

MARINE FUNGI FROM MAHARASHTRA (INDIA) -V. A CHECK LIST

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The paper deals with 83 species (62 Ascomycetes, 3 Basidiomycetes, 18 Deuteromycetes) of higher marine fungi from Maharashtra Coast (The Arabian sea) including 19 species as new records for the fungi of Maharashtra. Substrates include drift wood, intertidal wood harbour timber and dead submerged parts of the mangroves. Comments are given on some interesting species. New information is supplemented by some data from literature.

Keywords: Ascomycetes; Basidiomycetes; Deuteromycetes; Mangrove fungi; Marine fungi.

Introduction

During the survey (1996-1998) on the higher marine fungi from the coast of Maharashtra (560 kms) several interesting taxa have been collected. Many of these fungi have been reported in the earlier publications (Table 1) and an additional 19 species are collected as new records to the fungi of Maharashtra. Information on the occurrence of fungi species along the greater length is difficult to obtain. To solve this difficulty, the check list of higher marine fungi collected along the Maharashtra coast was presented in this paper. Lower fungi are omitted because data of occurrence along the coast of Maharashtra are insignificant.

Materials and Methods

Samples of drift wood deposited on beaches, intertidal wood caught between natural rocks or stones functioning for coastal protection, intertidal stationary harbour timber, submerged dead parts of mangroves and salt marsh plant were collected in polythene bags during low tide from various localities along the coast of Maharashtra [Alibag, Alibag Fort Island, Arondha, Bagmandala, Bankot, Dahanu, Dabhol, Devagad, Elephanta Island, Arondha Ganapatipule, Guhagar, Harnai Harihareshwar, Jaigad, Janjira Fort Island, Mahim, Malvan, Murud, Reddi, Ratnagiri, Ravadanda, Revas, Shriwardhn, Sindhudurg Fort Island, Vasai, Vengurla].

One half of the collected samples were examined as soon as possible for fungal growth (direct observations). The remaining samples were incubated in

plastic boxes with sterile wetsand at room temperature and examined repeatedly for the occurrence of fungi. Foam samples were collected from sandy beaches for arenicolous fungi.

This work has been substantially facilitated by the key^{1,2} list of fungi of India³ and list of fungi of Maharashtra^{4,5}.

Results and Discussion

In the earlier publication⁶ *Aigialus parous* was exclusively collected on submerged wood of mangroves. In the present work the said fungus collected on intertidal harbour timber at Revas. Thus it is not a substrate specific fungus. Similar observations were made for *Halorosellina oceanica* and *Julella avicenniae*.

Kohlmeyer and Volkmann-Kohlmeyer² commented on *Aigialus rhizophorae*. Recent collection of this fungus from *Rhizophora mucronata* Lamk. was critically examined. Shape, septation and colour of the ascospores of *A. grandis* and *A. rhizophorae* were not identical. Ascospores of *A. grandis* are yellow-brown where as they are brown in *A. rhizophorae*. Ascospores of *A. grandis* are pointed at the tips where as they are blunt at the tips in *A. rhizophorae* (As shown in the microphotographs⁶). Moreover septation pattern, shape and colour of the ascospores of *A. rhizophorae* are more or less identical with ascospores of *A. parvus*. Therefore *A. rhizophorae* is a valid species.

