

**STUDIES ON MARINE FUNGI OF KERALA  
WITH SPECIAL REFERENCE TO MANGLICOLEOUS FUNGI**

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*by*

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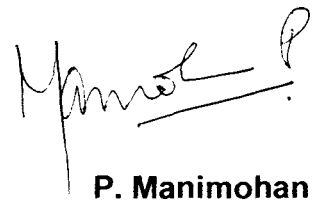
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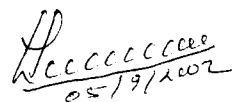
**CERTIFICATE**

This is to certify that the thesis entitled **Studies on marine fungi of Kerala with special reference to manglicolous fungi** submitted to the University of Calicut by **Raveendran. K.**, for the Degree of Doctor of Philosophy in Botany, embodies the results of bonafide research work carried out by him under my supervision and guidance and the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar title or recognition.

  
**P. Manimohan**

## DECLARATION

I hereby declare that the work presented in this thesis entitled "Studies on marine fungi of Kerala with special reference to manglicolous fungi" is original and carried out by me in the Department of Botany, University of Calicut and has not been submitted earlier either in part or in full for any degree or diploma of any University.

  
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**Raveendran. K.**

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# INTRODUCTION

4

# INTRODUCTION

Marine fungi are a fascinating group of organisms with unique physiology, ecology, and morphology. Many of them produce very distinctive spores that are, as Jones (1988) commented, aesthetically pleasing to look at. In addition, it is possible that some of them produce antibiotics and other useful metabolites. Their harmful role in mariculture is yet to be properly assessed.

Recent decades have seen a rapid growth in our knowledge of fungi occurring in the marine and estuarine habitats. Marine fungi are no longer overlooked as participants in ecological processes. More than 600 marine fungi have been described to this date and this number is increasing almost day by day. It is now a well-recognized fact that these fungi play a crucial role in the breakdown of organic matter in the sea.

A perusal of the literature revealed that information on the marine mycota of the Indian coastline is rather sketchy. Almost nothing is known about the marine fungi of the Kerala coast. Moreover, the mangrove vegetation, a major repository of marine fungi, is on the verge of extinction in this region. This situation provides the backdrop to the present study.

This treatise presents the results of a preliminary floristic and ecological study of higher filamentous marine fungi (Ascomycota, Basidiomycota and mitosporic fungi) of the Kerala coastal water body system, with emphasis on the manglicolous marine fungi.

# **REVIEW OF LITERATURE**



# REVIEW OF LITERATURE

## Historical

The occurrence of fungi in marine habitats has been known from very early times. The first obligate marine fungus recorded is *Sphaeria posidoniae* that was found growing on the sea grass *Posidonia oceanica* (Montagne, 1856; Kohlmeyer & Kohlmeyer, 1979). After this discovery, for almost a century, there were only some sporadic reports on the occurrence of fungi in marine habitats. The works of Crouan brothers (see Kohlmeyer, 1974) who described five marine fungi as early as 1867, and Sutherland (1915a,b, c; 1916a,b) who published a series of papers exclusively on marine fungi, are some notable contributions made during this time. Most of the early reports were on fungi associated with algae.

The prologue to marine mycology was written by Barghoorn and Linder (1944) when they described 25 species of lignicolous marine fungi. This paper stimulated mycologists all around the world to explore the marine habitats for fungi. Between 1950 and 1962, the following pioneering marine mycologists published their first contributions. Wilson (1951), Hohnk (1952), Meyers (1953), Cribb and Herbert (1954), Johnson (1956), Feldmann (1957), Kohlmeyer (1958), Doguet (1962) and Jones (1962).

The first monograph on marine fungi was published by Johnson and Sparrow (1961). In the next ten years the following important publications appeared: Tubaki (1966, 1969) on Japanese marine fungi; Hughes (1968, 1969)

on Canadian species; Kohlmeyer (1969 a & b) and Kohlmeyer & Kohlmeyer (1971) on tropical marine fungi including mangrove fungi from different parts of the world and Cribb & Cribb (1969) on Australian marine fungi.

Kohlmeyer's (1972) revision of the Halosphaeriaceae was the next milestone. Hughes (1975) provided a thorough review of all the work on marine fungi done between 1961 and 1975. Jones (1976) edited a treatise on aquatic mycology covering both marine and fresh water fungi. It was Kohlmeyer & Kohlmeyer (1979) who published the most comprehensive world monograph on marine fungi. For the first time in the history of marine mycology, the taxonomy of marine fungi was discussed thoroughly and a key to all the known higher filamentous marine fungi was provided. They also reviewed all other major aspects of marine fungi such as phylogeny, ontogeny, physiology, ecology, and geographical distribution.

After the publication of Kohlmeyer & Kohlmeyer's (1979) landmark treatise, several workers all around the world contributed to our knowledge of these organisms. Two more volumes dealing exclusively with marine fungi (Moss, 1986; Hyde & Pointing, 2000) and two illustrated keys to the filamentous higher marine fungi (Kohlmeyer & Volkmann-Kohlmeyer, 1991a; Hyde and Sarma, 2000) appeared in the last 15 years.

## **Definition of Marine Fungi**

Marine fungi are not a taxonomically, but an ecologically and physiologically defined group (Hyde, Sarma & Jones, 2000). Several workers have tried to define marine fungi. Johnson & Sparrow (1961) and Tubaki (1969) defined marine fungi based on their ability to grow at certain seawater concentrations. Meyers (1968) and Jones & Jennings (1964) have tried to determine the physiological requirements, especially of sodium chloride, for the growth of marine fungi in seawater. According to Kohlmeyer & Kohlmeyer (1979), "obligate marine fungi are those that grow and sporulate exclusively in a marine or estuarine habitat; facultative marine fungi are those from a fresh water or terrestrial milieu, able to grow and possibly also sporulate in the marine environment". This is the most widely accepted definition of marine fungi (Hyde, Sarma & Jones, 2000).

As pointed out by Raghukumar (1996), the marine system is as complex as its terrestrial counterpart and it incorporates the deep-sea, coral reefs, mangroves and intertidal beaches. In addition, estuarine habitats like river-mouths, lagoons, and backwaters containing brackish water also frequently support the growth of these fungi. Some of these habitats display a fascinating gradient of saline conditions where obligate marine fungi, facultative marine fungi, and purely terrestrial ones co-exist. Aerial parts of mangroves for example, support the growth of terrestrial fungi while the inundated parts of the same support growth of obligate marine fungi (Hyde, Sarma & Jones, 2000).

It is still not very clear why marine fungi are restricted to the sea and why terrestrial fungi are not isolated from marine habitats. It seems likely that the combination of high salinity and alkaline environment may restrict the terrestrial fungi from invading the sea. Some fungi do require sodium for growth and it is this requirement, at concentration that gives the element the status of a macronutrient, that makes them obligately marine. However, critical investigation of the presence or lack of a requirement for sodium is lacking for most marine fungi.

Schaumann (1975) felt that attempts to define marine fungi were premature, but according to Kohlmeyer & Kohlmeyer (1979), such efforts are necessary to understand the role of fungi in a particular environment. According to them, to obtain a better understanding of the role of fungi in the marine environment, we need to separate the obligate and facultative marine fungi from the contaminant terrestrial fungi. A valid criterion for the definition of a marine fungus, according to Kohlmeyer & Kohlmeyer (1979), might be its ability to germinate and to form a mycelium under natural marine conditions.

### **Diversity of marine fungi**

Kohlmeyer & Kohlmeyer (1979) recognized 209 species and 106 genera of higher marine fungi in their monograph. Kohlmeyer & Volkmann-Kohlmeyer (1991a) considered 321 species and 161 genera in their key to higher marine fungi. Since then several new genera and species have been described (Kohlmeyer & Volkmann-Kohlmeyer, 1993 a, b, c, 1995, 1996a,b, 1998; Kohlmeyer, Volkmann-Kohlmeyer & Eriksson 1995 a, b, c, d, 1996, 1997a,b;

Kohlmeyer, Baral & Volkmann-Kohlmeyer 1998; Hyde, 1991a,b, 1992a,b, c, 1993a,b, 1994, 1996; Hyde and Alias, 1998; Hyde and Sutton, 1992; Hyde *et al.*, 1998, 1999). Hyde, Sarma and Jones (2000) recognized 444 species of higher marine fungi with the following break-up: Ascomycota – 360 species representing 117 genera (81%); Basidiomycota – 10 species in 7 genera (1.6%); and mitosporic fungi – 74 species in 51 genera (17%).

Ascomycota is the most dominant group in the marine mycological milieu (Jones & Alias, 1997; Hyde, Sarma & Jones, 2000). With their small sporocarps, frequently appendaged spores, and an ability to withstand fluctuating saline conditions, they seem to have very effectively adapted to the marine ecosystems (Hyde, Sarma & Jones, 2000). Majority of them are lignicolous species occurring mostly on mangrove wood and are coastal in occurrence (Raghukumar, 1996). Amongst the different marine groups of Ascomycota, the order Halosphaeriales is the largest followed by Loculoascomycetes (Hyde, Sarma & Jones, 2000). Apart from filamentous Ascomycota, there are about 177 species of marine – occurring yeasts (Kohlmeyer & Kohlmeyer, 1979).

Members belonging to Basidiomycota are very rare in the marine habitats with only 10 species in 7 genera known to this date, and they occur mostly on decaying wood (Hyde, Sarma & Jones, 2000; Raghukumar, 1996). Basidiomycota, with their large putrescent fruit bodies and spore-discharge mechanism, are not easily adapted to the marine conditions and the marine basidiomycetes have sporocarps that are much reduced in size.

Amongst true fungi, Zygomycota are conspicuous by their absence in the sea while chytrids prefer brackish and estuarine conditions (Raghukumar, 1996). Pseudofungi such as the Oomycota are also more prevalent in conditions of lower salinity (Raghukumar, 1996).

### **Vertical distribution of marine fungi**

Endemic marine fungi are found mostly in the eutrophic zone, particularly in littoral regions (Kohlmeyer & Kohlmeyer, 1979). As Jones (1988) pointed out, most information on marine fungi refer to collections made along the drift line, intertidal zone, and to timbres and other substrata submerged to a depth of about 8 m. Although marine fungi are not frequently encountered in the ocean depths, a few of them are seen only at considerable depths (e.g. *Oceanites scuticella*, *Periconia abyssa*, *Abyssomyces hydrozoicus*, etc.) (Jones, 1988). Kohlmeyer (1983) states that the major factors controlling the distribution of marine fungi are availability of substrates or hosts, temperature, hydrostatic pressure and oxygen, and this explains why marine fungi are less in the ocean depths.

### **Sizes of marine fungi**

Most marine fungi are microscopic. The largest ascocarp is seen in *Amylocarpus encephaloides* and it does not exceed 3 mm (Kohlmeyer & Kohlmeyer, 1979). As pointed out by Kohlmeyer & Kohlmeyer (1979), the marine environment obviously does not permit the development of large and fleshy fruit bodies. Abrasion by waves and sand grains prevents the formation of such

structures. Even the fruit bodies of marine basidiomycetes are much smaller than their terrestrial counterparts. The fruit bodies of *Digitatispora marina* and *Nia vibrissa*, for example, have an average length of 4 mm and diameter of 3 mm (Kohlmeyer & Kohlmeyer, 1979). These comparatively larger species normally develop in sheltered habitats such as cracks in the wood or under the bark (Kohlmeyer & Kohlmeyer, 1979). Another environment where larger fruit bodies could develop seems to be the deep-sea because abrasive actions mentioned earlier are restricted there.

### **Substrates available in the marine milieu for colonization by fungi**

A wide variety of substrates are available in marine habitats for colonization by fungi. These include sea weeds, leaves, rhizomes and roots of marine angiosperms; wood, leaves, petioles, prop roots and fruits of mangroves; dead animals and their faecal pellets; shells of various mollusca, sewage effluent and man-made structures such as polythene and plastics (Jones, 1988). Some marine fungi are hydrocarbonoclastic (Kirk & Gordon, 1988). Most marine fungi have been recorded from submerged, intertidal or driftwood each forming a niche that supports a characteristic mycota (Jones, 1988). For example, quite a few fungi, the so-called arenicolous fungi, colonize wood buried in the sand with their ascocarps often developing on sand grains (Jones, 1988).

## **Ability of marine fungi to decompose lignocelluloses**

Most marine fungi are known to utilize lignocelluloses to some extent. Mouzouras (1986) observed that over 75% of the marine fungi tested by him had the ability to rot softwood. Basidiomycetes like *Digitatispora marina*, *Halocyphina villosa* and *Nia vibrissa* are able to cause white rot attack of wood, degrading both cellulose and lignin (Mouzouras *et al.*, 1986). The ability to utilize cellulose is weak in some marine fungi like *Arenariomyces trifurcatus* and *Zalerion maritimum* and not all strains have this ability (Jones, 1988). *Monodictyis pelagica*, *Savoryella lignicola* and *Lulworthia* spp. are some of the most active degraders of wood.

## **Adaptations to the marine environment**

Some marine fungi show an absolute requirement for sodium chloride. Jones, Byrne & Aldermann (1971) showed that growth of *Althornia crouchii* decreased with decreasing salinity and was completely inhibited in 30% seawater. Some fungi maintain high osmotic balance by storing sugar alcohols such as mannitol and arabitol (Jennings, 1983, 1985). Higher marine fungi, especially ascomycetes, show adaptation to the marine environment in the production of appendaged spores that serve a number of functions. According to Rees (1980), they keep the spores in the water column and thus may aid in their transportation. It has been demonstrated that spore whose appendages have been removed, sediment out more quickly than those with intact appendages (Jones, 1988). In addition, appendages may aid in the entrapment of spores to surfaces (Jones,



1988). Also, many appendages are gelatinous or mucilaginous in texture and help to adhere spores to surfaces (Rees & Jones, 1984).

### **Manglicolous marine fungi**

As Kohlmeyer & Kohlmeyer (1979) remarked, mangrove trees are of particular fascination to mycologists. The bases of their trunks and pneumatophores are permanently or intermittently submerged, while the salt water never reaches the upper parts. Owing to this, terrestrial fungi and lichens are seen on the upper part of the trees and marine fungi on the lower part with an overlap between marine fungi and terrestrial fungi in the middle (Kohlmeyer & Kohlmeyer, 1979).

Chapman (1976) listed more than hundred species of mangrove plants but according to Hyde & Jones (1988) only 19 of them have been examined for the presence of marine fungi. New World mangrove stands are studied more thoroughly than their Old World counterparts where the greatest species diversity occurs (Hyde & Jones, 1988).

Cribb & Cribb (1955, 1956) in Australia were the first mycologists to collect marine fungi on mangroves. Since then there has been a steady stream of reports on mangrove fungi from different parts of the tropical world: Kohlmeyer, 1966, 1968a,b, 1969a,b, 1980, 1981, 1984, 1985, 1986; Kohlmeyer & Kohlmeyer, 1964-1969, 1965, 1971, 1977; Kohlmeyer & Schatz, 1985, Kohlmeyer & Vittal, 1986; Borse, 1984, 1987b; Borse & Hyde, 1989; Hyde, 1990a,b, 1991a,b, 1992d; Hyde

& Borse, 1986a,b; Hyde & Jones, 1988, 1989b, 1992; Hyde & Nakagiri, 1989; Jones & Kuthubutheen, 1989; Jones & Hyde, 1990; Leong *et al.*, 1990, 1991; Leong, Tan & Jones, 1991; Ravikumar & Vittal, 1987, 1991; Sabada *et al.*, 1995; Sarma & Vittal, 2000,2001; Sarma, Hyde & Vittal, 2001; Vrijmoed, Hyde & Jones, 1994).

Several species of Ascomycota, mitosporic fungi and a few Basidiomycota have been recorded from the submerged parts of mangroves (Kohlmeyer & Kohlmeyer, 1979; Hyde & Jones, 1988, 1989a, b). Manglicolous marine fungi are almost exclusively saprobes (Kohlmeyer & Kohlmeyer, 1979). The genera *Rhizophila* and *Hypophloeda* are restricted to dead prop roots of the mangrove genus *Rhizophora* (Hyde, 1990c). Genera like *Capillatospora*, *Caryosporella*, and *Thalassogena* are found only on dead mangrove wood (Hyde, Sarma & Jones, 2000). According to Kohlmeyer & Kohlmeyer (1979), the most frequently encountered marine fungi on mangroves are *Lulworthia* spp., *Leptosphaeria australiensis* and *Phoma* spp. Most of the manglicolous marine fungi live in the bark or wood of mangroves (Kohlmeyer & Kohlmeyer, 1979). It seems, the high amount of tannins present in the bark of mangroves, which could protect them against biodeterioration, apparently does not prevent marine fungi from colonizing mangrove wood.

## Characters used in the identification of marine fungi

### a) Ascomycota

Although habitat is of little taxonomic value in the identification of most marine ascomycetes, it is of some value in a few cases. Some genera and species are restricted to some particular habitats, so that their identification is facilitated by information on their habitats (Hyde, Sarma & Jones, 2000). *Chadefaudia* spp. are parasitic on marine algae. *Trichomaris invadens* is a parasite of Tanner crab (Hibbits, Hughes & Sparks, 1981) while *Abyssomyces hydrozoicus* is restricted to hydrozoa (Hyde, Sarma & Jones, 2000). *Pontoporeia biturbinata* is restricted to the rhizomes of the sea grass *Posidonia oceanica* while *Pharicidia balani* is confined to calcareous shells of some marine animals (Hyde, Sarma & Jones, 2000). The genera *Rhizophila* and *Hypophloeda* are restricted to dead prop roots of the mangrove genus *Rhizophora* (Hyde, 1990c). Several genera such as *Capillatospora*, *Caryosporella*, and *Thalassogena* are seen only on dead mangrove wood (Hyde, Sarma & Jones, 2000). Genera like *Arenariomyces*, *Corollospora*, and *Nereiospora* are mostly seen associated with sand grains (Nakagiri & Tokura, 1987; Kohlmeyer & Volkmann-Kohlmeyer, 1987a, 1989) while the genus *Oceanites* is found on wood at considerable depths in the sea (Kohlmeyer, 1977). Finally, some fungi are restricted to the tropics and subtropics (e.g., *Antennospora quadricornuta*, *A. salina*) while some species like *Ceriosporopsis tubulifera* and *Ondiniella torquata* are only recorded from temperate regions (Hyde, Sarma & Jones, 2000).

The morphology of the ascoma is important in identification. The ascoma may be cleistothecial as in *Amylocarpus* and *Dryosphaera*, perithecial as in *Aniptodera* and *Etheiophora* or apothecial as in *Dactylospora* (Hyde, Sarma & Jones, 2000). Most of the marine ascomycetes have perithecia and the perithecial morphology has some diagnostic value (Hyde, Sarma & Jones, 2000). Most genera have immersed perithecia (Hyde & Mouzouras, 1988; Hyde & Jones, 1989a). Species of *Acrocordiopsis*, *Caryosporella* and *Corollospora* have superficial perithecia (Kohlmeyer, 1985; Borse & Hyde, 1989). Ascomata may be immersed or superficial in many members of the Halosphaeriaceae (Hyde, Sarma & Jones, 2000). In most cases, the orientation of the perithecia to the host surface is vertical but in a few species like *Aniptodera longispora* and *Lantospora gigantea*, it is horizontal (Hyde, Sarma & Jones, 2000). Ascomatal shape and colour frequently vary within a single species of a genus in the Halosphaeriaceae but in other families these features may be more consistent and hence of diagnostic value (Hyde, Sarma & Jones, 2000). Perithecia may be with or without papillae (neck), but this character is not of any diagnostic value because ascomata of the same species may or may not possess necks (Hyde, Sarma & Jones, 2000). In most species, ostioles are rounded, but *Lophiostoma mangrovei* has slit-like ostioles (Hyde, Sarma & Jones, 2000).

Features of the perithecial wall or peridium are of some diagnostic value. Peridium may be membranaceous, coriaceous or carbonaceous. In majority of the Halosphaeriaceae, the perithecial walls are either membranaceous or coriaceous but arenicolous genera like *Arenariomyces*, *Carbosphaerella* and *Corollospora*

have hard, carbonaceous peridium (Hyde, Sarma & Jones, 2000). In addition, most bitunicate genera (e.g. *Aigialus*, *Ascocratera*) also have carbonaceous peridium (Hyde, Sarma & Jones, 2000). Perithecial walls are smooth in most genera but in *Abyssomyces*, they are covered by setae and in *Crinigera* and *Dryosphaera* they are covered by hairs (Hyde, Sarma & Jones, 2000). The number of wall layers and the texture of peridium are also of taxonomic importance (Hyde, Sarma & Jones, 2000).

The sterile tissues found between asci (hamathecium) are of different types and are important diagnostic features. Paraphyses are seen mostly in unitunicate genera while pseudoparaphyses are found in the bitunicate genera (Hyde, Sarma & Jones, 2000). Paraphyses may be straight or branched. The pseudoparaphyses of bitunicate genera are of two types: melanommataceous and pleosporaceous. Melanommataceous pseudoparaphyses are trabeculate, usually narrower than 1  $\mu\text{m}$  and they anastomose and are embedded in a clearly visible gel matrix. Pleosporaceous pseudoparaphyses are cellular, usually wider than 1  $\mu\text{m}$ , only anastomosing above the asci and are also associated with a gel matrix (Hyde, Sarma & Jones, 2000). Trabeculae are found in some genera like *Aigialus* and *Ascocratera* (Hyde, Sarma & Jones, 2000).

Another important criterion for separating genera is the morphology of the ascus. Asci of marine species are either untunicate or bitunicate. The apical structure seen in most unitunicate as is of taxonomic significance. According to Hyde, Sarma & Jones (2000), a few genera within the Halosphaeriaceae and

most outside the family, can be separated by the type of the apical structure and its reaction to iodine. On the other hand, in bitunicate genera, ascus tips may be thick-walled only, contain an ocular chamber and only in *Banhegyia* and *Dactylospora*, the thickened wall stains blue with iodine (Hyde, Sarma & Jones, 2000).

In addition to the apical structure, the shape of the ascus is also often important. Most unitunicate genera have clavate asci, but globose and cylindrical asci are seen in some genera (Hyde, Sarma & Jones, 2000). Clavate to cylindrical asci are seen in most bitunicate genera except *Capillatospora* where saccate asci are found (Hyde, Sarma & Jones, 2000).

Characters related to the ascospores are the most useful in the separation of genera. Both at the generic and species level, the number of ascospores per ascus is important. In all marine ascomycetes except the following four cases, the asci are 8-spored (Hyde, Sarma & Jones, 2000). In *Savoryella paucispora*, 2-spored asci are found while in *Passeriniella savoryellopsis* 4-spored asci are seen. In the genus *Phycomelaina*, occasionally 6-spored asci are seen while in *Cryptovalsa* the asci contain several ascospores (Hyde, Sarma & Jones, 2000). Shape and septation of ascospores are also important at species level. The shape may be filiform, cylindrical, ellipsoidal or round and the ascospores may be septate or aseptate. The number and orientation of septa is valuable both at species and generic level (Hyde, Sarma & Jones, 2000). The ascospores may be hyaline, yellowish brown or dark brown and this feature is frequently of diagnostic

value. In some cases, the central cells are brown while the end-cells are hyaline or light-coloured as is the case in *Savoryella*, *Carbosphaerella*, *Passeriniella*, and some *Trematosphaeria* species (Hyde, Sarma & Jones, 2000).

Among the features of the ascospores, it is the morphology of the appendage that has the highest diagnostic value (Kohlmeyer & Kohlmeyer, 1979; Jones, 1995; Hyde, Sarma & Jones, 2000). Although appendages are absent in the ascospores of a few species and genera, they are present in the ascospores of most marine ascomycetes.

Appendage at its simplest form is seen when some ascospores release a drop of mucilage from the end chambers (e.g. *Aigialus grandis*, *Lulworthia* spp.) (Hyde, Sarma & Jones, 2000). In many cases the appendage may exist as a mucilaginous sheath around the ascospore (e.g. *Massarina* spp., *Lophiostoma* spp., *Trematosphaeria* spp.) (Hyde, Sarma & Jones, 2000).

Hamate or cap-like appendages that uncoil in water to form long viscous threads are seen in the ascospores of *Aniptodera*, *Cucullosporella*, *Halosarpheia*, *Ophiodeira*, and *Trichomaris* (Kohlmeyer & Volkmann-Kohlmeyer, 1991a; Hyde, Sarma & Jones, 2000). These appendages occur at both ends of the spore in some or only at one end in others. In some cases (e.g., *Tunicatispora*), the ascospores are provided with both a mucilaginous sheath and filamentous polar appendages (Hyde, 1990b). Ribbon-like appendages, either polar or equatorial or both are present in several genera like *Corollospora*, *Lanspora*, *Chaetosphaeria* and *Halosphaeriopsis*. A number of other types of appendages are also seen in

marine ascomycetes. The ultrastructure of appendages also yields useful taxonomic information (Johnson, 1980; Jones & Moss, 1987; Manimohan, Jones & Moss, 1993; Manimohan, Moss & Jones, 1993).

## **b) Basidiomycota**

As there are only very few marine basidiomycetes, and as almost all of them exhibit distinctive basidiomata and basidiospores, their identification is not at all difficult. The shape of the basidiomata is cyphelloid or funnel-shaped in *Calathella* and *Halocyphina*, globose or stipitate-capitate in *Physalacria*, subglobose or puffball-like in *Nia* and elliptical or irregular in *Digitatispora* (Hyde & Sarma, 2000). Size of basidiomata is above 1 mm (diameter) in *Calathella*, *Digitatispora*, *Nia*, and *Physalacria* while it is mostly less than 1 mm in *Halocyphina* and *Mycaureola*. Most of the marine basidiomycetes are saprobes growing on decaying wood (i.e., *Calathella*, *Digitatispora*, *Halocyphina*, *Nia* and *Physalacria*) while *Melanotaenium* is a parasitic smut in the stem of *Ruppia* and *Mycaureola* is parasitic on *Dilsea edulis*. Basidiospore morphology is also very valuable in identifying genera. *Digitatispora*, for example, has basidiospores consisting of four radiating arms while the basidiospores of *Nia* have five filamentous appendages. Basidiospores are subglobose in *Calathella* and *Halocyphina* while in *Physalacria* they are elongate-ellipsoid to subcylindrical (Kohlmeyer & Volkmann-Kohlmeyer, 1991a; Hyde & Sarma, 2000).



### **c) Mitosporic fungi**

There are about twenty genera of coelomycetes known in the marine environment that are easily separated on conidial characters (Hyde, Sarma & Jones, 2000). These characters include conidiogenesis (which may be holoblastic or enteroblastic), septation (which may be aseptate, mono-, bi- or polyseptate), and colour (which may be present or absent). Quite a lot of *Phoma*-like species that are very difficult to identify are also frequently encountered in the marine environment (Hyde, Sarma & Jones, 2000). About 28 genera of hyphomycetes are seen in marine habitats and according to Hyde, Sarma & Jones (2000), they are the most difficult of marine groups to identify. Marine hyphomycetes are separated mostly on conidial structure, colour, septation, and shape (Kohlmeyer & Volkmann-Kohlmeyer, 1991a; Hyde, Sarma & Jones, 2000).

### **Ecology of marine fungi**

Most of the literature on marine fungi is essentially floristic in nature that gives very little information on ecology of these organisms. There are, however, a few papers dealing with ecological aspects of marine fungi.

Hughes (1968, 1969, 1974), Brooks (1972), and Shearer (1972) demonstrated that species diversity and population density of marine fungi are directly related to salinity of the water. Gold (1959) reported that no mitosporic fungi could be observed at the estuary of a river where the salinity was higher than 28.9‰.

Only very few successional studies on marine fungi have been undertaken so far. Newell (1973, 1976) studied the succession of marine fungi on seedlings of *Rhizophora mangle*. Tan, Leong & Jones (1989) reported the pattern of succession of marine fungi in submerged wood blocks of *Avicennia* in Mandai mangrove of Singapore. Hyde (1990a) also made a similar investigation regarding the pattern of colonization of marine mycota on five mangrove tree species of Brunei and found that fungal communities of each tree species were different. Leong, Tan & Jones (1991) studied the colonization pattern of marine fungi on submerged mangrove wood for a period of over 60 weeks.

Kohlmeyer (1969a) gave some information about the vertical and horizontal distribution of manglicolous marine fungi of Hawaii. Sabada *et al.* (1995) studied the vertical distribution of higher marine fungi on *Acanthus ilicifolius*.

Koch (1975) observed that different zones of a single beach in Denmark exhibited characteristic mycoflora. Rees, Johnson & Jones (1979) compared the fungi that appeared on driftwood collected from beach sand with those appeared on test panels submerged in the sea. Volkmann-Kohlmeyer & Kohlmeyer (1993) made a comparison of the marine mycota of recently introduced *Rhizophora* species of Hawaii and Moorea with that of long-established *Rhizophora* Strands of Belize.

Boyd & Kohlmeyer (1982), after a detailed study of geographical distribution and seasonal occurrence of three marine fungi, observed that temperature tolerance could be the major factor influencing the geographical

distribution pattern of marine fungi. Hyde & Jones (1988) observed that several factors such as salinity of the water, mangrove tree species, position in the intertidal region, type of substratum such as roots or branches, nature of mangrove floor, pH of water and oceanic region affected the distribution of marine fungi in mangroves of Seychelles.

### **Marine Mycology in India**

Although there are a few passing references to marine fungi of India in some earlier publications (Becker & Kohlmeyer 1958; Kohlmeyer, 1959; Jones, 1968; Kohlmeyer, Schmidt & Nair, 1967), the first major publication on this group of fungi from India was that of Raghukumar (1973) who reported eighteen marine fungi from the coastal waters of Tamil Nadu.

The marine fungi of the Maharashtra coast have been extensively studied in the last two decades (Patil & Borse, 1982, 1983a,b, 1985a,b; Borse, 1984, 1985, 1987a, b, c, d, 1988; Borse & Shrivastava, 1988; Borse, Ramesh & Shrivastava, 1988; Borse & Hyde, 1989; Hyde & Borse, 1986a, b). Recently, Borse, Kelkar & Patil (2000) and Patil & Borse (2001) studied the marine fungi of Gujarat coast.

Borse (1988), Prasannarai & Sridhar (1997), and Sridhar & Kaveriappa (1991) provided quantitative information on marine fungi of the west coast. Ananda, Prasannarai & Sridhar (1998) and Ananda & Sridhar (2001a) studied the occurrence of marine fungi on marine animal substrates of some beaches and

mangrove habitats of west coast of India. Prasannarai & Sridhar (2001) and Sridhar & Prasannarai (1993) studied the diversity of higher marine fungi on woody substrates along the west coast concentrating mostly on the coastal areas of Karnataka. Prasannarai, Ananda & Sridhar (2000) and Ananda & Sridhar (2001b) described new species of marine fungi from Karnataka coast. Raghukumar, Santhakumaran & Chandramohan (1988), and Nandan, Shinde & Borse (1993) studied the marine fungi of Goa coast.

Kohlmeyer & Vittal (1986), Ravikumar & Purushothaman, (1988a, b) Ravikumar & Vittal (1987, 1991a, b, 1996), Sarma & Vittal (2000,2001) and Sarma, Hyde & Vittal (2001) studied the marine fungi of the east coast of India.

According to Sridhar & Prasannarai (2001), 89 taxa of marine fungi belonging to 53 genera (71 ascomycetes, 3 basidiomycetes, and 15 deuteromycetes) are known from the Indian Peninsula.

This perusal of literature reveals that information on marine fungi of the Kerala coast is scanty. Although some earlier workers (Becker & Kohlmeyer, 1958; Kohlmeyer, Schmidt & Nair, 1967; Prabhakaran, Gupta and Krishnankutty, 1987; Prasannarai & Sridhar, 2001) have made some occasional collections of marine fungi from some locations in the Kerala coast, thorough and systematic studies on marine fungi of this region are conspicuous by their absence.

## **MATERIALS AND METHODS**

# **MATERIALS AND METHODS**

## **Collecting sites**

Nineteen locations scattered on the coastal areas of Kerala were selected for collecting wood samples. These locations are arbitrarily classified into the following categories of water bodies based chiefly on salinity range-variation pattern.

### **1. Shoreline sites – Category A**

These locations are equivalent to the category designated 'marine' in Smith's classification of saline habitats (see Subramanian, 1983, p238) and here the salinity exceeds 30‰. The following locations will come under this category: Bekkal, Thikkodi, and Parappanangadi.

### **2. Shoreline sites – Category B**

These locations are equivalent to Smith's 'marine dominated' habitats where salinity variation is moderate and salinity is equal to that of sea water part of the time. The following locations are grouped here: Azhikkal, Dharmadam A, and Beypore.

### **3. Estuaries**

In Smith's classification, these locations will come under the category 'typically estuarine' where tidal and seasonal salinity are very typical. Salinities as high as seawater and as low as fresh water occur periodically. The locations

grouped in this category are: Valappattanam, Tellichery A, Tellichery B, Tellichery C, Mahe A, and Kadalundi A.

#### **4. Backwaters**

These locations may be placed in Smith's category called 'tide less brackish waters'. Salinity is less than that of seawater and salinity variation is seasonal and often prolonged: Two locations are placed here: Kavvai and Chettuva.

#### **5. Inland Brackish Waters**

These sites are also 'tide less brackish waters' in the strict sense but while backwaters are very large water bodies, these locations are small, isolated, away from the sea but still connected to it directly or indirectly and also have saline waters throughout or at least for a considerable period of a year. The following two sites are placed here: Edakkad and Vadakara.

#### **6. Coir-retting fields**

These brackish water locations are highly polluted by by-products of coir-retting such as hydrogen sulphide and phenolic compounds and the dissolved oxygen level is very low. Salinity is variable. Three locations are placed under this category: Dharmadam B, Mahe B, and Kadalundi B.

Except the shoreline locations (categories A & B) and coir-retting fields, all other locations had scattered patches of mangrove vegetation.

## **Wood samples**

Wood samples collected from these 19 locations are classified into the following 7 categories for comparison of the marine mycota of each of these categories: unidentified driftwood (hereafter referred to as driftwood), unidentified intertidal wood (hereafter referred to as intertidal wood), unidentified intertidal wood partially buried in sand (hereafter referred to as sand-buried wood), *Avicennia* wood, *Rhizophora* wood, *Bruguiera* wood and *Acanthus ilicifolius* wood. All these categories of wood were not present in all locations. Among the 1854 wood samples collected during this study, there were 127 driftwood samples, 566 intertidal wood samples, 87 sand-buried wood samples, 328 *Avicennia* wood samples, 291 *Bruguiera* wood samples, 227 *Rhizophora* wood samples and 228 *Acanthus ilicifolius* wood samples.

## **Seasons**

A one-year period was arbitrarily classified into the following seasons for comparing the influence of seasonal changes on the marine mycota on different substrates, locations, and water bodies: monsoon (June to September), post-monsoon (October to January) and pre-monsoon (February to May). Out of the 1854 wood samples collected during this study, 630 were collected during monsoon, 619 during post-monsoon season, and 605 during pre-monsoon season.



## Brief Descriptions of Locations

### Valappattanam

This location is situated in the Valappattanam estuary (Kannur District) near Valappattanam Bridge. The northern bank of this estuary is a somewhat low-lying area compared to the southern bank. Here mangroves grow in an area of about seven acres. Species of *Rhizophora*, *Avicennia*, *Bruguiera*, and *Acanthus ilicifolius* are growing well in this area along with other mangroves and mangrove associates. Three collections were made from this site. A total 104 decaying wood samples of *Rhizophora* (19), *Avicennia* (18), *Bruguiera* (22), *Acanthus ilicifolius* (21), and intertidal wood (24) were collected from this site.

### Tellicherry-A

This was one of the main collection sites of the present study. This site is situated at Anjarakandi River ½ km away from the mouth of Dharmadam estuary and 150 m away from the railway bridge across this river, in Kannur Dist. This mangal flat is encircled by the river making it an island and has an area of about 2 acres. The muddy floor of this flat gets submerged completely during high tide. Many mangrove plants are present in the small island and the fallen parts of these mangroves serve as the source for the luxuriant growth for manglicolous marine fungi. One peculiarity of this location is the total absence of *Acanthus ilicifolius*. Collections were carried out from this site for a period of two years from June 1992-July 1994. A total of 24 collections, one in each month, comprising

*Rhizophora* (66), *Avicennia* (85), *Bruguiera* (86), and intertidal wood (90) were made from this site. 109 samples were obtained during monsoon, 111 samples during post-monsoon period, and 107 samples during pre-monsoon season.

### **Tellicherry-B**

This collection site is on the bank of the river Eranjolyputzha in the Tellicherry estuary, near the railway bridge at Koduvally (Kannur District). On the western side of the railway bridge, there is a small canal, emptying its water in to the river. On the banks of the canal and the surrounding area, large numbers of mangrove plants are growing. The fallen mangrove debris on the ground is completely immersed during high tide and emerges during low tide. Six collections were made from this region over a period of two years. During the entire collection period, 122 wood samples comprising *Rhizophora* (25), *Avicennia* (24), *Bruguiera* (19), *Acanthus* (25), and intertidal wood (29) were collected from this site. 41 samples were from monsoon season, 43 from post- monsoon period, and 38 from pre-monsoon season.

### **Tellicherry-C**

The location Tellicherry C (Kannur District) is a water body of about 13 acres. This water body is separated from the Eranjolyputzha River by a 10-30 feet wide mud wall. This water body has only one outlet to the estuary, near the railway bridge, towards the northern part of the water body. The inflow and outflow of the seawater is through this one-meter wide outlet. However, wooden

shutters control the flow of water. Towards the northeastern part of the water body lies a small island of muddy mangal flat. The muddy bottom of this mangal flat is exposed during low tides. A large number of different mangrove trees are present in this muddy flat. Besides this, on the banks of this water body also grow a large number of mangroves and mangrove associates like *Acanthus ilicifolius*. Wood samples were collected regularly for one year, one collection per month. Thus a total of twelve collections were made from this site. 171 wood samples belonging to *Rhizophora* (43), *Avicennia* (45), *Bruguiera* (44), and *Acanthus ilicifolius* (39) were collected during the course of one year. 55 samples were collected during monsoon, 58 during post-monsoon period, and 58 during pre-monsoon period.

#### **Mahe – A**

This collection site is in Mahe estuary (Kozhikode District) located 2 km away from the mouth of the estuary, on the southern bank of the Mahe River, near the railway bridge. Extensive mangrove vegetations are present in and around this region. During the study period, four collections were made from this site and 135 wood substrates belonging to *Avicennia* (33), *Bruguiera* (32), *Acanthus ilicifolius* (33), and *intertidal wood* (37) were collected. 66 samples were obtained during monsoon, 35 during post-monsoon season, and 34 during pre-monsoon period.

#### **Kadalundi – A**

This estuary is in the boundary between Malappuram district and Kozhikode district. The collection site is situated in between the mouth of the

estuary and the railway bridge. Patches of mangroves are growing on the muddy floor of this estuary as well as along the sides. *Rhizophora* and *Bruguiera*, however, are not seen in this mangrove area. Four collections were made from this site. 78 wood samples were collected out of which 25 belonged to *Avicennia*, 25 to *Acanthus* and the rest (28) were intertidal wood samples. 20 samples were collected during monsoon, 24 during post-monsoon season, and 34 during pre-monsoon period.

### **Mahe – B**

This is a coir-retting field that lies on the western bank of a small canal that empties water to the southern side of the Mahe estuary, approximately 300 meter away from the railway bridge and 400 meter away in the southeast direction from the railway bridge, at the bank of the canal. This retting field is situated at a slightly higher elevation and the complete submergence of the field occurs only during high tide. From this location, 37 intertidal wood substrates were collected during four collections. Out of these 37 samples, 20 were collected during monsoon, 9 during post-monsoon season, and the remaining 8 during pre-monsoon season.

### **Kadalundi – B**

This is a coir-retting field situated in the southern side of the Kadalundi estuary. (Malappuram District). This field has the Kadalundi River as the boundary at its northern side and a small canal that joins the estuary at its eastern side. The

entry of the water into the coir-retting field is through this small canal and it is submerged during high tide. Three collections were made from this site, one in each season. 34 intertidal wood samples were collected from this site. Out of these samples, 10 were collected during monsoon, 10 during post-monsoon season, and the remaining 14 during pre-monsoon season.

### **Dharmadam – B**

This location is a coir-retting field situated in the southern side of the river in between in the Dharmadam Railway Bridge and Moidu Bridge. A thin layer of water covers this coir-retting field almost all the time except during low tide. Five collections were made from this field, two during two monsoons, two post-monsoon and one during pre-monsoon. 48 intertidal wood samples were collected from this location. 22 wood samples were collected during monsoon, 19 during post-monsoon season, and 7 during pre-monsoon period.

### **Chettuva**

This collection site is situated in the southern bank of the Chettuva sound (Thrissur District) one km away towards east from the bridge. Luxuriant mangroves are present along the banks as well as in the small muddy flats in this sound. Three collections, one in each season, were carried out from this location and 120 wood substrates were collected (*Rhizophora* 25, *Avicennia* 26, *Bruguiera* 21, *Acanthus* 20, and Intertidal wood 28). 33 wood samples were collected during monsoon, 48 during post-monsoon season, and 39 during pre-monsoon season.

## **Kavvai**

This collection site is situated in the Kavvai backwater near Payyannur (Kannur District). Collections were made from a small island situated in this backwater. Patches of different types of mangrove plants like *Rhizophora*, *Avicennia*, *Bruguiera* are seen on the banks of this island. *Acanthus ilicifolius* also grows luxuriantly in the locality. Three collections, one in each season, were carried out from this site and a total of 111 wood samples belonging to *Rhizophora* (22), *Avicennia* (25), *Bruguiera* (19), *Acanthus ilicifolius* (24) and intertidal wood (24) were collected. Out of those samples, 40 were collected during monsoon, 27 during post-monsoon season, and 44 during pre-monsoon period.

## **Edakkad**

This collection site is three and a half km away from the sea and is situated between the National Highway 17, and the railway track at Nadal (Kannur District). In this region, in between the National Highway and the railway track, the mangrove vegetation on either side of a small river covers a large area. The water in this river is brackish almost throughout the year, except during the monsoon months, but the salinity is considerably low even during pre-monsoon days due to the heavy fresh water in-flow from all the surrounding landmasses and paddy fields. A total of 130 wood samples belonging to *Rhizophora* (26), *Avicennia* (26), *Acanthus* (26), and intertidal wood were collected from the site. Three collections, one in each season, were carried out from this site. Among the 130 samples, 41

were collected during monsoon, 51 during post-monsoon season, and 38 during pre-monsoon season.

### **Vadakara**

This location at Vadakara (Calicut District) was just behind the railway station. There is a large marshy area opposite the railway station in which large number of mangroves and mangrove associates are growing. This marshy region is directly connected to the sea by means of a narrow, 4 km long canal. Water is brackish through out the year except during the rainy season. In this region mangroves like *Bruguiera* and *Avicennia* grow well and luxuriant growth of *Acanthus ilicifolius* is another peculiarity of this site. There was no *Rhizophora* vegetation in this site. Three collections were made from this site one in each season. A total 88 wood samples belonging to *Avicennia* (22), *Bruguiera* (22), *Acanthus* (19), and intertidal wood (25) were obtained from this location. Out of those samples, 33 were obtained during monsoon, 28 during post-monsoon season and 27 were from pre-monsoon period.

### **Bekkal**

This location is near the Bekkal fort (Kannur District). It is below the southern end of the fort. As there is no river close to this site, salinity of the seawater is higher when compared to that of beach sites at the mouth of the estuaries. From this location three collections were made, one in each season. 55 wood samples were, 14 were sand-buried wood, 18 belong to driftwood, and

another 23 were Intertidal woods. Out of those samples, 22 were collected during monsoon, 21 during post-monsoon, and the remaining 12 during pre-monsoon season.

### **Tikkodi**

This location is at Tikkodi beach (Calicut District) that is rocky in many parts. This location is situated one km away from the Tikkodi lighthouse towards north. Seawater salinity is high as there is no river in the nearby places of this site. Three collections, one in each season, were made from this site. 68 wood samples were collected of which 24 were driftwood, 25 were intertidal wood wedged among the rock, and 19 were sand-buried wood. 18 wood samples were obtained during monsoon, 24 samples during post-monsoon season, and 26 samples were from pre-monsoon period.

### **Parappanangadi**

This location is a sandy beach at Parappanangadi (Malappuram District). Three collections, one in each season, were made and a total of 43 wood samples (16 intertidal wood, 16 driftwood and 11 sand-buried wood) were obtained from this site. Out of the 43 samples, 12 were collected during monsoon, 15 during post-monsoon season, and 16 during pre-monsoon season.

### **Azhikkal**

This beach site is located at the mouth of the Valapattanam estuary (Kannur District) at the southern side of the Azhikkal ferry. Owing to the



continuous inflow of fresh water, the salinity is usually low. From this beach site, three collections were made, one in each season. A total of 79 wood samples were collected of which 20 were sand-buried wood, 29 were intertidal wood wedged among rocks and the rest were driftwood. Out of the 79 wood samples collected, 22 were collected during monsoon season, 24 during post-monsoon season, and 33 during pre-monsoon season.

#### **Dharmadam – A**

This location is at the Tellicherry beach, facing Dharmadam Island (Kannur District). The salinity of seawater at this location is usually much less than that of the normal seawater. Mangroves and mangrove-associates are absent here. Three collections, one in each season, were carried out from this site and 58 wood samples were collected. Among those 58, 13 were sand-buried wood, 21 were driftwood, and 24 were intertidal wood. 19 wood samples were collected during monsoon, 20 during post-monsoon, and 19 samples during pre-monsoon season.

#### **Beypore**

This shoreline location is situated at the mouth of Beypore estuary in the beach of Beypore. At this beach site, due to continuous outflow of fresh water from the river Chaliyar, the water salinity is less than that of the normal marine water. Although mangroves are absent at this location, mangroves grow luxuriantly on the banks of the upper reaches of the estuary. Three collections,

one in each season, were made from this site. 46 wood samples were collected of which ten were sand-buried wood, 18 were driftwood, and another 18 were intertidal wood. Out of the 46 samples, 13 were collected during monsoon, 17 during post-monsoon season, and 16 during pre-monsoon season.

### **Collection and treatment of Wood Samples**

Collections of wood samples were made between April 1992 and July 1994. Wood samples belonging to various categories were collected from the intertidal zone of the collecting locations. These included driftwood (wood that is floating or capable of floating at the time of collection), wood partially buried in sand, wood wedged between rocks and decaying wood substrates belonging to *Avicennia* spp., *Bruguiera* spp., *Rhizophora* spp., *Acanthus ilicifolius* and other unidentified plants. Uniformity in the size of the wood samples were maintained to a certain extent by picking only samples that came within the size range of 7.5-10 x 1-2 cm. Collected materials were placed in sterile polythene bags and brought to the laboratory on the same day.

After preliminary screening and isolation of marine fungi within a week after collection, the wood samples were incubated in sealed sterile polythene bags and incubated in the laboratory at room temperature. The incubated wood samples were periodically examined for marine fungi and the fungi observed were isolated and recorded. These periodical examinations were continued up to six months. The number of species obtained from each wood sample was also recorded.

## **Isolation and observation of fungi**

The wood samples were examined for sporulating structures such as conidia, perithecia, pycnidia and basidiomata under a stereomicroscope with an overhead light source. Fruiting structures were removed with a fine pair of forceps or a needle with a fine point. The isolated fungi were examined under a compound microscope. Free-hand sections or, in the case of small, delicate specimens, cryostat sections were made. Spores and sections were always mounted in the first instance in seawater so that any appendages present can dilate and their true morphology can be studied. Permanent mounts were prepared by replacing the seawater with lactophenol-cotton blue and sealing the cover glass with DPX. Drawings were prepared using a mirror-type camera lucida. All the slides prepared are kept in the Mycology Laboratory of the Department of Botany, Calicut University.

## **Hydrographical Data**

Temperature, salinity, and pH of surface water were measured and recorded for each location at each visit and this data is given in Table 1.

## **Statistical analysis of ecological data**

For each species, the percent frequency of occurrence and percent relative abundance for each location, season, wood type, and type of water body, were calculated. In addition, overall percent frequency of occurrence and overall percent relative abundance were also calculated. The average number of fungal

isolates per wood sample was calculated for each location, wood type, and season.

Percent frequency of occurrence (FO)

$$= \frac{\text{Number of isolates of a particular species}}{\text{Number of wood samples supporting sporulating marine fungi}} \times 100$$

Percent relative abundance (RA)

$$= \frac{\text{Number of isolates of a particular species}}{\text{Number of isolates of all the species obtained}} \times 100$$

To assess the diversity of marine fungi in the 19 locations as well as in different types of water bodies both Shannon index ( $H'$ ) (Shannon & Weaver, 1949) and Simpson's index ( $D'$ ) (Simpson, 1949) were calculated. Shannon index  $H'$  is calculated using the following formula:

$$H' = -\sum_{i=1}^{S_T} p_i \log p_i$$

where  $p_i$  is the proportion of the total number of individuals in the  $i^{\text{th}}$  species, and  $S_T$  is the total species. This index actually serves as a statistical means of the probability of guessing the identity of an individual taken from a sample at random.

Simpson index  $D'$  is calculated using the following formula:

$$D' = \sum_{i=1}^{S_T} p_i^2$$

$$\text{where } p_i^2 = \frac{N_i (N_i - 1)}{N_T (N_T - 1)}$$

and  $N_i$  = No. of isolates of the  $i^{\text{th}}$  species

$N_T$  = Total isolates in the sample

It is the probability that any two individuals picked at random from a population will be of the same species. In other words, Simpson index is a measure of how individuals in a sample population are concentrated into a few species. In the case of Shannon index, the higher the index, the higher the species diversity is. Simpson Index, however, is an inverse measure of diversity.

To assess the influence of water bodies, wood types, and seasons on the distribution of a species, logistic regression analysis was done for each species. Logistic regression analysis is a mathematical modeling approach that can be used to describe the relationship of several predictor variables  $X_1, X_2, \dots, X_k$  (e.g., water bodies, wood types, seasons etc.) to a dichotomous dependent variable  $Y$ , where  $Y$  is typically coded as 1 or 0 for its two possible categories (e.g. presence of a fungus or its absence) (Kleinbaum *et al.*, 1998). This analysis was done with the help of a computer using a statistical software (STATISTICA for WINDOWS, release 5.0 by StatSoft Inc. USA).

## **Salient Features of the Coastal Environment of Kerala**

Kerala State lies between altitude 8°18' and 12°48' North and longitude 74°52' and 77°2' East. It is a 580 km long strip of land at the southwest corner of India. It has a total area of 38,828 sq.km. It is bordered on the east by the Western Ghats and on the west by the Arabian Sea. The mean width of the state is just 67 km and is nowhere more than 129 km.

Kerala has a humid tropical climate that is monsoonal in character. Rainfall is abundant with an annual average of 300 cm. Most of the rain occurs during the southwest monsoon (June to September) with less rain during the northeast monsoon (October to November). Temperature ranges between 24°C and 37.5°C in the plains and between 10°C and 32°C in the hills.

The state has 41 west-flowing and 3 east-flowing rivers. The distance between the Western Ghats on the east and the Arabian Sea on the west being very short, rivers in Kerala are short in length and tidal in their lower reaches.

One remarkable feature of the Kerala coast is the presence of a large number of perennial and temporary estuaries known as the backwaters. These backwaters exist in different sizes and shapes and have their bed level at about 1.5 to 1.8 m below the mean sea level. They often remain separated from the sea by narrow strips of land ranging in width from 0.4 to 12 km. Most of the temporary estuaries remain closed for most part of the year by a sand bar formed by the persistent action of the littoral currents and waves of the sea. As most of the rivers

are shallow streams during this time, they are unable to enter the sea. During monsoon periods, however, these rivers swell up and the consequent heavy flow leads to the opening of bars resulting in sea-estuary interaction. The entire estuarine system of the Kerala coast is exposed to tides from the sea and hence the water is brackish almost throughout the year.

Wide salinity fluctuations can be seen in the estuaries of Kerala. According to the Venice System of classification (McLusky, 1971), all waters having salinity greater than 0.5‰ is referred to as brackish water. The salinity in the estuaries of Kerala may be less than 0.5‰ or greater than 20‰ in one annual cycle. Both river discharge and seawater intrusion play a role in determining the salinity at a particular point both in time and space. Based on variation of salinity, one annual cycle can be divided into three periods: (1) a period of high salinity with very little fluctuations during February to May. (2) a long period of low salinity with greater fluctuation from June to September, the period of the southwest monsoon; and (3) a period of recovery from October to January. The salinity of water diminishes progressively from the mouth of the estuary to the river tract and attains the lowest value at the interior most riverine zone.

## Salient Features of the Mangroves of Kerala

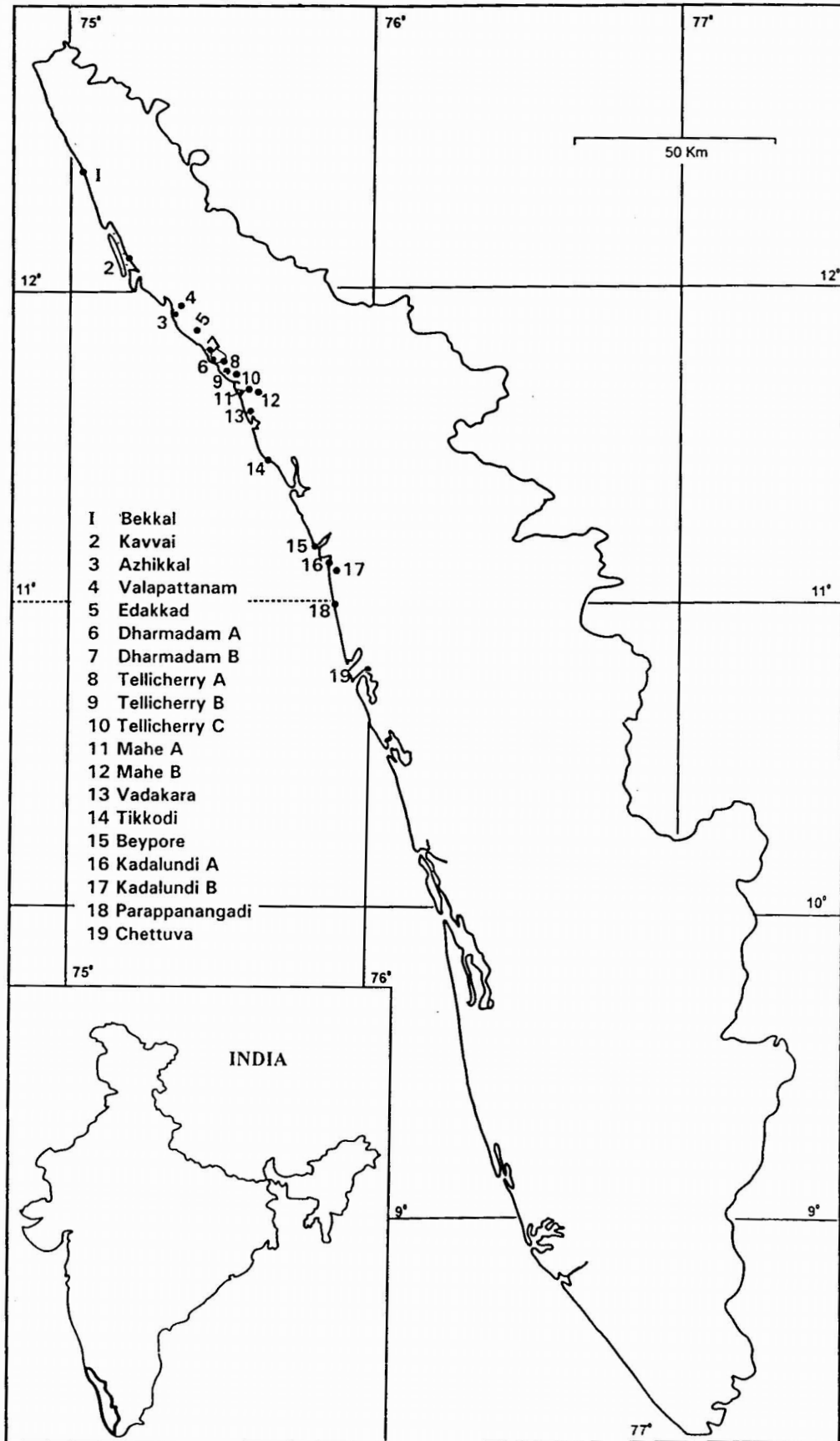
The backwaters of Kerala had been fringed with rich mangrove vegetation until a few decades back. There were about 70,000 hectares of mangroves in Kerala (Ramachandran and Mohanan, 1987) that have now become reduced to a few isolated patches composed of a few species covering only a few hundred hectares of area. These mangrove patches are now mostly confined to the upper reaches of some estuaries and creeks while some isolated species can also be seen in detached water bodies and reclaimed land along the coastal tracks. This highly restricted occurrence of mangroves in Kerala is solely due to the ever-increasing human encroachment to the mangrove domain.

Data on mangroves of Kerala can be found in the works of Bourdillon (1908), Troup (1921), Gamble (1915-1936), Thomas (1962), Rao and Sastri (1974), Blasco (1975), and Ramachandran and Mohanan (1987). There are about 39 species of mangroves and mangrove associates in Kerala coast (Ramachandran & Mohanan, 1987). A few major mangroves and mangrove associates of this region are: *Acanthus ilicifolius* L. (Acanthaceae), *Bruguiera cylindrica* (L.) Bl. (Rhizophoraceae), *Acrostichum aureum* L. (Pteridaceae), *Aegiceras corniculatum* (L.) Blanco (Myrsinaceae), *Avicennia marina* (Forsk.) Vierh (Avicenniaceae), *Avicennia officinalis* L. (Avicenniaceae), *Calophyllum inophyllum* L. (Guttiferae), *Cerbera odollam* Gaertner (Apocynaceae), *Excoecaria agallocha* L. (Euphorbiaceae), *Kandelia candel* (L.) Druce. (Rhizophoraceae), *Rhizophora apiculata* Bl. (Rhizophoraceae), *Rhizophora mucronata* Lamk.



(Rhizophoraceae) and *Sonneratia apetala* Buch.-Ham. (Sonneratiaceae). A few like *Syzygium travancoricum* Gamb. (Myrtaceae) and *Ardisia littoralis* Andr. (Myrcinaceae) are endemic species (Nayar, 1996).

# MAP OF KERALA SHOWING COLLECTING LOCATIONS



## ABBREVIATIONS USED

ACN	- Acanthus ilicifolius	Kav	- Kavvai
AVI	- Avicennia	Km	- Kilometer
Azi	- Azhikkal	Mah -A	- Mahe - A
Bek	: Bekkal	Mah -B	- Mahe - B
Bey	- Beypore	Ppd	- Parappanangadi
BRU	- Bruguiera	PPT	- Parts per thousand
Che	- Chettuva	RA	- Percent relative abundance
Cm	- Centimeter	RHI	- Rhizophora
Dha -A	- Dharmadam - A	SBI	- Sand buried intertidal wood
Dha -B	- Dharmadam - B	Tik	- Tikkodi
Diam	- Diameter	TLY-A	- Tellicherry - A
DRW	- Drift wood	TLY-B	- Tellicherry - B
Edk	- Edakkad	TLY-C	- Tellicherry - C
FO	- Percent frequency of occurrence	Vad	- Vadakara
INT	- Intertidal wood	Val	- Valapattanam
K.R.	- K. Raveendran	µm	- Micrometer
Kad -A	- Kadalundi - A		
Kad -B	- Kadalundi - B		

# FLORISTIC ACCOUNT

# FLORISTIC ACCOUNT

## Ascomycota

### Key to the species

1. Asci with a single wall layer and not functionally fissitunicate ..... 2
1. Asci with several wall layers and often releasing ascospores by fissitunicate dehiscence .....49
2. Asci lacking an apical ring, pore or thickening, often dissolving early ..... 3
2. Asci with an apical ring, pore or thickening ..... 27
3. Ascospores without appendages ..... 4
3. Ascospores with appendages ..... 16
4. Ascospores ellipsoid, subglobose or ovoid ..... 5
4. Ascospores filamentous ..... 11
5. Ascospores subglobose, aseptate ..... 6
5. Ascospores septate, not subglobose ..... 8
6. Asci clavate ..... Unidentified Ascomycete I
6. Asci not clavate ..... 7
7. Asci cylindrical ..... *Payosphaeria minuta*
7. Asci pyriform ..... Unidentified Ascomycete III

8. Ascomata attached to calcareous materials; ascospores thick-walled, multiseptate ..... *Koralionastes* sp.
8. Ascomata on wood; ascospores not combining the above features ..... 9
9. Ascospores less than 15  $\mu\text{m}$  long and 5  $\mu\text{m}$  wide, 2-3 septate ..... Unidentified Ascomycete IV
9. Ascospores more than 15  $\mu\text{m}$  long and 5  $\mu\text{m}$  wide, 0-1 septate ..... 10
10. Ascospores 20-54 x 6-11  $\mu\text{m}$ , 1 septate ..... *Halosphaeria cucullata*
10. Ascospores 17-26 x 6-9  $\mu\text{m}$  0-04 1-septate ..... Unidentified Ascomycete V
11. Spores multiseptate ..... *Lindra hawaiiensis*
11. Spores 0-1 septate ..... 12
12. Spores less than 100  $\mu\text{m}$  long, with rounded poles and without conical end chambers ..... *Bathyascus tropicalis*
12. Spores more than 100  $\mu\text{m}$  long, with conical end chambers ..... 13
13. Ascospores more than 500  $\mu\text{m}$  long ..... *Lulworthia grandispora*
13. Ascospores less than 500  $\mu\text{m}$  long ..... 14
14. Ascospores less than 300  $\mu\text{m}$  long ..... *Lulworthia* sp. III
14. Ascospores mostly more than 300  $\mu\text{m}$  long ..... 15
15. Ascomata greyish, with a neck up to 400  $\mu\text{m}$  long, ascospores 230-500  $\mu\text{m}$  long ..... *Lulworthia* sp. II
15. Ascomata dark brown to black, neck up to 75  $\mu\text{m}$  long, ascospores 310-370  $\mu\text{m}$  long ..... *Lulworthia* sp. I

16.	Appendages polar only .....	17
16.	Appendages both polar and central .....	25
17.	Ascospores with 3-4 thin, more or less rigid appendages .....	18
17.	Ascospores with different types of appendages .....	22
18.	Ascospores with 2 subterminal appendages at both poles .....	
	..... <i>Antennospora quadricornuta</i>	
18.	Ascospores with 3-4 terminal or subterminal appendages .....	19
19.	Appendages subterminal, spathulate .....	<i>Antennospora salina</i>
19.	Appendages terminal, not spathulate .....	20
20.	Ascospore diameter less than 6 $\mu\text{m}$ .....	<i>Arenariomyces parvulus</i>
20.	Ascospore diameter more than 7 $\mu\text{m}$ .....	21
21.	Ascomata on sand grains .....	<i>Arenariomyces trifurcatus</i>
21.	Ascomata partly immersed in wood .....	<i>Arenariomyces majusculus</i>
22.	Ascospores with a cap-like appendage at both poles .....	24
22.	Ascospores with ribbon-like appendages .....	23
23.	Spores 19-35 x 8-10 $\mu\text{m}$ , slightly constricted at septum .....	
	..... <i>Ceriosporopsis halima</i>	
23.	Spores 22-30 x 7-8 $\mu\text{m}$ , not constricted at septum .....	
	..... <i>Halosarpheia retorquens</i>	

24.	Ascospores 18-23 x 7-10 $\mu\text{m}$ , thick-walled, mostly not constricted at the septum .....	<i>Halosarpheia hamata</i>	
24.	Ascospores 15-21 x 7.5-10 $\mu\text{m}$ , thin-walled, always slightly constricted at the septum .....	<i>Halosarpheia viscosa</i>	
25.	Ascomata attached to sand grains; ascospores with ribbon-like appendages (with uniform width) all around the middle and at each pole .....		26
25.	Ascomata fully or partly immersed in wood; ascospore appendages not of uniform width .....	<i>Ocostaspora apilongissima</i>	
26.	Ascospores 70-80 x 7.5-10 $\mu\text{m}$ with 8 transverse septa .....	<i>Corollospora pseudopulchella</i>	
26.	Ascospores 80-115 x 7.5-12.5 $\mu\text{m}$ , with 10-13 transverse septa .....	<i>Corollospora filiformis</i>	
27.	Ascospores with appendages .....		28
27.	Ascospores without appendages .....		37
28.	Ascus apex with a pore .....		29
28.	Ascus apex without a pore .....		34
29.	Ascospores not constricted at the septum .....		30
29.	Ascospores constricted at the septum .....		33
30.	Ascospores with membranous, wing-like appendages on either side of the septum .....	Unidentified Ascomycete	2
30.	Appendages polar .....		31



31.	Ascospores more than 37 $\mu\text{m}$ long .....	<i>Aniptodera mangrovei</i>	
31.	Ascospores 37 $\mu\text{m}$ or less long .....		32
32.	Ascospores 12-20 x 5-8 $\mu\text{m}$ , broadly ellipsoid .....	<i>Aniptodera salsuginosa</i>	
32.	Ascospores 18-37 x 8-11 $\mu\text{m}$ , narrowly ellipsoid .....		
	.....	<i>Aniptodera chesapeakeensis</i>	
33.	Ascospores 10-16 x 5-6 $\mu\text{m}$ , thin-walled .....	<i>Halosarpheia minuta</i>	
33.	Ascospores 18-25 x 9-13 $\mu\text{m}$ , thick-walled .....	<i>Halosarpheia marina</i>	
34.	Ascospores more than 30 $\mu\text{m}$ long and 10 $\mu\text{m}$ broad .....		35
34.	Ascospores less than 30 $\mu\text{m}$ long and 10 $\mu\text{m}$ broad .....		36
35.	Ascospores 32-45 x 15-20 $\mu\text{m}$ , constricted at the apex .....		
	.....	<i>Halosarpheia abonnis</i>	
35.	Ascospores 55-62.5 x 22.5-27.5 $\mu\text{m}$ , slightly constricted at the base .....		
	.....	<i>Halosarpheia ratnagiriensis</i>	
36.	Ascospores 13-18 x 7-9 $\mu\text{m}$ , slightly constricted at the septum .....		
	.....	<i>Aniptodera sp. I</i>	
36.	Ascospores 17-23 x 7-9 $\mu\text{m}$ not constricted at the septum... ..		
	.....	<i>Aniptodera sp. II</i>	
37.	Ascospores 1- or 2-celled, entirely hyaline or entirely brown .....		41
37.	Ascospores 4-celled, brown with hyaline end-cells .....		38
38.	Asci with 8 ascospores .....	<i>Savoryella lignicola</i>	
38.	Asci with less than 8 ascospores .....		39
39.	Asci with 4 ascospores .....	<i>Savoryella sp. I</i>	

39.	Asci with less than 4 ascospores.....	40
40.	Ascospores 37.5-58 x 14-20 $\mu\text{m}$ , apical cells verrucose .....	
	..... <i>Savoryella paucispora</i>	
40.	Ascospores 38-44 x 13-16 $\mu\text{m}$ , apical cells not verrucose ..	<i>Savoryella</i> sp. II
41.	Ascospores brown, aseptate, with a germ slit .....	<i>Halorosellinia oceanica</i>
41.	Ascospores hyaline, 1- or more septate, without germ slit .....	42
42.	Ascospores multiseptate .....	<i>Marinosphaera mangrovei</i>
42.	Ascospore uniseptate .....	43
43.	Ascospores thick-walled .....	44
43.	Ascospores thin-walled .....	45
44.	Ascospores 15-20 x 7.5-10 $\mu\text{m}$ , broadly ellipsoid .....	<i>Aniptodera haispora</i>
44.	Ascospores 37.5-50 x 11-16 $\mu\text{m}$ , narrowly ellipsoid ..	<i>Aniptodera longispora</i>
45.	Ascospores 1-celled, subglobose to ovoid .....	Unidentified Ascomycete VI
45.	Ascospores with more than 1 cell, not subglobose or ovoid .....	46
46.	Ascospores cylindrical, multiseptate, 26-31 x 5-6.5 $\mu\text{m}$ .....	
	..... Unidentified Ascomycete VII	
46.	Ascospores ellipsoid, 1-septate .....	47
47.	Ascospores 27-32 x 11-13 $\mu\text{m}$ .....	<i>Lignincola tropica</i>
47.	Ascospores less than 27 $\mu\text{m}$ long .....	48
48.	Ascospores 17-24 x 5-8 $\mu\text{m}$ .....	<i>Lignincola laevis</i>
48.	Ascospores 13-18 x 5-8 $\mu\text{m}$ .....	<i>Lignincola longirostris</i>

49.	Ascomata apothecial, ascospores striate .....	<i>Dactylospora haliotrepha</i>
49.	Ascomata not apothecial, ascospores not striate .....	50
50.	Ascomata cleistothecial; ascospores with bipolar appendages .....	..... <i>Dryosphaera tropicalis</i>
50.	Ascomata perithecial; ascospores without appendages .....	51
51.	Ascospores muriform .....	52
51.	Ascospores not muriform .....	55
52.	Spores brown with lighter end-cells .....	53
52.	Spores entirely brown .....	<i>Pleospora pelagica</i>
53.	Ascospores 50 $\mu\text{m}$ or less long .....	<i>A. mangrovei</i>
53.	Ascospores more than 50 $\mu\text{m}$ long .....	54
54.	Ascospores 55-78 x 17-23 $\mu\text{m}$ , with 7-12 transsepta .....	<i>Aigialus parvus</i>
54.	Ascospores 97-107.5 x 21.5-30 $\mu\text{m}$ , with 12-19 transsepta .....	..... <i>Aigialus grandis</i>
55.	Ascospores 1-septate .....	56
55.	Ascospores 2- or more septate .....	57
56.	Ascospores fusiform with strongly eccentric septation .....	<i>Manglicola</i> sp.
56.	Ascospores ellipsoid; septation not eccentric .....	<i>Verruculina enalia</i>
57.	Ascospores spindle-shaped .....	58
57.	Ascospores not spindle-shaped .....	59

58. Spores 4-celled with eccentric septa ..... *Salsuginea ramicola*
58. Spores with more than 4 cells, septa at ends ..... *Biatriospora marina*
59. Ascospores thick-walled, 52.5-64 x 15-18  $\mu\text{m}$ .....*Ascocratera manglicola*
59. Ascospores thin-walled .....60
60. Ascospores 18-25 x 6-9  $\mu\text{m}$ , constricted at septa .....  
..... *Leptosphaeria australiensis*
60. Ascospores 30-45 x 7-11  $\mu\text{m}$ , not constricted at septum .....  
..... Unidentified Ascomycete VIII

***Aigialus grandis*** Kohlm. & S. Schatz in Tran. Br. Mycol. Soc. 85: 699 (1985).

Taxonomic Position: Pyrenulales, Massariaceae

**Fig. 1**

Ascomata perithecial, 800-1760 x 400-796  $\mu\text{m}$ , completely or partially (90%) immersed, subglobose or fusiform, ostiolate, black, with a longitudinal furrow at the top. Peridium 80-100  $\mu\text{m}$  thick, multilayered, with small, dark brown cells. Ostiole 50-100  $\mu\text{m}$  in diam.; ostiolar canal lined with numerous periphyses with swollen apices. Pseudoparaphyses 1.5-2- $\mu\text{m}$  wide, trabeculate, branched at the tip. Asci 265-440 x 20-30(40)  $\mu\text{m}$ , eight-spored, cylindrical, pedunculate, thick-walled, bitunicate, with a conspicuous apical ring. Ascospores 97-107.5 x 21.5-23 (30)  $\mu\text{m}$ , golden (yellow) brown with hyaline apical cells, muriform, with 12-19 transepta, 1-3 longisepta in all except the apical cells.

## Materials Examined

KR TLY B RHI 7 (1) + *Halocyphina villosa*+ *Halosarpheia marina*+ *Lulworthia grandispora* 26-07-92 - (M)  
KR Edk RHI 27 (1)+ *Halosarpheia marina* 15-11-92 - (Pm)  
KR TLY C RHI 63 (1) + *Halosarpheia marina* 21-02-93 - (Pm)  
KR Bey DRW 50 (1) + *Savoryella lignicola* 28-02-93 - (Pm)  
KR Che INT 254 (1) + *Halocyphina villosa*+*Halosarpheia marina* 17-04-93 - (Pm)  
KR Che INT 260 (1) 17-04-93 - (Pm)  
KR Che RHI 78 (1) + *Halosarpheia marina* 17-04-93 - (Pm)  
KR TLY C RHI 94 (1) + *Lignicola longirostris* + *Savoryella paucispora* 18-04-93 - (Pm)  
KR TLY C RHI 101 (1) + *Halosarpheia marina* 09-05-93 - (Pm)  
KR TLY C RHI 107 (1) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
KR Edk RHI 110 (1) 11-07-93 - (M)  
KR TLY C BRU 177 (1) + *Leptosphaeria australiensis* 18-07-93 - (M)  
KR TLY C RHI 122 (1) + *Cirrenalia pygmea* 18-07-93 - (M)  
KR Mah-A AVI 210 (1) + *Halosarpheia marina* 12-08-93 - (M)  
KR Bey DRW 83 (1) 15-08-93 - (M)  
KR TLY C RHI 140 (1) + *Halocyphina villosa* 22-08-93 - (M)  
KR Che RHI 146 (1) + *Aniptodera chesapeakeensis*+*Halocyphina villosa* 05-09-93 - (M)  
KR TLY A RHI 154 (1) + *Lulworthia grandispora* 17-10-93 - (Pm)  
KR Kav INT 422 (1) + *Halocyphina villosa*+ *Halosarpheia ratnagiriensis*+ *Halorosellinia oceanica* 30-10-93 - (Pm)  
KR Kav RHI 156 (1) + *Halocyphina villosa*+ *Cirrenalia pygmea*+ *Aniptodera haispora* 30-10-93 - (Pm)  
KR TLY A RHI 161 (1) + *Halocyphina villosa*+ *Leptosphaeria australiensis* 21-11-93 - (Pm)  
KR Che RHI 171 (1) + *Halosarpheia marina* +*Cirrenalia basiminuta* 18-12-93 - (Pm)  
KR Che RHI 178 (1) + *Halocyphina villosa* +*Dactylospora haliotrepha* 18-12-93 - (Pm)  
KR TLY A RHI 183 (1) + *Halocyphina villosa* 19-12-93 - (Pm)  
KR TLY A RHI 184 (1) + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
KR Edk RHI 197 (1) + *Lulworthia grandispora* 06-03-94 - (Pm)  
KR Kav RHI 216 (1) + *Aniptodera chesapeakeensis* +*Cirrenalia pygmea* 15-04-94 - (Pm)  
KR TLY A RHI 225 (1)- 15-05-94 - (Pm)

*Aigialus grandis* was first described by Kohlmeyer and Schatz (1985) from Atlantic Ocean. It is also known from Belize (Kohlmeyer & Volkmann-Kohlmeyer, 1987), India (Borse, 1988), Brunei (Hyde, 1988a), Seychelles (Hyde & Jones, 1988), Malaysia (Jones & Kuthubutheen, 1989), and Indonesia (Hyde & Jones, 1990). In most cases, it has been recorded on mangrove wood. The Kerala collections did not show any variations in microscopical features.

***Aigialus mangrovei*** Borse in Trans. Br. Mycol. Soc. 88: 424 (1987) (as *mangrovis*).

Taxonomic Position: Pyrenulales, Massariaceae

**Fig. 2**

Ascomata perithecial, 640-868 x 484-505  $\mu\text{m}$ , completely or partially (90%) immersed, subglobose or fusiform, ostiolate, black, solitary or in groups, with a longitudinal furrow at the top. Peridium 60-90 (100)  $\mu\text{m}$ , multilayered, with thick-walled, dark brown cells at the outer layers and thin-walled, subhyaline cells in the inner layers. Ostiole 35-50  $\mu\text{m}$  diam.; ostiolar canal lined with periphyses having swollen apices. Pseudoparaphyses 215-247 x 1.5-2  $\mu\text{m}$ , trabeculate, branched, with swollen tips. Asci 307-430 x 22-28  $\mu\text{m}$ , eight-spored, cylindrical, short-pedunculate, thick-walled, bitunicate, with a conspicuous apical ring. Ascospores (32) 35-50 x (12) 13-17  $\mu\text{m}$ , muriform, with 5-7 transepta, 1-2 longisepta in all except the apical cells; apical cells hyaline, with a mucilaginous cap.

**Materials examined**

- KR TLY A - RHI 21 (2) + *Halocyphina villosa* 25-10-92 - (Pm)
- KR Edk - RHI 33 (2) + *Halocyphina villosa* 15-11-92 - (Pm)
- KR TLY A - AVI 84 (2) + *Halosarpheia marina* + *Cirrenalia pygmaea* + *Aigialus parvus* 29-11-92 - (Pm)
- KR TLY A - BRU 72 (2) + *Aniptodera chesapeakeensis* + *Leptosphaeria australiensis* 29-11-92 - (Pm)
- KR TLY B - BRU 75 (2) + *Halocyphina villosa* 29-11-92 - (Pm)
- KR TLY A - RHI 37 (2) + *Halosarpheia ratnagiriensis* + *Halosarpheia marina* 29-11-92 - (Pm)
- KR TLY C - AVI 122 (2) + *Marinosphaera mangrovei* 21-02-93 - (Prm)
- KR Val - INT 451 (2) + *Halosarpheia marina* 5-12-93 - (Pm)
- KR Kav - INT 332 (2) + *Cirrenalia basiminuta* + *Halocyphina villosa* 19-07-93 - (M)
- KR Kav - RHI 159 (2) + *Halocyphina villosa* + *Dactylospora haliotrepha* 30-10-93 - (Pm)
- KR Val - RHI 71 (2) + *Lulworthia grandispora* 11-4-93 - (Prm)

KR Edk - RHI 109 (2) + *Halosarpheia marina* 11-7-93 - (M)

KR Kav - INT 539 (2) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* + *Halocyphina villosa* 15-04-94 - (Prm)

*Aigialus mangrovei* was first described from the Maharashtra coast of India by Borse (1987). Subsequently it has been reported from Belize (Kohlmeyer & Volkmann-Kohlmeyer, 1987), Brunei (Hyde, 1988), Seychelles, and Singapore (Jones & Hyde, 1990). The Kerala collections closely resemble the description of the type material by Borse (1987d).

***Aigialus parvus*** Kohlm. & S. Schatz. in Trans. Br. Mycol. Soc 85: 699-707 (1985).

Taxonomic Position: Pyrenulales, Massariaceae

**Fig. 3**

Ascomata perithecial, 728-896 x 308-500  $\mu\text{m}$ , completely or partially (90%) immersed, subglobose or fusiform, ostiolate, black, gregarious, with a longitudinal furrow at the top. Peridium 30-65(70)  $\mu\text{m}$  thick, multilayered; outer layers with thick-walled, black coloured cells and inner layers with thin-walled, hyaline or light brown cells. Ostiole 60-110  $\mu\text{m}$  in diam.; ostiolar canal lined with numerous periphyses with swollen heads. Pseudoparaphyses 2-2.5  $\mu\text{m}$  wide, long, slender, trabeculate, branched at the top. Asci 372-500 (520) x 20-32  $\mu\text{m}$ , eight-spored, cylindrical, pedunculate, thick-walled, bitunicate, with a conspicuous ring at the apex. Ascospores 55-74(78) x 17-23  $\mu\text{m}$ , muriform, with 7-12 transepta, and 1-3 longisepta in all except the apical cells, golden (yellow) brown; apical cells hyaline.

## Materials examined

- KR TLY A - RHI 4 (3) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 26-07-92 - (M)  
KR Val - RHI 11 (3) + *Halocyphina villosa* 09-08-92 - (M)  
KR Val - RHI 12 (3) + *Cirrenalia pygmea* 09-08-92 - (M)  
KR TLY C - RHI 24 (3) + *Leptosphaeria australiensis* 25-10-92 - (Pm)  
KR TLY C - RHI 26 (3) 25-10-92 - (Pm)  
KR Edk - INT 154 (3) + *Halocyphina villosa* 15-11-92 - (Pm)  
KR Edk - RHI 31 (3) + *Cirrenalia macrocephala* 15-11-92 - (Pm)  
KR TLY A - AVI 84 (3) + *Halosarpheia marina* + *Cirrenalia pygmea* + *Aigialus mangrovis* 29-11-92 - (Pm)  
KR TLY A - RHI 40 (3) + *Lulworthia grandispora* + *Leptosphaeria australiensis* 29-11-92 - (Pm)  
KR TLY B - RHI 41 (3) + *Halosarpheia marina* + *Verruculina enalia* 29-11-92 - (Pm)  
KR TLY C - RHI 46 (3) 29-11-92 - (Pm)  
KR TLY A - AVI 111 (3) + *Lulworthia grandispora* + *Salsuginea ramicola* 10-01-93 - (Pm)  
KR TLY A - RHI 54 (3) + *Lulworthia grandispora* 10-01-93 - (Pm)  
KR TLY C - RHI 58 (3) + *Marinosphaera mangrovei* + *Halocyphina villosa* 10-01-93 - (Pm)  
KR TLY C - RHI 65 (3) + *Dactylospora haliotrepha* + *Halosphaeria hamata* + *Savoryella lignicola* 28-03-93 - (Pm)  
KR Val - INT 249 (3) + *Dactylospora haliotrepha* + *Marinosphaera mangrovei* 11-04-93 - (Pm)  
KR Val - RHI 69 (3) + *Lindra hawaiiensis* 11-04-93 - (Pm)  
KR Val - RHI 70 (3) + *Lindra hawaiiensis* 11-04-93 - (Pm)  
KR Che - BRU 135 (3) + *Marinosphaera mangrovei* 17-04-93 - (Pm)  
KR Che - INT 255 (3) + *Savoryella lignicola* + *Halosarpheia marina* 17-04-93 - (Pm)  
KR TLY A - RHI 87 (3) + *Verruculina enalia* + *Lulworthia grandispora* 18-04-93 - (Pm)  
KR TLY B - RHI 88 (3) + *Aniptodera chesapeakeensis* 18-04-93 - (Pm)  
KR TIK - DRW 66 (3) + *Aniptodera chesapeakeensis* 25-04-93 - (Pm)  
KR Val - INT 452 (3) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 05-12-93 - (Pm)  
KR Kav - AVI 198 (3) *Lindra hawaiiensis* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
KR TLY B - RHI 136 (3) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 22-08-93 - (M)  
KR TLY C - RHI 141 (3) + *Halocyphina villosa* 22-08-93 - (M)  
KR Che - RHI 145 (3) + *Dactylospora haliotrepha* + *Halosarpheia ratnagiriensis* 05-09-93 - (M)  
KR TLY C - AVI 239 (3) + *Didymosphaeria enalia* 19-09-93 - (M)  
KR TLY C - BRU 215 (3) + *Halocyphina villosa* + *Periconia prolifica* 19-09-93 - (M)  
KR Kav - RHI 160 (3) + *Halocyphina villosa* + *Verruculina enalia* + *Aniptodera haispora* 30-10-93 - (Pm)  
KR TLY A - AVI 252 (3) + *Marinosphaera mangrovei* + *Halocyphina villosa* 21-11-93 - (Pm)  
KR TLY A - RHI 163 (3) + *Cirrenalia pygmea* 21-11-93 - (Pm)  
KR Che - AVI 268 (3) + *Marinosphaera mangrovei* + *Halocyphina villosa* 18-12-93 - (Pm)  
KR Che - AVI 269 (3) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Ascomycetes* sp. II 18-12-93 - (Pm)  
KR Che - INT 465 (3) + *Lulworthia grandispora* + *Lignicola laevis* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
KR Che - RHI 170 (3) + *Halosarpheia marina* + *Cirrenalia pygmea* + *Halorosellinia oceanica* 18-12-93 - (Pm)  
KR TLY B - AVI 290 (3) + *Halocyphina villosa* + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
KR Kav - AVI 313 (3) + *Dactylospora haliotrepha* + *Cirrenalia basiminuta* 15-04-94 - (Pm)  
KR Kav - INT 538 (3) + *Halocyphina villosa* + *Aniptodera salsuginosa* 15-04-94 - (Pm)



KR Kav - RHI 220 (3) + *Marinosphaera mangrovei* + *Halosarpheia marina* 15-04-94 - (Prm)

KR TLY A - RHI 223 (3) + *Halosarpheia marina* 17-04-94 - (Prm)

KR TLY A - RHI 226 (3) + *Lulworthia grandispora* 15-05-94 - (Prm)

*Aigialus parvus* was first described by Kohlmeyer and Schatz (1985). According to Jones & Hyde (1990), this species is known from Brunei, India, Malaysia, Singapore, and Sumatra. The Kerala collections agreed with previous descriptions of this species in all major features.

***Aniptodera chesapeakensis*** Shearer & M.A. Mill. in *Mycologia* 69: 894 (1977).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae.

**Fig. 4**

Ascomata perithecial, 180-450 x 150-270  $\mu\text{m}$ , globose or subglobose, partially or fully immersed or superficial, ostiolate, papillate, hyaline, light brown or brown, solitary. Peridium 15-20  $\mu\text{m}$  thick, multilayered, made up of elongate, thin-walled cells. Papillae 220-550 x 30-70  $\mu\text{m}$ , cylindrical; ostiolar canal lined with numerous periphyses. Interascal tissue absent. Asci 70-125 x 20-26  $\mu\text{m}$ , 8-spored, clavate, pedunculate, unitunicate, thin-walled but with a thickened area at the subapical region with a single pore. Ascospores 18-37 x 8-13  $\mu\text{m}$ , ellipsoidal, uniseptate, not constricted at the septum, hyaline, thick-walled, usually with two polar appendages folded side ways parallel to the spore wall and are unrolled in the sea water into very long, thin, thread-like structures.

## Materials examined

- KR Kad A - ACN 2 (4) + *Halosarpheia marina* 19-04-92 - (Prm)  
KR Kad A - AVI 1 (4) + *Pleospora pelagica* 19-04-92 - (Prm)  
KR Ppd - DRW 1 (4) 19-04-92 - (Prm)  
KR Ppd - DRW 4 (4) + *Savoryella lignicola* + *Halosarpheia marina* 19-04-92 - (Prm)  
KR Kad A - INT 3 (4) + *Halocyphina villosa* + *Lulworthia* sp. I 19-04-92 - (Prm)  
KR Kad B - INT 16 (4) 19-04-92 - (Prm)  
KR Mah-A - ACN 7 (4) + *Savoryella lignicola* 03-05-92 - (Prm)  
KR Mah-A - ACN 12 (4) 03-05-92 - (Prm)  
KR Mah-A - INT 27 (4) + *Leptosphaeria australiensis* 03-05-92 - (Prm)  
KR Mah-A - INT 34 (4) + *Halosarpheia marina* + *Marinosphaera mangrovei* 03-05-92 - (Prm)  
KR TLY A - AVI 16 (4) + *Halocyphina villosa* 21-06-92 - (M)  
KR TLY A - BRU 12 (4) 21-06-92 - (M)  
KR TLY A - INT 45 (4) + *Halosarpheia marina* + *Halocyphina villosa* + *Marinosphaera mangrovei* 21-06-92 - (M)  
KR TLY A - INT 47 (4) + *Marinosphaera mangrovei* 21-06-92 - (M)  
KR TLY A - RHI 1 (4) + *Halocyphina villosa* + *Aigialus parvus* 21-06-92 - (M)  
KR TLY B - ACN 14 (4) + *Halosarpheia marina* 26-07-92 - (M)  
KR TLY B - ACN 15 (4) + *Halosarpheia marina* 26-07-92 - (M)  
KR TLY A - AVI 19 (4) + *Lulworthia grandispora* + *Halocyphina villosa* 26-07-92 - (M)  
KR TLY B - AVI 23 (4) + *Halocyphina villosa* + *Halosphaeria hamata* + *Bathyasacus tropicalis* + *Bathyasacus tropicalis* 26-07-92 - (M)  
KR TLY B - AVI 25 (4) + *Lindra hawaiiensis* + *Halosarpheia marina* 26-07-92 - (M)  
KR TLY B - AVI 26 (4) + *Halocyphina villosa* + *Halosarpheia marina* 26-07-92 - (M)  
KR TLY A - BRU 13 (4) + *Halosarpheia marina* + *Lulworthia grandispora* 26-07-92 - (M)  
KR TLY A - BRU 15 (4) + *Cirrenalia macrocephala* + *Halocyphina villosa* 26-07-92 - (M)  
KR TLY A - INT 48 (4) + *Halosarpheia marina* + *Marinosphaera mangrovei* 26-07-92 - (M)  
KR TLY A - INT 49 (4) + *Cirrenalia macrocephala* + *Halocyphina villosa* 26-07-92 - (M)  
KR TLY A - RHI 4 (4) + *Halocyphina villosa* + *Aigialus parvus* 26-07-92 - (M)  
KR Vad - ACN 19 (4) + *Savoryella lignicola* + *Marinosphaera mangrovei* 02-08-92 - (M)  
KR Vad - ACN 25 (4) + *Marinosphaera mangrovei* + *Halosarpheia marina* 02-08-92 - (M)  
KR Vad - AVI 31 (4) + *Salsuginea ramicola* 02-08-92 - (M)  
KR Vad - AVI 34 (4) + *Savoryella paucispora* 02-08-92 - (M)  
KR Vad - INT 58 (4) + *Halocyphina villosa* 02-08-92 - (M)  
KR Val - BRU 29 (4) + *Halosarpheia marina* 09-08-92 - (M)  
KR Val - BRU 32 (4) + *Halocyphina villosa* + *Halosarpheia marina* 09-08-92 - (M)  
KR Val - BRU 35 (4) + *Halosarpheia marina* 09-08-92 - (M)  
KR Val - ACN 27 (4) + *Halosarpheia marina* 09-08-92 - (M)  
KR Val - ACN 32 (4) + *Periconia prolifica* 09-08-92 - (M)  
KR Val - AVI 39 (4) 09-08-92 - (M)  
KR Val - INT 65 (4) + *Halocyphina villosa* + *Halorosellinia oceanica* 09-08-92 - (M)  
KR Val - INT 70 (4) + *Periconia prolifica* + *Lulworthia* sp. I 09-08-92 - (M)

KR Val - INT 72 (4) + *Halocyphina villosa* + *Marinosphaera mangrovei* 09-08-92 - (M)  
 KR Val - RHI 10 (4) + *Dactylospora haliotrepha* + *Halorosellinia oceanica* 09-08-92 - (M)  
 KR Val - RHI 14 (4) + *Halocyphina villosa* + *Halosarpheia marina* 09-08-92 - (M)  
 KR Val - RHI 15 (4) + *Halocyphina villosa* + *Halosarpheia marina* 09-08-92 - (M)  
 KR TLY A - AVI 43 (4) + *Savoryella lignicola* + *Halocyphina villosa* 23-08-92 - (M)  
 KR Dha-A - DRW 7 (4) + *Lulworthia grandispora* 23-08-92 - (M)  
 KR TLY A - INT 74 (4) + *Savoryella lignicola* + *Halosarpheia marina* 23-08-92 - (M)  
 KR TLY A - INT 75 (4) + *Halocyphina villosa* 23-08-92 - (M)  
 KR Mah-A - ACN 36 (4) 06-09-92 - (M)  
 KR Mah-A - ACN 38 (4) + *Periconia prolifica* 06-09-92 - (M)  
 KR Mah-A - AVI 46 (4) + *Savoryella lignicola* 06-09-92 - (M)  
 KR Mah-A - BRU 42 (4) + *Dactylospora haliotrepha* 06-09-92 - (M)  
 KR Mah-A - BRU 44 (4) + *Savoryella lignicola* + *Cirrenalia pygmea* 06-09-92 - (M)  
 KR Mah-A - INT 101 (4) + *Halocyphina villosa* 06-09-92 - (M)  
 KR Mah-A - INT 110 (4) + *Lulworthia grandispora* 06-09-92 - (M)  
 KR Mah-B - INT 118 (4) 06-09-92 - (M)  
 KR Kad A - ACN 39 (4) + *Cirrenalia pygmea* + *Trichocladium alopallonellum* 13-09-92 - (M)  
 KR Kad A - ACN 42 (4) + *Halosarpheia marina* 13-09-92 - (M)  
 KR Kad A - AVI 52 (4) + *Cirrenalia pygmea* 13-09-92 - (M)  
 KR Kad A - AVI 53 (4) + *Halocyphina villosa* 13-09-92 - (M)  
 KR Kad A - INT 121 (4) + *Dactylospora haliotrepha* + *Halocyphina villosa* 13-09-92 - (M)  
 KR Kad A - INT 125 (4) + *Zalerion varium* + *Halosarpheia marina* 13-09-92 - (M)  
 KR TLY A - AVI 61 (4) + *Zalerion varium* + *Ceriosporopsis halima* 27-09-92 - (M)  
 KR TLY A - BRU 45 (4) + *Halocyphina villosa* 27-09-92 - (M)  
 KR TLY A - INT 129 (4) + *Halosarpheia marina* + *Halocyphina villosa* 27-09-92 - (M)  
 KR Bey - DRW 15 (4) 02-10-92 - (Pm)  
 KR Bey - INT 135 (4) + *Savoryella lignicola* 02-10-92 - (Pm)  
 KR Kad B - INT 143 (4) 18-10-92 - (Pm)  
 KR Kad B - INT 146 (4) + *Lulworthia* sp. I 18-10-92 - (Pm)  
 KR TLY A - AVI 64 (4) + *Dactylospora haliotrepha* 25-10-92 - (Pm)  
 KR TLY C - AVI 69 (4) + *Lulworthia* sp. I + *Cirrenalia pygmea* 25-10-92 - (Pm)  
 KR TLY C - AVI 71 (4) + *Lulworthia* sp. I 25-10-92 - (Pm)  
 KR TLY C - AVI 72 (4) + *Cirrenalia pygmea* + *Lulworthia grandispora* 25-10-92 - (Pm)  
 KR TLY A - BRU 51 (4) + *Dactylospora haliotrepha* 25-10-92 - (Pm)  
 KR TLY A - BRU 52 (4) + *Lulworthia grandispora* + *Verruculina enalia* 25-10-92 - (Pm)  
 KR TLY A - BRU 54 (4) + *Savoryella lignicola* + *Lignincola laevis* 25-10-92 - (Pm)  
 KR TLY C - BRU 55 (4) + *Cirrenalia pygmea* 25-10-92 - (Pm)  
 KR TLY C - BRU 58 (4) + *Halocyphina villosa* + *Periconia prolifica* 25-10-92 - (Pm)  
 KR Edk - ACN 49 (4) + *Periconia prolifica* + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - ACN 52 (4) + *Savoryella lignicola* + *Periconia prolifica* 15-11-92 - (Pm)  
 KR Edk - ACN 53 (4) + *Marinosphaera mangrovei* + *Periconia prolifica* 15-11-92 - (Pm)  
 KR Edk - ACN 57 (4) + *Savoryella lignicola* + *Marinosphaera mangrovei* 15-11-92 - (Pm)

KR Edk - ACN 59 (4) + *Marinosphaera mangrovei* + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - ACN 60 (4) + *Savoryella lignicola* + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - BRU 59 (4) + *Dactylospora haliotrepha* + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - BRU 67 (4) + *Marinosphaera mangrovei* 15-11-92 - (Pm)  
 KR Edk - INT 153 (4) + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - INT 161 (4) + *Periconia prolifica* + *Savoryella lignicola* 15-11-92 - (Pm)  
 KR TLY B - ACN 61 (4) + *Periconia prolifica* 29-11-92 - (Pm)  
 KR TLY B - ACN 64 (4) + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY A - AVI 85 (4) + *Halosarpheia marina* + *Biatrispora marina* 29-11-92 - (Pm)  
 KR TLY B - AVI 87 (4) + *Halocyphina villosa* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY B - AVI 90 (4) + *Halosphaeria hamata* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY A - BRU 69 (4) + *Halosarpheia marina* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY A - BRU 72 (4) + *Aigialus mangrovis* + *Leptosphaeria australiensis* 29-11-92 - (Pm)  
 KR TLY B - BRU 73 (4) + *Halocyphina villosa* + *Halosarpheia marina* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
 KR TLY B - BRU 74 (4) + *Halocyphina villosa* + *Halosarpheia marina* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
 KR TLY C - BRU 76 (4) + *Marinosphaera mangrovei* 29-11-92 - (Pm)  
 KR TLY C - BRU 78 (4) + *Lulworthia* sp. I + *Marinosphaera mangrovei* 29-11-92 - (Pm)  
 KR TLY A - INT 163 (4) + *Periconia prolifica* + *Leptosphaeria australiensis* + *Zalerion varium* 29-11-92 - (Pm)  
 KR TLY A - INT 164 (4) + *Lulworthia grandispora* + *Halosarpheia marina* + *Periconia prolifica* 29-11-92 - (Pm)  
 KR TLY A - RHI 39 (4) + *Lulworthia grandispora* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR Azi - DRW 25 (4) + *Halocyphina villosa* + *Antennospora quadricornuta* 20-12-92 - (Pm)  
 KR Azi - INT 169 (4) + *Halosarpheia marina* + *Halocyphina villosa* 20-12-92 - (Pm)  
 KR Azi - INT 172 (4) + *Lulworthia grandispora* + *Halocyphina villosa* 20-12-92 - (Pm)  
 KR Azi - INT 177 (4) + *Halocyphina villosa* + *Marinosphaera mangrovei* 20-12-92 - (Pm)  
 KR Azi - SBI 15 (4) + *Halosarpheia marina* + *Lulworthia grandispora* 20-12-92 - (Pm)  
 KR TLY C - ACN 67 (4) + *Halosarpheia marina* + *Cirrenalia pygmea* 27-12-92 - (Pm)  
 KR TLY C - ACN 68 (4) + *Lulworthia grandispora* 27-12-92 - (Pm)  
 KR TLY A - AVI 93 (4) + *Halosarpheia marina* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY C - AVI 98 (4) + *Halosarpheia marina* + *Halocyphina villosa* + *Lulworthia grandispora* 27-12-92 - (Pm)  
 KR TLY C - AVI 99 (4) + *Halosarpheia marina* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY C - AVI 100 (4) + *Lulworthia grandispora* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY A - BRU 79 (4) + *Halocyphina villosa* + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR TLY A - BRU 83 (4) + *Halocyphina villosa* + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR Dha-B - INT 185 (4) + *Lindra hawaiiensis* 27-12-92 - (Pm)  
 KR Dha-B - INT 187 (4) + *Lulworthia* sp. I 27-12-92 - (Pm)  
 KR Mah-A - ACN 70 (4) + *Halosarpheia marina* 03-01-93 - (Pm)  
 KR Mah-A - ACN 77 (4) + *Lindra hawaiiensis* 03-01-93 - (Pm)  
 KR Mah-A - ACN 78 (4) + *Periconia prolifica* 03-01-93 - (Pm)  
 KR Mah-A - AVI 101 (4) + *Savoryella paucispora* 03-01-93 - (Pm)  
 KR Mah-A - AVI 102 (4) + *Halocyphina villosa* 03-01-93 - (Pm)  
 KR Mah-A - AVI 108 (4) + *Lulworthia grandispora* 03-01-93 - (Pm)  
 KR TLY C - ACN 83 (4) + *Halosarpheia marina* 10-01-93 - (Pm)

KR TLY C - ACN 84 (4) + *Cirrenalia pygmea* 10-01-93 - (Pm)  
 KR TLY C - BRU 99 (4) + *Halocyphina villosa* + *Savoryella lignicola* 10-01-93 - (Pm)  
 KR TLY C - BRU 101 (4) + *Halocyphina villosa* + *Cirrenalia pygmea* + *Periconia prolifica* 10-01-93 - (Pm)  
 KR TLY C - RHI 55 (4) + *Leptosphaeria australiensis* + *Halocyphina villosa* 10-01-93 - (Pm)  
 KR TLY C - RHI 56 (4) + *Lulworthia grandispora* + *Manglicola* sp. 10-01-93 - (Pm)  
 KR Ppd - DRW 27 (4) + Unidentified ascomycete VIII 31-01-93 - (Pm)  
 KR Ppd - DRW 31 (4) 31-01-93 - (Pm)  
 KR Ppd - INT 211 (4) 31-01-93 - (Pm)  
 KR Ppd - INT 212 (4) + *Zalerion varium* 31-01-93 - (Pm)  
 KR Azi - DRW 38 (4) + *Savoryella lignicola* 13-02-93 - (Pm)  
 KR Azi - DRW 39 (4) + *Savoryella lignicola* + *Lignincola laevis* + *Halosarpheia marina* 13-02-93 - (Pm)  
 KR Azi - DRW 41 (4) + *Cirrenalia pygmea* + *Halocyphina villosa* + *Halosarpheia marina* 13-02-93 - (Pm)  
 KR Azi - DRW 43 (4) + *Lulworthia grandispora* + *Savoryella lignicola* 13-02-93 - (Pm)  
 KR Azi - SBI 26 (4) + *Halosarpheia marina* 13-02-93 - (Pm)  
 KR Azi - SBI 29 (4) + *Halosarpheia marina* 13-02-93 - (Pm)  
 KR TLY C - ACN 85 (4) + *Halosarpheia marina* 21-02-93 - (Pm)  
 KR TLY C - ACN 86 (4) + *Savoryella lignicola* 21-02-93 - (Pm)  
 KR TLY C - ACN 91 (4) + *Halosarpheia viscosa* 21-02-93 - (Pm)  
 KR TLY A - BRU 103 (4) 21-02-93 - (Pm)  
 KR TLY A - BRU 104 (4) + *Marinosphaera mangrovei* 21-02-93 - (Pm)  
 KR TLY A - BRU 105 (4) + *Lulworthia grandispora* 21-02-93 - (Pm)  
 KR TLY C - RHI 62 (4) + *Halocyphina villosa* 21-02-93 - (Pm)  
 KR Bey - DRW 49 (4) 28-02-93 - (Pm)  
 KR Bey - INT 231 (4) + *Cirrenalia pygmea* 28-02-93 - (Pm)  
 KR TLY A - INT 235 (4) + *Cirrenalia pygmea* + *Halosarpheia marina* 28-03-93 - (Pm)  
 KR TLY A - INT 236 (4) + *Halosarpheia marina* + *Zalerion varium* 28-03-93 - (Pm)  
 KR TLY C - AVI 123 (4) + *Lulworthia* sp. I 28-03-93 - (Pm)  
 KR TLY C - AVI 126 (4) + *Marinosphaera mangrovei* 28-03-93 - (Pm)  
 KR Vad - ACN 93 (4) + *Cirrenalia pygmea* 04-04-93 - (Pm)  
 KR Vad - ACN 94 (4) + *Cirrenalia pygmea* 04-04-93 - (Pm)  
 KR Vad - ACN 95 (4) + *Halosarpheia marina* 04-04-93 - (Pm)  
 KR Vad - ACN 96 (4) 04-04-93 - (Pm)  
 KR Vad - BRU 120 (4) + *Halosarpheia marina* + *Halocyphina villosa* 04-04-93 - (Pm)  
 KR Vad - BRU 122 (4) + *Cirrenalia macrocephala* + *Halocyphina villosa* 04-04-93 - (Pm)  
 KR Vad - INT 238 (4) + *Periconia prolifica* + *Halosarpheia retorquens* 04-04-93 - (Pm)  
 KR Vad - INT 240 (4) + *Halocyphina villosa* + *Cirrenalia macrocephala* + *Dactylospora haliotrepha* + *Savoryella lignicola* 04-04-93 - (Pm)  
 KR Vad - INT 241 (4) + *Savoryella paucispora* + *Halosarpheia marina* + *Halosarpheia retorquens* 04-04-93 - (Pm)  
 KR Val - BRU 124 (4) 11-04-93 - (Pm)  
 KR Val - BRU 125 (4) 11-04-93 - (Pm)  
 KR Val - BRU 131 (4) 11-04-93 - (Pm)  
 KR Val - BRU 132 (4) 11-04-93 - (Pm)

KR Che - ACN 104 (4) + *Halosarpheia marina* + *Savoryella lignicola* 17-04-93 - (Prm)  
 KR Che - ACN 105 (4) + *Periconia prolifica* 17-04-93 - (Prm)  
 KR Che - ACN 107 (4) + *Lindra hawaiiensis* 17-04-93 - (Prm)  
 KR Che - ACN 108 (4) + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR Che - AVI 148 (4) + *Cirrenalia pygmea* + *Verruculina enalia* 17-04-93 - (Prm)  
 KR Che - AVI 149 (4) + *Dactylospora haliotrepha* + *Lulworthia grandispora* + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR Che - BRU 133 (4) + *Cirrenalia pygmea* + *Halocyphina villosa* 17-04-93 - (Prm)  
 KR Che - BRU 134 (4) + *Halosarpheia marina* + *Halocyphina villosa* 17-04-93 - (Prm)  
 KR Che - BRU 138 (4) + *Halocyphina villosa* + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR Che - INT 256 (4) + *Lulworthia grandispora* + *Cirrenalia pygmea* 17-04-93 - (Prm)  
 KR Che - RHI 84 (4) + *Savoryella lignicola* + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR TLY B - ACN 111 (4) *Halosarpheia retorquens* 18-04-93 - (Prm)  
 KR TLY B - ACN 112 (4) + *Lignincola laevis* 18-04-93 - (Prm)  
 KR TLY B - ACN 113 (4) + *Halosarpheia viscosa* + *Lulworthia* sp. III 18-04-93 - (Prm)  
 KR TLY C - ACN 115 (4) + *Halosarpheia marina* 18-04-93 - (Prm)  
 KR TLY A - AVI 152 (4) + *Payosphaeria minuta* 18-04-93 - (Prm)  
 KR TLY A - AVI 153 (4) + *Biatriospora marina* + *Lulworthia grandispora* 18-04-93 - (Prm)  
 KR TLY A - AVI 154 (4) + *Dactylospora haliotrepha* + *Verruculina enalia* 18-04-93 - (Prm)  
 KR TLY A - AVI 155 (4) + *Lulworthia grandispora* 18-04-93 - (Prm)  
 KR TLY A - BRU 139 (4) + Unidentified ascomycete III 18-04-93 - (Prm)  
 KR TLY A - BRU 141 (4) + Unidentified ascomycete III 18-04-93 - (Prm)  
 KR TLY B - BRU 142 (4) + *Halosarpheia marina* 18-04-93 - (Prm)  
 KR TLY B - BRU 143 (4) + *Halosarpheia marina* + *Lignincola laevis* 18-04-93 - (Prm)  
 KR TLY A - INT 261 (4) + *Lulworthia grandispora* + *Zalerion varium* 18-04-93 - (Prm)  
 KR TLY A - INT 262 (4) + *Halosarpheia marina* + *Cirrenalia pygmea* 18-04-93 - (Prm)  
 KR TLY A - INT 265 (4) + *Halosarpheia marina* + *Lulworthia grandispora* 18-04-93 - (Prm)  
 KR Dha-A - INT 275 (4) + *Halosarpheia marina* 18-04-93 - (Prm)  
 KR Dha-B - INT 283 (4) 18-04-93 - (Prm)  
 KR TLY B - RHI 88 (4) + *Aigialus parvus* 18-04-93 - (Prm)  
 KR TLY B - RHI 89 (4) + *Halosarpheia abonnis* 18-04-93 - (Prm)  
 KR Tik - DRW 66 (4) + *Aigialus parvus* 25-04-93 - (Prm)  
 KR Tik - INT 287 (4) + *Halosarpheia marina* 25-04-93 - (Prm)  
 KR Tik - INT 289 (4) + *Halosarpheia marina* 25-04-93 - (Prm)  
 KR TLY C - BRU 152 (4) + *Verruculina enalia* + *Periconia prolifica* 09-05-93 - (Prm)  
 KR TLY C - BRU 153 (4) + *Savoryella lignicola* 09-05-93 - (Prm)  
 KR TLY C - BRU 154 (4) + *Savoryella lignicola* 09-05-93 - (Prm)  
 KR TLY A - INT 293 (4) + *Cirrenalia pygmea* + *Halosarpheia marina* 09-05-93 - (Prm)  
 KR TLY A - INT 296 (4) + *Halosarpheia marina* 09-05-93 - (Prm)  
 KR Kad A - ACN 122 (4) 23-05-93 - (Prm)  
 KR Kad A - ACN 127 (4) + *Lulworthia* sp. I 23-05-93 - (Prm)  
 KR Kad A - INT 301 (4) + *Halocyphina villosa* + *Halosarpheia marina* 23-05-93 - (Prm)  
 KR TLY A - AVI 174 (4) + *Halosarpheia retorquens* 20-06-93 - (M)

KR TLY C - AVI 178 (4) + *Halosarpheia marina* + *Halocyphina villosa* + *Savoryella lignicola* 20-06-93 - (M)  
 KR TLY C - AVI 179 (4) + *Halosarpheia viscosa* + *Halocyphina villosa* + *Bathyascus tropicalis* 20-06-93 - (M)  
 KR TLY A - BRU 156 (4) + *Leptosphaeria australiensis* + *Halosarpheia retorquens* 20-06-93 - (M)  
 KR TLY A - BRU 158 (4) + *Marinosphaera mangrovei* 20-06-93 - (M)  
 KR TLY C - BRU 161 (4) + *Halosarpheia marina* + *Halocyphina villosa* + *Lindra hawaiiensis* 20-06-93 - (M)  
 KR TLY C - BRU 162 (4) + *Halocyphina villosa* 20-06-93 - (M)  
 KR TLY A - INT 302 (4) + *Marinosphaera mangrovei* + *Cirrenalia pygmea* 20-06-93 - (M)  
 KR TLY A - INT 304 (4) + *Zalerion varium* 20-06-93 - (M)  
 KR TLY A - RHI 103 (4) + *Marinosphaera mangrovei* 20-06-93 - (M)  
 KR TLY A - RHI 104 (4) + *Leptosphaeria australiensis* 20-06-93 - (M)  
 KR TLY C - RHI 106 (4) + *Halocyphina villosa* + *Dactylospora haliotrepha* 20-06-93 - (M)  
 KR TLY C - RHI 107 (4) + *Aigialus grandis* + *Halosarpheia marina* 20-06-93 - (M)  
 KR Edk - ACN 133 (4) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Edk - ACN 135 (4) 11-07-93 - (M)  
 KR Edk - AVI 181 (4) + *Lulworthia grandispora* 11-07-93 - (M)  
 KR Edk - AVI 182 (4) + *Leptosphaeria australiensis* 11-07-93 - (M)  
 KR Edk - AVI 185 (4) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Edk - AVI 189 (4) 11-07-93 - (M)  
 KR Edk - BRU 163 (4) 11-07-93 - (M)  
 KR Edk - BRU 170 (4) + *Savoryella lignicola* 11-07-93 - (M)  
 KR Edk - INT 311 (4) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Edk - RHI 112 (4) + *Lulworthia grandispora* 11-07-93 - (M)  
 KR Edk - RHI 113 (4) + *Savoryella lignicola* 11-07-93 - (M)  
 KR Edk - RHI 114 (4) + *Cirrenalia fusca* + *Marinosphaera mangrovei* 11-07-93 - (M)  
 KR Azi - DRW 74 (4) + *Halosarpheia marina* 17-07-93 - (M)  
 KR Azi - DRW 76 (4) + *Halorosellinia oceanica* + *Savoryella lignicola* 17-07-93 - (M)  
 KR Azi - INT 315 (4) + *Halocyphina villosa* 17-07-93 - (M)  
 KR Azi - INT 320 (4) 17-07-93 - (M)  
 KR TLY A - BRU 171 (4) + *Halocyphina villosa* + *Lignicola laevis* 18-07-93 - (M)  
 KR TLY A - BRU 174 (4) + *Halocyphina villosa* + *Halosarpheia marina* 18-07-93 - (M)  
 KR TLY C - RHI 123 (4) + *Dactylospora haliotrepha* + *Marinosphaera mangrovei* 18-07-93 - (M)  
 KR Kav - ACN 140 (4) + *Savoryella lignicola* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - ACN 141 (4) + *Periconia prolifica* + *Lindra hawaiiensis* 19-07-93 - (M)  
 KR Kav - ACN 142 (4) + *Halosarpheia viscosa* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - ACN 145 (4) *Lindra hawaiiensis* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - AVI 197 (4) + *Periconia prolifica* 19-07-93 - (M)  
 KR Kav - AVI 198 (4) *Lindra hawaiiensis* + *Aigialus parvus* 19-07-93 - (M)  
 KR Kav - AVI 199 (4) + *Halocyphina villosa* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - BRU 180 (4) + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - BRU 184 (4) + *Lindra hawaiiensis* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - INT 327 (4) + *Halocyphina villosa* + *Cirrenalia pygmea* 19-07-93 - (M)  
 KR Kav - INT 334 (4) + *Halosarpheia marina* + *Marinosphaera mangrovei* 19-07-93 - (M)

KR Kav - RHI 125 (4) + *Halosarpheia marina* + *Dactylospora haliotrepha* 19-07-93 - (M)  
 KR Kav - RHI 128 (4) + *Leptosphaeria australiensis* + *Cirrenalia basiminuta* 19-07-93 - (M)  
 KR Mah-A - ACN 147 (4) + *Halosarpheia marina* 12-08-93 - (M)  
 KR Mah-A - ACN 148 (4) + *Lulworthia* sp. I 12-08-93 - (M)  
 KR Mah-A - ACN 149 (4) + *Lignincola laevis* 12-08-93 - (M)  
 KR Mah-A - ACN 151 (4) + *Halosarpheia marina* 12-08-93 - (M)  
 KR Mah-A - ACN 152 (4) + *Marinosphaera mangrovei* 12-08-93 - (M)  
 KR Mah-A - INT 338 (4) + *Halocyphina villosa* + *Cirrenalia pygmea* 12-08-93 - (M)  
 KR Mah-A - INT 345 (4) + *Halocyphina villosa* + *Periconia prolifica* 12-08-93 - (M)  
 KR Bey - INT 348 (4) 15-08-93 - (M)  
 KR TLY B - ACN 156 (4) + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY B - ACN 157 (4) + *Halosarpheia viscosa* 22-08-93 - (M)  
 KR TLY C - ACN 159 (4) + *Halosarpheia marina* + *Zalerion varium* 22-08-93 - (M)  
 KR TLY A - AVI 216 (4) + *Halocyphina villosa* + *Lindra hawaiiensis* 22-08-93 - (M)  
 KR TLY A - BRU 194 (4) + *Halosarpheia marina* + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY A - BRU 196 (4) + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY B - INT 357 (4) + *Halocyphina villosa* + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY B - INT 358 (4) + *Halocyphina villosa* + *Savoryella lignicola* + *Cirrenalia pygmea* 22-08-93 - (M)  
 KR Dha-B - INT 361 (4) + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY A - RHI 132 (4) + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY A - RHI 135 (4) + *Halocyphina villosa* + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY B - RHI 136 (4) + *Halosarpheia marina* + *Aigialus parvus* 22-08-93 - (M)  
 KR TLY B - RHI 138 (4) + *Verruculina enalia* + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY B - RHI 139 (4) + *Halosarpheia marina* 22-08-93 - (M)  
 KR Che - ACN 162 (4) + *Cirrenalia pygmea* 05-09-93 - (M)  
 KR Che - ACN 164 (4) + *Cirrenalia pygmea* + *Savoryella lignicola* 05-09-93 - (M)  
 KR Che - ACN 167 (4) + *Periconia prolifica* 05-09-93 - (M)  
 KR Che - AVI 228 (4) + *Halocyphina villosa* 05-09-93 - (M)  
 KR Che - AVI 229 (4) + *Halocyphina villosa* + *Savoryella lignicola* 05-09-93 - (M)  
 KR Che - AVI 231 (4) + *Lignincola laevis* + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che - BRU 206 (4) + *Halosarpheia marina* + *Savoryella lignicola* 05-09-93 - (M)  
 KR Che - BRU 207 (4) + *Halocyphina villosa* + *Lulworthia* sp. I 05-09-93 - (M)  
 KR Che - INT 367 (4) + *Lindra hawaiiensis* 05-09-93 - (M)  
 KR Che - INT 372 (4) + *Savoryella paucispora* + *Halocyphina villosa* 05-09-93 - (M)  
 KR Che - RHI 144 (4) + *Halocyphina villosa* + *Halorosellinia oceanica* 05-09-93 - (M)  
 KR Che - RHI 146 (4) + *Halocyphina villosa* + *Aigialus parvus* 05-09-93 - (M)  
 KR Mah-B - INT 378 (4) + *Lulworthia* sp. I 12-09-93 - (M)  
 KR Mah-B - INT 380 (4) + *Marinosphaera mangrovei* + *Lulworthia grandispora* 12-09-93 - (M)  
 KR Mah-B - INT 383 (4) + *Lulworthia* sp. I 12-09-93 - (M)  
 KR Tik - INT 388 (4) + *Lignincola laevis* 18-09-93 - (M)  
 KR Tik - INT 389 (4) 18-09-93 - (M)  
 KR TLY C - ACN 168 (4) + *Cirrenalia pygmea* 19-09-93 - (M)



KR TLY C - ACN 170 (4) + *Periconia prolifica* 19-09-93 - (M)  
 KR TLY C - BRU 216 (4) + *Halocyphina villosa* 19-09-93 - (M)  
 KR TLY C - BRU 217 (4) + *Periconia prolifica* 19-09-93 - (M)  
 KR Ppd - DRW 92 (4) 26-09-93 - (M)  
 KR Kad B - INT 402 (4) + *Halosarpheia marina* 26-09-93 - (M)  
 KR Kad B - INT 404 (4) + *Cirrenalia pygmea* 26-09-93 - (M)  
 KR TLY A - AVI 244 (4) + *Lulworthia grandispora* + *Halosarpheia marina* 17-10-93 - (Pm)  
 KR Kav - ACN 172 (4) + *Lulworthia* sp. III 30-10-93 - (Pm)  
 KR Kav - ACN 173 (4) + *Cirrenalia pygmea* 30-10-93 - (Pm)  
 KR Kav - ACN 174 (4) + *Periconia prolifica* 30-10-93 - (Pm)  
 KR Kav - ACN 175 (4) + *Lignincola laevis* + 30-10-93 - (Pm)  
 KR Kav - ACN 177 (4) + *Cirrenalia pygmea* 30-10-93 - (Pm)  
 KR Kav - ACN 178 (4) + *Lignincola laevis* + *Lindra hawaiiensis* 30-10-93 - (Pm)  
 KR Kav - AVI 251 (4) + *Dactylospora haliotrepha* + *Halocyphina villosa* + *Halosarpheia minuta* + *Halosarpheia ratnagiriensis* 30-10-93 - (Pm)  
 KR Kav - INT 424 (4) + *Cirrenalia pygmea* 30-10-93 - (Pm)  
 KR Tik - INT 431 (4) 31-10-93 - (Pm)  
 KR Tik - INT 433 (4) + *Halocyphina villosa* 31-10-93 - (Pm)  
 KR TLY A - BRU 227 (4) + *Halocyphina villosa* + *Halosarpheia viscosa* 21-11-93 - (Pm)  
 KR TLY A - INT 446 (4) + *Halosarpheia marina* + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR TLY A - INT 447 (4) + *Lulworthia grandispora* + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR Val - ACN 185 (4) + *Lulworthia* sp. III 05-12-93 - (Pm)  
 KR Val - AVI 257 (4) + *Marinosphaera mangrovei* + UNIDENTIFIED ASCOMYCETE III 05-12-93 - (Pm)  
 KR Val - INT 450 (4) + *Halosarpheia marina* + *Lulworthia grandispora* 05-12-93 - (Pm)  
 KR Val - INT 452 (4) + *Halocyphina villosa* + *Aigialus parvus* 05-12-93 - (Pm)  
 KR Val - INT 459 (4) + *Halosarpheia marina* + *Halocyphina villosa* 05-12-93 - (Pm)  
 KR Che - ACN 188 (4) + *Savoryella lignicola* 18-12-93 - (Pm)  
 KR Che - ACN 189 (4) + *Periconia prolifica* 18-12-93 - (Pm)  
 KR Che - ACN 192 (4) + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che - AVI 263 (4) + *Savoryella lignicola* + *Halosarpheia marina* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - AVI 264 (4) + *Verruculina enalia* + *Periconia prolifica* 18-12-93 - (Pm)  
 KR Che - BRU 239 (4) + *Halocyphina villosa* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR Che - BRU 240 (4) + *Halocyphina villosa* + *Halosarpheia marina* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - BRU 242 (4) + *Halosarpheia marina* + *Halocyphina villosa* 18-12-93 - (Pm)  
 KR Che - BRU 243 (4) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - INT 461 (4) + *Cirrenalia pygmea* + *Lignincola laevis* 18-12-93 - (Pm)  
 KR Che - INT 468 (4) + *Halosarpheia marina* + *Dactylospora haliotrepha* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - RHI 172 (4) + *Halosarpheia marina* + *Halocyphina villosa* + *Leptosphaeria australiensis* 18-12-93 - (Pm)  
 KR Che - RHI 179 (4) + *Halocyphina villosa* + *Halosarpheia marina* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR TLY A - AVI 272 (4) + *Halocyphina villosa* 19-12-93 - (Pm)  
 KR Vad - ACN 194 (4) + *Halosarpheia marina* 26-12-93 - (Pm)  
 KR Vad - ACN 195 (4) + *Lignincola laevis* 26-12-93 - (Pm)

KR Vad - ACN 196 (4) + *Halosarpheia minuta* 26-12-93 - (Pm)  
 KR Vad - ACN 197 (4) + *Savoryella lignicola* 26-12-93 - (Pm)  
 KR Vad - AVI 275 (4) + *Halocyphina villosa* + *Lulworthia* sp. I 26-12-93 - (Pm)  
 KR Vad - BRU 247 (4) + *Lulworthia* sp. I 26-12-93 - (Pm)  
 KR Vad - BRU 254 (4) + *Halocyphina villosa* + *Dactylospora haliotrepha* 26-12-93 - (Pm)  
 KR Vad - INT 474 (4) + *Halosarpheia marina* + *Savoryella lignicola* + *Cirrenalia macrocephala* 26-12-93 - (Pm)  
 KR Vad - INT 476 (4) + *Halocyphina villosa* + *Halosarpheia marina* 26-12-93 - (Pm)  
 KR Vad - INT 479 (4) + *Halocyphina villosa* + *Halosarpheia retorquens* 26-12-93 - (Pm)  
 KR Dha-A - SBI 84 (4) 27-12-93 - (Pm)  
 KR Kad A - ACN 200 (4) + *Cirrenalia pygmea* 16-01-94 - (Pm)  
 KR Kad A - ACN 205 (4) + *Halosarpheia marina* 16-01-94 - (Pm)  
 KR Kad A - AVI 280 (4) + *Cirrenalia fusca* 16-01-94 - (Pm)  
 KR Kad A - AVI 281 (4) + *Cladosporium* sp. 16-01-94 - (Pm)  
 KR Kad A - INT 492 (4) + *Halocyphina villosa* + *Lulworthia grandispora* 16-01-94 - (Pm)  
 KR TLY B - ACN 207 (4) + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY B - ACN 208 (4) + *Halosarpheia marina* + *Halosarpheia retorquens* 23-01-94 - (Pm)  
 KR TLY B - ACN 209 (4) + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY B - ACN 210 (4) + *Marinosphaera mangrovei* 23-01-94 - (Pm)  
 KR TLY A - INT 500 (4) + *Marinosphaera mangrovei* + *Halocyphina villosa* 23-01-94 - (Pm)  
 KR TLY A - INT 503 (4) + *Halosarpheia marina* + *Phoma* sp. 23-01-94 - (Pm)  
 KR TLY A - INT 504 (4) + *Halocyphina villosa* + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY B - INT 507 (4) + *Lulworthia grandispora* + *Dactylospora haliotrepha* + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY B - INT 508 (4) + *Ascochyta* sp. 23-01-94 - (Pm)  
 KR TLY B - RHI 191 (4) + *Halocyphina villosa* + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY B - RHI 192 (4) + *Halocyphina villosa* + *Leptosphaeria australiensis* 23-01-94 - (Pm)  
 KR TLY A - AVI 294 (4) + *Lulworthia* sp. I + *Lignicola tropica* 27-02-94 - (Prm)  
 KR TLY A - AVI 296 (4) + *Savoryella paucispora* 27-02-94 - (Prm)  
 KR TLY A - INT 513 (4) + *Halosarpheia marina* 27-02-94 - (Prm)  
 KR TLY A - INT 516 (4) + *Halosarpheia marina* + *Marinosphaera mangrovei* 27-02-94 - (Prm)  
 KR Edk - ACN 213 (4) + *Savoryella lignicola* + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR Edk - ACN 215 (4) + *Halosarpheia marina* + *Lignicola laevis* 06-03-94 - (Prm)  
 KR Edk - ACN 216 (4) + *Halosarpheia marina* + *Lulworthia* sp. I 06-03-94 - (Prm)  
 KR Edk - ACN 217 (4) + *Periconia prolifica* 06-03-94 - (Prm)  
 KR Edk - ACN 218 (4) + *Savoryella lignicola* 06-03-94 - (Prm)  
 KR Edk - AVI 298 (4) + *Dactylospora haliotrepha* 06-03-94 - (Prm)  
 KR Edk - AVI 300 (4) + *Marinosphaera mangrovei* 06-03-94 - (Prm)  
 KR Edk - INT 517 (4) + *Halosarpheia marina* + *Lulworthia* sp. I 06-03-94 - (Prm)  
 KR Edk - INT 519 (4) + *Lulworthia grandispora* 06-03-94 - (Prm)  
 KR Edk - INT 523 (4) + *Cirrenalia pygmea* 06-03-94 - (Prm)  
 KR Edk - INT 525 (4) + *Periconia prolifica* + *Lignicola laevis* 06-03-94 - (Prm)  
 KR Edk - INT 526 (4) + *Halocyphina villosa* + *Savoryella lignicola* 06-03-94 - (Prm)  
 KR TLY A - AVI 304 (4) + *Halosarpheia abonnis* 20-03-94 - (Prm)

KR TLY B - BRU 274 (4) + *Lulworthia* sp. III + *Halosarpheia marina* 20-03-94 - (Prm)  
 KR TLY B - BRU 275 (4) + *Halosarpheia viscosa* + *Halosarpheia marina* 20-03-94 - (Prm)  
 KR TLY B - BRU 277 (4) + *Lulworthia grandispora* 20-03-94 - (Prm)  
 KR TLY A - INT 527 (4) + *Halosarpheia marina* 20-03-94 - (Prm)  
 KR TLY A - INT 529 (4) + *Periconia prolifica* 20-03-94 - (Prm)  
 KR TLY A - INT 530 (4) + *Halosarpheia marina* + *Dactylospora haliotrepha* 20-03-94 - (Prm)  
 KR Kav - ACN 222 (4) + *Savoryella lignicola* 15-04-94 - (Prm)  
 KR Kav - ACN 223 (4) + *Aniptodera chesapeakensis* + *Lignicola laevis* 15-04-94 - (Prm)  
 KR Kav - ACN 224 (4) + *Lindra hawaiiensis* + *Periconia prolifica* 15-04-94 - (Prm)  
 KR Kav - ACN 228 (4) + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - AVI 312 (4) + *Marinosphaera mangrovei* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - AVI 315 (4) + *Cirrenalia pygmea* + *Halocyphina villosa* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - AVI 321 (4) + *Savoryella lignicola* + *Halocyphina villosa* + *Marinosphaera mangrovei* 15-04-94 - (Prm)  
 KR Kav - BRU 278 (4) + *Halosarpheia minuta* 15-04-94 - (Prm)  
 KR Kav - BRU 283 (4) + *Halocyphina villosa* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - INT 539 (4) + *Halosarpheia marina* + *Halocyphina villosa* + *Aigialus mangrovei* 15-04-94 - (Prm)  
 KR Kav - INT 542 (4) + *Verruculina enalia* + *Lindra hawaiiensis* 15-04-94 - (Prm)  
 KR Kav - RHI 214 (4) + *Leptosphaeria australiensis* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - RHI 216 (4) + *Aigialus grandis* + *Cirrenalia pygmea* 15-04-94 - (Prm)  
 KR TLY A - AVI 322 (4) + *Lulworthia* sp. I 17-04-94 - (Prm)  
 KR TLY A - AVI 324 (4) + *Lulworthia grandispora* + *Savoryella lignicola* 17-04-94 - (Prm)  
 KR TLY A - BRU 285 (4) + *Lulworthia grandispora* 17-04-94 - (Prm)  
 KR TLY A - BRU 288 (4) + *Lulworthia grandispora* + *Cirrenalia basiminuta* 17-04-94 - (Prm)  
 KR TLY A - INT 548 (4) + *Savoryella lignicola* + *Lulworthia grandispora* 17-04-94 - (Prm)  
 KR TLY A - INT 552 (4) + *Cirrenalia basiminuta* + *Lulworthia grandispora* 17-04-94 - (Prm)  
 KR Bek - DRW 125 (4) + *Antennospora quadricornuta* 24-07-94 - (M)  
 KR Bek - DRW 126 (4) + *Lulworthia grandispora* 24-07-94 - (M)  
 KR Bek - INT 562 (4) 24-07-94 - (M)  
 KR Bek - INT 564 (4) + *Savoryella lignicola* 24-07-94 - (M)  
 KR Bek - INT 566 (4) + *Lulworthia grandispora* 24-07-94 - (M)

*Aniptodera chesapeakensis* was first described by Shearer & Miller (1977) from the Chesapeake Bay of Maryland, U.S.A. Since then, it has been reported from several tropical and subtropical parts of the world (Kohlmeyer & Kohlmeyer, 1979; Shearer & Crane, 1980; Kohlmeyer, 1984; Hyde, 1988a; Hyde, 1990a; Borse, 1988; Tan, Leong & Jones, 1989; Leong *et al.*, 1990; Hyde & Jones 1988;

Prasannarai & Sridhar, 1997). Prasannarai & Sridhar (2001) first recorded it from Kerala.

***Aniptodera haispora*** Vrijmoed, K.D. Hyde & E.B.G. Jones in Mycol. Res. 98: 701 (1994).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

### Fig. 5

Ascomata perithecial, 200-400 x 190-250  $\mu\text{m}$ , fully or partially immersed in the substratum with a horizontally aligned venter and a recurved or vertical and straight neck, light brown, ostiolate, papillate, solitary; neck 120-190 x 40-50  $\mu\text{m}$  (base), 50-60  $\mu\text{m}$  (apex), hyaline, cylindrical, slightly inflated at the apex, internally lined with numerous periphyses. Peridium 12-20  $\mu\text{m}$  thick, multilayered, composed of light brown, elongated cells with thick walls, Asci 75-90 x 20-25  $\mu\text{m}$ , eight-spored, clavate-pedunculate, unitunicate, thin-walled, persistent, with a thickening beset with a simple pore at the apex. Ascospores 15-20 x 7.5-10  $\mu\text{m}$ , ellipsoidal, thick-walled, bicelled, not constricted at the septum, hyaline, with two hook-like apical appendages.

### Materials examined

KR Vad - INT 239 (9) + *Cirrenalia macrocephala* + *Halosarpheia marina* 04-04-93 - (Pm)

KR Kav - AVI 248 (9) + *Savoryella lignicola* + *Halocyphina villosa* + *Lulworthia* sp. III 30-10-93 - (Pm)

KR Kav - RHI 156 (9) + *Halocyphina villosa* + *Aigialus grandis* + *Cirrenalia pygmea* 30-10-93 - (Pm)

KR TLY A - AVI 253 (9) + *Halosarpheia marina* + *Leptosphaeria australiensis* 21-11-93 - (Pm)

KR Vad - INT 475 (9) + *Cirrenalia pygmea* + *Halosarpheia marina* 26-12-93 - (Pm)

KR Kav - AVI 316 (9) + *Aniptodera* sp. II + *Marinosphaera mangrovei* + *Halocyphina villosa* + *Halosarpheia marina* 15-04-94 - (Pm)

KR Kav - RHI 160 (9) + *Halocyphina villosa* + *Verruculina enalia* + *Aigialus parvus* 30-10-93 - (Pm)

*Aniptodera haispora* was first described from Macau by Vrijmoed, Hyde & Jones (1994). The present collections agreed with the Macau collections in all essential features, but while Vrijmoed *et al.* (l.c.) did not observe appendages, distinct polar appendages, typical of *Aniptodera* species, were observed in the Kerala collections.

***Aniptodera longispora*** K.D. Hyde in Bot. Mar. 33: 335 (1990).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 6**

Ascomata perithecial, 200-350 x 245-400  $\mu\text{m}$ , globose, subglobose or ellipsoidal, immersed or superficial, ostiolate, papillate, hyaline, light brown or brown, solitary. Peridium 25-40  $\mu\text{m}$ , composed of elongate, thin-walled cells. Neck 250-520 x 40-60  $\mu\text{m}$ , cylindrical; ostiolar canal lined by hyaline periphyses. Interascal tissue absent. Asci 160-175 x 44-50  $\mu\text{m}$ , 8-spored, clavate-pedunculate, unitunicate, thin-walled, with a thick refractive area and a simple pore at the apex. Ascospores (37.5) 42.5-50 x (11) 12-16  $\mu\text{m}$ , ellipsoidal, uniseptate, not constricted at the septum, hyaline, thick-walled. Polar appendages not observed.

**Materials examined**

KR TLY A - BRU 80 (6) + *Leptosphaeria australiensis* + *Halosarpheia marina* + *Marinosphaera mangrovei* 27-12-92 - (Pm)

KR TLY A - BRU 52 (6) + *Lulworthia grandispora* + *Verruculina enalia* 25-10-92 - (Pm)

KR TLY C - AVI 194 (6) + *Marinosphaera mangrovei* + *Pleospora pelagica* 18-07-93 - (M)

This manglicolous marine fungus was first reported by Hyde (1990) from Brunei. It is distinct from *A. chesapeakensis* in having longer ascospores devoid of polar

appendages. The Kerala collections resembled the type collections described by Hyde (1990a) very closely but the ascospores of the former are distinctly wider. This species is also known from Australia (Kohlmeyer & Volkmann-Kohlmeyer, 1991b), Belize (Volkmann-Kohlmeyer & Kohlmeyer, 1993), Caribbean and Western Atlantic Ocean (Kohlmeyer & Volkmann-Kohlmeyer, 1993b) and Macau and Hong Kong (Vrijmoed *et al.*, 1994). It has already been recorded from Kerala by Prasannarai & Sridhar (2001).

***Aniptodera mangrovei*** K.D. Hyde in Can. J. Bot. 64: 2989 (1986) (as *Mangrovii*).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 7**

Ascomata perithecial, 250-320 x 105-380  $\mu\text{m}$ , globose, subglobose or ellipsoidal, immersed or superficial, ostiolate, papillate, brown or dark brown, solitary. Neck 105-280 x 37.5-45  $\mu\text{m}$ , long and cylindrical, hyaline. Interascal tissue absent. Asci 112.5-130 x 20-47.5  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, unitunicate, thin-walled except for a thick-walled, flattened, and refractive area at the tip that is beset with a simple pore. Ascospores 37.5-46 x 11-13  $\mu\text{m}$ , ellipsoidal, uniseptate, not constricted at the septum, hyaline, thick-walled, with appendages at both poles.

**Materials examined**

KR TLY B - BRU 18 (7) *Halocyphina villosa* + *Marinosphaera mangrovei* 26-07-92 - (M)

KR Val - RHI 165 (7) + *Ascocratera manglicola* 05-12-93 - (Pm)

KR Kav - BRU 282 (7) + *Halocyphina villosa* 15-04-94 - (Pm)

*Aniptodera mangrovei* is known from Brunei (Hyde, 1988a), Seychelles (Hyde & Jones, 1988), Malaysia (Jones & Kuthubutheen, 1989), and Philippines (Jones, Uyenco & Follosco, 1988). The Kerala collections of this species agreed in all aspects with descriptions from other parts of the world. In the present study, however, the nature of the peridium could not be observed due to scarcity of specimens.

***Aniptodera salsuginosa*** Nakagiri & Ito in Mycol. Res. 98: 931 (1994).

Taxonomic Position: Halosphaerales, Halosphaeriaceae

**Fig. 8**

Ascomata perithecial, 140-240 x 110-180  $\mu\text{m}$ , globose or ellipsoidal, hyaline, solitary, immersed, only neck projecting out of the substratum, ostiolate, papillate. Peridium 10-12  $\mu\text{m}$  thick, multilayered, hyaline, with elongate cells. Neck 140-360  $\mu\text{m}$  long, 40-60  $\mu\text{m}$  wide at the base, 40-70  $\mu\text{m}$  wide at the apex, cylindrical; ostiolar canal lined with periphyses. Asci 40-70 x 12.5-20  $\mu\text{m}$ , cylindrical or clavate, eight-spored, short-pedunculate, persistent, unitunicate, thin-walled but apex slightly thickened and with a pore having 5-7  $\mu\text{m}$  diam. Ascospores 12-20 x 5-8  $\mu\text{m}$ , ellipsoidal, hyaline, two-celled, septation at the middle, not constricted at the septum, thick-walled, smooth, with polar appendages.

