

قسم : النباتات .

كلية العلوم .

رئيس القسم : أ. د. أ. د. عبدالرحمن .

الفلورا الفطرية لقواقع البيومغلاريا اليكسندرينا والهولينس شرينكاتس

العائل الوسيط للبلهارسيا في مياه النيل

بجمهورية مصر العربية

حسن الشاروني

كان الهدف من هذا البحث هو عزل وتعريف الفطريات الموجودة على قوقعين هاميين في مياه نهر النيل . ولقد تم الحصول على بعض النتائج نوجزها فيما يلي :

١- في هذا البحث تم عزل وتعريف ٣٦ نوعا من الفطريات التي تنتمي الى ٢٢ جنسا منها ٢٢ نوعا سجلت على البيومغلاريا و٢٥ نوعا على اليولينس .

٢- كانت الاجناس أكليا ، سابرولجينا وبيتوم عن اكثر الفطريات تراجدا على القوقعين .

٣- بينما كانت الانواع سابرولجينا ديكلينا و ، أكليا بروليفرا وبيتوم أنديولاتم من اكثر الفطريات شيوعا ..

٤- ووجد أن هناك تشابها كبيرا بين الفلورا الفطرية لهذه القواقع وبين الفلورا الفطرية لمياة النيل عند اماكن جمع العينات .

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**MYCOFLORA OF BIOMPHALARIA ALEXANDRINA
AND BULINUS TRUNCATUS, THE SNAIL VECTORS OF BILHARZIASIS
IN THE RIVER NILE, EGYPT**
(With 2 Tables)

By
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SUMMARY

Thirty-six fungal species which belong to twenty-three genera were collected from Biomphalaria alexandrina (22 genera and 32 species) and Bulinus truncatus (19 genera and 28 species) grown on the Nile water. Achlya, Saprolegnia and Pythium were the most frequent genera whereas Aprolifera, S.diclina and P. undulatum were the most frequent species on the two type of snails. The types of fungi of the two snails as well as the Nile water was nearly similar.

INTRODUCTION

During the last few decades there have been numerous reports on the role and organization of the fungal community in the freshwater ecosystem (WICKLOW and CARROLL, 1981). Most of these reports were focused on fungi colonizing plant materials in rivers and lakes (WILLOUGHBY and ARCHER, 1973; SHEARER and GRANE, 1971; BANDONI, 1974; CUMMINS, 1974; BARLOCHER and KENDRICK, 1975 and ANDERSON and MACFADYEN, 1976). In Egypt as well as in other places in the world, there is no available information about snail-inhabiting fungi in the freshwater stream.

The aim of the present investigation which is a one in a series, is to determine the fungal types of two important snails in the Nile water, namely Biomphalaria alexandrina and Bulinus truncatus the intermediate host for Schistosomiasis (Bilharziasis) in Egypt.

MATERIAL and METHODS

Collection of Samples :

Thirty samples (50 snails each) of each healthy Biomphalaria and Bulinus were carefully collected from shallow water near the shore of the Nile or its tributaries. Water samples were also collected at the same sites for recovering water-inhabiting fungi.

Determination of Snail-Inhabiting Fungi :

The agar-plate method was used. 10 snails of each snail type were placed on the surface of GYE tellurite agar (COLLINS and WILLOUGHBY, 1962). Four plates were used for each sample and then incubated at 25°C for 4-7 days.

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Determination of Water-Inhabiting Fungi :

1 ml of water samples were plated on GYE tellurite agar. Five plates were used for each sample and incubated as previously described. In order to identify the truly aquatic fungi, pieces of colonies on agar plate were collected and placed in sterile water with halves of hemp seeds. The aquatic fungi grew well on hemp seeds and could be easily assigned to genera and species by following the development of sexual structures (JOHNSON, 1956; SPARROW, 1960; WATERHOUSE, 1968 and SEYMOUR, 1970).

RESULTS and DISCUSSION

Thirty-six fungal species which belong to twenty-three genera were identified during this investigation associated with Biomphalaria alexandrina and Bulinus truncatus in the Nile water as shown in Table (1).

I. Fungi recorded on Biomphalaria alexandrina :**a- Aquatic Fungi:**

Six genera and twelve fungal species were identified constituting collectively 62.3% of total fungi. All these fungal species were collected previously from the Nile water (EL-HISSY et al., 1982) and muds (EL-HISSY and EL-NAGDY, 1983).

Achlya, Saprolegnia and Pythium were the most frequent genera on Biomphalaria. These genera were also common in rivers and lakes in different places in the world (ALABI, 1973, DAYAL and THAKURJI, 1968; DICK, 1969, 1971, 1972; EL-HISSY, 1974; EL-SHAROUNY and TIEFENBRUNNER, 1983; HUNTER, 1975; ISMAIL et al., 1979 and KHULBE, 1980).

