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FULL PAPER

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Three new species of *Craspedodidymum* from palm in Thailand

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Abstract Three new species of *Craspedodidymum, C. siamense*, *C. licualae*, *and C. microsporum*, are described and illustrated based on specimens collected on decaying trunks and sheaths of the palm, *Licuala longecalycata*, in Sirindhorn Peat Swamp Forest, Narathiwat, Southern Thailand. They are compared with similar species, and a key to the genus is provided.

Key words Anamorphic fungi · Palm fungi · Peat swamp forest · Tropical fungi

Introduction

Sirindhorn Peat Swamp Forest, Thailand offers an unusual habitat for tropical palms with its acidic water and humid conditions. A study is in progress to document the fungal diversity of selected palms in this unique habitat (Pinruan et al. 2002). In this article, we describe three new species of *Craspedodidymum* Hol.-Jech. from decaying parts of the palm *Licuala longecalycata* Furt. The genus *Craspedodidymum* was erected by Holubová-Jechová (1972) for a dematiaceous anamorphic fungus producing long, macronematous conidiophores and apically swollen conidiogenous cells, with a large and distinct funnel-shaped terminal collarette. To date, eight species have been accepted in the genus. *Craspedodidymum* was reviewed by Yanna et al. (2000), and they provided a key and synoptic table to the genus.

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Materials and methods

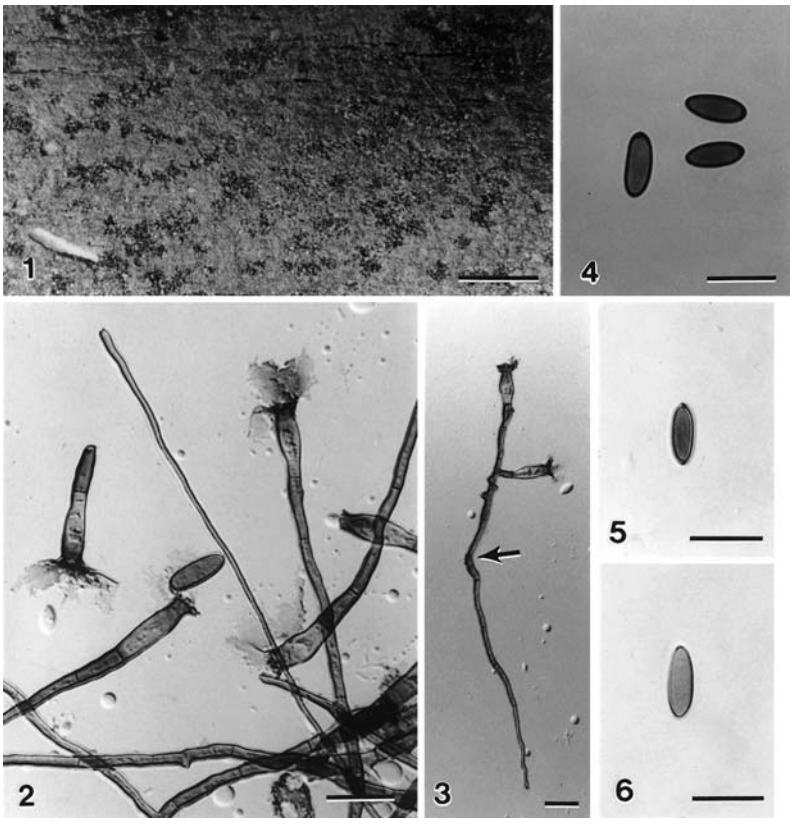
Decaying parts of *Licuala longecalycata* were collected from Sirindhorn Peat Swamp Forest, Narathiwat, Thailand, and returned to the laboratory in sterile plastic bags. Samples were incubated in plastic boxes with moistened tissue paper. The samples were examined over a period of 4 weeks, and the developing fungi were identified. Single spore isolations of all species were made on corn meal agar (CMA) with added antibiotic (penicillin G, 0.5 g/l; streptomycin sulfate, 0.5 g/l) to suppress bacterial growth. Microscopic measurements were taken from specimens mounted in water except for *C. licualae* sp. nov., which was mounted in lactophenol.

