

Three new hyphomycetes on *Pandanus* leaves from Mauritius

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Three new hyphomycetes colonizing dead leaves of *Pandanus* spp. in Mauritius are described, illustrated, and compared with related species. They are *Fuscophialis suttonii* sp. nov., *Paraceratocladium triseptatum* sp. nov., and *Sporidesmium paradecorosum* sp. nov.

Key Words—*Fuscophialis suttonii*; *Pandanus*; *Paraceratocladium triseptatum*; *Sporidesmium paradecorosum*.

The mycoflora associated with the Pandanaceae has hardly been studied. The first comprehensive account by Verona (1931, 1932) treated 90 species recorded on *Pandanus* and *Freycinetia*, mostly from the Samoa Islands. Recently there has been renewed interest in the fungi associated with this group of plants, particularly in Southeast Asia, and several new species have been discovered (McKenzie, 1995; McKenzie and Hyde, 1997).

In Mauritius the genus *Pandanus* is represented by 14 endemic species, all of which threatened with extinction at various levels. During recent fungal surveys in the remaining native forest, particularly in the region of Petrin of the Black River Gorges National Park, several collections have been made on *Pandanus barklyi* Balf., *P. rigidifolius* Vaughan & Wiehe, and *P. palustris* Thouars. Studies of these materials have revealed three new species of dematiaceous hyphomycetes, namely, *Fuscophialis suttonii*, *Paraceratocladium triseptatum*, and *Sporidesmium paradecorosum*. Here are described, illustrated, and compared with other related species in their respective genera.

Fuscophialis suttonii Dulymamode, W. Wu & Peerally, sp. nov. Figs. 1–3

Coloniae effusae, sparsae, pallide brunneae. Mycelium plerumque superficiale ex hyphis ramosis septatis brunneis laevibus 2–3.5 μm crassis compositum. Conidiophora macronematosa, mononematosa, non ramosa, singula, recta, flexuosa vel irregulariter contorta, laevia, 0–14-septata, brunnea vel atro-brunnea, apicem versus pallidiora 90–160 \times 4–5 μm . Cellulae conidiogenerae 8–22 μm longae, in conidiophoris incorporatae, intercalares vel terminales, sympodiales, polyphialidicae, collo usque ad 1.5 μm . Conidia holoblastica, acropleurogena, navicularia, versus apicem attenuata, pallide brunnea vel hyalina, laevia, 6–9-septata, 30–48 \times 3.5–5 μm .

In foliis dejectis *Pandani rigidifolii*, Mauritius, Petrin Reserve, 26 Aug. 1996, R. Dulymamode P111 (Holoty-

pus IMI 377959; Isotypus RDP111 in mycol. herb. Univ. Mauritius).

Colonies effuse, sparse, pale brown. Mycelium mostly superficial, composed of branched, septate, smooth-walled, brown hyphae, 2–3.5 μm wide. Conidiophores macronematous, mononematous, unbranched, single, flexuous and somewhat contorted, smooth, up to 14-septate, dark brown at the base, brown in the mid region, paler at the apex, 90–160 \times 4–5 μm . Conidigenous cells 8–22 μm long, integrated, terminal or intercalary, sympodial, polyblastic, denticles-like with long frills, darker, ca. 1.5 μm wide. Conidia holoblastic, acropleurogenous, navicular to elongated, straight or slightly curved, apex attenuate, base truncate with minute remains of the collarette, pale brown to nearly hyaline, smooth and thin-walled, 6–9-septate, slightly constricted at the septa, 30–48 \times 3.5–5 μm .

