Lindgomyces madisonensis
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Etymology. Name refers to ‘Madison’ town in North Carolina where the type species was collected.

Classification — Lindgomycetaceae, Pleosporales, Dothideomycetes.

Ascomata on wood 248–276 × 295–326 µm, black, superficial to partially immersed, scattered, globose to subglobose, ostiolate, short papillate; papilla 37 × 47 µm. Peridium c. 25–35 µm wide, composed of dark irregularly shaped cells. Pseudoparaphyses cellular, abundant, c. 2 µm wide, covered with gelatinous material, septate, anastomosing above the asci. Asci 100–157 × 14–16 µm (mean and SD = 125 ± 16 × 15 ± 1 µm, n = 20), clavate to cylindrical, narrow at the apex, fissitunicate, tapering to a short stipe at the base, with eight overlapping biserial ascospores at ascus apex becoming uniseriate at ascus base. Ascospores 36–43 × 6–9 µm (mean and SD = 39 ± 2 × 7 ± 1 µm, n = 45), fusiform, straight or slightly curved, tapering at the apices, 1-septate, constricted at the septum; primary septum supra-median to mostly median (0.43–0.5; average 0.5, n = 40), hyaline when young; ascospores become 3-septate and brown with age, multiguttulate, equipped with short bipolar appendages, c. 2 µm long; appendages ephemeral in water and not clearly visible in glycerin and lactic acid.

Culture characteristics — Colonies on PDA (Difco, Detroit, MI, USA) growing slowly (~25–30 mm diam in 4 wk), irregular, filamentous, raised, cottony, filiform margin, opaque, grey at the centre and black towards the periphery, occasionally colourless guttutes/exudates forming on the surface of the colony.

Typus. A specimen derived from a culture isolated from submerged decorated wood and grown on alfalfa (Medicago sp.) stems. USA, North Carolina, Rockingham County, Big Beaver Island Creek, Madison, N36°27'40.0" W80°01'46.0", water 10 °C, pH 5, 26 Apr. 2013, Huzefa A. Raja & Nicholas H. Oberlies, G416a (holotype ILS 73408, ex-type culture DSM 100629 = CBS 140367, single ascospore isolate from holotype; SSU sequences GenBank KT207822, KT207823, ITS sequences GenBank KT207818, KT207819, LSU sequences GenBank KT207820, KT207821, alignment in TreeBASE S17851, MycoBank MB812940).

Notes — Morphological features of this species, such as globose to subglobose, scattered, ostiolate and papillate ascomata; numerous cellular pseudoparaphyses; 8-spored, bitunicate, fissitunicate, cylindrical asci with short, fuscate pedicel; narrowly fusiform, hyaline, 1-septate ascospores bearing bipolar mucilaginous appendages, becoming brown and 3-septate with age, agree with the generic concept of the recently circumscribed genus Lindgomyces (Hirayama et al. 2010). Lindgomyces currently includes eight species, L. ingoldianus (type species), L. angustiascus, L. apiculatus, L. bre-viappendiculatus, L. cinctosporus, L. griseosporus, L. lemoni-wereinsis and L. rotundatus (Hirayama et al. 2010, Raja et al. 2011, 2013, Zhang et al. 2014). All species of Lindgomyces described thus far have been reported from submerged wood in freshwater habitats. Lindgomyces madisonensis is morphologically most similar to L. apiculatus in having biapiculate gelatinous appendages. The former, however, differs from the latter in having narrow asci (100–157 × 14–16 µm in L. madisonensis vs 85–125 × 17–25 µm in L. apiculatus) and ascospores (36–43 × 6–9 µm in L. madisonensis vs 33–43 × 8–11 µm in L. apiculatus). In addition, molecular phylogenetic analyses of combined SSU and LSU as well as ITS clearly separate the two species. Other species in the genus that have biapiculate appendages include: L. biappendiculatus and L. angustiascus. Lindgomyces madisonensis differs from these taxa in both morphology and size of ascii and ascospores. Molecular phylogenetic analysis also clearly distinguishes the aforementioned biapiculate spp. Raja et al. (2011) provided a key to six species of Lindgomyces described previously.

Colour illustrations. Background photo of a stream in Piedmont region of North Carolina. Arrows on apical apices of ascospores show biapiculate appendages; arrow on ascus tip showing gelatinous material. Photos: Huzefa A. Raja. Scale bars: ascma = 200 µm, all others = 20 µm.

Phylogram of the most likely tree (-lnL = 4216.43) from a RAxML analysis of 20 taxa based on ITS nrDNA sequence data (1 071 bp). Numbers refer to RAxML bootstrap support values ≥ 70 % based on 1 000 replicates. Strain G416 is identified as having phylogenetic affinities to members of the freshwater ascomycete genus Lindgomyces. Scale bar indicates number of nucleotide substitutions per site. A 30-d-old colony of G416a on PDA media is shown.