

A new species of *Falcocladium* (Hyphomycetes) with turbinate vesicles from Thailand

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The hyphomycete genus *Falcocladium* is reviewed. *Falcocladium turbinatum*, collected on dead leaves in a tropical forest in Thailand, is illustrated, described as a new species and compared with related taxa. The new fungus differs from the two previously described species of the genus by its turbinate vesicles.

Keywords: anamorphic fungi, new species, taxonomy, tropic.

Silveira and co-workers (in Crous *et al.* 1994) erected the new anamorph genus *Falcocladium* S.F. Silveira, Alfenas, Crous & M.J. Wingf., with *Falcocladium multivesiculatum* S.F. Silveira, Alfenas, Crous & M.J. Wingf., isolated from *Eucalyptus* leaf litter collected in Brazil, as the type species. The genus was characterized by “having thick-walled, non septate stipe extensions that terminate in thin-walled vesicles” and “appendaged, falcate conidia” (Crous *et al.* 1994). Other outstanding characters such as sporodochial or synnematosous conidiomata and stromata comprised of thick-walled, red-brown chlamydospores were also described. In *F. multivesiculatum* the vesicles are ellipsoidal and the conidia are 0–1 septate (Crous *et al.* 1994). Crous & Alfenas (in Crous *et al.* 1997) later described *Falcocladium sphaeropedunculatum* Crous & Alfenas from living leaves of a *Eucalyptus* hybrid in Brazil. The second species differed from the type species by its sphaeropedunculate vesicles and non-septate conidia. Thus, the known *Falcocladium* species are chiefly distinguished by the morphologies of their vesicles and conidia.

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During our continuing investigation on saprobic microfungi in Thailand (Somrithipol & Jones 2006), a fungus with vesiculate, synnematous conidiophores and falcate conidia, referable to the genus *Falcocladium*, was collected on dead leaves. This fungus differs in morphology from the other two presently known species and is described here as a new species.

Materials and Methods

Decaying plant material on the forest floor was collected and incubated in moist chambers and periodically examined for fungi. Examination and isolation methods follow those of Somrithipol & Jones (2003). Morphological measurements include minimum and maximum ranges. Conidial measurements are given as follows: (minimum) arithmetic mean (\bar{x}) \pm standard deviation (maximum), (n measured units). All material examined was dried and deposited in the BIOTEC Bangkok Herbarium (BBH), while cultures are deposited in the BIOTEC Culture Collection (BCC), Thailand.