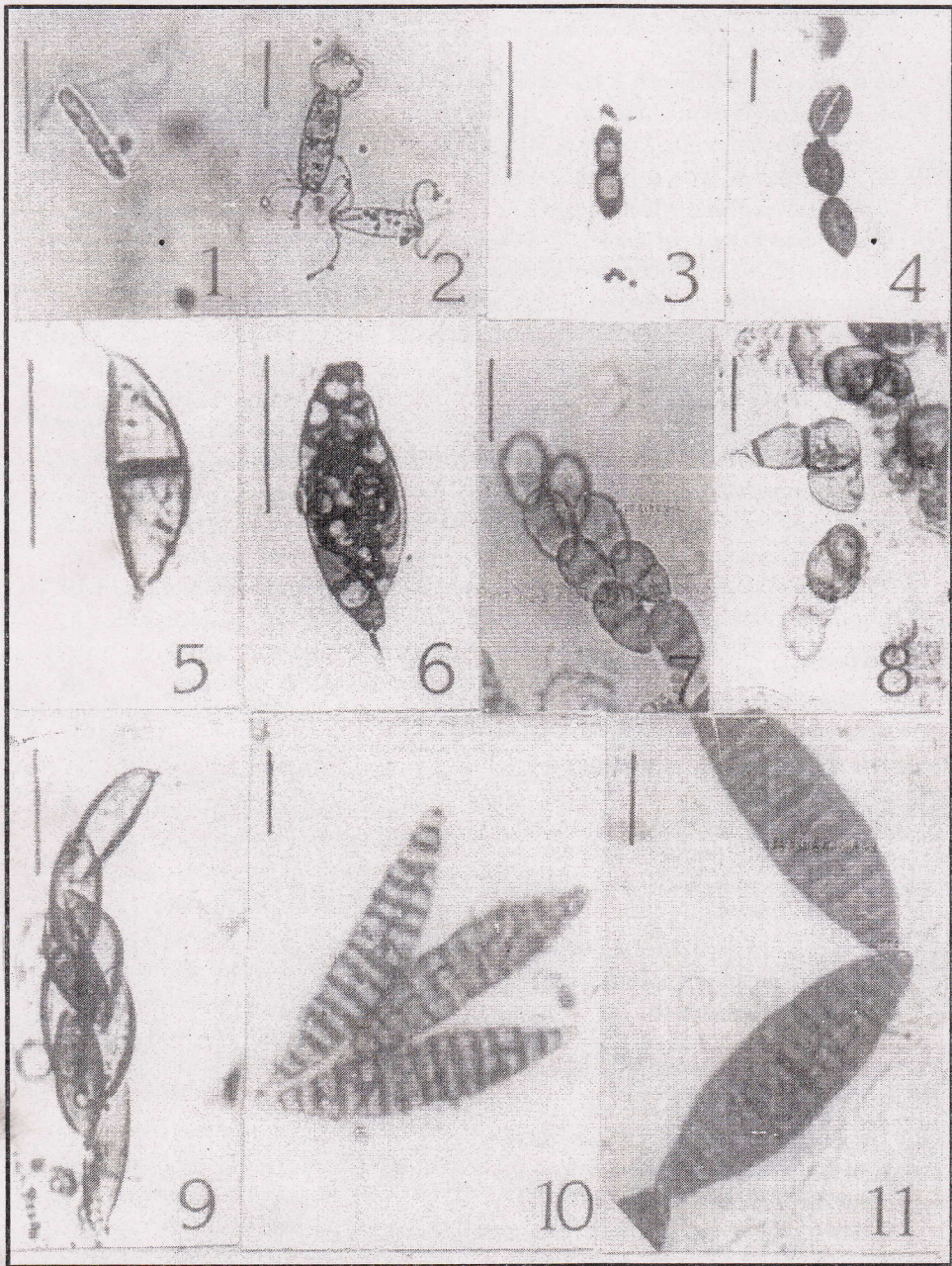
Borse⁷ wrongly identified *Ceriosporopsis caduca* as *C. cambrensis*

Table 1. List of marine fungi from Maharashtra.