Species descriptions

Craspedodidymum siamense Pinruan, sp. nov. Figs. 1–6
Etymology: Siam, in reference to an earlier name for Thailand.

Coloniae in substrato naturali effusae, nigrae. Mycelium superficiale. Conidiophora macronematosa, mononematosa, erecta, brunnea, ad apicem pallida, recta vel leviter flexuosa, aliquando ramosa, laevia, 95–235 μm alta, ad basim 2.5–5 μm et ad apicem 6.2–8.7 μm lata. Cellulae conidiogenae integratae, terminales, 20–22.5 × 6.2–7.5 μm, enteroblasticae, monophialidicae, ampulliformes, collaretti distincto praeditae; collarettia infundibularia, ad apicem 12.5–15 μm diametro. Conidia 15–20 × 6.2–7.5 μm, ellipsoidea, mediocriter brunnea, aseptata.

Colonies on natural substrata effuse, black. Mycelium superficial. Conidiophores macronematous, mononematous, erect, brown, paler toward the apex, straight or slightly



Figs. 1–6. Light micrographs of *Craspedodidymum siamense* (from holotype). **1** Colonies on substratum. **2,3** Conidiophores with with a large and distinct funnel-shaped terminal collarette. Note percurrent proliferation (*arrow*). **4–6** Conidia. *Bars* **1** 100 μm; **2–6** 20 μm

flexuous, sometimes branched, smooth, 95–235 μm ($\bar{x}$ = 176 μm, n = 17), 2.5–5 μm wide at the base ($\bar{x}$ = 4.1 μm, n = 20), 6.2–8.7 μm wide at the apex ($\bar{x}$ = 7.5 μm, n = 20). Conidiogenous cells integrated, terminal, 20–22.5 × 6.2–7.5 μm ($\bar{x}$ = 22 × 7.5 μm, n = 20), enteroblastic, monophialidic, with a large and distinct collarette; collarette funnel shaped, 12.5–15 μm diameter at the opening ($\bar{x}$ = 13 μm, n = 20). Conidia 15–20 × 6.2–7.5 μm ($\bar{x}$ = 18 × 7 μm, n = 25), ellipsoid, thick walled, mid brown, 0-septate.

Holotype: On decaying sheath of *Licuala longecalycata*, Thailand, Narathiwat, Sirindhorn Peat Swamp Forest. May 2001, U. Pinruan (Wah 31), in BIOTEC Bangkok Herbarium (BBH).

Distribution and habitat: Thailand, saprobic on decaying sheaths of *Licuala longecalycata*.

Teleomorph: Unknown.

Note: *Craspedodidymum siamense* is unique in having ellipsoid conidia that are rounded at the base. The conidia of *C. siamense* are most similar to those of *C. proliferans* V. Rao & de Hoog and *C. elatum* Hol.-Jech. However, they lack the papillate base of *C. elatum*, and are narrower and paler in color (Yanna et al. 2000; Ellis 1976). *Craspedodidymum proliferans* has shorter conidia, which are ovoid or trapezoid in shape (Rao and de Hoog 1989).

Craspedodidymum licualae Pinruan, sp. nov. Figs. 7–14

Etymology: *licualae* in reference to the host, *Licuala*.

Coloniae in substrato naturali effusae, atrae. Mycelium superficiale. Conidiophora macronematosa, mononematosa, erecta, brunnea, ad apicem pallida, recta vel flexuosa, laevia, exasperatus ad apicem, usque ad 95 μm longa, ad basim 2.5 μm et ad apicem 5 μm lata. Cellulae conidiogenae integratae, terminales, 20–27.5 × 6.2–7.5 μm, enteroblasticae, monophialidicae, ampulliformes, collaretti distincto praeditae; collarettia infundibularia, ad apicem 10 μm diametro. Conidia 13.7–17.5 × 7.5–10 μm, cylindrica, obovoidea vel ellipsoidea, brunnea, basi papillata, aseptata.

