MANGLICOLOUS FUNGI FROM INDIA

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ABSTRACT


Key-words : marine, mangrove, fungi.

Number of new species of marine fungi from mangroves have been reported in recent years (Kohlmeyer and Kohlmeyer, 1979; Kohlmeyer, 1984, 1985; Kohlmeyer and Volkman-Kohlmeyer, 1987, 1990; Hyde, 1988; Hyde and Jones, 1989; Hyde and Mouzouras, 1988; Scott Schatz, 1988). However, little is known about their occurrence on mangroves in India. Nine species of fungi collected from mangroves along the west coast of India and Andaman and Nicobar Islands, which are new records to India, are described and illustrated in this paper. All the specimen are deposited in the Herbarium collections at the National Institute of Oceanography.

Observations

Rhizophila marina Hyde et Jones.


Ascocarps: 500 to 900 µm in diameter, 450-750 µm in height, globose to subglobose, completely immersed, ostiolate, papillate, periphysate, dark brown to black, solitary. Neck: 450-500 µm in length, 100-500 µm in diameter. Asci: 70-100 µm long, 15-25 µm in diameter, 8 spored, 2-3 seriate, clavate, pedunculate, uninnicate, thin walled without apical apparatus. Ascospores: 20-28 µm x 7-9 µm, ellipsoidal to fusiform, one celled, yellowish to yellowish brown.

Collected on Rhizophora mucronata from Kundapura, Karnataka, India (August 1990 Herb. No: SCR 93, 94).

Trematosphaeria striatispora Hyde

Ascocarps: black, 350-500 μm in diameter, 170-350 μm in height, subglobose, conical, ostiolate, papillate, solitary. Neck: 180-350 μm in length, 50-75 μm in diameter. Asci: 96-175 μm long, 12-20 μm in diameter, 8 spored, cylindrical, pedunculate, bitunicate, thick walled with ocular chamber. Ascospores: 30-35 x 6-10 μm, two seriate at the apex and one seriate at the base, fusiform, 3 (-5) septate, slightly constricted at the septum. Central cell larger, brown, end cells smaller, light brown to yellow, striate, surrounded by an indistinct gelatinous sheath.

Collected on *Nypa fruticans* (Thum.) Wormb. from intertidal region at Great Nicobar Island, India (March 1990, Herb. No: SCR 82).


Ascocarps: 300-450 μm in height, 200-250 μm in diameter, obpyriform, partly immersed, ostiolate, papillate. Neck: 60-90 μm in diameter at the apex and increasing towards the base. Periphyses: present, 1.5-2.5 μm in diameter, septate, simple. Pseudoparaphyses: 1-1.5 μm in diameter, septate, simple. Asci: 150-170 x 15-18 μm, 8 spored, cylindrical, short pedunculate, bitunicate, thick walled. Ascospores: 23-31 x 9-11 μm, uniseriate, ellipsoidal, one septate, slightly constricted at the septum, dark brown, striate by delicate costae.


*Caryosporella rhizophorae* Kohlm.


Ascocarps: 100-1050 μm in height, 800-1200 μm in diameter, gregarious, subglobose, carbonaceous, thick walled, black, superficial, ostiolate, ostiolar canal 70-100 μm in diameter. Peridium 90-150 μm in thickness. Pseudoparaphyses: 2-5 μm in diameter, branched, inconspicuously septate. Asci: 210-250 x 16-18 μm, 8 spored, cylindrical, long pedunculate, bitunicate, thick walled. Ascospores 25-30 x 10.12 μm, ellipsoidal, one septate, slightly constricted at the septum, dark brown, indistinctly verruculose.

Collected on *Rhizophora mucronata* Lamk. from intertidal regions of Mayabandar, Katchal and Nan-cowry Islands, India (March 1990, Herb. No: SCR 62, 63, 64, 65).


