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Platythecium seychellense, a new species in the family *Graphidaceae* (lichenized Ascomycota: *Ostropales*) from the Seychelles and a world key to the genus

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Abstract: The new corticolous lichen fungus *Platythecium seychellense* is described from the Seychelles. Morphological characters as well as distribution and resemblance to related species are discussed. The species is characterized by a crustose, grey-green, smooth thallus lacking lichen substances, elongate and slender apothecia having flat, red-brown discs and grey 3-septate ascospores. A world key to all currently known species in the genus is presented.

Key words: crustose, grey ascospores, lichen, Palaeotropics, taxonomy

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Introduction

The genus *Platythecium* was introduced by Staiger (2002) to accommodate species of *Graphidaceae* having a corticate thallus in various colours, a poorly developed lateral exciple but well-developed, flat lirellae, exposed discs and lacking distinct carbonization or with slight carbonization restricted to the base. Additional features characterizing the original nine species were colourless to brown submuriform, muriform or septate ascospores of small dimensions, not exceeding 20 µm in length.

Currently, *Platythecium* comprises 24 known species predominantly occurring on the bark of trees in tropical regions of Africa, America, Asia and Australia, with a large number of specimens also collected on tropical islands. Following the initial study of Staiger (2002), the number of newly described or recombined species has been increasing steadily in subsequent years. Two further species of the genus were treated by Nakanishi *et al*. (2003) and one was identified as incorrectly classified by Kalb *et al*. (2004). Three new species were later reported from India by Adawadkar & Makhija (2005) and one new representative of the genus by Makhija & Adawadkar (2005). Archer (2006, 2007, 2009*a*, *b*) contributed a comprehensive study on Australian *Graphidaceae* and added new palaeotropical species, including a key to the species on the Solomon Islands. Cáceres (2007) reported one new pantropical species from South America and Lendemer & Knudsen (2008) found an additional neotropical species from North America. The most recent species have been added by Cáceres *et al*. (2014) in a study from South America and one new species from Sri Lanka was published by Weerakoon *et al*. (2014). Further information regarding the distribution of *Platythecium* species was provided by Lücking *et al*. (2014).

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Material and Methods

Morphological and anatomical investigations were carried out using a Euromex Mic 1642 ZHT stereomicroscope and a Reichert Neovar compound microscope. The chemistry of the type specimens was observed by spot reactions with KOH, C, and Pd. All

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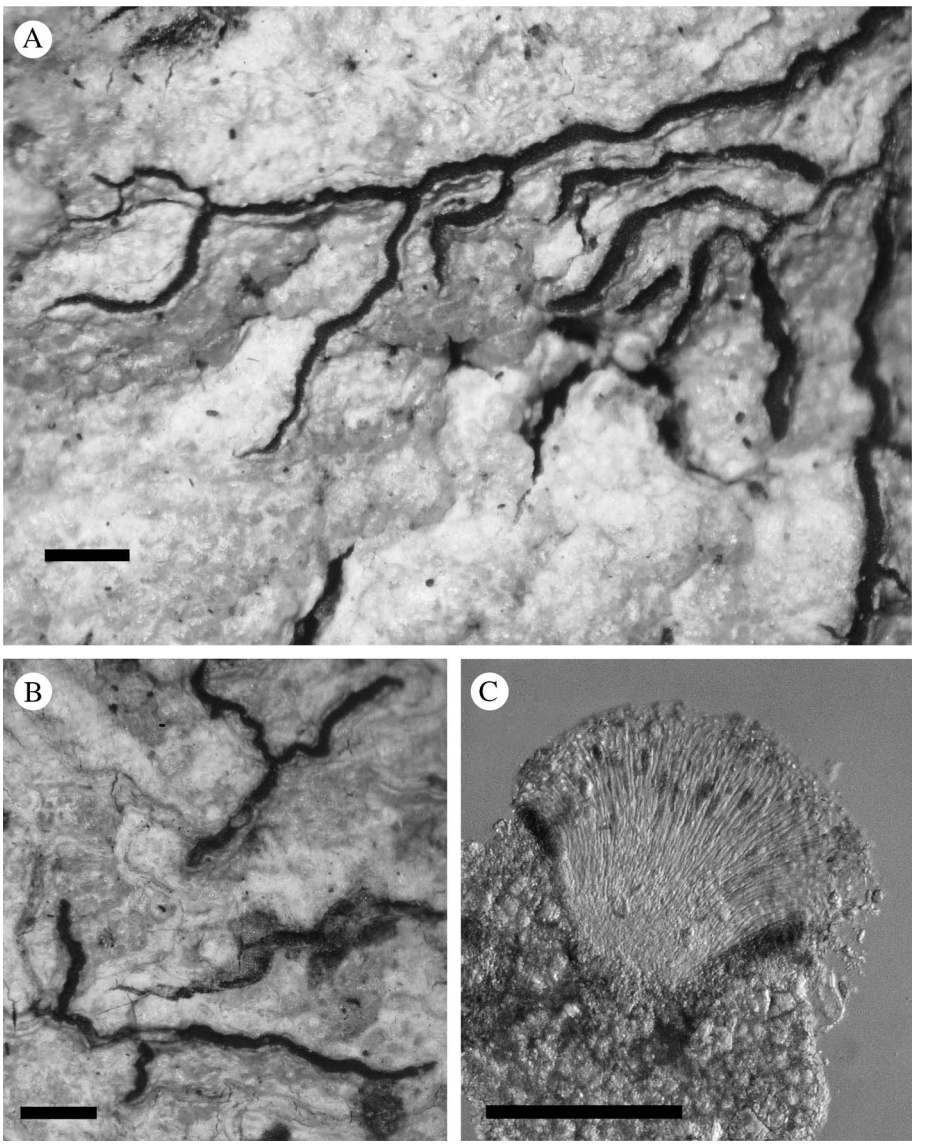

