Three new species of *Massarina* associated with terrestrial, non-marine parts of mangroves

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Three species of *Massarina* were collected during investigations into the saprobic fungi occurring on the terrestrial, non-marine parts of mangrove trees in Mauritius. The new species, *M. beaurivagea*, *M. mauritiana* and *M. rhizophorae* are described, illustrated and compared to similar species.

**Key words:** Lophiostomataceae, manglicolous fungi, *Massarina*, terrestrial fungi

**Introduction**

Most studies on manglicolous fungi have concentrated on the marine component of the ecosystem. An important part of mangrove ecosystems is the terrestrial, non-marine habitat, and this habitat has been neglected as far as saprobic fungi are concerned (Kohlmeyer, 1969). No species of *Massarina* were reported from terrestrial parts of mangrove plants, in the review of Kohlmeyer (1969).

In a recent world monograph on the genus *Massarina*, Aptroot (1998) retained 43 species amongst some 160 *Massarina* names (Hyde, 1995). Nine of the accepted species are from marine habitats and have been recorded on various intertidal mangrove substrates (Hyde, 1991; Kohlmeyer and Volkman-Kohlmeyer, 1991a, b; Hyde et al., 1992; Poon and Hyde, 1998). In the present study three species of *Massarina* are reported from the terrestrial, non-marine parts of various mangrove plants, including *Bruguiera gymnorrhiza*, *Rhizophora mucronata* and the mangrove associate, *Hibiscus tiliaceus*.

**Taxonomy**

1. *Massarina beaurivagea* Poonyth, K.D. Hyde, Aptroot and Peerally, **sp. nov.**
   (Figs. 1-8)
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**Etymology:** From the site of collection, Beau Rivage.

**Ascomata** 165-185 µm alta, 150-170 µm diam., immersa, subglobose ad pyriformia, ostiolata, solitaria vel gregaria. **Collum** 73-80 µm diam., periphysibus vestitum. **Peridium** 20-56 µm, textura intricata formans, brunneum. **Asci** 55-80 × 13-17 µm, octospori, clavati, breviter pedicellati, fissitunicati, cum camera apicali et spissescens apicali. **Ascosporae** 18-21 × 6-8 µm, fasciculatae, pallido fuscae, anguste fusiformes, cum apicibus rotundatos, uniseptatae, constrictis ad septum, tunica gelatinosa praeditae.

**Holotype:** MAURITIUS, Beau Rivage mangrove, on dead wood of *Hibiscus tiliaceus*, Dec. 1996, A.D. Poonyth (HKU(M) I 0262).

**Ascomata** 165-185 µm high, 150-170 µm diam., immersed, subglobose to pyriform, solitary or gregarious (Figs. 1, 2). **Neck** visible as a black cone or dome on the host surface, bleached around the neck, the bleached area being delimited by a black border, 73-80 µm diam., erumpent, periphysate, opening into a rounded ostiole (Figs. 2, 3). **Peridium** 20-56 µm wide, thickest around base of neck, comprising brown **textura intricata** (Figs. 4, 5). **Pseudoparaphyses** 1-2.5 µm diam., Anastomosing above the asci, branched, embedded in a gelatinous matrix (Fig. 6). **Asci** 55-80 × 13-17 µm, 8-spored, clavate, short-pedicellate, fissitunicate, apex rounded with an ocular chamber and apical thickening (Fig. 7). **Ascospores** 18-21 × 6-8 µm, 2-3-seriate, fusiform with acute rounded ends, thick-walled, 1-septate, slightly constricted at septum, surrounded by a 1-2 µm thick gelatinous sheath (Fig. 8); mature ascospores pale brown; young ascospores hyaline and thinner (4-6 µm) and seemingly 3-septate.

**Habitat:** Saprobic on *Hibiscus tiliaceus*.

**Known distribution:** Mauritius.

**Other material examined:** Same locality (HKU(M) 10261, 10263, 10264, 10265, 10267, 10268, 10273).

These collections could not be identified using the key provided by Aptroot (1998). *Massarina* species with thick-walled ascospores include *M. eburnea* (Tul. and Tul.) Sacc., *M. cisti* Bose and *M. moeszii* Tóth. *Massarina eburnea* has 3-septate ascospores, but differs from *M. beaurivagea* in having larger ascospores (33-42 × 9.5-12 µm) and a clypeus (Hyde, 1995; Aptroot, 1998). Ascospores of *M. cisti* are 1-3-septate, broadly fusiform with rounded ends and lack a gelatinous sheath, while those of *M. moeszii* are only 1-septate and lack a gelatinous sheath. Both *M. cisti* and *M. moeszii* have larger ascospores than those of the present collections (Aptroot, 1998).

2. **Massarina mauritiana** Poonyth, K.D. Hyde, Aptroot and Peerally, sp. nov. (Figs. 9-21)

**Etymology:** In reference to Mauritius, where the fungus was first collected.

**Ascomata** 160-185 µm alta, 210-240 µm diam., immersa, clypeata, pyriformia, ostiolata, solitaria vel gregaria. **Peridium** 34-42 µm crassum. **Asci** 74-81 × 23-36 µm, octospori, late clavati, breviter pedicellati, fissitunicati, cum apice rotundo et camera apicali. **Ascosporae** 26-34 × 8-9.5

μm, 3-4-seriatae, hyalinae, crassispissescens, prolatus ellipsoideae, 3-septatae, constrictae ad septae, cum constrictio magis conspicuum ad septae primariae, tunica gelatinosa praeditae.