Ascocarps: 206-250 μm in height, 226-250 μm in diameter, subglobose, partially immersed, ostiolate, black and carbonaceous above, light brown on the sides, ostiolar canal filled with a tissue of hyaline cells. Pseudoparaphyses: 2 μm in diameter, simple, rarely branched. Asci: 140-150 x 25-29 μm, 8 spored, cylindrical, short pedunculate, thick walled, fuscitunicate, without apical apparatus, with a small ocular chamber. Ascospores: 17-24 x
Fig. 1. *Rhizophila marina*: ascus-1200 X (A), ascospore-1200 X (B).
*Trematosphaeria striatispora*: ascus-400 X (C), Ascospore-4000 XD.
*Hydronectria tethys var glabra*: ascospore-1200 X (D).
*Lineolata rhizophorae*: ascus-400 X (F), ascospore-1200 X (G).
*Hypoxylon oceanicum*: ascus-400 X (H), ascospore-1200 X (I).
*Caryosporella rhizophorae*: ascocarp-160 X (J), ascospore-1200 X (K).

Fig. 2. *Belizeana tuberculata*: ascus-1200 X (L).
*Swampomyces armeniacus*: ascus-1200 X (M), ascospore-1200 X (N).
*Passeriniella savoryellipsis*: ascus-400 X (C), ascospore-1200 X (P).
10-15 μm, broad, ellipsoidal, one septate, constricted at the septum, hyaline, thick walled, double layered, mature spores with tuberculate ornamentation in between the two layers.


Ascocarps: 370-450 μm in height, 260-350 μm in diameter, subglobose, immersed, ostiolate, periphysate, light brown, ostiolar canal 40-65 μm in diameter, conical, filled with 2-3 μm thick periphyses. Clypeus: 45-100 μm thick, black, surrounding ostiole. Paraphyses: 1.3-1.5 μm thick, simple, rarely branched. Asci: 100-130 x 13-18 μm, 8 spored, cylindrical, short pedunculate, persistent ununiticate. Ascospores: 13-19 x 6-8 μm, broad, ellipsoidal, one septate, not constricted at the septum, hyaline to yellowish, smooth.


Ascocarps: 500-750 μm in height, 800-1300 μm in diameter, globose to subglobose, immersed, solitary or gregarious, dark brown to black, ostiolate. Neck: 300-600 μm long, 200-350 μm in diameter with periphyses. Pseudoparaphyses: 4-6 μm in diameter, numerous, filamentous, branched, hyaline. Asci: 280-440 x 24-35 μm, 4 spored, cylindrical, pedunculate, thick walled, bitunicate, with an ocular chamber. Ascospores: 64-80 x 24-30 μm, uniseriate, ellipsoidal, three septate, slightly constricted at the central septum, central cell brown, large, end cells small, conical and hyaline,


Ascocarps: 320-400 μm in height, 450-500 μm in diameter, subglobose, ostiolate, paraphyses persistent, broad, 2-2.5 μm in diameter. Asci: 8 spored, cylindrical, stipulate, with apical ring, 110-175 x 12-22 μm. Ascospores: brown to black, one celled, 18-23 x 7-12 μm, subglobose to broadly elliptic, rounded ends with a germ slit.

Collected on *Excoecaria agallocha, Rhizophora mucronata, Avicennia officinalis* and- *Aegiceras corniculatum* from intertidal regions of Great Nicobar Island, Vandoor Marine Park, Little Andaman Island, Car Nicobar Island, Kundapura (Karnataka), Chorao Island
MANGLICOLOUS FUNGI


Ascocarps 270-350 µm im height, 315-450 µm in diameter, subglobose, partially immersed, orange yellowish. Asci: 90-116 X 15-23 µm, 8 spored, short pedunculate, unitunicate, thinly walled at maturity. Ascospores: 17-25 x 8.5-13 µm, one or biseriate ellipsoidal, one septate somewhat below the centre, slightly constricted at the septum, hyaline, smooth.

