
Two new intertidal lignicolous *Swampomyces* species from Red Sea mangroves in Egypt

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During a study of the intertidal mangrove fungi of Egypt, two new species of *Swampomyces* were found and are described here. The new species *Swampomyces clavatispora* differs from the other species in having clavate ascospores, while *S. aegyptiacus* differs from *S. armeniacus* and *S. triseptatus* in having longer and narrower ascospores. A key to *Swampomyces* species is provided.

Key words: Ascomycota, subtropical mangrove fungi, taxonomy.

Introduction

Kohlmeyer and Volkmann-Kohlmeyer (1987) established the genus *Swampomyces* to accommodate *S. armeniacus* the type species, while Hyde and Nakagiri (1992) added *S. triseptatus* collected from mangroves in Australia. The taxonomic position of *Swampomyces* is unclear. Kohlmeyer and Volkmann-Kohlmeyer (1987) placed the genus in the *Polystigmataceae* but with reservation, while Eriksson and Hawksworth (1998) suggested that it should be included in ascomycetes *incertae sedis*.

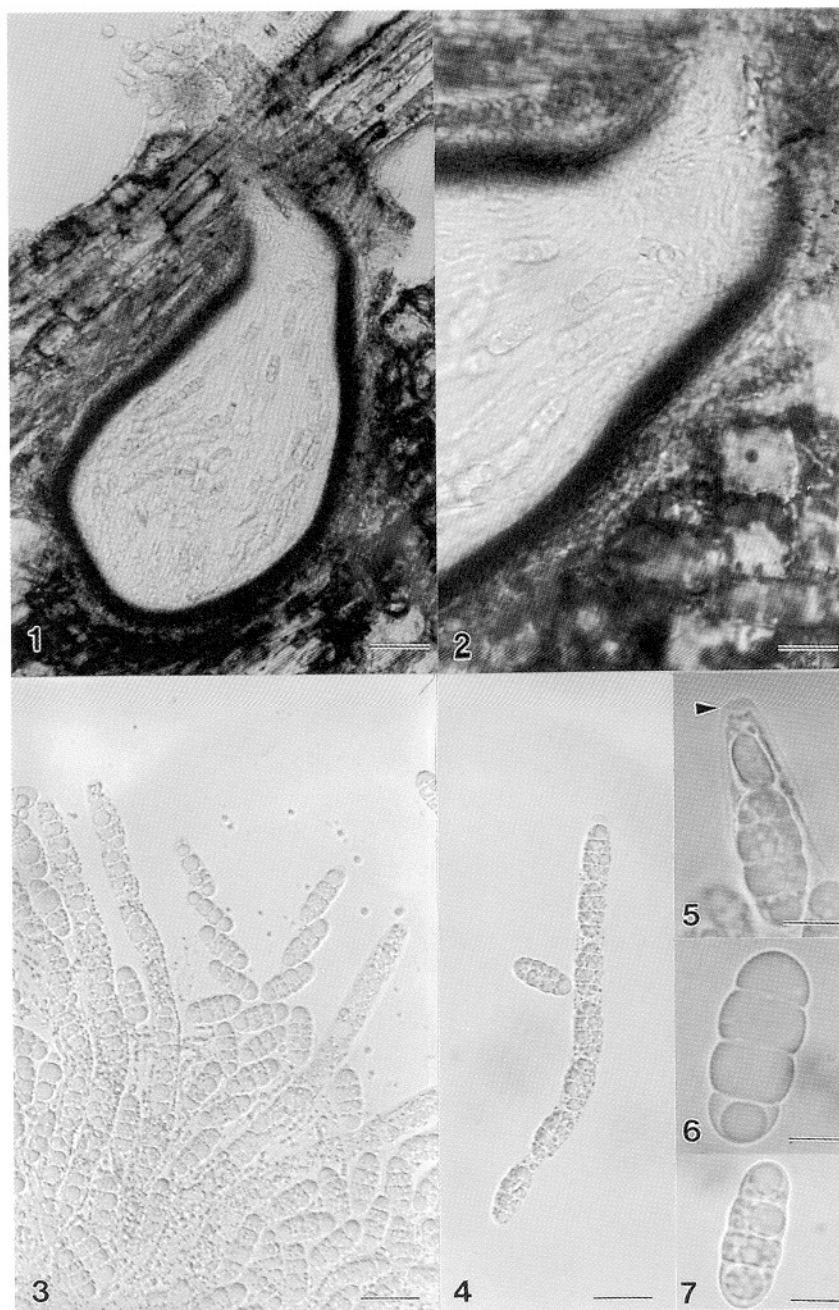
Taxonomy

***Swampomyces aegyptiacus* Abdel-Wahab, El-Sharouney and E.B.G. Jones, sp. nov.** (Figs. 1-7)

Ascomata 240-280 μm alta, 170-190 μm in diametro, pyriformia, immersa, brunnea vel nigra, coriacea, ostiolata, solitaria, pseudostromatica. *Asci* 145-155 \times 9-10 μm , octospori, cylindrici, leptodermi, pedicellati, apparato apicali praediti. *Ascosporae* 15-19 \times 6-8 μm , triseptatae, ellipsoideae, hyalinae, uniseriatae.

Etymology: In reference to the place where the fungus was first found.

Ascomata 240-280 μm high, 170-190 μm in diameter, pyriform, immersed, oblique or vertical to the host surface, dark brown to black,



