

Helminth Parasites of Fishes From Two Inland Lakes in Egypt

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Abstract

Results of helminthological examination of 1243 fishes, caught from two inland lakes, with unique and contrasting hydrobiological features at Fayoum Governorate in Egypt, are presented.

General incidence of trematodes, cestodes, nematodes and acanthocephalans in fishes from the two lakes are compared. Eleven genera of digenetic trematodes are reported for the first time in certain fishes of the two lakes. The incidence of single, simultaneous double or multiple infections with digenetic trematodes in fishes of the two lakes are compared. The respective relationships of digenetic trematode fauna of fishes from the two lakes with those from the River Nile and the Mediterranean Sea are suggested.

Key words: Fish – Helminth Parasites – Qarun and Wadi Al-Rayyan Lakes – Fayoum – Egypt.

General Introduction

The study of fish parasites in Egypt has received a good deal of attention from parasitologists working in this country. Before the close of the 19th Century, there was the work of Looss (Looss, 1896 and 1899) and early in the 20th Century we had the work of Odhner (1911).

Interest in the study of parasites of fishes was revived around the middle of the 20th Century. Fischthal and Kuntz (1959, 1963 a,b,c,d and e) published a series of papers on the helminth parasites of fishes, mainly freshwater from Egypt. Other studies on the parasites of freshwater fishes include those of Moravec (1976, 1977) on helminth of Nile fishes; Hassan (1980); and Saoud and Wannas (1984) on helminth

parasites of fishes from Aswan High Dam Lake; Mohammed (1978) on blood and helminth parasites of Silurid fishes from the Nile; Imam *et al.* (1984) on blood trematodes from some Nile fishes and Saoud *et al.* (1988) on helminths of Nile fishes from Sharkiya Governorate.

Two inland lakes occur in Fayoum Governorate in Northwestern part of upper Egypt, namely Qarun and Wadi Al-Rayyan (Fig. 1). These lakes have been selected as sites for the present investigation due to their unique and contrasting hydrobiological characteristics.

LAKE QARUN, is an inland closed basin of about 40 km long and 5.7 km wide, with an average depth of 4.2 m (Morcos and Meshal, 1984). It lies in an arid region occupying the deepest part of Fayoum depression in the Western Desert.

The water level of the lake is about 44m below mean Sea level. The lake represents the remnant of the ancient prehistoric freshwater Lake Moeries. It was directly connected with the River Nile forming a natural reservoir for the Nile flood and therefore inhabited at that time by freshwater fauna and flora derived from the Nile Water. The lake was disconnected from the Nile and became a drainage reservoir for the cultivated lands of

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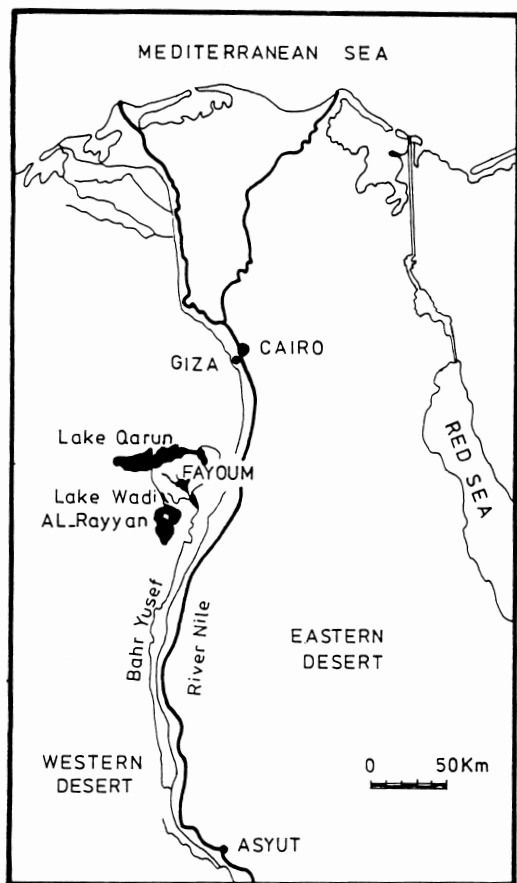


Fig. 1

Fayoum and the amount of freshwater which reached it was greatly reduced (Khalil, 1978). The lake receives only brackish water annually estimated to be as much as 390 million cubic metres which conveys about 430,000 tons of salt to the lake each year (Meshal, 1973). A volume of water nearly equal to that of the drainage influx is lost through evaporation and as a result, the salinity of the water increases continuously as time passes. Lucas (1906) recorded 13.41 gm/L of total dissolved solids, but Ball (1939), Naguib (1958) and Meshal (1973) reported salinity of 23.4, 30.1 and 32.8 gm/L respectively. The fish fauna of the lake was drastically affected by the increased salinity and those of freshwater origin gradually disappeared from the lake fauna. The only species from the original freshwater fauna that still exists in the lake is *Tilapia zillii* which

naturally resists salinity (Khalil, 1978). There was a gradual drop in the fish production from 4100 tons in 1920 to 1000–2000 tons/year during the period 1921–1933. To compensate for this reduction in annual fish catch, the Alexandria Institute of hydrobiology and Fisheries began acclimatization of some marine fishes from the Mediterranean into the Lake. *Mugil* spp. were transferred to the lake in 1928 and *Solea vulgaris* was also introduced later. The restocking of fish from the Mediterranean was effective and the annual fish production has increased to 2000–2500 tons/year (Khalil, 1978). El Maghraby and Dowaidar (1969) have reported 36 species of planktonic forms, most of which are well known in the Mediterranean at Alexandria.