Collected on *Avicennia marina* from intertidal regions of Great Nicobar Island, India (March 1990, Herb. No: SCR 53)

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REFERENCES


HIGHER MARINE FUNGI OF LAKSHADWEEP ISLANDS
AND A NOTE ON QUINTARIA LIGNATILIS

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ABSTRACT - The dead and decayed mangroves, Seagrasses and drift wood samples collected from Lakshadweep Islands were examined for fungi and yielded 32 species of higher marine fungi which includes 23 Ascomycetes, 1 Basidiomycete and 8 Deuteromycetes. This is the first report of higher marine from Lakshadweep Islands. A gelatinous sheath has been observed in fresh ascospores of Quintaria lignatilis.

RÉSUMÉ - Un premier inventaire sur le littoral des îles Lakshadweep a permis de répertorient 32 espèces de champignons dont 23 Ascomycètes, 1 Basidiomycètes et 8 Deutéromycètes sur des végétaux en cours de dégradation et des bois flottants. Un manchon gelatineux a été observé autour des jeunes ascospores de Quintaria lignatilis.

KEY WORDS : Higher marine fungi, Lakshadweep Islands.

INTRODUCTION

The role of marine fungi in the decomposition of organic matter in the marine environment is well documented (Fell & Master, 1980). The occurrence and distribution of marine fungi from the Indian Ocean has been studied to a certain extend (Borse, 1988; Hyde, 1988, 1989, 1990; Hyde & Jones, 1988; Hyde et al., 1990; Jones & Kuthubutheen, 1989; Kohlmeyer, 1984; Jones & Hyde, 1990; Kohlmeyer & Volkman-Kohlmeyer, 1991b; Leong et al., 1991). However, nothing is known about the occurrence of marine fungi from the Lakshadweep Islands. The present study was carried out to known the occurrence and distribution of marine fungi from the Lakshadweep Islands (Laccadive Islands).

MATERIALS AND METHODS

The dead and decayed mangroves seagrasses and drift wood samples from the intertidal regions of Agatii, Androth, Cheriyam, Kalpeni, Kavaratti, Kadmat and Minicoy Islands (Fig. 1) were collected in clean polythene bags during an oceanographic cruise to Lakshadweep Islands (R.V.G. Cruise No. 225, 5/2/92 to 20/2/92). The samples were examined for fungi after 7 to 10 days of incubation in a moist chamber. Identifications were made using standard keys and original descriptions. All the identified samples were deposited in the Taxonomy Reference Center at National Institute of Oceanography.
Fig. 1 - Map of Lakshadweep Islands (study area).
OBSERVATIONS

Ascomycetes

**Ascocratera manglicola** Kohlm.


**Arenariomyces majusculus** Kohlm. et Volkm.-Kohlm.

Recorded on the dead *Avicennia marina* (Forsk.) Vierh. wood heavily damaged by wood borers collected from Minicoy Island (10/2/92 Herb. No. S.C.R. 324).

**Biatriosporia marina** Hyde et Borse

Recorded on dead *Avicennia marina* (Forsk.) Vierh. wood collected from Minicoy Island (10/2/92, Herb. No. S.C.R. 346, 350).

**Dactylospora haliotrepha** (Kohlm. et Kohlm.) Hafellner


**Halosarpheia abonnis** Kohlm.

Recorded on the dead *Avicennia marina* (Forsk.) Vierh. pneumatophore collected from Minicoy Island (10/2/92 Herb. No. S.C.R. 331).

**Halosarpheia marina** (Cribb et Cribb) Kohlm.


**Halosphaeria quadricornuta** Cribb et Cribb


**Leptosphaeria australiensis** (Cribb et Cribb) Hughes

Recorded on dead shoreline tree *Scaevola taccada* (Gaertn.) Roxb. wood collected from Minicoy Island (10/2/92 Herb. No. S.C.R. 313, 315), shoreline tree *Scaevola taccada* (Gaertn.) Roxb. wood collected from Cheriyam Island (6/2/92 Herb. No. S.C.R. 333).

**Lignincola laevis** Höhnk


**Lindra thalassiae** Orpurt et al.

Recorded on drifted seagrass *Thalassia testudinum* König. collected from Kalpeni Island (8/2/92 Herb. No. S.C.R. 308).