Achlya was the most frequent genus forming the main type of mycoflora associated with Biomphalaria. It emerged in 76.6% of samples giving rise to 15.2% of total fungi and was represented by three species namely, A.prolifera, A.orion and A.dubia, collected respectively in 66.6%, 40% and 33.3% of samples donating 6.4%, 5.1% and 3.8% of total fungi. Achlya was also common in the river water in Ibadan, Nigeria (ALABI, 1971), in the river Inn, Austria (EL-SHAROUNY and TIEFENBRUNNER, 1983); in Shatt Al-Arab (Iraq) (RATTAN, et al., 1980) as well as in the Nile water (EL-NAGADY, 1981 and EL-HISSY et al., 1982).

Saprolegnia was the second most abundant genus. It occurred in 70% of samples constituting 12.1% of total fungi. Saprolegnia is well known fungus causing disease to freshwater fish (ROBERTS, 1978; WILLOUGHBY et al., 1983; SRIVASTAVA, 1979; CHIEN, 1981 and SRIVASTAVA and SRIVASTAVA, 1978). Three species of Saprolegnia were recorded, namely S.diclina, S.ferax and S.parasitica. They emerged in 63.3%, 36.6% and 26.6% of samples giving rise to 5.1%, 3.8% and 3.2% of total fungi, respectively. These species were also common in the Nile water (EL-HISSY, 1982).

Pythium was also one of the main component of fungal flora on Biomphalaria. It was recovered in 60% of samples giving rise to 10.8% of total fungi. Two species were identified namely, P.undulatum and P.monospermum. They emerged in 60% and 30% of samples donating respectively, 6.4% and 4.4% of total fungi. Pythium was previously recorded from the Nile water (EL-NAGDY, 1981 and KHALIL, 1984) as well as on cellulosic baits exposed to the river stream (BADRAN, 1986).

Dictyuchus was of moderate occurrence (50% of samples) constituting 10.2% of total fungi. D.monosporus and D.sterile were identified in 46.6% and 20% of samples.

Dictyuchus was also recovered from freshwater stream in Iraq (RATTAN et al., 1978), in India (MISRA, 1982), in Japan (SUZUKI, 1961) and in the river Nile (EL-NAGDY, 1981).

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Leptolegnia (L.caudata) and Aphanomyces (A.stellatus) were of moderate and low occurrence and recovered respectively, from 40% and 36.6% of samples donating 7.6% and 6.4% of total fungi. EL-HISSY, 1979, 1983 collected these two genera from water and mud of the river Nile.

b- Terrestrial Fungi :

16 genera and 20 species of non aquatic fungi were associated in low occurrence with Biomphalaria and constitute collectively 37.7% of total fungi. Most of these fungi were isolated before from Egyptian soils (MOUBASHER and MOUSTAFA; 1970; MOUBASHER and MAZEN, 1972 and MOUBASHER and ABDEL-HAFEZ, 1978) as well as from cellulosic materials in the Nile water (BADRAN, 1986).

Aspergillus, Penicillium and Fusarium were the most common genera among terrestrial fungi. They emerged in 33.3%, 26.6% and 23.3% of samples donating 5.1%, 4.4% and 2.5% of total fungi. EL-SHAROUNY and TIEFENBRUNNER (1983) collected these genera from the river Inn water in Austria and they concluded that these fungi were not real "inhabitants" in the river water. DICK (1971) reported that these fungi originate from the river banks and introduced into the river by rain and survive in aquatic habitats but do not appear to be living in running water.

2- Fungi Recorded on Bulinus truncatus :

The results obtained on this snail (Table 1) were basically similar to those on Biomphalaria except for the following observations:

1- The gross total count was considerably lower than on Biomphalaria (574 and 787 colonies, respectively).

2- The spectrum of fungal species was narrower on Bulinus (28 and 32 on Bulinus and Biomphalaria, respectively).

3- Some fungal species namely, Saprolegnia colorata, Pythium afertile, Fusarium solani and Chaetomium spirale were not recorded on Biomphalaria, on the other hand Saprolegnia diclina, Pythium monospermum, Cunninghamella echinulata, Trichoderma viride, Mucor hiemalis and Drechslera spicifera were absent on Bulinus (Table 2).

There were some similarities in the types of fungi-inhabiting water and the two studied snails in 30 samples but not recorded on the two snails on the other hand seven species were collected from snails but not recovered from the river water.

Whether snail-inhabiting fungi or at least part of them are contribution from water-inhabiting fungi or at least part of them are deposited with mud on the surface of the snails? a question has to be answered.

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Table (1): Percentage total counts (Per number of snails and percentage frequency of occurrence) (Per number of samples) of fungal genera and species recovered from the two snails on GYE tellurite agar at 25°C.