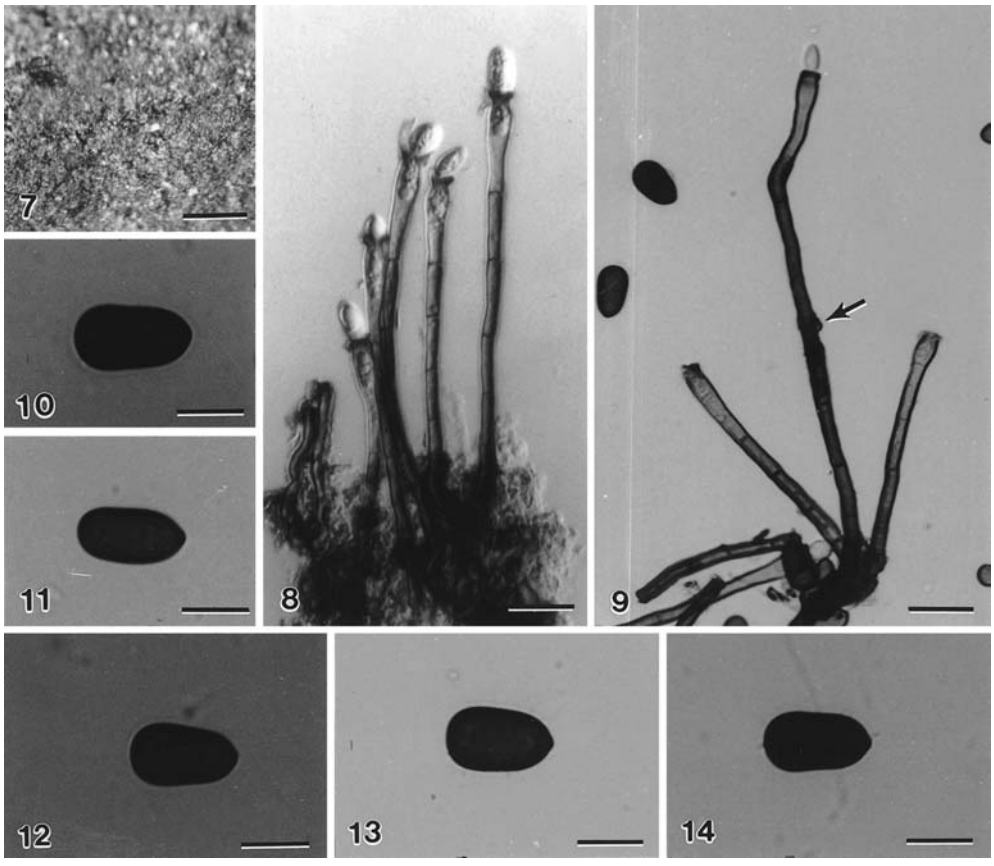
Colonies on natural substratum effuse, black. Mycelium superficial. Conidiophores macronematous, mononematous, erect, brown and paler toward the apex, straight or flexuous, smooth, but rough at the apex. Conidiogenous cells integrated, terminal, 20–27.5 × 6.2–7.5 μm ($\bar{x}$ = 24 × 6.5 μm, n = 20), enteroblastic, monophialidic, with a large and distinct collarette; collarette funnel shaped, 10 μm diameter at the opening. Conidia 13.7–17.5 × 7.5–10 μm ($\bar{x}$ = 15 × 9 μm, n = 20), cylindrical, obovoid or ellipsoid, broadly rounded at both ends, brown, papillate at the basal end, 0-septate.