FIG. 1. *Platythecium seychellense* (*Stocker-Wörgötter* LI 787329—holotype). A, thallus with branched apothecia up to 10 mm long; B, lirellae up to 4 mm long; C, section through apothecium, 0·2 mm wide, showing paraphyses with brown caps and hymenium (80 µm high). Scales: A & B = 1 mm; C = 0·1 mm.

photographs for Figs 1 & 2 were taken using a Canon EOS 600D camera fitted with an LM-Scope camera adapter.

The specimens were collected in February 2015. The holotype has been deposited in LI and the isotypes in the private herbaria of the authors. One sample will be sent to Charles Morel, curator of the herbarium at the Seychelles Natural History Museum.

The New Species

Platythecium seychellense Neuwirth, Aptroot & Stocker-Wörgötter sp. nov.

MycoBank No.: MB 817223

Corticolous *Platythecium* with a smooth, shiny thallus, grey, 3-septate ascospores and paraphyses with brown caps. Ascospores 8 per ascus, 8–12 × 3–5 µm.

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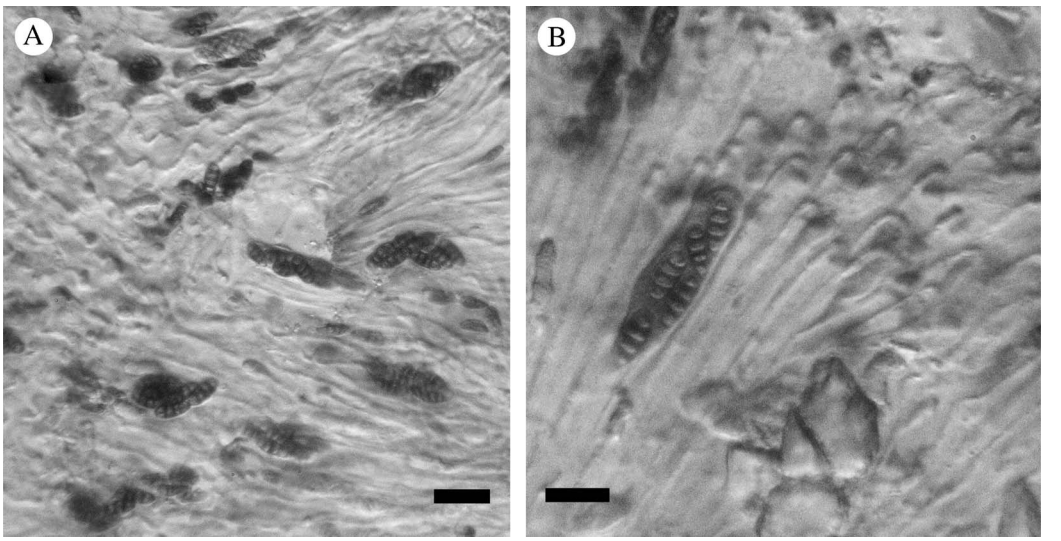

FIG. 2. *Platythecium seychellense* (holotype). A, asci (40–50 × 8–10 µm) with 8 ascospores; B, ascospores (8–12 × 4–5 µm), grey. Scales: A = 20 µm; B = 10 µm.

FIG. 3. Tropical rainforest at summit of Morne Blanc, Mahé, 675 m.

