

Braunomyces dictyosporus gen. sp. nov. from Vietnam

Vadim A. Mel'nik¹ and Pedro W. Crous²

¹Laboratory of the Systematics and Geography of Fungi, Komarov Botanical Institute, Russian Academy of Sciences, Professor Popov Street 2, St. Petersburg, 197376, Russia; corresponding author e-mail: vadim.melnik@mail.ru

²CBS-KNAW Fungal Biodiversity Centre, Uppsalalaan 8, 3584 CT Utrecht, The Netherlands

Abstract: The generic name *Braunomyces* (ascomycetes, asexual morph), with *B. dictyosporus* as type species, is described, illustrated and discussed, based on material collected in Vietnam on leaf debris of an unidentified broadleaved tree. The new genus is well characterised and quite distinct from other synnematos and non-synnematos dematiaceous hyphomycete genera by its unique combination of traits, viz. determinate synnematos conidiomata, integrated, terminal and intercalary conidiogenous cells with one to several conidiogenous vesicles becoming cupulate with age, tetric conidiogenesis, and mostly cruciately septate, solitary dictyosporidia.

Key words:

Ascomycota
asexual morph
dematiaceous hyphomycetes
south-east Asia
synnemata

Article info: Submitted: 10 October 2013; Accepted: 9 January 2014; Published: 28 January 2014.

INTRODUCTION

Fungal diversity, especially that of tropical countries, is far from being well explored. Vietnam in south-east Asia is characteristic. Attempts to improve the knowledge on the diversity of Vietnamese fungi have been made within the scope of a Research Program of the Vietnam-Russian Tropical Research and Technological Centre. Numerous specimens of fungi were collected, including various hyphomycetes (asexual fungal morphs, mostly of ascomycetes). Results of examinations and identifications of these fungi were published in a series of papers (Alexandrova *et al.* 2013, Mel'nik 2011, 2012a, b, Mel'nik *et al.* 2012, 2013, Mel'nik & Braun 2013), including numerous new records and some new species. A synnematos hyphomycete on leaf debris of an unidentified broadleaved tree, superficially similar to species of the genus *Paathramaya* (Subramanian 1956, Bhat 1985, Seifert *et al.* 2011), proved to be a novel species that must be assigned to a new genus. The new genus is discussed and compared with morphologically similar synnematos and non-synnematos hyphomycete genera. Attempts to cultivate this fungus proved to be unsuccessful. Conidia failed to germinate, and all fungi cultivated from synnemata belonged to other genera, leading us to conclude that the fungus probably does not grow in culture, or was too old when cultivation was attempted.

MATERIAL AND METHODS

The freshly collected sample was dried at room temperature (22 °C), and later examined in distilled water and photographed using a Zeiss microscope, Stemi 2000CS, and Axio Imager A1 equipped with Nomarski differential interference contrast optics. The conclusion that it represented an unnamed genus

was accomplished through comparison of descriptions and illustrations in current relevant literature, including Seifert *et al.* (2011) and Seifert & Gams (2011). Type material is deposited at CBS, HAL, and LE.

TAXONOMY

***Braunomyces* Melnik & Crous, gen. nov.**
Mycobank MB807593

Etymology: In honour of the German mycologist Uwe Braun, on the occasion of his 60th birthday in 2013, recognising his outstanding contributions to mycology.

Diagnosis: *Synnemata* determinate, consisting of brown, apically splaying conidiophores. *Conidiogenous cells* terminal and intercalary, with a single or several aggregated swellings, subcircular to somewhat oblong in outline, later often collapsing, becoming cupulate, mono- to polytetric. *Conidia* solitary, dictyosporous, globose, subglobose, cruciately to obliquely septate, pale to medium dark olivaceous brown, verruculose to verrucose.

Type species: *Braunomyces dictyosporus* Melnik & Crous 2014.

Description: Hyphomycete (asexual morph of ascomycetes). *Conidiomata* synnematos, on leaf debris, saprobic, scattered, dark brown to blackish. *Synnemata* determinate, erect, straight, composed of tightly appressed filaments, forming a firm subcylindrical, dark brown stipe, widened and foot-like at the base, and a loose capitulum of apically divergent conidiophores. *Conidiophores* individually filiform, simple

© 2014 International Mycological Association

You are free to share - to copy, distribute and transmit the work, under the following conditions:

Attribution: You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).
Non-commercial: You may not use this work for commercial purposes.
No derivative works: You may not alter, transform, or build upon this work.