**Lophiostoma mangrovei** Kohlm. et Vittal

Recorded on dead bark of *Avicennia marina* (Forsk.) Vierh. collected from Minicoy Island (10/2/92 Herb. No. 352).
Lulworthia grandispora Meyers

Recorded on dead intertidal Avicennia marina (Forsk.) Vierh. wood collected from Minicoy Island (10/2/92 Herb. No. S.C.R. 320).

Lulworthia spp. (spore length 300 to 40 μm)

Recorded on dead intertidal Avicennia marina (Forsk.) Vierh. stem and pneumatophores collected from Minicoy Island (10/2/92 Herb. No. S.C.R. 323, 323a), dead shoreline tree Pemphis acidula Forst. wood collected from Minicoy Island (10/2/92 Herb. No. S.C.R. 325).

Marinosphaera mangrovei Hyde


Massarina thalassiae Kohlm. et Volkm.-Kohlm.


Massarina velatospora Hyde et Borse


Massaria sp.

Recorded on shoreline tree Scaevola taccada (Gaertn.) Roxb. wood collected from Androth Island (16/2/92 Herb. No. S.C.R. 326).

Payosphaeria minuta Leong et al.

Recorded on dead intertidal Ceriops tagal (Perr.) C.B. Rob. wood and Avicennia marina (Forsk.) Vierh. wood collected from Minicoy Island (10/2/92 Herb. No. S.C.R. 342, 343).

Quintaria lignatilis (Kohlm.) Kohlm. et Volkm.-Kohlm.

This species was first described under the genus Trematosphaeria (Kohlmeyer, 1984). Later on, this fungus was described as new genus Quintaria (Kohlmeyer & Volkman-Kohlmeyer, 1991a) in both studies, there was no mention of the gelatinous sheath around the ascospore. But our collections from Lakshadweep, Maldives, Andaman and Nicobar Islands (when the fresh ascocarps are observed) show a distinct gelatinous sheath around the ascospores (Plate 1).


Sarvoryella lignicola Jones et Eaton

Recorded on unidentified drift wood collected from Kavaratti Island (8/2/92 Herb. No. S.C.R. 309), dead intertidal shoreline tree Scaevola taccada (Gaertn.) Roxb. stem collected from Androth Island (16/2/92 Herb. No. S.C.R. 330).

Savoryella paucispora (Cribb et Cribb) Koch
Plate I - A-D: *Quintaria lignatilis*. A-B: Gelatinous sheath around the ascospore (1100 x). C-D: Ascus (275 x).

Recorded along with *Monodictys pelagica* (Johnson) Jones on unidentified drift wood collected from Kavaratti Island (8/2/92 Herb. No. S.C.R. 310).

*Torpedospora radiata* Meyers


*Verruculina enalia* (Kohlm.) Kohlm. et Volkm.-Kohlm.


*Basidiomycetes*

*Halocyphina villosa* Kohlm. et Kohlm.


*Deuteromycetes*

*Cirrenalia basiminuta* Ragukumar et al.
Recorded on drifted coconut frond collected from Kavaratti Island (8/2/92 Herb. No. S.C.R. 332).

*Cirrenalia pygmea* Kohlm.


*Humicola alopallonella* Meyers et Moore


*Monodictys pelagica* (Johnson) Jones

Recorded on unidentified drift wood collected from Kavaratti Island (8/2/92 Herb. No. S.C.R. 310).

*Periconia prolifica* Anast.

Recorded on dead intertidal shoreline tree *Pemphis acidula* Forst. wood collected from Kalpeni Island (6/2/92 Herb. No. S.C.R. 303).

*Trichocladium achrapsorum* (Meyers et Moore) Dixon


*Zalerion maritimum* (Linder) Anast.

Recorded along with *Cirrenalia basiminuta* Ragukumar et al. on coconut frond collected from Kavaratti Island (8/2/92 Herb. No. S.C.R. 332).

*Zalerion varium* Anast.

Recorded on unidentified drift wood collected from Kavaratti Island (8/2/92 Herb. No. S.C.R. 307).

