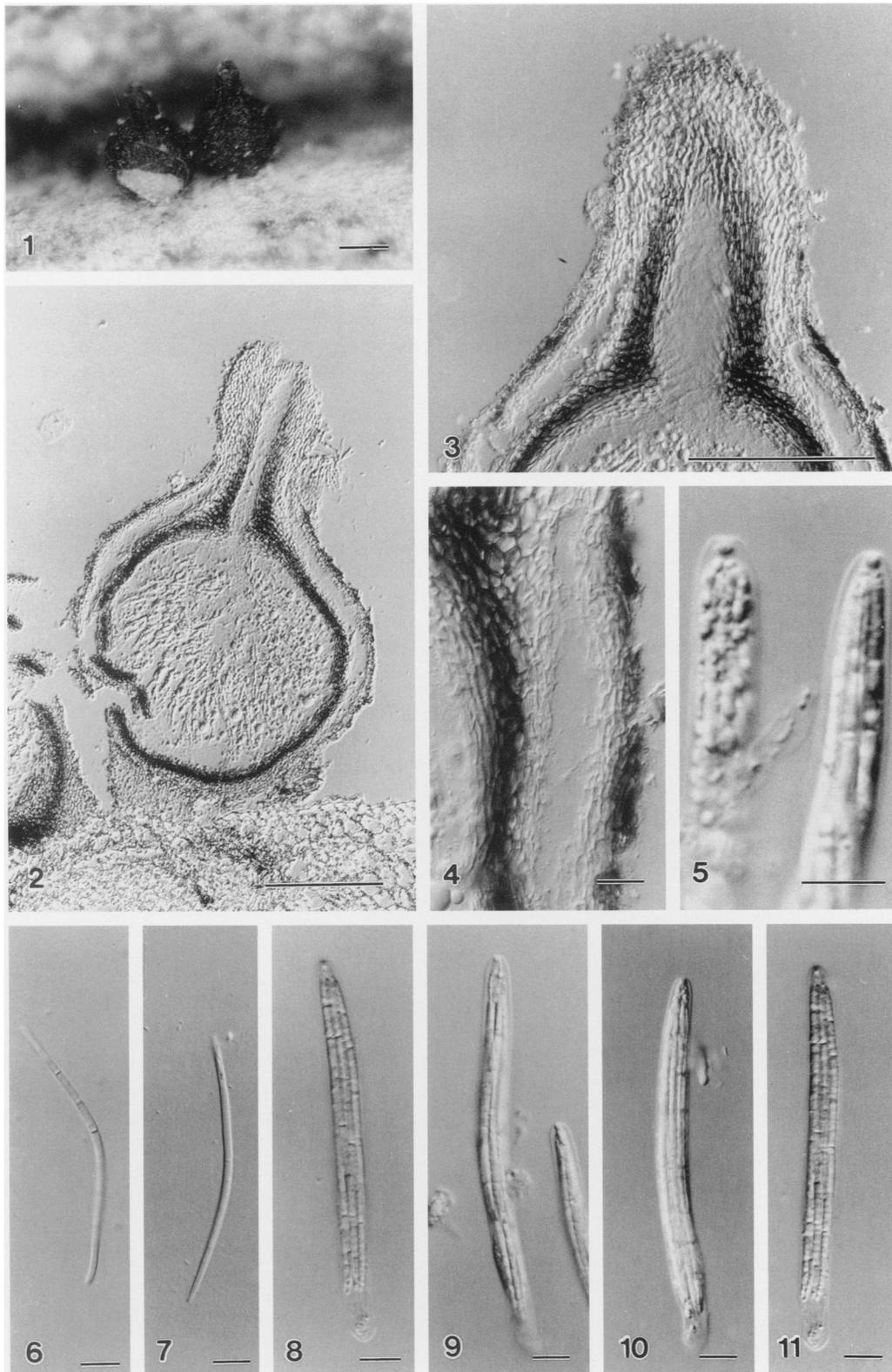
Two previously unrecorded *Pseudohalonestria* species were found during the present study of fungi on palms. This is the first record of members of the genus being associated with monocotyledonous substrata and/or in a terrestrial habitat.

### *Pseudohalonestria eubenangeensis* K. D. Hyde, J. E.

Taylor et J. Fröhl., sp. nov. FIGS. 1–11

Ascomata immersa vel superficialia, spherica vel pyriformia, 358–658  $\mu\text{m}$  alta, 286–458  $\mu\text{m}$  in diametro, papillata, brunnea vel nigra, glabra, solitaria vel gregaria. Asci 80–120  $\times$  8–11.5  $\mu\text{m}$ , 8-spore, cylindrici, apparato apicale (2–2.5  $\mu\text{m}$  alti  $\times$  1.5–2  $\mu\text{m}$  diam) praediti. Ascospores 70–98  $\times$  2.5–3.5  $\mu\text{m}$ , fasciculatae, filiformes vel cylindrici, subhyaline, 3–5(–7) septatae.

