

Mangrove Marine Fungi from Mayabandar-Andaman Island (India)-III

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ABSTRACT

This investigation is study of nine mangroves ecosystem of Mayabandar-Andaman. Out of these 3 species of Ascomycota- Halorosellinia oceanica, Lignincola laevis, Savoryella lignicola. While 6 species from Mitosporic fungi- Cirrenalia basiminuta, Hydea pygmea, Bactrodesmium linderii, Periconia prolifica, Trichocladium alopallonellum and Halenospora varium. All nine higher marine fungi were first time reported from Mayabandar-Andaman Island.

Keywords: Mangrove, Marine, Fungi, Mayabandar-Andaman Islands.

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INTRODUCTION

Marine fungi play an important role in food production as decomposers of organic matter. A range of fungi occurs in the mangrove ecosystem, although their composition and frequency of occurrence vary with location. Mangroves sustain a wide range of fungi and the fungal diversity reflects the availability of substrate for colonization. Mangroves are the evergreen forest common to tropical and subtropical coastal regions and occur along inlet, harbors and hinterland. They reduce the tidal currents, causes extensive deposition provide surface for adjunct the maritime creature e.g. brace roots of *Rhizophora mangle* [18]. Although the importance of mangroves is better understood, they are still being destroyed at an alarming rate [19]. In the Andaman mangrove covered 612km² region FSI (2009). As many as 34 exclusive species are investigated from Andaman and Nicobar [9]. An extensive ecological study on mangroves fungi in India were studied by Borse [2], [10], [4], However study of Andaman Island is merger. Some extent Chinnaraj [7], Baskaran [1], Tuwar and Cholake [30][31] investigated fungi from Andaman. This article provides information about distribution of mycosporeous marine fungi in the mangrove ecosystem of the Mayabandar Andaman. Taxonomy and ecology of these fungi will be discussed and described.

MATERIAL AND METHODS

Samples of dead and decayed mangrove wood, intertidal wood, driftwood and submerged wood were randomly collected from Mayabandar- Andaman (India). The samples were carried to laboratory in airtight plastic bags for avoid loss of moisture. These specimens were washed thoroughly with tap water. Then these are observed and examined under stereomicroscope for fungal growth. After observations, these samples were incubated moist and salty condition and periodically examined for isolation of fungus. The slides for permanent preparation, guidelines followed which are given by (Volk. - Kohlm. and Kohl.,[36] Kohl. and Kohl. [13]. The sizes of different parts of fungi and their photos were taken. Identification of the marine fungi were made with the help of [14] [15] [11] and other relevant literature. Samples of dead and decaying mangroves, tide woods, driftwood and fillets were randomly collected from Mayan Bandar- Andaman Island (India) during the cold winter period. Place the sample in a plastic bag and seal it to prevent moisture. Back at the laboratory, samples containing residual and contaminating bacteria were thoroughly washed in running water. After rinsing in tap water, bacteria contaminating the surface are scraped off. Investigate new patterns of fungal growth using a stereomicroscope.

TAXONOMIC ACCOUNT

Halorosellinia oceanica (Schatz) Whalley, Jones, Hyde and Laessle. (Fig.1) Mycol. Res., **104**: 368, 2000. *Hypoxylon oceanicum* Schatz, Mycotaxon, **33**: 413, 1988. Pseudostromata: seated on decorticated wood, occasionally embedded at the base, pulvinate to hemispherical, 0.4-0.8 mm diam., single, or in clusters, linear to suborbicular, surface leathery in fresh material, when young covered with a whitish hyphal layer bearing the anamorph, at maturity black, generally with conspicuous ascomatal projections. In section pseudostromata comprising host cells filled with light brown fungal cells in the form of textura globulosa or amorphous black fungal material. Ascomata: 614-785 x 724-980 µm, immersed in pseudostroma, subglobose to hemispherical, soft to leathery, black, ostioles papillate. Peridium: 25-32µm wide, comprising tissue of textura porrecta, fusing at the outside with the pseudostromata. Paraphyses: 2-3 µm wide at the base, abundant, persistent, remotely septate. Asci: eight-spored, 168-214 µm long, spore-bearing part 132-140 µm long, stipe 36-78 µm long, cylindrical, unitunicate, subapical apparatus dark blue in Melzer's reagent, tapering with a distinct apical rim. Ascospores: uniseriate to obliquely uniseriate or partially biserial at the upper end of the ascus, dark grey-olive to opaque brown, more or less inequilaterally ellipsoid, ventral side varying in degree of convex curvature, upper end broadly rounded, lower end slightly pointed, one-celled, 16-18 x 6-8 µm, biguttulate, wall smooth and relatively thick, without appendages, germination slit usually clearly seen on the ventral side, straight, conspicuous.