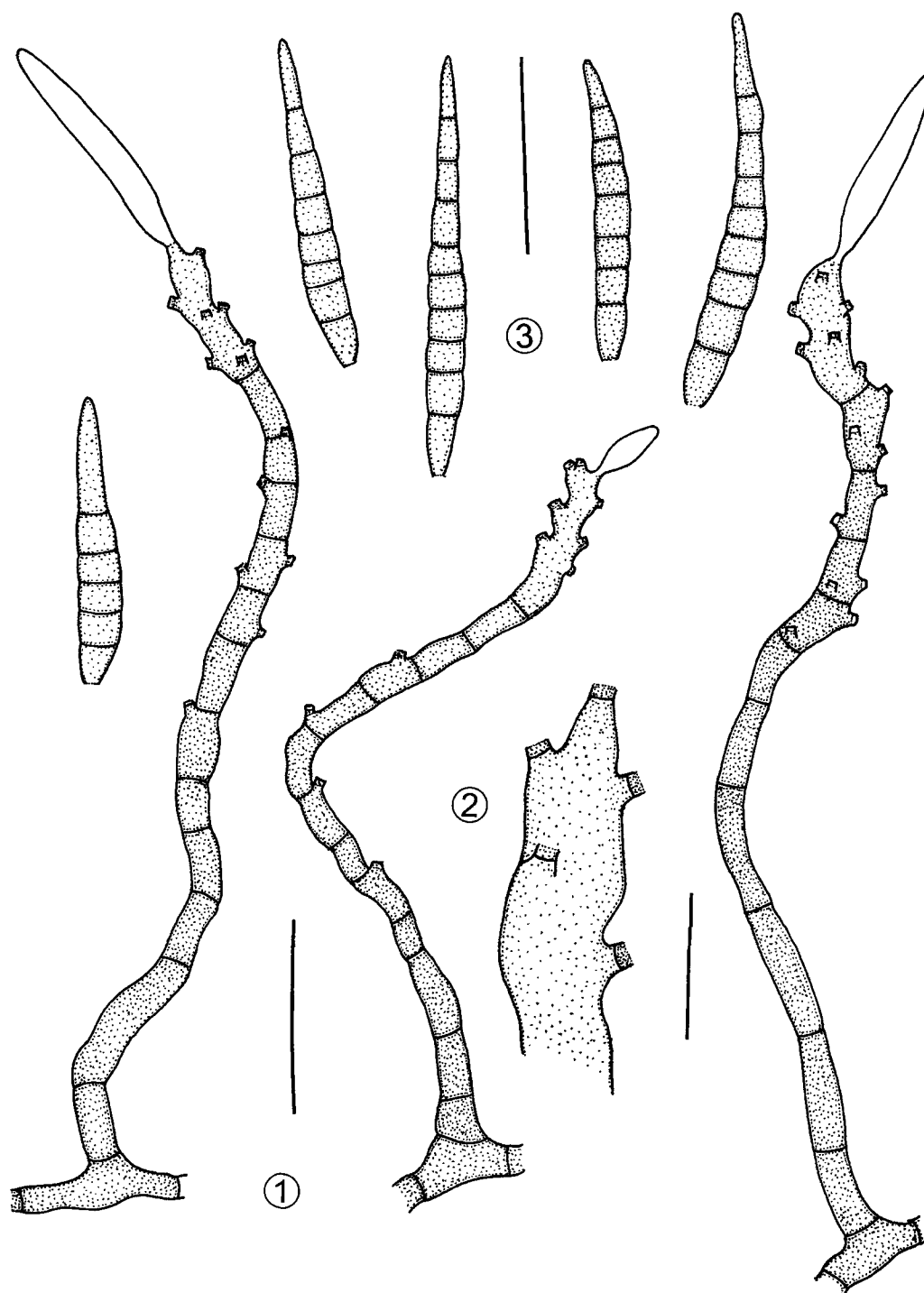
Host plant: *Pandanus rigidifolius*.

Known distribution: Mauritius.

Other specimen examined: Mauritius, Petrin Reserve, on abaxial surface of dead leaves of *P. rigidifolius* still attached to the plant, 26 Aug. 1996, R. Dulymamode P106b (mycol. herb. Univ. Mauritius).

Fuscophialis suttonii differs from *F. brasiliensis* B. Sutton, the type species, mostly in its conidial features: conidia are more septate, longer and wider, measuring 30–48 \times 3.5–5 μm with 6–9 septa in *F. suttonii* compared to 18–28.5 \times 2–2.5 μm and 1–3 septa in *F. brasiliensis*. The other species described in the genus include *F. cubensis* Mercado & J. Mena and *F. gigas* R. F. Castañeda. *Fuscophialis gigas* differs from *F. suttonii* in the conidiophore appearance and the insertion of conidigenous cells. In addition, *F. cubensis* has aseptate conidia of smaller size (15–40 \times 2–3 μm), and *F. gigas* has somewhat longer but narrower conidia (31–55 \times 2–3 μm) with 3–6 septa (Castañeda Ruíz, 1987; Mercado and Mena, 1992).

