

Absidia montepascoalís



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Absidia montepascoalis L.W.S. Freitas, Hyang B. Lee, T.T.T. Nguyen, M.O. Cruz & A.L. Santiago, *sp. nov.*

Etymology. Refers to the Reserve Parque Nacional e Histórico do Monte Pascoal from where the species was isolated.

Classification — *Cunninghamellaceae*, *Mucorales*, *Mucoromycetes*.

Mycelium with hyaline to pale brown *rhizoids*, slightly branched, commonly finger-like or lobular, 25–240 × 2.5–7 µm. *Stolons* hyaline to pale brown, irregularly septate, with septa commonly observed near the origin of sporangiophores, smooth-walled, 5–10 µm diam. *Sporangiophores* pale brown, arising along the pale brown *stolons* or terminal, single or in whorls of 4–6(–7), simple or branched, with branches shorter or longer than the main sporangiophore, with slightly incrustated wall, (45–)120–325(–400) × 4–8 µm; some branches may re-branch up to five times with a septum below the sporangium. *Sporangia* pale brown, pyriform, smooth-walled, 25–40 × 21.5–35 µm, with a funnel-shaped (short or long) apophysis, 5–15 × 11–21.5 µm. *Columellae* hyaline to brownish grey, mostly subglobose, some hemispherical, and fig-shaped, smooth-walled, frequently with one projection, less commonly with two or rarely three projections on its surface, 9.5–25 × 10–30 µm diam, or without projections on the largest columellae; *collar* distinct or absent. *Projections* cylindrical, conical, some bulbous at distal end, and some may show a constriction on its apical portion, 2.5–5.5 × 1.5–5 µm. These projections may arise separated at the base or fork. *Sporangiospores* hyaline, short cylindrical, slightly constricted in the centre, smooth-walled, 3–5 × 1.5–3 µm. *Chlamydospores* present in aerial hyphae, globose, 5–10 µm diam, subglobose and ovoid, 7–15 × 6–15 µm. *Zygospores* not observed.

Culture characteristics & cardinal temperatures for growth — Colony initially white, becoming pale grey after 5 d at 25 °C on PDA; reverse cream, wave zonate. On MEA: at 10 °C no growth; at 15 °C 4 cm in 96 h and poor sporulation; at 20 °C 5.5 cm in 96 h with good sporulation; at 25 °C 7 cm in 96 h with excellent sporulation; at 30 °C 9 cm in 96 h with excellent sporulation; at 35 °C 4 cm in 96 h with good sporulation; at 40 °C no growth. On PDA: at 10 °C no growth; 15 °C 3.5 cm in 96 h with poor sporulation; at 20 °C 5.5 cm in 96 h with good sporulation; at 25 °C 7 cm in 96 h with excellent sporulation; at 30 °C 9 cm in 96 h with excellent sporulation; at 35 °C 4 cm in 96 h with good sporulation; at 40 °C no growth.

Typus. BRAZIL, Reserve Parque Nacional e Histórico do Monte Pascoal, Itamaraju, Bahia state, S16°53'00.6" W39°24'37.7", soil, 9 Aug. 2018, L. W.S. Freitas (holotype CNUFC HT19001, culture ex-type CNUFC B190023 = URM 8218, ITS and LSU sequences MW473494 and MW561560, MycoBank MB 838694).

Colour illustrations. Fragment of Atlantic Forest at the biological Reserve Parque Nacional e Histórico do Monte Pascoal, located in the State of Bahia, Brazil. Sporangiophore with sporangium; sporangiophore with columella and one (constricted) projection on its surface; sporangiophore with columella and two projections on its surface; sporangiophore with columella and one (fork) projection on its surface; sporangiophore with columella and one projection on its surface; branched sporangiophore with sporangium and columellae; sporangiospores. Scale bars = 25 µm.

Notes — The ITS and LSU phylogenetic trees showed that *A. montepascoalis* is a new species related to *A. bonitoensis*, but also close to *A. anomala*, *A. multispora* and *A. jindoensis*. The morphological characteristics differ among these species. *Absidia montepascoalis* presents rare swellings (on MEA at 25, 30 and 35 °C), and abortive sporangia are never formed. However, sporangiospores of *A. montepascoalis* are exclusively cylindrical. In contrast, *A. bonitoensis* produces sporangiophores commonly with one or more randomly distributed swellings, as well as some sporangiophores with abortive sporangia that bear a new sporangiophore. In addition, *A. bonitoensis* produces globose to subglobose and rarely cylindrical sporangiospores (Lima et al. 2020). *Absidia multispora* produces sporangiophores arranged singly or in whorls of two to four, with the formation of occasional abortive sporangia, and sporangiospores are of varied shapes such as globose, subglobose, ellipsoid, short cylindrical, ellipsoidal and irregular (Cordeiro et al. 2020), whereas *A. montepascoalis* produces sporangiophores in whorls of up to seven, and does not form abortive sporangia. Sporangiospores are typically cylindrical and slightly constricted at the centre. *Absidia anomala* can be differentiated from *A. montepascoalis* as the former produces sporangiophores singly and in whorls of two, and only one projection can be observed at the columellae. The colony is purple to violet and azygospores are produced (Hesseltine & Ellis 1964). *Absidia jindoensis* is morphologically different from *A. montepascoalis* as it has 2–6(–8) sporangiophores in a whorl, hemispherical columellae, sometimes subglobose, commonly with one projection on its surface, and sporangiophores cylindrical with rounded ends (Wanasinghe et al. 2018).

Supplementary material

FP1226 Maximum likelihood (ML) tree obtained from the ITS sequence of *A. montepascoalis* and sequences retrieved from GenBank. Bayesian inference (BI) and Maximum likelihood analyses were performed using MrBayes v. 3.2 (Ronquist et al. 2012) and PhyML v. 3.0 (Guindon & Gascuel 2003), respectively. Bayesian posterior probabilities (BYPP) ≥ 0.9 and bootstrap values for maximum likelihood (MLBS) ≥ 70 % are placed above the branches (MLBS/BYPP). Support values lower than 0.9 and 70 % are marked with ‘*’, and absent are marked with ‘-’. The bar indicates the expected number of substitutions per position. Ex-type, ex-isotype, and ex-neotype strains are marked with superscript ‘[†]’, ‘^{††}’ and ‘^{†††}’, respectively. *Cunninghamella phaeospora* CBS 692.68 and *C. vesiculosa* CBS 989.96 were used as outgroups.

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