Ecology & Conservation Science: Open Access
ISSN: 2689-4637

Research Article
Volume 1 Issue 1 - June 2019
DOI: 10.19080/ECOA.2019.01.555555

Ecol Conserv Sci

First Record Fungi for Iraq

Hussein Al-Nasrawi*

Southern Technical University, Iraq

Submission: October 12, 2018; **Published:** June 19, 2019

***Corresponding author:** Hussein Al-Nasrawi, Southern Technical University, Iraq

Abstract

44 fungal species were isolated from plant parts submerged in Al-Huwaiza marsh within Iraqi borders, and 7 new first records fungi in Iraq were isolated too, which have been illustrated and described as follows: -

Carbosphaerella leptosphaeriodes, Curvularia lunata var.aria, Graphium sp., Helicascus kanaloanus, Leptosphaeria obions, Stagnospora sp. and Ulocladium tuberculatum, Carbosphaerella leptosphaeriodes, Curvularia lunata var.aeria, Graphium sp., Helicascus kanaloanus, Leptosphaeria obions, Stagnospora sp., Ulocladium tuberculatum.

Keywords: Fungi; Submerged plants; Marsh; New record; Iraq

Introduction

Al-Huwaizah marsh is an aquatic ecosystem extend between Iraq and Iran with freshwater body.Al-Huwaizah marsh locates between latitudes 31˚45¯ and 31˚00¯ in the north and longitude 47˚50¯ and 47˚ 25¯ in the east , passing through Iranian borders , 80km X 30km [1]. Reed plants (Phragmites Australis Trin) and Typha (Typha Australis Schum & Thonn) are the main components of the vegetative cover in the marsh ecosystem [2]. Many endemic fungal species play an important role in the biodegradation and bioremediation of marsh environment. Fungi play an important role in biodegradation process of plant debris submerged in marsh and bioremediation occurs during mycoremediation during decomposers (fungi) in the aquatic environment along with some types of bacteria [3-5].

Hussein Al-Nasrawi (2006) was confirmed isolation of fungal diversity (fifteen species) as a new record for the first time in Iraq, isolated from the plant remains submerged in aquatic ecosystems in Iraq , in addition to many studies conducted in Iraq for the same mycological puroses [6,7]. Many species of *Basidiomycetes* were isolated from stems and leaves of the reed plant submerged in salt marshes in Belgium [8].

Materials and Methods

Collection of samples

50 pieces of decomposed plants were collected from water body and sediments in Al Huwaizah marsh in Iraq during 2016. Samples were washed gently by tap water and then by distilled water. Plant debris were cut into small parts 7-5cm long and each 10 pieces were settled in the bottom of petri dish.

Preparation of culture media

Potato Carrot Agar (PCA), which was obtained by weighing 20g of potato and carrots after washing and peeling, then sliced and boiled with a quantity of distilled water, was sprayed well in a ceramic vase , filtered and placed in a 1 liter flask then added to the prepared mixture of each of the potatoes and carrots media .the media objected to sterilizing process in autoclave under standard conditions for 20 minutes (250mg of chloramphenicol as antibiotic to inhibit bacterial growth.

Insolation and identification of fungi

In this study, two methods were used to isolate the fungi: direct isolation from the substrate. The humid chamber method was used to remove the previously prepared vegetable pieces from the beaker using sterile forceps and placed 7 to 5 pieces in a glass bowl of 15cm diameter Petri dishes Sterilize the filter leaves, then moisten the filter leaves with sterilized distilled water and incubate the dishes under 25°C. The second method is the method of dilution. Dilution method to isolate the fungus from the washing of submerged plant parts and summarized the method by withdrawing 10ml of sterile distilled water, which was washed by the samples previously using a sterile pipette placed in a flask containing 90ml of distilled water and a well and withdraw from it 1ml transferred to A sterile glass dish with a diameter of 9cm. The food medium, plate roast and incubation were incubated under 25°C. Three replicates were made of each sample.

The isolated fungi were classified under light microscope by using international taxonomic keys published in the following literatures: [9-20]

Results

Table 1: Fungal species isolated from plant debris in Al-Audem marsh in Iraq.