S. No.	Fungi species	Substrate	Reference
Ascomycetes			
1.	<i>Acrocordiopsis patilli</i> Borse & Hyde	MS	15
2.	<i>Aigialus grandis</i> Kohlmeyer & Schatz	MS	6,16
3.	<i>A. mangrovei</i> Borse	MS	6
4.	<i>A. parvus</i> Schatz & Kochmeyer	HT, MS	6,16 PW
5.	<i>A. rhizophorae</i> Borse	MS	6
6.	<i>Aniptodera chesapeakensis</i> Shearer & Miller	IW	17
7.	<i>Antennospora quadricornuta</i> (Cribb&Cribb) Johnson	IW,MS	18,19
8.	<i>A.salina</i> (Meyers) Yusoff, Jones& Moss	IW	17
9.	<i>Arenariomyces majusculus</i> Kohlmeyer & Volk-Kohlmeyer	DW	PW
10.	<i>A.parvulus</i> Koch	DW,FS	PW
11.	<i>A. trifurcatus</i> Hohnk	DW,FS	20,PW
12.	<i>Ascocratera manglicola</i> Kohlmeyer	MS	21
13.	<i>Bathyascus tropicalis</i> Kohlmeyer	IW	17
14.	<i>Biatriospora marina</i> Hydle& Borse	MS	16,22
15.	<i>Ceriosporopsis caduca</i> Jones& Zainal	IW	7
16.	<i>C.halima</i> Linder	IW	7
17.	<i>Corollospora cinnamomea</i> Koch	DW	PW
18.	<i>C.colossa</i> Nakagiri & Tokura	DW	PW
19.	<i>C.lacera</i> (Linder) Kohlmeyer	FS	20
20.	<i>C. maritima</i> Werdermann	FS, IW	20PW
21.	<i>C.pulchella</i> Kohlm. Schmidt&Nair	IW	23
22.	<i>Cryptovalsa halosarceicola</i> Hyde	MS	PW
23.	<i>Dactylospora haliotrepha</i> (Kohlm. & Kohlm.) Hafellner	HT, MS	16,19 PW
24.	<i>Didymella avicenniae</i> Patil & Borse	MS	8,16
25.	<i>Dryosphaera tropicalis</i> Kohlmeyer Volk- Kohlmeyer	IW	PW
26.	<i>Eutypa bathurstensis</i> Hyde & Rappaz	MS	PW
27.	<i>Halorosellina oceanica</i> Whalley et al.	HT, IW, MS	PW
28.	<i>Halosarpehia abonnis</i> Kohlmeyer	IW	23
29.	<i>H. fibrosa</i> Kohlmeyer & Kohlmeyer	IW RM	24,25
30.	<i>H.marina</i> (Cribb& Cribb) Kohlmeyer	IW	25
31.	<i>H. minuta</i> Leong	MS	PW
32.	<i>H.ratnagiriensis</i> Patil & Borse	IW,MS	24,25
33.	<i>H.retorquens</i> Shearer & Crane	MS	25
34.	<i>H.viscosa</i> (Schm.) Shearer&crane ex Kohlmeyer & Volk-Kohlmeyer	MS	14
35.	<i>Halosphaeria cucullata</i> (Kohlm.) Kohlm.	IW	17
36.	<i>Kallichroma glabrun</i> (Kohlmeyer) Kohlmeyer & Volk-Kohlmeyer	MS	PW
37.	<i>K.tethys</i> (Kohl,&Kohlm.) Kohlm & Volk-Kohlm.	MS	PW
38.	<i>Julella avicenniae</i> (Borse) Hydle	HT,MS	26 PW
39.	<i>Leptosphaeria australiensis</i> (Cribb&Cribb) Hughes	MS	25
40.	<i>Lignincola laevis</i> Hohnk	IW, MS	11,19,PW
41.	<i>L.longirostris</i> (Cribb&Cribb) Kohlm.	IW,MS	7,11
42.	<i>Lineolata rhizophorae</i> (Kohlm.&Kohlm) Kohlmeyer & Volk-Kohlmeyer	MS	PW
43.	<i>Lophiostoma mangrovei</i> Kohlmeyer & Vittal	MS	27,28