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**Massarina armatispora** sp. nov., a New Intertidal Ascomycete from Mangroves

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**Abstract**

**Massarina armatispora** sp. nov. is described from dead intertidal mangrove wood collected in India and Hong Kong. The new taxon is compared with other **Massarina** species, and its placement in the genus **Massarina** is discussed.

**Introduction**

Studies of the intertidal mangrove fungi of Macau, along the coast of Southern China and India have simultaneously yielded a new taxon, which belongs in the genus **Massarina**. Six **Massarina** species are presently known from the marine environment (Hyde 1991, Kohlmeyer and Volkmann-Kohlmeyer 1991a, b) and include **M. acrostichae** Hyde, **M. cystophorae** (Cribb et Herbert) Kohlm. et Kohlm., **M. lacertensis** Kohlm. et Volkm.-Kohlm., **M. ramunculicola** Hyde, **M. thalassiae** Kohlm. et Volkm.-Kohlm. and **M. velatospora** Hyde et Borse (Hyde 1989, 1991, Hyde and Borse 1986, Kohlmeyer and Volkmann-Kohlmeyer 1987, 1991a, b). **Massarina armatispora** sp. nov. differs from these marine and other **Massarina** species and is therefore described as a new species.

**Taxonomy**

**Massarina armatispora** Hyde, Vrijmoed, Chinnaraj et Jones, sp. nov.

Illustrations 1 – 13

Etymology: from the Latin armatus meaning armed in relation to the ascospore appendages.
pressed cells, brown and angular towards the middle and a confused highly melanised textura intricata towards the outside. Hamathecium hyaline, hyphal-like, unbranched, numerous, septate, weakly tapering, up to 3 μm wide, fused at the base and sides of the ascomata and joined at the top with the periphyses and upper wall. Ascii 112–148 x 19.6–25.5 μm (§ = 133.28 x 22.4 μm, n = 25), forming from the sides and base of ascoma, 8-spored, bitunicate, fissitunicate, clavate, pedunculate and with an ocular chamber and non amyloid ring. Ascospores 28–39.2 x 7–9.8 μm (§ = 32.9 x 7.7 μm, n = 25), 2–3 seriate, 2-celled, fusiform, constricted at the septa, hyaline, surrounded by a narrow mucilaginous sheath which is drawn out at the poles to form tapering appendages, 6–8 μm long.

Discussion

This new taxon keys out in Barr (1987) to the Lophiostomataceae, where it can be included in Lophiotrema Saccardo or Massaria Saccardo. Ascospores with mucilaginous sheaths are found in both Massaria (Bose 1961, Kohlmeyer and Volkman-Kohlmeyer 1987, Hyde 1991) and Lophiotrema (Holm and Holm 1988) and both genera seem to be closely related, the latter being separated by the slit or slot-like ostiole of the ascomata (Holm and Holm 1988). With our present knowledge, we prefer to place the new taxon in Massaria, but eventually ultrastructural or molecular studies may show this genus to be an assemblage of unrelated species.
Differences between *M. armatispora* and *M. eburnea* (Tul.) Saccardo, the type species of *Massarina* (Bose 1961) are centered around the structure of the ascomata wall and ascospore appendages. In *M. eburnea* the wall is comprised of brown elongate cells, while in *M. armatispora* the cells are thick-walled, light-coloured and compressed towards the inside, becoming brown and angular in the centre and a confused textura intricata towards the outside, where the wall fuses with the host. Similar wall structures are found in *M. cisti* Bose and *M. juniperi* Bose (Bose 1961).

A regular sheath is found around the ascospores of *M. eburnea*, while in *M. armatispora* the sheath is drawn out at the poles. Polar appendages are also found in *M. deyopteri* Bose and *M. spinatae* Bose (Bose 1961). Similarities with *M. eburnea* include the small dark cells that make up the neck, the cylindrical-clavate asci, the sheet-like hamathecium and sheathed ascospores, characteristics that presently warrant inclusion of *M. armatispora* in *Massarina*.