The genus *Fuscophialis* B. Sutton was erected by



Figs. 1-3. *Fuscophialis suttonii*.

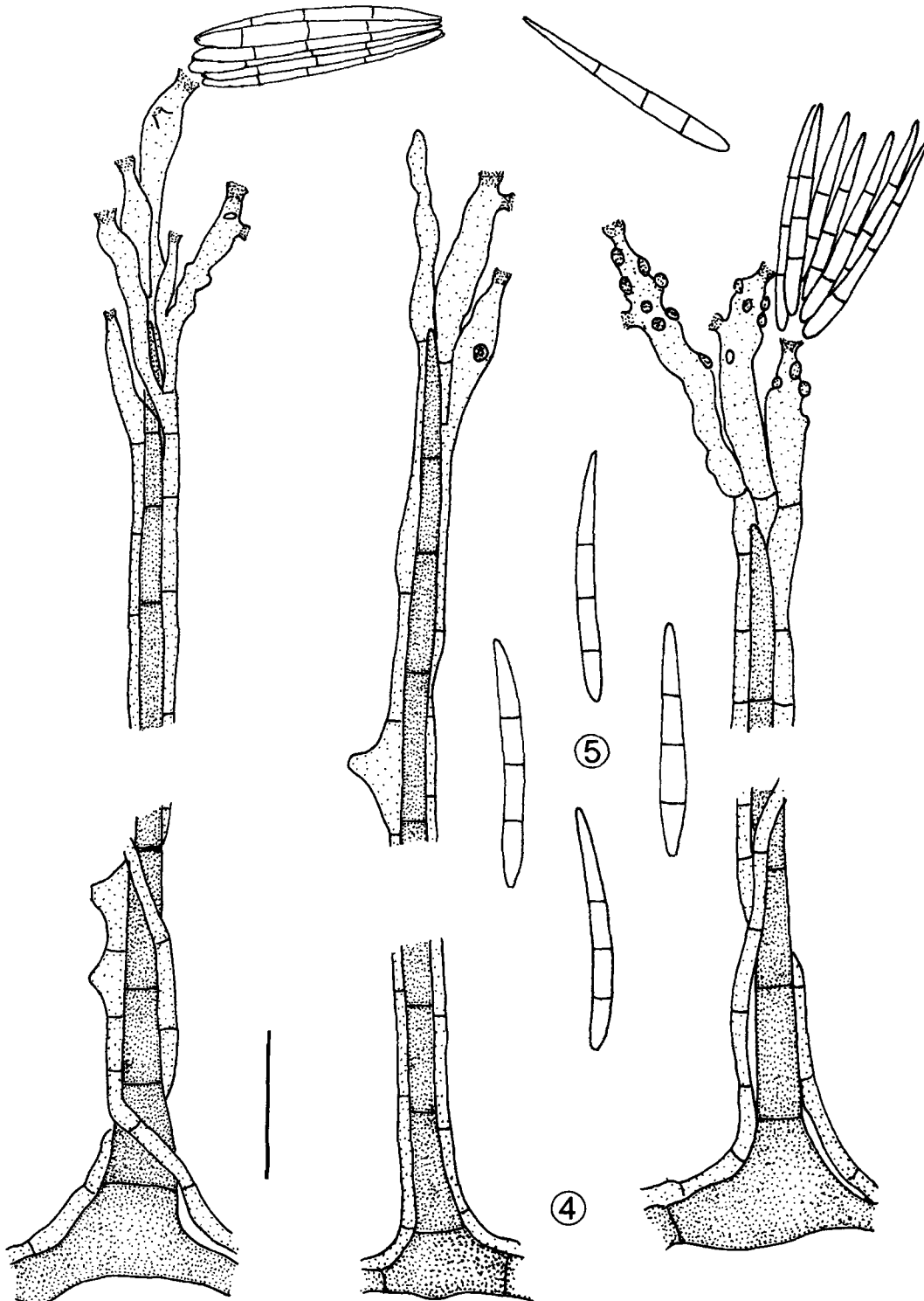
1. Conidiophores and conidiogenous cells. 2. Conidiogenous cells. 3. Conidia. Scale bars = 20 μm for Figs. 1, 3; 5 μm for Fig. 2.

