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New Taxa for Marine Fungi from Western Coast of Libya

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Abstract

Background: Marine fungi can be found in every marine habitat and are important organisms from ecological and biotechnological perspectives. However, there is little information on marine fungi in Libya. *Objective:* To report on marine fungi species from Libya. *Method:* Organisms were isolated from drift wood and phanerogamic plant remains from six different locations along the western coast of Libya. The collected specimens were examined under light microscope and standard identification keys were used. *Result and Conclusion:* Thirteen marine fungal species have been identified from driftwood and phanerogamic plant remains. These species belong to the classes Ascomycetes (eleven species) and Hyphomycetes (two species). The identified organisms were not reported previously from Libya. More studies are needed in the future to address the importance of marine fungi ecologically and biotechnologically in Libya.

Keywords

Marine Fungi, Driftwood, *Posidonia oceanica,* Ascomycetes, Hyphomycetes, Libya

1. Introduction

Marine fungi can be found in every marine habitat and are important organisms from ecological and biotechnological perspectives. They include a wide range of saprotrophs, parasites, symbionts, endophytes and epiphytes. These organisms are associated with decomposition of woody and herbaceous substrata entering marine environs. Their significance lies in their capacity to break down lignocellulose. Likewise, marine fungi may be essential in the break down of dead animals and animal parts [1]. The production of diverse extracellular enzymes by marine fungi is associated with their ability to degrade organic matter. Such bioactive products are used in pharmaceutical and nutraceutical industries to manufacture antimicrobial, anticancer, antioxidant, antidiabetic, and other therapeutic agents [2].

Marine fungi are found on a wide variety of substrata that include marine plants (i.e. algae, seagrasses and driftwood), marine invertebrates, vertebrates and inorganic matter [3]. Parts of dead trees may drift off into estuaries and coastal seas as driftwood. These may be deposited in intertidal beaches, float in the water, or eventually become submerged in the sea [4]. Several methods are used to harvest marine fungi among them collection of different plant parts, grass culms, driftwood, and algae along the shore at low tide and kept submerged in a container of seawater until studied [5].

In 1981 a survey study of 702 fungal taxa (species, varieties and forms) from different habitats in Libya was published [6], amongst them four marine species were included; *Ceriosporopsis halima* Linder, *Halosphaeria mediostegera* Cribb & Cribb, *Lignicola laevis Höhnk.* and *Zalerion maritime* Linder. Recently, a study airborne and dustborne fungi was reported from the atmospheric air of El-Beida city in Libya [7]. However, there is little information on marine fungi in Libya. This study reports on new fungal species that were identified for the first time from Libya.

2. Materials and Methods

Organisms were isolated from drift wood and phanerogamic plant remains, from the following locations along the Libyan coast: Zuwara, Tripoli, Tajoura, El-Khoms,

Misurata and Susa. The remains of drift wood and phanerogamic plants were collected and transported in seawater in sterile plastic bags to the laboratory, where they were examined under light microscope. Standard identification keys were used as previously reported [8]-[15].

3. Results

In this study thirteen fungal species have been identified that were not reported previously from Libya. The identified species belong to the classes ascomycetes (eleven species) and hyphomycetes (two species). Some species were detected in one location as with *Halosarpheia fibrosa* Kohlm. & Kohlm. which was identified on driftwood from Tripoli. On the other hand some of the identified species were detected in more than one location along the Libyan coast. For example *Torpedospora radiata* Meyers found on drift wood at Tajoura, Tripoli and Susa and *Corollospora maritima* Werderm. was found on driftwood and landed rhizomes of *Posidonia oceanica* collected from all locations included in the study. Table 1 shows the fungal species identified, their habitat and location of isolation.

Table 1. *Marine fungal species identified, their habitat and location of isolation in Libya.*

Fungi	Habitat	Location
Ascomycetes:		
1. *Arenariomyces majusculus* Kohlm. & VolKm.-Kohlm.	Driftwood	El-Khoms and Misurata
2. Corollospora maritima Werderm.	Drift wood and landed rhizomes of *Posidonia oceanica*	All locations studied
3. *Halosarpheia fibrosa* Kohlm. & Kohlm.	Driftwood	Tripoli
4. *Halosphaeria maritima* (Linder) Kohlm.	Driftwood	Misurata
5. *Holatthia posidoniae* (Dur. & Mont.) Kohlm	Landed rhizomes of *Posidonia oceanica*	Zuwara
6. *Leptosphaeria albopunctata* (West.) Sacc.	Driftwood	Tripoli and Tajoura
7. *Leptosphaeria oraemaris* Linder	Soft driftwood.	Tripoli
8. *Lulworthia opaca* (Linder) Cribb & J. W. Cribb	Driftwood	Zuwara, Tripoli and Tajoura
9. *Pontoporeia biturbinata* (Dur. & Mont.) Kohlm.	Landed rhizomes of *Posidonia oceanica*	Zuwara
10. *Torpedospora radiata* Meyers	Driftwood	Tajoura, Tripoli and Susa
Hyphomycetes:		
11. *Dendryphiella arenaria* Nicot	Landed rhizomes of *Cymodocea nodosa*	Zuwara
12. *Dictyosporium pelagicum* (Linder) G. C. Hughes	Drift wood	All locations studied

Identification sheets include descriptions of the reported new taxa were deposited in Marine Biology Research Center, Tajura, Libya.