**Materials examined**

KR Kav - BRU 182 (8) + *Halocyphina villosa* + *Periconia prolifica* 19-07-93 - (M)

KR TLY A - AVI 218 (8) + *Lindra hawaiiensis* + *Halocyphina villosa* 22-08-93 - (M)

KR Kav - INT 538 (8) + *Aigialus parvus* + *Halocyphina villosa* 15-04-94 - (Prm)

This species was first described from Japan by Nakagiri & Ito (1994). Before the present study, it has not been reported from any other parts of the world. According to Nakagiri & Ito (l.c.) *Aniptodera salsuginosa* has black ascoma and they isolated it from mangrove wood. However, during the present study the ascoma obtained was hyaline. In all other aspects the Kerala collections were very much similar to those described by the Japanese workers. This species is very close to *A. chesapeakensis* in the morphology of ascus and ascospore but differs in its smaller-sized ascomata, asci and ascospores.

### ***Aniptodera* sp. 1**

Taxonomic Position: Halosphaerales, Halosphaeriaceae

#### **Fig. 9**

Ascomata 170-240 x 170-200  $\mu\text{m}$ , globose or subglobose, solitary or in groups, immersed, ostiolate, papillate, hyaline or cream-coloured, with papillae projecting out of the substratum. Peridium 12.5-20  $\mu\text{m}$ , multilayered with thick-walled elongate cells with large lumina. Neck 230-360 x 50-60  $\mu\text{m}$ , cylindrical, central or eccentric, hyaline; ostiolar canal filled with periphyses. Asci 60-87.5 (105) x 17.5-20  $\mu\text{m}$ , eight-spored, clavate or ellipsoidal, pedunculate, unitunicate, with an apical thickening but without a pore and a ring, developing at the base of the venter. Paraphyses absent. Ascospores 13-17 (18) x 7-9  $\mu\text{m}$ , ellipsoidal, uniseptate, not or slightly constricted at the septum, hyaline, thick-walled, with or without cap-like or hook-like or appendages at the apices.



## Materials examined

KR Mah-A - ACN 76 (57) + *Halosarpheia marina* 03-01-93 - (Pm)

KR Mah-A - INT 192 (57) + *Dactylospora haliotrepha* 03-01-93 - (Pm)

KR Mah-A - ACN 150 (57) 12-08-93 - (M)

KR Kav - RHI 158 (57) + *Halocyphina villosa Halosarpheia abonnis* 30-10-93 - (Pm)

This species is not agreeing with any known species of *Aniptodera*. It will come between *P. intermedia* Hyde & Alias and *A. haispora* Vrijmoed, Hyde & Jones in the size of ascospores but the ascospores of the latter species do not show appendages. In lacking an apical pore and ring, the asci of the present collections are similar to those of *A. margarition* Shearer.

## *Aniptodera* sp. II

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

### Fig. 10

Ascomata perithecial, 200 - 220 x 205 - 210  $\mu\text{m}$ , partly immersed, globose or subglobose, solitary, ostiolate, papillate, hyaline or light brown. Peridium 10-15  $\mu\text{m}$ , multilayered, with thick-walled elongate cells, hyaline or light brown. Neck 100 - 110  $\mu\text{m}$  long, 26 - 40  $\mu\text{m}$  wide at the base, 40-50  $\mu\text{m}$  wide at the apex, hyaline, cylindrical, slightly inflated at the apex, internally lined with numerous periphyses. Asci 60-75 x 10-22  $\mu\text{m}$ , eight-spored, clavate, pedunculate, unitunicate, thin-walled, persistent, with a thickening at the apex. Ascospores 17-23 x 7-9  $\mu\text{m}$ , ellipsoidal, thick-walled, bicelled, not constricted at the septum, hyaline, with a hook-like appendage at each pole.

## Materials examined

KR TLY A - AVI 68 (58) + *Halocyphina villosa* + *Pleospora pelagica* 25-10-92 - (Pm)

KR Vad - INT 245 (58) + *Marinosphaera mangrovei* + *Leptosphaeria australiensis* 04-04-93 - (Pm)

Nature of the ascomata, ascus, ascospores and the morphology of the appendages were similar to those of other species of *Aniptodera*, but the dimensions of the asci and ascospores differ from all other reported species of *Aniptodera*. It seems to be a new species.

***Antennospora quadricornuta*** (Cribb & J. W. Cribb) Johnson in Elisha Mitchell Sci. Soc. 74: 46 (1958).

*Halosphaeria quadricornuta* Cribb & J. W. Cribb in Univ. Queensl. Pap. Dept. Bot. 3: 99 (1956).

*Antennospora caribbea* Meyers. Mycologia 49: 503 (1957).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

### Fig. 11

Ascomata perithecial, 110-300 x 80-210  $\mu\text{m}$ , subglobose or ellipsoidal, fully or partly immersed or superficial, ostiolate, papillate, dark brown to black, with brown coloured hyphae around the base of ascomata, solitary or gregarious. Peridium 10-12.5  $\mu\text{m}$  thick, multilayered (4-6 layered), composed of small, thick-walled, brown-coloured cells. Papillae 55-140 x 20-70  $\mu\text{m}$ , subconical or almost cylindrical. Asci 45-60 x 15 x 15-30  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, unitunicate, thin-walled, early deliquescing. Ascospores 25-30 x 7-12  $\mu\text{m}$ , ellipsoidal, uniseptate, not constricted at the septum, hyaline, with two pairs of

appendages, at each pole; appendages 20-35 x 1-1.5(2)  $\mu\text{m}$ , subterminal, arranged at right angle to one another, with broad base and tapering apex.

### Materials examined

KR Ppd - INT 21 (44) 19-04-92 - (Prm)  
KR Ppd - INT 25 (44) + *Halosarpheia marina* 19-04-92 - (Prm)  
KR Dha-A - INT 77 (44) 23-08-92 - (M)  
KR Dha-A - INT 78 (44) 23-08-92 - (M)  
KR Bey - INT 133 (44) + *Lulworthia grandispora* 02-10-92 - (Pm)  
KR Azi - DRW 21 (44) + *Halocyphina villosa* + *Savoryella paucispora* 20-12-92 - (Pm)  
KR Azi - DRW 22 (44) + *Marinosphaera mangrovei* 20-12-92 - (Pm)  
KR Azi - DRW 24 (44) + *Savoryella lignicola* 20-12-92 - (Pm)  
KR Azi - DRW 25 (44) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 20-12-92 - (Pm)  
KR Azi - INT 173 (44) + *Savoryella lignicola* + *Cirrenalia pygmaea* + *Arenariomyces trifurcatus* 20-12-92 - (Pm)  
KR Azi - INT 176 (44) + *Lulworthia grandispora* + *Periconia prolifica* 20-12-92 - (Pm)  
KR Azi - INT 178 (44) + *Halosarpheia marina* + *Verruculina enalia* + *Halorosellinia oceanica* 20-12-92 - (Pm)  
KR Azi - SBI 14 (44) + *Halosphaeria salina* 20-12-92 - (Pm)  
KR Azi - SBI 16 (44) + *Corollospora filiformis* 20-12-92 - (Pm)  
KR Azi - SBI 18 (44) + *Lulworthia grandispora* + *Halosphaeria cucullata* 20-12-92 - (Pm)  
KR Ppd - INT 209 (44) 31-01-93 - (Pm)  
KR Ppd - INT 213 (44) + *Lulworthia grandispora* 31-01-93 - (Pm)  
KR Azi - DRW 33 (44) + *Cirrenalia pygmaea* 13-02-93 - (Prm)  
KR Azi - DRW 42 (44) + *Halocyphina villosa* 13-02-93 - (Prm)  
KR Azi - INT 214 (44) + *Ceriosporopsis halima* 13-02-93 - (Prm)  
KR Azi - INT 216 (44) 13-02-93 - (Prm)  
KR Azi - INT 218 (44) + *Ceriosporopsis halima* 13-02-93 - (Prm)  
KR Azi - INT 219 (44) + *Arenariomyces trifurcatus* 13-02-93 - (Prm)  
KR Azi - INT 220 (44) 13-02-93 - (Prm)  
KR Azi - INT 221 (44) 13-02-93 - (Prm)  
KR Azi - SBI 25 (44) + *Corollospora filiformis* 13-02-93 - (Prm)  
KR Bek - DRW 48 (44) + *Halosphaeria salina* 14-02-93 - (Prm)  
KR Bek - INT 224 (44) 14-02-93 - (Prm)  
KR Bek - INT 225 (44) + *Koralionastes* sp. 14-02-93 - (Prm)  
KR Bey - INT 230 (44) 28-02-93 - (Prm)  
KR Dha-A - INT 274 (44) + *Savoryella lignicola* 18-04-93 - (Prm)  
KR Dha-A - INT 276 (44) 18-04-93 - (Prm)  
KR Dha-A - SBI 42 (44) + *Arenariomyces majusculus* 18-04-93 - (Prm)  
KR Tik - DRW 63 (44) + *Savoryella lignicola* 25-04-93 - (Prm)  
KR Tik - DRW 70 (44) 25-04-93 - (Prm)  
KR Tik - INT 284 (44) 25-04-93 - (Prm)

KR Tik - INT 288 (44) 25-04-93 - (Prm)  
KR Tik - INT 292 (44) + *Periconia prolifica* 25-04-93 - (Prm)  
KR Azi - DRW 72 (44) + *Halosarpheia marina* 17-07-93 - (M)  
KR Azi - INT 314 (44) 17-07-93 - (M)  
KR Azi - INT 316 (44) + *Cirrenalia pygmea* 17-07-93 - (M)  
KR Azi - INT 319 (44) 17-07-93 - (M)  
KR Bey - INT 347 (44) + *Lulworthia grandispora* 15-08-93 - (M)  
KR Bey - INT 349 (44) 15-08-93 - (M)  
KR Tik - DRW 86 (44) 18-09-93 - (M)  
KR Ppd - INT 396 (44) + *Zalerion varium* 26-09-93 - (M)  
KR Ppd - INT 399 (44) 26-09-93 - (M)  
KR Ppd - SBI 68 (44) + *Savoryella lignicola* 26-09-93 - (M)  
KR Bek - DRW 99 (44) 03-10-93 - (Pm)  
KR Bek - DRW 101 (44) 03-10-93 - (Pm)  
KR Bek - DRW 102 (44) 03-10-93 - (Pm)  
KR Bek - INT 410 (44) 03-10-93 - (Pm)  
KR Bek - INT 411 (44) + *Lulworthia grandispora* 03-10-93 - (Pm)  
KR Bek - INT 413 (44) + *Savoryella lignicola* 03-10-93 - (Pm)  
KR Bek - INT 414 (44) + *Lulworthia grandispora* 03-10-93 - (Pm)  
KR Bek - INT 415 (44) + *Periconia prolifica* 03-10-93 - (Pm)  
KR Bek - INT 416 (44) 03-10-93 - (Pm)  
KR Bek - INT 417 (44) + *Periconia prolifica* 03-10-93 - (Pm)  
KR Bek - SBI 73 (44) + *Arenariomyces trifurcatus* 03-10-93 - (Pm)  
KR Bek - SBI 74 (44) + *Arenariomyces trifurcatus* 03-10-93 - (Pm)  
KR Tik - DRW 108 (44) 31-10-93 - (Pm)  
KR Tik - DRW 109 (44) + *Halosphaeria salina* 31-10-93 - (Pm)  
KR Tik - DRW 111 (44) + *Zalerion varium* 31-10-93 - (Pm)  
KR Tik - INT 427 (44) + *Trichocladium atopallonellum* 31-10-93 - (Pm)  
KR Tik - INT 430 (44) + *Ceniosporopsis halima* 31-10-93 - (Pm)  
KR Tik - INT 432 (44) + *Zalerion varium* 31-10-93 - (Pm)  
KR Tik - SBI 79 (44) 31-10-93 - (Pm)  
KR Tik - SBI 80 (44) 31-10-93 - (Pm)  
KR Dha-A - INT 484 (44) + *Lulworthia* sp. I 27-12-93 - (Pm)  
KR Dha-A - INT 487 (44) 27-12-93 - (Pm)  
KR Dha-A - SBI 83 (44) 27-12-93 - (Pm)  
KR Bek - DRW 121 (44) 24-07-94 - (M)  
KR Bek - DRW 123 (44) + *Zalerion maritimum* 24-07-94 - (M)  
KR Bek - DRW 124 (44) + *Savoryella lignicola* 24-07-94 - (M)  
KR Bek - DRW 125 (44) + *Aniptodera chesapeakeensis* 24-07-94 - (M)  
KR Bek - INT 556 (44) 24-07-94 - (M)  
KR Bek - INT 558 (44) + *Halosphaeria cucullata* 24-07-94 - (M)

As discussed by Johnson (1958), this species has a confusing taxonomic history. It was Meyers (1954) who first reported this fungus but he did not give it a name then. Later he (Meyers, 1957) gave the name *Antennospora caribbea* to this species. In the meanwhile, Cribb & Cribb (1956) independently discovered the same fungus and described it as a new species, *quadricornuta* under the genus *Halosphaeria*. Johnson (1958) argued that it was better to place the new species in the new genus *Antennospora*, and as the specific name proposed by Cribb & Cribb (1956) antedates the name selected by Meyers (1957). Johnson (1958) made the new combination *Antennospora quadricornuta*. Many modern authors accept this name for this fungus, but Kohlmeyer & Volkmann-Kohlmeyer (1987) discussed the reasons for keeping it in *Halosphaeria*. It has already been recorded from Kerala by Prasannarai & Sridhar (2001).

***Antennospora salina*** Yusoff, E.B.G. Jones & S.T. Moss in Mycol. Res. 98: 1003 (1994).

*Halosphaeria salina* (Meyers) Kohlm. in Can. J. Bot. 50: 1957 (1972).

*Arenariomyces salina*, Meyers in Mycologia 49: 505 (1957).

*Remispora salina* (Meyers) Kohlm. Mycologia 60: 262 (1968).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

### Fig. 12

Ascomata perithecial, 100-340 x 80-300  $\mu\text{m}$ , globose or subcylindrical, partly or fully immersed, brown to black, ostiolate, papillate, solitary, surrounded by brown hyphae. Peridium (12.5) 20-27.5  $\mu\text{m}$  thick, multilayered; outer layers composed of

thick-walled, dark brown cells; inner layers composed of thin-walled, light brown cells. Neck 55-100 x 30-50  $\mu\text{m}$ , cylindrical. Asci 62.5-74 x 34-38  $\mu\text{m}$ , eight-spored, clavate, pedunculate, thin-walled, unitunicate, early deliquescing. Ascospores 21-26 x 8-12  $\mu\text{m}$  (excluding appendages), ellipsoidal, uniseptate, with 3 (rarely 4) polar appendages; appendages 12-16 x 2-3  $\mu\text{m}$ , subterminal, spathulate, with tapering apices.

### Materials examined

- KR Azi - SBI 14 (45) + *Antennospora quadricornuta* 20-12-92 - (Pm)  
KR Bek - DRW 48 (45) + *Antennospora quadricornuta* 14-02-93 - (Pm)  
KR Tik - DRW 69 (45) + *Trichocladium alopallonellum* 25-04-93 - (Pm)  
KR Tik - DRW 90 (45) + *Zalerion varium* 18-09-93 - (M)  
KR Tik - SBI 62 (45) + *Arenariomyces trifurcatus* 18-09-93 - (M)  
KR Tik - DRW 109 (45) + *Antennospora quadricornuta* 31-10-93 - (Pm)  
KR Tik - INT 428 (45) 31-10-93 - (Pm)  
KR Tik - INT 434 (45) + *Trichocladium alopallonellum* 31-10-93 - (Pm)  
KR Tik - SBI 78 (45) + *Corollospora filiformis* 31-10-93 - (Pm)

The collections made in Kerala agree well with the description of this species (as *Halosphaeria salina*) by Kohlmeyer & Kohlmeyer (1979). Meyers (1957) first described this species as *Arenariomyces salina*, but Kohlmeyer (1968) transferred it at first to *Remispora* and later (Kohlmeyer, 1972) to *Halosphaeria*. Yusoff *et al.* (1994) transferred this species to *Antennospora* based on the position and ultrastructure of the appendages. Borse (1987a) first recorded this species from India. It has already been recorded from Kerala (Prasannarai & Sridhar, 2001).

***Arenariomyces majusculus*** Kohlm. & Volkm.-Kohlm in Mycol. Res. 92: 411 (1989).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 13**

Ascomata perithecial, 200-280 x 210-290  $\mu\text{m}$ , globose or subglobose, partly immersed or superficial, ostiolate, papillate, dark brown, with spinous hyphal projection all over the ascoma; hyphal projections 10-12 x 2-3.5  $\mu\text{m}$ , with tapering apex. Peridium 15-18  $\mu\text{m}$  thick, multilayered, with dark brown cells. Neck 40-170 x 36-40  $\mu\text{m}$ , conical or cylindrical; ostiolar canal without periphyses. Asci not observed, possibly early deliquescing, venter filled with mature ascospores. Ascospores (25) 30-36 x (8) 10-13  $\mu\text{m}$ , ellipsoidal, uniseptate, slightly constricted at the septum, hyaline, with 3 appendages at each pole; appendages attached to the subapical region of the spore, with a broad base and a tapering apex, 16-22 x 2-2.5  $\mu\text{m}$ , 1-1.5  $\mu\text{m}$  broad at the apex.

**Materials examined**

KR Azi - DRW 45 (10) 13-02-93 - (Prm)

KR Dha-A - SBI 42 (10) + *Antennospora quadricornuta* 18-04-93 - (Prm)

KR Azi - DRW 78 (10) 17-07-93 - (M)

KR Bek - SBI 71 (10) 03-10-93 - (Pm)

KR Bek - DRW 120 (10) + *Savoryella lignicola* 24-07-94 - (M)

*Arenariomyces majusculus* was first described by Kohlmeyer & Volkmann-Kohlmeyer (1989) from Hawaii. It differs from other species of the genus due to its larger ascomata partially submerged in wood and covered with spinous hyphal projections. All other species of *Arenariomyces* show ascomata attached with

subicles to sand grains. The Kerala collections are remarkably close to the Hawaiian material except for the slightly smaller ascomata and the consistently 3-appendaged ascospores of the former.

***Arenariomyces parvulus*** J. Koch in Nordic J. Bot. 6: 497 (1986).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 14**

Ascomata cleistothecial, 120-190 x 110-190  $\mu\text{m}$ , globose or subglobose, solitary, superficial, non-ostiolate, epapillate, hyaline or yellow, beset with numerous hairs, 20 - 170 x 4-5  $\mu\text{m}$ , with blunt, forked or disc-like apices. Peridium 8-13  $\mu\text{m}$  thick, multilayered, composed of thin-walled, elongated cells. Interascal tissue absent. Asci 30-50 x 7-12 (15)  $\mu\text{m}$ , eight-spored, pyriform, unitunicate, biseriate, thin-walled, early deliquescing. Ascospores 12-14.5 x (3) 4-5  $\mu\text{m}$ , hyaline, ellipsoidal, narrow, uniseptate, with a cluster of polar or subterminal appendages at both apices of the ascospores; appendages 10-12 x 3-5  $\mu\text{m}$ , slender, attenuate.

**Materials examined**

KR Tik - SBI 51 (11) 25-04-93 - (Prm)

KR Bek - SBI 69 (11) + *Corollospora filiformis* 03-10-93 - (Pm)

KR Bek - SBI 72 (11) + *Corollospora filiformis* 03-10-93 - (Pm)

This fungus was originally described by Koch (1986) from Thailand. According to Kohlmeyer & Volkmann-Kohlmeyer (1989), it is known also from Belize, Bermuda, Fiji, Hawaii, Mexico, Puerto Rico, Tobago, and U.S.A. The spore dimensions of the Kerala collections are smaller than those described by both Koch (l.c.) and



Kohlmeyer & Volkmann-Kohlmeyer (l.c.). In addition, the ascomata obtained during the present study were devoid of papillae. Kohlmeyer & Volkmann-Kohlmeyer (l.c.) also have reported similar ascoma, a section of which showed a simple pore without a papilla.

***Arenariomyces trifurcatus*** Hohnk in Veroeff. Inst. Meeresforsch. Bremerhaven 3: 30 (1954).

*Halosphaeria trifurcata* (Hohnk) Cribb & Cribb in Univ. Queensl. Pap., Dep. Bot. 3, 99, (1956).

*Peritrichospora trifurcata* (Hohnk) Kohlm in Nova. Hedwigia. 3, 89, (1961).

*Corollospora trifurcata* (Hohnk) Kohlm. in Ber. Dtsch., Bot. Ges. 75: 126 (1962).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 15**

Ascomata perithecial, 100-240 x (60) 80-180  $\mu\text{m}$ , subglobose, superficial, attached to sand grains, ostiolate, papillate, dark brown or black, solitary or in small groups (2-3). Neck 30-60 (100) x 20-60  $\mu\text{m}$ , conical or cylindrical. Peridium 10-15  $\mu\text{m}$  thick, multilayered, composed of small, thick-walled cells. Interascal tissue absent. Asci 50-62.5 x 20-22.5  $\mu\text{m}$ , four-spored, fusiform or subclavate, short-pedunculate, unitunicate, thin-walled, early deliquescing. Ascospores 25-(27.5) 32.5 x 10-12.5  $\mu\text{m}$ , fusiform or ellipsoidal, uniseptate, with or without a slight constriction at the septum, with 3 hyaline subterminal appendages on both poles; appendages 22.5-27.5 x 1.5-2  $\mu\text{m}$ , slender, curved, with tapering apex.

## Materials examined

KR Ppd - SBI 1 (12) + *Corollospora filiformis* 19-04-92 - (Prm)  
KR Dha-A - SBI 5 (12) 23-08-92 - (M)  
KR Dha-A - SBI 7 (12) + *Zalerion maritimum* 23-08-92 - (M)  
KR Dha-A - SBI 8 (12) 23-08-92 - (M)  
KR Bey - SBI 9 (12) 02-10-92 - (Pm)  
KR Azi - DRW 26 (12) + *Lulworthia grandispora* 20-12-92 - (Prm)  
KR Azi - INT 173 (12) + *Savoryella lignicola* + *Cirrenalia pygmaea* + *Antennospora quadricornuta* 20-12-92 - (Pm)  
KR Azi - SBI 13 (12) + *Corollospora filiformis* 20-12-92 - (Prm)  
KR Azi - DRW 35 (12) + *Cirrenalia pygmaea* 13-02-93 - (Prm)  
KR Azi - INT 215 (12) 13-02-93 - (Prm)  
KR Azi - INT 217 (12) + *Lulworthia grandispora* 13-02-93 - (Prm)  
KR Azi - INT 219 (12) + *Antennospora quadricornuta* 13-02-93 - (Prm)  
KR Azi - SBI 23 (12) + *Corollospora filiformis* 13-02-93 - (Prm)  
KR Azi - SBI 27 (12) + *Corollospora filiformis* 13-02-93 - (Prm)  
KR Azi - SBI 28 (12) + *Corollospora filiformis* 13-02-93 - (Prm)  
KR Bek - DRW 47 (12) + *Corollospora filiformis* 14-02-93 - (Prm)  
KR Bey - SBI 38 (12) + *Corollospora filiformis* 28-02-93 - (Prm)  
KR Dha-A - SBI 45 (12) 18-04-93 - (Prm)  
KR Tik - SBI 47 (12) + *Corollospora filiformis* 25-04-93 - (Prm)  
KR Tik - SBI 49 (12) + *Ceriosporopsis halima* 25-04-93 - (Prm)  
KR Tik - SBI 53 (12) 25-04-93 - (Prm)  
KR Azi - DRW 71 (12) + *Corollospora filiformis* 17-07-93 - (M)  
KR Azi - DRW 75 (12) + *Corollospora filiformis* 17-07-93 - (M)  
KR Azi - DRW 77 (12) + *Corollospora filiformis* 17-07-93 - (M)  
KR Azi - SBI 57 (12) + *Corollospora filiformis* 17-07-93 - (M)  
KR Bey - SBI 59 (12) 15-08-93 - (M)  
KR Tik - DRW 88 (12) 18-09-93 - (M)  
KR Tik - SBI 61 (12) + *Corollospora filiformis* 18-09-93 - (M)  
KR Tik - SBI 62 (12) + *Halosphaeria salina* 18-09-93 - (M)  
KR Ppd - SBI 66 (12) + *Corollospora filiformis* 26-09-93 - (M)  
KR Ppd - SBI 67 (12) + *Corollospora filiformis* 26-09-93 - (M)  
KR Bek - SBI 70 (12) + *Corollospora filiformis* 03-10-93 - (Pm)  
KR Bek - SBI 73 (12) + *Antennospora quadricornuta* 03-10-93 - (Pm)  
KR Bek - SBI 74 (23) + *Antennospora quadricornuta* 03-10-93 - (Pm)  
KR Tik - DRW 104 (12) + *Corollospora filiformis* 31-10-93 - (Pm)  
KR Tik - DRW 106 (12) + *Corollospora filiformis* 31-10-93 - (Pm)  
KR Tik - SBI 75 (12) + *Corollospora filiformis* 31-10-93 - (Pm)  
KR Dha-A - SBI 81 (12) + *Corollospora filiformis* 27-12-93 - (Pm)

This species, one of the common arenicolous fungi, was first described by Hohnk (1954). It is known from Australia (Cribb & Cribb, 1956; Kohlmeyer & Kohlmeyer, 1977), Canada (Hughes, 1969), British Columbia, Japan (Tubaki, 1969; Nakagiri & Tubaki, 1985); Hawaii (Kohlmeyer, 1969a); Denmark (Koch, 1975); Kuwait (Zainal & Jones, 1984); Belize (Kohlmeyer & Vokmann-Kohlmeyer, 1987), Chile (Shearer & Burgos, 1987); Brunei (Hyde, 1988a); Seychelles (Hyde & Jones, 1989) and India (Raghukumar, 1973; Patil & Borse, 1983b; Borse, 1988). The Kerala collections did not show any remarkable deviations from earlier collections made from other parts of the world. This species has already been recorded from Kerala by Prasannarai & Sridhar (2001).

***Ascocratera manglicola*** Kohlm. in Can. J. Bot. 64: 3037 (1986).

Taxonomic Position: Dothideales, Monoblastiaceae

**Fig. 16**

Ascomata 360-680 x 960-1100  $\mu\text{m}$ , partly immersed, with a dome-shaped, exposed upper part and an immersed lower part with a flat base, ostiolate, epapillate, carbonaceous; ostiolar canal lined with periphyses. Peridium 160-240  $\mu\text{m}$ , multilayered, composed of small, thick-walled, brown cells. Pseudoparaphyses 200-250 x 1-1.5  $\mu\text{m}$ , numerous, with swollen upper tips, 2.5-3  $\mu\text{m}$  wide. Asci 290-400 x 20-25  $\mu\text{m}$ , eight-spored, pedunculate, cylindrical, thick-walled, bitunicate. Ascospores 52.5-64 x 15-18  $\mu\text{m}$ , ellipsoidal, 3-septate, slightly

constricted at the central septum, hyaline; no appendages noticed, but have a thin hyaline covering around the spore.

### Materials Examined

KR TLY C - BRU 147 (13) + *Marinosphaera mangrovei* 18-04-93 - (Prm))

KR TLY C - RHI 95 (13) + *Verruculina enalia* 18-04-93 - (Prm)

KR TLY C - BRU 155 (13) + *Periconia prolifica* 09-05-93 - (Prm)

KR Val - RHI 165 (13) + *Aniptodera mangrovei* 05-12-93 - (Pm)

This species was first described by Kohlmeyer (1986) based on collections from Belize and Australia. It is also known from India (Ravikumar & Vittal, 1987; Borse, 1988) and Brunei (Hyde, 1988b; Jones & Hyde, 1990). The present author could not find any difference between the Kerala collections and the descriptions of this species from other parts of the world except for the slightly larger ascomata and asci of Kohlmeyer's (l.c.) collections.

***Bathyascus tropicalis*** Kohlm. in Bot. Mar. 23: 532 (1980).

Taxonomic Position: Halosphaerales, Halosphaeriaceae

### Fig. 17

Ascomata perithecial, 155-230 x 70-195  $\mu\text{m}$ , ellipsoidal, immersed, ostiolate, papillate, light brown, thin-walled, solitary. Peridium translucent, 5-10  $\mu\text{m}$  thick, multilayered (3-4 layers), composed of thin-walled, light brown cells. Neck 220-350  $\mu\text{m}$  long, 25-30 (35)  $\mu\text{m}$  wide at the base, 20-25  $\mu\text{m}$  wide at the apex, laterally attached. Periphyses and paraphyses not observed. Asci (only a few immature asci observed) 62.5-75 x 12.5-15  $\mu\text{m}$ , eight-spored, ellipsoidal, thin-walled,

unitunicate, early deliquescing. Ascospores 62.5-90(100) x 5-7.5(10)  $\mu\text{m}$ , fusiform, rounded at the top and tapering towards the base, straight or slightly curved, uniseptate, septation off-centre with a smaller basal cell, slightly or not constricted at the septum.

### Materials examined

KR TLY B - AVI 23 (17) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Halosphaeria hamata* 26-07-92 - (M)

KR TLY C - AVI 121 (17) + *Halosarpheia marina* 21-02-93 - (Pm)

KR TLY C - AVI 179 (17) + *Halosarpheia viscosa* + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 20-06-93 - (M)

KR TLY C - AVI 193 (17) + *Marinosphaera mangrovei* + *Halocyphina villosa* 18-07-93 - (M)

KR TLY B - AVI 293 (17) + *Halocyphina villosa* + *Halosarpheia marina* 23-01-94 - (Pm)

KR TLY B - INT 505 (17) + *Halosarpheia marina* 23-01-94 - (Pm)

*Bathyascus tropicalis* was first reported from the Virgin Island of tropical Atlantic Ocean by Kohlmeyer (1980). The present collections are in remarkable agreement with the descriptions given by Kohlmeyer (l.c.) and later by Borse (1987a) who collected the fungus from the Maharashtra Coast of India. The only remarkable difference observed is that while Kohlmeyer (l.c.) could not see asci in his collection, Borse (l.c.) reported distinctly wider asci in his collection. Kohlmeyer (l.c.) isolated *B. tropicalis* from the branch of an unidentified tree that also harboured ascocarps of *Ceriosporopsis halima* and *Antennospora quadricornuta*. Borse (l.c.) isolated this species from an intertidal wood collected at Alibag, Maharashtra, India.

***Biatriospora marina*** K.D. Hyde & Borse in Mycotaxon 26: 263 (1986).

Taxonomic Position: Dothideales (inc. sed.)

**Fig. 18**

Ascomata perithecial, 800-820 x 365-420  $\mu\text{m}$ , subglobose, immersed, solitary, black, carbonaceous, ostiolate and papillate. Neck 300-360 x 70-85  $\mu\text{m}$ ; ostiolar canal periphysate. Pseudoparaphyses 300-350 x 0.5-1.5  $\mu\text{m}$ , numerous, simple or branched, hyaline, Asci 260-330 x 20-30  $\mu\text{m}$ , eight-spored, cylindrical, pedunculate, thick-walled, bitunicate, with an apical apparatus. Ascospores 55-65 x (15) 20-30  $\mu\text{m}$ , uniseriate, fusiform, 2-3-septate with septations towards the poles, non-septate at the centre, non-constricted at the septa, hyaline, turning to dark brown at maturity, with hyaline refractive appendages at both poles.

**Materials examined**

KR TLY B - RHI 8 (18) + *Halosarpheia marina* + *Halocyphina villosa* 26-07-92 - (M)

KR TLY A - AVI 85 (18) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)

KR TLY C - BRU 84 (18) + *Periconia prolifica* + *Trichocladium alopallonellum* 27-12-92 - (Pm)

KR TLY C - BRU 108 (18) + *Lulworthia grandispora* + *Halosarpheia marina* 21-02-93 - (Pm)

KR TLY A - AVI 153 (18) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 18-04-93 - (Pm)

KR Tik - DRW 91 (18) 18-09-93 - (M)

KR TLY B - INT 506 (18) + *Lulworthia grandispora* + *Halocyphina villosa* 23-01-94 - (Pm)

*Biatriospora marina* is a rare tropical manglicolous marine fungus first recorded from Seychelles and India (Hyde & Borse, 1986a). In most features the Kerala collections are very much similar to those described by Hyde & Borse (l.c.). This species has dark-coloured, multi-septate spores with hyaline polar cells. According to Hyde & Borse (l.c.), the nature and behaviour of the polar chamber of the ascospores of this species are similar to those of *Lulworthia*, where it helps

to adhere to the substratum and therefore are analogous to appendages. Similar polar chambers are known in the ascospores of all the reported species of *Savoryella* and *Aigialus*.

***Ceriosporopsis halima*** Linder in Farlowia 1: 409 (1944).

*Ceriosporopsis barbata* Hohnk in Veroeff. Inst. Meeresforsch. Bremerhaven. 3, 210: (1955).

Taxonomic Position: Halosphaerales, Halosphaeriaceae

**Fig. 19**

Ascomata perithecial, 120-360 x 110-340  $\mu\text{m}$ , light brown to dark brown, globose or subglobose, immersed, ostiolate, papillate, coriaceous, solitary. Peridium 8-10  $\mu\text{m}$  thick, multilayered, composed of thin-walled cells. Neck 370 x 20-35  $\mu\text{m}$ , cylindrical, ventrally attached; ostiolar canal lined with numerous periphyses. Asci not observed, seems to be early deliquescing. Ascospores (19) 21-33 (35) x 8-10  $\mu\text{m}$  excluding appendages, ellipsoidal, uniseptate, slightly constricted at the septum, hyaline, with ribbon-shaped polar appendages of variable length (9-14  $\mu\text{m}$  long) with broader apex.

**Materials examined**

KR Ppd - SBI 3 (23) 19-04-92 - (Prm)

KR Dha-A - SBI 6 (23) 23-08-92 - (M)

KR TLY A - AVI 61 (23) + *Zalerion varium* + *Aniptodera chesapeakeensis* 27-09-92 - (M)

KR Bey - SBI 11 (23) 02-10-92 - (Prm)

KR Azi - INT 214 (23) + *Antennospora quadricornuta* 13-02-93 - (Prm)

KR Azi - INT 218 (23) + *Antennospora quadricornuta* 13-02-93 - (Prm)

KR Azi - SBI 24 (23) + *Corollospora filiformis* 13-02-93 - (Prm)

KR Bey - SBI 41 (23) 28-02-93 - (Prm)

KR TLY B - INT 268 (23) + *Halosarpheia marina* + *Cirrenalia pygmaea* 18-04-93 - (Prm)  
KR Dha-A - SBI 44 (23) 18-04-93 - (Prm)  
KR Dha-A - SBI 46 (23) 18-04-93 - (Prm)  
KR Tik - SBI 49 (23) + *Arenariomyces trifurcatus* 25-04-93 - (Prm)  
KR Azi - DRW 73 (23) + *Corollospora filiformis* 17-07-93 - (M)  
KR Tik - DRW 105 (23) 31-10-93 - (Prm)  
KR Tik - INT 430 (23) + *Antennospora quadricornuta* 31-10-93 - (Prm)  
KR Tik - SBI 76 (23) + *Corollospora filiformis* 31-10-93 - (Prm)  
KR TLY A - INT 549 (23) + *Zalerion varium* + *Lulworthia grandispora* 17-04-94 - (Prm)  
KR Bek - SBI 86 (23) 24-07-94 - (M)

*Ceriosporopsis halima* is a widely distributed marine species characterized by 2-celled ascospores with an exosporial sheath and ribbon-shaped, gelatinous appendages at the poles. The microscopic and macroscopic features of the Kerala collections are almost identical with those of *C. halima* described from other parts of the world (Tubaki, 1966; Raghukumar, 1973; Koch, 1975; Kohlmeyer & Kohlmeyer, 1979 and Borse, 1988).

***Corollospora filiformis*** Nakagiri & Tokura in Trans. Mycol. Soc. Japan 28: 422 (1987).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 20**

Ascomata perithecial, 170-320 x 170-300  $\mu\text{m}$ , globose to subglobose, superficial, black, carbonaceous, solitary, firmly attached to sand grains. Peridium 25-30  $\mu\text{m}$ , multilayered, dark, with thick-walled cells. Neck 20-50 x 30-50  $\mu\text{m}$ , cylindrical. No paraphyses or periphyses observed. Asci (100) 120-175 x (22.5) 25-45 (65)  $\mu\text{m}$ ,



eight-spored, fusiform or subfusiform with short peduncle, hyaline, unitunicate and early deliquescent. Ascospores 80-115 x 75-10 (12.5)  $\mu\text{m}$ , filiform, 10-13 septate, hyaline, with two types of appendages: polar and central; polar appendages shorter and wider, ribbon-like, 15-27.5  $\mu\text{m}$  long; centrally radiating appendages (20) 28-37.5  $\mu\text{m}$  long, numerous, long and cylindrical.

### Materials examined

KR Ppd - SBI 1 (25) + *Arenariomyces trifurcatus* 19-04-92 - (Prm)  
KR Ppd - SBI 4 (25) 19-04-92 - (Prm)  
KR Azi - SBI 13 (25) + *Arenariomyces trifurcatus* 20-12-92 - (Prm)  
KR Azi - SBI 16 (25) + *Antennospora quadricornuta* 20-12-92 - (Prm)  
KR Ppd - SBI 19 (25) + *Savoryella lignicola* 31-01-93 - (Prm)  
KR Ppd - SBI 21 (25) + *Savoryella lignicola* 31-01-93 - (Prm)  
KR Azi - SBI 23 (25) + *Arenariomyces trifurcatus* 13-02-93 - (Prm)  
KR Azi - SBI 24 (25) + *Ceriosporopsis halima* 13-02-93 - (Prm)  
KR Azi - SBI 25 (25) + *Antennospora quadricornuta* 13-02-93 - (Prm)  
KR Azi - SBI 27 (25) + *Arenariomyces trifurcatus* 13-02-93 - (Prm)  
KR Azi - SBI 28 (25) + *Arenariomyces trifurcatus* 13-02-93 - (Prm)  
KR Azi - SBI 32 (25) 13-02-93 - (Prm)  
KR Bek - DRW 47 (25) + *Arenariomyces trifurcatus* 14-02-93 - (Prm)  
KR Bek - SBI 33 (25) 14-02-93 - (Prm)  
KR Bek - SBI 34 (25) 14-02-93 - (Prm)  
KR Bek - SBI 35 (25) 14-02-93 - (Prm)  
KR Bey - SBI 38 (25) + *Arenariomyces trifurcatus* 28-02-93 - (Prm)  
KR Bek - SBI 69 (25) + *Arenariomyces parvulus* 03-10-93 - (Prm)  
KR Bek - SBI 70 (25) + *Arenariomyces trifurcatus* 03-10-93 - (Prm)  
KR Bek - SBI 72 (25) + *Arenariomyces parvulus* 03-10-93 - (Prm)  
KR Tik - SBI 47 (25) + *Arenariomyces trifurcatus* 25-04-93 - (Prm)  
KR Tik - SBI 48 (25) 25-04-93 - (Prm)  
KR Tik - SBI 52 (25) 25-04-93 - (Prm)  
KR Azi - DRW 71 (25) + *Arenariomyces trifurcatus* 17-07-93 - (M)  
KR Azi - DRW 73 (25) + *Ceriosporopsis halima* 17-07-93 - (M)  
KR Azi - DRW 75 (25) + *Arenariomyces trifurcatus* 17-07-93 - (M)  
KR Azi - DRW 77 (25) + *Arenariomyces trifurcatus* 17-07-93 - (M)  
KR Azi - DRW 79 (25) + *Cirrenalia pygmea* 17-07-93 - (M)  
KR Azi - SBI 55 (25) + *Lulworthia* sp. 17-07-93 - (M)  
KR Azi - SBI 56 (25) 17-07-93 - (M)

KR Azi - SBI 57 (25) + *Arenariomyces trifurcatus* 17-07-93 - (M)  
KR Tik - DRW 89 (25) 18-09-93 - (M)  
KR Tik - SBI 61 (25) + *Arenariomyces trifurcatus* 18-09-93 - (M)  
KR Tik - SBI 65 (25) 18-09-93 - (M)  
KR Ppd - SBI 66 (25) + *Arenariomyces trifurcatus* 26-09-93 - (M)  
KR Ppd - SBI 67 (25) + *Arenariomyces trifurcatus* 26-09-93 - (M)  
KR Tik - DRW 104 (25) + *Arenariomyces trifurcatus* 31-10-93 - (Pm)  
KR Tik - DRW 106 (25) + *Arenariomyces trifurcatus* 31-10-93 - (Pm)  
KR Tik - SBI 75 (25) + *Arenariomyces trifurcatus* 31-10-93 - (Pm)  
KR Tik - SBI 76 (25) + *Ceriosporopsis halima* 31-10-93 - (Pm)  
KR Tik - SBI 78 (25) + *Halosphaeria salina* 31-10-93 - (Pm)  
KR Dha-A - SBI 81 (25) + *Arenariomyces trifurcatus* 27-12-93 - (Pm)  
KR Dha-A - SBI 82 (25) 27-12-93 - (Pm)  
KR Bek - SBI 85 (25) 24-07-94 - (M)  
KR Bek - SBI 87 (25) 24-07-94 - (M)

*Corollospora filiformis* was first described from Japan by Nakagiri & Tokura (1987) and these authors opined that it could be a subtropical species. The Kerala collections were nearly similar in almost all characters to the Japanese collections. This species has already been recorded from Kerala by Prasannarai & Sridhar (2001).

***Corollospora pseudopuichella*** Nakagiri & Tokura in Trans. Mycol. Soc. Japan. 28: 428 (1987).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae.

#### Fig. 21

Ascoma 159 x 113  $\mu\text{m}$ , oval, superficial, dark brown, solitary, firmly attached to sand grains. Neck (2-3) 25 x 30  $\mu\text{m}$ , cylindrical. Peridial structure not studied. No periphyses or paraphyses. Asci 95-115 x 25-30  $\mu\text{m}$ , eight-spored, fusiform or

ellipsoidal, short-pedunculate, hyaline, unitunicate, early deliquescent. Ascospores 70-90 x 7.5-10  $\mu\text{m}$ ; filiform, with 8 transverse septa, hyaline, with two types of appendages: polar appendages 15-20  $\mu\text{m}$  long, 4-6 in number; central appendages 25-30  $\mu\text{m}$ , 8-10 in number.

### **Material examined**

KR Ppd - SBI 20 (24) 31-01-93 - (Pm)

*Corollospora pseudopulchella* was first described by Nakagiri & Tokura (1987) from Japan. Although the ascoma of the Kerala collection is slightly smaller, it is agreeing with the Japanese species in all other features. During the present study, this fungus was isolated from only a single wood sample buried in sand. As only a single ascoma was obtained, some details like the peridial structure could not be studied.

***Dactylospora haliotrepha*** (Kohlm. & E. Kohlm.) Hafellner in Beih. Nova Hedwig. 62: 111 (1979).

*Kymadiscus haliotrephus* (Kohlm. & E. Kohlm.) Kohlm. & E. Kohlm. in Mycologia 63: 837 (1971).

*Buellia haliotrepha* Kohlm. & E. Kohlm. in Nova Hedwig. 9: 90 (1965).

Taxonomic Position: Dactylosporaceae (inc. sed.)

### **Fig. 22**

Ascomata 210-320 x 420-960  $\mu\text{m}$ , small, initially globose or button-shaped, developing in to semiglobose or discoid, apothecium-like, dark reddish brown to

black fruit body with a deeply rooted obconical foot in the wood, solitary or in groups. Excipula with polygonal cells overarching the hymenium. Hypothecia made up of thin-walled cells. Epithecium reddish brown in colour, crumbling and exposing the hymenium at maturity. Pseudoparaphyses 62.5-125 x 1-15  $\mu\text{m}$ , cylindrical, with a swollen apex 2-5.5  $\mu\text{m}$  in diam., septate, hyaline, longer than asci. Asci 60-85 x 15-20  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, bitunicate, thick-walled, without any apical pore or apparatus. Ascospores 18-25 x 5-10  $\mu\text{m}$ , uni- or biserial, ellipsoidal, brown, uniseptate, unequally bicelled, constricted at the septum, with fine longitudinal striations.

### Materials examined

- KR Kad A AVI 2 (31) + *Halosarpheia marina* 19-04-92 - (Prm)  
KR Kad A INT 1 (31) + *Halosarpheia marina* + *Halocyphina villosa* 19-04-92 - (Prm)  
KR Ppd INT 22 (31) 19-04-92 - (Prm)  
KR Mah-A - AVI 10 (31) + *Savoryella lignicola* 03-05-92 - (Prm)  
KR Mah-A - AVI 13 (31) + *Savoryella lignicola* 03-05-92 - (Prm)  
KR Mah-A - AVI 15 (31) + *Savoryella lignicola* 03-05-92 - (Prm)  
KR Mah-A - INT 29 (31) + *Halosarpheia marina* 03-05-92 - (Prm)  
KR Mah-A INT 35 (31) 03-05-92 - (Prm)  
KR TLY B BRU 17 (31) + *Halocyphina villosa* + *Lindra hawaiiensis* 26-07-92 - (M)  
KR TLY B INT 51 (31) + *Halosarpheia marina* + *Halosarpheia retorquens* 26-07-92 - (M)  
KR TLY B INT 52 (31) + *Lulworthia grandispora* 26-07-92 - (M)  
KR TLY B RHI 9 (31) + *Halosarpheia marina* + *Halocyphina villosa* + *Lulworthia grandispora* 26-07-92 - (M)  
KR Vad - AVI 28 (31) + *Halocyphina villosa* 02-08-92 - (M)  
KR Vad - BRU 22 (31) + *Halocyphina villosa* 02-08-92 - (M)  
KR Val ACN 30 (31) 09-08-92 - (M)  
KR Val RHI 10 (31) + *Halorosellinia oceanica* + *Aniptodera chesapeakeensis* 09-08-92 - (M)  
KR Mah-A BRU 42 (31) + *Aniptodera chesapeakeensis* 06-09-92 - (M)  
KR Kad A AVI 55 (31) + *Halocyphina villosa* 13-09-92 - (M)  
KR Kad A INT 121 (31) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 13-09-92 - (M)  
KR Bey - INT 134 (31) 02-10-92 - (Pm)  
KR TLY A AVI 64 (31) + *Aniptodera chesapeakeensis* 25-10-92 - (Pm)  
KR TLY A AVI 67 (31) + *Lulworthia grandispora* + *Marinosphaera mangrovei* 25-10-92 - (Pm)

KR TLY A BRU 51 (31) + *Aniptodera chesapeakeensis* 25-10-92 - (Pm)  
 KR TLY A INT 149 (31) + *Halocyphina villosa* + *Lulworthia grandispora* + *Marinosphaera mangrovei* 25-10-92 - (Pm)  
 KR TLY A INT 151 (31) + *Halocyphina villosa* + *Halosarpheia retorquens* 25-10-92 - (Pm)  
 KR TLY A RHI 22 (31) + *Halocyphina villosa* + *Halosarpheia marina* 25-10-92 - (Pm)  
 KR Edk BRU 59 (31) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk BRU 61 (31) + *Cirrenalia pygmaea* 15-11-92 - (Pm)  
 KR TLY B BRU 73 (31) + *Halocyphina villosa* + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
 KR TLY B BRU 74 (31) + *Halocyphina villosa* + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
 KR TLY B INT 165 (31) + *Halocyphina villosa* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY B INT 167 (31) + *Trichocladium alopallonellum* + *Phoma* sp. 29-11-92 - (Pm)  
 KR TLY B RHI 43 (31) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Savoryella paucispora* 29-11-92 - (Pm)  
 KR Azi INT 179 (31) + *Lulworthia grandispora* 20-12-92 - (Pm)  
 KR Mah-A INT 192 (31) + *Aniptodera* sp. I + *Aniptodera* sp. II 03-01-93 - (Pm)  
 KR Mah-A INT 196 (31) + *Verruculina enalia* + *Marinosphaera mangrovei* 03-01-93 - (Pm)  
 KR Azi DRW 36 (31) + *Cirrenalia fusca* 13-02-93 - (Pm)  
 KR Azi INT 223 (31) 13-02-93 - (Pm)  
 KR TLY A AVI 127 (31) + *Lulworthia grandispora* + *Savoryella lignicola* 28-03-93 - (Pm)  
 KR TLY C BRU 112 (31) + *Halosarpheia marina* 28-03-93 - (Pm)  
 KR TLY A BRU 114 (31) + *Lulworthia grandispora* + *Lignicola laevis* 28-03-93 - (Pm)  
 KR TLY C RHI 65 (31) + *Halosphaeria hamata* + *Aigialus parvus* + *Savoryella lignicola* 28-03-93 - (Pm)  
 KR TLY A RHI 67 (31) + *Lulworthia grandispora* 28-03-93 - (Pm)  
 KR Vad AVI 130 (31) + *Halosarpheia marina* + *Halocyphina villosa* 04-04-93 - (Pm)  
 KR Vad INT 240 (31) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Cirrenalia macrocephala* + *Savoryella lignicola* 04-04-93 - (Pm)  
 KR Val ACN 103 (31) 11-04-93 - (Pm)  
 KR Val INT 249 (31) + *Aigialus parvus* + *Marinosphaera mangrovei* 11-04-93 - (Pm)  
 KR Che AVI 145 (31) + *Halosarpheia marina* 17-04-93 - (Pm)  
 KR Che AVI 149 (31) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* + *Halosarpheia marina* 17-04-93 - (Pm)  
 KR Che INT 253 (31) + *Halocyphina villosa* + *Verruculina enalia* 17-04-93 - (Pm)  
 KR Che INT 259 (31) + *Lulworthia grandispora* 17-04-93 - (Pm)  
 KR Che RHI 81 (31) + *Lindra hawaiiensis* 17-04-93 - (Pm)  
 KR TLY A AVI 154 (31) + *Verruculina enalia* + *Aniptodera chesapeakeensis* 18-04-93 - (Pm)  
 KR TLY A BRU 140 (31) + *Lulworthia grandispora* 18-04-93 - (Pm)  
 KR TLY B BRU 144 (31) + *Lulworthia grandispora* + *Halosarpheia viscosa* 18-04-93 - (Pm)  
 KR TLY B INT 266 (31) + *Halosarpheia marina* 18-04-93 - (Pm)  
 KR TLY A RHI 86 (31) + *Verruculina enalia* + *Lulworthia grandispora* 18-04-93 - (Pm)  
 KR TLY B RHI 90 (31) + *Lulworthia grandispora* + *Halosarpheia marina* 18-04-93 - (Pm)  
 KR Tik INT 290 (31) 25-04-93 - (Pm)  
 KR TLY C RHI 106 (31) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR Edk BRU 165 (31) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Azi INT 321 (31) 17-07-93 - (M)  
 KR TLY C RHI 123 (31) + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 18-07-93 - (M)

KR Kav RHI 125 (31) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR Mah-A AVI 207 (31) 12-08-93 - (M)  
 KR Mah-A BRU 188 (31) + *Halorosellinia oceanica* 12-08-93 - (M)  
 KR Mah-A INT 341 (31) + *Marinosphaera mangrovei* + *Halosarpheia minuta* 12-08-93 - (M)  
 KR Bey INT 351 (31) 15-08-93 - (M)  
 KR TLY C RHI 142 (31) + *Verruculina enalia* + *Halocyphina villosa* 22-08-93 - (M)  
 KR Che INT 371 (31) + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che RHI 145 (31) + *Aigialus parvus* + *Halosarpheia ratnagiriensis* 05-09-93 - (M)  
 KR Tik INT 384 (31) 18-09-93 - (M)  
 KR TLY C AVI 240 (31) + *Zalerion varium* + *Halocyphina villosa* 19-09-93 - (M)  
 KR TLY A RHI 148 (31) + *Halocyphina villosa* + *Halosarpheia marina* 19-09-93 - (M)  
 KR Ppd INT 397 (31) 26-09-93 - (M)  
 KR Bek DRW 100 (31) 03-10-93 - (Pm)  
 KR TLY A INT 419 (31) + *Leptosphaeria australiensis* 17-10-93 - (Pm)  
 KR Kav AVI 251 (31) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Halosarpheia minuta* + *Halosarpheia ratnagiriensis* 30-10-93 - (Pm)  
 KR Kav BRU 225 (31) + *Savoryella lignicola* + *Leptosphaeria australiensis* + *Lignicola laevis* 30-10-93 - (Pm)  
 KR Kav INT 423 (31) + *Halocyphina villosa* + *Halosarpheia minuta* 30-10-93 - (Pm)  
 KR Kav RHI 157 (31) + *Halosarpheia ratnagiriensis* + *Cirrenalia pygmea* 30-10-93 - (Pm)  
 KR Kav RHI 159 (31) + *Halocyphina villosa* + *Aigialus mangrovis* 30-10-93 - (Pm)  
 KR TLY A INT 449 (31) + *Trichocladium alopallonellum* + *Halosarpheia marina* 21-11-93 - (Pm)  
 KR TLY A RHI 162 (31) + *Lulworthia grandispora* + *Marinosphaera mangrovei* 21-11-93 - (Pm)  
 KR Val BRU 231 (31) + *Halocyphina villosa* 05-12-93 - (Pm)  
 KR Val BRU 234 (31) + *Cirrenalia pygmea* 05-12-93 - (Pm)  
 KR Val INT 454 (31) + *Cirrenalia pygmea* + *Halocyphina villosa* 05-12-93 - (Pm)  
 KR Che AVI 265 (31) + *Halocyphina villosa* + *Periconia prolifica* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR Che BRU 241 (31) + *Verruculina enalia* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che INT 462 (31) + *Verruculina enalia* + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che INT 468 (31) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che RHI 174 (31) + *Halosarpheia marina* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR Che RHI 178 (31) + *Halocyphina villosa* + *Aigialus grandis* 18-12-93 - (Pm)  
 KR TLY A INT 473 (31) + *Halocyphina villosa* 19-12-93 - (Pm)  
 KR Vad BRU 248 (31) + *Halosarpheia marina* 26-12-93 - (Pm)  
 KR Vad BRU 254 (31) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 26-12-93 - (Pm)  
 KR Dha-A INT 482 (31) + *Periconia prolifica* 27-12-93 - (Pm)  
 KR Kad A INT 490 (31) + *Halocyphina villosa* + *Cirrenalia pygmea* 16-01-94 - (Pm)  
 KR Kad A INT 495 (31) + *Verruculina enalia* + *Halocyphina villosa* 16-01-94 - (Pm)  
 KR TLY B AVI 290 (31) + *Halocyphina villosa* + *Aigialus parvus* 23-01-94 - (Pm)  
 KR TLY A BRU 256 (31) + *Marinosphaera mangrovei* + *Cirrenalia pygmea* 23-01-94 - (Pm)  
 KR TLY B INT 507 (31) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY B INT 510 (31) + *Halosarpheia marina* + *Halocyphina villosa* 23-01-94 - (Pm)  
 KR TLY A RHI 184 (31) + *Aigialus grandis* 23-01-94 - (Pm)

KR TLY B RHI 189 (31) + *Halocyphina villosa* + *Halosarpheia marina* + *Lulworthia* sp. III 23-01-94 - (Pm)  
 KR TLY B RHI 190 (31) + *Halocyphina villosa* + *Halosarpheia marina* + *Leptosphaeria australiensis* 23-01-94 - (Pm)  
 KR TLY A RHI 195 (31) + *Halosphaeria hamata* + *Cirrenalia pygmea* 27-02-94 - (Pm)  
 KR TLY A RHI 196 (31) + *Halosphaeria hamata* + *Lulworthia grandispora* 27-02-94 - (Pm)  
 KR Edk AVI 298 (31) + *Aniptodera chesapeakensis* 06-03-94 - (Pm)  
 KR Edk - RHI 200 (76) + *Halocyphina villosa* + *Marinosphaera mangrovei* + *Halosarpheia marina* 06-03-94 - (Pm)  
 KR Edk RHI 204 (31) 06-03-94 - (Pm)  
 KR TLY A INT 528 (31) + *Halosarpheia marina* + *Cirrenalia basiminuta* 20-03-94 - (Pm)  
 KR TLY A INT 530 (31) + *Halosarpheia marina* + *Aniptodera chesapeakensis* 20-03-94 - (Pm)  
 KR TLY B INT 535 (31) + *Halocyphina villosa* + *Halosarpheia marina* 20-03-94 - (Pm)  
 KR Kav AVI 313 (31) + *Aigialus parvus* + *Cirrenalia basiminuta* 15-04-94 - (Pm)  
 KR Kav AVI 314 (31) + *Lulworthia grandispora* + *Savoryella lignicola* 15-04-94 - (Pm)  
 KR Kav INT 541 (31) + *Halorosellinia oceanica* 15-04-94 - (Pm)  
 KR Kav RHI 212 (31) + *Halocyphina villosa* + *Lignincola laevis* + *Verruculina enalia* 15-04-94 - (Pm)  
 KR TLY C RHI 57 (31) + *Marinosphaera mangrovei* + *Halocyphina villosa* + *Lulworthia grandispora* 10-01-93-1993 - (Pm)

Kohlmeyer (1980, 1983) Kohlmeyer and Volkmann-Kohlmeyer (1987, 1991b) collected and reported the occurrence of this fungus from the tropical parts. Raghukumar (1973), Patil & Borse (1983a, 1985a), Borse (1988), Borse, Ramesh & Shrivastava (1988) and Prasannarai & Sridhar (2001) have reported the occurrence of this fungus in the coastal waters of India. Hyde (1988a, 1990a, 1992d) isolated this fungus from the coastal waters of Brunei and Mexico. The occurrence of this fungus in the coastal waters of Malaysia (Hyde & Jones 1988), Singapore (Long, Tan & Jones, 1991) and Hong Kong (Vrijmoed, Hyde & Jones, 1994) were also reported. Prasannarai & Sridhar (2001) recorded it for the first time from Kerala.

***Dryosphaera tropicalis*** Kohlm. & Volkm.-Kohlm. in *Can. J. Bot.* 71, 9, 992.

Taxonomic Position: Ascomycota (inc.sed.)

**Fig. 23**

Ascomata cleistothecial, 180-220 (370) x 180-220 (370)  $\mu\text{m}$ , globose or semiglobose, superficial, hyaline or pale yellow, solitary or in groups, covered with numerous short appendages of almost uniform length with broad, branched apices, 20-25 x 4-6  $\mu\text{m}$ . Peridium 10-20  $\mu\text{m}$ , composed of thin-walled cells in 4-6 layers. Asci 20-40 (65) x 7.5-10  $\mu\text{m}$ , eight-spored, fusiform, short-pedunculate, bitunicate, thin-walled. Ascospores 12-15 x 4-5  $\mu\text{m}$ , ellipsoidal, uniseptate, hyaline, with a cluster of 6-8 appendages near both poles; appendages 10-12 x  $\mu\text{m}$  long, thin and bristles-like.

**Material examined**

KR TLY A - INT 324 (21) + *Phoma* sp. 18-07-93 - (M)

As this species was isolated only once during the entire period of this study, it seems to be a very rare species. The Kerala collection was obtained from an unidentified intertidal mangrove wood collected from Tellicherry A site.

***Halosarpheia abonnis*** Kohlm. in *Mar. Ecol. (P.S.Z.N.1)* 5: 339 (1984).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 24**

Ascomata perithecial, 485-640 x 320-450  $\mu\text{m}$ , ellipsoid, immersed, ostiolate, papillate, hyaline to light brown, sometimes with a horizontal long axis and a



recurved neck. Peridium 25-35  $\mu\text{m}$  thick. Neck 230-290 x 110-130  $\mu\text{m}$ , cylindrical, ostiolate; ostiolar canal lined with numerous periphyses. Asci 145-220 x 30-45  $\mu\text{m}$ , eight-spored, clavate, pedunculate, unitunicate, thin-walled, but slightly thick-walled at the apical and subapical regions. Ascospores (32)-34-45 x 15-20  $\mu\text{m}$  (excluding appendages), ellipsoidal, uniseptate, hyaline, with apical, cap-like or spatulate appendages that run parallelly along the sides of the ascospores; appendages 16-20  $\mu\text{m}$  long and 2-5  $\mu\text{m}$  wide.

### Materials examined

- KR Mah-A - INT 30 (36) + *Lulworthia grandispora* 03-05-92 - (Prm)  
KR Vad - BRU 24 (36) + *Cirrenalia pygmea* 02-08-92 - (M)  
KR Mah-A - INT 103 (36) + *Halosarpheia marina* + *Halorosellinia oceanica* 06-09-92 - (M)  
KR Bey - INT 137 (36) 02-10-92 - (Pm)  
KR Edk - AVI 80 (36) + *Trichocladium* sp. 15-11-92 - (Pm)  
KR TLY A - RHI 38 (36) + *Halosarpheia marina* + *Lulworthia grandispora* 29-11-92 - (Pm)  
KR TLY B - RHI 42 (36) + *Verruculina enalia* + *Marinosphaera mangrovei* + *Halosarpheia marina* 29-11-92 - (Pm)  
KR Mah-A - AVI 106 (36) + *Cirrenalia pygmea* 03-01-93 - (Pm)  
KR TLY A - RHI 59 (36) + *Marinosphaera mangrovei* 21-02-93 - (Prm)  
KR Che - BRU 137 (36) + *Cirrenalia pygmea* 17-04-93 - (Prm)  
KR TLY C - AVI 160 (36) + *Halosarpheia marina* + *Lignicola laevis* + *Halocyphina villosa* 18-04-93 - (Prm)  
KR TLY B - RHI 89 (36) + *Aniptodera chesapeakeensis* 18-04-93 - (Prm)  
KR TLY C - AVI 165 (36) + *Halosarpheia ratnagiriensis* 09-05-93 - (Prm)  
KR TLY A - RHI 96 (36) + *Marinosphaera mangrovei* 09-05-93 - (Prm)  
KR TLY C - RHI 100 (36) + *Lulworthia grandispora* 09-05-93 - (Prm)  
KR TLY B - RHI 137 (36) + *Halosarpheia marina* 22-08-93 - (M)  
KR TLY C - RHI 152 (36) + *Halosarpheia marina* + *Marinosphaera mangrovei* 19-09-93 - (M)  
KR Kav - INT 421 (36) + *Halocyphina villosa* + *Savoryella lignicola* 30-10-93 - (Prm)  
KR Kav - RHI 158 (36) + *Halocyphina villosa* + *Aniptodera* sp. I 30-10-93 - (Prm)  
KR Che - AVI 261 (36) + *Halocyphina villosa* + *Savoryella lignicola* 18-12-93 - (Prm)  
KR Che - AVI 266 (36) + *Halosarpheia marina* + *Marinosphaera mangrovei* 18-12-93 - (Prm)  
KR TLY B - RHI 193 (36) + *Halosarpheia ratnagiriensis* + *Cirrenalia pygmea* 23-01-94 - (Prm)  
KR TLY A - AVI 304 (36) + *Aniptodera chesapeakeensis* 20-03-94 - (Prm)  
KR TLY B - RHI 208 (36) + *Halosarpheia marina* 20-03-94 - (Prm)  
KR Kav - INT 545 (36) + *Cirrenalia basiminuta* + *Lulworthia grandispora* 15-04-94 - (Prm)  
KR Kav - RHI 218 (36) + *Marinosphaera mangrovei* + *Halosarpheia marina* 15-04-94 - (Prm)

KR TLY A - RHI 222 (36) + *Halosarpheia marina* 17-04-94 - (Prm)

KR TLY A - RHI 224 (36) + *Halosarpheia ratnagiriensis* 17-04-94 - (Prm)

Kohlmeyer (1984) first described this species from Bermuda. Since then, it has been recorded from Belize (Kohlmeyer & Volkmann-Kohlmeyer, 1987), Seychelles (Hyde & Jones, 1988a), India (Borse, Remash, Shrivastava, 1988), Brunei (Hyde, 1988a), Malaysia (Jones & Kuthubutheen, 1989), Australia (Kohlmeyer & Volkmann-Kohlmeyer, 1991) and Macau & Hong Kong (Vrijmoed, Hyde & Jones, 1994). Except for the shorter asci, the Kerala collections agreed with Kohlmeyer's (1984) description of *Halosarpheia abonnis*.

***Halosphaeria hamata*** (Hohnk) Kohlm. in Can. J. Bot. 50: 1956 (1972).

*Ceriosporopsis hamata* Hohnk in Veroeff. Inst. Meeresforsch Bremerhaven 3: 211 (1955).

*Remispora hamata* (Hohnk) Kohlm. in Ber. Dtsch. Bot. Ges. 74: 305 (1961).

Halosphaeriales – Halosphaeriaceae

**Fig. 25**

Ascomata perithecial, 250-380 x 210-340  $\mu\text{m}$ , globose or subglobose, partly or fully immersed with the neck projecting above the substratum, ostiolate, papillate, light yellow to light brown, solitary. Peridium 8.5-23  $\mu\text{m}$  thick, multilayered, composed of elongated, thin-walled cells. Neck 130-610 x 70-100  $\mu\text{m}$ , laterally or centrally attached; ostiolar canal lined with periphyses. Asci 67.5-100 x 17.5-27.5, eight-spored, clavate, subfusiform, pedunculate, unitunicate, early deliquescing,

thin-walled, without apical pore or apparatus. Ascospores 18-23 x 7-10 (excluding appendages), ellipsoidal, thick-walled, uniseptate, slightly or not constricted at the septum, hyaline, with a cap-like appendage at both poles of the spore; appendages 2-3  $\mu\text{m}$  high and 2-4  $\mu\text{m}$  wide.

### Materials examined

- KR TLY B - AVI 23 (35) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Bathyascus tropicalis* 26-07-92 - (M)  
KR TLY B - AVI 90 (35) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
KR TLY A - BRU 71 (35) + *Halosarpheia marina* + *Zalerion varium* 29-11-92 - (Pm)  
KR TLY C - ACN 88 (35) 21-02-93 - (Pm)  
KR TLY C - AVI 120 (35) + *Halosarpheia marina* + *Trichocladium alopallonellum* 21-02-93 - (Pm)  
KR TLY C - BRU 107 (35) + *Lulworthia* sp. I 21-02-93 - (Pm)  
KR TLY C - RHI 65 (35) + *Dactylospora haliotrepha* + *Aigialus parvus* + *Savoryella lignicola* 28-03-93 - (Pm)  
KR TLY C - BRU 146 (35) + *Lulworthia* sp. I 18-04-93 - (Pm)  
KR TLY B - AVI 292 (35) + *Halocyphina villosa* + *Lignicola laevis* 23-01-94 - (Pm)  
KR TLY A - INT 514 (35) + *Lulworthia grandispora* 27-02-94 - (Pm)  
KR TLY A - RHI 195 (35) + *Dactylospora haliotrepha* + *Cirrenalia pygmea* 27-02-94 - (Pm)  
KR TLY A - RHI 196 (35) + *Dactylospora haliotrepha* + *Lulworthia grandispora* 27-02-94 - (Pm)  
KR TLY A - BRU 272 (35) + *Halosarpheia marina* 20-03-94 - (Pm)  
KR TLY A - INT 531 (35) + *Halosarpheia marina* 20-03-94 - (Pm)  
KR TLY A - AVI 322 (35) + *Aniptodera chesapeakeensis* + *Lulworthia* sp1 17-04-94 - (Pm)  
KR TLY A - AVI 325 (35) + *Lulworthia* sp. I 17-04-94 - (Pm)  
KR TLY A - BRU 286 (35) + *Savoryella lignicola* + *Cirrenalia basiminuta* 17-04-94 - (Pm)

According to Kohlmeyer & Volkmann-Kohlmeyer (1991a), this species most probably belongs to *Halosarpheia*. They considered the basionym *Ceriosporopsis hamata* Hohnk as *nomen dubium* because the type material of *C. hamata* does not occur. As the present collections agree closely with the description of *Halosphaeria hamata* given by Kohlmeyer & Kohlmeyer (1979), they are assigned here tentatively to that species. The first record of this species from India was by Ravikumar and Vittal (1987).

***Halosarpheia marina*** (Cribb & J. W. Cribb) Kohlm. in Mar. Ecol. (P.S.Z.N.I.)

5:345 (1984).

*Gnomonia marina* Cribb & J. W. Cribb in Univ. Queensl. Pap., Dep. Bot. 3:100

(1956).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 26**

Ascomata perithecial, 290-350 x 195-280  $\mu\text{m}$ , obpyriform, immersed with neck projecting out of the substratum, ostiolate, with numerous brown hyphae, 3-4 $\mu\text{m}$  diam., surrounding the ascoma, light brown to brown, solitary. Neck 120-350 x 50-80(100)  $\mu\text{m}$ , hyaline to light brown, cylindrical; ostiolar canal lined with numerous periphyses. Paraphyses not observed. Asci (87.5) 90-125 x 20-32.5  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, unitunicate, thin-walled at the lower part but with a plate-like thickened area at the apical part with a simple pore. Ascospores 18-25 x 9-12(13)  $\mu\text{m}$  excluding appendages, ellipsoidal, uniseptate, not constricted at the septum, hyaline, with round apices, with a cap-like, gelatinous, 2-3  $\mu\text{m}$  long appendage at each pole.

**Materials examined**

KR Kad A - ACN 2 (37) + *Aniptodera chesapeakensis* 19-04-92 - (Prm)

KR Kad A - ACN 3 (37) + *Lulworthia* sp1 19-04-92 - (Prm)

KR Kad A - AVI 2 (37) + *Dactylospora haliotrepha* 19-04-92 - (Prm)

KR Kad A - AVI 3 (37) + *Lulworthia grandispora* 19-04-92 - (Prm)

KR Ppd - DRW 4 (37) + *Savoryella lignicola* + *Aniptodera chesapeakensis* 19-04-92 - (Prm)

KR Kad A - INT 1 (37) + *Dactylospora haliotrepha* + *Halocyphina villosa* 19-04-92 - (Prm)

KR Kad A - INT 2 (37) + *Cirrenalia pygmea* + *Lulworthia grandispora* 19-04-92 - (Prm)

KR Kad A - INT 5 (37) + *Marinosphaera mangrovei* + *Periconia prolifica* 19-04-92 - (Prm)

KR Ppd - INT 25 (37) + *Antennospora quadricornuta* 19-04-92 - (Prm)  
 KR Mah-A - ACN 8 (37) + *Lignicola laevis* 03-05-92 - (Prm)  
 KR Mah-A - ACN 13 (37) 03-05-92 - (Prm)  
 KR Mah-A - AVI 7 (37) + *Lulworthia grandispora* 03-05-92 - (Prm)  
 KR Mah-A - AVI 8 (37) + *Halorosellinia oceanica* 03-05-92 - (Prm)  
 KR Mah-A - AVI 11 (37) + *Lulworthia grandispora* 03-05-92 - (Prm)  
 KR Mah-A - INT 28 (37) + *Verruculina enalia* + *Cirrenalia pygmea* 03-05-92 - (Prm)  
 KR Mah-A - INT 29 (37) + *Dactylospora haliotrepha* 03-05-92 - (Prm)  
 KR Mah-A - INT 31 (37) + *Lulworthia* sp. I 03-05-92 - (Prm)  
 KR Mah-A - INT 32 (37) + *Savoryella lignicola* + *Leptosphaeria australiensis* 03-05-92 - (Prm)  
 KR Mah-A - INT 33 (37) + *Halosarpheia ratnagiriensis* + *Marinosphaera mangrovei* 03-05-92 - (Prm)  
 KR Mah-A - INT 34 (37) + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 03-05-92 - (Prm)  
 KR TLY A - AVI 17 (37) + *Marinosphaera mangrovei* 21-06-92 - (M)  
 KR TLY A - AVI 18 (37) + *Halocyphina villosa* 21-06-92 - (M)  
 KR TLY A - BRU 10 (37) + *Halocyphina villosa* + *Marinosphaera mangrovei* 21-06-92 - (M)  
 KR TLY A - INT 45 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Marinosphaera mangrovei* 21-06-92 - (M)  
 KR TLY A - INT 46 (37) + *Halocyphina villosa* 21-06-92 - (M)  
 KR TLY A - RHI 2 (37) + *Halocyphina villosa* 21-06-92 - (M)  
 KR TLY A - RHI 3 (37) + *Marinosphaera mangrovei* + *Halocyphina villosa* 21-06-92 - (M)  
 KR TLY B - ACN 14 (37) + *Aniptodera chesapeakeensis* 26-07-92 - (M)  
 KR TLY B - ACN 15 (37) + *Aniptodera chesapeakeensis* 26-07-92 - (M)  
 KR TLY B - ACN 16 (37) 26-07-92 - (M)  
 KR TLY A - AVI 20 (37) + *Lindra hawaiiensis* + *Halosarpheia retorquens* 26-07-92 - (M)  
 KR TLY A - AVI 21 (37) + *Lulworthia* sp. III + *Halocyphina villosa* 26-07-92 - (M)  
 KR TLY B - AVI 24 (37) + *Halocyphina villosa* + *Cirrenalia pygmea* 26-07-92 - (M)  
 KR TLY B - AVI 25 (37) + *Aniptodera chesapeakeensis* + *Lindra hawaiiensis* 26-07-92 - (M)  
 KR TLY B - AVI 26 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 26-07-92 - (M)  
 KR TLY A - BRU 13 (37) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 26-07-92 - (M)  
 KR TLY B - BRU 16 (37) + *Halocyphina villosa* + *Marinosphaera mangrovei* 26-07-92 - (M)  
 KR TLY B - BRU 19 (37) + *Leptosphaeria australiensis* 26-07-92 - (M)  
 KR TLY B - BRU 20 (37) + *Marinosphaera mangrovei* 26-07-92 - (M)  
 KR TLY A - INT 48 (37) + *Marinosphaera mangrovei* + *Aniptodera chesapeakeensis* 26-07-92 - (M)  
 KR TLY A - INT 50 (37) + *Halocyphina villosa* + *Lulworthia grandispora* 26-07-92 - (M)  
 KR TLY B - INT 51 (37) + *Halosarpheia retorquens* + *Dactylospora haliotrepha* 26-07-92 - (M)  
 KR TLY B - INT 53 (37) + *Trichocladium alopallonellum* 26-07-92 - (M)  
 KR TLY B - INT 55 (37) + *Zalerion varium* 26-07-92 - (M)  
 KR TLY A - RHI 5 (37) + *Lulworthia grandispora* + *Halocyphina villosa* 26-07-92 - (M)  
 KR TLY A - RHI 6 (37) + *Halocyphina villosa* + *Lulworthia grandispora* 26-07-92 - (M)  
 KR TLY B - RHI 7 (37) + *Aigialus grandis* + *Halocyphina villosa* + *Lulworthia grandispora* 26-07-92 - (M)  
 KR TLY B - RHI 8 (37) + *Biatrispora marina* + *Halocyphina villosa* 26-07-92 - (M)  
 KR TLY B - RHI 9 (37) + *Dactylospora haliotrepha* + *Halocyphina villosa* + *Lulworthia grandispora* 26-07-92 - (M)  
 KR Vad - ACN 20 (37) + *Periconia prolifica* 02-08-92 - (M)

KR Vad - ACN 22 (37) + *Lulworthia* sp. I 02-08-92 - (M)  
 KR Vad - ACN 25 (37) + *Marinosphaera mangrovei* + *Aniptodera chesapeakeensis* 02-08-92 - (M)  
 KR Vad - AVI 30 (37) + *Lulworthia* sp. I 02-08-92 - (M)  
 KR Vad - AVI 35 (37) + *Savoryella lignicola* 02-08-92 - (M)  
 KR Vad - AVI 36 (37) + *Halocyphina villosa* 02-08-92 - (M)  
 KR Vad - BRU 21 (37) + *Lulworthia* sp. I 02-08-92 - (M)  
 KR Vad - BRU 27 (37) + *Halocyphina villosa* 02-08-92 - (M)  
 KR Vad - INT 57 (37) 02-08-92 - (M)  
 KR Vad - INT 61 (37) 02-08-92 - (M)  
 KR Val - ACN 27 (37) + *Aniptodera chesapeakeensis* 09-08-92 - (M)  
 KR Val - ACN 28 (37) + *Marinosphaera mangrovei* 09-08-92 - (M)  
 KR Val - ACN 29 (37) + *Halorosellinia oceanica* 09-08-92 - (M)  
 KR Val - AVI 40 (37) + *Lulworthia grandispora* + *Marinosphaera mangrovei* 09-08-92 - (M)  
 KR Val - AVI 41 (37) + *Halocyphina villosa* + *Marinosphaera mangrovei* + *Periconia prolifica* 09-08-92 - (M)  
 KR Val - AVI 42 (37) + *Halocyphina villosa* + *Marinosphaera mangrovei* + *Periconia prolifica* 09-08-92 - (M)  
 KR Val - BRU 29 (37) + *Aniptodera chesapeakeensis* 09-08-92 - (M)  
 KR Val - BRU 30 (37) + *Marinosphaera mangrovei* 09-08-92 - (M)  
 KR Val - BRU 32 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 09-08-92 - (M)  
 KR Val - BRU 33 (37) + *Halocyphina villosa* + *Marinosphaera mangrovei* 09-08-92 - (M)  
 KR Val - BRU 35 (37) *Aniptodera chesapeakeensis* 09-08-92 - (M)  
 KR Val - INT 69 (37) + *Marinosphaera mangrovei* 09-08-92 - (M)  
 KR Val - INT 71 (37) + *Verruculina enalia* 09-08-92 - (M)  
 KR Val - RHI 14 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 09-08-92 - (M)  
 KR Val - RHI 15 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 09-08-92 - (M)  
 KR Dha-A - DRW 9 (37) 23-08-92 - (M)  
 KR Dha-A - DRW 10 (37) 23-08-92 - (M)  
 KR TLY A - INT 73 (37) + *Cirrenalia pygmaea* + *Halocyphina villosa* 23-08-92 - (M)  
 KR TLY A - INT 74 (37) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 23-08-92 - (M)  
 KR Dha-B - INT 91 (37) + *Marinosphaera mangrovei* 23-08-92 - (M)  
 KR Dha-B - INT 99 (37) + *Cirrenalia pygmaea* 23-08-92 - (M)  
 KR Mah-A - AVI 47 (37) 06-09-92 - (M)  
 KR Mah-A - AVI 49 (37) + *Halocyphina villosa* 06-09-92 - (M)  
 KR Mah-A - INT 100 (37) + *Verruculina enalia* + *Periconia prolifica* 06-09-92 - (M)  
 KR Mah-A - INT 102 (37) + + *Halocyphina villosa* 06-09-92 - (M)  
 KR Mah-A - INT 103 (37) + *Halorosellinia oceanica*+ *Halosarpheia abonnis* 06-09-92 - (M)  
 KR Mah-A - INT 106 (37) + *Lindra hawaiiensis* + *Periconia prolifica* 06-09-92 - (M)  
 KR Mah-A - INT 109 (37) + *Lulworthia grandispora* + *Periconia prolifica* 06-09-92 - (M)  
 KR Kad A - ACN 42 (37) + *Aniptodera chesapeakeensis* 13-09-92 - (M)  
 KR Kad A - ACN 43 (37) + *Cirrenalia fusca* 13-09-92 - (M)  
 KR Kad A - INT 122 (37) + *Halocyphina villosa* + *Cirrenalia pygmaea* 13-09-92 - (M)  
 KR Kad A - INT 123 (37) + *Marinosphaera mangrovei* + *Halocyphina villosa* + *Lulworthia grandispora* 13-09-92 - (M)  
 KR Kad A - INT 125 (37) + *Zalerion varium* + *Aniptodera chesapeakeensis* 13-09-92 - (M)

KR Kad A - INT 127 (71) + *Savoryella lignicola* 13-09-92 - (M)  
 KR TLY A - AVI 58 (37) + *Marinosphaera mangrovei* + *Halocyphina villosa* + *Savoryella lignicola* 27-09-92 - (M)  
 KR TLY A - AVI 59 (37) + *Savoryella paucispora* + *Lignincola laevis* 27-09-92 - (M)  
 KR TLY A - AVI 62 (37) + *Halosarpheia minuta* + *Halocyphina villosa* 27-09-92 - (M)  
 KR TLY A - BRU 47 (37) + *Lignincola laevis* 27-09-92 - (M)  
 KR TLY A - BRU 48 (37) + *Dendryphiella salina* + *Halocyphina villosa* 27-09-92 - (M)  
 KR TLY A - INT 129 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 27-09-92 - (M)  
 KR TLY A - INT 130 (37) + *Lulworthia grandispora* + *Savoryella paucispora* 27-09-92 - (M)  
 KR TLY A - INT 131 (37) + *Lignincola laevis* + *Halocyphina villosa* 27-09-92 - (M)  
 KR Bey - DRW 19 (37) + *Halorosellinia oceanica* 02-10-92 - (Pm)  
 KR TLY A - AVI 63 (37) + *Leptosphaeria australiensis* + *Halocyphina villosa* 25-10-92 - (Pm)  
 KR TLY A - BRU 49 (37) + *Halocyphina villosa* + *Cirrenalia basiminuta* + *Verruculina enalia* 25-10-92 - (Pm)  
 KR TLY A - BRU 50 (37) + *Cirrenalia pygmea* + *Halosarpheia retorquens* 25-10-92 - (Pm)  
 KR TLY A - INT 152 (37) + *Verruculina enalia* + *Lulworthia grandispora* + *Marinosphaera mangrovei* 25-10-92 - (Pm)  
 KR TLY A - RHI 20 (37) + *Halosarpheia ratnagiriensis* 25-10-92 - (Pm)  
 KR TLY A - RHI 22 (37) + *Halocyphina villosa* + *Dactylospora haliotrepha* 25-10-92 - (Pm)  
 KR Edk - ACN 49 (37) + *Aniptodera chesapeakeensis* + *Periconia prolifica* 15-11-92 - (Pm)  
 KR Edk - ACN 50 (37) + *Lulworthia* sp. I 15-11-92 - (Pm)  
 KR Edk - ACN 51 (37) + *Lignincola laevis* 15-11-92 - (Pm)  
 KR Edk - ACN 58 (37) + *Savoryella lignicola* 15-11-92 - (Pm)  
 KR Edk - ACN 59 (37) + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 15-11-92 - (Pm)  
 KR Edk - ACN 60 (37) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 15-11-92 - (Pm)  
 KR Edk - BRU 59 (37) + *Dactylospora haliotrepha* + *Aniptodera chesapeakeensis* 15-11-92 - (Pm)  
 KR Edk - BRU 68 (37) + *Lignincola laevis* 15-11-92 - (Pm)  
 KR Edk - INT 153 (37) + *Aniptodera chesapeakeensis* 15-11-92 - (Pm)  
 KR Edk - INT 157 (37) + *Lulworthia grandispora* 15-11-92 - (Pm)  
 KR Edk - RHI 29 (37) 15-11-92 - (Pm)  
 KR Edk - RHI 32 (37) + *Lulworthia grandispora* 15-11-92 - (Pm)  
 KR Edk - RHI 36 (37) + *Lulworthia grandispora* + *Halocyphina villosa* 15-11-92 - (Pm)  
 KR TLY B - ACN 62 (37) + *Savoryella lignicola* + *Periconia prolifica* 29-11-92 - (Pm)  
 KR TLY B - ACN 63 (37) + *Savoryella lignicola* + *Marinosphaera mangrovei* 29-11-92 - (Pm)  
 KR TLY B - ACN 64 (37) + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
 KR TLY A - AVI 83 (37) + *Lulworthia grandispora* + *Leptosphaeria australiensis* 29-11-92 - (Pm)  
 KR TLY A - AVI 84 (37) + *Cirrenalia pygmea* + *Aigialus mangrovis* + *Aigialus parvus* 29-11-92 - (Pm)  
 KR TLY A - AVI 85 (37) + *Aniptodera chesapeakeensis* + *Biatriospora marina* 29-11-92 - (Pm)  
 KR TLY B - AVI 87 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
 KR TLY B - AVI 88 (37) + *Halocyphina villosa* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY A - BRU 69 (37) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY A - BRU 70 (37) + *Cirrenalia pygmea* + *Leptosphaeria australiensis* 29-11-92 - (Pm)  
 KR TLY A - BRU 71 (37) + *Halosphaeria hamata* + *Zalerion varium* 29-11-92 - (Pm)  
 KR TLY B - BRU 73 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
 KR TLY B - BRU 74 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* 29-11-92 - (Pm)

KR TLY A - INT 162 (37) + *Lulworthia grandispora* + *Cirrenalia pygmea* 29-11-92 - (Pm)  
 KR TLY A - INT 164 (37) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* + *Periconia prolifica* 29-11-92 - (Pm)  
 KR TLY B - INT 165 (37) + *Halocyphina villosa* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
 KR TLY B - INT 166 (37) + *Halocyphina villosa* + *Payosphaeria minuta* + *Cirrenalia basiminuta* 29-11-92 - (Pm)  
 KR TLY B - INT 168 (37) + *Halosarpheia retorquens* 29-11-92 - (Pm)  
 KR TLY A - RHI 37 (37) + *Halosarpheia ratnagiriensis* + *Aigialus mangrovis* 29-11-92 - (Pm)  
 KR TLY A - RHI 38 (37) + *Halosarpheia abonnis* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY A - RHI 39 (37) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY B - RHI 41 (37) + *Verruculina enalia* + *Aigialus parvus* 29-11-92 - (Pm)  
 KR TLY B - RHI 42 (37) + *Halosarpheia abonnis* + *Verruculina enalia* + *Marinosphaera mangrovei* 29-11-92 - (Pm)  
 KR TLY B - RHI 43 (37) + *Marinosphaera mangrovei* + *Savoryella paucispora* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
 KR TLY C - RHI 44 (37) + *Lignincola laevis* 29-11-92 - (Pm)  
 KR TLY C - RHI 45 (37) + *Halocyphina villosa* + *Cirrenalia pygmea* 29-11-92 - (Pm)  
 KR TLY C - RHI 47 (37) + *Halocyphina villosa* + *Cirrenalia pygmea* 29-11-92 - (Pm)  
 KR Azi - INT 169 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 20-12-92 - (Pm)  
 KR Azi - INT 171 (37) + *Halocyphina villosa* + *Periconia prolifica* 20-12-92 - (Pm)  
 KR Azi - INT 174 (37) + *Halocyphina villosa* + *Savoryella lignicola* + *Lignincola laevis* 20-12-92 - (Pm)  
 KR Azi - INT 178 (37) + *Verruculina enalia* + *Antennospora quadricornuta* + *Halorosellinia oceanica* 20-12-92 - (Pm)  
 KR Azi - SBI 15 (37) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 20-12-92 - (Pm)  
 KR Azi - SBI 17 (37) + *Savoryella lignicola* 20-12-92 - (Pm)  
 KR TLY C - ACN 67 (37) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmea* 27-12-92 - (Pm)  
 KR TLY C - ACN 69 (37) + *Phoma* sp. + *Cirrenalia pygmea* 27-12-92 - (Pm)  
 KR TLY A - AVI 93 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY A - AVI 94 (37) + *Leptosphaeria australiensis* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY A - AVI 96 (37) + *Zalerion varium* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY C - AVI 97 (37) + *Savoryella lignicola* + *Halocyphina villosa* + *Cirrenalia pygmea* 27-12-92 - (Pm)  
 KR TLY C - AVI 98 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Lulworthia grandispora* 27-12-92 - (Pm)  
 KR TLY C - AVI 99 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY A - BRU 79 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 27-12-92 - (Pm)  
 KR TLY A - BRU 80 (37) + *Leptosphaeria australiensis* + *Aniptodera longispora* + *Marinosphaera mangrovei* 27-12-92 - (Pm)  
 KR TLY A - BRU 81 (37) + *Lignincola laevis* + *Lulworthia* sp. 1 + *Cirrenalia pygmea* 27-12-92 - (Pm)  
 KR TLY A - BRU 82 (37) + *Zalerion varium* + *Phialophorophoma litoralis* 27-12-92 - (Pm)  
 KR TLY A - BRU 83 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY C - BRU 85 (37) + *Lulworthia grandispora* + *Periconia prolifica* 27-12-92 - (Pm)  
 KR TLY C - BRU 86 (37) + *Periconia prolifica* + *Trichocladium alopallonellum* 27-12-92 - (Pm)  
 KR TLY C - BRU 87 (37) + *Lulworthia grandispora* 27-12-92 - (Pm)  
 KR TLY A - INT 180 (37) + *Lignincola laevis* 27-12-92 - (Pm)  
 KR TLY A - INT 181 (37) + *Verruculina enalia* 27-12-92 - (Pm)  
 KR Dha-B - INT 184 (37) + *Cirrenalia pygmea* 27-12-92 - (Pm)  
 KR Dha-B - INT 188 (37) + *Lulworthia grandispora* 27-12-92 - (Pm)  
 KR TLY A - RHI 48 (37) + *Marinosphaera mangrovei* 27-12-92 - (Pm)

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KR TLY A - RHI 49 (37) + *Leptosphaeria australiensis* 27-12-92 - (Pm)  
 KR TLY C - RHI 50 (37) + *Zalerion maritimum* + *Cirrenalia basiminuta* 27-12-92 - (Pm)  
 KR TLY C - RHI 52 (37) + *Lulworthia grandispora* + *Cirrenalia basiminuta* + *Phoma* sp. 27-12-92 - (Pm)  
 KR TLY C - RHI 53 (37) + *Lulworthia grandispora* + *Zalerion maritimum* 27-12-92 - (Pm)  
 KR Mah-A - ACN 70 (37) + *Aniptodera chesapeakeensis* 03-01-93 - (Pm)  
 KR Mah-A - ACN 72 (37) + *Savoryella lignicola* 03-01-93 - (Pm)  
 KR Mah-A - ACN 76 (37) + *Aniptodera* sp. I 03-01-93 - (Pm)  
 KR Mah-A - ACN 79 (37) + *Savoryella lignicola* 03-01-93 - (Pm)  
 KR Mah-A - AVI 104 (37) + *Leptosphaeria australiensis* 03-01-93 - (Pm)  
 KR Mah-A - INT 194 (37) + *Marinosphaera mangrovei* + *Savoryella lignicola* 03-01-93 - (Pm)  
 KR Mah-A - INT 195 (37) + *Lulworthia grandispora* + *Savoryella paucispora* 03-01-93 - (Pm)  
 KR TLY C - ACN 81 (37) + *Periconia prolifica* 10-01-93 - (Pm)  
 KR TLY C - ACN 82 (37) + *Savoryella lignicola* 10-01-93 - (Pm)  
 KR TLY C - ACN 83 (37) + *Aniptodera chesapeakeensis* 10-01-93 - (Pm)  
 KR TLY C - AVI 113 (37) + *Halocyphina villosa* + *Lulworthia grandispora* 10-01-93 - (Pm)  
 KR TLY C - AVI 115 (37) + *Savoryella lignicola* + *Lulworthia* sp. I 10-01-93 - (Pm)  
 KR TLY A - BRU 97 (37) + *Lulworthia* sp. I + *Marinosphaera mangrovei* + *Savoryella lignicola* 10-01-93 - (Pm)  
 KR TLY A - BRU 98 (37) + *Halosarpheia retorquens* + *Zalerion varium* 10-01-93 - (Pm)  
 KR TLY A - INT 206 (37) + *Zalerion varium* + *Cirrenalia macrocephala* 10-01-93 - (Pm)  
 KR TLY A - INT 207 (37) + *Marinosphaera mangrovei* + *Cirrenalia macrocephala* 10-01-93 - (Pm)  
 KR TLY A - INT 208 (37) + *Halosarpheia retorquens* + *Cirrenalia macrocephala* 10-01-93 - (Pm)  
 KR Ppd - DRW 28 (37) 31-01-93 - (Pm)  
 KR Ppd - DRW 32 (37) + *Savoryella lignicola* 31-01-93 - (Pm)  
 KR Azi - DRW 37 (37) + *Lulworthia grandispora* + *Halocyphina villosa* 13-02-93 - (Pm)  
 KR Azi - DRW 39 (37) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* + *Lignicola laevis* 13-02-93 - (Pm)  
 KR Azi - DRW 41 (37) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmaea* + *Halocyphina villosa* 13-02-93 - (Pm)  
 KR Azi - DRW 44 (37) + *Lignicola laevis* + *Halocyphina villosa* 13-02-93 - (Pm)  
 KR Azi - SBI 26 (37) + *Aniptodera chesapeakeensis* 13-02-93 - (Pm)  
 KR Azi - SBI 29 (37) + *Aniptodera chesapeakeensis* 13-02-93 - (Pm)  
 KR Azi - SBI 30 (37) + *Savoryella lignicola* 13-02-93 - (Pm)  
 KR TLY C - ACN 85 (37) + *Aniptodera chesapeakeensis* 21-02-93 - (Pm)  
 KR TLY C - AVI 120 (37) + *Trichocladium alopallonellum* + *Halosphaeria hamata* 21-02-93 - (Pm)  
 KR TLY C - AVI 121 (37) + *Bathyscus tropicalis* 21-02-93 - (Pm)  
 KR TLY C - BRU 108 (37) + *Lulworthia grandispora* + *Biatrispora marina* 21-02-93 - (Pm)  
 KR TLY C - BRU 109 (37) + *Savoryella lignicola* 21-02-93 - (Pm)  
 KR TLY C - RHI 63 (37) + *Aigialus grandis* 21-02-93 - (Pm)  
 KR Bey - DRW 55 (37) + *Periconia prolifica* 28-02-93 - (Pm)  
 KR TLY C - ACN 90 (37) + *Trichocladium* sp. 28-03-93 - (Pm)  
 KR TLY C - BRU 112 (37) + *Dactylospora haliotrepha* 28-03-93 - (Pm)  
 KR TLY A - BRU 115 (37) + *Lulworthia grandispora* + *Marinosphaera mangrovei* 28-03-93 - (Pm)  
 KR TLY A - BRU 116 (37) + *Savoryella lignicola* + *Verruculina enalia* 28-03-93 - (Pm)  
 KR TLY A - BRU 117 (37) + *Savoryella lignicola* + *Lulworthia grandispora* + *Lignicola laevis* 28-03-93 - (Pm)

KR TLY A - INT 235 (37) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmea* 28-03-93 - (Prm)  
 KR TLY A - INT 236 (37) + *Aniptodera chesapeakeensis* + *Zalerion varium* 28-03-93 - (Prm)  
 KR TLY A - INT 237 (37) + *Cirrenalia pygmea* + *Zalerion varium* 28-03-93 - (Prm)  
 KR Vad - ACN 95 (37) + *Aniptodera chesapeakeensis* 04-04-93 - (Prm)  
 KR Vad - AVI 130 (37) + *Halocyphina villosa* + *Dactylospora haliotrepha* 04-04-93 - (Prm)  
 KR Vad - AVI 133 (37) + *Marinosphaera mangrovei* 04-04-93 - (Prm)  
 KR Vad - AVI 134 (37) + *Marinosphaera mangrovei* 04-04-93 - (Prm)  
 KR Vad - AVI 135 (37) + *Halocyphina villosa* + *Cirrenalia macrocephala* 04-04-93 - (Prm)  
 KR Vad - AVI 136 (37) + *Cirrenalia pygmea* + *Savoryella lignicola* + *Marinosphaera mangrovei* 04-04-93 - (Prm)  
 KR Vad - BRU 118 (37) + *Savoryella lignicola* 04-04-93 - (Prm)  
 KR Vad - BRU 119 (37) + *Savoryella lignicola* 04-04-93 - (Prm)  
 KR Vad - BRU 120 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 04-04-93 - (Prm)  
 KR Vad - INT 239 (37) + *Aniptodera* sp. II + *Cirrenalia macrocephala* 04-04-93 - (Prm)  
 KR Vad - INT 241 (37) + *Savoryella paucispora* + *Aniptodera chesapeakeensis* + *Halosarpheia retorquens* 04-04-93 - (Prm)  
 KR Vad - INT 244 (37) + *Halocyphina villosa* + *Cirrenalia pygmea* 04-04-93 - (Prm)  
 KR Val - ACN 98 (37) + *Savoryella lignicola* 11-04-93 - (Prm)  
 KR Val - ACN 101 (37) + *Lindra hawaiiensis* 11-04-93 - (Prm)  
 KR Val - ACN 102 (37) + *Halosarpheia minuta* 11-04-93 - (Prm)  
 KR Val - AVI 137 (37) + *Trichocladium alopallonellum* + *Halorosellinia oceanica* 11-04-93 - (Prm)  
 KR Val - AVI 139 (37) + *Marinosphaera mangrovei* 11-04-93 - (Prm)  
 KR Val - AVI 141 (37) + *Marinosphaera mangrovei* 11-04-93 - (Prm)  
 KR Val - AVI 142 (37) + *Zalerion varium* + *Halorosellinia oceanica* 11-04-93 - (Prm)  
 KR Val - BRU 123 (37) + *Periconia prolifica* 11-04-93 - (Prm)  
 KR Val - BRU 129 (37) + *Savoryella lignicola* 11-04-93 - (Prm)  
 KR Val - BRU 130 (37) + *Savoryella lignicola* 11-04-93 - (Prm)  
 KR Val - INT 248 (37) + *Trichocladium alopallonellum* + *Lulworthia grandispora* 11-04-93 - (Prm)  
 KR Val - INT 251 (37) + *Marinosphaera mangrovei* 11-04-93 - (Prm)  
 KR Val - INT 252 (37) + *Lulworthia grandispora* 11-04-93 - (Prm)  
 KR Val - RHI 73 (37) + *Lulworthia grandispora* 11-04-93 - (Prm)  
 KR Val - RHI 74 (37) + Unidentified ascomycetes III 11-04-93 - (Prm)  
 KR Val - RHI 75 (37) + *Lindra hawaiiensis* 11-04-93 - (Prm)  
 KR Val - RHI 76 (37) + *Lindra hawaiiensis* 11-04-93 - (Prm)  
 KR Che - ACN 104 (37) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 17-04-93 - (Prm)  
 KR Che - ACN 106 (37) + *Lignicola laevis* 17-04-93 - (Prm)  
 KR Che - ACN 108 (37) + *Aniptodera chesapeakeensis* 17-04-93 - (Prm)  
 KR Che - ACN 110 (37) + *Savoryella lignicola* + *Halosarpheia viscosa* 17-04-93 - (Prm)  
 KR Che - AVI 143 (37) + *Lulworthia grandispora* + *Marinosphaera mangrovei* 17-04-93 - (Prm)  
 KR Che - AVI 144 (37) + *Cirrenalia pygmea* + *Halorosellinia oceanica* 17-04-93 - (Prm)  
 KR Che - AVI 145 (37) + *Dactylospora haliotrepha* 17-04-93 - (Prm)  
 KR Che - AVI 146 (37) + *Savoryella lignicola* + *Lulworthia grandispora* 17-04-93 - (Prm)  
 KR Che - AVI 149 (37) + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* + *Lulworthia grandispora* 17-04-93 - (Prm)  
 KR Che - AVI 151 (37) + *Halorosellinia oceanica* + *Savoryella lignicola* 17-04-93 - (Prm)

KR Che - BRU 134 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 17-04-93 - (Prm)  
 KR Che - BRU 138 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 17-04-93 - (Prm)  
 KR Che - INT 254 (37) + *Halocyphina villosa* + *Aigialus grandis* 17-04-93 - (Prm)  
 KR Che - INT 255 (37) + *Savoryella lignicola* + *Aigialus parvus* 17-04-93 - (Prm)  
 KR Che - INT 257 (37) + *Marinosphaera mangrovei* 17-04-93 - (Prm)  
 KR Che - RHI 78 (37) + *Aigialus grandis* 17-04-93 - (Prm)  
 KR Che - RHI 82 (37) + *Verruculina enalia* + *Halocyphina villosa* 17-04-93 - (Prm)  
 KR Che - RHI 84 (37) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 17-04-93 - (Prm)  
 KR TLY B - ACN 114 (37) + *Halosarpheia viscosa* 18-04-93 - (Prm)  
 KR TLY C - ACN 115 (37) + *Aniptodera chesapeakeensis* 18-04-93 - (Prm)  
 KR TLY C - AVI 159 (37) + *Pleospora pelagica* + *Cirrenalia basiminuta* 18-04-93 - (Prm)  
 KR TLY C - AVI 160 (37) + *Lignincola laevis* + *Halocyphina villosa* + *Halosarpheia abonnis* 18-04-93 - (Prm)  
 KR TLY B - BRU 142 (37) + *Aniptodera chesapeakeensis* 18-04-93 - (Prm)  
 KR TLY B - BRU 143 (37) + *Aniptodera chesapeakeensis* + *Lignincola laevis* 18-04-93 - (Prm)  
 KR Dha-A - DRW 60 (37) + *Trichocladium alopallonellum* 18-04-93 - (Prm)  
 KR TLY A - INT 262 (37) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmea* 18-04-93 - (Prm)  
 KR TLY A - INT 265 (37) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 18-04-93 - (Prm)  
 KR TLY B - INT 266 (37) + *Dactylospora haliotrepha* 18-04-93 - (Prm)  
 KR TLY B - INT 267 (37) + *Lulworthia grandispora* 18-04-93 - (Prm)  
 KR TLY B - INT 268 (37) + *Cirrenalia pygmea* + *Ceriosporopsis halima* 18-04-93 - (Prm)  
 KR Dha-A - INT 271 (37) + *Halocyphina villosa* 18-04-93 - (Prm)  
 KR Dha-A - INT 273 (37) + *Leptosphaeria australiensis* 18-04-93 - (Prm)  
 KR Dha-A - INT 275 (37) + *Aniptodera chesapeakeensis* 18-04-93 - (Prm)  
 KR TLY B - RHI 90 (37) + *Dactylospora haliotrepha* + *Lulworthia grandispora* 18-04-93 - (Prm)  
 KR TLY B - RHI 91 (37) + *Manglicola* sp. + *Ocostaspora apilongissima* 18-04-93 - (Prm)  
 KR Tik - DRW 62 (37) + *Lulworthia* sp. V 25-04-93 - (Prm)  
 KR Tik - INT 285 (37) + *Lulworthia grandispora* 25-04-93 - (Prm)  
 KR Tik - INT 287 (37) + *Aniptodera chesapeakeensis* 25-04-93 - (Prm)  
 KR Tik - INT 289 (37) + *Aniptodera chesapeakeensis* 25-04-93 - (Prm)  
 KR TLY C - AVI 164 (37) + *Lulworthia grandispora* + *Marinosphaera mangrovei* + *Halocyphina villosa* 09-05-93 - (Prm)  
 KR TLY C - AVI 166 (37) + *Lulworthia grandispora* + *Zalerion varium* 09-05-93 - (Prm)  
 KR TLY C - AVI 167 (37) + *Marinosphaera mangrovei* 09-05-93 - (Prm)  
 KR TLY A - INT 293 (37) + *Cirrenalia pygmea* + *Aniptodera chesapeakeensis* 09-05-93 - (Prm)  
 KR TLY A - INT 296 (37) + *Aniptodera chesapeakeensis* 09-05-93 - (Prm)  
 KR TLY C - RHI 99 (37) + *Lulworthia grandispora* 09-05-93 - (Prm)  
 KR TLY C - RHI 101 (37) + *Aigialus grandis* 09-05-93 - (Prm)  
 KR TLY C - RHI 102 (37) + *Halosarpheia viscosa* 09-05-93 - (Prm)  
 KR Kad A - ACN 123 (37) + *Cirrenalia fusca* 23-05-93 - (Prm)  
 KR Kad A - ACN 125 (37) + *Lignincola laevis* 23-05-93 - (Prm)  
 KR Kad A - AVI 169 (37) + *Halosarpheia ratnagiriensis* 23-05-93 - (Prm)  
 KR Kad A - AVI 172 (37) + *Zalerion varium* 23-05-93 - (Prm)  
 KR Kad A - INT 298 (37) + *Leptosphaeria australiensis* 23-05-93 - (Prm)

KR Kad A - INT 299 (37) + *Marinosphaera mangrovei* 23-05-93 - (Prm)  
 KR Kad A - INT 301 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 23-05-93 - (Prm)  
 KR TLY C - ACN 128 (37) + *Cirrenalia pygmea* 20-06-93 - (Prm)  
 KR TLY C - ACN 130 (37) + *Zalenion varium* + *Savoryella lignicola* 20-06-93 - (Prm)  
 KR TLY C - AVI 177 (37) + *Verruculina enalia* + *Lignincola laevis* 20-06-93 - (M)  
 KR TLY C - AVI 178 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 20-06-93 - (M)  
 KR TLY C - BRU 159 (37) + *Periconia prolifica* + *Leptosphaeria australiensis* 20-06-93 - (M)  
 KR TLY C - BRU 160 (37) + Unidentified ascomycetes VI + *Halocyphina villosa* 20-06-93 - (M)  
 KR TLY C - BRU 161 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Lindra hawaiiensis* 20-06-93 - (M)  
 KR TLY C - RHI 105 (37) + *Halocyphina villosa* + *Verruculina enalia* 20-06-93 - (M)  
 KR TLY C - RHI 107 (37) + *Aigialus grandis* + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR Edk - ACN 133 (37) + *Aniptodera chesapeakeensis* 11-07-93 - (M)  
 KR Edk - ACN 134 (37) + *Lignincola laevis* 11-07-93 - (M)  
 KR Edk - AVI 184 (37) + *Cirrenalia macrocephala* 11-07-93 - (M)  
 KR Edk - AVI 185 (37) + *Aniptodera chesapeakeensis* 11-07-93 - (M)  
 KR Edk - BRU 164 (37) + *Marinosphaera mangrovei* 11-07-93 - (M)  
 KR Edk - BRU 165 (37) + *Dactylospora haliotrepha* 11-07-93 - (M)  
 KR Edk - BRU 166 (37) + *Verruculina enalia* 11-07-93 - (M)  
 KR Edk - INT 306 (37) + *Lulworthia grandispora* 11-07-93 - (M)  
 KR Edk - INT 311 (37) + *Aniptodera chesapeakeensis* 11-07-93 - (M)  
 KR Edk - RHI 109 (37) + *Aigialus mangrovis* 11-07-93 - (M)  
 KR Edk - RHI 111 (37) + *Verruculina enalia* 11-07-93 - (M)  
 KR Edk - RHI 115 (37) + *Savoryella lignicola* 11-07-93 - (M)  
 KR Azi - DRW 72 (37) + *Antennospora quadricomuta* 17-07-93 - (M)  
 KR Azi - DRW 74 (37) + *Aniptodera chesapeakeensis* 17-07-93 - (M)  
 KR Azi - DRW 80 (37) 17-07-93 - (M)  
 KR Azi - INT 317 (37) + *Halocyphina villosa* 17-07-93 - (M)  
 KR TLY C - ACN 138 (37) + *Lulworthia* sp. I 18-07-93 - (M)  
 KR TLY A - AVI 192 (37) + *Lignincola laevis* 18-07-93 - (M)  
 KR TLY A - BRU 172 (37) + *Halocyphina villosa* + *Savoryella lignicola* 18-07-93 - (M)  
 KR TLY A - BRU 173 (37) + *Dendryphiella salina* 18-07-93 - (M)  
 KR TLY A - BRU 174 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 18-07-93 - (M)  
 KR TLY A - INT 322 (37) + *Halocyphina villosa* 18-07-93 - (M)  
 KR TLY A - INT 323 (37) + *Halocyphina villosa* 18-07-93 - (M)  
 KR TLY A - RHI 119 (37) 18-07-93 - (M)  
 KR TLY A - RHI 120 (37) + *Halocyphina villosa* 18-07-93 - (M)  
 KR Kav - ACN 140 (37) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 19-07-93 - (M)  
 KR Kav - ACN 142 (37) + *Halosarpehia viscosa* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR Kav - ACN 145 (37) *Lindra hawaiiensis* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR Kav - AVI 199 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR Kav - AVI 202 (37) + *Halocyphina villosa* + *Savoryella lignicola* 19-07-93 - (M)  
 KR Kav - AVI 205 (37) + *Halocyphina villosa* + *Lignincola laevis* 19-07-93 - (M)

KR Kav - AVI 206 (37) + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - BRU 178 (37) + *Halosarpheia minuta* 19-07-93 - (M)  
 KR Kav - BRU 179 (37) + 19-07-93 - (M)  
 KR Kav - BRU 183 (37) + *Periconia prolifica* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - INT 328 (37) + *Marinosphaera mangrovei* + *Cirrenalia basiminuta* 19-07-93 - (M)  
 KR Kav - INT 330 (37) + *Savoryella lignicola* + *Lulworthia grandispora* 19-07-93 - (M)  
 KR Kav - INT 333 (37) + *Cirrenalia pygmea* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - INT 334 (37) + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 19-07-93 - (M)  
 KR Kav - RHI 125 (37) + *Dactylospora haliotrepha* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR Kav - RHI 127 (37) + *Halocyphina villosa* + *Lignincola laevis* 19-07-93 - (M)  
 KR Kav - RHI 130 (37) + *Halocyphina villosa* 19-07-93 - (M)  
 KR Mah-A - ACN 147 (37) + *Aniptodera chesapeakeensis* 12-08-93 - (M)  
 KR Mah-A - ACN 151 (37) + *Aniptodera chesapeakeensis* 12-08-93 - (M)  
 KR Mah-A - ACN 153 (37) 12-08-93 - (M)  
 KR Mah-A - AVI 208 (37) + *Lignincola laevis* 12-08-93 - (M)  
 KR Mah-A - AVI 209 (37) + *Savoryella lignicola* 12-08-93 - (M)  
 KR Mah-A - AVI 210 (37) + *Aigialus grandis* 12-08-93 - (M)  
 KR Mah-A - BRU 185 (37) + *Halocyphina villosa* 12-08-93 - (M)  
 KR Mah-A - BRU 186 (37) + *Savoryella paucispora* 12-08-93 - (M)  
 KR Mah-A - BRU 192 (37) + *Lulworthia grandispora* 12-08-93 - (M)  
 KR Mah-A - BRU 193 (37) + *Halocyphina villosa* + *Lulworthia* sp. III 12-08-93 - (M)  
 KR Mah-A - INT 337 (37) + *Lulworthia* sp. I + *Trichocladium* sp. 12-08-93 - (M)  
 KR Mah-A - INT 340 (37) + *Trichocladium* sp. 12-08-93 - (M)  
 KR Mah-A - INT 344 (37) + *Marinosphaera mangrovei* + *Lulworthia grandispora* 12-08-93 - (M)  
 KR Bey - DRW 85 (37) + *Lignincola laevis* 15-08-93 - (M)  
 KR TLY B - ACN 156 (37) + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY B - ACN 158 (37) + *Periconia prolifica* 22-08-93 - (M)  
 KR TLY C - ACN 159 (37) + *Aniptodera chesapeakeensis* + *Zalerion varium* 22-08-93 - (M)  
 KR TLY C - ACN 161 (37) + *Halosarpheia viscosa* 22-08-93 - (M)  
 KR TLY A - AVI 217 (37) + *Lulworthia grandispora* + *Halosarpheia retorquens* 22-08-93 - (M)  
 KR TLY A - AVI 219 (37) + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY B - AVI 220 (37) + *Halocyphina villosa* + *Halosarpheia viscosa* 22-08-93 - (M)  
 KR TLY B - AVI 221 (37) + *Halocyphina villosa* + *Marinosphaera mangrovei* 22-08-93 - (M)  
 KR TLY C - AVI 224 (37) + *Lulworthia* sp. I 22-08-93 - (M)  
 KR TLY C - AVI 225 (37) + *Cirrenalia pygmea* + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY A - BRU 194 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY A - BRU 197 (37) + *Lindra hawaiiensis* 22-08-93 - (M)  
 KR TLY B - BRU 198 (37) + *Marinosphaera mangrovei* + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY B - BRU 199 (37) + *Periconia prolifica* + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY B - BRU 201 (37) + *Lulworthia grandispora* + *Periconia prolifica* 22-08-93 - (M)  
 KR TLY C - BRU 203 (37) + *Halocyphina villosa* + *Verruculina enalia* 22-08-93 - (M)  
 KR TLY C - BRU 204 (37) + *Leptosphaeria australiensis* 22-08-93 - (M)

KR TLY A - INT 353 (37) + *Cirrenalia basiminuta* 22-08-93 - (M)  
 KR TLY A - INT 355 (37) + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY B - INT 356 (37) + *Halocyphina villosa* + *Cirrenalia pygmaea* 22-08-93 - (M)  
 KR TLY B - INT 357 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR Dha-B - INT 359 (37) 22-08-93 - (M)  
 KR Dha-B - INT 361 (37) + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR Dha-B - INT 364 (37) 22-08-93 - (M)  
 KR TLY A - RHI 133 (37) + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY A - RHI 135 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY B - RHI 136 (37) + *Aniptodera chesapeakeensis* + *Aigialus parvus* 22-08-93 - (M)  
 KR TLY B - RHI 137 (37) + *Halosarpheia abonnis* 22-08-93 - (M)  
 KR TLY B - RHI 138 (37) + *Verruculina enalia* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY B - RHI 139 (37) + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR Che - AVI 231 (37) + *Lignincola laevis* + *Aniptodera chesapeakeensis* 05-09-93 - (M)  
 KR Che - AVI 232 (37) + *Lindra hawaiiensis* + *Savoryella lignicola* 05-09-93 - (M)  
 KR Che - AVI 234 (37) + *Lulworthia grandispora* 05-09-93 - (M)  
 KR Che - BRU 206 (37) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 05-09-93 - (M)  
 KR Che - BRU 208 (37) + *Savoryella paucispora* 05-09-93 - (M)  
 KR Che - BRU 210 (37) + *Halocyphina villosa* 05-09-93 - (M)  
 KR Che - INT 368 (37) + *Halocyphina villosa* 05-09-93 - (M)  
 KR Che - INT 371 (37) + *Dactylospora haliotrepha* 05-09-93 - (M)  
 KR Tik - INT 390 (37) + *Savoryella lignicola* 18-09-93 - (M)  
 KR TLY A - AVI 236 (37) + *Halocyphina villosa* 19-09-93 - (M)  
 KR TLY A - AVI 237 (37) + *Lignincola laevis* 19-09-93 - (M)  
 KR TLY A - BRU 212 (37) + *Halocyphina villosa* 19-09-93 - (M)  
 KR TLY A - BRU 213 (37) 19-09-93 - (M)  
 KR TLY A - INT 393 (37) + *Marinosphaera mangrovei* + *Halosarpheia retorquens* 19-09-93 - (M)  
 KR TLY A - INT 394 (37) + *Marinosphaera mangrovei* + *Halocyphina villosa* 19-09-93 - (M)  
 KR TLY A - RHI 148 (37) + *Halocyphina villosa* + *Dactylospora haliotrepha* 19-09-93 - (M)  
 KR TLY A - RHI 149 (37) + *Halocyphina villosa* 19-09-93 - (M)  
 KR TLY C - RHI 151 (37) + *Leptosphaeria australiensis* + *Lulworthia grandispora* + *Marinosphaera mangrovei* 19-09-93 - (M)  
 KR TLY C - RHI 152 (37) + *Halosarpheia abonnis* + *Marinosphaera mangrovei* 19-09-93 - (M)  
 KR Kad B - INT 400 (37) 26-09-93 - (M)  
 KR Kad B - INT 402 (37) + *Aniptodera chesapeakeensis* 26-09-93 - (M)  
 KR Kad B - INT 403 (37) 26-09-93 - (M)  
 KR Bek - DRW 97 (37) + *Periconia prolifica* 03-10-93 - (Pm)  
 KR Bek - DRW 103 (37) + *Halorosellinia oceanica* 03-10-93 - (Pm)  
 KR TLY A - AVI 244 (37) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 17-10-93 - (Pm)  
 KR Tik - DRW 110 (37) + *Verruculina enalia* 31-10-93 - (Pm)  
 KR TLY A - AVI 253 (37) + *Leptosphaeria australiensis* + *Aniptodera* sp. II 21-11-93 - (Pm)  
 KR TLY A - AVI 254 (37) + *Lignincola laevis* + *Halocyphina villosa* 21-11-93 - (Pm)

KR TLY A - BRU 228 (37) + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR Dha-B - INT 437 (37) 21-11-93 - (Pm)  
 KR Dha-B - INT 441 (37) 21-11-93 - (Pm)  
 KR TLY A - INT 446 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR TLY A - INT 448 (37) + *Verruculina enalia* + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR TLY A - INT 449 (37) + *Trichocladium alopallonellum* + *Dactylospora haliotrepha* 21-11-93 - (Pm)  
 KR TLY A - RHI 164 (37) + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR Val - ACN 179 (37) + *Lulworthia* sp. III 05-12-93 - (Pm)  
 KR Val - ACN 180 (37) + *Lulworthia* sp. III 05-12-93 - (Pm)  
 KR Val - ACN 181 (37) + *Periconia prolifica* + *Marinosphaera mangrovei* 05-12-93 - (Pm)  
 KR Val - ACN 182 (37) + *Periconia prolifica* + *Marinosphaera mangrovei* 05-12-93 - (Pm)  
 KR Val - INT 450 (37) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 05-12-93 - (Pm)  
 KR Val - INT 451 (37) + *Aigialus mangrovis* 05-12-93 - (Pm)  
 KR Val - INT 456 (37) + *Marinosphaera mangrovei* + *Halocyphina villosa* 05-12-93 - (Pm)  
 KR Val - INT 459 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 05-12-93 - (Pm)  
 KR Che - ACN 190 (37) 18-12-93 - (Pm)  
 KR Che - ACN 191 (37) + *Savoryella lignicola* 18-12-93 - (Pm)  
 KR Che - ACN 192 (37) + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - AVI 262 (37) + *Halocyphina villosa* + *Lignicola laevis* 18-12-93 - (Pm)  
 KR Che - AVI 263 (37) + *Savoryella lignicola* + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - AVI 266 (37) + *Marinosphaera mangrovei* + *Halosarpheia abonnis* 18-12-93 - (Pm)  
 KR Che - AVI 269 (37) + *Marinosphaera mangrovei* + *Aigialus parvus* + *Ascomycetes* sp. II 18-12-93 - (Pm)  
 KR Che - BRU 237 (37) + *Halocyphina villosa* + *Verruculina enalia* 18-12-93 - (Pm)  
 KR Che - BRU 238 (37) + *Lignicola laevis* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR Che - BRU 240 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - BRU 242 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - BRU 243 (37) + *Marinosphaera mangrovei* + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - INT 462 (37) + *Verruculina enalia* + *Dactylospora haliotrepha* 18-12-93 - (Pm)  
 KR Che - INT 464 (37) + *Halocyphina villosa* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR Che - INT 466 (37) + *Cirrenalia basiminuta* 18-12-93 - (Pm)  
 KR Che - INT 467 (37) + *Leptosphaeria australiensis* + *Halosarpheia ratnagiriensis* 18-12-93 - (Pm)  
 KR Che - INT 468 (37) + *Dactylospora haliotrepha* + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - INT 470 (37) + *Verruculina enalia* + UNIDENTIFIED ASCOMYCETE II 18-12-93 - (Pm)  
 KR Che - RHI 170 (37) + *Cirrenalia pygmaea* + *Halorosellinia oceanica* + *Aigialus parvus* 18-12-93 - (Pm)  
 KR Che - RHI 171 (37) + *Cirrenalia basiminuta* + *Aigialus grandis* 18-12-93 - (Pm)  
 KR Che - RHI 172 (37) + *Halocyphina villosa* + *Leptosphaeria australiensis* + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - RHI 173 (37) + *Halocyphina villosa* + *Cirrenalia pygmaea* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - RHI 174 (37) + *Marinosphaera mangrovei* + *Dactylospora haliotrepha* 18-12-93 - (Pm)  
 KR Che - RHI 179 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR Che - RHI 180 (37) + *Halosarpheia ratnagiriensis* + *Verruculina enalia* 18-12-93 - (Pm)  
 KR TLY A - AVI 270 (37) + *Halocyphina villosa* 19-12-93 - (Pm)

KR TLY A - AVI 273 (37) + *Marinosphaera mangrovei* 19-12-93 - (Pm)  
 KR TLY A - BRU 244 (37) + *Periconia prolifica* 19-12-93 - (Pm)  
 KR TLY A - BRU 246 (37) + *Halocyphina villosa* + *Marinosphaera mangrovei* 19-12-93 - (Pm)  
 KR TLY A - INT 472 (37) + *Lindra hawaiiensis* 19-12-93 - (Pm)  
 KR Vad - ACN 194 (37) + *Aniptodera chesapeakeensis* 26-12-93 - (Pm)  
 KR Vad - ACN 198 (37) + *Savoryella lignicola* 26-12-93 - (Pm)  
 KR Vad - AVI 276 (37) + *Leptosphaeria australiensis* 26-12-93 - (Pm)  
 KR Vad - AVI 278 (37) + *Verruculina enalia* 26-12-93 - (Pm)  
 KR Vad - BRU 248 (37) + *Dactylospora haliotrepha* 26-12-93 - (Pm)  
 KR Vad - BRU 253 (37) + 26-12-93 - (Pm)  
 KR Vad - INT 474 (37) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* + *Cirrenalia macrocephala* 26-12-93 - (Pm)  
 KR Vad - INT 475 (37) + *Aniptodera* sp. I + *Cirrenalia pygmaea* 26-12-93 - (Pm)  
 KR Vad - INT 476 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 26-12-93 - (Pm)  
 KR Dha-A - INT 481 (37) + *Halocyphina villosa* 27-12-93 - (Pm)  
 KR Dha-A - INT 483 (37) + 27-12-93 - (Pm)  
 KR Kad A - ACN 201 (37) + *Cirrenalia macrocephala* + *Lulworthia* sp. I 16-01-94 - (Pm)  
 KR Kad A - ACN 203 (37) + *Marinosphaera mangrovei* 16-01-94 - (Pm)  
 KR Kad A - ACN 204 (37) + *Savoryella lignicola* 16-01-94 - (Pm)  
 KR Kad A - ACN 205 (37) + *Aniptodera chesapeakeensis* 16-01-94 - (Pm)  
 KR Kad A - INT 491 (37) + *Savoryella lignicola* + *Savoryella* sp. + *Savoryella paucispora* 16-01-94 - (Pm)  
 KR Kad A - INT 496 (37) + *Lulworthia grandispora* + *Zalerion varium* 16-01-94 - (Pm)  
 KR Kad A - INT 498 (37) + Unidentified ascomycetes III 16-01-94 - (Pm)  
 KR TLY B - ACN 207 (37) + *Aniptodera chesapeakeensis* 23-01-94 - (Pm)  
 KR TLY B - ACN 208 (37) + *Aniptodera chesapeakeensis* + *Halosarpheia retorquens* 23-01-94 - (Pm)  
 KR TLY B - ACN 209 (37) + *Aniptodera chesapeakeensis* 23-01-94 - (Pm)  
 KR TLY A - AVI 288 (37) + *Savoryella lignicola* + *Lindra hawaiiensis* 23-01-94 - (Pm)  
 KR TLY A - AVI 289 (37) + *Marinosphaera mangrovei* 23-01-94 - (Pm)  
 KR TLY B - AVI 293 (37) + *Halocyphina villosa* + *Bathyascus tropicalis* 23-01-94 - (Pm)  
 KR TLY A - BRU 257 (37) + *Lignicola laevis* + *Lulworthia grandispora* 23-01-94 - (Pm)  
 KR TLY A - BRU 258 (37) + *Marinosphaera mangrovei* + *Cirrenalia pygmaea* 23-01-94 - (Pm)  
 KR TLY A - INT 502 (37) + *Halocyphina villosa* + *Cirrenalia pygmaea* 23-01-94 - (Pm)  
 KR TLY A - INT 503 (37) + *Phoma* sp. + *Aniptodera chesapeakeensis* 23-01-94 - (Pm)  
 KR TLY A - INT 504 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 23-01-94 - (Pm)  
 KR TLY B - INT 505 (37) + *Bathyascus tropicalis* 23-01-94 - (Pm)  
 KR TLY B - INT 507 (37) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
 KR TLY B - INT 510 (37) + *Halocyphina villosa* + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
 KR TLY B - INT 511 (37) + *Halocyphina villosa* + *Halosarpheia viscosa* 23-01-94 - (Pm)  
 KR TLY B - INT 512 (37) + *Halocyphina villosa* + *Lignicola laevis* 23-01-94 - (Pm)  
 KR TLY B - RHI 187 (37) + *Halocyphina villosa* + *Cirrenalia pygmaea* 23-01-94 - (Pm)  
 KR TLY B - RHI 188 (37) + *Halocyphina villosa* + *Lignicola laevis* 23-01-94 - (Pm)  
 KR TLY B - RHI 189 (37) + *Halocyphina villosa* + *Lulworthia* sp. III + *Dactylospora haliotrepha* 23-01-94 - (Pm)



KR TLY B - RHI 190 (37) + *Halocyphina villosa* + *Leptosphaeria australiensis* *Dactylospora haliotrepha* 23-01-94 - (Prm)  
 KR TLY B - RHI 191 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 23-01-94 - (Prm)  
 KR TLY A - INT 513 (37) + *Aniptodera chesapeakeensis* 27-02-94 - (Prm)  
 KR TLY A - INT 516 (37) + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 27-02-94 - (Prm)  
 KR Edk - ACN 213 (37) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 06-03-94 - (Prm)  
 KR Edk - ACN 214 (37) + *Lulworthia* sp. I 06-03-94 - (Prm)  
 KR Edk - ACN 215 (37) + *Aniptodera chesapeakeensis* + *Lignincola laevis* 06-03-94 - (Prm)  
 KR Edk - ACN 216 (37) + *Aniptodera chesapeakeensis* + *Lulworthia* sp. I 06-03-94 - (Prm)  
 KR Edk - AVI 301 (37) + *Leptosphaeria australiensis* + *Zalerion varium* 06-03-94 - (Prm)  
 KR Edk - AVI 302 (37) + *Marinosphaera mangrovei* + *Verruculina enalia* + *Ascochyta* sp. 06-03-94 - (Prm)  
 KR Edk - AVI 303 (37) + *Cirrenalia pygmea* + *Lulworthia grandispora* 06-03-94 - (Prm)  
 KR Edk - BRU 262 (37) + *Halocyphina villosa* 06-03-94 - (Prm)  
 KR Edk - BRU 264 (37) + *Halocyphina villosa* 06-03-94 - (Prm)  
 KR Edk - BRU 265 (37) + *Savoryella paucispora* + *Lulworthia* sp. I 06-03-94 - (Prm)  
 KR Edk - BRU 267 (37) + *Lulworthia* sp. I 06-03-94 - (Prm)  
 KR Edk - INT 517 (37) + *Aniptodera chesapeakeensis* + *Lulworthia* sp. I 06-03-94 - (Prm)  
 KR Edk - INT 521 (37) + *Lulworthia grandispora* + *Cirrenalia pygmea* 06-03-94 - (Prm)  
 KR Edk - INT 522 (37) + *Savoryella paucispora* 06-03-94 - (Prm)  
 KR Edk - INT 524 (37) + *Leptosphaeria australiensis* 06-03-94 - (Prm)  
 KR Edk - RHI 198 (37) + *Lulworthia grandispora* + *Marinosphaera mangrovei* 06-03-94 - (Prm)  
 KR Edk - RHI 199 (37) + *Lulworthia grandispora* + *Marinosphaera mangrovei* 06-03-94 - (Prm)  
 KR Edk - RHI 200 (37) + *Dactylospora haliotrepha* + *Marinosphaera mangrovei* + *Halocyphina villosa* 06-03-94 - (Prm)  
 KR Edk - RHI 203 (37) + *Marinosphaera mangrovei* + *Halocyphina villosa* 06-03-94 - (Prm)  
 KR TLY B - ACN 219 (37) + *Halosarpheia viscosa* + *Zalerion varium* 20-03-94 - (Prm)  
 KR TLY B - ACN 220 (37) + *Periconia prolifica* 20-03-94 - (Prm)  
 KR TLY B - AVI 307 (37) + *Cirrenalia pygmea* 20-03-94 - (Prm)  
 KR TLY B - AVI 308 (37) + *Periconia prolifica* + *Marinosphaera mangrovei* + *Halosarpheia viscosa* 20-03-94 - (Prm)  
 KR TLY B - AVI 310 (37) + *Periconia prolifica* 20-03-94 - (Prm)  
 KR TLY A - BRU 270 (37) 20-03-94 - (Prm)  
 KR TLY A - BRU 272 (37) + *Halosphaeria hamata* 20-03-94 - (Prm)  
 KR TLY A - BRU 273 (37) + *Halosarpheia retorquens* + *Trichocladium alopallonellum* 20-03-94 - (Prm)  
 KR TLY B - BRU 274 (37) + *Aniptodera chesapeakeensis* + *Lulworthia* sp. III 20-03-94 - (Prm)  
 KR TLY B - BRU 275 (37) + *Aniptodera chesapeakeensis* + *Halosarpheia viscosa* 20-03-94 - (Prm)  
 KR TLY B - BRU 276 (37) + *Periconia prolifica* + *Zalerion maritimum* 20-03-94 - (Prm)  
 KR TLY A - INT 527 (37) + *Aniptodera chesapeakeensis* 20-03-94 - (Prm)  
 KR TLY A - INT 528 (37) + *Dactylospora haliotrepha* + *Cirrenalia basiminuta* 20-03-94 - (Prm)  
 KR TLY A - INT 530 (37) + *Dactylospora haliotrepha* + *Aniptodera chesapeakeensis* 20-03-94 - (Prm)  
 KR TLY A - INT 531 (37) + *Halosphaeria hamata* 20-03-94 - (Prm)  
 KR TLY B - INT 532 (37) + *Lulworthia* sp. III + *Marinosphaera mangrovei* + *Lignincola laevis* 20-03-94 - (Prm)  
 KR TLY B - INT 535 (37) + *Halocyphina villosa* + *Dactylospora haliotrepha* 20-03-94 - (Prm)  
 KR TLY B - INT 536 (37) + *Lulworthia grandispora* + *Halocyphina villosa* + *Cirrenalia pygmea* 20-03-94 - (Prm)  
 KR TLY B - RHI 208 (37) + *Halosarpheia abonnis* 20-03-94 - (Prm)

KR TLY B - RHI 209 (37) + *Lignicola laevis* 20-03-94 - (Prm)  
 KR TLY B - RHI 210 (37) + *Lulworthia grandispora* + *Halosarpheia retorquens* 20-03-94 - (Prm)  
 KR Kav - ACN 225 (37) + *Savoryella lignicola* 15-04-94 - (Prm)  
 KR Kav - ACN 226 (37) + *Lindra hawaiiensis* + *Halosarpheia viscosa* 15-04-94 - (Prm)  
 KR Kav - ACN 228 (37) + *Aniptodera chesapeakeensis* 15-04-94 - (Prm)  
 KR Kav - AVI 312 (37) + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 15-04-94 - (Prm)  
 KR Kav - AVI 315 (37) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmaea* + *Halocyphina villosa* 15-04-94 - (Prm)  
 KR Kav - AVI 316 (37) + *Aniptodera* sp. II + *Marinosphaera mangrovei* + *Halocyphina villosa* + *Aniptodera haispora* 15-04-94 - (Prm)  
 KR Kav - AVI 318 (37) + *Halocyphina villosa* + *Halosarpheia retorquens* 15-04-94 - (Prm)  
 KR Kav - AVI 320 (37) + *Lulworthia grandispora* + *Leptosphaeria australiensis* 15-04-94 - (Prm)  
 KR Kav - BRU 283 (37) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 15-04-94 - (Prm)  
 KR Kav - INT 539 (37) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Aigialus mangrovis* 15-04-94 - (Prm)  
 KR Kav - INT 540 (37) + *Leptosphaeria australiensis* 15-04-94 - (Prm)  
 KR Kav - INT 547 (37) + *Marinosphaera mangrovei* 15-04-94 - (Prm)  
 KR Kav - RHI 213 (37) + *Halocyphina villosa* + *Lulworthia grandispora* 15-04-94 - (Prm)  
 KR Kav - RHI 214 (37) + *Leptosphaeria australiensis* + *Aniptodera chesapeakeensis* 15-04-94 - (Prm)  
 KR Kav - RHI 217 (37) + *Halocyphina villosa* + *Halosarpheia ratnagiriensis* + *Lulworthia grandispora* 15-04-94 - (Prm)  
 KR Kav - RHI 218 (37) + *Halosarpheia abonnis* + *Marinosphaera mangrovei* 15-04-94 - (Prm)  
 KR Kav - RHI 219 (37) + *Halocyphina villosa* 15-04-94 - (Prm)  
 KR Kav - RHI 220 (37) + *Marinosphaera mangrovei* + *Aigialus parvus* 15-04-94 - (Prm)  
 KR TLY A - INT 550 (37) + *Zalerion maritimum* + *Cirrenalia pygmaea* 17-04-94 - (Prm)  
 KR TLY A - INT 551 (37) + *Dendryphiella salina* + *Phoma* sp. 17-04-94 - (Prm)  
 KR TLY A - RHI 222 (37) + *Halosarpheia abonnis* 17-04-94 - (Prm)  
 KR TLY A - RHI 223 (37) + *Aigialus parvus* 17-04-94 - (Prm)  
 KR TLY A - AVI 328 (37) + *Lulworthia grandispora* 15-05-94 - (Prm)  
 KR TLY A - BRU 290 (37) + *Lignicola laevis* + *Savoryella lignicola* 15-05-94 - (Prm)  
 KR TLY A - INT 555 (37) + *Marinosphaera mangrovei* + *Zalerion maritimum* 15-05-94 - (Prm)

This species was originally described as *Gnomonia marina* by Cribb & Cribb (1956). Earlier it was known only from Atlantic and Pacific oceans (Kohlmeyer & Kohlmeyer, 1979) but recently there have been several reports of this species from Indian Ocean (Borse, 1987b; Ravikumar & Vittal, 1987; Hyde, 1988a; Jones & Hyde, 1990). According to Kohlmeyer & Kohlmeyer, (1979), this species appears to be restricted to tropical or subtropical regions. It has already been recorded from Kerala by Prasannarai & Sridhar (2001).

***Halosarpheia minuta*** W.F. Leong in Can. J. Bot. 69: 883 (1991).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 27**

Ascomata perithecial, 240-320 x 192-240  $\mu\text{m}$ , globose or ellipsoidal, solitary, partly or fully immersed, ostiolate, papillate, long axis of ascomata lying parallel to the substratum with a recurved neck. Peridium 16-35  $\mu\text{m}$  thick, multilayered, composed of brown to dark brown, thin-walled cells. Neck hyaline, short or elongate, cylindrical, laterally inserted, with numerous periphyses lining in the ostiolar canal. Asci (42) 59 – 58 x 10-13  $\mu\text{m}$ , cylindrical or clavate-pedunculate, eight-spored, unitunicate, thin-walled, with an apical pore 4-5  $\mu\text{m}$  wide. Ascospores 10-12 (16) x 5-6  $\mu\text{m}$ , fusoid, hyaline, 2-celled, slightly constricted at the septum, thin-walled, with a cap-like appendage, 5-6 x 1  $\mu\text{m}$ , at both poles.

**Materials examined**

- KR TLY A - AVI 62 (42) + *Halosarpheia marina* + *Halocyphina villosa* 27-09-92 - (M)  
KR Mah-A - BRU 90 (42) + *Halocyphina villosa* 03-01-93 - (Pm)  
KR Mah-A - BRU 94 (42) + *Verruculina enalia* 03-01-93 - (Pm)  
KR Val - ACN 100 (42) 11-04-93 - (Pm)  
KR Val - ACN 102 (42) + *Halosarpheia marina* 11-04-93 - (Pm)  
KR Kav - BRU 178 (42) + *Halosarpheia marina* 19-07-93 - (M)  
KR Mah-A - INT 341 (42) + *Marinosphaera mangrovei* + *Dactylospora haliotrepha* 12-08-93 - (M)  
KR Bey - DRW 82 (42) *Marinosphaera mangrovei* 15-08-93 - (M)  
KR TLY C - AVI 226 (42) + *Zalerion maritimum* + *Halocyphina villosa* 22-08-93 - (M)  
KR TLY C - AVI 227 (42) + *Halocyphina villosa* 22-08-93 - (M)  
KR Kav - AVI 249 (42) + *Savoryella lignicola* + *Lignicola laevis* + *Lulworthia* sp. III 30-10-93 - (Pm)  
KR Kav - AVI 251 (42) + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* + *Halocyphina villosa* + *Halosarpheia ratnagiriensis* 30-10-93 - (Pm)  
KR Kav - BRU 226 (42) + *Halocyphina villosa* + *Savoryella paucispora* + *Leptosphaeria australiensis* 30-10-93 - (Pm)  
KR Kav - INT 423 (42) + *Dactylospora haliotrepha* + *Halocyphina villosa* 30-10-93 - (Pm)  
KR Val - ACN 183 (42) + *Lignicola laevis* 05-12-93 - (Pm)  
KR Val - ACN 184 (42) + *Lignicola laevis* 05-12-93 - (Pm)

KR Val - ACN 186 (42) + *Periconia prolifica* 05-12-93 - (Pm)  
KR Val - BRU 230 (42) + *Lulworthia* sp. III + *Halocyphina villosa* 05-12-93 - (Pm)  
KR Val - BRU 233 (42) + *Lignincola laevis* 05-12-93 - (Pm)  
KR Val - INT 453 (42) + *Cirrenalia basiminuta* 05-12-93 - (Pm)  
KR Val - RHI 167 (42) + *Dendryphiella salina* 05-12-93 - (Pm)  
KR Vad - ACN 196 (42) + *Aniptodera chesapeakensis* 26-12-93 - (Pm)  
KR Kav - BRU 278 (42) + *Aniptodera chesapeakensis* 15-04-94 - (Pm)

*Halosarpheia minuta* was first described by Leong *et al.* (1991) based on collections from Singapore and Brunei. Earlier to this, it was recorded as an unnamed species of *Halosarpheia* by Tan, Leong & Jones (1989) and Hyde (1990a). A comparison of the description of *Halosarpheia minuta* by Leong *et al.* (1991) and that of the Kerala collections shows close similarity in almost all features except one. According to Leong *et al.* (1991), the apical pore of the ascus of *H. minuta* is indistinct. In the present collections, a very prominent, 4-5  $\mu\text{m}$  wide apical pore could be seen.