Sutton (1977) for a fungus on dead *Eucalyptus saligna* leaves from Brazil. It is characterised by phialidic conidiogenous cells with coloured collarettes and pale brown, septate conidia with darker thickened bases. It is distinguished from other related genera with collarettes such as *Angulimaya* Subram., *Eladia* Smith,

Gliomastix Guéguen, and *Phialophora* Medlar by its septate conidia and from *Fusariella* Sacc., which shows catenate conidial development. The conidiogenesis of *F. brasiliensis* was described as enteroblastic, semi-endogenous, and conidia were formed from sympodial, polyphialidic conidiogenous cells with 1-18 apertures,

each with a well-defined dark collarette up to $1.5\ \mu\text{m}$ diam (Sutton, 1977). However, reexamination of type material of *F. brasiliensis* (IMI 173096d, holotypus) showed that the conidiogenous cells are not phialidic but

denticulate with long frills similar to those of *F. suttonii*. Thus the following amendment of the generic circumscription is proposed:



Figs. 4, 5. *Paraceratocladium triseptatum*.

4. Setae, conidiophores, conidiogenous cells and developing conidia. 5. Conidia. Scale bar = $20\ \mu\text{m}$.

Fuscophialis B. Sutton, Bol. Soc. Argent. Bot. **18**: 158. 1977.

Colonies effuse. Mycelium mostly superficial, composed of branched, septate, brown and smooth hyphae. Conidiophores macronematous, mononematous, unbranched, straight, flexuous or irregularly contorted, smooth, septate, brown. Conidiogenous cells integrated,

rarely discrete, lageniform, intercalary or terminal, rarely lateral, sympodially proliferated, polyblastic. Conidia holoblastic, acropleurogenously arranged, solitary, straight, tapered to a rounded apex, pale brown, smooth, septate, darker and thickened at the base; secession schizolytic from conidiogenous cells.

Key to the species of *Fuscophialis*

- | | |
|--|------------------------|
| 1. Conidia aseptate | <i>F. cubensis</i> |
| 1. Conidia septate | 2 |
| 2. Conidia 3-septate, $18-28.5 \times 2-2.5 \mu\text{m}$ | <i>F. brasiliensis</i> |
| 2. Conidia more than 3-septate, $30-55 \mu\text{m}$ long | 3 |
| 3. Conidiophores little differentiated; conidia 3-6-septate, $31-55 \times 2-3 \mu\text{m}$ | <i>F. gigas</i> |
| 3. Conidiophores erect, septate and cylindrical; conidia 6-9-septate, $30-48 \times 3.5-5 \mu\text{m}$ | <i>F. suttonii</i> |

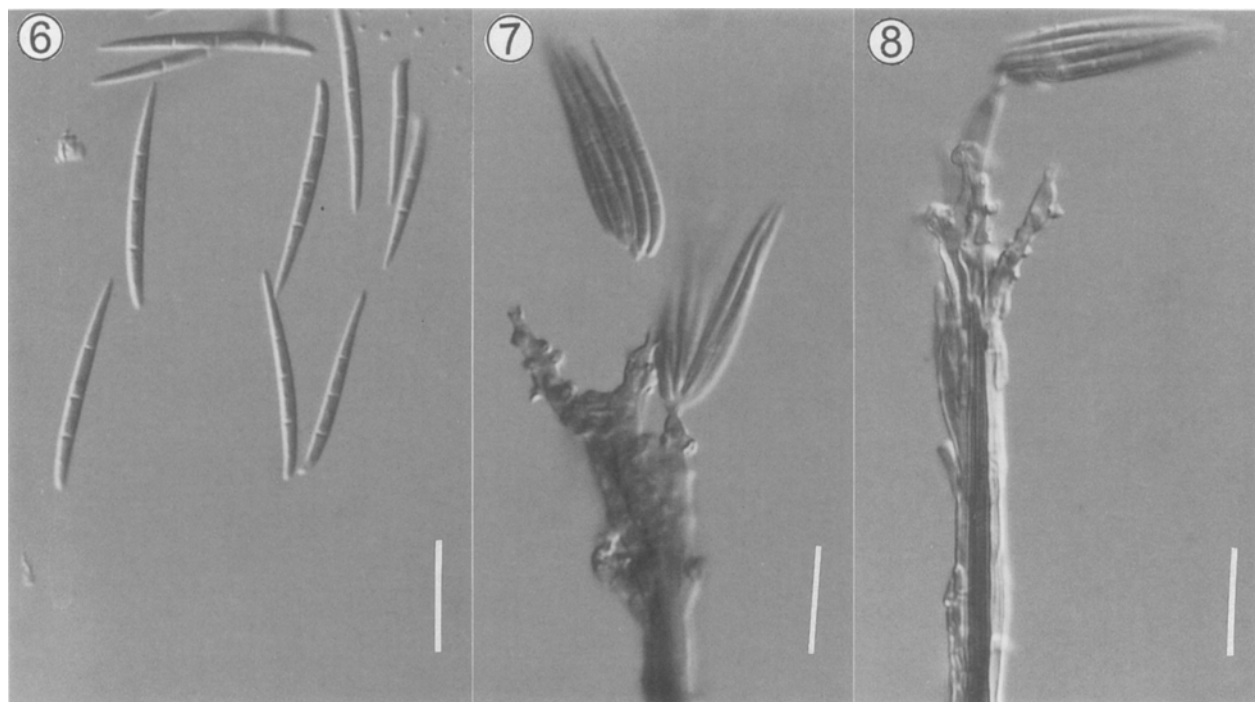
Paraceratocladium triseptata Dulymamode, W. Wu & Peerally, sp. nov. Figs. 4-8

