

Marine fungi associated with the brown Algae, *Cystoseira compressa* , Gerloff et . Nizamuddin. From west coast of Libya.

Almasri.T.A.

The Educational Inspection of Authority – Tripoli. Libya.

Tahermasri9030@gmail.com

Abstract:-

The present study reports on filamentous fungi associated with *Cystoseira compressa* Gerloff et Nizamuddin, a brown Algae frequently retrieved in the Mediterranean basin. Fourteen genera and species isolated by moist-chamber techniques from healthy landed thalli of *Cystoseira compressa*, collected from different locations along the western coast of Libya, have been identified. Out of these four are new records for Libya. The identified taxa belong to the classes Ascomycetes (2 species) and Hyphomycetes (12 species). The results were obtained from more than one collection (minimum three) at each location included in this study. More studies are needed in the future to address the importance of such marine fungi ecologically and biotechnologically in Libya.

Key words : Marine fungi , Brown Algae , *Cystoseira compressa*, Ascomycetes ,Hyphomycetes, Libya.

Introduction:-

Marine fungi are found on a wide variety of substrata that include Algae. Algae represent an important isolation source of marine fungi, with almost one third of all known marine fungal species associated with these organisms (14)(6). Fungi inhabiting or associated with marine Algae are usually referred to as Algicolous marine fungi (MAF).(11). Studies by Kohlmeyer J. and Kohlmeyer E (17), Zuccaro (24) Suryanarayanan,(22) Jones, E.B.G, (14) and Rhaghukumar (21), have shown a rich diversity of fungi associated with marine Algae (MAF). Several methods are used to harvest such organisms among them collection of landed Algae along the shore at low tide and kept submerged in a container of sea water until studied (7). Brief description of the recorded species are presented. Brief description of the species has been taken from the literature when seemed adequate to describe our own collection (17) (13).

Materials and Methods:-

The study area was a marine brown Algae *Cystoseira compressa*. The main last survey of marine Algae of western coast of Libya (Tripoli) was made by Alaa A Said (1). Over all 35 species, 19 genera belong to the brown Algae (Phaeophyta) were recorded and clear dominance was observed to the genus *Cystoseira* (14 spp). Fig. 1.

Organisms were isolated from healthy landed thalli, of the brown Algae *Cystoseira compressa*, collected from the 4 sites noted in .Table 1. along western coast of Libya.



Fig1:- *Cystoseira compressa*

After collection the samples were washed extensively to remove ,debris. And transported to the laboratory in sea water in sterile plastic containers where they were placed individually in glass compartments Containing filter papers moistened with sterile sea water and100 mg / L Chloramphenicol .These were incubated for 4 - 8 (months) at room temperature. Sections or crushed mounts for microscopic study were prepared in water or Lactophenol cotton blue . Lactophenol cotton blue mounts of squashed fungal fruit bodies were prepared for permanent specimens.

Table(1) Location of isolatio

Tajoura	I
Sog- Algoma	II
Tripoli	III
Hy - Andalusia	IV

Notes : The major problems of incubating specimens in moist chambers is contamination. The basic guidelines to avoid contamination are: (A) All container and tools used for moist chamber should be sterilized. (B) Chambers are slightly moistened with sterilized water and excess water may from rotting or deterioration of specimens. (D)Specimens are surface sterilized if necessary to remove insects and their eggs. (C) Samples are incubated at room temperature, 18 --25 C° gives a good yield of fruiting bodies and also less contamination (21) .

Result:-

In the present study, fungi isolated by moist – chamber technics method, yielding yielding 17 fungal taxa. Listed in table 2. The organisms have been identified taxa belong to the two classes, Ascomycetes(2) Species and Hyphomycetes (15) species . Some species were detected in one location as with *Vericosporina ramulosa* Fig2 E , which was identified on landed

samples from Hy - Andalous . On other hand the four sites included in the present study share three common fungi *Alternaria sp.* Fig2 A *Aspergillus sp.* and *Penecillium sp.* Table1, shows fungi detected in present study and their locations of isolation.