***Halosarpheia ratnagiriensis*** S.D. Patil & Borse in Ind. Bot. Rep.1:102 (1982).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 28**

Ascomata perithecial, 270-867 x 365-586  $\mu\text{m}$ , ellipsoidal, immersed, ostiolate, papillate, coriaceous, hyaline. Peridium 21-26  $\mu\text{m}$  thick, multilayered. Neck 290-840 x 95-148  $\mu\text{m}$ , cylindrical, protruding above the wood, centrally or laterally inserted; ostiolar canal lined with numerous periphyses. Asci 240-285 x 58.5-70  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, unitunicate, thin-walled, but wall

slightly thick at the apical region. Ascospores 55-62.5 x 22.5-27.5 µm, ellipsoidal, uniseptate, slightly constricted at the septum, hyaline, with one large and several small guttules present in each cell, with apical cap-like appendages that run parallelly along the sides of the ascospores, 24-36 x 9-6 µm.

### Materials examined

- KR Mah-A - INT 33 (38) + *Halosarpheia marina* + *Marinosphaera mangrovei* 03-05-92 - (Prm)  
KR Val - RHI 13 (38) + *Halocyphina villosa* 09-08-92 - (M)  
KR Mah-A - INT 104 (38) + *Halocyphina villosa* + *Lignincola laevis* 06-09-92 - (M)  
KR TLY A - RHI 20 (38) + *Halosarpheia marina* 25-10-92 - (Pm)  
KR Edk - RHI 28 (38) + *Cirrenalia pygmaea* 15-11-92 - (Pm)  
KR Edk - RHI 35 (38) + *Cirrenalia fusca* 15-11-92 - (Pm)  
KR TLY A - RHI 37 (38) + *Halosarpheia marina* + *Aigialus mangrovis* 29-11-92 - (Pm)  
KR Mah-A - AVI 107 (38) + *Halocyphina villosa* 03-01-93 - (Pm)  
KR Val - RHI 72 (38) 11-04-93 - (Prm)  
KR Che - BRU 136 (38) + *Halocyphina villosa* 17-04-93 - (Prm)  
KR Che - RHI 77 (38) + *Lignincola laevis* + *Halocyphina villosa* 17-04-93 - (Prm)  
KR Che - RHI 85 (38) + *Verruculina enalia* + *Savoryella lignicola* 17-04-93 - (Prm)  
KR TLY C - AVI 165 (38) + *Halosarpheia abonnis* 09-05-93 - (Prm)  
KR TLY A - RHI 97 (38) + *Verruculina enalia* + *Leptosphaeria australiensis* 09-05-93 - (Prm)  
KR Kad A - AVI 169 (38) + *Halosarpheia marina* 23-05-93 - (Prm)  
KR Che - RHI 145 (38) + *Aigialus parvus* + *Dactylospora haliotrepha* 05-09-93 - (M)  
KR Kav - AVI 251 (38) + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* + *Halocyphina villosa* + *Halosarpheia minuta* 30-10-93 - (Pm)  
KR Kav - INT 422 (38) + *Halocyphina villosa* + *Aigialus grandis* + *Hatorosellinia oceanica* 30-10-93 - (Prm)  
KR Kav - RHI 157 (38) + *Dactylospora haliotrepha* + *Cirrenalia pygmaea* 30-10-93 - (Pm)  
KR Val - INT 455 (38) + *Lignincola laevis* + Unidentified ascomycetes I 05-12-93 - (Pm)  
KR Che - INT 467 (38) + *Leptosphaeria australiensis* + *Halosarpheia marina* 18-12-93 - (Pm)  
KR Che - INT 469 (38) + *Cirrenalia pygmaea* + *Savoryella paucispora* + *Lindra hawaiiensis* 18-12-93 - (Pm)  
KR Che - RHI 180 (38) + *Verruculina enalia* + *Halosarpheia marina* 18-12-93 - (Pm)  
KR TLY B - RHI 193 (38) + *Halosarpheia abonnis* + *Cirrenalia pygmaea* 23-01-94 - (Pm)  
KR Edk - BRU 263 (38) + *Cirrenalia fusca* 06-03-94 - (Prm)  
KR TLY B - RHI 211 (38) + *Lulworthia grandispora* + *Lignincola laevis* 20-03-94 - (Prm)  
KR Kav - INT 543 (38) + *Halocyphina villosa* + *Halosarpheia viscosa* 15-04-94 - (Prm)  
KR Kav - RHI 215 (38) + *Halocyphina villosa* 15-04-94 - (Prm)  
KR Kav - RHI 217 (38) + *Halocyphina villosa* + *Halosarpheia marina* + *Lulworthia grandispora* 15-04-94 - (Prm)  
KR TLY A - RHI 224 (38) + *Halosarpheia abonnis* 17-04-94 - (Prm)

Patil & Borse (1982) first described this species from the Maharashtra coast. Since then, it has been collected by Kohlmeyer (1984), Hyde (1988, 1990), Hyde & Jones (1988), Jones & Hyde (1988), Jones & Kuthubutheen (1989), and Leong *et al.* (1991) from different tropical locations. The Kerala collections agree fully with the description of *H. ratnagiriensis* given by Kohlmeyer & Kohlmeyer (1984).

***Halosarpheia retorquens*** Shearer & J. L. Crane in Bot. Mar. 23: 608 (1980).

Taxonomic Position: Halosphaerales, Halosphaeriaceae

**Fig. 29**

Ascomata perithecial, 165-180 x 155-179  $\mu\text{m}$ , subglobose, fully or partially immersed, solitary, ostiolate, papillate, brownish. Peridium 10-15  $\mu\text{m}$  thick, multilayered, composed of elongate cells with thin walls. Neck 115-135 x 25-45  $\mu\text{m}$ , cylindrical, laterally attached; ostiolar canal lined with numerous periphyses. Asci not observed. Ascospores 22-30 x 7-8  $\mu\text{m}$  (excluding appendages), narrowly ellipsoidal, uniseptate, not constricted at the septum, hyaline, with apical appendages; appendages 15-20  $\mu\text{m}$  long, cap-like at first, becoming ribbon-like when unrolled.

**Materials examined**

- KR TLY A - AVI 20 (39) + *Lindra hawaiiensis* + *Halosarpheia marina* 26-07-92 - (M)
- KR TLY A - BRU 14 (39) + *Halocyphina villosa* 26-07-92 - (M)
- KR TLY B - INT 51 (39) + *Halosarpheia marina* + *Dactylospora haliotrepha* 26-07-92 - (M)
- KR TLY A - AVI 44 (39) + *Savoryella paucispora* + *Halocyphina villosa* 23-08-92 - (M)
- KR TLY A - BRU 38 (39) + *Halocyphina villosa* 23-08-92 - (M)
- KR TLY A - AVI 65 (39) + *Lignincola laevis* 25-10-92 - (Pm)
- KR TLY A - BRU 50 (39) + *Cirrenalia pygmea* + *Halosarpheia marina* 25-10-92 - (Pm)
- KR TLY A - INT 151 (39) + *Halocyphina villosa* + *Dactylospora haliotrepha* 25-10-92 - (Pm)

KR Edk - INT 156 (39) + *Savoryella lignicola* 15-11-92 - (Pm)  
 KR TLY C - AVI 91 (39) + *Savoryella lignicola* + *Cirrenalia basiminuta* + *Periconia prolifica* 29-11-92 - (Pm)  
 KR TLY B - INT 168 (39) + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY A - AVI 110 (39) + *Lulworthia grandispora* + *Zalerion varium* 10-01-93 - (Pm)  
 KR TLY A - BRU 98 (39) + *Halosarpheia marina* + *Zalerion varium* 10-01-93 - (Pm)  
 KR TLY A - INT 208 (39) + *Halosarpheia marina* + *Cirrenalia macrocephala* 10-01-93 - (Pm)  
 KR TLY C - BRU 113 (39) + *Leptosphaeria australiensis* 28-03-93 - (Pm)  
 KR Vad - INT 238 (39) + *Periconia prolifica* + *Aniptodera chesapeakeensis* 04-04-93 - (Pm)  
 KR Vad - INT 241 (39) + *Savoryella paucispora* + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 04-04-93 - (Pm)  
 KR TLY A - BRU 273 (39) + *Halosarpheia marina* + *Trichocladium alopallonellum* 20-03-94 - (Pm)  
 KR TLY B - ACN 111 (39) + *Aniptodera chesapeakeensis* 18-04-93 - (Pm)  
 KR TLY C - AVI 158 (39) + *Savoryella lignicola* + *Halocyphina villosa* 18-04-93 - (Pm)  
 KR TLY C - ACN 129 (39) 20-06-93 - (M)  
 KR TLY A - AVI 174 (39) + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR TLY A - BRU 156 (39) + *Aniptodera chesapeakeensis* + *Leptosphaeria australiensis* 20-06-93 - (M)  
 KR Edk - INT 308 (39) + *Lulworthia grandispora* 11-07-93 - (M)  
 KR TLY C - ACN 139 (39) + *Trichocladium alopallonellum* *Periconia prolifica* 18-07-93 - (M)  
 KR TLY C - ACN 160 (39) + *Cirrenalia pygmaea* 22-08-93 - (M)  
 KR TLY A - AVI 217 (39) + *Halosarpheia marina* + *Lulworthia grandispora* 22-08-93 - (M)  
 KR TLY A - BRU 195 (39) + *Lulworthia grandispora* 22-08-93 - (M)  
 KR TLY B - BRU 200 (39) + *Marinosphaera mangrovei* + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY C - ACN 169 (39) + *Savoryella lignicola* 19-09-93 - (M)  
 KR TLY A - INT 393 (39) + *Halosarpheia marina* + *Marinosphaera mangrovei* 19-09-93 - (M)  
 KR TLY C - RHI 150 (39) + *Lulworthia grandispora* + *Periconia prolifica* 19-09-93 - (M)  
 KR Vad - INT 479 (39) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 26-12-93 - (Pm)  
 KR TLY B - ACN 208 (39) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY B - AVI 291 (39) + *Periconia prolifica* + *Leptosphaeria australiensis* 23-01-94 - (Pm)  
 KR TLY A - RHI 194 (39) + *Lulworthia grandispora* + *Cirrenalia pygmaea* 27-02-94 - (Pm)  
 KR Edk - INT 518 (39) + *Lulworthia grandispora* 06-03-94 - (Pm)  
 KR TLY B - RHI 210 (39) + *Halosarpheia marina* + *Lulworthia grandispora* 20-03-94 - (Pm)  
 KR Kav - AVI 318 (39) + *Halosarpheia marina* + *Halocyphina villosa* 15-04-94 - (Pm)  
 KR Kav - INT 546 (39) + *Marinosphaera mangrovei* + *Cirrenalia macrocephala* 15-04-94 - (Pm)

This species was first described by Shearer & Crane (1980) from Maryland and Illinois in USA. Since then, it is also known from Sri Lanka (Koch, 1982), India (Borse, 1987b), Chile (Shearer & Burgos, 1987); Brunei (Hyde, 1988a); Singapore (Tan, Leong & Jones, 1989), Hawaii (Volkman-Kohlmeyer & Kohlmeyer, 1993) and Hong Kong (Vrijmoed, Hyde & Jones, 1994). No asci were observed in the

present Kerala collections which otherwise agreed well with the descriptions of the species given by Shearer & Crane (1980) and Koch (1982).

***Halosarpheia viscosa*** (I. Schmidt) Shearer & J. L. Crane ex Kohlm. & Volkm.-Kohlm. in Bot. Mar. 34: 22 (1991).

Basionym: *Halosarpheia viscosa* I. Schmidt. in Mycotaxon 24: 420 (1985).

*non Halosarpheia viscosa* I. Schmidt. in Nat. Naturschutz. Mecklenburg 12: 70 (1974) (No type designated).

*nec non Halosarpheia viscosa* (I. Schmidt) Shearer & J. L. Crane. in Bot. Mar. 23: 608 (1980) (Invalid new combination).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

### Fig. 30

Ascomata perithecial, 215-540 x 175-270  $\mu\text{m}$ , globose or subglobose, immersed or partly immersed, ostiolate, papillate, light brown, solitary or gregarious. Peridium 15-(20)-40  $\mu\text{m}$  thick, multilayered, composed of elongate, thick-walled cells. Neck 50-200 x 45-70  $\mu\text{m}$ , straight or curved, cylindrical; ostiolar canal lined with periphyses. Asci 62.5-85 (100) x 12.5-20  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, unitunicate, thin-walled, without any apical pore or apparatus. Ascospores 15-21 x 7.5-10  $\mu\text{m}$  (excluding appendages), ellipsoidal, uniseptate, slightly constricted at the septum, hyaline, with a cap-like terminal or subterminal appendage at both ends.



## Materials examined

- KR TLY C - AVI 114 (34) + *Savoryella lignicola* + *Halocyphina villosa* 10-01-93 - (Pm)  
KR TLY C - ACN 91 (34) + *Aniptodera chesapeakeensis* 28-03-93 - (Prm)  
KR Che - ACN 110 (34) + *Halosarpheia marina* + *Savoryella lignicola* 17-04-93 - (Prm)  
KR TLY B - ACN 114 (34) + *Halosarpheia marina* 18-04-93 - (Prm)  
KR TLY B - BRU 144 (34) + *Lulworthia grandispora* + *Dactylospora haliotrepha* 18-04-93 - (Prm)  
KR TLY C - ACN 121 (34) + 09-05-93 Prm  
KR TLY C - RHI 102 (34) + *Halosarpheia marina* 09-05-93 - (Prm)  
KR TLY C - AVI 179 (34) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Bathyasacus tropicalis* 20-06-93 - (M)  
KR Kav - ACN 142 (34) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 19-07-93 - (M)  
KR Kav - ACN 144 (34) + *Lindra hawaiiensis* 19-07-93 - (M)  
KR Kav - AVI 203 (34) + *Halocyphina villosa* 19-07-93 - (M)  
KR TLY C - RHI 102 (34) + *Halosarpheia marina* 05-09-93 - (Prm)  
KR Kav - RHI 131 (34) + *Halocyphina villosa* + *Lulworthia grandispora* 19-07-93 - (M)  
KR TLY B - ACN 157 (34) + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
KR TLY C - ACN 161 (34) + *Halosarpheia marina* 22-08-93 - (M)  
KR TLY B - AVI 220 (34) + *Halosarpheia marina* + *Halocyphina villosa* 22-08-93 - (M)  
KR Che - INT 369 (34) + *Marinosphaera mangrovei* + *Periconia prolifica* 05-09-93 - (M)  
KR TLY C - ACN 171 (34) 19-09-93 - (M)  
KR TLY C - AVI 241 (34) + *Verruculina enalia* + *Halocyphina villosa* 19-09-93 - (M)  
KR TLY C - AVI 242 (34) + *Halocyphina villosa* 19-09-93 - (M)  
KR TLY C - BRU 214 (34) + *Leptosphaeria australiensis* + *Halocyphina villosa* 19-09-93 - (M)  
KR TLY A - INT 391 (34) + *Halocyphina villosa* 19-09-93 - (M)  
KR TLY A - BRU 218 (34) + *Marinosphaera mangrovei* + *Cirrenalia pygmea* 17-10-93 - (Pm)  
KR TLY A - RHI 153 (34) + *Cirrenalia pygmea* + *Marinosphaera mangrovei* 17-10-93 - (Pm)  
KR TLY A - BRU 227 (34) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 21-11-93 - (Pm)  
KR Che - INT 460 (34) + *Marinosphaera mangrovei* + *Lulworthia grandispora* 18-12-93 - (Pm)  
KR Che - RHI 181 (34) + *Marinosphaera mangrovei* + *Savoryella lignicola* 18-12-93 - (Pm)  
KR TLY B - ACN 212 (34) + *Savoryella lignicola* 23-01-94 - (Pm)  
KR TLY B - INT 511 (34) + *Halosarpheia marina* + *Halocyphina villosa* 23-01-94 - (Pm)  
KR TLY B - ACN 219 (34) + *Halosarpheia marina* + *Zalerion varium* 20-03-94 - (Prm)  
KR TLY B - AVI 308 (34) + *Halosarpheia marina* + *Periconia prolifica* + *Marinosphaera mangrovei* 20-03-94 - (Prm)  
KR TLY B - BRU 275 (34) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 20-03-94 - (Prm)  
KR Kav - ACN 226 (34) + *Halosarpheia marina* + *Lindra hawaiiensis* 15-04-94 - (Prm)  
KR Kav - ACN 227 (34) + *Halosarpheia viscosa* 15-04-94 - (Prm)  
KR Kav - INT 543 (34) + *Halocyphina villosa* + *Halosarpheia ratmagiriensis* 15-04-94 - (Prm)

This species has a slightly complicated nomenclatural history. It was first described as *Halosarpheia viscosa* by Schmidt (1974), but as he failed to

designate a type for this species, the name became invalid. Later it was described as *Halosphaeria viscosa* by the same author (Schmidt, 1985). Shearer & Crane (1980) tried to validate *Halosarpheia viscosa* but the result was the invalid new combination *Halosarpheia viscosa* (l. Schmidt) Shearer & Crane. Finally, it was Kohlmeyer & Volkmann-Kohlmeyer (1991a) who validated the currently accepted name of this species. It has been known from United States (Shearer & Crane, 1980), India (Patil & Borse, 1982), Australia (Kohlmeyer & Volkmann-Kohlmeyer, 1991b), Hawaii and Fiji (Volkmann-Kohlmeyer & Kohlmeyer, 1993), Chile (Shearer & Burgos, 1987), Seychelles (Hyde & Jones, 1988), Brunei (Hyde, 1988a) and Philippines (Jones & Hyde, 1990). The present collections are exactly similar to the collections described by Shearer & Crane (1980).

***Halosphaeria cucullata*** (Kohlm.) Kohlm. in Can. J. Bot. 50: 1956 (1972).

*Remispora cucullata* Kohlm. in Mycologia 56: 770 (1964).

Conidial state: *Periconia prolifica*. Anastasiou in Nova Hewig. 6: 260 (1961).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 31**

Ascomata perithecial, 230-260 x 160-220  $\mu\text{m}$ , subglobose or globose, immersed, ostiolate, papillate, brown to dark brown, solitary. Neck 370-540 x 20-42  $\mu\text{m}$ , long and cylindrical. Peridium 12.5-15  $\mu\text{m}$ , multilayered. Asci 32.5-87.5 x 15-20  $\mu\text{m}$ , 8-spored, clavate-pedunculate, unitunicate, thin-walled, without an apical apparatus, early deliquescing and releasing ascospores in the venter. Ascospores 20-54 x 6-

8 (11)  $\mu\text{m}$ , cylindrical, uniseptate, hyaline, slightly constricted at the septum.

Appendages not observed.

### Materials examined

KR Bey - SBI 10 (43) 02-10-92 - (Pm)

KR Azi - SBI 18 (43) + *Antennospora quadricornuta* + *Lulworthia grandispora* 20-12-92 - (Pm)

KR Dha-A - DRW 56 (43) + *Lignicola laevis* 18-04-93 - (Pm)

KR Bek - INT 558 (43) + *Antennospora quadricornuta* 24-07-94 - (M)

The Kerala collections differ from the collections described by Kohlmeyer & Kohlmeyer (1979) in having much longer papillae of the perithecia and in the absence of polar appendages of ascospores. Polar appendages in this species are deciduous structures and ascospores of this fungus have often been recorded without appendages (e.g., Borse, 1987a). *Halosphaeria cucullata* is known from tropical and subtropical waters of all the three oceanic regions of the world. The first record of this species from India was by Raghukumar (1973).

***Halorosellinia oceanica*** (Schatz) Whalley, A.J.S., E.B.G. Jones, K.D. Hyde & T. Laessoe. – Mycol. Res. 104(3) 368-374 (2000).

*Hypoxylon oceanicum* Schatz, Mycotaxon. 33: 413 (1988).

Pseudostromata 1.5-2.5 mm diam., subglobose, partially immersed, black; solitary or in groups. Ascomata 380-450  $\mu\text{m}$  diam., subglobose ostiolate, papillate. Peridium 30-40  $\mu\text{m}$  thick, with dark brown or black coloured thick-walled cells. Paraphyses 2-2.5  $\mu\text{m}$  diam., persistent, rarely septate. Asci 142-198 x 15-23  $\mu\text{m}$ , eight-spored, cylindrical, unitunicate, with an apical ring. Ascospores 17.5-25 x 8-

13.5 µm brown, one-celled, subglobose or more or less ellipsoid with rounded ends, with a conspicuous germ slit on the ventral side. No appendages noticed.

### Material examined

KR Mah-A - AVI 8 (48) + *Halosarpheia marina* 03-05-92 (Prm)  
KR Val - ACN 29 (48) + *Halosarpheia marina* 09-08-92 (M)  
KR Val - AVI 37 (48) + *Halocyphina villosa* 09-08-92 (M)  
KR Val - INT 65 (48) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 09-08-92 (M)  
KR Val - RHI 10 (48) + *Dactylospora haliotrepha* + *Aniptodera chesapeakeensis* 09-08-92 (M)  
KR Mah-A - BRU 43 (48) + *Halocyphina villosa* 06-09-92 (M)  
KR Mah-A - INT 103 (48) + *Halosarpheia marina* + *Halosarpheia abonnis* 06-09-92 (M)  
KR Bey - DRW 19 (48) + *Halosarpheia marina* 02-10-92 (Pm)  
KR Azi - DRW 20 (48) + *Lulworthia grandispora* 20-12-92 (Pm)  
KR Azi - INT 178 (48) + *Halosarpheia marina* + *Didymosphaeria enalia* + *Halosphaeria quadricornuta* 20-12-92 (Pm)  
KR Mah-A - AVI 103 (48) + *Halocyphina villosa* + *Marinosphaeria mangrovei* 03-01-93 (Prm)  
KR Mah-A - BRU 89 (48) + *Savoryella lignicola* + *Halocyphina villosa* 03-01-93 (Pm)  
KR Azi - DRW 40 (48) + *Halocyphina villosa* 13-02-93 (Prm)  
KR Azi - SBI 31 (48) + *Cirrenalia pygmea* 13-02-93 (Prm)  
KR Bey - DRW 52 (48) 28-02-93 (Prm)  
KR Val - AVI 137 (48) + *Halosarpheia marina* + *Trichocladium alopallonellum* 11-04-93 (Prm)  
KR Val - AVI 142 (48) + *Zalarion varium* + *Halosarpheia marina* 11-04-93 (Prm)  
KR Che - AVI 144 (48) + *Halosarpheia marina* + *Cirrenalia pygmea* 17-04-93 (Prm)  
KR Che - AVI 151 (48) + *Halosarpheia marina* + *Savoryella lignicola* 17-04-93 (Prm)  
KR Azi - DRW 76 (48) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 17-07-93 (M)  
KR Kav - AVI 200 (48) + *Leptosphaeria australiensis* 19-07-93 (M)  
KR Mah-A - BRU 188 (48) + *Dactylospora haliotrepha* 12-08-93 (M)  
KR Mah-A - INT 343 (48) + *Halocyphina villosa* 12-08-93 (M)  
KR Che - RHI 144 (48) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 05-09-93 (M)  
KR Bek - DRW 103 (48) + *Halosarpheia marina* 03-10-93 (Pm)  
KR Kav - INT 422 (48) + *Halocyphina villosa* + *Aigialus grandis* + *Halosarpheia ratnagiriensis* 30-10-93 (Prm)  
KR Che - RHI 170 (48) + *Halosarpheia marina* + *Cirrenalia pygmea* + *Aigialus parvus* 18-12-93 (Pm)  
KR Kad A - AVI 286 (48) + *Savoryella lignicola* + *Lulworthia grandispora* 16-01-94 (Pm)  
KR Kav - INT 541 (48) + *Dactylospora haliotrepha* 15-04-94 (Prm)

The first report about this fungus was by Aleem (1980) as *Rosellinia* sp. It was Schatz (1988) who assigned it to *Hypoxylon*. Ju & Rogers (1996) reviewed the taxonomic position of this fungus and reported its uncertain taxonomy position.

Later, a critical comparative study with lignicolous *Anthostomella* species and other closely related genera lead to the erection of a new genus *Halorosellinia*, to accommodate *Hypoxylon oceanicum* by Whalley *et al.* (2000). It is one of the most widely distributed marine fungi known from several parts of the world (Schatz, 1988; Hyde & Jones, 1988; Jones & Hyde, 1990; Prasannarai and Sridhar, 2000).

### ***Koralionastes* sp.**

Taxonomic Position: Koralionastetaceae (inc. sed.)

#### **Fig. 33**

Ascomata perithecial, 470-600 x 360-400  $\mu\text{m}$ , ellipsoidal, dark brown, partially immersed or superficial, ostiolate, papillate. Neck 180-200 x 190-250  $\mu\text{m}$ , straight or slightly curved, light brown or brown; ostiolar canal lined with periphyses. Peridium 28-35  $\mu\text{m}$ , multilayered with dark brown outer layers and light brown inner layers, composed of polygonal cells. Paraphyses 130-165 (180) x 2-4  $\mu\text{m}$ , simple, septate, hyaline. Asci 200-230 x 7-10  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, thin-walled, unitunicate. Ascospores 27-34 x 6-9  $\mu\text{m}$ , uniseriate, ellipsoidal, initially aseptate, becoming septate with up to eight transverse septa, thick-walled, smooth, not constricted at the septa, hyaline.

#### **Material examined**

KR Bek - INT 225 (10A) + *Antennospora quadricornuta* 14-02-93 - (Prm)

Three species of a new genus, *Koralionastes* were reported by Kohlmeyer & Volkmann-Kohlmeyer, 1987b) from coral reefs off the coast of Belize, Central America, occurring on coral slabs. This new genus was assigned to a new family Koralionastetaceae, of uncertain taxonomic position and was assigned to Ascomycota. A similar fungus was obtained during the present study from a wood substrate with calcareous covering collected from shoreline waters of Bekkel. The ascomata obtained were, partly immersed or superficial on wood substratum and were dark brown. The morphology of the ascomata, asci ascospores, and paraphyses are almost similar to those described by Kohlmeyer & Kohlmeyer (l.c.), but the size of the ascospores are much smaller than those of the previously reported species. Even then, the number of the transverse septa and mode of septation are similar. Therefore, this newly obtained fungus can be referred to the genus *Koralionastes*, but not to any previously reported species due to its smaller sized sporocarps. The three previously reported species were obtained from coral slabs, while the Kerala collection was isolated from an intertidal wood wedged on rocks covered with some calcareous material. This is the first record of this genus from India.

***Leptosphaeria australiensis*** (Cribb & J. W. Cribb) G. C. Hughes in Syesis  
2: 132 (1969).

*Metasphaeria australiensis* Cribb & J. W. Cribb in Univ. Queensl. Pap. Dep. Bot.  
3: 79 (1955).

Taxonomic Position: Dothideales, Leptosphaeriaceae

### Fig. 34

Ascomata perithecial, (140) 180-230 x 160-200  $\mu\text{m}$ , obpyriform, immersed, ostiolate, light brown, solitary. Peridium 15-20  $\mu\text{m}$ , multilayered, composed of thin-walled, light yellow coloured, elongate cells. Neck 180-230 x 50-60  $\mu\text{m}$  at the base and 30-40  $\mu\text{m}$  at the apex, cylindrical, light brown or hyaline; ostiolar canal filled with numerous periphyses. Pseudoparaphyses present, 1-1.5  $\mu\text{m}$  diam., septate, persistent. Asci 80-107.5 x 10-20  $\mu\text{m}$ , eight-spored, clavate-pedunculate, bitunicate, thick-walled, with pad-like apical apparatus, developing from the base of the ascoma venter. Ascospores (18) 20-25 x (6) 7-9  $\mu\text{m}$ , biseriate, ellipsoidal or fusiform, triseptate, constricted at septa, hyaline.

### Materials examined

- KR Kad A - AVI 4 (52) + *Marinosphaera mangrovei* 19-04-92 - (Prm)
- KR Mah-A - BRU 7 (52) + *Marinosphaera mangrovei* 03-05-92 - (Prm)
- KR Mah-A - BRU 8 (52) + *Zalerion maritimum* 03-05-92 - (Prm)
- KR Mah-A - INT 27 (52) + *Aniptodera chesapeakeensis* 03-05-92 - (Prm)
- KR Mah-A - INT 32 (52) + *Savoryella lignicola* + *Halosarpheia marina* 03-05-92 - (Prm)
- KR TLY B - BRU 19 (52) + *Halosarpheia marina* 26-07-92 - (M)
- KR Vad - AVI 29 (52) + *Halocyphina villosa* 02-08-92 - (M)
- KR Val - INT 67 (52) + *Lignicola laevis* + *Lulworthia grandispora* 09-08-92 - (M)
- KR Mah-A - AVI 51 (52) + *Marinosphaera mangrovei* 06-09-92 - (M)
- KR Mah-A - BRU 40 (52) + *Halocyphina villosa* 06-09-92 - (M)
- KR Mah-A - INT 105 (52) + *Marinosphaera mangrovei* + *Lulworthia* sp. I 06-09-92 - (M)
- KR Kad A - AVI 56 (52) + *Periconia prolifica* 13-09-92 - (M)
- KR Kad A - INT 128 (52) + *Lulworthia* sp. V + *Periconia prolifica* 13-09-92 - (M)
- KR Bey - DRW 14 (52) + *Savoryella lignicola* 02-10-92 - (Pm)
- KR Bey - INT 138 (52) + *Halocyphina villosa* 02-10-92 - (Pm)
- KR TLY A - AVI 63 (52) + *Halosarpheia marina* + *Halocyphina villosa* 25-10-92 - (Pm)
- KR TLY A - BRU 53 (52) + *Lulworthia* sp. III 25-10-92 - (Pm)
- KR TLY C - RHI 23 (52) 25-10-92 - (Pm)
- KR TLY C - RHI 24 (52) + *Aigialus parvus* 25-10-92 - (Pm)
- KR TLY C - RHI 25 (52) 25-10-92 - (Pm)
- KR Edk - AVI 74 (52) + *Cirrenalia macrocephala* 15-11-92 - (Pm)

KR Edk - INT 155 (52) + *Periconia prolifica* 15-11-92 - (Pm)  
 KR Edk - RHI 30 (52) + *Periconia prolifica* 15-11-92 - (Pm)  
 KR TLY A - AVI 83 (52) + *Halosarpheia marina* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY A - BRU 70 (52) + *Cirrenalia pygmaea* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY A - BRU 72 (52) + *Aigialus mangrovis* + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
 KR TLY A - INT 163 (52) + *Aniptodera chesapeakeensis* + *Periconia prolifica* + *Zalerion varium* 29-11-92 - (Pm)  
 KR TLY A - RHI 40 (52) + *Aigialus parvus* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY A - AVI 94 (52) + *Halosarpheia marina* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY A - BRU 80 (52) + *Halosarpheia marina* + *Aniptodera longispora* + *Marinosphaera mangrovei* 27-12-92 - (Pm)  
 KR TLY C - RHI 49 (52) + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR Mah-A - AVI 104 (52) + *Halosarpheia marina* 03-01-93 - (Pm)  
 KR Mah-A - AVI 105 (52) + *Savoryella lignicola* 03-01-93 - (Pm)  
 KR Mah-A - INT 193 (52) + *Cirrenalia pygmaea* + *Lindra hawaiiensis* 03-01-93 - (Pm)  
 KR TLY C - RHI 55 (52) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 10-01-93 - (Pm)  
 KR Bey - INT 233 (52) 28-02-93 - (Pm)  
 KR TLY C - BRU 113 (52) + *Halosarpheia retorquens* 28-03-93 - (Pm)  
 KR TLY C - RHI 66 (52) + *Lignincola tropica* 28-03-93 - (Pm)  
 KR Vad - INT 245 (52) + *Marinosphaera mangrovei* + *Aniptodera* sp. II 04-04-93 - (Pm)  
 KR Val - INT 247 (52) + *Verruculina enalia* 11-04-93 - (Pm)  
 KR Che - RHI 83 (52) + *Cirrenalia pygmaea* + *Halocyphina villosa* 17-04-93 - (Pm)  
 KR Dha-A - DRW 57 (52) 18-04-93 - (Pm)  
 KR Dha-A - INT 273 (52) + *Halosarpheia marina* 18-04-93 - (Pm)  
 KR Tik - INT 291 (52) 25-04-93 - (Pm)  
 KR TLY A - AVI 163 (52) + *Savoryella lignicola* + *Marinosphaera mangrovei* 09-05-93 - (Pm)  
 KR TLY A - BRU 150 (52) + *Marinosphaera mangrovei* + *Lignincola laevis* 09-05-93 - (Pm)  
 KR TLY A - RHI 97 (52) + *Verruculina enalia* + *Halosarpheia retorquens* 09-05-93 - (Pm)  
 KR Kad A - INT 298 (52) + *Halosarpheia marina* 23-05-93 - (Pm)  
 KR TLY A - AVI 176 (52) + *Marinosphaera mangrovei* 20-06-93 - (M)  
 KR TLY A - BRU 156 (52) + *Aniptodera chesapeakeensis* + *Halosarpheia retorquens* 20-06-93 - (M)  
 KR TLY A - BRU 157 (52) + *Lulworthia* sp. I 20-06-93 - (M)  
 KR TLY C - BRU 159 (52) + *Halosarpheia marina* + *Periconia prolifica* 20-06-93 - (M)  
 KR TLY A - INT 303 (52) + *Marinosphaera mangrovei* 20-06-93 - (M)  
 KR TLY A - RHI 104 (52) + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR Edk - AVI 182 (52) + *Aniptodera chesapeakeensis* 11-07-93 - (M)  
 KR TLY C - BRU 177 (52) + *Aigialus parvus* 18-07-93 - (M)  
 KR Kav - AVI 200 (52) + *Halorosellinia oceanica* 19-07-93 - (M)  
 KR Kav - RHI 128 (52) + *Cirrenalia basiminuta* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR Bey - DRW 84 (52) 15-08-93 - (M)  
 KR TLY C - BRU 204 (52) + *Halosarpheia marina* 22-08-93 - (M)  
 KR Che - INT 373 (52) + *Savoryella lignicola* + *Halocyphina villosa* 05-09-93 - (M)  
 KR TLY C - BRU 214 (52) + *Halocyphina villosa* + *Halosarpheia viscosa* 19-09-93 - (M)  
 KR TLY A - RHI 151 (52) + *Halosarpheia marina* + *Lulworthia grandispora* + *Marinosphaera mangrovei* 19-09-93 - (M)



KR TLY A - AVI 246 (52) + *Periconia prolifica* 17-10-93 - (Pm)  
 KR TLY A - BRU 219 (52) + *Halocyphina villosa* 17-10-93 - (Pm)  
 KR TLY A - INT 419 (52) + *Dactylospora haliotrepha* 17-10-93 - (Pm)  
 KR TLY A - RHI 155 (52) + *Marinosphaera mangrovei* 17-10-93 - (Pm)  
 KR Kav - AVI 250 (52) + *Verruculina enalia* + *Halocyphina villosa* 30-10-93 - (Pm)  
 KR Kav - BRU 225 (52) + *Dactylospora haliotrepha* + *Savoryella lignicola* + *Lignicola laevis* 30-10-93 - (Pm)  
 KR Kav - BRU 226 (52) + *Halocyphina villosa* + *Savoryella paucispora* + *Halosarpheia minuta* 30-10-93 - (Pm)  
 KR TLY A - AVI 253 (52) + *Aniptodera* sp. II + *Halosarpheia marina* 21-11-93 - (Pm)  
 KR TLY A - RHI 161 (52) + *Halocyphina villosa* + *Aigialus grandis* 21-11-93 - (Pm)  
 KR Val - AVI 256 (52) + *Halocyphina villosa* + *Lindra hawaiiensis* 05-12-93 - (Pm)  
 KR Val - AVI 260 (52) + *Halocyphina villosa* + *Lindra hawaiiensis* 05-12-93 - (Pm)  
 KR Che - INT 467 (52) + *Halosarpheia ratnagiriensis* + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che - RHI 172 (52) + *Halosarpheia marina* + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Vad - AVI 276 (52) + *Halosarpheia marina* 26-12-93 - (Pm)  
 KR Vad - BRU 250 (52) + *Halocyphina villosa* 26-12-93 - (Pm)  
 KR Kad A - AVI 284 (52) + *Halocyphina villosa* 16-01-94 - (Pm)  
 KR Kad A - INT 497 (52) + *Halocyphina villosa* 16-01-94 - (Pm)  
 KR TLY A - AVI 287 (52) + *Marinosphaera mangrovei* 23-01-94 - (Pm)  
 KR TLY B - AVI 291 (52) + *Periconia prolifica* + *Halosarpheia retorquens* 23-01-94 - (Pm)  
 KR TLY A - RHI 185 (52) 23-01-94 - (Pm)  
 KR TLY B - RHI 190 (52) + *Halocyphina villosa* + *Halosarpheia marina* + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
 KR TLY B - RHI 192 (52) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 23-01-94 - (Pm)  
 KR TLY A - AVI 295 (52) + *Marinosphaera mangrovei* 27-02-94 - (Prm)  
 KR TLY A - BRU 260 (52) + *Lulworthia grandispora* 27-02-94 - (Prm)  
 KR TLY A - BRU 261 (52) + *Lignicola laevis* 27-02-94 - (Prm)  
 KR Edk - AVI 301 (52) + *Zalerion varium* + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR Edk - INT 524 (52) + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR TLY B - INT 534 (52) + *Halocyphina villosa* + *Marinosphaera mangrovei* 20-03-94 - (Prm)  
 KR TLY A - RHI 207 (52) + *Marinosphaera mangrovei* 20-03-94 - (Prm)  
 KR Kav - AVI 320 (52) + *Lulworthia grandispora* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - INT 540 (52) + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - RHI 214 (52) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 15-04-94 - (Prm)

*Leptosphaeria australiensis* is a widely distributed warm-water marine fungus first recorded from Australia (Cribb & Cribb, 1955). According to Kohlmeyer & Kohlmeyer (1979), it is known from different subtropical and tropical parts of both Atlantic and Pacific oceans. After that, there had been several reports on the occurrence of this species from different parts of Indian Ocean (Patil & Borse,

1985a; Hyde, 1988a; Hyde & Jones, 1988; Jones, Uyenko & Follosco, 1988 and Jones & Kuthubutheen, 1989). The description of the Kerala collections agrees closely with the description of *L. australiensis* given by Kohlmeyer & Kohlmeyer (1979).

***Lignincola laevis*** Hohnk in Veroeff Inst. Meeresforsch. Bremerhaven 3: 216 (1955).

Taxonomic Position: Halosphaerales, Halosphaeriaceae

**Fig. 35**

Ascomata perithecial, 250-350 x 150-300  $\mu\text{m}$ , subglobose or ellipsoidal, ostiolate, papillate, light brown or blackish brown, solitary. Peridium 10-20  $\mu\text{m}$ , multilayered, composed of thick-walled, brown-coloured, elongate cells. Neck 120-260 x 25-80  $\mu\text{m}$ , cylindrical, straight and projecting above the substratum. Asci 40-70 (75) x 10-15 (17.5)  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, persistent, unitunicate, thin-walled, slightly thickened at the subapical region; mature asci along with ascospores detaching from a cushion-shaped mass of cells at the base of the venter and released through the ostiole. Ascospores 17-24 x 5-7 (8)  $\mu\text{m}$ , ellipsoidal, uniseptate with unequal cells, with a single globule in each cell, smooth, slightly constricted at the septum, without appendages.

**Materials examined**

KR Kad A - ACN 1 (54) + *Lulworthia* sp. I 19-04-92 - (Prm)

KR Kad A - ACN 4 (54) + *Lulworthia* sp. I 19-04-92 - (Prm)

KR Kad A - INT 4 (54) + *Verruculina enalia* + *Savoryella lignicola* 19-04-92 - (Prm)

KR Ppd - INT 26 (54) + *Savoryella lignicola* 19-04-92 - (Prm)

KR Mah-A - ACN 8 (54) + *Halosarpheia marina* 03-05-92 - (Prm)

KR Mah-A - ACN 10 (54) 03-05-92 - (Prm)  
 KR Val - INT 67 (54) + *Leptosphaeria australiensis* + *Lulworthia grandispora* 09-08-92 - (M)  
 KR Dha-A - DRW 8 (54) + *Zalerion varium* 23-08-92 - (M)  
 KR Mah-A - ACN 34 (54) + *Marinosphaera mangrovei* 06-09-92 - (M)  
 KR Mah-A - INT 104 (54) + *Halocyphina villosa* + *Halosarpheia ratnagiriensis* 06-09-92 - (M)  
 KR Kad A - INT 124 (54) + *Lulworthia* sp. I + *Halocyphina villosa* 13-09-92 - (M)  
 KR TLY A - AVI 59 (54) + *Savoryella paucispora* + *Halosarpheia marina* 27-09-92 - (M)  
 KR TLY A - BRU 47 (54) + *Halosarpheia marina* 27-09-92 - (M)  
 KR TLY A - INT 131 (54) + *Halosarpheia marina* + *Halocyphina villosa* 27-09-92 - (M)  
 KR Bey - DRW 16 (54) 02-10-92 - (Pm)  
 KR TLY A - AVI 65 (54) + *Halosarpheia retorquens* + *Cirrenalia macrocephala* 25-10-92 - (Pm)  
 KR TLY A - BRU 54 (54) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 25-10-92 - (Pm)  
 KR TLY C - BRU 56 (54) + *Halocyphina villosa* + *Periconia prolifica* 25-10-92 - (Pm)  
 KR Edk - ACN 51 (54) + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - BRU 68 (54) + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR TLY B - AVI 89 (54) + *Halocyphina villosa* + *Lulworthia* sp. III 29-11-92 - (Pm)  
 KR TLY C - RHI 44 (54) + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR Azi - DRW 23 (54) + *Halocyphina villosa* 20-12-92 - (Pm)  
 KR Azi - INT 174 (54) + *Halosarpheia marina* + *Halocyphina villosa* + *Savoryella lignicola* 20-12-92 - (Pm)  
 KR TLY A - AVI 95 (54) + *Cirrenalia pygmaea* + *Marinosphaera mangrovei* 27-12-92 - (Pm)  
 KR TLY A - BRU 81 (54) + *Halosarpheia marina* + *Lulworthia* sp. I + *Cirrenalia pygmaea* 27-12-92 - (Pm)  
 KR TLY A - INT 180 (54) + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR Mah-A - ACN 71 (54) + *Lindra hawaiiensis* 03-01-93 - (Pm)  
 KR Mah-A - BRU 95 (54) + *Halocyphina villosa* + *Savoryella lignicola* 03-01-93 - (Pm)  
 KR Azi - DRW 39 (54) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 13-02-93 - (Pm)  
 KR Azi - DRW 44 (54) + *Halocyphina villosa* + *Halosarpheia marina* 13-02-93 - (Pm)  
 KR TLY C - ACN 87 (54) + *Periconia prolifica* 21-02-93 - (Pm)  
 KR TLY A - AVI 129 (54) + *Verruculina enalia* + *Lulworthia grandispora* 28-03-93 - (Pm)  
 KR TLY A - BRU 114 (54) + *Dactylospora haliotrepha* + *Lulworthia grandispora* 28-03-93 - (Pm)  
 KR TLY A - BRU 117 (54) + *Savoryella lignicola* + *Halosarpheia marina* + *Lulworthia grandispora* 28-03-93 - (Pm)  
 KR Vad - ACN 92 (54) 04-04-93 - (Pm)  
 KR Val - BRU 126 (54) + *Savoryella lignicola* 11-04-93 - (Pm)  
 KR Val - BRU 127 (54) + *Savoryella lignicola* 11-04-93 - (Pm)  
 KR Val - BRU 128 (54) + *Savoryella lignicola* 11-04-93 - (Pm)  
 KR Val - INT 250 (54) + *Verruculina enalia* 11-04-93 - (Pm)  
 KR Che - ACN 106 (54) + *Halosarpheia marina* 17-04-93 - (Pm)  
 KR Che - RHI 77 (54) + *Halosarpheia ratnagiriensis* + *Halocyphina villosa* 17-04-93 - (Pm)  
 KR TLY B - ACN 112 (54) + *Aniptodera chesapeakeensis* 18-04-93 - (Pm)  
 KR TLY B - AVI 157 (54) + *Periconia prolifica* 18-04-93 - (Pm)  
 KR TLY C - AVI 160 (54) + *Halosarpheia marina* + *Halocyphina villosa* + *Halosarpheia abonnis* 18-04-93 - (Pm)  
 KR TLY B - BRU 143 (54) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 18-04-93 - (Pm)  
 KR Dha-A - DRW 56 (54) + *Halosphaeria cucullata* 18-04-93 - (Pm)

KR Tik - DRW 67 (54) + *Verruculina enalia* 25-04-93 - (Prm)  
 KR TLY C - ACN 119 (54) 09-05-93 - (Prm)  
 KR TLY C - ACN 120 (54) + *Trichocladium alopallonellum* 09-05-93 - (Prm)  
 \* KR TLY A - AVI 161 (54) + *Verruculina enalia* + Unidentified ascomycete VIII 09-05-93 - (Prm)  
 KR TLY A - BRU 150 (54) + *Marinosphaera mangrovei* + *Leptosphaeria australiensis* 09-05-93 - (Prm)  
 KR TLY A - INT 294 (54) + *Cirrenalia basiminuta* 09-05-93 - (Prm)  
 KR Kad A - ACN 125 (54) + *Halosarpheia marina* 23-05-93 - (Prm)  
 KR Kad A - ACN 126 (54) + *Cirrenalia fusca* 23-05-93 - (Prm)  
 KR TLY C - AVI 177 (54) + *Halosarpheia marina* + *Verruculina enalia* 20-06-93 - (M)  
 KR Edk - ACN 134 (54) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Edk - RHI 116 (54) + *Verruculina enalia* 11-07-93 - (M)  
 KR TLY A - AVI 190 (54) + *Halocyphina villosa* 18-07-93 - (M)  
 KR TLY A - AVI 192 (54) + *Halosarpheia marina* 18-07-93 - (M)  
 KR TLY C - AVI 196 (54) + *Halocyphina villosa* 18-07-93 - (M)  
 KR TLY A - BRU 171 (54) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 18-07-93 - (M)  
 KR Kav - AVI 205 (54) + *Halosarpheia marina* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - RHI 127 (54) + *Halocyphina villosa* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Mah-A - ACN 149 (54) + *Aniptodera chesapeakeensis* 12-08-93 - (M)  
 KR Mah-A - AVI 208 (54) + *Halosarpheia marina* 12-08-93 - (M)  
 KR Mah-A - AVI 211 (54) + *Cirrenalia pygmea* 12-08-93 - (M)  
 KR Mah-A - INT 342 (54) + *Halocyphina villosa* 12-08-93 - (M)  
 KR Bey - DRW 85 (54) + *Halosarpheia marina* 15-08-93 - (M)  
 KR Che - ACN 163 (54) + *Periconia prolifica* + *Savoryella lignicola* 05-09-93 - (M)  
 KR Che - ACN 165 (54) 05-09-93 - (M)  
 KR Che - AVI 231 (54) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che - INT 365 (54) + *Cirrenalia macrocephala* 05-09-93 - (M)  
 KR Tik - INT 388 (54) + *Aniptodera chesapeakeensis* 18-09-93 - (M)  
 KR TLY A - AVI 237 (54) + *Halosarpheia marina* 19-09-93 - (M)  
 KR TLY A - INT 395 (54) + *Halocyphina villosa* 19-09-93 - (M)  
 KR Ppd - DRW 94 (54) + *Cirrenalia pygmea* 26-09-93 - (M)  
 KR TLY A - AVI 245 (54) + *Marinosphaera mangrovei* 17-10-93 - (Pm)  
 KR Kav - ACN 175 (54) + + *Aniptodera chesapeakeensis* 30-10-93 - (Pm)  
 KR Kav - ACN 176 (54) + *Savoryella paucispora* + *Lindra hawaiiensis* + *Cirrenalia pygmea* 30-10-93 - (Pm)  
 KR Kav - ACN 178 (54) + *Aniptodera chesapeakeensis* + *Lindra hawaiiensis* 30-10-93 - (Pm)  
 KR Kav - AVI 249 (54) + *Savoryella lignicola* + *Lulworthia* sp. III + *Halosarpheia minuta* 30-10-93 - (Pm)  
 KR Kav - BRU 224 (54) + *Halocyphina villosa* + *Savoryella lignicola* + *Cladosporium* sp. 30-10-93 - (Pm)  
 KR Kav - BRU 225 (54) + *Dactylospora haliotrepha* + *Savoryella lignicola* + *Leptosphaeria australiensis* 30-10-93 - (Pm)  
 KR Kav - INT 425 (54) + + *Cirrenalia pygmea* 30-10-93 - (Pm)  
 KR TLY A - AVI 254 (54) + *Halocyphina villosa* + *Halosarpheia marina* 21-11-93 - (Pm)  
 KR Val - ACN 183 (54) + *Halosarpheia minuta* 05-12-93 - (Pm)  
 KR Val - ACN 184 (54) + *Halosarpheia minuta* 05-12-93 - (Pm)  
 KR Val - BRU 233 (54) + *Halosarpheia minuta* 05-12-93 - (Pm)

KR Val - INT 455 (54) + *Halosarpheia ratnagiriensis* + Unidentified ascomycetes III 05-12-93 - (Pm)  
 KR Che - ACN 187 (54) 18-12-93 - (Pm)  
 KR Che - AVI 262 (54) + *Halocyphina villosa* + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che - BRU 238 (54) + *Marinosphaera mangrovei* + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che - INT 465 (54) + *Lulworthia grandispora* + *Marinosphaera mangrovei* + *Aigialus parvus* 18-12-93 - (Pm)  
 KR Che - RHI 177 (54) + *Lindra hawaiiensis* + *Savoryella paucispora* 18-12-93 - (Pm)  
 KR Vad - ACN 195 (54) + *Aniptodera chesapeakeensis* 26-12-93 - (Pm)  
 KR Vad - ACN 199 (54) 26-12-93 - (Pm)  
 KR Dha-A - INT 485 (54) *Savoryella* sp. II 27-12-93 - (Pm)  
 KR Kad A - ACN 202 (54) + *Periconia prolifica* 16-01-94 - (Pm)  
 KR Kad A - ACN 206 (54) + *Periconia prolifica* 16-01-94 - (Pm)  
 KR Kad A - AVI 283 (54) + *Halocyphina villosa* + *Verruculina enalia* 16-01-94 - (Pm)  
 KR Kad A - INT 493 (54) + *Marinosphaera mangrovei* 16-01-94 - (Pm)  
 KR TLY B - AVI 292 (54) + *Halocyphina villosa* + *Halosphaeria hamata* 23-01-94 - (Pm)  
 KR TLY A - BRU 257 (54) + *Halosarpheia marina* + *Lulworthia grandispora* 23-01-94 - (Pm)  
 KR TLY B - INT 512 (54) + *Halosarpheia marina* + *Halocyphina villosa* 23-01-94 - (Pm)  
 KR TLY B - RHI 188 (54) + *Halocyphina villosa* + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY A - BRU 259 (54) + *Marinosphaera mangrovei* 27-02-94 - (Pm)  
 KR TLY A - BRU 261 (54) + *Leptosphaeria australiensis* 27-02-94 - (Pm)  
 KR Edk - ACN 215 (54) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 06-03-94 - (Pm)  
 KR Edk - INT 520 (54) + *Halocyphina villosa* 06-03-94 - (Pm)  
 KR TLY B - INT 532 (54) + *Halosarpheia marina* + *Lulworthia* sp. III + *Marinosphaera mangrovei* 20-03-94 - (Pm)  
 KR TLY B - RHI 209 (54) + *Halosarpheia marina* 20-03-94 - (Pm)  
 KR TLY B - RHI 211 (54) + *Halosarpheia ratnagiriensis* + *Lulworthia grandispora* 20-03-94 - (Pm)  
 KR Kav - ACN 223 (54) + *Aniptodera chesapeakeensis* + *Lignincola laevis* 15-04-94 - (Pm)  
 KR Kav - AVI 319 (54) + *Savoryella lignicola* + *Lindra hawaiiensis* 15-04-94 - (Pm)  
 KR Kav - RHI 212 (54) + *Halocyphina villosa* + *Dactylospora haliotrepha* + *Verruculina enalia* 15-04-94 - (Pm)  
 KR Kav - RHI 221 (54) + *Cirrenalia basiminuta* + *Lulworthia grandispora* 15-04-94 - (Pm)  
 KR TLY A - AVI 323 (54) + *Lulworthia grandispora* + *Cirrenalia pygmea* 17-04-94 - (Pm)  
 KR TLY A - BRU 287 (54) + *Zalerion maritimum* 17-04-94 - (Pm)  
 KR TLY A - AVI 326 (54) + *Verruculina enalia* + *Savoryella lignicola* 15-05-94 - (Pm)  
 KR TLY A - BRU 290 (54) + *Halosarpheia marina* + *Savoryella lignicola* 15-05-94 - (Pm)

*Lignincola laevis* is a cosmopolitan species known from both temperate and tropical waters of all the three major oceanic regions (Kohlmeyer & Kohlmeyer, 1979). From India, this fungus was first reported by Raghukumar (1973). Later Patil and Borse (1983a) recorded it from Maharashtra coast. Other places from where it has been reported include Japan (Tubaki, 1968, 1969; Tubaki & Ito,

1973), Hong Kong and Macau (Vrijmoed, Hyde & Jones (1994), Fiji (Volkmann-Kohlmeyer & Kohlmeyer, 1993), Mexico (Hyde, 1992d), Malaysia (Jones & Kuthubutheen, 1989) Singapore (Leong, Tan & Jones, 1991), Chile (Shearer & Burgos, 1987), Seychelles (Hyde & Jones, 1988) and Brunei (Hyde, 1988a). Kohlmeyer & Kohlmeyer (1979) observed a swelling of the central part of the ascus when released in water and this could be clearly seen in the Kerala collections as well.

***Lignincola longirostris*** (Cribb & J. W. Cribb) Kohlm. in Mar. Ecol. (P.S.Z.N.I) 5:353 (1984).

*Gnomonia longirostris* Cribb et J. W. Cribb in Univ. Queensl. Pap. Dep. Bot. 3: 101(1950).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 36**

Ascomata perithecial, 240-440 x 175-400  $\mu\text{m}$ , subglobose or ellipsoidal, partly immersed or superficial, ostiolate, papillate, solitary. Peridium (15) 20-25  $\mu\text{m}$ , multilayered, composed of large, thick-walled cells. Neck 120-260 x 25-80  $\mu\text{m}$ . Asci 30-50 x 10-12.5  $\mu\text{m}$ , eight-spored, clavate or fusiform, short-pedunculate, unitunicate, thin-walled, slightly thickened at the apex, with an apical pore. Ascospores 13-16(18) x 5-6 (8)  $\mu\text{m}$ , irregularly biseriate, septate, bicelled, ellipsoidal, hyaline, without appendages.

## Materials examined

KR Vad - ACN 23 (55) + *Cirrenalia macrocephala* 02-08-92 - (M)

KR TLY A - AVI 60 (55) + *Halocyphina villosa* + *Cirrenalia pygmaea* 27-09-92 - (M)

KR TLY A - BRU 46 (55) + *Halocyphina villosa* + *Savoryella lignicola* 27-09-92 - (M)

KR TLY C - RHI 94 (55) + *Aigialus grandis* + *Savoryella paucispora* 18-04-93 - (Prm)

KR Edk - ACN 136 (55) + *Savoryella lignicola* 11-07-93 - (M)

This species was first described by Cribb & Cribb (1956) as *Gnomonia longirostris*. Later Kohlmeyer (1984) showed that it was not showing asci with apical rings, a characteristic feature of *Gnomonia* and instead was showing a refractive ascal apex with a distinct pore, a diagnostic character of *Lignicola* and hence transferred it to the latter genus. It is a widely distributed marine fungus with records from Japan (Tubaki, 1969), India (Patil & Borse, 1985a), Singapore (Tan, Leong & Jones, 1989), Malaysia (Jones & Kuthubutheen, 1989), Brunei (Hyde, 1990a), Australia (Kohlmeyer & Volkmann-Kohlmeyer, 1991b), Hawaii (Volkmann-Kohlmeyer & Kohlmeyer, 1993) and Macau & Hong Kong (Vrijmoed, Hyde & Jones, 1994).

***Lignicola tropica*** Kohlm. in Mar. Ecol. (P.S.Z.N.I) 5(4): 355 (1984).

Taxonomic Position: Halosphaerales, Halosphaeriaceae

### Fig. 37

Ascomata perithecial, 150-300 x 250-350  $\mu\text{m}$ , globose to ellipsoidal, fully or partly immersed, ostiolate, papillate, coriaceous, brown, solitary. Peridium 25-45  $\mu\text{m}$  thick, multilayered, with thick-walled, dark brown outer cells and thin-walled, light brown to hyaline inner cells. Neck, 100-500 x 80-120  $\mu\text{m}$ , cylindrical, straight or

curved; ostiolar canal lined with numerous periphyses. Asci 90-127.5 x 23-30  $\mu\text{m}$ , eight-spored, clavate, pedunculate, unitunicate, thin-walled, slightly thickened at the apex with a pore. Ascospores, 27-32 x 11-13 $\mu\text{m}$ , fusiform, uniseptate, rarely aseptate, slightly or not constricted at the septum, thin-walled, without appendages.

### Materials examined

KR Bey - DRW 17 (56) + *Savoryella paucispora* 02-10-92 - (Pm)

KR Bey - INT 234 (56) 28-02-93 - (Pm)

KR TLY C - RHI 66 (56) + *Leptosphaeria australiensis* 28-03-93 - (Pm)

KR Edk - RHI 117 (56) + *Cirrenalia pygmaea* 11-07-93 - (M)

KR TLY A - AVI 294 (56) + *Aniptodera chesapeakensis* + *Lulworthia* sp. 1 27-02-94 - (Pm)

KR Edk - BRU 266 (56) + *Lulworthia* sp. 1 06-03-94 - (Pm)

Kohlmeyer (1984) first described this species from coastal waters of Mexico. Since then, it has been recorded from Belize (Kohlmeyer & Volkmann-Kohlmeyer, 1987), Brunei (Hyde, 1988a), India (Borse, 1988), Malaysia (Jones & Kuthubutheen, 1989) and Hong Kong and Macau (Vrijmoed, Hyde & Jones, 1994). The features of the Kerala collections are similar to those of *L. tropica* described by Kohlmeyer (1984). It is distinguished from other species of *Lignincola* mainly based on its larger ascospore diameter.

***Lindra hawaiiensis*** Kohlm. & Volkm.-Kohlm. in Can. J. Bot. 65: 574 (1987)

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

### Fig. 38

Ascomata perithecial, 120-150 x 150-260  $\mu\text{m}$ , globose, cylindrical or subcylindrical, dark brown, immersed, ostiolate, papillate. Neck 140-470 x 40-20



µm, tapering towards apex. Peridium 25-37.5 µm thick. Paraphyses absent, Asci: 112.5-165 x 7.5-10µm, eight-spored, elongate, cylindrical, unitunicate, thin-walled, early deliquescing. Ascospores 107.5-185 x 2.5-3 µm, filamentous, curved, hyaline, uniform in thickness, without apical chambers; spore apices rounded.

### Materials examined

KR TLY A - AVI 20 (61) + *Halosarpheia marina* + *Halosarpheia retorquens* 26-07-92 - (M)  
KR TLY B - AVI 25 (61) + *Aniptodera chesapeakensis* + *Halosarpheia marina* 26-07-92 - (M)  
KR TLY B - BRU 17 (61) + *Halocyphina villosa* + *Dactylospora haliotrepha* 26-07-92 - (M)  
KR Mah-A - ACN 35 (61) 06-09-92 - (M)  
KR TLY B - AVI 89 (62)+ *Halocyphina villosa* + *Lignincola laevis* 29-11-92 - (Pm)  
KR Mah-A - INT 106 (61) + *Periconia prolifica* + *Halosarpheia marina* 06-09-92 - (M)  
KR Mah-A - ACN 71 (61) + *Lignincola laevis* 03-01-93 - (Pm)  
KR Mah-A - ACN 77 (61) + *Aniptodera chesapeakensis* 03-01-93 - (Pm)  
KR Mah-A - INT 193 (61) + *Cirrenalia pygmea* + *Leptosphaeria australiensis* 03-01-93 - (Pm)  
KR TLY C - AVI 125 (61) + *Cirrenalia pygmea* + *Marinosphaera mangrovei* 28-03-93 - (Pm)  
KR Val - ACN 99 (61) 11-04-93 - (Pm)  
KR Val - ACN 101 (61) + *Halosarpheia marina* 11-04-93 - (Pm)  
KR Val - RHI 69 (61) + *Aigialus parvus* 11-04-93 - (Pm)  
KR Val - RHI 70 (61) + *Aigialus parvus* 11-04-93 - (Pm)  
KR Val - RHI 75 (61) + *Halosarpheia marina* 11-04-93 - (Pm)  
KR Val - RHI 76 (61) + *Halosarpheia marina* 11-04-93 - (Pm)  
KR Che - ACN 107 (61) + *Aniptodera chesapeakensis* 17-04-93 - (Pm)  
KR Che - RHI 81 (61) + *Dactylospora haliotrepha* 17-04-93 - (Pm)  
KR TLY C - BRU 145 (61) + *Marinosphaera mangrovei* 18-04-93 - (Pm)  
KR TLY C - BRU 146 (61) + *Halosphaeria hamata* 18-04-93 - (Pm)  
KR Dha-A - DRW 58 (61) + *Savoryella lignicola* 18-04-93 - (Pm)  
KR TLY C - RHI 93 (61) + *Marinosphaera mangrovei* 18-04-93 - (Pm)  
KR TLY A - AVI 161 (61) + *Verruculina enalia* + *Lignincola laevis* 09-05-93 - (Pm)  
KR TLY A - AVI 175 (61) + *Halocyphina villosa* 20-06-93 - (M)  
KR TLY C - BRU 161 (61) + *Halosarpheia marina* + *Aniptodera chesapeakensis* + *Halocyphina villosa* 20-06-93 - (M)  
KR Kav - ACN 141 (61) + *Aniptodera chesapeakensis* + *Periconia prolifica* 19-07-93 - (M)  
KR Kav - ACN 144 (61) + *Halosarpheia viscosa* 19-07-93 - (M)  
KR Kav - ACN 145 (61) + *Aniptodera chesapeakensis* + *Halosarpheia marina* 19-07-93 - (M)  
KR Kav - AVI 198 (61) + *Aniptodera chesapeakensis* + *Aigialus parvus* 19-07-93 - (M)  
KR Kav - BRU 181 (61) + *Cirrenalia pygmea* 19-07-93 - (M)  
KR Che - INT 329 (61) + *Halocyphina villosa* 19-07-93 - (M)  
KR TLY A - AVI 216 (61) + *Halocyphina villosa* + *Aniptodera chesapeakensis* 22-08-93 - (M)

KR TLY A - AVI 218 (61) + *Aniptodera salsuginosa* + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY A - BRU 197 (61) + *Halosarpheia marina* 22-08-93 - (M)  
 KR Che - AVI 232 (61) + *Savoryella lignicola* + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che - INT 367 (61) + *Aniptodera chesapeakeensis* 05-09-93 - (M)  
 KR Kav - ACN 176 (61) + *Lignincola laevis* + *Savoryella paucispora* + *Cirrenalia pygmea* 30-10-93 - (Pm)  
 KR Kav - ACN 178 (61) + *Aniptodera chesapeakeensis* + *Lignincola laevis* 30-10-93 - (Pm)  
 KR Val - AVI 256 (61) + *Leptosphaeria australiensis* + *Halocyphina villosa* 05-12-93 - (Pm)  
 KR Val - AVI 260 (61) + *Halocyphina villosa* + *Leptosphaeria australiensis* 05-12-93 - (Pm)  
 KR Che - INT 469 (61) + *Halosarpheia ratnagiriensis* + *Cirrenalia pygmea* + *Savoryella paucispora* 18-12-93 - (Pm)  
 KR Che - RHI 177 (61) + *Savoryella paucispora* + *Lignincola laevis* 18-12-93 - (Pm)  
 KR TLY A - INT 472 (61) + *Halosarpheia marina* 19-12-93 - (Pm)  
 KR TLY A - AVI 288 (61) + *Halosarpheia marina* + *Savoryella lignicola* 23-01-94 - (Pm)  
 KR Kav - ACN 224 (61) + *Aniptodera chesapeakeensis* + *Periconia prolifica* 15-04-94 - (Prm)  
 KR Kav - ACN 226 (61) + *Halosarpheia marina* + *Halosarpheia viscosa* 15-04-94 - (Prm)  
 KR Kav - AVI 319 (61) + *Savoryella lignicola* + *Lignincola laevis* 15-04-94 - (Prm)  
 KR Kav - INT 542 (61) + *Verruculina enalia* + *Aniptodera chesapeakeensis* 15-04-94 - (Prm)

Kohlmeyer & Volkmann-Kohlmeyer's (1991a) key leads straight to *Lindra hawaiiensis*. This species was first described by Kohlmeyer & Volkmann-Kohlmeyer (1987c) from the Hawaiian Islands. When mounted in seawater, the ascospores of the Kerala collections looked aseptate but when stained, some faint, obliquely placed or irregular septations could be seen. This is the first record of this fungus from India.

***Lulworthia grandispora*** Meyers in Mycologia 49: 513 (1957).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 39**

Ascomata perithecial, 220-300 x 115-270  $\mu$ m, globose or subglobose, immersed or superficial, ostiolate, long-necked, brown or blackish brown, solitary or gregarious. Neck 137.5-400 x 25-45  $\mu$ m, cylindrical, straight or curved, sometimes

with two necks on one ascoma. Peridium 20-50  $\mu\text{m}$  thick. Paraphyses absent. Asci 470-690 (700) x (8) 10-13  $\mu\text{m}$ , eight-spored, elongate, fusiform or cylindrical, unitunicate, thin-walled, early deliquescing. Ascospores 540-680 (700) x 3-4  $\mu\text{m}$  (including apical chambers), filamentous, curved, hyaline, tapering at each end into an elongate conical apical chamber (3-10 x 3-4  $\mu\text{m}$ ) filled with a gelatinous material that is released through an apical or lateral pore.

### Materials examined

KR Kad A - ACN 5 (59) + *Lulworthia* sp. 1 19-04-92 - (Prm)  
KR Kad A - ACN 6 (59) 19-04-92 - (Prm)  
KR Kad A - AVI 3 (59) + *Halosarpheia marina* 19-04-92 - (Prm)  
KR Kad A - INT 2 (59) + *Halosarpheia marina* + *Cirrenalia pygmea* 19-04-92 - (Prm)  
KR Ppd - INT 20 (59) 19-04-92 - (Prm)  
KR Mah-A - AVI 7 (59) + *Halosarpheia marina* 03-05-92 - (Prm)  
KR Mah-A - AVI 9 (59) + *Cirrenalia pygmea* 03-05-92 - (Prm)  
KR Mah-A - AVI 11 (59) + *Halosarpheia marina* 03-05-92 - (Prm)  
KR Mah-A - AVI 12 (59) + *Cirrenalia pygmea* 03-05-92 - (Prm)  
KR Mah-A - BRU 5 (59) + *Marinosphaera mangrovei* 03-05-92 - (Prm)  
KR Mah-A - BRU 6 (59) 03-05-92 - (Prm)  
KR Mah-A - INT 30 (59) + *Halosarpheia abonnis* 03-05-92 - (Prm)  
KR TLY A - INT 44 (59) + *Cirrenalia pygmea* + *Halocyphina villosa* 21-06-92 - (M)  
KR TLY A - AVI 19 (59) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 26-07-92 - (M)  
KR TLY A - BRU 13 (59) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 26-07-92 - (M)  
KR TLY A - INT 50 (59) + *Halosarpheia marina* + *Halocyphina villosa* 26-07-92 - (M)  
KR TLY B - INT 52 (59) + *Dactylospora haliotrepha* 26-07-92 - (M)  
KR TLY B - INT 54 (59) + *Periconia prolifica* 26-07-92 - (M)  
KR TLY A - RHI 5 (59) + *Halosarpheia marina* + *Halocyphina villosa* 26-07-92 - (M)  
KR TLY A - RHI 6 (59) + *Halosarpheia marina* + *Halocyphina villosa* 26-07-92 - (M)  
KR TLY B - RHI 7 (59) + *Aigialus grandis* + *Halocyphina villosa* + *Halosarpheia marina* 26-07-92 - (M)  
KR TLY B - RHI 9 (59) + *Dactylospora haliotrepha* + *Halosarpheia marina* + *Halocyphina villosa* 26-07-92 - (M)  
KR Val - AVI 40 (59) + *Halosarpheia marina* + *Marinosphaera mangrovei* 09-08-92 - (M)  
KR Val - INT 67 (59) + *Leptosphaeria australiensis* + *Lignincola laevis* 09-08-92 - (M)  
KR Dha-A - DRW 7 (59) + *Aniptodera chesapeakeensis* 23-08-92 - (M)  
KR TLY A - INT 76 (59) + *Halocyphina villosa* + *Marinosphaera mangrovei* 23-08-92 - (M)  
KR Dha-A - INT 79 (59) 23-08-92 - (M)  
KR Dha-A - INT 80 (59) 23-08-92 - (M)

KR Mah-A - INT 109 (59) + *Periconia prolifica* + *Halosarpheia marina* 06-09-92 - (M)  
 KR Mah-A - INT 110 (59) + *Aniptodera chesapeakeensis* 06-09-92 - (M)  
 KR Kad A - INT 123 (59) + *Marinosphaera mangrovei* + *Halosarpheia marina* + *Halocyphina villosa* 13-09-92 - (M)  
 KR TLY A - INT 130 (59) + *Halosarpheia marina* + *Savoryella paucispora* 27-09-92 - (M)  
 KR TLY A - RHI 18 (59) + *Halocyphina villosa* + *Marinosphaera mangrovei* 27-09-92 - (M)  
 KR Bey - INT 132 (59) 02-10-92 - (Pm)  
 KR Bey - INT 133 (59) + *Antennospora quadricornuta* 02-10-92 - (Pm)  
 KR TLY A - AVI 67 (59) + *Dactylospora haliotrepha* + *Marinosphaera mangrovei* 25-10-92 - (Pm)  
 KR TLY C - AVI 70 (59) + *Cirrenalia pygmaea* 25-10-92 - (Pm)  
 KR TLY C - AVI 72 (59) + *Cirrenalia pygmaea* + *Aniptodera chesapeakeensis* 25-10-92 - (Pm)  
 KR TLY A - BRU 52 (59) + *Aniptodera chesapeakeensis* + *Verruculina enalia* 25-10-92 - (Pm)  
 KR TLY A - INT 149 (59) + *Halocyphina villosa* + *Marinosphaera mangrovei* + *Dactylospora haliotrepha* 25-10-92 - (Pm)  
 KR TLY A - INT 150 (59) + *Halocyphina villosa* + *Verruculina enalia* 25-10-92 - (Pm)  
 KR TLY A - INT 152 (59) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Verruculina enalia* 25-10-92 - (Pm)  
 KR TLY A - RHI 19 (59) + *Halocyphina villosa* 25-10-92 - (Pm)  
 KR Edk - AVI 78 (59) + *Periconia prolifica* 15-11-92 - (Pm)  
 KR Edk - AVI 79 (59) 15-11-92 - (Pm)  
 KR Edk - BRU 60 (59) + *Periconia prolifica* + *Marinosphaera mangrovei* 15-11-92 - (Pm)  
 KR Edk - BRU 63 (59) + *Marinosphaera mangrovei* 15-11-92 - (Pm)  
 KR Edk - BRU 66 (59) + *Savoryella lignicola* 15-11-92 - (Pm)  
 KR Edk - INT 157 (59) + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - RHI 32 (59) + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - RHI 36 (59) + *Halosarpheia marina* + *Halocyphina villosa* 15-11-92 - (Pm)  
 KR TLY A - AVI 83 (59) + *Halosarpheia marina* + *Leptosphaeria australiensis* 29-11-92 - (Pm)  
 KR TLY B - AVI 88 (59) + *Halocyphina villosa* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY B - AVI 90 (59) + *Halosphaeria hamata* + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
 KR TLY A - BRU 69 (59) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY A - INT 162 (59) + *Halosarpheia marina* + *Cirrenalia pygmaea* 29-11-92 - (Pm)  
 KR TLY A - INT 164 (59) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Periconia prolifica* 29-11-92 - (Pm)  
 KR TLY A - RHI 38 (59) + *Halosarpheia abonnis* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY A - RHI 39 (59) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY A - RHI 40 (59) + *Aigialus parvus* + *Leptosphaeria australiensis* 29-11-92 - (Pm)  
 KR Azi - DRW 20 (59) + *Halorosellinia oceanica* 20-12-92 - (Pm)  
 KR Azi - DRW 26 (59) + *Arenariomyces trifurcatus* 20-12-92 - (Pm)  
 KR Azi - INT 170 (59) + *Halocyphina villosa* + *Savoryella paucispora* 20-12-92 - (Pm)  
 KR Azi - INT 172 (59) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 20-12-92 - (Pm)  
 KR Azi - INT 176 (59) + *Periconia prolifica* + *Antennospora quadricornuta* 20-12-92 - (Pm)  
 KR Azi - INT 179 (59) + *Dactylospora haliotrepha* 20-12-92 - (Pm)  
 KR Azi - SBI 15 (59) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 20-12-92 - (Pm)  
 KR Azi - SBI 18 (59) + *Antennospora quadricornuta* + *Halosphaeria cucullata* 20-12-92 - (Pm)  
 KR TLY A - ACN 68 (59) + *Aniptodera chesapeakeensis* 27-12-92 - (Pm)  
 KR TLY C - AVI 98 (59) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* + *Halocyphina villosa* 27-12-92 - (Pm)

KR TLY C - AVI 100 (59) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY C - BRU 85 (59) + *Periconia prolifica* + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR TLY C - BRU 87 (59) + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR Dha-B - INT 183 (59) + *Marinosphaera mangrovei* 27-12-92 - (Pm)  
 KR Dha-B - INT 188 (59) + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR TLY C - RHI 51 (59) + *Phoma* sp. + *Zalerion maritimum* 27-12-92 - (Pm)  
 KR TLY C - RHI 52 (59) + *Halosarpheia marina* + *Cirrenalia basiminuta* + *Phoma* sp. 27-12-92 - (Pm)  
 KR TLY C - RHI 53 (59) + *Halosarpheia marina* + *Zalerion maritimum* 27-12-92 - (Pm)  
 KR Mah-A - BRU 88 (59) + *Savoryella lignicola* + *Halocyphina villosa* 03-01-93 - (Pm)  
 KR Mah-A - BRU 91 (59) + *Halocyphina villosa* 03-01-93 - (Pm)  
 KR Mah-A - BRU 92 (59) + *Halocyphina villosa* 03-01-93 - (Pm)  
 KR Mah-A - BRU 93 (59) 03-01-93 - (Pm)  
 KR Mah-A - INT 190 (59) + *Trichocladium alopallonellum* 03-01-93 - (Pm)  
 KR Mah-A - INT 195 (59) + *Halosarpheia marina* + *Savoryella paucispora* 03-01-93 - (Pm)  
 KR TLY A - AVI 111 (59) + *Aigialus parvus* + *Salsuginea ramicola* 10-01-93 - (Pm)  
 KR TLY A - AVI 112 (59) + *Marinosphaera mangrovei* 10-01-93 - (Pm)  
 KR TLY C - AVI 113 (59) + *Halosarpheia marina* + *Halocyphina villosa* 10-01-93 - (Pm)  
 KR TLY C - AVI 116 (76) + *Halocyphina villosa* 10-01-93 - (Pm)  
 KR TLY A - BRU 96 (59) + *Verruculina enalia* + *Savoryella lignicola* 10-01-93 - (Pm)  
 KR TLY C - BRU 100 (59) + *Halocyphina villosa* + *Cirrenalia pygmea* 10-01-93 - (Pm)  
 KR TLY C - BRU 102 (59) + *Halocyphina villosa* + *Cirrenalia pygmea* + *Periconia prolifica* 10-01-93 - (Pm)  
 KR TLY A - RHI 54 (59) + *Aigialus parvus* 10-01-93 - (Pm)  
 KR TLY C - RHI 56 (59) + *Aniptodera chesapeakeensis* + *Manglicola* sp. 10-01-93 - (Pm)  
 KR TLY C - RHI 57 (59) + *Marinosphaera mangrovei* + *Dactylospora haliotrepha* + *Halocyphina villosa* 10-01-93 - (Pm)  
 KR Ppd - INT 210 (59) 31-01-93 - (Pm)  
 KR Ppd - INT 213 (59) + *Antennospora quadricornuta* 31-01-93 - (Pm)  
 KR Azi - DRW 34 (59) + *Marinosphaera mangrovei* 13-02-93 - (Pm)  
 KR Azi - DRW 37 (59) + *Halocyphina villosa* + *Halosarpheia marina* 13-02-93 - (Pm)  
 KR Azi - DRW 43 (59) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 13-02-93 - (Pm)  
 KR Azi - INT 217 (59) + *Arenariomyces trifurcatus* 13-02-93 - (Pm)  
 KR Bek - INT 227 (59) 14-02-93 - (Pm)  
 KR TLY A - AVI 117 (59) 21-02-93 - (Pm)  
 KR TLY A - AVI 118 (59) + *Marinosphaera mangrovei* + *Zalerion* sp. 21-02-93 - (Pm)  
 KR TLY A - BRU 105 (59) + *Aniptodera chesapeakeensis* 21-02-93 - (Pm)  
 KR TLY A - BRU 106 (59) + *Marinosphaera mangrovei* 21-02-93 - (Pm)  
 KR TLY C - BRU 108 (59) + *Biatrispora marina* + *Halosarpheia marina* 21-02-93 - (Pm)  
 KR TLY A - RHI 60 (59) 21-02-93 - (Pm)  
 KR TLY C - RHI 61 (59) + *Cirrenalia macrocephala* 21-02-93 - (Pm)  
 KR Bey - DRW 51 (59) 28-02-93 - (Pm)  
 KR Bey SBI 39 (59) 28-02-93 - (Pm)  
 KR TLY A - AVI 127 (59) + *Dactylospora haliotrepha* + *Savoryella lignicola* 28-03-93 - (Pm)  
 KR TLY A - AVI 128 (59) + *Marinosphaera mangrovei* 28-03-93 - (Pm)

KR TLY A - AVI 129 (59) + *Verruculina enalia* + *Lignincola laevis* 28-03-93 - (Prm)  
 KR TLY C - BRU 111 (59) + *Marinosphaera mangrovei* + *Periconia prolifica* 28-03-93 - (Prm)  
 KR TLY A - BRU 114 (59) + *Dactylospora haliotrepha* + *Lignincola laevis* 28-03-93 - (Prm)  
 KR TLY A - BRU 115 (59) + *Halosarpheia marina* + *Marinosphaera mangrovei* 28-03-93 - (Prm)  
 KR TLY A - BRU 117 (59) + *Savoryella lignicola* + *Halosarpheia marina* + *Lignincola laevis* 28-03-93 - (Prm)  
 KR TLY C - RHI 64 (59) + *Halocyphina villosa* 28-03-93 - (Prm)  
 KR TLY C - RHI 67 (59) + *Dactylospora haliotrepha* 28-03-93 - (Prm)  
 KR Val - INT 248 (59) + *Halosarpheia marina* + *Trichocladium alopallonellum* 11-04-93 - (Prm)  
 KR Val - INT 252 (59) + *Halosarpheia marina* 11-04-93 - (Prm)  
 KR Val - RHI 71 (59) + *Aigialus mangrovis* 11-04-93 - (Prm)  
 KR Val - RHI 73 (59) + *Halosarpheia marina* 11-04-93 - (Prm)  
 KR Che - AVI 143 (59) + *Halosarpheia marina* + *Marinosphaera mangrovei* 17-04-93 - (Prm)  
 KR Che - AVI 146 (59) + *Halosarpheia marina* + *Savoryella lignicola* 17-04-93 - (Prm)  
 KR Che - AVI 147 (59) + *Marinosphaera mangrovei* + *Savoryella lignicola* 17-04-93 - (Prm)  
 KR Che - AVI 149 (59) + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR Che - INT 256 (59) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmea* 17-04-93 - (Prm)  
 KR Che - INT 259 (59) + *Dactylospora haliotrepha* 17-04-93 - (Prm)  
 KR Che - RHI 80 (59) + *Verruculina enalia* 17-04-93 - (Prm)  
 KR TLY A - AVI 153 (59) + *Biatrispora marina* + *Aniptodera chesapeakeensis* 18-04-93 - (Prm)  
 KR TLY A - AVI 155 (59) + *Aniptodera chesapeakeensis* 18-04-93 - (Prm)  
 KR TLY A - BRU 140 (59) + *Dactylospora haliotrepha* 18-04-93 - (Prm)  
 KR TLY B - BRU 144 (59) + *Dactylospora haliotrepha* + *Halosarpheia viscosa* 18-04-93 - (Prm)  
 KR TLY A - INT 261 (59) + *Aniptodera chesapeakeensis* + *Zalerion varium* 18-04-93 - (Prm)  
 KR TLY A - INT 263 (59) + *Zalerion maritimum* + *Trichocladium alopallonellum* 18-04-93 - (Prm)  
 KR TLY A - INT 264 (59) + *Zalerion maritimum* + *Phialophorophoma litoralis* 18-04-93 - (Prm)  
 KR TLY B - INT 267 (59) + *Halosarpheia marina* 18-04-93 - (Prm)  
 KR Dha-A - INT 269 (59) + *Cirrenalia fusca* 18-04-93 - (Prm)  
 KR TLY A - RHI 86 (59) + *Verruculina enalia* + *Dactylospora haliotrepha* 18-04-93 - (Prm)  
 KR TLY A - RHI 87 (59) + *Verruculina enalia* + *Aigialus parvus* 18-04-93 - (Prm)  
 KR TLY B - RHI 90 (59) + *Dactylospora haliotrepha* + *Halosarpheia marina* 18-04-93 - (Prm)  
 KR Tik - INT 285 (59) + *Halosarpheia marina* 25-04-93 - (Prm)  
 KR Tik SBI 50 (59) 25-04-93 - (Prm)  
 KR Tik SBI 54 (59) 25-04-93 - (Prm)  
 KR TLY C - AVI 164 (59) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Halocyphina villosa* 09-05-93 - (Prm)  
 KR TLY C - AVI 166 (59) + *Halosarpheia marina* + *Zalerion varium* 09-05-93 - (Prm)  
 KR TLY C - RHI 99 (59) + *Halosarpheia marina* 09-05-93 - (Prm)  
 KR TLY C - RHI 100 (59) + *Halosarpheia abonnis* 09-05-93 - (Prm)  
 KR Kad A - AVI 170 (59) + *Marinosphaera mangrovei* 23-05-93 - (Prm)  
 KR Kad A - AVI 171 (59) + *Savoryella lignicola* 23-05-93 - (Prm)  
 KR Kad A - INT 297 (59) + *Halocyphina villosa* + *Cirrenalia pygmea* 23-05-93 - (Prm)  
 KR TLY C - AVI 180 (59) + *Halocyphina villosa* 20-06-93 - (M)  
 KR TLY C - RHI 108 (59) + *Halocyphina villosa* 20-06-93 - (M)

KR Edk - AVI 181 (59) + *Aniptodera chesapeakeensis* 11-07-93 - (M)  
 KR Edk - AVI 183 (59) + *Halocyphina villosa* 11-07-93 - (M)  
 KR Edk - AVI 188 (59) 11-07-93 - (M)  
 KR Edk - INT 306 (59) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Edk - INT 308 (59) + *Halosarpheia retorquens* 11-07-93 - (M)  
 KR Edk - RHI 112 (59) + *Aniptodera chesapeakeensis* 11-07-93 - (M)  
 KR Azi - INT 318 (59) + *Savoryella lignicola* 17-07-93 - (M)  
 KR Azi - SBI 55 (59) + *Corollospora filiformis* 17-07-93 - (M)  
 KR Azi - SBI 58 (59) 17-07-93 - (M)  
 KR Che - INT 330 (59) + *Halosarpheia marina* + *Savoryella lignicola* 19-07-93 - (M)  
 KR Kav - RHI 131 (59) + *Halocyphina villosa* + *Halosarpheia viscosa* 19-07-93 - (M)  
 KR Mah-A - BRU 191 (59) + *Halocyphina villosa* 12-08-93 - (M)  
 KR Mah-A - BRU 192 (59) + *Halosarpheia marina* 12-08-93 - (M)  
 KR Mah-A - INT 336 (59) + *Periconia prolifica* 12-08-93 - (M)  
 KR Mah-A - INT 344 (59) + *Halosarpheia marina* + *Marinosphaera mangrovei* 12-08-93 - (M)  
 KR Bey - INT 347 (59) + *Antennospora quadricornuta* 15-08-93 - (M)  
 KR TLY A - AVI 217 (59) + *Halosarpheia marina* + *Halosarpheia retorquens* 22-08-93 - (M)  
 KR TLY B - AVI 223 (59) + *Cirrenalia basiminuta* 22-08-93 - (M)  
 KR TLY A - BRU 195 (59) + *Halosarpheia retorquens* 22-08-93 - (M)  
 KR TLY B - BRU 201 (59) + *Periconia prolifica* + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY C - BRU 202 (59) + *Halocyphina villosa* + *Savoryella lignicola* 22-08-93 - (M)  
 KR TLY A - INT 354 (59) + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY A - RHI 134 (59) + *Halocyphina villosa* 22-08-93 - (M)  
 KR Che - AVI 233 (59) + *Halocyphina villosa* 05-09-93 - (M)  
 KR Che - AVI 234 (59) + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che - INT 366 (59) + *Cirrenalia pygmea* 05-09-93 - (M)  
 KR Mah-B - INT 380 (59) + *Marinosphaera mangrovei* + *Aniptodera chesapeakeensis* 12-09-93 - (M)  
 KR Tik - DRW 87 (59) + *Savoryella lignicola* 18-09-93 - (M)  
 KR Tik - SBI 63 (59) 18-09-93 - (M)  
 KR TLY A - INT 392 (59) + *Lulworthia* sp. I 19-09-93 - (M)  
 KR TLY A - RHI 150 (59) + *Halosarpheia retorquens* + *Periconia prolifica* 19-09-93 - (M)  
 KR TLY A - RHI 151 (59) + *Leptosphaeria australiensis* + *Halosarpheia marina* + *Marinosphaera mangrovei* 19-09-93 - (M)  
 KR Ppd - INT 398 (59) 26-09-93 - (M)  
 KR Bek - DRW 98 (59) + *Savoryella lignicola* 03-10-93 - (Pm)  
 KR Bek - INT 411 (59) + *Antennospora quadricornuta* 03-10-93 - (Pm)  
 KR Bek - INT 412 (59) + *Periconia prolifica* 03-10-93 - (Pm)  
 KR Bek - INT 414 (59) + *Antennospora quadricornuta* 03-10-93 - (Pm)  
 KR TLY A - AVI 244 (59) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 17-10-93 - (Pm)  
 KR TLY A - BRU 220 (59) + *Halocyphina villosa* 17-10-93 - (Pm)  
 KR TLY A - BRU 221 (59) + *Cirrenalia pygmea* 17-10-93 - (Pm)  
 KR TLY A - INT 420 (59) + *Marinosphaera mangrovei* 17-10-93 - (Pm)  
 KR TLY A - RHI 154 (59) + *Aigialus grandis* 17-10-93 - (Pm)

KR Tik - DRW 107 (59) 31-10-93 - (Pm)  
 KR Tik - INT 429 (59) 31-10-93 - (Pm)  
 KR Tik SBI 77 (59) 31-10-93 - (Pm)  
 KR TLY A - INT 447 (59) + *Aniptodera chesapeakensis* + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR TLY A - RHI 162 (59) + *Marinosphaera mangrovei* + *Dactylospora haliotrepha* 21-11-93 - (Pm)  
 KR Val - AVI 258 (59) + Unidentified ascomycetes VII + *Savoryella paucispora* 05-12-93 - (Pm)  
 KR Val - INT 450 (59) + *Aniptodera chesapeakensis* + *Halosarpheia marina* 05-12-93 - (Pm)  
 KR Val - RHI 166 (59) + *Savoryella lignicola* + *Verruculina enalia* 05-12-93 - (Pm)  
 KR Che - AVI 263 (59) + *Savoryella lignicola* + *Halosarpheia marina* + *Aniptodera chesapeakensis* 18-12-93 - (Pm)  
 KR Che - AVI 267 (59) + *Cirrenalia pygmea* 18-12-93 - (Pm)  
 KR Che - BRU 236 (59) + *Halocyphina villosa* + *Savoryella lignicola* 18-12-93 - (Pm)  
 KR Che - BRU 240 (59) + *Halocyphina villosa* + *Halosarpheia marina* + *Aniptodera chesapeakensis* 18-12-93 - (Pm)  
 KR Che - BRU 241 (59) + *Dactylospora haliotrepha* + *Verruculina enalia* 18-12-93 - (Pm)  
 KR Che - BRU 243 (59) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Aniptodera chesapeakensis* 18-12-93 - (Pm)  
 KR Che - INT 460 (59) + *Marinosphaera mangrovei* + *Halosarpheia viscosa* 18-12-93 - (Pm)  
 KR Che - INT 465 (59) + *Lignicola laevis* + *Marinosphaera mangrovei* + *Aigialus parvus* 18-12-93 - (Pm)  
 KR Che - INT 468 (59) + *Halosarpheia marina* + *Dactylospora haliotrepha* + *Aniptodera chesapeakensis* 18-12-93 - (Pm)  
 KR Che - RHI 173 (59) + *Halosarpheia marina* + *Halocyphina villosa* + *Cirrenalia pygmea* 18-12-93 - (Pm)  
 KR TLY A - INT 471 (59) + *Halocyphina villosa* 19-12-93 - (Pm)  
 KR Dha-A - DRW 116 (59) + *Zalerion varium* 27-12-93 - (Pm)  
 KR Dha-A - DRW 117 (59) + *Cirrenalia pygmea* 27-12-93 - (Pm)  
 KR Kad A - AVI 282 (59) + *Savoryella lignicola* 16-01-94 - (Pm)  
 KR Kad A - AVI 286 (59) + *Halorosellinia oceanica* + *Savoryella lignicola* 16-01-94 - (Pm)  
 KR Kad A - INT 492 (59) + *Halocyphina villosa* + *Aniptodera chesapeakensis* 16-01-94 - (Pm)  
 KR Kad A - INT 496 (59) + *Zalerion varium* + *Halosarpheia marina* 16-01-94 - (Pm)  
 KR Kad A - INT 499 (59) + *Marinosphaera mangrovei* + *Halocyphina villosa* 16-01-94 - (Pm)  
 KR TLY B - ACN 211 (59) + *Periconia prolifica* 23-01-94 - (Pm)  
 KR TLY A - BRU 257 (59) + *Halosarpheia marina* + *Lignicola laevis* 23-01-94 - (Pm)  
 KR TLY B - INT 506 (59) + *Biatrispora marina* + *Halocyphina villosa* 23-01-94 - (Pm)  
 KR TLY B - INT 507 (59) + *Aniptodera chesapeakensis* + *Dactylospora haliotrepha* + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY A - BRU 260 (59) + *Leptosphaeria australiensis* 27-02-94 - (Prm)  
 KR TLY A - INT 514 (59) + *Halosphaeria hamata* 27-02-94 - (Prm)  
 KR TLY A - RHI 194 (59) + *Halosarpheia retorquens* + *Cirrenalia pygmea* 27-02-94 - (Prm)  
 KR TLY A - RHI 196 (59) + *Halosphaeria hamata* + *Dactylospora haliotrepha* 27-02-94 - (Prm)  
 KR Edk AVI 303 (59) + *Halosarpheia marina* + *Cirrenalia pygmea* 06-03-94 - (Prm)  
 KR Edk - INT 518 (59) + *Halosarpheia retorquens* 06-03-94 - (Prm)  
 KR Edk - INT 519 (59) + *Aniptodera chesapeakensis* 06-03-94 - (Prm)  
 KR Edk - INT 521 (59) + *Halosarpheia marina* + *Cirrenalia pygmea* 06-03-94 - (Prm)  
 KR Edk - RHI 197 (59) + *Aigialus grandis* 06-03-94 - (Prm)  
 KR Edk - RHI 198 (59) + *Marinosphaera mangrovei* + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR Edk - RHI 199 (59) + *Marinosphaera mangrovei* + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR TLY B - AVI 309 (59) + *Marinosphaera mangrovei* 20-03-94 - (Prm)



KR TLY B - AVI 311 (59) + *Zalerion maritimum* 20-03-94 - (Prm)  
 KR TLY B - BRU 277 (59) + *Aniptodera chesapeakeensis* 20-03-94 - (Prm)  
 KR TLY B - INT 536 (59) + *Halocyphina villosa* + *Cirrenalia pygmea* + *Halosarpheia marina* 20-03-94 - (Prm)  
 KR TLY B - INT 537 (59) + *Halocyphina villosa* + *Marinosphaera mangrovei* 20-03-94 - (Prm)  
 KR TLY A - RHI 205 (59) + *Marinosphaera mangrovei* 20-03-94 - (Prm)  
 KR TLY A - RHI 206 (59) 20-03-94 - (Prm)  
 KR TLY B - RHI 210 (59) + *Halosarpheia marina* + *Halosarpheia retorquens* 20-03-94 - (Prm)  
 KR TLY B - RHI 211 (59) + *Halosarpheia ratnagiriensis* + *Lignincola laevis* 20-03-94 - (Prm)  
 KR Kav - AVI 314 (59) + *Dactylospora haliotrepha* + *Savoryella lignicola* 15-04-94 - (Prm)  
 KR Kav - AVI 317 (59) + *Verruculina enalia* 15-04-94 - (Prm)  
 KR Kav - AVI 320 (59) + *Leptosphaeria australiensis* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - INT 545 (59) + *Cirrenalia basiminuta* + *Halosarpheia abonnis* 15-04-94 - (Prm)  
 KR Kav - RHI 213 (59) + *Halocyphina villosa* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - RHI 217 (59) + *Halocyphina villosa* + *Halosarpheia ratnagiriensis* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - RHI 221 (59) + *Lignincola laevis* + *Cirrenalia basiminuta* 15-04-94 - (Prm)  
 KR TLY A - AVI 323 (59) + *Lignincola laevis* + *Cirrenalia pygmea* 17-04-94 - (Prm)  
 KR TLY A - AVI 324 (59) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 17-04-94 - (Prm)  
 KR TLY A - BRU 285 (59) + *Aniptodera chesapeakeensis* 17-04-94 - (Prm)  
 KR TLY A - BRU 288 (59) + *Aniptodera chesapeakeensis* + *Cirrenalia basiminuta* 17-04-94 - (Prm)  
 KR TLY A - INT 548 (59) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 17-04-94 - (Prm)  
 KR TLY A - INT 549 (59) + *Ceriosporopsis halima* + *Zalerion varium* 17-04-94 - (Prm)  
 KR TLY A - INT 552 (59) + *Aniptodera chesapeakeensis* + *Cirrenalia basiminuta* 17-04-94 - (Prm)  
 KR TLY A - AVI 327 (59) + *Marinosphaera mangrovei* 15-05-94 - (Prm)  
 KR TLY A - AVI 328 (59) + *Halosarpheia marina* 15-05-94 - (Prm)  
 KR TLY A - BRU 289 (59) + *Verruculina enalia* + *Marinosphaera mangrovei* 15-05-94 - (Prm)  
 KR TLY A - BRU 291 (59) + *Trichocladium alopallonellum* + *Periconia prolifica* 15-05-94 - (Prm)  
 KR TLY A - INT 553 (59) + *Verruculina enalia* 15-05-94 - (Prm)  
 KR TLY A - RHI 226 (59) + *Aigialus grandis* 15-05-94 - (Prm)  
 KR TLY A - RHI 227 (59) + *Verruculina enalia* 15-05-94 - (Prm)  
 KR Bek - DRW 122 (59) 24-07-94 - (M)  
 KR Bek - DRW 126 (59) + *Aniptodera chesapeakeensis* 24-07-94 - (M)  
 KR Bek - INT 557 (59) 24-07-94 - (M)  
 KR Bek - INT 559 (59) 24-07-94 - (M)  
 KR Bek - INT 561 (59) 24-07-94 - (M)  
 KR Bek - INT 566 (59) + *Aniptodera chesapeakeensis* 24-07-94 - (M)

Of all species of *Lulworthia* described so far, *L. grandispora* has the longest spores. It is a widely distributed species known from all the three important

oceanic regions of the world. This species was one of the most frequently collected fungi during the present study.

### ***Lulworthia* sp. I**

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

#### **Fig. 40**

Ascomata perithecial, 300-480 x 110-200  $\mu\text{m}$ , cylindrical or subcylindrical, immersed, ostiolate, papillate, carbonaceous, dark brown or black. Neck up to 75  $\mu\text{m}$  long, 25-40  $\mu\text{m}$  wide at the base, 20-30  $\mu\text{m}$  wide at the tip, black-coloured, hyaline at the tip. Paraphyses absent. Asci 310-380 x 16-20  $\mu\text{m}$ , eight-spored, elongate, fusiform or cylindrical, unitunicate, thin-walled, early deliquescing. Ascospores 310-370 x 3-4  $\mu\text{m}$ , filamentous, curved, hyaline, tapering at each end into an elongate, conical process or apical chamber; apical chamber 6-8 x 3-4  $\mu\text{m}$ , acute or rounded, filled with a gelatinous substance that is released through an apical or lateral pore.

#### **Materials examined**

- KR Kad A - ACN 1 (60) + *Lignincola laevis* 19-04-92 - (Prm)
- KR Kad A - ACN 3 (60) + *Halosarpheia marina* 19-04-92 - (Prm)
- KR Kad A - ACN 4 (60) + *Lignincola laevis* 19-04-92 - (Prm)
- KR Kad A - ACN 5 (60) + *Lulworthia grandispora* 19-04-92 - (Prm)
- KR Kad A - INT 3 (60) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 19-04-92 - (Prm)
- KR Mah-A - ACN 9 (60) 03-05-92 - (Prm)
- KR Mah-A - INT 31 (60) + *Halosarpheia marina* 03-05-92 - (Prm)
- KR Mah-B - INT 42 (60) 03-05-92 - (Prm)
- KR Vad - ACN 22 (60) + *Halosarpheia marina* 02-08-92 - (M)
- KR Vad - AVI 30 (60) + *Halosarpheia marina* 02-08-92 - (M)
- KR Vad - BRU 21 (60) + *Halosarpheia marina* 02-08-92 - (M)
- KR Val - INT 70 (60) + *Periconia prolifica* + *Aniptodera chesapeakeensis* 09-08-92 - (M)
- KR TLY A - BRU 36 (60) + *Halocyphina villosa* 23-08-92 - (M)

KR Dha-B - INT 89 (60) 23-08-92 - (M)  
 KR Dha-B - INT 96 (60) + *Marinosphaera mangrovei* 23-08-92 - (M)  
 KR Mah-A - AVI 50 (60) + *Phialophorophoma litoralis* 06-09-92 - (M)  
 KR Mah-A - INT 105 (60) + *Marinosphaera mangrovei* + *Leptosphaeria australiensis* 06-09-92 - (M)  
 KR Mah-B - INT 113 (60) + *Marinosphaera mangrovei* 06-09-92 - (M)  
 KR Mah-B - INT 115 (60) 06-09-92 - (M)  
 KR Kad A - ACN 40 (60) + *Cirrenalia fusca* 13-09-92 - (M)  
 KR Kad A - ACN 41 (60) + *Cirrenalia pygmaea* 13-09-92 - (M)  
 KR Kad B - INT 141 (60) 18-10-92 - (Pm)  
 KR Kad B - INT 146 (60) + *Aniptodera chesapeakeensis* 18-10-92 - (Pm)  
 KR TLY C - AVI 69 (60) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmaea* 25-10-92 - (Pm)  
 KR TLY C - AVI 71 (60) + *Aniptodera chesapeakeensis* 25-10-92 - (Pm)  
 KR TLY C - BRU 57 (60) + *Halocyphina villosa* 25-10-92 - (Pm)  
 KR Edk - ACN 50 (60) + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - AVI 76 (60) + *Verruculina enalia* 15-11-92 - (Pm)  
 KR Edk - AVI 81 (60) 15-11-92 - (Pm)  
 KR Edk - BRU 65 (60) + *Savoryella paucispora* 15-11-92 - (Pm)  
 KR Edk - INT 158 (60) + *Halocyphina villosa* + *Cirrenalia pygmaea* 15-11-92 - (Pm)  
 KR TLY C - BRU 77 (60) + *Marinosphaera mangrovei* 29-11-92 - (Pm)  
 KR TLY C - BRU 78 (60) + *Marinosphaera mangrovei* + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
 KR TLY A - BRU 81 (60) + *Halosarpheia marina* + *Lignicola laevis* + *Cirrenalia pygmaea* 27-12-92 - (Pm)  
 KR Dha-B - INT 185 (60) + *Aniptodera chesapeakeensis* 27-12-92 - (Pm)  
 KR Dha-B - INT 186 (60) + *Cirrenalia pygmaea* 27-12-92 - (Pm)  
 KR Dha-B - INT 187 (60) + *Aniptodera chesapeakeensis* 27-12-92 - (Pm)  
 KR Mah-A - INT 191 (60) + *Marinosphaera mangrovei* 03-01-93 - (Pm)  
 KR Mah-B - INT 199 (60) 03-01-93 - (Pm)  
 KR Mah-B - INT 201 (60) 03-01-93 - (Pm)  
 KR TLY C - AVI 115 (60) + *Savoryella lignicola* + *Halosarpheia marina* 10-01-93 - (Pm)  
 KR TLY A - BRU 97 (60) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Savoryella lignicola* 10-01-93 - (Pm)  
 KR TLY C - BRU 107 (60) + *Halosphaeria hamata* 21-02-93 - (Pm)  
 KR Bey - DRW 54 (60) 28-02-93 - (Pm)  
 KR TLY C - AVI 123 (60) + *Aniptodera chesapeakeensis* 28-03-93 - (Pm)  
 KR Vad - ACN 97 (60) 04-04-93 - (Pm)  
 KR Vad - AVI 131 (60) + *Marinosphaera mangrovei* + *Halocyphina villosa* 04-04-93 - (Pm)  
 KR TLY B - AVI 156 (60) + *Savoryella paucispora* + Unidentified ascomycetes VII 18-04-93 - (Pm)  
 KR TLY C - BRU 146 (60) + *Halosphaeria hamata* 18-04-93 - (Pm)  
 KR Dha-B - INT 277 (60) 18-04-93 - (Pm)  
 KR Dha-B - INT 280 (60) 18-04-93 - (Pm)  
 KR TLY C - ACN 118 (60) 09-05-93 - (Pm)  
 KR Kad A - ACN 124 (60) + *Trichocladium alopallonellum* 23-05-93 - (Pm)  
 KR Kad A - ACN 127 (60) + *Aniptodera chesapeakeensis* 23-05-93 - (Pm)  
 KR TLY A - BRU 157 (60) + *Leptosphaeria australiensis* 20-06-93 - (M)

KR Edk - ACN 137 (60) + *Periconia prolifica* 11-07-93 - (M)  
 KR Edk - AVI 186 (60) + *Marinosphaera mangrovei* 11-07-93 - (M)  
 KR Edk - INT 307 (60) + *Cirrenalia pygmea* 11-07-93 - (M)  
 KR TLY C - ACN 138 (60) + *Halosarpheia marina* 18-07-93 - (M)  
 KR Mah-A - ACN 148 (60) + *Aniptodera chesapeakeensis* 12-08-93 - (M)  
 KR Mah-A - AVI 213 (60) + *Marinosphaera mangrovei* 12-08-93 - (M)  
 KR Mah-A - BRU 187 (60) *Savoryella paucispora* 12-08-93 - (M)  
 KR Mah-A - INT 337 (60) + *Halosarpheia marina* + *Trichocladium* sp. 12-08-93 - (M)  
 KR TLY C - AVI 224 (60) + *Halosarpheia marina* 22-08-93 - (M)  
 KR Che - BRU 207 (60) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 05-09-93 - (M)  
 KR Mah-B - INT 376 (60) 12-09-93 - (M)  
 KR Mah-B - INT 378 (60) + *Aniptodera chesapeakeensis* 12-09-93 - (M)  
 KR Mah-B - INT 383 (60) + *Aniptodera chesapeakeensis* 12-09-93 - (M)  
 KR TLY A - INT 392 (60) + *Lulworthia grandispora* 19-09-93 - (M)  
 KR TLY A - RHI 147 (60) + *Halocyphina villosa* 19-09-93 - (M)  
 KR Kad B - INT 409 (60) + *Cirrenalia pygmea* 26-09-93 - (M)  
 KR Kav - BRU 223 (60) + *Cirrenalia pygmea* 30-10-93 - (Pm)  
 KR TLY A - BRU 229 (60) + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR Dha-B - INT 438 (60) 21-11-93 - (Pm)  
 KR Vad - AVI 275 (60) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 26-12-93 - (Pm)  
 KR Vad - BRU 247 (60) + *Aniptodera chesapeakeensis* 26-12-93 - (Pm)  
 KR Dha-A - INT 484 (60) + *Antennospora quadricornuta* 27-12-93 - (Pm)  
 KR Kad A - ACN 201 (60) + *Cirrenalia macrocephala* + *Halosarpheia marina* 16-01-94 - (Pm)  
 KR TLY A - AVI 294 (60) + *Aniptodera chesapeakeensis* + *Lignincola tropica* 27-02-94 - (Pm)  
 KR TLY A - INT 515 (60) + *Marinosphaera mangrovei* 27-02-94 - (Pm)  
 KR Edk - ACN 214 (60) + *Halosarpheia marina* 06-03-94 - (Pm)  
 KR Edk - ACN 216 (60) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 06-03-94 - (Pm)  
 KR Edk - AVI 299 (60) + *Marinosphaera mangrovei* 06-03-94 - (Pm)  
 KR Edk - BRU 265 (60) + *Halosarpheia marina* *Savoryella paucispora* 06-03-94 - (Pm)  
 KR Edk - BRU 266 (60) + *Lignincola tropica* 06-03-94 - (Pm)  
 KR Edk - BRU 267 (60) + *Halosarpheia marina* 06-03-94 - (Pm)  
 KR Edk - INT 517 (60) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 06-03-94 - (Pm)  
 KR Kav - BRU 281 (60) + *Cirrenalia pygmea* 15-04-94 - (Pm)  
 KR TLY A - AVI 322 (60) + *Aniptodera chesapeakeensis* 17-04-94 - (Pm)  
 KR TLY A - AVI 325 (60) + *Halosphaeria hamata* 17-04-94 - (Pm)

These collections do not agree with any of the nine species of *Lulworthia* accepted by Kohlmeyer & Volkmann-Kohlmeyer (1991a). In the same paper Kohlmeyer & Volkmann-Kohlmeyer (l.c) mention several collections, belonging to

this genus but which cannot be distinguished with traditional morphological methods, as '*Lulworthia* spp.' all of which have ascospore lengths between 150 and 500  $\mu\text{m}$ .

### ***Lulworthia* sp. II**

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

#### **Fig. 41**

Ascomata perithecial, 300-700 x 170-350  $\mu\text{m}$ , ovoid or obpyriform, greyish, immersed or superficial, ostiolate, papillate. Neck 120-400 x 20-40  $\mu\text{m}$ , cylindrical, straight or curved, sometimes furcate at the apical part. Peridium 20-30  $\mu\text{m}$ , multilayered. Asci 300-370 x 8-12.5  $\mu\text{m}$ , eight-spored, elongate, fusiform or cylindrical, unitunicate, thin-walled, early deliquescing. Ascospores (230) 300-500 x 3-5  $\mu\text{m}$  including apical chambers, filamentous, curved, hyaline, with tapering or round tips; apical chambers 3.4 - 7.5 x 3-5  $\mu\text{m}$ , containing a gelatinous substance.

#### **Materials examined**

KR TLY A - AVI 21 (62) + *Halosarpheia marina* + *Halocyphina villosa* 26-07-92 - (M)

KR Val - BRU 31 (62) + *Periconia prolifica* + *Halocyphina villosa* 09-08-92 - (M)

KR Val - BRU 34 (62) + *Periconia prolifica* 09-08-92 - (M)

KR Kad - AVI 57 (62) + *Marinosphaera mangrovei* 13-09-92 - (M)

KR TLY A - BRU 53 (62) + *Leptosphaeria australiensis* 25-10-92 - (Pm)

KR TLY B - ACN 113 (62) + *Aniptodera chesapeakeensis* + *Halosarpheia viscosa* 18-04-93 - (Pm)

KR Kav - RHI 129 (62) + *Halocyphina villosa* 19-07-93 - (M)

KR Mah-A - BRU 193 (62) + *Halosarpheia marina* + *Halocyphina villosa* 12-08-93 - (M)

KR Kav - ACN 172 (62) + *Aniptodera chesapeakeensis* 30-10-93 - (Pm)

KR Kav - AVI 248 (62) + *Halocyphina villosa* + *Savoryella lignicola* + *Aniptodera haispora* 30-10-93 - (Pm)

KR Kav - AVI 249 (62) + *Savoryella lignicola* + *Lignicola laevis* + *Halosarpheia minuta* 30-10-93 - (Pm)

KR Val - ACN 179 (62) + *Halosarpheia marina* 05-12-93 - (Pm)

KR Val - ACN 180 (62) + *Halosarpheia marina* 05-12-93 - (Pm)

KR Val - ACN 185 (62) + *Aniptodera chesapeakensis* 05-12-93 - (Pm)

KR Val - BRU 230 (62) + *Halocyphina villosa* + *Halosarpheia minuta* 05-12-93 - (Pm)

KR TLY B - RHI 189 (62) + *Halocyphina villosa* + *Halosarpheia marina* + *Dactylospora haliotrepha* 23-01-94 - (Pm)

KR TLY B - BRU 274 (62) + *Aniptodera chesapeakensis* + *Halosarpheia marina* 20-03-94 - (Prm)

KR TLY B - INT 532 (62) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Lignicola laevis* 20-03-94 - (Prm)

These collections differ from other *Lulworthia* spp. described in this treatise in having greyish ascomata with longer necks and longer spores.

### ***Lulworthia* sp. III**

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

#### **Fig. 42**

Ascomata perithecial, 220-520 x 150-220  $\mu\text{m}$ , globose, subglobose or cylindrical, immersed, ostiolate, with long necks, blackish brown, solitary. Neck 70-380 x 30-50  $\mu\text{m}$ , cylindrical, dark coloured with a hyaline apex, projecting above the surface of the substratum, Asci (180) – 200-280 x 10-13  $\mu\text{m}$ , eight-spored, elongate, fusiform, unitunicate, thin-walled, early deliquescing. Ascospores 200- 275 x 3-4  $\mu\text{m}$  (including apical chamber), filamentous, curved, hyaline, tapering at each end into an elongate, conical process or apical chamber, 6-10  $\mu\text{m}$  long and filled with a gelatinous material.

#### **Materials examined**

KR Ppd - INT 23 (64) 19-04-92 - (Prm)

KR Ppd - INT 24 (64) + *Savoryella lignicola* 19-04-92 - (Prm)

KR Kad A - INT 128 (64) + *Leptosphaeria australiensis* + *Periconia prolifica* 13-09-92 - (M)

KR Tik - DRW 64 (64) + *Zalerion varium* 25-04-93 - (Prm)

KR Tik - INT 286 (64) + *Periconia prolifica* 25-04-93 - (Prm)

KR Tik - DRW 62 (64) + *Halosarpheia marina* 18-09-93 - (Prm)

KR Ppd - DRW 93 (64) 26-09-93 - (M)

KR Kad A - INT 494 (64) + *Halocyphina villosa* + *Periconia prolifica* 16-01-94 - (Pm)

These collections are very much similar to *Lulworthia kniepii* Kohlmeyer in all microscopic features but differ from the latter in two aspects: 1) the apex of the neck is hyaline in the Kerala collections and 2) *L. kniepii* is, so far, known to grow only on coralline algae. All the present collections were from either intertidal wood or driftwood. The present collections differ from *Lulworthia* spp. described earlier, in having much smaller spores.

### ***Manglicola* sp.**

Taxonomic Position: Melanommatales, Hypsostromataceae

#### **Fig. 43**

Ascomata perithecial, 1000-1100 x 500-700 $\mu$ m, fusiform superficial, papillate. Neck 200-230 x 300-345  $\mu$ m, cylindrical. Paraphyses 300-350 x 5-7.5 $\mu$ m aseptate with forked tip. Asci 630-695 x 27.5-32.5  $\mu$ m, cylindrical, bitunicate, with a prominent umbrella-like apical apparatus, eight-spored with uniseriately arranged ascospores. Ascospores 90-100 x 15-18  $\mu$ m, hyaline, without sheath of appendages, fusiform; immature spores aseptate.

### **Materials Examined**

KR TLY C - RHI 56 (66) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* + *Manglicola* sp. 10-01-93 - (Pm)

KR TLY B - RHI 91 (66) + *Halosarpheia marina* + *Manglicola* sp. + *Ocostaspora apilongissima* 18-04-93 - (Pm)

The Kerala collections belong to the genus *Manglicola* but they do not agree fully with any known species. The present collections come somewhat intermediate between *M. guatemalensis* and *M. samuelsii*. The size of ascospores of *M. guatemalensis* is 80-180 x 18-34  $\mu\text{m}$  and that of *M. samuelsii*, is 50-65 (75) x 6.5-8  $\mu\text{m}$ . The spores of the Kerala collections measured 90-100 x 50-18  $\mu\text{m}$ . This is the first record of this genus from India.

***Marinosphaera mangrovei*** K. D. Hyde in Can. J. Bot. 67: 3080 (1989).

Taxonomic Position: Phyllachorales, Phyllachoraceae

**Fig. 44**

Ascomata perithecial, 150-310 x 150-280  $\mu\text{m}$ , globose to ellipsoidal, fully or partially immersed, light brown or hyaline, papillate, ostiolate. Papilla short or long, projecting out of the substratum, crowned by small, variously curved, outwardly projecting hyphae; ostiolar canal filled with periphyses. Peridium 15-30  $\mu\text{m}$  thick, multilayered, with thick-walled cells in the outer layers and thin-walled cells in the inner layers. Paraphyses 87.5-100 x 1.5-3  $\mu\text{m}$ , septate, with swollen apices. Asci 65-125 x 10-20  $\mu\text{m}$ , eight-spored, elongate, cylindrical, pedunculate, with a subapical, plate-like thickening. Ascospores 22.5-30 x 7.5-11  $\mu\text{m}$ , hyaline, ellipsoidal; immature spores aseptate or biseptate; mature spores always tri-septate.



## Materials examined

KR Kad A - AVI 4 (67) + *Leptosphaeria australiensis* 19-04-92 - (Prm)  
KR Kad A - AVI 6 (67) 19-04-92 - (Prm)  
KR Ppd - DRW 3 (67) 19-04-92 - (Prm)  
KR Ppd - DRW 5 (67) 19-04-92 - (Prm)  
KR Kad A - INT 5 (67) + *Halosarpheia marina* + *Periconia prolifica* 19-04-92 - (Prm)  
KR Kad B - INT 7 (67) 19-04-92 - (Prm)  
KR Mah-A - BRU 4 (67) + *Cirrenalia pygmaea* 03-05-92 - (Prm)  
KR Mah-A - BRU 5 (67) + *Lulworthia grandispora* 03-05-92 - (Prm)  
KR Mah-A - BRU 7 (67) + *Leptosphaeria australiensis* 03-05-92 - (Prm)  
KR Mah-A - BRU 9 (67) + *Trichocladium alopallonellum* 03-05-92 - (Prm)  
KR Mah-A - INT 33 (67) + *Halosarpheia ratnagiriensis* + *Halosarpheia marina* 03-05-92 - (Prm)  
KR Mah-A - INT 34 (67) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 03-05-92 - (Prm)  
KR TLY A - AVI 17 (67) + *Halosarpheia marina* 21-06-92 - (M)  
KR TLY A - BRU 10 (67) + *Halosarpheia marina* + *Halocyphina villosa* 21-06-92 - (M)  
KR TLY A - BRU 11 (67) 21-06-92 - (M)  
KR TLY A - INT 45 (67) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* + *Halocyphina villosa* 21-06-92 - (M)  
KR TLY A - INT 47 (67) + *Aniptodera chesapeakeensis* 21-06-92 - (M)  
KR TLY A - RHI 1 (67) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 21-06-92 - (M)  
KR TLY A - RHI 3 (67) + *Halocyphina villosa* + *Halosarpheia marina* 21-06-92 - (M)  
KR TLY A - AVI 22 (67) + *Zalerion spl* 26-07-92 - (M)  
KR TLY B - AVI 27 (67) + *Verruculina enalia* + *Halocyphina villosa* 26-07-92 - (M)  
KR TLY B - BRU 16 (67) + *Halocyphina villosa* + *Halosarpheia marina* 26-07-92 - (M)  
KR TLY B - BRU 18 (67) + *Halocyphina villosa* + *Aniptodera mangrovei* 26-07-92 - (M)  
KR TLY B - BRU 20 (67) + *Halosarpheia marina* 26-07-92 - (M)  
KR TLY A - INT 48 (67) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 26-07-92 - (M)  
KR Vad - ACN 19 (67) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 02-08-92 - (M)  
KR Vad - ACN 24 (67) + *Cirrenalia pygmaea* 02-08-92 - (M)  
KR Vad - ACN 25 (67) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 02-08-92 - (M)  
KR Vad - BRU 23 (67) + *Halocyphina villosa* 02-08-92 - (M)  
KR Vad - BRU 28 (67) + *Halocyphina villosa* 02-08-92 - (M)  
KR Val - ACN 26 (67) + *Cirrenalia pygmaea* 09-08-92 - (M)  
KR Val - ACN 28 (67) + *Halosarpheia marina* 09-08-92 - (M)  
KR Val - AVI 40 (67) + *Halosarpheia marina* + *Lulworthia grandispora* 09-08-92 - (M)  
KR Val - AVI 41 (67) + *Halosarpheia marina* + *Halocyphina villosa* + *Periconia prolifica* 09-08-92 - (M)  
KR Val - AVI 42 (67) + *Halosarpheia marina* + *Halocyphina villosa* + *Periconia prolifica* 09-08-92 - (M)  
KR Val - BRU 30 (67) + *Halosarpheia marina* 09-08-92 - (M)  
KR Val - BRU 33 (67) + *Halocyphina villosa* + *Halosarpheia marina* 09-08-92 - (M)  
KR Val - INT 66 (67) + *Verruculina enalia* + *Savoryella lignicola* 09-08-92 - (M)  
KR Val - INT 69 (67) + *Halosarpheia marina* 09-08-92 - (M)  
KR Val - INT 72 (67) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 09-08-92 - (M)

KR TLY A - AVI 45 (67) + *Savoryella paucispora* + *Halocyphina villosa* + 23-08-92 - (M)  
 KR Dha-A - DRW 12 (67) 23-08-92 - (M)  
 KR TLY A - INT 76 (67) + *Halocyphina villosa* + *Lulworthia grandispora* 23-08-92 - (M)  
 KR Dha-B - INT 84 (67) 23-08-92 - (M)  
 KR Dha-B - INT 91 (67) + *Halosarpheia marina* 23-08-92 - (M)  
 KR Dha-B - INT 94 (67) + *Cirrenalia pygmaea* 23-08-92 - (M)  
 KR Dha-B - INT 96 (67) + *Lulworthia* sp. I 23-08-92 - (M)  
 KR Mah-A - ACN 33 (67) + *Periconia prolifica* 06-09-92 - (M)  
 KR Mah-A - ACN 34 (67) + *Lignicola laevis* 06-09-92 - (M)  
 KR Mah-A - ACN 37 (67) 06-09-92 - (M)  
 KR Mah-A - AVI 51 (67) + *Leptosphaeria australiensis* 06-09-92 - (M)  
 KR Mah-A - BRU 39 (67) + *Cirrenalia pygmaea* 06-09-92 - (M)  
 KR Mah-A - BRU 41 (67) + *Savoryella lignicola* 06-09-92 - (M)  
 KR Mah-A - INT 105 (67) + *Lulworthia* sp. I + *Leptosphaeria australiensis* 06-09-92 - (M)  
 KR Mah-A - INT 107 (67) + *Trichocladium* sp. 06-09-92 - (M)  
 KR Mah-B - INT 113 (67) + *Lulworthia* sp. I 06-09-92 - (M)  
 KR Mah-B - INT 117 (67) + *Cirrenalia pygmaea* 06-09-92 - (M)  
 KR Kad A - AVI 54 (67) + *Halocyphina villosa* + *Cirrenalia fusca* 13-09-92 - (M)  
 KR Kad A - AVI 57 (67) + *Lulworthia* sp. III 13-09-92 - (M)  
 KR Kad A - INT 123 (67) + *Halosarpheia marina* + *Halocyphina villosa* + *Lulworthia grandispora* 13-09-92 - (M)  
 KR TLY A - AVI 58 (67) + *Halosarpheia marina* + *Halocyphina villosa* + *Savoryella lignicola* 27-09-92 - (M)  
 KR TLY A - RHI 18 (67) + *Halocyphina villosa* + *Lulworthia grandispora* 27-09-92 - (M)  
 KR Bey - DRW 18 (67) 02-10-92 - (Pm)  
 KR Kad B - INT 142 (67) 18-10-92 - (Pm)  
 KR TLY C - ACN 45 (67) + *Periconia prolifica* 25-10-92 - (Pm)  
 KR TLY C - ACN 46 (67) + *Savoryella lignicola* 25-10-92 - (Pm)  
 KR TLY C - ACN 48 (67) + *Savoryella lignicola* + *Periconia prolifica* 25-10-92 - (Pm)  
 KR TLY A - AVI 67 (67) + *Lulworthia grandispora* + *Dactylospora haliotrepha* 25-10-92 - (Pm)  
 KR TLY A - INT 149 (67) + *Halocyphina villosa* + *Lulworthia grandispora* + *Dactylospora haliotrepha* 25-10-92 - (Pm)  
 KR TLY A - INT 152 (67) + *Halosarpheia marina* + *Lulworthia grandispora* + *Verruculina enalia* 25-10-92 - (Pm)  
 KR Edk - ACN 53 (67) + *Aniptodera chesapeakeensis* + *Periconia prolifica* 15-11-92 - (Pm)  
 KR Edk - ACN 57 (67) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 15-11-92 - (Pm)  
 KR Edk - ACN 59 (67) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - AVI 75 (67) + *Zalerion varium* 15-11-92 - (Pm)  
 KR Edk - BRU 60 (67) + *Periconia prolifica* + *Lulworthia grandispora* 15-11-92 - (Pm)  
 KR Edk - BRU 63 (67) + *Lulworthia grandispora* 15-11-92 - (Pm)  
 KR Edk - BRU 67 (67) + *Aniptodera chesapeakeensis* 15-11-92 - (Pm)  
 KR Edk - RHI 34 (67) + *Periconia prolifica* 15-11-92 - (Pm)  
 KR TLY B - ACN 63 (67) + *Savoryella lignicola* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY C - ACN 65 (67) + *Periconia prolifica* + *Phoma* sp. 29-11-92 - (Pm)  
 KR TLY C - ACN 66 (67) + *Zalerion varium* 29-11-92 - (Pm)  
 KR TLY C - BRU 76 (67) + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)

KR TLY C - BRU 77 (67) + *Lulworthia* sp. I 29-11-92 - (Pm)  
 KR TLY C - BRU 78 (67) + *Lulworthia* sp. I + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
 KR TLY B - RHI 42 (67) + *Halosarpheia abonnis* + *Verruculina enalia* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY B - RHI 43 (67) + *Halosarpheia marina* + *Savoryella paucispora* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
 KR Azi - DRW 22 (67) + *Antennospora quadricornuta* 20-12-92 - (Pm)  
 KR Azi - INT 175 (67) + *Savoryella paucispora* 20-12-92 - (Pm)  
 KR Azi - INT 177 (67) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 20-12-92 - (Pm)  
 KR TLY A - AVI 95 (67) + *Cirrenalia pygmaea* + *Lignincola laevis* 27-12-92 - (Pm)  
 KR TLY A - BRU 80 (67) + *Leptosphaeria australiensis* + *Halosarpheia marina* + *Aniptodera longispora* 27-12-92 - (Pm)  
 KR Dha-B - INT 182 (67) 27-12-92 - (Pm)  
 KR Dha-B - INT 183 (67) + *Lulworthia grandispora* 27-12-92 - (Pm)  
 KR Dha-B - INT 189 (67) 27-12-92 - (Pm)  
 KR TLY A - RHI 48 (67) + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR Mah-A - AVI 103 (67) + *Halorosellinia oceanica* + *Halocyphina villosa* 03-01-93 - (Pm)  
 KR Mah-A - AVI 109 (67) + *Halocyphina villosa* + *Trichocladium* sp. 03-01-93 - (Pm)  
 KR Mah-A - INT 191 (67) + *Lulworthia* sp. I 03-01-93 - (Pm)  
 KR Mah-A - INT 194 (67) + *Halosarpheia marina* + *Savoryella lignicola* 03-01-93 - (Pm)  
 KR Mah-A - INT 196 (67) + *Verruculina enalia* + *Dactylospora haliotrepha* 03-01-93 - (Pm)  
 KR Mah-B - INT 204 (67) 03-01-93 - (Pm)  
 KR TLY A - AVI 112 (67) + *Lulworthia grandispora* 10-01-93 - (Pm)  
 KR TLY A - BRU 97 (67) + *Lulworthia* sp. I + *Halosarpheia marina* + *Savoryella lignicola* 10-01-93 - (Pm)  
 KR TLY A - INT 207 (67) + *Halosarpheia marina* + *Cirrenalia macrocephala* 10-01-93 - (Pm)  
 KR TLY C - RHI 57 (67) + *Dactylospora haliotrepha* + *Halocyphina villosa* + *Lulworthia grandispora* 10-01-93 - (Pm)  
 KR TLY C - RHI 58 (67) + *Aigialus parvus* + *Halocyphina villosa* 10-01-93 - (Pm)  
 KR Ppd - DRW 29 (67) 31-01-93 - (Pm)  
 KR Azi - DRW 34 (67) + *Lulworthia grandispora* 13-02-93 - (Pm)  
 KR TLY A - AVI 118 (67) + *Lulworthia grandispora* + *Zalerion* sp. 21-02-93 - (Pm)  
 KR TLY C - AVI 119 (67) + *Periconia prolifica* 21-02-93 - (Pm)  
 KR TLY C - AVI 122 (67) + *Aigialus mangrovis* 21-02-93 - (Pm)  
 KR TLY A - BRU 104 (67) + *Aniptodera chesapeakeensis* 21-02-93 - (Pm)  
 KR TLY A - BRU 106 (67) + *Lulworthia grandispora* 21-02-93 - (Pm)  
 KR TLY A - RHI 59 (67) + *Halosarpheia abonnis* 21-02-93 - (Pm)  
 KR TLY C - AVI 125 (67) + *Lindra hawaiiensis* + *Cirrenalia pygmaea* 28-03-93 - (Pm)  
 KR TLY C - AVI 126 (67) + *Aniptodera chesapeakeensis* 28-03-93 - (Pm)  
 KR TLY A - AVI 128 (67) + *Lulworthia grandispora* 28-03-93 - (Pm)  
 KR TLY C - BRU 111 (67) + *Lulworthia grandispora* + *Periconia prolifica* 28-03-93 - (Pm)  
 KR TLY A - BRU 115 (67) + *Halosarpheia marina* + *Lulworthia grandispora* 28-03-93 - (Pm)  
 KR TLY A - RHI 68 (67) + *Verruculina enalia* 28-03-93 - (Pm)  
 KR Vad - AVI 131 (67) + *Halocyphina villosa* + *Lulworthia* sp. I 04-04-93 - (Pm)  
 KR Vad - AVI 133 (67) + *Halosarpheia marina* 04-04-93 - (Pm)  
 KR Vad - AVI 134 (67) + *Halosarpheia marina* 04-04-93 - (Pm)  
 KR Vad - AVI 136 (67) + *Halosarpheia marina* + *Cirrenalia pygmaea* + *Savoryella lignicola* 04-04-93 - (Pm)

KR Vad - BRU 121 (67) + *Savoryella lignicola* + *Halocyphina villosa* 04-04-93 - (Prm)  
 KR Vad - INT 243 (67) + *Verruculina enalia* + *Cirrenalia pygmea* 04-04-93 - (Prm)  
 KR Vad - INT 245 (67) + *Aniptodera* sp. II + *Leptosphaeria australiensis* 04-04-93 - (Prm)  
 KR Val - AVI 138 (67) 11-04-93 - (Prm)  
 KR Val - AVI 139 (67) + *Halosarpheia marina* 11-04-93 - (Prm)  
 KR Val - AVI 140 (67) 11-04-93 - (Prm)  
 KR Val - AVI 141 (67) + *Halosarpheia marina* 11-04-93 - (Prm)  
 KR Val - INT 249 (67) + *Aigialus parvus* + *Dactylospora haliotrepha* 11-04-93 - (Prm)  
 KR Val - INT 251 (67) + *Halosarpheia marina* 11-04-93 - (Prm)  
 KR Val - INT 252 (67) + *Lulworthia grandispora* + *Halosarpheia marina* 11-04-93 - (Prm)  
 KR Che - AVI 143 (67) + *Lulworthia grandispora* + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR Che - AVI 147 (67) + *Savoryella lignicola* + *Lulworthia grandispora* 17-04-93 - (Prm)  
 KR Che - AVI 150 (67) + *Verruculina enalia* + *Savoryella lignicola* 17-04-93 - (Prm)  
 KR Che - BRU 135 (67) + *Aigialus parvus* 17-04-93 - (Prm)  
 KR Che - INT 257 (67) + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR TLY C - BRU 145 (67) + *Lindra hawaiiensis* 18-04-93 - (Prm)  
 KR TLY C - BRU 147 (67) + *Ascocratera Manglicola* 18-04-93 - (Prm)  
 KR Dha-B - INT 279 (67) 18-04-93 - (Prm)  
 KR Dha-B - INT 281 (67) 18-04-93 - (Prm)  
 KR TLY C - RHI 92 (67) + *Trichocladium alopallonellum* 18-04-93 - (Prm)  
 KR TLY C - RHI 93 (67) + *Lindra hawaiiensis* 18-04-93 - (Prm)  
 KR TLY A - AVI 162 (67) + *Verruculina enalia* + *Savoryella lignicola* 09-05-93 - (Prm)  
 KR TLY A - AVI 163 (67) + *Leptosphaeria australiensis* + *Savoryella lignicola* 09-05-93 - (Prm)  
 KR TLY C - AVI 164 (67) + *Lulworthia grandispora* + *Halosarpheia marina* + *Halocyphina villosa* 09-05-93 - (Prm)  
 KR TLY C - AVI 167 (67) + *Halosarpheia marina* 09-05-93 - (Prm)  
 KR TLY A - BRU 150 (67) + *Lignicola laevis* + *Leptosphaeria australiensis* 09-05-93 - (Prm)  
 KR TLY A - BRU 151 (67) + Unidentified ascomycete VIII 09-05-93 - (Prm)  
 KR TLY A - RHI 96 (67) + *Halosarpheia abonnis* 09-05-93 - (Prm)  
 KR TLY A - RHI 98 (67) + *Ocostaspora apilongissima* 09-05-93 - (Prm)  
 KR Kad A - AVI 170 (67) + *Lulworthia grandispora* 23-05-93 - (Prm)  
 KR Kad A - INT 299 (67) + *Halosarpheia marina* 23-05-93 - (Prm)  
 KR TLY A - AVI 176 (67) + *Leptosphaeria australiensis* 20-06-93 - (M)  
 KR TLY A - BRU 158 (67) + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR TLY A - INT 302 (67) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmea* 20-06-93 - (M)  
 KR TLY A - INT 303 (67) + *Leptosphaeria australiensis* 20-06-93 - (M)  
 KR TLY A - INT 305 (67) + *Periconia prolifica* 20-06-93 - (M)  
 KR TLY A - RHI 103 (67) + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR Edk - AVI 186 (67) + *Lulworthia* sp. I 11-07-93 - (M)  
 KR Edk - AVI 187 (67) + *Periconia prolifica* 11-07-93 - (M)  
 KR Edk - BRU 164 (67) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Edk - BRU 169 (67) 11-07-93 - (M)  
 KR Edk - RHI 114 (67) + *Aniptodera chesapeakeensis* + *Cirrenalia fusca* 11-07-93 - (M)

KR TLY C - AVI 193 (67) + *Halocyphina villosa* + *Bathyascus tropicalis* 18-07-93 - (M)  
 KR TLY C - AVI 194 (67) + *Aniptodera longispora* + *Pleospora pelagica* 18-07-93 - (M)  
 KR TLY C - BRU 175 (67) + *Halocyphina villosa* 18-07-93 - (M)  
 KR TLY C - BRU 176 (67) + Unidentified ascomycetes VI + *Halocyphina villosa* 18-07-93 - (M)  
 KR TLY A - RHI 121 (67) + *Halocyphina villosa* 18-07-93 - (M)  
 KR TLY C - RHI 123 (67) + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* 18-07-93 - (M)  
 KR Kav - AVI 201 (67) + *Halocyphina villosa* + *Cirrenalia basiminuta* 19-07-93 - (M)  
 KR Kav - AVI 204 (67) + *Savoryella lignicola* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - INT 328 (67) + *Halosarpheia marina* + *Cirrenalia basiminuta* 19-07-93 - (M)  
 KR Kav - INT 334 (67) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Mah-A - ACN 152 (67) + *Aniptodera chesapeakeensis* 12-08-93 - (M)  
 KR Mah-A - ACN 154 (67) 12-08-93 - (M)  
 KR Mah-A - AVI 213 (67) + *Lulworthia* sp. I 12-08-93 - (M)  
 KR Mah-A - AVI 214 (67) + *Halocyphina villosa* 12-08-93 - (M)  
 KR Mah-A - BRU 189 (67) + *Halocyphina villosa* 12-08-93 - (M)  
 KR Mah-A - BRU 190 (67) + *Halocyphina villosa* 12-08-93 - (M)  
 KR Mah-A - INT 341 (67) + *Dactylospora haliotrepha* + *Halosarpheia minuta* 12-08-93 - (M)  
 KR Mah-A - INT 344 (67) + *Halosarpheia marina* + *Lulworthia grandispora* 12-08-93 - (M)  
 KR Bey - DRW 81 (67) + *Halocyphina villosa* 15-08-93 - (M)  
 KR Bey - DRW 82 (67) + *Halosarpheia minuta* 15-08-93 - (M)  
 KR TLY B - AVI 221 (67) + *Halosarpheia marina* + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY B - AVI 222 (67) + *Zalerion varium* 22-08-93 - (M)  
 KR TLY B - BRU 198 (67) + *Halosarpheia marina* + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY B - BRU 200 (67) + *Halosarpheia retorquens* + *Halocyphina villosa* 22-08-93 - (M)  
 KR Dha-B - INT 360 (67) 22-08-93 - (M)  
 KR Che - INT 369 (67) + *Halosarpheia viscosa* + *Periconia prolifica* 05-09-93 - (M)  
 KR Che - INT 370 (67) + *Savoryella lignicola* + *Verruculina enalia* 05-09-93 - (M)  
 KR Mah-B - INT 374 (67) 12-09-93 - (M)  
 KR Mah-B - INT 380 (67) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 12-09-93 - (M)  
 KR Tik - INT 386 (67) + *Halocyphina villosa* 18-09-93 - (M)  
 KR Tik - INT 387 (67) + *Cirrenalia pygmea* 18-09-93 - (M)  
 KR TLY A - INT 393 (67) + *Halosarpheia marina* + *Halosarpheia retorquens* 19-09-93 - (M)  
 KR TLY A - INT 394 (67) + *Halosarpheia marina* + *Halocyphina villosa* 19-09-93 - (M)  
 KR TLY C - RHI 151 (67) + *Leptosphaeria australiensis* + *Halosarpheia marina* + *Lulworthia grandispora* 19-09-93 - (M)  
 KR TLY C - RHI 152 (67) + *Halosarpheia abonnis* + *Halosarpheia marina* 19-09-93 - (M)  
 KR Kad B - INT 401 (67) 26-09-93 - (M)  
 KR Kad B - INT 405 (67) + *Cirrenalia pygmea* 26-09-93 - (M)  
 KR TLY A - AVI 243 (67) + *Periconia prolifica* 17-10-93 - (Pm)  
 KR TLY A - AVI 245 (67) + *Lignicola laevis* 17-10-93 - (Pm)  
 KR TLY A - BRU 218 (67) + *Halosarpheia viscosa* + *Cirrenalia pygmea* 17-10-93 - (Pm)  
 KR TLY A - INT 418 (67) + *Verruculina enalia* 17-10-93 - (Pm)  
 KR TLY A - INT 420 (67) + *Lulworthia grandispora* 17-10-93 - (Pm)

KR TLY A - RHI 153 (67) + *Halosarpheia viscosa* + *Cirrenalia pygmea* 17-10-93 - (Pm)  
 KR TLY A - RHI 155 (67) + *Leptosphaeria australiensis* 17-10-93 - (Pm)  
 KR TLY A - AVI 252 (67) + *Aigialus parvus* + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR Dha-B - INT 440 (67) 21-11-93 - (Pm)  
 KR Dha-B - INT 443 (67) 21-11-93 - (Pm)  
 KR TLY A - RHI 162 (67) + *Lulworthia grandispora* + *Dactylospora haliotrepha* 21-11-93 - (Pm)  
 KR Val - ACN 181 (67) + *Halosarpheia marina* + *Periconia prolifica* 05-12-93 - (Pm)  
 KR Val - ACN 182 (67) + *Halosarpheia marina* + *Periconia prolifica* 05-12-93 - (Pm)  
 KR Val - AVI 257 (67) + *Aniptodera chesapeakeensis* + Unidentified ascomycetes III 05-12-93 - (Pm)  
 KR Val - INT 456 (67) + *Halosarpheia marina* + *Halocyphina villosa* 05-12-93 - (Pm)  
 KR Val - INT 458 (67) + *Halocyphina villosa* + *Savoryella paucispora* 05-12-93 - (Pm)  
 KR Che - AVI 265 (67) + *Dactylospora haliotrepha* + *Halocyphina villosa* + *Periconia prolifica* 18-12-93 - (Pm)  
 KR Che - AVI 266 (67) + *Halosarpheia marina* + *Halosarpheia abonnis* 18-12-93 - (Pm)  
 KR Che - AVI 268 (67) + *Halocyphina villosa* + *Aigialus parvus* 18-12-93 - (Pm)  
 KR Che - AVI 269 (67) + *Halosarpheia marina* + *Aigialus parvus* + Ascomycetes sp. II 18-12-93 - (Pm)  
 KR Che - BRU 238 (67) + *Lignincola laevis* + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che - BRU 239 (67) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - BRU 243 (67) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - INT 460 (67) + *Halosarpheia viscosa* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - INT 464 (67) + *Halocyphina villosa* + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che - INT 465 (67) + *Lulworthia grandispora* + *Lignincola laevis* + *Aigialus parvus* 18-12-93 - (Pm)  
 KR Che - RHI 174 (67) + *Halosarpheia marina* + *Dactylospora haliotrepha* 18-12-93 - (Pm)  
 KR Che - RHI 179 (67) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che - RHI 181 (67) + *Halosarpheia viscosa* + *Savoryella lignicola* 18-12-93 - (Pm)  
 KR TLY A - AVI 273 (67) + *Halosarpheia marina* 19-12-93 - (Pm)  
 KR TLY A - BRU 245 (67) + *Halocyphina villosa* 19-12-93 - (Pm)  
 KR TLY A - BRU 246 (67) + *Halocyphina villosa* + *Halosarpheia marina* 19-12-93 - (Pm)  
 KR Vad - BRU 249 (67) + *Savoryella lignicola* 26-12-93 - (Pm)  
 KR Vad - BRU 255 (67) + *Cirrenalia pygmea* 26-12-93 - (Pm)  
 KR Dha-A - INT 486 (67) 27-12-93 - (Pm)  
 KR Dha-A - INT 489 (67) 27-12-93 - (Pm)  
 KR Kad A - ACN 203 (67) + *Halosarpheia marina* 16-01-94 - (Pm)  
 KR Kad A - INT 493 (67) + *Lignincola laevis* 16-01-94 - (Pm)  
 KR Kad A - INT 499 (67) + *Lulworthia grandispora* + *Halocyphina villosa* 16-01-94 - (Pm)  
 KR TLY B - ACN 210 (67) + *Aniptodera chesapeakeensis* 23-01-94 - (Pm)  
 KR TLY A - AVI 287 (67) + *Leptosphaeria australiensis* 23-01-94 - (Pm)  
 KR TLY A - AVI 289 (67) + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY A - BRU 256 (67) + *Cirrenalia pygmea* + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
 KR TLY A - BRU 258 (67) + *Halosarpheia marina* + *Cirrenalia pygmea* 23-01-94 - (Pm)  
 KR TLY A - INT 500 (67) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 23-01-94 - (Pm)  
 KR TLY A - AVI 295 (67) + *Leptosphaeria australiensis* 27-02-94 - (Prm)  
 KR TLY A - BRU 259 (67) + *Lignincola laevis* 27-02-94 - (Prm)

KR TLY A - INT 515 (67) + *Lulworthia* sp. I 27-02-94 - (Prm)  
 KR TLY A - INT 516 (67) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 27-02-94 - (Prm)  
 KR Edk - AVI 297 (67) + *Lulworthia* sp. I 06-03-94 - (Prm)  
 KR Edk - AVI 299 (67) + *Lulworthia* sp. I 06-03-94 - (Prm)  
 KR Edk - AVI 300 (67) + *Aniptodera chesapeakeensis* 06-03-94 - (Prm)  
 KR Edk - AVI 302 (67) + *Verruculina enalia* + *Ascochyta* sp. + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR Edk - RHI 198 (67) + *Lulworthia grandispora* + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR Edk - RHI 199 (67) + *Lulworthia grandispora* + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR Edk - RHI 200 (67) + *Dactylospora haliotrepha* + *Halosarpheia marina* + *Halocyphina villosa* 06-03-94 - (Prm)  
 KR Edk - RHI 203 (67) + *Halocyphina villosa* + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR TLY B - AVI 308 (67) + *Halosarpheia marina* + *Periconia prolifica* + *Halosarpheia viscosa* 20-03-94 - (Prm)  
 KR TLY B - AVI 309 (67) + *Lulworthia grandispora* 20-03-94 - (Prm)  
 KR TLY A - BRU 271 (67) + *Trichocladium alopallonellum* 20-03-94 - (Prm)  
 KR TLY B - INT 532 (67) + *Halosarpheia marina* + *Lulworthia* sp. III + *Lignincola laevis* 20-03-94 - (Prm)  
 KR TLY B - INT 534 (67) + *Halocyphina villosa* + *Leptosphaeria australiensis* 20-03-94 - (Prm)  
 KR TLY B - INT 537 (67) + *Lulworthia grandispora* + *Halocyphina villosa* 20-03-94 - (Prm)  
 KR TLY A - RHI 205 (67) + *Lulworthia grandispora* 20-03-94 - (Prm)  
 KR TLY A - RHI 207 (67) + *Leptosphaeria australiensis* 20-03-94 - (Prm)  
 KR Kav - AVI 312 (67) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - AVI 316 (67) + *Aniptodera haispora* + *Halocyphina villosa* + *Halosarpheia marina* + *Aniptodera haispora* 15-04-94 - (Prm)  
 KR Kav - AVI 321 (67) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* + *Halocyphina villosa* 15-04-94 - (Prm)  
 KR Kav - INT 546 (67) + *Cirrenalia macrocephala* + *Halosarpheia retorquens* 15-04-94 - (Prm)  
 KR Kav - INT 547 (67) + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - RHI 218 (67) + *Halosarpheia abonnis* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - RHI 220 (67) + *Halosarpheia marina* + *Aigialus parvus* 15-04-94 - (Prm)  
 KR TLY A - AVI 327 (67) + *Lulworthia grandispora* 15-05-94 - (Prm)  
 KR TLY A - BRU 289 (67) + *Verruculina enalia* + *Lulworthia grandispora* 15-05-94 - (Prm)  
 KR TLY A - INT 555 (67) + *Halosarpheia marina* + *Zalerion maritimum* 15-05-94 - (Prm)

*Marinosphaera mangrovei* was first described by Hyde (1989) from Sumatra. Subsequently it has been recorded from Malaysia (Jones & Kuthubutheen, 1989), Brunei (Hyde, 1990a), Singapore (Tan, Leong & Jones, 1989), Hawaii (Kohlmeyer & Volkmann-Kohlmeyer, 1993), Hong Kong & Macau (Vrijmoed, Hyde & Jones, 1994), and India (Sarma & Vittal, 2000, 2001; Sarma, Hyde & Vittal 2001). Read *et al.* (1995) reported the presence of chain-like, septate paraphyses in the

ascomata of this species. During the present study, in majority of the cases, paraphyses could not be seen in mature ascomata and those observed were not chain-like, but filamentous with only slightly swollen cells. In all other features, the Kerala collections agreed with *M. mangrovei*.