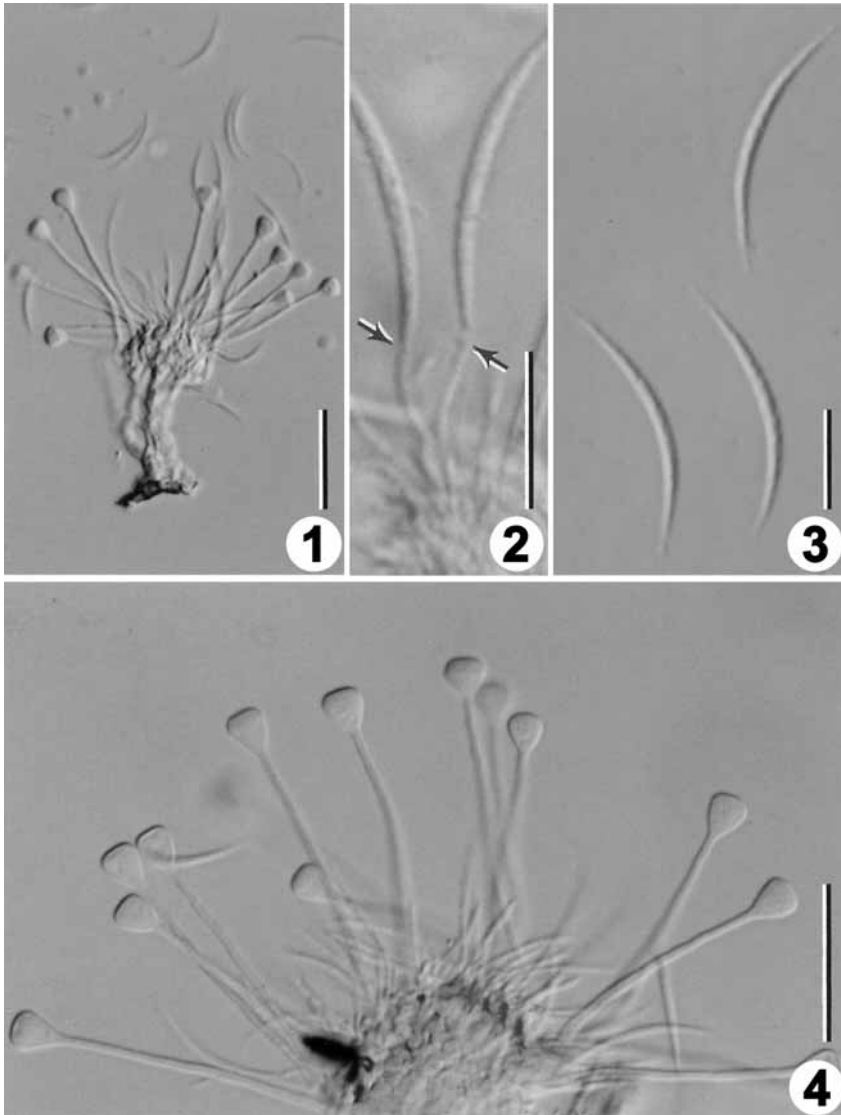
Taxonomy

Falcocladium turbinatum Somrithipol, Sudhom, Tippawan & E. B. G. Jones **sp. nov.** Figs. 1–6.

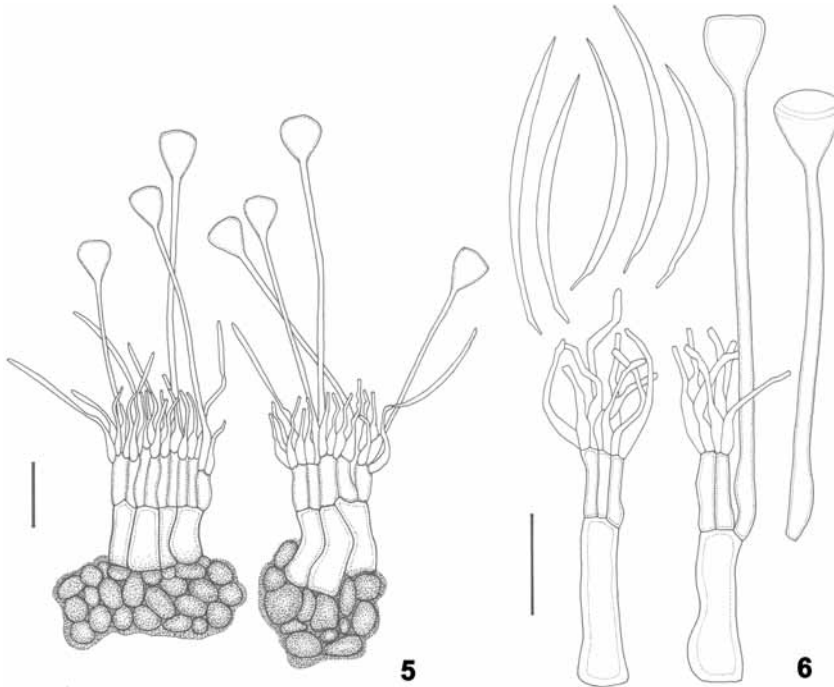
Conidiomata synnematosa 100 μm alta, ad basim 10–40 μm lata. Conidiophora ramosa, stipites 15–20 μm longi, 5–10 μm lati, metulae 7–10 μm longae 1–3 μm latae, 2–5 in quoque stipite. Setae cylindricae 30–50 μm longae 1–1.5 μm latae, vesciculae turbinatae 5–10 μm longae 5–7.5 μm latae terminanti. Cellulae conidiogena phialidicae, 10–15 (usque 50) μm longae, basi inflatae 1.5–2.5 μm latae, apici longo 0.5–1.5 μm lato angustato. Conidia unicellulae, falcata 17.5–30 μm longa, 0.5–1.5 μm lata. Teleomorphus ignota.

Holotypus. – Thailandia, Provincia Nakhon-Rashasima, in folio mortuo sylvis montane, S. Somrithipol lectus, 15 VI 2005 (SFC 1653 in BBH).