T	Fungi
1	*Alternaria alternata Keissler*
2	*Alternaria sp.*
3	*Aspergills candidus Link*
4	*A.flavus Link & Fries*
5	*A.fumigatus Fres*
6	*A.nidulans (Eidam) vuill*
7	*A.niger van Tieghem*
8	*A.terreus Thom*
9	*Aspergillus sp.*
10	*Aureobasidium pullulans (De Bary) Arnaud*
11	*Bipolaris hawaiiensis (M.B.Ellis) Subram.&Jain*
12	*Carbosphaerella leptosphaeriodes I.Schmidt*
13	*Chaetomium globosum Kunze & Fries*
14	*Chaetomium piluliferum Daniels*
15	*Chaetomium sp.*
16	*Chuppia sarcinifera Deighton*
17	*Cladosporium cladosporoides (Fresen) de Vries*
18	*Cladosporium sp.*
19	*Curvularia lunata var.aeria(Batista ,Lima &Vasconselos)M.B.Ellis*
20	*Curvularia penniseti (Metra)Boedijn*
21	*Emericella nidulans (Eidam) vuill.*
22	*Eurotium sp.*
23	*Exerohilum sp.*
24	*Fusarium oxysporum Schlecht.*
25	*Fusarium sp.*
26	*Graphium sp.*
27	*Graphium putredinis (Corda)Hughes*
28	*Helicascus kanaloanus Kohlm.*
29	*Leptosphaeria obions (Crouan et Crouan) Saccardo*
30	*Monodictys glauca (Cooke & Harken) Hughes*
31	*Mucor sp.*
32	*Mycosphaerella pneumatophora Kohlm,Ber.*
33	*Penicillium sp.*
34	*Phoma herbarum Westend.*
35	*Phoma sp.*
36	*Pleospora pelagica Johnson*
37	*Rhizopus stolonifer (Ehrenb:Fr.)Vuill.*
38	*Savoryella lignicola E.B.G.Johnes et Eaton*
39	*Stachybotrys atra Corda*
40	*Stagnospora sp.*
41	*Torula herbarum (Pers.)Link ex S.F.Gray*

How to cite this article: Hussein Al-Nasrawi. First Record Fungi for Iraq. Ecol Conserv Sci. 2019; 1(1): 555555. DOI: 10.19080/ECOA.2019.01.555555

42	*Trichurus spiralis Hasselbring*
43	*Ulocladium botrytis Preuss*
44	*Ulocladium tuberculatum Simmons*

Table 2: First record fungi.

T	Fungi
1	*Carbosphaerella leptosphaeriodes I.Schmidt*
2	*Curvularia lunata var.aeria(Batista ,Lima & Vasconselos) M.B.Ellis.*
3	*Graphium sp.*
4	*Helicascus kanaloanus Kohlm.*
5	*Leptosphaeria obions (Crouan et Crouan) Saccardo*
6	*Stagnospora sp.*
7	*Ulocladium tuberculatum Simmons*

The total fungal species isolated from Al-Huwaizah marsh (Table 1 & 2).

Carbosphaerella leptosphaeriodes I. Schmidt Nat. Naturschutz Mecklenburg 7,9-10,1969(publ.1971)

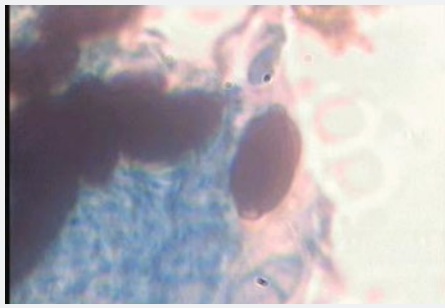

Figure 1: Ascospores of Carbosphaerella leptosphaeriodes.

Ascocarp 90-120um in diameter, globose to subglobose shape. The Asci 40-45 × 60-80µm with 8 Ascospores. The Ascospore 15-18 × 25-30µm, devided by triseptate, the two mid cells within the ascospore dark to brown color, whereas the terminal cells pale and surrounded by mucous sheath. The present isolate nearly like the isolate of Schmidt [21]. This species considers as a new record for Iraq. The isolate was illustrated and kept in under no. BASRA 2011 (Figure 1).

Curvularia lunata var.aeria (Batista, Lima & Vasconselos) M.B.Ellis.1960, publcos inst Micol Recife 263: 5-10

The colony with black to gray color, the hyphae immersed under substrate surface. Conidiophore thicker than fungal filament (macronematous), subhyaline. *Conidiogenous* cell is polytretic. The conidia with curve shape divided with three septae to form four cells, the two mid cells thicker and darker from the two terminal pale cells. Conidia 10-15 × 20-30µm. This species was previously isolated from painted wood and soil whereas our present fungus isolated from reed sample submerged in marsh sediments. Dry culture was kept in Basra herbarium under no. BASRA 2012 (Figure 2).