***Ocostaspora apilongissima*** E. B. G. Jones, R. G. Johnson & S. T. Moss in Bot. Mar. 26: 354 (1983).

Taxonomic Position: Halosphaeriales, Halosphaeriaceae

**Fig. 45**

Ascomata perithecial, 200-250 x 120-200  $\mu\text{m}$ , coffee-brown to black, globose to subglobose, solitary, fully or partially immersed, membranous. Neck 200-280 (300) x 30-40  $\mu\text{m}$ ; ostiole lined with periphyses. Peridium 30-35  $\mu\text{m}$  thick, multilayered (4-5), with thin-walled cells. Asci 35-65 x 10-15  $\mu\text{m}$ , eight-spored, unitunicate, thin-walled, clavate or subcylindrical, short-pedunculate, early deliquescing. Paraphyses not observed. Ascospores 12-16 x 6-7  $\mu\text{m}$ , ellipsoidal, uniseptate, slightly constricted at the septum, hyaline, with polar and equatorial appendages; equatorial appendages 3-7  $\mu\text{m}$  long; polar appendages 12  $\mu\text{m}$  or more; both type with broad base and tapering apex.

**Materials examined**

KR TLY B - RHI 91 (68) + *Halosarpheia marina* + *Manglicola* sp. 18-04-93 - (Prm)

KR TLY A - RHI 98 (68) + *Marinosphaera mangrovei* 09-05-93 - (Prm)



The Kerala collections of this species are indistinguishable from the type described by Jones, Johnson & Moss (1983) except for the slightly shorter spores of the former. The morphology of the ascospores of this fungus is very similar to that of *Halosphaeria appendiculata* Linder. The latter species has larger ascospores with equally sized polar and equatorial appendages. The appendage ontogeny is also different in these two species. This species has been recorded from Hawaii (Kohlmeyer & Volkmann-Kohlmeyer, 1989), Australia (Kohlmeyer & Volkmann-Kohlmeyer, 1991b) and Mexico (Hyde, 1992d). This is the first record of this fungus from India.

***Payosphaeria minuta*** W.F. Leong in Bot. Mar. 33: 511 (1990).

Taxonomic Position: Hypocreales (inc. sed.)

**Fig. 46**

Ascomata perithecial, 140-190 x 70-90  $\mu\text{m}$ , oval, superficial, ostiolate, papillate, hyaline. Peridium 7.5-13  $\mu\text{m}$  thick, multilayered, composed of thin-walled cells. Neck 40-80  $\mu\text{m}$  long, 20-30  $\mu\text{m}$  wide at the base, 15-25  $\mu\text{m}$  wide at the apex, cylindrical, hyaline. Asci 40-70 x 4-8  $\mu\text{m}$ , eight-spored, cylindrical, pedunculate, unitunicate, thin-walled, developing at the base of the ascoma. Ascospores 7.5-9 x 5-6  $\mu\text{m}$ , subglobose to globose, hyaline, thin-walled, containing a few oil globules, often budding off secondary spores.

## Materials examined

KR TLY B - INT 166 (69) + *Halocyphina villosa* + *Halosarpheia marina* + *Cirrenalia basiminuta* 29-11-92 - (Pm)

KR TLY A - AVI 152 (69) + *Aniptodera chesapeakensis* 18-04-93 - (Prm)

Except for the absence of paraphyses, the present collection is indistinguishable from *Payosphaeria minuta* reported from Mandai mangrove, Singapore by Leong *et al.* (1990). As this fungus was seen only twice during the present study, the author is not sure whether the absence of paraphyses is a consistent feature. As pointed out by Leong *et al.* (l.c), the taxonomic position of this genus is not clear as it shows some similarities to both Trichosphaeriales and Nectriales. This is the first record of this fungus from India.

***Pleospora pelagica*** T. W. Johnson in Mycologia 48: 504 (1956).

Taxonomic Position: Dothideales, Pleosporaceae

### Fig. 47

Ascomata perithecial, 280-460 x 180-450  $\mu\text{m}$ , brown to dark brown, subglobose or ellipsoidal, immersed, ostiolate, short-papillate. Peridium 30-40  $\mu\text{m}$  thick, multilayered. Neck 80-150 x 60-100  $\mu\text{m}$ , projecting above the substratum as a dome-shaped structure; ostiolar canal filled with paraphyses. Pseudoparaphyses persistent, simple or branched, septate, cylindrical. Asci 85-170 x 20-22.5  $\mu\text{m}$ , eight-spored, clavate or subcylindrical, short-pedunculate, bitunicate, without any apical pore or apparatus, developing at the base of the ascoma. Ascospores 42.5-50 x 7.5-11  $\mu\text{m}$ , yellowish brown, partly biseriate, fusiform, muriform with 8-9 (10)

transverse septa and one or two longitudinal septa in central segments, slightly constricted at the septa below the middle of the spore.

### Materials examined

KR Kad A - AVI 1 (70) + *Aniptodera chesapeakensis* 19-04-92 - (Pm)

KR TLY A - AVI 68 (70) + *Halocyphina villosa* + *Aniptodera* sp. 25-10-92 - (Pm)

KR TLY A - AVI 86 (70) + *Periconia prolifica* + *Zalerion varium* 29-11-92 - (Pm)

KR TLY C - AVI 159 (70) + *Halosarpheia marina* + *Cirrenalia basiminuta* 18-04-93 - (Pm)

KR TLY C - AVI 194 (70) + *Marinosphaera mangrovei* + *Aniptodera longispora* 18-07-93 - (M)

KR Vad - AVI 279 (70) + *Cirrenalia pygmaea* 26-12-93 - (Pm)

KR Kad A - AVI 285 (70) + + *Halocyphina villosa* 16-01-94 - (Pm)

*Pleospora pelagica* is a rather rare species known previously from Florida, North Carolina (Kohlmeyer & Kohlmeyer, 1979) and Mexico (Hyde, 1992d). When compared to the description of the species given by Kohlmeyer & Kohlmeyer (1979), the Kerala collections had slightly larger ascomata, shorter asci and narrower ascospores.

***Salsuginea ramicola*** K.D. Hyde in Bot. Mar. 34: 316 (1991).

Taxonomic Position: Dothideales (inc. sed.)

### Fig. 48

Ascomata perithecial, 700-2000 x 260-920  $\mu\text{m}$ , projecting above the surface of the substratum, with a central ostiole; ostiolar canal internally lined with periphyses. Peridium 50-80 (110)  $\mu\text{m}$  thick, multilayered, with thick-walled cells. Hamathecium composed of numerous anastomosing delicate hyphae, 1-1.5  $\mu\text{m}$  wide. Asci 325-550 x 27.5-32.5  $\mu\text{m}$ , 8-spored, bitunicate, cylindrical, pedunculate, having an apical apparatus with a prominent ring and an ocular chamber at the apex; ocular

chamber 3-5- $\mu\text{m}$  diam., Ascospores 55-70-28  $\mu\text{m}$ , uniseptate, unequally two-celled, obovoid, highly constricted at the septa, light brown to brownish yellow, smooth-walled, hyaline; apical chambers 4-6 x 4-6  $\mu\text{m}$ .

### Materials examined

KR Vad - AVI 31 (75) + *Aniptodera chesapeakensis* 02-08-92 - (M)

KR TLY A - AVI 111 (75) + *Lulworthia grandispora* + *Aigialus parvus* 10-01-93 - (Pm)

The genus *Salsuginea* was first described by Hyde (1991a). It is very close to the genus *Helicascus* but differs in having larger ascospores with more pronounced apical hyaline chambers and asci with a ring around the apical ocular chamber. The Kerala collections agree with *S. ramicola* in almost all characters. This is the first report of this fungus from India.

***Savoryella lignicola*** E. B. G. Jones & R. A. Eaton. in Trans. Br. Mycol. Soc. 52: 162 (1969).

Taxonomic Position: ? Sordariales

### Fig. 49

Ascomata perithecial, 180-300 x 110-200  $\mu\text{m}$ , subglobose or ellipsoidal, completely or partly immersed or superficial, ostiolate, papillate, pale brown to dark brown. Neck 60-120 x 40-60  $\mu\text{m}$ , light brown to brown; ostiolar canal lined with periphyses. Peridium 12-15 (20)  $\mu\text{m}$  thick, multilayered (3-4), with thick-walled, elongate cells. Paraphyses 120-140 x 1.5-2  $\mu\text{m}$ , seen only in young ascomata, few in number, evanescent, Asci 90-140 x 12.5-25  $\mu\text{m}$ , eight-spored,

cylindrical or clavate-pedunculate, unitunicate, persistent, with an apical pore. Ascospores 22-30(32) x 10-13 µm, biseriate, ellipsoidal, triseptate, slightly constricted at the septa, central cells larger and dark brown, polar cells smaller and hyaline.

### Materials examined

- KR Ppd - DRW 4 (71) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 19-04-92 - (Prm)  
KR Kad A - INT 4 (71) + *Verruculina enalia* + *Lignincola laevis* 19-04-92 - (Prm)  
KR Ppd - INT 24 (71) + *Lulworthia* sp. V 19-04-92 - (Prm)  
KR Ppd - INT 26 (71) + *Lignincola laevis* 19-04-92 - (Prm)  
KR Mah-A - ACN 7 (71) + *Aniptodera chesapeakeensis* 03-05-92 - (Prm)  
KR Mah-A - ACN 11 (71) 03-05-92 - (Prm)  
KR Mah-A - AVI 10 (71) + *Dactylospora haliotrepha* 03-05-92 - (Prm)  
KR Mah-A - AVI 13 (71) + *Dactylospora haliotrepha* 03-05-92 - (Prm)  
KR Mah-A - AVI 15 (71) + *Dactylospora haliotrepha* 03-05-92 - (Prm)  
KR Mah-A - BRU 1 (71) + *Cirrenalia pygmaea* 03-05-92 - (Prm)  
KR Mah-A - INT 32 (71) + *Halosarpheia marina* + *Leptosphaeria australiensis* 03-05-92 - (Prm)  
KR Vad - ACN 19 (71) + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 02-08-92 - (M)  
KR Vad - ACN 21 (71) + *Periconia prolifica* 02-08-92 - (M)  
KR Vad - AVI 35 (71) + *Halosarpheia marina* 02-08-92 - (M)  
KR Val - INT 66 (71) + *Verruculina enalia* + *Marinosphaera mangrovei* 09-08-92 - (M)  
KR TLY A - AVI 43 (71) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 23-08-92 - (M)  
KR TLY A - BRU 37 (71) + *Halocyphina villosa* + *Savoryella paucispora* 23-08-92 - (M)  
KR Dha-A - DRW 13 (71) + *Periconia prolifica* 23-08-92 - (M)  
KR TLY A - INT 74 (71) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 23-08-92 - (M)  
KR TLY A - RHI 16 (71) + *Halocyphina villosa* 23-08-92 - (M)  
KR Mah-A - AVI 46 (71) + *Aniptodera chesapeakeensis* 06-09-92 - (M)  
KR Mah-A - AVI 48 (71) + *Halocyphina villosa* 06-09-92 - (M)  
KR Mah-A - BRU 41 (71) + *Marinosphaera mangrovei* 06-09-92 - (M)  
KR Mah-A - BRU 44 (71) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmaea* 06-09-92 - (M)  
KR Kad A - INT 127 (71) + *Halosarpheia marina* 13-09-92 - (M)  
KR TLY A - AVI 58 (71) + *Marinosphaera mangrovei* + *Halocyphina villosa* + *Halosarpheia marina* 27-09-92 - (M)  
KR TLY A - BRU 46 (71) + *Halocyphina villosa* + *Lignincola longirostris* 27-09-92 - (M)  
KR Bey - DRW 14 (71) + *Leptosphaeria australiensis* 02-10-92 - (Pm)  
KR Bey - INT 135 (71) + *Aniptodera chesapeakeensis* 02-10-92 - (Pm)  
KR TLY C - ACN 46 (71) + *Marinosphaera mangrovei* 25-10-92 - (Pm)  
KR TLY C - ACN 47 (71) + *Periconia prolifica* 25-10-92 - (Pm)  
KR TLY C - ACN 48 (71) + *Periconia prolifica* + *Marinosphaera mangrovei* 25-10-92 - (Pm)

KR Edk - ACN 52 (71) + *Aniptodera chesapeakeensis* + *Periconia prolifica* 15-11-92 - (Pm)  
 KR Edk - ACN 54 (71) + *Dendryphiella salina* 15-11-92 - (Pm)  
 KR Edk - ACN 57 (71) + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 15-11-92 - (Pm)  
 KR Edk - ACN 58 (71) + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - ACN 60 (71) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR Edk - BRU 66 (71) + *Lulworthia grandispora* 15-11-92 - (Pm)  
 KR Edk - INT 156 (71) + *Halosarpheia retorquens* 15-11-92 - (Pm)  
 KR Edk - INT 161 (71) + *Periconia prolifica* + *Aniptodera chesapeakeensis* 15-11-92 - (Pm)  
 KR TLY B - ACN 62 (71) + *Halosarpheia marina* + *Periconia prolifica* 29-11-92 - (Pm)  
 KR TLY B - ACN 63 (71) + *Marinosphaera mangrovei* + *Halosarpheia marina* 29-11-92 - (Pm)  
 KR TLY C - AVI 92 (71) + *Cirrenalia basiminuta* + *Periconia prolifica* 29-11-92 - (Pm)  
 KR Azi - DRW 24 (71) + *Antennospora quadricomuta* 20-12-92 - (Pm)  
 KR Azi - SBI 17 (71) + *Halosarpheia marina* 20-12-92 - (Pm)  
 KR TLY C - AVI 97 (71) + *Halocyphina villosa* + *Halosarpheia marina* + *Cirrenalia pygmea* 27-12-92 - (Pm)  
 KR Mah-A - ACN 72 (71) + *Halosarpheia marina* 03-01-93 - (Pm)  
 KR Mah-A - ACN 73 (71) + *Periconia prolifica* 03-01-93 - (Pm)  
 KR Mah-A - ACN 79 (71) + *Halosarpheia marina* 03-01-93 - (Pm)  
 KR Mah-A - ACN 80 (71) + *Cirrenalia pygmea* 03-01-93 - (Pm)  
 KR Mah-A - AVI 105 (71) + *Leptosphaeria australiensis* 03-01-93 - (Pm)  
 KR Mah-A - BRU 88 (71) + *Lulworthia grandispora* + *Halocyphina villosa* 03-01-93 - (Pm)  
 KR Mah-A - BRU 89 (71) + *Halorosellinia oceanica* + *Halocyphina villosa* 03-01-93 - (Pm)  
 KR Mah-A - BRU 95 (71) + *Lignincola laevis* + *Halocyphina villosa* 03-01-93 - (Pm)  
 KR Mah-A - INT 194 (71) + *Halosarpheia marina* + *Marinosphaera mangrovei* 03-01-93 - (Pm)  
 KR TLY C - ACN 82 (71) + *Halosarpheia marina* 10-01-93 - (Pm)  
 KR TLY C - AVI 114 (71) + *Halocyphina villosa* + *Halosarpheia viscosa* 10-01-93 - (Pm)  
 KR TLY C - AVI 115 (71) + *Lulworthia* sp. 1 + *Halosarpheia marina* 10-01-93 - (Pm)  
 KR TLY A - BRU 96 (71) + *Vermiculina enalia* + *Lulworthia grandispora* 10-01-93 - (Pm)  
 KR TLY A - BRU 97 (71) + *Lulworthia* sp. 1 + *Halosarpheia marina* + *Marinosphaera mangrovei* 10-01-93 - (Pm)  
 KR TLY C - BRU 99 (71) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 10-01-93 - (Pm)  
 KR Ppd - DRW 30 (71) + Unidentified ascomycetes VIII 31-01-93 - (Pm)  
 KR Ppd - DRW 32 (71) + *Halosarpheia marina* 31-01-93 - (Pm)  
 KR Ppd - SBI 19 (71) + *Corollospora filiformis* 31-01-93 - (Pm)  
 KR Ppd - SBI 21 (71) + *Corollospora filiformis* 31-01-93 - (Pm)  
 KR Azi - DRW 38 (71) + *Aniptodera chesapeakeensis* 13-02-93 - (Pm)  
 KR Azi - DRW 39 (71) + *Aniptodera chesapeakeensis* + *Lignincola laevis* + *Halosarpheia marina* 13-02-93 - (Pm)  
 KR Azi - DRW 43 (71) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 13-02-93 - (Pm)  
 KR Azi - SBI 30 (71) + *Halosarpheia marina* 13-02-93 - (Pm)  
 KR Bek - DRW 46 (71) 14-02-93 - (Pm)  
 KR TLY C - ACN 86 (71) + *Aniptodera chesapeakeensis* 21-02-93 - (Pm)  
 KR TLY C - BRU 109 (71) + *Halosarpheia marina* 21-02-93 - (Pm)  
 KR Bey - DRW 50 (71) + *Aigialus grandis* 28-02-93 - (Pm)  
 KR TLY C - ACN 89 (71) + *Cirrenalia basiminuta* 28-03-93 - (Pm)

KR TLY C - AVI 124 (71) + *Periconia prolifica* 28-03-93 - (Prm)  
 KR TLY A - AVI 127 (71) + *Dactylospora haliotrepha* + *Lulworthia grandispora* 28-03-93 - (Prm)  
 KR TLY A - BRU 116 (71) + *Halosarpheia marina* + *Verruculina enalia* 28-03-93 - (Prm)  
 KR TLY A - BRU 117 (71) + *Halosarpheia marina* + *Lulworthia grandispora* + *Lignincola laevis* 28-03-93 - (Prm)  
 KR Vad - AVI 132 (71) + *Verruculina enalia* + *Halocyphina villosa* 04-04-93 - (Prm)  
 KR Vad - BRU 118 (71) + *Halosarpheia marina* 04-04-93 - (Prm)  
 KR Vad - BRU 119 (71) + *Halosarpheia marina* 04-04-93 - (Prm)  
 KR Vad - BRU 121 (71) + *Marinosphaera mangrovei* + *Halocyphina villosa* 04-04-93 - (Prm)  
 KR Vad - INT 240 (71) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Cirrenalia macrocephala* + *Dactylospora haliotrepha* 04-04-93 - (Prm)  
 KR Val - ACN 98 (71) + *Halosarpheia marina* 11-04-93 - (Prm)  
 KR Val - BRU 126 (71) + *Lignincola laevis* 11-04-93 - (Prm)  
 KR Val - BRU 127 (71) + *Lignincola laevis* 11-04-93 - (Prm)  
 KR Val - BRU 128 (71) + *Lignincola laevis* 11-04-93 - (Prm)  
 KR Val - BRU 129 (71) + *Halosarpheia marina* 11-04-93 - (Prm)  
 KR Val - BRU 130 (71) + *Halosarpheia marina* 11-04-93 - (Prm)  
 KR Che - ACN 104 (71) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR Che - ACN 110 (71) + *Halosarpheia marina* + *Halosarpheia viscosa* 17-04-93 - (Prm)  
 KR Che - AVI 146 (71) + *Halosarpheia marina* + *Lulworthia grandispora* 17-04-93 - (Prm)  
 KR Che - AVI 147 (71) + *Marinosphaera mangrovei* + *Lulworthia grandispora* 17-04-93 - (Prm)  
 KR Che - AVI 150 (71) + *Verruculina enalia* + *Marinosphaera mangrovei* 17-04-93 - (Prm)  
 KR Che - AVI 151 (71) + *Halorosellinia oceanica* + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR Che - INT 255 (71) + *Halosarpheia marina* + *Aigialus parvus* 17-04-93 - (Prm)  
 KR Che - INT 258 (71) + *Halocyphina villosa* 17-04-93 - (Prm)  
 KR Che - RHI 84 (71) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR Che - RHI 85 (71) + *Halosarpheia ratnagiriensis* + *Verruculina enalia* 17-04-93 - (Prm)  
 KR TLY C - ACN 116 (71) + *Cirrenalia pygmea* 18-04-93 - (Prm)  
 KR TLY C - AVI 158 (71) + *Halosarpheia retorquens* + *Halocyphina villosa* 18-04-93 - (Prm)  
 KR TLY C - BRU 148 (71) + *Zalerion varium* 18-04-93 - (Prm)  
 KR Dha-A - DRW 58 (71) + *Lindra hawaiiensis* 18-04-93 - (Prm)  
 KR Dha-A - DRW 61 (71) + *Cirrenalia pygmea* 18-04-93 - (Prm)  
 KR Dha-A - INT 270 (71) + *Halocyphina villosa* 18-04-93 - (Prm)  
 KR Dha-A - INT 274 (71) + *Antennospora quadricornuta* 18-04-93 - (Prm)  
 KR Tik - DRW 63 (71) + *Antennospora quadricornuta* 25-04-93 - (Prm)  
 KR TLY A - AVI 162 (71) + *Verruculina enalia* + *Marinosphaera mangrovei* 09-05-93 - (Prm)  
 KR TLY A - AVI 163 (71) + *Leptosphaeria australiensis* + *Marinosphaera mangrovei* 09-05-93 - (Prm)  
 KR TLY A - BRU 149 (71) + *Verruculina enalia* 09-05-93 - (Prm)  
 KR TLY C - BRU 153 (71) + *Aniptodera chesapeakeensis* 09-05-93 - (Prm)  
 KR TLY C - BRU 154 (71) + *Aniptodera chesapeakeensis* 09-05-93 - (Prm)  
 KR Kad A - AVI 171 (71) + *Lulworthia grandispora* 23-05-93 - (Prm)  
 KR Kad A - AVI 173 (71) + *Savoryella* sp. 23-05-93 - (Prm)  
 KR TLY C - ACN 130 (71) + *Zalerion varium* + *Halosarpheia marina* 20-06-93 - (Prm)

KR TLY C - AVI 178 (71) + *Halosarpheia marina* + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR Edk - ACN 136 (71) + *Lignincola longirostris* 11-07-93 - (M)  
 KR Edk - BRU 170 (71) + *Aniptodera chesapeakeensis* 11-07-93 - (M)  
 KR Edk - RHI 113 (71) + *Aniptodera chesapeakeensis* 11-07-93 - (M)  
 KR Edk - RHI 115 (71) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Azi - DRW 76 (71) + *Halorosellinia oceanica* + *Aniptodera chesapeakeensis* 17-07-93 - (M)  
 KR Azi - INT 318 (71) + *Lulworthia grandispora* 17-07-93 - (M)  
 KR TLY A - AVI 191 (71) + *Halocyphina villosa* 18-07-93 - (M)  
 KR TLY A - BRU 172 (71) + *Halosarpheia marina* + *Halocyphina villosa* 18-07-93 - (M)  
 KR TLY A - INT 326 (71) 18-07-93 - (M)  
 KR Kav - ACN 140 (71) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - ACN 143 (71) + *Periconia prolifica* + 19-07-93 - (M)  
 KR Kav - ACN 146 (71) 19-07-93 - (M)  
 KR Kav - AVI 202 (71) + *Halosarpheia marina* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - AVI 204 (71) + *Halocyphina villosa* + *Marinosphaera mangrovei* 19-07-93 - (M)  
 KR Kav - INT 330 (71) + *Halosarpheia marina* + *Lulworthia grandispora* 19-07-93 - (M)  
 KR Kav - INT 331 (71) + *Periconia prolifica* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - INT 335 (71) + *Halocyphina villosa* + *Periconia prolifica* 19-07-93 - (M)  
 KR Mah-A - AVI 209 (71) + *Halosarpheia marina* 12-08-93 - (M)  
 KR Bey - INT 350 (71) 15-08-93 - (M)  
 KR TLY C - BRU 202 (71) + *Halocyphina villosa* + *Lulworthia grandispora* 22-08-93 - (M)  
 KR TLY A - INT 358 (71) + *Halocyphina villosa* + *Cirrenalia pygmaea* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR Che - ACN 163 (71) + *Periconia prolifica* + *Lignincola laevis* 05-09-93 - (M)  
 KR Che - ACN 164 (71) + *Cirrenalia pygmaea* + *Aniptodera chesapeakeensis* 05-09-93 - (M)  
 KR Che - AVI 229 (71) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 05-09-93 - (M)  
 KR Che - AVI 232 (71) + *Lindra hawaiiensis* + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che - AVI 235 (71) + *Periconia prolifica* + *Halocyphina villosa* 05-09-93 - (M)  
 KR Che - BRU 206 (71) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che - BRU 208 (71) + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che - INT 370 (71) + *Marinosphaera mangrovei* + *Verruculina enalia* 05-09-93 - (M)  
 KR Che - INT 373 (71) + *Leptosphaeria australiensis* + *Halocyphina villosa* 05-09-93 - (M)  
 KR Tik - DRW 87 (71) + *Lulworthia grandispora* 18-09-93 - (M)  
 KR Tik - INT 390 (71) + *Halosarpheia marina* 18-09-93 - (M)  
 KR TLY C - ACN 169 (71) + *Halosarpheia retorquens* 19-09-93 - (M)  
 KR Ppd - SBI 68 (71) + *Antennospora quadricornuta* 26-09-93 - (M)  
 KR Bek - DRW 98 (71) + *Lulworthia grandispora* 03-10-93 - (Pm)  
 KR Bek - INT 413 (71) + *Antennospora quadricornuta* 03-10-93 - (Pm)  
 KR Kav - AVI 247 (71) + *Halocyphina villosa* 30-10-93 - (Pm)  
 KR Kav - AVI 248 (71) + *Aniptodera haispora* + *Halocyphina villosa* + *Lulworthia* sp. III 30-10-93 - (Pm)  
 KR Kav - AVI 249 (71) + *Lulworthia* sp. III + *Lignincola laevis* + *Halosarpheia minuta* 30-10-93 - (Pm)  
 KR Kav - BRU 224 (71) + *Halocyphina villosa* + *Lignincola laevis* + *Cladosporium* sp. 30-10-93 - (M)  
 KR Kav - BRU 225 (71) + *Lignincola laevis* + *Dactylospora haliotrepha* + *Leptosphaeria australiensis* 30-10-93 - (M)



KR TLY B – INT 358 (71) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* + *Cirrenalia pygmaea* 22-08-93 - (M)  
 KR Kav - INT 421 (71) + *Halocyphina villosa* + *Halosarpheia abonnis* 30-10-93 - (Pm)  
 KR Tik - DRW 112 (71) + *Halocyphina villosa* 31-10-93 - (Pm)  
 KR Val - INT 457 (71) + *Periconia prolifica* + *Verruculina enalia* 05-12-93 - (Pm)  
 KR Val - RHI 166 (71) + *Lulworthia grandispora* + *Verruculina enalia* 05-12-93 - (Pm)  
 KR Che - ACN 188 (71) + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - ACN 191 (71) + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che - AVI 261 (71) + *Halocyphina villosa* + *Halosarpheia abonnis* 18-12-93 - (Pm)  
 KR Che - AVI 263 (71) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - BRU 236 (71) + *Lulworthia grandispora* + *Halocyphina villosa* 18-12-93 - (Pm)  
 KR Che - INT 461 (71) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmaea* 18-12-93 - (Pm)  
 KR Che - INT 463 (71) + *Periconia prolifica* + *Halocyphina villosa* 18-12-93 - (Pm)  
 KR Che - RHI 175 (71) + *Halocyphina villosa* + *Verruculina enalia* 18-12-93 - (Pm)  
 KR Che - RHI 181 (71) + *Halosarpheia viscosa* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR Vad - ACN 197 (71) + *Aniptodera chesapeakeensis* 26-12-93 - (Pm)  
 KR Vad - ACN 198 (71) + *Halosarpheia marina* 26-12-93 - (Pm)  
 KR Vad - BRU 249 (71) + *Marinosphaera mangrovei* 26-12-93 - (Pm)  
 KR Vad - INT 474 (71) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Cirrenalia macrocephala* 26-12-93 - (Pm)  
 KR Dha-A - DRW 114 (71) 27-12-93 - (Pm)  
 KR Dha-A - DRW 118 (71) 27-12-93 - (Pm)  
 KR Kad A - ACN 204 (71) + *Halosarpheia marina* 16-01-94 - (Pm)  
 KR Kad A - AVI 282 (71) + *Lulworthia grandispora* 16-01-94 - (Pm)  
 KR Kad A - AVI 286 (71) + *Halorosellinia oceanica* + *Lulworthia grandispora* 16-01-94 - (Pm)  
 KR Kad A - INT 491 (71) + *Halosarpheia marina* + *Savoryella paucispora* + *Savoryella* sp. I 16-01-94 - (Pm)  
 KR TLY B - ACN 212 (71) + *Halosarpheia viscosa* 23-01-94 - (Pm)  
 KR TLY A - AVI 288 (71) + *Halosarpheia marina* + *Lindra hawaiiensis* 23-01-94 - (Pm)  
 KR Edk - ACN 213 (71) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 06-03-94 - (Prm)  
 KR Edk - ACN 218 (71) + *Aniptodera chesapeakeensis* 06-03-94 - (Prm)  
 KR Edk - INT 526 (71) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 06-03-94 - (Prm)  
 KR Kav - ACN 222 (71) + *Aniptodera chesapeakeensis* 15-04-94 - (Prm)  
 KR Kav - ACN 225 (71) + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - AVI 314 (71) + *Lulworthia grandispora* + *Dactylospora haliotrepha* 15-04-94 - (Prm)  
 KR Kav - AVI 319 (71) + *Lignincola laevis* + *Lindra hawaiiensis* 15-04-94 - (Prm)  
 KR Kav - AVI 321 (71) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Marinosphaera mangrovei* 15-04-94 - (Prm)  
 KR TLY A - AVI 324 (71) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 17-04-94 - (Prm)  
 KR TLY A - BRU 286 (71) + *Halosphaeria hamata* + *Cirrenalia basiminuta* 17-04-94 - (Prm)  
 KR TLY A - INT 548 (71) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 17-04-94 - (Prm)  
 KR TLY A - AVI 326 (71) + *Verruculina enalia* + *Lignincola laevis* 15-05-94 - (Prm)  
 KR TLY A - BRU 290 (71) + *Halosarpheia marina* + *Lignincola laevis* 15-05-94 - (Prm)  
 KR Bek - DRW 120 (71) + *Arenariomyces majusculus* 24-07-94 - (M)  
 KR Bek - DRW 124 (71) + *Antennospora quadricornuta* 24-07-94 - (M)  
 KR Bek - DRW 127 (71) + *Zalerion maritimum* 24-07-94 - (M)

KR Bek - INT 560 (71) + *Zalerion maritimum* 24-07-94 - (M)

KR Bek - INT 563 (71) + *Trichocladium alopallonellum* 24-07-94 - (M)

KR Bek - INT 564 (71) + *Aniptodera chesapeakensis* 24-07-94 - (M)

KR Bek - INT 565 (71) + *Zalerion maritimum* 24-07-94 - (M)

*Savoryella lignicola*, the type species of the genus, was first described by Jones & Eaton (1969) from the Great Britain. Subsequently, it has been recorded from India (Raghukumar, 1973; Borse, 1988), Japan (Tubaki & Ito, 1973), Sri Lanka (Koch, 1982), Brunei (Hyde, 1988a), Singapore (Tan, Leong & Jones, 1989) and Hawaii (Volkman-Kohlmeyer & Kohlmeyer, 1993). Interestingly, the original discovery of this species was from a fresh water habitat (Jones & Eaton, 1969). Now this species is considered as a facultative marine fungus (Kohlmeyer & Kohlmeyer, 1979).

***Savoryella paucispora*** (Cribb & J. W. Cribb) J. Koch in Nordic. J. Bot. 2: 169 (1982).

*Leptosphaeria paucispora* Cribb & J. W. Cribb in Univ. Queensl. Pap., Dep. Bot. 4:41(1960)

Taxonomic Position: ? Sordariales

### Fig. 50

Ascomata, perithecial, 150-300 x 130-140  $\mu\text{m}$ , ellipsoidal, immersed or superficial, ostiolate, papillate, dark brown, solitary. Neck 60-150 x 40-50  $\mu\text{m}$ , stout, light brown. Peridium 20-30  $\mu\text{m}$  thick, multilayered (3-6), with thick-walled elongate cells. Paraphyses 110-162.5 x 1-1.5  $\mu\text{m}$ , few in number, evanescent. Asci 120-155 x 19-26  $\mu\text{m}$ , 2-spored, cylindrical or clavate, short-pedunculate, unitunicate,

with an apical thickening and a pore. Ascospores 37.5-52.5 (58) x 14-18 (20)  $\mu\text{m}$ , ellipsoidal, triseptate, slightly constricted at the septa; central cells brown, polar cells hyaline and verrucose.

### Materials examined

- KR Vad - AVI 34 (72) + *Aniptodera chesapeakensis* 02-08-92 - (M)  
KR TLY A - AVI 44 (72) + *Halocyphina villosa* + *Halosarpheia retorquens* 23-08-92 - (M)  
KR TLY A - AVI 45 (72) + *Halocyphina villosa* + *Marinosphaera mangrovei* 23-08-92 - (M)  
KR TLY A - BRU 37 (72) + *Halocyphina villosa* + *Savoryella lignicola* 23-08-92 - (M)  
KR Kad A - INT 126 (72) + *Verruculina enalia* 13-09-92 - (M)  
KR TLY A - AVI 59 (72) + *Halosarpheia marina* + *Lignincola laevis* 27-09-92 - (M)  
KR TLY A - INT 130 (72) + *Halosarpheia marina* + *Lulworthia grandispora* 27-09-92 - (M)  
KR Bey - DRW 17 (72) + *Lignincola longirostris* 02-10-92 - (Pm)  
KR Edk - BRU 65 (72) + *Lulworthia sp1* 15-11-92 - (Pm)  
KR TLY B - RHI 43 (72) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
KR Azi - DRW 21 (72) + *Halocyphina villosa* + *Antennospora quadricornuta* 20-12-92 - (Pm)  
KR Azi - INT 170 (72) + *Lulworthia grandispora* + *Halocyphina villosa* 20-12-92 - (Pm)  
KR Azi - INT 175 (72) + *Marinosphaera mangrovei* 20-12-92 - (Pm)  
KR Mah-A - AVI 101 (72) + *Aniptodera chesapeakensis* 03-01-93 - (Pm)  
KR Mah-A - INT 195 (72) + *Halosarpheia marina* + *Lulworthia grandispora* 03-01-93 - (Pm)  
KR TLY C - RHI 65 (72) + *Dactylospora haliotrepha* + *Halosphaeria hamata* + *Aigialus parvus* 28-03-93 - (Pm)  
KR Vad - INT 241 (72) + *Halosarpheia marina* + *Aniptodera chesapeakensis* + *Halosarpheia retorquens* 04-04-93 - (Pm)  
KR Che - RHI 79 (72) + *Cirrenalia pygmaea* + *Halocyphina villosa* 17-04-93 - (Pm)  
KR TLY B - AVI 156 (72) + *Lulworthia sp. I* + Unidentified ascomycetes VII 18-04-93 - (Pm)  
KR TLY C - RHI 94 (72) + *Aigialus grandis* + *Lignincola longirostris* 18-04-93 - (Pm)  
KR TLY C - AVI 195 (72) + *Halocyphina villosa* + *Verruculina enalia* 18-07-93 - (M)  
KR Mah-A - BRU 186 (72) + *Halosarpheia marina* 12-08-93 - (M)  
KR Mah-A - BRU 187 (72) + *Lulworthia sp. I* 12-08-93 - (M)  
KR Che - INT 372 (72) + *Aniptodera chesapeakensis* + *Halocyphina villosa* 05-09-93 - (M)  
KR Kav - ACN 176 (72) + *Lignincola laevis* + *Lindra hawaiiensis* + *Cirrenalia pygmaea* 30-10-93 - (Pm)  
KR Kav - BRU 226 (72) + *Halocyphina villosa* + *Leptosphaeria australiensis* + *Halosarpheia minuta* 30-10-93 - (Pm)  
KR Val - AVI 258 (72) + *Lulworthia grandispora* + Unidentified ascomycetes VII 05-12-93 - (Pm)  
KR Val - INT 458 (72) + *Marinosphaera mangrovei* + *Halocyphina villosa* 05-12-93 - (Pm)  
KR Che - INT 469 (72) + *Halosarpheia ratnagiriensis* + *Cirrenalia pygmaea* + *Lindra hawaiiensis* 18-12-93 - (Pm)  
KR Che - RHI 177 (72) + *Lindra hawaiiensis* + *Lignincola laevis* 18-12-93 - (Pm)  
KR Kad A - INT 491 (72) + *Halosarpheia marina* + *Savoryella lignicola* + *Savoryella sp.* 16-01-94 - (Pm)  
KR TLY A - AVI 296 (72) + *Aniptodera chesapeakensis* 27-02-94 - (Pm)  
KR Edk - BRU 265 (72) + *Halosarpheia marina* + *Lulworthia sp. I* 06-03-94 - (Pm)  
KR Edk - INT 522 (72) + *Halosarpheia marina* 06-03-94 - (Pm)

*Savoryella paucispora* was first described by Cribb & Cribb (1960) from Australia. Later it was found to be widely distributed in the tropical waters with reports from Sri Lanka (Koch, 1982), Brunei (Hyde, 1988a), Singapore (Leong, Tan & Jones, 1991) and Philippines (Jones, Uyenco & Foleosco, 1988). Cribb & Cribb (1960) described it as *Leptosphaeria* and it was Koch (1982) who transferred it to *Savoryella* because of the presence of unitunicate asci and absence of pseudoparaphyses. Jones & Hyde (1992) reported the presence of a non-amyloid apical thickening containing a pore at the apex of the ascus. This could be clearly seen in the present collections as well. Similarly, the verrucose nature of the apical cells of the ascospores, first reported by Kohlmeyer & Volkmann-Kohlmeyer (1991a) was also seen in the present collections.

### ***Savoryella* sp. I**

Taxonomic Position: ? Sordariales

#### **Fig. 51**

Ascomata perithecial, 140-340 x 100-180  $\mu\text{m}$ , fully or partly immersed, globose or pyriform, solitary, ostiolate, papillate, dark brown to black. Neck 55-180 x 50-65  $\mu\text{m}$ , projecting above the substratum, ostiolate, cylindrical, centrally or laterally attached. Asci 130-140 x 16-20  $\mu\text{m}$ , 4-spored, cylindrical, short-pedunculate, unitunicate, thin-walled, with an apical pore 4-5  $\mu\text{m}$  diam. at the apex. Paraphyses 120-150 x 1-1.5  $\mu\text{m}$ , simple, aseptate, with a slightly swollen apex, persistent.

Ascospores 37.5-50 x 15-22.5  $\mu\text{m}$ , uniseriate, fusoid, triseptate; central cells brown, not equal, slightly constricted at the septum; apical cells hyaline, smaller than the central cells.

### **Materials examined**

KR Che - RHI 176 (7b) + *Halocyphina villosa* + *Periconia prolifica* 18-12-93 - (Pm)

KR Kad A - AVI 173 (7b) + *Savoryella lignicola* 23-05-93 - (Prm)

KR Kad A - INT 491 (7b) + *Halosarpheia marina* + *Savoryella lignicola* + *Savoryella paucispora* 16-01-94 - (Pm)

The present collections differ from other known species of *Savoryella* in having persistent, non-septate paraphyses and 4-spored asci. It seems to be an as yet undescribed species of *Savoryella*.

### ***Savoryella* sp. II**

Taxonomic Position: ? Sordariales

### **Fig. 52**

Ascoma perithecial, 420 x 400  $\mu\text{m}$ , globose, immersed, ostiolate, papillate. Neck 280 x 30-60  $\mu\text{m}$ . Peridium 5-7.5  $\mu\text{m}$  thick, multilayered, subhyaline. Paraphyses numerous, elongate, septate, 175-205 x 2-2.5  $\mu\text{m}$ . Ascus 275 x 10  $\mu\text{m}$  (immature), long, cylindrical, pedunculate, unitunicate, with a prominent pore at the apex. Ascospores 38-44 x 13-16  $\mu\text{m}$ , ellipsoidal, triseptate, slightly constricted at the septum; central cells larger and thick-walled; polar cells smaller and thin-walled.

### **Material examined**

KR Dha-A - INT 485 (82) *Lignicola laevis* 27-12-93 - (Pm)

The material of this fungus obtained during the present study was very scanty and only very few asci and ascospores were seen. With the available information, it is very difficult to assign the present collection to any known species of *Savoryella*. Hence it is designated here as *Savoryella* sp. II. It differs from *Savoryella* sp. I described earlier in the size of the asci and the nature of paraphyses.

### ***Unidentified ascomycete - I***

#### **Fig. 53**

Ascomata perithecial, 200-250 x 220-270  $\mu\text{m}$ , globose or subglobose, partially immersed, ostiolate, papillate, dark brown, single. Neck 80-150 x 30-40  $\mu\text{m}$ .

Peridium 18-22  $\mu\text{m}$ , multilayered; outer layer composed of thick-walled, brown-coloured cell and inner layer thin-walled light brown coloured cells. Asci 37.5-62.5 x 12.5-20  $\mu\text{m}$ , eight-spored, clavate, pedunculate, thin-walled, unitunicate, early deliquescing. Ascospores 8-10  $\mu\text{m}$  diam., round, one-celled, hyaline, without any appendages or oil globules.

#### **Material Examined:**

KR TLY B INT 533 (121) 20-3-94 – (Prm)

According to Jones (1991), there are three genera with round to oval ascospores in the family Halosphaeriaceae. These are *Thalassogena* Kohlm. & Volkm.-Kohlm, *Moana* Kohlm. & Volkm.-Kohlm. and *Iwilsoniella* Jones. The present collection comes nearer to *Iwilsoniella* in most character than to the other two genera. But the ascospores are much smaller in the present collection. Moreover, *Iwilsoniella*

is so far known only from the type locality where it was found growing on exposed wood on a water-cooling tower. Also, Jones (1991) observed a membranous material that appeared to peel off the spore wall when examined under a scanning electron microscope. This structure could not be resolved at the light-microscope level. Taking all these into consideration, the present author finds it difficult to place the Kerala collection in the genus *Iwiloniella*. Further studies with additional collections are necessary to confirm the identity of this fungus.

### ***Unidentified ascomycete – II***

#### **Fig. 54**

Ascomata 90-105 x 75-100  $\mu\text{m}$ , globose, subglobose or ellipsoidal, hyaline, partly immersed or superficial, ostiolate, papillate, fully covered with fine hairs. Papillae 40-60 x 40-30  $\mu\text{m}$ ; ostiolar canal lined with numerous periphyses. Peridium 10-15  $\mu\text{m}$  thick, composed of 8-10 layers of thin-walled elongate cells. Asci 70-80 x 20-37.5  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, unitunicate, thin-walled, without apical pore or thickening. Ascospores 25-27.5 x 7.5-8  $\mu\text{m}$ , ovoid to ellipsoidal, uniseptate, not constricted at the septum, thick-walled, hyaline, smooth, with medially attached, membranous, wing-like appendages on either sides of the septum.

#### **Material examined**

KR Che INT-470 (122) + *Didymosphaeria enalia* + *H. marina* – 18-12-93 (PM).

This fungus was seen only once during the present study and the material was scanty. The morphology of the appendage of ascospores is very unique and has not been reported for any marine ascomycetes to this date. Additional collections are necessary to confirm the observations made on the scanty material.

### ***Unidentified ascomycete – III***

#### **Fig. 55**

Ascomata perithecial, 250-420 x 205-370  $\mu\text{m}$ , globose or subglobose, solitary, immersed, light yellow, ostiolate, papillate. Peridium 10-15  $\mu\text{m}$ , multilayered, (7-10 layers) composed of cells with thin wall. Neck 90-135 x 30-50  $\mu\text{m}$ ; ostiolar canal without periphyses. Ascus 60 x 15  $\mu\text{m}$ , eight-spored, pyriform, thin-walled, unitunicate, without any pore or thickening at the apex, early deliquescing. Ascospores 12-14 x 7-5-8  $\mu\text{m}$ , globose or oval, aseptate when young uniseptate at maturity, not constricted at the septum, without appendages.

#### **Materials examined**

KR Vad - INT 63 (123) + *Anguillospora* 2-8-92 - (M)

KR Bey - INT 136 (123) 02-10-92 - (Pm)

KR Kad A - AVI 5 (123) 19-04-92 - (Pm)

KR Ppd - DRW 2 (123) 19-04-92 - (Pm)

KR Edk - RHI 29 (123) + *Halosarpheia marina* 15-11-92 - (Pm)

KR TLY A - BRU 139 (123) + *Aniptodera chesapeakeensis* 18-04-93 - (Pm)

KR TLY A - BRU 141 (123) + *Aniptodera chesapeakeensis* 18-04-93 - (Pm)

KR Dha-A - SBI 43 (123) 18-04-93 - (Pm)

KR Tik - DRW 68 (123) 25-04-93 - (Pm)



KR Val - AVI 257 (123) + *Marinosphaera mangrovei* + *Aniptodera chesapeakensis* 5-12-93 - (Pm)

KR Val INT - 455 (123) + *Halosarpheia ratnagiriensis* + *Lignincola laevis* 5-12-93 - (Pm)

KR Val RHI - 74 (123) *Halosarpheia marina* 11-4-93 - (Pm)

KR Kad A INT- 498 (123) *Halosarpheia marina* 16-01-94 - (Pm)

The ascospores dimensions of this fungus show a close affinity to *Aniptodera* species like *Aniptodera* sp. I, *Aniptodera* sp. II and to *A. haispora*. But all those species have thick-walled ascospores. Moreover the asci of these species have an apical thickening with or without a pore. The present species on the other hand has thin-walled ascospores and early deliquescing asci. The spores show a close resemblance to the *Payosphaeria minuta* too, but in that species the spores are unseptate and are still smaller than the spores of the presently obtained one.

### ***Unidentified ascomycete – IV***

#### **Fig. 56**

Ascomata cleistothecial, doughnut-shaped 70-100 µm diam., superficial, round, flat and appressed to the substratum, brown. Asci (17) 22-5.27.5 x (7.5) 10-12 µm, eight-spored, turbinate, short-pedunculate, unitunicate, thin-walled, without apical pore or thickening. Ascospores 10-12 x 2.4 µm, ellipsoid, bi-or triseptate, not constricted at the septum, thin-walled, hyaline, without any appendages.

#### **Materials examined**

KR Edk - AVI 82 (124) 15-11-92 - (Pm)

KR Edk - ACN 132 (124) 11-07-93 - (M)

KR Edk - INT 309 (124) + *Phoma* sp. 11-07-93 - (M)

KR Edk - INT 310 (124) + *Dendryphiella salina* 11-07-93 - (M)

In some aspects, it is very similar to the genus *Microthyrium* that so far has not been recorded from marine habitats. Further collections are needed to verify both its marine origin and identity.

## ***Unidentified ascomycete – V***

### **Fig. 57**

Ascoma perithecial, 190 x 160  $\mu\text{m}$ , ovate, immersed, ostiolate, papillate, solitary. Peridium 7-10  $\mu\text{m}$ , multilayered; cells thin-walled, elongated. Neck 155 x 30  $\mu\text{m}$ , centrally attached, long and projecting above the substratum, cylindrical, hyaline. Asci not observed. Ascospores 17-26 x 6-9  $\mu\text{m}$ , ellipsoidal, uniseptate or non-septate, freely lying in the cavity of venter of the ascocarp, thin-walled, hyaline, smooth, without appendages.

### **Material examined.**

KR TLY – AVI 305 (125) 20-3-94 - (Prm)

The material of this species is very scanty and asci, paraphyses and periphyses were not observed. Hence it is very difficult to place it even at the genus-level. More collections are needed to identify it.

## ***Unidentified ascomycete – VI***

### **Fig. 58**

Ascomata 110-280 x 70-110  $\mu\text{m}$ , hyaline or pale yellow, globose or oval, superficial, ostiolate, papillate. Peridium 15-25  $\mu\text{m}$ , multilayered, with elongated, thin-walled cells, pale yellow or hyaline. Neck 70-160 x 30-50  $\mu\text{m}$ , cylindrical, pale yellow or hyaline. Paraphyses 70-102  $\mu\text{m}$  long 3.5-4  $\mu\text{m}$ , thick at the base, 2-1  $\mu\text{m}$  thick at the apex, branched, septate, rarely unbranched and with uniform thickness. Asci 70-105 x 7.5-10  $\mu\text{m}$ , eight-spored, cylindrical, short-pedunculate, unitunicate, thick-walled, operculate, with a well-marked apical pore, 8-10  $\mu\text{m}$  wide. Ascospores 9-12 x 6-8  $\mu\text{m}$ , sub-globose or ovoid, hyaline, non-septate, thin-walled, smooth, without appendages, with 2-4 conspicuous refractive globules. In

some asci, the formation of secondary spores by the cleavage of the ascospores and their escape through the apical pore were noticed.

### Materials examined

KR TLY C BRU 160 (126) + *Halosarpheia marina* + *Halocyphina villosa* 20-06-93 - (M)

KR TLY C - BRU 176 (126) + *Marinosphaera mangrovei* + *Halocyphina villosa* 18-07-93 - (M)

Che AVI 269 (126) + *Aigialus parvus* + *Halosarpheia marina* + *Marinosphaera mangrovei* 18-12-93 - (Pm)

Kohlmeyer & Volkmann-Kohlmeyer's (1991a) key leads straight to *Payosphaeria minuta*. The similarity in the morphology and size of ascomata, asci and ascospores of these two species is striking but the present collections differ from *P. minuta* in the presence of a conspicuous apical pore at the ascus apex and in the development of secondary spores from the ascospores even when they are inside the ascus. Another closely related fungus, *Thalassogena sphaerica*, has asci with apical pores and subglobose spores. *Thalassogena sphaerica*, however, has a single layered peridium while the present collection had multilayered peridium.

### Unidentified ascomycete – VII

#### Fig. 59

Ascomata perithecial, 250 x 250  $\mu\text{m}$ , globose, hyaline or light brown, solitary, immersed, papillate, ostiolate. Neck 100 x 100  $\mu\text{m}$ , centrally attached, with a thick base and tapering apex, light brown; ostiolar canal lined by hyaline periphyses. Peridium 20-40  $\mu\text{m}$  thick, multilayered, outer layers with rounded cells and inner layer with thin-walled, elongate cells. Paraphyses 120-160 x 1-1.5  $\mu\text{m}$ , numerous, septate, longer than asci. Asci 110-150(175) x 5-7.5  $\mu\text{m}$ , eight-spored, clavate, short-pedunculate, unitunicate, thin-walled, with an apical pore or pad. Ascospores 26-31 x 5-6.5  $\mu\text{m}$ , cylindrical, straight or slightly curved, hyaline, 6-7 septate, not constricted at the septa, thin-walled, without appendages.

### Materials examined

KR TLY B - AVI 156 (127) *Savoryella paucispora* + *Lulworthia* sp. 1 18-04-93 - (Pm)

KR Val - AVI 258 (127) *Lulworthia grandispora* + *Savoryella paucispora* 05-12-93 - (Pm)

This species seems to be somewhat similar to *Marinosphaera* but lacks the characteristically elongate hairy neck of that genus. Moreover the spores are broader and triseptate in *Marinosphaera*. As the material was very scanty, additional collections are required to properly identify this species.

### Unidentified ascomycete – VIII

#### Fig. 60

Ascomata perithecial, 200-511 x 135-275  $\mu\text{m}$ , partly (95%) immersed, subglobose or fusiform, ostiolate dark brown. Peridium 22.5-30  $\mu\text{m}$  thick, multilayered, with small, polygonal or elongate, thick-walled, brown coloured cells. Neck 120–260  $\mu\text{m}$  long, 50-60  $\mu\text{m}$  thick at the base, 30-32.5  $\mu\text{m}$  thick at the apex; ostiolar canal filled with periphyses. Paraphyses not observed. Asci 82.5- 110 x 12.5-20  $\mu\text{m}$ , eight-spored, cylindrical, pedunculate, thick-walled, bitunicate. Ascospores 30-45 x 7-10 (11)  $\mu\text{m}$ , ellipsoidal, hyaline while young and light brown at maturity; immature spores aseptate, uniseptate, or biseptate; mature spores triseptate.

### Materials examined

Ppd - DRW 27 + (128) + *Aniptodera chesapeakensis* 31-01-93 - (Pm)

Ppd - DRW 30 + (128) + *Savoryella lignicola* 31-01-93 - (Pm)

T A - BRU 151 + (128) + *Marinosphaera mangrovei* 09-05-93 - (Pm)

This ascomycetous species shows a close resemblance to *Marinosphaeria mangrovei*. The ascomata of both these fungi are, partly immersed in wood. But major portion (95%) of the present fungus is immersed in the wood. Moreover the

peridium of this fungus has dark brown coloured, thick walled cells, while the peridial cells of *Marinosphaeria mangrovei* are thin walled and hyaline to yellow. This unidentified fungus has bitunicate asci with much longer ascospores (30-45  $\mu\text{m}$  long). Young ascospores are uniseptate and hyaline in both but mature spores are always triseptate. The present fungus has no paraphyses, which are present in *M. mangrovei*. Moreover, the long, hyaline neck of *M. mangrovei* is conspicuously having outwardly projecting hyphae at the apex of the neck. Due to these reason this fungus cannot assign to the species of *Marinosphaeria*. More detailed study is required for placing this fungus in a proper taxonomic position.

***Verruculina enalia*** (Kohlm.) Kohlm. & Volkm.-Kohlm. in Mycol. Res. 94: 689 (1990).

*Didymosphaeria enalia* Kohlm. in Ber. Dtsch., Bot. Ges. 79: 28 (1966).

Taxonomic Position: Dothideales, Verruculinaceae

### Fig. 61

Ascomata perithecial, 300-1000 x 225-320  $\mu\text{m}$  (including papilla), obpyriform, ampulliform or ellipsoidal, fully immersed, ostiolate, papillate, clypeate, carbonaceous, black, solitary or in groups. Peridium 40-100  $\mu\text{m}$  thick, multilayered, with rounded, thick-walled cells. Neck 100-290 x 50-200  $\mu\text{m}$ , cylindrical or conical, black or brown; ostiolar canal lined with paraphyses. Pseudoparaphyses 1.5-2  $\mu\text{m}$  broad, 150-175  $\mu\text{m}$  long, septate. Asci 120-165 x 12.5-15  $\mu\text{m}$ , eight-spored, cylindrical, short-pedunculate, bitunicate, thick-walled, without any apical apparatus. Ascospores 17-23 x 7-11  $\mu\text{m}$ , uniseriate, ellipsoidal, uniseptate, constricted at the septum, dark brown and verrucose.

## Materials examined

- KR Mah-A - AVI 14 (74) 03-05-92 - (Prm)
- KR Kad A - INT 4 (74) + *Savoryella lignicola* + *Lignincola laevis* 19-04-92 - (Prm)
- KR Mah-A - INT 28 (74) + *Halosarpheia marina* + *Cirrenalia pygmaea* 03-05-92 - (Prm)
- KR TLY B - AVI 27 (74) + *Halocyphina villosa* + *Marinosphaera mangrovei* 26-07-92 - (M)
- KR Vad - BRU 25 (74) + *Periconia prolifica* 02-08-92 - (M)
- KR Val - INT 66 (74) + *Savoryella lignicola* + *Marinosphaera mangrovei* 09-08-92 - (M)
- KR Val - INT 71 (74) + *Halosarpheia marina* 09-08-92 - (M)
- KR Mah-A - INT 100 (74) + *Periconia prolifica* + *Halosarpheia marina* 06-09-92 - (M)
- KR Kad A - INT 126 (74) + *Savoryella paucispora* 13-09-92 - (M)
- KR TLY A - RHI 17 (74) + *Halocyphina villosa* 27-09-92 - (M)
- KR TLY A - BRU 49 (74) + *Halocyphina villosa* + *Halosarpheia marina* + *Cirrenalia basiminuta* 25-10-92 - (Pm)
- KR TLY A - BRU 52 (74) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 25-10-92 - (Pm)
- KR TLY A - INT 150 (74) + *Halocyphina villosa* + *Lulworthia grandispora* 25-10-92 - (Pm)
- KR TLY A - INT 152 (74) + *Halosarpheia marina* + *Lulworthia grandispora* + *Marinosphaera mangrovei* 25-10-92 - (Pm)
- KR Edk - AVI 73 (74) 15-11-92 - (Pm)
- KR Edk - AVI 76 (74) + *Lulworthia* sp. I 15-11-92 - (Pm)
- KR TLY B - RHI 41 (74) + *Halosarpheia marina* + *Aigialus parvus* 29-11-92 - (Pm)
- KR TLY B - RHI 42 (74) + *Halosarpheia abonnis* + *Marinosphaera mangrovei* + *Halosarpheia marina* 29-11-92 - (Pm)
- KR Azi - INT 178 (74) + *Halosarpheia marina* + *Antennospora quadricomuta* + *Halorosellinia oceanica* 20-12-92 - (Pm)
- KR TLY A - INT 181 (74) + *Halosarpheia marina* 27-12-92 - (Pm)
- KR Mah-A - BRU 94 (74) + *Halosarpheia minuta* 03-01-93 - (Pm)
- KR Mah-A - INT 196 (74) + *Marinosphaera mangrovei* + *Dactylospora haliotrepha* 03-01-93 - (Pm)
- KR TLY A - BRU 96 (74) + *Lulworthia grandispora* + *Savoryella lignicola* 10-01-93 - (Pm)
- KR TLY C - BRU 110 (74) 21-02-93 - (Prm)
- KR Bey - DRW 53 (74) 28-02-93 - (Prm)
- KR TLY A - AVI 129 (74) + *Lulworthia grandispora* + *Lignincola laevis* 28-03-93 - (Prm)
- KR TLY A - BRU 116 (74) + *Halosarpheia marina* + *Savoryella lignicola* 28-03-93 - (Prm)
- KR TLY C - RHI 68 (74) + *Marinosphaera mangrovei* 28-03-93 - (Prm)
- KR Vad - AVI 132 (74) + *Halocyphina villosa* + *Savoryella lignicola* 04-04-93 - (Prm)
- KR Vad - INT 243 (74) + *Marinosphaera mangrovei* + *Cirrenalia pygmaea* 04-04-93 - (Prm)
- KR Val - INT 247 (74) + *Leptosphaeria australiensis* 11-04-93 - (Prm) KR Val - INT 250 (74) + *Lignincola laevis* 11-04-93 - (Prm)
- KR Che - AVI 148 (74) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmaea* 17-04-93 - (Prm)
- KR Che - AVI 150 (74) + *Savoryella lignicola* + *Marinosphaera mangrovei* 17-04-93 - (Prm)
- KR Che - INT 253 (74) + *Halocyphina villosa* + *Dactylospora haliotrepha* 17-04-93 - (Prm)
- KR Che - RHI 80 (74) + *Lulworthia grandispora* 17-04-93 - (Prm)
- KR Che - RHI 82 (74) + *Halocyphina villosa* + *Halosarpheia marina* 17-04-93 - (Prm)
- KR Che - RHI 85 (74) + *Halosarpheia ratnagiriensis* + *Savoryella lignicola* 17-04-93 - (Prm)
- KR TLY A - AVI 154 (74) + *Dactylospora haliotrepha* + *Aniptodera chesapeakeensis* 18-04-93 - (Prm)
- KR Dha-A - DRW 59 (74) 18-04-93 - (Prm)

KR TLY A - RHI 86 (74) + *Dactylospora haliotrepha* + *Lulworthia grandispora* 18-04-93 - (Prm)  
 KR TLY A - RHI 87 (74) + *Aigialus parvus* + *Lulworthia grandispora* 18-04-93 - (Prm)  
 KR TLY C - RHI 95 (74) + *Ascocratera Manglicola* 18-04-93 - (Prm)  
 KR Tik - DRW 67 (74) + *Lignincola laevis* 25-04-93 - (Prm)  
 \* KR TLY A - AVI 161 (74) + *Lignincola laevis* + Unidentified ascomycete VIII 09-05-93 - (Prm)  
 KR TLY A - AVI 162 (74) + *Savoryella lignicola* + *Marinosphaera mangrovei* 09-05-93 - (Prm)  
 KR TLY A - BRU 149 (74) + *Savoryella lignicola* 09-05-93 - (Prm)  
 KR TLY C - BRU 152 (74) + *Periconia prolifica* + *Aniptodera chesapeakeensis* 09-05-93 - (Prm)  
 KR TLY A - RHI 97 (74) + *Halosarpheia retorquens* + *Leptosphaeria australiensis* 09-05-93 - (Prm)  
 KR Kad A - INT 300 (74) + *Halocyphina villosa* 23-05-93 - (Prm)  
 KR TLY C - AVI 177 (74) + *Halosarpheia marina* + *Lignincola laevis* 20-06-93 - (M)  
 KR TLY C - RHI 105 (74) + *Halosarpheia marina* + *Halocyphina villosa* 20-06-93 - (M)  
 KR Edk - BRU 166 (74) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Edk - RHI 111 (74) + *Halosarpheia marina* 11-07-93 - (M)  
 KR Edk - RHI 116 (74) + *Lignincola laevis* 11-07-93 - (M)  
 KR TLY C - AVI 195 (74) + *Halocyphina villosa* + *Savoryella paucispora* 18-07-93 - (M)  
 KR TLY C - RHI 124 (74) + *Zalerion varium* 18-07-93 - (M)  
 KR TLY C - BRU 203 (74) + *Halocyphina villosa* + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY B - RHI 138 (74) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY C - RHI 142 (74) + *Halocyphina villosa* + *Dactylospora haliotrepha* 22-08-93 - (M)  
 KR Che - AVI 230 (74) + *Halocyphina villosa* + *Cirrenalia basiminuta* 05-09-93 - (M)  
 KR Che - BRU 209 (74) + *Halocyphina villosa* 05-09-93 - (M)  
 KR Che - INT 370 (74) + *Savoryella lignicola* + *Marinosphaera mangrovei* 05-09-93 - (M)  
 KR Tik - INT 385 (74) 18-09-93 - (M)  
 KR TLY C - AVI 239 (74) + *Aigialus parvus* 19-09-93 - (M)  
 KR TLY C - AVI 241 (74) + *Halosarpheia viscosa* + *Halocyphina villosa* 19-09-93 - (M)  
 KR TLY A - INT 418 (74) + *Marinosphaera mangrovei* 17-10-93 - (Pm)  
 KR Kav - AVI 250 (74) + *Leptosphaeria australiensis* + *Halocyphina villosa* 30-10-93 - (Pm)  
 KR Kav - RHI 160 (74) + *Halocyphina villosa* + *Aigialus parvus* + *Aniptodera haispora* 30-10-93 - (Pm)  
 KR Tik - DRW 110 (74) + *Halosarpheia marina* 31-10-93 - (Pm)  
 KR Tik - INT 426 (74) 31-10-93 - (Pm)  
 KR TLY A - INT 448 (74) + *Halosarpheia marina* + *Halocyphina villosa* 21-11-93 - (Pm)  
 KR Val - BRU 232 (74) + *Halocyphina villosa* 05-12-93 - (Pm)  
 KR Val - INT 457 (74) + *Periconia prolifica* + *Savoryella lignicola* 05-12-93 - (Pm)  
 KR Val - RHI 166 (74) + *Lulworthia grandispora* + *Savoryella lignicola* 05-12-93 - (Pm)  
 KR Che - AVI 264 (74) + *Periconia prolifica* + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - BRU 237 (74) + *Halosarpheia marina* + *Halocyphina villosa* 18-12-93 - (Pm)  
 KR Che - BRU 241 (74) + *Dactylospora haliotrepha* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - INT 462 (74) + *Halosarpheia marina* + *Dactylospora haliotrepha* 18-12-93 - (Pm)  
 KR Che - INT 470 (74) + *Halosarpheia marina* + Unidentified ascomycetes II 18-12-93 - (Pm)  
 KR Che - RHI 175 (74) + *Halocyphina villosa* + *Savoryella lignicola* 18-12-93 - (Pm)  
 KR Che - RHI 180 (74) + *Halosarpheia ratnagiriensis* + *Halosarpheia marina* 18-12-93 - (Pm)

KR Vad - AVI 278 (74) + *Halosarpheia marina* 26-12-93 - (Pm)  
 KR Dha-A - DRW 113 (74) 27-12-93 - (Pm)  
 KR Dha-A - INT 488 (74) 27-12-93 - (Pm)  
 KR Kad A - AVI 283 (74) + *Lignincola laevis* + *Halocyphina villosa* 16-01-94 - (Pm)  
 KR Kad A - INT 495 (74) + *Dactylospora haliotrepha* + *Halocyphina villosa* 16-01-94 - (Pm)  
 KR TLY A - RHI 186 (74) 23-01-94 - (Pm)  
 KR Edk - AVI 297 (74) + *Periconia prolifica* 06-03-94 - (Pm)  
 KR Edk - AVI 302 (74) + *Marinosphaera mangrovei* + *Ascochyta* sp. + *Halosarpheia marina* 06-03-94 - (Pm)  
 KR TLY A - AVI 306 (74) 20-03-94 - (Pm)  
 KR Kav - AVI 317 (74) + *Lulworthia grandispora* 15-04-94 - (Pm)  
 KR Kav - INT 542 (74) + *Lindra hawaiiensis* + *Aniptodera chesapeakeensis* 15-04-94 - (Pm)  
 KR Kav - RHI 212 (74) + *Halocyphina villosa* + *Dactylospora haliotrepha* + *Lignincola laevis* 15-04-94 - (Pm)  
 KR TLY A - RHI 227 (74) + *Lulworthia grandispora* 15-04-94 - (Pm)  
 KR TLY A - AVI 326 (74) + *Savoryella lignicola* + *Lignincola laevis* 15-05-94 - (Pm)  
 KR TLY A - BRU 289 (74) + *Marinosphaera mangrovei* + *Lulworthia grandispora* 15-05-94 - (Pm)  
 KR TLY A - INT 553 (74) + *Lulworthia grandispora* 15-05-94 - (Pm)

*Verruculina enalia* was first described by Kohlmeyer (1966). It is a widely distributed and common marine fungus that has been reported from Australia (Kohlmeyer, 1984), Belize (Kohlmeyer & Volkmann-Kohlmeyer, 1987), Brunei (Hyde, 1988a), India (Patil & Borse, 1985a), Hong Kong and Macao (Vrijmoed, Hyde & Jones, 1994), Malaysia (Jones & Kuthubutheen, 1989), Seychelles (Hyde & Jones, 1988a), Singapore (Leong, Tang & Jones, 1991) and several other tropical and subtropical parts of the world (Kohlmeyer, 1980). The Kerala collections of this species showed distinctly larger ascomata with remarkably thicker peridium but the size and shape of asci and ascospores were similar when compared to Kohlmeyer & Kohlmeyer's (1979) description of the species.



## Basidiomycota

***Halocyphina villosa*** Kohlm. in Nova Hedwigia 9: 100 (1965).

Taxonomic Position: Stereales, Cyphellaceae

### Fig. 62

Basidiomata cyphelloid, 280-880  $\mu\text{m}$  high, 220-380 (520)  $\mu\text{m}$  wide at the apex, with a 50-100  $\mu\text{m}$  wide stalk, initially turbinate or clavate, later becoming funnel-shaped, superficial, white or yellow, soft, entirely tomentose, solitary or in groups. Peridium 30(40)-45  $\mu\text{m}$  thick, composed of closely packed, hyaline, unbranched or rarely branched hyphae 3-3.5  $\mu\text{m}$  wide; external hair-like hyphae up to 110  $\mu\text{m}$  long, 3.5-5  $\mu\text{m}$  wide at the base 1.5-2  $\mu\text{m}$  at the apex, simple or branched at the tip, hyaline. Hymenium lining the inner wall of the funnel-shaped basidiomata. Basidia 1-(25)- 30 x 5-8.5  $\mu\text{m}$ , four-spored, clavate or cylindrical with a narrow base, non-septate, hyaline, with four evanescent sterigmata, 3-4  $\mu\text{m}$  long. Basidiospores 5-11 x 5-10 (11)  $\mu\text{m}$ , subglobose or globose, single-celled, smooth, hyaline, accumulating at maturity at the opening of the basidiomata.

### Materials examined

KR Kad A - INT 1 (76) + *Halosarpheia marina* + *Dactylospora haliotrepha* 19-04-92 - (Prm)

KR Kad A - INT 3 (76) + *Aniptodera chesapeakeensis* + *Lulworthia* sp. I 19-04-92 - (Prm)

KR TLY A - AVI 16 (76) + *Aniptodera chesapeakeensis* 21-06-92 - (M)

KR TLY A - AVI 18 (76) + *Halosarpheia marina* 21-06-92 - (M)

KR TLY A - BRU 10 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* 21-06-92 - (M)

KR TLY A - INT 44 (76) + *Lulworthia grandispora* + *Cirrenalia pygmaea* 21-06-92 - (M)

KR TLY A - INT 45 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* + *Marinosphaera mangrovei* 21-06-92 - (M)

KR TLY A - INT 46 (76) + *Halosarpheia marina* 21-06-92 - (M)

KR TLY A - RHI 1 (76) + *Aigialus parvus* + *Aniptodera chesapeakeensis* 21-06-92 - (M)

KR TLY A - RHI 2 (76) + *Halosarpheia marina* 21-06-92 - (M)

KR TLY A - RHI 3 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* 21-06-92 - (M)

KR TLY A - AVI 19 (76) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 26-07-92 - (M)  
 KR TLY A - AVI 21 (76) + *Lulworthia* sp. III + *Halosarpheia marina* 26-07-92 - (M)  
 KR TLY B - AVI 23 (76) + *Aniptodera chesapeakeensis* + *Halosphaeria hamata* + *Bathyasacus tropicalis* 26-07-92 - (M)  
 KR TLY B - AVI 24 (76) + *Halosarpheia marina* + *Cirrenalia pygmea* 26-07-92 - (M)  
 KR TLY B - AVI 26 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 26-07-92 - (M)  
 KR TLY B - AVI 27 (76) + *Verruculina enalia* + *Marinosphaera mangrovei* 26-07-92 - (M)  
 KR TLY A - BRU 14 (76) + *Halosarpheia retorquens* 26-07-92 - (M)  
 KR TLY A - BRU 15 (76) + *Aniptodera chesapeakeensis* + *Cirrenalia macrocephala* 26-07-92 - (M)  
 KR TLY B - BRU 16 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* 26-07-92 - (M)  
 KR TLY B - BRU 17 (76) + *Dactylospora haliotrepha* + *Lindra hawaiiensis* 26-07-92 - (M)  
 KR TLY B - BRU 18 (76) + *Marinosphaera mangrovei* + *Aniptodera mangrovei* 26-07-92 - (M)  
 KR TLY A - INT 49 (76) + *Aniptodera chesapeakeensis* + *Cirrenalia macrocephala* 26-07-92 - (M)  
 KR TLY A - INT 50 (76) + *Halosarpheia marina* + *Lulworthia grandispora* 26-07-92 - (M)  
 KR TLY A - RHI 4 (76) + *Aigialus parvus* + *Aniptodera chesapeakeensis* 26-07-92 - (M)  
 KR TLY A - RHI 5 (76) + *Lulworthia grandispora* + *Halosarpheia marina* 26-07-92 - (M)  
 KR TLY A - RHI 6 (76) + *Halosarpheia marina* + *Lulworthia grandispora* 26-07-92 - (M)  
 KR TLY B - RHI 7 (76) + *Aigialus grandis* + *Halosarpheia marina* + *Lulworthia grandispora* 26-07-92 - (M)  
 KR TLY B - RHI 8 (76) + *Biatriospora marina* + *Halosarpheia marina* 26-07-92 - (M)  
 KR TLY B - RHI 9 (76) + *Dactylospora haliotrepha* + *Halosarpheia marina* + *Lulworthia grandispora* 26-07-92 - (M)  
 KR Vad - AVI 28 (76) + *Dactylospora haliotrepha* 02-08-92 - (M)  
 KR Vad - AVI 29 (76) + *Leptosphaeria australiensis* 02-08-92 - (M)  
 KR Vad - AVI 36 (76) + *Halosarpheia marina* 02-08-92 - (M)  
 KR Vad - BRU 22 (76) + *Dactylospora haliotrepha* 02-08-92 - (M)  
 KR Vad - BRU 23 (76) + *Marinosphaera mangrovei* 02-08-92 - (M)  
 KR Vad - BRU 27 (76) + *Halosarpheia marina* 02-08-92 - (M)  
 KR Vad - BRU 28 (76) + *Marinosphaera mangrovei* 02-08-92 - (M)  
 KR Vad - INT 58 (76) + *Aniptodera chesapeakeensis* 02-08-92 - (M)  
 KR Vad - INT 60 (76) 02-08-92 - (M)  
 KR Val - AVI 37 (76) + *Halorosellinia oceanica* 09-08-92 - (M)  
 KR Val - AVI 38 (76) + *Periconia prolifica* 09-08-92 - (M)  
 KR Val - AVI 41 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Periconia prolifica* 09-08-92 - (M)  
 KR Val - AVI 42 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* + *Periconia prolifica* 09-08-92 - (M)  
 KR Val - BRU 31 (76) + *Lulworthia* sp. III + *Periconia prolifica* 09-08-92 - (M)  
 KR Val - BRU 32 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 09-08-92 - (M)  
 KR Val - BRU 33 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* 09-08-92 - (M)  
 KR Val - INT 65 (76) + *Halorosellinia oceanica* + *Aniptodera chesapeakeensis* 09-08-92 - (M)  
 KR Val - INT 68 (76) + *Cirrenalia pygmea* 09-08-92 - (M)  
 KR Val - INT 72 (76) + *Marinosphaera mangrovei* + *Aniptodera chesapeakeensis* 09-08-92 - (M)  
 KR Val - RHI 11 (76) + *Aigialus parvus* 09-08-92 - (M)  
 KR Val - RHI 13 (76) + *Halosarpheia ratnagiriensis* 09-08-92 - (M)  
 KR Val - RHI 14 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 09-08-92 - (M)  
 KR Val - RHI 15 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 09-08-92 - (M)

KR TLY A - AVI 43 (76) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 23-08-92 - (M)  
 KR TLY A - AVI 44 (76) + *Savoryella paucispora* + *Halosarpheia retorquens* 23-08-92 - (M)  
 KR TLY A - AVI 45 (76) + *Savoryella paucispora* + *Marinosphaera mangrovei* 23-08-92 - (M)  
 KR TLY A - BRU 36 (76) + *Lulworthia* sp. I 23-08-92 - (M)  
 KR TLY A - BRU 37 (76) + *Savoryella lignicola* + *Savoryella paucispora* 23-08-92 - (M)  
 KR TLY A - BRU 38 (76) + *Halosarpheia retorquens* 23-08-92 - (M)  
 KR Dha-A - DRW 6 (76) 23-08-92 - (M)  
 KR TLY A - INT 73 (76) + *Cirrenalia pygmea* + *Halosarpheia marina* 23-08-92 - (M)  
 KR TLY A - INT 75 (76) + *Aniptodera chesapeakeensis* 23-08-92 - (M)  
 KR TLY A - INT 76 (76) + *Lulworthia grandispora* + *Marinosphaera mangrovei* 23-08-92 - (M)  
 KR Dha-B - INT 86 (76) + *Cirrenalia pygmea* 23-08-92 - (M)  
 KR TLY A - RHI 16 (76) + *Savoryella lignicola* 23-08-92 - (M)  
 KR Mah-A - AVI 48 (76) + *Savoryella lignicola* 06-09-92 - (M)  
 KR Mah-A - AVI 49 (76) + *Halosarpheia marina* 06-09-92 - (M)  
 KR Mah-A - BRU 40 (76) + *Leptosphaeria australiensis* 06-09-92 - (M)  
 KR Mah-A - BRU 43 (76) + *Halorosellinia oceanica* 06-09-92 - (M)  
 KR Mah-A - INT 101 (76) + *Aniptodera chesapeakeensis* 06-09-92 - (M)  
 KR Mah-A - INT 102 (76) + *Halosarpheia marina* + 06-09-92 - (M)  
 KR Mah-A - INT 104 (76) + *Halosarpheia ratnagiriensis* + *Lignicola laevis* 06-09-92 - (M)  
 KR Mah-A - INT 108 (76) + *Phialophorophoma litoralis* 06-09-92 - (M)  
 KR Kad A - AVI 53 (76) + *Aniptodera chesapeakeensis* 13-09-92 - (M)  
 KR Kad A - AVI 54 (76) + *Marinosphaera mangrovei* + *Cirrenalia fusca* 13-09-92 - (M)  
 KR Kad A - AVI 55 (76) + *Dactylospora haliotrepha* 13-09-92 - (M)  
 KR Kad A - INT 121 (76) + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* 13-09-92 - (M)  
 KR Kad A - INT 122 (76) + *Halosarpheia marina* + *Cirrenalia pygmea* 13-09-92 - (M)  
 KR Kad A - INT 123 (76) + *Marinosphaera mangrovei* + *Halosarpheia marina* + *Lulworthia grandispora* 13-09-92 - (M)  
 KR Kad A - INT 124 (76) + *Lulworthia* sp. I + *Lignicola laevis* 13-09-92 - (M)  
 KR TLY A - AVI 58 (76) + *Marinosphaera mangrovei* + *Halosarpheia marina* + *Savoryella lignicola* 27-09-92 - (M)  
 KR TLY A - AVI 60 (76) + *Lignicola longirostris* + *Cirrenalia pygmea* 27-09-92 - (M)  
 KR TLY A - AVI 62 (76) + *Halosarpheia minuta* + *Halosarpheia marina* 27-09-92 - (M)  
 KR TLY A - BRU 45 (76) + *Aniptodera chesapeakeensis* 27-09-92 - (M)  
 KR TLY A - BRU 46 (76) + *Lignicola longirostris* + *Savoryella lignicola* 27-09-92 - (M)  
 KR TLY A - BRU 48 (76) + *Dendryphiella salina* + *Halosarpheia marina* 27-09-92 - (M)  
 KR TLY A - INT 129 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 27-09-92 - (M)  
 KR TLY A - INT 131 (76) + *Lignicola laevis* + *Halosarpheia marina* 27-09-92 - (M)  
 KR TLY A - RHI 17 (76) + *Verruculina enalia* 27-09-92 - (M)  
 KR TLY A - RHI 18 (76) + *Marinosphaera mangrovei* + *Lulworthia grandispora* 27-09-92 - (M)  
 KR Bey - INT 138 (76) + *Leptosphaeria australiensis* 02-10-92 - (Pm)  
 KR TLY A - AVI 63 (76) + *Leptosphaeria australiensis* + *Halosarpheia marina* 25-10-92 - (Pm)  
 KR TLY A - AVI 66 (76) 25-10-92 - (Pm)  
 KR TLY A - AVI 68 (76) + *Aniptodera* sp. II + *Pleospora pelagica* 25-10-92 - (Pm)  
 KR TLY A - BRU 49 (76) + *Halosarpheia marina* + *Cirrenalia basiminuta* + *Verruculina enalia* 25-10-92 - (Pm)

KR TLY C - BRU 56 (76) + *Lignincola laevis* + *Periconia prolifica* 25-10-92 - (Pm)  
 KR TLY C - BRU 57 (76) + *Lulworthia* sp. I 25-10-92 - (Pm)  
 KR TLY C - BRU 58 (76) + *Periconia prolifica* + *Aniptodera chesapeakeensis* 25-10-92 - (Pm)  
 KR TLY A - INT 149 (76) + *Dactylospora haliotrepha* + *Lulworthia grandispora* + *Marinosphaera mangrovei* 25-10-92 - (Pm)  
 KR TLY A - INT 150 (76) + *Verruculina enalia* + *Lulworthia grandispora* 25-10-92 - (Pm)  
 KR TLY A - INT 151 (76) + *Dactylospora haliotrepha* + *Halosarpheia retorquens* 25-10-92 - (Pm)  
 KR TLY A - RHI 19 (76) + *Lulworthia grandispora* 25-10-92 - (Pm)  
 KR TLY A - RHI 21 (76) + *Aigialus mangrovis* 25-10-92 - (Pm)  
 KR TLY A - RHI 22 (76) + *Halosarpheia marina* + *Dactylospora haliotrepha* 25-10-92 - (Pm)  
 KR Edk - BRU 62 (76) + *Dendryphiella salina* 15-11-92 - (Pm)  
 KR Edk - INT 154 (76) + *Aigialus parvus* 15-11-92 - (Pm)  
 KR Edk - INT 158 (76) + *Cirrenalia pygmaea* + *Lulworthia* sp. I 15-11-92 - (Pm)  
 KR Edk - RHI 27 (76) + *Aigialus grandis* 15-11-92 - (Pm)  
 KR Edk - RHI 33 (76) + *Aniptodera mangrovei* 15-11-92 - (Pm)  
 KR Edk - RHI 36 (76) + *Lulworthia grandispora* + *Halosarpheia marina* 15-11-92 - (Pm)  
 KR TLY B - AVI 87 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 29-11-92 - (Pm)  
 KR TLY B - AVI 88 (76) + *Halosarpheia marina* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY B - AVI 89 (76) + *Lignincola laevis* + *Lulworthia* sp. III 29-11-92 - (Pm)  
 KR TLY B - BRU 73 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
 KR TLY B - BRU 74 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
 KR TLY B - BRU 75 (76) + *Aigialus mangrovis* 29-11-92 - (Pm)  
 KR TLY B - INT 165 (76) + *Halosarpheia marina* + *Dactylospora haliotrepha* 29-11-92 - (Pm)  
 KR TLY B - INT 166 (76) + *Halosarpheia marina* + *Payosphaeria minuta* + *Cirrenalia basiminuta* 29-11-92 - (Pm)  
 KR TLY C - RHI 45 (76) + *Halosarpheia marina* + *Cirrenalia pygmaea* 29-11-92 - (Pm)  
 KR TLY C - RHI 47 (76) + *Halosarpheia marina* + *Cirrenalia pygmaea* 29-11-92 - (Pm)  
 KR Azi - DRW 21 (76) + *Savoryella paucispora* + *Antennospora quadricornuta* 20-12-92 - (Pm)  
 KR Azi - DRW 23 (76) + *Lignincola laevis* 20-12-92 - (Pm)  
 KR Azi - DRW 25 (76) + *Aniptodera chesapeakeensis* + *Antennospora quadricornuta* 20-12-92 - (Pm)  
 KR Azi - INT 169 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 20-12-92 - (Pm)  
 KR Azi - INT 170 (76) + *Lulworthia grandispora* + *Savoryella paucispora* 20-12-92 - (Pm)  
 KR Azi - INT 171 (76) + *Halosarpheia marina* + *Periconia prolifica* 20-12-92 - (Pm)  
 KR Azi - INT 172 (76) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 20-12-92 - (Pm)  
 KR Azi - INT 174 (76) + *Halosarpheia marina* + *Savoryella lignicola* + *Lignincola laevis* 20-12-92 - (Pm)  
 KR Azi - INT 177 (76) + *Marinosphaera mangrovei* + *Aniptodera chesapeakeensis* 20-12-92 - (Pm)  
 KR TLY A - AVI 93 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR TLY A - AVI 94 (76) + *Leptosphaeria australiensis* + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR TLY A - AVI 96 (76) + *Zalerion varium* + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR TLY C - AVI 97 (76) + *Savoryella lignicola* + *Halosarpheia marina* + *Cirrenalia pygmaea* 27-12-92 - (Pm)  
 KR TLY C - AVI 98 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* + *Lulworthia grandispora* 27-12-92 - (Pm)  
 KR TLY C - AVI 99 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR TLY C - AVI 100 (76) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 27-12-92 - (Pm)  
 KR TLY A - BRU 79 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 27-12-92 - (Pm)

KR TLY A - BRU 83 (76) + *Aniptodera chesapeakensis* + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR Mah-A - AVI 102 (76) + *Aniptodera chesapeakensis* 03-01-93 - (Pm)  
 KR Mah-A - AVI 103 (76) + *Halorosellinia oceanica* + *Marinosphaera mangrovei* 03-01-93 - (Pm)  
 KR Mah-A - AVI 107 (76) + *Halosarpheia ratnagiriensis* 03-01-93 - (Pm)  
 KR Mah-A - AVI 109 (76) + *Marinosphaera mangrovei* + *Trichocladium* sp. 03-01-93 - (Pm)  
 KR Mah-A - BRU 88 (76) + *Savoryella lignicola* + *Lulworthia grandispora* 03-01-93 - (Pm)  
 KR Mah-A - BRU 89 (76) + *Savoryella lignicola* + *Halorosellinia oceanica* 03-01-93 - (Pm)  
 KR Mah-A - BRU 90 (76) + *Halosarpheia minuta* 03-01-93 - (Pm)  
 KR Mah-A - BRU 91 (76) + *Lulworthia grandispora* 03-01-93 - (Pm)  
 KR Mah-A - BRU 92 (76) + *Lulworthia grandispora* 03-01-93 - (Pm)  
 KR Mah-A - BRU 95 (76) + *Lignicola laevis* + *Savoryella lignicola* 03-01-93 - (Pm)  
 KR TLY C - AVI 113 (76) + *Halosarpheia marina* + *Lulworthia grandispora* 10-01-93 - (Pm)  
 KR TLY C - AVI 114 (76) + *Savoryella lignicola* + *Halosarpheia viscosa* 10-01-93 - (Pm)  
 KR TLY C - AVI 116 (76) + *Lulworthia grandispora* 10-01-93 - (Pm)  
 KR TLY C - BRU 99 (76) + *Aniptodera chesapeakensis* + *Savoryella lignicola* 10-01-93 - (Pm)  
 KR TLY C - BRU 100 (76) + *Lulworthia grandispora* + *Cirrenalia pygmea* 10-01-93 - (Pm)  
 KR TLY C - BRU 101 (76) + *Aniptodera chesapeakensis* + *Cirrenalia pygmea* + *Periconia prolifica* 10-01-93 - (Pm)  
 KR TLY C - BRU 102 (76) + *Lulworthia grandispora* + *Cirrenalia pygmea* + *Periconia prolifica* 10-01-93 - (Pm)  
 KR TLY C - RHI 55 (76) + *Aniptodera chesapeakensis* + *Leptosphaeria australiensis* 10-01-93 - (Pm)  
 KR TLY C - RHI 57 (76) + *Marinosphaera mangrovei* + *Dactylospora haliotrepha* + *Lulworthia grandispora* 10-01-93 - (Pm)  
 KR TLY C - RHI 58 (76) + *Aigialus parvus* + *Marinosphaera mangrovei* 10-01-93 - (Pm)  
 KR Azi - DRW 37 (76) + *Lulworthia grandispora* + *Halosarpheia marina* 13-02-93 - (Prm)  
 KR Azi - DRW 40 (76) + *Halorosellinia oceanica* 13-02-93 - (Prm)  
 KR Azi - DRW 41 (76) + *Aniptodera chesapeakensis* + *Cirrenalia pygmea* + *Halosarpheia marina* 13-02-93 - (Prm)  
 KR Azi - DRW 42 (76) + *Antennospora quadricornuta* 13-02-93 - (Prm)  
 KR Azi - DRW 44 (76) + *Lignicola laevis* + *Halosarpheia marina* 13-02-93 - (Prm)  
 KR TLY C - RHI 62 (76) + *Aniptodera chesapeakensis* 21-02-93 - (Prm)  
 KR TLY C - RHI 64 (76) + *Lulworthia grandispora* 28-03-93 - (Prm)  
 KR Vad - AVI 130 (76) + *Halosarpheia marina* + *Dactylospora haliotrepha* 04-04-93 - (Prm)  
 KR Vad - AVI 131 (76) + *Marinosphaera mangrovei* + *Lulworthia* sp. I 04-04-93 - (Prm)  
 KR Vad - AVI 132 (76) + *Verruculina enalia* + *Savoryella lignicola* 04-04-93 - (Prm)  
 KR Vad - AVI 135 (76) + *Halosarpheia marina* + *Cirrenalia macrocephala* 04-04-93 - (Prm)  
 KR Vad - BRU 120 (76) + *Halosarpheia marina* + *Aniptodera chesapeakensis* 04-04-93 - (Prm)  
 KR Vad - BRU 121 (76) + *Marinosphaera mangrovei* + *Savoryella lignicola* 04-04-93 - (Prm)  
 KR Vad - BRU 122 (76) + *Cirrenalia macrocephala* + *Aniptodera chesapeakensis* 04-04-93 - (Prm)  
 KR Vad - INT 240 (76) + *Aniptodera chesapeakensis* + *Dactylospora haliotrepha* + *Cirrenalia macrocephala* + *Savoryella lignicola* 04-04-93 - (Prm)  
 KR Vad - INT 242 (76) 04-04-93 - (Prm)  
 KR Vad - INT 244 (76) + *Halosarpheia marina* + *Cirrenalia pygmea* 04-04-93 - (Prm)  
 KR Che - BRU 133 (76) + *Cirrenalia pygmea* + *Aniptodera chesapeakensis* 17-04-93 - (Prm)  
 KR Che - BRU 134 (76) + *Halosarpheia marina* + *Aniptodera chesapeakensis* 17-04-93 - (Prm)  
 KR Che - BRU 136 (76) + *Halosarpheia ratnagiriensis* 17-04-93 - (Prm)

KR Che - BRU 138 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 17-04-93 - (Prm)  
 KR Che - INT 253 (76) + *Verruculina enalia* + *Dactylospora haliotrepha* 17-04-93 - (Prm)  
 KR Che - INT 254 (76) + *Halosarpheia marina* + *Aigialus grandis* 17-04-93 - (Prm)  
 KR Che - INT 258 (76) + *Savoryella lignicola* 17-04-93 - (Prm)  
 KR Che - RHI 77 (76) + *Lignincola laevis* + *Halosarpheia ratnagiriensis* 17-04-93 - (Prm)  
 KR Che - RHI 79 (76) + *Cirrenalia pygmaea* + *Savoryella paucispora* 17-04-93 - (Prm)  
 KR Che - RHI 82 (76) + *Verruculina enalia* + *Halosarpheia marina* 17-04-93 - (Prm)  
 KR Che - RHI 83 (76) + *Leptosphaeria australiensis* + *Cirrenalia pygmaea* 17-04-93 - (Prm)  
 KR TLY C - AVI 158 (76) + *Halosarpheia retorquens* + *Savoryella lignicola* 18-04-93 - (Prm)  
 KR TLY C - AVI 160 (76) + *Halosarpheia marina* + *Lignincola laevis* + *Halosarpheia abonnis* 18-04-93 - (Prm)  
 KR Dha-A - INT 270 (76) + *Savoryella lignicola* 18-04-93 - (Prm)  
 KR Dha-A - INT 271 (76) + *Halosarpheia marina* 18-04-93 - (Prm)  
 KR Dha-A - INT 272 (76) 18-04-93 - (Prm)  
 KR TLY C - AVI 164 (76) + *Lulworthia grandispora* + *Halosarpheia marina* + *Marinosphaera mangrovei* 09-05-93 - (Prm)  
 KR Kad A - INT 297 (76) + *Lulworthia grandispora* + *Cirrenalia pygmaea* 23-05-93 - (Prm)  
 KR Kad A - INT 300 (76) + *Verruculina enalia* 23-05-93 - (Prm)  
 KR Kad A - INT 301 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 23-05-93 - (Prm)  
 KR TLY A - AVI 175 (76) + *Lindra hawaiiensis* 20-06-93 - (M)  
 KR TLY C - AVI 178 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 20-06-93 - (M)  
 KR TLY C - AVI 179 (76) + *Halosarpheia viscosa* + *Aniptodera chesapeakeensis* + *Bathyscus tropicalis* 20-06-93 - (M)  
 KR TLY C - AVI 180 (76) + *Lulworthia grandispora* 20-06-93 - (M)  
 KR TLY C - BRU 160 (76) + *Halosarpheia marina* + UNIDENTIFIED ASCOMYCETE III 20-06-93 - (M)  
 KR TLY C - BRU 161 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Lindra hawaiiensis* 20-06-93 - (M)  
 KR TLY C - BRU 162 (76) + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR TLY C - RHI 105 (76) + *Halosarpheia marina* + *Verruculina enalia* 20-06-93 - (M)  
 KR TLY C - RHI 106 (76) + *Dactylospora haliotrepha* + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR TLY C - RHI 108 (76) + *Lulworthia grandispora* 20-06-93 - (M)  
 KR Edk - AVI 183 (76) + *Lulworthia grandispora* 11-07-93 - (M)  
 KR Azi - INT 315 (76) + *Aniptodera chesapeakeensis* 17-07-93 - (M)  
 KR Azi - INT 317 (76) + *Halosarpheia marina* 17-07-93 - (M)  
 KR TLY A - AVI 190 (76) + *Lignincola laevis* 18-07-93 - (M)  
 KR TLY A - AVI 191 (76) + *Savoryella lignicola* 18-07-93 - (M)  
 KR TLY C - AVI 193 (76) + *Marinosphaera mangrovei* + *Bathyscus tropicalis* 18-07-93 - (M)  
 KR TLY C - AVI 195 (76) + *Savoryella paucispora* + *Verruculina enalia* 18-07-93 - (M)  
 KR TLY C - AVI 196 (76) + *Lignincola laevis* 18-07-93 - (M)  
 KR TLY A - BRU 171 (76) + *Aniptodera chesapeakeensis* + *Lignincola laevis* 18-07-93 - (M)  
 KR TLY A - BRU 172 (76) + *Halosarpheia marina* + *Savoryella lignicola* 18-07-93 - (M)  
 KR TLY A - BRU 174 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 18-07-93 - (M)  
 KR TLY C - BRU 175 (76) + *Marinosphaera mangrovei* 18-07-93 - (M)  
 KR TLY C - BRU 176 (76) + Unidentified ascomycetes VI + *Marinosphaera mangrovei* 18-07-93 - (M)  
 KR TLY A - INT 322 (76) + *Halosarpheia marina* 18-07-93 - (M)  
 KR TLY A - INT 323 (76) + *Halosarpheia marina* 18-07-93 - (M)

KR TLY A - RHI 118 (76) 18-07-93 - (M)  
 KR TLY A - RHI 120 (76) + *Halosarpheia marina* 18-07-93 - (M)  
 KR TLY A - RHI 121 (76) + *Marinosphaera mangrovei* 18-07-93 - (M)  
 KR Kav - AVI 199 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - AVI 201 (76) + *Marinosphaera mangrovei* + *Cirrenalia basiminuta* 19-07-93 - (M)  
 KR Kav - AVI 202 (76) + *Halosarpheia marina* + *Savoryella lignicola* 19-07-93 - (M)  
 KR Kav - AVI 203 (76) + *Halosarpheia viscosa* 19-07-93 - (M)  
 KR Kav - AVI 204 (76) + *Savoryella lignicola* + *Marinosphaera mangrovei* 19-07-93 - (M)  
 KR Kav - AVI 205 (76) + *Halosarpheia marina* + *Lignicola laevis* 19-07-93 - (M)  
 KR Kav - AVI 206 (76) + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - BRU 180 (76) + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR Kav - BRU 182 (76) + *Aniptodera salsuginosainosa* + *Periconia prolifica* 19-07-93 - (M)  
 KR Kav - BRU 183 (76) + *Periconia prolifica* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - BRU 184 (76) + *Lindra hawaiiensis* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR Kav - INT 327 (76) + *Cirrenalia pygmaea* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR Kav - INT 329 (76) + *Lindra hawaiiensis* 19-07-93 - (M)  
 KR Kav - INT 331 (76) + *Periconia prolifica* + *Savoryella lignicola* 19-07-93 - (M)  
 KR Kav - INT 332 (76) + *Cirrenalia basiminuta* + *Aigialus mangrovis* 19-07-93 - (M)  
 KR Kav - INT 333 (76) + *Cirrenalia pygmaea* + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - INT 335 (76) + *Savoryella lignicola* + *Periconia prolifica* 19-07-93 - (M)  
 KR Kav - RHI 126 (76) + *Cirrenalia basiminuta* 19-07-93 - (M)  
 KR Kav - RHI 127 (76) + *Halosarpheia marina* + *Lignicola laevis* 19-07-93 - (M)  
 KR Kav - RHI 129 (76) + *Lulworthia* sp. III 19-07-93 - (M)  
 KR Kav - RHI 130 (76) + *Halosarpheia marina* 19-07-93 - (M)  
 KR Kav - RHI 131 (76) + *Halosarpheia viscosa* + *Lulworthia grandispora* 19-07-93 - (M)  
 KR Mah-A - AVI 212 (76) + *Cirrenalia pygmaea* 12-08-93 - (M)  
 KR Mah-A - AVI 214 (76) + *Marinosphaera mangrovei* 12-08-93 - (M)  
 KR Mah-A - BRU 185 (76) + *Halosarpheia marina* 12-08-93 - (M)  
 KR Mah-A - BRU 189 (76) + *Marinosphaera mangrovei* 12-08-93 - (M)  
 KR Mah-A - BRU 190 (76) + *Marinosphaera mangrovei* 12-08-93 - (M)  
 KR Mah-A - BRU 191 (76) + *Lulworthia grandispora* 12-08-93 - (M)  
 KR Mah-A - BRU 193 (76) + *Halosarpheia marina* + *Lulworthia* sp. III 12-08-93 - (M)  
 KR Mah-A - INT 338 (76) + *Cirrenalia pygmaea* + *Aniptodera chesapeakeensis* 12-08-93 - (M)  
 KR Mah-A - INT 342 (76) + *Lignicola laevis* 12-08-93 - (M)  
 KR Mah-A - INT 343 (76) + *Halorosellinia oceanica* 12-08-93 - (M)  
 KR Mah-A - INT 345 (76) + *Aniptodera chesapeakeensis* + *Periconia prolifica* 12-08-93 - (M)  
 KR Bey - DRW 81 (76) + *Marinosphaera mangrovei* 15-08-93 - (M)  
 KR Bey - INT 346 (76) 15-08-93 - (M)  
 KR TLY A - AVI 216 (76) + *Lindra hawaiiensis* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY A - AVI 218 (76) + *Aniptodera salsuginosa* + *Lindra hawaiiensis* 22-08-93 - (M)  
 KR TLY A - AVI 219 (76) + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY B - AVI 220 (76) + *Halosarpheia marina* + *Halosarpheia viscosa* 22-08-93 - (M)

KR TLY B - AVI 221 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* 22-08-93 - (M)  
 KR TLY C - AVI 225 (76) + *Cirrenalia pygmaea* + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY C - AVI 226 (76) + *Zalerion maritimum* + *Halosarpheia minuta* 22-08-93 - (M)  
 KR TLY C - AVI 227 (76) + *Halosarpheia minuta* 22-08-93 - (M)  
 KR TLY A - BRU 194 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY A - BRU 196 (76) + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY B - BRU 198 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* 22-08-93 - (M)  
 KR TLY B - BRU 199 (76) + *Halosarpheia marina* + *Periconia prolifica* 22-08-93 - (M)  
 KR TLY B - BRU 200 (76) + *Marinosphaera mangrovei* + *Halosarpheia retorquens* 22-08-93 - (M)  
 KR TLY C - BRU 202 (76) + *Lulworthia grandispora* + *Savoryella lignicola* 22-08-93 - (M)  
 KR TLY C - BRU 203 (76) + *Halosarpheia marina* + *Verruculina enalia* 22-08-93 - (M)  
 KR TLY A - INT 352 (76) + *Phoma sp.* 22-08-93 - (M)  
 KR TLY A - INT 354 (76) + *Lulworthia grandispora* 22-08-93 - (M)  
 KR TLY A - INT 355 (76) + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY B - INT 356 (76) + *Halosarpheia marina* + *Cirrenalia pygmaea* 22-08-93 - (M)  
 KR TLY B - INT 357 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY B - INT 358 (76) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* + *Cirrenalia pygmaea* 22-08-93 - (M)  
 KR TLY A - RHI 132 (76) + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY A - RHI 133 (76) + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY A - RHI 134 (76) + *Lulworthia grandispora* 22-08-93 - (M)  
 KR TLY A - RHI 135 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR TLY C - RHI 140 (76) + *Aigialus grandis* 22-08-93 - (M)  
 KR TLY C - RHI 141 (76) + *Aigialus parvus* 22-08-93 - (M)  
 KR TLY C - RHI 142 (76) + *Verruculina enalia* + *Dactylospora haliotrepha* 22-08-93 - (M)  
 KR Che - AVI 228 (76) + *Aniptodera chesapeakeensis* 05-09-93 - (M)  
 KR Che - AVI 229 (76) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 05-09-93 - (M)  
 KR Che - AVI 230 (76) + *Verruculina enalia* + *Cirrenalia pygmaea* 05-09-93 - (M)  
 KR Che - AVI 233 (76) + *Lulworthia grandispora* 05-09-93 - (M)  
 KR Che - AVI 235 (76) + *Periconia prolifica* + *Savoryella lignicola* 05-09-93 - (M)  
 KR Che - BRU 205 (76) + *Cirrenalia basiminuta* 05-09-93 - (M)  
 KR Che - BRU 207 (76) + *Aniptodera chesapeakeensis* + *Lulworthia sp. I* 05-09-93 - (M)  
 KR Che - BRU 209 (76) + *Verruculina enalia* 05-09-93 - (M)  
 KR Che - BRU 210 (76) + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che - INT 368 (76) + *Halosarpheia marina* 05-09-93 - (M)  
 KR Che - INT 372 (76) + *Aniptodera chesapeakeensis* + *Savoryella paucispora* 05-09-93 - (M)  
 KR Che - INT 373 (76) + *Savoryella lignicola* + *Leptosphaeria australiensis* 05-09-93 - (M)  
 KR Che - RHI 143 (76) + *Cirrenalia pygmaea* 05-09-93 - (M)  
 KR Che - RHI 144 (76) + *Aniptodera chesapeakeensis* + *Halorosellinia oceanica* 05-09-93 - (M)  
 KR Che - RHI 146 (76) + *Aniptodera chesapeakeensis* + *Aigialus parvus* 05-09-93 - (M)  
 KR Tik - INT 386 (76) + *Marinosphaera mangrovei* 18-09-93 - (M)  
 KR TLY A - AVI 236 (76) + *Halosarpheia marina* 19-09-93 - (M)  
 KR TLY A - AVI 238 (76) 19-09-93 - (M)



KR TLY C - AVI 240 (76) + *Dactylospora haliotrepha* + *Zalerion varium* 19-09-93 - (M)  
 KR TLY C - AVI 241 (76) + *Halosarpheia viscosa* + *Verruculina enalia* 19-09-93 - (M)  
 KR TLY C - AVI 242 (76) + *Halosarpheia viscosa* 19-09-93 - (M)  
 KR TLY A - BRU 211 (76) + *Trichocladium alopallonellum* 19-09-93 - (M)  
 KR TLY A - BRU 212 (76) + *Halosarpheia marina* 19-09-93 - (M)  
 KR TLY C - BRU 214 (76) + *Leptosphaeria australiensis* + *Halosarpheia viscosa* 19-09-93 - (M)  
 KR TLY C - BRU 215 (76) + *Aigialus parvus* + *Periconia prolifica* 19-09-93 - (M)  
 KR TLY C - BRU 216 (76) + *Aniptodera chesapeakeensis* 19-09-93 - (M)  
 KR TLY A - INT 391 (76) + *Halosarpheia viscosa* 19-09-93 - (M)  
 KR TLY A - INT 394 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* 19-09-93 - (M)  
 KR TLY A - INT 395 (76) + *Lignincola laevis* 19-09-93 - (M)  
 KR TLY A - RHI 147 (76) + *Lulworthia* sp. I 19-09-93 - (M)  
 KR TLY A - RHI 148 (76) + *Halosarpheia marina* + *Dactylospora haliotrepha* 19-09-93 - (M)  
 KR TLY A - RHI 149 (76) + *Halosarpheia marina* 19-09-93 - (M)  
 KR TLY A - BRU 219 (76) + *Leptosphaeria australiensis* 17-10-93 - (Pm)  
 KR TLY A - BRU 220 (76) + *Lulworthia grandispora* 17-10-93 - (Pm)  
 KR Kav - AVI 247 (76) + *Savoryella lignicola* 30-10-93 - (Pm)  
 KR Kav - AVI 248 (76) + *Savoryella lignicola* + *Lulworthia* sp. III + *Aniptodera haispora* 30-10-93 - (Pm)  
 KR Kav - AVI 250 (76) + *Verruculina enalia* + *Leptosphaeria australiensis* 30-10-93 - (Pm)  
 KR Kav - AVI 251 (76) + *Aniptodera chesapeakeensis* + *Dactylospora haliotrepha* + *Halosarpheia minuta* + *Halosarpheia ratnagiriensis* 30-10-93 - (Pm)  
 KR Kav - BRU 222 (76) + *Cirrenalia pygmea* 30-10-93 - (Pm)  
 KR Kav - BRU 224 (76) + *Savoryella lignicola* + *Cladosporium* sp. + *Lignincola laevis* 30-10-93 - (Pm)  
 KR Kav - BRU 226 (76) + *Savoryella paucispora* + *Leptosphaeria australiensis* + *Halosarpheia minuta* 30-10-93 - (Pm)  
 KR Kav - INT 421 (76) + *Savoryella lignicola* + *Halosarpheia abonnis* 30-10-93 - (Pm)  
 KR Kav - INT 422 (76) + *Aigialus grandis* + *Halosarpheia ratnagiriensis* + *Halorosellinia oceanica* 30-10-93 - (Pm)  
 KR Kav - INT 423 (76) + *Dactylospora haliotrepha* + *Halosarpheia minuta* 30-10-93 - (Pm)  
 KR Kav - RHI 156 (76) + *Aigialus grandis* + *Cirrenalia pygmea* + *Aniptodera haispora* 30-10-93 - (Pm)  
 KR Kav - RHI 158 (76) + *Halosarpheia abonnis* + *Aniptodera* sp. I 30-10-93 - (Pm)  
 KR Kav - RHI 159 (76) + *Dactylospora haliotrepha* + *Aigialus mangrovis* 30-10-93 - (Pm)  
 KR Kav - RHI 160 (76) + *Aigialus parvus* + *Verruculina enalia* + *Aniptodera haispora* 30-10-93 - (Pm)  
 KR Tik - DRW 112 (76) + *Savoryella lignicola* 31-10-93 - (Pm)  
 KR Tik - INT 433 (76) + *Aniptodera chesapeakeensis* 31-10-93 - (Pm)  
 KR TLY A - AVI 252 (76) + *Aigialus parvus* + *Marinosphaera mangrovei* 21-11-93 - (Pm)  
 KR TLY A - AVI 254 (76) + *Lignincola laevis* + *Halosarpheia marina* 21-11-93 - (Pm)  
 KR TLY A - BRU 227 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia viscosa* 21-11-93 - (Pm)  
 KR TLY A - BRU 228 (76) + *Halosarpheia marina* 21-11-93 - (Pm)  
 KR TLY A - BRU 229 (76) + *Lulworthia* sp. I 21-11-93 - (Pm)  
 KR TLY A - INT 446 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 21-11-93 - (Pm)  
 KR TLY A - INT 447 (76) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 21-11-93 - (Pm)  
 KR TLY A - INT 448 (76) + *Verruculina enalia* + *Halosarpheia marina* 21-11-93 - (Pm)  
 KR TLY A - RHI 161 (76) + *Aigialus grandis* + *Leptosphaeria australiensis* 21-11-93 - (Pm)

KR TLY A - RHI 164 (76) + *Halosarpheia marina* 21-11-93 - (Pm)  
 KR Val - AVI 255 (76) + *Cirrenalia pygmea* 05-12-93 - (Pm)  
 KR Val - AVI 256 (76) + *Leptosphaeria australiensis* + *Lindra hawaiiensis* 05-12-93 - (Pm)  
 KR Val - AVI 259 (76) + *Cirrenalia pygmea* 05-12-93 - (Pm)  
 KR Val - AVI 260 (76) + *Leptosphaeria australiensis* + *Lindra hawaiiensis* 05-12-93 - (Pm)  
 KR Val - BRU 230 (76) + *Lulworthia* sp. III + *Halosarpheia minuta* 05-12-93 - (Pm)  
 KR Val - BRU 231 (76) + *Dactylospora haliotrepha* 05-12-93 - (Pm)  
 KR Val - BRU 232 (76) + *Verruculina enalia* 05-12-93 - (Pm)  
 KR Val - INT 452 (76) + *Aniptodera chesapeakeensis* + *Aigialus parvus* 05-12-93 - (Pm)  
 KR Val - INT 454 (76) + *Cirrenalia pygmea* + *Dactylospora haliotrepha* 05-12-93 - (Pm)  
 KR Val - INT 456 (76) + *Marinosphaera mangrovei* + *Halosarpheia marina* 05-12-93 - (Pm)  
 KR Val - INT 458 (76) + *Marinosphaera mangrovei* + *Savoryella paucispora* 05-12-93 - (Pm)  
 KR Val - INT 459 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 05-12-93 - (Pm)  
 KR Val - RHI 168 (76) 05-12-93 - (Pm)  
 KR Val - RHI 169 (76) 05-12-93 - (Pm)  
 KR Che - AVI 261 (76) + *Halosarpheia abornis* + *Savoryella lignicola* 18-12-93 - (Pm)  
 KR Che - AVI 262 (76) + *Halosarpheia marina* + *Lignicola laevis* 18-12-93 - (Pm)  
 KR Che - AVI 265 (76) + *Dactylospora haliotrepha* + *Periconia prolifica* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR Che - AVI 268 (76) + *Marinosphaera mangrovei* + *Aigialus parvus* 18-12-93 - (Pm)  
 KR Che - BRU 235 (76) + *Cirrenalia basiminuta* 18-12-93 - (Pm)  
 KR Che - BRU 236 (76) + *Lulworthia grandispora* + *Savoryella lignicola* 18-12-93 - (Pm)  
 KR Che - BRU 237 (76) + *Halosarpheia marina* + *Verruculina enalia* 18-12-93 - (Pm)  
 KR Che - BRU 239 (76) + *Marinosphaera mangrovei* + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - BRU 240 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - BRU 242 (76) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - INT 463 (76) + *Periconia prolifica* + *Savoryella lignicola* 18-12-93 - (Pm)  
 KR Che - INT 464 (76) + *Halosarpheia marina* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR Che - RHI 172 (76) + *Halosarpheia marina* + *Leptosphaeria australiensis* + *Aniptodera chesapeakeensis* 18-12-93 - (Pm)  
 KR Che - RHI 173 (76) + *Halosarpheia marina* + *Cirrenalia pygmea* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che - RHI 175 (76) + *Savoryella lignicola* + *Verruculina enalia* 18-12-93 - (Pm)  
 KR Che - RHI 176 (76) + *Savoryella* sp. + *Periconia prolifica* 18-12-93 - (Pm)  
 KR Che - RHI 178 (76) + *Aigialus grandis* + *Dactylospora haliotrepha* 18-12-93 - (Pm)  
 KR Che - RHI 179 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* + *Marinosphaera mangrovei* 18-12-93 - (Pm)  
 KR TLY A - AVI 270 (76) + *Halosarpheia marina* 19-12-93 - (Pm)  
 KR TLY A - AVI 272 (76) + *Aniptodera chesapeakeensis* 19-12-93 - (Pm)  
 KR TLY A - BRU 245 (76) + *Marinosphaera mangrovei* 19-12-93 - (Pm)  
 KR TLY A - BRU 246 (76) + *Marinosphaera mangrovei* + *Halosarpheia marina* 19-12-93 - (Pm)  
 KR TLY A - INT 471 (76) + *Lulworthia grandispora* 19-12-93 - (Pm)  
 KR TLY A - INT 473 (76) + *Dactylospora haliotrepha* 19-12-93 - (Pm)  
 KR TLY A - RHI 182 (76) + *Cirrenalia pygmea* 19-12-93 - (Pm)  
 KR TLY A - RHI 183 (76) + *Aigialus grandis* 19-12-93 - (Pm)  
 KR Vad - AVI 274 (76) 26-12-93 - (Pm)

KR Vad - AVI 275 (76) + *Aniptodera chesapeakensis* + *Lulworthia* sp. I 26-12-93 - (Pm)  
 KR Vad - BRU 250 (76) + *Leptosphaeria australiensis* 26-12-93 - (Pm)  
 KR Vad - BRU 254 (76) + *Aniptodera chesapeakensis* + *Dactylospora haliotrepha* 26-12-93 - (Pm)  
 KR Vad - INT 476 (76) + *Aniptodera chesapeakensis* + *Halosarpheia marina* 26-12-93 - (Pm)  
 KR Vad - INT 479 (76) + *Aniptodera chesapeakensis* + *Halosarpheia retorquens* 26-12-93 - (Pm)  
 KR Dha-A - INT 481 (76) + *Halosarpheia marina* 27-12-93 - (Pm)  
 KR Kad A - AVI 283 (76) + *Lignincola laevis* + *Verruculina enalia* 16-01-94 - (Pm)  
 KR Kad A - AVI 284 (76) + *Leptosphaeria australiensis* 16-01-94 - (Pm)  
 KR Kad A - AVI 285 (76) + *Pleospora pelagica* 16-01-94 - (Pm)  
 KR Kad A - INT 490 (76) + *Cirrenalia pygmea* + *Dactylospora haliotrepha* 16-01-94 - (Pm)  
 KR Kad A - INT 492 (76) + *Lulworthia grandispora* + *Aniptodera chesapeakensis* 16-01-94 - (Pm)  
 KR Kad A - INT 494 (76) + *Lulworthia* sp. V + *Periconia prolifica* 16-01-94 - (Pm)  
 KR Kad A - INT 495 (76) + *Dactylospora haliotrepha* + *Verruculina enalia* 16-01-94 - (Pm)  
 KR Kad A - INT 497 (76) + *Leptosphaeria australiensis* 16-01-94 - (Pm)  
 KR Kad A - INT 499 (76) + *Marinosphaera mangrovei* + *Lulworthia grandispora* 16-01-94 - (Pm)  
 KR TLY B - AVI 290 (76) + *Aigialus parvus* + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
 KR TLY B - AVI 292 (76) + *Lignincola laevis* + *Halosphaeria hamata* 23-01-94 - (Pm)  
 KR TLY B - AVI 293 (76) + *Halosarpheia marina* + *Bathysascus tropicalis* 23-01-94 - (Pm)  
 KR TLY A - INT 500 (76) + *Marinosphaera mangrovei* + *Aniptodera chesapeakensis* 23-01-94 - (Pm)  
 KR TLY A - INT 502 (76) + *Halosarpheia marina* + *Cirrenalia pygmea* 23-01-94 - (Pm)  
 KR TLY A - INT 504 (76) + *Halosarpheia marina* + *Aniptodera chesapeakensis* 23-01-94 - (Pm)  
 KR TLY B - INT 506 (76) + *Biatrispora marina* + *Lulworthia grandispora* 23-01-94 - (Pm)  
 KR TLY B - INT 509 (76) + *Cirrenalia basiminuta* 23-01-94 - (Pm)  
 KR TLY B - INT 510 (76) + *Halosarpheia marina* + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
 KR TLY B - INT 511 (76) + *Halosarpheia marina* + *Halosarpheia viscosa* 23-01-94 - (Pm)  
 KR TLY B - INT 512 (76) + *Halosarpheia marina* + *Lignincola laevis* 23-01-94 - (Pm)  
 KR TLY B - RHI 187 (76) + *Halosarpheia marina* + *Cirrenalia pygmea* 23-01-94 - (Pm)  
 KR TLY B - RHI 188 (76) + *Halosarpheia marina* + *Lignincola laevis* 23-01-94 - (Pm)  
 KR TLY B - RHI 189 (76) + *Halosarpheia marina* + *Lulworthia* sp. III + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
 KR TLY B - RHI 190 (76) + *Halosarpheia marina* + *Leptosphaeria australiensis* + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
 KR TLY B - RHI 191 (76) + *Halosarpheia marina* + *Aniptodera chesapeakensis* 23-01-94 - (Pm)  
 KR TLY B - RHI 192 (76) + *Leptosphaeria australiensis* + *Aniptodera chesapeakensis* 23-01-94 - (Pm)  
 KR Edk - BRU 262 (76) + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR Edk - BRU 264 (76) + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR Edk - BRU 268 (76) 06-03-94 - (Prm)  
 KR Edk - INT 520 (76) + *Lignincola laevis* 06-03-94 - (Prm)  
 KR Edk - INT 526 (76) + *Savoryella lignicola* + *Aniptodera chesapeakensis* 06-03-94 - (Prm)  
 KR Edk - RHI 200 (76) + *Dactylospora haliotrepha* + *Marinosphaera mangrovei* + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR Edk - RHI 203 (76) + *Marinosphaera mangrovei* + *Halosarpheia marina* 06-03-94 - (Prm)  
 KR TLY B - INT 534 (76) + *Leptosphaeria australiensis* + *Marinosphaera mangrovei* 20-03-94 - (Prm)  
 KR TLY B - INT 535 (76) + *Dactylospora haliotrepha* + *Halosarpheia marina* 20-03-94 - (Prm)  
 KR TLY B - INT 536 (76) + *Lulworthia grandispora* + *Cirrenalia pygmea* + *Halosarpheia marina* 20-03-94 - (Prm)

KR TLY B - INT 537 (76) + *Lulworthia grandispora* + *Marinosphaera mangrovei* 20-03-94 - (Prm)  
 KR Kav - AVI 315 (76) + *Aniptodera chesapeakeensis* + *Cirrenalia pygmaea* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - AVI 316 (76) + *Aniptodera* sp. II + *Marinosphaera mangrovei* + *Halosarpheia marina* + *Aniptodera haispora* 15-04-94 - (Prm)  
 KR Kav - AVI 318 (76) + *Halosarpheia marina* + *Halosarpheia retorquens* 15-04-94 - (Prm)  
 KR Kav - AVI 321 (76) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* + *Marinosphaera mangrovei* 15-04-94 - (Prm)  
 KR Kav - BRU 282 (76) + *Aniptodera mangrovei* 15-04-94 - (Prm)  
 KR Kav - BRU 283 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - INT 538 (76) + *Aigialus parvus* + *Aniptodera salsuginosa* 15-04-94 - (Prm)  
 KR Kav - INT 539 (76) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* + *Aigialus mangrovis* 15-04-94 - (Prm)  
 KR Kav - INT 543 (76) + *Halosarpheia ratnagiriensis* + *Halosarpheia viscosa* 15-04-94 - (Prm)  
 KR Kav - INT 544 (76) + *Periconia prolifica* + *Cirrenalia pygmaea* 15-04-94 - (Prm)  
 KR Kav - RHI 212 (76) + *Dactylospora haliotrepha* + *Lignicola laevis* + *Verruculina enalia* 15-04-94 - (Prm)  
 KR Kav - RHI 213 (76) + *Lulworthia grandispora* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav - RHI 215 (76) + *Halosarpheia ratnagiriensis* 15-04-94 - (Prm)  
 KR Kav - RHI 217 (76) + *Halosarpheia ratnagiriensis* + *Halosarpheia marina* + *Lulworthia grandispora* 15-04-94 - (Prm)  
 KR Kav - RHI 219 (76) + *Halosarpheia marina* 15-04-94 - (Prm)

*Halocyphina villosa* is one of the very few obligate marine basidiomycetes with a very extensive geographical distribution. It has been recorded from United States (Kohlmeyer & Kohlmeyer, 1979). Belize (Kohlmeyer & Volkmann-Kohlmeyer, 1987), India (Patil & Borse, 1983a), Seychelles (Hyde & Jones, 1988a), Malaysia (Jones & Kuthubutheen, 1989), Singapore (Leong, Tan & Jones, 1991), Hong Kong & Macau (Vrijmoed, Hyde & Jones, 1994), and Brunei (Hyde, 1990a). The Kerala collections exhibited a slightly larger range of spore dimension.

# Mitosporic Fungi

## Key to the species

1. Conidia borne on hyphae and not on or in fruit bodies (hyphomycetes) ... 2
1. Conidia borne on or in fruit bodies (coelomycetes) ..... 14
2. Conidia hyaline and filiform ..... *Anguillospora* sp.
2. Conidia coloured and not filiform ..... 3
3. Conidia 1-2-celled ..... 4
3. Conidia usually with 3 or more cells ..... 5
4. Conidia 1-celled, formed in chains ..... *Periconia prolifica*
4. Conidia 2-celled, apical cell larger and darker .....  
..... *Trichocladium alopallonellum*
5. Conidia helicoid ..... 6
5. Conidia not helicoid ..... 12
6. Apical cell or penultimate cell considerably larger than the basal cells ..... 7
6. Apical cell or penultimate cell not considerably larger than the basal cells  
..... 10
7. Penultimate cell usually the largest; apical cell 14-17  $\mu\text{m}$  diam. ....  
..... *Cirrenalia macrocephala*
7. Apical cell always the largest ..... 8
8. Conidia fist-shaped ..... 9
8. Conidia not fist-shaped ..... *Cirrenalia basiminuta*
9. Conidia greyish, distinctly constricted at septa ..... *Cirrenalia fusca*

- 9. Conidia dark reddish brown, not constricted at septa ..... *Cirrenalia pygmea*
- 10. Cells of the conidial spiral eventually fusing together to form an irregular compact, discoid mass ..... *Zalerion* sp.
- 10. Cells of the conidial spiral not fusing together ..... 11
- 11. Conidial spiral finally becoming irregular ..... *Zalerion varium*
- 11. Conidial spiral regular ..... *Zalerion maritimum*
- 12. Apical cell broader than basal cells ..... *Trichocladium* sp.
- 12. Apical cell not broader than basal cells ..... 13
- 13. Conidia thin-walled ..... *Cladosporium* sp.
- 13. Conidia slightly thick-walled ..... *Dendryphiella salina*
- 14. Conidia with appendages ..... Unidentified Anamorph
- 14. Conidia without appendages ..... 15
- 15. Conidiomata eustromatic, unilocular ..... *Phomopsis* sp.
- 15. Conidiomata pycnidial ..... 16
- 16. Conidia brownish, 1-2 septate ..... *Aschochyta* sp.
- 16. Conidia hyaline, 0-1 septate ..... 17
- 17. Conidia 5-7 x 2-2.5  $\mu\text{m}$  ..... *Phoma* sp.
- 17. Conidia 3-5 x 1.5-2  $\mu\text{m}$  ..... *Phialophorophoma litoralis*

## ***Anguillospora* sp.**

### **Fig. 63**

Conidiophores 100 - 125  $\mu\text{m}$  long, 7-12  $\mu\text{m}$  wide at the base, tapering towards the apex, septate. Conidia terminal, 375 - 800 x 3.5 - 9  $\mu\text{m}$ , very long and filiform, many septate, irregularly coiled, hyaline, thin-walled.

### **Materials examined**

KR Vad - BRU 251 (93) + *Phoma* sp. 26-12-93 - (Pm)

KR Vad - INT 63 (93) + Unidentified ascomycete III 02-08-92 - (M)

KR Vad - INT 477 (93) + Unidentified anamorph + *Phomopsis* sp. 26-12-93 - (Pm)

*Anguillospora* is an aquatic anamorphic genus. In the beginning, only freshwater forms were known, but Nakagiri & Tubaki (1982) described a marine species named *A. marina*. The present collection differs from *A. marina* in having much longer conidia. This is the first marine record of this genus from India.

## ***Ascochyta* sp.**

### **Fig. 64**

Conidiomata pycnidial, 400-800 x 450  $\mu\text{m}$ , ovoid, immersed, ostiolate, papillate, brown. Peridium 28-40  $\mu\text{m}$ , multilayered with thick-walled, brown-coloured cells; inner layers lighter in colour. Neck 80-120 x 60-110  $\mu\text{m}$ ; ostiolar canal lined by periphyses. Conidiogenous cells 8-12 x 2.3-8  $\mu\text{m}$ , 1-1.5  $\mu\text{m}$  long, cylindrical with narrowing tip holding the conidia. Conidia 6-10 x 2-3  $\mu\text{m}$ , one-celled or two-celled, slightly constricted at the septum, ellipsoidal, light yellow, smooth-walled.

## Materials examined

KR Vad - INT 64 (80) 02-08-92 - (M)

KR Edk - ACN 56 (80) 15-11-92 - (Pm)

KR Vad - INT 478 (80) + *Phialophorophoma littoralis* 26-12-93 - (Pm)

KR TLY B - INT 508 (80) + *Aniptodera chesapeakensis* 23-01-94 - (Pm)

KR Edk - AVI 302 (80) + *Marinosphaera mangrovei* + *Verruculina enalia* + *Halosarpheia marina* 06-03-94 - (Prm)

KR Edk - RHI 202 (80) 06-03-94 - (Prm)

This fungus is intermediate between *Ascochyta salicorniae* and *A. obiones*. *Ascochyta salicorniae* have spores with one, two, or rarely three septa and the spore-size range is 10-19 x 4-7  $\mu\text{m}$ , which is much larger than that of the presently obtained fungus from Kerala coastal waters. The conidia of *A. obiones* have a size range of 9-11.5 x 3.5-5  $\mu\text{m}$ , which is nearer to that of the present collections. However, the nature of septation, with smaller lower cell and a larger upper cell, is similar to that of *Ascochyta salicorniae*.

***Cirrenalia basiminuta*** Raghuk. & Zainal in Mycotaxon 31: 163 (1988).

### Fig. 65

Hyphae 2-3  $\mu\text{m}$  wide, septate, pale brown to brown. Conidia 25 x 12.5-20  $\mu\text{m}$ , developing acrogenously, rarely laterally on conidiophore, solitary, somewhat helicoid, 3-4 septate, constricted at the septa, pigmentation and diameter of the cells increasing gradually from base to the apex; apical cell 10-14 x 7-20  $\mu\text{m}$  subglobose, reddish brown in colour.

## Materials examined

KR TLY A - BRU 49 (85) + *Halocyphina villosa* + *Halosarpheia marina* + *Verruculina enalia* 25-10-92 - (Pm)

KR TLY C - AVI 91 (85) + *Savoryella lignicola* + *Halosarpheia retorquens* + *Periconia prolifica* 29-11-92 - (Pm)

KR TLY C - AVI 92 (85) + *Savoryella lignicola* + *Periconia prolifica* 29-11-92 - (Pm)

KR TLY B - INT 166 (85) + *Halocyphina villosa* + *Halosarpheia marina* + *Payosphaeria minuta* 29-11-92 - (Pm)



KR TLY C - RHI 50 (85) + *Zalerion maritimum* + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR TLY C - RHI 52 (85) + *Halosarpheia marina* + *Lulworthia grandispora* + *Phoma* sp. 27-12-92 - (Pm)  
 KR TLY C - ACN 89 (85) + *Savoryella lignicola* 28-03-93 - (Prm)  
 KR TLY C - AVI 159 (85) + *Halosarpheia marina* + *Pleospora pelagica* 18-04-93 - (Prm)  
 KR TLY A - INT 294 (85) + *Lignincola laevis* 09-05-93 - (Prm)  
 KR Kav - AVI 201 (85) + *Marinosphaera mangrovei* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - INT 328 (85) + *Halosarpheia marina* + *Marinosphaera mangrovei* 19-07-93 - (M)  
 KR Kav - INT 332 (85) + *Aigialus mangrovis* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - RHI 126 (85) + *Halocyphina villosa* 19-07-93 - (M)  
 KR Kav - RHI 128 (85) + *Leptosphaeria australiensis* + *Aniptodera chesapeakeensis* 19-07-93 - (M)  
 KR TLY B - AVI 223 (85) + *Lulworthia grandispora* 22-08-93 - (M)  
 KR TLY A - INT 353 (85) + *Halosarpheia marina* 22-08-93 - (M)  
 KR Che - BRU 205 (85) + *Halocyphina villosa* 05-09-93 - (M)  
 KR Val - AVI 255 (85) + *Halocyphina villosa* 05-12-93 - (Pm)  
 KR Val - AVI 259 (85) + *Halocyphina villosa* 05-12-93 - (Pm)  
 KR Val - INT 453 (85) + *Halosarpheia minuta* 05-12-93 - (Pm)  
 KR Che - BRU 235 (85) + *Halocyphina villosa* 18-12-93 - (Pm)  
 KR Che - INT 466 (85) + *Halosarpheia marina* 18-12-93 - (Pm)  
 KR Che - RHI 171 (85) + *Halosarpheia marina* + *Aigialus grandis* 18-12-93 - (Pm)  
 KR TLY B - INT 509 (85) + *Halocyphina villosa* 23-01-94 - (Pm)  
 KR TLY A - INT 528 (85) + *Dactylospora haliotrepha* + *Halosarpheia marina* 20-03-94 - (Prm)  
 KR Kav - AVI 313 (85) + *Aigialus parvus* + *Dactylospora haliotrepha* 15-04-94 - (Prm)  
 KR Kav - INT 545 (85) + *Halosarpheia abonnis* + *Lulworthia grandispora* 15-04-94 - (Prm)  
 KR Kav - RHI 221 (85) + *Lignincola laevis* + *Lulworthia grandispora* 15-04-94 - (Prm)  
 KR TLY A - BRU 286 (85) + *Savoryella lignicola* + *Halosphaeria hamata* 17-04-94 - (Prm)  
 KR TLY A - BRU 288 (85) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 17-04-94 - (Prm)  
 KR TLY A - INT 552 (85) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 17-04-94 - (Prm)

This species of *Cirrenalia* was first isolated from mangrove wood from Goa, and from test blocks submerged in the sea at Kuwait (Raghukumar, Zainal and Jones 1988). The size of the conidia of the Kerala collections is slightly smaller than those of the type materials. This species is also known from Singapore (Leong, Tan & Jones, 1991) and Hong Kong (Sadaba *et al.*, 1995).