Colonies on dead leaves effuse, glistening. – Mycelium immersed. – Stromata with smooth- and thick-walled, red-brown chlamydospores. – Conidiomata synnematous, subhyaline to pale brown, solitary, up to 100 μm high, 10–40 μm wide at the base (Figs. 1, 5). – Conidiophores macronematous, synnematous, more or less penicillate branched. – Conidiophore stipes cylindrical, straight or flexuous, thick- and smooth-walled, hyaline to pale brown, 15–20 μm long, terminating in 2–5 metulae or setae (Fig. 6). – Matulae cylindrical, thick- and smooth-walled, hyaline, 7–10 μm long, 1–3 μm wide (Fig. 6). – Setae cylindrical, thick- and smooth-walled, hyaline, non-septate, 30–50 μm long, 1–1.5 μm wide, terminating in a turbinate vesicle, 5–10 μm long, 5–7.5 μm wide (Figs. 4, 6). – Con-



Figs. 1–4. Light micrographs of *Falcocladium turbinatum*: **1.** A synnema with prominent vesicles (Bar = 25 μm). **2.** Conidiogenous cells (arrowed) with attached conidia (Bar = 10 μm). **3.** Conidia (Bar = 10 μm). **4.** Compact conidiogenous cells intermingle with the setae that terminate in top-shaped vesicles (Bar = 20 μm).



Figs. 5–6. Line drawing of *Falcocladium turbinatum*: **5.** Synnemata on stromata of thick-walled chlamydospores (Bar = 10 μ m). **6.** Conidia and conidiophores comprising stipes, metulae, phialides, and setae terminating in top-shaped vesicles (Bar = 10 μ m).

idiogenous cells phialidic, 2–6 on each metula, hyaline, lageniform or subulate, often curved and undulate, 10–15 μ m (up to 50) long, 1.5–2.5 μ m wide at the swollen base, tapering to a long, 0.5–1.5 μ m wide apex (Figs. 2, 6). – Conidia unicellular, falcate, hyaline, smooth, thin-walled, (17.5) 23.8 ± 2.7 (30.0) ($n = 50$) μ m long, (0.5) 1.3 ± 0.2 (1.5) ($n = 50$) μ m wide, with an ankle-like shape at the base (Figs. 3, 6). – Teleomorph unknown.

Colonies on PDA at 20 °C reaching 1.5–2 cm diam. in 7 days, effuse with hyaline submerged mycelium, turning to reddish brown with age, no pigmentation of the agar. Sporulation was not found during 30 days of incubation.

Etymology – Referring to the vesicle shape.

Habitat – Dead leaves of evergreen tree in a tropical forest.

Distribution – Thailand.

Holotype – THAILAND, Nakhon Rashesima Province, on dead leaves in the montane forest, S. Somrithipol, 15 June 2005 (SFC 1653 in BBH).

Mycobank – MB 510389

Other material examined. – THAILAND, Nakhon Rasha-sima Province, on dead leaves, S. Somrithipol, 9 Sep 2005 (SFC 1676 in BBH); *ibidem* 11 Apr 2006 (SFC 2101 in BBH), culture BCC 22055 in BCC.

Key to species of *Falcocladium*

1. Conidia mostly non-septate, rarely 1-septate, $12\text{--}20 \times 1.5\text{--}2.0 \mu\text{m}$; vesicles ellipsoidal *F. multivesiculatum*
1. Conidia non-septate; vesicles not ellipsoidal 2
2. Vesicles sphaeropedunculate; conidia $12\text{--}20 \times 1.5\text{--}2.0 \mu\text{m}$
..... *F. sphaeropedunculatum*
2. Vesicles turbinate; conidia $17.5\text{--}30 \times 0.5\text{--}1.5 \mu\text{m}$
..... *F. turbinatum*

Discussion

Falcocladium species are mainly distinguished based on vesicle morphologies: they are ellipsoidal in *F. multivesiculatum*, sphaeropedunculate in *F. sphaeropedunculatum* and turbinate in the new species, *F. turbinatum*. Vesicle morphology of the new species was consistent in the three collections and this is regarded as a defining character for the species. The conidia of *F. turbinatum* ($17.5\text{--}30 \times 0.8\text{--}1.5 \mu\text{m}$) are also longer and narrower than those of *F. multivesiculatum* and *F. sphaeropedunculatum* ($12\text{--}20 \times 1.5\text{--}2.0 \mu\text{m}$) (Crous *et al.*, 1994, 1997).

Previous *Falcocladium* species were reported from *Eucalyptus* leaves in Brazil, while *F. turbinatum* extends the geographical distribution of the genus to Asia and a new plant substratum.

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