Material examined: on intertidal stem of *Sonneratia alba* Mayabandar, 27/5/2013, MFANI 1, Leg.A.R. Tuwar&J.B.Cholake.

Distribution along Indian coast: East coast: Andhra Pradesh, [33], Tamilnadu [16],[22]. West coast: Karnataka and Goa [6], Gujrat [3], Maharashtra [3], Kerala [7], [22], [26]. Andaman and Nicobar Islands: [6],

Remark: The present fungus is common in occurrence (13.55%) from Mayabandar -Andaman and Nicobar Island.

Lignicola laevis Hohnk (Fig.2) Veroeff. Inst. Meeresforsch. Bremerhaven,**3**: 216, 1955.

Ascomata: 132-254 µm in diameter, subglobose or ellipsoidal, immersed or superficial, ostiolate, papillate, coriaceous, hyaline, light brown, fuscous or blackish, solitary or gregarious. Peridium: composed of two or five layers of elongate thick-walled cells with large lumina, forming a textura angularis, merging into the pseudoparenchyma of the venter. Papillae or Necks: upto 4 mm long and 28-40 µm in diameter, cylindrical, centric or eccentric, ostiolar canal at first filled with small-celled pseudoparenchyma. Pseudoparenchyma of thin-walled cells with large lumina filling the venter of young ascomata, eventually breaking up into catenophyses. Asci: 46-68 x 14-22 µm, eight-spored, clavate or subfusiform, short pedunculate, unitunicate, thin-walled, aphysoclastic, without apical apparatuses, persistent, developing at the base of the ascomata venter on a tissue of small asogenous cells. Stipe becoming detached at ascospore maturity and asci released through the ostiole into the water while enclosing the ascospores, central part of ascus swelling in water. Ascospores: 14-24 x 6-8 µm, irregularly biserial, ellipsoidal, one-septate, slightly constricted at the septum, hyaline, without appendages.

Material examined: on intertidal stem of *Sonneratia alba* Mayabandar, 27/5/2013, MFANI 1 and *Rhizophora mucronata*, Mayabandar, 27/5/2013, MFANI2, Leg.A.R.Tuwar&J.B.Cholake.

Distribution in India: East coast: Tamilnadu [16], [24], Andhra Pradesh [33], West Bengal [10], West coast: Maharashtra [29], Goa [2], Kerala [16][26], Gujrat [20]. Lakshadweep Islands: Chinnaraj [6]. Andaman and Nicobar Islands: [7].

Remark: The present fungus is occasional in occurrence (1.32%) from Mayabandar-Andaman and Nicobar Island.

Savoryella lignicola Jones and Eaton(Fig.3)Trans. Br. Mycol. Soc., **52**: 161, 1969.

Ascomata: 212-292 µm high, 120-264 µm in diameter, globose, subglobose or ellipsoidal, immersed, partly immersed or superficial, ostiolate, papillate, membranous and pale to dark brown. Necks: 72-148 µm long and upto 70 µm in diameter, brown with periphyses. Peridium: brown, a textura angularis when viewed from the surface, while in section composed of several layers of thick-walled angular cells. Paraphyses present but sparse. Asci: 106-178 x 16-26 µm, 8-spored, cylindrical or clavate, short stalked, unitunicate, persistent, with an apical truncate non-amyloid apical thickening containing a pore. Ascospores: 26-36 x 9-22 µm, uni or triseriate, ellipsoidal, tri-septate, constricted at the septa, central cells brown, apical cells smaller and hyaline.