***Cirrenalia fusca*** I. Schmidt in Feddes Rept 80: 110 (1969).

**Fig. 66**

Hyphae (2)3-3.5  $\mu\text{m}$  diam., septate, branched, immersed, light brown. Conidiphore up to 30  $\mu\text{m}$  long, 4-5  $\mu\text{m}$  wide, simple, light brown. Conidia 23-30 x 20-37  $\mu\text{m}$ , solitary, regularly helicoid, 3-4-septate, constricted at septa; cells increasing in diameter from base to apex; terminal cells 20-24 x 12.5-22  $\mu\text{m}$  subglobose, brownish; basal cells 6-12 x 4-7  $\mu\text{m}$ , hyaline, cylindrical.

**Material examined:**

KR Kad A - ACN 40 (90) + *Lulworthia* sp I 13-09-92 (M)

KR Kad A - ACN 43 (90) + *Halosarpheia marina* 13-09-92 (M)

KR Kad A - AVI 54 (90) + *Halocyphina villosa* + *Marinosphaeria mangrovei* 13-09-92 (M)

KR Edk - RHI 35 (90) + *Halosarpheia ratnagiriensis* 15-11-92 (Pm)

KR Azi - DRW 36 (90) + *Dactylospora haliotrepha* 13-02-93 (Pm)

KR Dha-A - INT 269 (90) + *Lulworthia grandispora* 18-04-93 (Pm)

KR Kad A - ACN 123 (90) + *Halosarpheia marina* 23-05-93 (Pm)

KR Kad A - ACN 126 (90) + *Lignincola laevis* 23-05-93 (Pm)

KR Kad A - AVI 168 (90) 23-05-93 (Pm)

KR Edk - RHI 114 (90) + *Aniptodera chesapeakeensis* + *Marinosphaeria mangrovei* 11-07-93 (M)

KR Kad A - ACN 200 (90) + *Aniptodera chesapeakeensis* 16-01-94 (Pm)

KR Kad A - AVI 280 (90) + *Aniptodera chesapeakeensis* 16-01-94 (Pm)

KR Edk - BRU 263 (90) + *Halosarpheia ratnagiriensis* 06-03-94 (Pm)

*Cirrenalia fusca* is considered as a temperate fungus. However, the Kerala collections agree with the descriptions of this species by Kohlmeyer & Kohlmeyer (1979) and Raghukumar, Zainal, & Jones (1988).

***Cirrenalia macrocephala*** (Kohlm.) Meyers & R. T. Moore in Am. J. Bot. 47: 347 (1960).

*Helicoma macrocephala* Kohlm. in Ber. Dtsch. Bot. Ges. 71: 99 (1958).

## Fig. 67

Hyphae 2-2-5  $\mu\text{m}$  wide, septate, branched, hyaline to brown. Conidia 28-31 x 25-30  $\mu\text{m}$ , solitary, helicoid, 2-4 septate, constricted at the septa, upper cells reddish brown while lower cells light brown to hyaline, cells dissimilar in size and increasing in diameter from base to apex; terminal cell 10-13 x 14-17  $\mu\text{m}$ ; basal cell 4-6 x 2.5 – 4  $\mu\text{m}$ ; middle cells 9-16 x 8-17  $\mu\text{m}$ .

## Materials examined

- KR TLY A - BRU 15 (87) + *Aniptodera chesapeakensis* + *Halocyphina villosa* 26-07-92 - (M)  
KR TLY A - INT 49 (87) + *Aniptodera chesapeakensis* + *Halocyphina villosa* 26-07-92 - (M)  
KR Vad - ACN 23 (87) + *Lignicola longirostris* 02-08-92 - (M)  
KR Vad - INT 56 (87) 02-08-92 - (M)  
KR Kad A - ACN 44 (87) + *Trichocladium alopallonellum* 13-09-92 - (M)  
KR TLY A - AVI 65 (87) + *Halosarpheia retorquens* + *Lignicola laevis* 25-10-92 - (Pm)  
KR Edk - AVI 74 (87) + *Leptosphaeria australiensis* 15-11-92 - (Pm)  
KR Edk - RHI 31 (87) + *Aigialus parvus* 15-11-92 - (Pm)  
KR TLY A - INT 206 (87) + *Zalerion varium* + *Halosarpheia marina* 10-01-93 - (Pm)  
KR TLY A - INT 207 (87) + *Halosarpheia marina* + *Marinosphaera mangrovei* 10-01-93 - (Pm)  
KR TLY A - INT 208 (87) + *Halosarpheia retorquens* + *Halosarpheia marina* 10-01-93 - (Pm)  
KR TLY C - RHI 61 (87) + *Lulworthia grandispora* 21-02-93 - (Pm)  
KR Vad - AVI 135 (87) + *Halosarpheia marina* + *Halocyphina villosa* 04-04-93 - (Pm)  
KR Vad - BRU 122 (87) + *Aniptodera chesapeakensis* + *Halocyphina villosa* 04-04-93 - (Pm)  
KR Vad - INT 239 (87) + *Aniptodera* sp. II + *Halosarpheia marina* 04-04-93 - (Pm)  
KR Vad - INT 240 (87) + *Halocyphina villosa* + *Aniptodera chesapeakensis* + *Dactylospora haliotrepha* + *Savoryella lignicola* 04-04-93 - (Pm)  
KR Tik - DRW 65 (87) 25-04-93 - (Pm)  
KR Edk - AVI 184 (87) + *Halosarpheia marina* 11-07-93 - (M)  
KR Che - INT 365 (87) + *Lignicola laevis* 05-09-93 - (M)  
KR Vad - INT 474 (87) + *Halosarpheia marina* + *Savoryella lignicola* + *Aniptodera chesapeakensis* 26-12-93 - (Pm)  
KR Kad A - ACN 201 (87) + *Halosarpheia marina* + *Lulworthia* sp. I 16-01-94 - (Pm)  
KR Kav - INT 546 (87) + *Marinosphaera mangrovei* + *Halosarpheia retorquens* 15-04-94 - (Pm)

Tubaki (1969) reported *Cirrenalia macrocephala* as one of the widely distributed marine fungi in coastal Japan. Shearer (1972) isolated this fungus from a water

body in which the salinity of water was 13.5% and the range of temperature was 18.3-29°C. Hughes (1974) reported that *Cirrenalia macrocephala* was much less common in the tropical parts compared to the temperate regions. Kohlmeyer (1980) reported the occurrence of this fungus in USA.

***Cirrenalia pygmea*** Kohlm. in Ber. Dtsh. Bot. Ges. 79: 35 (1966).

**Fig. 68**

Hyphae 2.5-3.5 µm in diam., septate, branched, brown. Conidiophores very small. Conidia 20-30 x 22-40 µm, solitary, helicoid or twisted, 2- to 4-septate, slightly constricted at the septa; the upper 2-3 cells reddish brown to black while the lower cells are light brown to hyaline; cells dissimilar and gradually increase in diameter from base to apex; terminal cells 15-22 x 17.5-24 µm, subglobose or pear-shaped; basal cells 4-8 x 3-6 µm.

**Materials examined**

KR Kad A - INT 2 (89) + *Halosarpheia marina* + *Lulworthia grandispora* 19-04-92 - (Prm)  
KR Kad B - INT 12 (89) 19-04-92 - (Prm)  
KR Mah-A - AVI 9 (89) + *Lulworthia grandispora* 03-05-92 - (Prm)  
KR Mah-A - AVI 12 (89) + *Lulworthia grandispora* 03-05-92 - (Prm)  
KR Mah-A - INT 28 (89) + *Verruculina enalia* + *Halosarpheia marina* 03-05-92 - (Prm)  
KR Mah-A BRU 1 (89) + *Savoryella lignicola* 03-05-92 - (Prm)  
KR Mah-A BRU 2 (89) + *Zalerion varium* 03-05-92 - (Prm)  
KR Mah-A BRU 3 (89) + *Trichocladium alopallonellum* 03-05-92 - (Prm)  
KR Mah-A BRU 4 (89) + *Marinosphaera mangrovei* 03-05-92 - (Prm)  
KR TLY A - INT 44 (89) + *Lulworthia grandispora* + *Halocyphina villosa* 21-06-92 - (M)  
KR TLY B - ACN 17 (89) + *Periconia prolifica* 26-07-92 - (M)  
KR TLY B AVI 24 (89) + *Halosarpheia marina* + *Halocyphina villosa* 26-07-92 - (M)  
KR Vad ACN 24 (89) + *Marinosphaera mangrovei* 02-08-92 - (M)  
KR Vad BRU 24 (89) + *Halosarpheia abonnis* 02-08-92 - (M)  
KR Val ACN 26 (89) + *Marinosphaera mangrovei* 09-08-92 - (M)

KR Val ACN 31 (89) 09-08-92 - (M)  
 KR Val INT 68 (89) + *Halocyphina villosa* 09-08-92 - (M)  
 KR Val RHI 12 (89) + *Aigialus parvus* 09-08-92 - (M)  
 KR TLY A INT 73 (89) + *Halocyphina villosa* + *Halosarpheia marina* 23-08-92 - (M)  
 KR Dha-B INT 86 (89) + *Halocyphina villosa* 23-08-92 - (M)  
 KR Dha-B INT 94 (89) + *Marinosphaera mangrovei* 23-08-92 - (M)  
 KR Dha-B INT 99 (89) + *Halosarpheia marina* 23-08-92 - (M)  
 KR Mah-A BRU 39 (89) + *Marinosphaera mangrovei* 06-09-92 - (M)  
 KR Mah-A BRU 44 (89) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 06-09-92 - (M)  
 KR Mah-B INT 117 (89) + *Marinosphaera mangrovei* 06-09-92 - (M)  
 KR Kad A ACN 39 (89) + *Aniptodera chesapeakeensis* + *Trichocladium alopallonellum* 13-09-92 - (M)  
 KR Kad A ACN 41 (89) + *Lulworthia* sp. I 13-09-92 - (M)  
 KR Kad A AVI 52 (89) + *Aniptodera chesapeakeensis* 13-09-92 - (M)  
 KR Kad A INT 122 (89) + *Halocyphina villosa* + *Halosarpheia marina* 13-09-92 - (M)  
 KR TLY A AVI 60 (89) + *Halocyphina villosa* + *Lignincola longirostris* 27-09-92 - (M)  
 KR Kad B INT 144 (89) 18-10-92 - (Pm)  
 KR TLY C AVI 69 (89) + *Lulworthia* sp. I + *Aniptodera chesapeakeensis* 25-10-92 - (Pm)  
 KR TLY C AVI 70 (89) + *Lulworthia grandispora* 25-10-92 - (Pm)  
 KR TLY C AVI 72 (89) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 25-10-92 - (Pm)  
 KR TLY A BRU 50 (89) + *Halosarpheia marina* + *Halosarpheia retorquens* 25-10-92 - (Pm)  
 KR TLY C BRU 55 (89) + *Aniptodera chesapeakeensis* 25-10-92 - (Pm)  
 KR Edk BRU 61 (89) + *Dactylospora haliotrepha* 15-11-92 - (Pm)  
 KR Edk INT 158 (89) + *Halocyphina villosa* + *Lulworthia* sp. I 15-11-92 - (Pm)  
 KR Edk RHI 28 (89) + *Halosarpheia ratnagiriensis* 15-11-92 - (Pm)  
 KR TLY A AVI 84 (89) + *Halosarpheia marina* + *Aigialus mangrovis* + *Aigialus parvus* 29-11-92 - (Pm)  
 KR TLY A BRU 70 (89) + *Halosarpheia marina* + *Leptosphaeria australiensis* 29-11-92 - (Pm)  
 KR TLY A INT 162 (89) + *Halosarpheia marina* + *Lulworthia grandispora* 29-11-92 - (Pm)  
 KR TLY C RHI 45 (89) + *Halosarpheia marina* + *Halocyphina villosa* 29-11-92 - (Pm)  
 KR TLY C RHI 47 (89) + *Halosarpheia marina* + *Halocyphina villosa* 29-11-92 - (Pm)  
 KR Azi INT 173 (89) + *Savoryella lignicola* + *Arenariomyces trifurcatus* + *Antennospora quadricornuta* 20-12-92 - (Pm)  
 KR TLY C ACN 67 (89) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 27-12-92 - (Pm)  
 KR TLY C ACN 69 (89) + *Phoma* sp. + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR TLY A AVI 95 (89) + *Marinosphaera mangrovei* + *Lignincola laevis* 27-12-92 - (Pm)  
 KR TLY C AVI 97 (89) + *Savoryella lignicola* + *Halosarpheia marina* + *Halocyphina villosa* 27-12-92 - (Pm)  
 KR TLY A BRU 81 (89) + *Halosarpheia marina* + *Lignincola laevis* + *Lulworthia* sp. I 27-12-92 - (Pm)  
 KR Dha-B INT 184 (89) + *Halosarpheia marina* 27-12-92 - (Pm)  
 KR Dha-B INT 186 (89) + *Lulworthia* sp. I 27-12-92 - (Pm)  
 KR Mah-A ACN 75 (89) + *Periconia prolifica* 03-01-93 - (Pm)  
 KR Mah-A ACN 80 (89) + *Savoryella lignicola* 03-01-93 - (Pm)  
 KR Mah-A AVI 106 (89) + *Halosarpheia abonnis* 03-01-93 - (Pm)  
 KR Mah-A INT 193 (89) + *Leptosphaeria australiensis* + *Lindra hawaiiensis* 03-01-93 - (Pm)  
 KR Mah-B INT 200 (89) 03-01-93 - (Pm)

KR TLY C ACN 84 (89) + *Aniptodera chesapeakeensis* 10-01-93 - (Pm)  
 KR TLY C BRU 100 (89) + *Lulworthia grandispora* + *Halocyphina villosa* 10-01-93 - (Pm)  
 KR TLY C BRU 101 (89) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Periconia prolifica* 10-01-93 - (Pm)  
 KR TLY C BRU 102 (89) + *Lulworthia grandispora* + *Halocyphina villosa* + *Periconia prolifica* 10-01-93 - (Pm)  
 KR Azi DRW 33 (89) + *Antennospora quadricornuta* 13-02-93 - (Pm)  
 KR Azi DRW 35 (89) + *Arenariomyces trifurcatus* 13-02-93 - (Pm)  
 KR Azi DRW 41 (89) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Halosarpheia marina* 13-02-93 - (Pm)  
 KR Azi SBI 31 (89) + *Halorosellinia oceanica* 13-02-93 - (Pm)  
 KR Bey INT 231 (89) + *Aniptodera chesapeakeensis* 28-02-93 - (Pm)  
 KR TLY A INT 235 (89) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 28-03-93 - (Pm)  
 KR TLY A INT 237 (89) + *Halosarpheia marina* + *Zalerion varium* 28-03-93 - (Pm)  
 KR TLY C AVI 125 (89) + *Lindra hawaiiensis* + *Marinosphaera mangrovei* 28-03-93 - (Pm)  
 KR Vad ACN 93 (89) + *Aniptodera chesapeakeensis* 04-04-93 - (Pm)  
 KR Vad ACN 94 (89) + *Aniptodera chesapeakeensis* 04-04-93 - (Pm)  
 KR Vad AVI 136 (89) + *Halosarpheia marina* + *Savoryella lignicola* + *Marinosphaera mangrovei* 04-04-93 - (Pm)  
 KR Vad INT 243 (89) + *Verruculina enalia* + *Marinosphaera mangrovei* 04-04-93 - (Pm)  
 KR Vad INT 244 (89) + *Halocyphina villosa* + *Halosarpheia marina* 04-04-93 - (Pm)  
 KR Che ACN 109 (89) + *Periconia prolifica* 17-04-93 - (Pm)  
 KR Che AVI 144 (89) + *Halosarpheia marina* + *Halorosellinia oceanica* 17-04-93 - (Pm)  
 KR Che AVI 148 (89) + *Aniptodera chesapeakeensis* + *Verruculina enalia* 17-04-93 - (Pm)  
 KR Che BRU 133 (89) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* 17-04-93 - (Pm)  
 KR Che BRU 137 (89) + *Halosarpheia abonnis* 17-04-93 - (Pm)  
 KR Che INT 256 (89) + *Lulworthia grandispora* + *Aniptodera chesapeakeensis* 17-04-93 - (Pm)  
 KR Che RHI 79 (89) + *Savoryella paucispora* + *Halocyphina villosa* 17-04-93 - (Pm)  
 KR Che RHI 83 (89) + *Leptosphaeria australiensis* + *Halocyphina villosa* 17-04-93 - (Pm)  
 KR TLY C ACN 116 (89) + *Savoryella lignicola* 18-04-93 - (Pm)  
 KR Dha-A DRW 61 (89) + *Savoryella lignicola* 18-04-93 - (Pm)  
 KR TLY A INT 262 (89) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 18-04-93 - (Pm)  
 KR TLY B INT 268 (89) + *Halosarpheia marina* + *Ceriosporopsis halima* 18-04-93 - (Pm)  
 KR TLY A INT 293 (89) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 09-05-93 - (Pm)  
 KR TLY A INT 295 (89) + *Zalerion varium* 09-05-93 - (Pm)  
 KR Kad A INT 297 (89) + *Halocyphina villosa* + *Lulworthia grandispora* 23-05-93 - (Pm)  
 KR TLY C ACN 128 (89) + *Halosarpheia marina* 20-06-93 - (Pm)  
 KR TLY A INT 302 (89) + *Aniptodera chesapeakeensis* + *Marinosphaera mangrovei* 20-06-93 - (M)  
 KR Edk BRU 168 (89) 11-07-93 - (M)  
 KR Edk INT 307 (89) + *Lulworthia* sp. I 11-07-93 - (M)  
 KR Edk RHI 117 (89) + *Lignicola tropica* 11-07-93 - (M)  
 KR Azi DRW 79 (89) + *Corollospora filiformis* 17-07-93 - (M)  
 KR Azi INT 316 (89) + *Antennospora quadricornuta* 17-07-93 - (M)  
 KR TLY C RHI 122 (89) + *Aigialus grandis* 18-07-93 - (M)  
 KR KAV – BRU 181 (89) + *Lindra hawaiiensis* 19-07-93 - (M)  
 KR Kav INT 327 (89) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 19-07-93 - (M)

KR Kav INT 333 (89) + *Halosarpheia marina* + *Halocyphina villosa* 19-07-93 - (M)  
 KR Mah-A ACN 155 (89) 12-08-93 - (M)  
 KR Mah-A AVI 211 (89) + *Lignincola laevis* 12-08-93 - (M)  
 KR Mah-A AVI 212 (89) + *Halocyphina villosa* 12-08-93 - (M)  
 KR Mah-A INT 338 (89) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 12-08-93 - (M)  
 KR TLY C ACN 160 (89) + *Halosarpheia retorquens* 22-08-93 - (M)  
 KR TLY C AVI 225 (89) + *Halosarpheia marina* + *Halocyphina villosa* 22-08-93 - (M)  
 KR TLY B INT 356 (89) + *Halocyphina villosa* + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY B INT 358 (89) + *Halocyphina villosa* + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 22-08-93 - (M)  
 KR Dha-B INT 363 (89) 22-08-93 - (M)  
 KR Che ACN 162 (89) + *Aniptodera chesapeakeensis* 05-09-93 - (M)  
 KR Che ACN 164 (89) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 05-09-93 - (M)  
 KR Che AVI 230 (89) + *Halocyphina villosa* 05-09-93 - (M)  
 KR Che INT 366 (89) + *Lulworthia grandispora* 05-09-93 - (M)  
 KR Che RHI 143 (89) + *Halocyphina villosa* 05-09-93 - (M)  
 KR Mah-B INT 382 (89) 12-09-93 - (M)  
 KR Tik INT 387 (89) + *Marinosphaera mangrovei* 18-09-93 - (M)  
 KR TLY C ACN 168 (89) + *Aniptodera chesapeakeensis* 19-09-93 - (M)  
 KR Ppd DRW 94 (89) + *Lignincola laevis* 26-09-93 - (M)  
 KR Kad B INT 404 (89) + *Aniptodera chesapeakeensis* 26-09-93 - (M)  
 KR Kad B INT 405 (89) + *Marinosphaera mangrovei* 26-09-93 - (M)  
 KR Kad B INT 409 (89) + *Lulworthia* sp. I 26-09-93 - (M)  
 KR TLY A BRU 218 (89) + *Marinosphaera mangrovei* + *Halosarpheia viscosa* 17-10-93 - (Pm)  
 KR TLY A BRU 221 (89) + *Lulworthia grandispora* 17-10-93 - (Pm)  
 KR TLY A RHI 153 (89) + *Halosarpheia viscosa* + *Marinosphaera mangrovei* 17-10-93 - (Pm)  
 KR Kav ACN 173 (89) + *Aniptodera chesapeakeensis* 30-10-93 - (Pm)  
 KR Kav ACN 176 (89) + *Lignincola laevis* + *Savoryella paucispora* + *Lindra hawaiiensis* 30-10-93 - (Pm)  
 KR Kav ACN 177 (89) + *Aniptodera chesapeakeensis* 30-10-93 - (Pm)  
 KR Kav BRU 222 (89) + *Halocyphina villosa* 30-10-93 - (Pm)  
 KR Kav BRU 223 (89) + *Lulworthia* sp. I 30-10-93 - (Pm)  
 KR Kav INT 424 (89) + *Aniptodera chesapeakeensis* 30-10-93 - (Pm)  
 KR Kav INT 425 (89) + *Lignincola laevis* + 30-10-93 - (Pm)  
 KR Kav RHI 156 (89) + *Halocyphina villosa* + *Aigialus grandis* + *Aniptodera haispora* 30-10-93 - (Pm)  
 KR Kav RHI 157 (89) + *Halosarpheia ratnagiriensis* + *Dactylospora haliotrepha* 30-10-93 - (Pm)  
 KR Dha-B INT 439 (89) 21-11-93 - (Pm)  
 KR TLY A RHI 163 (89) + *Arenariomyces parvulus* + *Aigialus parvus* 21-11-93 - (Pm)  
 KR Val BRU 234 (89) + *Dactylospora haliotrepha* 05-12-93 - (Pm)  
 KR Val INT 454 (89) + *Halocyphina villosa* + *Dactylospora haliotrepha* 05-12-93 - (Pm)  
 KR Che ACN 193 (89) 18-12-93 - (Pm)  
 KR Che AVI 267 (89) + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR Che INT 461 (89) + *Aniptodera chesapeakeensis* + *Lignincola laevis* 18-12-93 - (Pm)  
 KR Che INT 469 (89) + *Halosarpheia ratnagiriensis* + *Savoryella paucispora* + *Lindra hawaiiensis* 18-12-93 - (Pm)

KR Che RHI 170 (89) + *Halosarpheia marina* + *Halorosellinia oceanica* + *Aigialus parvus* 18-12-93 - (Pm)  
 KR Che RHI 173 (89) + *Halosarpheia marina* + *Halocyphina villosa* + *Lulworthia grandispora* 18-12-93 - (Pm)  
 KR TLY A RHI 182 (89) + *Halocyphina villosa* 19-12-93 - (Pm)  
 KR Vad AVI 279 (89) + *Pleospora pelagica* 26-12-93 - (Pm)  
 KR Vad BRU 255 (89) + *Marinosphaera mangrovei* 26-12-93 - (Pm)  
 KR Vad INT 475 (89) + *Halosarpheia marina* + *Aniptodera* sp. I 26-12-93 - (Pm)  
 KR Dha-A DRW 115 (89) 27-12-93 - (Pm)  
 KR Dha-A DRW 117 (89) + *Lulworthia grandispora* 27-12-93 - (Pm)  
 KR Kad A INT 490 (89) + *Halocyphina villosa* + *Dactylospora haliotrepha* 16-01-94 - (Pm)  
 KR TLY A BRU 256 (89) + *Marinosphaera mangrovei* + *Dactylospora haliotrepha* 23-01-94 - (Pm)  
 KR TLY A BRU 258 (89) + *Halosarpheia marina* + *Marinosphaera mangrovei* 23-01-94 - (Pm)  
 KR TLY A INT 502 (89) + *Halosarpheia marina* + *Halocyphina villosa* 23-01-94 - (Pm)  
 KR TLY B RHI 187 (89) + *Halocyphina villosa* + *Halosarpheia marina* 23-01-94 - (Pm)  
 KR TLY B RHI 193 (89) + *Halosarpheia abonnis* + *Halosarpheia ratnagiriensis* 23-01-94 - (Pm)  
 KR TLY A RHI 194 (89) + *Halosarpheia retorquens* + *Lulworthia grandispora* 27-02-94 - (Prm)  
 KR TLY A RHI 195 (89) + *Halosphaeria hamata* + *Dactylospora haliotrepha* 27-02-94 - (Prm)  
 KR Edk AVI 303 (89) + *Halosarpheia marina* + *Lulworthia grandispora* 06-03-94 - (Prm)  
 KR Edk INT 521 (89) + *Halosarpheia marina* + *Lulworthia grandispora* 06-03-94 - (Prm)  
 KR Edk INT 523 (89) + *Aniptodera chesapeakeensis* 06-03-94 - (Prm)  
 KR TLY B AVI 307 (89) + *Halosarpheia marina* 20-03-94 - (Prm)  
 KR TLY B INT 536 (89) + *Lulworthia grandispora* + *Halocyphina villosa* + *Halosarpheia marina* 20-03-94 - (Prm)  
 KR Kav AVI 315 (89) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Halosarpheia marina* 15-04-94 - (Prm)  
 KR Kav BRU 281 (89) + *Lulworthia* sp. I 15-04-94 - (Prm)  
 KR Kav BRU 284 (89) + *Periconia prolifica* 15-04-94 - (Prm)  
 KR Kav INT 544 (89) + *Periconia prolifica* + *Halocyphina villosa* 15-04-94 - (Prm)  
 KR Kav RHI 216 (89) + *Aigialus grandis* + *Aniptodera chesapeakeensis* 15-04-94 - (Prm)  
 KR TLY A AVI 323 (89) + *Lulworthia grandispora* + *Lignincola laevis* 17-04-94 - (Prm)  
 KR TLY A INT 550 (89) + *Zalerion maritimum* + *Halosarpheia marina* 17-04-94 - (Prm)

*Cirrenalia pygmea* is a widely distributed anamorphic species first described by Kohlmeyer (1966). Patil & Borse (1983a) first recorded this species in India from the Maharashtra coast. It is also known from Liberia, Trinidad, Mexico (Kohlmeyer & Kohlmeyer, 1979), Brunei (Hyde, 1988a), Malaysia (Jones & Kuthubutheen, 1989) and Singapore (Leong, Tan & Jones, 1991). The Kerala collections match well with the descriptions of this fungus from other parts of the world.



## ***Cladosporium* sp.**

### **Fig. 69**

Hyphae not observed. Conidiophores 130-180 x 7-14  $\mu\text{m}$ , cylindrical, septate, simple, straight or curved, pale brown. Conidia 25.5-36(39) x 7.5-10  $\mu\text{m}$ , cylindrical or ellipsoidal, 3- to 4-septate, not constricted at the septa, with a prominent scar at the basal part of the conidium, smooth, thick-walled, olive brown.

### **Materials examined**

KR Vad - BRU 26 (83) 02-08-92 - (M)

KR Kav - BRU 224 (83) + *Halocyphina villosa* + *Savoryella lignicola* + *Lignicola laevis* 30-10-93 - (Pm)

KR Vad - BRU 252 (83) 26-12-93 - (Pm)

KR Kad A - AVI 281 (83) + *Aniptodera chesapeakensis* 16-01-94 - (Pm)

KR Kav - BRU 280 (83) 15-04-94 - (Pm)

Although *Cladosporium* species have been recorded from the marine habitats, (Cribb & Cribb, 1969; Kohlmeyer & Kohlmeyer, 1979), according to Kohlmeyer and Kohlmeyer (1979), the marine origin of these species is to be confirmed. The Kerala collections agreed with the genus *Cladosporium* in all essential characters.

***Dendryphiella salina*** (Sutherland) Pugh & Nicot in Trans. Br. Mycol. Soc. 47: 266 (1964).

*Cercospora salina* Sutherland in New Phytol. 15: 43 (1916).

### **Fig. 70**

Hyphae 2-3.5  $\mu\text{m}$  broad, septate, hyaline or light brown. Conidiophores 10-55 x 2.5-3.5  $\mu\text{m}$ , macronematous, cylindrical, septate, simple, straight or curved,

hyaline or light brown. Conidia 20-27.5 x 5-8 µm, cylindrical or subellipsoidal, 1-4 septate, slightly or not constricted at the septum, straight or slightly curved, smooth, pale brown, solitary, developing laterally or terminally, with a basal scar.

### Materials examined

KR Vad - INT 59 (91) 02-08-92 - (M)  
KR TLY A - BRU 48 (91) + *Halocyphina villosa* + *Halosarpheia marina* 27-09-92 - (M)  
KR Edk - ACN 54 (91) + *Savoryella lignicola* 15-11-92 - (Pm)  
KR Edk - BRU 62 (91) + *Halocyphina villosa* 15-11-92 - (Pm)  
KR Edk - BRU 64 (91) 15-11-92 - (Pm)  
KR Edk - INT 160 (91) 15-11-92 - (Pm)  
KR Vad - INT 246 (91) + *Phoma* sp. 04-04-93 - (Prm)  
KR Edk - ACN 131 (91) 11-07-93 - (M)  
KR Edk - BRU 167 (91) 11-07-93 - (M)  
KR Edk - INT 310 (91) + UNIDENTIFIED ASCOMYCETE IV 11-07-93 - (M)  
KR Edk - INT 312 (91) + *Phoma* sp. 11-07-93 - (M)  
KR TLY A - BRU 173 (91) + *Halosarpheia marina* 18-07-93 - (M)  
KR TLY A - INT 325 (91) 18-07-93 - (M)  
KR Val - RHI 167 (91) + *Halosarpheia minuta* 05-12-93 - (Pm)  
KR Vad - INT 480 (91) 26-12-93 - (Pm)  
KR Edk - BRU 269 (91) 03-06-94 - (Prm)  
KR Edk - RHI 201 (91) + *Phialophorophoma litoralis* 06-03-94 - (Prm)  
KR TLY A - INT 551 (91) + *Halosarpheia marina* + *Phoma* sp. 17-04-94 - (Prm)

This fungus was originally described as a species of *Cercospora* (Sutherland, 1916). Ellis (1976) transferred it to *Scolecobasidium* because, according to him the conidia are formed on denticles on the conidiophores. Kohlmeyer & Kohlmeyer (1979) preferred to maintain it in *Dendryphiella*, as they could not see denticles in their collections. All the morphological characters of the Kerala collections are in close agreement with those of *D. salina* described by Kohlmeyer & Kohlmeyer (1979). This is the first record of this fungus from India.

***Periconia prolifica*** Anastasiou in Nova Hedwig. 6: 260 (1963).

**Fig. 71**

Hyphae 2.5-3  $\mu\text{m}$  diam., septate, hyaline. Conidiophore 10-25 (30) x 3-3.5 (4)  $\mu\text{m}$ , cylindrical, septate, hyaline. Conidiogenous cells cylindrical, ellipsoidal, globose, subglobose or ovoid. Conidia 8-16 (20) x 6-15 (16)  $\mu\text{m}$ , single-celled, globose, subglobose or ovoid, smooth, thick-walled, light brown to dark reddish brown, developing in basipetal succession, top-most cells separating one by one.

**Material examined:**

- KR Kad A - INT 5 (97) *Marinosphaeria mangrovei* + *Halosarpheia marina* 19-04-92 (Prm)  
KR TLY B - ACN 17 (97) *Cirrenalia pygmaea* 26-07-92 (M)  
KR TLY B - INT 54 (97) + *Lulworthia grandispora* 26-07-92 (M)  
KR Vad - ACN 20 (97) *Halosarpheia marina* 02-08-92 (M)  
KR Vad - ACN 21 (97) *Savoryella lignicola* 02-08-92 (M)  
KR Vad - BRU 25 (97) *Didymosphaeria enalia* 02-08-92 (M)  
KR Val - ACN 32 (97) *Aniptodera chesapeakeensis* 09-08-92 (M)  
KR Val - AVI 38 (97) + *Halocyphina villosa* 09-08-92 (M)  
KR Val - AVI 41 (97) *Halosarpheia marina* + *Halocyphina villosa* + *Marinosphaeria mangrovei* 09-08-92 (M)  
KR Val - AVI 42 (97) + *Halosarpheia marina* + *Halocyphina villosa* + *Marinosphaeria mangrovei* 09-08-92 (M)  
KR Val - BRU 31 (97) + *Lulworthia* sp III + *Halocyphina villosa* 09-08-92 (M)  
KR Vld - BRU 34 (97) *Lulworthia* sp III 09-08-92 (M)  
KR Val - INT 70 (97) + *Lulworthia* sp I + *Aniptodera chesapeakeensis* 09-08-92 (M)  
KR Dha-A - DRW 13 (97) + *Savoryella lignicola* 23-08-92 (M)  
KR Dha-A - INT 82 (97) 23-08-92 (M)  
KR Mah-A - ACN 33 (97) + *Marinosphaeria mangrovei* 06-09-92 (M)  
KR Mah-A - ACN 38 (97) + *Aniptodera chesapeakeensis* 06-09-92 (M)  
KR Mah-A - INT 100 (97) + *Didymosphaeria enalia* + *Halosarpheia marina* 06-09-92 (M)  
KR Mah-A - INT 106 (97) + *Lindra hawaiiensis* + *Halosarpheia marina* 06-09-92 (M)  
KR Mah-A - INT 109 (97) + *Lulworthia grandispora* + *Halosarpheia marina* 06-09-92 (M)  
KR Kad A - AVI 56 (97) + *Leptosphaeria australiensis* 13-09-92 (M)  
KR Kad A - INT 128 (97) + *Lulworthia* sp V + *Leptosphaeria australiensis* 13-09-92 (M)  
KR TLY C - ACN 45 (97) + *Marinosphaeria mangrovei* 25-10-92 (Pm)  
KR TLY C - ACN 47 (97) + *Savoryella lignicola* 25-10-92 (Pm)  
KR TLY C - ACN 48 (97) + *Savoryella lignicola* + *Marinosphaeria mangrovei* 25-10-92 (Pm)  
KR TLY C - BRU 56 (97) + *Halocyphina villosa* + *Lignicola laevis* 25-10-92 (Pm)  
KR TLY C - BRU 58 (97) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 25-10-92 (Pm)  
KR Edk - ACN 49 (97) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 15-11-92 (Pm)

KR Edk - ACN 52 (97) + *Aniptodera chesapeakeensis* + *Savoryella lignicola* 15-11-92 (Pm)  
 KR Edk - ACN 53 (97) + *Aniptodera chesapeakeensis* + *Marinosphaeria mangrovei* 15-11-92 (Pm)  
 KR Edk - ACN 55 (97) + *Phialophorophoma litoralis* 15-11-92 (Pm)  
 KR Edk - AVI 78 (97) + *Lulworthia grandispora* 15-11-92 (Pm)  
 KR Edk - BRU 60 (97) + *Marinosphaeria mangrovei* + *Lulworthia grandispora* 15-11-92 (Pm)  
 KR Edk - INT 155 (97) + *Leptosphaeria australiensis* 15-11-92 (Pm)  
 KR Edk - INT 161 (97) + *Savoryella lignicola* + *Aniptodera chesapeakeensis* 15-11-92 (Pm)  
 KR Edk - RHI 30 (97) + *Leptosphaeria australiensis* 15-11-92 (Pm)  
 KR Edk - RHI 34 (97) + *Marinosphaeria mangrovei* 15-11-92 (Pm)  
 KR TLY B - ACN 61 (97) + *Aniptodera chesapeakeensis* 29-11-92 (Pm)  
 KR TLY B - ACN 62 (97) + *Savoryella lignicola* + *Halosarpheia marina* 29-11-92 (Pm)  
 KR TLY C - ACN 65 (97) + *Marinosphaeria mangrovei* + *Phoma* sp I 29-11-92 (Pm)  
 KR TLY A - AVI 86 (97) + *Zalarion varium* + *Pleospora pelagica* 29-11-92 (Pm)  
 KR TLY C - AVI 91 (97) + *Savoryella lignicola* + *Cirrenalia basiminuta* + *Halosarpheia retorquens* 29-11-92 (Pm)  
 KR TLY C - AVI 92 (97) + *Savoryella lignicola* + *Cirrenalia basiminuta* 29-11-92 (Pm)  
 KR TLY A - INT 163 (97) + *Aniptodera chesapeakeensis* + *Leptosphaeria australiensis* + *Zalarion varium* 29-11-92 (Pm)  
 KR TLY A - INT 164 (97) + *Lulworthia grandispora* + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 29-11-92 (Pm)  
 KR Azi - INT 171 (97) + *Halosarpheia marina* + *Halocyphina villosa* 20-12-92 (Pm)  
 KR Azi - INT 176 (97) + *Lulworthia grandispora* + *Halosphaeria quadricornuta* 20-12-92 (Pm)  
 KR TLY C - BRU 84 (97) + *Biatrispora marina* + *Trichocladium alopallonellum* 27-12-92 (Pm)  
 KR TLY C - BRU 85 (97) + *Lulworthia grandispora* + *Halosarpheia marina* 27-12-92 (Pm)  
 KR TLY C - BRU 86 (97) + *Halosarpheia marina* + *Trichocladium alopallonellum* 27-12-92 (Pm)  
 KR Mah-A - ACN 73 (97) + *Savoryella lignicola* 03-01-93 (Pm)  
 KR Mah-A - ACN 75 (97) + *Cirrenalia pygmea* 03-01-93 (Pm)  
 KR Mah-A - ACN 78 (97) + *Aniptodera chesapeakeensis* 03-01-93 (Pm)  
 KR TLY C - ACN 81 (97) + *Halosarpheia marina* 10-01-93 (Pm)  
 KR TLY C - BRU 101 (97) + *Aniptodera chesapeakeensis* + *Halocyphina villosa* + *Cirrenalia pygmea* 10-01-93 (Pm)  
 KR TLY C - BRU 102 (97) + *Lulworthia grandispora* + *Halocyphina villosa* + *Cirrenalia pygmea* 10-01-93 (Pm)  
 KR TLY C - ACN 87 (97) + *Lignicola laevis* 21-02-93 (Prm)  
 KR TLY C - AVI 119 (97) + *Marinosphaeria mangrovei* 21-02-93 (Prm)  
 KR Bey - DRW 55 (97) + *Halosarpheia marina* 28-02-93 (Prm)  
 KR TLY C - AVI 124 (97) + *Savoryella lignicola* 28-03-93 (Prm)  
 KR TLY C - BRU 111 (97) + *Lulworthia grandispora* + *Marinosphaeria mangrovei* 28-03-93 (Prm)  
 KR Vad - INT 238 (97) + *Aniptodera chesapeakeensis* + *Halosarpheia retorquens* 04-04-93 (Prm)  
 KR Val - BRU 123 (97) + *Halosarpheia marina* 11-04-93 (Prm)  
 KR Che - ACN 105 (97) + *Aniptodera chesapeakeensis* 17-04-93 (Prm)  
 KR Che - ACN 109 (97) + *Cirrenalia pygmea* 17-04-93 (Prm)  
 KR TLY B - AVI 157 (97) + *Lignicola laevis* 18-04-93 (Prm)  
 KR Tik - INT 286 (97) + *Lulworthia* sp V 25-04-93 (Prm)  
 KR Tik - INT 292 (97) + *Halosphaeria quadricornuta* 25-04-93 (Prm)  
 KR TLY C - BRU 152 (97) + *Didymosphaeria enalia* + *Aniptodera chesapeakeensis* 09-05-93 (Prm)  
 KR TLY C - BRU 155 (97) + *Ascocratera manglicola* 09-05-93 (Prm)

KR TLY C - BRU 159 (97) + *Halosarpheia marina* + *Leptosphaeria australiensis* 20-06-93 (M)  
 KR TLY A - INT 305 (97) + *Marinosphaeria mangrovei* 20-06-93 (M)  
 KR Edk - ACN 137 (97) + *Lulworthia* sp I 11-07-93 (M)  
 KR Edk - AVI 187 (97) + *Marinosphaeria mangrovei* 11-07-93 (M)  
 KR TLY C - ACN 139 (97) + *Halosarpheia retorquens* + *Trichocladium alopallonellum* 18-07-93 (M)  
 KR Kav - ACN 141 (97) + *Aniptodera chesapeakeensis* + *Lindra hawaiiensis* 19-07-93 (M)  
 KR Kav - ACN 143 (97) + *Savoryella lignicola* + 19-07-93 (M)  
 KR Kav - AVI 197 (97) + *Aniptodera chesapeakeensis* 19-07-93 (M)  
 KR Kav - BRU 182 (97) + *Halocyphina villosa* + *Aniptodera salsuginosa* 19-07-93 (M)  
 KR Kav - BRU 183 (97) + *Halocyphina villosa* + *Halosarpheia marina* 19-07-93 (M)  
 KR Kav - INT 331 (97) + *Savoryella lignicola* + *Halocyphina villosa* 19-07-93 (M)  
 KR Kav - INT 335 (97) + *Halocyphina villosa* + *Savoryella lignicola* 19-07-93 (M)  
 KR Mah-A - AVI 215 (97) 12-08-93 (M)  
 KR Mah-A - INT 336 (97) + *Lulworthia grandispora* 12-08-93 (M)  
 KR Mah-A - INT 345 (97) + *Halocyphina villosa* + *Aniptodera chesapeakeensis* 12-08-93 (M)  
 KR TLY B - ACN 158 (97) + *Halosarpheia marina* 22-08-93 (M)  
 KR TLY B - BRU 199 (97) + *Halosarpheia marina* + *Halocyphina villosa* 22-08-93 (M)  
 KR TLY B - BRU 201 (97) + *Lulworthia grandispora* + *Halosarpheia marina* 22-08-93 (M)  
 KR Che - ACN 163 (97) + *Savoryella lignicola* + *Lignicola laevis* 05-09-93 (M)  
 KR Che - ACN 166 (97) 05-09-93 (M)  
 KR Che - ACN 167 (97) + *Aniptodera chesapeakeensis* 05-09-93 (M)  
 KR Che - AVI 235 (97) + *Halocyphina villosa* + *Savoryella lignicola* 05-09-93 (M)  
 KR Che - INT 369 (97) + *Halosarpheia viscosa* + *Marinosphaeria mangrovei* 05-09-93 (M)  
 KR TLY C - ACN 170 (97) + *Aniptodera chesapeakeensis* 19-09-93 (M)  
 KR TLY C - BRU 215 (97) + *Aigialus parvus* + *Halocyphina villosa* 19-09-93 (M)  
 KR TLY C - BRU 217 (97) + *Aniptodera chesapeakeensis* 19-09-93 (M)  
 KR TLY C - RHI 150 (97) + *Halosarpheia retorquens* + *Lulworthia grandispora* 19-09-93 (M)  
 KR Ppd - DRW 95 (97) 26-09-93 (M)  
 KR Bek - DRW 97 (97) + *Halosarpheia marina* 03-10-93 (Pm)  
 KR Bek - INT 412 (97) + *Lulworthia grandispora* 03-10-93 (Pm)  
 KR Bek - INT 415 (97) + *Halosphaeria quadricornuta* 03-10-93 (Pm)  
 KR Bek - INT 417 (97) + *Halosphaeria quadricornuta* 03-10-93 (Pm)  
 KR TLY A - AVI 243 (97) + *Marinosphaeria mangrovei* 17-10-93 (Pm)  
 KR TLY A - AVI 246 (97) + *Leptosphaeria australiensis* 17-10-93 (Pm)  
 KR Kav - ACN 174 (97) + *Aniptodera chesapeakeensis* 30-10-93 (Pm)  
 KR Val - ACN 181 (97) + *Halosarpheia marina* + *Marinosphaeria mangrovei* 05-12-93 (Pm)  
 KR Val - ACN 182 (97) + *Halosarpheia marina* + *Marinosphaeria mangrovei* 05-12-93 (Pm)  
 KR Val - ACN 186 (97) + *Halosarpheia minuta* 05-12-93 (Pm)  
 KR Val - INT 457 (97) + *Savoryella lignicola* + *Didymosphaeria enalia* 05-12-93 (Pm)  
 KR Che - ACN 189 (97) + *Aniptodera chesapeakeensis* 18-12-93 (Pm)  
 KR Che - AVI 264 (97) + *Didymosphaeria enalia* + *Aniptodera chesapeakeensis* 18-12-93 (Pm)  
 KR Che - AVI 265 (97) + *Dactylospora haliotrepha* + *Halocyphina villosa* + *Marinosphaeria mangrovei* 18-12-93 (Pm)

KR Che - INT 463 (97) + *Savoryella lignicola* + *Halocyphina villosa* 18-12-93 (Pm)  
 KR Che - RHI 176 (97) + *Halocyphina villosa* + *Savoryella* sp 18-12-93 (Pm)  
 KR TLY A - BRU 244 (97) + *Halosarpheia marina* 19-12-93 (Pm)  
 KR Dha-A - INT 482 (97) + *Dactylospora haliotrepha* 27-12-93 (Pm)  
 KR Kad A - ACN 202 (97) + *Lignicola laevis* 16-01-94 (Pm)  
 KR Kad A - ACN 206 (97) + *Lignicola laevis* 16-01-94 (Pm)  
 KR Kad A - INT 494 (97) + *Halocyphina villosa* + *Lulworthia* sp V 16-01-94 (Pm)  
 KR TLY B - ACN 211 (97) + *Lulworthia grandispora* 23-01-94 (Pm)  
 KR TLY B - AVI 291 (97) + *Leptosphaeria australiensis* + *Halosarpheia retorquens* 23-01-94 (Pm)  
 KR TLY A - INT 501 (97) + *Trichocladium alopallonellum* + *Zalarion varium* 23-01-94 (Pm)  
 KR Edk - ACN 217 (97) + *Aniptodera chesapeakeensis* 06-03-94 (Pm)  
 KR Edk - AVI 297 (97) + *Didymosphaeria enalia* 06-03-94 (Pm)  
 KR Edk - INT 525 (97) + *Halocyphina villosa* 06-03-94 (Pm)  
 KR TLY B - ACN 220 (97) + *Halosarpheia marina* 20-03-94 (Pm)  
 KR TLY B - ACN 221 (97) + *Zalarion varium* 20-03-94 (Pm)  
 KR TLY B - AVI 308 (97) + *Halosarpheia marina* + *Marinosphaeria mangrovei* + *Halosarpheia viscosa* 20-03-94 (Pm)  
 KR TLY B - AVI 310 (97) + *Halosarpheia marina* 20-03-94 (Pm)  
 KR TLY B - BRU 276 (97) + *Zalarion maritimum* + *Halosarpheia marina* 20-03-94 (Pm)  
 KR TLY A - INT 529 (97) + *Aniptodera chesapeakeensis* 20-03-94 (Pm)  
 KR Kav - ACN 224 (97) + *Aniptodera chesapeakeensis* + *Lindra hawaiiensis* 15-04-94 (Pm)  
 KR Kav - ACN 227 (97) + *Halosarpheia viscosa* 15-04-94 (Pm)  
 KR Kav - BRU 279 (97) + 15-04-94 (Pm)  
 KR Kav - BRU 284 (97) + *Cirrenalia pygmea* 15-04-94 (Pm)  
 KR Kav - INT 544 (97) + *Cirrenalia pygmea* + *Halocyphina villosa* 15-04-94 (Pm)  
 KR TLY A - BRU 291 (97) + *Trichocladium alopallonellum* + *Lulworthia grandispora* 15-05-94 (Pm)  
 KR TLY A - INT 554 (97) + *Trichocladium alopallonellum* 15-05-94 (Pm)

*Periconia prolifica* is the anamorph of *Halosphaeria cucullata* and it has been observed on a very wide range of substrata and occurs in all the three major oceanic regions. Kohlmeyer and Kohlmeyer (1979) recorded a very wide range of length (5-200  $\mu\text{m}$ ) for the conidiophore while in the present study it was observed that the conidiophores of the fungus had a very short range of length (5-30  $\mu\text{m}$ ). It was Raghukumar (1973) who first reported the occurrence of this species in India from Madras coast. Later Patil & Borse (1985a) recorded it from the Maharashtra coast. There is a record of this species from Kerala (Prasannarai & Sridhar, 2001).

***Phialophorophoma litoralis*** Linder in Farlowia 1: 403 (1944).

**Fig. 72**

Pycnidia 180-210 x 100-1190  $\mu\text{m}$ , subglobose, immersed, ostiolate, epapillate, brown to dark brown, solitary. Peridium multilayered, with thin-walled, elongated, dark brown cells towards the outer side and hyaline cells towards the inner side. Conidiophores 10-20 x 2-2.5  $\mu\text{m}$ , cylindrical, septate, hyaline. Conidiogenous cells 7-10.5 x 2.5-3.5  $\mu\text{m}$ , tapering towards the tip. Conidia 3-5 x 1.5-2  $\mu\text{m}$ , ellipsoidal or obovoid, unicellular, smooth, thin-walled and hyaline.

**Materials examined**

KR Mah-A - AVI 50 (96) + *Lulworthia* sp. I 06-09-92 - (M)

KR Mah-A - INT 108 (96) + *Halocyphina villosa* 06-09-92 - (M)

KR Edk - ACN 55 (96) + *Periconia prolifica* 15-11-92 - (Pm)

KR Edk - INT 159 (96) 15-11-92 - (Pm)

KR TLY A - BRU 82 (96) + *Zalerion varium* + *Halosarpheia marina* 27-12-92 - (Pm)

KR TLY A - INT 264 (96) + *Zalerion maritimum* + *Lulworthia grandispora* 18-04-93 - (Pm)

KR Edk - INT 313 (96) 11-07-93 - (M)

KR Mah-A - INT 339 (96) + 12-08-93 - (M)

KR Vad - INT 478 (96) + *Ascochyta* 26-12-93 - (Pm)

KR Edk - RHI 201 (96) + *Dendryphiella salina* 06-03-94 - (Pm)

The Kerala collections agree with *Phialophorophoma litoralis* in all characters. *Phialophorophoma* is a monotypic genus that according to Kohlmeyer & Kohlmeyer (1979), is known from England, USA and Australia. This is the first record of this fungus from India.

## ***Phoma* sp.**

### **Fig. 73**

Pycnidia 100-260 x 85-170  $\mu\text{m}$ , globose or subglobose, partly immersed, ostiolate, epapillate, dark orange-coloured, hairy. Hairs 100-125 x 3-4.5  $\mu\text{m}$ , septate and simple. Peridium 10-20  $\mu\text{m}$ , multilayered with thick-walled, orange-coloured outer layers and light coloured inner layers. Conidiogenous cells 15-20 x 2-2.5 (3)  $\mu\text{m}$ , straight or curved, hyaline. Conidia 5-7 x 2-2.5  $\mu\text{m}$ , ellipsoidal, hyaline, one-celled, rarely two-celled, septate at the centre, not constricted at the septum, smooth, without any appendages.

### **Materials examined**

KR Vad - AVI 33 (99) 02-08-92 - (M)

KR Edk - AVI 77 (99) 15-11-92 - (Pm)

KR TLY C - ACN 65 (99) + *Marinosphaera mangrovei* + *Periconia prolifica* 29-11-92 - (Pm)

KR TLY B - INT 167 (99) + *Dactylospora haliotrepha* + *Trichocladium alopalloneium* 29-11-92 - (Pm)

KR TLY A - ACN 69 (99) + *Cirrenalia pygmea* + *Halosarpheia marina* 27-12-92 - (Pm)

KR TLY C - RHI 51 (99) + *Lulworthia grandispora* + *Zalerion maritimum* 27-12-92 - (Pm)

KR TLY C - RHI 52 (99) + *Halosarpheia marina* + *Lulworthia grandispora* + *Cirrenalia basiminuta* 27-12-92 - (Pm)

KR Vad - INT 246 (99) + *Dendryphiella salina* 04-04-93 - (Pm)

KR Edk - INT 309 (99) + UNIDENTIFIED ASCOMYCETE IV 11-07-93 - (M)

KR Edk - INT 312 (99) + *Dendryphiella salina* 11-07-93 - (M)

KR TLY A - INT 324 (99) + *Dryosphaeria tropicalis* 18-07-93 - (M)

KR TLY A - INT 352 (99) + *Halocyphina villosa* 22-08-93 - (M)

KR Vad - BRU 251 (99) + *Anguillospora* sp. 26-12-93 - (Pm)

KR TLY A - INT 503 (99) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 23-01-94 - (Pm)

KR TLY A - INT 551 (99) + *Dendryphiella salina* + *Halosarpheia marina* 17-04-94 - (Pm)

According to Kohlmeyer & Volkmann-Kohlmeyer (1991a) coelomycetes resembling *Phoma* and *Macrophoma* are frequently encountered in the marine and estuarine environment on a variety of substrates, and they have not made



any effort to separate the different species except *Phoma laminariae* and *Phoma suaedae*. The present collections differ from both *P. laminariae* and *P. suaedae* in a number of characters including the colour and size of the pycnidia and the size of the conidia.

### ***Phomopsis* sp.**

#### **Fig. 74**

Pycnidium 480 x 350  $\mu\text{m}$ , subglobose, partly immersed, epapillate, hyaline, with an apical ostiolar pore about 80  $\mu\text{m}$  wide. Conidiogenous cells 12.5 x 1-1.5  $\mu\text{m}$ , cylindrical, aseptate, hyaline. Alpha conidia 5-110 x 2-2.5  $\mu\text{m}$ , ellipsoidal, single-celled or bicelled, irregularly septate, slightly constricted at the septum, hyaline, smooth, thin-walled, without appendages. Beta conidia 14-21.5 x 1-1.5  $\mu\text{m}$ , hyaline, filiform, straight or slightly curved, eguttulate, aseptate.

#### **Material examined**

KR Vad - INT 477 (105) + *Anguillospora* + UNIDENTIFIED ANAMORPH26-12-93 - (Pm)

The genus *Phomopsis* (Sacc.) Sacc. with more than 400 species, is not common in marine or estuarine habitats. While it was easy to assign the present collection to *Phomopsis*, the author could not find a suitable species name for this species.

***Trichocladium alopallonellum*** (Meyers & R.T. Moore) Kohlm. & Viokm.-  
Kohlm. in Mycotaxon 53: 352 (1995).

*Humicola alopallonella* Meyers & R.T. Moore in Am. J. Bot. 47: 346 (1960).

### Fig. 75

Hyphae 2-2.5  $\mu\text{m}$  wide, light brown, septate. Conidiophores not observed.  
Conidia 20-25 x 15-20  $\mu\text{m}$ , obpyriform, ovoid or subglobose, 1-2 celled; terminal cell larger and darker, 15-20 x 15-20  $\mu\text{m}$  globose, subglobose or ovoid; lower cell or the basal cells 4-11 x 6-9  $\mu\text{m}$ , smaller lightly coloured, obconical or cylindrical, conidiogenous cell 4-6 x 3-6  $\mu\text{m}$ , lighter in colour than the basal cell.

### Material examined:

KR Mah-A - BRU 3 (94) + *Cirrenalia pygmaea* 03-05-92 (Prm)  
KR Mah-A - BRU 9 (94) + *Marinosphaeria mangrovei* 03-05-92 (Prm)  
KR TLY B - ACN 18 (94) 26-07-92 (M)  
KR TLY B - INT 53 (94) + *Halosarpheia marina* 26-07-92 (M)  
KR Dha-A - INT 83 (94) 23-08-92 (M)  
KR Kad A - ACN 39 (94) + *Cirrenalia pygmaea* + *Aniptodera chesapeakeensis* 13-09-92 (M)  
KR Kad A - ACN 44 (94) + *Cirrenalia macrocephalla* 13-09-92 (M)  
KR TLY B - INT 167 (94) + *Dactylospora haliotrepha* + *Phoma* sp 29-11-92 (Pm)  
KR TLY C - BRU 84 (94) + *Biatrispora marina* + *Periconia prolifica* 27-12-92 (Pm)  
KR TLY C - BRU 86 (94) + *Halosarpheia marina* + *Periconia prolifica* 27-12-92 (Pm)  
KR Mah-A - ACN 74 (94) 03-01-93 (Pm)  
KR Mah-A - INT 190 (94) + *Lulworthia grandispora* 03-01-93 (Pm)  
KR Bek - INT 226 (94) 14-02-93 (Prm)  
KR Bek - SBI 37 (94) + *Zalarion varium* 14-02-93 (Prm)  
KR TLY C - AVI 120 (94) + *Halosarpheia marina* + *Halosarpheia hamata* 21-02-93 (Prm)  
KR TLY A - INT 228 (94) + *Zalarion varium* 21-02-93 (Prm)  
KR Bey - INT 232 (94) 28-02-93 (Prm)  
KR Val - AVI 137 (94) + *Halosarpheia marina* + *Halorosellinia oceanica* 11-04-93 (Prm)  
KR Val - INT 248 (94) + *Halosarpheia marina* + *Lulworthia grandispora* 11-04-93 (Prm)

KR Dha-A - DRW 60 (94) + *Halosarpheia marina* 18-04-93 (Prm)  
 KR TLY A - INT 263 (94) + *Zalarion maritimum* + *Lulworthia grandispora* 18-04-93 (Prm)  
 KR TLY C - RHI 92 (94) + *Marinosphaeria mangrovei* 18-04-93 (Prm)  
 KR Tik - DRW 69 (94) + *Halosphaeria salina* 25-04-93 (Prm)  
 KR TLY C - ACN 120 (94) + *Lignincola laevis* 09-05-93 (Prm)  
 KR Kad A - ACN 124 (94) + *Lulworthia* sp I 23-05-93 (Prm)  
 KR TLY C - ACN 139 (94) + *Halosarpheia retorquens* + *Periconia prolifica* 18-07-93 (M)  
 KR TLY A - BRU 211 (94) + *Halocyphina villosa* 19-09-93 (M)  
 KR Tik - INT 427 (94) + *Halosphaeria quadricornuta* 31-10-93 (Prm)  
 KR Tik - INT 434 (94) + *Halosphaeria salina* 31-10-93 (Prm)  
 KR TLY A - INT 449 (94) + *Dactylospora haliotrepha* + *Halosarpheia marina* 21-11-93 (Prm)  
 KR TLY A - AVI 271 (94) + *Zalarion maritimum* 19-12-93 (Prm)  
 KR TLY A - INT 501 (94) + *Zalarion varium* + *Periconia prolifica* 23-01-94 (Prm)  
 KR TLY A - BRU 271 (94) + *Marinosphaeria mangrovei* 20-03-94 (Prm)  
 KR TLY A - BRU 273 (94) + *Halosarpheia retorquens* + *Halosarpheia marina* 20-03-94 (Prm)  
 KR TLY A - BRU 291 (94) + *Periconia prolifica* + *Lulworthia grandispora* 15-05-94 (Prm)  
 KR TLY A - INT 554 (94) + *Periconia prolifica* 15-05-94 (Prm)  
 KR Bek - INT 563 (94) + *Savoryella lignicola* 24-07-94 (M)

*T. alopallonellum* is one of the most frequently encountered fungus in the tropical and subtropical marine habitats (Tubaki, 1969; Shearer, 1972; Kohlmeyer & Volmann Kohlmeyer, 1987; Hyde and Jones, 1988; Hyde, 1988; Jones & Kuthubutheen, 1989; Hyde, 1990; Kohlmeyer & Volkmann0Kohlmeyer, 1991; Tan *et al.*, 1989; Leong *et al.*, 1991; Vrijmoed *et al.*, 1994). From India Patil & Borse (1985) and Borse *et al.* (1988) have already recorded it. It has already been recorded from Kerala by Prasannarai & Sridhar (2001).

### ***Trichocladium* sp.**

#### **Fig. 76**

Conidiophores unbranched, straight or flexuous, pale brown, smooth and thin-walled. Conidia (20) 25-35 x (10) 14-17.5  $\mu\text{m}$ , mostly terminal, solitary, dry,

pyriform to ellipsoidal, straight or slightly curved, 1- to 3-septate, rounded at the apex, thick-walled, smooth, apical cell larger, proximal cell pale, other cells brown to dark brown.

#### **Materials examined:**

KR Mah-A - INT 107 (102) + *Marinosphaera mangrovei* 06-09-92 - (M)

KR Edk - AVI 80 (102) + *Halosarpheia abonnis* 15-11-92 - (Pm)

KR TLY C - ACN 90 (102) + *Halosarpheia marina* 21-02-93 - (Prm)

KR Mah-A - AVI 109 (102) + *Marinosphaera mangrovei* + *Halocyphina villosa* 03-01-93 - (Pm)

KR Mah-A - INT 337 (102) + *Lulworthia* sp. I + *Halosarpheia marina* 12-08-93 - (M)

KR Mah-A - INT 340 (102) + + *Halosarpheia marina* 12-08-93 - (M)

While the present collection is agreeing with the general characters of *Trichocladium* Harz., it is not agreeing with any known marine species of the genus. *Trichocladium nypae* has similar conidial morphology but different conidial dimensions. On the other hand, *T. lignincola* Schmidt has similar conidial size but different conidial morphology.

#### ***Unidentified anamorph***

##### **Fig. 77**

Pycnidia 350-380 x 290-480  $\mu\text{m}$ , superficial, solitary, ostiolate, papillate, pale yellow, fully covered with outwardly projecting hyphae and a thick gelatinous covering except at the neck region, rupturing irregularly to release the conidia. Neck 190-290 x 80-110  $\mu\text{m}$ , hyaline, free from gelatinous covering. Conidiophore 110-15 x 1.5-2  $\mu\text{m}$ , hyaline, septate and smooth. Conidia 20-25 (30) x 4-6 (9)  $\mu\text{m}$ , cylindrical, smooth, hyaline, non-septate, thin-walled, with several unbranched

filiform appendages originating from the subapicular region. Appendages 10-20 x 1.5  $\mu$ m, with tapering apex. Appendages in immature spores are folded and adhere together sideways as a cap like structure on both sides of the conidia.

### **Materials examined**

KR Vad - AVI 32 (129) 02-08-92 - (M)

KR Vad - INT 62 (129) 02-08-92 - (M)

KR Vad - AVI 277 (129) 26-12-93 - (Pm)

KR Vad - INT 477 (129) + *Anguillospora* + *Phomopsis* sp. 26-12-93 - (Pm)

Conidiomata covered except at the neck region by outwardly projecting hyphae as well as a thick gelatinous layer, and cylindrical, non-septate conidia with several unbranched filiform appendages originating from the subapicular region are the diagnostic features of this fungus. In immature spores, the appendages remains as a single compact mass that hang to one side and at this stage they are strikingly similar to those of ascospores of *Halosarpheia* species. The author could not find a suitable anamorphic genus to accommodate these collections. The genus *Chaetospermum* is similar in a few characters but differs in the nature of the conidiomal envelope and in the morphology of the appendages.

***Zalerion maritimum*** (Linder) Anastasiou in Can. J. Bot. 41: 1136 (1963).

*Helicoma maritimum* Linder Farlowia 1: 405-406 (1944)

*Helicoma salinum* Linder in Farlowia 1: 406 (1944).

*Zalerion eistla* Moore & Meyers in Can. J. Microbiol. 8: 413 (1962).

*Zalerion nepura* Moore & Meyers in Can. J. Microbiol. 8: 413 (1962)

*Zalerion raptor* Moore & Meyers in Can. J. Microbiol. 8: 415 (1962)

*Zalerion xylestrix* Moore & Meyers - Can. J. Microbiol. 8: 414 (1962).

### Fig. 78

Hyphae 2-2.5  $\mu\text{m}$  diam., septate, branched, light brown. Conidiophores 8-30 x 2-3  $\mu\text{m}$ , superficial, simple or branched, straight or curved, septate, cylindrical, brown. Conidia 12-22 x 5-16  $\mu\text{m}$ , solitary, acrogenous, coiled, 4-9 septate, constricted at the septa, dark reddish brown.

### Materials examined

KR Mah-A - BRU 2 (100) + *Cirrenalia pygmaea* 03-05-92 - (Prm)  
KR Mah-A - BRU 8 (100) + *Leptosphaeria australiensis* 03-05-92 - (Prm)  
KR Dha-A - DRW 11 (100) 23-08-92 - (M)  
KR Dha-A - INT 81 (100) 23-08-92 - (M)  
KR Dha-A - SBI 7 (100) + *Arenariomyces trifurcatus* 23-08-92 - (M)  
KR TLY C - ACN 66 (100) + *Marinosphaera mangrovei* 29-11-92 - (Prm)  
KR TLY C - RHI 50 (100) + *Halosarpheia marina* + *Cirrenalia basiminuta* 27-12-92 - (Prm)  
KR TLY C - RHI 51 (100) + *Phoma* sp. + *Lulworthia grandispora* 27-12-92 - (Prm)  
KR TLY C - RHI 53 (100) + *Halosarpheia marina* + *Lulworthia grandispora* 27-12-92 - (Prm)  
KR TLY A - INT 229 (100) 21-02-93 - (Prm)  
KR TLY A - INT 263 (100) + *Lulworthia grandispora* + *Trichocladium alopallonellum* 18-04-93 - (Prm)  
KR TLY A - INT 264 (100) + *Lulworthia grandispora* + *Phialophorophoma litoralis* 18-04-93 - (Prm)  
KR TLY C - AVI 226 (100) + *Halosarpheia minuta* + *Halocyphina villosa* 22-08-93 - (M)  
KR TLY A - AVI 271 (100) + *Trichocladium alopallonellum* 19-12-93 - (Prm)  
KR TLY B - AVI 311 (100) + *Lulworthia grandispora* 20-03-94 - (Prm)  
KR TLY B - BRU 276 (100) + *Periconia prolifica* + *Halosarpheia marina* 20-03-94 - (Prm)  
KR TLY A - BRU 287 (100) + *Lignicola laevis* 17-04-94 - (Prm)  
KR TLY A - INT 550 (100) + *Halosarpheia marina* + *Cirrenalia pygmaea* 17-04-94 - (Prm)  
KR TLY A - INT 555 (100) + *Halosarpheia marina* + *Marinosphaera mangrovei* 15-05-94 - (Prm)  
KR Bek - DRW 123 (100) + *Antennospora quadricornuta* 24-07-94 - (M)  
KR Bek - DRW 127 (100) + *Savoryella lignicola* 24-07-94 - (M)  
KR Bek - INT 560 (100) + *Savoryella lignicola* 24-07-94 - (M)  
KR Bek - INT 565 (100) + *Savoryella lignicola* 24-07-94 - (M)

The Kerala collections of this species, although agreed in all essential features, had slightly smaller conidia. It is known from all major oceanic regions of the world

and colonizes a wide range of substrates (Kohlmeyer & Kohlmeyer, 1979). The first report of this species from India was that of Raghukumar (1973). It has already been recorded from Kerala by Prasannarai & Sridhar (2001).

***Zalerion varium*** Anastasiou in Can. J. Bot. 41: 1136 (1963).

### Fig. 79

Hyphae 3-3.5  $\mu\text{m}$  wide, hyaline, septate, branched, immersed. Conidiophores 7-55  $\mu\text{m}$  long, 2.3-5  $\mu\text{m}$  wide, septate, hyaline, cylindrical, superficial. Conidia 12-22  $\times$  6-20  $\mu\text{m}$ , solitary, variously coiled, having 2 to 9 cells; terminal cell largest in majority, 5.5-8.5  $\times$  5-9.5  $\mu\text{m}$ , subglobose or ovoid, thick-walled, smooth, brown to reddish brown.

### Materials examined

KR Ppd - SBI 2 (101) 19-04-92 - (Prm)

KR TLY B - INT 55 (101) + *Halosarpheia marina* 26-07-92 - (M)

KR Dha-A - DRW 8 (101) + *Lignincola laevis* 23-08-92 - (M)

KR Kad A - INT 125 (101) + *Aniptodera chesapeakensis* + *Halosarpheia marina* 13-09-92 - (M)

KR TLY A - AVI 61 (101) + *Aniptodera chesapeakensis* + *Ceriosporopsis halima* 27-09-92 - (M)

KR Bey - SBI 12 (101) 02-10-92 - (Pm)

KR Edk - AVI 75 (101) + *Marinosphaera mangrovei* 15-11-92 - (Pm)

KR TLY A - AVI 86 (101) + *Periconia prolifica* + *Pleospora pelagica* 29-11-92 - (Pm)

KR TLY A - BRU 71 (101) + *Halosphaeria hamata* + *Halosarpheia marina* 29-11-92 - (Pm)

KR TLY A - INT 163 (101) + *Aniptodera chesapeakensis* + *Periconia prolifica* + *Leptosphaeria australiensis* 29-11-92 - (Pm)

KR TLY A - AVI 96 (101) + *Halosarpheia marina* + *Halocyphina villosa* 27-12-92 - (Pm)

KR TLY A - BRU 82 (101) + *Phialophorophoma litoralis* + *Halosarpheia marina* 27-12-92 - (Pm)

KR TLY A - AVI 110 (101) + *Lulworthia grandispora* + *Halosarpheia retorquens* 10-01-93 - (Pm)

KR TLY A - BRU 98 (101) + *Halosarpheia retorquens* + *Halosarpheia marina* 10-01-93 - (Pm)

KR TLY A - INT 206 (101) + *Halosarpheia marina* + *Cirrenalia macrocephala* 10-01-93 - (Pm)

KR Ppd - INT 212 (101) + *Aniptodera chesapeakensis* 31-01-93 - (Pm)

KR Ppd - SBI 22 (101) 31-01-93 - (Pm)

KR Azi - INTER 222 (101) 13/2/93 Prm

KR Bek - SBI 36 (101) 14-02-93 - (Prm)

KR Bek - SBI 37 (101) + *Trichocladium alopallonellum* 14-02-93 - (Prm)  
 KR TLY A - INT 228 (101) + *Trichocladium alopallonellum* 21-02-93 - (Prm)  
 KR Bey - SBI 40 (101) 28-02-93 - (Prm)  
 KR TLY A - INT 236 (101) + *Halosarpheia marina* + *Aniptodera chesapeakeensis* 28-03-93 - (Prm)  
 KR TLY A - INT 237 (101) + *Halosarpheia marina* + *Cirrenalia pygmea* 28-03-93 - (Prm)  
 KR Val - AVI 142 (101) + *Halosarpheia marina* + *Halorosellinia oceanica* 11-04-93 - (Prm)  
 KR TLY C - ACN 117 (101) 18-04-93 - (Prm)  
 KR TLY C - BRU 148 (101) + *Savoryella lignicola* 18-04-93 - (Prm)  
 KR TLY A - INT 261 (101) + *Aniptodera chesapeakeensis* + *Lulworthia grandispora* 18-04-93 - (Prm)  
 KR Tik - DRW 64 (101) + *Lulworthia* sp. V 25-04-93 - (Prm)  
 KR TLY C - AVI 166 (101) + *Lulworthia grandispora* + *Halosarpheia marina* 09-05-93 - (Prm)  
 KR TLY A - INT 295 (101) + *Cirrenalia pygmea* 09-05-93 - (Prm)  
 KR Kad A - AVI 172 (101) + *Halosarpheia marina* 23-05-93 - (Prm)  
 KR TLY C - ACN 130 (101) + *Savoryella lignicola* + *Halosarpheia marina* 20-06-93 - (Prm)  
 KR TLY A - INT 304 (101) + *Aniptodera chesapeakeensis* 20-06-93 - (M)  
 KR TLY C - RHI 124 (101) + *Verruculina enalia* 18-07-93 - (M)  
 KR Bey - SBI 60 (101) 15-08-93 - (M)  
 KR TLY C - ACN 159 (101) + *Aniptodera chesapeakeensis* + *Halosarpheia marina* 22-08-93 - (M)  
 KR TLY B - AVI 222 (101) + *Marinosphaera mangrovei* 22-08-93 - (M)  
 KR Tik - DRW 90 (101) + *Halosphaeria salina* 18-09-93 - (M)  
 KR Tik - SBI 64 (101) 18-09-93 - (M)  
 KR TLY C - AVI 240 (101) + *Dactylospora haliotrepha* + *Halocyphina villosa* 19-09-93 - (M)  
 KR Ppd - DRW 96 (101) 26-09-93 - (M)  
 KR Ppd - INT 396 (101) + *Antennospora quadricornuta* 26-09-93 - (M)  
 KR Tik - DRW 111 (101) + *Antennospora quadricornuta* 31-10-93 - (Pm)  
 KR Tik - INT 432 (101) + *Antennospora quadricornuta* 31-10-93 - (Pm)  
 KR Dha-A - DRW 116 (101) + *Lulworthia grandispora* 27-12-93 - (Pm)  
 KR Dha-A - DRW 119 (101) 27-12-93 - (Pm)  
 KR Kad A - INT 496 (101) + *Lulworthia grandispora* + *Halosarpheia marina* 16-01-94 - (Pm)  
 KR TLY A - INT 501 (101) + *Trichocladium alopallonellum* + *Periconia prolifica* 23-01-94 - (Pm)  
 KR TLY B - ACN 219 (101) + *Halosarpheia marina* + *Halosarpheia viscosa* 20-03-94 - (Prm)  
 KR TLY B - ACN 221 (101) + *Periconia prolifica* 20-03-94 - (Prm)  
 KR TLY A - INT 549 (101) + *Ceriosporopsis halima* + *Lulworthia grandispora* 17-04-94 - (Prm)

*Zalerion varium* differs from *Z. maritimum* in producing variably coiled conidial filament. It is widely distributed in both temperate and tropical waters (Kohlmeyer & Kohlmeyer, 1979). Raghukumar (1973) reported it for the first time from India. Kohlmeyer & Kohlmeyer (1979) mention a collection of *Z. varium* from Kerala but



no other details are given. It is already known from Kerala (Prasannarai & Sridhar, 2001).

### ***Zalerion* sp.**

#### **Fig. 80**

Conidiophores up to 14  $\mu\text{m}$  long, 2.5-3  $\mu\text{m}$  wide, cylindrical, septate, greenish brown. Conidia acrogenous, 10-27 x 6-22  $\mu\text{m}$ , solitary, helicoid, multi-cellular (7-35 cells), thick-walled, with a dark brown wall, eventually all cells fusing together to form an irregular compact, discoid mass of highly thick-walled cells.

#### **Materials examined**

KR TLY A- AVI 22 (104) + *Marinosphaera mangrovei* 26-07-92 - (M)

KR TLY A - AVI 118 (104) + *Marinosphaera mangrovei* + *Lulworthia grandispora* 21-02-93 - (Prm)

The most distinctive feature of this species of *Zalerion* is the eventual fusing-together of all cells of the conidium to form an irregular, compact, discoid mass of highly thick-walled cells. The conidial dimensions are also much different from those of *Z. varium* and *Z. maritimum*. The author believes that this is an as yet undescribed species of *Zalerion*.

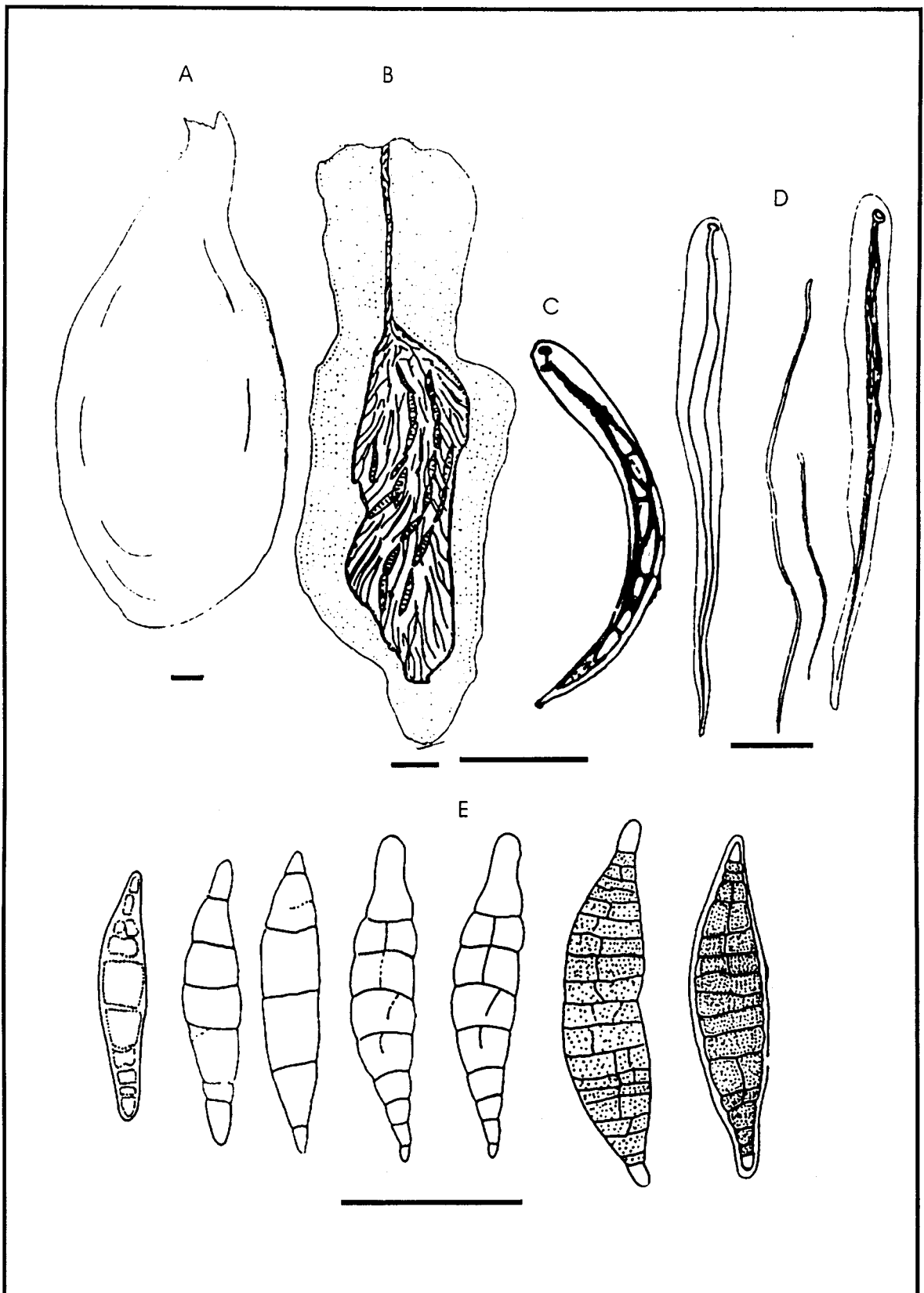


Fig-1: *Aigialus grandis*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Immature ascus, bar 100 $\mu$ m., D. Empty asci & paraphyses, bar 50 $\mu$ m., E. Different stages of development of ascospores, bar 50 $\mu$ m.

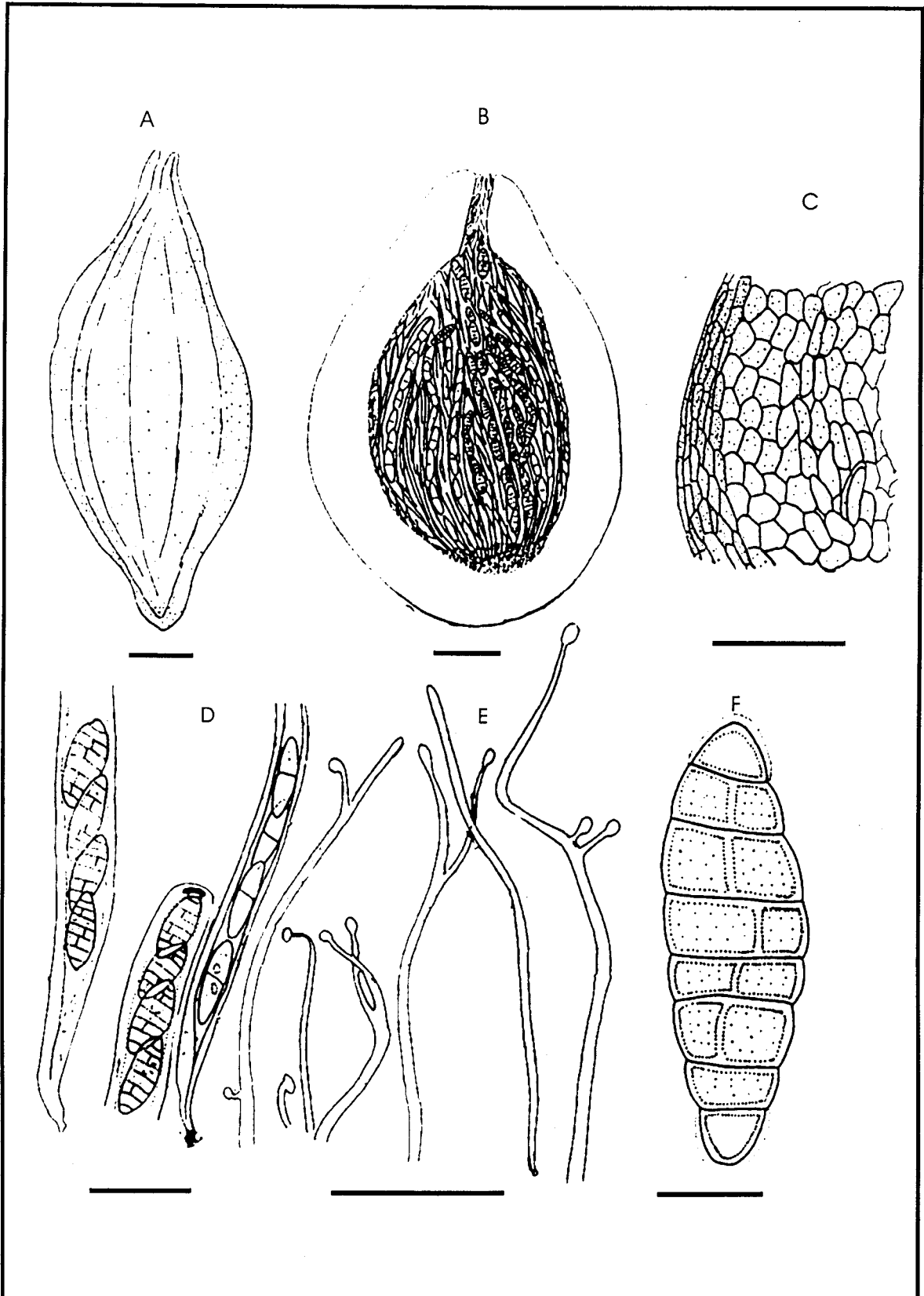


Fig-2 : *Aigialus mangrovei*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. A portion of the peridium, bar 50 $\mu$ m., D. Portions of mature & immature Asci, bar 50 $\mu$ m., E. Pseudoparaphyses, bar 50 $\mu$ m., F. Ascospore, bar 10 $\mu$ m.

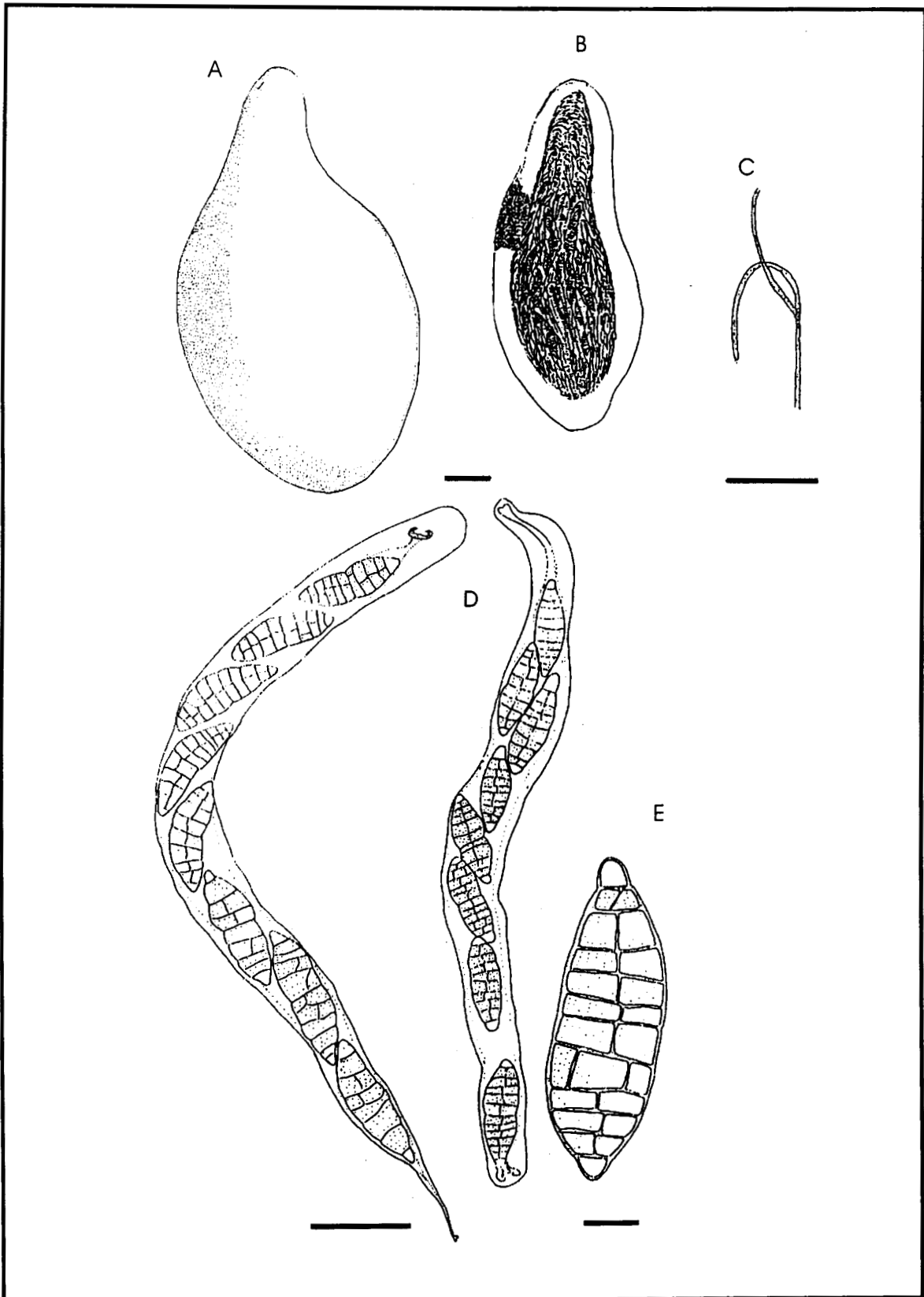


Fig-3 :*Aigialus parvus*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 100µm., C. Pseudoparaphysis, bar 50µm., D. Asci, bar 50µm. E. Ascospore, bar 10µm.

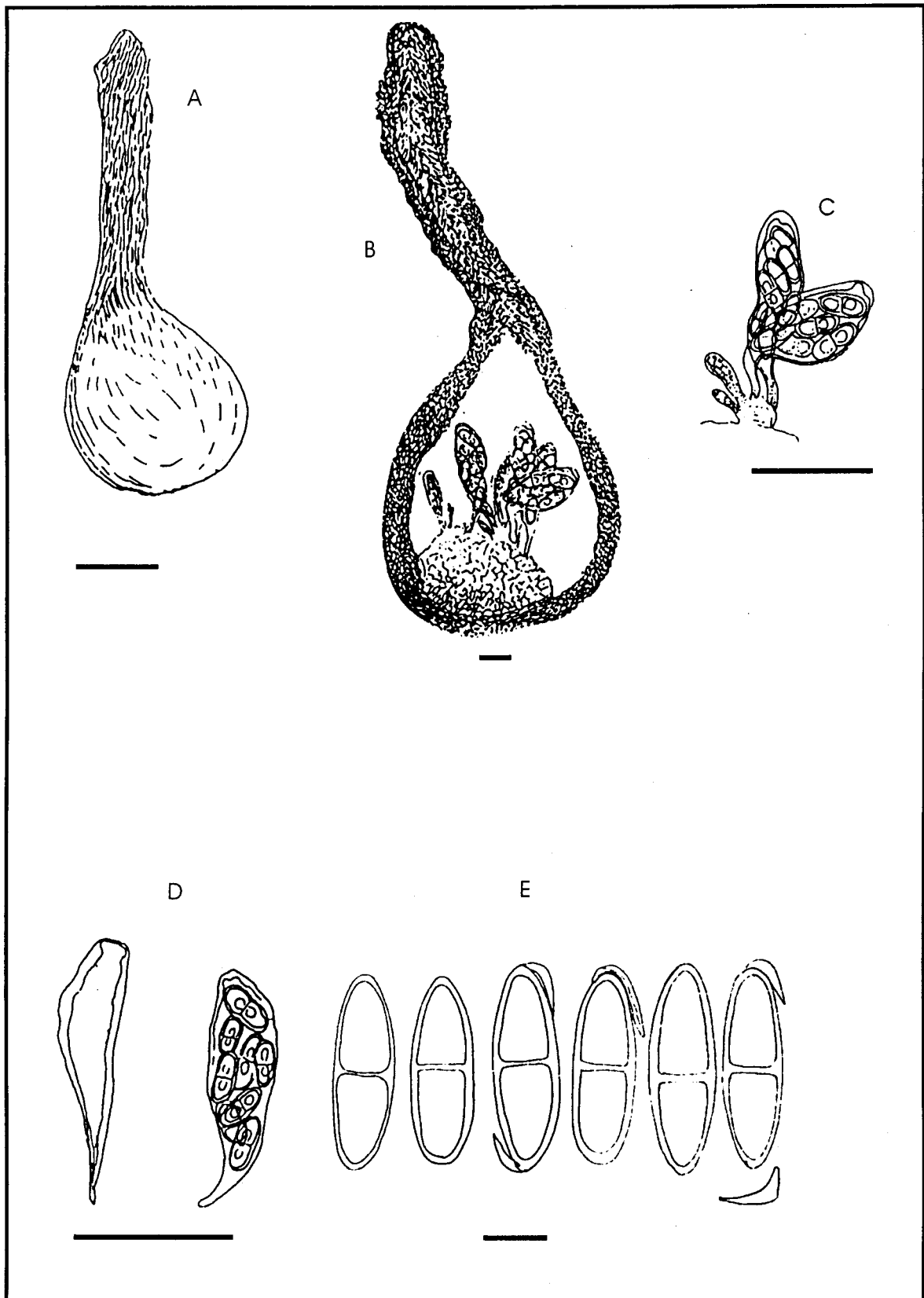


Fig-4 : *Aniptodera chesapeakensis*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 50µm., C. Asci different stages of development, bar 50µm., D. Mature Asci, bar 50µm., E. Ascospores, bar 10µm.

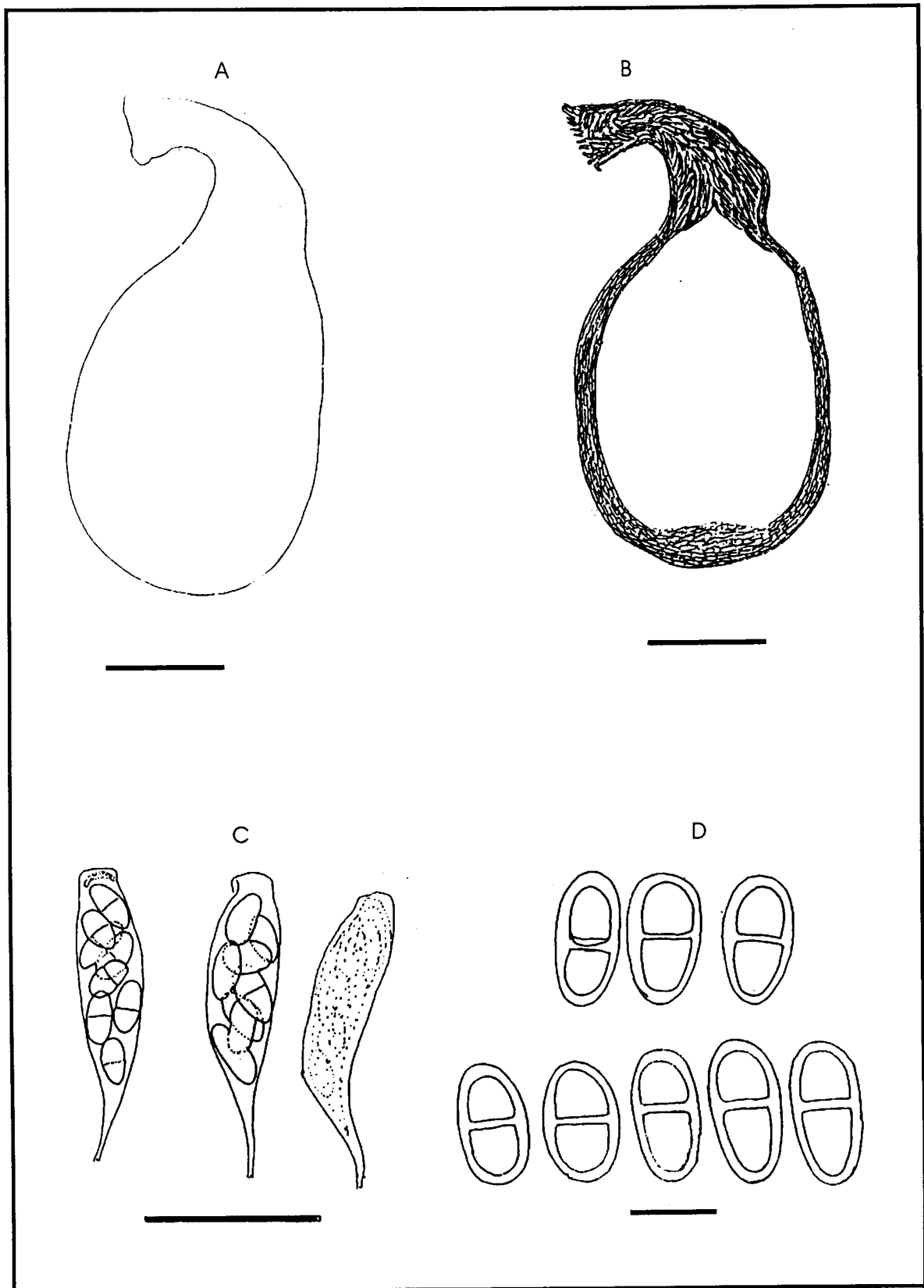


Fig-5 :*Aniptodera haispora*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Young & mature Asci, bar 50 $\mu$ m., D. Ascospores, bar 100 $\mu$ m.

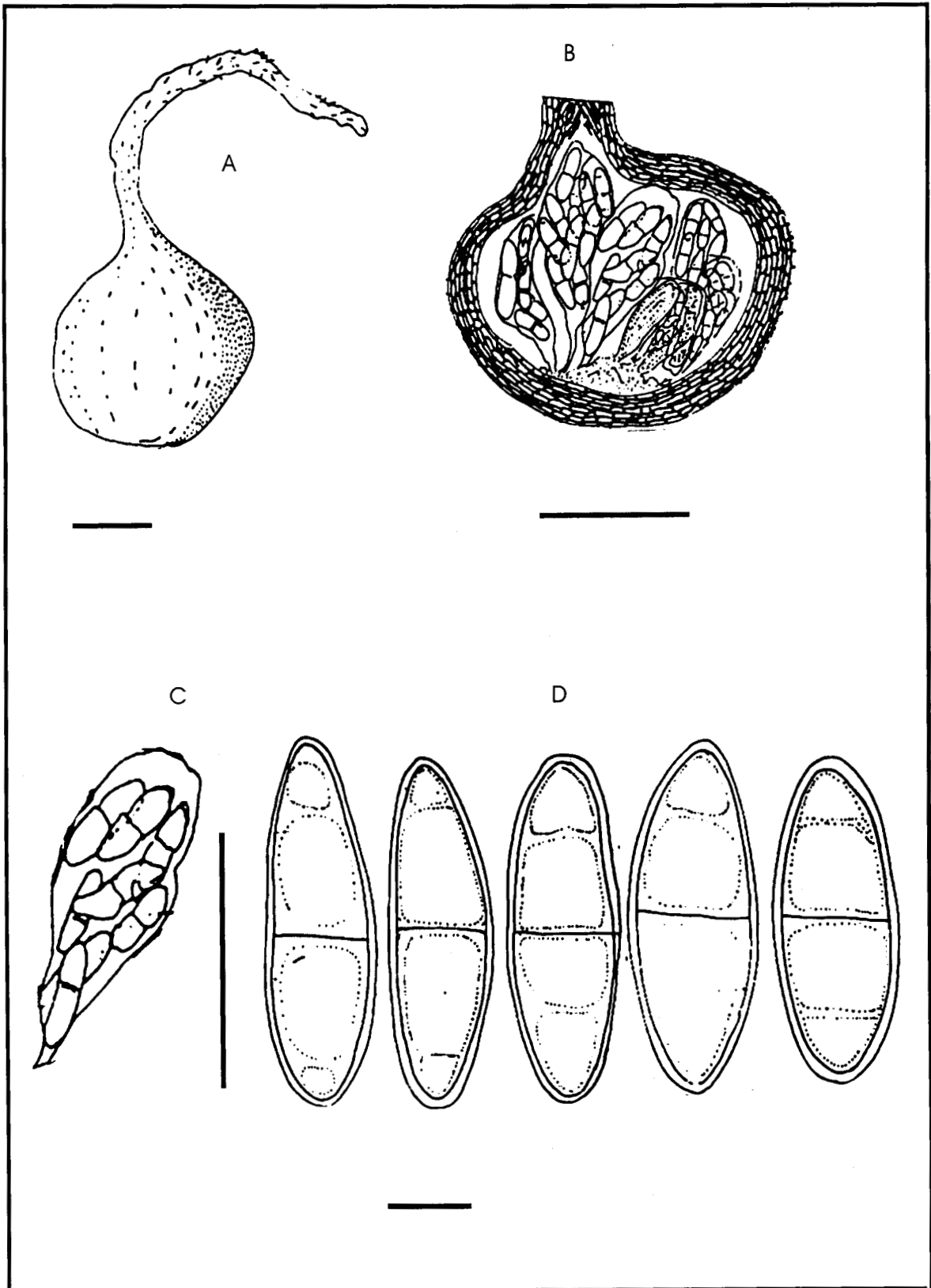


Fig-6 : *Aiptodera longispora*. A. Ascoma, bar 50 $\mu$ m. B. Ascoma v.s., bar 100 $\mu$ m.  
 C. Ascus, bar 100 $\mu$ m. D. Ascospores, bar 10  $\mu$ m.

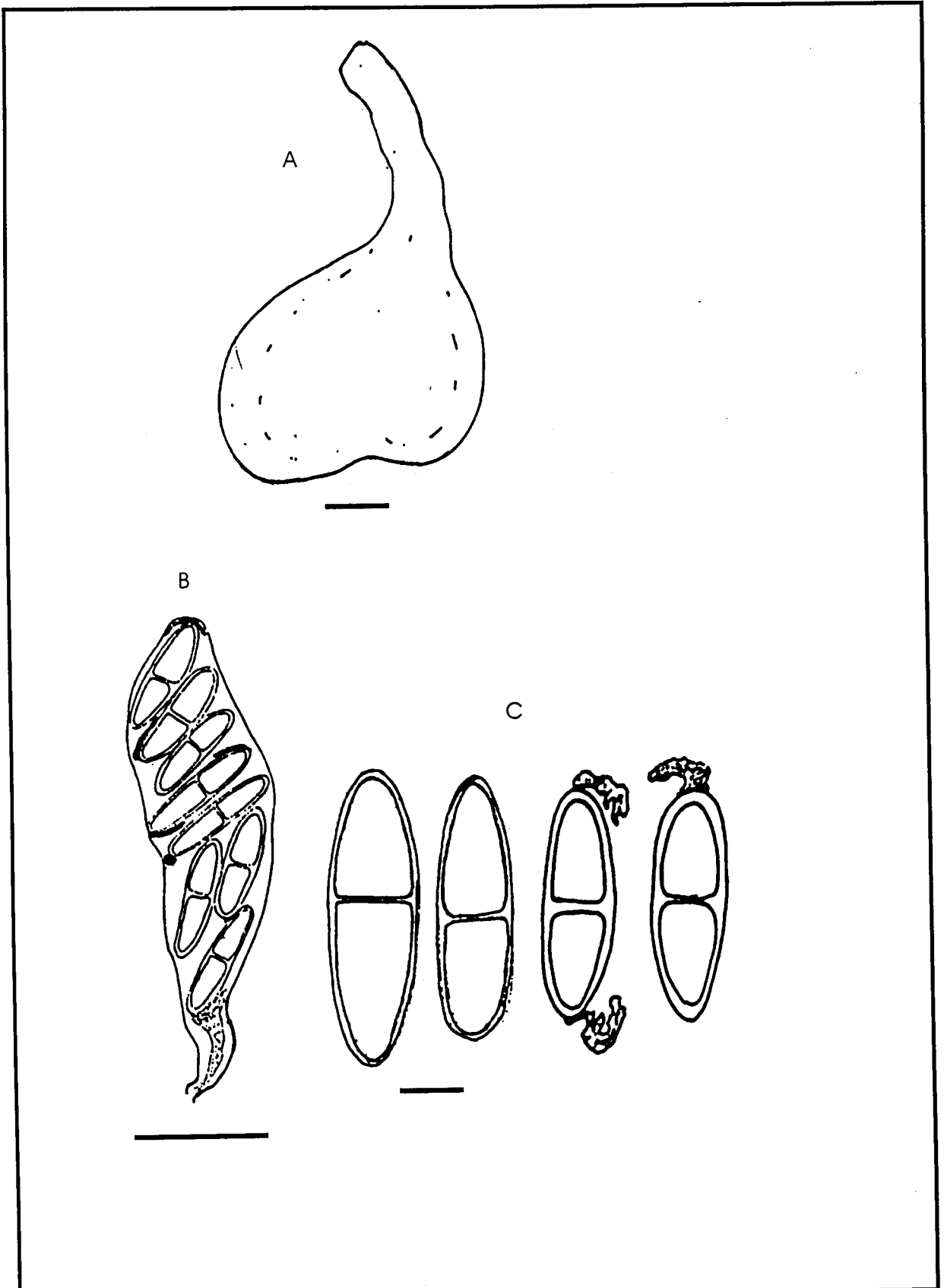


Fig - 7 : *Aniptodera mangrovei* : A. Asoma, bar 100 $\mu$ m.,  
B. Ascus, bar 50 $\mu$ m., C. Ascospores, bar 10 $\mu$ m.



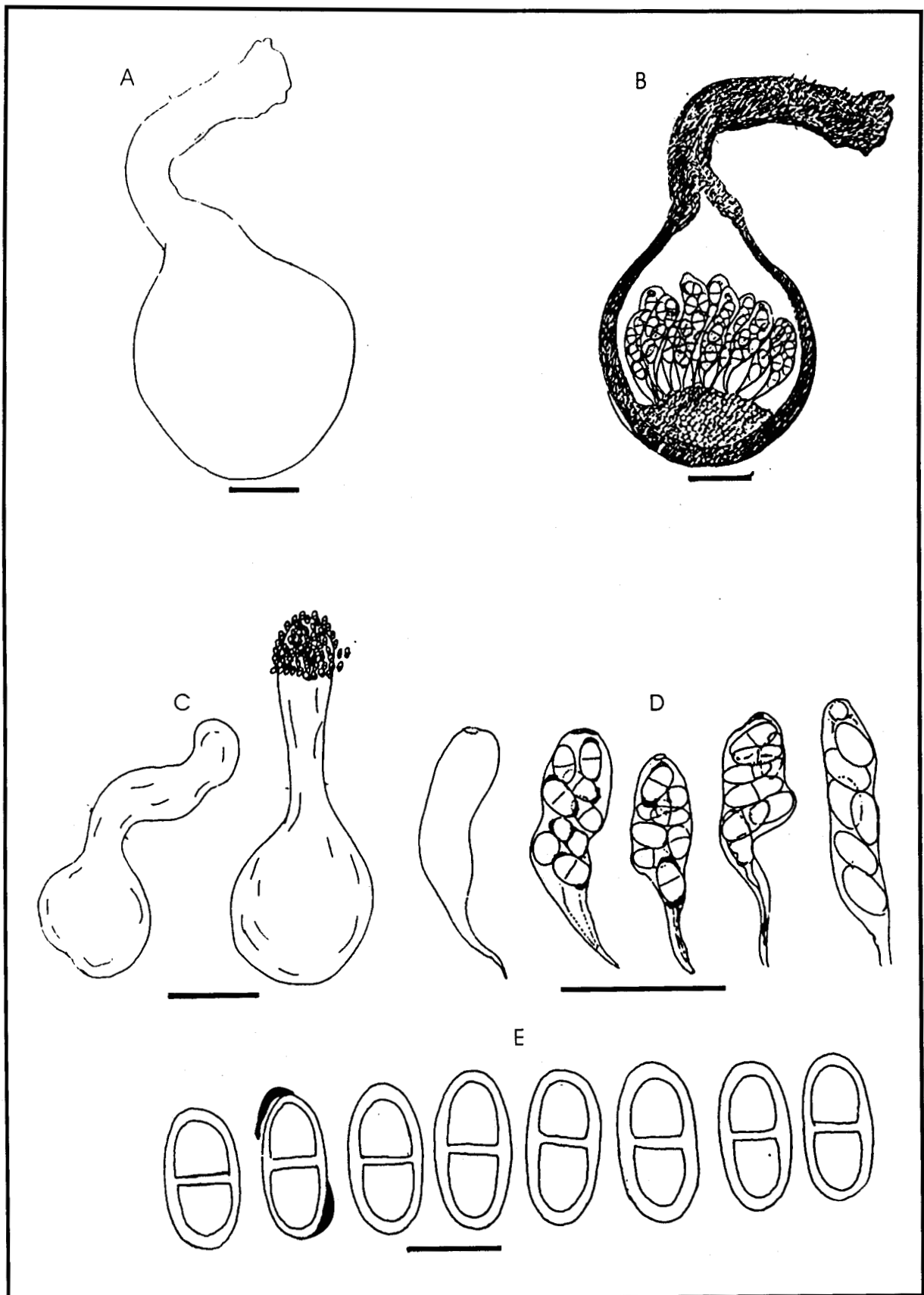


Fig - 8 : *Aniptodera salsuginosa* : A. Asoma, bar 50 $\mu$ m., B. Ascoma v.s, bar 50 $\mu$ m., C. Ascomata showing different type of Papillae, bar 100 $\mu$ m., D. Asci, bar 50 $\mu$ m. E. Ascospores, bar 10 $\mu$ m.

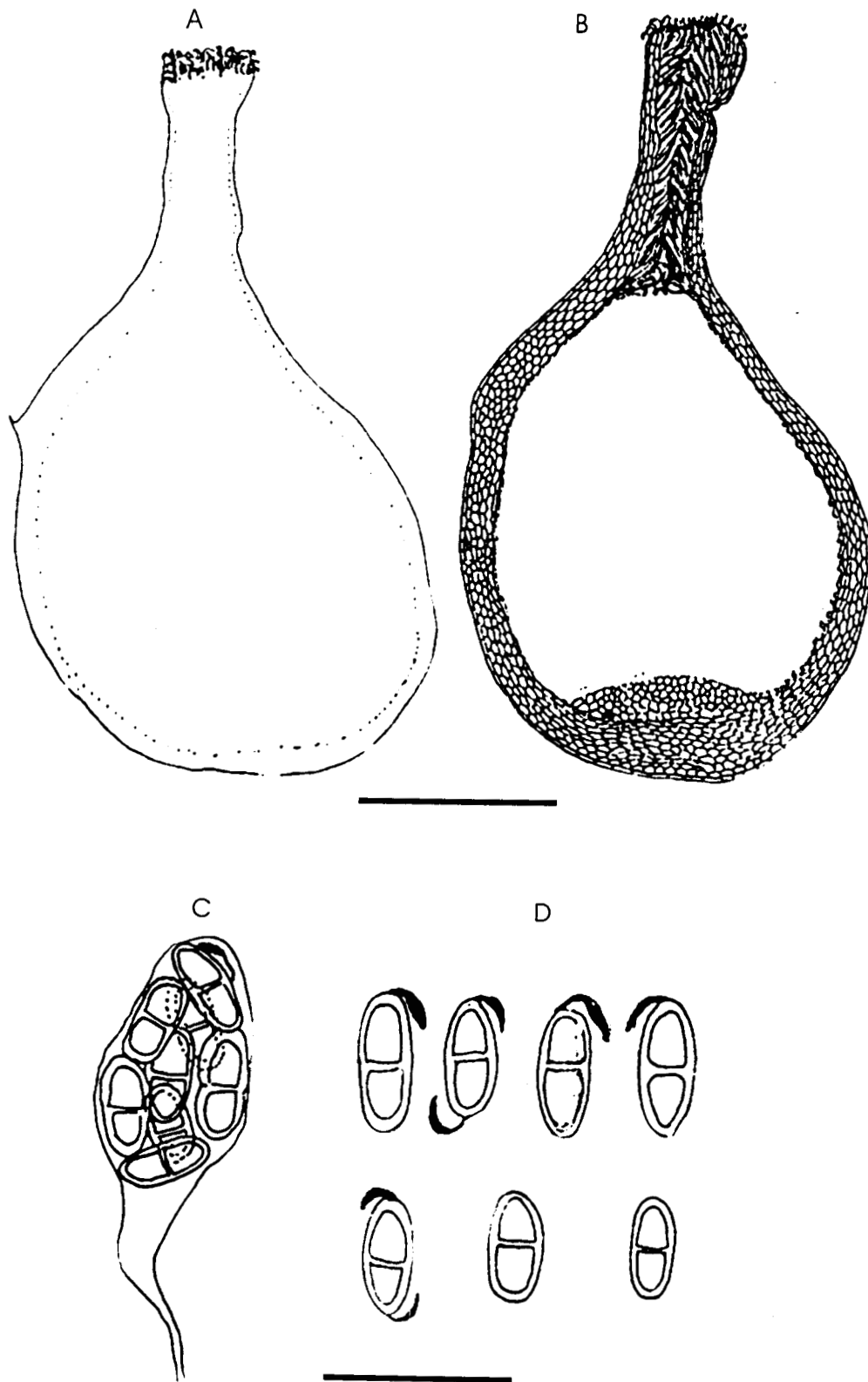


Fig - 10 : *Aseptodera* sp.II. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Ascus with Ascospore, bar 50 $\mu$ m., D. Ascospores, bar 50 $\mu$ m.

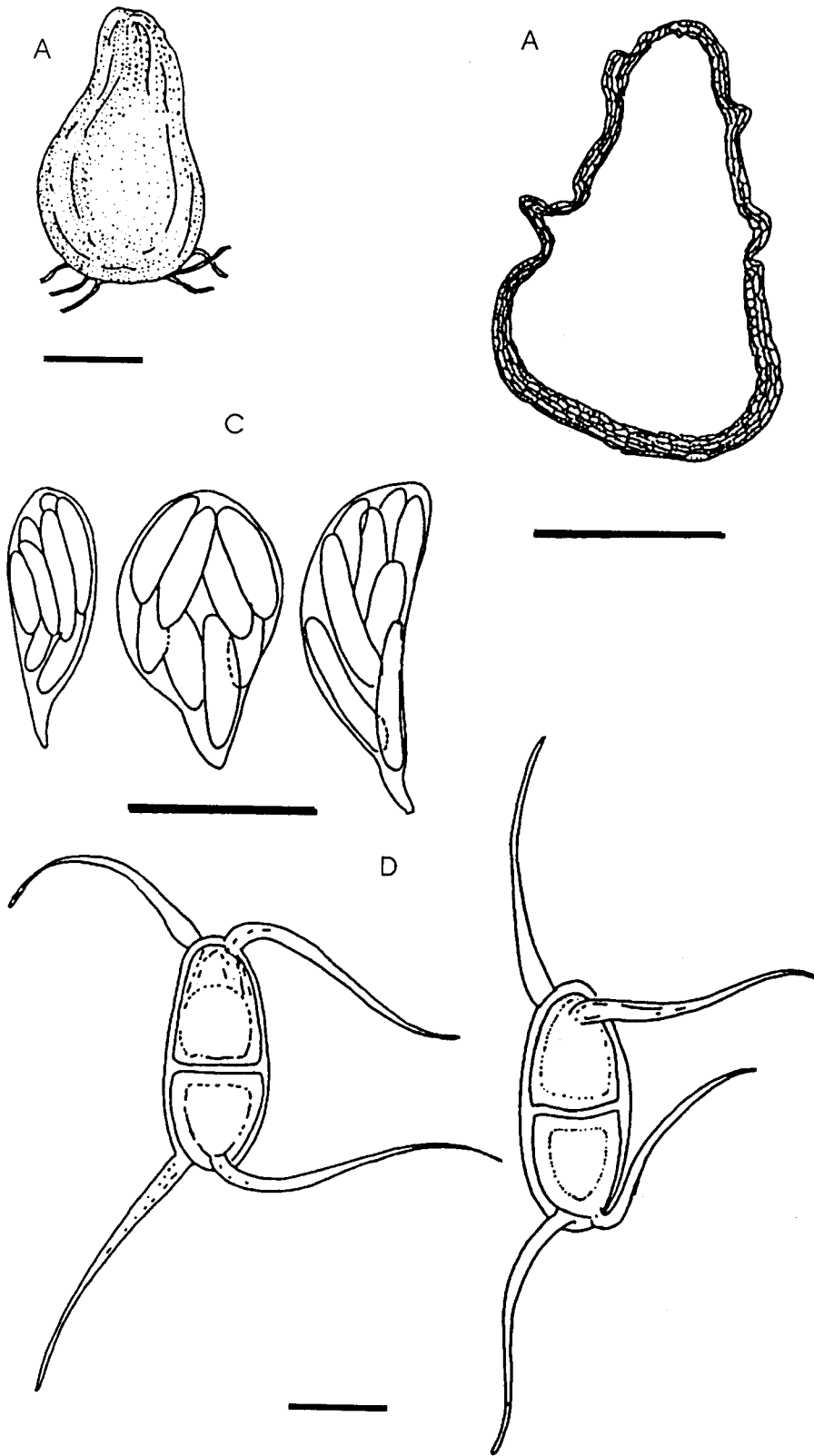


Fig - 11 : *Antennospora quadricornuta*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 100µm., C. Asci, bar 50µm., D. Ascospores, bar 10µm.

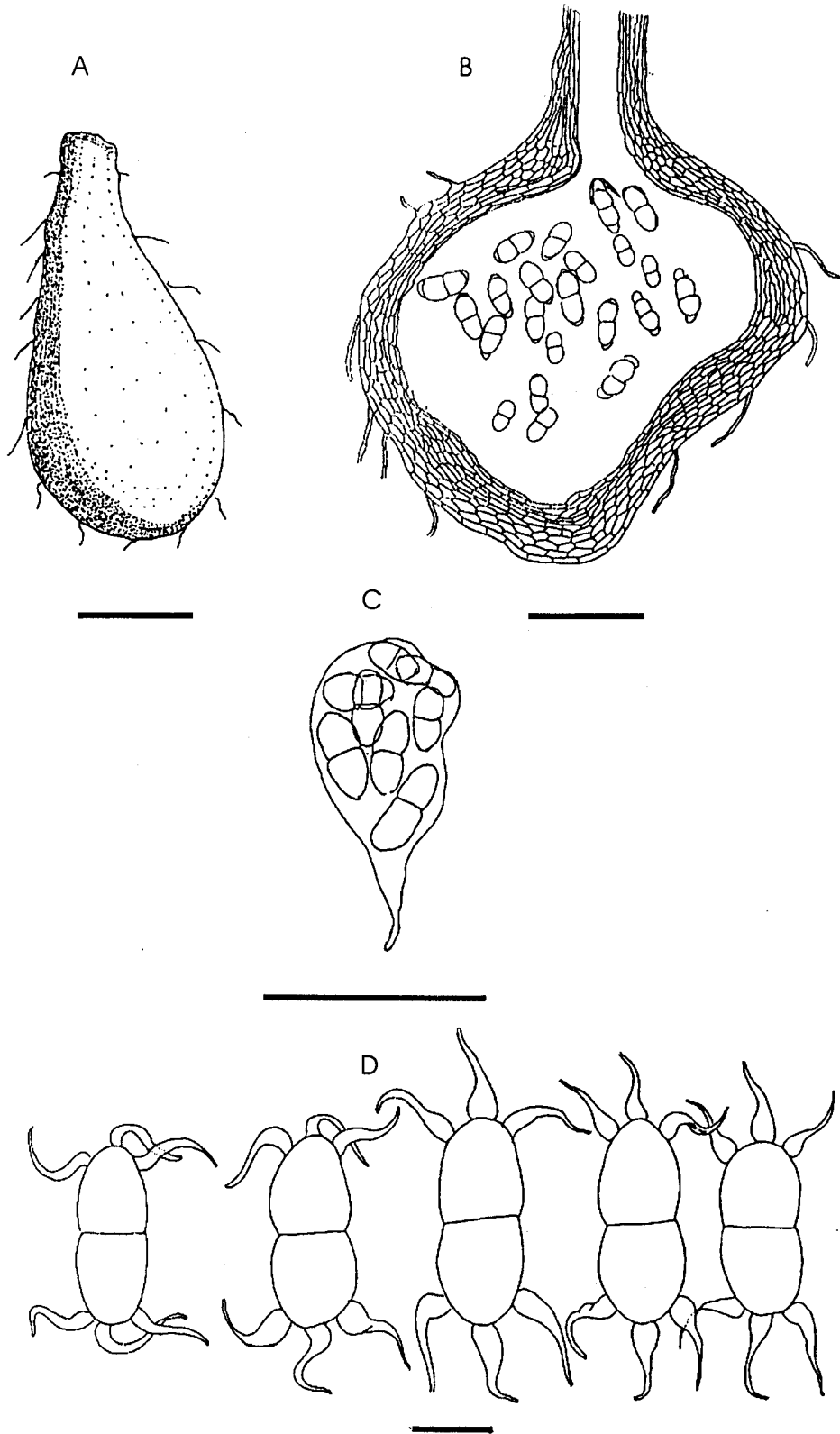


Fig - 12 : *Antennospora salina*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 50µm., C. Ascus, bar 50µm., D. Ascospores, bar 10µm.

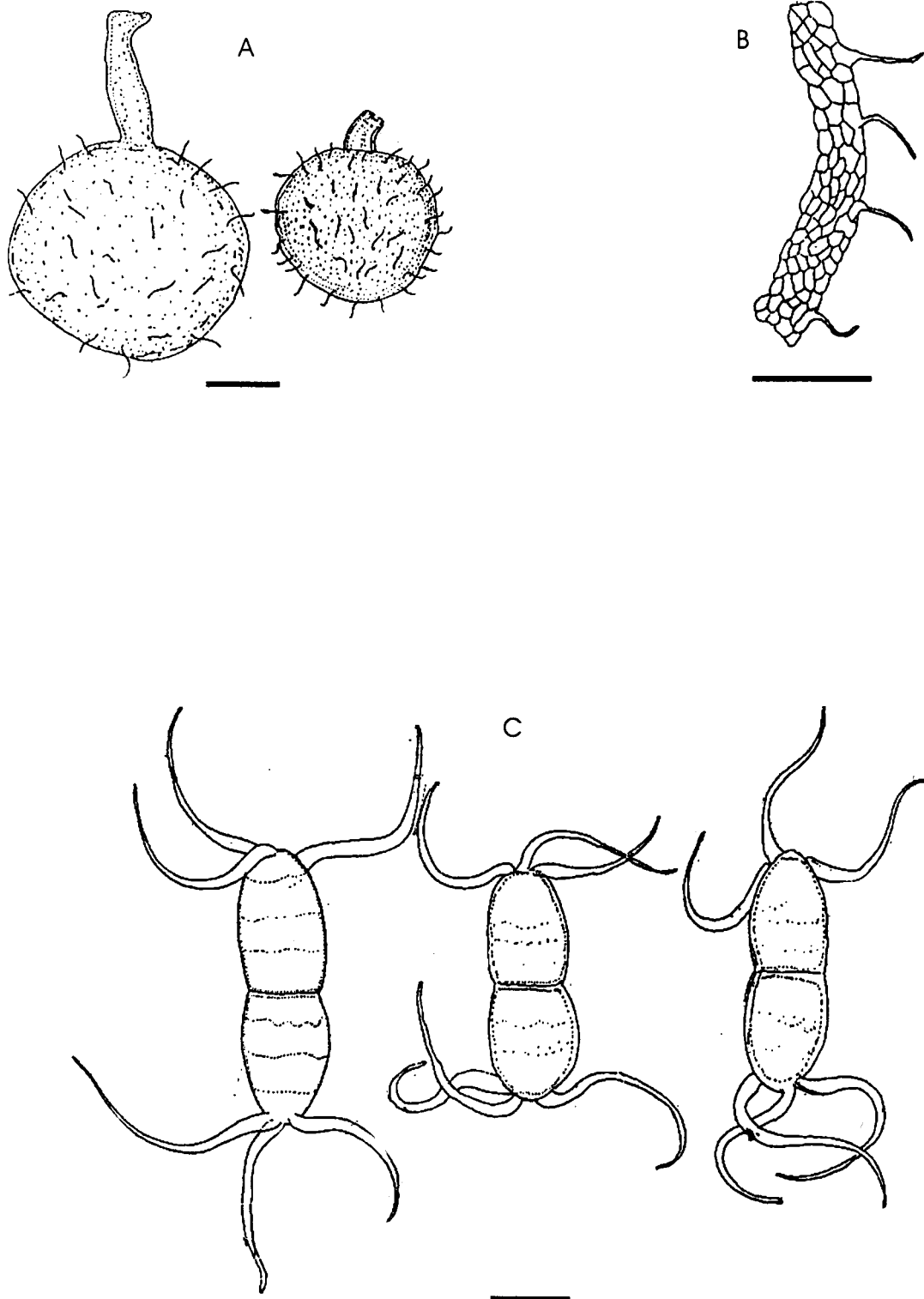


Fig - 13 : *Arenariomyces majusculus*. A. Ascomata, bar 100 $\mu$ m., B. A portion of peridium, bar 50 $\mu$ m., C. Ascospores, bar 10 $\mu$ m.

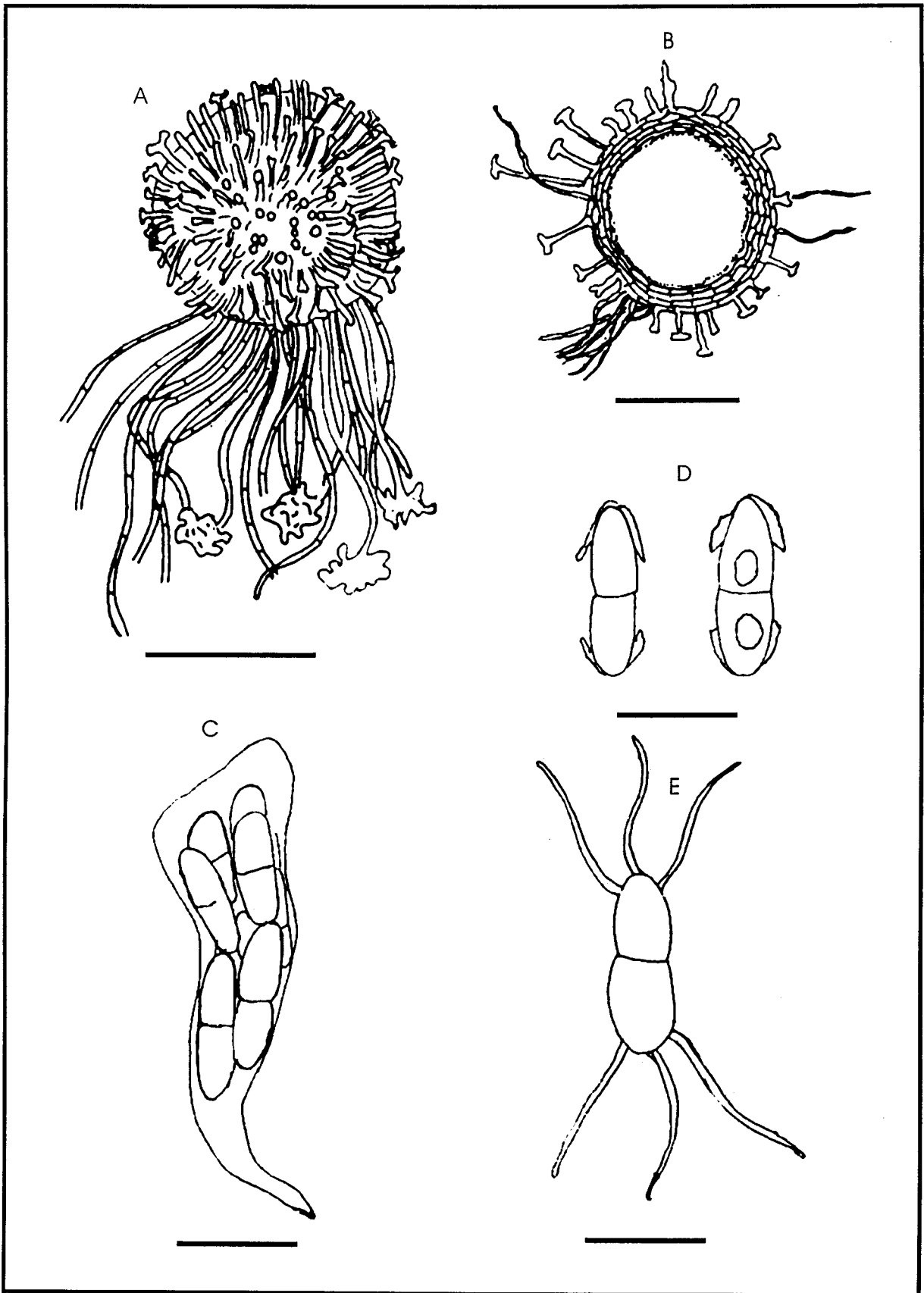


Fig-14 :*Arenariomyces parvulus*. A. Cleistothecium, bar 100 $\mu$ m., B. Cleistothecium v.s., bar 100 $\mu$ m., C. Ascus, bar 10 $\mu$ m., D. Immature ascospores, bar 10 $\mu$ m., E. Mature ascospore, bar 10 $\mu$ m.

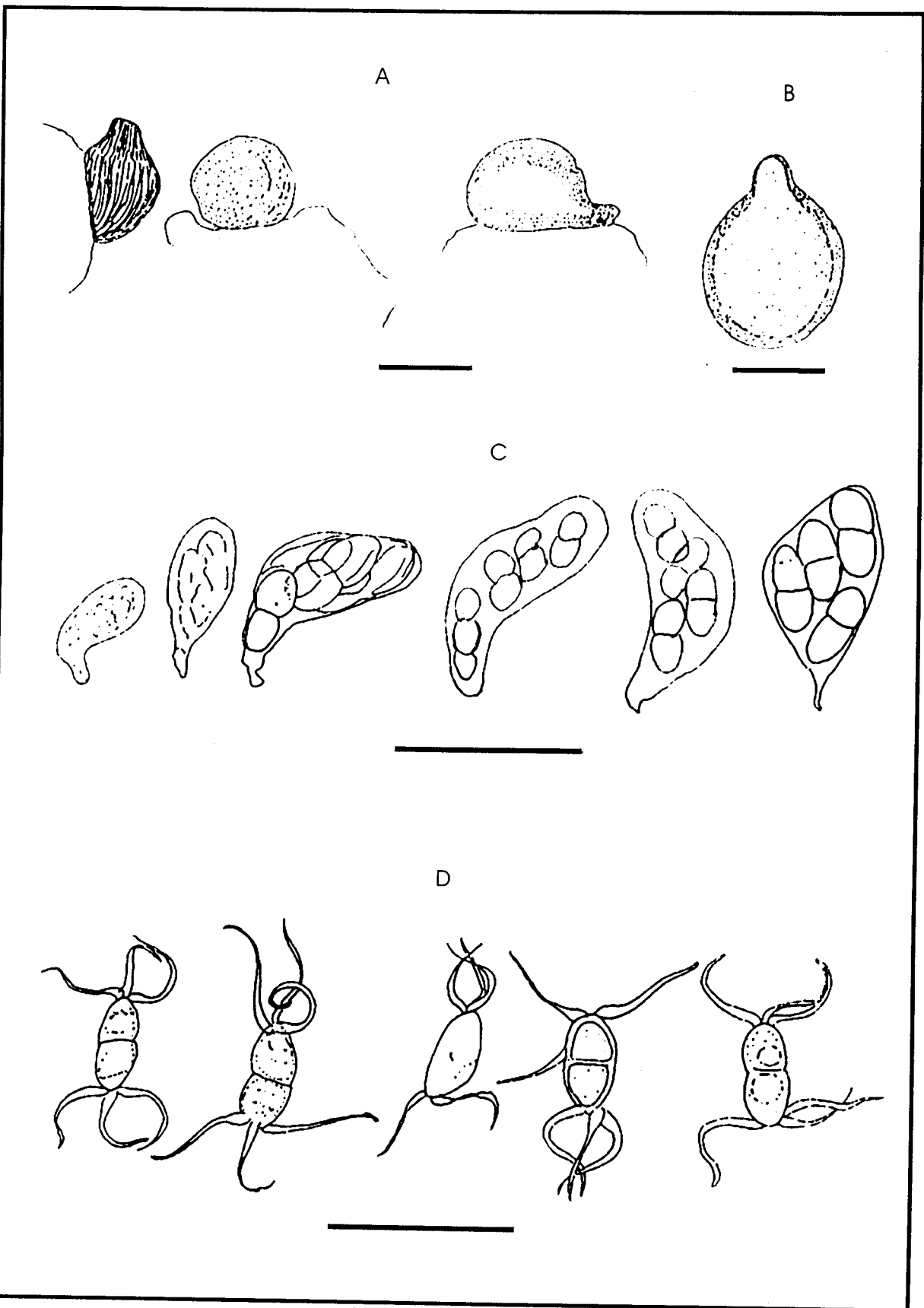


Fig - 15: *Arenariomyces trifurcatus*. A. Ascomata on sand grains, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Stages of development of asci, bar 50 $\mu$ m., D. Ascorpores, bar 50 $\mu$ m.

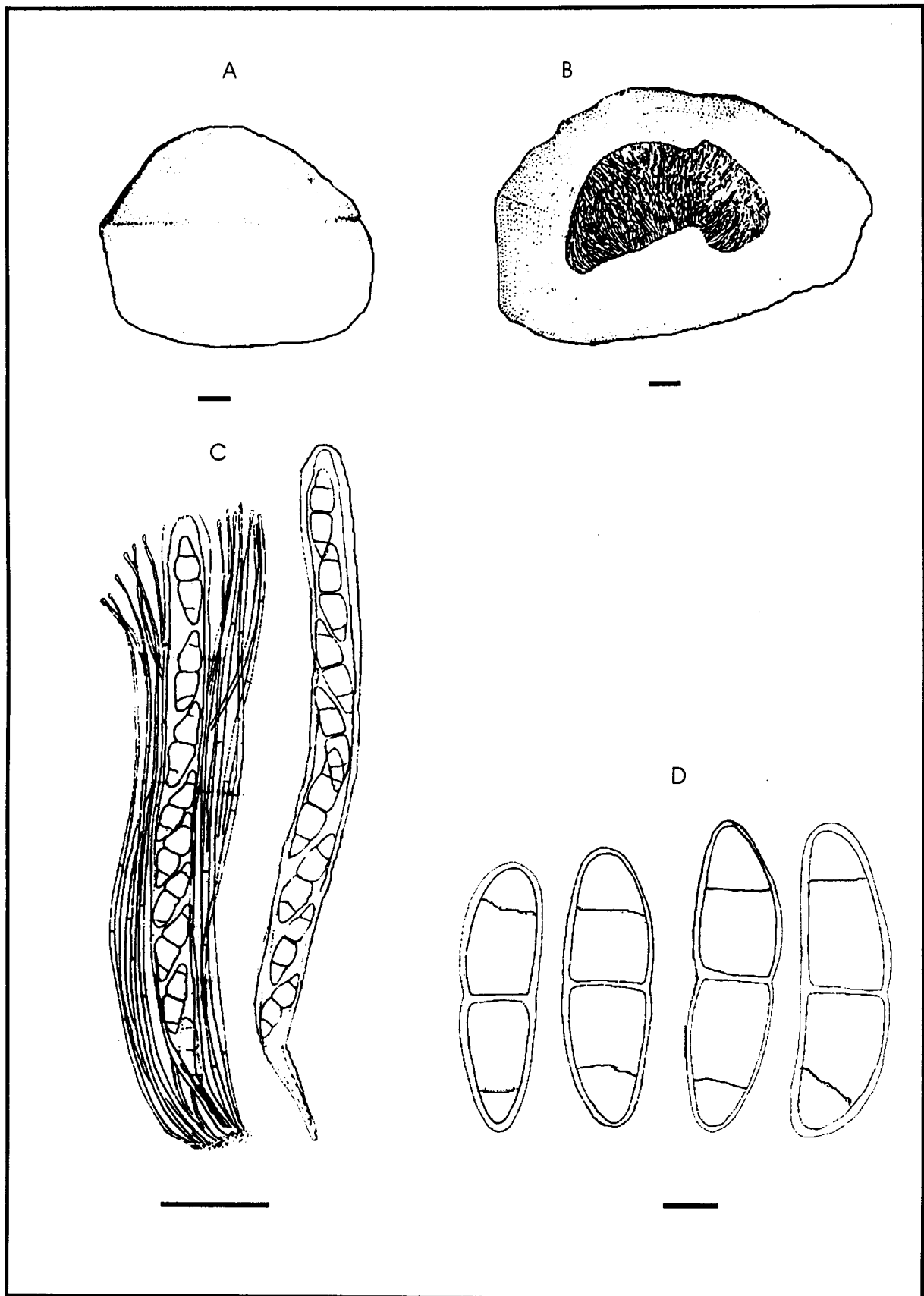


Fig - 16 : *Ascocratera manglicola*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Asci with paraphyses, bar 50 $\mu$ m., D. Ascospores, bar 10 $\mu$ m.



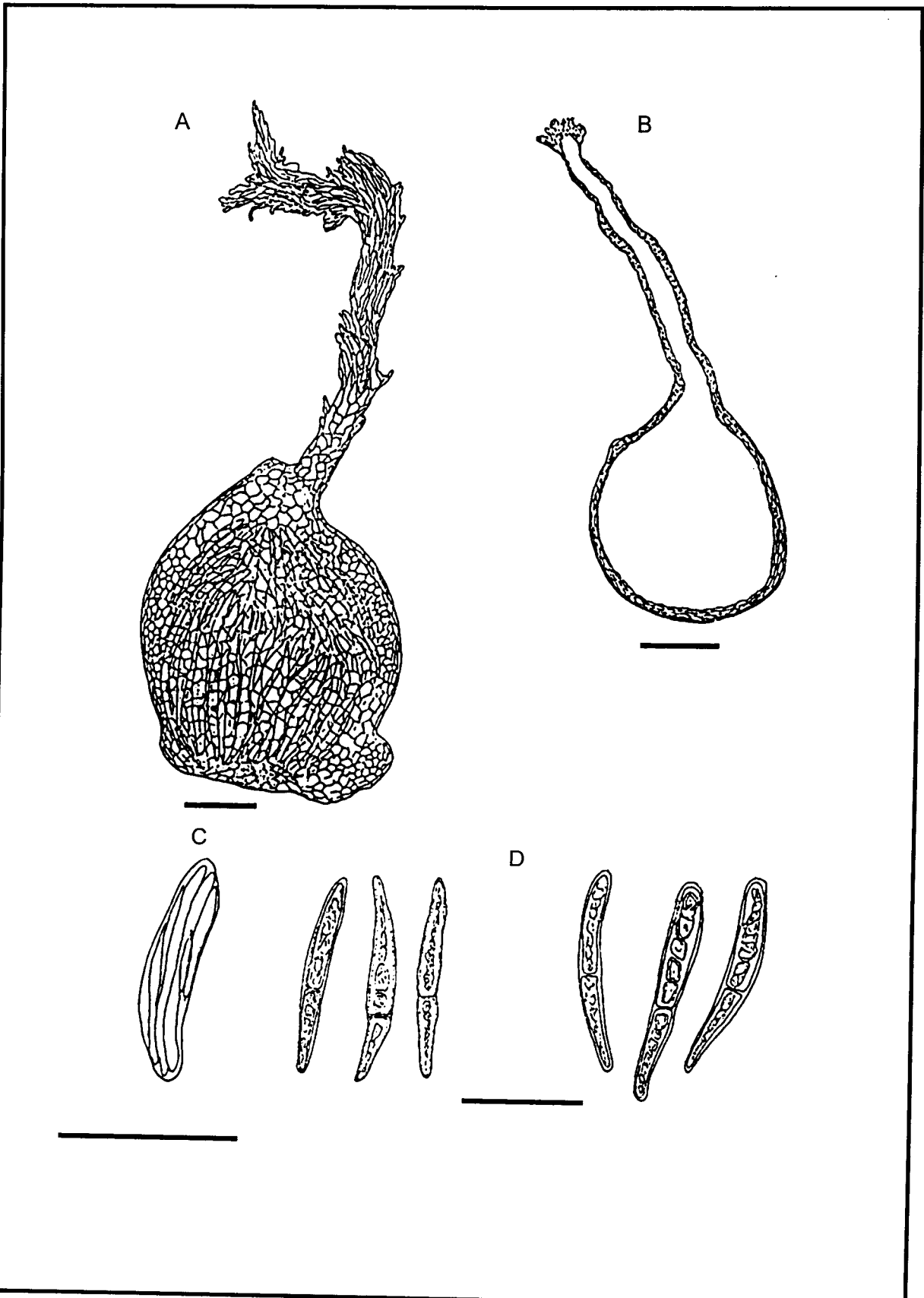


Fig - 17 : *Bathyasacus tropicalis*. A. Ascoma, bar 50 $\mu$ m., B. Ascoma v.s., bar 50 $\mu$ m., C. Ascus, bar 50 $\mu$ m., D. Ascospores, bar 10 $\mu$ m.