Table2: Marine fungal species identified and their iocation of isolation in Libya

Fungi	Location			
	I	II	III	IV
1-Ascomycetes				
<i>Cheatomuim sp</i>	+	+	+	-
<i>Corollospora maritima</i>	-	+	-	+
2- Hyphomycetes				
<i>Alternaria sp</i>	+	+	+	+
<i>Aspergillus sp</i>	+	+	+	+
<i>Cheirsosporium vesicular</i>	+	-	+	+
<i>Cirrenalia macrocephala</i>	+	-	-	+
<i>Cladosporium sp</i>	+	+	-	-
<i>Fusarium sp</i>	+	-	+	+
<i>Dendryphiella arenaria</i>	+	+	+	-
<i>Humicola alopallona</i>	+	-	+	-
<i>Penecillium sp</i>	+	+	+	+
<i>Periconia sp</i>	+	+	-	-
<i>Piricauda sp</i>	-	-	+	+
<i>Stachybotrys sp</i>	+	+	-	-
<i>Triciadium sp</i>	-	-	-	+
<i>Tricoderma sp</i>	+	+	-	+
<i>Varicosporina ranuloma</i>	+	+	-	+

Discussion :-

In the present investigation (17) fungal taxa were identified that belong to the class Ascomycetes (2species) and Hyphomycetes (15)species) Of these fungi , the Ascomycete *Chaetomium sp* . was isolated from landed samples of *Cystoseira* collected at Tajoura, Sog-Algoma and Tripoli location .The organism was reported previously from freshwater habitats from Libya (9). *Corollospora maritima* Werderm.is characteristic of wood associated with sand. The organism was previously isolated from driftwood and landed rhizomes of *Posidonia Oceanica* (L.)DELIL (8) and from sand - buried wood from Western coast of Libya.

The Hyphomycetes, *Alternaria spp*, fig2A, *Aspergillus spp* *Cladosporium sp*. *Fusarium spp*. *Penecillium spp* and *Stachybotrys spp*. found in the present study are terrestrial fungi in survival

in marine environment and usually referred to as Facultative marine fungi, (18). Wide diversity of such organisms were found to be dominant in 20 species of red, green and brown Algae collected along the coasts of red sea in Egypt, (3). *Cirrenalia macrocephala* common in our collections is one of the most widely distributed lignicolous fungi in marine habitats, (18). *Cirrenalia* and *Trichoderma spp.* both have brown to black conidia, 1-3 cells with apical cell being larger. In *Cirrenalia spp.* the conidia are coiled while in *Trichoderma spp.* Conidia are more or less straight. *Dendryphiella arenaria* Nicot habitats are decaying stems and marine Algae in warm climates and frequently reported from saline environment (18). The organism was previously detected on landed rhizomes of *Posidonæ oceanica* in Zuwara the only one out of the six locations examined along western coast of Libya, (8). Conidia straight, cylindrical, 1 - 3(4) Septate, with dark spot or scar at one end. (Not: *Dendryphiella salina* Sutherland, conidia 1-9, septate).

Cheirosporium sp Fig2 B. Conidia dark brown, consisting of 3- 4 rows of cells, arising from basal light brown cell without appendages, with each row composed of 8 - 10 cells. Material examined on the landed samples of the brown Algae. *Cystoseira* collected from Tajoura, Tripoli and Hay - Alandalos locations our specimen represents an aberrant resemblance with *Cheirosporium vesicular* Abdel- Aziz Fig2 B collected from the River Nile, Egypt on submerged decayed wood. (2). Insufficient materials prevent a thorough study of its morphology. However the organism. First report from Libya. *Humicola alopallonllum* (Meyers and Moore, 1960.) Kohlm. and V. Kohlm. Mycotaxon 53 : 392(1995)(Figure 8b) Syn. Fig2 C. *Trichocodium alopallonllum* (Meyers and Moore) Kohlm. 1991. This fungus is a marine species, with conidia that are mostly 1- septate the apical cell larger 7-10 × 8-14 μ and fucous. The basal cell is smaller and light brown. The organism was previously reported from freshwater habitats in Libya (9) *Periconia spp.* Fig2 F have a cosmopolitan distribution, occurring on a wide variety of substrata in freshwater (2) and marine habitats (19). Conidia single - celled thick walled catenulate, smooth or verrucose. Our specimen produces verrucose conidia in chains on conidiophores simple lack a swollen apex and base, the conidial size 6 – 15 μ. Resembling those of *Periconia prolifica* Anastasiou Fig2 F (5). First report from Libya. *Piricauda pelagica*, T, W, Johnson J Elisha Mitchell. Sci. Soc. 74 : 42 (1958) Fig2 D.

