New species of *Phaeodactylium* and *Neosporidesmium* from China

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Phaeodactylium cephalotaxi sp. nov. and *Neosporidesmium micheliae* sp. nov., found on dead branches of *Cephalotaxus fortunei* and *Michelia maudiae*, respectively, from the tropical forests of China, are described and illustrated. The former species is characterized by narrowly ellipsoidal to clavate, 2-septate conidia and the latter is distinguished by the scattered synnemata and obclavate conidia with 7–8-euseptate.

Keywords: anamorphic fungi, Taxonomy.

The diversity of microfungi is very rich in tropical forests of southern China, and many wood-inhabiting fungi have been discovered (Dai *et al.* 2009, Dai & Li 2010). During our continuing survey of microfungi in tropical areas of China, we pay special attention to conidial fungi colonizing decaying plant material. Many interesting species have been found from samples collected in different localities of the country. Two conspicuous anamorphic fungi were collected. An unknown species of *Phaeodactylium* Agnihothr. and of *Neosporidesmium* Mercado & J. Mena respectively are described here as new to science.

Materials and methods

Samples of submerged plant material were placed in separate paper bags, transported to the laboratory, and then incubated in Petri dishes with 200 ml sterile water plus 2 ml glycerol at 27 °C in an RXZ-260A Artificial Climate Box. The plant material was examined at regular intervals for the presence of microfungi. All microscopic characteristics were determined on the basis of measurements of 50 mature co-

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nidia and 30 conidiophores. Micrographs were obtained with an Olympus BX51 microscope. The specimens were deposited at the Herbarium of the Department of Plant Pathology, Shandong Agricultural University (HSAUP) and the Mycological Herbarium, Institute of Microbiology, Chinese Academy of Sciences (HMAS).

Taxonomy

Phaeodactylium cephalotaxi Y.D. Zhang & X.G. Zhang, **sp. nov.** – Figs. 1 – 4.
MycoBank no.: MB 561141

Coloniae in substrato naturali, effusae, pilosae, brunneae. **Mycelium partim** superficiale et partim in substrato immersum, ex hyphis ramosis, septatis, pallide brunneis, laevibus, 1–2 µm crassis compositum. Conidiophora macronemata, mononematica, fasciculata erecta, multi-septata, 145–285 µm altis, 2.5–3.5 µm crassis ad basim, dichotome ramose, ramis leviter geniculatis, flexuosis, pallide brunneis ad apicem. Cellulae conidiogenae polyblasticae, sympodiales, terminales et intercalares, indeterminatae, cum denticulis cylindricis, manifestis vel interdum inconspicuis praeditae, 8.5–16 × 1.5–3.5 µm. **Conidia solitaria, anguste ellipsoidea** vel clavata, 2-septata, plerumque ad septa angustiora, acropleurogena, laevia, pallide brunneae vel brunneae, 15–20.5 × 6–7.5 **µm.**

Holotypus. – China, Fujian Province, Forest park of Wuyishan, collected from dead branches of *Cephalotaxus fortunei* Hook., 16 Aug. 2009, Y. D. Zhang, HSAUP H3115 (holotype), HMAS 146134 (isotype).