For any reuse or distribution, you must make clear to others the license terms of this work, which can be found at <http://creativecommons.org/licenses/by-nc-nd/3.0/legalcode>. Any of the above conditions can be waived if you get permission from the copyright holder. Nothing in this license impairs or restricts the author's moral rights.



Fig. 1. *Brauomyces dictyosporus* (HAL 2606). A–B. Synnemata. C. Synnema with rhizoid-like base. Bars = 100 µm.

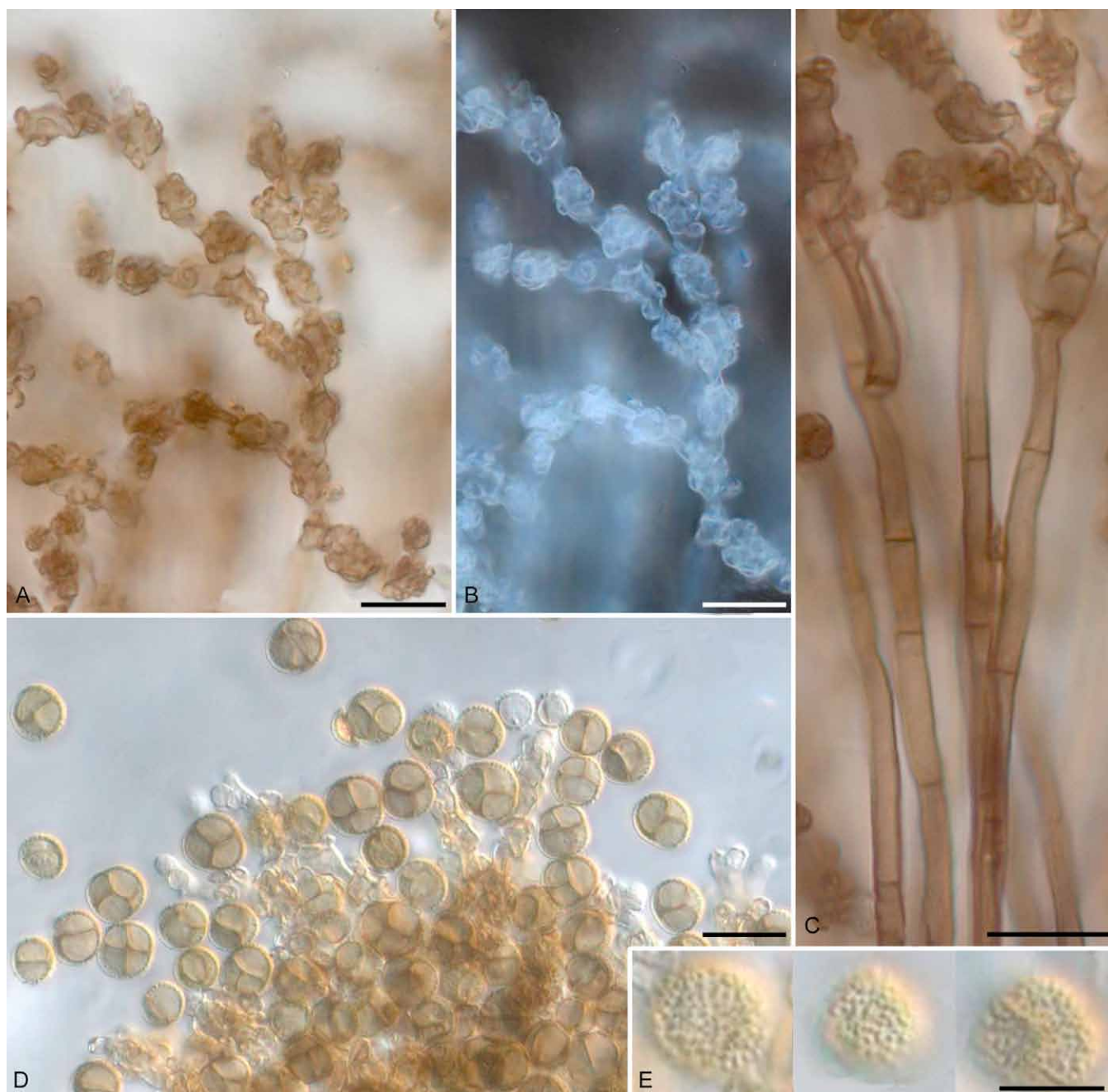


Fig. 2. *Braunomyces dictyosporus* (HAL 2606). **A–B.** Monochasial branching of conidiogenous cells (B in dark field). **C.** Threads of the synnema stipe with terminal conidiogenous cells. **D.** Conidia (focused on conidial septa). **E.** Conidia (focused on ornamentation). Bars: A–D = 10 μ m, E = 5 μ m.

or sparingly branched, pluriseptate, brown, wall thin to slightly thickened, smooth. *Conidiogenous cells* integrated, terminal and intercalary, irregularly shaped due to vesicular conidiogenous loci, pale to medium brown, thin-walled, smooth, with a single or several aggregated