Figs. 1-7. *Swampomyces egyptiacus*, light micrographs from holotype. **1.** Vertical section of ascoma immersed in wood. **2.** Magnified part of the ascoma shows periphysate neck, peridial wall and the paraphyses connect to the apex of the ascomatal cavity. **3, 4.** Asci at different stages of maturation. **Fig. 5.** Apical thickening of the ascus (arrowed). **6, 7.** Ascospores. Bars: 1 = 50 μm ; 2-4 = 20 μm ; 5-7 = 5 μm .

coriaceous, ostiolate, contents apricot coloured in mass, single, developing under a thin darkened superficial pseudostroma, covering the area where ascomata develop and composed of host cells with darkened fungal hyphae (Fig. 1). Neck 70-80 μm in diameter, filled with periphyses. *Peridium* 8-10 μm comprising brown to dark brown polygonal cells (Fig. 2). *Paraphyses* numerous, hyaline, in a gel, mostly unbranched, attached to the apex of the ascomatal cavity (Fig. 2). *Asci* 145-155 \times 9-10 μm , (\bar{x} = 152 \times 9.6 μm , n = 20), 8-spored, cylindrical, thin-walled, short pedicellate and apically thickened. *Ascospores* 15-20 \times 6-8 μm , (\bar{x} = 19 \times 7.8 μm , n = 40), 3-septate, ellipsoidal, hyaline, uniseriate, constricted at the septa and smooth (Figs. 6, 7).

Anamorph: unknown.

Material examined: EGYPT, Red Sea Coast, Safaga mangrove, on decayed attached branches of *Avicennia marina* in the intertidal zone, January 1999, M.A. Abdel-Wahab [IMI 386146 **holotype**, designated here]; EGYPT, Red Sea, on *Avicennia marina* twigs, November, 1998.

Single ascospore isolates of *S. aegyptiacus* growing on CMSA are light brown, ca. 20 mm diam. after one month. No sporulating structures were observed on CMSA medium.

Swampomyces aegyptiacus closely resembles *S. triseptatus*, but differs in having longer and narrower asci and smaller ascospores that are smooth-walled.