*Massarina armatispora* cannot be confused with other marine species of *Massarina* since the ascospore sheath is drawn out at the poles to form polar appendages. In other marine *Massarina* species the ascospores are provided with regular sheaths (Hyde and Borse 1986, Kohlmeyer and Volkmann-Kohlmeyer 1987, 1991 a, b, Hyde 1989, 1991).

Ascospores of *Massarina armatispora* were released by two methods. In freshwater mounts, the asci swelled, ruptured centrally and released spores through this opening. In other cases the apex of the ascus breaks away, due to swelling of the endotunica and the spores were observed held within the ring, but not seen to be actively released. These observations may be artifacts due to slide preparation.

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**References**


Manglicolous fungi from atolls of Maldives, Indian Ocean

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Thirty nine species represented by 29 species of Ascomycetes, 2 of Basidiomycetes and 8 of Deuteromycetes were collected from partially submerged and submerged, dead and decayed parts of 5 mangrove species. The dominant species were Dactylospora halirapeho, Lineolata rhizophorae, Lophiostoma mangrovei, Massarina thalassiae and Verruculina enalia. The maximum number of fungal species were recorded on Rhizophora mueronata.

Role of fungi in converting mangrove litter to detritus is well documented. Recent studies have provided data on the quantitative and qualitative aspects of manglicolous (higher marine fungi associated with mangroves) fungi from different geographical regions of world. However, the mangroves of the oceanic islands of Chagos-Laccadive bank, in the Indian Ocean remain unexplored for their higher marine fungi. Attempts have been made to study the manglicolous fungi from Maldives atolls in the Indian Ocean.

Maldives comprise about 1190 islands in a double row of atolls and is situated on the Chagos-Laccadive bank (lat. 0° 42'S-7°05' N; long. 73°E). The Islands are enclosed by coral reefs with deep natural channels and shallow lagoons. Mangroves confined to the islands are either closed in the depression or fringing along the brackish water regions. Atmospheric temperature varies from 30.4° to 35.7°C. Average annual rainfall is 1948 mm mainly received from southwest monsoon (May-October). Mangrove vegetation comprises 13 species and Bruguiera cylindrica, Ceriops tagal and Lumnitzera racemosa form the dominant flora.

The dead and damaged wood from the trunks, branches, roots, prop roots and pneumatophores of mangroves Rhizophora mueronata, B. cylindrica, C. tagal, L. racemosa and Avicennia marina, were collected from intertidal zones of the islands of Haadhaalu (lat. 6°20'-7°N, long. 72°45'-73°20'E), Shaviyani (lat. 5°40'-6°15'N, long. 72°50'-73°30'E), and Addu (lat. 0°30'-0°45'S, long. 73°05'-73°15'E), atolls of Maldives sealed in airtight polythene bags and transported to the laboratory. The materials were examined directly under stereomicroscope for fungal fructification. Identification of fungi was done using standard taxonomic keys and other relevant literature. The percentage occurrence of individual fungi was calculated as

\[
\text{Percentage occurrence} = \left( \frac{\text{Number of collections of a particular species}}{\text{Number of samples supporting sporulating marine fungi}} \right) \times 100
\]

During the present investigation, 39 species (29 Ascomycetes, 2 Basidiomycetes and 8 Deuteromycetes) of manglicolous fungi were recorded (Table 1), most of which were previously reported from tropics. A few species of manglicolous fungi such as Dactylospora halirapeho, Lineolata rhizophorae, Lophiostoma mangrovei, Massarina thalassiae and Verruculina enalia were commonly observed (percentage occurrence > 5%). These were reported to be either frequent or rare on the mangroves of other regions of Indian Ocean.

The maximum number of species (24) were recorded on R. mueronata followed by B. cylindrica (13), C. tagal (12), A. marina (10) and L. racemosa (7). Rhizophora spp have been observed to harbour nearly 50% of manglicolous fungi out of 120 species recorded on the mangroves. Qualitative and quantitative richness of manglicolous fungi on the prop roots could be attributed to the regular inundation, spongy and soft tissue which helps the substratum to retain high amount of moisture required for fungal growth. The other dominant mangroves such as B. cylindrica, C. tagal and L. racemosa showed poor diversity of manglicolous fungi on them and this might be due to their hard wood and poor moisture conditions due to long exposures.