Holotype: On decaying trunk of *Licuala longecalycata*, Thailand, Narathiwat, Sirindhorn Peat Swamp Forest. Sept. 2001, U. Pinruan (Wah 136), in BBH.

Distribution and habitat: Thailand, saprobic on decaying trunks of *Licuala longecalycata*.

Teleomorph: Unknown.

Note: *Craspedodidymum licualae* can be distinguished from the other three species of *Craspedodidymum*, which have conidia with a papillate base, by the size and shape of the conidia. The conidia of the following species are much



Figs. 7–14. Light micrographs of *Craspedodidymum licualae* (from holotype). **7** Colonies on substratum. **8,9** Conidiophores that are paler toward the apex. Note percurrent proliferation (*arrow*). **10–14** Conidia. *Bars* **7** 100 μm; **8,9** 20 μm; **10–14** 10 μm

smaller (5–6.2 × 3.5–4 μm), whereas the conidia of *C. abigianense* Lunghini & Onofri are spherical or obovoid, and those of *C. elatum* are broadly ellipsoid. In addition, *C. elatum* is the only *Craspedodidymum* species to have branched conidiophores (Yanna et al. 2000).

Craspedodidymum microsporum Pinruan, sp. nov.

Figs. 15–21

Etymology: In reference to the relatively small size of the conidia.

Coloniae in substrato naturali effusae, atrae. Mycelium superficiale. Conidiophora macronematosa, mononematosa, erecta, pallide, brunnea, ad apicem hyalina, recta vel leviter flexuosa, usque ad 85 μm longa, ad basim 2 μm et ad apicem 5 μm lata. Cellulae conidiogenae integratae, terminales, 16.2–21.2 × 3.7–5 μm, enteroblasticae, monophialidicae, ampulliformes, collaretti distincto praeditae; collarettia infundibularia, ad apicem 7.5 μm diametro. Conidia 5–6.2 × 3.5–4 μm, obovoidea, sphaerica vel late ellipsoidea, basi papillata, aseptata.

Colonies on natural substratum effuse, black. Mycelium superficial. Conidiophores macronematous, mononematous, erect, pale brown, hyaline toward the apex, straight or slightly flexuous, smooth, up to 85 μm long, 2 μm wide at the base, 5 μm wide at the apex. Conidiogenous cells integrated, terminal, 16.2–21.2 × 3.7–5 μm ($\bar{x}$ = 18 × 4.5 μm, n = 20), enteroblastic, monophialidic, with a large and distinct collarette; collarette funnel-shaped, 7.5 μm diameter at the opening. Conidia 5–6.2 × 3.5–4 μm ($\bar{x}$ = 5.8 × 3.5 μm, n = 25), obovoid, spherical or broadly ellipsoid, pale brown, papillate at the basal end, 0-septate.

Holotype: On decaying trunk of *Licuala longecalycata*, Thailand, Narathiwat, Sirindhorn Peat Swamp Forest. Sept. 2001, U. Pinruan (Wah 142), in BBH.

Distribution and habitat: Thailand, saprobic on decaying trunks of *Licuala longecalycata*.

