Diversity of Marine mitosporic fungi from Maharashtra Coast (India) - II

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ABSTRACT

Present paper deals with six marine mitosporic fungi viz., Bactrodesmium linderii, Cirrenalia basiminuta, Clavatospora bulbosa, Halenospora varia, Hydea pygmea and Matsuporium tropicale which were isolated form intertidal wood samples from the coast of Thane District of Maharashtra. The data provides information on the distribution of these fungi in India, apart from description and illustrations. This data will be useful in the compilation of aquatic fungal biodiversity of India.

Keywords: Hyphomycetes, Biodiversity, Intertidal wood, Marine fungi.

INTRODUCTION

Marine fungi can be defined based on their morphology, physiology and ecology and their ability to reproduce in the marine environment. Early physiological studies of marine fungi focused on their salinity tolerance (Jennings, 1986a, b), temperature requirement (Jones, 1971), nutrient requirement (Amon, 1986), enzyme production (Schaumann and Molitories 1986), aspects of wood decay (Leightly, 1980) and ability to grow on different polysaccharides (Meyers, 1971). Garzoli, et al. (2015) updated knowledge on marine fungi associated with wood substrates in the Mediterranean Sea and hints about their potential to remediate hydrocarbons.

MATERIAL AND METHODS

The study involved the frequent visits to collection sites located in and around coastal region in Thane district of Maharashtra to collect the intertidal drift wood, woody debris, dead stem, root, leaves, fruits of mangroves. specimens were returned to the laboratory and observed
under research microscope for the presence of sporulating structure like mycelium, conidiophores and conidia of Hyphomycetes.

The permanent slides were prepared as suggested by Volkman- Kohlmeyer and Kohlmeyer (1996). Identification of marine fungi were confirmed with the help of monographs and illustrated keys provided by Kohlmeyer and Kohlmeyer (1979). Hyde et al (2000), and Jones et al (2009). Reports of fungi from India and Maharashtra were confirmed with the help of Kamat et al. (1971), Bhide et al. (1987), Bilgrami et al. (1979, 1981, 1991), Jamaluddhin et al. 2004 and Borse et al. (2012, 2013) and other relevant literature.

Taxonomic account-

1) **Bactrodesmium linderii** (J.L. Crane & Shearer) Palm & Stewart

*Mycotaxon*, 15- 319-325 (1982). (Photo.1; Fig.1)


*Mycelium* is composed of branched, septate, hyaline to brown hyphae, *Conidiophores* are macronematous, mononematous, smooth, thin-walled and hyaline or thick-walled and brown. *Conidiogenous cells* are holoblastic, integrated, terminal or intercalary, smooth, cylindrical, determinate. *Conidia* are 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 driftwood, Bordi- Dahanu; S. A. Gosavi 1118 (PGDB), 3 April 2013.

Distribution in India- *East coast-* Andhra Pradesh.


Remarks- The measurements of conidia are agreed with that of *B. linderii* (J.L. Crane and Shearer, 1978). Therefore, it is assigned to that species. It is being reported for the first time from Thane district.

2) **Cirrenalia basiminuta** Raghukumar & Zainal

(Phot 2; Fig. 2)


*Hyphae* are 2.5-4.5 µm in diam., septate, pale brown. *Conidiophores* are terminal, integrated, monoblastic, determinate, 8-27 x 1 µm, conidia borne laterally and directly on conidiophore, solitary, helicoid, 28-38 µm x 20-32 µm. *Conidia* are 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.


Remarks- The descriptions of conidia are agreed with that of *C. basiminuta* Raghukumar and Zainal (In-Raghukumar et al. 1988). Therefore, it is assigned to that species. It is an addition to the fungi of Thane district.

3) **Clavatospora bulbosa** (Anast.) Nakagiri & Tubaki.

(Phot 3; Fig. 3).


*Hyphae* are 2.5-4 µm in diameter, septate, ramose, and fuscous; *Conidiophores* are 18-78 x 2-4.5 µm, cylindrical, septate, simple or branched, hyaline. *Conidia* are tetra radiate, septate, slightly constricted at the septa, hyaline to light brown, developing by transformation of the inflated apex of the conidiophore, basal arm one–septate, proximal cell 8-16 x 4-9 µm ellipsoidal or ovoid, truncate at the base, light brown; distal cell 7-12 x 6-14µm, cylindrical or shortly three branched, fuscous, three divergent arms arising simultaneously from the inflated distal cell of basal arm, 20-60 x 4-6 µm, cylindrical, one-to-five septate, light brown.
Material examined- On intertidal wood of *Rhizophora apiculata*, Mahim; S. A. Gosavi 1120 (PGDB), 20 April 2014.