Present study revealed that the occurrence of manglicolous fungi of Maldives is very much similar...
Table 1  List of manglicolous fungi recorded from 3 atolls of Maldives and their percentage occurrence

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<thead>
<tr>
<th>Name of the species</th>
<th>Atolls</th>
<th>Percent</th>
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<td>Handilan</td>
<td>Shaviyani</td>
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<td>Ascomycetes</td>
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<tr>
<td>1  Acrocordiopsis patilii Borse et Hyde</td>
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<td>1</td>
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<td>2  Agiales grandis Kohlm. et Schatz</td>
<td>2</td>
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<tr>
<td>3  Agiales parvis Schatz et Kohlm</td>
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<tr>
<td>4  Anpiaera sp.</td>
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<td>1</td>
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<tr>
<td>5  Aserceratera manglicola Kohlm</td>
<td>1</td>
<td>2</td>
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<tr>
<td>6  Biatrixspora marina Hyde et Borse</td>
<td>4</td>
<td>6</td>
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<tr>
<td>7  Daetytspora huliotrepha (Kohlm.et Kohlm.) Hafellner</td>
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<td>2</td>
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<td>8  Eiheliruphora blephaspora (Kohlm. et Kohlm) Kohlm. et Volkm.-Kohlm.</td>
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<td>9  Halosphaerio reinauguritensis Patil et Borse</td>
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<td>10  Halosphenia sp.</td>
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<tr>
<td>11  Halosphaeria quadrivirgata Cribb et Cribb</td>
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<td>12  Helicascus kandovas Kohlm.</td>
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<td>13  Julidula avriciniae (Borse) Hyde</td>
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<td>14  Lepinsphaeria australis (Cribb et Cribb) Hughes</td>
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<td>2</td>
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<tr>
<td>15  Lignincola hovis Hohnk</td>
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<tr>
<td>16  Linocholus huliothrophes (Kohlm. et Kohlm.) Hafellner</td>
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<td>17  Lophothopez monemwe Kohlm. et Vittal</td>
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<tr>
<td>18  Lulworthia grandispora Meyers</td>
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<tr>
<td>19  Lulworthia sp.</td>
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<tr>
<td>20  Marssoniaspora mangrovei Hyde</td>
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<td>21  Marssonius phalassee Kohlm. et Volkm.-Kohlm.</td>
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<tr>
<td>22  Marssonius velutina Hyde et Borse</td>
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<tr>
<td>23  Patosphaeria minuta Leong, Tan, Hyde et Jones</td>
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<td>24  Quintaria lignata (Kohlm.) Kohlm. et Volkm.-Kohlm.</td>
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<tr>
<td>25  Rhizophila marina Hyde et Jones</td>
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<td>26  Savoryella ligulata Jones et Eaton</td>
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<td>27  Trematosphaeria sp.</td>
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<td>28  Verruculina enalia (Kohlm.) Kohlm. et Volkm.-Kohlm.</td>
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<td>29  Succarabella marinospora Hyde</td>
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<td>Basidiomycetes</td>
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<td>30  Halaxepyra villosa Kohlm. et Kohlm.</td>
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<td>31  Calathea mangrovei Jones et Agerer</td>
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<td>Deuteromycetes</td>
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<td>32  Ciremialu pygmae Kohlm.</td>
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<td>33  Clavatochroa bathosa (Anas.) Nakagiri et Tabaki</td>
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<td>34  Cytospora rhizophorae Kohlm. et Kohlm.</td>
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<td>35  Humicola olivallima Meyers et Moore</td>
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<td>36  Pericinna probus Anasta</td>
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<td>37  Plasma sp.</td>
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<td>38  Tribechlinum aechasporeum (Meyers et Moore) Dixon</td>
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<td>39  Zulcria variata Anasta</td>
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Numbers indicates number of identifications

References
3. Kast 