Coloniae effusae, pilosae, atrobrunneae vel brunneae. Mycelium partim superficiale et partim in substrato immersum, ex hyphis septatis ramosis laevibus pallide brunneis $2.5-3.5 \mu\text{m}$ diam compositum. Setae cylindricae, acerosae, septatae, erectae, rectae vel flexuosae, laeves, ad basim atro-brunneae, ad apicem brunneae, $240-380 \mu\text{m}$ altae, basi $7-12 \mu\text{m}$ crassae. Conidiophora micronematosa vel semimacronematosa, mononematosa, septata, erecta vel flexuosa, sarmentosa et in setis adhaerentia, laevia, hyalina vel pallide brunnea. Cellulae conidiogenae monophialidicae vel

polyphialidicae, lageniformes, laeves, pallide brunneae $8-38 \times 3-6 \mu\text{m}$. Conidia holoblastica, acicularia, 3-septata, laevia, hyalina, $28-34 \times 1.5-2.5 \mu\text{m}$, in massa minuta mucosa deposita.

In foliis emortuis *Pandani palustris*, Mauritius, Petrin Reserve, 30 Apr. 1996, R. Dulymamode P50 (Holotypus IMI 377960; Isotypus RDP50 in mycol. herb. Univ. Mauritius).

Colonies effuse, hairy, pale brown to brown. Mycelium partly immersed and partly superficial, composed of hyaline to pale brown, septate, branched hyphae, $2.5-3.5 \mu\text{m}$ wide. Setae cylindrical, tapering towards the apex, erect, straight or flexuous, smooth,



Figs. 6-8. *Paraceratocladium triseptatum*.

