
Microfungi on the *Pandanaceae*: *Paraceratocladium seychellarum* sp. nov. and a review of the genus

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Paraceratocladium seychellarum sp. nov. is introduced, based on a specimen identified on *Pandanus seychellarum* from Seychelles. The new species is compared with presently accepted species, two of which are also known from the *Pandanaceae*, and a key to the genus is provided.

Key words: new species, *Pandanaceae*, taxonomy.

Introduction

Paraceratocladium was introduced with two species, *P. silvestre* R.F. Castañeda and *P. polysetosum* R.F. Castañeda and is characterised by branched or unbranched, septate, dark brown, acutely tipped setae, each of which has a pale-brown, macronematous, septate conidiophore twisted around it. The conidiophores produce discrete, 0-1 septate, ampulliform or lageniform conidiogenous cells that are mono- or polyphialidic and have distinct and flared collarettes (Castañeda Ruiz, 1987; McKenzie and Hyde, 1997; Dulymamode *et al.*, 1998). The four currently accepted species, and *P. seychellarum*, are easily distinguished by the branching nature of the setae, and conidial morphology and dimensions.

This work originates from an ongoing study of the saprobic microfungi that inhabit members of the monocotyledon family *Pandanaceae* (e.g. McKenzie, 1995; McKenzie and Hyde, 1996, 1997; Hyde, 1997; Whitton *et al.*, 1999, 2000). Three species of *Paraceratocladium* are known to inhabit members of the *Pandanaceae*. *Paraceratocladium triseptatum* Dulymamode, W. Wu and Peerally was described on *Pandanus palustris* from Mauritius

(Dulymamode *et al.*, 1998) and *P. silvestre* has been reported on *Pandanus furcatus* from Hong Kong (McKenzie and Hyde, 1997). In the current paper, *P. seychellarum* found on *Pandanus seychellarum* is described and compared with currently accepted species, and *P. silvestre* from Hong Kong is re-examined and discussed. A dichotomous key to *Paraceratocladium* species is provided, along with a comparative synopsis of all species (Table 1).

Taxonomy

Paraceratocladium R.F. Castañeda, Fungi Cubenses II: 8 (1987).

Type species: Paraceratocladium silvestre R.F. Castañeda, Fungi Cubenses II: 9 (1987).

Key to species of *Paraceratocladium*

1. Setae branched; conidia cylindrical, ovoid or ellipsoid, \pm straight, apex rounded or slightly constricted, base rounded..... 2
1. Setae unbranched; conidia narrowly-fusoid, slightly curved, apex attenuated and blunt or acute, base rounded 3
2. Setae 85-385 μm long; conidia aseptate, $3-5.2 \times 1.2-1.5 \mu\text{m}$ *P. seychellarum*
2. Setae up to 450 μm long; conidia 1-septate, $14-17 \times \pm 2 \mu\text{m}$ *P. polysetosum*
3. Setae 350-500 μm long; conidia 40-46 μm long..... *P. malaysianum*
3. Setae mostly less than 350 μm long, conidia less than 35 μm long..... 4
4. Conidia 1-septate, $21-32 \times 1-2.5 \mu\text{m}$ *P. silvestre*
4. Conidia 3-septate, $28-34 \times 1.5-2.5 \mu\text{m}$ *P. triseptatum*

Paraceratocladium silvestre R.F. Castañeda, Fungi Cubense II: 9 (1987).

Setae unbranched, cylindrical, attenuated to an acute apex, typically curved, dark brown, smooth, 4-8 septate, thickened walls, basal cell slightly swollen or \perp -shaped, 210-380 μm long, 5.5-8 μm wide towards the base. *Conidiophores* macronematous, mononematous, cylindrical, entwined around setae, pale-brown, smooth, septate, 1.8-5.5 μm diam. *Conidiogenous cells* enteroblastic, mono- or polyphialidic, lageniform or ampulliform, smooth, pale-brown, collarettes distinct and flared. *Conidia* 30-32 \times 2-2.5 μm , acicular, attenuated to an acute apex, base obtuse, hyaline, smooth, 1-septate, straight or slightly-curved, aggregated into small, mucoid masses.

Habitat: Unidentified grass, *Pandanus furcatus*.

Distribution: Cuba (Castañeda Ruiz, 1987), Hong Kong (McKenzie and Hyde, 1997).

Specimen examined: HONG KONG, New Territories, Tai Mo Shan, on decaying leaves of *Pandanus furcatus*, 23 March 1994, E.H.C. McKenzie [PDD 72306].

Notes: *Paraceratocladium silvestre* is characterised by having unbranched setae and 1-septate, acicular conidia (Castañeda Ruiz, 1987). Setae and conidial dimensions of the current specimen differ slightly from that reported by Castañeda Ruiz (1986) (200-350 × 6-8 µm and 21-30 × 1-2 µm, respectively) and the conidiogenous cells are often distinctly polyphialidic. These differences are interpreted as due to natural variation.