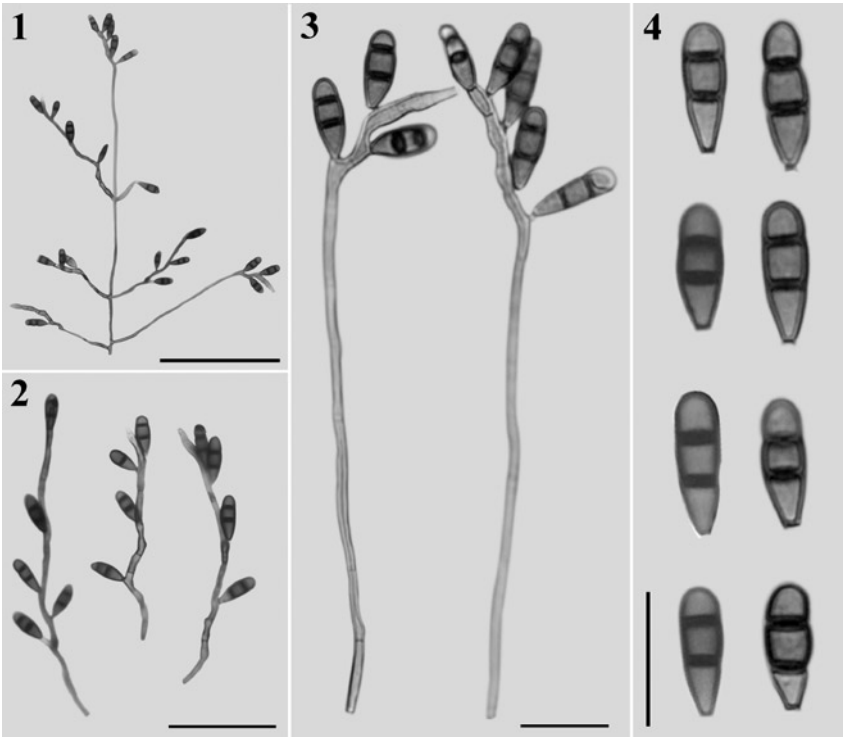
Colonies on natural substrate effuse, hairy, brown. – Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, pale brown, smooth-walled hyphae, 1–2 µm thick. – Conidiophores macronematous, mononematous, fasciculate, erect, dichotomously branched, multi-septate, pale brown towards the apex of flexuous, slightly geniculate branches, smooth, 145–285 µm tall, 2.5–3.5 µm wide at the base. – Conidiogenous cells holoblastic, multilocal, terminal and intercalary, sympodially proliferating, indeterminate, 8.5–16 × 1.5–3.5 µm, with conspicuous or sometimes inconspicuous cylindrical denticles. – Conidia solitary, narrowly ellipsoidal to clavate, 2-septate, usually narrower at the septa. acropleurogenous, smooth, pale brown to brown, 15–20.5 × 6–7.5 µm. Teleomorph: unknown.

Etymology. –The epithet refers to the type host *Cephalotaxus fortunei* Hook.

Habitat or Host plant. – on dead branches.

Distribution. – China.

Agnihothrudu (1968) erected *Phaeodactylium* with *P. venkatesamum* as type species. Ellis (1971) proposed that *P. venkatesamum* was synonymous with *Dactylium alpiniae* Sawada and made a new combination *P. alpiniae*. Matsushima (1980) added *P. curvularioides* into this genus. *Phaeodactylium acutisporum* Matsush. was designated as the type species of the genus *Phaeobotrys* (Calduch *et al*. 2002) based



Figs. 1–4. Phaeodactylium cephalotaxi (holotype) **1–3**. Conidiophores and conidia. 4. Conidia. Bars: 1 = 100 µm, 2 = 50 µm, 3–4 = 20 µm.

on conidiogenous cells with denticles forming distinct clusters. *Phaeodactylium* is characterized by macronematous, dichotomous or trichotomous conidiophores, polyblastic, sympodial, denticulate conidiogenous cells with simple conidia (Agnihothrudu 1968). *Phaeodactylium cephalotaxi* differs from earlier described species by having narrowly ellipsoidal to clavate, 2-septate conidia (Tab. 1.).

Tab. 1. Synopsis of Phaeodactylium spp.