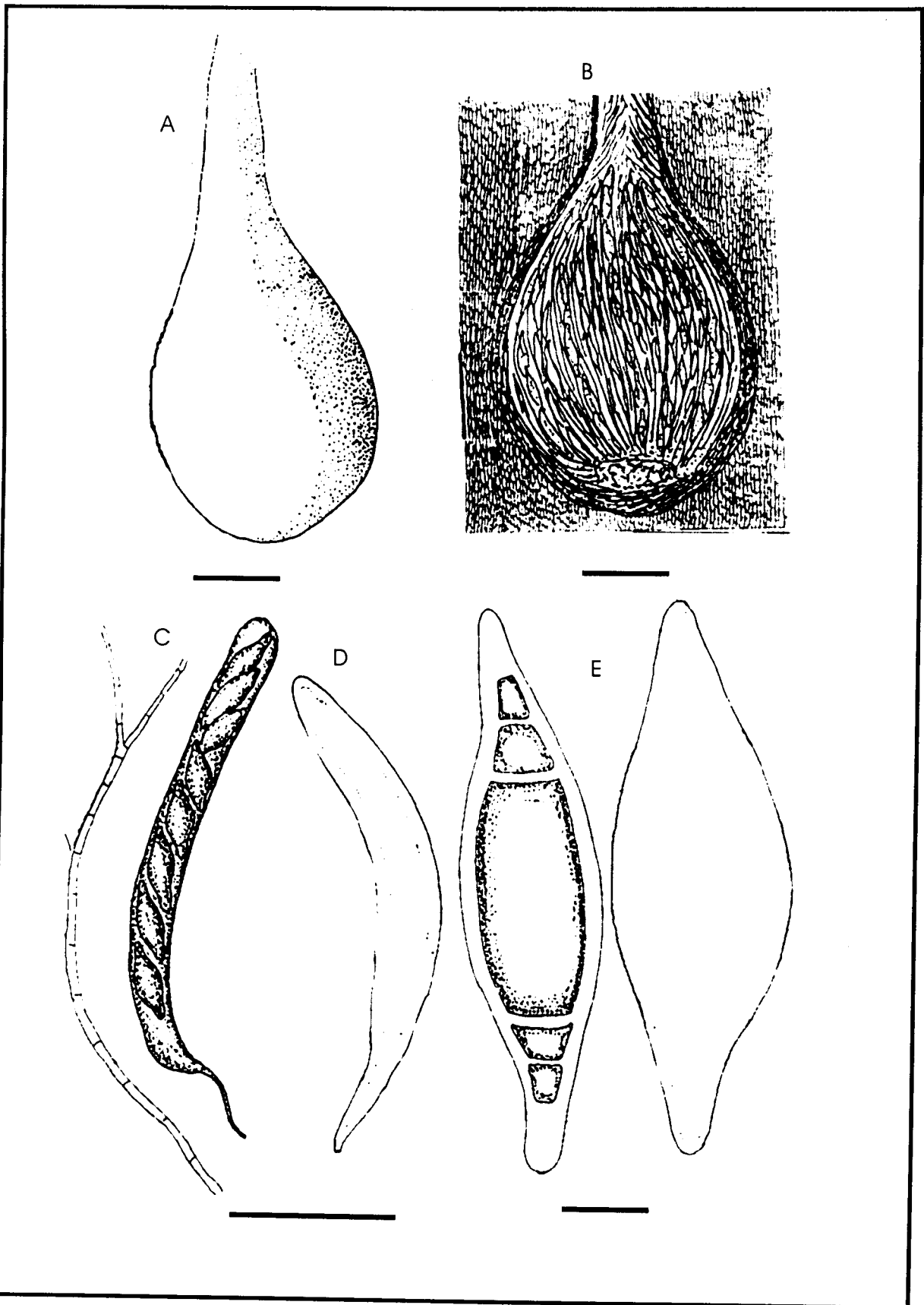


Fig-18 :*Biatriospora marina*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s. (lower part), bar 100 $\mu$ m., C. Pseudoparaphysis & D. Ascus, bar 50 $\mu$ m., E. Mature & immature ascospores, bar 10 $\mu$ m.

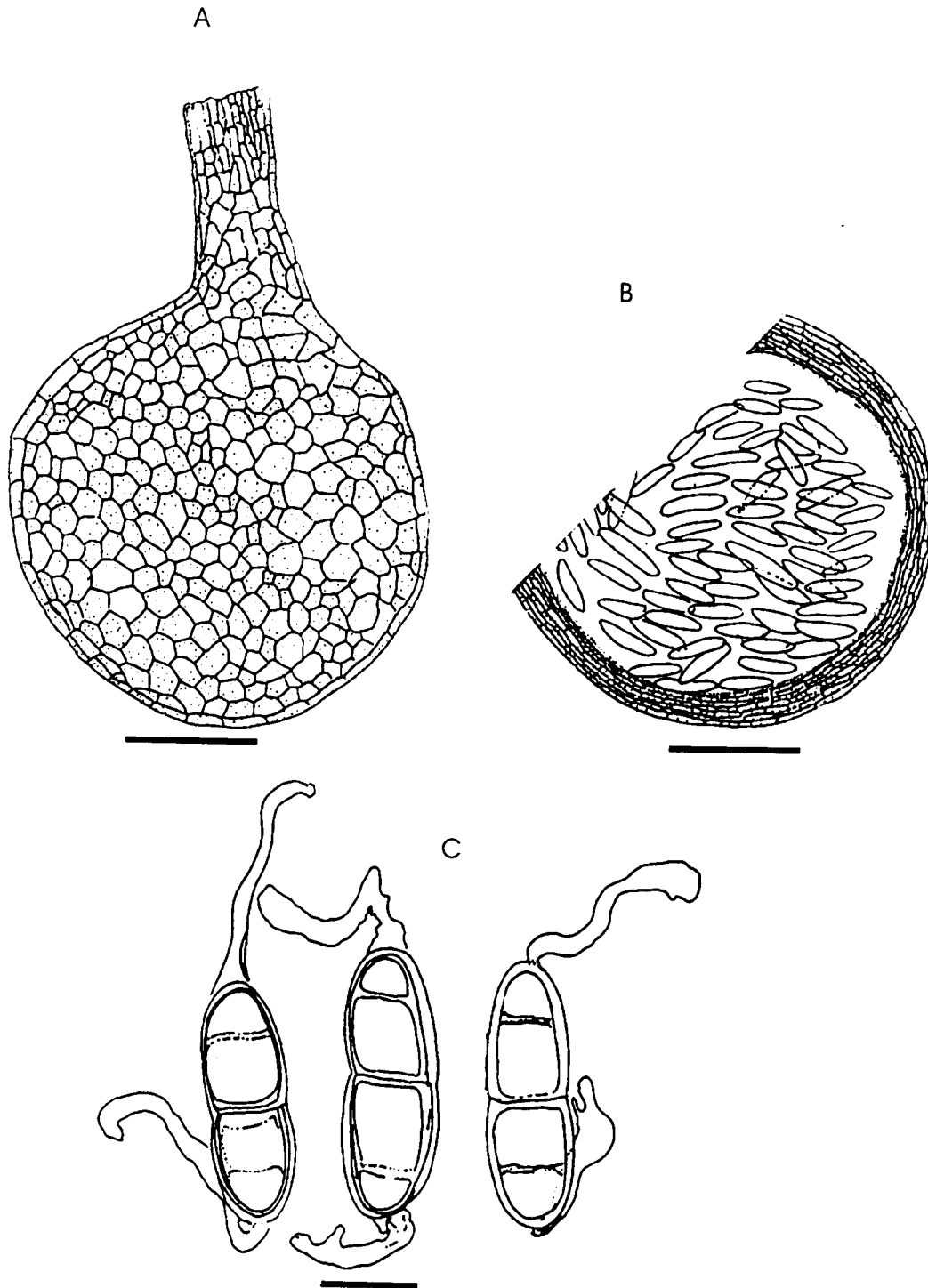


Fig - 19 : *Ceriosporopsis halima*. A. Ascoma, bar 50µm., B. Ascoma venter v.s., (A portion) bar 50µm., C. Ascospores, bar 10µm.

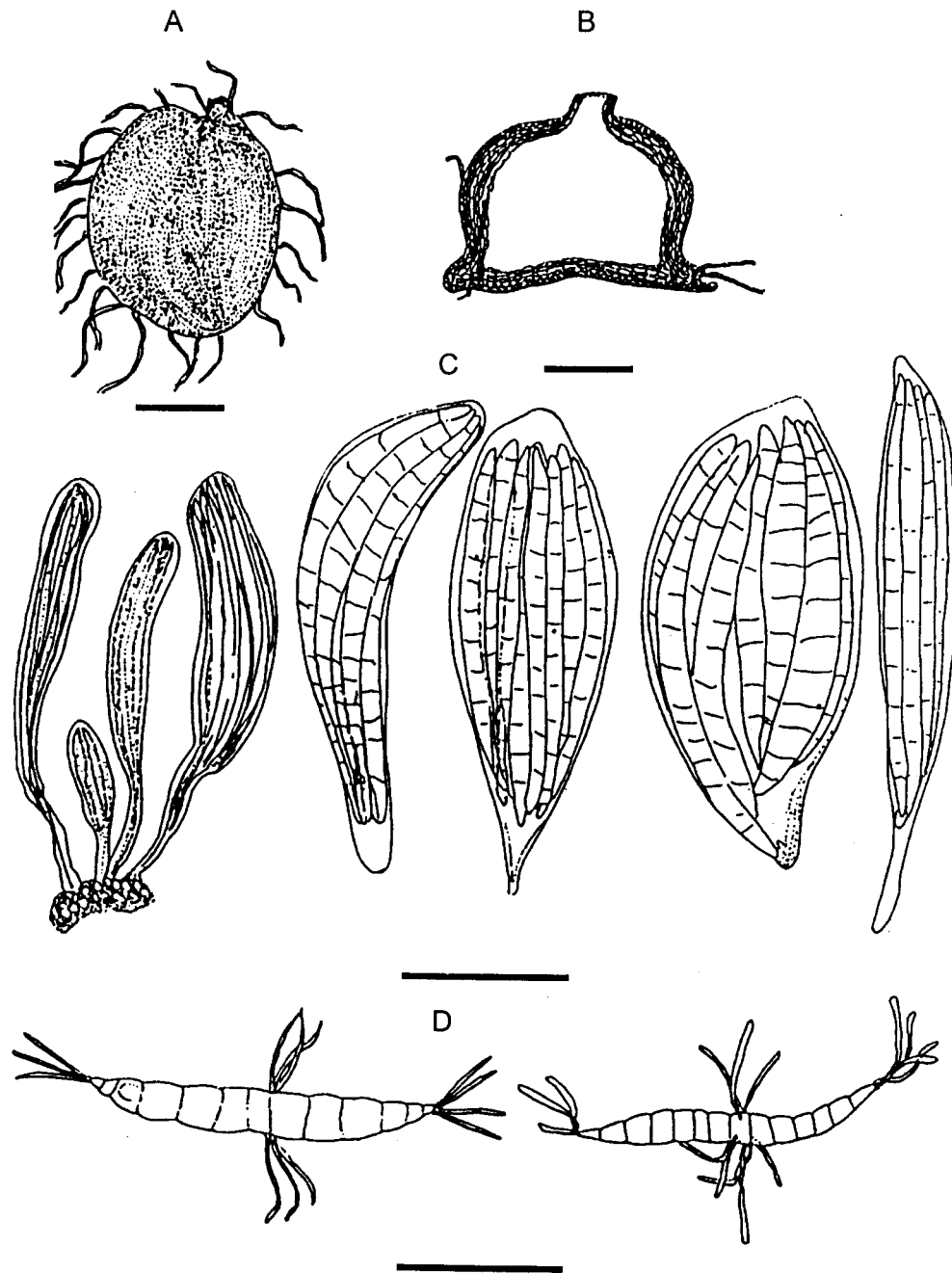


Fig - 20 : *Corollospora filiformis*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., Bar 100 $\mu$ m., C. Different stages of development of asci, bar 50 $\mu$ m., D. Ascospores, bar 50  $\mu$ m.

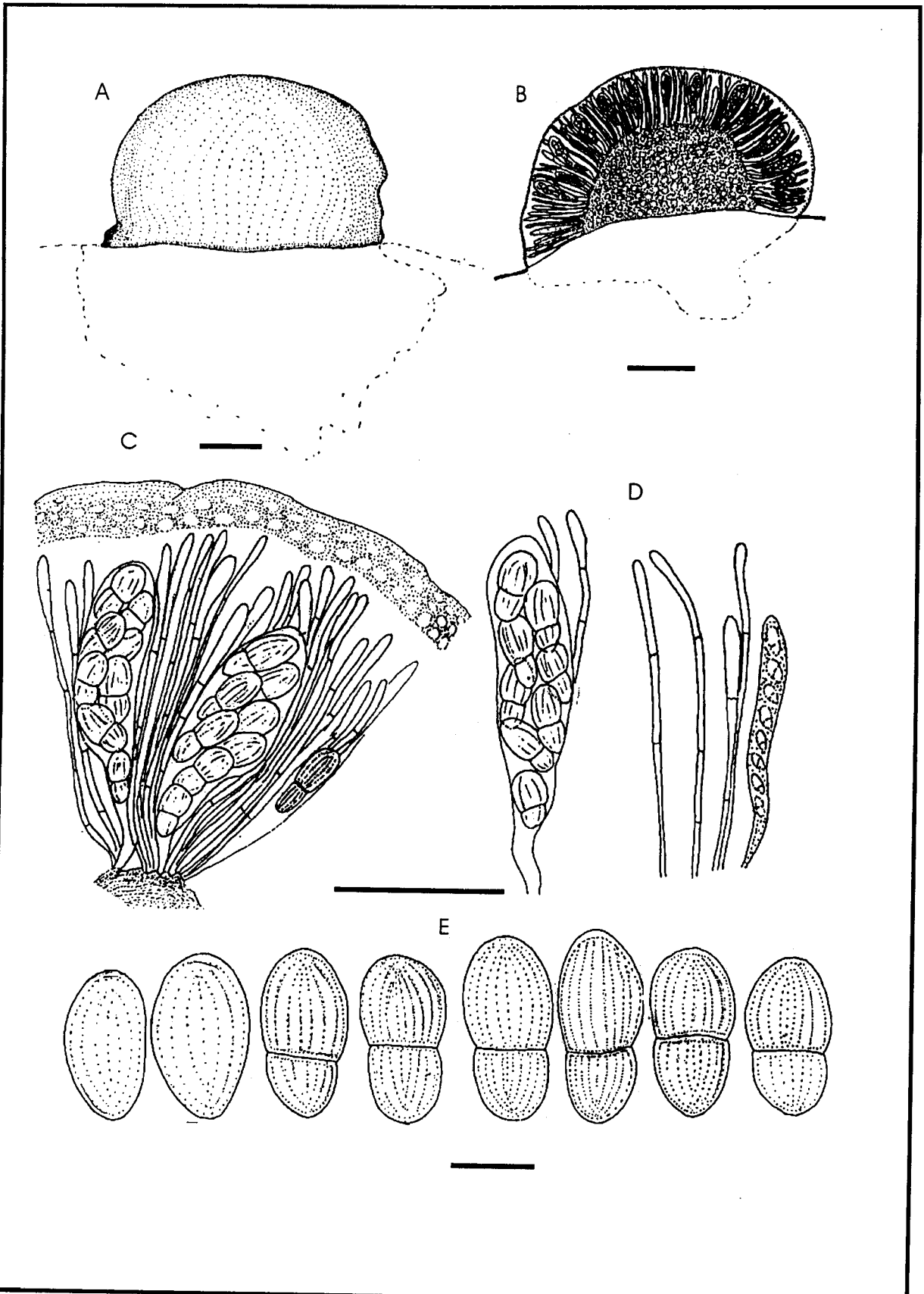


Fig-22: *Dactylospora haliotrepha*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 50µm., C. Ascoma v.s. (a portion enlarged), D. Mature and immature asci and paraphyses, bar 50µm., E. Ascospores, bar 10µm.

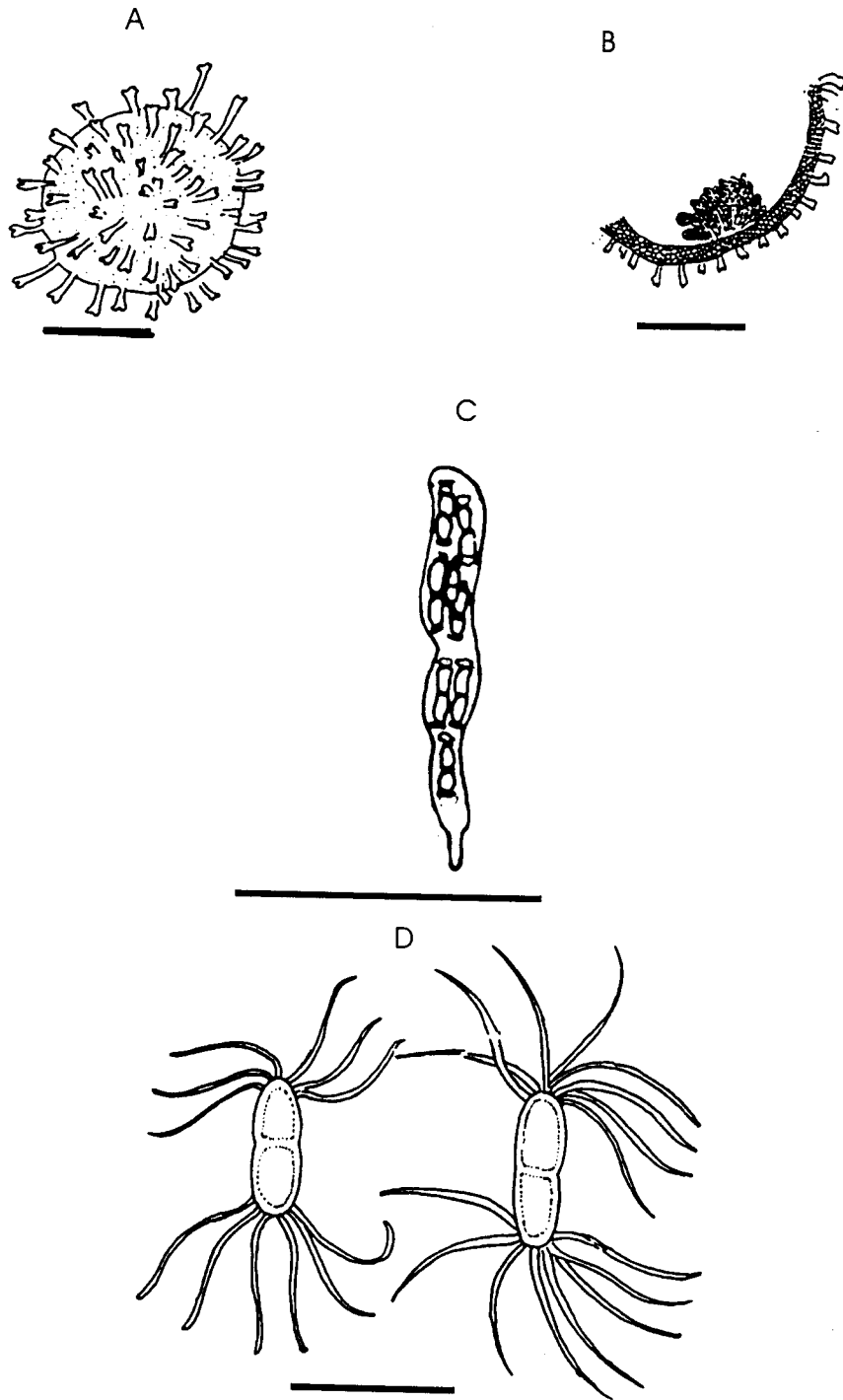


Fig - 23 : *Dryosphaera tropicalis*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s. (a portion), bar 50 $\mu$ m., C. Ascus, bar 50 $\mu$ m., D. Ascospores, bar 10 $\mu$ m.

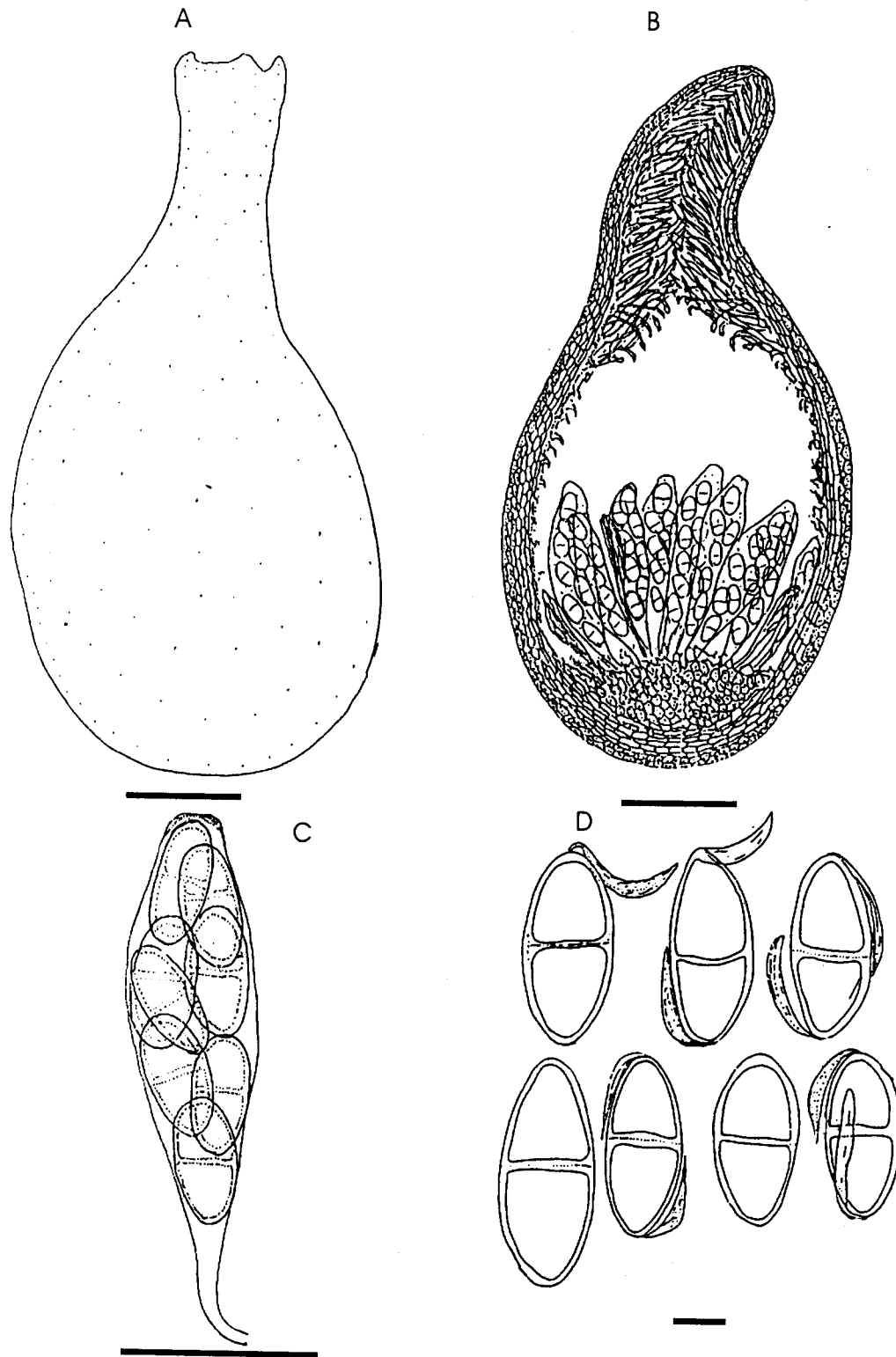


Fig-24 : *Halosarpheia abbonis*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 100µm., C. Ascus, bar 50µm., D. Ascospores, bar 10µm.

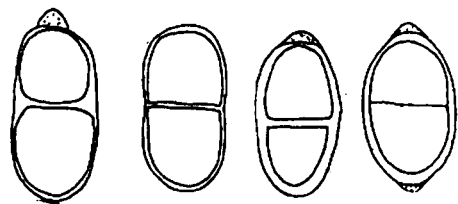
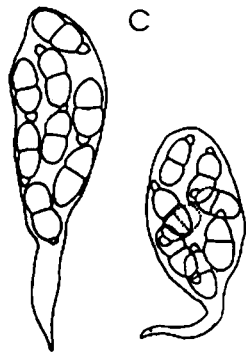
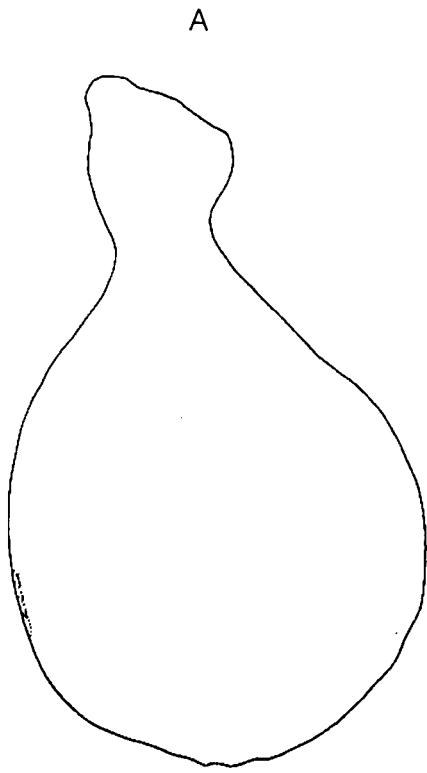


Fig-25 : *Halosarpheia hamata*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Asci, bar 50 $\mu$ m., D. Ascospores, bar 10 $\mu$ m.



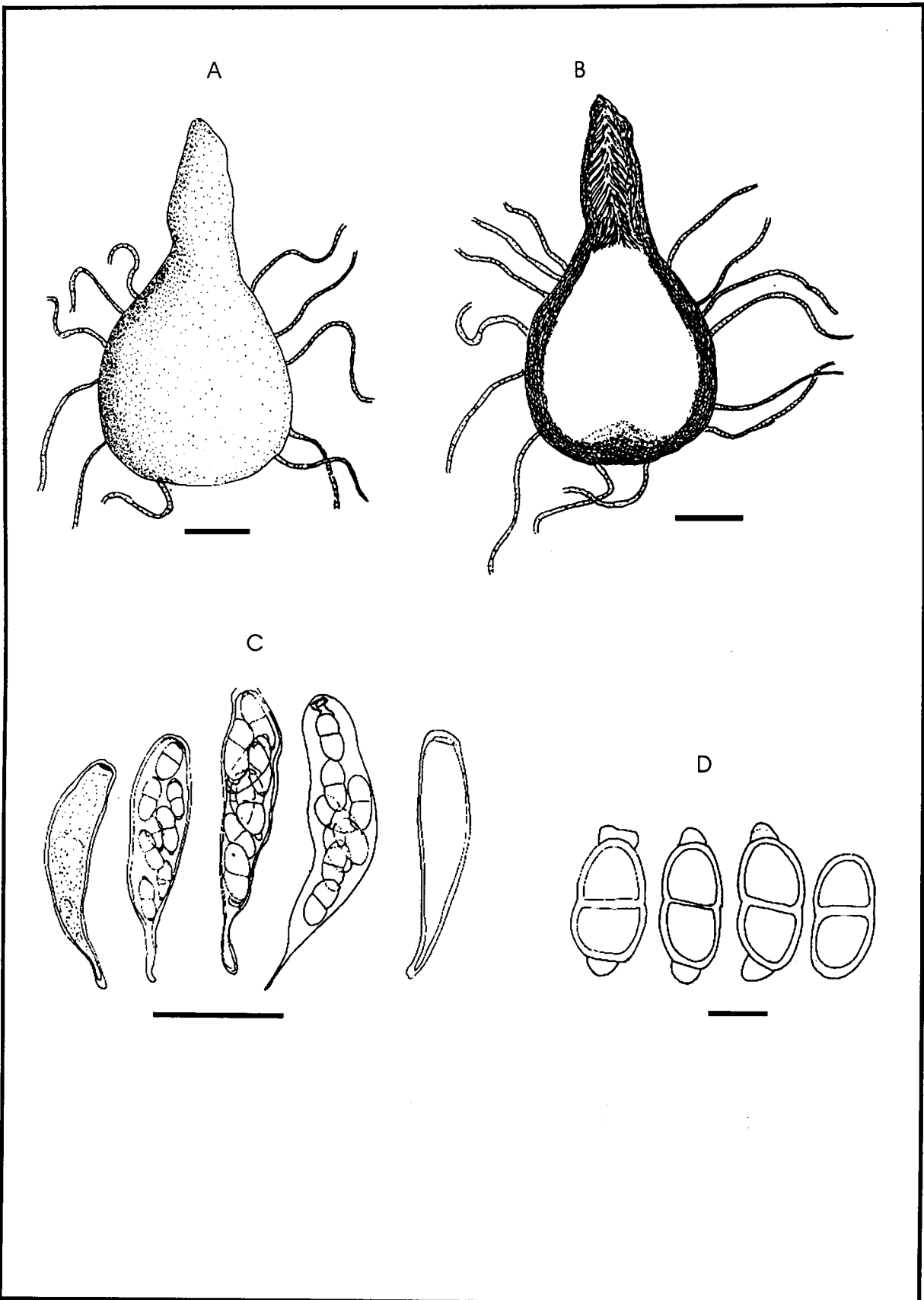


Fig-26 : *Halosarpheia marina*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 100µm., C. Different stages of development of asci, bar 50µm., D. Ascospores, bar 10µm.

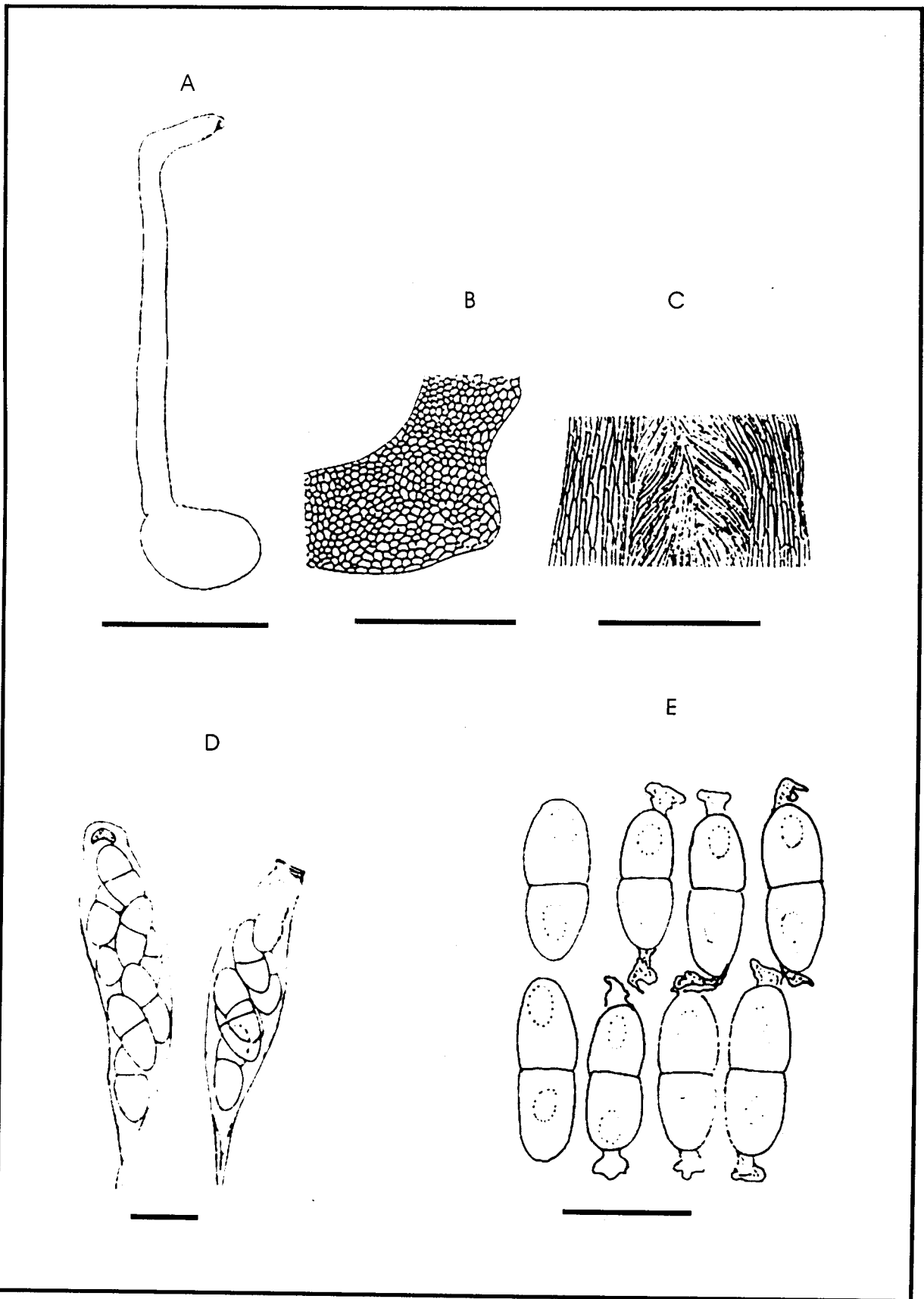


Fig - 27 : *Halosarpheia minuta*. A. Ascoma, bar 50µm., B. A portion of peridium v.s., bar 50µm., C. A portion of L.S. of the neck of ascoma, bar 50µm., D. Asci, bar 10µm., E. Ascospores, bar 10µm.

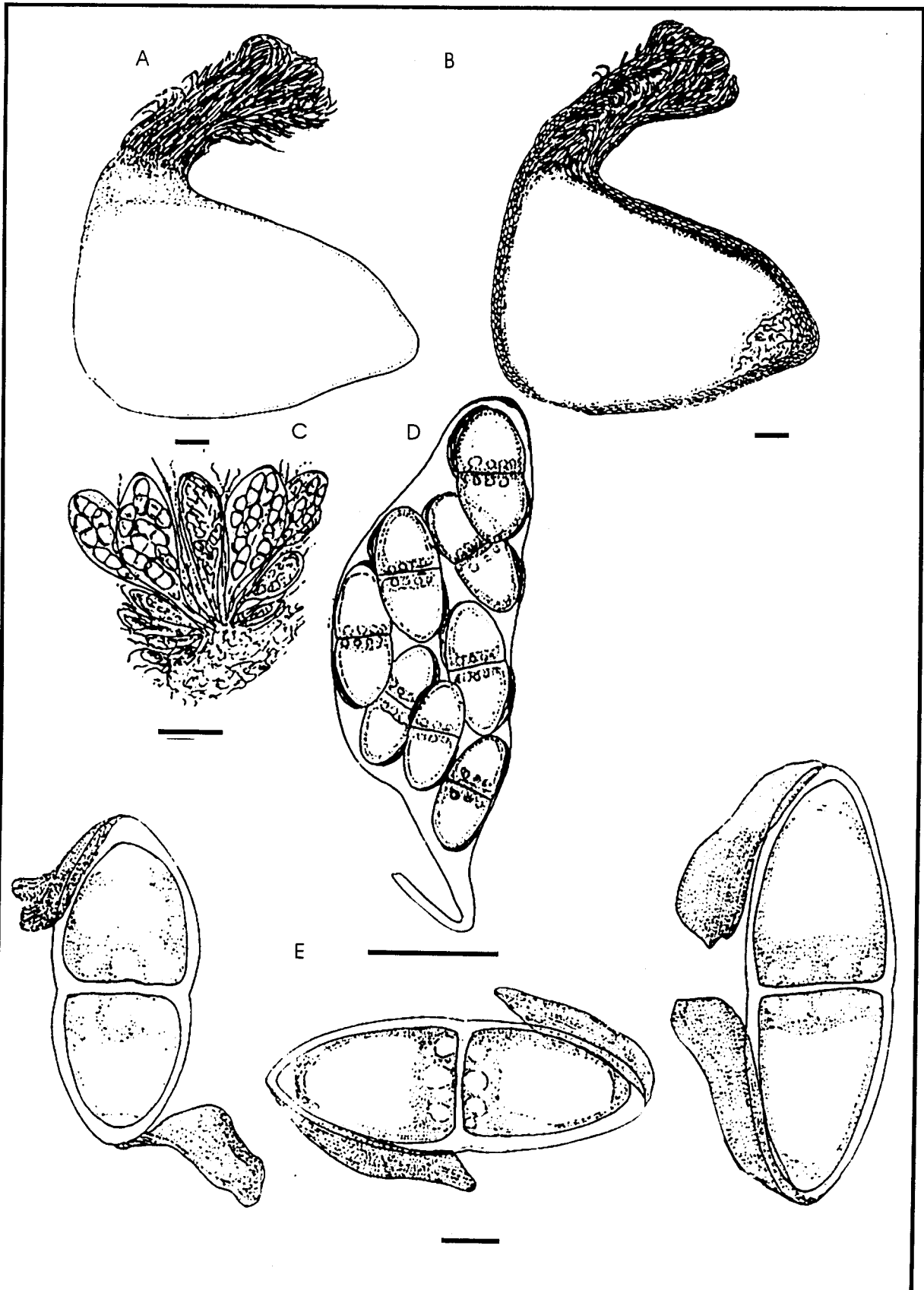
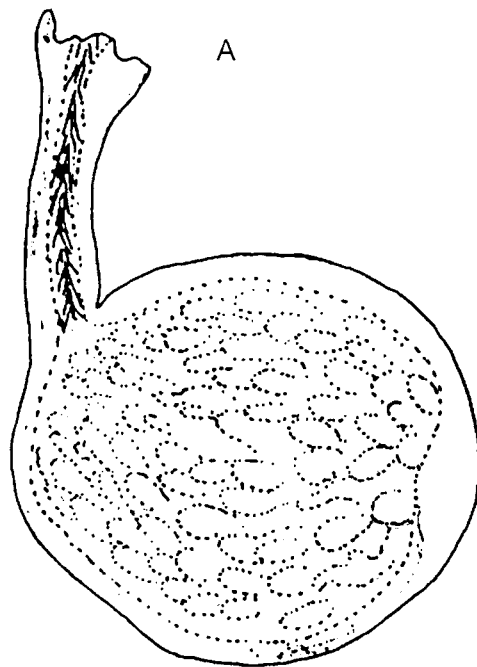


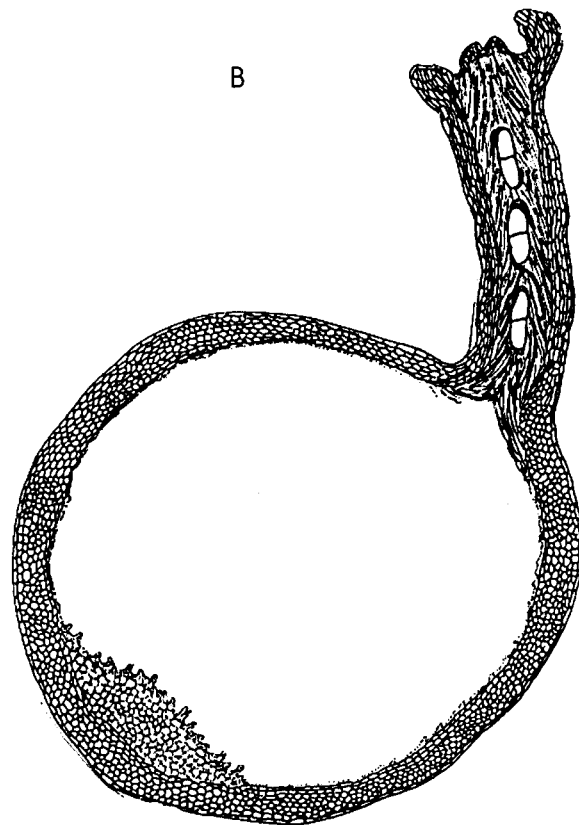
Fig -28 : *Halosarpheia ratnagiriensis*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Asci different stages of development, bar 100 $\mu$ m., D. Ascus, bar 50 $\mu$ m., E. Ascospores, bar 10 $\mu$ m.

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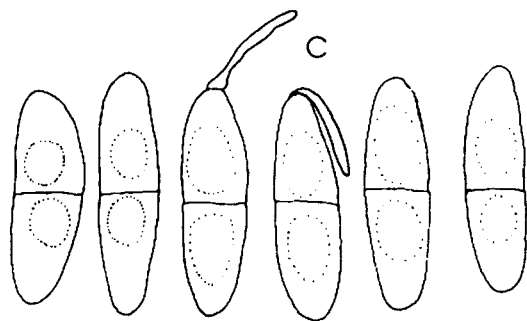
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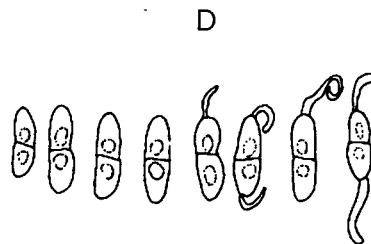
A



B



C



D

Fig-29 :*Halosarpheia retorquens*. A. Ascoma, bar 100 $\mu$ m ., B. Ascoma v.s., bar 50 $\mu$ m., C. Ascospores, bar 10 $\mu$ m., D. Ascospores (low magnification view), bar 50 $\mu$ m.

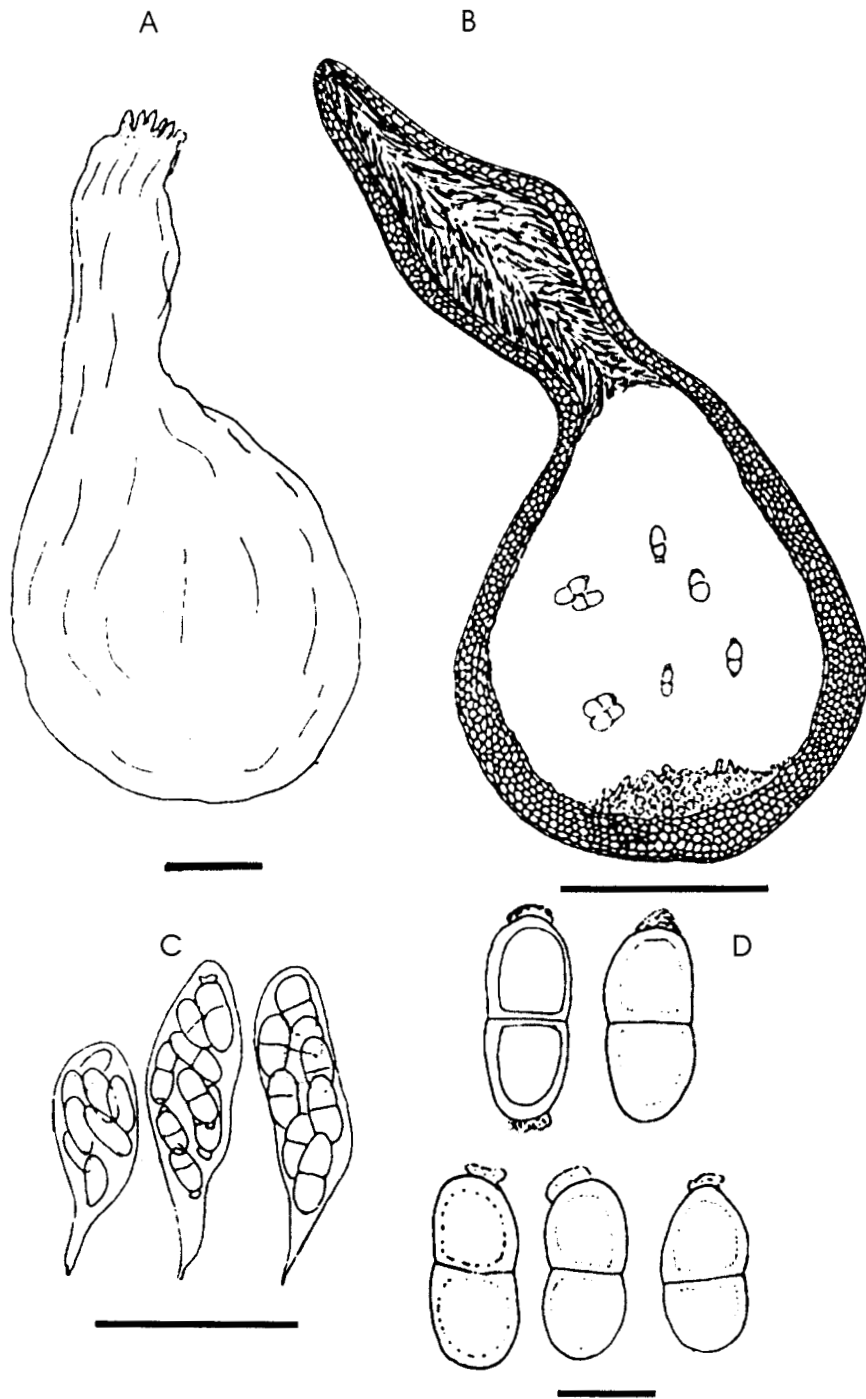


Fig-30 : *Halosarpheia viscosa*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 100µm., C. Asci, bar 50µm., D. Ascospores, bar 10µm.

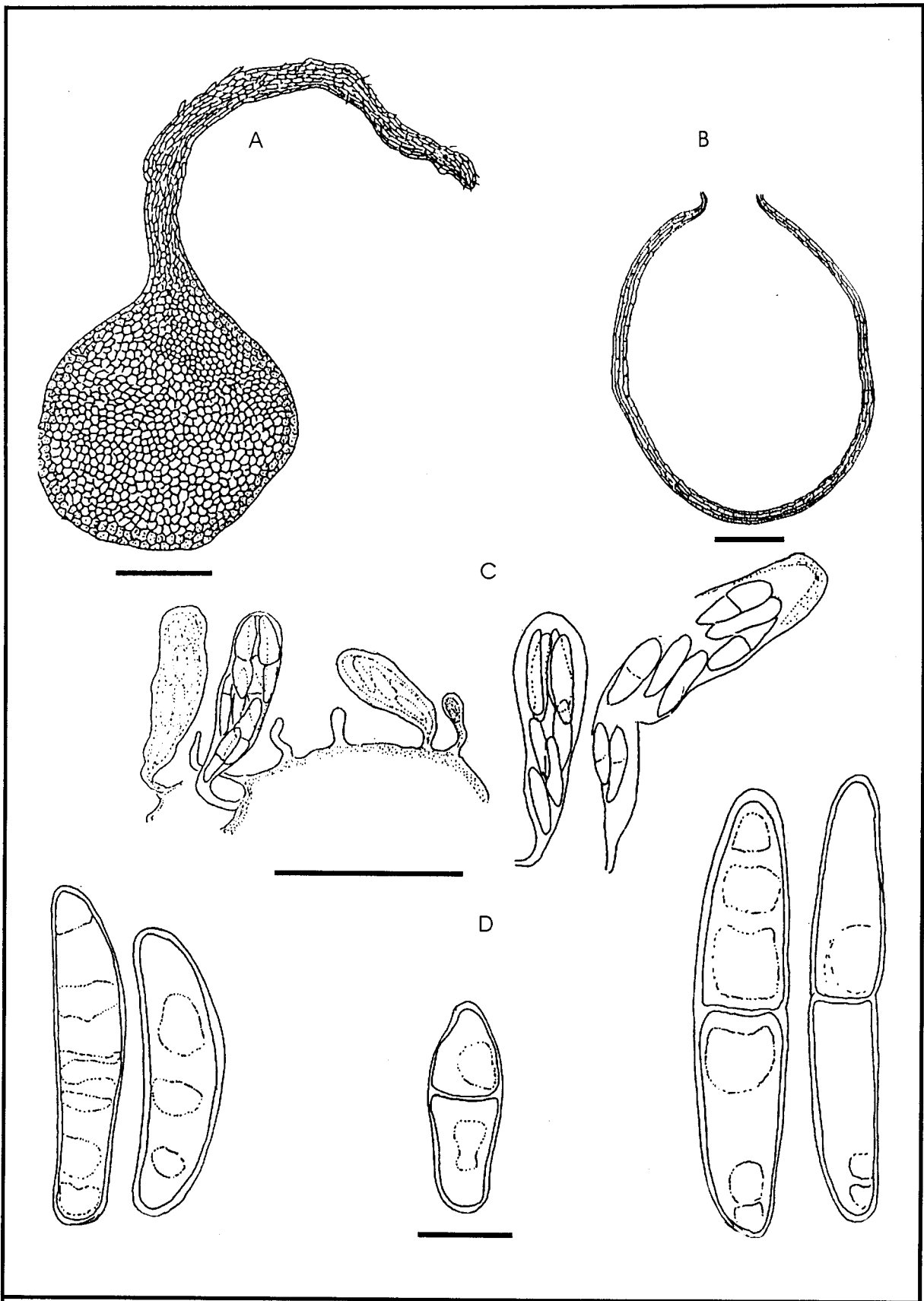


Fig-31 : *Halosphaeria cucullata*. A. Ascoma, bar 100µm., B. Ascoma (Venter portion) v.s., bar 50µm., C. Different stages of developments of asci, bar 50µm., D. Ascospores, bar 10µm.

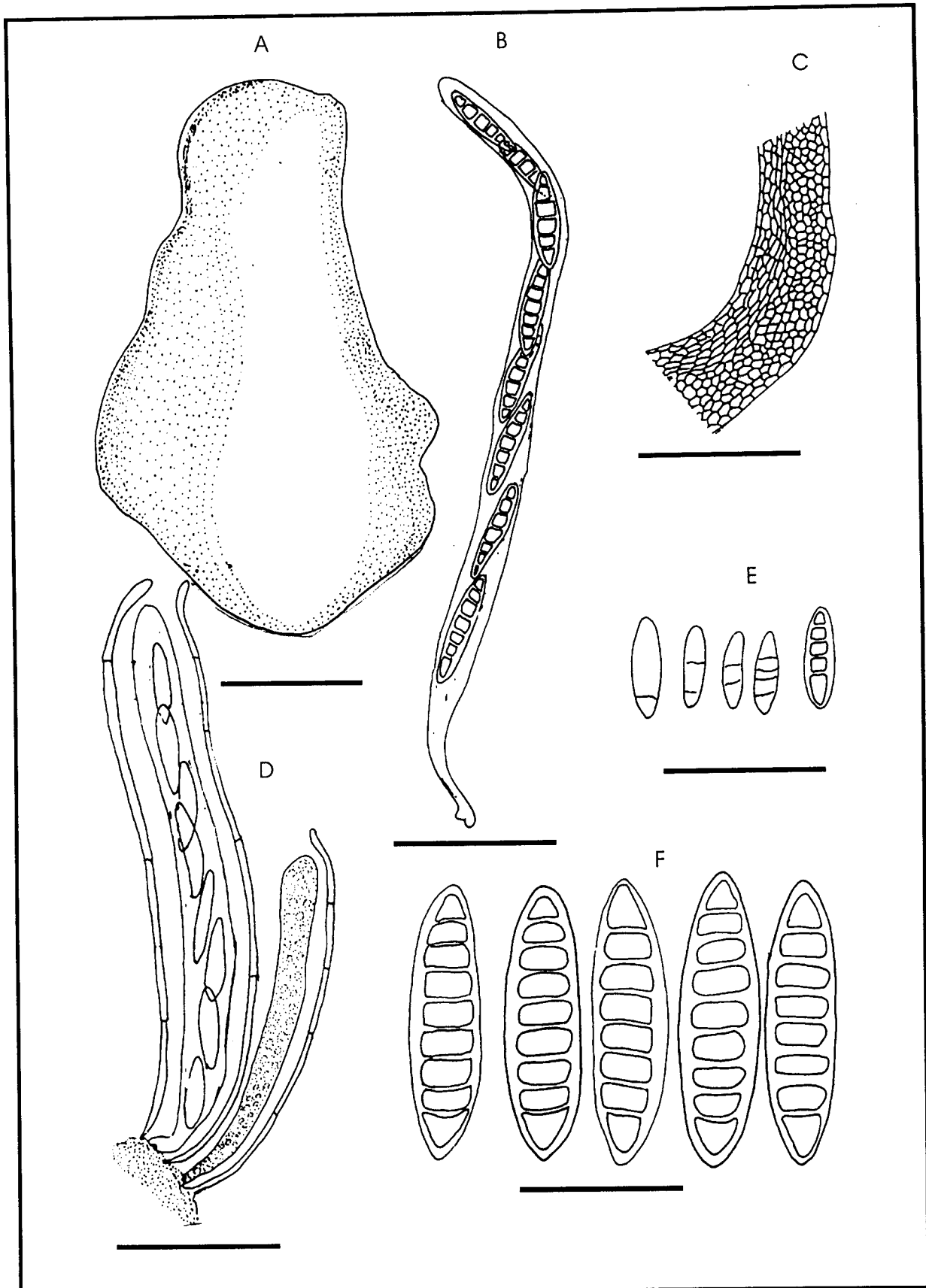


Fig - 33 : *Koralionastes* sp. A. Ascoma, bar 100 $\mu$ m., B. Ascus, bar 50 $\mu$ m., C. A portion of peridium, bar 50 $\mu$ m., D. Young asci & paraphyses, bar 50 $\mu$ m., E. Stages of development of ascospores bar 50 $\mu$ m., F. Ascospores, bar 10 $\mu$ m.

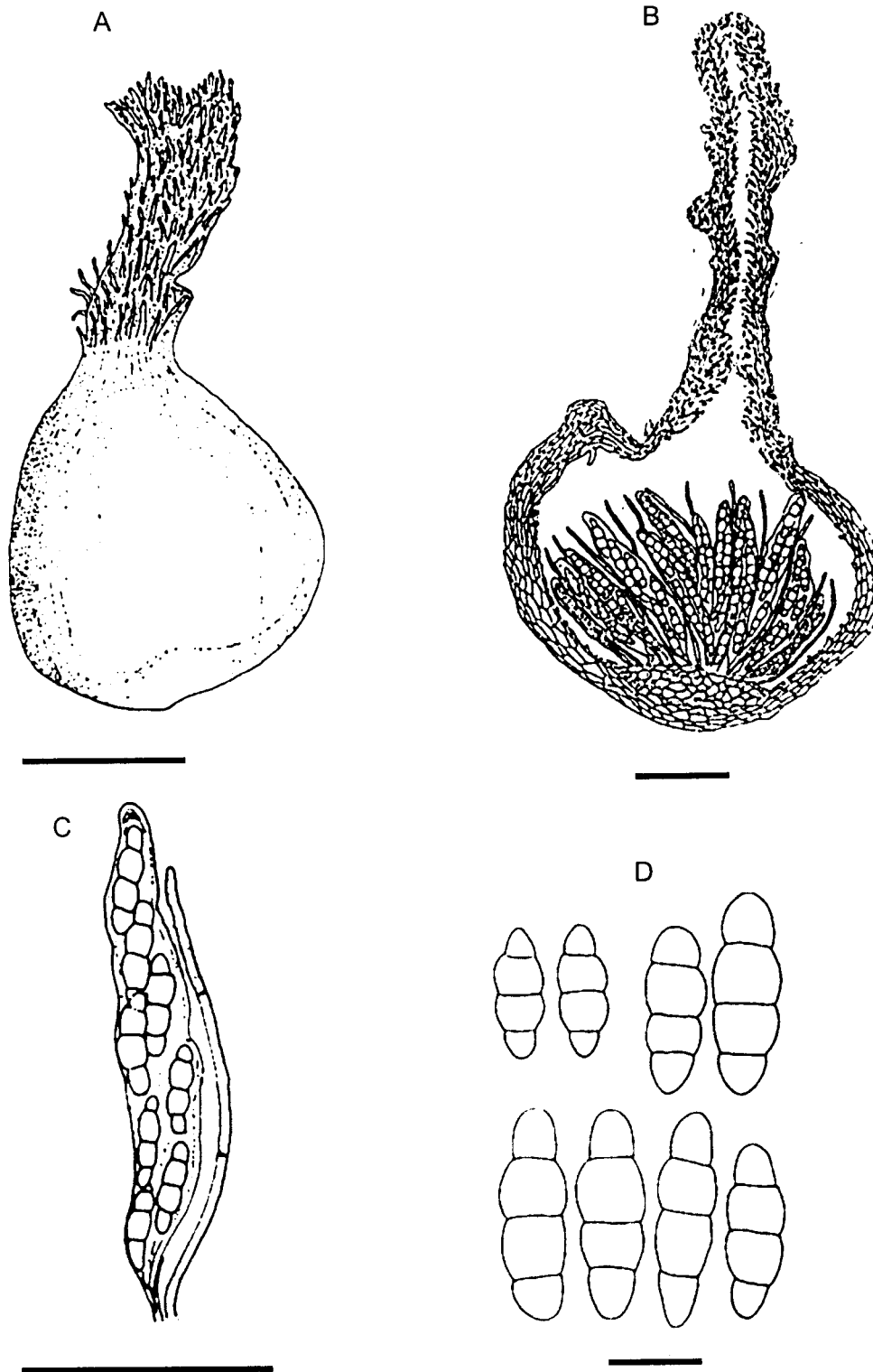


Fig -34: *Leptosphaeria australiensis*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 50µm., C. Ascus & Paraphysis, bar 50µm., D. Ascospores, bar 10µm.



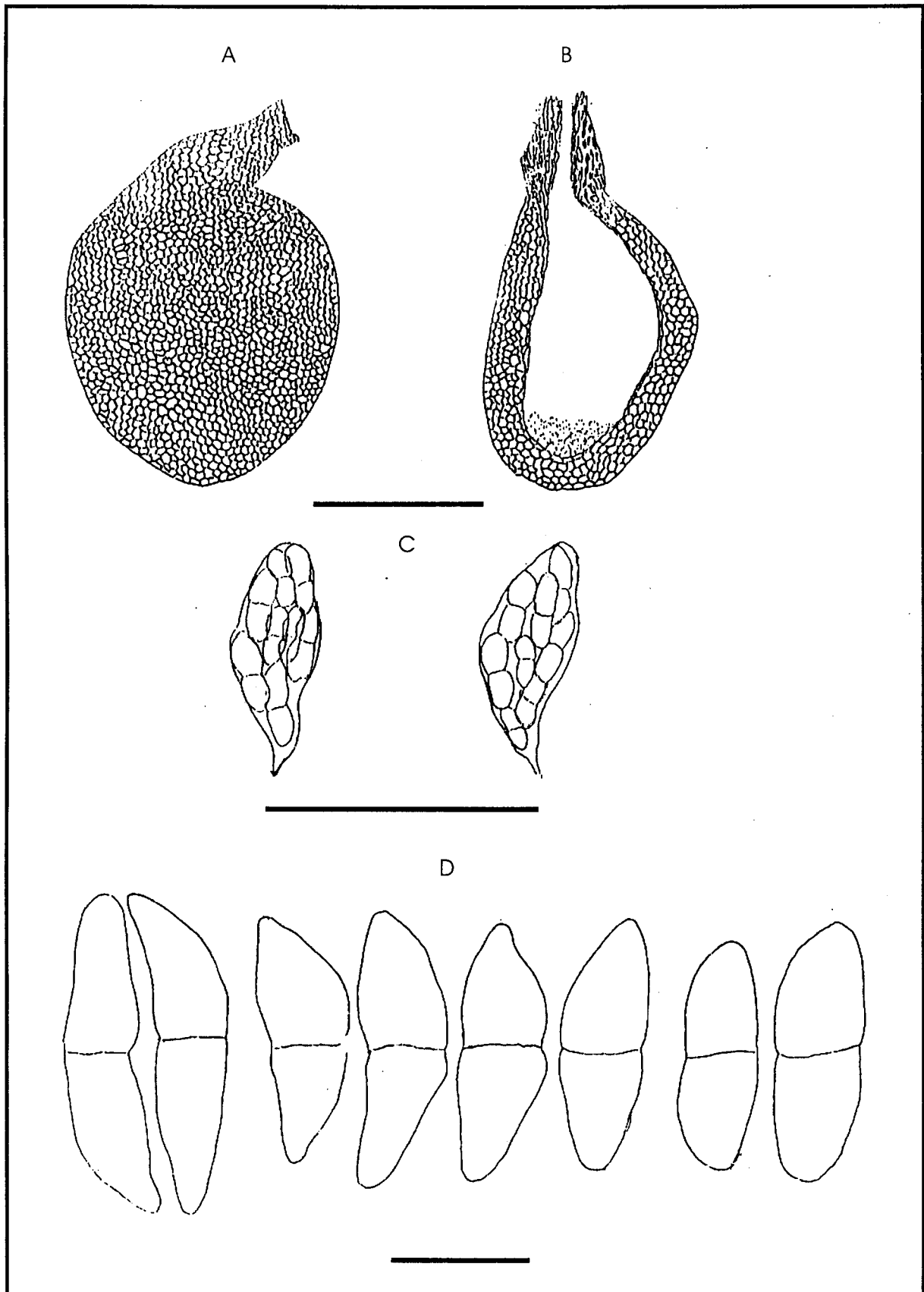


Fig - 35 : *Lignicola laevis*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Asci, bar 50 $\mu$ m., D. Ascospores, bar 10 $\mu$ m.

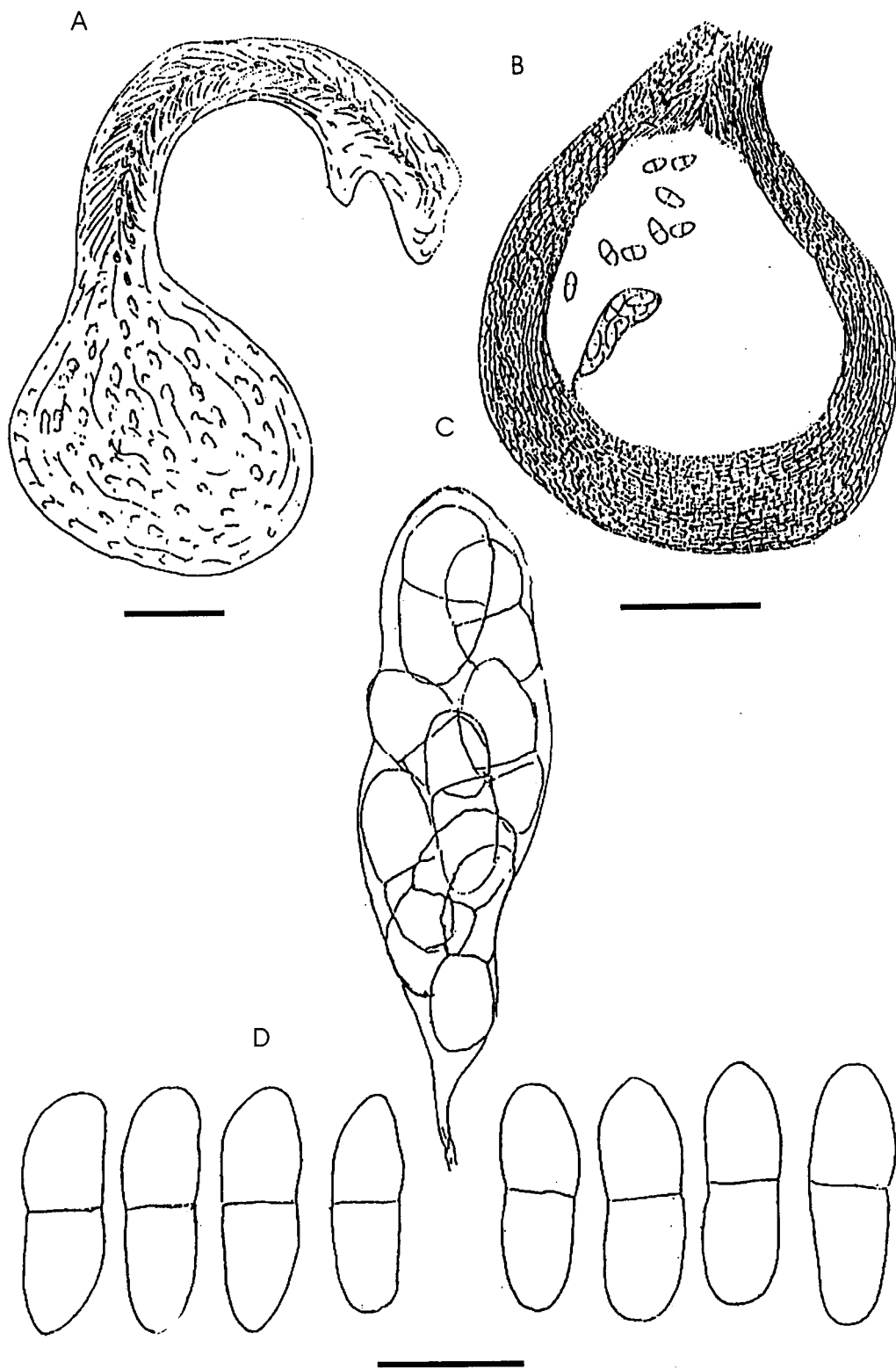


Fig-36 : *Lignicola longirostris*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Ascus, bar 50 $\mu$ m., D. Ascospores, bar 10 $\mu$ m.

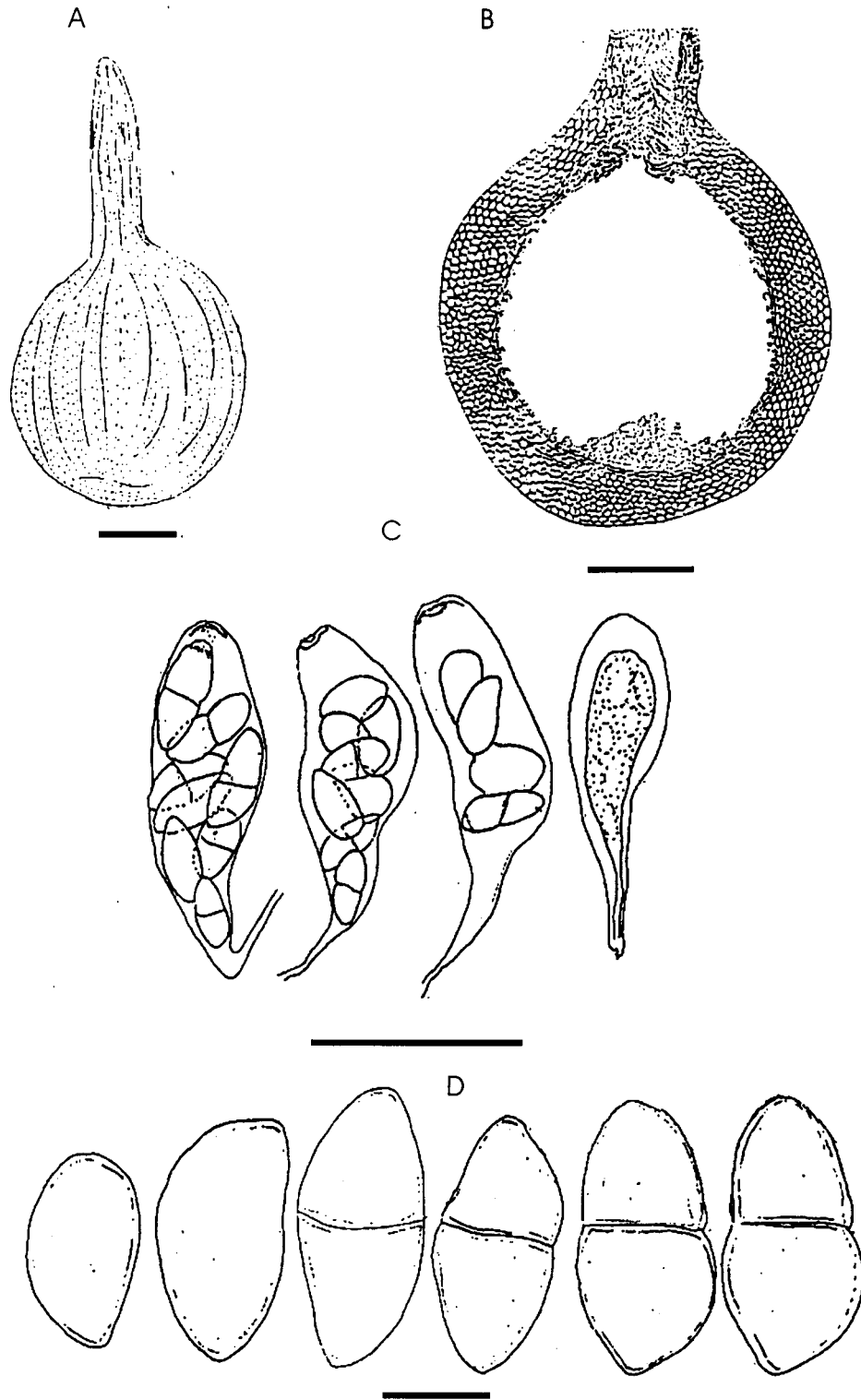


Fig-37 : *Lignicola tropica*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Asci (different stages), bar 50 $\mu$ m., D. Ascospores, bar 10 $\mu$ m.

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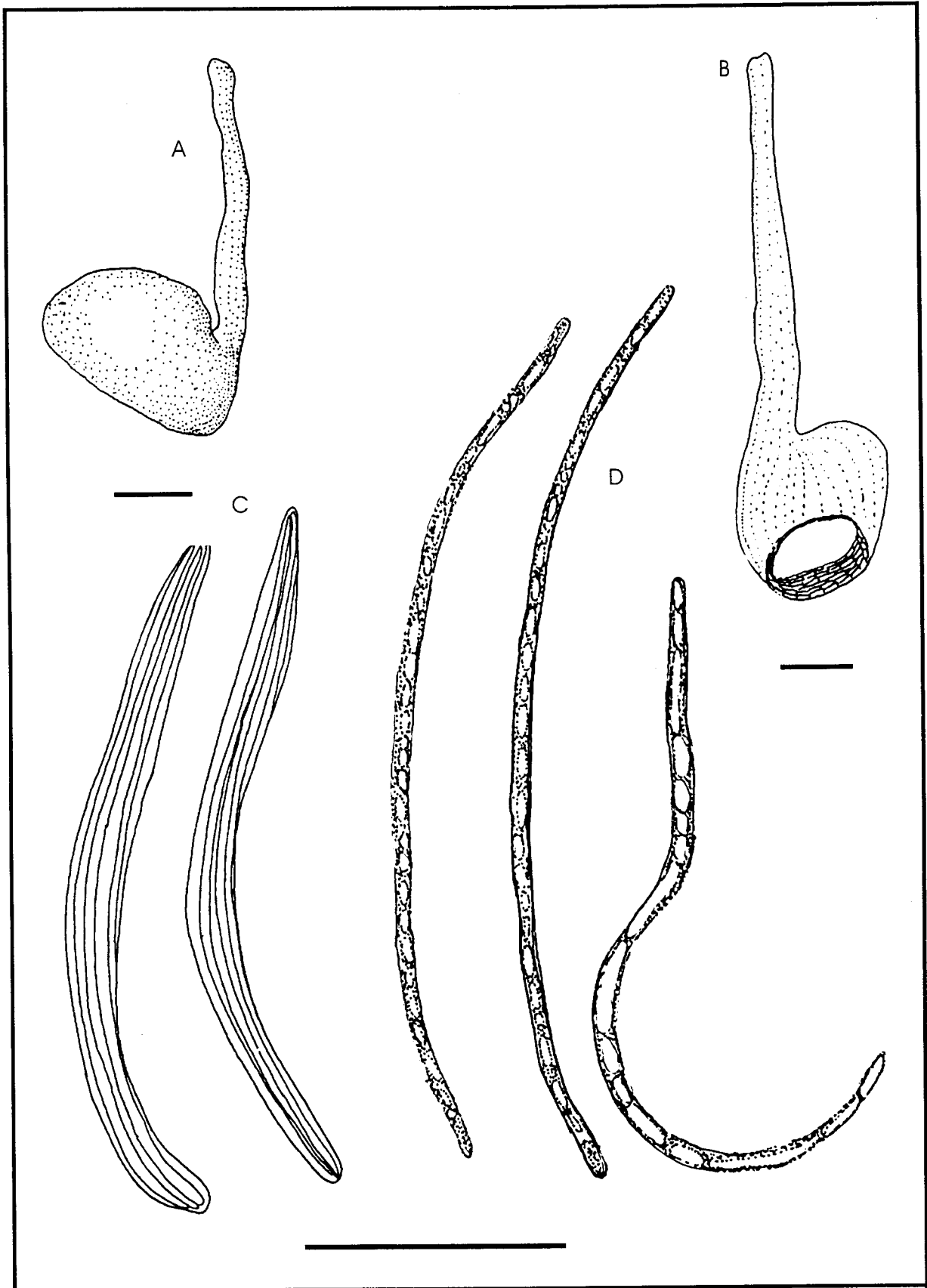


Fig -38: *Lindra hawaiiensis*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s. (a portion only), bar 100 $\mu$ m., C. Asci, bar 50 $\mu$ m., D. Ascospores, bar 50 $\mu$ m.

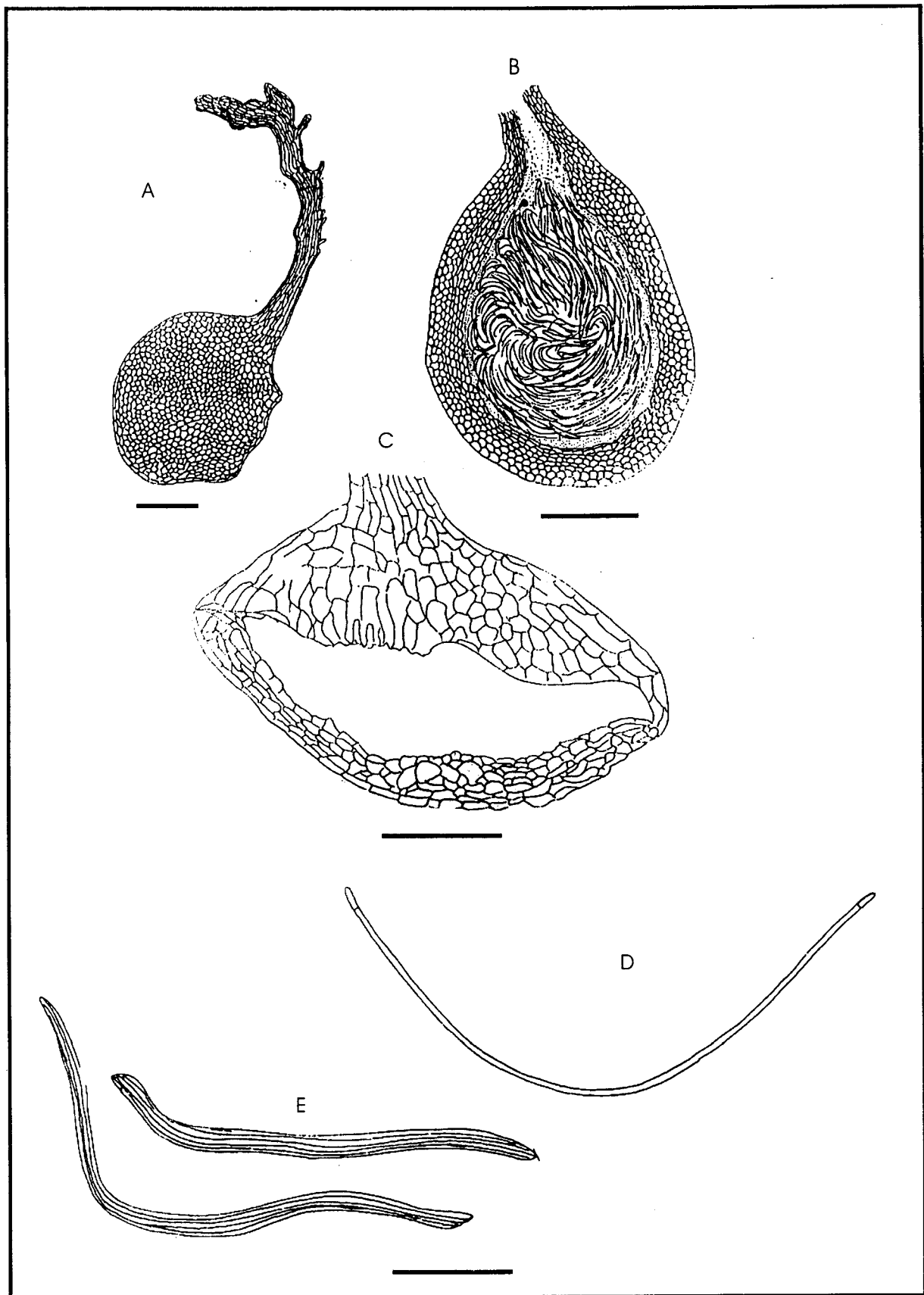


Fig-39 : *Lulworthia grandispora*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s. (venter), bar 100 $\mu$ m., C. Ascoma c.s. showing peridial wall, bar 50 $\mu$ m., D. Ascospore, bar 100 $\mu$ m., E. Asci, bar 100 $\mu$ m.

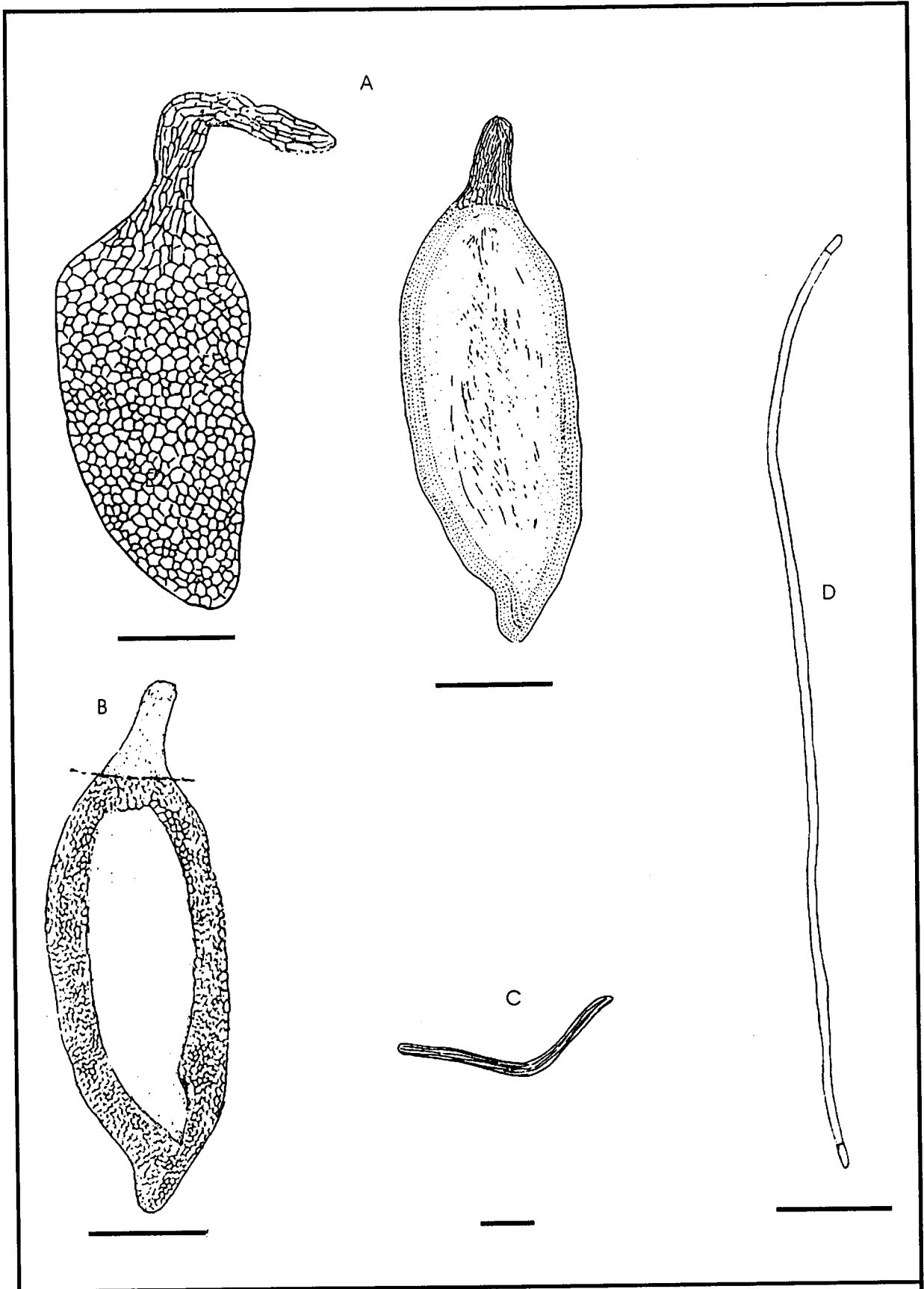


Fig - 40 : *Lulworthia* sp. I. A. Ascomata, bar 100 $\mu$ m., B. Ascoma v.s, bar 100 $\mu$ m., C. Ascus, bar 100 $\mu$ m., D. Ascospore, bar 50 $\mu$ m.

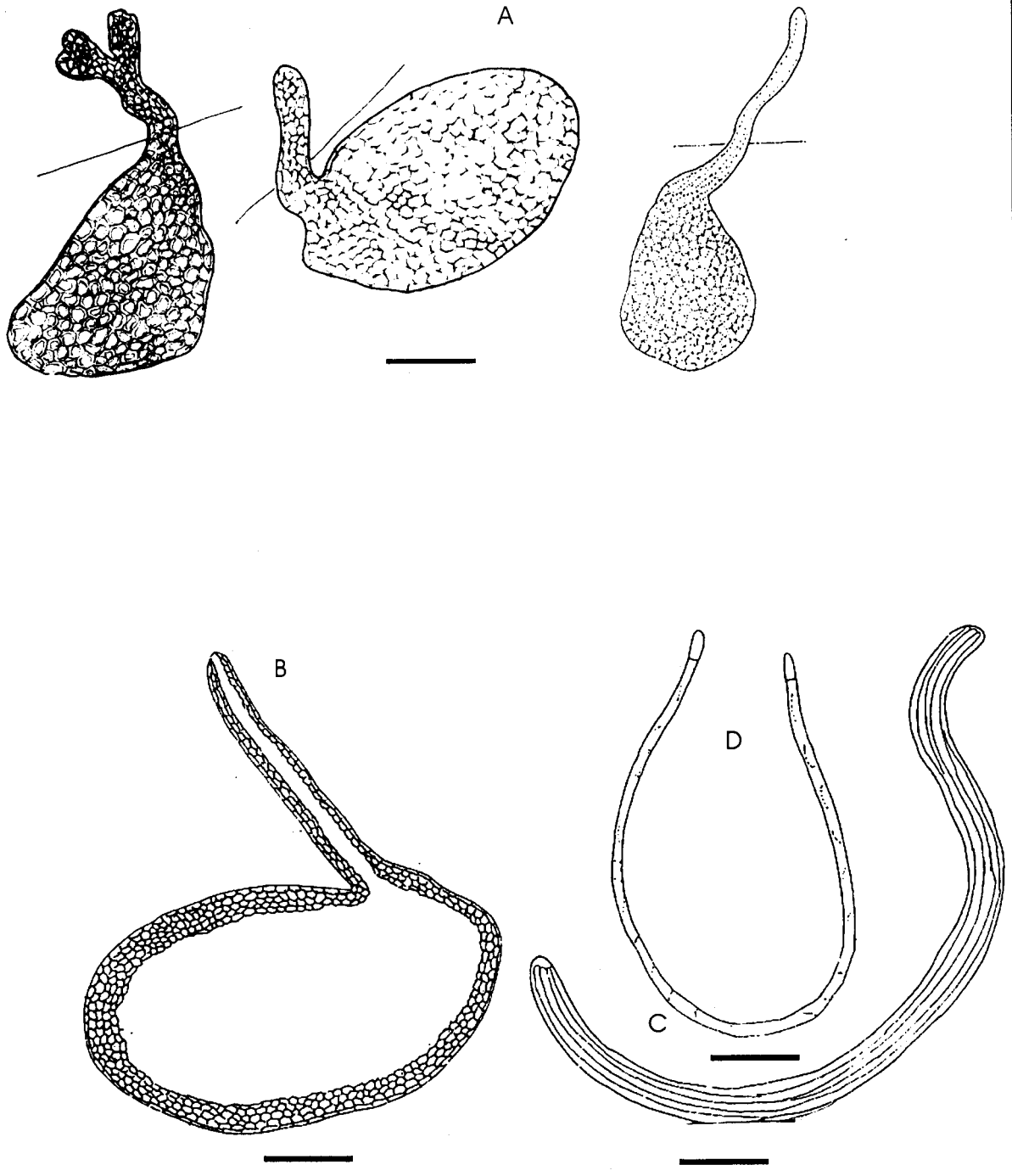


Fig-41 : *Lulworthia* sp. II. A2. Ascomata, bar100µm., B. Ascoma v.s., Bar 100µm., C. Ascus, bar 50µm., D. Ascospore, bar 50µm.

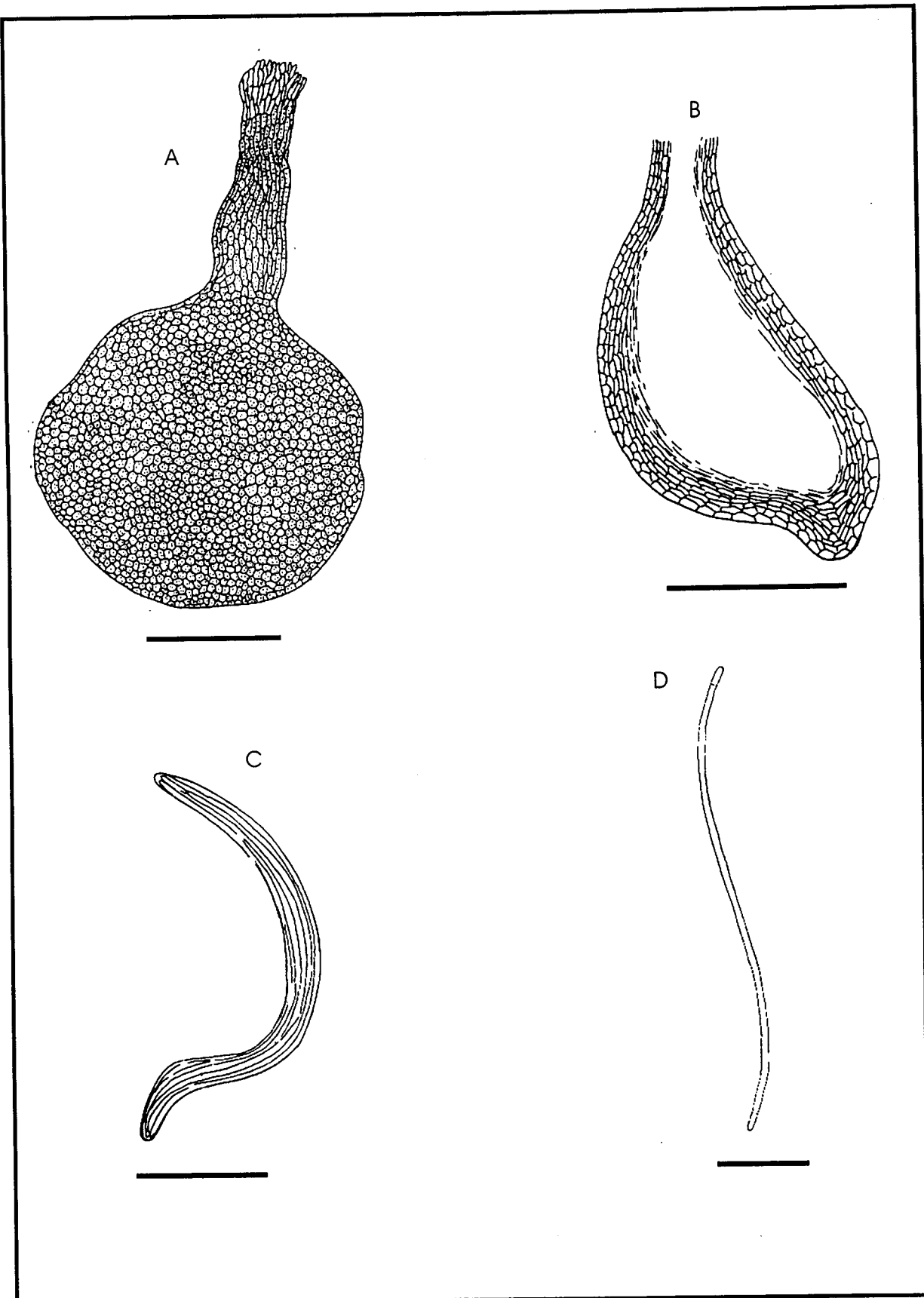


Fig-42 : *Lulworthia* sp. III. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Ascus, bar 50 $\mu$ m., D. Ascospore, bar 50 $\mu$ m.



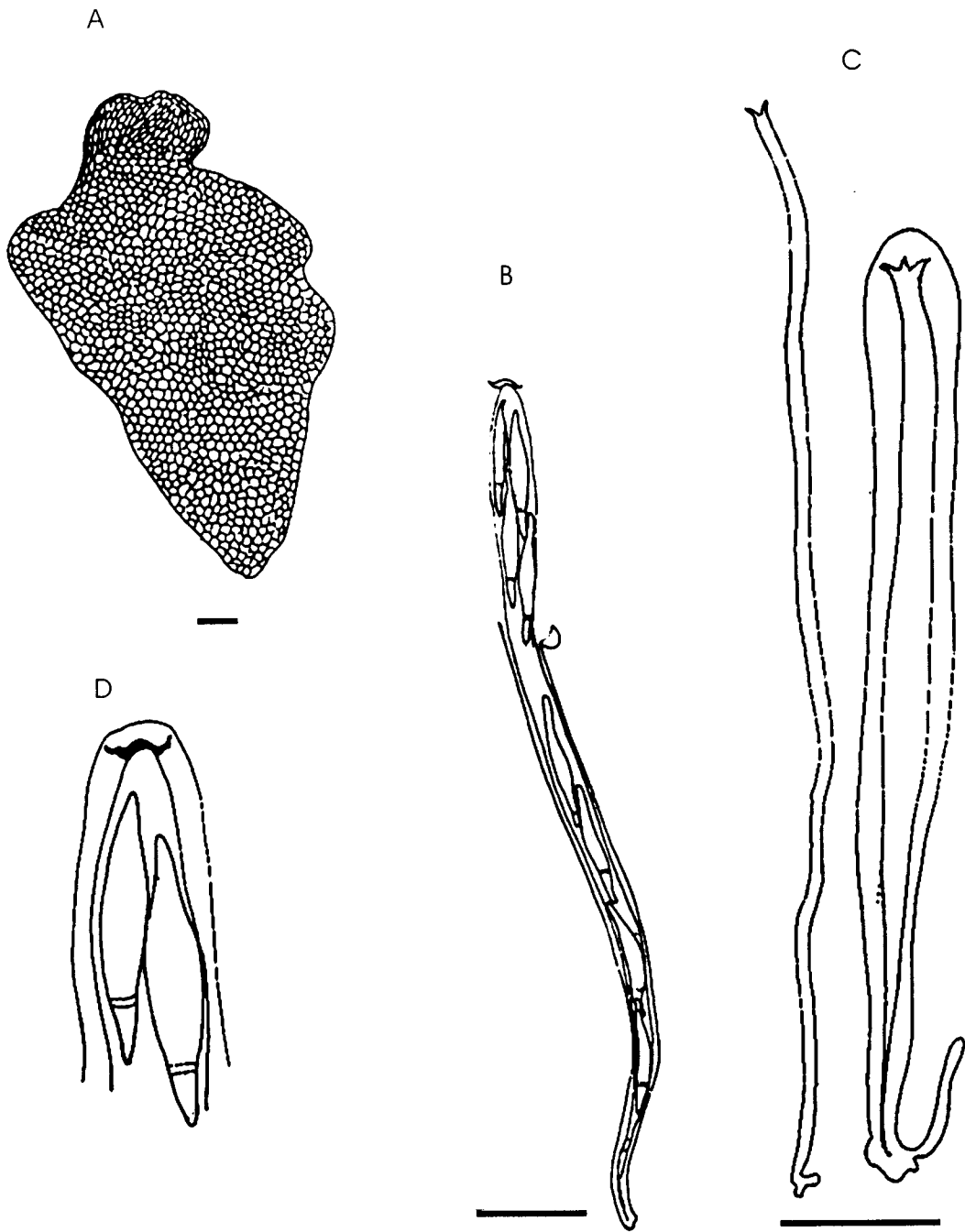


Fig-43 : *Manglicola* sp. A. Ascoma, bar 100 $\mu$ m., B. Ascus, bar 50 $\mu$ m., C. Paraphysis & empty ascus, bar 50 $\mu$ m., D. Tip of the ascus with two ascospores, bar 50 $\mu$ m.

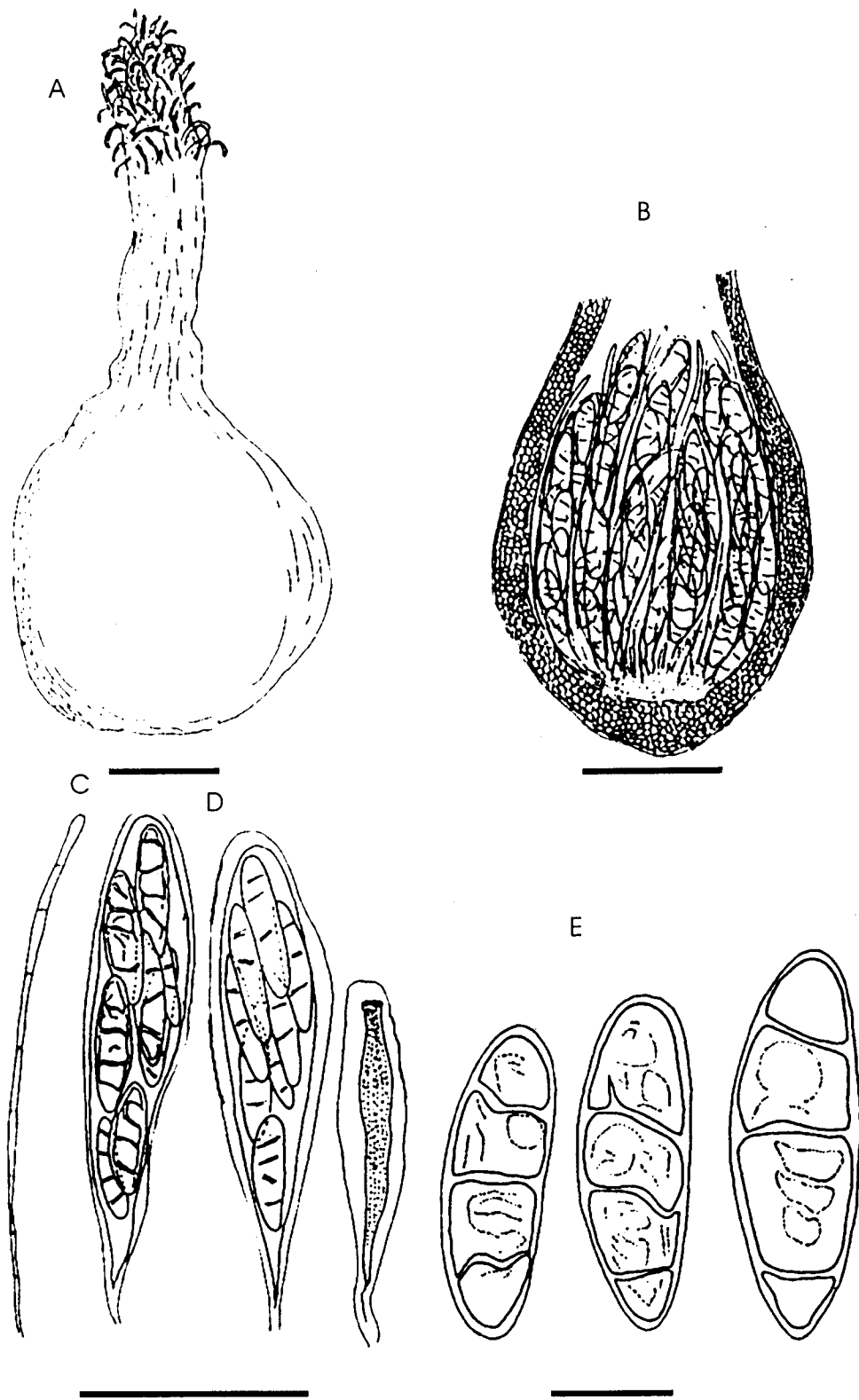


Fig-44 : *Marinosphaera mangrovei*. A. Ascoma, bar 100µm., B. Ascoma v.s. (venter part), bar 100µm., C. Paraphysis, D. Ascus with mature ascospores, bar 50µm., E. Ascospores 10µm.

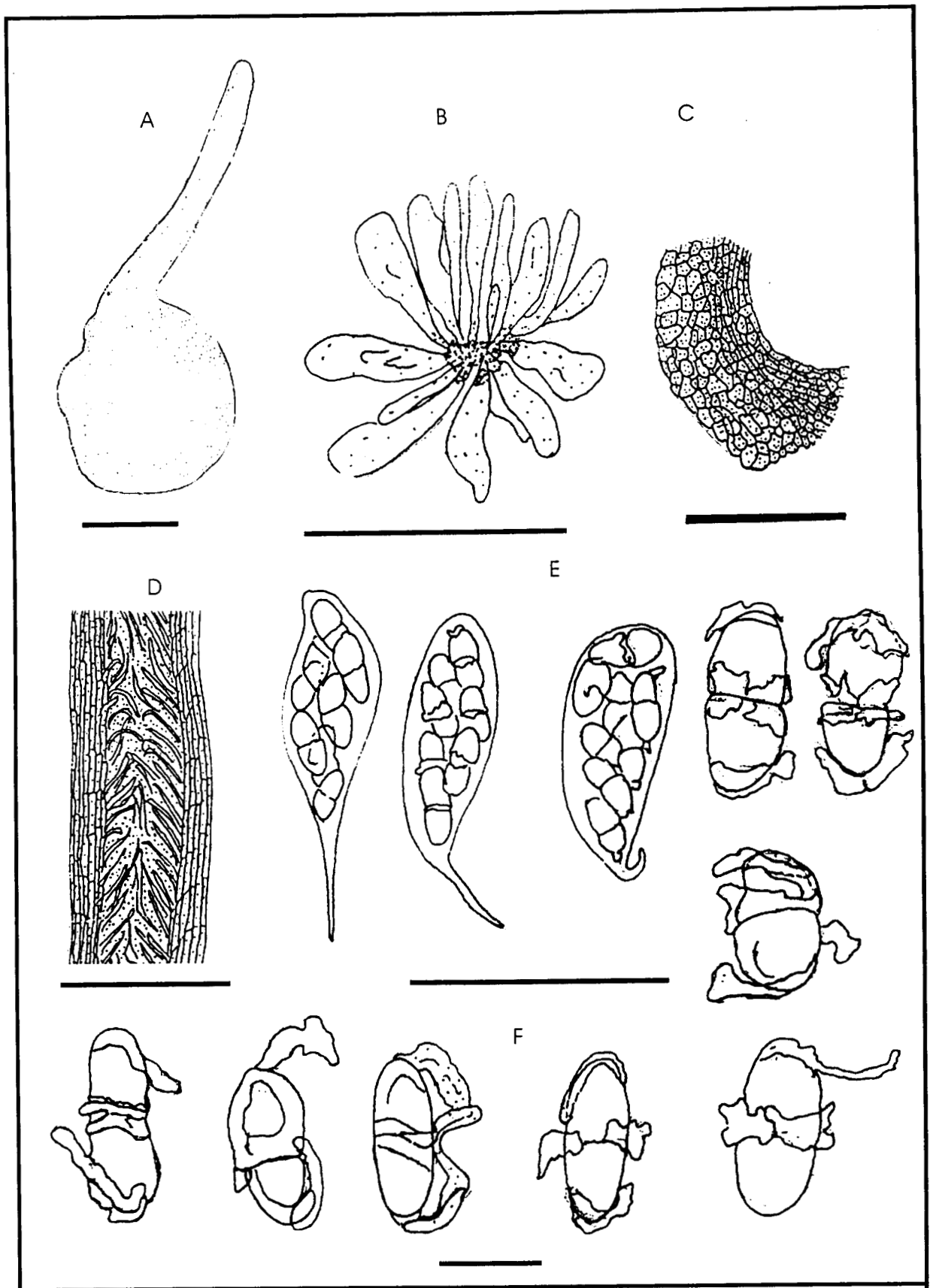


Fig-45 : *Ocostaspora apilongissima*. A. Ascoma, bar 100 $\mu$ m., B. Cluster of immature asci, bar 50 $\mu$ m., C. Part of the peridium of ascoma v.s., bar 50 $\mu$ m., D. A part of the neck L.S., bar 50 $\mu$ m., E. Asci of different stages, bar 50 $\mu$ m., F. Ascospores, bar 10 $\mu$ m.

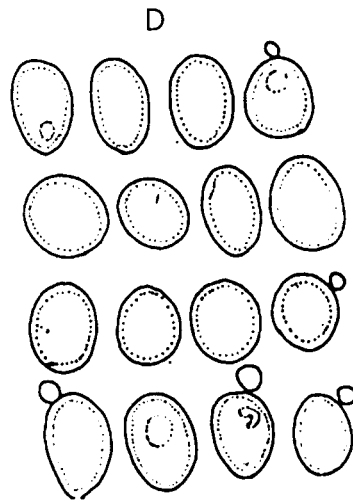
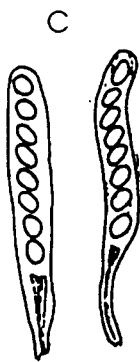
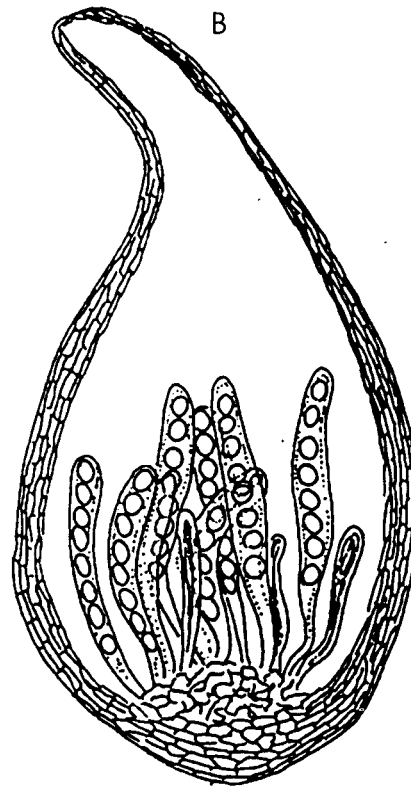
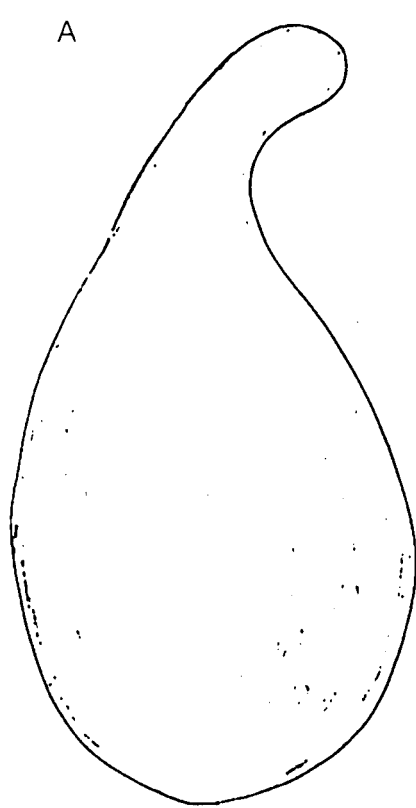


Fig - 46 : *Payosphaeria minuta*. A. Ascoma, bar 50 $\mu$ m., B. Ascoma v.s., bar 50 $\mu$ m., C. Asci, bar 50 $\mu$ m., D. Ascospores, bar 10 $\mu$ m.

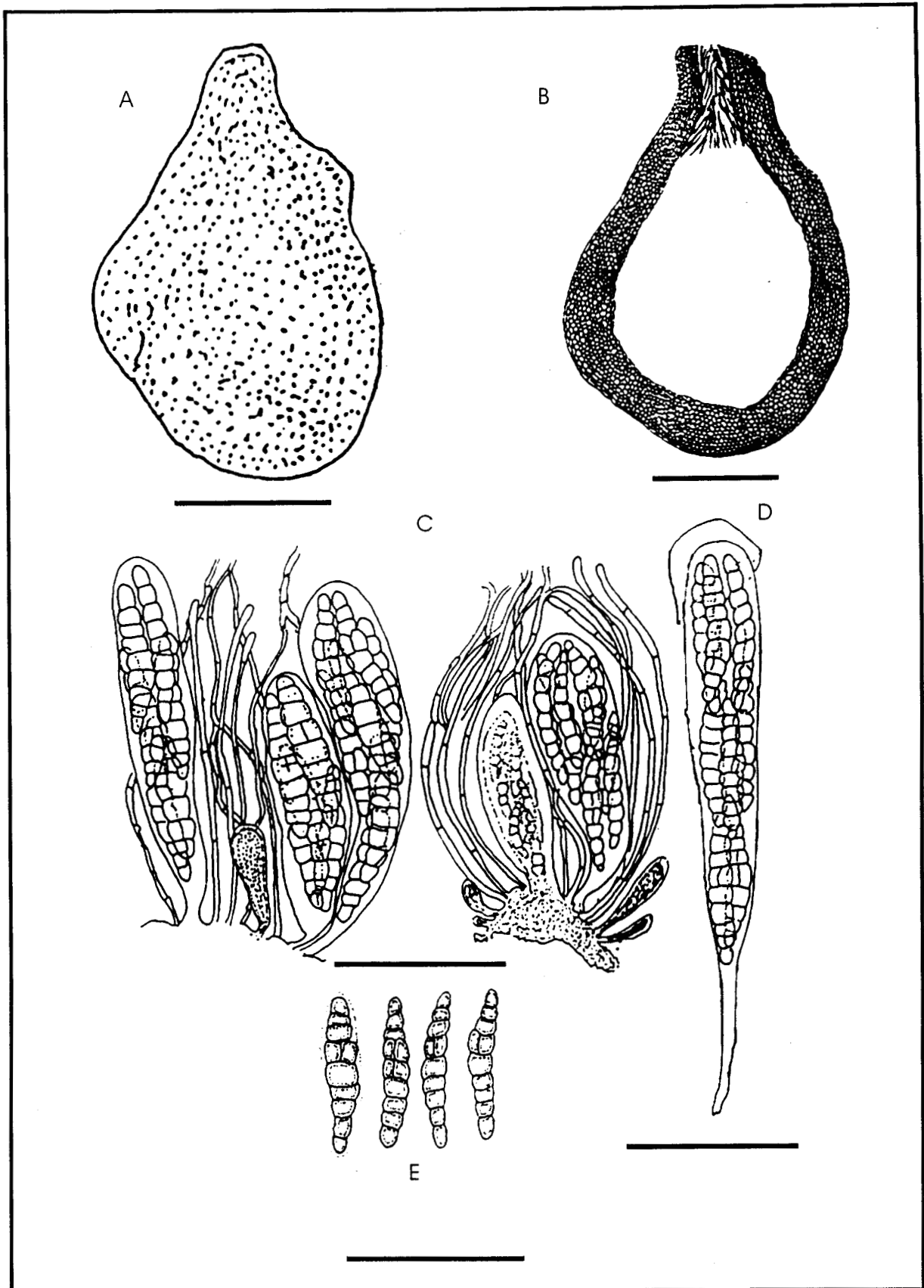


Fig - 47 : *Pleospora pelagica*. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 100µm., C. Asci & Pseudoparaphyses, bar 50µm. D. Mature ascus, bar 50µm., E. Ascospores, bar 50µm.

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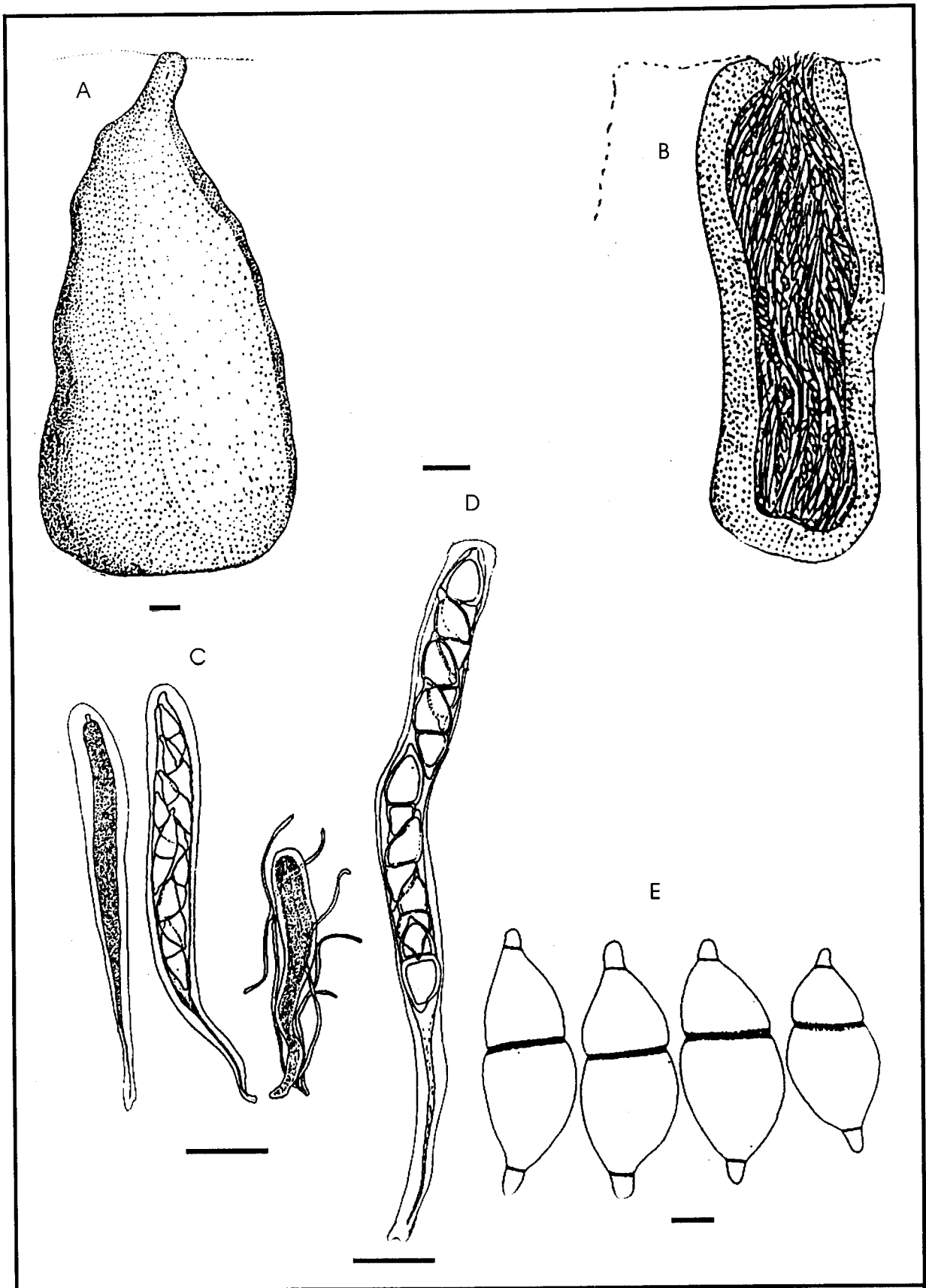


Fig-48 : *Salsuginea ramicola*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Young asci with paraphyses, bar 50 $\mu$ m, D. Mature ascus, bar 50 $\mu$ m., E. Ascospores, bar 10 $\mu$ m.

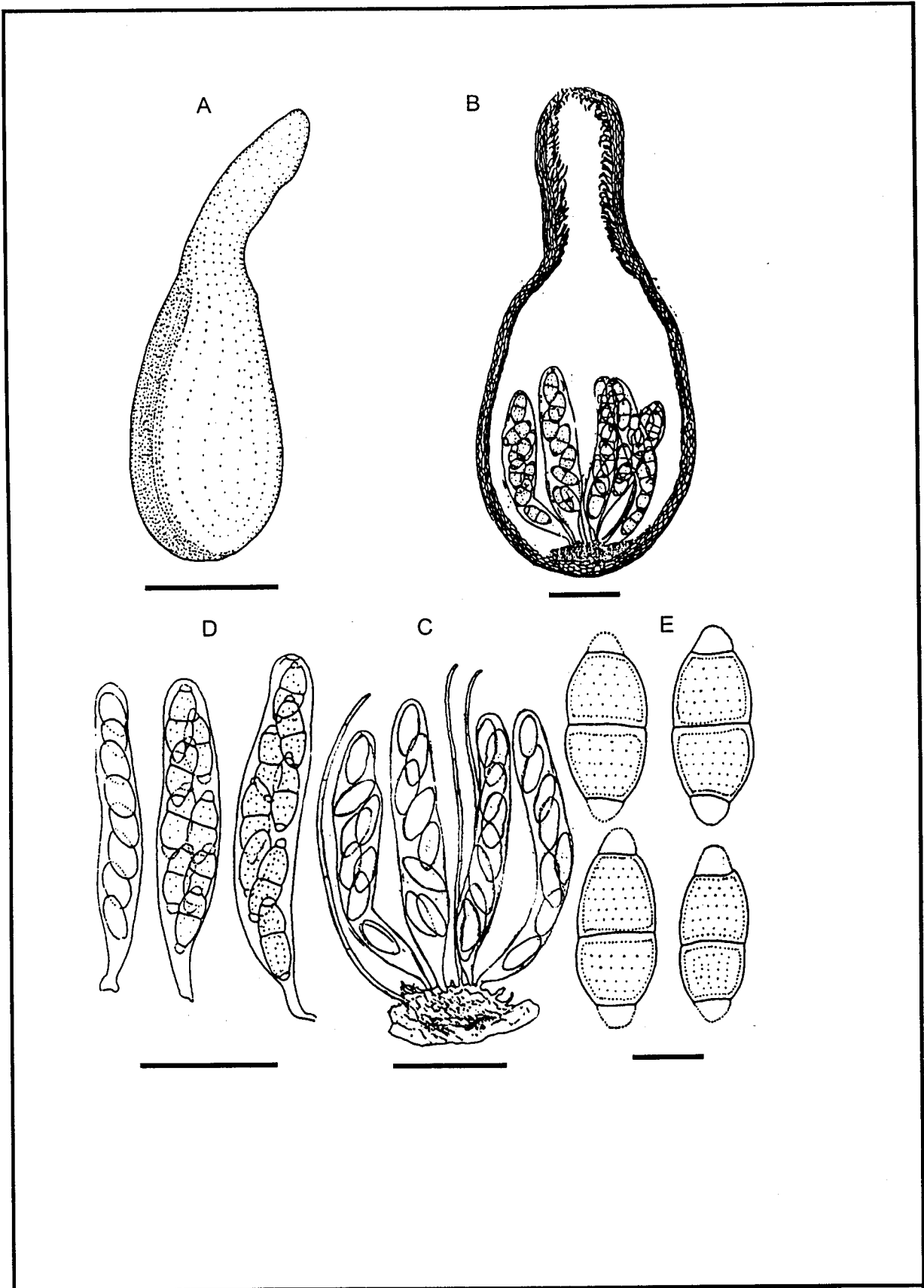


Fig - 49 : *Savoryella lignicola*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Young asci & paraphyses, bar 50 $\mu$ m., D. Stages of development of asci, bar 50 $\mu$ m., E. Ascospores, bar 10 $\mu$ m.

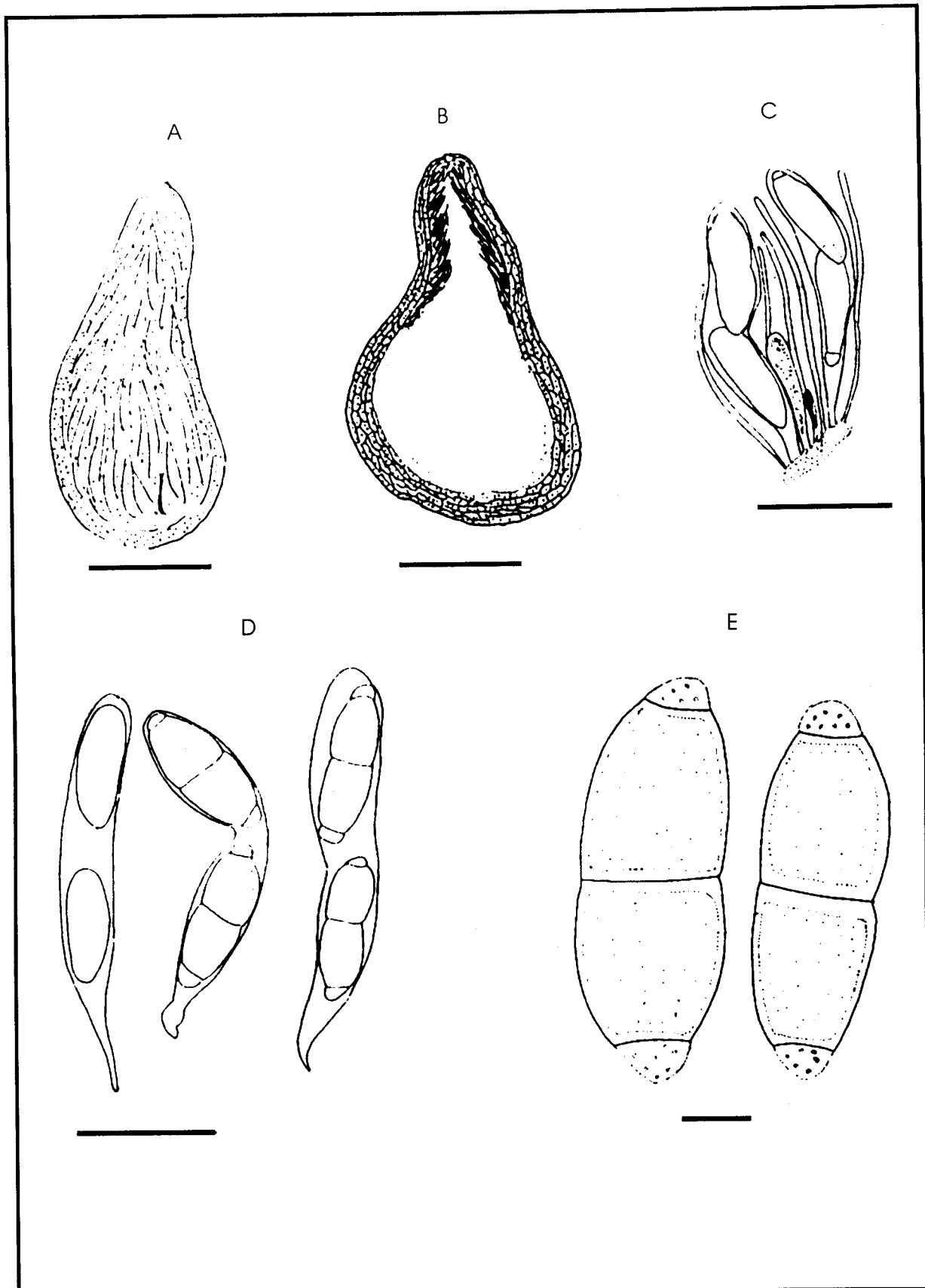


Fig - 50 : *Savoryella paucispora*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 50 $\mu$ m., C. Young asci & paraphyses, bar 50 $\mu$ m., D. Different stages of development of asci, bar 50 $\mu$ m., E. Ascospores, bar 10 $\mu$ m.



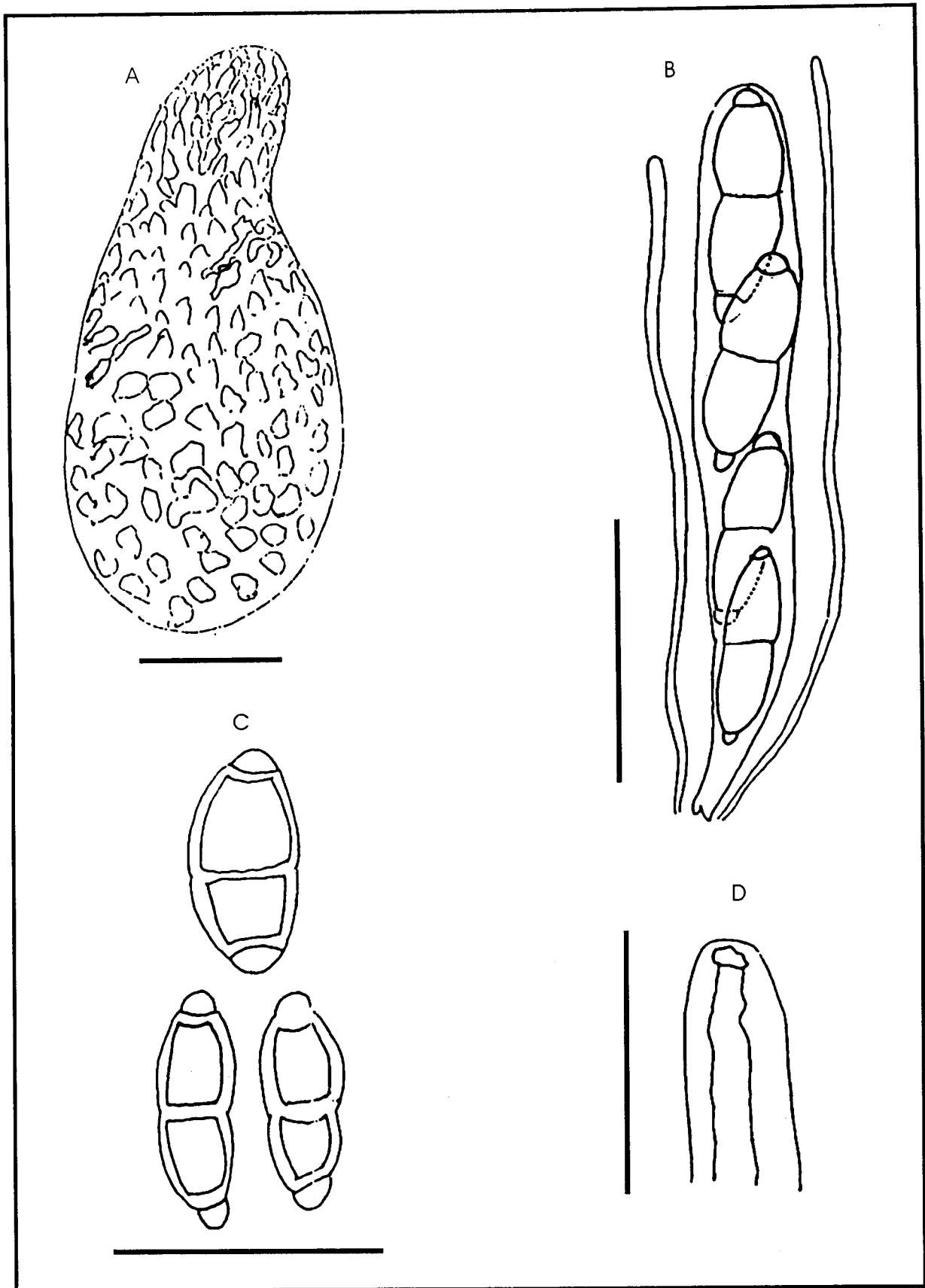


Fig-51 : *Savoryella* sp I. A. Ascoma, bar 50 $\mu$ m., B. Ascus & paraphyses, bar 50 $\mu$ m., C. Ascospores, bar 50 $\mu$ m., D. Tip of the ascus, bar 50 $\mu$ m.

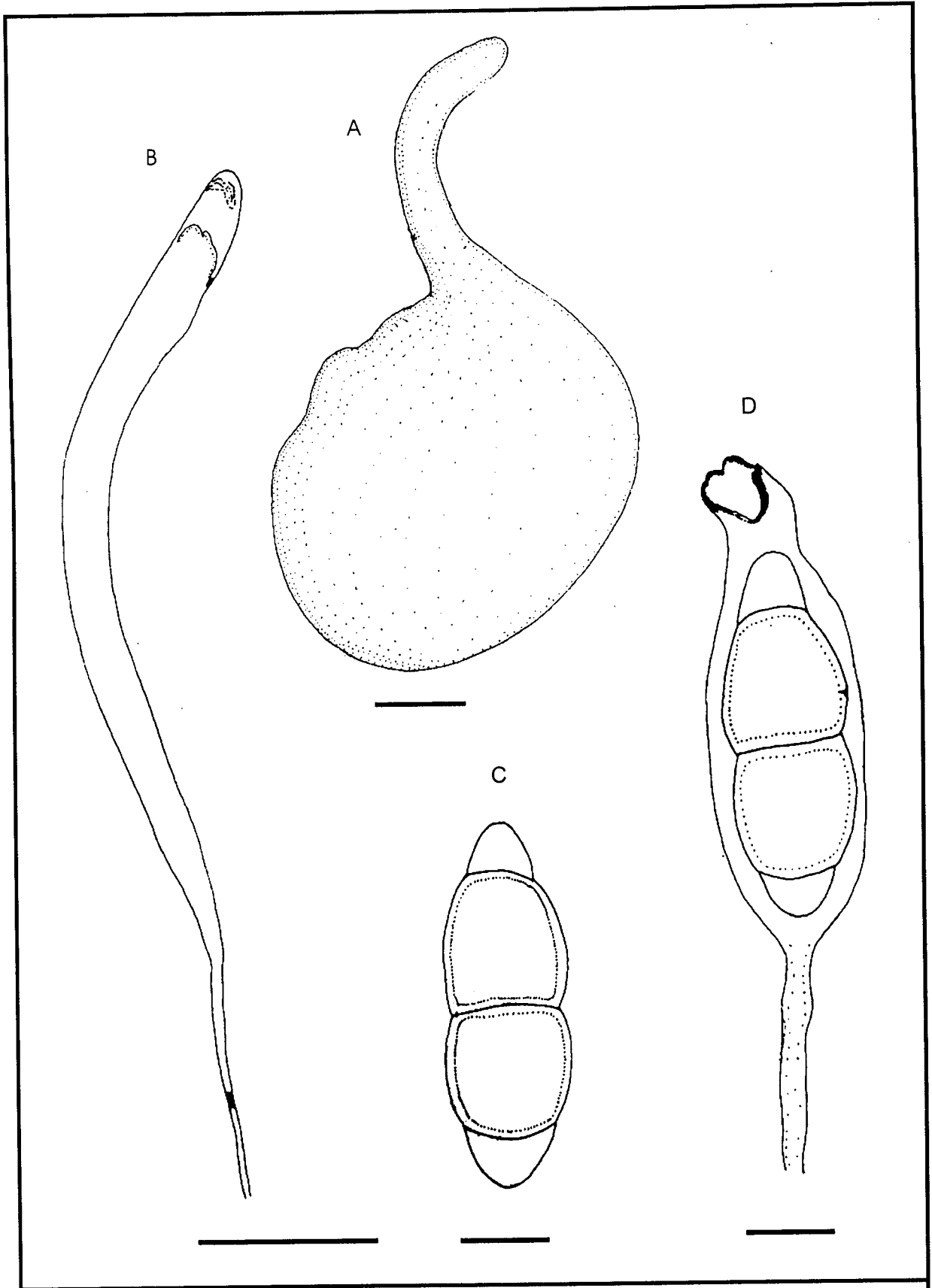
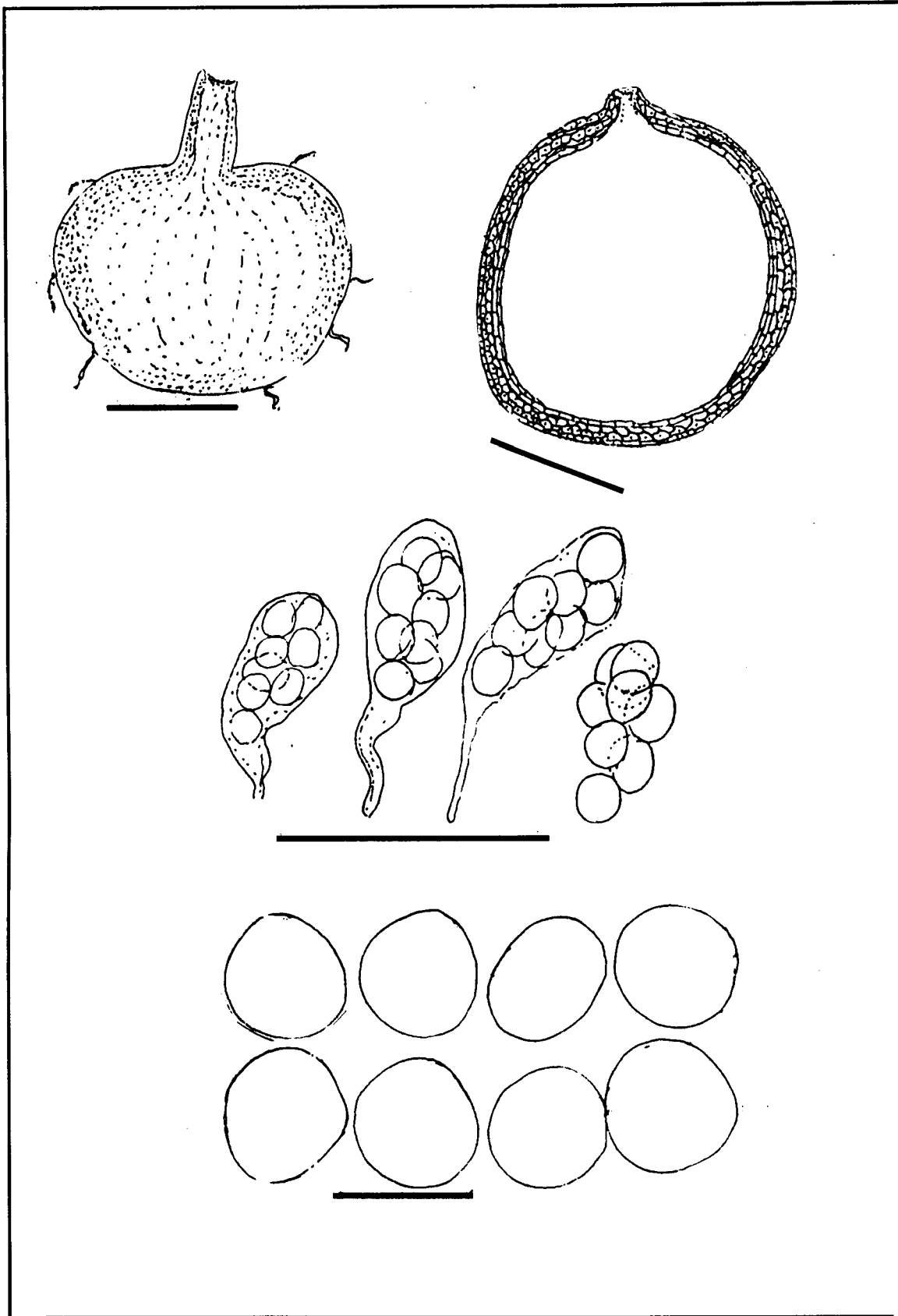


Fig - 52 : *Savoryella* sp. II. A. Ascoma, bar 100 $\mu$ m., B. Empty ascus, bar 50 $\mu$ m., C. Ascospore, bar 10 $\mu$ m., D. Ascus tip with ascospore, bar 10 $\mu$ m.



**Fig - 53 : Unidentified ascomycete 1. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 100µm, C. Asci – Different stage of development, bar 50µm.. D. Ascospores. bar 10µm**

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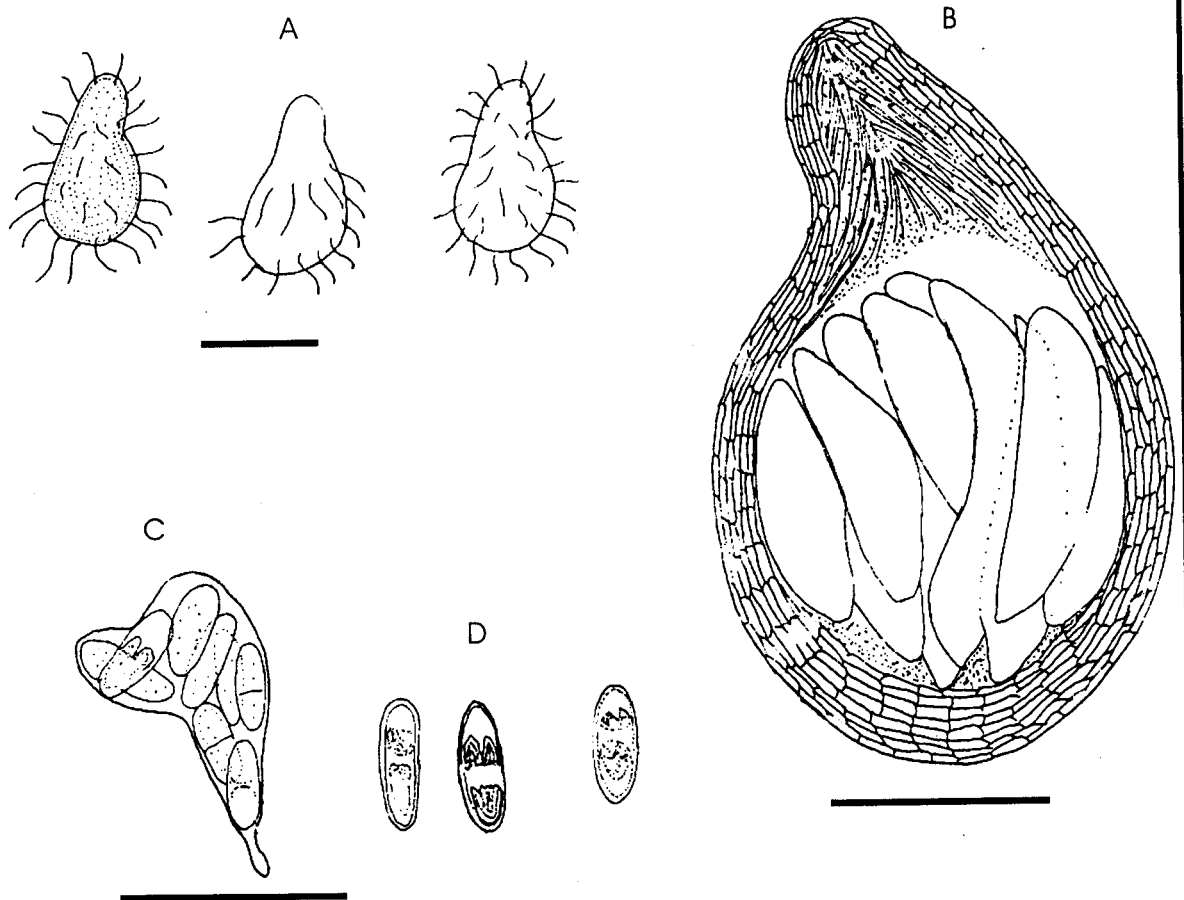


Fig-54 :Unidentified ascomycete II. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 50 $\mu$ m., C. Ascus, bar 50 $\mu$ m., D. Ascospores, bar 50 $\mu$ m.