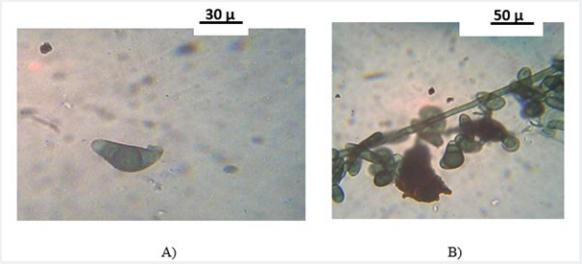

Figure 2: A) Conidia.
B) Conidiophore of *Curvularia lunata* var. aeria.

Graphium sp.

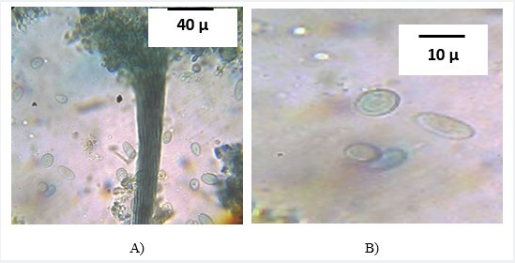

Figure 3: A) Conidiophore.
B) Conodia of *Graphium* sp.

The colony is gray to Olivaceous brown, Conidiophore thicker than fungal filament (macronematous) appears under dissecting microscope as Synnemata. Fungal hyphae immersed under the epidermis. Conidiogenous cell is monobasic type. Conidia 5-7 × 15-20µm. Oval to cylindrical shape, with rounded end, pale color without, unseptated. Our isolated fungus resembles species Graphium putredinis isolated by Huges [19]. Our present isolate differentiated by its shape and size (cylindrical 2-4 × 5-11µm. The species isolated from reed segment submerged in marsh sediment. Dry culture was kept in Basra herbarium under no. BASRA 2013 (Figure 3).

How to cite this article: Hussein Al-Nasrawi. First Record Fungi for Iraq. Ecol Conserv Sci. 2019; 1(1): 555555. DOI: 10.19080/ECOA.2019.01.555555

Helicascus kanaloanus Kohlm.Can.J.Bot.47,1471.1969

Figure 4: Ascospores of *Helicascus kanaloanus*..

The Ascocarp globose, immersed, 400-250µm high, 400-800 with ostule. Black to dark brown color. Asci 200-300µm., bitunicate, with 8 ascospores. The ascospore 15-25 × 35-50µm. Arranged inside ascus as uninervate. The ascospore divided by septum into 2 dark cells, with funnel shape. cell wall of ascospore surrounded by two layers. There are two germination pores in the ends of ascospore. The ascospore differentiated by gelatinous layer clearly appears when immerse in water drop (disappear with lactophenol stain). The present fungus isolated from Typha segment submerged in marsh sediments, illustrated and kept in Basra herbarium under no. BASRA 2014 (Figure 4).

Leptosphaeria obions (Crouan et Crouan) Saccardo Syll Fung 2,24,1883.

Ascocarp sub globose, immersed, with high about 100-300 and diameter 200-400µm., black to dark brown color, usually covered by brown filaments. The ascocarp coated by two layers, large dark external layer and pale small internal layer. The asci thick, bitunicate,14-20 × 150-300µm. Each ascus contains 8 ascospores, 8-15 × 25-40µm. Arranged inside the ascus as uniseriate in the top of the ascus whereas as biseriate in middle site. The ascospore divided by three septae to form 4 cells, the two middle cells dark brown and larger than the terminal smallest cells. This species was previously isolated from herbal plants and from mangrove area in Australia. The present fungus isolated from Typha segment submerged in marsh sediment, illustrated and kept in Basra herbarium under no. BASRA 2015 (Figure 5).

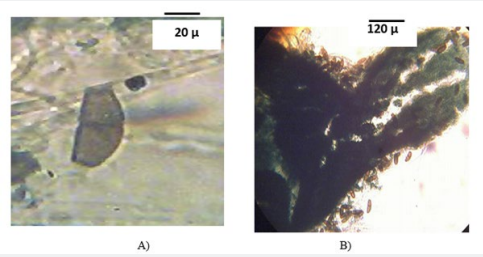

Figure 5: A) Ascospore.
B) Ascocarp of *Leptosphaeria* obions.

Stagnospora sp

The Pycnidium sub globose, partially immersed, with pale brown ostiole and short papillate. High of pycnidium 150-180µm, 100-200µm diameter with a neck about 10µm diameter. The conidia pale to brown color, cylindrical in shape, 4-8 × 40-70µm., divided by 5-7 septae. The present isolate resembles Stagonospora haliclysta which was previously isolated by Kohlm [22] (conidia size 3.5-4.5 × 20-27µm, smaller than our isolate). The present fungus isolated from reed segment submerged in marsh sediment and consider as first record in Iraq. It was illustrated and kept in Basra herbarium under no. BASRA 2016 (Figure 6).