Distribution in India- East coast- Tamil Nadu, Orissa and West Bengal. West coast- Maharashtra, Kerala, Goa, Gujarat and Pondicherry-Mahe (source- Borse et al 2012, 2013)

Remarks- The descriptions and measurements of conidia are completely agreed with that of *Clavatospora bulbosa* (Anast.) Nakagiri & Tubaki (Anastasiou, 1961). Hence, it is assigned to that species. It is being recorded for the first time from Thane district.

4) *Halenospora varia* (Anastasiou) E.B.G. Jones (Photo.4; Fig. 4).
*Hyphae* are septate, branched, immersed, and hyaline, *Conidiophores* are upto 30 µm long, 2-3 µm in diameter, micrornematous, simple, cylindrical, septate, sometimes absent, superficial, hyaline to light olive coloured. *Conidia* are 14-62 x 13-44 µm, solitary, irregularly helicoid 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 6-13x 4-11µm.

**Material examined**- On intertidal stem of *Avicennia marina*, Bordi; S. A. Gosavi 1122 (PGDB), 15 Octo. 2013.

**Distribution in India- East coast**- Tamil Nadu, Orissa and West Bengal **West coast**- Maharashtra, Goa, Daman, Gujarat and Kerala (source Borse et al 2012, 2013)

**Remarks**- The descriptions and measurements of conidia are agreed with that of *H. varia* (Anastasiou) E.B.G. Jones (Jones et al. 2009). Therefore, it is assigned to that species. It is an addition to the fungi of Thane district.

**5) Hydea pygmea** (Kohlm.) K.L. Pang & Jones (Photo.5; Fig. 5)


*Hyphae* are 2.2-4.5 µm in diam, septe, ramose and fuscous. *Conidiophores* are obsolete. *Conidia* are acrogenous, solitary, igantean, contorted ½ or 1 time contorted, 3-4-septate, not or slightly constricted at the septa, hooked appearance, 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 25.5- 31 x 28.5-34 µm; terminal cell 16-23 µm in diam, subglobose to reniform, basely flattened; basal cells 3.5-5.5µm in diam; central cells irregularly conical or almost wedge-shaped. *Note*- It is a common species on mangrove wood, especially *Rhizophora* species, growing on the bark, with slow growth in culture but sporulates readily. It differs from all othe *Cirrenalia* like species by the dark-brown to black hooked nature of the conidia.

**Material examined**- On decaying driftwood in the intertidal zone, Dahanu; S. A. Gosavi 1123 (PGDB), 5 Mar. 2014.

**Distribution in India- West Coast**- Gujarat, Maharashtra, Goa, Pondicherry Mahe and Kerala. **East Coast**- Tamil Nadu, Pondicherry, Andhra Pradesh, Orissa and West Bengal (Source - Borse et al .2012, 2013)

**Remarks**- The descriptions and measurements of conidia are agreed with that of *H. pygmea* (Kohlm.) K.L. Pang and E.B.G. Jones (Kohlm. and Kohlm., 1979). Therefore, it is assigned to that species. It is an addition to the fungi of Thane district.

**6) Matsusporium tropicale** (Kohlm.) Jones & K.L. Pang


*Hyphae* are 2-5 µm in diam., septe, superficial or immersed, brown. *Conidiophores* are 24-40 x 2.5-4.5 µm, cylindrical, 0-4-septate, simple, acrogenous or lateral, often remaining connected with detached conidia, sometimes obsolete, straight or curved, light brown. *Conidiogenous cells* are monoblastic, integrated, terminal, and determinate. *Conidia* are acrogenous, solitary, regularly or irregularly helicoid, mostly 1 to 1 ½ times contorted, rarely semicontorted, six - twelve septate, not or slightly constricted at the septa, umber to reddish brown; cells increasing in diameter from base to apex, distinctly dissimilar; spirals 22-35µm in diameter; terminal cell 8.5-14.5 x 11-20 µm, subglobose to ellipsoidal, basally flattened; basal cells 5-10 x 4-5.5 µm; cylindrical; central cells subglobose, obtusely conical or dolliform.


**Distribution in India-East coast**- Orissa, West Bengal **West coast**- Goa, Kerala- Maharashtra (Source - Borse et al.2012, 2013)

**Remarks**-The descriptions of conidia are agreed with that of *Matsusporium tropicale* (Kohlm.) Jones and Pang (Kohlmeyer,1968). Hence, it is assigned to that species. It is an addition to the fungi of Thane district.

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REFERENCES