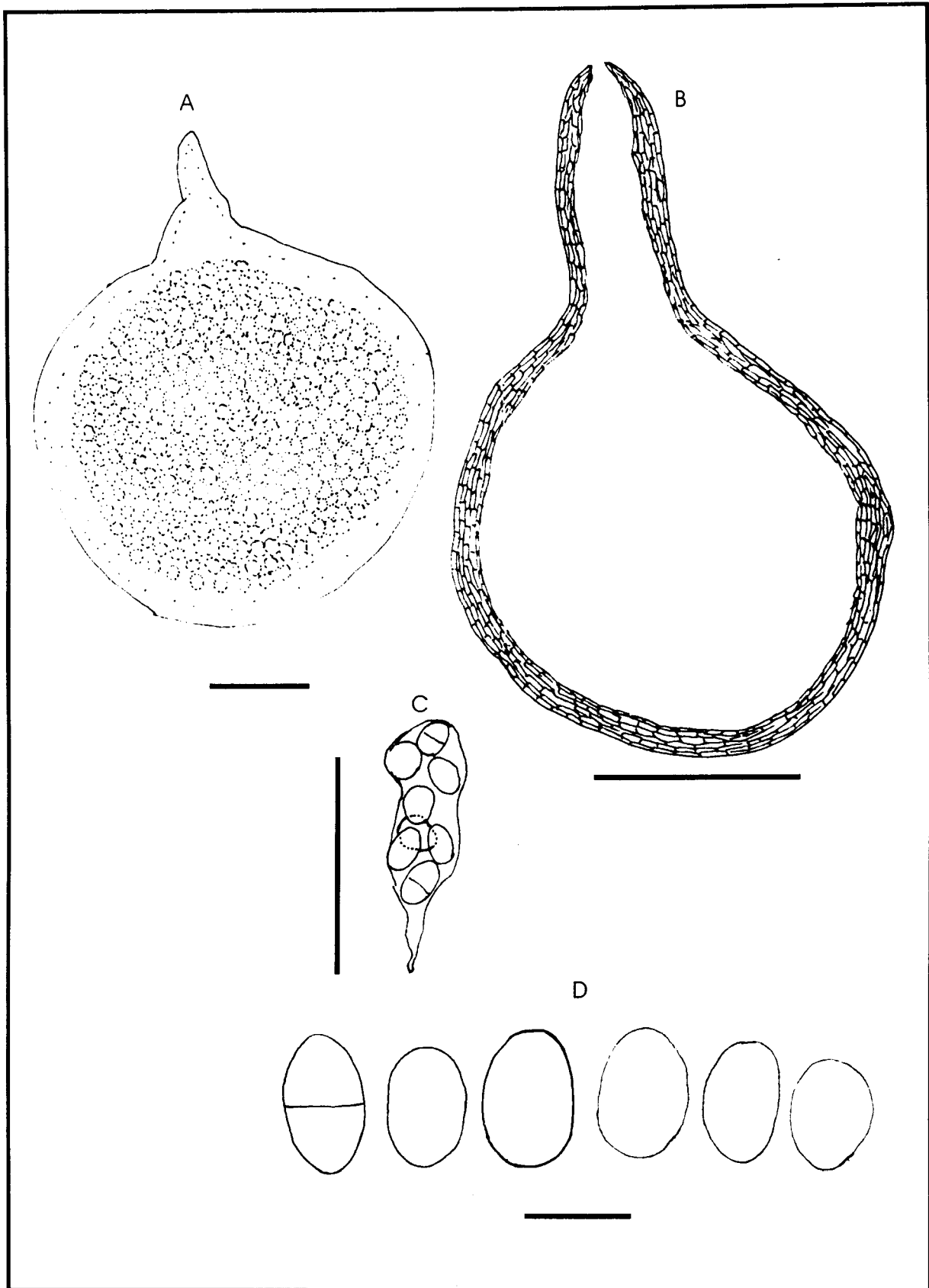


Fig-55 : Unidentified ascomycete III. A. Ascoma, bar100µm., B. Ascoma v.s., bar 100µm., C. Asci, bar 50µm., D. Ascospores different stages development, bar 10µm.

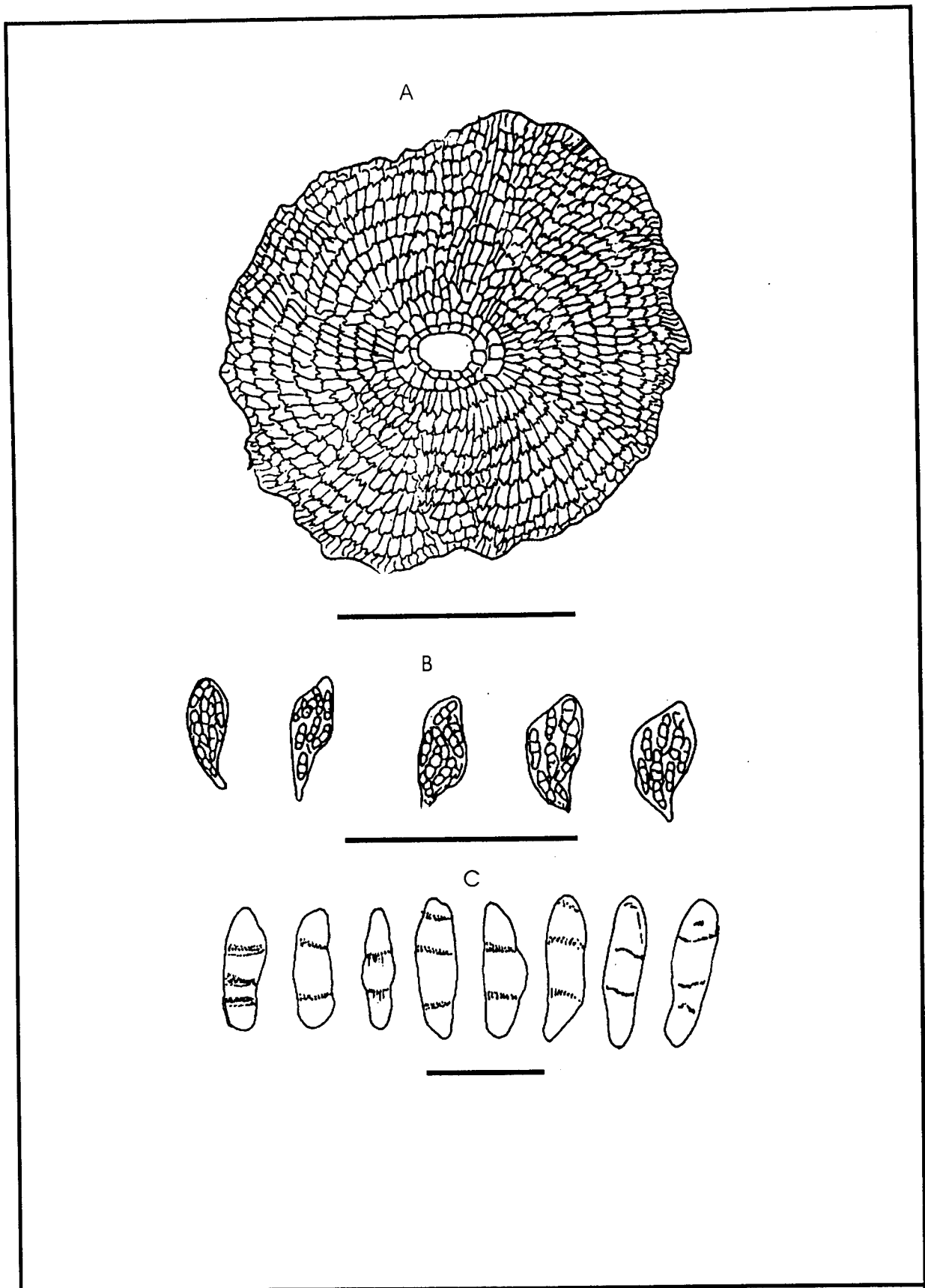


Fig - 56 : Unidentified ascomycete IV. A. Ascoma, bar 100µm., B. Different stages of development of Asci, bar 50µm., C. Ascospores, bar 10µm.

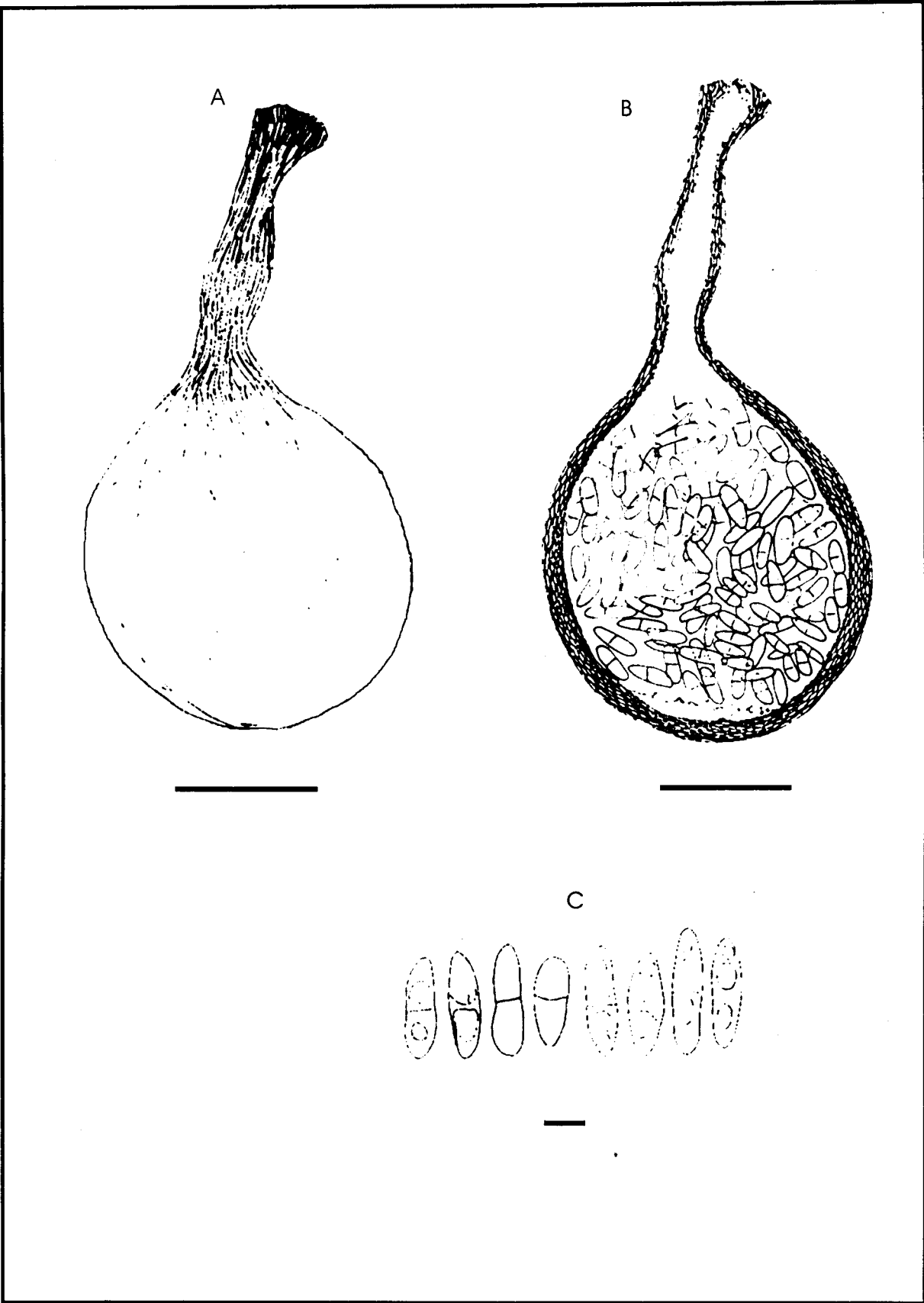


Fig-57 : Unidentified ascomycete V. A. Ascoma, bar 50 $\mu$ m., B. Ascoma v.s., bar 50 $\mu$ m., C. Ascospores, bar 10 $\mu$ m.

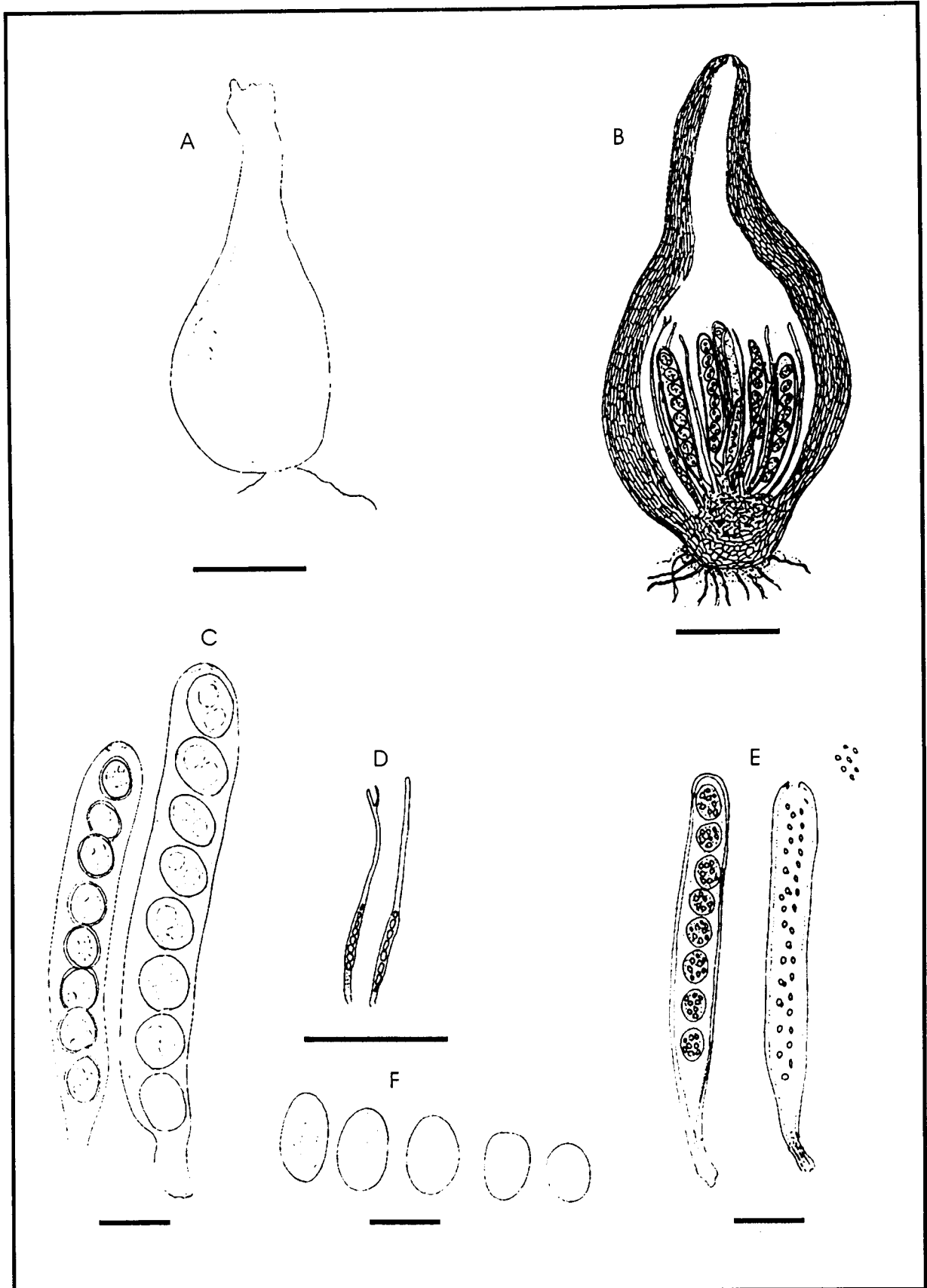


Fig-58 : Unidentified ascomycete VI. A. Ascoma, bar  $50\mu\text{m}$ ., B. Ascoma v.s., bar  $50\mu\text{m}$ ., C. Immature & mature Asci, bar  $10\mu\text{m}$ ., D. Paraphyses with branched & unbranched apices, bar  $50\mu\text{m}$ ., E. Formation & liberation of secondary spores, bar  $10\mu\text{m}$ ., F. Ascospores, bar  $10\mu\text{m}$ .



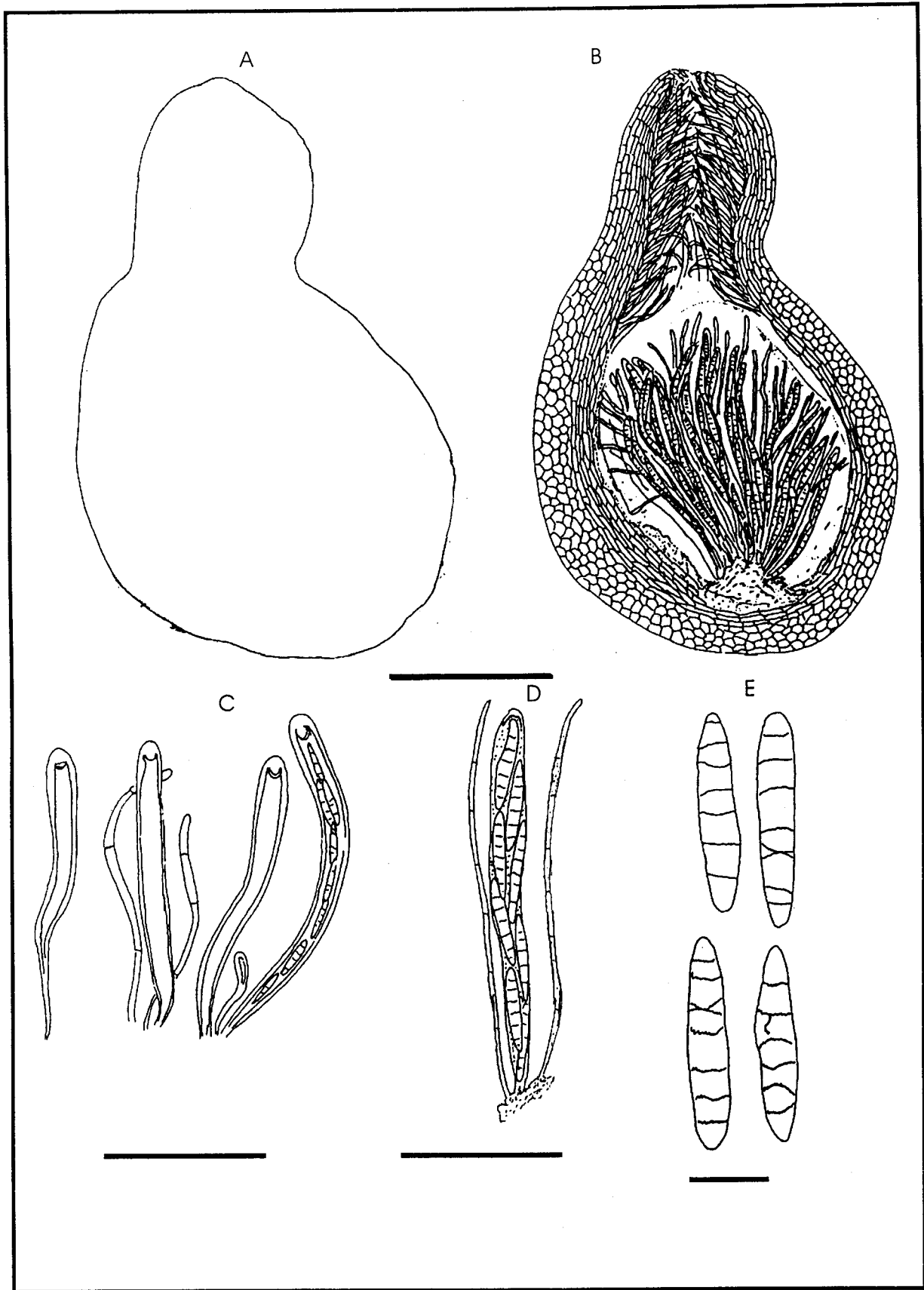


Fig - 59 : Unidentified ascomycete VII. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., bar 100 $\mu$ m., C. Different stages of ascus development, bar 50 $\mu$ m., D. Mature ascus and paraphyses, bar 50 $\mu$ m, E. Ascospores, bar 10 $\mu$ m.

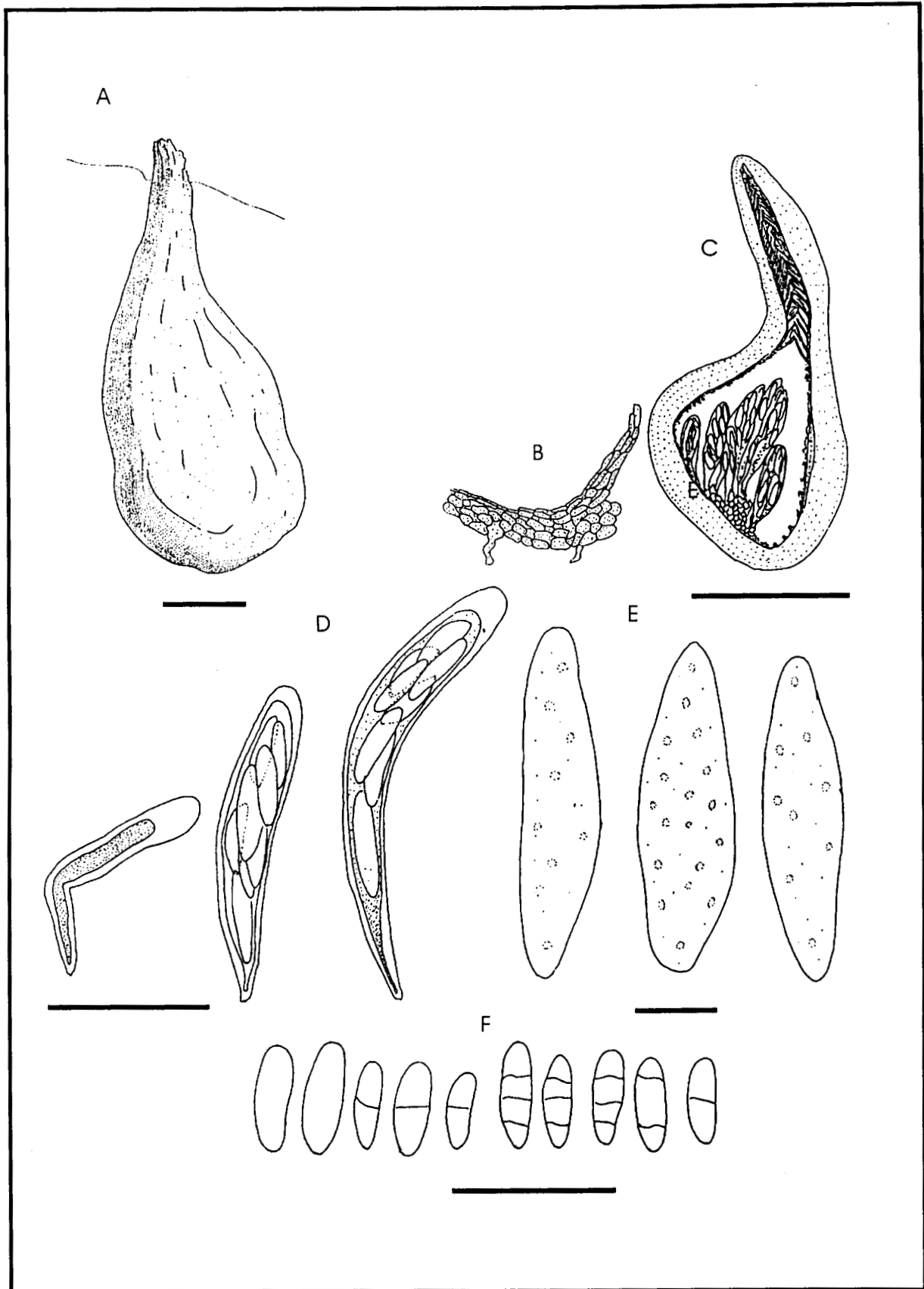


Fig -60 : Unidentified ascomycete VIII. A. Ascoma, bar 100µm., B. Ascoma v.s., bar 50µm., C. A portion of the peridium, bar 50µm., D. Different stages of development of asci, bar 50µm., E. Immature ascospores, bar 10µm., F. Different stages of development of ascospores, bar 50µm.

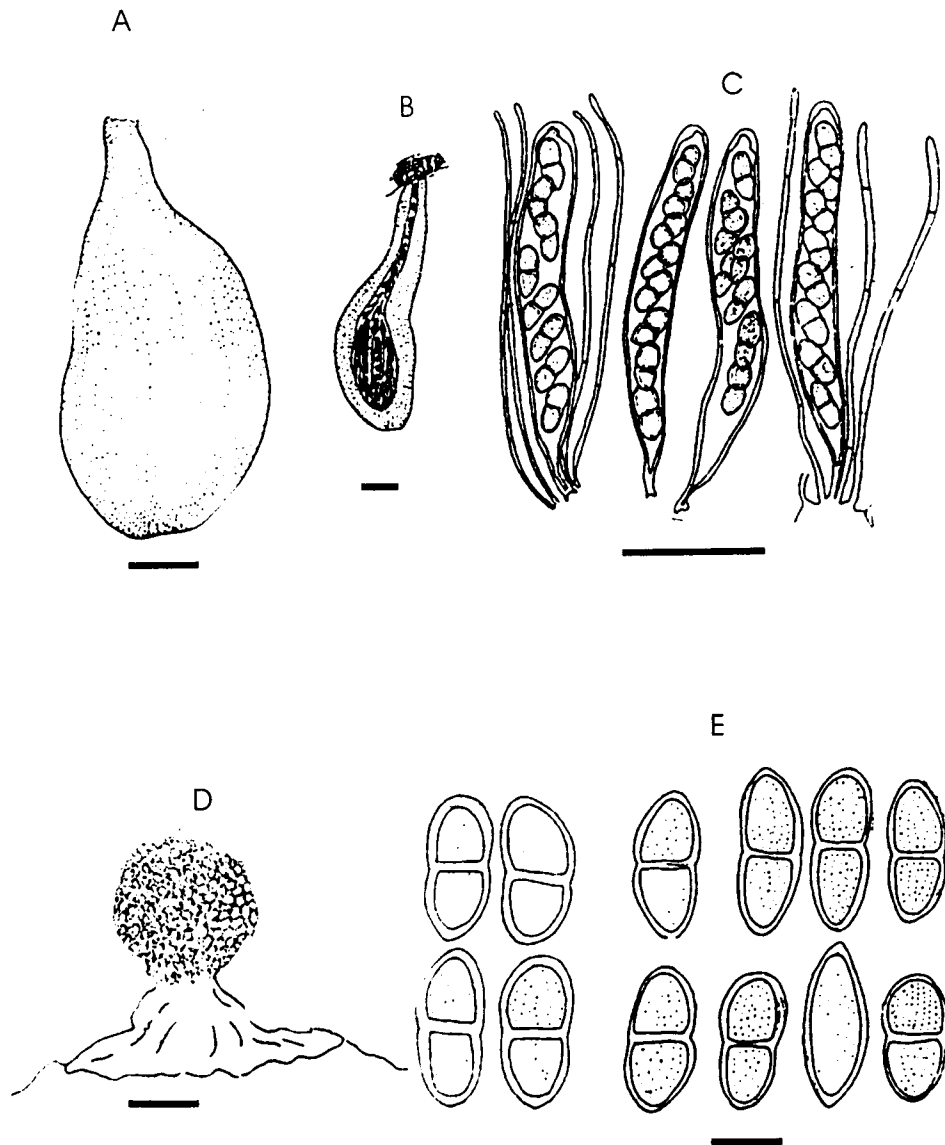


Fig -61 : *Verruculina enalia*. A. Ascoma, bar 100 $\mu$ m., B. Ascoma v.s., Bar 100 $\mu$ m., C. Asci & paraphyses, bar 50 $\mu$ m., D. Spore mass at the ostiole, bar 100 $\mu$ m., E. Ascospores, bar 10 $\mu$ m.

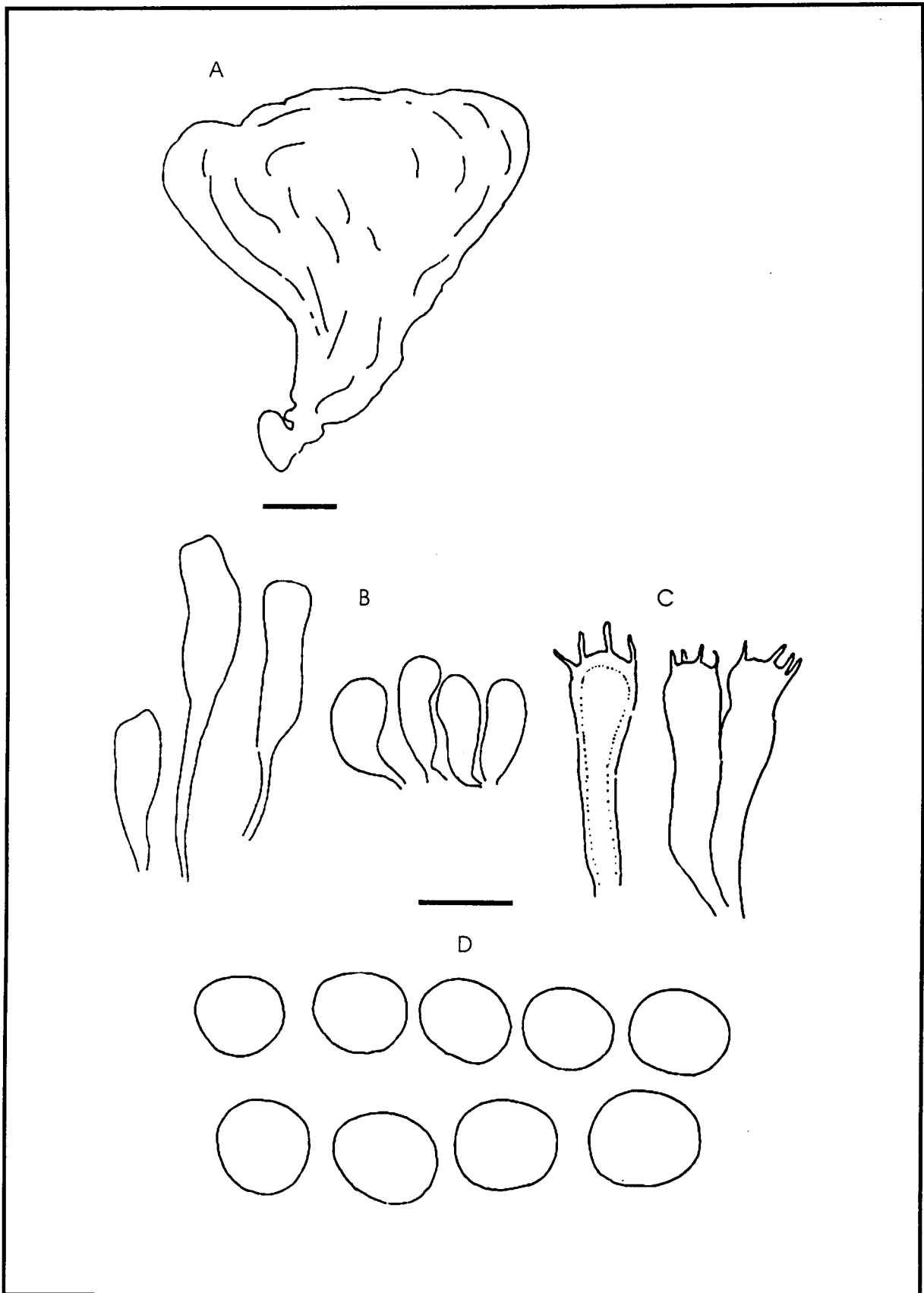


Fig-62 : *Halocyphina villosa*. A. Basidioma, bar 100 $\mu$ m., B. Basidioles , bar 10 $\mu$ m., C. Basidia, bar 10 $\mu$ m., D. Basidiospores, bar 10 $\mu$ m.

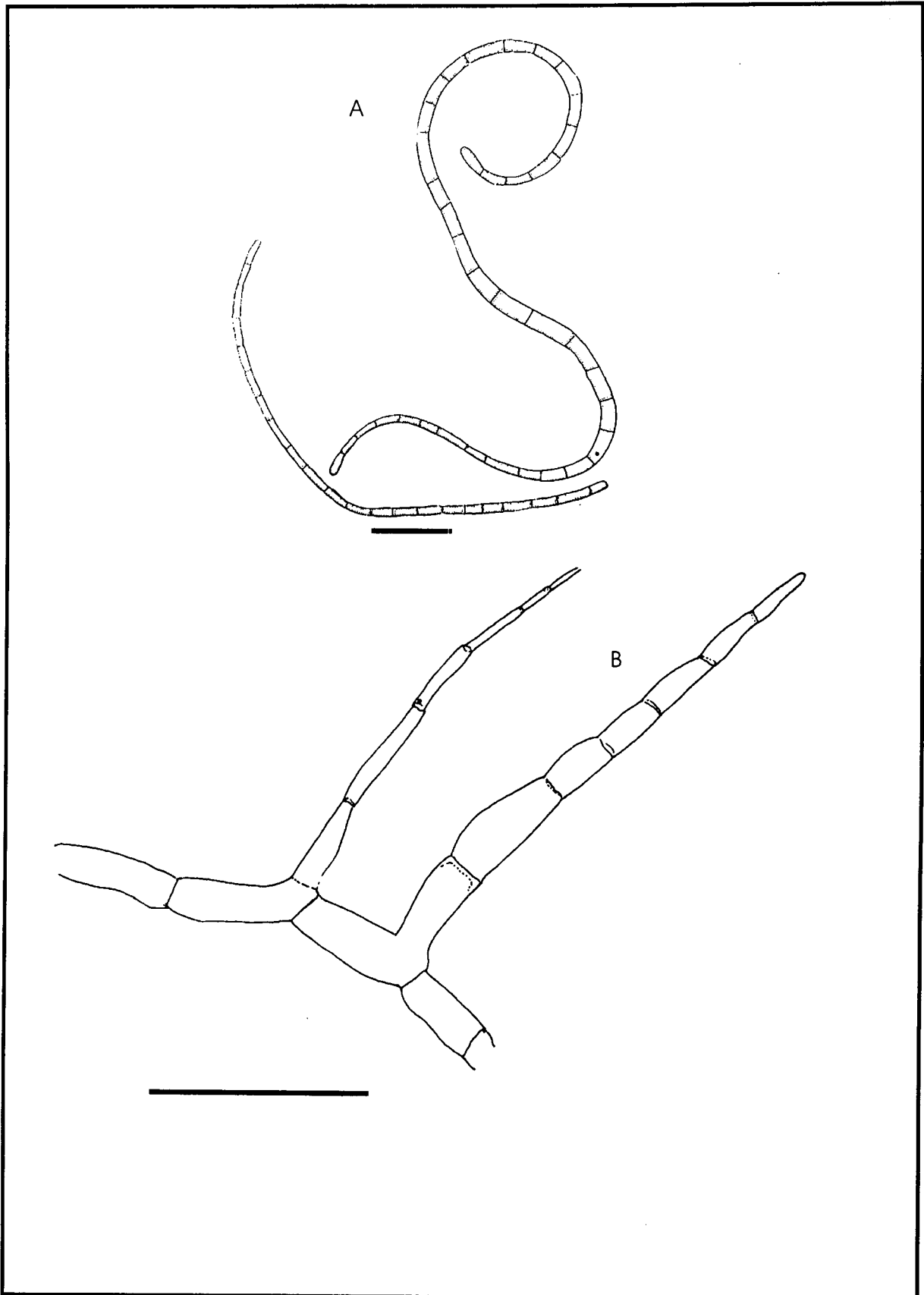


Fig - 63 : *Anguillospora* sp. A. Conidia, bar 50 $\mu$ m., B. Conidiophores, bar 50 $\mu$ m.

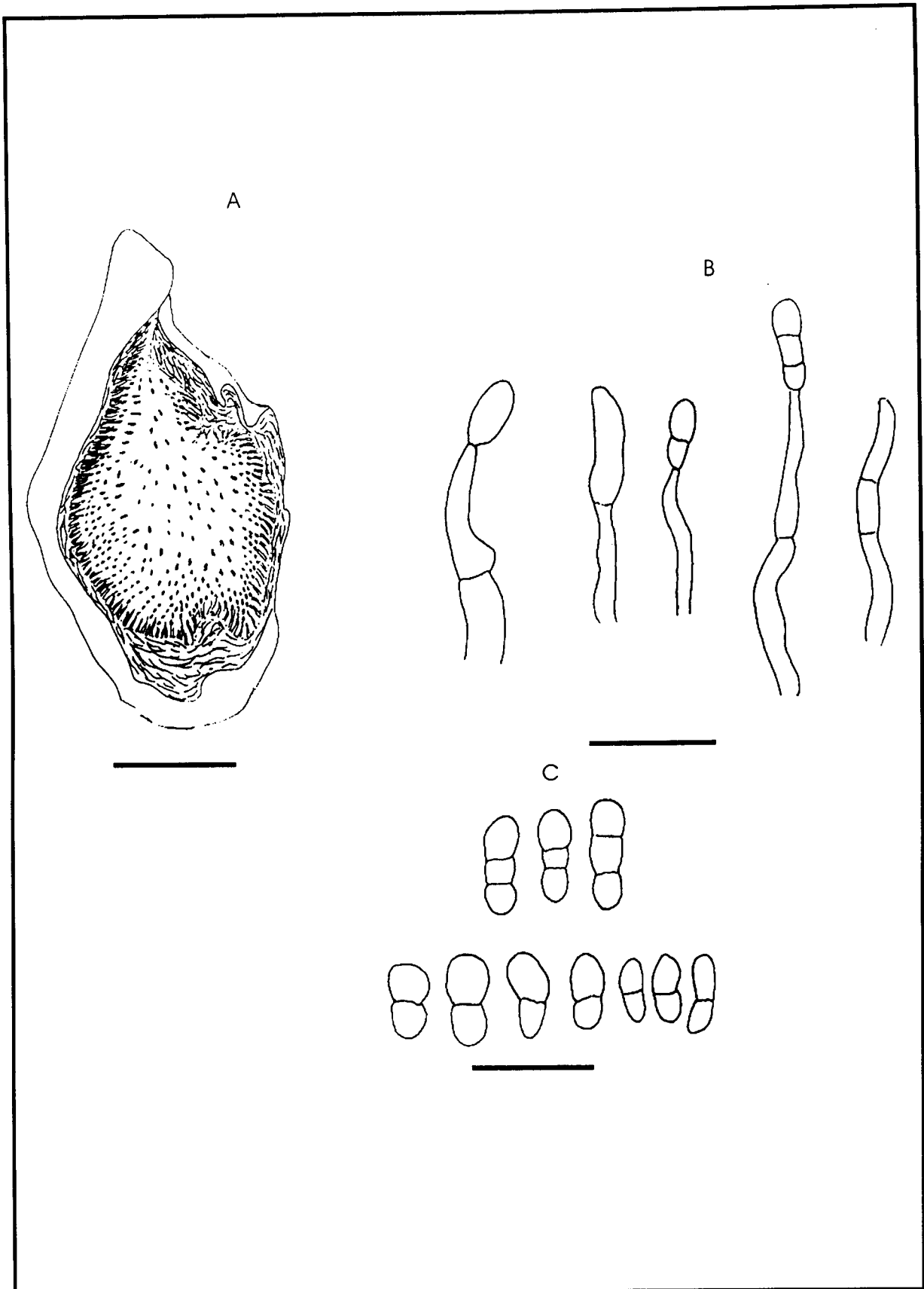


Fig - 64 : *Ascochyta* sp. A. Pycnidium, bar 50 $\mu$ m., B. Different stages of conidial development, bar 10 $\mu$ m., C. Conidia, bar 10 $\mu$ m.

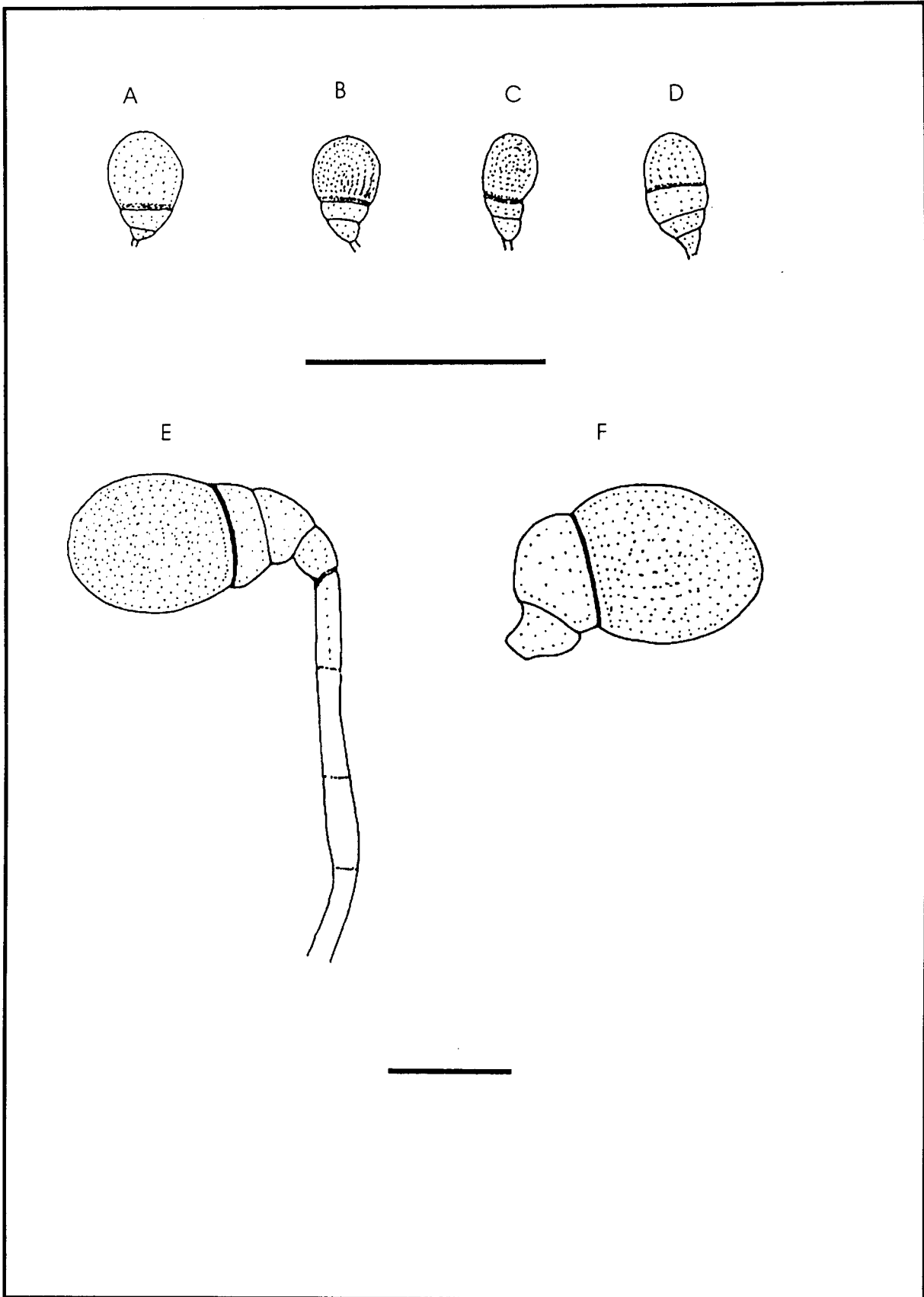


Fig-65 :*Cirrenalia basiminuta*. A-D. Conidia, bar 50 $\mu$ m., E. Conidium & Conidiophore, bar 10 $\mu$ m., F. Conidium, bar 10 $\mu$ m.

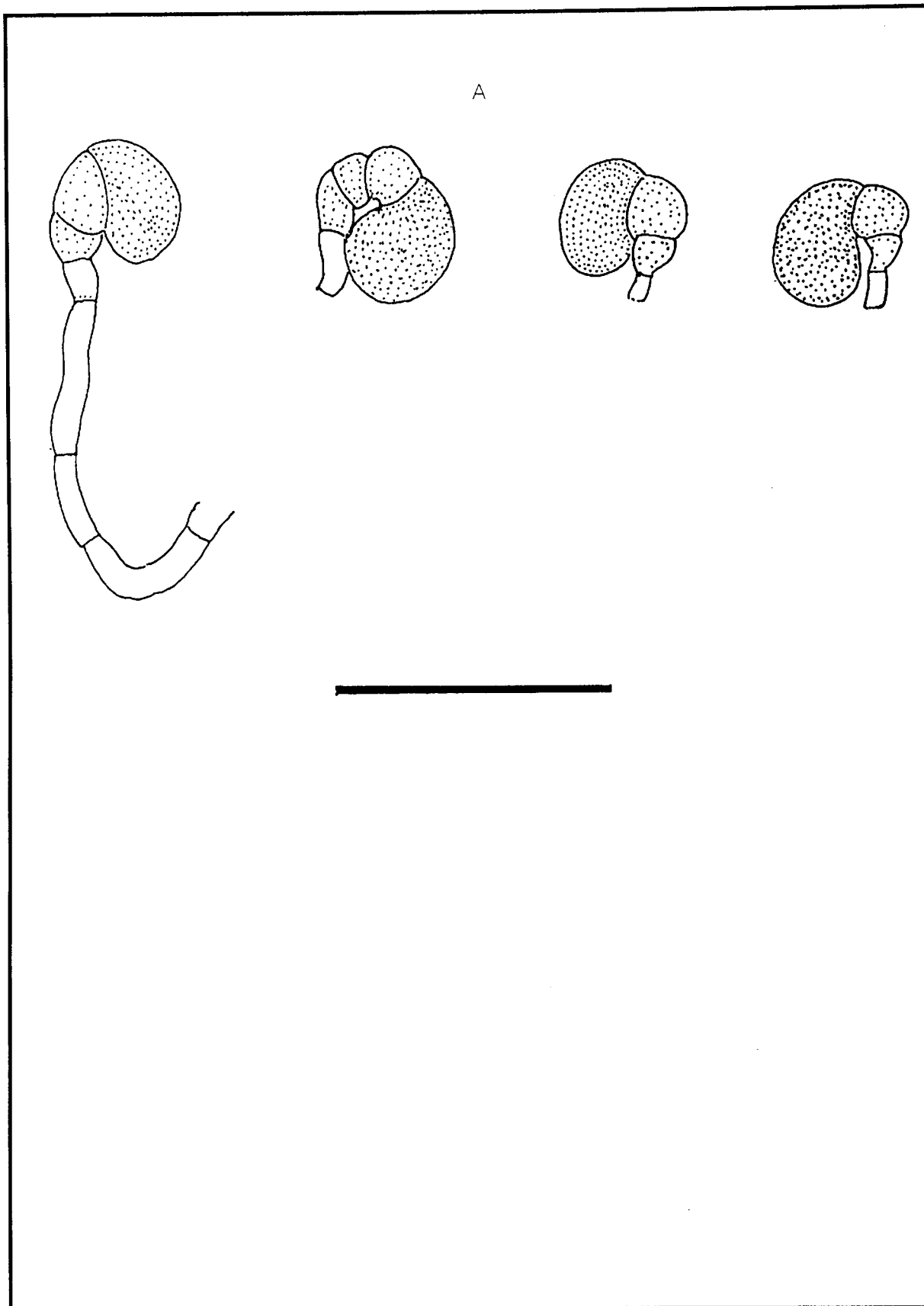


Fig-66 : *Cirrenalia fusca*. A. Conidia & Conidiophore - different stages of development.



A

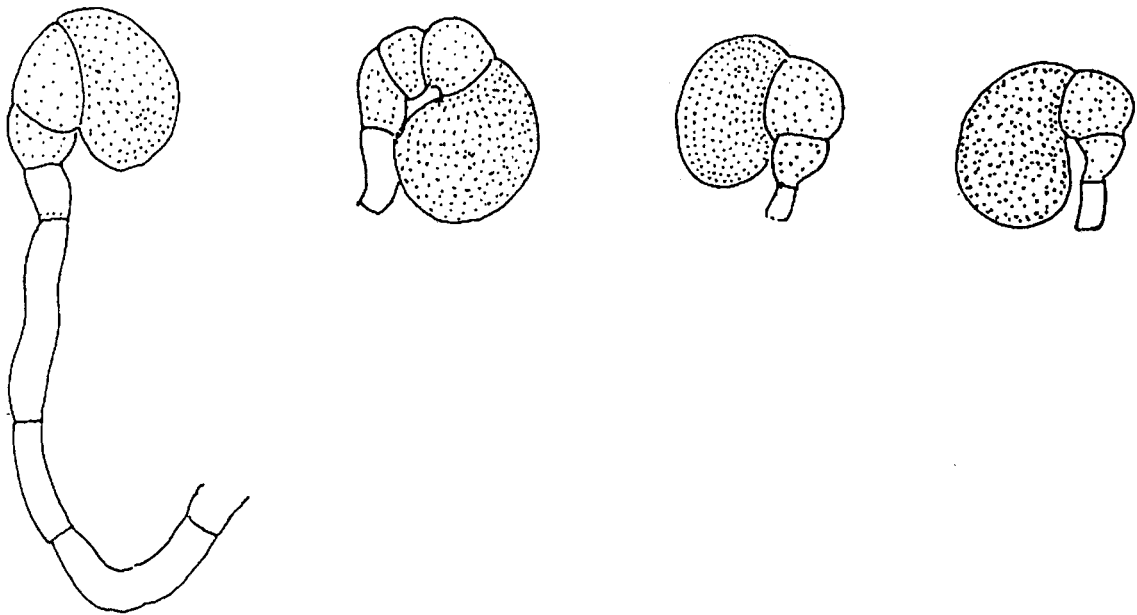


Fig-66 : *Cirrenalia fusca*. A. Conidia & Conidiophore - different stages of development.

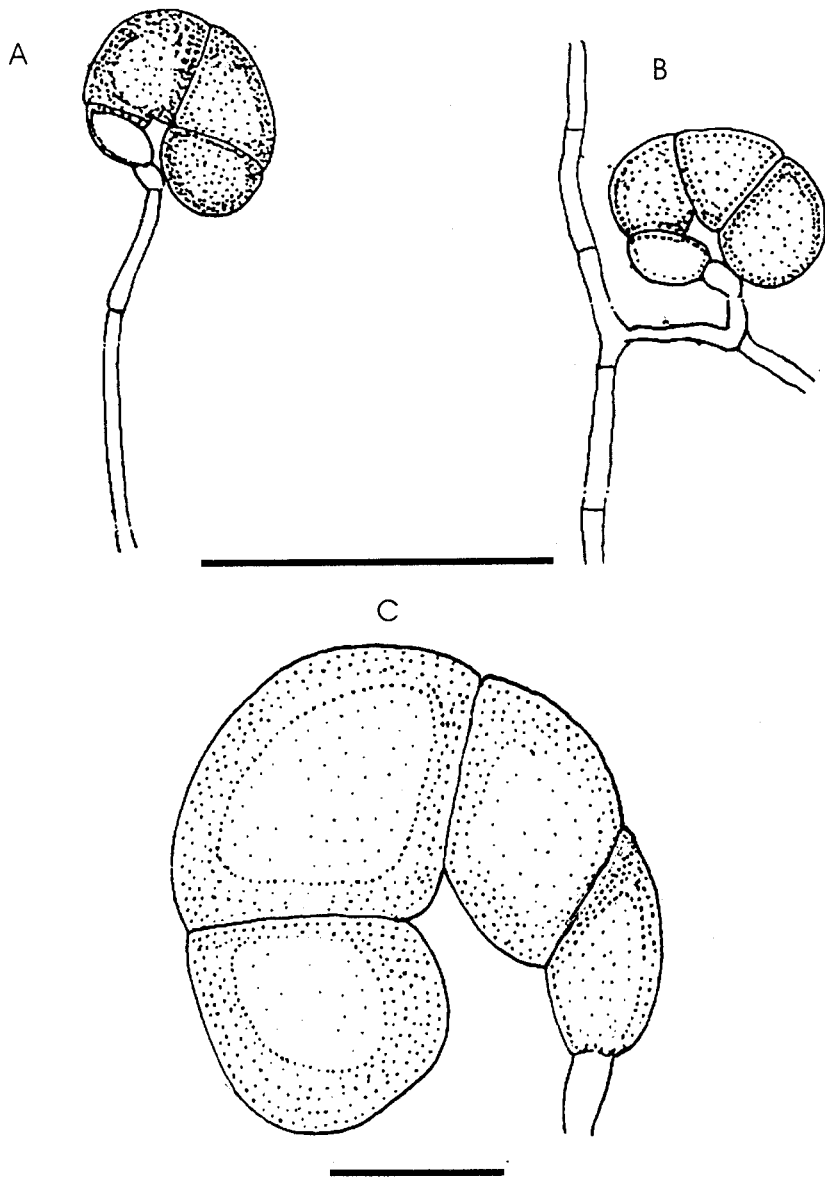


Fig -67 :*Cirrenalia macrocephela*. A & B. Conidiophores & conidia, bar 50 $\mu$ m., C. Conidium, bar 10 $\mu$ m.

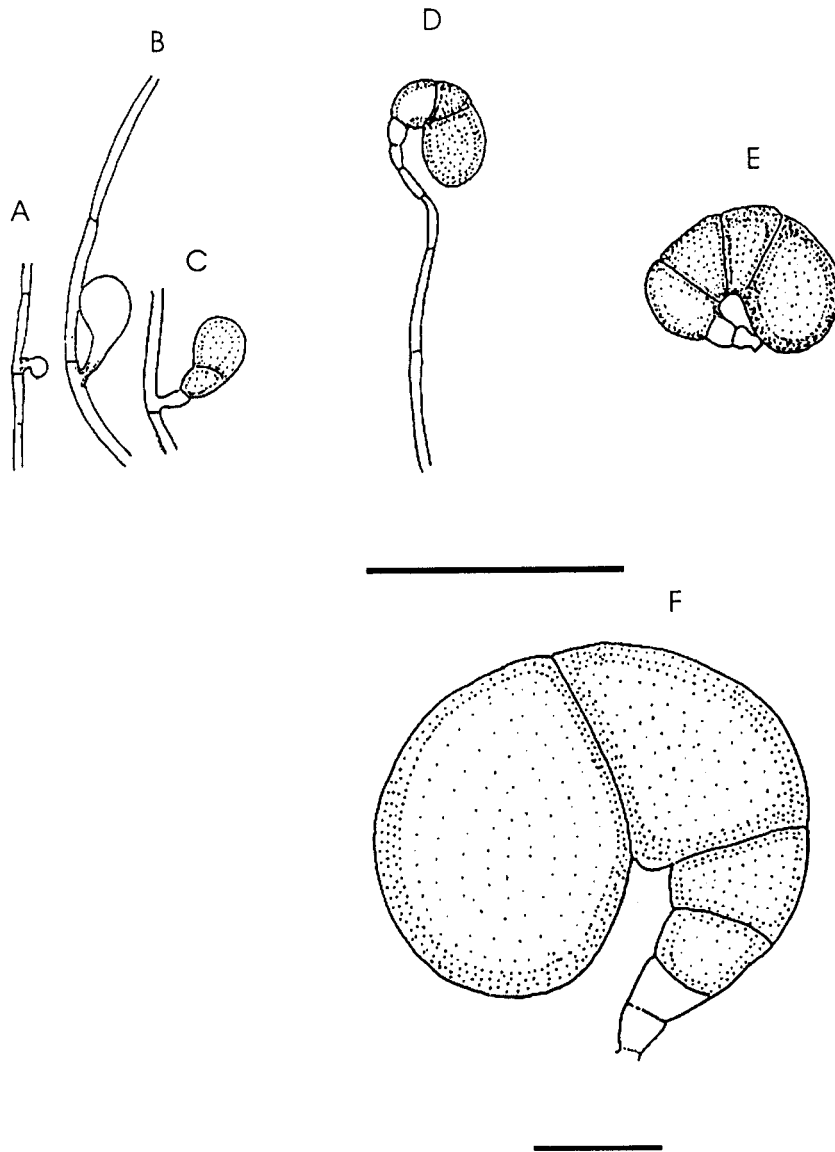


Fig - 68 : *Cirrenalia pygmea*. A-E. Conidia - different stages of development, bar 50 $\mu$ m., F. Conidium, bar 10 $\mu$ m.

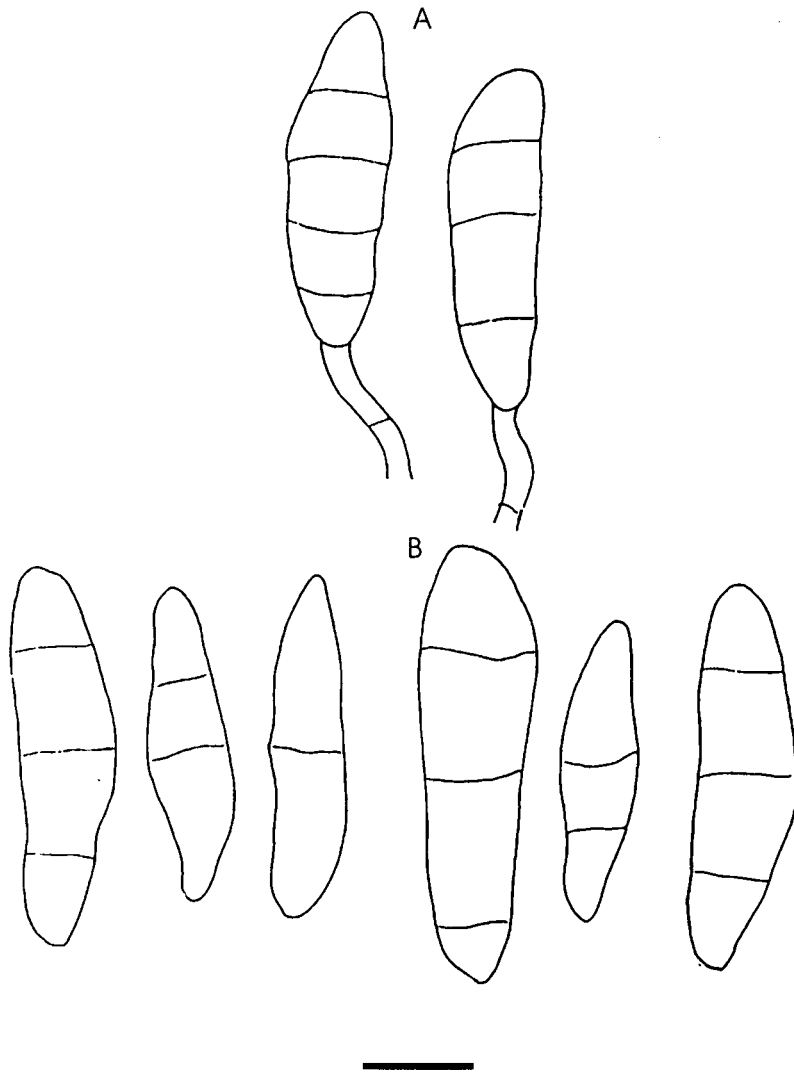


Fig - 69 : *Cladosporium* sp. A. Conidiophores & Conidia, B. Conidia, bar 10 $\mu$ m.

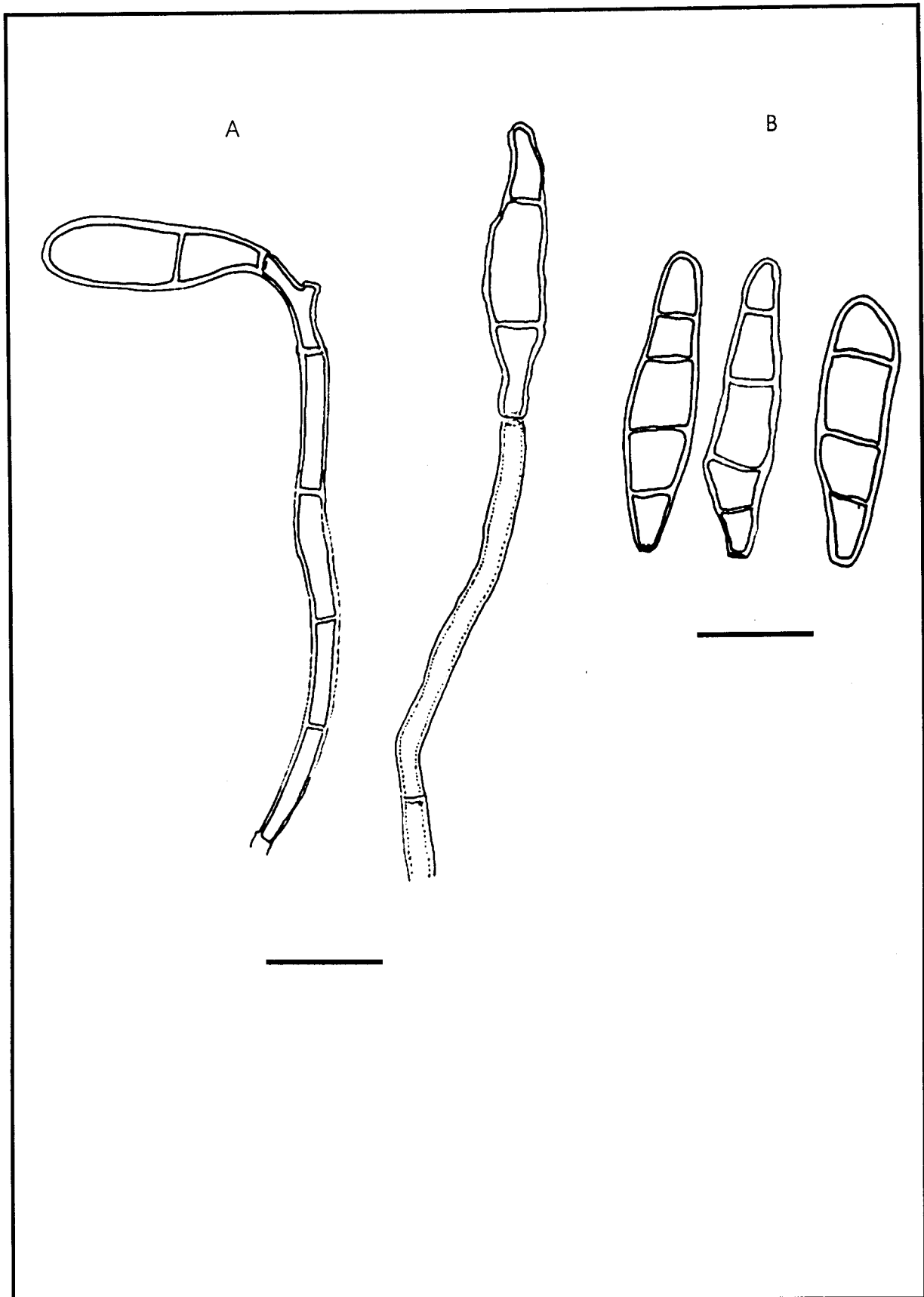


Fig-70 : *Dendryphiella salina*. A. Conidiophores and Conidia, bar 10 $\mu$ m.,  
B. Conidia, bar 10 $\mu$ m.

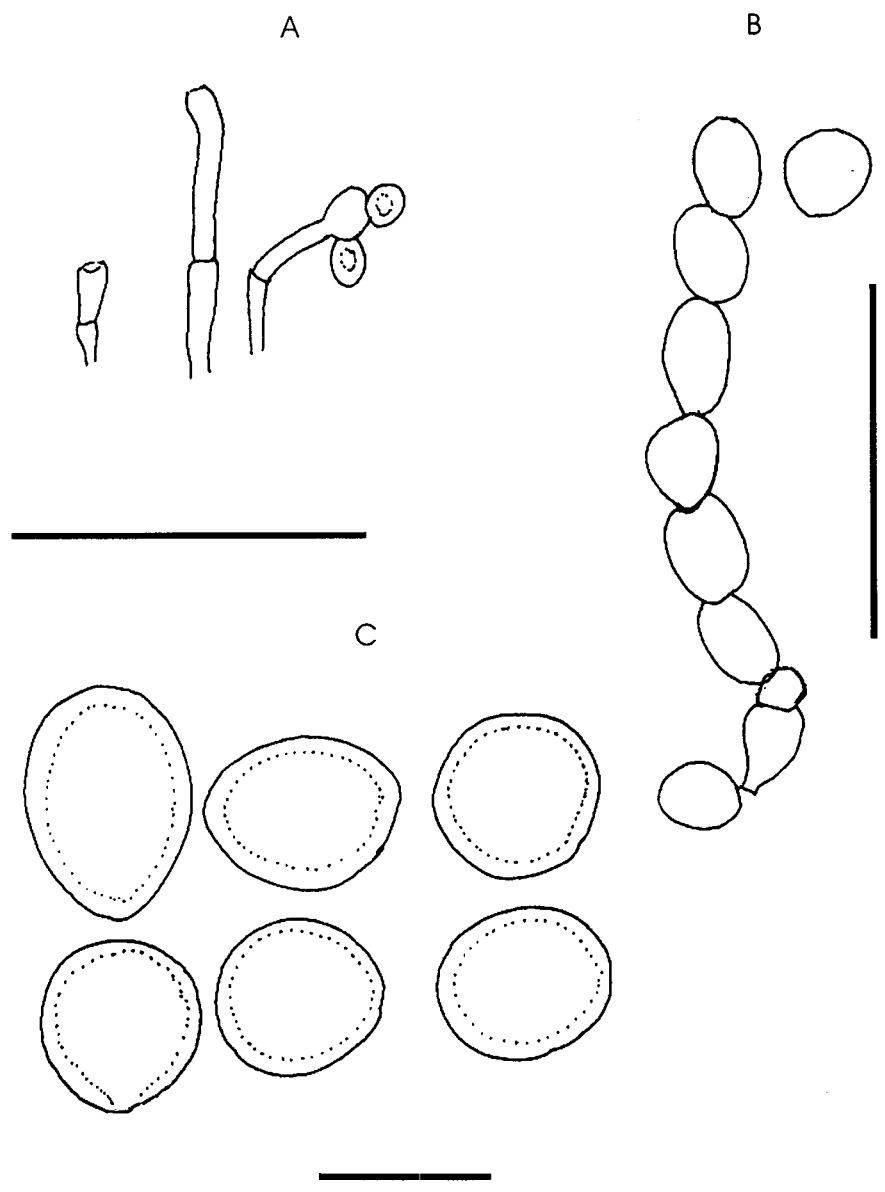


Fig-71 : *Periconia prolifica*. A. Conidiophores & Conidia, bar 50µm., B. Chain of conidia, bar 50µm., C. Conidia, bar 10µm.

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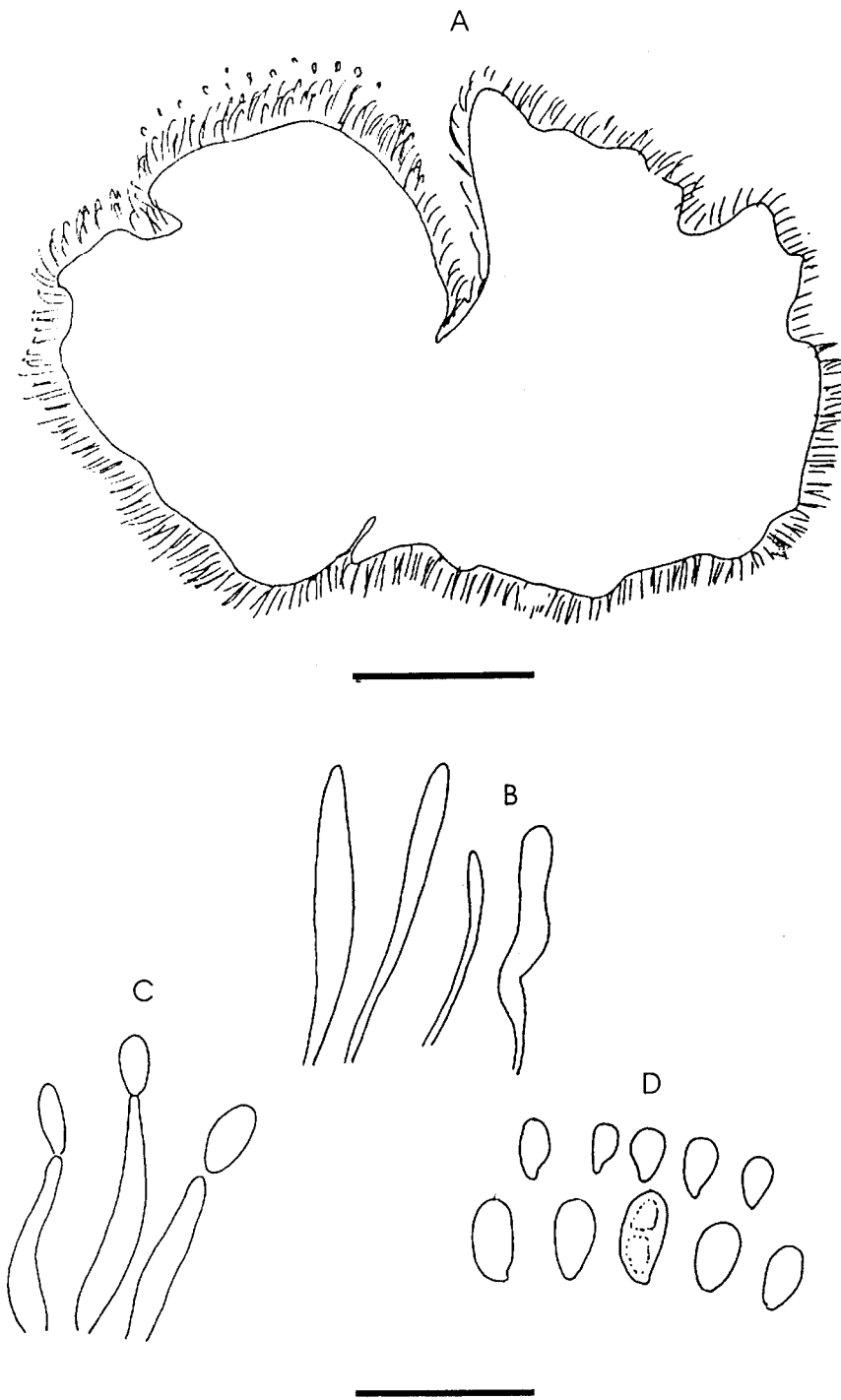


Fig -72 : *Phialophorophoma litoralis*. A. Squashed pycnidium, bar 100µm.,  
B. Conidiophores, C. Conidiophores with conidia, D. Conidia, bar 10µm.

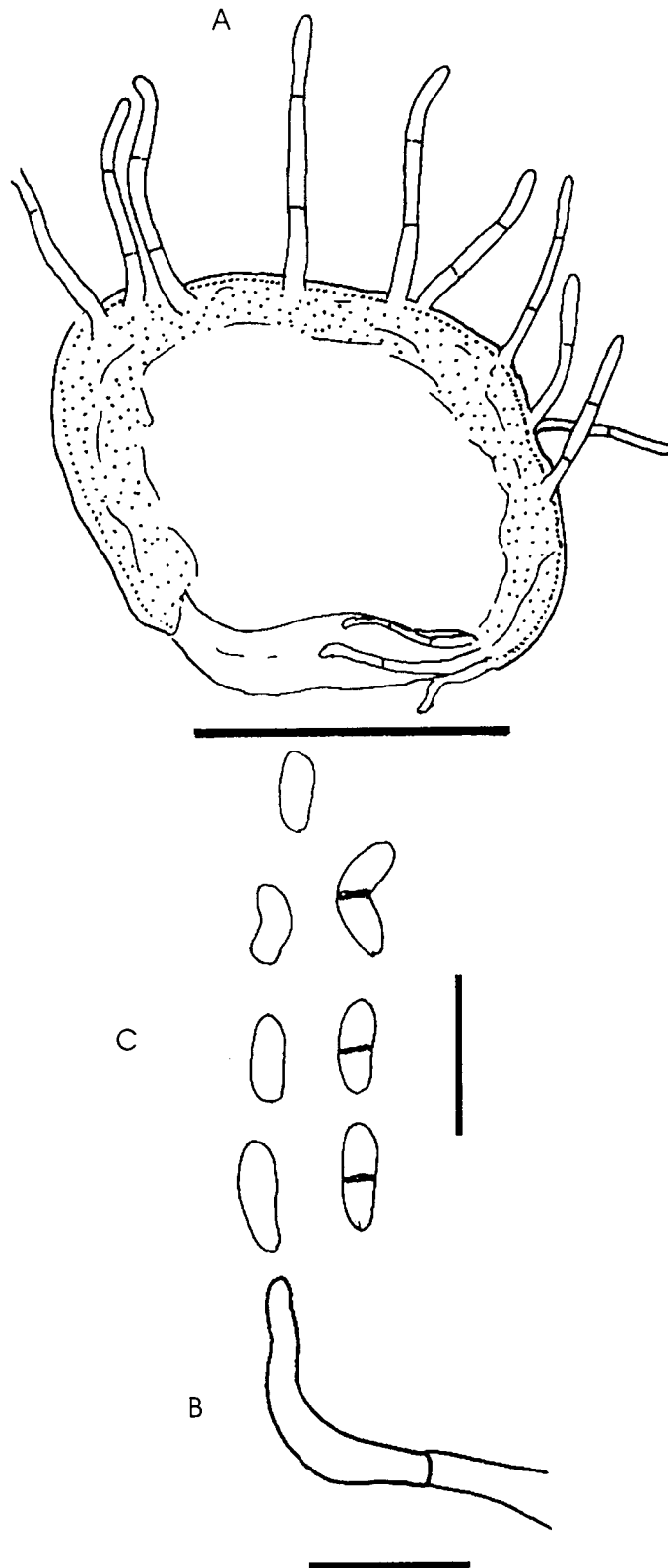


Fig-73 : *Phoma* sp. A.Pycnidium, L-s bar 100 $\mu$ m., B. Conidiophore, bar 10 $\mu$ m.,  
C. Conidia, bar 10 $\mu$ m.



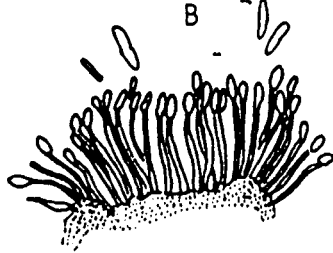
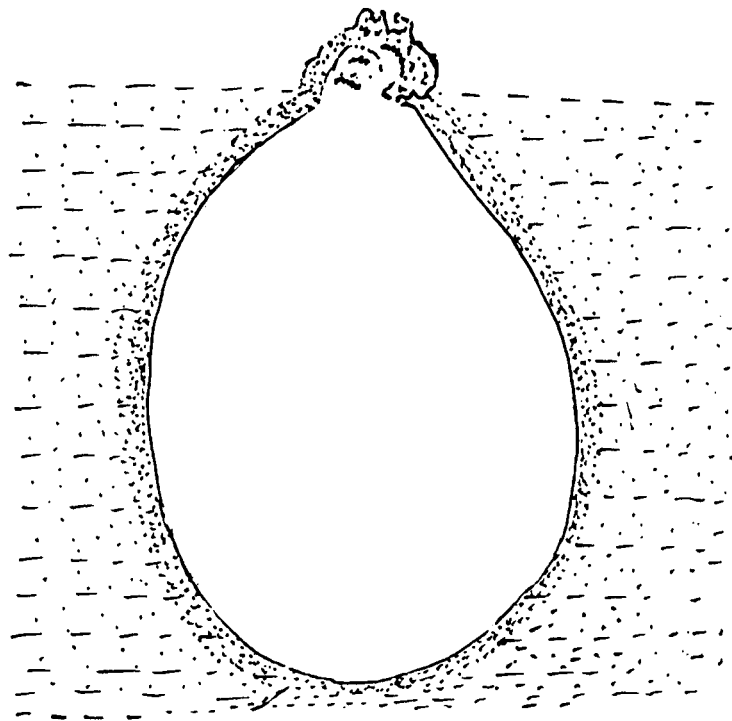


Fig-74: *Phomopsis* sp. A. conidioma, bar100 $\mu$ m., B. Alpha conidia & Conidophores, bar 50 $\mu$ m., C. Beta conidia & conidiophores, bar 50 $\mu$ m.

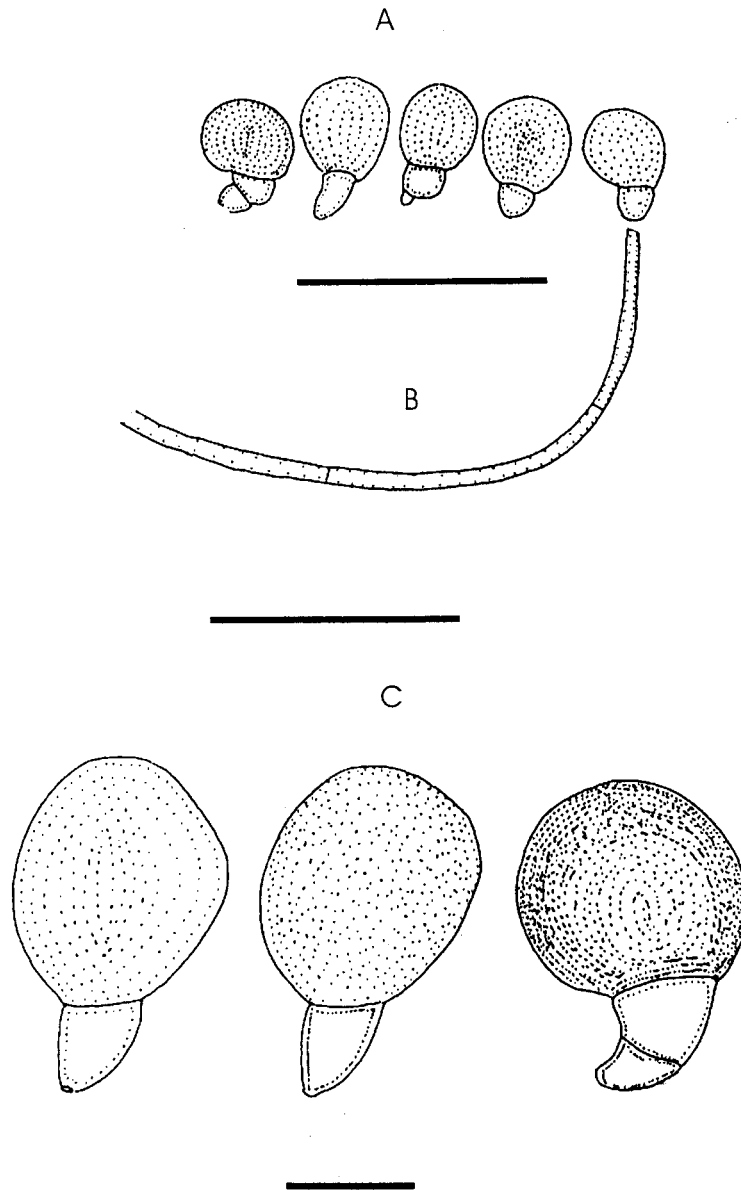


Fig-75 : *Trichocladium alopallonellum*. A. Conidia (different stages of developments), bar, 50µm., B. Conidiophore, bar 50µm., C. Conidia, bar 10µm.

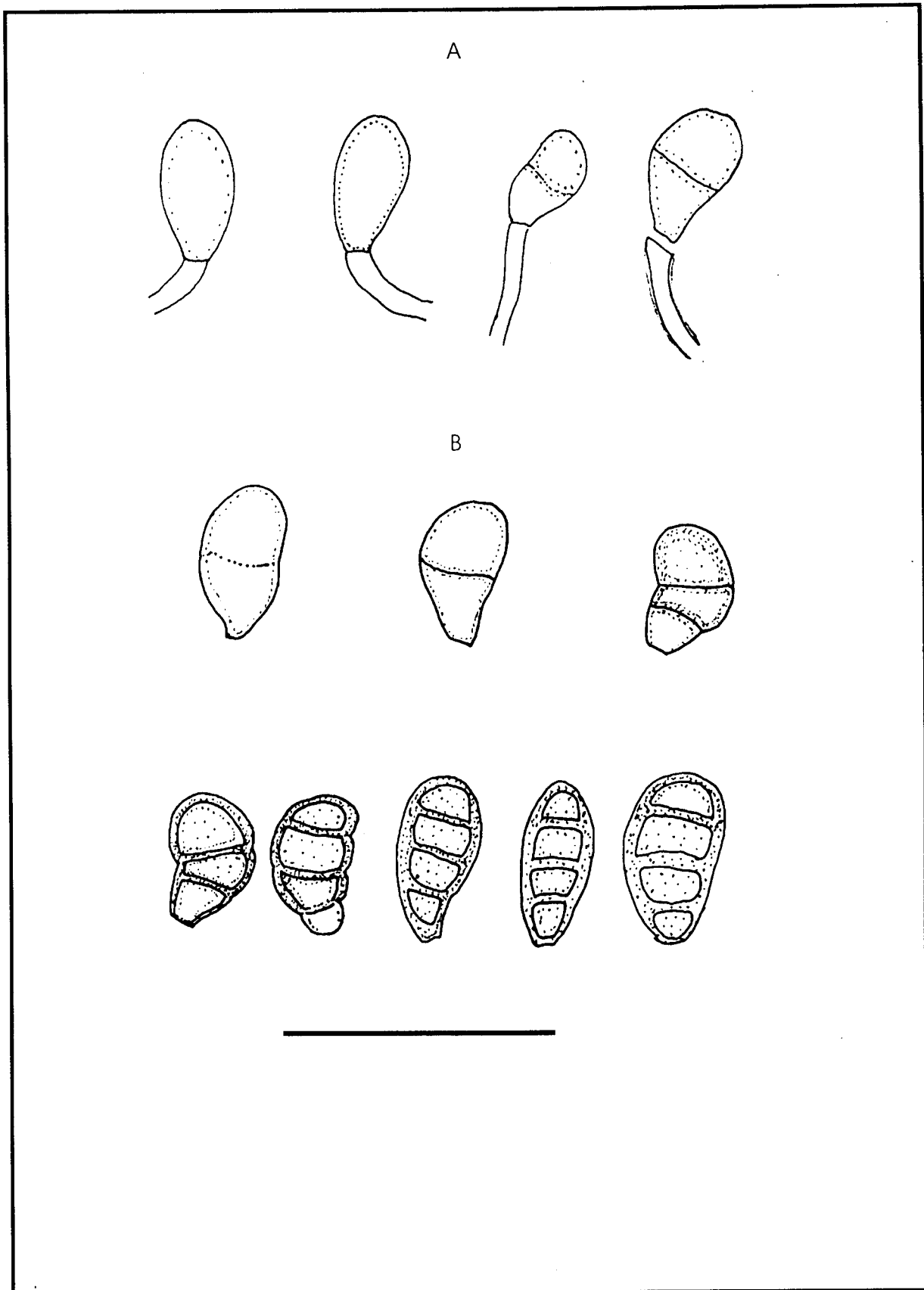


Fig-76 : *Trichocladium* sp. A. Conidia & Conidiophores, B. Different stages of conidial development, bar 50 $\mu$ m.

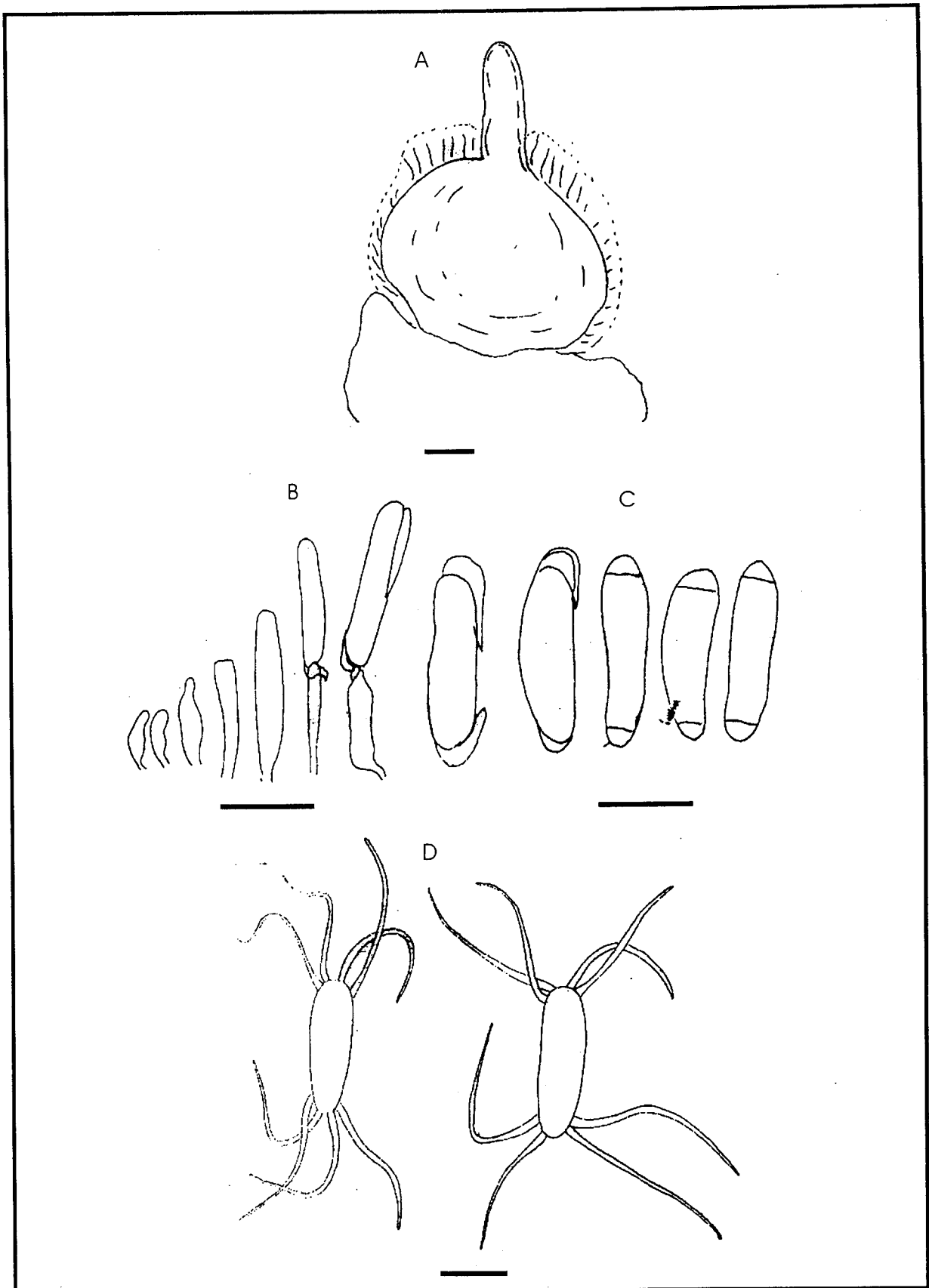


Fig-77 : Unidentified anamorph. A. Pycnidium, bar 100µm., B. Different stages of development of conidia, bar 10µm., C. Conidia before unfolding of appendages, bar 10µm., D. Mature conidia, bar 10µm.

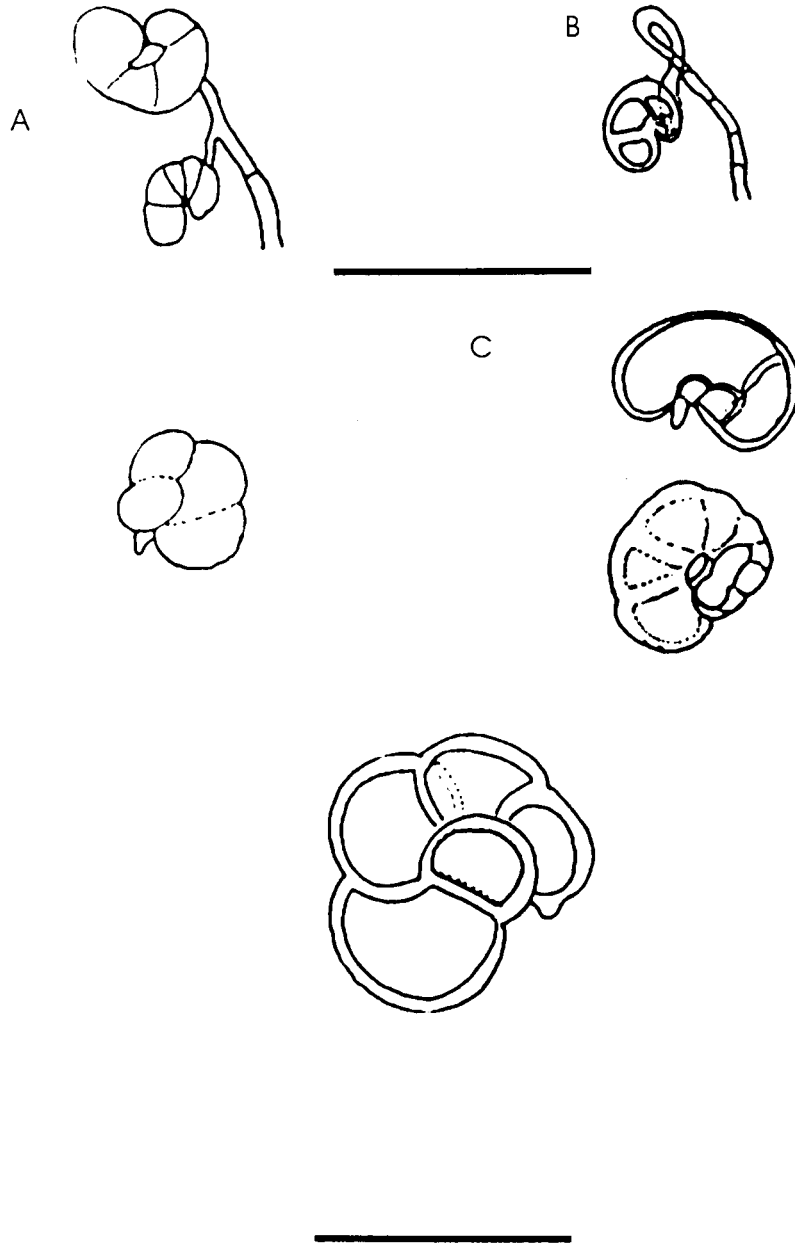


Fig - 78 : *Zalerion maritimum*. A & B. Conidiophores & Conidia, bar 50 $\mu$ m, C. Conidia different stages of development, bar 50 $\mu$ m.

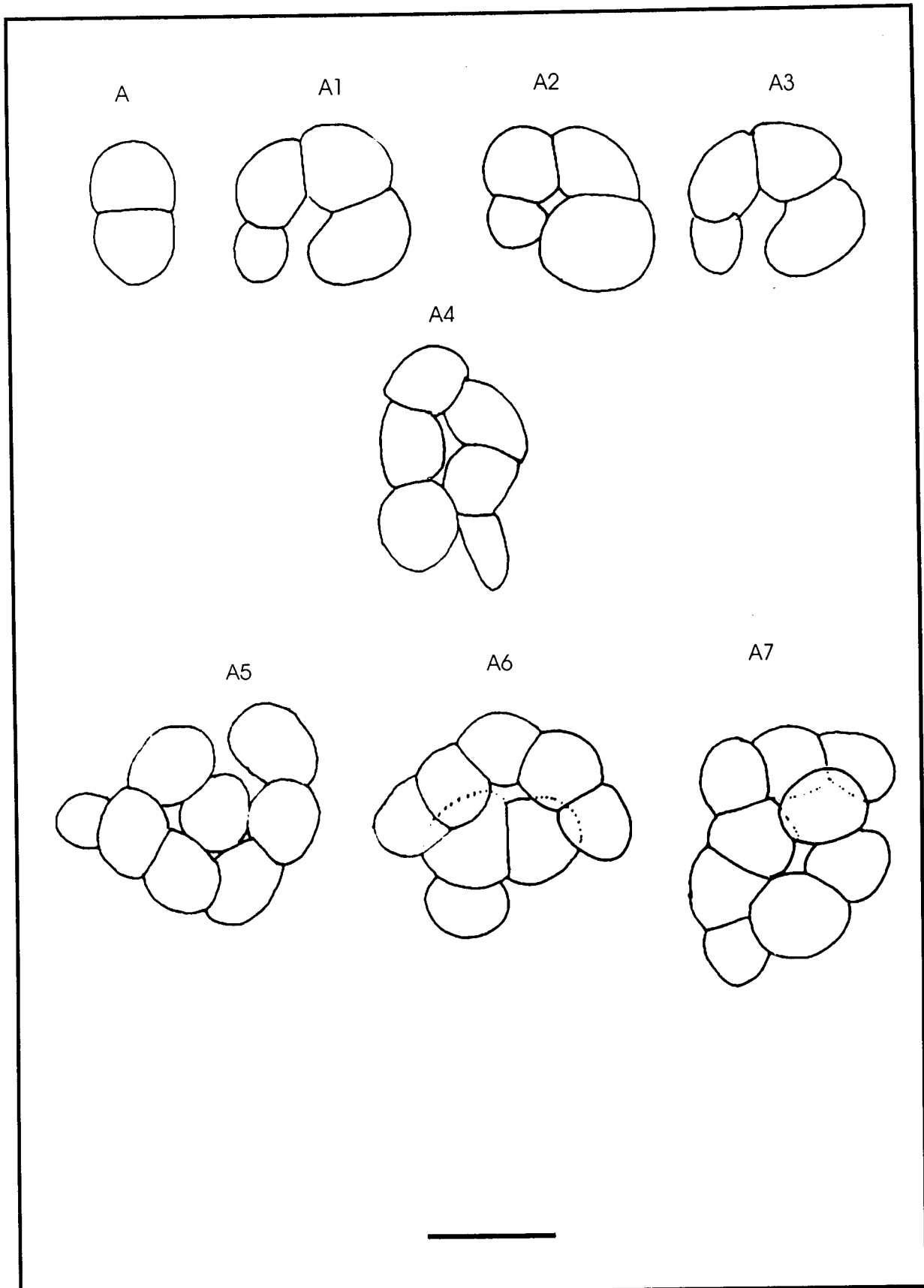


Fig - 79 : *Zalerion varium*. A-A7. Different stages of conidial development, bar 10 $\mu$ m.

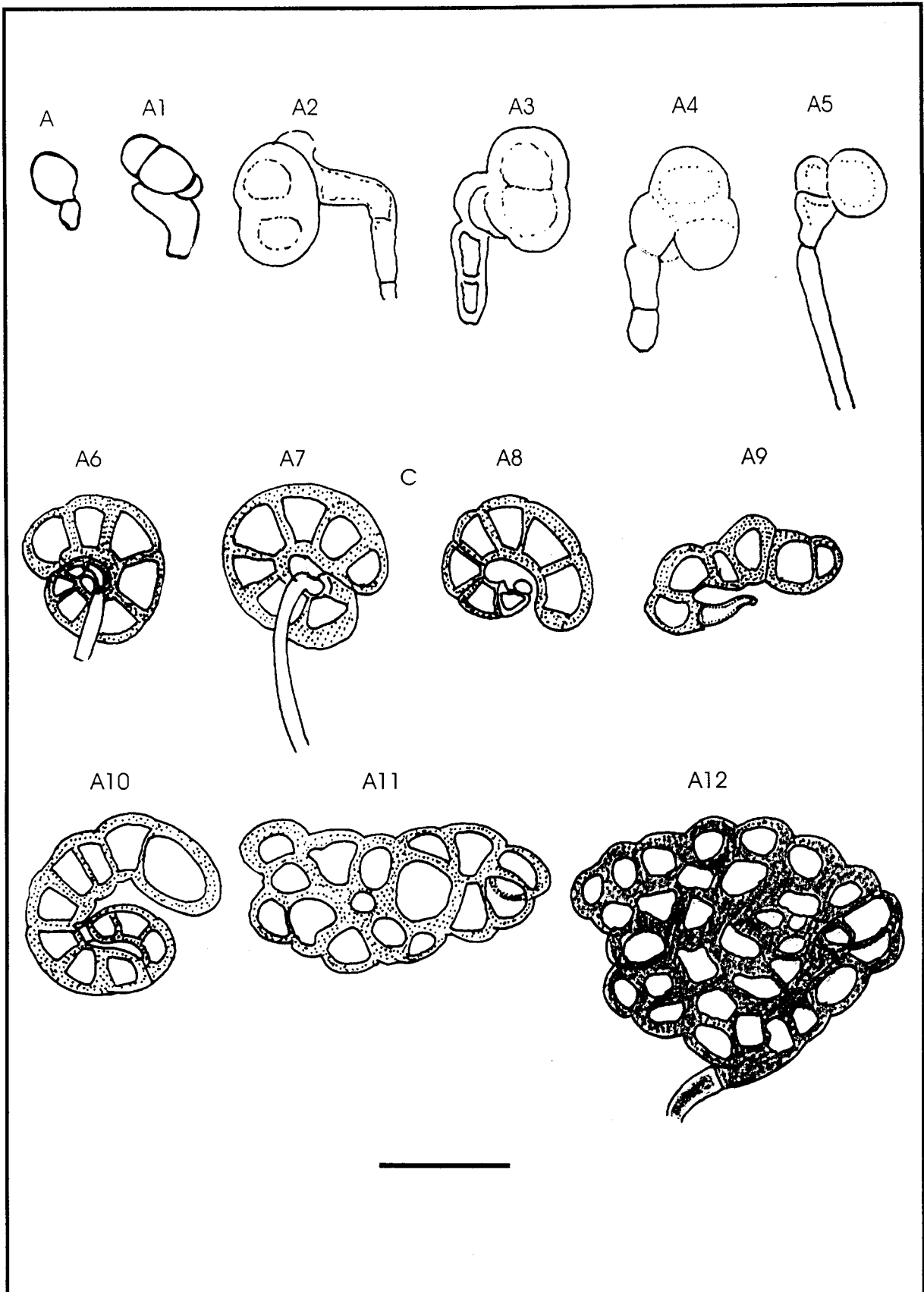


Fig-80 : *Zalerion* sp. A-A12. Different stages of conidial development, bar 10µm.

# QUANTITATIVE OBSERVATIONS

2010



## Quantitative Observations

The quantitative data obtained in the present investigation are given in the following order:

1. Hydrographical data of collecting locations (Table 1).
2. List of marine fungi collected during this study along with the number of isolates, overall percent frequency of occurrence and overall percent relative abundance of each species (Table 2).
3. Comparison of percent frequency of occurrence and percent relative abundance of species at each of the 19 locations (Tables 3 & 4).
4. Number of isolates, percent frequency of occurrence and percent relative abundance of species obtained during different seasons (Table 5).
5. List of marine fungi isolated from the different wood types, along with their percent relative abundance and percent frequency of occurrence (Tables 6-12).
6. List of marine fungi collected from different water bodies along with their percent frequency of occurrence and percent relative abundance (Tables 13-18).
7. Comparison of the occurrence of marine fungi at different locations (Table 19).
8. Comparison of the occurrence of marine fungi in different wood types (Table 20).
9. Comparison of the occurrence of marine fungi in different types of water bodies (Table 21).
10. Comparison of the occurrence of marine fungi in different seasons (Table 22).

11. Comparison of average isolates per wood sample in different locations, wood types, water bodies, and season (Table 23-27).
12. Shannon index and Simpson index calculated for the 19 locations and the 6 types of water bodies (Tables 28-29).
13. Results of the logistic regression analysis (pages 225-230).

**Table – 1 Hydrographical data of collecting locations**

Name of Location	Date of Retrieval	Salinity of water	Temperature of water	pH of water
Parappanangadi	19-4-92	31.3 ppt	30.5°C	8.2
Kadalundi-A	19-4-92	28.1 ppt	27°C	7.8
Kadalundi-B	19-4-92	26 ppt	26.5°C	5.5
Mahe-A	3-5-92	29 ppt	29°C	7.8
Mahe-B	3-5-92	26.5 ppt	29°C	5.7
Tellicherry-A	21-6-92	9 ppt	26°C	7
Tellicherry-A	26-7-92	Not recorded	Not recorded	Not recorded
Tellicherry-B	26-7-92	4 ppt	27°C	7
Vadakara	2-8-92	7 ppt	27.5°C	6.7
Valapattanam	9-8-92	25.2 ppt	28°C	7.2
Dharmadam-A	23-8-92	20 ppt	26.5°C	7.8
Tellicherry-A	23-8-92	12.5 ppt	26°C	7.35
Dharmadam-B	23-8-92	11 ppt	27°C	6.75
Mahe-A	6-9-92	11 ppt	27.5°C	7.3
Mahe-B	6-9-92	7 ppt	27°C	6.7
Kadalundi-A	13-9-92	15 ppt	28°C	7.13
Tellicherry-A	27-9-92	26.75 ppt	28.5°C	7.5
Beypore	2-10-92	26 ppt	27°C	7.85
Kadalundi-B	18-10-92	20 ppt	28°C	7.1
Tellicherry-A	25-10-92	25 ppt	29°C	7.5
Tellicherry-C	25-10-92	21.5 ppt	28°C	7.3
Edakkad	15-11-92	18 ppt	28°C	7.1
Tellicherry-A	29-11-92	26.5 ppt	27.5°C	7.4
Tellicherry-B	29-11-92	26.15 ppt	28°C	7.4
Tellicherry-C	29-11-92	27.3 ppt	27.5°C	7.5
Azhikkal	20-12-92	28 ppt	27°C	8
Tellicherry-A	27-12-92	28.5 ppt	28.5°C	7.7
Tellicherry-C	27-12-92	28.5 ppt	28°C	7.7
Dharmadam-B	27-12-92	19.6 ppt	26.5°C	6.9
Mahe-A	3-1-93	23 ppt	29°C	7.5
Mahe-B	3-1-93	26.3 ppt	28°C	7.1
Tellicherry-A	10-1-93	29.5 ppt	28.5°C	7.8
Tellicherry-C	10-1-93	30 ppt	27°C	7.8
Parappanangadi	31-1-93	30 ppt	27.5°C	8.1
Azhikkal	13-2-93	28.1 ppt	27°C	7.67
Bekkal	14-2-93	31 ppt	27.5°C	8.2
Tellicherry-A	21-2-93	30.5 ppt	27°C	7.85
Tellicherry-C	21-2-93	30 ppt	28.53°C	7.8
Beypore	28-2-93	30.2 ppt	28°C	8.1
Tellicherry-A	28-3-93	30 ppt	31.5°C	8.1
Tellicherry-C	28-3-93	31.5 ppt	30°C	8
Vadakara	4-4-93	23.5 ppt	30°C	7.4
Valapattanam	11-4-93	29 ppt	29°C	8.1
Chettuva	17-4-93	25.5 ppt	28°C	7.7
Dharmadam-A	18-4-93	25 ppt	29°C	8
Tellicherry-A	18-4-93	30 ppt	30.5°C	8
Tellicherry-B	18-4-93	28 ppt	29°C	7.8

(Continued)

Tellicherry-C	18-4-93	30.1 ppt	29.5°C	8.1
Dharmadam-B	18-4-93	21.5 ppt	28.5°C	6.35
Tikkodi	25-4-93	31 ppt	29°C	8.1
Tellicherry-A	9-5-93	30 ppt	31°C	8
Tellicherry-C	9-5-93	31 ppt	30°C	8.2
Kadalundi-A	23-5-93	30.7 ppt	29.5°C	8
Tellicherry-A	20-6-93	17 ppt	27°C	7
Tellicherry-C	20-6-93	16.5 ppt	27.5°C	7.1
Edakkad	11-7-93	5 ppt	27.5°C	7
Azhikkal	17-7-93	22.6 ppt	28.5°C	7.6
Tellicherry-A	18-7-93	12.5 ppt	27°C	7.1
Tellicherry-C	18-7-93	6.25 ppt	28°C	7.4
Kavvai	19-7-93	7.1 ppt	26.3°C	7.3
Mahe-A	12-8-93	13 ppt	26°C	7.6
Beyepore	15-8-93	21.5 ppt	26°C	7.8
Tellicherry-A	22-8-93	2.1 ppt	27°C	6.8
Tellicherry-B	22-8-93	13 ppt	27°C	7
Tellicherry-C	22-8-93	4.2 ppt	29°C	6.9
Dharmadam-B	22-8-93	7.2 ppt	27°C	7
Chettuva	5-9-93	24.4 ppt	27.5°C	7.8
Mahe-B	12-9-93	9.1 ppt	27°C	6.5
Tikkodi	18-9-93	28 ppt	28°C	7.9
Tellicherry-A	19-9-93	18.4 ppt	28°C	7.1
Tellicherry-C	19-9-93	17.2 ppt	30°C	7.6
Parappanangadi	26-9-93	29 ppt	29°C	8.1
Kadalundi-b	26-9-93	14 ppt	28°C	7
Bekkal	3-10-93	30.5 ppt	28.5°C	8
Tellicherry-A	17-10-93	26 ppt	29.5°C	7.8
Kavvai	30-10-93	23.5 ppt	28°C	7.6
Tikkodi	31-10-93	30 ppt	28°C	8.1
Tellicherry-A	21-11-93	28.15 ppt	30°C	7.65
Dharmadam-B	21-11-93	19.8 ppt	28°C	6.35
Valapattanam	5-12-93	26.7 ppt	27°C	7.6
Chettuva	18-12-93	22.5 ppt	25.5°C	7.3
Tellicherry-A	19-12-93	26.5 ppt	29°C	7.4
Vadakara	26-12-93	20.1 ppt	28.5°C	7.5
Dharmadam-A	27-12-93	25 ppt	29°C	7.9
Kadalundi-A	16-1-94	28 ppt	29°C	7.8
Tellicherry-A	23-1-94	27.5 ppt	28°C	7.6
Tellicherry-B	23-1-94	24.3 ppt	28°C	7.6
Tellicherry-A	27-2-94	28.5 ppt	29.5°C	7.4
Edakkad	6-3-94	24 ppt	28°C	7.3
Tellicherry-A	20-3-94	29 ppt	30°C	7.8
Tellicherry-B	20-3-94	27.65 ppt	28°C	7.8
Kavvai	15-4-94	26 ppt	26.4°C	7.8
Tellicherry-A	17-4-94	31 ppt	28°C	8.1
Tellicherry-A	15-5-94	28.5 ppt	30.5°C	7.8
Bekkal	24-7-94	29 ppt	26°C	8

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Table 2 List of marine fungi collected during the entire duration of this study from all localities with total number of isolates, overall percent frequency of occurrence and overall percent relative abundance of each species

Name	Number of isolates	* FO	** RA
<i>Aigialus grandis</i>	28	1.51	0.71
<i>Aigialus mangrovei</i>	13	0.70	0.33
<i>Aigialus parvus</i>	43	2.32	1.09
<i>Aniptodera chesapeakensis</i>	404	21.79	10.23
<i>Aniptodera longispora</i>	3	0.16	0.08
<i>Aniptodera mangrovei</i>	3	0.16	0.08
<i>Aniptodera salsuginosa</i>	3	0.16	0.08
<i>Aniptodera haispora</i>	7	0.38	0.18
<i>Aniptodera sp I</i>	4	0.22	0.10
<i>Aniptodera sp II</i>	2	0.11	0.05
<i>Antennospora quadricornuta</i>	77	4.15	1.95
<i>Antennospora salina</i>	9	0.49	0.23
<i>Arenariomyces majusculus</i>	5	0.22	0.13
<i>Arenariomyces parvulus</i>	3	0.76	0.08
<i>Arenariomyces trifurcatus</i>	38	2.05	0.96
<i>Ascocratera manglicola</i>	4	0.22	0.10
<i>Anguillospora sp.</i>	3	0.16	0.08
<i>Ascochyta sp.</i>	6	0.32	0.15
<i>Bathyascus tropicalis</i>	6	0.32	0.15
<i>Biatrispora marina</i>	7	0.38	0.18
<i>Ceriosporopsis halima</i>	18	0.09	0.46
<i>Corollospora filiformis</i>	45	2.43	1.14
<i>Corollospora pseudopulchella</i>	1	0.05	0.03
<i>Cirrenalia basiminuta</i>	31	1.50	0.78
<i>Cirrenalia fusca</i>	13	0.70	0.33
<i>Cirrenalia macrocephala</i>	22	1.19	0.56
<i>Cirrenalia pygmea</i>	169	9.12	4.28
<i>Cladosporium sp.</i>	5	0.27	0.13
<i>Dactylospora haliotrepha</i>	119	6.42	3.01
<i>Dryosphaera tropicalis</i>	1	0.05	0.03
<i>Dendryphiella salina</i>	18	0.97	0.46
<i>Halocyphina villosa</i>	445	24.00	11.23
<i>Halosarpheia abonnis</i>	28	1.51	0.71
<i>Halosarpheia hamata</i>	17	0.92	0.43
<i>Halosarpheia marina</i>	577	30.04	14.10
<i>Halosarpheia minuta</i>	23	1.24	0.58
<i>Halosarpheia ratnagiriensis</i>	30	1.62	0.76
<i>Halosarpheia retorquens</i>	40	2.16	1.01
<i>Halosarpheia viscosa</i>	34	1.83	0.87
<i>Halosphaeria cucullata</i>	4	0.22	0.10

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<i>Halorosellinia oceanica</i>	29	1.56	0.73
<i>Koralionastes sp.</i>	1	0.05	0.03
<i>Leptosphaeria australiensis</i>	95	5.12	2.40
<i>Lignincola laevis</i>	121	6.53	3.06
<i>Lignincola longirostris</i>	5	0.27	0.13
<i>Lignincola tropica</i>	6	0.32	0.15
<i>Lulworthia grandispora</i>	273	14.72	6.91
<i>Lulworthia sp.I</i>	90	4.85	2.28
<i>Lindra hawaiiensis</i>	45	2.43	1.14
<i>Lulworthia sp.II</i>	18	0.99	0.46
<i>Lulworthia sp.III</i>	8	0.43	0.20
<i>Manglicola sp.</i>	2	0.11	0.05
<i>Marinosphaera mangrovei</i>	278	14.99	7.04
<i>Ocostaspora apilongissima</i>	2	0.11	0.05
<i>Payosphaeria minuta</i>	2	0.11	0.05
<i>Pleospora pelagica</i>	7	0.38	0.18
<i>Periconia prolifica</i>	138	7.44	3.49
<i>Phialophorophoma litoralis</i>	10	0.54	0.25
<i>Phoma sp.</i>	15	0.81	0.38
<i>Phomopsis sp.</i>	1	0.05	0.03
<i>Savoryella lignicola</i>	206	11.11	5.21
<i>Savoryella paucispora</i>	34	1.83	0.86
<i>Salsuginea remicola</i>	2	0.10	0.05
<i>Savoryella sp I</i>	3	0.16	0.08
<i>Savoryella sp II</i>	1	0.05	0.03
<i>Trichocladium alopallonellum</i>	37	1.10	0.94
<i>Trichocladium sp.</i>	6	0.32	0.15
Unidentified anamorph	4	0.22	0.10
Unidentified ascomycete I	1	0.05	0.03
Unidentified ascomycete II	1	0.05	0.03
Unidentified ascomycete III	13	0.22	0.10
Unidentified ascomycete IV	4	0.16	0.08
Unidentified ascomycete V	1	0.05	0.03
Unidentified ascomycete VI	3	0.10	0.05
Unidentified ascomycete VII	2	0.16	0.08
Unidentified ascomycete VIII	3	0.22	0.10
<i>Verrucilina enalia</i>	98	5.29	2.48
<i>Zalerion maritimum</i>	23	1.24	0.58
<i>Zalerion varium</i>	53	2.86	1.34
<i>Zalerion sp.</i>	2	0.11	0.05

\* - Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained during this study divided by total number of wood samples (1854) supporting marine fungi x 100

\*\* - Percent relative abundance (RA) = Number of isolates of a particular species obtained during this study divided by total number of isolates (3951) of all wood samples collected x 100

**Table – 3 Comparison of percent frequency of occurrence of species at each of the 19 locations\***

Name of the fungus	Bek	Azi	Dha-A	Tik	Bey	Pad	Val	Tly-A	Tly-B	Tly-C	Mah-A	Kad-A	Kav	Che	Eda	Vad	Dha-A	Mah-B	Kad-B
<i>Aigialus grandis</i>	0	0	0	0	4.35	0	0	1.53	0.82	4.09	0.74	0	2.70	5	2.30	0	0	0	0
<i>Aigialus mangrovei</i>	0	0	0	0	0	0	1.92	1.22	0.82	0.59	0	0	2.70	0	1.56	0	0	0	0
<i>Aigialus parvus</i>	0	0	0	1.47	0	0	5.77	3.06	3.28	4.67	0	0	4.50	5.83	1.56	0	0	0	0
<i>Aniptodera chesapeakeensis</i>	9.09	20.25	3.45	10.29	10.87	16.28	20.19	25.08	29.51	23.39	11.78	21.79	30.63	30	26.16	27.27	8.33	10.81	14.7
<i>Aniptodera longispora</i>	0	0	0	0	0	0	0	0.61	0	0.59	0	0	0	0	0	0	0	0	0
<i>Aniptodera mangrovei</i>	0	0	0	0	0	0	0.96	0	0.82	0	0	0	0.90	0	0	0	0	0	0
<i>Aniptodera salsuginosa</i>	0	0	0	0	0	0	0	0.31	0	0	0	0	0.80	0	0	0	0	0	0
<i>Aniptodera haispora</i>	0	0	0	0	0	0	0	0.31	0	0	0	0	3.60	0	0	2.27	0	0	0
<i>Aniptodera sp. I</i>	0	0	0	0	0	0	0	0	0	0	2.22	0	0.90	0	0	0	0	0	0
<i>Aniptodera sp. II</i>	0	0	0	0	0	0	0	0.31	0	0	0	0	0	0	0	1.14	0	0	0
<i>Antennospora quadricomuta</i>	38.18	29.11	13.79	19.12	8.70	16.28	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Antennospora salina</i>	1.82	1.27	0	10.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Arenariomyces majusculus</i>	3.64	2.53	1.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Arenariomyces parvulus</i>	3.64	0	0	1.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Arenariomyces trifurcatus</i>	7.27	17.72	8.62	13.24	6.52	6.98	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ascocratera manglicola</i>	0	0	0	0	0	0	0.96	0	0	1.75	0	0	0	0	0	0	0	0	0
<i>Anguillospora sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.27	0	0	0
<i>Ascochyta sp.</i>	0	0	0	0	0	0	0	0	0.82	0	0	0	0	0	2.3	2.27	0	0	0
<i>Bathyascus tropicalis</i>	0	0	0	0	0	0	0	0	2.46	1.75	0	0	0	0	0	0	0	0	0
<i>Biatrispora marina</i>	0	0	0	1.47	0	0	0	0.61	1.64	1.17	0	0	0	0	0	0	0	0	0
<i>Ceriosporopsis halima</i>	1.82	5.06	5.17	5.88	4.35	2.33	0	0.61	0.82	0	0	0	0	0	0	0	0	0	0
<i>Corollospora filiformis</i>	16.36	20.25	3.45	16.18	2.17	13.95	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Corollospora pseudopulchella</i>	0	0	0	0	0	2.33	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cirrenalia basiminuta</i>	0	0	0	0	0	0	2.88	2.14	2.46	3.50	0	0	7.21	3.33	0	0	0	0	0
<i>Cirrenalia fusca</i>	0	1.27	1.72	0	0	0	0	0	0	0	0	10.26	0	0	2.30	0	0	0	0
<i>Cirrenalia macrocephala</i>	0	0	0	1.47	0	0	0	1.83	0	0.59	0	2.56	0.90	0.83	2.30	7.95	0	0	0
<i>Cirrenalia pygmea</i>	0	8.86	5.17	1.47	2.17	2.33	5.77	8.26	7.38	11.69	12.60	8.97	15.32	15.83	6.92	11.36	14.58	8.11	14.7
<i>Cladosporium sp.</i>	0	0	0	0	0	0	0	0	0	0	0	1.28	1.80	0	0	2.27	0	0	0
<i>Dactylospora haliotrepha</i>	1.82	5.06	1.72	2.94	4.35	4.65	6.73	7.03	14.75	4.09	8.15	7.69	9.01	10.33	4.62	6.81	0	0	0
<i>Dryosphaera tropicalis</i>	0	0	0	0	0	0	0	0.31	0	0	0	0	0	0	0	0	0	0	0
<i>Dendryphiella salina</i>	0	0	0	0	0	0	0.96	1.22	0	0	0	0	0	0	7.69	3.40	0	0	0
<i>Halocyphina villosa</i>	0	20.25	8.63	4.41	6.52	0	26.92	33.33	36.07	30.4	21.50	26.92	45.96	36.66	10.71	28.08	2.08	0	0
<i>Halosarpheia abonnis</i>	0	0	0	0	2.17	0	0	1.83	4.10	2.33	2.22	0	3.60	2.50	0.77	1.14	0	0	0
<i>Halosarpheia hamata</i>	0	0	0	0	0	0	0	2.75	2.46	2.92	0	0	0	0	0	0	0	0	0
<i>Halosarpheia marina</i>	3.64	21.52	15.52	8.82	6.52	9.30	38.46	39.14	63.11	31.58	28.14	34.62	31.53	42.50	33.85	35.22	18.75	0	8.82
<i>Halosarpheia minuta</i>	0	0	0	0	2.17	0	8.65	0.31	0	1.17	2.22	0	5.41	0	0	1.14	0	0	0
<i>Halosarpheia ratnagiriensis</i>	0	0	0	0	0	0	2.88	1.22	1.64	0.59	2.22	1.28	5.41	5.83	2.30	0	0	0	0
<i>Halosarpheia retorquens</i>	0	0	0	0	0	0	5.20	5.74	4.68	0	0	1.80	0	2.30	3.40	0	0	0	0
<i>Halosarpheia viscosa</i>	0	0	0	0	0	0	1.22	7.38	5.84	0	0	6.30	3.33	0	0	0	0	0	0
<i>Halosphaeria cucullata</i>	1.82	1.27	1.72	0	2.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Halorosellinia oceanica</i>	1.82	6.33	0	0	4.35	0	5.77	0	0	0	5.16	1.28	2.70	3.33	0	0	0	0	0

(Continued)

Name of the fungus	Bek	Azi	Dha-A	Tik	Bey	Pad	Val	Tly-A	Tly-B	Tly-C	Mah-A	Kad-A	Kav	Che	Eda	Vad	Dha-A	Mah-B	Kad-B
<i>Koralionastes sp.</i>	1.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Leptosphaeria australiensis</i>	0	0	3.45	1.47	8.70	0	3.85	9.17	4.10	6.43	7.40	7.69	7.21	3.33	4.62	4.56	0	0	0
<i>Lignincola laevis</i>	0	5.06	5.17	2.94	4.35	4.65	8.65	8.56	8.20	4.68	7.40	12.82	11.71	9.16	4.62	3.40	0	0	0
<i>Lignincola longirostris</i>	0	0	0	0	0	0	0	0.61	0	0.59	0	0	0	0	0.77	1.14	0	0	0
<i>Lignincola tropica</i>	0	0	0	0	4.35	0	0	0.31	0	0.59	0	0	0	0	1.56	0	0	0	0
<i>Lulworthia grandispora</i>	20	18.99	10.34	12.5	10.89	9.30	8.65	24.77	17.21	16.37	14.07	16.67	8.11	16.66	16.15	0	4.17	2.70	0
<i>Lulworthia sp. I</i>	0	0	1.72	0	2.17	0	0.96	3.36	0.82	7.02	6.67	12.82	1.80	0.83	11.54	7.95	16.67	21.62	8.82
<i>Lindra hawaiiensis</i>	0	0	1.72	0	0	0	7.69	2.14	2.46	2.33	3.74		9.91	5	0	0	0	0	0
<i>Lulworthia sp. II</i>	0	0	0	0	0	0	5.77	0.61	3.28	0	0.74	1.28	3.60	0	0	0	0	0	0
<i>Lulworthia sp. III</i>	0	0	0	4.41	0	6.98	0	0	0	0	0	2.56	0	0	0	0	0	0	0
<i>Manglicola sp.</i>	0	0	0	0	0	0	0	0	0.82	0.59	0	0	0	0	0	0	0	0	0
<i>Marinosphaera mangrovei</i>	0	5.06	5.17	2.94	6.52	6.98	21.15	21.71	13.93	15.20	20	14.10	9.91	16.66	16.15	15.9	25	13.51	11.76
<i>Ocostaspora apilongissima</i>	0	0	0	0	0	0	0	0.31	0.82	0	0	0	0	0	0	0	0	0	0
<i>Payosphaeria minuta</i>	0	0	0	0	0	0	0	0.31	0.82	0	0	0	0	0	0	0	0	0	0
<i>Pleospora pelagica</i>	0	0	0	0	0	0	0	0.81	0	1.17	0	2.56	0	0	0	1.14	0	0	0
<i>Periconia prolifica</i>	7.27	2.53	5.17	2.94	2.17	2.33	11.54	3.36	12.3	1.75	8.15	7.69	11.71	10	11.54	4.56	0	0	0
<i>Phialophorophoma litoralis</i>	0	0	0	0	0	0	0	0.81	0	0	2.22	0	0	0	3.08	1.14	0	0	0
<i>Phoma sp.</i>	0	0	0	0	0	0	0	1.53	0.82	1.75	0	0	0	0	2.30	3.40	0	0	0
<i>Phomopsis sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	0	0	0
<i>Savoryella lignicola</i>	18.18	12.66	12.07	5.88	8.70	18.60	8.65	7.03	3.28	13.45	15.56	10.26	17.12	23.33	11.54	14.77	0	0	0
<i>Savoryella paucispora</i>	0	3.8	0	0	2.17	0	1.92	1.83	1.64	1.75	2.96	2.56	1.80	3.33	2.30	2.27	0	0	0
<i>Salsuginea ramicola</i>	0	0	0	0	0	0	0	0.31	0	0	0	0	0	0	0	1.14	0	0	0
<i>Savoryella sp. I</i>	0	0	0	0	0	0	0	0	0	0	0	2.56	0	0.83	0	0	0	0	0
<i>Savoryella sp. II</i>	0	0	1.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Trichocladium alopallonellum</i>	5.45	0	3.45	4.41	2.17	0	1.92	2.45	2.46	3.50	2.96	3.85	0	0	0	0	0	0	0
<i>Trichocladium sp.</i>	0	0	0	0	0	0	0	0	0	0.59	2.96	0	0	0	0.77	0	0	0	0
Unidentified ascomycete I	0	0	0	0	0	0	0	0	0.82	0	0	0	0	0	0	0	0	0	0
Unidentified ascomycete II	0	0	0	0	0	0	0	0	0	0	0	0	0	0.83	0	0	0	0	0
Unidentified ascomycete III	0	0	1.72	1.47	2.17	2.33	2.88	0.81	0	0	0	2.56	0	0	0.77	1.14	0	0	0
Unidentified ascomycete IV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.08	0	0	0	0
Unidentified ascomycete V	0	0	0	0	0	0	0	0.31	0	0	0	0	0	0	0	0	0	0	0
Unidentified ascomycete VI	0	0	0	0	0	0	0	0	0	1.17	0	0	0	0.83	0	0	0	0	0
Unidentified ascomycete VII	0	0	0	0	0	0	0.96	0	0.82	0	0	0	0	0	0	0	0	0	0
Unidentified ascomycete VIII	0	0	0	0	0	4.65	0	0.81	0	0	0	0	0	0	0	0	0	0	0
Unidentified anamorph	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.55	0	0	0
<i>Verruculina enalia</i>	0	1.27	5.17	5.88	2.17	0	6.73	7.34	3.28	7.02	3.74	6.41	4.50	13.33	5.38	4.55	0	0	0
<i>Zalerion maritimum</i>	7.27	0	5.17	0	0	0	0	2.14	1.64	2.92	1.48	0	0	0	0	0	0	0	0
<i>Zalerion varium</i>	3.64	1.27	5.17	7.35	6.52	11.63	0.96	5.2	4.10	4.09	0	3.85	0	0	0.77	0	0	0	0
<i>Zalerion sp.</i>	0	0	0	0	0	0	0	0.31	0	0	0	0	0	0	0	0	0	0	0

\* Percent frequency of occurrence pertaining to specific location (FO) = Number of isolates of a particular species at one location divided by total number of wood samples collected from that location x 100



**Table – 4 Comparison of percent relative abundance of species at each of the 19 locations\***

Name of the fungus	Bek	Azi	Dha-A	Tik	Bey	Pad	Val	Tly-A	Tly-B	Tly-C	Mah-A	Kad-A	Kav	Che	Eda	Vad	Dha-A	Mah-B	Kad-B
<i>Aigialus grandis</i>	0	0	0	0	3.33	0	0	0.62	0.30	1.67	0.36	0	0.99	1.85	1.13	0	0	0	0
<i>Aigialus mangrovei</i>	0	0	0	0	0	0	0.87	0.50	0.30	0.24	0	0	0.99	0	0.75	0	0	0	0
<i>Aigialus parvus</i>	0	0	0	0.97	0	0	2.61	1.24	1.22	1.91	0	0	1.65	2.16	0.75	0	0	0	0
<i>Aniptodera chesapeakensis</i>	5.88	9.58	3.75	6.80	8.33	11.48	9.13	10.17	10.94	9.55	8.76	9.60	11.25	11.11	12.78	12.97	9.76	19.05	25.00
<i>Aniptodera longispora</i>	0	0	0	0	0	0	0	0.25	0	0.24	0	0	0	0	0	0	0	0	0
<i>Aniptodera mangrovei</i>	0	0	0	0	0	0	0.43	0	0.30	0	0	0	0.33	0	0	0	0	0	0
<i>Aniptodera salsuginosa</i>	0	0	0	0	0	0	0	0.12	0	0	0	0	0.66	0	0	0	0	0	0
<i>Aniptodera haispora</i>	0	0	0	0	0	0	0	0.12	0	0	0	0	1.32	0	0	1.08	0	0	0
<i>Aniptodera sp. I</i>	0	0	0	0	0	0	0	0	0	0	0.36	0	0.33	0	0	0	0	0	0
<i>Aniptodera sp. II</i>	0	0	0	0	0	0	0	0.12	0	0	0	0	0	0	0	0.54	0	0	0
<i>Antennospora quadricornuta</i>	24.70	13.77	10.00	13.59	6.67	11.48	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Antennospora salina</i>	1.18	0.60	0	6.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Arenariomyces majusculus</i>	2.35	1.20	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Arenariomyces parvulus</i>	2.35	0	0	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Arenariomyces trifurcatus</i>	4.11	8.38	6.25	8.74	5.00	4.92	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ascocratera manglicola</i>	0	0	0	0	0	0	0.43	0	0	0.72	0	0	0	0	0	0	0	0	0
<i>Anguillospora sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.62	0	0	0
<i>Ascochyta sp.</i>	0	0	0	0	0	0	0	0	0.30	0	0	0	0	0	1.13	1.08	0	0	0
<i>Bathyascus tropicalis</i>	0	0	0	0	0	0	0	0	0.91	0.76	0	0	0	0	0	0	0	0	0
<i>Biatrispora marina</i>	0	0	0	0.97	0	0	0	0.25	0.65	0.48	0	0	0	0	0	0	0	0	0
<i>Ceriosporopsis halima</i>	1.18	2.40	3.75	3.88	3.33	1.64	0	0.25	1.30	0	0	0	0	0	0	0	0	0	0
<i>Corollospora filiformis</i>	10.59	9.58	2.50	10.68	1.67	9.84	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Corollospora pseudopulchella</i>	0	0	0	0	0	1.64	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cirrenalia basiminuta</i>	0	0	0	0	0	0	1.30	0.87	0.91	1.43	0	0	2.65	12.34	0	0	0	0	0
<i>Cirrenalia fusca</i>	0	0.60	1.25	0	0	0	0	0	0	0	0	4.52	0	0	1.13	0	0	0	0
<i>Cirrenalia macrocephala</i>	0	0	0	0.97	0	0	0	0.74	0	0.24	0	1.13	0.35	0.31	1.13	3.78	0	0	0
<i>Cirrenalia pygmaea</i>	0	4.19	3.75	0.97	1.67	1.64	2.61	3.35	2.74	4.77	6.20	3.95	5.63	5.86	3.38	5.41	17.07	14.28	25.00
<i>Cladosporium sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0.56	0.66	0	0	1.08	0	0	0
<i>Dactylospora haliotrepha</i>	1.18	2.40	1.25	1.94	3.33	3.28	3.04	2.85	5.47	1.67	4.01	3.39	3.31	4.01	2.26	3.24	0	0	0
<i>Dryosphaera tropicalis</i>	0	0	0	0	0	0	0	0.12	0	0	0	0	0	0	0	0	0	0	0
<i>Dendryphiella salina</i>	0	0	0	0	0	0	0.43	0.50	0	0	0	0	0	0	3.76	1.62	0	0	0
<i>Halocyphina villosa</i>	0	9.58	6.25	2.91	5.00	0	12.17	13.52	13.37	12.41	10.50	11.86	16.89	13.58	5.26	13.51	2.44	0	0
<i>Halosarpheia abonnis</i>	0	0	0	0	1.67	0	0	0.74	1.52	0.95	1.09	0	1.32	0.93	0.38	0.54	0	0	0
<i>Halosarpheia hamata</i>	0	0	0	0	0	0	0	1.12	0.91	1.19	0	0	0	0	0	0	0	0	0
<i>Halosarpheia marina</i>	2.35	10.18	10.00	5.83	5.00	6.56	17.39	15.88	23.40	12.89	13.86	15.20	11.58	15.74	16.54	16.76	21.95	0	15.00
<i>Halosarpheia minuta</i>	0	0	0	0	1.67	0	3.91	0.12	0	0.48	1.09	0	1.99	0	0	0.54	0	0	0
<i>Halosarpheia ratnaginiensis</i>	0	0	0	0	0	0	1.30	0.50	0.61	0.24	1.09	0.56	1.99	2.16	1.13	0	0	0	0
<i>Halosarpheia retorquens</i>	0	0	0	0	0	0	0	2.11	2.13	1.91	0	0	0.66	0	1.13	1.62	0	0	0
<i>Halosarpheia viscosa</i>	0	0	0	0	0	0	0	0.50	2.72	2.89	0	0	2.31	1.23	0	0	0	0	0
<i>Halosphaeria cucullata</i>	1.18	0.60	1.25	0	1.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(Continued)

Name of the fungus	Bek	Azi	Dha-A	Tik	Bey	Pad	Val	Tly-A	Tly-B	Tly-C	Mah-A	Kad-A	Kav	Che	Eda	Vad	Dha-A	Mah-B	Kad-B
<i>Halorosellinia oceanica</i>	1.18	2.99	0	0	3.33	0	2.61	0	0	0	2.55	0.56	0.99	1.23	0	0	0	0	0
<i>Koralionastes sp.</i>	1.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Leptosphaeria australiensis</i>	0	0	2.5	0.97	6.67	0	1.74	0.37	1.50	2.63	3.64	3.39	2.65	1.23	2.26	2.12	0	0	0
<i>Lignincola laevis</i>	0	2.40	3.75	1.94	3.33	3.28	3.91	3.47	3.04	1.91	3.64	5.65	4.30	3.40	2.26	1.62	0	0	0
<i>Lignincola longirostris</i>	0	0	0	0	0	0	0	0.25	0	0.24	0	0	0	0	0.38	0.54	0	0	0
<i>Lignincola tropica</i>	0	0	0	0	3.33	0	0	0.12	0	0.24	0	0	0	0	0.75	0	0	0	0
<i>Lulworthia grandispora</i>	12.94	8.98	7.5	7.77	6.67	6.58	3.91	10.05	6.38	6.68	6.93	7.34	2.98	6.17	7.89	0	4.88	4.76	0
<i>Lulworthia sp. I</i>	0	0	1.25	0	1.67	0	0.43	1.36	0.30	2.86	3.28	5.65	0.66	0.31	5.63	3.78	19.51	38.09	15.00
<i>Lindra hawaiiensis</i>	0	0	1.25	0	0	0	3.48	0.87	0.91	0.95	1.82	0	3.64	1.85	0	0	0	0	0
<i>Lulworthia sp. II</i>	0	0	0	0	0	0	2.61	0.25	1.22	0	0.36	0.57	1.32	0	0	0	0	0	0
<i>Lulworthia sp. III</i>	0	0	0	2.91	0	4.92	0	0	0	0	0	1.13	0	0	0	0	0	0	0
<i>Manglicola sp.</i>	0	0	0	0	0	0	0	0	0.30	0.24	0	0	0	0	0	0	0	0	0
<i>Marinosphaera mangrovei</i>	0	2.40	3.75	1.94	5.00	4.92	9.57	8.81	5.17	6.68	9.85	6.21	3.64	6.17	7.89	7.57	29.27	23.81	20.00
<i>Ocostaspora apilongissima</i>	0	0	0	0	0	0	0	0.12	0.30	0	0	0	0	0	0	0	0	0	0
<i>Payosphaeria minuta</i>	0	0	0	0	0	0	0	0.12	0.30	0	0	0	0	0	0	0	0	0	0
<i>Pleospora pelagica</i>	0	0	0	0	0	0	0	0.25	0	0.48	0	1.13	0	0	0	0.54	0	0	0
<i>Periconia prolifica</i>	4.71	1.20	3.75	1.97	1.67	1.64	5.22	1.36	4.56	6.21	4.01	3.39	4.30	3.70	5.63	2.12	0	0	0
<i>Phialophorophoma litoralis</i>	0	0	0	0	0	0	0	0.25	0	0	1.09	0	0	0	1.50	0.54	0	0	0
<i>Phoma sp.</i>	0	0	0	0	0	0	0	0.62	0.30	0.72	0	0	0	0	1.13	1.62	0	0	0
<i>Phomopsis sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.54	0	0	0
<i>Savoryella lignicola</i>	11.77	5.99	8.75	3.88	6.67	13.11	3.91	2.85	1.22	5.49	7.66	4.52	6.29	8.64	5.63	7.03	0	0	0
<i>Savoryella paucispora</i>	0	1.80	0	0	1.67	0	0.87	0.74	0.61	0.72	1.46	1.13	0.66	1.23	1.13	1.08	0	0	0
<i>Salsuginea ramicola</i>	0	0	0	0	0	0	0	0.12	0	0	0	0	0	0	0	0.54	0	0	0
<i>Savoryella sp. I</i>	0	0	0	0	0	0	0	0	0	0	0	0.57	0	0.31	0	0	0	0	0
<i>Savoryella sp. II</i>	0	0	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Trichocladium alopallonellum</i>	3.53	0	2.50	2.91	1.67	0	0.87	1.24	0.91	1.43	1.46	1.69	0	0	0	0	0	0	0
<i>Trichocladium sp.</i>	0	0	0	0	0	0	0	0	0	0.24	1.46	0	0	0	0.38	0	0	0	0
Unidentified ascomycete I	0	0	0	0	0	0	0	0	0.30	0	0	0	0	0	0	0	0	0	0
Unidentified ascomycete II	0	0	0	0	0	0	0	0	0	0	0	0	0	0.31	0	0	0	0	0
Unidentified ascomycete III	0	0	1.25	0.97	1.67	1.64	1.30	0.25	0	0	0	1.13	0	0	0.38	0.54	0	0	0
Unidentified ascomycete IV	0	0	0	0	0	0	0	0	0	0.48	0	0	0	0	0.38	0	0	0	0
Unidentified ascomycete V	0	0	0	0	0	0	0	0.25	0	0	0	0	0	0	0	0	0	0	0
Unidentified ascomycete VI	0	0	0	0	0	0	0	0	0	2	0	0	0	0.31	0	0	0	0	0
Unidentified ascomycete VII	0	0	0	0	0	0	0.43	0	0.30	0	0	0	0	0	0	0	0	0	0
Unidentified ascomycete VIII	0	0	0	0	0	3.28	0	0.25	0	0	0	0	0	0	0	0	0	0	0
Unidentified anamorph	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.12	0	0	0
<i>Verruculina enalia</i>	0	0.60	3.75	3.88	1.67	0	3.04	2.98	1.22	2.86	1.82	2.82	1.65	4.94	2.63	2.12	0	0	0
<i>Zalerion maritimum</i>	4.71	0	3.75	0	0	0	0	0.87	0.61	1.20	0.73	0	0	0	0	0	0	0	0
<i>Zalerion varium</i>	2.35	0.60	3.75	4.85	5.00	8.20	0.43	2.11	1.52	1.67	0	1.69	0	0	1.50	0	0	0	0
<i>Zalerion sp.</i>	0	0	0	0	0	0	0	0.25	0	0	0	0	0	0	0	0	0	0	0

\* Percent relative abundance pertaining to specific location (RA) = Number of isolates of a particular species at one location divided by total number of fungal isolates obtained from that location x 100

**Table – 5 Number of isolates, Percent frequency of occurrence and percent relative abundance of species obtained during different seasons.**

Name of the Fungi	Monsoon			Post monsoon			Pre monsoon		
	No. of isolates	* FO	** RA	No. of isolates	* FO	** RA	No. of isolates	* FO	** RA
<i>Aigialus grandis</i>	9	1.44	0.71	9	1.45	0.63	10	1.65	0.80
<i>Aigialus mangrovei</i>	2	0.32	0.16	8	1.29	0.53	3	0.50	0.23
<i>Aigialus parvus</i>	9	1.44	0.71	20	3.22	1.41	14	2.31	1.11
<i>Aniptodera chesapeakeensis</i>	150	23.92	11.76	128	20.61	18.18	126	20.79	10.03
<i>Aniptodera longispora</i>	1	0.16	0.08	2	0.32	0.14	0	0	0
<i>Aniptodera mangrovei</i>	1	0.16	0.08	1	0.16	0.07	1	0.17	0.08
<i>Aniptodera salsuginosa</i>	2	0.32	0.16	0	0	0	1	0.17	0.08
<i>Aniptodera haispora</i>	0	0	0	4	0.64	0.28	3	0.50	0.23
<i>Aniptodera sp. I</i>	1	0.16	0.08	3	0.48	0.21	0	0	0
<i>Aniptodera sp. II</i>	0	0	0	1	0.16	0.07	1	0.17	0.08
<i>Antennospora quadricornuta</i>	18	2.87	1.41	36	5.80	2.54	23	3.80	1.83
<i>Antennospora salina</i>	2	0.32	0.16	5	0.81	0.35	2	0.33	0.16
<i>Arenariomyces majusculus</i>	2	0.32	0.16	1	0.16	0.07	2	0.33	0.16
<i>Arenariomyces parvulus</i>	0	0	0	2	0.32	0.14	1	0.17	0.08
<i>Arenariomyces trifurcatus</i>	13	2.07	1.02	11	1.77	0.77	14	2.31	1.11
<i>Ascocratera manglicola</i>	0	0	0	1	0.16	0.07	3	0.50	.23
<i>Anguillospora sp.</i>	1	0.16	0.08	2	0.32	0.14	0	0	0
<i>Ascochyta sp.</i>	1	0.16	0.08	3	0.48	0.21	2	0.33	0.16
<i>Bathyascus tropicalis</i>	3	0.48	0.24	2	0.32	0.14	1	0.17	0.08
<i>Biatrispora marina</i>	2	0.32	0.16	3	0.48	.21	2	0.33	0.16
<i>Ceriosporopsis halima</i>	4	0.64	0.31	4	0.64	0.28	10	1.65	0.79
<i>Corollospora filiformis</i>	15	2.39	1.18	14	2.25	0.99	16	2.64	1.27
<i>Corollospora pseudopulchella</i>	0	0	0	1	0.16	0.07	0	0	0
<i>Cirrenalia basiminuta</i>	8	1.28	0.63	13	2.09	0.92	10	1.65	0.79
<i>Cirrenalia fusca</i>	4	0.64	0.31	3	0.48	0.21	6	0.99	0.48
<i>Cirrenalia macrocephala</i>	7	1.12	0.55	8	1.29	0.56	7	1.16	0.56
<i>Cirrenalia pygmea</i>	52	8.29	4.09	65	10.47	4.56	52	8.58	4.14
<i>Cladosporium sp.</i>	1	0.16	0.08	3	0.48	0.21	1	0.17	0.08
<i>Dactylospora haliotrepha</i>	27	4.31	2.12	49	7.89	3.45	43	10.40	5.02
<i>Dryosphaera tropica</i>	1	0.16	0.08	0	0	0	0	0	0
<i>Dendryphiella salina</i>	8	1.20	0.63	6	0.97	0.42	4	0.66	0.32
<i>Halocyphina villosa</i>	211	33.67	16.54	169	27.21	11.90	65	10.73	5.18
<i>Halosarpheia abonnis</i>	4	0.64	0.31	10	1.51	0.70	14	2.31	1.11
<i>Halosarpheia hamata</i>	1	0.16	0.08	3	0.48	0.21	13	2.15	1.14
<i>Halosarpheia marina</i>	197	31.27	15.45	187	30.11	13.17	193	32.07	15.45
<i>Halosarpheia minuta</i>	6	0.96	0.47	14	2.25	0.99	3	0.50	0.23
<i>Halosarpheia ratnagiriensis</i>	3	0.48	0.24	13	2.09	0.92	14	2.31	1.11
<i>Halosarpheia retorquens</i>	17	2.71	1.33	12	1.93	0.85	11	1.08	0.88
<i>Halosarpheia viscosa</i>	14	2.23	1.10	9	1.45	0.63	11	1.08	0.88
<i>Halosphaeria cucullata</i>	1	0.16	0.08	2	0.32	0.14	1	0.17	0.08

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<i>Halorosellinia oceanica</i>	11	1.75	0.86	9	1.45	0.63	9	1.49	0.72
<i>Koralionastes sp.</i>	0	0	0	0	0	0	1	0.17	0.08
<i>Leptosphaeria australiensis</i>	23	3.67	1.80	44	7.09	3.10	28	4.62	2.22
<i>Lignincola laevis</i>	30	4.78	2.35	44	7.09	3.10	47	7.76	3.74
<i>Lignincola longirostris</i>	4	0.64	0.31	0	0	0	1	0.17	0.08
<i>Lignincola tropica</i>	1	0.16	0.08	1	0.16	0.07	4	0.66	0.32
<i>Lulworthia grandispora</i>	62	9.89	4.86	102	16.42	7.18	109	17.99	8.68
<i>Lulworthia sp.I</i>	30	4.78	2.35	29	4.67	2.04	31	5.12	2.47
<i>Lindra hawaiiensis</i>	17	2.71	1.33	12	1.93	0.85	16	2.64	1.27
<i>Lulworthia sp.II</i>	6	0.96	0.47	9	1.45	0.63	3	0.50	0.23
<i>Lulworthia sp.III</i>	2	0.32	0.16	1	0.16	0.07	5	0.83	0.40
<i>Manglicola sp.</i>	0	0	0	1	0.16	0.07	1	0.17	0.08
<i>Marinosphaera mangrovei</i>	98	15.63	7.69	91	14.65	6.41	89	14.60	7.09
<i>Ocostaspora apilongissima</i>	0	0	0	0	0	0	2	0.33	0.16
<i>Payosphaeria minuta</i>	0	0	0	1	0.16	0.07	1	0.17	0.08
<i>Periconia prolifica</i>	49	7.81	3.84	58	9.34	4.08	31	5.12	2.47
<i>Pleospora pelagica</i>	1	0.16	0.08	4	0.64	0.28	2	0.33	0.16
<i>Phialophorophoma litoralis</i>	4	0.64	0.31	4	0.64	0.28	2	0.33	0.16
<i>Phoma sp.</i>	5	0.80	0.39	8	1.29	0.56	2	0.33	0.16
<i>Phomopsis sp.</i>	0	0	0	1	0.16	0.07	0	0	0
<i>Savoryella lignicola</i>	58	9.25	4.55	73	11.76	5.14	75	12.38	5.97
<i>Savoryella paucispora</i>	11	1.75	0.86	15	2.42	1.07	8	1.32	0.63
<i>Salsuginea ramicola</i>	1	0.16	0.08	1	0.16	0.07	0	0	0
<i>Savoryella sp. I</i>	0	0	0	2	0.32	0.14	1	0.17	0.08
<i>Savoryella sp. II</i>	0	0	0	1	0.16	0.07	0	0	0
<i>Trichocladium alopallonellum</i>	8	1.28	0.63	10	1.61	0.70	19	3.14	1.51
<i>Trichocladium sp.</i>	3	0.48	0.24	2	0.32	0.14	1	0.17	0.08
Unidentified anamorph I	2	0.32	0.16	2	0.32	0.14	0	0	0
Unidentified ascomycete I	0	0	0	0	0	0	1	0.17	0.08
Unidentified ascomycete II	0	0	0	0	0	0	1	0.17	0.08
Unidentified ascomycete III	1	0.16	0.08	5	0.81	0.35	7	1.16	0.56
Unidentified ascomycete IV	3	0.48	0.24	1	0.16	0.07	0	0	0
Unidentified ascomycete V	0	0	0	0	0	0	1	0.17	0.08
Unidentified ascomycete VI	2	0.32	0.16	1	0.16	0.07	0	0	0
Unidentified ascomycete VII	0	0	0	1	0.16	0.07	1	0.17	0.08
Unidentified ascomycete VIII	0	0	0	2	0.32	0.16	1	0.17	0.17
<i>Verruculina enalia</i>	23	3.67	1.80	35	5.63	2.16	40	6.60	3.18
<i>Zalerion maritimum</i>	8	1.28	0.63	5	0.81	0.35	10	1.65	0.80
<i>Zalerion varium</i>	14	2.23	1.10	18	2.90	1.27	21	3.47	1.67
<i>Zalerion sp.</i>	1	0.16	0.08	0	0	0	1	0.17	0.08
<b>Total isolates</b>	1275			1420			1256		

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained during a season divided by total number of wood samples collected during that particular season x 100.