Fungal genera and species	<u>Biomphalaria alexandrina</u>		<u>Bulins truncatus</u>	
	% TC	% F	% TC	% F
Aquatic fungi				
<u>Achlya</u>	5.2	76.6	19.5	66.6
<u>A.prolifera</u> Nees	6.4	66.6	4.3	40
<u>A.orion</u> Coker & Couch	5.1	40	4.3	20
<u>A.dubia</u> Ckoker	3.8	33.3	3.8	20
<u>A. colorata</u> Pringsheim	-	-	6.9	13.3
<u>Saprolegnia</u>				
<u>S.diclina</u> Humphrey	12.1	70	13.9	60
<u>S.diclina</u> Humphrey	5.1	63.3	8.7	60
<u>S.ferax</u> (Gruith.) Thuret	3.8	36.6	5.2	23.3
<u>S.parasitica</u> Coker	3.2	26.6	-	-
<u>Pythium</u>				
<u>P.undulatum</u> , Peterson	10.8	60	11.3	56.6
<u>P.afertile</u> (Kanouse & Humphery)	6.4	60	6.1	56.6
<u>P.monospermum</u> (Pringsheim)	-	-	5.2	16.6
	4.4	30	-	-
<u>Dictyuchus</u>				
<u>D.monosperus</u> Leitgeb	10.2	50	10.1	43.3
<u>D.sterile</u> Coker	6.4	46.6	4.8	20
	3.8	20	5.1	13.3
<u>Leptolegnia caudata</u> de Bary				
<u>Aphanomyces stellatus</u> de Bary	7.6	40	8.7	50
	6.4	36.6	8.0	50
Terrestrial fungi				
<u>Aspergillus</u>				
<u>A.flavus</u> Link ex Fr.	5.1	33.3	5.2	30
<u>A.terreus</u> Thom.	2.5	26.6	3.1	20
<u>A.fischeri</u> Wehmer	1.3	13.3	2.1	10
	1.3	13.3	-	-
<u>Penicillium</u>				
<u>P.frequentans</u> Westling	4.4	26.6	3.8	30
<u>P.funiculosum</u> Thom	2.5	-	2.1	30
	1.9	-	1.7	6.6
<u>Fusarium</u>				
<u>F.moniliforme</u> sheldon	2.5	23.3	3	20
<u>F.solani</u> (Mart.) Sacc.	2.5	23.3	2.4	13.3
	-	-	0.52	10
<u>Cladosporium herbarum</u> (Pers.) Link exfr.	2.5	20	2.3	13.3
<u>Paecilomyces variotii</u> Bainier	2.3	16.6	2.1	13.3
<u>Humicola grisea</u> Traeen	2.2	16.6	1.7	10
<u>Alternaria alternata</u> (Nees) Keissler	2.2	13.3	1.7	10
<u>Curvularia spicifera</u>	1.9	13.3	1.4	6.6
<u>Epicoccum nigrum</u> Link	2.1	13.	2.1	6.6
<u>Ulocladium utrum</u> Preuss	2.3	10	1.6	6.6
<u>Cunninghamella echinulata</u> Thaxter	2.4	10	-	-
<u>Trichoderma Viride</u> Pers. ex. Gray	1.9	10	-	-
<u>Phoma humicola</u> Gilman & Abbott	1.8	10	2.1	3.3
<u>Rhizopus stolonifer</u> (Ehr. ex. Fries) Lind	1.9	6.6	1.2	3.3
<u>Mucor hiemalis</u> Wehmer	1.5	3.3	-	-
<u>Drechslera spicifera</u> (Bain) Von Arx	7.6	3.3	-	-
<u>Chaetomium spirale</u> Zopf	-	-	1.0	3.3

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Table (2): Types of water-borne fungi as well as fungi associated with snails (Biomphalaria and Bulinus) growing in the Nile water.

Water-inhabiting fungi	Snail - inhabiting fungi	
	<u>Biomphalaria alexandrina</u>	<u>Bulinus truncatus</u>
<u>Achla prolifera</u>	+	+
<u>A.orion</u>	+	+
<u>A.dubia</u>	+	+
<u>A.colorata</u>	-	+
<u>Saprolegnia diclina</u>	+	-
<u>S.ferax</u>	+	+
<u>S.parasitica</u>		+
<u>S.eccentrica</u>	-	-
<u>Pythium undulatum</u>	+	+
<u>P.afertile</u>	-	+
<u>P.monospermum</u>	+	-
<u>P.catenulatum</u>	-	-
<u>Dictyuchus monosporus</u>	+	+
<u>D.sterile</u>	+	+
<u>D.polysporus</u>	-	-
<u>Aphanomyces stellatus</u>	+	+
<u>A.irregulare</u>	-	-
<u>Leptolegnia caudata</u>	+	+
<u>Phytophthora cinnamoni</u>	-	-
-	<u>A.flavus</u>	+
<u>Aspergillus terreus</u>	+	+
<u>A.fischeri</u>	+	-
<u>Penicillium frequentans</u>	+	+
-	<u>F.moniliforme</u>	+
<u>Fusarium solani</u>	-	+
<u>Cladosporium herbarum</u>	+	+
<u>Paecilomyces variotii</u>	+	+
-	<u>Humicola grisea</u>	+
<u>Alternaria alternata</u>	+	+
-	<u>Curvularia spicifera</u>	+
-	<u>Epicoccum nigrum</u>	+
-	<u>Ulocladium atrum</u>	+
<u>Cunninghamella echinulata</u>	+	-
<u>Trichoderma viride</u>	+	-
-	<u>Rhizopus stolonifer</u>	+
<u>Mucor hiemalis</u>	+	-
<u>Drechslera spicifera</u>	+	-
-	-	<u>Chaetomium spirale</u>