swellings, subcircular to somewhat oblong in outline, later often collapsing, becoming cupulate, with a minute pore surrounded by a slightly darkened-refractive halo or halo sometimes lacking, conidiogenesis tretic (mono- to mostly polytretic). *Conidia* solitary, dictyosporous, globose, subglobose to slightly angular in outline, cruciately to obliquely septate, occasionally slightly constricted at the septa, wall relatively thin, pale to medium dark olivaceous brown, verruculose to verrucose.

Notes: Although we have no sexual structures or accompanying DNA phylogenetic data, we conclude that *Braunomyces* is a genus of ascomycetes, chiefly based on its tretic conidiogenous cells, further suggesting it to be affiliated to *Dothideomycetes*.

***Braunomyces dictyosporus* Melnik & Crous, sp. nov.**
Mycobank MB807594
(Figs 1–3)

Etymology: Epithet derived from the dictyoseptate conidia.

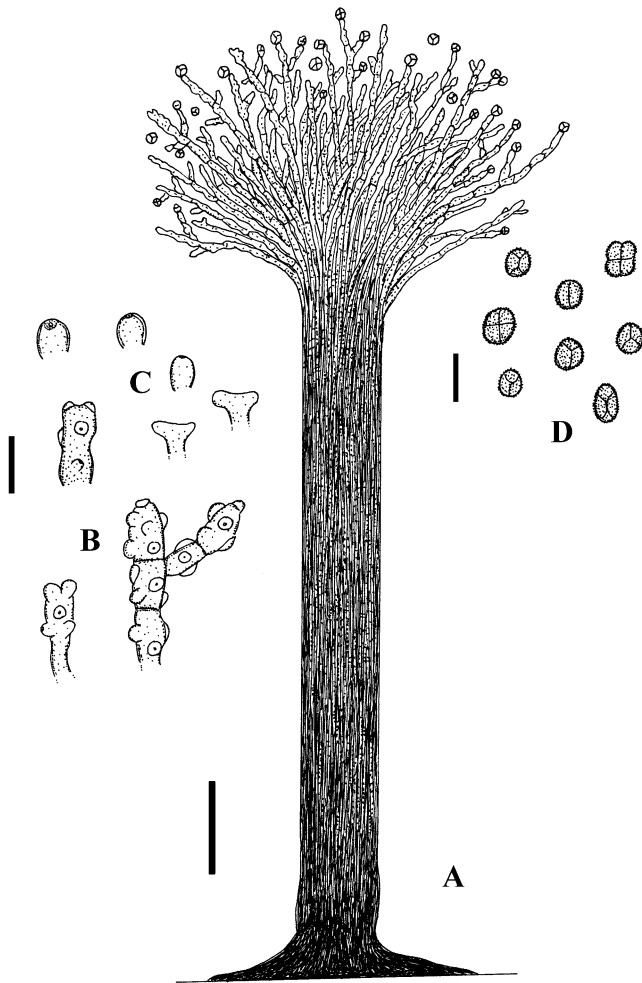


Fig. 3. *Braunomyces dictyosporus* (HAL 2606). **A.** Synnema. **B.** Conidiogenous cells. **C.** Conidiogenous vesicles. **D.** Conidia. Bars: A = 50 µm, B–D = 10 µm.