S. No.	Fungi species	Substrate	Reference
44.	<i>Lulworthia floridana</i> Meyers	IW	14,18
45.	<i>L.grandispora</i> Meyers	IW,MS	17,PW
46.	<i>L.medusa</i> (Ellis& Everh.)Cribb& Cribb	MS	7,14
47.	<i>L. purpurea</i> (Wilson) Johnson	IW	14,18
48.	<i>Massarina thalassiae</i> Kohlm.& Volk-Kohlm.	MS	21
49.	<i>M.velatospora</i> Hyde & Borse	MS	29
50.	<i>Nimbospora octonae</i> Kohlmeyer	IW	17
51.	<i>Pheosphaeria neomaritima</i> (Gessner&Kohlm. Shoemaker&Babcock	MS	14
52.	<i>Pleospora pelagica</i> Johnson	MS	23
53.	<i>Quintaria lignatilis</i> (Kohlmeyer) Kohlm. &	MS	PW
54.	<i>Rhizophila marina</i> Hyde & Jones	MS	PW
55.	<i>Saccardoella</i> sp.	MS	PW
56.	<i>Salsuginea ramicola</i> Hyde	HT, MS	18,16 PW
57.	<i>Savoryella lignicola</i> Jones&Eaton	IW	7
58.	<i>S.paucispora</i> (Cribb&Cribb) Koch	MS	30
59.	<i>Trematosphaeria striatispora</i> Hyde	MS	PW
60.	<i>Torpedospora radiata</i> Meyers	IW	7
61.	<i>Verruculina enalia</i> (Kohlm.) Kohlm.& Volk-Kohlmeyer	HT, IW	8,14,16
62.	<i>Zopfiella latipes</i> (Lundqvist) Malloch & Cain	IW	23
Basidiomycetes			
1.	<i>Calathella mangrovei</i> Jones & Agerer	MS	PW
2.	<i>Halocyphina villosa</i> Kohlm.& Kohlm.	MS	11,19
3.	<i>Nia vibrisa</i> Moore & Meyers	IW	31
Dueteromycetes			
1.	<i>Ascochyta salicorniae</i> Magnus	MS	10
2.	<i>Camarosporium palliatum</i> Kohlm. & Kohlm.	IW,MS	32,33
3.	<i>C.roumeguerii</i> Saccardo	IW, MS	14,33
4.	<i>Cirrenalia basiminuta</i> Raghukumar & Zainal	MS	10,14
5.	<i>C. macrocephala</i> (Kohlm.) Meyers	IW, MS	18,32
6.	<i>C. pygmea</i> Kohlmeyer	IW MS	10
7.	<i>C. tropicalis</i> Kohlmeyer	MS	PW
8.	<i>Clavatospora bulbosa</i> (Anastasiou) Nakagiri & Tubaki	IW, MS	10,32
9.	<i>Cytospora rhizophorae</i> Kohlm & Kohlm.	MS	PW
10.	<i>Dictyosporium pelagicum</i> (Linder) Hughes	IW,MS	32,33
11.	<i>Periconia prolifica</i> Anastasiou	DW,IW, MS	10,11,32
12.	<i>Phomopsis mangrovei</i> Hyde	MS	PW
13.	<i>Trichocladium achrasporum</i> (Meyers& Moore) Dixon	IW	32
14.	<i>T. alopallonellum</i> (Meyers&Moore) Kohlmeyer and Volk-Kohlmeyer	MS	10,11,14,32
15.	<i>T.linderi</i> Shearer	IW, MS	10,11,14
16.	<i>T.opacum</i> (Corda) Hughes	DW,IW, MS,	10,11,14
17.	<i>Zalerion maritimum</i> (Linder)Anastasiou	IW,MS	10,14,32
18.	<i>Z.varium</i> Anastasiou	DW,IW, MS	10,11,14,32

DW= Drift wood, FS= Foam sample, HT= Harbour timber, IW=Inertidal wood, MS=Mangrove substrate, PW= Present work (New records for the fungi of Maharashtra).