Syn. *Monodictys pelagica* (Johnson), E B G Jones, Trans. Br. Mycol. Soc. 46 : 138(1963) Specimen examined on landed samples of the *Cystoseira* a cosmopolitan species occurring on a wide range of substrates largely with temperate distribution. The species has been isolated from soils and mud of the tidal zone of Khor Azubair canal southern Iraq. (4). First report from Libya. *Varicosporina ramulosa*, Myers and Kohlm. Fig2 E. Conidia 3 - radiating hyaline consisting by a main axis, 1-2 (4) septa with two lateral branches in the same plane (at right angles) to each other) In the present study the conidia that were identified, resembling those of

Varicosporina ranuloma, Meyers et Kohlm. First report from Libya. *Trichoderma spp.* Is among the commonly described fungi associated with marine Algae. *Trichoderma spp.* are reported as marine derived fungi associated with the brown Algae *Sargassum spp* from the sea of Japan. (16) .

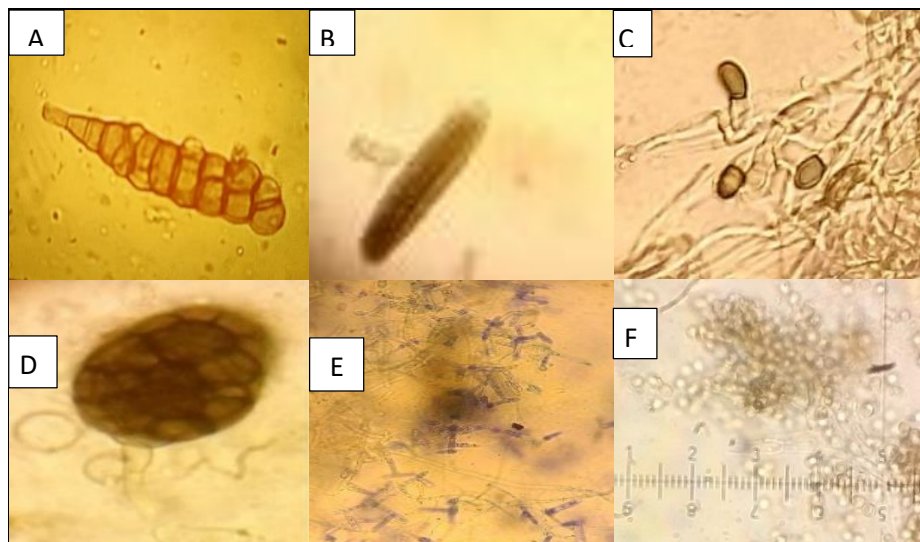


Fig2: A) *Alternaria sp*,400X. B) *Cheirosorium vesicular*,400X. C) *Humicola alopallona*,400X.D) *Piricauda pelagica* 400X. E) *Varicosporina ranuloma* 400X. F) *Periconia prolifica* Anastasiou 400X

Conclusion :-

In conclusion fourteen fungal species have been identified from healthy landed samples of the brown Algae *Cystoseira compressa* species. The taxa belong to the classes Ascomycetes (2 taxa) and Hyphomycetes (12 taxa). More studies are needed in the future to address a checklist of Algicolous fungi in marine habitats from Libya.

Acknowledgment:-

I would like to thank D. Massuda Sifaw Ghenghish for her encouragement.