Diagnosis: *Synnemata* determinate, 400–650 µm long, consisting of brown, apically splaying conidiophores. *Conidiogenous cells* terminal and intercalary, 6–20 × 2–7 µm, with a single or several aggregated swellings, 1.5–3.5 µm diam, subcircular to somewhat oblong in outline, later often collapsing, becoming cupulate, mono- to polytretic, loci about 0.8–1.5 µm diam. *Conidia* solitary, dictyosporous, globose, subglobose, (4–)5–8(–9) µm diam, 2- to 4-celled, cruciately to obliquely septate, pale to medium dark olivaceous brown, verruculose to verrucose.

Type: Vietnam: *Dong Nai Prov.:* Cat Tien National Park, Nam Cat Tien Sector, polydominant monsoon tropical forest, on dry leaves of an unidentified broadleaved tree, 16 Nov. 2011, Yu. Novozhilov (HAL 2606 F – holotype; LE 263985, CBS H-21489 – isotypes).

Description: *Conidiomata* synnematos, scattered, dark brown to blackish. *Synnemata* determinate, erect, straight, 400–650 µm long, composed of tightly appressed filaments, forming a firm subcylindrical, dark brown stipe, 20–40(–50) µm wide, widened and foot-like at the very base, to

130 µm diam, with a loose capitulum of apically divergent conidiophores, free terminal portions of the filaments 80–300 µm long. *Conidiophores* individually filiform, simple or occasionally branched, 1.5–3 µm wide, pluriseptate, brown, wall thin to slightly thickened, smooth. *Conidiogenous cells* integrated, terminal and intercalary, about 6–20 × 2–7 µm, irregularly shaped due to vesicular conidiogenous loci, pale to medium brown, thin-walled, smooth, with a single or several aggregated swellings (“conidiogenous vesicles”), 1.5–3.5 µm diam, subcircular to somewhat oblong in outline, later often collapsing, becoming cupulate, loci about 0.8–1.5 µm diam, with minute pore surrounded by a slightly darkened refractive halo or halo sometimes lacking, conidiogenesis tretic (mono- to mostly polytretic). *Conidia* solitary, conidium initials globose, colourless or very pale, aseptate, in this stage rough wall ornamentation already evident, at first forming a single median septum, followed by one or mostly two additional oblique to perpendicular septa, pigmentation setting in with septation and gradually proceeding, mature conidia dictyosporous, globose, subglobose to slightly angular in outline, (4–)5–8(–9) µm diam, 2- to 4-celled, cruciately to obliquely septate, occasionally slightly constricted at the septa, wall relatively thin (up to 0.8 µm), pale to medium dark olivaceous-brown, verruculose to verrucose.

DISCUSSION

Using the key to synnematos hyphomycete genera by Seifert & Okada (in Seifert *et al.* 2011), all accepted genera with dictyoconidia proved to be distinct from, and not applicable to, this species. Among other synnematos hyphomycete genera, there is only one which is superficially similar, *Paathramaya*, established by Subramanian (1956) for a single Indian species, *P. sundara*, based on a collection on dead twigs. Later, Subramanian & Nair (1966) introduced another genus, *Panchanania*, which was reduced to synonymy with *Paathramaya* by Bhat (1985). The conidiomata of the latter genus are also synnematos, determinate, and the conidiogenous cells are equipped with similar conidiogenous vesicles that collapse with age and become cupulate, but the conidiogenesis is holoblastic and the conidia of all species assigned to this genus (*Paathramaya drewsii*, *P. indica*, *P. jaipurensis*, *P. sundara*, and *P. suttonii*) are globose, subglobose to broadly ellipsoidal, consistently aseptate (amerosporous), dark brown and thick-walled (Moore 1984, Bhat 1985, Dominik 1970, Seifert *et al.* 2011) – in contrast to the tretic, dictyosporous Vietnamese fungus. Because of the collapsing, cupulate conidiogenous cells and globose, aseptate, dark, thick-walled conidia, the non-synnematos hyphomycete genus *Lemkea* is morphologically similar to *Paathramaya*, but differs in that the conidiogenous cells are discrete, appearing vesicle-like (Morgan-Jones & Sinclair 1983). Similar subglobose dictyoconidia are formed in *Neopericonia* (Kamal *et al.* 1983), but that genus is readily distinguishable by its mononematos conidiophores, discrete terminal conidiogenous cells, mono- to polyblastic conidiogenesis, and conidia formed singly or in short basipetal chains. Globose conidiogenous cells that finally collapse and become cupulate are also known in the mononematos