Material examined: on intertidal stem of *Rhizophora mucronata*, Mayabandar, 27/5/2013, MFANI 1, Leg. A.R.Tuwar&J.B.Cholake.

Distribution in India: East coast: Tamilnadu [16][24], Orissa and West Bengal [4], Andhra Pradesh [33]. West coast: Maharashtra [3] [29], Goa [3], Karnataka [23], Kerala [17], Gujrat [2], Kerala [16][17][22],

Lakshadweep Islands: [8]. Andaman and Nicobar Islands: [9].

Remark: The present fungus is frequent in occurrence (5.89%). Mayabandar -Andaman and Nicobar Island.

Bactrodesmium linderii (Crane & Shearer) Palm & Stewart (Fig.4) Mycotaxon, **15**: 319-325, 1982.

Trichocladium linderii Crane & Shearer, Mycologia, **70**: 866, 1978.

Mycelium: composed of branched, septate, at first hyaline, latter sub hyaline to light brown hyphae, Conidiophores: macronematous, mononematous, smooth, thin-walled and hyaline or thick-walled and brown. Conidiogenous cells: holoblastic, integrated, terminal or intercalary, smooth, cylindrical, determinate. Conidia: solitary, subglobose to obpyriform, 1-2 septate, without constriction, 18-27 x 8-18 µm, becoming 3-6 µm wide at base, apical cell larger, dark brown to black, 11-16 µm high, basal and sub-basal cells smaller, light brown, wall unequal in height, hence the base of the conidia become curved.

Material examined: on intertidal stem of *Rhizophora mucronata*, Mayabandar, 27/5/2013, MFANI 1, Leg. A.R.Tuwar&J.B.Cholake.

Distribution in India: East coast: Andhra Pradesh [33], West coast: Maharashtra [2] [10].

Remark: It is occasional in occurrence (1.44 %). The present fungus is being reported for the first time from Mayabandar Andaman and Nicobar Island.

Cirrenalia basiminuta Raghukumar and Zainal (Fig.5) Mycotaxon, **31**: 163, 1988.

Hyphae: 2.5–4.5 µm in diameter, septate, hyaline to pale brown. Conidiophores: terminal, integrated, monoblastic, determinate, 8-27 x 1µm, conidia borne laterally and directly on conidiophores, solitary, helicoid, semi-contorted, 28-38 µm x 20-32 µm. Conidia: 3-4 septate, constricted at the septa, cells increasing in size from base to apex, apical cell 10-14 x 10-13 µm, subglobose, basal cell cylindrical and tapering, 7-14 x 2-6 µm, pigmentation of cells increasing from base to apex, the apical cell light brown with a reddish tinge.

Material examined: on intertidal stem of *Rhizophora mucronata*, Mayabandar, 27/5/2013, MFANI 1, Leg. A.R.Tuwar&J.B.Cholake.

Distribution in India: East coast: Tamilnadu [28], Andhra Pradesh [33], Orissa [5]. West coast: Goa [25], Kerala [17], Gujarat [20], Maharashtra [2] [10], Lakshadweep Islands: [6].

Remark: In present study this fungus is rare in occurrence (0.7%). The present fungus is being reported for the first time from Mayabandar Andaman and Nicobar Island.

Halenospora varium (Anastasiou) Jones (Fig.6) *Zalerion varium* Anastasiou, Can. J. Bot., **41**:1136, 1963 (as *Z. Varia*).

Hyphae: septate, branched, immersed, hyaline, Conidiophores: up to 30 µm long, 2-3 µm in diameter, micronematous, simple, cylindrical, septate, sometimes absent, superficial, hyaline to light olive coloured. Conidia: 14-62 x 13-44 µm, solitary, irregularly helicoids or coiled in three planes, forming a knot or ball of about 10 to 28 cells; Conidial filament lateral, rarely branched or subtending an additional conidium; thick-walled, smooth, brown to dark brown, appearing black in mass; cells 6-13x4-11µm.

Material examined: on intertidal stem of *Rhizophora mucronata*, Mayabandar, A.R.Tuwar (MFANI 1) 27 May 2013.