References: -

- 1- Alaa A .Said et al.2013 . Marine Brown Algae of Benghazi and Tripoli Coasts, Eastern and Western Libya. Egypt Pt.J .Exp.Biol (Bot.) : 9(1) ,49 -- 53.
- 2- Abdel- Aziz, F.A.2016 .Freshwater fungi from the River Nile Egypt. Mycospher, 7(6) : 741—7.
- 3- Abdel Gawad et al. 2014 .Spautio-- temporal environment factors and host identity shape cultivable epibiotic fungi of sea weeds in the red sea in Egypt. Al - Saadon and Al -

- Dossary, M.N. Fungi from submerged plant debris in aquatic habitats in Iraq. Intern.J .of Biodiversity and conservation. 6(6): 468--487.
- 4- AL- sadon and AL-dossary, M.Nfungi from submerged plant debris in aquatic habitats in Iraq. Intern.j of biodiversity and conseruation.6.(6) 468-487.
 - 5- Anstasion 1963 biodivrsity of marine fungi in hongkong coastal of marine waters in world registrar or marine species. Mar.21.2005.
 - 6- Bugni TS ,and Roland CM,2004 .Marine-- derived fungi : a chemically and biologically diverse group of microorganisms. Nat ,Pred ,Rep ,21 : 143 -- 163.
 - 7- Cavalier , A R .1977 .Marine Flora and Fauna of the Northwestern United states. Higher fungi Ascomycetes, Deuteromycetes. and Bsidiomycetes. National Oceanic and Atmospheric Administration Technical Report NMFS CIRCULAR 308
 - 8- Ghenghish M.S. 2017.new taxa for marine fungi from western coast of Libya. American journal of Biology and life science. Vol.5 (6) : 51- 54.
 - 9- Ghenghish M.S. et al. 2019.New5 records for freshwater lignicolous fungi from Libya. Internet research J of Biolog.Sci . Vol. 8(4), 20 - 22.
 - 10- Ghenghish M.S, 2021.Marine fungi associated with the *seagrass Cymodocea nodosa* (UCREA) Asher. from west coast of Libya. Al - Academia J .for Basic and Applied science. (AJBAS), Vol.3 .No 2 September, 2021.
 - 11- Hughes, G .C .1975 .Studies of fungi in oceans and estuaries since 1961.J .Lignicolous, Caulicolous,and Folicolous species. Oceanogr.Mar .Biol .Ann .Rev. 13 : 69 -- 180.
 - 12- Ingold ,C.T .1966 .The tetradia aquatic fungal spore .Mycologia 58 :43--56.
 - 13- Jones, G .2011 Fifty years of marine Mycology. Fungal Diversity, 50 : 73 - 112.
 - 14- Jones EBG et al .2012. Fungi from marine Algae in Jones,E.B.G and Pang K L (Ed's). Marine fungi and fungal like organisms . Marine and freshwater Botany, Walter and Gruyter , Berlin—Boston
 - 15- Kafu. R.et al. 2021. Ten Arenicolous marine fungi from Libya. Internat. Research J. of Biolog .science. Vol. 10 (3) : 1 -6.
 - 16- kirchuk N .N. and P .Mikhail 2015 Secondary marine fungi associated with the brown Algae *Sargassum spp.*From Peter the great (Japan). G .B .Elyakov Pacific institute of Bjoorganic chemistry of the Far East branch of the Russian Academy.
 - 17- Kohlmeyer, J .(1973 b) .Fungi forme marine Algae. Botanica marina.16 :201 – 215.
 - 18- Kohlmeyer J. and Kohlmeyer E 1979. Marine Mycology. The higher fungi. Academic press, New York.
 - 19- Kohlmeyer ,J .and Kohlmeyer E 1991 .Illustrated Key to the filamentous fungi higher marine fungi. Botanica marina, 34 : 1-- 61.
 - 20- Meyers and Reynolds E.S 1959. Growth and cellulytic activity of lignicolous Deuteromycetes from marine localities. Can .Jour. of Microbiology 5(5) : 493-- 503.

- 21- Raghukumar ,2017 .Fungi in coastal and oceanic Marine Ecosystems. Springer inter. publishing AG,Cham. Switzerland.
- 22- Suryanarayanan T.S .2012 .Fungal endosymbiont of Seaweeds. In Biology of marine fungi. PP (53--69).Germany Springer.
- 23- Senanayak IC .et al. 2020 .Morphological approach in studying fungi : Collection, Examination, Isolation, Sporulation and Preservation. Mycospher 11(1) : 2678--2754.
- 24- Zuccaro A .et al. 2008 .Detection and identification of fungi intimately associated with the brown Algae, *Fucus serratus*. Appl .Environ .Microbial. Vol .74 .pp 93 --941 .