hyphomycete genera *Bahuchashaka* and *Dwayabeeja*, but the conidiogenous cells in these genera are discrete, and the conidia are phragmosporous and moniloid (Seifert *et al.* 2011). *Dictyopolyschema* is a polyschema-like genus with monotretic conidiogenous cells forming dictyoconidia, but conidiophores are lacking, i.e. conidiogenous cells are formed on supporting hyphae directly (Ellis 1976, Seifert *et al.* 2011). In summary, although there are some hyphomycete genera with single or several traits similar to those of the Vietnamese fungus, none of them is sufficiently similar to justify classification of our species within them. Therefore, we introduce the new generic name *Braunomyces*, for this synnematosus hyphomycete.

ACKNOWLEDGEMENTS

Sincere thanks are due to Yuri Novozhilov, who made the field collection in Vietnam and provided the material for further taxonomic treatment, and Eugene Popov, who prepared the final photographic plates.

REFERENCES

- Alexandrova AV, Braun U, Mel'nik VA (2013) *Pyricularia contorta* sp. nov. – a new species from Vietnam. *Schlechtendalia* **25**: 73–76.
- Bhat DJ (1985) Notes on *Paathramaya* and *Panchanania*. *Transactions of the British Mycological Society* **85**: 101–106.
- Dominik T (1970) Further contribution to the knowledge of keratinolytic fungi of the region of Szczecin. Keratinolytic and keratinophilic fungi in the excrements of farm animals. *Ekologia Polska* **18**: 571–611.
- Ellis MB (1976) *More Dematiaceous Hyphomycetes*. Kew: Commonwealth Mycological Institute.
- Kamal, Rai AN, Morgan-Jones G (1983) Notes on hyphomycetes. XLV. *Neopericonia*, a new phaeodictyosporous genus from India. *Mycotaxon* **18**: 15–18.
- Mel'nik VA (2011) Anamorphic fungi of Vietnam. I. *Mikologiya i Fitopatologiya* **45**: 323–331. [In Russian].
- Mel'nik VA (2012a) A new species of *Ardhachandra* (hyphomycetes) from Vietnam. *Mycosphere* **3**: 922–924.
- Mel'nik VA (2012b) *Phaeoisariopsis vietnamensis* sp. nov. and *P. clematidis* (hyphomycetes) from Vietnam. *Mycosphere* **3**: 957–960.
- Mel'nik VA, Novozhilov YuK, Popov ES, Alexandrova AV (2012) Anamorphic fungi of Vietnam. II. *Mikologiya i Fitopatologiya* **46**: 347–356. [In Russian].
- Mel'nik VA, Braun U (2013) *Atractilina alinae* sp. nov. and *Neosporidesmium vietnamense* sp. nov. – two new synnematosus hyphomycetes from Vietnam. *Mycobiota* **3**: 1–9.
- Mel'nik VA, Braun U, Alexandrova AV (2013) *Dactylaria mucoglobifera* sp. nov. – a new species from Vietnam. *Schlechtendalia* **25**: 49–52.
- Moore RT (1984) Deuteromycetes III. The other species of *Antromyopsis*. *Transactions of the British Mycological Society* **82**: 377–380.
- Morgan-Jones G, Sinclair RC (1983) *Lemkea*, a new dematiaceous hyphomycete genus. *Mycologia* **75**: 159–161.
- Seifert KA, Gams W (2011) The Genera of Hyphomycetes - 2011 update. *Persoonia* **27**: 119–129.
- Seifert K, Morgan-Jones G, Gams W, Kendrick B (2011) *The Genera of Hyphomycetes*. [CBS Biodiversity Series no. 9] Utrecht: CBS-KNAW Fungal Biodiversity Centre.
- Subramanian CV (1956) Hyphomycetes. I. *Journal of the Indian Botanical Society* **35**: 53–91.
- Subramanian CV, Nair NG (1966) *Panchanania* and *Phragmospathula*, two new genera of the hyphomycetes. *Antonie van Leeuwenhoek* **32**: 381–386.