4. Discussion

In the present work *Arenariomyces majusculus* was isolated from driftwood collected from El-Khoms and Misurata beaches. Nambiar and Raveendran [16] isolated this fungus from various animal substrates including wood borers and mollusk collected from intertidal beaches along west coast of India.

Corollospora maritime is characterisitic of wood associated with sand. El-Sharouny et al. [17] isolated *Corollospora maritima* from driftwood samples collected at mangrove stands of Red Sea in Upper Egypt. In addition, this organism was frequently collected in Kuwait and in Seychelles [18], [19]. *Corollospora maritima* was detected in driftwood and landed rhizomes of *Posidonia oceanica* in all six locations included in this study.

Halosarpheia fibrosa is among the marine fungi commonly collected from tropical and subtropical waters [18]. The fungus was isolated from driftwood at Tripoli location only. In line with the findings of this study *Halosarpheia fibrosa* was rarely isolated from driftwood in Seychelles [18]. Similar findings were reported by Prasannarai and Sridhar [20]. They isolated the fungus from intertidal wood samples collected from only one out of thirteen locations examined along the west coast of India.

Halosphaeria maritima is commonly detected in driftwood and other cellulosic material. In the present work the organism was found in driftwood collected from Misurata location only. *Halosphaeria maritime* was previously reported from driftwood and intertidal wood from the Bay of Fundy, New Brunswick in Canada [21]. Recently, the fungus was reported from sediments of sea foams in estuarine ecosystem in India [22].

Halotthia posidoniae, as the name of the species indicates, is commonly isolated from the seagrass *Posidonia oceanica*. Cuomo et al. [23] surveyed the fungi associated with *Posidoniae oceanica* collected from meadows on the island of Ischia, Bay of Napoli, Italy. They reported that the most frequently identified fungus was *Halotthia posidoniae* followed by *Corollospora maritime*. Similar to their observation *Halotthia posidoniae* was detected from landed rhizomes of *Posidonia oceanica* at Zuwara location. Recently, Kodsueb et al. [24] examined the communities of fungi on *Magnolia liliifera* wood in terrestrial and freshwater habitats in northern Thailand. They detected *Halotthia posidoniae* on naturally occurring and terrestrial baits but not on submerged *Magnolia liliifera* wood baits habitats.

Leptosphaeria albopunctata was isolated from driftwood in Tripoli and Tajoura while *Leptosphaeria oraemaris* was detected on soft driftwood in Tripoli only. *Leptosphaeria albopunctata* is found on *Typha australis* and *Leptosphaeria oraemaris* on dead leaves of *Tupha australis* in southern marshes of Iraq [25]. Recently, Al-Saadoon and Al-Dossary [26] reported both fungi from submerged plant debris in aquatic habitats in Iraq. Rani and Panneerselvam [27] reported that *Leptosphaeria* sp. are frequently occurred in wood samples collected from the intertidal regions of the Muthupet mangrove environment in east coast of India, while

Lulworthia sp. was occasionally found in such samples. They also reported that *Leptosphaeria albopunctata* has been recorded for the first time in Muthupet environs. In the present study *Lulworthia opaca* was isolated from driftwood in Zuwara, Tripoli and Tajoura.

Pontoporeia biturbinata usually occurs on *Posidonia* in marine habitats. The organism was found on landed rhizomes of *Posidonia oceanica* in Zuwara only. *Pontoporeia biturbinata* was among several marine fungi identified from submerged mangrove leaf litter in India [28].

Prasannarai and Sridhar [20] assessed the diversity of marine fungi on intertidal wood collected from 13 locations in the west coast of India. *Torpedospora radiata* was the only fungus common to all locations. They also reported *Torpedospora radiata* was among five fungi that were more frequently isolated. In this study *Torpedospora radiata* was isolated from driftwood in the locations of Tajoura, Tripoli and Susa. This fungus was also reported from lignicolous material found at tropical seashore sites in Brunei [29].

The hyphomycete *Dendryphiella arenaria* habitats are decaying stems and marine algae in warm climates. In the present investigation *Dendryphiella arenaria* Nicot was detected on landed rhizomes of *Cymodocea nodosa* in Zuwara only. On the other hand the hyphomycete *Dictyosporium pelagicum* was found on driftwood from all location examined. Ravikumar et al. [30] reported the dominance of *Dictyosporium pelagicum* among mitosporic fungi on coastal woody debris after tsunami on the southeast coast of India. However, they did not detect *Dendryphiella arenaria* Nicot in their study.

5. Conclusion

Thirteen marine fungal species have been identified from driftwood and phanerogamic plant remains. These species belong to the classes Ascomycetes (eleven species) and Hyphomycetes (two species). The identified organisms were not reported previously from Libya. More studies are needed in the future to address the importance of marine fungi ecologically and biotechnologically in Libya.

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