Ascomata erumpent from beneath several layers of host tissue which are not discolored, 358–658  $\mu\text{m}$  high  $\times$  286–458  $\mu\text{m}$  diam, globose to pyriform, dark brown when wet, to almost black when dry, glabrous, solitary or in small clusters, with a central, cylindrical, periphysate neck, 135–175  $\mu\text{m}$  long  $\times$  90–125  $\mu\text{m}$  diam (FIGS. 1–3). Peridium 24–46  $\mu\text{m}$  wide, comprising four distinct strata of small, thin walled, often compressed *textura angularis*; innermost stratum comprising 1–2 rows of hyaline compressed cells, second stratum 5–8 rows of reddish brown cells, third



FIGS. 1-11. *Pseudohalonectria eubenangeensis* (from holotype). 1. Ascomata partially immersed on host substrate. 2. Vertical section of ascoma. 3. Periphysate ostiolar canal. 4. Peridium comprising four distinct strata. 5. Asci with a refractive, thimble-shaped, nonamyloid, apical apparatus. 6, 7. Ascospores. 8-11. Asci. Scale bars: 1 = 100  $\mu\text{m}$ ; 2, 3 = 50  $\mu\text{m}$ ; 4-11 = 10  $\mu\text{m}$ .

TABLE I. A comparison of *Pseudohalonestria eubenangeensis* and *P. palmicola* with *P. lignicola* and *P. longirostrum* (measurements from Shearer 1989)

Taxa	Ascospore ( $\mu\text{m}$ )	Asci ( $\mu\text{m}$ )	Apical apparatus (high $\times$ diam $\mu\text{m}$ )	Neck ( $\mu\text{m}$ )	Ascospore septation
<i>P. eubenangeensis</i>	70–98 $\times$ 2.5–3.5	80–120 $\times$ 8–11.5	2–2.5 $\times$ 1.5–2	135–175 $\times$ 90–125	3–5(–7)
<i>P. palmicola</i>	74–83 $\times$ 4–4.5	120–156 $\times$ 13–15	3.5–4 $\times$ 2.5–4	1600 $\times$ 132–152	3–6
<i>P. lignicola</i>	38.4–74.8 $\times$ 3.5–6.5	90–132 $\times$ 11–17.5	(Not given)	170–621	5–11
<i>P. longirostrum</i>	84–105.5 $\times$ 3–4	94–130 $\times$ 8.5–12	3–5 $\times$ 2	1683–3712 $\times$ 118–168	4–8

stratum similar to outer stratum, but hyaline and thin-walled (this stratum often disintegrating), outermost stratum 1–2 rows of reddish-brown cells with slightly thickened walls; peridium releasing yellow pigments when crushed (FIGS. 3, 4). Paraphyses numerous, 4–6  $\mu\text{m}$  wide, filamentous, septate, infrequently branched, tapering, same length as asci. Asci 80–120  $\times$  8–11.5  $\mu\text{m}$ , 8-spored, cylindrical, apedicellate, apex rounded to slightly acute, with a refractive, thimble-shaped, nonamyloid apical apparatus, blue in cotton blue, 2–2.5  $\mu\text{m}$  high, and 1.5–2  $\mu\text{m}$  diam. (FIGS. 5, 8–11). Ascospores 70–98  $\times$  2.5–3.5  $\mu\text{m}$ , fasciculate, filiform or cylindrical, 3–5(–7)-septate, subhyaline to pale yellow, rounded at the apex and attenuated slightly at base, without sheaths or appendages (FIGS. 6, 7).

**Etymology.** In reference to Eubenangee Swamp, near Cairns in northern Queensland Australia, where this species was first collected, with the Latin suffix “-ensis” indicating origin or place.

**Host.** *Archontophoenix alexandrae*.

**Known distribution.** Australia.

**Specimens examined.** AUSTRALIA. NORTH QUEENSLAND: Eubenangee Swamp, northern Queensland, on a dead rachis of *Archontophoenix alexandrae*, 16 April 1995, J.E. Taylor and K.D. Hyde JP2227 (HKU(M) 3785, HOLOTYPE).

**Notes.** The overall morphology of *Pseudohalonestria eubenangeensis* and the yellow pigmentation of the peridium are characteristic features of *Pseudohalonestria*. However, this collection does not correspond to any species given in the key provided by Shearer (1989), although it is similar to *P. longirostrum* Shearer (TABLE I).