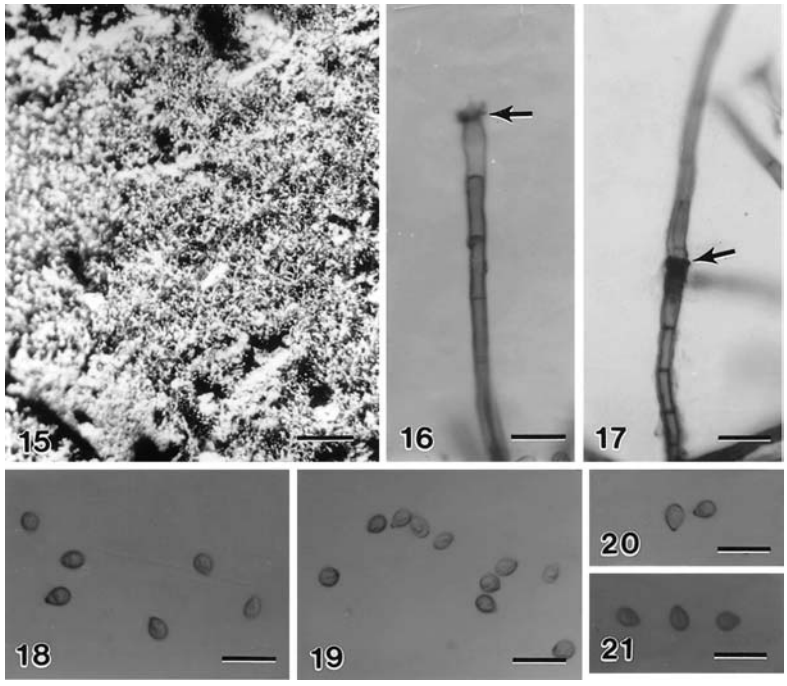
Teleomorh: Unknown.

Note: Four species of *Craspedodidymum* have conidia with a papillate base. The conidia of *C. microsporum* are distinct, being considerably smaller than those of the other three species (Yanna et al. 2000).

Currently, 11 *Craspedodidymum* species are recognized (8 and 3 described in this article), while *C. pulneyensis* Sub. & Bhat has been placed in synonymy with *C. proliferans* V. Rao & de Hoog (Bhat and Kendrick 1993).

Key to *Craspedodidymum* species (based on Yanna et al. 2000)

1. Conidia septate 2
   Conidia nonseptate 4
2. Conidia dark brown, 3–4-septate, versicolored, 24–30 × 13–19 μm . . . . . *C. nigroseptatum* . . . . . Yanna, Wai H. Ho, T.K. Goh, & K.D. Hyde
   Conidia 1-septate 3
3. Conidia hyaline, 8–12.5 × 4-6 μm . . . . . *C. hyalosporum* Bhat & W.B. Kendrick



Figs. 15–21. Light micrographs of *Craspedodidymum microsporum* (from holotype). **15** Colonies on substratum. **16,17** Conidiophores with a large and distinct funnel-shaped collarette (*arrow* in **16**). Note percurrent proliferation (*arrow* in **17**). **18–21** Conidia. *Bars* **15** 100 μm; **16–21** 10 μm

Conidia brown, 11–18 × (6–)7–9 μm ..... *C. keniense* (P.M. Kirk) Bhat & W.B. Kendrick

4. Conidia papillate at the base 5
   Conidia truncate or rounded at the base 8
5. Conidia 5–6.2 × 3.5–4 μm, pale brown ..... *C. microsporum* sp. nov.
   Conidia larger than 6.2 × 4 μm 6
6. Conidia broadly ellipsoid, 15–19 × 9–12 μm; conidiophores branched .....*C. elatum* Hol.-Jech.
   Conidia cylindrical, spherical, or obovoid; conidiophores unbranched 7
7. Conidia cylindrical or obovoid, 12.5–17.5 × 7.5–10 μm; conidiophores unbranched .....*C. licualae* sp. nov.
   Conidia spherical or obovoid, 13.5–14.5 × 14.5–16.5 μm .....*C. abigianense* Lunghini & Onofri
8. Conidia 18–24 μm diameter, globose, surrounded by a sheath of fibrillar appendages ..... *C. fimbriatum* Bhat & W.B. Kendrick
   Conidia of other shapes, lacking a sheath of fibrillar appendages 9
9. Conidia ellipsoid, 15–20 × 6.2–7.5 μm ..... *C. siamense* sp. nov.
   Conidia of other shapes, shorter 10
10. Conidia obovoid to pyriform, 11.5–15 × 10.5–13 μm ..... *C. cubense* J. Mena & Mercado
    Conidia obovoid or trapezoid, 10–14 × 8–11 μm ..... *C. proliferans* V. Rao & de Hoog

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