6. Conidia. 7, 8. Setae, conidiophores, conidiogenous cells, and developing conidia. Scale bar = $10 \mu\text{m}$.

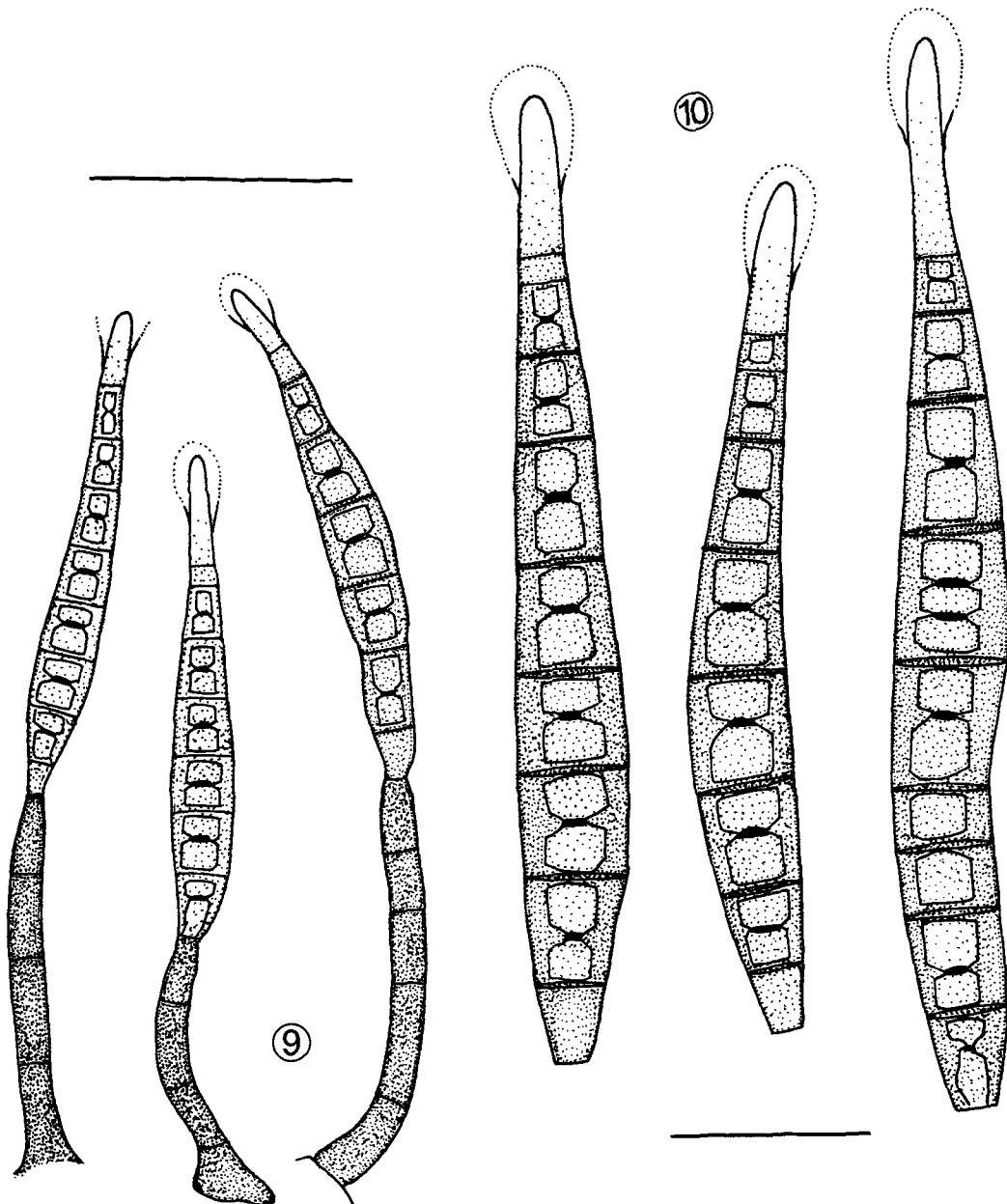
septate, dark brown at the bases and brown at the apices, 240–380 μm long, 7–12 μm wide. Conidiophores micronematous to semimacronematous, mononematous, flexuous, branched at the apex, adhering and twining around the setae, smooth, septate, hyaline to very pale brown. Conidiogenous cells mono- to polyphialidic, elongated lageniform, smooth, pale brown, 8–38 μm long, 3–6 μm wide. Conidia holoblastic (Hawksworth et al., 1995), acerose, 3-septate, smooth, hyaline, 28–34 \times 1.5–2.5 μm , aggregating in minute masses.

Host species: *Pandanus palustris*.

Distribution: Mauritius.

Other specimen examined: Mauritius, Petrin Reserve, on abaxial and adaxial surfaces of dead fallen leaf tips of *P. palustris*, 27 June 1996, R. Dulymamode P173 (mycol herb. Univ. Mauritius).

This fungus shows typical *Paraceratocladium* R. F. Casteñeda features: 1) flexuous conidiophores bearing terminal or intercalary conidiogenous cells twine around septate dark brown setae, 2) conidia are septate and acerose (Castañeda Ruíz, 1987). Two species, *P. polysetosum* R. F. Casteñeda and *P. silvestre* R. F. Casteñeda, have both been described as uniseptate and monopialidic from Cuba. However, *P. silvestre* was reported as polyphialidic on *Pandanus* from Hong Kong



Figs. 9, 10. *Sporidesmium pardecorosum*.

9. Conidiophores, conidiogenous cells and conidia. 10. Conidia. Scale bars = 40 μm for Fig. 9; 20 μm for Fig. 10.

(McKenzie and Hyde, 1997). In *P. triseptata*, conidiogenous cells are polyphialidic and conidia are 3-septate. Furthermore, *P. polysetosum* has cylindrical conidia with swollen apices.