*Holotype:* MAURITIUS, Grand Gaube, Melville Barachois, in bark of *Bruguiera gymnorrhiza* twig still attached to living tree, 20 Aug. 1995, A.D. Poonyth (HKU(M)10239).

*Ascomata* 160-185 μm high, 210-240 μm diam., immersed, forming under
black, oval, shallow depression on host surface, surrounded by slight elypeus (Fig. 10, arrowed), 200-300 × 280-420 μm, pyriform with rounded ostiole, solitary or gregarious (Figs. 9, 10). Peridium 34-42 μm wide (Figs. 11, 12). Pseudoparaphyses 1.5-2.5 μm wide, septate, long, with slightly swollen apices (Fig. 16). Asci 74-81 × 23-36 μm, 8-spored, broad-clavate, short-pedicellate, fissitunicate, thick-walled, thick at apices, apex rounded, with an ocular chamber (Figs. 13-15). Ascospores 26-34 × 8-9.5 μm, 3-4-seriate, hyaline, elongate ellipsoidal, 3-septate, strongly constricted at septa, constriction more pronounced at middle septum, surrounded by a 2-5 μm wide gelatinous sheath which swells strongly in water and appears granular at poles and refractive adjacent to the septa (Figs. 17-21).

**Habitat:** Saprobic on Bruguiera gymnorrhiza.

**Known distribution:** Mauritius.

*Massarina mauritiana* can be confused with *Massarina carolinensis* Kohlm., Volkm.-Kohlm. and O. Eriksson and *M. ricifera* Kohlm., Volkm.-Kohlm. and O. Eriksson collected from the saltmarsh grass *Juncus roemerianus* Scheele (Kohlmeyer *et al.*, 1995a, b). Both *M. carolinensis* and *M. ricifera* have smaller ascospores (16.5-21 × 4.5-6.5 μm and 19-25 × 5.5-7 μm), and cylindrical asci compared to broad clavate in the present collection. *Massarina ricifera* also differs from the present collection in having ascomata with a distinct neck. The granular texture at the poles and refractive appearance adjacent to the septa observed in the sheath surrounding the ascospores was not reported in *M. carolinensis* and *M. ricifera* (Kohlmeyer *et al.*, 1995a, b). The species belongs to the genus *Massarina s.s.* and seems related to the type species, *M. eburnea* Tul. and C. Tul.

3. *Massarina rhizophorae* Poonyth, K.D. Hyde, Aptroot and Peerally, sp. nov. (Figs. 22-31)

**Etymology:** In reference to the host, *Rhizophora*.

**Ascomata** 140-160 μm alta, 90-120 μm diam., immersa in parte, obovata, solitaria vel gregaria. **Collum** brevis, densus periphysibus vestitum. **Peridium** 10-28 μm crassum, cellularum angulatum cum grandilumen, brunneum. **Asci** 70-86 × 12-14 μm, octospori, cylindricei ad clavati, breviter pedicellati, fissitunicati, crassitunicati, cum apice rotundo et camera apicali. **Ascospora**ae 22-28(-33) × 4.5-6.5 μm, imbricatus uniseriatae vel biseriatae, anguste fusiformes cum acutis extremis, hyalinae, 1-septatae, non constrictae ad septae, ad polum utrimque mucilagina, elongata, apice producta.

**Holotype:** MAURITIUS, Grand Gaube, Melville Barachois mangrove, on dead *Rhizophora mucronata* wood still attached to living tree, Jan. 1995, A.D. Poonyth (HKU(M)10208).

**Ascomata** 140-160 μm high, 90-120 μm diam., partially immersed, obovoid, necks appearing as black cones on substrate surface, solitary or gregarious (Figs. 22, 23). **Neck** short, with a rounded ostiole, ca. 20 μm diam., plugged by dense

tuft of periphyses (Fig. 23). *Peridium* 10-28 μm wide, composed of brown thick-walled angular cells with large lumina (Fig. 24). *Paraphyses* 1-2 μm diam.,
filamentous, branched, numerous, anastomosing above asci, embedded in a gelatinous matrix (Fig. 25). Asci 70-86 × 12-14 μm, 8-spored, cylindrical to clavate, short pedicellate, fissitunicate, thick-walled; apex rounded with an ocular chamber (Figs. 25-28). Ascospores 22-28(-33) × 4.5-6.5 μm, overlapping uniseriate or biseriate, narrowly fusiform with pointed ends, hyaline, guttulate, 1-septate, not constricted at the septum; surrounded by a 1 μm thick mucilaginous sheath protracted to 2-6 μm at ends, ending bluntly (Figs. 29-31).

**Habitat:** Saprobic on Rhizophora mucronata.

**Known distribution:** Mauritius.

*Massarina rhizophorae* has a unique appendage type not shown by any of the species reported in the monograph by Aptroot (1998). The size of the 1-septate ascospores of *Massarina amphibia* Magnes and Hafellner (23-32 × 4-7 μm) agree with those of the present collection, but its protracted sheaths do not end bluntly (Aptroot, 1998). *Massarina amphibia* is a temperate, boreo-alpine species and it is unlikely to be the same species that occurs on tropical coasts (Aptroot, 1998).

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**References**