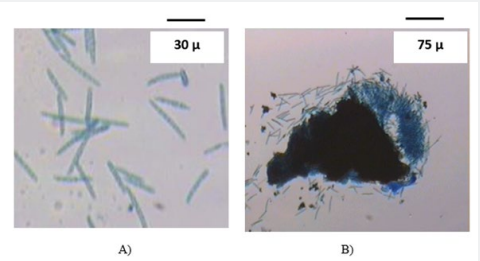

Figure 6: A) Conidia.
B) Pycnedium of *Stagnospora* sp.

Ulocladium tuberculatum Simmons, 1967, Mycologia 59: 83 -84.

The fungal hyphae immersed, sub hyaline, with thick conidiophore 4-6µm. 160-200µm. length, pale brown color, divided by septae. Conidia 10-16 × 10-20µm. sub globose, like potato fruit, divided into several parts by septae cross shape.

The species was firstly isolated in united states. The present isolate resembles Tetracoccosporium paxianum, which isolated by Szabo,1905. Our species was isolated from reed segment submerged in marsh sediment, kept in Basra herbarium under no. BASRA 2017 (Figure 7).

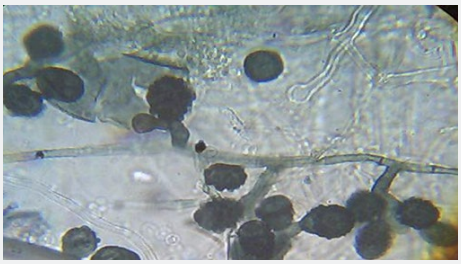

Figure 7: Conidia of *Ulocladium tuberculatu*.

Discussion

Fungi Inhabit plant segments submerged in aquatic ecosystems used their enzymic complex system to biodegrade cellulose and produce carbon source, the most important matter for fungal metabolism process [23,24].

Guaro et al. [25] & Guaro et al. [26] the pioneers who worked on wetland area in Iraq, they isolated and identified many new fungal species and new record fungi forom plant segments submerged in marsh ecosystem in southern area of Iraq. The present study choosed one fresh and natural premium deep marsh ecosystem

How to cite this article: Hussein Al-Nasrawi. First Record Fungi for Iraq. Ecol Conserv Sci. 2019; 1(1): 555555. DOI: 10.19080/ECOA.2019.01.555555

called al-Audem in Mysan province to suray fungal diversity and new records .This ecosystem consider a natural , undiscovered mycoflora enriched with organic materials and with high quality sediments settle in the bottom of water body , that encourage growth of different fungal species. The present study contributed in recording seven new record fungi for Iraq from this marsh environment [27-34].

Conclusion

Several marshed in southern area of Iraq still waiting more studies and novel works to discover more new species and new record fungi. The high-quality water parameters of marsh ecosystem with enrichment of plant diversity, leads to establishment a perfect foundation of sediment layers embedded in the bottom of marsh environment. This study opens the track for researchers to investigate the ecological niche of fungi in marsh community to detect more aquatic and sediment mycoflora of wetlands.