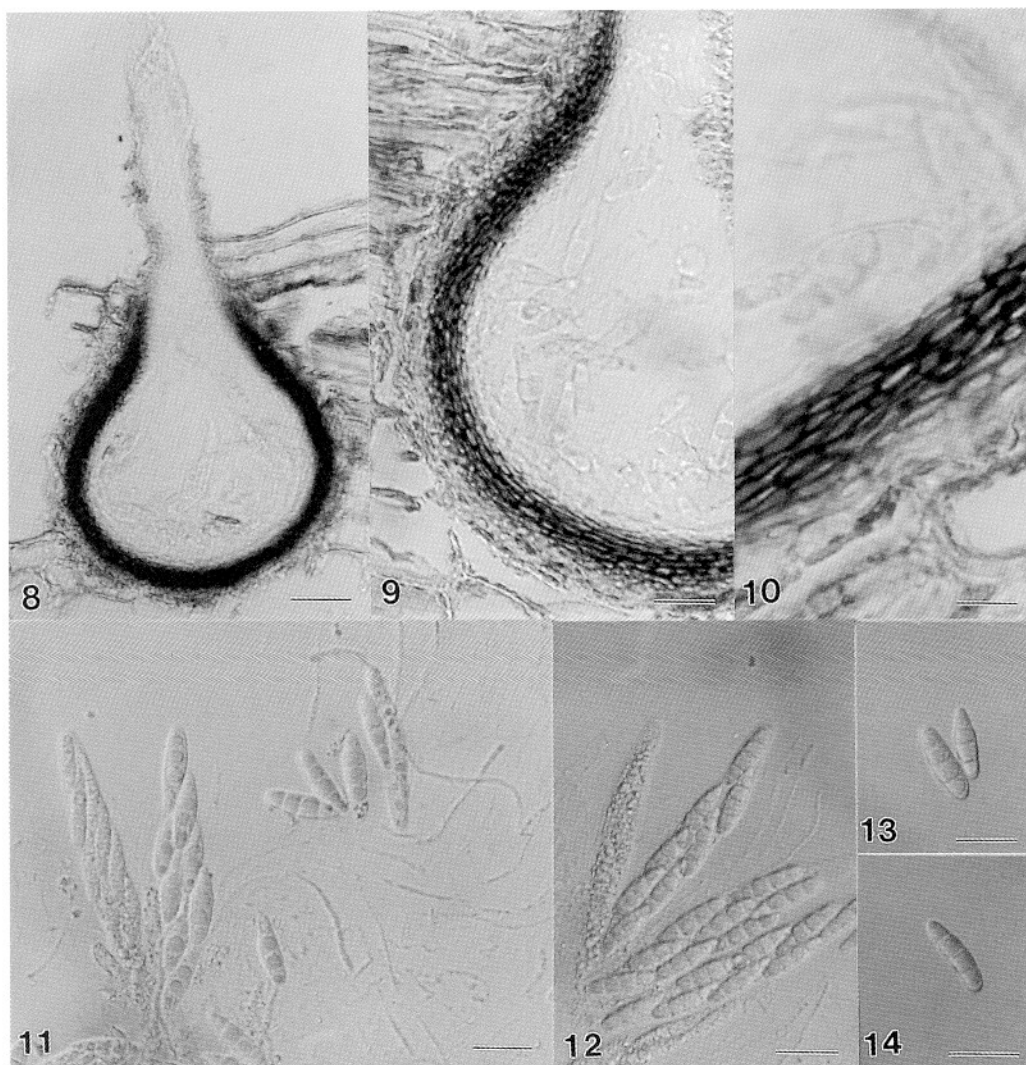
***Swampomyces clavatispora* Abdel-Wahab, El-Sharouney and E.B.G. Jones, sp. nov.** (Figs. 8-14)

Ascomata 160-170 μm alta, 160-190 μm in diametro, immersa, globosa vel subglobosa, solitaria, ostilata, brunnea, pseudostromatica. *Asci* 80-96 \times 10-13 μm , octospori, oblong, leptodermi, pedcellati, apparato apicali praediti. *Ascosporae* 25-28 \times 5-6 μm , clavate, biseriatae, hyalinae, triseptatae, ad septa constrictae.

Etymology: In reference to the shape of the ascospores.

Ascomata 160-170 μm high, 160-190 μm in diameter, immersed, vertical, single, ostilate, brown to dark brown, with hyaline neck (Fig. 8), contents apricot coloured in mass, developing under a thin darkened superficial pseudostroma, covering area where ascomata develop and composed of host cells with darkened fungal hyphae. Neck up to 50 μm long and 60 μm in diameter. Ostiolar canal filled with periphyses. *Peridium* 14-20 μm , comprising elongated yellow-brown to brown cells forming *textura angularis*. *Paraphyses* numerous, hyaline, in a gel and mostly unbranched (Figs. 9, 11). *Asci* 80-96 \times 10-13 μm , (\bar{x} = 87 \times 11.8 μm n = 20), 8-spored, oblong, thin-walled, short pedicellate, apically thickened. *Ascospores* 25-28 \times 5-6 μm (\bar{x} = 25.6 \times 5.7 μm , n = 40), clavate, biseriatae, hyaline, 3-septate, and weakly constricted at the septa.