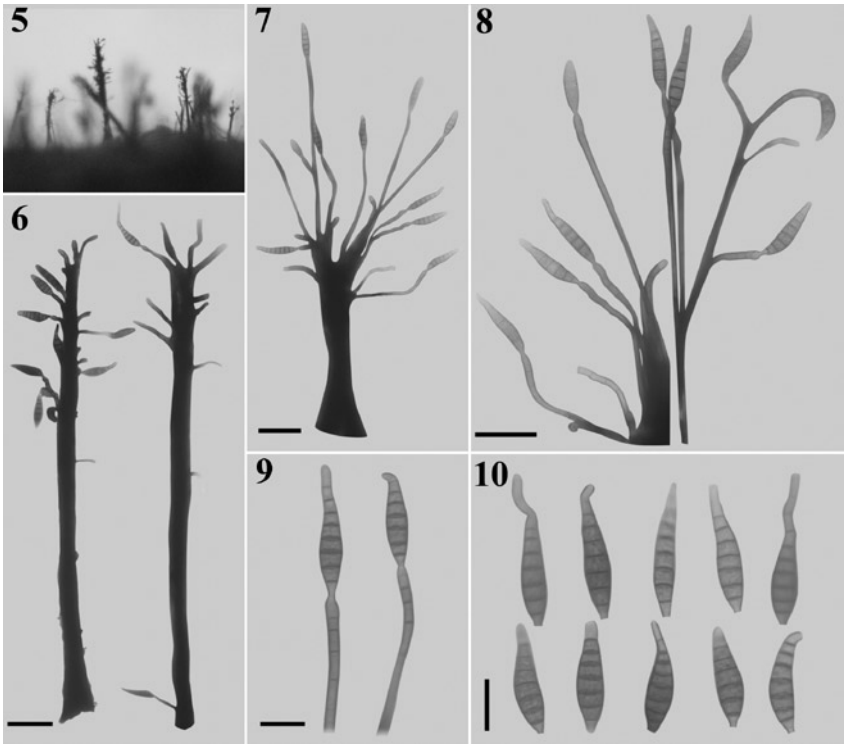
Species	*Conidiophores* [µm]	*Conidiogenous cells*	*Conidia* [µm]
P. alpiniae	Up to 350 × 3–5	polyblastic and sympodially with denticles	3-septate 16–25 × 6–9
P. biseptatum	350–440 × 6–7	holoblastic and sympodially with denticles	2-septate 10–14 × 2–3
P. cephalotaxi	145–285 ×2.5–3.5	holoblastic and sympodially with denticles	2-septate 15–20.5 × 5–10
P. curvularioides	Up to 400 × 3–4	holoblastic and sympodially with denticles	3-septate 13–22 × 5–10

Neosporidesmium micheliae Y.D. Zhang & X.G. Zhang, **sp. nov.** – Figs. 5–10.
MycoBank no.: MB 561142

Coloniae effusae, atrobrunneae, pilosae. Mycelium partim superficiale et partim immersum in substrato. Conidiomata synnematica, solitaria, erecta, atrobrunnea vel nigra, cylindrica, sporifera supra, usque 530 µm alta, 20–30 µm crassa ad basim, saepe inflata. conidiophora macronematosa, synnematosa, nonramosa, septata, laevia, brunnea vel atrobrunnea, usque 530 µm longa, 4.5–6.5 µm crassa, divergentia ad apicem et latera. Cellulae conidiogenae monoblasticae, integratae, terminales, laeves, cuniformes vel lageniformes, brunneae vel atrobrunneae, 7.5–11 × 3–5.5 µm. Conidiorum secessio schizolytica. **Conidia holoblastica, solitaria, sicca,** acrogena, obclavata, 7–8-euseptata, laevia, brunnea, cellula apicali pallide brunnea, 40–60 **µm longa, 8.5–11 µm crassa, apicem versus ad 2–3 µm attenuata, basi** truncata 3–4.5 **µm lata. Teleomorphosis ignota.**

Holotypus. – China, Hainan Province, Bawangling Nature Reserve, collected from dead branches of *Michelia maudiae* Dunn, 16 Dec. 2010, Y. D. Zhang, HSAUP H3352 (holotype), HMAS 146135 (isotype).