References

1. Scott, Derek A (1995) Directory of wetlands in the middle east. IUCN-The World Conservation Union. International Waterfowl and Wetlands Research Bureau.
2. Al-Edany TY (1978) On the ecology of common reed Phragmites australis Trin in shatt al-Arab M.Sc Thesis Univ of Basrah Iraq.
3. Mille-Lindblom C, Tranvik lJ (2003) Antagonism between bacteria and fungi on decomposing aquatic plant litter. Microb Eco 45: 173-82.
4. Muhsin T, Abdulkader M (1995) Ecology of fungi associated with Phragmites australis in Iraq. Abhath Al-Yarmouk 4:31-50.
5. Muhsin TM, Khalaf KT (2002) Fungal from submerged wood in aquatic habitats, southern Iraq. Iraqi Journal of Biology 2: 455-463.
6. Jaber BM, Alilawi R, Alnajjar T (2012) Isolation and molecular identification of Ascomycetes in sediments and waters of the Gulf of Aqaba, Red Sea Natyral science 4(8): 555-561.
7. Graca MAS, Hyde K, Chauvet E (2016) Aquatic hyphomycetes and litter decomposition in tropical – subtropical low order streams. Fungal Ecology 19: 182-189.
8. Van RG, Verbeken A (2005) Fungal diversity and community structure on Phragmites australis along a salinity gradient in the Scheldt estuary(Belgium). Nova Hedwigia 80(1-2): 173-197.
9. Arx JA, Guarro J, Figueras MJ (1986) The ascomycetes genus Chaetomium. Nova Heydwigia J Cramer, Berlin.
10. Boerema GH (1993) (Contributions towards a monograph of Phoma (Coelomycetes)- II, section Pyrenomycetes. Personia 15(2): 197-221.
11. Booth C (1971) The genus Fusarium. Commonwealth Mycological Institute Kew, Surrey, England.
12. Cai L, Zhang K, Hyde KD (2003) Freshwater Ascomycetes Fungal. Diversity Research series 10: 275-324.
13. Ellis MB (1971) Dematiaceous Hyphomycetes. Commonwealth Mycological Institute. Kew Surrey England, p. 608.
14. Ellis MB (1976) More dematiaceous Hyphomycetes. Commonwealth Mycological Institute. Kew Surrey England, p. 507.
15. Goh TK, Clement KMT (2003) Key to common dematiaceous hyphomycetes from freshwater. Fungal diversity Research series 10: 325-343.
16. Hoog GS, Guarro J (1995) Atlas of clinicalfungi. Gentra albureau Voor Schimmel cultures Universitat Rovera in Virgili Spain p. 720.
17. Kohlmeyer J, Kohlmeyer E (1979) Marine Mycology. The Higher Fungi Institute of Marine Sciences, University of North Carolina at Chapel Hill Morehead City. North Carolina, p. 690.
18. Kohlmeyer J, Kohlmeyer V (1991) Illustrated key to the filamentous higher marine fungi. Botanica Marina 34(1): 1-61.
19. Sivavanesan A (1987) Graminicolous species of Bipolaris, Curvularia, Drechslera, Exerohilum and their Teleomorphs. Mycological papers, 158 C A B U K.
20. Pitt JI (1997) The genus penicillium and its teleomorphic states. Academic press London, New York Toronto Sydney San Francisco, p. 634.
21. Schmidt I (1969) *Carbosphaerella pleosporoides* gen. nov. et spec. nov. und Cirrenalia fusca spec. nov. zwei neue marine pilzarten von der ostseekuste. Feddes Repert 80(2-3): 107-112.
22. Kohlmeyer J (1973) Fungi from marine algae. Bot Mar 16(4): 201-215.
23. Gessner RV (1980) Degradative enzyme production by salt marsh fungi. Bot Mar 23(2): 133-139.
24. Garraway MO, Evans RC (1984) Fungal nutrition and physiology. A Wiley-Interscience Publication Jhon Wiley and Sons p. 401.
25. Guarro J, Abdullah SK, AL-Saadoon AH (1996) A new Zopfiella (Lasiosphaeriaceae) from Iraq. Mycotaxon 11: 197-202.
26. Guarro J, AL-Saadoon AH, Gene J, Abdullah SK (1997) Tow new Cleistothecial Ascomycetes from Iraq. Mycologia 89: 955- 961.
27. Abdullah SK, Abdulkader MA, Goos RD (1989) Basramyces marinus sp nov Hyphomycetes from southern marshes of Iraq Int J Mycol Lichenol 4: 181-186.
28. Apinis AE, Chester CGC, Tailigoola HK (1972) Microfungi Colonizing submerged culms of Phragmites communis Trin. Nova Hedwigia 23: 473-480.
29. Domsch KH, Gams W, Enderson T (1980) Compenedium of soil fungi. Academic press, London 1: 859.
30. Hughes SJ (1958) Revisiones Hyphomycetes aliquot cum appendice de nominibus rejiciendis. Can J Bot 36(6): 727- 836.
31. Kohlmeyer J (1969) The role of marine fungi in the penetration of calcareous substances. Am Zool 9: 741-746.
32. Muhsin TM, Khalaf KT (2002) Fungal from submerged wood in aquatic habitats, southern Iraq. Iraqi Journal of Biology 2: 455-463.
33. Schmidt I (1974) Hohere meerespilze der Ostsee. Biologische Rundschau 12: 96-112.
34. Taligoola HK, Apinis AE, Chesters CGC (1972) Microfungi colonizing collapsed aerial parts of Phragmites communis Trin in water. Nova Hedwigia 23: 465-474.

How to cite this article: Hussein Al-Nasrawi. First Record Fungi for Iraq. Ecol Conserv Sci. 2019; 1(1): 555555. DOI: 10.19080/ECOA.2019.01.555555

DOI: 10.19080/ECOA.2019.01.555555