Distribution in India: East coast: Tamilnadu [24], Andhra Pradesh [33], Orissa [5], West coast: Maharashtra [10][29], Karnataka [35], Gujrat [20], Kerala [16][17][22]. Lakshadweep Islands: [6]. Andaman and Nicobar Islands: [7].

Remark: The present fungus is occasional in distribution (4.13%). The present fungus is being reported for the first time from Mayabandar-Andaman and Nicobar Island.

Hydea pygmea (Kohlmeyer) Pang & Jones (Fig.7) Ber. Disch. Bot. Ges., **79**: 35, 1966.

Hyphae: 2-4 µm in diameter, septate, ramose, fuscous. Conidiophores: obsolete. Conidia: acrogenous, solitary, helicoid, contorted ½ or 1 time, three or four septate, not or lightly constricted at the septa, fist-shaped or reniform, black or fuscous, fulgent (upper three cells dark, lower two or three cells light-coloured); cells increasing in diameter from base to apex distinctly dissimilar; spirals 25- 30 x 26-32 µm; terminal cell 14-20 µm in diameter, subglobose to reniform, basally flattened basal cells 3-5.5µm in diameter, central cells irregularly conical or almost wedge-shaped.

Material examined: on intertidal stem of *Rhizophora apiculata*, Mayabandar A.R.Tuwar (MFANI 1) 27 May 2013.

Distribution in India: East coast: Andhra Pradesh [33], Tamilnadu [28], Orissa [5]; West coast: Gujrat [20], Maharashtra [4], [20], Kerala [7], Goa [4], Lakshadweep Islands: [6]. Andaman and Nicobar Islands: [7].

Remark: The fungus is frequent in occurrence (5.1 %). The present fungus is being reported for the first time from Mayabandar-Andaman and Nicobar Island.

Periconia prolifica Anastasiou (Fig.8) Nova Headwigia, **6**: 260, 1963.

Conidiophores: 5-180 x 3 µm; cylindrical, septate, simple or branched, hyaline, often forming pustules on the surface of the substrates. Conidiogenous cell: ellipsoidal or ovoid, hyaline, produced acrogenously. Conidia: 6.5-8.5 µm in diameter, one-celled, subglobose or ovoid, smooth, thick-walled, light brown with a reddish tint or dark brown, developing basipetally, catenulate, cells finally separating.

Material examined: on intertidal stem of *Sonneratia alba* and *Rhizophora mucronata*, Mayabandar, A.R. Tuwar (MFANI 1&2) 27may 2013

Distribution in India: East coast: Tamilnadu [24], Andhra Pradesh [33]; Orissa [5]; West Bengal [4]. West coast: Maharashtra [4], Goa [4], Karnataka [21], Gujrat [20], Kerala [17][26]. Lakshadweep Islands: [8]. Andaman and Nicobar Islands: [7].

Remark: This fungus is very common (11%). The present fungus is being reported for the first time from Mayabandar-Andaman and Nicobar Island.

Trichocladium alopallonellum (Meyers and Moore) Kohlm. and Volk-Kohlm. (Fig.9) Mycotaxon, **53**: 349-353, 1995, *Humicola alopallonella* Meyers and Moore, Am.J. Bot., **47**: 346, 1960.

Hyphae: septate, subhyaline to light brown. Conidiophores: 4-8 x 3-6 µm, macronematous, simple, one-to two-celled, smooth, hyaline to light brown, lateral, short, sometimes indistinct. Conidia: 12-18 x 14-20 µm, obpyriform, ovoidal or subglobose, one-to two-celled, fuscous, when two-celled, apical cell larger (8-16 x 6-12 µm), fuscous, basal cell, smaller, obconical to cylindrical, light brown, conidiogenous cell usually remaining connected with the conidium.

Material examined: on intertidal mangrove wood *Rhizophora mucronata*, Mayabandar, A.R. Tuwar (MFANI 1) 27may 2013.

Distribution in India: East coast: Orissa [5] West Bengal [4], Tamilnadu [16][28], Andhra Pradesh [33][34], West coast: Maharashtra [12], Karnataka, [21], Gujrat [20], Goa [4].

Remark: The present fungus is occasional in Mayabandar-Andaman and Nicobar Island.