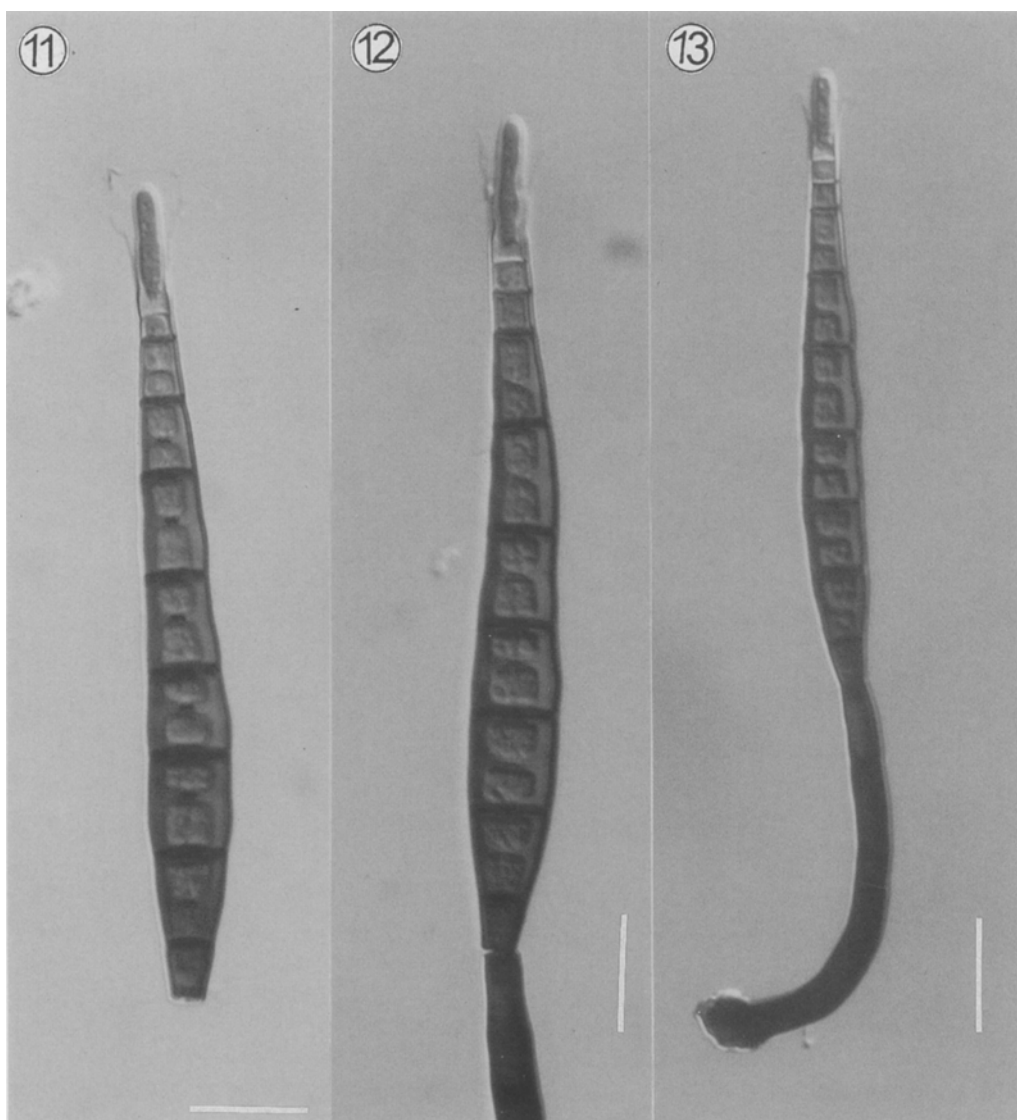
Sporidesmium paradecorosum Dulymamode, W. Wu & Peerally, sp. nov. Figs. 9–13

Coloniae effusae, pilosae, atrobrunnae. Mycelium partim superficiale, partim in substrato immersum, ex hyphis septatis ramosis laevibus atrobrunneis vel brunneis compositum. Conidiophora macronematosa, mononematosa, brevia, erecta, recta, simplicia, 1–4-septata, cylindrica, basi triangularia, laevia, brunnea vel atro brunnea, 72–130 μm longa, basi 8–9 μm lata. Cellulae conidiogenae monoblasticae, terminales, determinatae, laeves, raro percurrentes, brunneae vel atro-brunneae.