Type: Africa, Seychelles, Mahé, Morne Seychellois National Park, 4°39'00"S, 55°25'60"E, on bark of trees, 675 m, 6 February 2015, *E. Stocker-Wörgötter* (LI 787329—holotype; hb. Neuwirth 12327, hb. Stocker S 201, ABL—isotypes).

(Fig. 1)

Thallus crustose, corticate, grey-green, smooth, shiny.

Apothecia elongate, slender, partly branched, up to 10 mm long, 0·2–0·3 mm wide; *disc* flat, dark red-brown, margins entire (Fig. 1A & B); *exciple* not carbonized, sometimes with brown to orange hyphae. *Hymenium* hyaline, not inspersed, 75–80 µm high, KI−, I−; *epithecium* brown; *hypothecium* hyaline; *paraphyses* unbranched with brown caps (Fig. 1C); *asci* 40–50 × 8–10 µm.

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Ascospores 8 per ascus, grey, 3-septate, fusiform with rounded ends, I+ faintly blue, 8–12 × 3–5 µm (Fig. 2A & B).

Chemistry. No substances detected.

Etymology. The specific epithet refers to its only known locality on an island in the Seychelles.

Ecology and distribution. Mountain forest, on smooth bark of trees. The specimens were found close to the summit of Morne Blanc which is located within the Morne Seychellois National Park (Fig. 3). In the lower forest of Morne Blanc two typical higher plants of the Seychelles (*Pandanus seychellarum* and *P. hornei*) are present. *Platythecium seychellense* grows on smooth bark of trees higher up the mountain, which is covered by a nearly impenetrable misty rainforest of which *Roscheria melanochaetes* (endemic palm tree, *Arecaceae*) and *Northia seychellana* ('Capucin' tree, *Sapotaceae*) are important elements.

Notes. The species is close to *Platythecium albolabiatum* but that species differs by the longer (12–15 µm) ascospores and whitish thalline margin. *Platythecium leiogramma* differs in having distinctly smaller lirellae (1–3 × 0·1–0·2 mm), and larger (9–13 × 5–7 µm) hyaline or pale brown ascospores. *Platythecium grammitis* is also similar to the new species but has hyaline ascospores, paraphyses with slightly yellow or orange-brown caps and pale yellow or brown discs.

Platythecium seychellense is the only species belonging to the genus that has so far been found on the Seychelles.

World key to species of *Platythecium*

Ascospore colour, dimensions, septation, thalline chemistry and world distribution (in parentheses) are given.

1 Lirellae with distinct striate labia 2
Lirellae entire 3

2(1) Thallus containing norstictic acid, with cylindrical isidia that are visible as low warts when young; ascospores 3–5/1–2 locular, 9–16 × 5–8 µm; pantropical (India, Indonesia, the Philippines, Thailand, Papua New Guinea, Guinea and Brazil) . . . . . **Platythecium dimorphodes** (Nyl.) Staiger
Thallus containing salazinic acid; ascospores 4/1–2 locular, 12–20 × 7–9 µm; palaeotropical (India) . . . . . **Platythecium intortulum** (Stirt.) M. Nakan. & Kashiw.

3(1) Hymenium inspersed, ascospores 4–5/2 locular, 12–15 × 6–7 µm; exciple with basal carbonization; neotropical (Brazil) . . . . . **Platythecium inspersum** Staiger
Hymenium clear; other characters variable 4

4(3) Ascospores becoming grey, pale brown or brown; lichen substances absent 5
Ascospores remaining hyaline; lichen substances absent or present 8

5(4) Ascospores 3-septate 6
Ascospores at least partly submuriform 7

6(5) Ascospores 8–12 µm long; thalline margin absent; palaeotropical (Seychelles) . . . . . **Platythecium seychellense** Neuwirth, Aptroot & Stocker-Wörgötter
Ascospores 12–15 µm long; thalline margin conspicuous, white; palaeotropical (Solomon Islands, India) . . . . . **Platythecium albolabiatum** (Patw. & C. R. Kulk.) A. W. Archer

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7(5) Ascospores 13–17 µm long; pantropical (Colombia, India) . . . . . **Platythecium serpentinellum** (Nyl.) Staiger
Ascospores 12–14 µm long; pantropical (Solomon Islands, Brazil) . . . . . **Platythecium annonaceum** (Müll. Arg.) A. W. Archer

8(4) Ascospores transversely septate. 9
Ascospores submuriform to muriform or loculi irregularly arranged 17

9(8) Ascospores consistently 2-septate; neotropical (Brazil) . . . . . **Platythecium biseptatum** M. Cáceres *et al.*
Ascospores 3- or more septate 10

10(9) Lichen substances absent; ascospores 3-septate 11
Lichen substances present; ascospores 3–7-septate 13