*Pseudohalonestria eubenangeensis* has similar-sized ascospores with a similar number of septa to those found in *P. longirostrum* Shearer (Shearer 1989) and *P. palmicola* Hyde et al, described below. However, *P. eubenangeensis* has a smaller apical apparatus and shorter necks than both of these species (TABLE I). In addition the peridium and ascomatal morphology in these species differs. The black ascomata of *P. palmicola* are immersed beneath the raised host epidermis and possess a peridium composed of three strata, whereas the ascomata of *P. longirostrum* are bright

yellow to brownish yellow, immersed or partially immersed and have a peridium composed of two strata (Shearer 1989).

***Pseudohalonestria palmicola*** K. D. Hyde, J. E. Taylor et J. Fröhlich, sp. nov. FIGS. 12–21

Ascomata immersa, 340–408  $\mu\text{m}$  alta, 264–332  $\mu\text{m}$  diam, spherica, papillata. Asci 120–156  $\times$  13–15  $\mu\text{m}$ , 8-sporei, cylindrici, apparatuso apicale (3.5–4  $\mu\text{m}$  alti, 2.5–4  $\mu\text{m}$  diam.) praediti. Ascosporeae 74–83  $\times$  4–4.5  $\mu\text{m}$ , fasciculatae, filiformes, 3–6-septatae, hyalinae.

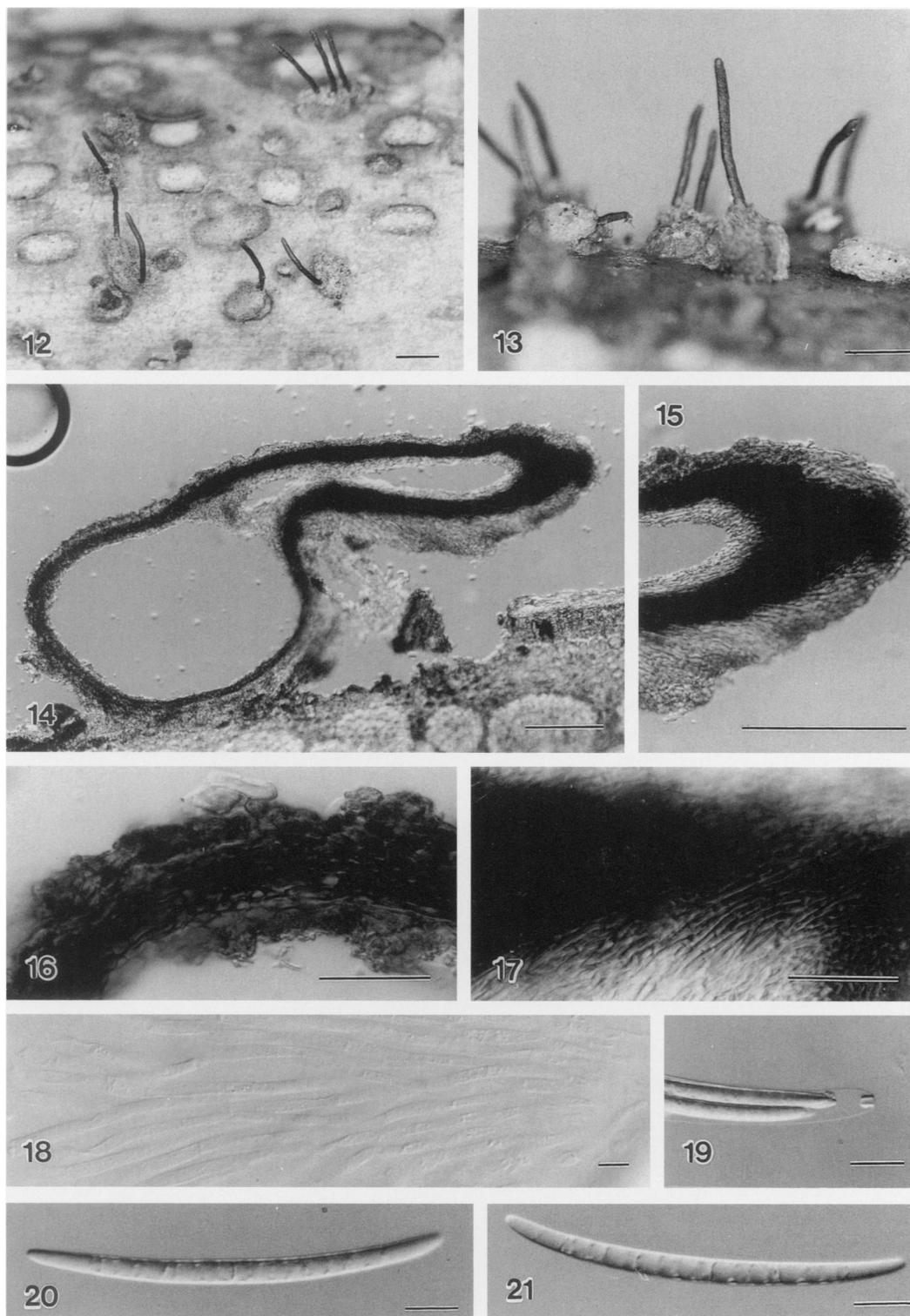
Ascomata immersed beneath raised areas of host epidermis, which are not discolored, 340–408  $\mu\text{m}$  high  $\times$  264–332  $\mu\text{m}$  diam, globose, dark brown, glabrous, mostly clustered, with an eccentric black, cylindrical, periphysate neck, up to 1.6 mm long  $\times$  132–152  $\mu\text{m}$  diam, emerging at the edge of the uplifted tissue and curving upwards (FIGS. 12–15). Peridium 23–67  $\mu\text{m}$  wide, comprising three distinct strata of mostly *textura angularis*: innermost stratum 10–34  $\mu\text{m}$  thick, central stratum 7–16  $\mu\text{m}$  thick, outermost stratum 4–14  $\mu\text{m}$  thick (FIGS. 16, 17), cells in innermost and outermost region with hyaline walls, filled with light greenish yellow pigment, while cells of central region have brown walls and lack bright pigment. Paraphyses numerous, 4.5–8  $\mu\text{m}$  wide at the base, filamentous, septate, infrequently branched, tapering gradually to 2–2.5  $\mu\text{m}$  at the ends, same length as asci (FIG. 18). Asci 120–156  $\times$  13–15  $\mu\text{m}$ , 8-spored, cylindrical, apedicellate, apex rounded, with a refractive, thimble-shaped, nonamyloid apical apparatus, blue in cotton blue, 3.5–4  $\mu\text{m}$  high and 2.5–4  $\mu\text{m}$  diam (FIG. 19). Ascospores 74–83  $\times$  4–4.5  $\mu\text{m}$ , fasciculate, filiform, 3–6-septate, hyaline, without sheaths or appendages (FIGS. 20, 21).