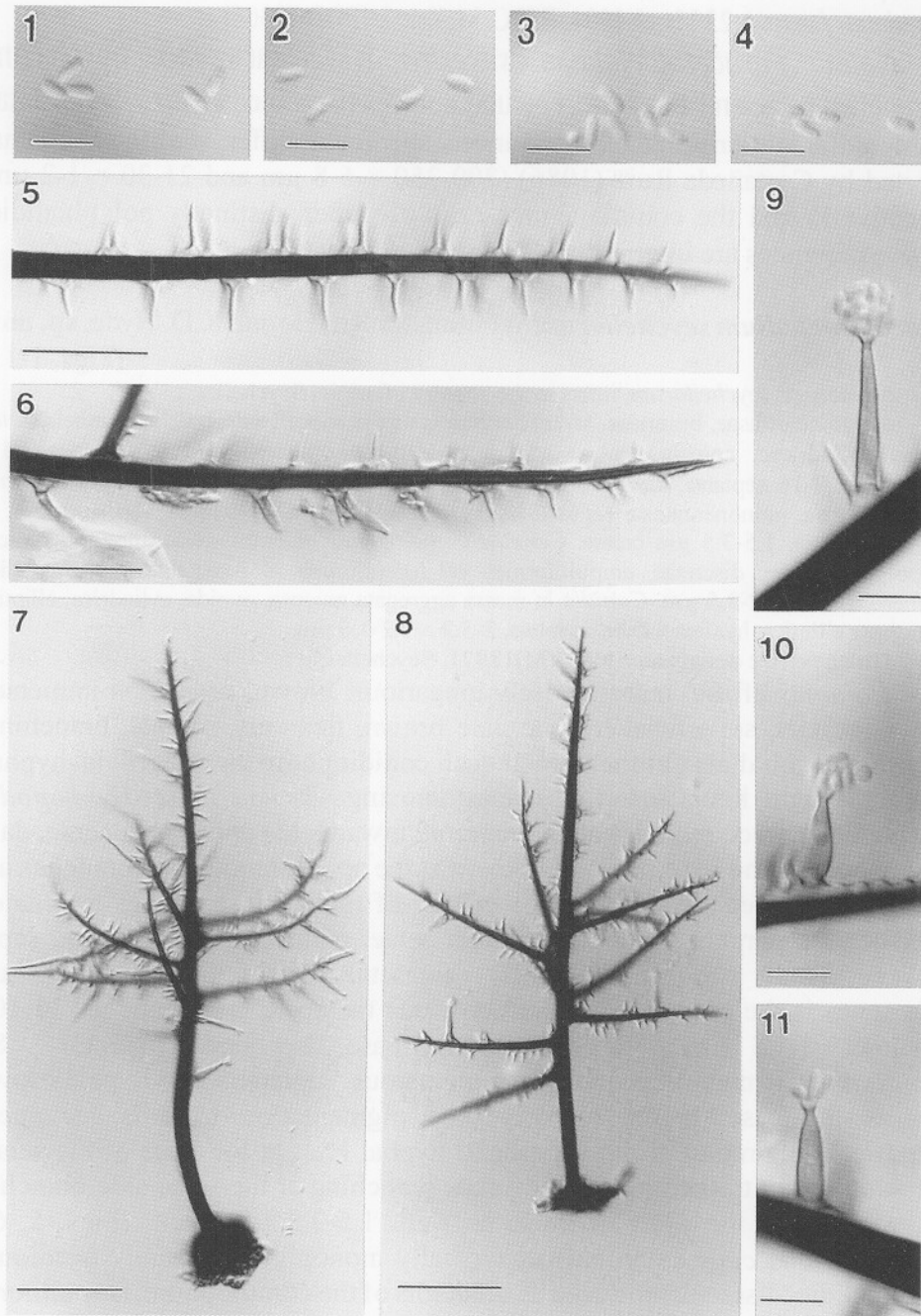
***Paraceratocladium seychellarum* Whitton, McKenzie and K.D. Hyde, sp. nov.**
(Figs. 1-11)

Etymology: *seychellarum*, refers to the country of origin, Seychelles.

Coloniae effusae, brunneae. *Mycelium* immersum et superficiale, pallide brunneis. *Setae* erectae, cylindricae, apicem acutae, ad basim atro-brunneae, ad apicem brunneae, 1-9 dendroideae, 7-16 septatae, laeves, 85-385 µm longae, basi 5-8.5 µm crassae. *Conidiophora* macronematosa, mononematosa, septata, laevia, pallide brunnea, cylindrica, sarmentosa et in setis adhaerentia, 1.5-3.5 µm crassa. *Cellulae conidiogenae* enteroblasticae, monophialidicae vel polyphialidicae, discretiae, ampulliformes vel lageniformes, 0-1-septatae, laeves, pallide brunneae, 13-32 × 2-3.5 µm. *Conidia* in massa aggregata mucosa, ovoida, cylindrica, elliptica vel anguste elliptica, hyalina, laevia, aseptata, 3-5.2 × 1.2-1.5 µm.

