Submersisphaeria bambusicola sp. nov. from bamboo in Hong Kong

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A new Submersisphaeria species found from collections of fungi on bamboo in Hong Kong is described. This fungus has affinities with Submersisphaeria aquatica, but differs in having long-pedicellate asci and unicellular ascospores. This new taxon is compared with S. aquatica, Annulatascus velatisporus and Ascotaiwania lignicola.

Key words: Annulatasceae, taxonomy.

Introduction

During a study of the fungal diversity on bamboo in Hong Kong, a new Submersisphaeria species on dead culms of Arundinaria hindsii, from Mt. Lung Fu Shan Country Park, Hong Kong was collected and identified. Hyde (1996) established a monotypic genus, Submersisphaeria, which is typified by S. aquatica K.D. Hyde. Characteristics salient to Submersisphaeria include immersed or erumpent ascomata, short pedicellate asci with a massive, refractive apical ring, and brown, bicellular ascospores with granular contents and a single central septum which is slightly constricted (Hyde, 1996). In the specimens from Mt. Lung Fu Shan, apart from the long pedicellate asci and unicellular ascospores, all other characters are consistent with those in Submersisphaeria. It is, therefore, necessary to extend the generic concept of Submersisphaeria, and a new species, S. bambusicola is introduced to accommodate the specimen.

Materials and methods

Dead culm samples of Arundinaria hindsii were collected from Lung Fu Shan Country Park, Hong Kong Island, and returned to the laboratory where they were incubated in polythene bags lined with moistened tissue. Material was examined for bambusicolous fungi after 3 days and 1 week. Single-spore isolation was attempted, but the ascospores failed to germinate on PDA at
room temperate. All microscopic measurements were taken from specimen mounted in water.

Taxonomy

**Submersisphaeria bambusicola** D.Q. Zhou and K.D. Hyde, sp. nov. (Figs. 1-15)

*Etymology:* From bamboo and the Latin *cola* meaning living on bamboo.


*Ascomata* deeply immersed in the host tissue, visible as a blackened cirrus of ascospores, 420-580 μm diam. (\(x = 506\) μm, \(n = 15\)), 350-540 μm high (\(x = 424\) μm, \(n = 15\)), globose or subglobose, solitary, with a central periphysate ostiolar canal up to 60 μm diam., 210 μm high (Figs. 1, 2). *Peridium* 50-60 μm thick, comprising a brown outer layer and a hyaline inner layer (Fig. 4). *Paraphyses* 4-8 μm diam. (\(x = 6\) μm, \(n = 15\)), hypha-like, filamentous, septate, tapering, numerous (Fig. 3). *Asci* 235-290 × 10-12 μm (\(x = 258 \times 11.6\) μm, \(n = 50\)), 8-spored, cylindrical, thin-walled, with a long tapering pedicel, and a relatively massive, elongate, refractive, non-amyloid apical ring, 5 μm diam., 4 μm high (\(n = 10\)) (Figs. 5-8). *Ascospores* (26-)28-36 × 6-8(-10) μm (\(x = 31 \times 7.5\) μm, \(n = 50\)), uniseriate or partly overlapping uniseriate, unicellular, mostly inequilaterally ellipsoidal-fusiform, containing one lipid globule, smooth, dark brown, with hyaline germ pores at each end, and sometimes with thin, drawn-out sheath at each end (Figs. 9-15).

*Anamorph:* Unknown, as single-spore isolation failed to germinate in culture.

*Material examined:* HONG KONG, Hong Kong Island, Lung Fu Shan, on a dead culm of *Arundinaria hindsii*, 19 July 1998, Dequn Zhou [HKU(M) 9045, HOLOTYPE]; ibid. [HKU(M) 9353].

Discussion

Wong et al. (1998) introduced the *Annulatascaeae* to accommodate *Annulatascus* and *Annulatascus*-like species, as the apical ring in these species are similar and bipartite. In *Annulatascus*, ascomata are immersed to superficial and black, and paraphyses are septate and wide. Asci are cylindrical with a relatively massive refractive apical ring (Hyde, 1992). These fungi are mostly found in freshwater habitats, although terrestrial species have been collected on bamboo and palms in the tropics (Wong et al., 1998). *Annulatascus*, *Aquaticola*, *Cataractispora*, *Clohiesia*, *Diluviocola*, *Fluminicola*, *Frondicola*, *Fuscus*, *Hyphesoma*. 