Anamorph: Unknown.



Figs. 8-14. *Swampomyces clavatispora*, light micrographs from holotype. **8.** Vertical section of ascoma in wood. **9, 10.** Peridial wall and paraphyses. **11, 12.** Immature and mature asci. **11.** Shows paraphyses in gel. **13, 14.** Ascospores. Bars: 8 = 50 μ m; 9 = 30 μ m; 10 = 10 μ m; 11-14 = 20 μ m.

Material examined: EGYPT, Red Sea Coast, Safaga mangrove, on decayed attached branches of *Avicennia marina* in the intertidal zone, January 1999, M.A. Abdel-Wahab (IMI 386145, **holotype**, designated here); EGYPT, Red Sea on *A. marina* twigs, April 1999, Abu-Mingar mangrove, M.A. Abdel-Wahab; on test blocks of *Bruguiera parviflora* and *Kandelia candel* exposed 32 weeks at Safaga mangrove, M.A. Abdel-Wahab.

Single ascospore isolates of *S. clavatispora* growing on CMSA are light brown, ca. 25 mm diam. after one month. No sporulating structures were observed on CMSA medium.

Swampomyces clavatispora differs from the other three *Swampomyces* species in having short, oblong asci and longer and narrower ascospores that are clavate in shape. *Swampomyces clavatispora* is similar to *Leptosphaeria australiensis* in having oblong asci and 3-sepate ascospores that are clavate in shape. In *S. clavatispora* ascomata develop under a thin darkened superficial pseudostroma, composed of host cells with dark fungal hyphae, a one layered peridium, unitunicate asci and ascospores with granular ornamentation (Figs. 13, 14). In contrast, *L. australiensis* ascomata are immersed, gregarious or solitary, asci are bitunicate with an apical apparatus (pulvillus and annulus), a bi-layered peridial wall, shorter and wider ascospores that are smooth-walled (Kohlmeyer and Kohlmeyer, 1979).

Key to *Swampomyces* species

1. Ascospores 2-celled, $13-20 \times 6.9 \mu\text{m}$ *S. armeniacus*
1. Ascospores 4-celled 2
2. Ascospores clavate, $25-28 \times 5-6 \mu\text{m}$ weakly constricted at the septa *S. clavatispora*
2. Ascospores ellipsoidal 3
3. Ascospores $15-19 \times 6-8 \mu\text{m}$, deeply constricted at the septa *S. aegyptiacus*
3. Ascospores $18-25 \times 8-11 \mu\text{m}$, weakly constricted at the septa and spore wall with granular ornamentation *S. triseptatus*

Discussion

Twenty-five marine fungi (22 ascomycetes and 4 mitosporic fungi) were recorded from 432 wood samples collected from three Red Sea mangrove sites in Egypt (Abu-Mingar, Safaga and Sharm El-Sheikh). Most of the fungi identified were typically mangrove species: *Dactylospora haliotrepha*, *Eutypa bathurstensis*, *Halosarpheia abonnis*, *Julella avicenniae*, *Lineolata rhizophorae* and *Lulworthia grandispora* (Abdel-Wahab, 2000). *Swampomyces clavatispora* was a frequent species occurring on 15.3% of the samples collected from Abu-Mingar mangrove site, while it was a common species (5.3%) on samples collected from the Safaga mangrove. *Swampomyces aegyptiacus* was a frequent species (24.3%) on decayed attached wood of *Avicennia marina* collected from the intertidal zone of Safaga mangrove and was recorded on 4.3% of *Bruguiera parviflora*, *Kandelia candel* and *Sonneratia alba* wood blocks exposed at three different levels in the intertidal zone at Safaga mangrove (Abdel-Wahab, 2000).

Swampomyces armeniacus has clypeate ascomata, while in the other three species they are immersed under a thin darkened superficial pseudostroma. However, this difference does not justify separation at the

generic level. The four *Swampomyces* species all have immersed ascomata, a centrum that is apricot in colour, periphysate necks, branched, numerous, anasomosing, filamentous, paraphyses embedded in a gel and connected to the upper part of the ascomatal cavity and an ascus apical thickening that is J-.

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