Holotype (hic designatus): HKU(M)12971, Seychelles.

Colonies effuse, hairy, densely gregarious, brown. *Mycelium* immersed and superficial, superficial hyphae pale brown, flexuous, septate, branching, smooth, 1-3 µm diam., at the base of each conidiophore the superficial hyphae forming a tight knot, sometimes anastomosing. *Stroma* none. *Hyphopodia* absent. *Setae* erect, cylindrical and tapering towards the apex, apex acute, dark brown towards the base, fading to brown at the apex, smooth, 1-9 branches are typically produced towards the lower half of the setae, branches orientated more or less perpendicular to the main setae, main setae 7-16 septa, septa thickened, walls strongly thickened, main setae 85-385 µm long, 5-8.5 µm wide towards the base, 2-4 µm wide towards the apex, side branches 35-105 µm long, 3-4.5 µm wide towards the base, 1-5 septate (Figs. 7, 8). *Conidiophores* macronematous, mononematous, septate, smooth, pale brown towards the base, fading to very pale pigmentation towards the apex, cylindrical, beginning at the superficial hyphal knot at the base of the setae, and winding up to the apex of the setae, branching at the setae side branches and winding to the apex of those as well, 1.5-3.5 µm diam. (Figs. 5, 6). *Conidiogenous cells* enteroblastic, typically monophialidic, rarely becoming polyphialidic, discrete, produced as offshoots of the conidiophore, ampulliform to lageniform, typically 0-, sometimes 1-septate, straight or curved, collarettes distinct and flared, smooth, very pale in pigmentation, infrequently with a single percurrent proliferation, not all phialides mature at any one time, mature



Figs. 1-11. *Paraceratocladium seychellarum* (from holotype). 1-4. Conidia. 5-6. Setae apex showing the phialides of the entwined conidiophore. 7-8 Setae showing branching pattern. 9-11. Phialides. Note the distinct collarettes. Bars: 1-6, 9-11 = 10 μ m, 7-8 = 40 μ m.

Table 1. Synopsis of *Paraceratocladium*.

Species	Setae size (μm)	Setae morphology	Conidial morphology	Conidial size (μm) and septation
<i>P. malaysianum</i>	350-500 \times 10-12	Simple	Acerose, apex acute, base obtuse	40-46 \times 1.5-2, 1-septate
<i>P. polysetosum</i>	Up to 450 \times 9-12	Branched	Cylindrical, slightly, constricted at the apex, base obtuse	14-17 \times \pm 2, 1-septate
<i>P. seychellarum</i>	85-385 \times 5-8.5	Branched	Ovoid, cylindrical or elliptical, both ends obtuse	3-5.2 \times 1.2-1.5, aseptate
<i>P. silvestre</i>	200-380 \times 6-8	Unbranched	Narrowly-fusoid, tapering to an acute apex, base obtuse	21-32 \times 1-2.5, 1-septate
<i>P. triseptatum</i>	240-380 \times 7-12	Unbranched	Narrowly-fusoid, tapering to a blunt apex, base obtuse	28-34 \times 1.5-2.5, 3-septate

phialides 13-32 μm long, 2-3.5 μm wide towards the base, immature phialides 4-12 μm long, 1-1.8 μm wide towards the base (Figs. 9-11). *Conidia* 3-5.2 \times 1.2-1.5 μm , produced in glistening masses at the apices of the phialides, ovoid, cylindrical, ellisoidal or narrowly ellipsoidal, hyaline, smooth, both ends rounded or with a small rounded papillae at one end, aseptate (Figs. 1-4).

Habitat: Known to inhabit decaying leaves of *Pandanus seychellarum*.

Distribution: Seychelles.

Specimen examined: SEYCHELLES, Mont Blanc, on decaying leaves of *Pandanus seychellarum*, 1 August 1996, K.D. Hyde [HKU(M) 12971].

Notes: The three currently accepted species of *Paraceratocladium* are distinguished primarily by setae and conidial morphology. *Paraceratocladium silvestre* has unbranched setae (200-380 μm long), and 1-septate, slightly curved conidia (21-32 \times 1-2.5 μm), which taper to an acute apex. In *P. polysetosum* the setae are up to 450 μm long and branched. The conidia are 14-17 \times 2 μm , cylindrical, 1-septate and with a rounded papilla at one end (Castañeda Ruiz, 1987). In *P. malaysianum* Goh and K.D. Hyde the conidiophores are unbranched and conidia 42-44 μm long and 3-septate (Goh and Hyde, 2000). In *P. triseptatum* the setae are unbranched (240-380 μm long), and the conidia are acicular, taper to a blunt apex and 3-septate (Dulymamode *et al.*, 1998). Based on the branching setae in *P. seychellarum* this species is morphologically similar to *P. polysetosum*, but differs in conidial morphology and dimensions.

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