Figs.1-11. Fig1 - Ascospore of *Arenariomyces parvulus*; 2- Ascospores of *A.majusculus*; 3-Ascospore of *Corollospora cinnamomea*; 4-Ascospores of *Halorosellina oceanica*; 5-Ascospore of *Corollospora cinnamomea*; 6- Ascus of *Halasarpheia minuta*; 7- Ascus of *Kallichroma glabrum*; 8 Conidia of *Cirrenalia basiminuta*; 9-Ascus of *Rhizophila marina*; 10-Ascospores of *Aigialus grandis*; 11-Ascospores of *A.rhizophorae*. All Scale Bars = 20 μ m

Wilson. It is one of the rare fungi collected on intertidal wood. Patil and Brose⁸ wrongly cited sub nomen *Helicascus kanaloanus* Kohlmeyer and Kohlmeyer for *Salsuginea ramicola* Hyde. It is one of the common fungi collected on damaged mangrove stems and intertidal harbour timber.

Prasannarai and Shridhar⁹ list *Calathella mangrovei* from Karnataka. In the present work basidiocarps of the said fungus collected on dead seedlings and prop roots of *Rhizophora mucronata*. However, basidia and basidiospores were not observed.

Borse¹⁰ wrongly cites sub nomen *Cirrenalia macrocephala* for *Cirranalia basiminuta*. The species was rarely collected in the present study. Borse¹⁰, patil and Borse¹¹ wrongly cited sub nomen *Trichocladium achrasporum* for *T. opacum*. Raghukumar¹² recorded this fungus from Tamil Nadu coast. The fungus is considered as facultative marine species. Ellis¹³ wrote "common on wood and herbaceous stems" indicating it as a terrestrial species.

Ramesh and Borse¹⁴ wrongly cited sub nomen *Ceriosporopsis cambrensis* for *C. caduca*, *C. circumvestita* for *Nimbospora octonae*, *Halosarpheia alibagensis* for *H. abonnis*, *Mycosphaerella avicenniae* for *Didymella avicenniae*, *Helicascus kanaloanus* for *Salsuginea ramicola*, *Leptosphaeria albopunctata* for *Quintaria lignatilis*, *Leptosphaeria bombayensis* for *Ascochtera manglicola*, *Pleospora malvanensis* for *Aigialus parvus*, *P. rhizophorae* for *A. rhizophorae*, *P. sonneratia* for *A. grandis*, *Cirrenalia macrocephala* for *C. basiminuta*, and *Trichocladium achrasporum* for *T. opacum*. *Halosarpheia indica* and *H. rhizophorae* remain undescribed until sufficient new material become available.

In the present paper data on 83 species of higher marine fungi from drift wood, intertidal wood, harbour timber, mangrove wood, salt marsh plant and foam samples was provided (Table 1).

The common fungi collected on drift

wood deposited on beaches were *Antennospora quadricornuta*, *Arenariomyces trifurcatus*, *A. majusculus*, *Clavatospora bulbosa*, *Corollospora maritima*, *C. pulchella*, *Verruculina enalia* and *Zalerion maritimum*.

The most common fungi recorded on intertidal harbour timber were *Aigialus parvus*, *Antenospora quadricornuta*, *A. salina*, *Dactylospora haliotrepha*, *Halorosellina oceanica*, *Trichocladium alopallonellum*, *T. opacum*, *Verruculina enalia* and *Zalerion maritimum*.

The dominant fungi recorded on intertidal wood caught between natural rocks of stones functioning for coastal protection were *Antennospora quadricornuta*, *A. salina*, *Ceriosporopsis halima*, *Clavatospora bulbosa*, *Halocyphina villosa*, *Lignicola laevis*, *Lulworthia grandispora*, *L. medusa*, *Torpedospora radiata*, *Verruculina enalia* and *Zalerion maritimum*.

The common fungi collected on submerged dead parts of mangroves were *Aigialus grandis*, *A. parvus*, *Antennospora quadricornuta*, *Calathella mangrovei*, *Cirrenalia pygmaea*, *Dactylospora haliotrepha*, *Halorosellina oceanica*, *Hydronectria tethys*, *Julella avicenniae*, *Leptosphaeria australiensis*, *Lophiostoma mangrovei*, *Lulworthia grandispora*, *Massarina velatospora*, *Rhizophila marina*, *Salsuginea ramicola*, *Verruculina enalia* and *Zalerion varium*.

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