

Muriphila oklahomaensis



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Muriphila Jurjević, Čmoková & Hubka, *gen. nov.*

Etymology. Refers to the wall (*L. murum*) of distillery from where the species was repeatedly isolated.

Classification — *Teratosphaeriaceae*, *Mycosphaerellales*, *Dothideomycetes*.

Colonies slowly growing, velvety, dark olivaceous to black, convex, radially wrinkled to crateriform, colony margins entire,

reverse dark. Hyphae septate, with smooth to verrucous walls, hyphal cells rectangular to asymmetrical, disintegrates into fragments at maturity. Sexual morph unknown.

Type species. *Muriphila oklahomaensis* Jurjević, Čmoková & Hubka. MycoBank MB834485.

Muriphila oklahomaensis Jurjević, Čmoková & Hubka, *sp. nov.*

Etymology. Name refers to the state in the USA where it was collected, Oklahoma.

Micromorphology (on MEA): *Hyphae* dark olivaceous, moderately thick, with smooth occasionally verrucous walls. *Hyphal cells* rectangular to sub-spherical, occasionally asymmetrical, 8–25(–45) × 4–11 µm diam, occasionally 1(–2) septa, at maturity hyphae falls apart into separate cells. *Sexual morph* unknown.

Culture characteristics — (in darkness, 25 °C after 21 d): Colonies on malt extract (Oxoid) agar (MEA) 13–15 mm diam, dark olivaceous to black, velvety, abruptly rising, 5–7 mm high, radially moderate deep to deep sulcate, crateriform; aerial mycelia absent; reverse black. Colonies on Czapek yeast autolysate agar (CYA) 6–8 mm diam, dark olivaceous black to black, smooth, abruptly rising approximately 3 mm high, radially moderate deep sulcate near wrinkled; reverse black. Colonies on potato dextrose agar (PDA) 13–14 mm diam, dark olivaceous black to black, velvety, approximately 3–4 mm high, radially moderate deep to deep sulcate; aerial mycelium absent; reverse black. Colonies on oatmeal agar (OA) 12–14 mm diam, black, smooth, abruptly rising approximately 3–4 mm, radially moderate deep to deep sulcate, crateriform; aerial mycelium absent; reverse black. Colony diam (in mm after 21 d) at 30 °C/32 °C: MEA 7–9/no growth (ng) to 4, CYA 5–6/ng, PDA 6–8/ng to 2, OA 8–10/ng to 2. No growth on MEA, CYA, PDA and OA at 35 °C.

Typus. USA, Oklahoma, McAlester, East side of building, outside wall, alcohol distillery, swab, 20 Jan. 2016, isol. Ž. Jurjević (holotype BPI 911212, culture ex-type CCF 5751 = CBS 146146 = EMSL 3307; ITS, LSU, SSU and β-tubulin sequences GenBank LR736040, LR736041, LR736042 and LR736049, MycoBank MB834486).

Additional materials examined. USA, Oklahoma, McAlester, East side of building, outside wall, alcohol distillery, swab, 20 Jan. 2016, Ž. Jurjević (culture CCF 5712 = CBS 142814 = EMSL 3308; ITS, LSU and SSU sequences GenBank LR736043, LR736044 and LR736045); South Carolina, outside wall, alcohol distillery, Oct. 2017, Ž. Jurjević (culture EMSL 4482; ITS sequence GenBank LR736046); *ibid.*, (culture EMSL 4484; ITS sequence GenBank LR736047); *ibid.*, (culture EMSL 4485; ITS sequence GenBank LR736048).

Colour illustrations. Barrels against outside wall, alcohol distillery. Twenty-one-day-old cultures at 25 °C of *Muriphila oklahomaensis*, from top to bottom on MEA, OA and PDA; hyphal structure on MEA. Scale bars = 10 µm.

Notes — BLAST analysis with the ITS sequences of *M. oklahomaensis* showed low similarity with members of different genera, including *Austroafricana parva* (91.5–92 %), *Pseudotaeniolina globosa* (91.7 %) and *Camarosporula persooniae* (91.1 %), other taxa had similarity lower than 91 %. The LSU nrDNA sequence showed 94–95 % similarity to a wide variety of genera in the *Teratosphaeriaceae* with *Devriesia shelburniensis* having the highest degree of similarity (94.9 %). The position of *Muriphila* within *Teratosphaeriaceae* is unresolved. Neither LSU nor SSU phylogenetic analyses comprising *Teratosphaeriaceae* genera (Quaedvlieg et al. 2014) were able to resolve its position with satisfactory support. In the resulting phylogenetic trees, the genus *Muriphila* was most commonly placed close to genera *Batcheloromyces* and *Devriesia* (data not shown).

Muriphila oklahomaensis resembles morphologically meristematic rock-inhabiting fungi that are relatively common in *Teratosphaeriaceae* (Egidi et al. 2014). Namely, *Pseudotaeniolina* and *Meristemomyces* are the most closely related genera with similar ecology and morphology. *Muriphila oklahomaensis* produces on average larger hyphal cells, 8–25(–45) µm × 4–11 µm diam, compared to *Pseudotaeniolina globosa*, 8–15 × 6–7 µm diam.

Additionally, *M. oklahomaensis* hyphal cells are rectangular to asymmetrical, compared to *Meristemomyces frigidus* hyphal cells which are pyriform or reniform. Another morphologically and ecologically similar genus of *Teratosphaeriaceae* is *Baudoinia* (Scott et al. 2016) that is, however, phylogenetically more distant (LSU similarity ~91–92 %, ITS similarity only ~84–85 %). The members of this genus frequently occur on outdoor surfaces near distilleries periodically exposed to ethanolic vapours, similarly to *M. oklahomaensis*. Interestingly, we were able to isolate *Baudoinia panamericana* strains (EMSL 4486 and EMSL 4487; identified by ITS rDNA) together with *M. oklahomaensis* from identical samples collected in South Carolina. The morphology of *Muriphila* and *Baudoinia* are very similar suggesting convergent evolution associated with adaptations to identical extreme environments. Reliable differentiation is possible only by means of molecular methods.

Supplementary material

FP1095 A best scoring maximum likelihood tree based on the LSU region shows the relationships of *Muriphila* to selected genera of *Teratosphaeriaceae*.

Željko Jurjević, EMSL Analytical, Inc., 200 Route 130 North, Cinnaminson, NJ 08077 USA; e-mail: zjurjevic@emsl.com
 Vit Hubka, Department of Botany, Faculty of Science, Charles University, Benátská 2, 128 01 Prague 2, Czech Republic and
 Laboratory of Fungal Genetics and Metabolism, Institute of Microbiology of the CAS, v.v.i, Vídeňská 1083, 142 20 Prague 4,
 Czech Republic; e-mail: hubka@biomed.cas.cz
 Adéla Čmoková, Department of Botany, Faculty of Science, Charles University, Benátská 2, 128 01 Prague 2, Czech Republic;
 e-mail: cmokova@gmail.com