\*\* Percent relative abundance (RA) = Number of isolates of a particular species obtained during a season divided by total number of fungal isolates obtained during that season.

**Table - 6 List of marine fungi isolated from *Acanthus ilicifolius* with number of isolates obtained during monsoon, post-monsoon & pre-monsoon seasons and total number of isolates of each species with percent frequency of occurrence & percent relative abundance**

Name	M	PM	PrM	TOTAL	* FO	** RA
<i>Aniptodera chesapeakensis</i>	29	35	29	93	40.97	19.46
<i>Aniptodera sp.I</i>	1	1	0	2	0.88	0.42
<i>Ascochyta sp.</i>	0	1	0	1	0.44	0.21
<i>Cirrenalia basiminuta</i>	0	0	1	1	0.44	0.21
<i>Cirrenalia fusca</i>	2	1	2	5	2.20	1.05
<i>Cirrenalia macrocephala</i>	2	1	0	3	1.32	0.63
<i>Cirrenalia pygmea</i>	11	9	5	25	11.01	5.23
<i>Dactylospora haliotrepha</i>	1	0	1	2	0.88	0.42
<i>Dendryphiella salina</i>	1	1	0	2	0.88	0.42
<i>Halosarpheia hamata</i>	0	0	1	1	0.44	0.21
<i>Halosarpheia marina</i>	24	34	29	87	38.33	18.20
<i>Halosarpheia minuta</i>	0	4	2	6	2.64	1.26
<i>Halorosellinia oceanica</i>	1	0	0	1	0.44	0.21
<i>Halosarpheia retorquens</i>	4	1	1	6	2.64	1.26
<i>Halosarpheia viscosa</i>	5	2	6	13	5.73	2.72
<i>Leptosphaeria australiensis</i>	6	15	5	26	11.45	5.44
<i>Lulworthia grandispora</i>	0	2	2	4	1.76	0.84
<i>Lindra hawaiiensis</i>	3	4	5	12	5.28	2.51
<i>Lignincola laevis</i>	5	12	14	31	13.66	6.49
<i>Lignincola longirostris</i>	2	0	0	2	0.88	0.42
<i>Lulworthia sp.I</i>	6	2	11	19	8.37	3.97
<i>Lulworthia sp.II</i>	0	4	1	5	2.20	1.05
<i>Marinosphaera mangrovei</i>	10	13	0	23	10.13	4.81
<i>Periconia prolifica</i>	15	22	8	45	19.82	9.41
<i>Phialophorophoma litoralis</i>	0	1	0	1	0.44	0.21
<i>Phoma sp.</i>	0	2	0	2	0.88	0.42
<i>Savoryella lignicola</i>	9	21	13	43	18.94	8.99
<i>Savoryella paucispora</i>	0	1	0	1	0.44	0.21
<i>Trichocladium alopallonellum</i>	4	1	2	7	3.08	1.46
<i>Trichocladium sp.</i>	0	0	1	1	0.44	0.21
Unidentified ascomycete IV	1	0	0	1	0.44	0.21
<i>Zalerion maritimum</i>	0	1	0	1	0.44	0.21
<i>Zalerion varium</i>	1	0	5	6	2.64	1.26
TOTAL	143	191	144	478		

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from *Acanthus ilicifolius* divided by number of *Acanthus ilicifolius* wood samples (227) supporting marine fungi x 100

\*\*Percent relative abundance (RA) = Number of isolates of particular species obtained from *Acanthus ilicifolius* divided by total number of fungal isolates on *Acanthus ilicifolius* wood samples (478) x 100

**Table – 7 List of marine fungi isolated from *Avicennia* with number of isolates obtained during monsoon, post-monsoon & pre-monsoon seasons and total number of isolates of each species with percent frequency of occurrence & percent relative abundance**

Name	M	PM	PrM	TOTAL	* FO	** RA
<i>Aigialus grandis</i>	1	0	0	1	0.30	0.13
<i>Aigialus mangrovei</i>	0	1	1	2	0.60	0.26
<i>Aigialus parvus</i>	2	6	1	9	2.74	1.16
<i>Aniptodera chesapeakeensis</i>	27	23	19	69	21.04	8.87
<i>Aniptodera haispora</i>	0	2	1	3	0.60	0.39
<i>Aniptodera longispora</i>	1	0	0	1	0.30	0.13
<i>Aniptodera salsuginosa</i>	1	0	0	1	0.30	0.13
<i>Aniptodera sp. II</i>	0	1	0	1	0.30	0.13
<i>Ascochyta sp.</i>	0	0	1	1	0.30	0.13
<i>Bathyascus tropicalis</i>	3	1	1	5	1.50	0.64
<i>Biatriospora marina</i>	0	1	1	2	0.60	0.26
<i>Ceriosporopsis halima</i>	1	0	0	1	0.30	0.13
<i>Cirrenalia basiminuta</i>	2	4	2	8	2.40	1.03
<i>Cirrenalia fusca</i>	1	1	1	3	0.90	0.39
<i>Cirrenalia macrocephala</i>	1	2	1	4	1.20	0.51
<i>Cirrenalia pygmea</i>	7	9	10	26	7.93	3.34
<i>Cladosporium sp.</i>	0	1	0	1	0.30	0.13
<i>Dactylospora haliotrepha</i>	4	5	12	21	6.40	2.70
<i>Halocyphina villosa</i>	62	44	11	117	35.67	15.02
<i>Halosarpheia abonnis</i>	0	4	3	7	2.13	0.90
<i>Halosarpheia hamata</i>	1	2	3	6	1.83	0.77
<i>Halosarpheia marina</i>	41	29	41	111	33.84	14.25
<i>Halosarpheia minuta</i>	3	2	0	5	1.5	0.64
<i>Halosarpheia ratnagiriensis</i>	0	2	2	4	1.2	0.51
<i>Halosarpheia retorquens</i>	4	4	2	10	3.3	1.28
<i>Halosarpheia viscosa</i>	5	1	1	7	2.13	0.90
<i>Halorosellinia oceanica</i>	2	2	5	9	2.70	1.16
<i>Lignincola leavis</i>	10	9	7	26	7.93	3.34
<i>Lignincola longirostris</i>	1	0	0	1	0.30	0.13

(Continued)

<i>Lignicola tropica</i>	0	0	1	1	0.30	0.13
<i>Lulworthia grandispora</i>	10	20	30	60	18.29	7.70
<i>Lulworthia sp. I</i>	5	6	7	18	5.49	2.31
<i>Lindra hawaiiensis</i>	6	4	2	12	3.66	1.54
<i>Lulworthia sp. II</i>	2	2	0	4	1.22	0.51
<i>Marinosphaera mangrovei</i>	22	17	35	74	22.56	9.50
<i>Payosphaeria minuta</i>	0	0	1	1	0.30	0.13
<i>Pleospora pelagica</i>	1	4	2	7	2.13	0.90
<i>Periconia prolifica</i>	8	9	6	23	7.01	2.95
<i>Phialophorophoma litoralis</i>	1	0	0	1	0.30	0.13
<i>Phoma sp.</i>	1	1	0	2	0.60	0.26
<i>Savoryella lignicola</i>	13	14	21	48	14.63	6.16
<i>Savoryella paucispora</i>	5	2	2	9	2.74	1.16
<i>Salsuginea ramicola</i>	1	1	0	2	0.60	0.26
<i>Savoryella sp. I</i>	0	0	1	1	0.30	0.13
<i>Trichocladium alopallonellum</i>	0	1	2	3	0.90	0.39
<i>Trichocladium sp.</i>	0	2	0	2	0.60	0.26
Unidentified ascomycete I	1	1	0	2	0.60	0.26
Unidentified ascomycete III	0	1	1	2	0.60	0.26
Unidentified ascomycete IV	0	1	0	1	0.30	0.13
Unidentified ascomycete V	0	0	1	1	0.30	0.13
Unidentified ascomycete VI	0	1	0	1	0.30	0.13
Unidentified ascomycete VII	0	1	1	2	0.60	0.26
<i>Verruculina enalia</i>	6	6	13	25	7.62	3.21
<i>Zalerion maritimum</i>	1	1	1	3	0.90	0.39
<i>Zalerion varium</i>	3	4	3	10	3.00	1.28
<i>Zalerion sp.</i>	1	0	1	2	0.60	0.26
TOTAL	267	255	257	779		

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from *Avicennia* divided by number of *Avicennia* wood samples (328) x 100

\*\*Percent relative abundance (RA) = Number of isolates of particular species obtained from *Avicennia* divided by total number of fungal isolates on *Avicennia* wood samples (779) x 100

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**Table – 8 List of marine fungi isolated from *Bruguiera* with number of isolates obtained during monsoon, post-monsoon & pre-monsoon season and total number of isolates of each species with percent frequency of occurrence & percent relative abundance.**

Name	M	PM	PrM	TOTAL	* FO	** RA
<i>Aigialus grandis</i>	1	0	0	1	0.34	0.15
<i>Aigialus mangrovei</i>	0	2	0	2	0.68	0.29
<i>Aigialus parvus</i>	1	0	1	2	0.68	0.29
<i>Aniptodera chesapeakeensis</i>	25	24	26	75	25.77	10.93
<i>Aniptodera longispora</i>	0	2	0	2	0.68	0.29
<i>Aniptodera mangrovei</i>	1	0	1	2	0.68	0.29
<i>Aniptodera salsuginosa</i>	1	0	0	1	0.34	0.15
<i>Ascocratera manglicola</i>	0	0	2	2	0.68	0.29
<i>Biatriospora marina</i>	0	1	1	2	0.68	0.29
<i>Cirrenalia basiminuta</i>	1	2	2	5	1.72	0.73
<i>Cirrenalia fusca</i>	0	0	1	1	0.34	0.15
<i>Cirrenalia macrocephala</i>	1	0	1	2	0.68	0.29
<i>Cirrenalia pygmaea</i>	5	16	8	29	9.97	4.23
<i>Cladosporium sp.</i>	1	2	1	4	1.37	0.58
<i>Dactylospora haliotrepha</i>	5	12	4	21	7.22	3.06
<i>Dendryphiella salina</i>	3	2	1	6	2.06	0.87
<i>Halocyphina villosa</i>	54	41	12	107	36.77	15.60
<i>Halosarpheia abonnis</i>	1	0	1	2	0.68	0.29
<i>Halosarpheia hamata</i>	0	1	4	5	1.72	0.73
<i>Halosarpheia marina</i>	42	31	28	101	34.71	14.72
<i>Halosarpheia minuta</i>	1	5	1	7	2.41	1.02
<i>Halosarpheia ratnagiriensis</i>	0	0	2	2	0.68	0.29
<i>Halosarpheia retorquens</i>	5	2	2	9	3.09	1.31
<i>Halosarpheia viscosa</i>	1	2	2	5	1.72	0.73
<i>Halorosellinia oceanica</i>	2	1	0	3	1.03	0.44
<i>Leptosphaeria australiensis</i>	8	8	6	22	7.56	3.21
<i>Lignincola leavis</i>	2	10	11	23	7.90	3.35
<i>Lignincola longirostris</i>	1	0	0	1	0.34	0.15
<i>Lignincola tropica</i>	0	0	1	1	0.34	0.15

(Continued)



<i>Lulworthia grandispora</i>	6	21	17	44	15.12	6.41
<i>Lulworthia sp. I</i>	5	9	6	20	6.80	2.92
<i>Lindra hawaiiensis</i>	5	0	1	6	2.06	0.87
<i>Lulworthia sp. II</i>	3	2	1	6	2.06	0.87
<i>Marinosphaera mangrovei</i>	20	18	17	55	18.90	8.02
<i>Periconia prolifica</i>	10	9	8	27	9.28	3.94
<i>Phialophorophoma litoralis</i>	0	1	0	1	0.34	0.15
<i>Phoma sp.</i>	0	1	0	1	0.34	0.15
<i>Savoryella lignicola</i>	9	11	18	38	13.06	5.54
<i>Savoryella paucispora</i>	3	2	1	6	2.06	0.87
<i>Trichocladium alopallonellum</i>	1	2	5	8	7.75	1.17
Unidentified ascomycete III	0	0	2	2	0.68	0.29
Unidentified ascomycete VI	2	0	0	2	0.68	0.29
Unidentified ascomycete VIII	0	0	1	1	0.34	0.15
<i>Verruculina enalia</i>	4	7	5	16	5.50	2.33
<i>Zalerion maritimum</i>	0	0	4	4	1.37	0.58
<i>Zalerion varium</i>	0	3	1	4	1.37	0.58
TOTAL	230	250	206	686		

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from *Bruguiera* divided by number of *Bruguiera* wood samples (291) x 100

\*\*Percent relative abundance (RA) = Number of isolates of particular species obtained from *Bruguiera* divided by total number of fungal isolates on *Bruguiera* wood samples (686) x 100

**Table – 9 Marine fungi isolated from driftwood with number of isolates obtained during monsoon, post-monsoon & pre-monsoon season and total number of isolates of each species with percent frequency of occurrence & percent relative abundance**

Name	M	PM	PrM	TOTAL	* FO	** RA
<i>Aigialus grandis</i>	1	0	1	2	1.57	0.94
<i>Aigialus parvus</i>	0	0	1	1	0.79	0.47
<i>Aniptodera chesapeakeensis</i>	6	4	8	18	14.17	8.49
<i>Antennospora quadricornuta</i>	6	10	5	21	16.57	9.91
<i>Antennospora salina</i>	1	1	2	4	3.15	1.89
<i>Arenariomyces majusculus</i>	2	0	1	3	2.36	1.42
<i>Arenariomyces trifurcatus</i>	4	3	2	9	7.09	4.25
<i>Biatrispora marina</i>	1	0	0	1	0.79	0.47
<i>Corollospora filiformis</i>	6	2	1	9	7.09	4.25
<i>Cirrenalia fusca</i>	0	0	1	1	0.79	0.47
<i>Ceriosporopsis halima</i>	1	1	0	2	1.57	0.94
<i>Cirrenalia macrocephala</i>	0	0	1	1	0.79	0.47
<i>Cirrenalia pygmea</i>	2	2	4	8	6.30	3.77
<i>Dactylospora haliotrepha</i>	0	1	1	2	1.57	0.94
<i>Halocyphina villosa</i>	2	4	5	11	8.66	5.19
<i>Halosarpheia marina</i>	6	6	8	20	15.79	9.43
<i>Halosarpheia minuta</i>	1	0	0	1	0.79	0.47
<i>Halosphaeria cucullata</i>	0	0	1	1	0.79	0.47
<i>Halorosellinia oceanica</i>	1	3	2	6	7.75	2.83
<i>Leptosphaeria australiensis</i>	1	1	1	3	2.36	1.42
<i>Lignincola leavis</i>	3	2	4	9	7.09	4.25
<i>Lignincola tropica</i>	0	1	0	1	0.79	0.47
<i>Lulworthia grandispora</i>	4	6	4	14	11.02	6.60
<i>Lulworthia sp. I</i>	0	0	1	1	0.79	0.47
<i>Lindra hawaiiensis</i>	0	0	1	1	0.79	0.47
<i>Lulworthia sp. III</i>	1	0	2	3	2.36	1.42
<i>Marinosphaera mangrovei</i>	3	3	3	9	7.10	4.25
<i>Periconia prolifica</i>	2	1	1	4	3.15	1.89
<i>Savoryella lignicola</i>	6	8	9	23	18.11	10.85
<i>Savoryella paucispora</i>	0	2	0	2	1.57	0.94
<i>Trichocladium alopallonellum</i>	0	0	2	2	1.57	0.94
Unidentified ascomycete III	0	0	2	2	1.57	0.94
Unidentified ascomycete VIII	0	2	0	2	1.57	0.94
<i>Verruculina enalia</i>	0	2	3	5	3.94	2.36
<i>Zalerion maritimum</i>	3	0	0	3	2.36	1.42
<i>Zalerion varium</i>	3	3	1	7	5.51	3.30
TOTAL	66	68	78	212		

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from drift wood divided by number of drift wood samples (127) x 100

\*\*Percent Relative abundance (RA) = Number of isolates of particular species obtained from drift wood divided by total number of fungal isolates on drift wood samples (212) x 100

**Table – 10 List of marine fungi isolated from intertidal wood with number of isolates obtained during monsoon, post-monsoon & pre-monsoon season and total number of isolates of each species with percent frequency of occurrence & percent relative abundance**

Name	M	PM	PrM	TOTAL	* FO	** RA
<i>Aigialus grandis</i>	0	1	2	3	0.53	0.27
<i>Aigialus mangrovei</i>	1	1	1	3	0.53	0.27
<i>Aigialus parvus</i>	0	3	3	6	1.06	0.54
<i>Aniptodera chesapeakeensis</i>	41	33	36	110	19.43	9.99
<i>Aniptodera haispora</i>	0	1	1	2	0.36	0.09
<i>Aniptodera salsuginosa</i>	0	0	1	1	0.18	0.09
<i>Aniptodera sp. I</i>	0	1	0	1	0.18	0.09
<i>Aniptodera sp. II</i>	0	0	1	1	0.18	0.09
<i>Antennospora quadricornuta</i>	11	18	16	45	7.95	4.09
<i>Antennospora salina</i>	0	2	0	2	0.36	0.18
<i>Arenariomyces trifurcatus</i>	0	1	3	4	0.71	0.36
<i>Anguillospora sp.</i>	1	2	0	3	0.53	0.27
<i>Ascochyta sp.</i>	1	2	0	3	0.53	0.27
<i>Bathyascus tropicalis</i>	0	1	0	1	0.18	0.09
<i>Biatrispora marina</i>	0	1	0	1	0.18	0.09
<i>Ceriosporopsis halima</i>	0	1	4	5	0.88	0.45
<i>Cirrenalia basiminuta</i>	3	4	4	11	1.94	1.00
<i>Cirrenalia fusca</i>	0	0	1	1	0.18	0.09
<i>Cirrenalia macrocephala</i>	3	4	3	10	1.80	0.91
<i>Cirrenalia pygmea</i>	23	17	19	59	10.42	5.36
<i>Dactylospora haliotrepha</i>	9	20	15	44	7.77	4.00
<i>Dryosphaera navigans</i>	1	0	0	1	0.18	0.09
<i>Dendryphiella salina</i>	4	2	2	8	1.41	0.73
<i>Halocyphina villosa</i>	52	47	24	123	21.73	11.17
<i>Halosarpheia abonnis</i>	1	2	2	5	0.88	0.45
<i>Halosarpheia hamata</i>	0	0	2	2	0.36	0.18
<i>Halosarpheia marina</i>	54	53	57	164	28.98	14.90
<i>Halosarpheia minuta</i>	1	2	0	3	0.53	0.27
<i>Halosarpheia ratnagiriensis</i>	1	4	2	7	5.51	0.64
<i>Halosarpheia retorquens</i>	3	5	4	12	2.12	1.09
<i>Halosarpheia viscosa</i>	2	2	1	5	0.88	0.45
<i>Halosphaeria cucullata</i>	1	0	0	1	0.18	0.09
<i>Halorosellinia oceanica</i>	3	2	1	6	1.06	0.54
<i>Koralionastes sp.</i>	0	0	1	1	0.18	0.09
<i>Leptosphaeria australiensis</i>	5	7	11	23	4.06	2.09

(Continued)

<i>Lignincola leavis</i>	8	8	6	22	3.89	2.00
<i>Lignincola tropica</i>	0	0	1	1	0.18	0.09
<i>Lulworthia grandispora</i>	28	34	27	89	15.72	8.08
<i>Lulworthia sp. I</i>	13	11	7	31	5.48	2.82
<i>Lindra hawaiiensis</i>	3	3	1	7	1.24	0.64
<i>Lulworthia sp. II</i>	0	0	1	1	0.18	0.09
<i>Lulworthia sp. III</i>	1	1	3	5	0.88	0.45
<i>Marinosphaera mangrovei</i>	34	27	21	82	14.49	7.45
<i>Payosphaeria minuta</i>	0	1	0	1	0.18	0.09
<i>Periconia prolifica</i>	13	14	8	35	6.18	3.18
<i>Phialophorophoma litoralis</i>	3	2	1	6	1.06	0.54
<i>Phomopsis sp.</i>	0	1	0	1	0.18	0.09
<i>Phoma sp.</i>	4	2	2	8	1.41	0.73
<i>Savoryella lignicola</i>	17	13	11	41	7.24	3.72
<i>Savoryella paucispora</i>	3	6	2	11	1.94	1.00
<i>Savoryella sp. I</i>	0	1	0	1	0.18	0.09
<i>Savoryella sp. II</i>	0	1	0	1	0.18	0.09
<i>Trichocladium alopallonellum</i>	3	6	6	15	2.65	1.36
<i>Trichocladium sp.</i>	3	0	0	3	0.53	0.27
Unidentified anamorph I	1	1	0	2	0.36	0.18
Unidentified ascomycete I	0	0	1	1	0.18	0.09
Unidentified ascomycete II	0	1	0	1	0.18	0.09
Unidentified ascomycete III	1	3	0	4	0.72	0.36
Unidentified ascomycete IV	2	0	0	2	0.36	0.18
<i>Verruculina enalia</i>	6	13	9	28	4.95	2.54
<i>Zalerion maritimum</i>	3	0	5	8	1.48	0.73
<i>Zalerion varium</i>	4	6	7	17	3.00	1.54
TOTAL	371	394	336	1101		

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from intertidal wood samples divided by number of intertidal wood samples (566) x 100

\*\*Percent relative abundance (RA) = Number of isolates of particular species obtained from intertidal wood samples divided by total number of fungal isolates on intertidal wood samples (1101) x 100

**Table – 11 List of marine fungi isolated from *Rhizophora* with number of isolates obtained during monsoon, post-monsoon & pre-monsoon season and total number of isolates of each species with percent frequency of occurrence & percent relative abundance**

Name	M	PM	PrM	TOTAL	* FO	** RA
<i>Aigialus grandis</i>	6	8	7	21	9.25	3.71
<i>Aigialus mangrovei</i>	1	4	1	6	2.64	1.06
<i>Aigialus parvus</i>	6	11	8	25	11.01	4.42
<i>Aniptodera chesapeakeensis</i>	22	7	6	35	15.42	6.18
<i>Aniptodera mangrovei</i>	0	1	0	1	0.44	0.18
<i>Aniptodera haispora</i>	0	1	1	2	0.88	0.35
<i>Aniptodera sp. I</i>	0	1	0	1	0.44	0.18
<i>Ascocratera manglicola</i>	0	1	1	2	0.88	0.35
<i>Ascochyta sp.</i>	0	0	1	1	0.44	0.18
<i>Biatriospora marina</i>	1	0	0	1	0.44	0.18
<i>Cirrenalia basiminuta</i>	2	3	1	6	2.64	1.06
<i>Cirrenalia fusca</i>	1	1	0	2	0.88	0.35
<i>Cirrenalia macrocephala</i>	0	1	1	2	0.88	0.35
<i>Cirrenalia pygmea</i>	4	12	5	21	9.25	3.71
<i>Dactylospora haliotrepha</i>	8	11	10	29	12.78	5.12
<i>Dendryphiella salina</i>	0	1	1	2	0.88	0.35
<i>Halocyphina villosa</i>	41	33	13	87	38.33	15.37
<i>Halosarpheia abonnis</i>	2	4	8	14	6.17	2.47
<i>Halosarpheia hamata</i>	0	0	3	3	1.32	0.53
<i>Halosarpheia marina</i>	29	32	28	89	39.20	15.72
<i>Halosarpheia minuta</i>	0	1	0	1	0.44	0.18
<i>Halosarpheia ratnagiriensis</i>	2	7	8	17	7.49	3.00
<i>Halosarpheia retorquens</i>	1	0	2	3	1.82	0.53
<i>Halosarpheia viscosa</i>	1	2	1	4	1.76	0.71
<i>Halorosellinia oceanica</i>	2	1	0	3	1.32	0.53
<i>Leptosphaeria australiensis</i>	3	13	5	21	9.29	3.71
<i>Lignincola leavis</i>	2	3	5	10	4.41	1.77
<i>Lignincola longirostris</i>	0	0	1	1	0.44	0.18
<i>Lignincola tropica</i>	1	0	1	2	0.88	0.35
<i>Lulworthia grandispora</i>	11	16	26	53	23.35	9.36

(Continued)

<i>Lulworthia sp. I</i>	1	0	0	1	0.44	0.18
<i>Lindra hawaiiensis</i>	0	1	6	7	3.08	1.24
<i>Lulworthia sp. II</i>	1	1	0	2	0.88	0.35
<i>Manglicola sp.</i>	0	1	1	2	0.88	0.35
<i>Marinosphaera mangrovei</i>	9	13	13	35	15.42	6.18
<i>Ocostaspora apilongissima</i>	0	0	2	2	0.88	0.35
<i>Periconia prolifica</i>	1	3	0	4	1.76	0.71
<i>Phialophorophoma litoralis</i>	0	0	1	1	0.44	0.18
<i>Phoma sp.</i>	0	2	0	2	0.88	0.35
<i>Savoryella lignicola</i>	3	3	2	8	3.52	1.41
<i>Savoryella paucispora</i>	0	2	3	5	2.20	0.88
<i>Savoryella sp. I</i>	0	1	0	1	0.44	0.18
<i>Trichocladium alopallonellum</i>	0	0	1	1	0.44	0.18
Unidentified ascomycete III	0	1	1	2	0.88	0.35
<i>Verruculina enalia</i>	7	7	10	24	10.57	4.24
<i>Zalerion maritimum</i>	0	3	0	3	1.32	0.53
<i>Zalerion varium</i>	1	0	0	1	0.44	0.18
TOTAL	169	213	184	566		

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from *Rhizophora* divided by number of *Rhizophora* wood samples (227) x 100

\*\*Percent relative abundance (RA) = Number of isolates of particular species obtained from *Rhizophora* divided by total number of fungal isolates on *Rhizophora* wood samples (566) x 100

**Table – 12 List of marine fungi isolated from sand-buried wood with number of isolates obtained during monsoon, post-monsoon & pre-monsoon season and total number of isolates of each species with percent frequency of occurrence & percent relative abundance**

Name	M	PM	PrM	TOTAL	* FO	** RA
<i>Aigialus parvus</i>	0	2	1	3	3.45	2.32
<i>Aniptodera chesapeakeensis</i>	0	2	2	4	4.6	3.1
<i>Antennospora quadricornuta</i>	1	8	2	11	12.64	8.53
<i>Antennospora salina</i>	1	2	0	3	3.45	2.32
<i>Arenariomyces majusculus</i>	0	1	1	2	2.3	1.55
<i>Arenariomyces trifurcates</i>	9	7	9	25	28.74	19.38
<i>Ceriosporopsis halima</i>	2	2	6	10	11.49	7.75
<i>Corollospora filiformis</i>	9	12	15	36	41.38	27.91
<i>Corollospora pseudopulchella</i>	0	1	0	1	1.45	0.78
<i>Cirrenalia pygmea</i>	0	0	1	1	1.45	0.78
<i>Halosphaeria cucullata</i>	0	2	0	2	2.3	1.55
<i>Halosphaeria marina</i>	0	2	3	5	5.75	3.88
<i>Halorosellinia oceanica</i>	0	0	1	1	1.45	0.78
<i>Lulworthia grandispora</i>	3	3	3	9	10.34	6.98
<i>Savoryella lignicola</i>	1	3	1	5	5.75	3.88
<i>Trichocladium alopallonellum</i>	0	0	1	1	1.45	0.78
Unidentified ascomycete III	0	0	1	1	1.45	0.78
<i>Zalerion maritimum</i>	1	0	0	1	1.45	0.78
<i>Zalerion varium</i>	2	2	4	8	9.2	6.2
<b>TOTAL</b>	<b>29</b>	<b>49</b>	<b>51</b>	<b>129</b>		

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from sand-buried wood samples divided by number of sand-buried wood samples (87) x 100

\*\*Percent relative abundance (RA) = Number of isolates of particular species obtained from sand-buried wood samples divided by total number of fungal isolates on sand-buried wood samples (129) x 100

**Table – 13 List of species of marine fungi isolated from shore-line locations (Category A) along with percent frequency of occurrence and percent relative abundance of each species**

Name	No. of Isolates	* FO	** RA
<i>Aigialus parvus</i>	01	0.60	0.40
<i>Aniptodera chesapeakeensis</i>	19	11.45	7.63
<i>Antennospora quadricornuta</i>	42	25.30	16.87
<i>Antennospora salina</i>	08	4.82	3.21
<i>Arenariomyces majusculus</i>	02	1.20	0.80
<i>Arenariomyces parvulus</i>	03	1.81	1.20
<i>Arenariomyces trifurcatus</i>	16	9.64	6.43
<i>Biatriospora marina</i>	01	0.60	0.40
<i>Ceriosporopsis halima</i>	06	3.61	2.41
<i>Corollospora filiformis</i>	26	15.66	10.44
<i>Corollospora pseudopulchella</i>	01	0.60	0.40
<i>Cirrenalia macrocephala</i>	01	0.60	0.40
<i>Cirrenalia pygmea</i>	02	1.20	0.80
<i>Dactylospora haliotrepha</i>	05	3.01	2.01
<i>Halocyphina villosa</i>	03	1.81	1.20
<i>Halosarpheia marina</i>	12	7.23	4.82
<i>Halosphaeria cucullata</i>	01	0.60	0.40
<i>Halorosellinia oceanica</i>	01	0.60	0.40
<i>Koralionastes sp.</i>	01	0.60	0.40
<i>Leptosphaeria australiensis</i>	01	0.60	0.40
<i>Lignincola laevis</i>	04	2.41	1.61
<i>Lulworthia grandispora</i>	23	13.86	9.24
<i>Lulworthia sp.III</i>	06	3.61	2.41
<i>Marinosphaera mangrovei</i>	05	3.01	2.01
<i>Periconia prolifica</i>	07	4.22	2.81
<i>Savoryella lignicola</i>	22	13.25	8.84
<i>Trichocladium alopallonellum</i>	06	3.61	2.41
Unidentified ascomycete III	02	1.20	0.80
Unidentified ascomycete VIII	02	1.20	0.80
<i>Verruculina enalia</i>	04	2.41	1.60
<i>Zalerion maritimum</i>	04	2.41	1.61
<i>Zalerion varium</i>	12	7.23	4.82

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species divided by total number of wood samples collected from shore-line sites (Category-A) = (166) supporting marine fungi x 100

\*\*Percent relative abundance (RA) = Number of isolates of particular species divided by total number of isolates obtained from wood samples collected from shore-line sites (Category-A) = (249) x 100



**Table - 14 List of species of marine fungi isolated from shore-line locations (Category B) along with percent frequency of occurrence and percent relative abundance of each species**

Name	No. of Isolates	* FO	** RA
<i>Aigialus grandis</i>	02	1.09	0.65
<i>Aniptodera chesapeakensis</i>	24	13.11	7.82
<i>Antennospora quadricornuta</i>	35	19.13	11.40
<i>Antennospora salina</i>	01	0.55	0.33
<i>Arenariomyces majusculus</i>	03	1.64	0.98
<i>Arenariomyces trifurcatus</i>	22	12.02	7.17
<i>Ceriosporopsis halima</i>	09	4.92	2.93
<i>Corollospora filiformis</i>	19	10.38	6.19
<i>Cirrenalia fusca</i>	02	1.09	0.65
<i>Cirrenalia pygmea</i>	11	6.01	3.58
<i>Dactylospora haliotrepha</i>	07	3.83	2.28
<i>Halocyphina villosa</i>	24	13.11	7.82
<i>Halosarpheia abonnis</i>	01	0.55	0.33
<i>Halosarpheia marina</i>	28	15.30	9.12
<i>Halosarpheia minuta</i>	01	0.55	0.33
<i>Halosphaeria cucullata</i>	03	1.64	0.98
<i>Halorosellinia oceanica</i>	07	3.83	2.28
<i>Leptosphaeria australiensis</i>	06	3.28	1.95
<i>Lignincola laevis</i>	09	4.92	2.93
<i>Lignincola tropica</i>	02	1.09	0.65
<i>Lulworthia grandispora</i>	26	14.21	8.47
<i>Lulworthia sp. I</i>	02	1.09	0.65
<i>Lindra hawaiiensis</i>	01	0.55	0.33
<i>Marinosphaera mangrovei</i>	10	5.46	3.26
<i>Periconia prolifica</i>	06	3.28	1.96
<i>Savoryella lignicola</i>	21	11.48	6.86
<i>Savoryella paucispora</i>	04	2.19	1.30
<i>Savoryella sp. II</i>	01	0.55	0.33
<i>Trichocladium alopallonellum</i>	03	1.64	0.98
Unidentified ascomycete III	02	1.09	0.65
<i>Verruculina enalia</i>	05	2.73	1.63
<i>Zalerion maritimum</i>	03	1.64	0.98
<i>Zalerion varium</i>	07	3.83	2.28

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from shoreline sites (category-B) divided by total number of wood samples (183) supporting marine fungi collected from category-B locations x 100

\*\* Percent relative abundance (RA) = Number of isolates of particular species obtained from shoreline sites (category-B) divided by total number of fungal isolates obtained from shore-line (category-B) locations (307) x 100

**Table-15 List of species of marine fungi isolated from estuarine locations along with percent frequency of occurrence and percent relative abundance of each species**

Name	Number of Isolates	* FO	** RA
<i>Aigialus grandis</i>	14	1.49	0.63
<i>Aigialus mangrovei</i>	8	0.85	0.36
<i>Aigialus parvus</i>	28	2.99	1.25
<i>Aniptodera chesapeakeensis</i>	220	23.48	9.85
<i>Aniptodera haispora</i>	1	0.11	0.045
<i>Aniptodera longispora</i>	3	0.32	0.13
<i>Aniptodera mangrovei</i>	2	0.21	0.09
<i>Aniptodera salsuginosa</i>	1	0.11	0.045
<i>Aniptodera sp. I</i>	3	0.32	0.13
<i>Aniptodera sp. II</i>	1	0.11	0.045
<i>Ascocratera manglicola</i>	4	0.43	0.18
<i>Ascochyta sp.</i>	1	0.11	0.045
<i>Bathyascus tropicalis</i>	6	0.64	0.27
<i>Biatriospora marina</i>	6	0.64	0.27
<i>Ceriosporopsis halima</i>	3	0.32	0.13
<i>Cirrenalia basiminuta</i>	19	2.03	0.85
<i>Cirrenalia fusca</i>	8	0.85	0.36
<i>Cirrenalia macrocephala</i>	9	0.96	0.40
<i>Cirrenalia pygmea</i>	86	9.18	3.85
<i>Cladosporium sp.</i>	1	0.11	0.045
<i>Dactylospora haliotrepha</i>	72	7.68	3.22
<i>Dryosphaera tropicalis</i>	1	0.11	0.045
<i>Dendryphiella salina</i>	5	0.53	0.22
<i>Halocyphina villosa</i>	283	30.20	12.67
<i>Halosarpheia abonnis</i>	18	1.92	0.81
<i>Halosarpheia hamata</i>	17	1.81	0.76
<i>Halosarpheia marina</i>	364	38.85	16.29
<i>Halosarpheia minuta</i>	15	1.60	0.67
<i>Halosarpheia ratnagiriensis</i>	14	1.49	0.63
<i>Halosarpheia retorquens</i>	32	3.42	1.43
<i>Halosarpheia viscosa</i>	23	2.45	1.03
<i>Halorosellinia oceanica</i>	14	1.49	0.63
<i>Leptosphaeria australiensis</i>	66	7.04	2.95
<i>Lignincola laevis</i>	75	8.00	3.36
<i>Lignincola longirostris</i>	3	0.32	0.13
<i>Lignincola tropica</i>	2	0.21	0.09
<i>Lulworthia grandispora</i>	171	18.25	7.65
<i>Lulworthia sp.I</i>	44	4.70	1.97
<i>Lindra hawaiiensis</i>	27	2.88	1.21
<i>Lulworthia sp.II</i>	14	1.71	0.72

(Continued.)

<i>Lulworthia sp.III</i>	02	0.21	0.09
<i>Manglicola sp.</i>	02	0.21	0.09
<i>Marinosphaera mangrovei</i>	176	18.78	7.88
<i>Ocostaspora apilongissima</i>	02	0.21	0.09
<i>Payosphaeria minuta</i>	02	0.21	0.09
<i>Pleospora pelagica</i>	06	0.64	0.27
<i>Periconia prolifica</i>	81	8.64	3.63
<i>Phialophorophoma litoralis</i>	05	0.53	0.22
<i>Phoma sp.</i>	09	0.96	0.40
<i>Savoryella lignicola</i>	88	9.39	3.94
<i>Savoryella paucispora</i>	19	2.03	0.85
<i>Salsuginea ramicola</i>	01	0.11	0.045
<i>Savoryella sp. I</i>	02	0.21	0.09
<i>Trichocladium alopallonellum</i>	28	2.99	1.25
<i>Trichocladium sp.</i>	05	0.53	0.22
Unidentified ascomycete I	01	0.11	0.045
Unidentified ascomycete III	07	0.75	0.31
Unidentified ascomycete V	01	0.11	0.45
Unidentified ascomycete VI	03	0.32	0.13
Unidentified ascomycete VII	02	0.21	0.09
Unidentified ascomycete VIII	01	0.11	0.045
<i>Verruculina enalia</i>	57	6.08	2.55
<i>Zalerion maritimum</i>	16	1.71	0.72
<i>Zalerion varium</i>	33	3.42	1.43
<i>Zalerion sp.</i>	02	0.21	0.09

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from all estuaries divided by total number of wood samples (937) supporting marine fungi collected from all estuaries x 100

\*\*Percent relative abundance (RA) = Number of isolates of particular species obtained from all estuaries divided by total number of fungal isolates (2234) obtained from all estuaries x 100

**Table-16 List of species of marine fungi isolated from backwater locations along with percent frequency of occurrence and percent relative abundance of each species**

Name	Number of Isolates	* FO	** RA
<i>Aigialus grandis</i>	9	3.90	1.44
<i>Aigialus mangrovei</i>	3	1.30	0.48
<i>Aigialus parvus</i>	12	5.19	1.92
<i>Aniptodera chesapeakeensis</i>	70	30.30	11.18
<i>Aniptodera mangrovei</i>	01	0.43	0.16
<i>Aniptodera salsuginosa</i>	02	0.87	0.32
<i>Aniptodera haispora</i>	04	1.73	0.64
<i>Aniptodera sp. I</i>	01	0.43	0.16
<i>Cirrenalia basiminuta</i>	12	5.19	1.92
<i>Cirrenalia macrocephala</i>	02	0.87	0.32
<i>Cirrenalia pygmea</i>	36	15.58	5.75
<i>Cladosporium sp.</i>	02	0.87	0.32
<i>Dactylospora haliotrepha</i>	23	9.96	3.67
<i>Halocyphina villosa</i>	95	41.13	15.18
<i>Halosarpheia abbonis</i>	07	3.02	1.12
<i>Halosarpheia marina</i>	86	37.23	13.74
<i>Halosarpheia minuta</i>	06	2.60	0.96
<i>Halosarpheia ratnagiriensis</i>	13	5.63	2.08
<i>Halosarpheia retorquens</i>	02	0.87	0.32
<i>Halosarpheia viscosa</i>	11	4.76	1.76
<i>Halorosellinia oceanica</i>	07	3.03	1.12
<i>Leptosphaeria australiensis</i>	12	5.19	1.92
<i>Lignincola laevis</i>	24	10.39	3.83
<i>Lulworthia grandispora</i>	29	12.55	4.63
<i>Lulworthia sp.I</i>	03	1.30	0.48
<i>Lindra hawaiiensis</i>	17	7.36	2.72
<i>Lulworthia sp.II</i>	04	1.73	0.64
<i>Marinosphaera mangrovei</i>	31	13.42	4.95
<i>Periconia prolifica</i>	25	10.82	3.99
<i>Savoryella lignicola</i>	47	20.35	7.51
<i>Savoryella paucispora</i>	06	2.60	0.96
<i>Savoryella sp. I</i>	01	0.43	0.16
Unidentified ascomycete II	01	0.43	0.16
Unidentified ascomycete VI	01	0.43	0.16
<i>Verruculina enalia</i>	21	9.09	3.35

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from all backwater locations divided by total number of wood samples (231) supporting marine fungi collected from all backwater locations x 100

\*\*Percent relative abundance (RA) = Number of isolates of particular species obtained from all backwater locations divided by total number of isolates (626) obtained from all backwater locations x 100

**Table-17 List of species of marine fungi isolated from inland brackish water locations along with percent frequency of occurrence and percent relative abundance of each species**

Name	Number of Isolates	* FO	** RA
<i>Aigialus grandis</i>	03	1.38	0.67
<i>Aigialus mangrovei</i>	02	0.92	0.44
<i>Aigialus parvus</i>	02	0.92	0.44
<i>Aniptodera chesapeakeensis</i>	58	26.61	12.86
<i>Aniptodera haispora</i>	02	0.92	0.44
<i>Aniptodera sp. II</i>	01	0.46	0.22
<i>Anguillospora sp.</i>	03	1.38	0.67
<i>Ascochyta sp.</i>	05	2.29	1.11
<i>Cirrenalia fusca</i>	03	1.38	0.67
<i>Cirrenalia macrocephala</i>	10	4.59	2.22
<i>Cirrenalia pygmea</i>	19	8.72	4.21
<i>Cladosporium sp.</i>	02	0.92	0.44
<i>Dendryphiella salina</i>	13	5.96	2.88
<i>Halocyphina villosa</i>	39	17.89	8.65
<i>Halosarpheia abonnis</i>	02	0.92	0.44
<i>Halosarpheia marina</i>	75	35.40	16.63
<i>Halosarpheia minuta</i>	01	0.46	0.22
<i>Halosarpheia ratnagiriensis</i>	03	1.38	0.67
<i>Halosarpheia retorquens</i>	06	2.75	1.33
<i>Dadylospora haliotrepha</i>	12	5.50	2.66
<i>Leptosphaeria australiensis</i>	10	4.59	2.22
<i>Lignincola laevis</i>	09	4.13	2.00
<i>Lignincola longirostris</i>	02	0.92	0.44
<i>Lignincola tropica</i>	02	0.92	0.44
<i>Lulworthia grandispora</i>	21	9.63	4.66
<i>Lulworthia sp.I</i>	22	10.09	4.88
<i>Marinosphaera mangrovei</i>	35	16.06	7.76
<i>Pleospora pelagica</i>	01	0.46	0.22
<i>Periconia prolifica</i>	19	8.72	4.21
<i>Phialophorophoma litoralis</i>	05	2.29	1.11
<i>Phoma sp.</i>	06	2.75	1.33
<i>Phomopsis sp.</i>	01	0.46	0.22
<i>Savoryella lignicola</i>	28	12.84	6.21
<i>Savoryella paucispora</i>	05	2.29	1.11
<i>Salsuginea ramicola</i>	01	0.46	0.22
<i>Trichocladium sp.</i>	01	0.46	0.22
Unidentified ascomycete III	02	0.46	0.22
Unidentified ascomycete IV	04	1.83	0.89
Unidentified anamorph	04	1.83	0.89
<i>Verruculina enalia</i>	11	5.05	2.44
<i>Zalerion varium</i>	01	0.46	0.22

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from all inland brackish water locations divided by total number of wood samples (218) supporting marine fungi collected from all inland brackish water locations x 100

\*\* Percent relative abundance (RA) = Number of a isolates of particular species obtained from all inland brackish water locations divided by total number of fungal isolates (451) obtained from all inland brackish water locations x 100

**Table-18 List of species of marine fungi isolated from coir-retting fields along with percent frequency of occurrence and percent relative abundance of each species**

Name	Number of Isolates	* FO	** RA
<i>Aniptodera chesapeakensis</i>	13	10.92	15.48
<i>Cirrenalia pygmea</i>	15	12.61	17.86
<i>Halocyphina villosa</i>	01	0.84	1.19
<i>Halosarpheia marina</i>	12	10.08	14.29
<i>Lulworthia grandispora</i>	03	2.52	3.57
<i>Lulworthia sp.1</i>	19	15.97	22.62
<i>Marinosphaera mangrovei</i>	21	17.65	25

\* Percent frequency of occurrence (FO) = Number of isolates of a particular species obtained from all coir-retting fields divided by total number of wood samples (119) collected from all coir-retting fields (119) x 100

\*\* Percent relative abundance (RA) = Number of isolates of particular species obtained from all coir-retting fields divided by total number of fungal isolates obtained from all coir-retting fields (84) x 100

2010

**Table-19 Occurrence of species of marine fungi at different locations**

Name of the fungus	Bek	Azi	Dha-A	Tik	Bey	Pad	Val	Tly-A	Tly-B	Tly-C	Mah-A	Kad-A	Kav	Che	Eda	Vad	Dha-B	Mah-B	Kad-B	Total No. of locations where the species occurred
<i>Aigialus grandis</i>					✓			✓	✓	✓	✓		✓	✓	✓					8
<i>Aigialus mangrovei</i>							✓	✓	✓	✓			✓		✓					6
<i>Aigialus parvus</i>				✓			✓	✓	✓	✓			✓	✓	✓					8
<i>Aniptodera chesapeakeensis</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	19
<i>Aniptodera longispora</i>								✓		✓										2
<i>Aniptodera mangrovei</i>							✓	✓	✓				✓							4
<i>Aniptodera salsuginosa</i>								✓					✓							2
<i>Aniptodera haispora</i>													✓			✓				2
<i>Aniptodera sp. I</i>											✓		✓							2
<i>Aniptodera sp. II</i>								✓								✓				2
<i>Antennospora quadricornuta</i>	✓	✓	✓	✓	✓	✓														6
<i>Antennospora salina</i>	✓	✓		✓																3
<i>Arenariomyces majusculus</i>	✓	✓	✓	✓																4
<i>Arenariomyces parvulus</i>	✓																			1
<i>Arenariomyces trifurcatus</i>	✓	✓	✓	✓	✓	✓														6
<i>Ascocratera manglicola</i>							✓			✓										2
<i>Anguillospora sp.</i>																✓				1
<i>Ascochyta sp.</i>									✓						✓	✓				3
<i>Bathyascus tropicalis</i>									✓	✓										2
<i>Biatriospora marina</i>				✓				✓	✓	✓										4
<i>Ceriosporopsis halima</i>	✓	✓	✓	✓	✓	✓		✓	✓											8
<i>Corollospora filiformis</i>	✓	✓	✓	✓	✓	✓														6
<i>Corollospora pseudopulchella</i>						✓														1
<i>Cirrenalia basiminuta</i>							✓	✓	✓	✓			✓	✓						6
<i>Cirrenalia fusca</i>		✓	✓									✓			✓					4
<i>Cirrenalia macrocephala</i>				✓				✓		✓		✓	✓	✓	✓	✓				8
<i>Cirrenalia pygmaea</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	18
<i>Cladosporium sp.</i>												✓	✓			✓				3
<i>Dactylospora haliotrepha</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				16
<i>Dryosphaeria tropicalis</i>								✓												1
<i>Dendryphiella salina</i>							✓	✓							✓	✓				4
<i>Halocyphina villosa</i>		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			15
<i>Halosarpheia abonnis</i>					✓			✓	✓	✓	✓		✓	✓	✓	✓				9
<i>Halosarpheia hamata</i>								✓	✓	✓										3
<i>Halosarpheia marina</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	18
<i>Halosarpheia minuta</i>					✓		✓	✓		✓	✓		✓			✓				7
<i>Halosarpheia ratnagiriensis</i>							✓	✓	✓	✓	✓	✓	✓	✓	✓					9
<i>Halosarpheia retorquens</i>								✓	✓	✓			✓		✓	✓				6
<i>Halosarpheia viscosa</i>								✓	✓	✓			✓	✓						5
<i>Halosphaeria cucullata</i>	✓	✓	✓		✓															4

(Continued)

Name of the fungus	Bek	Azi	Dha-A	Tik	Bey	Pad	Val	Tly-A	Tly-B	Tly-C	Mah-A	Kad-A	Kav	Chc	Eda	Vad	Dha-B	Mah-B	Kad-B	Total No. of locations where the species occurred
<i>Halorosellinia oceanica</i>	✓	✓			✓		✓				✓	✓	✓	✓						8
<i>Koralionastes sp.</i>	✓																			1
<i>Leptosphaeria australiensis</i>			✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				13
<i>Lignincola laevis</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				15
<i>Lignincola longirostris</i>								✓		✓					✓	✓				4
<i>Lignincola tropica</i>					✓			✓		✓					✓					4
<i>Lulworthia grandispora</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		17
<i>Lulworthia sp.I</i>			✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	15
<i>Lindra hawaiiensis</i>			✓				✓	✓	✓	✓	✓		✓	✓						8
<i>Lulworthia sp.II</i>							✓	✓	✓		✓	✓	✓							6
<i>Lulworthia sp.III</i>				✓		✓						✓								3
<i>Manglicola sp.</i>									✓	✓										2
<i>Marinosphaera mangrovei</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	18
<i>Ocostaspora apilongissima</i>								✓	✓											2
<i>Payosphaeria minuta</i>								✓	✓											2
<i>Pleospora pelagica</i>								✓		✓		✓				✓				4
<i>Periconia prolifica</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				16
<i>Phialophorophoma litoralis</i>								✓			✓				✓	✓				4
<i>Phoma sp.I</i>								✓	✓	✓					✓	✓				5
<i>Phomopsis sp.</i>																✓				1
<i>Savoryella lignicola</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				16
<i>Savoryella paucispora</i>		✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				12
<i>Salsuginea ramicola</i>								✓								✓				2
<i>Savoryella sp. I</i>												✓		✓						2
<i>Savoryella sp. II</i>			✓																	1
<i>Trichocladium alopallonellum</i>	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓								10
<i>Trichocladium sp.</i>										✓	✓				✓					3
Unidentified ascomycete I									✓											1
Unidentified ascomycete II														✓						1
Unidentified ascomycete III			✓	✓	✓	✓	✓	✓				✓			✓	✓				9
Unidentified ascomycete IV															✓					1
Unidentified ascomycete V								✓												1
Unidentified ascomycete VI										✓				✓						2
Unidentified ascomycete VII							✓		✓											2
Unidentified ascomycete VIII						✓		✓												2
Unidentified anamorph																✓				1
<i>Verruculina enalia</i>		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				14
<i>Zalerion maritimum</i>	✓		✓					✓	✓	✓	✓									6
<i>Zalerion varium</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			✓					12
<i>Zalerion sp.</i>								✓												1
Total number of species obtained from each location	19	22	26	25	27	18	29	50	39	40	26	26	32	26	32	31	7	5	5	



**Table – 20 Occurrence of species of marine fungi on different wood types**

Name of the Fungi	ACN	AVI	BRU	DRW	INT	RHI	SBI	No. of wood types on which the species occurred
<i>Aigialus grandis</i>		✓	✓	✓	✓	✓		5
<i>Aigialus mangrovei</i>		✓	✓		✓	✓		4
<i>Aigialus parvus</i>		✓	✓	✓	✓	✓		5
<i>Aniptodera chesapeakensis</i>	✓	✓	✓	✓	✓	✓	✓	7
<i>Aniptodera longispora</i>		✓	✓					2
<i>Aniptodera mangrovei</i>			✓			✓		2
<i>Aniptodera salsuginosa</i>		✓	✓		✓			3
<i>Aniptodera haispora</i>		✓			✓	✓		3
<i>Aniptodera sp. I</i>	✓				✓	✓		3
<i>Aniptodera sp. II</i>		✓			✓			2
<i>Antennospora quadricornuta</i>				✓	✓		✓	3
<i>Antennospora salina</i>				✓	✓		✓	3
<i>Arenariomyces majusculus</i>				✓			✓	2
<i>Arenariomyces parvulus</i>							✓	1
<i>Arenariomyces trifurcatus</i>				✓	✓		✓	3
<i>Ascocratera manglicola</i>			✓			✓		2
<i>Anguillospora sp.</i>					✓			1
<i>Ascochyta sp.</i>	✓	✓			✓	✓		4
<i>Bathyascus tropicalis</i>		✓			✓			2
<i>Biatriospora marina</i>		✓	✓	✓	✓	✓		5
<i>Ceriosporopsis halima</i>		✓		✓	✓		✓	4
<i>Corollospora filiformis</i>				✓			✓	2
<i>Corollospora pseudopulchella</i>							✓	1
<i>Cirrenalia basiminuta</i>	✓	✓	✓		✓	✓		5
<i>Cirrenalia fusca</i>	✓	✓	✓	✓	✓	✓		6
<i>Cirrenalia macrocephala</i>	✓	✓	✓	✓	✓	✓		6
<i>Cirrenalia pygmea</i>	✓	✓	✓	✓	✓	✓	✓	7
<i>Cladosporium sp.</i>		✓	✓					2
<i>Dactylospora haliotrepha</i>	✓	✓	✓	✓	✓	✓		6
<i>Dryosphaeria tropicalis</i>					✓			1
<i>Dendryphiella salina</i>	✓		✓		✓	✓		4
<i>Halocyphina villosa</i>		✓	✓	✓	✓	✓		5
<i>Halosarpheia abbonis</i>		✓	✓		✓	✓		4
<i>Halosarpheia hamata</i>	✓	✓	✓		✓	✓		5
<i>Halosarpheia marina</i>	✓	✓	✓	✓	✓	✓	✓	7
<i>Halosarpheia minuta</i>	✓	✓	✓	✓	✓	✓		6
<i>Halosarpheia ratnagiriensis</i>		✓	✓		✓	✓		4
<i>Halosarpheia retorquens</i>	✓	✓	✓		✓	✓		5
<i>Halosarpheia viscosa</i>	✓	✓	✓		✓	✓		5

Continued

Name of the Fungi	ACN	AVI	BRU	DRW	INT	RHI	SBI	No. of wood types on which the species occurred
<i>Halosphaeria cucullata</i>				✓	✓		✓	3
<i>Halorosellinia oceanica</i>	✓	✓	✓	✓	✓	✓	✓	7
<i>Koralionastes sp.</i>					✓			1
<i>Leptosphaeria australiensis</i>	✓		✓	✓	✓	✓		5
<i>Lignincola laevis</i>	✓	✓	✓	✓	✓	✓		6
<i>Lignincola longirostris</i>	✓	✓	✓			✓		4
<i>Lignincola tropica</i>		✓	✓	✓	✓	✓		5
<i>Lulworthia grandispora</i>	✓	✓	✓	✓	✓	✓	✓	7
<i>Lulworthia sp. I</i>	✓	✓	✓	✓	✓	✓		6
<i>Lindra hawaiiensis</i>	✓	✓	✓	✓	✓	✓		6
<i>Lulworthia sp. II</i>	✓	✓	✓		✓	✓		5
<i>Lulworthia sp. III</i>				✓	✓	✓		3
<i>Manglicola sp.</i>						✓		1
<i>Marinosphaera mangrovei</i>	✓	✓	✓	✓	✓	✓		6
<i>Ocostaspora apilongissima</i>						✓		1
<i>Payosphaeria minuta</i>		✓			✓			2
<i>Pleospora pelagica</i>		✓						1
<i>Periconia prolifica</i>	✓	✓	✓	✓	✓	✓		6
<i>Phialophorophoma litoralis</i>	✓	✓	✓		✓	✓		5
<i>Phoma sp.</i>	✓	✓	✓		✓	✓		5
<i>Phomopsis sp.</i>					✓			1
<i>Savoryella lignicola</i>	✓	✓	✓	✓	✓	✓	✓	7
<i>Savoryella paucispora</i>	✓	✓	✓	✓	✓	✓		6
<i>Salsuginea ramicola</i>		✓						1
<i>Savoryella sp. I</i>		✓			✓	✓		3
<i>Savoryella sp. II</i>					✓			1
<i>Trichocladium alopallonellum</i>	✓	✓	✓	✓	✓	✓	✓	7
<i>Trichocladium sp.</i>	✓	✓			✓			3
Unidentified ascomycete I					✓			1
Unidentified ascomycete II					✓			1
Unidentified ascomycete III		✓	✓	✓	✓	✓	✓	6
Unidentified ascomycete IV	✓	✓			✓			3
Unidentified ascomycete V		✓						1
Unidentified ascomycete VI		✓	✓					2
Unidentified ascomycete VII		✓						1
Unidentified ascomycete VIII			✓	✓				2
Unidentified anamorph		✓			✓			2
<i>Verruculina enalia</i>		✓	✓	✓	✓	✓		5
<i>Zalerion maritimum</i>	✓	✓	✓	✓	✓	✓	✓	7
<i>Zalerion varium</i>	✓	✓	✓	✓	✓	✓	✓	7
<i>Zalerion sp.</i>		✓						1
Total number of species obtained from each types of wood	33	56	46	36	62	48	19	

**Table – 21 Occurrence of species of marine fungi in different types of water bodies**

Name of the fungus	Shoreline locations (A-category)	Shoreline locations (B-category)	Estuaries	Back waters	Inland Brackish Waters	Coir retting field	No. of types of water bodies in which the species occurred
<i>Aigialus grandis</i>		✓	✓	✓	✓		4
<i>Aigialus mangrovei</i>			✓	✓	✓		3
<i>Aigialus parvus</i>	✓		✓	✓	✓		4
<i>Aniptodera chesapeakensis</i>	✓	✓	✓	✓	✓	✓	6
<i>Aniptodera haispora</i>			✓	✓	✓		3
<i>Aniptodera longispora</i>			✓				1
<i>Aniptodera mangrovei</i>			✓	✓			2
<i>Aniptodera salsuginosa</i>			✓	✓			2
<i>Aniptodera sp. I</i>			✓	✓			2
<i>Aniptodera sp. II</i>			✓		✓		2
<i>Antennospora quadricornuta</i>	✓	✓					2
<i>Antennospora salina</i>	✓	✓					2
<i>Arenariomyces majusculus</i>	✓	✓					2
<i>Arenariomyces parvulus</i>	✓						1
<i>Arenariomyces trifurcatus</i>	✓	✓					2
<i>Ascocratera manglicola</i>			✓				1
<i>Anguillospora sp.</i>					✓		1
<i>Ascochyta sp.</i>			✓		✓		2
<i>Bathyascus tropicalis</i>			✓				1
<i>Biatriospora marina</i>	✓		✓				2
<i>Ceriosporopsis halima</i>	✓	✓	✓				3
<i>Corollospora filiformis</i>	✓	✓					2
<i>Corollospora pseudopulchella</i>	✓						1
<i>Cirrenalia basiminuta</i>			✓	✓			2
<i>Cirrenalia fusca</i>		✓	✓		✓		3
<i>Cirrenalia macrocephala</i>	✓		✓	✓	✓		4
<i>Cirrenalia pygmaea</i>	✓	✓	✓	✓	✓	✓	6
<i>Cladosporium sp.</i>			✓	✓	✓		3
<i>Dactylospora haliotrepha</i>	✓	✓	✓	✓	✓		5
<i>Dryosphaera tropicalis</i>			✓				1
<i>Dendryphiella salina</i>			✓		✓		2
<i>Halocyphina villosa</i>	✓		✓	✓	✓	✓	5
<i>Halosarpheia abonnis</i>		✓	✓	✓	✓		4
<i>Halosarpheia hamata</i>			✓				1
<i>Halosarpheia marina</i>	✓	✓	✓	✓	✓	✓	6
<i>Halosarpheia minuta</i>		✓	✓	✓	✓		4
<i>Halosarpheia ratnagiriensis</i>			✓	✓	✓		3
<i>Halosarpheia retorquens</i>			✓	✓	✓		3
<i>Halosarpheia viscosa</i>			✓	✓			2
<i>Halosphaeria cucullata</i>	✓	✓					2

(Continued)

<i>Halorosellinia oceanica</i>	✓	✓	✓	✓			4
<i>Koralionastes sp.</i>	✓						1
<i>Leptosphaeria australiensis</i>	✓	✓	✓	✓	✓		5
<i>Lignincola laevis</i>	✓	✓	✓	✓	✓		5
<i>Lignincola longirostris</i>			✓		✓		2
<i>Lignincola tropica</i>			✓		✓		2
<i>Lulworthia grandispora</i>	✓	✓	✓	✓	✓	✓	6
<i>Lulworthia sp. I</i>		✓	✓		✓	✓	4
<i>Lindra hawaiiensis</i>		✓	✓	✓			3
<i>Lulworthia sp. II</i>			✓	✓			2
<i>Lulworthia sp. III</i>	✓		✓				2
<i>Manglicola sp.</i>			✓				1
<i>Marinosphaera mangrovei</i>	✓	✓	✓	✓	✓	✓	6
<i>Ocostaspora apilongissima</i>			✓				1
<i>Payosphaeria minuta</i>			✓				1
<i>Pleospora pelagica</i>			✓		✓		2
<i>Periconia prolifica</i>	✓	✓	✓	✓	✓		5
<i>Phialophorophoma litoralis</i>			✓		✓		2
<i>Phoma sp.</i>			✓		✓		2
<i>Phomopsis sp.</i>					✓		1
<i>Savoryella lignicola</i>	✓	✓	✓	✓	✓		5
<i>Savoryella paucispora</i>		✓	✓	✓	✓		4
<i>Salsuginea ramicola</i>					✓		1
<i>Savoryella sp. I</i>			✓	✓			2
<i>Savoryella sp. II</i>		✓					1
<i>Trichocladium alopallonellum</i>	✓	✓	✓				3
<i>Trichocladium sp.</i>			✓		✓		2
Unidentified ascomycete I			✓				1
Unidentified ascomycetes II				✓			1
Unidentified ascomycete III	✓	✓	✓		✓		4
Unidentified ascomycete IV					✓		1
Unidentified ascomycete V	-						
Unidentified ascomycete VI			✓	✓			2
Unidentified ascomycete VII			✓				1
Unidentified ascomycete VIII	✓		✓				2
Unidentified anamorph					✓		1
<i>Verruculina enalia</i>	✓	✓	✓	✓	✓		5
<i>Zalerion maritimum</i>	✓	✓	✓				3
<i>Zalerion varium</i>	✓	✓	✓		✓		4
<i>Zalerion sp.</i>			✓				1
Total number of species obtained from each type of water body	32	31	63	34	41	7	

2017

**Table – 22 Occurrence of species of marine fungi during different seasons**

Name of the fungus	Monsoon	Post-monsoon	Pre-monsoon	Number of seasons in which the species appeared
<i>Aigialus grandis</i>	✓	✓	✓	3
<i>Aigialus mangrovei</i>	✓	✓	✓	3
<i>Aigialus parvus</i>	✓	✓	✓	3
<i>Aniptodera chesapeakensis</i>	✓	✓	✓	3
<i>Aniptodera haispora</i>		✓	✓	2
<i>Aniptodera longispora</i>	✓	✓		2
<i>Aniptodera mangrovei</i>	✓	✓	✓	3
<i>Aniptodera salsuginosa</i>	✓			1
<i>Aniptodera sp. I</i>	✓	✓		2
<i>Aniptodera sp. II</i>		✓	✓	2
<i>Antemospora quadricornuta</i>	✓	✓	✓	3
<i>Antemospora salina</i>	✓	✓	✓	3
<i>Arenariomyces majusculus</i>	✓	✓	✓	3
<i>Arenariomyces parvulus</i>		✓	✓	2
<i>Arenariomyces trifurcatus</i>	✓	✓	✓	3
<i>Ascocratera manglicola</i>		✓	✓	2
<i>Anguillospora sp.</i>	✓	✓		2
<i>Ascochyta sp.</i>	✓	✓	✓	3
<i>Bathyascus tropicalis</i>	✓	✓	✓	3
<i>Biatrispora marina</i>	✓	✓	✓	3
<i>Ceriosporopsis halima</i>	✓	✓	✓	3
<i>Corollospora filiformis</i>	✓	✓	✓	3
<i>Corollospora pseudopulchella</i>		✓		1
<i>Cirrenalia basiminuta</i>	✓	✓	✓	3
<i>Cirrenalia fusca</i>	✓	✓	✓	3
<i>Cirrenalia macrocephala</i>	✓	✓	✓	3
<i>Cirrenalia pygmaea</i>	✓	✓	✓	3
<i>Cladosporium sp.</i>	✓	✓	✓	3
<i>Dactylospora haliotrepha</i>	✓	✓	✓	3
<i>Dryosphaera tropicalis</i>	✓			1
<i>Dendryphiella salina</i>	✓	✓	✓	3
<i>Halocyphina villosa</i>	✓	✓	✓	3
<i>Halosarpheia abonnis</i>	✓	✓	✓	3
<i>Halosarpheia hamata</i>	✓	✓	✓	3
<i>Halosarpheia marina</i>	✓	✓	✓	3
<i>Halosarpheia minuta</i>	✓	✓	✓	3
<i>Halosarpheia ratnagiriensis</i>	✓	✓	✓	3
<i>Halosarpheia retorquens</i>	✓	✓	✓	3
<i>Halosarpheia viscosa</i>	✓	✓	✓	3
<i>Halosphaeria cucullata</i>	✓	✓	✓	3
<i>Halorosellinia oceanica</i>	✓	✓	✓	3
<i>Koralionastes sp.</i>			✓	1
<i>Leptosphaeria australiensis</i>	✓	✓	✓	3

(Continued)

<i>Lignicola laevis</i>	✓	✓	✓	3
<i>Lignicola longirostris</i>	✓		✓	2
<i>Lignicola tropica</i>	✓	✓	✓	3
<i>Lulworthia grandispora</i>	✓	✓	✓	3
<i>Lulworthia sp. I</i>	✓	✓	✓	3
<i>Lindra hawaiiensis</i>	✓	✓	✓	3
<i>Lulworthia sp. II</i>	✓	✓	✓	3
<i>Lulworthia sp. III</i>	✓	✓	✓	3
<i>Manglicola sp.</i>	✓	✓	✓	3
<i>Marinosphaera mangrovei</i>	✓	✓	✓	3
<i>Ocostaspora apilongissima</i>	✓		✓	2
<i>Payosphaeria minuta</i>	✓	✓	✓	3
<i>Pleospora pelagica</i>	✓	✓	✓	3
<i>Periconia prolifica</i>	✓	✓	✓	3
<i>Phialophorophoma litoralis</i>	✓	✓	✓	3
<i>Phoma sp.</i>	✓	✓	✓	3
<i>Phomopsis sp.</i>	✓	✓	✓	3
<i>Savoryella lignicola</i>	✓	✓	✓	3
<i>Savoryella paucispora</i>	✓	✓	✓	3
<i>Salsuginea ramicola</i>	✓	✓		2
<i>Savoryella sp. I</i>		✓	✓	2
<i>Savoryella sp. II</i>		✓		1
<i>Trichocladium alopallonellum</i>	✓	✓	✓	3
<i>Trichocladium sp.</i>	✓	✓	✓	3
Unidentified ascomycete I			✓	1
Unidentified ascomycetes II			✓	1
Unidentified ascomycete III	✓	✓	✓	3
Unidentified ascomycete IV	✓	✓		2
Unidentified ascomycete V			✓	1
Unidentified ascomycete VI	✓	✓		2
Unidentified ascomycete VII		✓	✓	2
Unidentified ascomycete VIII		✓	✓	2
Unidentified anamorph	✓	✓		2
<i>Verruculina enalia</i>	✓	✓	✓	3
<i>Zalerion maritimum</i>	✓	✓	✓	3
<i>Zalerion varium</i>	✓	✓	✓	3
<i>Zalerion sp.</i>	✓		✓	2
Total number of species obtained in each season	67	72	69	

**Table – 23 Average isolates per wood sample in various locations**

Locations	Total Isolates	Total wood samples	Average Isolates per wood sample
Bekkal	85	55	1.55
Tikkodi	103	68	1.51
Parappanangadi	61	43	1.42
Azhikkal	167	79	2.11
Dharmadam-A	80	58	1.38
Beypore	60	46	1.43
Valapattanam	230	104	2.21
Tellicherry-A	805	327	2.46
Tellicherry -B	329	122	2.70
Tellicherry -C	419	171	2.45
Mahe-A	274	135	2.03
Kadalundi-A	177	78	2.27
Kavvai	302	111	2.75
Chettuva	324	120	2.70
Edakkad	266	130	2.04
Vadakara	185	88	2.10
Dharmadam-B	43	48	0.90
Mahe-B	21	37	0.57
Kadalundi-B	20	34	0.59
<b>TOTAL</b>	<b>3951</b>	<b>1854</b>	<b>2.13</b>

**Table – 24 Average isolates per wood sample in different wood type**

Wood Type	Total Isolates	Total wood samples	Average isolates per wood sample
Rhizophora	566	227	2.49
Avicennia	779	328	2.38
Bruguiera	686	291	2.36
Acanthus ilicifolius	478	228	2.10
Intertidal wood	1101	566	1.92
Drift wood	212	127	1.67
Sand buried intertidal wood	129	87	1.48
<b>MEAN</b>	<b>3951</b>	<b>1854</b>	<b>2.13</b>

**Table – 25 Average isolates per wood sample in different water bodies**

Type of water body	Total Isolates	Total wood samples	Average isolates per wood sample
Shore line locations (A-category)	249	166	1.50
Shore line locations (B-category)	307	186	1.65
Estuaries	2234	937	2.38
Back waters	616	231	2.67
Inland brackish waters	451	218	2.07
Coir-retting fields	84	119	0.71

**Table – 26 Average isolates per wood samples in three seasons**

Season	Total Isolates	Total wood samples	Average isolates per Wood sample
<b>Monsoon</b>	<b>1275</b>	<b>630</b>	<b>2.02</b>
<b>Post-monsoon</b>	<b>1420</b>	<b>619</b>	<b>2.29</b>
<b>Pre-monsoon</b>	<b>1256</b>	<b>605</b>	<b>2.08</b>

**Table – 27 Average isolates per wood sample in different locations in different seasons**

<b>Locations</b>	<b>Monsoon</b>	<b>Post-monsoon</b>	<b>Pre-monsoon</b>
<b>Bekkal</b>	1.55	1.67	1.33
<b>Tikkodi</b>	1.44	1.58	1.5
<b>Parappanangadi</b>	1.42	1.47	1.38
<b>Azhikkal</b>	1.68	2.71	1.97
<b>Dharmadam-A</b>	1.21	1.35	1.58
<b>Beypore</b>	1.31	1.35	1.25
<b>Valapattanam</b>	2.38	2.41	1.68
<b>Tellicherry-A</b>	2.4	2.66	2.31
<b>Tellicherry -B</b>	2.61	2.91	2.55
<b>Tellicherry -C</b>	2.42	2.66	2.28
<b>Mahe-A</b>	2.03	2.17	1.88
<b>Kadalundi-A</b>	2.40	2.46	2.06
<b>Kavvai</b>	2.53	3	2.73
<b>Chettuva</b>	2.42	2.98	2.59
<b>Edakkad</b>	1.76	2.04	2.37
<b>Vadakara</b>	1.76	2.07	2.56
<b>Dharmadam-B</b>	0.82	1.05	0.71
<b>Mahe-B</b>	0.8	0.44	0.13
<b>Kadalundi-B</b>	1.1	0.6	0.21
<b>TOTAL</b>	2.02	2.29	2.08



Table 28 Shannon Index and Simpson Index for the 19 locations

Location	Shanon Index, H'	Simpson Index, D'
Azhikkal	2.7015	0.075575
Bekkal	2.4822	0.106723
Beypore	3.1356	0.033333
Chettuva	2.7668	0.081439
Dharmadam - A	3.0567	0.045167
Dharmadam - B	1.7430	0.174972
Edakkad	2.9908	0.071551
Kavvai	2.9887	0.068958
Kadalundi - A	2.8656	0.06831
Kadalundi - B	1.5842	0.168421
Mahe - A	2.8687	0.068554
Mahe - B	1.4482	0.22381
Parappanangadi	2.6713	0.065027
Tellicherry - A	2.9600	0.080076
Tellicherry - B	2.8192	0.098829
Tellicherry - C	3.0993	0.06184
Tikoodi	2.899972	0.059604
Vadakara	2.8331	0.083831
Valapattanam	2.8989	0.070467

Table 29 Shannon Index and Simpson Index for the 6 types of water bodies

Type of Waterbody	Shanon Index, H'	Simpson Index, D'
1. Shoreline sites A	2.73642	0.0847
2. Shoreline sites B	3.041476	0.0585
3. Eestuaries	3.075502	0.0739
4. Backwaters	2.915439	0.0754
5. Brackishwaters	3.031245	0.0745
6. Coir retting field	1.728922	0.1816

## Results of Logistic Regression Analysis

[23 species were not considered for the analysis because of insufficient number of isolates obtained. Out of the remaining 57 species, only those species which are significantly influenced by any one of the three predictor variables are considered here. Values given in bold numerals ( $P < 0.01$ ) are significant at 1% level]

Model: Logistic regression (logit) N of 0's:1826 1's:28

Dep. Var: **AIGIALUS GRANDIS** Loss: Max likelihood (MS-err. scaled to 1)

Final loss: 131.61205158  $\text{Chi}^2(3)=27.153$   $p=.00001$

	Const.B0	W Body	WOOD Type	Season
Estimate	0.482972	-0.05107	0.585288	-0.59239
Std.Err.	20.65186	0.019213	0.134607	0.198345
t(1850)	0.023386	-2.65822	4.348119	-2.98667
p-level	0.981345	<b>0.007923</b>	<b>1.45E-05</b>	<b>0.002857</b>

Model: Logistic regression (logit) N of 0's:1811 1's:43

Dep. var: **AIGIALUS PARVUS** Loss: Max likelihood (MS-err. scaled to 1)

Final loss: 197.71125295  $\text{Chi}^2(3)=13.268$   $p=.00410$

	Const.B0	W Body	WOOD Type	Season
Estimate	0.549017	-0.044	0.294719	-0.29669
Std.Err.	18.19361	0.016824	0.093554	0.166989
t(1850)	0.030176	-2.61512	3.150246	-1.7767
p-level	0.97593	<b>0.008992</b>	<b>0.001657</b>	0.075783

Model: Logistic regression (logit) N of 0's:1449 1's:404

Dep. var: **ANIPTODERA CHESAPEAKENSIS** Loss: Max likelihood (MS-err. Scaled to 1)

Final loss: 949.77452445  $\text{Chi}^2(3)=43.865$   $p=.00000$

	Const.B0	W Body	WOOD Type	Season
Estimate	1.646631	-0.01831	-0.14096	0.134814
Std.Err.	7.504034	0.013894	0.028686	0.069413
t(1849)	0.219433	-1.31766	-4.91393	1.942195
p-level	0.826337	0.187782	<b>9.71E-07</b>	0.052265

Model: Logistic regression (logit) N of 0's:1816 1's:38

Dep. var: **ARENARIOMYCES TRIFURCATUS** Loss: Max likelihood (MS-err. Scaled to 1)

Final loss: 143.08732004  $\text{Chi}^2(3)=84.492$   $p=.00000$

	Const.B0	W Body	WOOD Type	Season
Estimate	0.406351	0.16602	0.710815	-0.95601
Std.Err.	16.73535	0.037142	0.138739	0.187294
t(1850)	0.024281	4.469838	5.123412	-5.10433
p-level	0.980631	<b>8.3E-06</b>	<b>3.31E-07</b>	<b>3.66E-07</b>

Model: Logistic regression (logit) N of 0's:1836 1's:18  
 Dep. var: **CERIOSPOROPSIS HALIMA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 84.612954468 Chi<sup>2</sup>(3)=33.449 p=.00000

	Const.B0	W Body	WOOD Type	Season
Estimate	15.06271	0.106291	0.671994	-1.0016
Std.Err.	43.53768	0.050952	0.202213	0.374927
t(1850)	0.345969	2.086088	3.3232	-2.67146
p-level	0.729405	0.037107	<b>0.000907</b>	<b>0.007619</b>

Model: Logistic regression (logit) N of 0's:1735 1's:119  
 Dep. var: **DACTYLOSPORA HALIOTREPHA** Loss: Max likelihood (MS-err. Scaled to 1)  
 Final loss: 424.30924110 Chi<sup>2</sup>(3)=35.117 p=.00000

	Const.B0	W Body	WOOD Type	Season
Estimate	0.618503	-0.12483	0.201646	-0.10783
Std.Err.	62.55117	0.02644	0.085912	0.530073
t(1850)	0.009888	-4.72124	2.347119	-0.20343
p-level	0.992112	<b>2.52E-06</b>	<b>0.019024</b>	0.838824

Model: Logistic regression (logit) N of 0's:1820 1's:34  
 Dep. var: **HALOSARPHEIA VISCOSA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 163.80378502 Chi<sup>2</sup>(3)=11.679 p=.00857

	Const.B0	W Body	WOOD Type	Season
Estimate	0.556423	-0.02357	-0.22678	0.211287
Std.Err.	39.3266	0.046404	0.098194	0.345136
t(1850)	0.014149	-0.50786	-2.30947	0.612185
p-level	0.988713	0.611614	<b>0.021027</b>	0.540491

Model: Logistic regression (logit) N of 0's:1826 1's:28  
 Dep. var: **HALOSARPHEIA ABONNIS** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 138.29197596 Chi<sup>2</sup>(3)=13.793 p=.00320

	Const.B0	W Body	WOOD Type	Season
Estimate	0.531806	-0.13957	0.288674	-0.19625
Std.Err.	39.2105	0.04932	0.109514	0.33896
t(1850)	0.013563	-2.82985	2.63597	-0.57896
p-level	0.98918	<b>0.004707</b>	<b>0.00846</b>	0.562684

Model: Logistic regression (logit) N of 0's:1277 1's:577  
 Dep. var: **HALOSARPHEIA MARINA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 1101.4362161 Chi<sup>2</sup>(3)=96.356 p=.00000

	Const.B0	W Body	WOOD Type	Season
Estimate	13.31663	-0.1155	0.017776	-0.03449
Std.Err.	6.88287	0.013118	0.025327	0.06286
t(1850)	1.934749	-8.8048	0.701869	-0.54866
p-level	0.053173	<b>2.95E-18</b>	0.482849	0.583306

Model: Logistic regression (logit) N of 0's:1824 1's:30  
 Dep. var: **HALOSARPHEIA RATNAGIRIENSIS** Loss: Max likelihood (MS-err. Scaled to 1)  
 Final loss: 142.71689947 Chi<sup>2</sup>(3)=21.512 p=.00008

	Const.B0	W Body	WOOD Type	Season
Estimate	0.45637	-0.13303	0.413691	-0.33116
Std.Err.	76.45277	0.047007	0.164895	0.616786
t(1850)	0.005969	-2.83008	2.508818	-0.53691
p-level	0.995238	<b>0.004704</b>	0.012199	0.591395

Model: Logistic regression (logit) N of 0's:1830 1's:23  
 Dep. var: **HALOSARPHEIA MINUTA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 116.93674104 Chi<sup>2</sup>(3)=13.737 p=.00329

	Const.B0	W Body	WOOD Type	Season
Estimate	0.624715	-0.0562	-0.29526	0.309948
Std.Err.	31.33029	0.060573	0.114972	0.28223
t(1849)	0.01994	-0.92789	-2.56812	1.098209
p-level	0.984094	0.353585	<b>0.010303</b>	0.272256

Model: Logistic regression (logit) N of 0's:1777 1's:77  
 Dep. var: **ANTENNOSPORA QUADRICORNUTA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 259.14453363 Chi<sup>2</sup>(3)=122.39 p=.00000

	Const.B0	W Body	WOOD Type	Season
Estimate	0.48741	0.266398	0.036539	-0.36378
Std.Err.	20.0653	0.031122	0.088696	0.171926
t(1850)	0.024291	8.559895	0.411953	-2.1159
p-level	0.980623	<b>2.34E-17</b>	0.680421	0.034487

Model: Logistic regression (logit) N of 0's:1845 1's:9  
 Dep. var: **ANTENNOSPORA SALINA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 48.069407146 Chi<sup>2</sup>(3)=17.719 p=.00050

	Const.B0	W Body	WOOD Type	Season
Estimate	0.27386	0.305358	-0.01737	-0.37206

Std.Err.	111.1305	0.102971	0.427278	0.804382
t(1850)	0.002464	2.965467	-0.04065	-0.46254
p-level	0.998034	<b>0.003061</b>	0.967576	0.643751

Model: Logistic regression (logit) N of 0's:1759 1's:95  
 Dep. var: **LEPTOSPHAERIA AUSTRALINESIS** Loss: Max likelihood (MS-err. Scaled to 1)  
 Final loss: 366.46619011 Chi<sup>2</sup>(3)=16.647 p=**0.0084**

	Const.B0	W Body	WOOD Type	Season
Estimate	0.531674	-0.11018	0.072879	0.007538
Std.Err.	12.64252	0.02741	0.050734	0.1145
t(1850)	0.042054	-4.01983	1.436504	0.065832
p-level	0.96646	<b>6.06E-05</b>	0.151028	0.947519

Model: Logistic regression (logit) N of 0's:1733 1's:121  
 Dep. var: **LIGNINCOLA LAEVIS** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 432.07408166 Chi<sup>2</sup>(3)=30.270 p=**0.0000**

	Const.B0	W Body	WOOD Type	Season
Estimate	27.02454	-0.03216	-0.20145	-0.05165
Std.Err.	12.74073	0.024919	0.048564	0.116194
t(1850)	2.121113	-1.29076	-4.14805	-0.4445
p-level	0.034045	0.196947	<b>3.51E-05</b>	0.656735

Model: Logistic regression (logit) N of 0's:1581 1's:273  
 Dep. var: **LULWORTHIA GRANDISPORA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 763.77539200 Chi<sup>2</sup>(3)=22.051 p=**0.0006**

	Const.B0	W Body	WOOD Type	Season
Estimate	-8.13756	-0.04566	0.14906	-0.04203
Std.Err.	8.880278	0.015357	0.033956	0.080722
t(1850)	-0.91636	-2.97317	4.389803	-0.52064
p-level	0.359596	<b>0.002986</b>	<b>1.2E-05</b>	0.602677

Model: Logistic regression (logit) N of 0's:1764 1's:90  
 Dep. var: **LULWORTHIA SPI.** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 353.53213822 Chi<sup>2</sup>(3)=13.047 p=**0.00454**

	Const.B0	W Body	WOOD Type	Season
Estimate	0.495549	0.040356	-0.18903	0.116141
Std.Err.	12.23046	0.026693	0.056298	0.115525
t(1850)	0.040518	1.511894	-3.35761	1.005335
p-level	0.967685	0.130732	<b>0.000802</b>	0.314867

Model: Logistic regression (logit) N of 0's:1575 1's:278  
 Dep. var: *MARINOSPHERA MANGROVEI* Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 776.34474833 Chi<sup>2</sup>(3)=14.044 p=.00285

	Const.B0	W Body	WOOD Type	Season
Estimate	-1.72254	-0.0489	-0.02257	0.074685
Std.Err.	9.266	0.01599	0.032237	0.085125
t(1849)	-0.1859	-3.05832	-0.7001	0.877356
p-level	0.852544	<b>0.002258</b>	0.48395	0.380407

Model: Logistic regression (logit) N of 0's:1847 1's:7  
 Dep. var: *PLEOSPORA PELAGICA* Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 40.246601535 Chi<sup>2</sup>(3)=11.589 p=.00894

	Const.B0	W Body	WOOD Type	Season
Estimate	0.788158	-0.12134	-0.52164	0.590484
Std.Err.	29.59202	0.129395	0.246482	0.326381
t(1850)	0.026634	-0.93772	-2.11634	1.809186
p-level	0.978754	0.348511	0.034449	0.070584

Model: Logistic regression (logit) N of 0's:1648 1's:206  
 Dep. var: *SAVORYELLA LIGNICOLA* Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 629.37272133 Chi<sup>2</sup>(3)=34.724 p=.00000

	Const.B0	W Body	WOOD Type	Season
Estimate	1.413186	0.022722	-0.20391	0.149856
Std.Err.	9.737287	0.01847	0.038814	0.089997
t(1850)	0.145131	1.230227	-5.25356	1.665118
p-level	0.884623	0.218769	<b>1.66E-07</b>	0.096059

Model: Logistic regression (logit) N of 0's:1756 1's:98  
 Dep. var: *VERRUCULINA ENALIA* Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 377.30105991 Chi<sup>2</sup>(3)=12.390 p=.00617

	Const.B0	W Body	WOOD Type	Season
Estimate	0.492029	-0.07514	0.136508	-0.09381
Std.Err.	11.22695	0.025233	0.051636	0.10589
t(1850)	0.043826	-2.97771	2.64368	-0.8859
p-level	0.965048	<b>0.002942</b>	<b>0.00827</b>	0.375786

Model: Logistic regression (logit) N of 0's:1409 1's:445  
 Dep. var: **HALOCYPHINA VILLOSA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 954.73776627 Chi<sup>2</sup>(3)=134.02 p=.00000

	Const.B0	W Body	WOOD Type	Season
Estimate	-52.2949	-0.12608	0.136414	0.494331
Std.Err.	8.510505	0.014419	0.028446	0.077731
t(1850)	-6.14474	-8.74377	4.795545	6.359469
p-level	9.78E-10	<b>4.96E-18</b>	<b>1.75E-06</b>	<b>2.54E-10</b>

Model: Logistic regression (logit) N of 0's:1841 1's:13  
 Dep. var: **CIRRENALIA FUSCA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 70.758214917 Chi<sup>2</sup>(3)=13.356 p=.00393

	Const.B0	W Body	WOOD Type	Season
Estimate	72.59494	-0.22142	-0.17076	-0.35667
Std.Err.	39.58404	0.094482	0.140134	0.360142
t(1850)	1.833945	-2.34353	-1.21855	-0.99036
p-level	0.066823	<b>0.019208</b>	0.22317	0.322127

Model: Logistic regression (logit) N of 0's:1716 1's:138  
 Dep. var: **PERICONIA PROLIFICA** Loss: Max likelihood (MS-err. scaled to 1)  
 Final loss: 463.13080846 Chi<sup>2</sup>(3)=56.208 p=.00000

	Const.B0	W Body	WOOD Type	Season
Estimate	0.507877	-0.04434	-0.24505	0.266525
Std.Err.	20.36214	0.02427	0.050235	0.179686
t(1850)	0.024942	-1.82683	-4.87805	1.483285
p-level	0.980104	0.067887	<b>1.16E-06</b>	0.138169

## **DISCUSSIONS AND CONCLUSIONS**



## Discussions & Conclusions

### Floristic novelties

During the course of this study eighty species of marine fungi were collected from different parts of coastal Kerala. Of these eighty species, 61 were ascomycetes, one was a basidiomycete and 18 species were mitosporic fungi. Out of these eighty species, all except the twelve species recorded by Prasannarai & Sridhar (2001) from Bekkal and Kovalam, are new records for the Kerala coast. The following 8 genera are new to the list of marine fungi known from India: *Lindra*, *Koralionastes*, *Manglicola*, *Dendriphiella*, *Phialophorophoma*, *Payosphaeria*, *Salsuginea* and *Anguillospora*. *Aniptodera salsuginosa* and *Cirrenalia fusca* are new records for India.

### Species Diversity and Composition

*Aniptodera chesapeakensis* was the only fungus that was obtained from all the 19 locations. *Cirrenalia pygmaea*, *Halosarpheia marina* and *Marinosphaera mangrovei* were obtained from 18 locations. In contrast, *Arenariomyces parvulus*, *Anguillospora* sp, *Corollospora pseudopulchella*, *Dryosphaera tropicalis*, *Koralionastes* sp, *Phomopsis* sp., *Savoryella* sp. II, Unidentified Ascomycete I, Unidentified Ascomycete II, Unidentified ascomycete V, Unidentified Anamorph and *Zalerion* sp. were obtained from any single location only.

*Aniptodera chesapeakeensis*, *Cirrenalia pygmea*, *Halosarpheia marina*, *Halorosellinia oceanica*, *Lulworthia grandispora*, *Savoryella lingnicola*, *Zalerion maritimum* and *Zalerion varium* were obtained from all the wood types examined. 16 species were obtained only from any one wood type.

*Aniptodera chesapeakeensis*, *Cirrenalia pygmea*, *Halosarpheia marina*, *Lulworthia grandispora* and *Marinosphaera mangrovei* were obtained from all the types of water bodies. In contrast, 21 species were obtained only from any one type of water body.

Maximum number of species (65) was obtained from intertidal wood and minimum (19) from sand-buried wood. Amongst the mangrove woods, *Acanthus* wood yielded the minimum number of species (33). Maximum number of species was obtained from estuaries (63) and minimum from coir-retting fields (7).

Shannon index was maximum for estuaries and minimum for coir-retting fields. Simpson index was maximum for coir-retting fields and minimum for shoreline site B.

Species diversity therefore was found to be highest in estuaries as both Shannon index and the number of species obtained were highest for that type of water body. Species diversity was minimum in coir-retting field.

The numbers of species obtained in each season were also remarkably similar further proving the lack of influence of seasonal changes on marine fungi.

Maximum number of species was obtained from Tellicherry-A (50 species) followed by Tellicherry-C (40 species) and Tellicherry-B (39 species). In contrast, 7 species or less only were obtained from Dharmadam-B, Mahe-B and Kadalundi-B. All the other locations yielded numbers between 18 and 32.

Shannon index was maximum for Beypore (3.1356), closely followed by Tellicherry (3.0993) and Dharmadam-A (3.0567). For the three coir-retting locations, Dharmadam-B, Kadalundi-B, and Mahe-B, the Shannon indices were less than two. For all other locations the indices were between 2 and 3.

Simpson index was minimum for Beypore followed by Dharmadam-A (0.045167) and Tikkody (0.059604). The maximum value of Simpson index was obtained for Mahe-B (0.22381) followed by Dharmadam-B (0.174972) and Kadalundi-B (0.168421), which were all coir-retting fields.

These values of both Shannon index and Simpson index indicate that species diversity is maximum at Beypore and is remarkably low at Dharmadam-B, Kadalundi-B and Mahe-B.

Although the species diversity was maximum at Beypore, as indicated by the highest Shannon index value and lowest Simpson index value, maximum number of species was obtained from Tellicherry-A. This is because maximum collections were made from Tellicherry-A.

The very low species diversity of marine fungi observed at Dharmadam-B, Kadalundi-B and Mahe-B can be easily explained. These locations are coir-retting fields that are highly polluted and anoxic.

### Population density of marine fungi

Average isolates per wood sample was calculated for each location, each type of water body, each type of wood and for each season and it is taken as a measure of the population density of marine fungi.

Amongst the 19 locations, maximum value for average isolates per wood sample was obtained from Kavvai closely followed by Chettuva and Tellicherry-B. Least isolates per wood sample was obtained from Mahe-B with Dharmadam-B and Kadalundi-B (all coir retting fields) also showing strikingly similar values.

Average isolates per wood sample was maximum for *Rhizophora* wood (2.49) and minimum for sand-buried wood (1.48). Average isolates per wood sample was maximum at backwaters (2.67) and was least at coir-retting fields (0.71). The numbers of average isolates per wood sample were almost the same in all the three seasons indicating that seasonal changes have only very limited influence on the population density of marine fungi in the Kerala coastal waters.

The observations on species diversity and population density on different locations, wood types and water bodies indicate that maximum species diversity and maximum population density need not go together. For example, species

diversity was maximum at Beypore while population density was maximum at Kawai.

The explanation given earlier for the least species diversity in the coir retting fields is applicable for the least population density seen at these sites.

While seasonal influence was negligible on the population density of marine fungi in the study area as a whole, it was not so in some particular locations. For example, in the coir retting fields Mahe-B and Kadalundy-B, the population density doubled during the monsoon season. This could be due to the flushing action of the monsoonal showers on these water bodies, which brings down the level of pollution.

### Frequency and relative abundance of species

In terms of overall percent frequency of occurrence and percent relative abundance, *Halosarpheia marina* emerged as the most dominant, followed by *Halocyphina villosa*, *Aniptodera chesapeakeensis*, *Marinosphaera mangrovei*, *Lulworthia grandispora* and *Savoryella lignicola*. Only these six species had percent frequency of occurrence above 10 and percent relative abundance above 5. In contrast, *Corollospora pseudopulchella*, *Dryosphaera tropicalis*, *Koralionastes* sp., *Phomopsis* sp., *Savoryella* sp. II, Unidentified ascomycetes I, II and V were represented by a single isolate each and hence their percent frequency of occurrence and percent relative abundance were minimum (less than 0.05 and 0.03 respectively).

At the level of individual locations, however, the ascending order of the values of both the percent frequency of occurrence and percent relative abundance of each species were different. For example, in the case of *Halosarpheia marina*, which showed the highest overall percent frequency of occurrence and percent relative abundance, had only 10<sup>th</sup> position at Bekkal.

The percent frequency of occurrence and percent relative abundance of individual species at different seasons were remarkably similar in the case of most species. In a few cases, however, some notable differences could be observed. For example, in the case of *Halocyphina villosa*, the percent frequency of occurrence was 33.67 during monsoon season while it was just 10.73 in the pre-monsoon season.

With regard to the wood-type, the percent frequency of occurrence and percent relative abundance of individual species exhibited notable differences in most cases. For example, the percent frequency of occurrence of *Aniptodera chesapeakensis* was 40.97 on *Acanthus* wood while it was just 4.6 on sand-buried wood.

In the case of different types of water bodies also, the frequency and relative abundance of individual species were remarkably different. For example, *Aniptodera chesapeakensis* had a percent frequency of occurrence 30.3 in backwaters while the value was just 10.92 in coir-retting fields.

## Influence of water body, wood, and season on the occurrence of individual species

Out of the 57 fungal species subjected to logistic regression analysis, the occurrence of only twenty four fungi were found significantly influenced by any one or all the three predictor variables considered (type of water body, type of wood and season). The occurrence of only three species, i.e. *Aigialus grandis*, *Arenariomyces trifurcatus* and *Halocyphina villosa* were found significantly influenced by the type of water body, type of wood and the season. Out of the remaining 21 species, the occurrence of 12 species, i.e. *Aigialus parvus*, *Dactylospora haliotrepha*, *Halosarpheia abonnis*, *Halosarpheia marina*, *Halosarpheia ratnagiriensis*, *Antennospora quadricomuta*, *A. salina*, *Leptosphaeria australiensis*, *Lulworthia grandispora*, *Marinosphaera mangrovei*, *Verruculina enalia*, and *Cirrenalia pygmea* was found to be significantly influenced by the type of water body. Thus, the distribution of a total of 15 species was found significantly influenced by the type of water body.

The occurrence of 16 species, i.e. *Aigialus grandis*, *Aigialus parvus*, *Aniptodera chesapeakeensis*, *Arenariomyces trifurcatus*, *Ceriosporopsis halima*, *Dactylospora haliotrepha*, *Halosarpheia viscosa*, *Halosarpheia abonnis*, *Halosarpheia minuta*, *Lignicola laevis*, *Lulworthia grandispora*, *Lulworthia* sp. 1, *Savoryella lignicola*, *Verruculina enalia*, *Halocyphina villosa* and *Periconia prolifica* were found to be significantly influenced by the type of wood. The occurrence of only four species were found significantly influenced by the season and these

species are the following: *Aigialus grandis*, *Arenariomyces trifurcatus*, *Ceriosporopsis halima* and *Halocyphina villosa*. Among the three parameters considered, it was season that had the least influence on the occurrence of marine fungi in Kerala.

## Ecological observations on individual species

### *Aigialus grandis*

The overall percent frequency of occurrence of this fungus during the present study was 1.51. This is much less than the percent frequency of occurrence of this fungus reported by Borse (1988) from Maharashtra (6.8%) and by Hyde & Jones (1989a) from Seychelles (3.95%). Jones & Kuthubutheen (1989), however, reported a lower percent frequency (0.16%) of occurrence of this fungus from Malaysian coast.

### *Aigialus mangrovei*

The overall percent frequency of occurrence of this fungus during this study was 0.70. It seems that *A. mangrovei* prefers to colonize on mangrove plant materials and to grow in water bodies having an intermediate salinity conditions. Leong, Tan & Jones (1991), Hyde (1988a) and Borse (1988) isolated this species from mangrove material. Borse (l.c.) could collect this species only from a mangrove site and adjacent non-mangrove sites did not yield it. The very low percentage of occurrence of this species indicates that it is rather rare in Kerala coast. Leong, Tan & Jones (1991), however, found it to be frequent in Singapore.



### *Aigialus parvus*

The overall percent frequency of occurrence of this species in the present study was 2.32. Borse (1988) reported a similar overall percentage of occurrence of this fungus in coastal waters of Maharashtra (2.38), while Jones & Kuthubutheen (1989) reported a lower percentage from Malaysia (1.44%). Most of the wood samples that yielded *A. parvus* were collected from backwaters (13 out of 43), which indicate a preference for this habitat. In contrast, wood samples collected from beach sites were totally devoid of this species. Borse (1988) also observed that the occurrence of this species in beach sites was very poor.

### *Aniptodera chesapeakensis*

*Aniptodera chesapeakensis* was the most frequently encountered fungus during the present study. It was observed on almost all types of substrates examined although the majority of isolates were from *Acanthus* wood. Similarly it was observed on all kinds of water bodies studied, although, maximum isolates were obtained from backwaters. Kohlmeyer & Kohlmeyer (1979) observed the capacity of this species to tolerate a wide range of salinity and the present data confirm their observations. The overall percent frequency of occurrence of this fungus during the present study was 21.79. Hyde (1990a) and Borse (1988) found the overall percent frequency of occurrence of this fungus as 2.8 and 1.8 respectively. Compared to those values, the percentage found in the present study is extremely high.

### *Aniptodera haispora*

Out of the 19 collection sites, this fungus was obtained from only three sites. Out of the total wood samples examined, only 7 were found to harbour this species. The percent frequency of occurrence of this species observed in the present study was 0.38.

### *Aniptodera longispora*

During the present study, this species was isolated from only 3 wood samples. The samples were dead and decaying wood of *Avicennia* and *Bruguiera*. Out of the 19 collection sites only two yielded this species and the percent frequency of occurrence was just 0.16. It seems to be very rare in Kerala. According to Hyde (1990a), the percentage of occurrence of this species in Brunei was 0.4.

### *Aniptodera mangrovei*

In the present study, this species was observed in only 3 wood samples of which 2 were *Bruguiera* and the remaining one belonged to *Rhizophora*. The percentage of occurrence of this species in the present study was 0.16, which is the lowest value reported so far from any region. The previously reported percentages were: Philippines – 0.75 (Jones, Uyenco & Follosco, 1988); Brunei – 2.8 (Hyde, 1990a); Seychelles – 3.7-6.7 (Hyde & Jones, 1989a) and Malaysia – 1.44 (Jones & Kuthubutheen, 1989). Of the 3 wood samples that supported the growth of this species, 2 were from estuaries and 1 from backwater. Jones,

Uyenco & Follosco (1988) observed that this species could tolerate a wide range of salinity (10.2-27.2%).

*Aniptodera salsuginosa*

This species seems to be very rare in the Kerala coastal waters. It appeared only thrice during the entire period of this study. Out of the 19 collection sites, this species was obtained from only two sites. The percent frequency of occurrence during the present study was 0.16.

*Anitpodera* sp. I

The percent frequency of occurrence of this fungus in the Kerala coastal waters was only on 0.22% and it was obtained from only four wood samples.

*Aniptodera* sp. II

This species of *Aniptodera* seems to be a rarely occurring fungus in the coastal waters of Kerala. The overall percent frequency of occurrence was only 0.11.

*Antennospora quadricornuta*

The overall percent frequency of occurrence of this species in the present study was 4.15. Koch (1982) reported a high percent of frequency of occurrence of this fungus in the coastal waters of Sri Lanka (18.75%). Lower percent frequency of occurrence of this fungus was reported from the coastal waters of

Singapore (3.3%) by Leong, Tan & Jones (1991) and from the Malaysian waters (0.16%) by Jones & Kuthubutheen (1989).

*Antennospora salina*

The overall percent frequency of occurrence of this fungus in Kerala coastal region was 0.49. Hyde & Jones (1989a) observed that the percentage of occurrence of this fungus was 2.1 in Seychelles. During the course of the present study, this arenicolous marine fungus was obtained mainly from shoreline sites. It seems that high salinity is required for this fungus to grow as no trace of this fungus was found on the wood samples collected during monsoon seasons.

*Arenariomyces majusculus*

Out of the 1854 wood samples examined, only 5 samples yielded this species and all these 5 samples were from shoreline sites. The overall percent frequency of occurrence of this species in this study was 0.27. The affinity of this species for a sandy habitat is evident from the observation that even in shoreline sites, intertidal woods trapped in rocky regions never yielded this species.

*Arenariomyces parvulus*

Out of the 19 collection sites, this species was isolated from wood samples obtained from 2 shoreline sites. This is understandable as it is an arenicolous fungus growing on sand grains or on wood buried in the intertidal region of sandy beaches. The overall percent frequency occurrence of this species in the present study was 0.16.

*Arenariomyces trifurcatus*

As this species is an arenicolous species, during the present study, it was obtained mostly from beach sites. Almost the same number of isolates of this species was collected in all the three seasons, which indicates the absence of seasonal fluctuations. The overall percent frequency of this species in this study was 2.05.

*Ascocratera manglicola*

In Kerala, this species appears to be a rarely occurring one and the overall percent frequency of occurrence was just 0.22. During this study only 4 wood samples showed colonization by this species, but remarkably, all of them were mangrove woods. A low percentage of occurrence of this species, was also reported by Jones & Hyde (1990). Kohlmeyer (1986), however, stated that this species was one of the most common marine fungi. All previous reports about this species showed that this species grew only on mangroves. The present study confirms this observation.

*Bathyascus tropicalis*

According to Borse (1988), the percent frequency of occurrence of this species in the Maharashtra coast was 0.88. During the present study, this species was collected from two sites and the substrates were decaying wood of *Avicennia* and an unidentified intertidal wood. The percent frequency occurrence was only

0.32 but it could be isolated in all three seasons although the frequency of occurrence was less during the pre-monsoon season.

#### *Biatriospora marina*

During the present study, this fungus appeared only at four out of the 19 collection sites and out of the 1854 wood samples examined, only seven were found inhabited by this species. The overall percent frequency of occurrence was 0.38. It was found on decaying wood of *Rhizophora* sp., *Avicennia* sp., *Bruguiera cylindrica* and on unidentified intertidal wood and driftwood. Hyde and Borse (1986a) reported that this fungus had only "occasional occurrence". A similar comment was made by Kohlmeyer & Kohlmeyer (1987a) who observed that during their many years of research, *B. marina* was found only once.

#### *Ceriosporopsis halima*

The overall percent frequency of occurrence of this species in the present study was only 0.97. Rees, Johnson & Jones (1979) reported a similar percentage of occurrence in Danish coastal waters. The present study revealed that *C. halima* prefers shoreline waters than estuaries, backwaters and brackish waters. The percent frequency of occurrence of this fungus in the shoreline waters was 4%. A similar percentage was obtained by Borse (1988) during his study conducted in the Maharashtra coast. The arenicolous habitat of this species, reported by several earlier workers, was confirmed during the present

study as well, because, out of the 18 isolates obtained, 15 were from the shoreline sites and they showed a preference for sand-buried wood.

*Corollospora filiformis*

During the present study, the fungus was obtained from wood samples collected only from shoreline sites indicating its arenicolous nature. The overall percent frequency of occurrence of this fungus in this study was 2.43. Most of the wood samples were sand-buried (36/45) while the rest were unidentified driftwood (9/45). This fungus was isolated from wood samples collected in all seasons.

*Corollospora pseudopulchella*

This arenicolous fungus was obtained only once from a sand-buried wood sample collected from a shoreline site. Its percent frequency of occurrence was 0.05.

*Dactylospora haliotrepha*

The overall percent frequency of occurrence of this fungus in the Kerala coast was 6.42, which is nearer to the percent frequency of occurrence of this fungus (6%) at Mexican waters as reported by Hyde (1992d). The percent frequency of occurrence of this fungus at two mangroves of Seychelles were 7.2% and 3% respectively (Hyde & Jones, 1989a). A slightly higher percent frequency of occurrence of this fungus (7.18%) was reported by Jones & Kuthubutheen (1989) in the coastal waters of Malaysia while it was 7.1% in the coastal waters of Singapore (Leong, Tan & Jones (1991). Vrijmoed, Hyde & Jones (1994) reported

a lesser percent frequency of occurrence of this fungus (5.74%) from the coastal water of Hong Kong. Still lesser percent frequency of occurrence of this fungus was reported by Borse (1988) from Maharashtra beaches (2.62%) and mangrove habitats (5.1%) and overall the percent frequency of occurrence in the Maharashtra coast was only 3.2% which is much less than that of Kerala coastal waters.

*Dryosphaera tropicalis*

As this species was isolated only once during the entire period of this study, it seems to be a very rare species. The Kerala collection was obtained from an unidentified, intertidal mangrove wood collected from Tellicherry estuary. The overall percent frequency of occurrence of this fungus was 0.05.

*Halosarpheia abonnis*

The overall percent frequency of occurrence of this fungus in Kerala coast was 1.51, which is nearer (1.08) to the percent frequency of occurrence of this fungus in the coastal waters of Maharashtra (Borse, 1988). Vrijmoed, Hyde & Jones (1994) reported a slightly higher percent frequency of occurrence (2.45) in the coastal waters of Macau and Hong Kong. A much less percent frequency of occurrence (0.32) was reported from the coastal waters of Malaysia (Jones & Kuthubutheen, 1989). A preference of this fungus for mangrove wood substrates was observed during the present course of investigation.



### *Halosarpheia hamata*

During the course of the present study, this fungus was obtained from 17 wood samples. All those samples were collected from estuaries. The overall percent frequency of occurrence of this fungus in the coastal waters of Kerala was 0.92. Although this fungus was reported to have a wide range of salinity tolerance (Shearer, 1972), during the present study, majority of the isolates were obtained (13 out of 17) from the wood samples collected during pre-monsoon months.

### *Halosarpheia marina*

*Halosarpheia marina* is one of the most prolific fungi in the Kerala coastal waters. During this study, 558 wood samples were found to harbour this species and its overall percent frequency of occurrence was 31.12. This is a remarkably high value and such abundance has not been reported from other parts of the world. Interestingly, from the Maharashtra coast, Borse (1988) reported an extremely low (0.44) overall percent frequency of occurrence of this fungus. The highest overall percent frequency of occurrence reported previously for this fungus was 22.5 by Tan, Leong & Jones (1989). Also, during the present study, all the sites visited except one (18 out of 19) yielded this fungus. This species could be collected in all the three seasons and did not show any appreciable seasonal variation. All types of woods considered in this study yielded this fungus. All types of mangrove woods yielded this species without indicating preferential occurrence on any type. Apart from mangrove woods, unidentified intertidal wood, drift wood and wood buried in sand also yielded this species but the number of isolates

made from wood buried in sand was very small. All types of water bodies including highly polluted coir-retting fields yielded this species but the number of isolates obtained from shoreline sites was conspicuously small indicating that it is sensitive to higher level of salinity. Also, the comparatively higher number of isolates made from coir-retting fields indicates that this species can tolerate a high level of pollution.

#### *Halosarpheia minuta*

The overall percent frequency of this fungus in the coastal waters of Kerala was 0.11, which is much less compared to the overall percent frequency of occurrence of this fungus in Singapore which was 6.7 as reported by Leong *et al.* (1991). Jones & Kuthubutheen (1989) reported a still lesser percent frequency of occurrence of this fungus (1.28%) in the coast of Malaysia.

#### *Halosarpheia ratnagiriensis*

The overall percent colonization of this fungus in Kerala coastal waters was 1.62. An almost similar percent frequency of occurrence was reported in the beach sites of Maharashtra (1.3) while the percent frequency of occurrence at mangrove sites of Maharashtra was 4.3 (Borse, 1988), which is similar to the percent frequency of this fungus in Kerala backwaters.

#### *Halosarpheia retorquens* Shearer & Crane

The overall percent frequency of occurrence of this species during this study was 2.16. A lesser percent frequency of occurrence of this fungus was

reported by Vrijmoed, Hyde & Jones (1994) from Hong Kong & Macau while a higher percent frequency of occurrence (15.63%) of this fungus was reported by Koch (1982) from Sri Lanka.

*Halosarpheia viscosa*

The overall percent frequency of occurrence of this fungus was 1.83. In the present study, this species was obtained mostly from estuaries. Its preference to estuarine water was also reported by Shearer (1972).

*Halosphaeria cucullata*

During the course of the present study, this fungus was isolated only from three wood samples and the overall percentage of occurrence was 0.16. Two of the wood samples were unidentified intertidal wood partially buried in sand and the third was driftwood. All the three wood samples were obtained from shoreline sites. The observed habitat and substrates indicate that this species could be arenicolous. Hyde (1988a) reported that the overall percentage of occurrence of this species found during his studies on marine fungi of Brunei was 1.4.

*Halorosellinia oceanica*

This fungus seems to be one of the widely distributed fungi in the Kerala coastal waters. Although this fungus was found in four types of water bodies, no isolates were obtained from the wood samples collected from either inland brackish water sites or coir-retting fields. The overall percent frequency of occurrence of this fungus was 1.56. The overall percent frequency of occurrence

of this fungus in the coastal waters of Karnataka was reported as only 0.6, by Prasannarai & Sridhar (2001) which is much less than the percent frequency of occurrence observed during the present study.

*Koralionastes* sp.

This fungus appeared on a single wood sample with some calcareous materials attached to it. Its overall percent frequency of occurrence was just 0.20.

*Leptosphaeria australiensis*

The overall percentage of occurrence of this species observed during the present study (5.12) is comparable to that of the species in Hong Kong and Macau (4.09%) reported by Vrijmoed, Hyde & Jones (1994). Hyde & Jones (1989a) observed the percent frequency of occurrence of this fungus in the coastal waters of Seychelles as 6.4. Borse (1988) obtained lesser number of isolates of this species from beach sites and the present study supports that observation.

*Lignincola laevis*

The overall percent frequency of occurrence of *L. laevis* in the present study was 6.53. A somewhat similar overall percentage of occurrence of this species (5.42) was reported by Jones & Kuthubutheen (1989) from Malaysia, while a much higher value (14%) was obtained by Hyde (1992d) from Mexico. In the present study, maximum isolates of this species were obtained from *Acanthus* wood. This species could be collected from 15 sites out of the 19 sites visited.

*Lignicola longirostris*

This species was seen only on five wood samples. Its percent frequency of occurrence, therefore, was very low (0.29). Volkmann-Kohlmeyer & Kohlmeyer (1993) and Tan, Leong & Jones (1989) reported slightly higher percent frequency of occurrence of this fungus (i.e. 5.3 and 9.4 respectively).

*Lignicola tropica*

Percent frequency of occurrence of this fungus in the Kerala coastal waters was only 0.32. Slightly lower percent frequency of occurrence of this fungus was also reported by Borse (1988) and Vrijmoed, Hyde & Jones (1994).

*Lindra hawaiiensis*

The overall percent frequency of occurrence of this species in the Kerala coastal water was found as 2.43. Most of the collections were from backwaters and from monsoon season.

*Lulworthia grandispora*

The occurrences of this fungus in the western coastal waters of India have been reported by Borse (1988) and Prasannarai & Sridhar (2001). But all the above-mentioned authors reported a lesser percent frequency of occurrence of this fungus (below 3%). During the present study, the percent frequency of occurrence of this species was 14.71. A similar high percentage (15%) was reported by Hyde & Jones (1989a) from the coastal waters of Seychelles. Percent

frequency of occurrence of this fungus in the coastal waters of Malaysia was 8 (Jones & Kuthubutheen, 1989), while it was 6.8 in Brunei (Hyde, 1988a) and 4.3 in Singapore coastal waters (Tan, Leong & Jones, 1989). The maximum percent frequency of occurrence of this fungus (31%) was reported from the coastal waters of Mexico by Hyde (1992d).

#### *Lulworthia* sp. I

This species of *Lulworthia* seems to be a widely distributed one in Kerala coast. Out of the six types of water bodies subjected for study, this fungus was found in all except the shoreline sites (A category). Remarkably, the maximum frequency of occurrence of this fungus was found in coir retting fields where most other fungi were absent. Out of the seven types of wood samples, this species was obtained from all except sand-buried wood. Among the total wood substrate collected, 90 were found harbouring this fungus and the overall percent frequency of occurrence was 4.85.

#### *Lulworthia* sp. II

18 wood samples collected from estuaries and backwaters were found harbouring this fungus and the overall percent frequency of occurrence of this fungus was 0.97.

#### *Lulworthia* sp. III

A total of eight wood samples yielded this fungus and the overall percent frequency of occurrence of this fungus in the present study was 0.43.

*Manglicola* sp.

This species seems to be a rarely occurring one in the Kerala coastal waters. The percent frequency of occurrence was found as 0.11% and this fungus was isolated from two *Rhizophora* wood samples collected from two nearby estuaries.

*Marinosphaera mangrovei*

*Marinosphaera mangrovei* seems to be one of the most widely distributed marine fungi in the Kerala coast, because, out of the 19 collection sites, this fungus was present at eighteen sites, and out of the seven types of wood substrates subjected for the study, six were found colonized by this fungus. The overall percent frequency of occurrence of this fungus observed during this study was 15. Such a high percent frequency of occurrence has not been reported from anywhere else till this date. Somewhat nearer percent frequencies of occurrence were reported by Vrijmoed, Hyde & Jones (1994) from Hong Kong (9.76%) and by Tan, Leong & Jones (1989) from Singapore (8.5%) while in all other reports, the values were less than those mentioned above (Jones & Kuthubutheen, 1989; Sabada *et al.*, 1995).

*Ocostaspora apilongissima*

The percent frequency of occurrence of this fungus at Mexican waters was reported as 3 by Hyde (1992d). During the course of present study, only two wood samples were found colonised by this fungus and so it can be considered as a

rarely occurring one in the coastal waters of Kerala and the overall percent frequency of occurrence was 0.11.

*Payosphaeria minuta*

This fungus seems to be a rare one and occurred only twice during the entire collection period. One isolate of this fungus was obtained from *Avicennia* wood and the other from an intertidal wood, both collected from estuaries and the percent frequency of occurrence of this fungus in the Kerala coastal waters was 0.12.

*Pleospora pelagica*

The overall percent frequency of occurrence of this species during the present study was 0.38. During this study it was obtained only from decaying wood of *Avicennia*, but it could be collected in all the three seasons. Out of seven isolates, six were obtained from estuaries and one from an inland brackish water body.

*Salsuginea ramicola*

This fungus seems to be of rare occurrence in Kerala coastal waters. This fungus was obtained from *Avicennia* wood only. Hyde (1991a) also mentioned about isolation of this fungus from *Avicennia* wood. The overall percent frequency of occurrence of this species in the present study was 0.11.



### *Savoryella lignicola*

During the present study, this species was observed on 206 samples and the overall percent frequency of occurrence was 11.11. This is a much higher value when compared to the percent frequency of occurrence of this species in Maharashtra coast (0.88%, Borse, 1988), and Sri Lankan coast (3.13%, Koch, 1982). It was isolated from all types of mangrove wood samples as well as from unidentified intertidal wood and driftwood. *Acanthus* wood supported the maximum number of isolates. Also, it was isolated from all types of water bodies except coir-retting fields of Kerala indicating its ability to tolerate a wide range of salinity. Maximum number of isolates was made from wood samples collected from backwaters.

### *Savoryella paucispora*

During the course of the present study, this fungus was isolated from 34 wood samples and the overall percent frequency of occurrence of this fungus was 1.83. A similar percentage (1.4) was reported by Leong, Tan & Jones (1991) from Singapore, while Hyde (1990a) reported that the overall percentage of occurrence of this species in Brunei was only 0.2. From Seychelles also, Hyde & Jones (1989a) reported a much lower percentage (0.4) of occurrence of this species. Another observation was made during the present study is that this species colonise on a wide range of substrates including various mangrove woods. This ability of *S. paucispora* has already been noted by Jones & Eaton (1969) and Jones & Hyde (1992).

#### *Savoryella* sp. I

This fungus was isolated from only three wood samples. The overall percentage of occurrence was only 0.16%. It seems to be a rare species.

#### *Savoryella* sp. II

This species was isolated only once from an intertidal wood sample collected from a shoreline site (B category). The species seems to be a rare one in Kerala coastal water body system as its percent frequency of occurrence was only 0.05.

#### Unidentified Ascomycete I

This species was found only once and hence it seems to be a rarely occurring one in the coastal water bodies of Kerala. Its overall percent frequency of occurrence was 0.05%.

#### Unidentified Ascomycete II

This fungus was isolated from a single intertidal wood collected from a backwater. Its percent frequency of occurrence in Kerala coastal waters was 0.05. It seems to be a very rare fungus.

#### Unidentified Ascomycete III

This fungus was found on thirteen wood samples collected during the course of this study and the overall percent frequency of occurrence was 0.70.

#### Unidentified Ascomycete IV

The overall percent frequency of occurrence of this fungus in the Kerala coastal waters was 0.22. It seems to be a rare species.

#### Unidentified Ascomycete V

This fungus was isolated only once from a decaying *Avicennia* wood sample collected from an estuary. The overall percent frequency of occurrence was only 0.05.

#### Unidentified Ascomycete VI

This fungus was found only on three wood samples and the overall percent frequency of occurrence was 0.16.

#### Unidentified Ascomycete VII

This fungus was found only on two *Avicennia* wood samples collected from estuarine waters. The overall percent frequency of occurrence of this fungus in the Kerala coastal waters was 0.11.

#### Unidentified ascomycetes VIII

This species seems to be a rare one in Kerala coastal waters and the overall percent frequency of occurrence was only 0.16.

### *Verruculina enalia*

During the present study, the overall percent frequency of occurrence was 5.29. Almost similar overall percentages were reported by Vrijmoed, Hyde & Jones (1994) and Jones & Kuthubutheen (1989) from coastal waters of Hong Kong & Macau and Malaysia respectively. Borse (1988) observed that overall percentage of occurrence of this fungus in the Maharashtra coast of India was 8.44. Hyde (1990a) reported an almost similar value from Brunei. Hyde & Jones (1989a), however, observed a much less overall percentage of occurrence (2.13) of this species in Seychelles.

### *Halocyphina villosa*

*Halocyphina villosa* is reported as one of the most widely distributed marine fungi (Hyde & Jones, 1988; Hyde, 1990a; Jones & Kuthubutheen, 1989). This basidiomycete has been found colonizing on a wide variety of decaying wood substrates including mangroves (Kohlmeyer, 1980; Hyde & Jones, 1988; Hyde, 1990a). During the present study, this fungus was isolated from all types of wood samples except *Acanthus ilicifolius*, and was present in all the 19 collection sites. The overall percentage of occurrence of this fungus in the Kerala coastal waters was 24. A similar percent frequency of occurrence of this fungus was also reported by Hyde & Jones (1989a) from Seychelles. A smaller value (18) was reported from the coastal water of Malaysia by Jones & Kuthubutheen (1989). During the present study *Halocyphina villosa* emerged as one of the most widely

distributed marine fungi in the Kerala coastal waters. It is also interesting to note that *H. villosa* was present in all types of water bodies subjected to study.

*Anguillospora* sp.

This species of *Anguillospora* was isolated from a single site located in an inland brackish water body. The overall percent frequency of occurrence of this fungus was 0.62.

*Ascochyta* sp.

The overall percent frequency of occurrence of this fungus in the present study was 0.32. Only six isolates of this were obtained during the entire period of this study.

*Cirrenalia basiminuta*

The overall percent frequency of occurrence of this species was only 1.67. A similar (1.7%) percent frequency of occurrence of this fungus was reported by Leong, Tan & Jones (1991) at Mandai mangrove of Singapore.

*Cirrenalia fusca*

The overall percent frequency of occurrence of this fungus in the Kerala coastal waters was only 0.70. This fungus seems to prefer *Acanthus* wood for colonisation. The present frequency of occurrence of this fungus on *Acanthus* wood was 2.19 while on all other types of wood samples the percent frequency of occurrence was less than one.

### *Cirrenalia macrocephala*

During the present study this fungus was present in four out of six types of water bodies subjected for the study. Hughes (1974) reported that *C. macrocephala* was much less in the tropical part compared to the temperate region. Rees, Johnson & Jones (1979) stated that the percent frequency of occurrence was 21 in Danish sand dunes while the percent frequency of occurrence of this fungus in Kerala coastal waters was only 1.19. Tubaki (1969) reported *C. macrocephala* as one of the most widely distributed marine fungus in the coastal waters of Japan.

### *Cirrenalia pygmea*

During the present study, this fungus appeared in all types of water bodies considered and also in all types of wood samples subjected for study. Previous authors also have recorded the apparent absence of preference of this species for any particular substrate. The overall percent frequency of occurrence of this species during the present study was 9.12. A similar, high percentage has been recorded only from Brunei (Hyde, 1990a). Most previous records from other parts of the world including that of Borse (1988) from the Maharashtra coast show much less overall percent frequency of occurrence of this species.

### *Cladosporium* sp.

This species seems to be a manglicolous marine fungus because all the five isolates obtained during the present study were from mangrove wood. The overall percent frequency of occurrence was 0.22.

### *Dendryphiella salina*

This fungus could be isolated from only 18 samples and hence the overall percent frequency of occurrence of this species during the present study was very low (0.98). Out of the 18 wood samples that yielded this species, 13 were from brackish waters and the rest were from estuaries. This fungus was absent in all other types of water bodies studied. Of the 18 wood samples, 6 belonged to *Bruguiera*, 8 to unidentified intertidal wood, 2 to *Rhizophora* and 2 to *Acanthus*.

### *Periconia prolifica*

During the present study, this fungus was isolated from 138 wood samples collected and the percentage of occurrence was 7.44. A nearer percent frequency of occurrence (9%) of this fungus was reported from Mexican waters by Hyde (1992d). Mouzouras (1989), Jones & Kuthubutheen (1989), and Hyde (1990a) reported lesser percent frequency of this fungus. This fungus seems to prefer estuaries, brackish waters and backwaters rather than shoreline waters. This may be due to the high salinity of shoreline waters. A similar observation regarding this species was made by Shearer (1972). Among the wood substrates, this species seems to prefer the wood of *Acanthus ilicifolius*, as the maximum colonization was recorded on it. Sabada *et al.* (1995) also have reported such a preference of this species for *Acanthus*.

*Phialophorophoma litoralis*

The overall percent frequency of occurrence of this fungus in Kerala coastal waters was only 0.54. A higher percent frequency of occurrence was reported by Rees, Johnson & Jones (1979) from Denmark.

*Phoma* sp.

The overall percent frequency of occurrence of this fungus in the Kerala coastal waters was 0.81 and it was always obtained from mangrove wood.

*Phomopsis* sp.

This fungus seems to be a rare one and was found only in an inland brackish water body. It was isolated from an intertidal wood, collected during post- monsoon season.

*Trichocladium alopallonellum*

*Trichocladium alopallonellum* seems to be a rare fungus in the coastal water of Kerala and its distribution seems to be limited to shoreline water and estuaries. It is absent in backwaters and brackish waters of Kerala and this may be due to the lesser salinity of these two types of water bodies. The overall percent frequency of occurrence of *Trichocladium alopallonellum* in Kerala coastal waters was only 2. An almost equal (1.52) percent frequency of occurrence of this fungus was reported from Maharashtra coast by Borse (1988). From Seychelles (Hyde & Jones, 1989a), Brunei (Hyde, 1988a), Malaysia (Jones & Kuthubutheen,



1989) and Hong Kong (Vrijmoed, Hyde & Jones, 194), however, workers reported lower frequency of occurrence of this species.

*Trichocladium* sp.

The overall percent frequency of occurrence of this fungus in the present study was 0.32. Only six isolates were obtained.

Unidentified Anamorph

This fungus seems to be a brackish water fungus, because, all the four isolates obtained during the study period were from a single inland brackish water body at Vadakara. The overall percent frequency of occurrence of this fungus in the Kerala coastal waters was 0.22.

*Zalerion maritimum*

During the present study, this fungus was isolated from 23 wood samples and its overall percent frequency of occurrence was 1.24. It was isolated from decaying wood of *Bruguiera*, *Avicennia* and *Rhizophora* as well as from unidentified intertidal wood, driftwood and sand-buried wood. This species was seen only on wood samples collected from estuaries and shoreline sites. Out of the 23 collections, 16 were from estuaries and 7 were from shoreline sites.

*Zalerion varium*

*Zalerion varium* was found on 53 wood samples during this study and the overall percentage of occurrence was reported from Malaysia (Jones &

Kuthubutheen, 1989) and Maharashtra coast (Borse, 1988). Shoreline sites yielded the maximum wood samples harbouring this fungus. Most of the isolates were obtained from wood partially buried in sand although it was obtained from all categories of wood including unidentified intertidal wood and driftwood as well as various mangrove woods. Most of the wood samples that yielded this species were collected during the post-monsoon season while least was from monsoon season.

*Zalerion* sp.

This fungus was isolated only once and that was from a decaying *Avicennia* wood sample collected from an estuary. The percent frequency of occurrence of this fungus was 0.05.

## Concluding Remarks

The high diversity observed in the present study is similar to that of other tropical locations (Borse, 1988; Hyde, 1988a; Hyde & Jones, 1989a; Sarma, Hyde & Vittal, 2001; Prasannarai & Sridhar, 2001). Also, the observation that the great majority of the fungi collected during this study belonged to Ascomycota supports similar reports by several workers (Kohlmayer, 1984; Kohlmayer & Volkmann-Kohlmayer, 1987a,c, 1989; Hyde & Jones, 1988; Hyde, 1988a; Sarma & Vittal, 2001).

The frequency of species observed in the present study, however, is quite distinct from earlier reports including those from other parts of peninsular India. For example, none of the five fungi that showed more than 10% frequency of occurrence in Prasannarai & Sridhar's (2001) study of the marine fungi of the west coast of India, either was collected or showed more than 10% frequency in the present study. One reason for this contrasting observations could be the fact that the earlier study concentrated mostly on beach locations. The observations of Sarma, Hyde & Vittal (2001) on the mangrove fungi of east coast of India are also in conflict with the present observations, as far as the most dominant fungi are concerned. Only *Verruculina enalia* and *Eutypa bathurstensis* had more than 10% frequency of occurrence in their study. None of the fungi observed by Borse (1988) showed more than 10% frequency of occurrence. The only other reports where *Halosarpheia marina* was the most dominant species, were those of Tan &

Leong (1992, from Singapore), Hyde (1989, from North Sumatra) and Hyde & Jones (1988, from Anse Boileau, Seychelles).

All these studies together indicate that subtle local environmental factors play a significant role in the frequency and distribution of marine fungi. Looking with a different perspective, these studies also indicate that comparisons are useless when stretched beyond a point, especially when samplings were either uneven or inadequate or both.

Similarly, although each location, wood type and water body had its own profile of species diversity, frequency and population density, meaningful comparisons are not possible as there was no uniformity in the number of samples examined in each case. In fact, to do the logistic regression analysis, statistically significant numbers of samples were available only for 57 species. The analysis revealed that the occurrence of 24 species of marine fungi in the Kerala coastal waters were significantly influenced by at least one of the following factors: wood type, water body and season.

# SUMMARY

## SUMMARY

This treatise presents the results of a preliminary floristic and ecological study of the marine fungi of the Kerala coastal waters with emphasis on mangrove fungi.

Altogether, eighty species of marine fungi were collected from different parts of coastal Kerala. Of these eighty species, 61 were ascomycetes, one was a basidiomycete and 18 species were mitosporic fungi. All these species are fully described and illustrated and detailed collection data are given for each species. Keys are provided for all the ascomycetes and mitosporic fungi collected. A full synonymy and author citations are given for each species. Eight species are recorded as unidentified ascomycetes and one as unidentified anamorph.

Out of these eighty species, all except twelve species are new records for the Kerala coast. The following 8 genera are new to the list of marine fungi known from India: *Lindra*, *Koralionastes*, *Manglicola*, *Dendriphiella*, *Phialophorophomina*, *Payosphaeria*, *Salsuginea* and *Anguillospora*. Two species, *Aniptodera salsuginosa* and *Cirrenalia fusca* are new records for India.

Percent frequency of occurrence and percent relative abundance of each species were calculated for each location, wood-type, water body and season, in addition to their overall values for the entire study. Shannon Index and Simpson Index were calculated for each location and each type of water body.

Average isolates per wood sample was calculated for each location, each type of water body, each type of wood and for each season and it is taken as a measure of the population density of marine fungi.

In order to see whether the types of water body, wood type and season had any influence on the occurrence of marine fungi. logistic regression analysis was done.

*Aniptodera chesapeakensis* was the only fungus that was obtained from all the locations. In terms of overall percent frequency of occurrence and percent relative abundance, *Halosarpheia marina* emerged as the most dominant, followed by *Halocyphina villosa*, *Aniptodera chesapeakensis*, *Marinosphaera mangrovei*, *Lulworthia grandispora* and *Savoryella lignicola*.

Each location, wood type and season had its own profile of species diversity, frequency and population density. Logistic regression analysis revealed that the occurrence of 24 species of marine fungi in the Kerala coastal waters were significantly influenced by at least one of the following factors: wood type, water body and season.

Ecological observations are given for each species treated and the ecological and floristical data obtained are discussed and compared to those from other geographical locations.

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