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<table>
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<tr>
<th></th>
<th>Submersisphaeria bambusicola</th>
<th>Submersisphaeria aquatica</th>
<th>Annulatascus velatisporus</th>
<th>Ascoaiaiwania lignicola</th>
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<tbody>
<tr>
<td><strong>Ascomata</strong></td>
<td>420-580 μm diam., 350-540 μm high, globose or subglobose, immersed or erumpent, solitary</td>
<td>180-250 μm diam., globose or subglobose, immersed or semi-immersed, solitary or partly to fully gregarious</td>
<td>260-410 μm diam., 450 μm high, globose or subglobose, immersed or semi-immersed, solitary or mostly gregarious</td>
<td>300-600 μm diam., 190-350 μm, globose, partly to fully immersed, solitary to aggregated</td>
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<tr>
<td><strong>Paraphyses</strong></td>
<td>4-8 μm diam., hypha-like</td>
<td>3-4 μm diam., hypha-like</td>
<td>1 μm diam., filiform, deliquescent early</td>
<td>1 μm diam., filiform, deliquescent early</td>
</tr>
<tr>
<td><strong>Asci</strong></td>
<td>235-290 × 10-12 μm, cylindrical, long pedicellate, tapering</td>
<td>175-210 × 10-12.5 μm, cylindrical, short pedicellate</td>
<td>220-290 × 12-18 μm, cylindrical, peduncle tapering</td>
<td>234-290 × 13-19 μm, cylindrical, short pedicellate</td>
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<tr>
<td><strong>Apical ring</strong></td>
<td>5 μm diam., 4 μm high, massive, elongate, refractive, non-amyloid</td>
<td>6-7 μm diam., 4-5 μm high, refractive</td>
<td>7-8 μm diam., 4-5 μm high, large, elongate, non-amyloid</td>
<td>7-9.2 μm diam., 3.3-6.7 μm high, distinct, wedge-shaped, non-amyloid</td>
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<tr>
<td><strong>Ascospores</strong></td>
<td>28-36 × 6-8 μm, unicellular, dark brown, with hyaline germ pores and thin, drawn-out sheath at each end</td>
<td>23-37 × 7.5-10 μm, unicellular, brown, with granular contents and hyaline germ pores at each end</td>
<td>26-42 × 9-12 μm, unicellular, hyaline, up to 3 septate, verruculose, surrounded by a thin irregular sheath</td>
<td>42-55 × 8-13 μm, 7-septate, with larger, mid brown central cells and smaller hyaline to subhyaline end cells</td>
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<td><strong>Nutritional mode</strong></td>
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<td><strong>Habitat</strong></td>
<td>On terrestrial dead bamboo culm</td>
<td>On submerged wood in rainforest stream</td>
<td>On submerged wood in river</td>
<td>On terrestrial dead wood</td>
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<td><strong>Hosts</strong></td>
<td>Decaying culms of <em>Arundinaria hindsii</em></td>
<td>Decaying wood</td>
<td>Decaying wood</td>
<td>Decaying wood</td>
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<tr>
<td><strong>Distribution</strong></td>
<td>Hong Kong</td>
<td>Australia</td>
<td>Australia</td>
<td>Taiwan</td>
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</table>
Pseudoproboscispora and Submersisphaeria are the currently accepted genera in the Annulatascaceae (Hyde, et al., 1998; Wong et al., 1998, 1999; Ho, et al., 1999; Wong and Hyde, 1999). Submersisphaeria has dark brown ascospores and thus differs from other genera in the Annulatascaceae which all have hyaline ascospores (Hyde et al., 1998; Wong et al., 1998; Ho et al., 1999; Wong and Hyde, 1999). Ascotaiwania was recently excluded from the Annulatascaceae based on molecular studies (Ho et al., 1999; Ranghoo et al., 1999). Ascotaiwania resembles Submersisphaeria in several aspects, however, in Ascotaiwania the ascospores lacks germ pores, and with hyaline end cells (Sivanesan and Chang, 1992; Hyde, 1996).

Submersisphaeria bambusicola is consistent with the generic description of Submersisphaeria, especially in having subglobose, immersed ascomata, cylindrical, unitunicate and pedicellate asci, with a refractive, non-amyloid apical ring and brown ascospores, with hyaline germ pores at each end (Hyde, 1996). Submersisphaeria bambusicola has long pedicellate asci and unicellular ascospores, which conspicuously differs from S. aquatica, the type species of Submersisphaeria. We believe that the characters, namely long pedicellate asci and unicellular ascospores, are not good enough to establish a new genus, which can distinguishes from Submersisphaeria. So the generic concept of Submersisphaeria should be widened to include S. bambusicola. Submersisphaeria bambusicola is saprobic and found on decaying bamboo culms in terrestrial habitat in Hong Kong whereas S. aquatica is saprobic on wood submerged in freshwater in Australia (Hyde, 1996).

Submersisphaeria bambusicola is compared with S. aquatica, Annulatascus velatisporus and Ascotaiwania lignicola in Table 1.

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