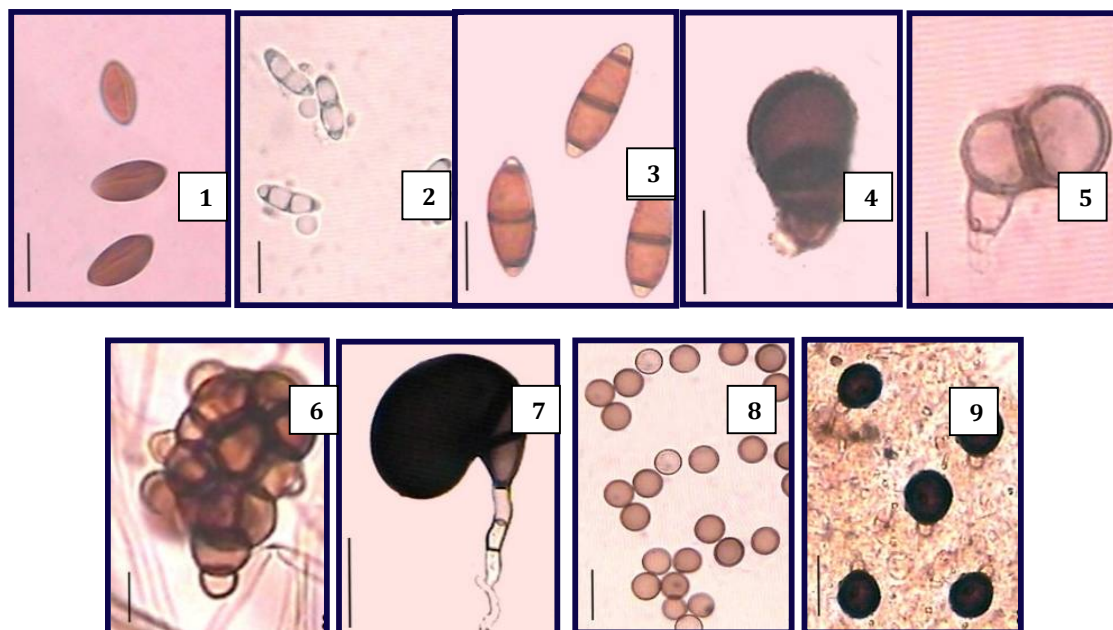


Fig.No.1. *Haloresellinia oceanica*, Fig.No.2. *Lignincola laevis*, Fig.No.3. *Savoryella lignicola*, Fig.No.4. *Bacterodesmium linderii*, Fig.No. 5 *Cirrenalia basiminuta*. Fig. No. 6. *Halenospora varium*, Fig.No.7. *Hydea pygmaea*, Fig.No.8. *Periconia prolifica*, Fig.No.9. *Trichocladium alopallonellum*.

RESULT AND DISCUSSION

In this research, we examined the isolation of different marine organisms such as *Rhizophora apiculata*, *Rhizophora mucronata* and *Sonneratia alba* in mangroves. Among them, *Rhizophora mucronata* is the main host from which three species of marine fungi have been isolated. Group of 9 species of maritime fungi were encountered, identified, and illustrated during this research. Among marine fungi, there are 3 Ascomycota phyla, namely *Haloresellinia oceanica* (S.Schatz) Whalley et al., *Lignincola laevis* Hohnk., *Savoryella lignicola* E.B.G. Jones and R.A. Eaton. Among them, 6 types of hyposporous mushrooms are *Cirrenalia basiminuta* Raghuk. and Zainal, *Hydea pygmaea* (Kohlm.) K.L. Pang and E.B.G. Jones, *Bacterodesmium linderii* (Crane & Shearer), Palm & Stewart, *Periconia prolifica* Anastasiou., *Trichocladium alopallonellum* Meyers

and Moore, and *Gelenospora* variant Islands (Andastasiou) and fungal data. , *Bactrodesmium*, Sheiier; (Crane) and *Bactrodesmium* Sheiier) Stewart and *Cirrenalia basiminuta* Raghukumar and Zainal are new records from the Andaman Islands. In addition to descriptions and images, this information is on distribution of fungi in India. The taxonomy, morphology and ecology of these fungi will be described and discussed.

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