Conidia holoblastica, solitaria, acrogena, obclavata, attenuata ad apicem et basi truncata, laevia, 14–18-septata (8–10-euseptata, 6–8-distoseptata), brunnea, cum cellula apicali pallide brunnea vel hyalina, 80–114 \times 11–13 μm , apice rotundata et tunica mucosa subglobosa usque 10 μm diam tecta.

In foliis emortuis *Pandani barklyi*, Mauritius, Petrin Reserve, 14 Oct. 1996, R. Dulymamode P132 (Holotypus IMI377961; Isotypus RDP132 in mycol. herb. Univ. Mauritius).

Colonies spreading, hairy, brown to dark brown. Mycelium partly superficial and partly immersed, composed of branched, smooth-walled, septate, brown to dark brown hyphae. Conidiophores mononematous, cylindrical, erect, straight, unbranched, 1–4-septate, smooth, base triangular, 72–130 μm long, 8–9 μm wide



Figs. 11–13. *Sporidesmium paradecorosum*.

11. Conidia. 12, 13. Conidiophores, conidiogenous cells, and attached conidia. Scale bar = 10 μm .

at the base. Conidiogenous cells integrated, determinate, terminal, monoblastic, rarely proliferating, smooth-walled, brown to dark brown. Conidia $80\text{--}114 \times 11\text{--}13 \mu\text{m}$, holoblastic, solitary, acrogenous, obclavate, tapering gradually towards the apex, base truncate, 14–18-septate (8–10-eusepte, 6–8-distosepte), smooth-walled, brown except for very pale brown to nearly hyaline apical cells; apex rounded and invested in a drop of mucilage ca. $10 \mu\text{m}$ in diam.

Host plant: *Pandanus barklyi*.

Known distribution: Mauritius.

Other specimen examined: Mauritius, Petrin Reserve, on abaxial surface of dead fallen leaves of *P. barklyi*, 14 Oct. 1996, R. Dulymamode P139 (mycol. herb. Univ. Mauritius).

Sporidesmium, established by Link (1809), is a very heterogeneous group as judged from the variation in the general aspects of conidiophores, conidiogenous cells, and conidia of the described species (Ellis, 1958, 1959, 1971, 1976; Castañeda Ruiz and Kendrick, 1990). Subramanian (1992) proposed seven different genera to accommodate some representative taxa previously included in *Sporidesmium* on the basis of percurrent development of conidiophores, type of conidiogenous cells, and conidial septation (euseptate or distoseptate). The concept of *Polydesmus* Durieu & Mont. was revised and two more genera, *Imimyces* A. Hern. & B. Sutton and *Linkosia* A. Hern. & B. Sutton, were erected by Hernandez-Gutiérrez and Sutton (1997).

McKenzie (1995) successfully classified species of *Sporidesmium* sensu lato on the Pandanaceae based on the revised generic concepts. Thirteen species of *Sporidesmium* sensu lato were described and illustrated from leaves of *Freycinetia* and *Pandanus*, two of the three genera of the Pandanaceae. Of these species, only *Stanjehughesia decorosa* (R. F. Castañeda & W. B. Kendr.) McKenzie (\equiv *Sporidesmium decorosum* R. F. Castañeda & W. B. Kendr.) resembles *S. paradecorosum* in conidial morphology. In the original description of *S. decorosum* on grass from Cuba, Castañeda Ruiz and Kendrick (1990) reported the very short conidiophores ($20\text{--}30 \mu\text{m}$ long) and dark brown, verrucose multiseptate (10–14) conidia with hyaline apical cell surrounded by a mucilaginous sheath. McKenzie (1995) recorded this species on *Freycinetia* from Palau with slight differences in morphology such as the longer conidiophores (up to $60 \mu\text{m}$) and shorter and narrower conidia ($90\text{--}175 \times$

$10\text{--}13 \mu\text{m}$). *Sporidesmium paradecorosum* differs from *S. decorosum* by its longer conidiophores, and smaller, smooth-walled conidia ($80\text{--}114 \times 11\text{--}13 \mu\text{m}$).

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