**Etymology.** In reference to the palm host and the Latin suffix *cola* meaning “dweller.”

**Host.** *Calamus australis*.

**Known distribution.** Australia.

**Specimens examined.** AUSTRALIA. NORTH QUEENSLAND: Atherton Tablelands, near Topaz, Bellenden Ker National Park, Mt. Bartle Frere walking track, on dead rattan of *Calamus australis*, April 1995, J. Fröhlich (HKU(M) JF640, HOLOTYPE); *ibid.*, March 1997, C. Pearce (HKU(M) 1501).



FIGS. 12–21. *Pseudohalonectria palmicola* (from holotype). 12, 13. Appearance of ascomata on host surface as seen from above (12) and in side view (13). Note the very long black necks. 14. Vertical section of ascoma. 15. Vertical section through part of neck. 16. Peridium. 17. Vertical section of peridium illustrating the arrangement of the peridial cells. 18. Paraphyses. 19. Ascus apex with refractive, thimble-shaped, nonamyloid, apical apparatus. 20, 21. Ascospores. Note the inconspicuous septa. Scale bars: 12, 13 = 1000  $\mu\text{m}$ , 14 = 100  $\mu\text{m}$ ; 15–21 = 10  $\mu\text{m}$ .

*Notes.* The bright yellowish green pigment associated with the peridial cells of *P. palmicola* are characteristic of *Pseudohalonestria*. The collection is compared with the most similar *Pseudohalonestria* species in TABLE I.

The ascospores and ascomatal necks of *P. palmicola* are longer than those of *Pseudohalonestria lignicola* and smaller than those of *P. longirostrum*. The taxa also differ in ascus size and ascospore septation and the ascospores of *P. eubenangeensis*, *P. lignicola*, *P. longirostrum* become pigmented at maturity, while those of *P. palmicola* remain hyaline.

*Pseudohalonestria* species have until now been collected only from submerged, rotting wood (Shearer 1989). *Pseudohalonestria palmicola* was collected from a dead rattan (stem of *Calamus*) on the floor of a tropical rainforest that was moist, but not subject to flooding. As there is very little rain in the forest during the dry season, it seems likely that this species of *Pseudohalonestria* is not an aquatic species. The species was not associated with soft rot cavities. *Pseudohalonestria* species have been found to be inhibitory to other filamentous fungi and yeasts in paired culture (Shearer 1989), but we were unable to isolate *P. palmicola*.

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