Colonies on dead wood effuse, dark brown, hairy. – Mycelium partly superficial, partly immersed in the substratum. – Conidiomata



Figs. 5–10. Neosporidesmium micheliae (holotype) **5.** Colonies on natural substratum. **6–7.** Synnemata with conidiophores and conidia. **8–9.** Conidiophores and conidia. 10. Conidia. Bars: 6–7 = 50 µm, 8 = 40 µm, 9–10 = 20 µm.

Tab. 2. Synopsis of Neosporidesmium spp.

Species	*Conidiomata* [µm]	*Conidiogenous cells*	*Conidia* [µm]
N. antidesmae	Synnematous Up to 950 × 30–50	doliiform to lageniform 0–1 prolifertation 11–15×3–4.5	11–15-distoseptate 48–75 × 7.5–9
N. maestrense	Synnematous Up to 2500 × 60–250	doliiform to lageniform 1–4 prolifertation 18-25×7-10*	8–12-distoseptate 55–100 × 15–19
N. malloti	Synnematous Up to 380 × 20–30	doliiform to lageniform without percurrent prolifertation 7.5–12×2.5–3.5	6–7-distoseptate 22.5–33.5 × 7–9
N. micheliae	Synnematous Scattered towards the apex Up to 530 × 20–30	cuniform to lageniform without percurrent prolifertation 7.5–11×3–5.5	7–8-euseptate 40–60 × 8.5–11
N. micro-sporum	Synnematous Scattered Up to 1200 × 20–40	doliiform to lageniform 1–5 percurrent prolifertation 4–5×2.5–4	6–7-distoseptate 45–67 × 6–7
N. sinensis	Synnematous Up to 1000 × 80–110	doliiform to lageniform without percurrent prolifertation 10–15×7–9	10–11-distoseptate 120–150 × 12–15
N. xantho-phylli	Synnematous Up to 1000 × 40–55	doliiform to lageniform without percurrent prolifertation 14–17×4–5.5	6–10-distoseptate 33.5–51.5 × 12–14

*According to Heredia-Abarca et al 1997.

synnematous, solitary, erect, dark brown to black, cylindrical, becoming scatter towards the apex, up to 530 µm high, 20–30 µm wide at the often swollen base. – Conidiophores macronematous, synnematous, unbranched, septate, smooth, brown to dark brown, up to 530 µm long, 4.5–6.5 µm wide, diverging laterally and terminally. – Conidiogenous cells monoblastic, integrated, terminal, smooth, cuniform to lageniform, brown to dark brown, 7.5–11 × 3–5.5 µm. Conidial secession schizolytic. – Conidia holoblastic, solitary, dry, acrogenous, obclavate, 7–8-euseptate, smooth-walled, brown, apical cell pale brown, 40–60 µm long, 8.5–11 µm thick in the widest part, tapering to 2–3 µm at the apex, 3–4.5 µm wide at the truncate base. Teleomorph unknown. No sporulating structures were observed in pure culture.

Etymology. –The epithet refers to the type host *Michelia maudiae* Dunn.

Habitat or Host plant. – on dead branches.

Distribution. – China.

Neosporidesmium was established by Mercado and Mena with *N. maestrense* as the type species (Mercado & Mena 1988). Subsequently, Wu and Zhuang (2005) described two species *N. sinensis* and *N. microsporum*. Ma *et al.* (2010) added three species *N. malloti*, *N. xanthophylli* and *N. antidesmae* into this genus. Thus, the genus until now has accommodated six species. It is characterized by synnematous conidiomata, macronematous, unbranched conidiophores, and monoblastic, lageniform, doliiform, determinate or percurrently proliferating conidiogenous cells with distoseptate conidia (Mercado & Mena 1988, Wu & Zhuang 2005, Ma *et al.* 2010). *Neosporidesmium micheliae* differs from earlier described species by having the scattered synnemata and obclavate, 7–8-euseptate conidia (Tab. 2.).

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