11(10) Ascospores slender, >3 times as long as wide, 12–16 × 3–4 µm; palaeotropical (India) . . . . . **Platythecium parvicarpum** Makhija & Adaw.
Ascospores wider and generally shorter, <3 times as long as wide. 12

12(11) Apothecia generally short, <2 cm long; discs brown-black; pantropical (Brazil, Colombia, Cuba, Indonesia, Sri Lanka, Réunion) . . . . . **Platythecium leiogramma** (Nyl.) Staiger
Apothecia generally >2 cm long, much branched; disc pale yellow to pale brown; pantropical (South America, India, South-East Asia, Australia) . . . . . **Platythecium grammitis** (Fée) Staiger

13(10) Thallus containing testacein A and/or B 14
Thallus containing lichexanthone, hypostictic, constictic, norstictic, salazinic and/ or consalazinic acids 15

14(13) Lirellae with narrow discs, wavy; ascospores with tapering ends, 11–15 µm long; pantropical (Brazil, Papua New Guinea). . . . **Platythecium acutisporum** Staiger
Lirellae with wide discs, stellate; ascospores with rounded ends, 13–16 µm long; palaeotropical (San Cristobal Island) . . . . . **Platythecium cristobalense** (A. W. Archer) A. W. Archer

15(13) Ascospores 3–5 septate, 12–25 × 4–8 µm; lichexanthone (UV + yellow) and consalazinic acid (in trace amounts) present; palaeotropical (India) . . . . . **Platythecium commiscens** Adaw. & Makhija
Ascospores 5–7-septate; chemistry variable. 16

16(15) Thallus verrucose; consalazinic, hypostictic or norstictic acids; ascospores 12–25 × 3–4 µm; palaeotropical (India) . . . . . **Platythecium verrucoareolatum** Adaw. & Makhija
Thallus smooth; lichexanthone, norstictic and constictic acids present; ascospores 21–29 × 4–8 µm; palaeotropical (India) . . . . . **Platythecium occultum** Adaw. & Makhija

17(8) Thallus without lichen substances 18
Thallus containing norstictic, salazinic, protocetraric acids or testacein A or B 19

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18(17) Ascospores 15–18 × 7–9 µm; palaeotropical (Australia) . . . . . **Platythecium streimannii** A. W. Archer
Ascospores 9–13 × 4–7 µm; pantropical (Brazil, Colombia, Cuba, Indonesia, Sri Lanka, Réunion) . . . . . **Platythecium leiogramma** (Nyl.) Staiger

19(17) Thallus containing norstictic acid 20
Thallus containing salazinic or protocetraric acids or testacein A or B 23

20(19) Lirellae pseudostromatic; ascospores submuriform, 5/1–2-locular, 17−20 × 6−7 µm; palaeotropical (Sri Lanka). . . . . **Platythecium sripadakandense** Weerak. *et al.*
Lirellae not in pseudostromatic clusters; ascospores variable. 21

21(20) Ascospores submuriform, 15–20 × 7–9 µm; lirellae >2 cm long; neotropical (Florida). . . . . **Platythecium floridanum** (Tuck.) Lendemer
Ascospores muriform; lirellae shorter 22

22(21) Ascospores 5–7/1–3-locular, 17–28 × 10–14 µm, length:width ratio 1·8/1; pantropical (Caribbean, Thailand) . . . . . **Platythecium suberythrellum** (M. Wirth & Hale) Staiger & Kalb
Ascospores 5–6/2–3-locular, 18–23 × 6–8 µm, length:width ratio 2·9/1; palaeotropical (Australia) . . . . **Platythecium nothofagi** (A. W. Archer) A. W. Archer

23(19) Thallus containing salazinic or protocetraric acids 24
Thallus containing testacein A or B 25

24(23) Thallus containing protocetraric acid; ascospores 4(–6)/2-locular, 9–14(–16) µm long; palaeotropical (Australia, Thailand) . . . . . **Platythecium pertenellum** (Stirt.) A.W. Archer
Thallus containing salazinic acid; ascospores 4/1–2-locular; 9–(13)–16 × 5–7 µm . . . . . **Platythecium colliculosum** (Mont.) Staiger

25(23) Ascospores 4–5/1–2-locular, 9–15 × 5–8 µm; pantropical (Central and South America, Caribbean, Thailand) . . . . . **Platythecium allosporellum** (Nyl.) Staiger
Ascospores 2–4/1–2-locular, 7–10 × 7–9 µm; pantropical (Brazil and Papua New Guinea) . . . . . **Platythecium sphaerosporellum** (Nyl.) Staiger

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