



Fungal Planet 742 – 13 July 2018

Mucor souzae C.A. de Souza, D.X. Lima & A.L. Santiago, *sp. nov.*

Etymology. The specific epithet honours Dr José Ivanildo de Souza, for his many contributions to our knowledge of mucoralean fungi in Brazil.

Classification — *Mucoraceae*, *Mucorales*, *Mucoromycota*.

Mycelium presents dilated rhizoid-like hyphae with yellow contents as well as randomly distributed globose, subglobose and doliiform swellings, 12.5–22 µm diam. *Odour* acid, strong and unpleasant. *Sporangiophores* arising from aerial mycelia, simple or repeatedly sympodially branched, with long or short branches, erect, some slightly curved, smooth-walled, hyaline, (3–)5–11(–12.5) µm diam. Distance between sporangium and the next lateral branch is sometimes reduced, so that the sporangia appear to be sessile. One or two septa may be formed below the sporangia, mainly in those with short branches. *Sporangia* first yellow then becoming yellow to pale brown, globose, subglobose, 30–50 µm diam, subsmooth to very shortly echinulate; wall evanescent, some leaving small collars. *Columellae* hyaline to pale grey, smooth-walled, globose, subglobose, 15–35 µm diam or applanate, 12–25 × 15–25 µm, some with an evident collar. *Sporangiospores* variable in shape and size, hyaline, smooth-walled, mostly ellipsoid, (6–)7.5–20 × 4.5–7(–10) µm, some ellipsoid to fusoid, 2.5–7.5 × 1.5–2.5 µm, reniform, 6–15 × 3.5–7.5 µm, and some bizarre in shape, 7.5–22 × 5–10 µm. *Oidia* often observed. *Zygosporangia* not observed.

Culture characteristics and cardinal temperatures for growth — Colonies firstly white then turning yellow due to the presence of numerous cytoplasmic oil droplets, silken-like, low and exhibiting fast growth (9 cm diam and 0.5 cm in height) after 3 d on MEA at 25 °C. Reverse yellowish with irregular margins. On MEA: At 10 °C lack of growth and sporulation. At 12 °C limited growth, reaching 3.1 cm diam after 96 h; poor sporulation. At 15 °C slow growth, reaching 4.5 cm diam after 120 h; poor sporulation. At 20 °C good growth (7.5 cm diam in 96 h); excellent sporulation. Mostly sporangiophores with simple branches. At 25 °C better growth (9 cm diam in 72 h); excellent sporulation. At 30 °C good growth (7 cm diam in 72 h); good sporulation. At 35 °C limited growth (0.8 mm diam after 96 h); poor sporulation. At 40 °C growth and sporulation lacking. The growth of *M. souzae* on PDA was slightly slower than on MEA at all the temperatures tested.

Typus. BRAZIL, Triunfo municipality, Pernambuco state, S7°52'29.42" W38°06'12.07", isolated from soil samples, 6 Nov. 2015, C.A.F de Souza (holotype URM 91186, culture ex-type URM 7553, ITS and LSU sequences GenBank KY992878 and KY992879, MycoBank MB824580).

Colour illustrations. Fragment of an Upland Atlantic Forest within the semi-arid region in Triunfo municipality, Pernambuco state of Northeast Brazil; colony surface on MEA; simple sporangiophore with sporangium; simple sporangiophore with columellae; sympodially branched sporangiophores with columella; sporangiospores and oidia. Scale bars = 25 µm.

Notes — Based on phylogenetic relationships inferred from LSU and ITS nrDNA loci and morphophysiological analysis, *M. souzae* differs from the other accepted species of the genus. *Mucor souzae* produces sporangiophores arising from aerial mycelia, simple or repeatedly sympodially branched, with long or short branches and sporangiospores that are variable in shape and size. One or two septa may sometimes be formed below the sporangia. In the LSU tree (data not shown), *M. souzae* was nested in a subclade close to *M. hiemalis*, *M. merdicola* and *M. irregularis*. *Mucor hiemalis* is characterised as producing tall sporangiophores that are slightly sympodially branched as well as ellipsoidal columellae with a truncate base, differing from those observed in *M. souzae*, which presents simple or repeatedly sympodially branched sporangiophores, and globose, subglobose or applanate columellae. In contrast to *M. souzae*, *M. irregularis* produces ellipsoidal, cylindrical and pyriform columellae, and rhizoids, which are absent in *M. souzae*. The production of ellipsoid and ellipsoid to fusiform sporangiospores is very common in both *M. souzae* and *M. merdicola*. However, the former is distinguished from *M. merdicola* by the production of larger and bizarre shape of its sporangiospores, 7.5–22 × 5–10 µm, in contrast with those observed in *M. merdicola*, which are ellipsoid to fusiform, ellipsoid or subglobose. The ITS tree showed the new species formed a separate clade between *M. nidicola* and *M. irregularis*. At first, *M. souzae* may be morphologically confused with *M. nidicola* (Madden et al. 2012), as the colour and height of colonies of both can be similar. However, the branching pattern of the sporangiophores of *M. nidicola* reported by Madden et al. (2012), which are simple or 1–2 branched, does not correspond to that observed here. Additionally, *M. souzae* exhibits subsmooth to very shortly echinulate, globose or subglobose sporangia, 30–50 µm diam, whereas *M. nidicola* sporangia are globose, 30–70 µm diam, and smooth-walled to warty. Both ITS and LSU nrDNA sequences of *M. souzae* revealed a close genetic relationship to the *M. hiemalis* group, although it presents a sporangiophore branching pattern different from those described by Schipper (1973) for this group, in which species are characterised as producing tall and weakly sympodially branched sporangiophores. According to Madden et al. (2012), the morphological differences among species within the *M. hiemalis* group are not obvious, although differences between *M. irregularis* and *M. merdicola* were supported (Álvarez et al. 2011).

Legend and tree are in MycoBank.