No parasitological investigation has been reported on fishes of the lake, with the single exception of a record of a parasitic copepod on the gills of *Tilapia zillii* and *Mugil* spp. by Khalil (1978).

LAKE WADI AL-RAYYAN, is a new man-made Lake which lies to the Southern West of Fayoum Governorate. It is formed of three sections whose total and final volume will be about two milliard cubic meters of water at –18 m below sea level (Khalil, 1984). Its first section covers an area of about 52.8 km² at –10 m below sea level and is filled with water from Al-Wadi Drain which carries freshwater fish and planktonic organisms to this section. The first section overflowed into the second which has an area of about 26.5 km² at –18 m below sea level. The last section is the largest with an area of 110 km² at –18 m below sea level. Khalil (1984) recorded a total of 10 species of benthic fauna of the Lake including the gastropods *Biomphalaria alexandrina*, *Physa acuta*, *Cleopatra bulimoides* and *Melanoides* sp. in addition to amphipods, isopods and ostracods. The same author reported six species of freshwater fishes originating from the Nile as well as *Mugil* spp. The total fish catch from the Lake for the years 1980 and 1981 was estimated as about 325 and 286 tons respectively.

It is hoped that the present investigation will help in extending our knowledge of the parasitic fauna of fishes in Egypt to two important inland

Lakes with contrasting hydrobiological features. In the meantime, it is also envisaged that a study of this nature may throw some light on the relationships of the parasitic fauna of fishes in the two lakes with the corresponding fauna in fishes of the River Nile and the Mediterranean Sea.

Materials and Methods

Altogether 1243 fishes were collected from both lakes and examined for the purpose of the present investigation. Fishes were identified using four references: Boulenger (1907), Sandon (1950), Latif (1974) and Boraey (1974). The species of fish as well as the respective lakes from which they were collected are shown in Table (1).

Methods used for examination of fishes, collection, fixation, staining, mounting and identification of parasites are essentially those described by Saoud and Wannas (1984) and Saoud *et al.* (1988).

Results and Discussion

I. INCIDENCE OF THE MAJOR GROUPS OF HELMINTH PARASITES IN FISHES

Table 2 gives a summary of helminth infections in all fishes examined during the present investigation. During the present work, 1243 fishes, belonging to 7 genera and 12 species were examined. Helminth infections were reported in all genera of fish, with the only exception of fishes belonging to the genus *Solea* which was found free of helminth parasites. 219 fish (17.6%) were found to harbour either trematodes, cestodes or acanthocephalans. It is worth mentioning that no nematode infections are reported in the present survey. These infections are reported, however, in other surveys done on Nile fishes in Egypt (Wannas 1977, Hassan, 1980, Saoud and Wannas, 1984 and Saoud *et al.* 1988).

1. TREMATODE INFECTIONS:

These infections are reported in *Mugil* spp,

Table 1 Fishes and their localities

SCIENTIFIC NAME	LOCAL NAME	LAKES	
		Qarun	Wadi Al-Rayyan
Mugilidae			
<i>Mugil cephalus</i>	Bouri	+	+
<i>M. chelo</i>	Halilli or Fahhar	+	+
<i>M. capito</i>	Tobar	+	
<i>M. saliens</i>	Garana	+	
Chiclidae			
<i>Tilapia zillii</i>	Bolti Berkawy	+	
<i>T. nilotica</i>	Bolti Soltany		+
<i>T. galilaea</i>	Bolti Galily		+
Clariidae			
<i>Clarias lazera</i>	Karmout		+
Cyprinidae			
<i>Barbus bynni</i>	Benni		+
Anguillidae			
<i>Anguilla anguilla</i>	Hannash		+
Soleoidae			
<i>Solea vulgaris</i>	Mousa	+	

Table 2 The incidence of major groups of helminth parasites in fishes from the two lakes

	Examined		Positive		Trematodes		Cestodes		Acanthocephala	
	No.		No.	%	No.	%	No.	%	No.	%
<i>Mugil</i> spp.	509		146	28.6	146	28.6	0	0	0	0
<i>Tilapia</i> spp.	366		44	12.0	0	0	0	0	44	12.02
<i>Clarias lazera</i>	86		15	17.4	15	17.4	0	0	0	0
<i>Bagrus bayad</i>	30		7	23.3	7	23.3	0	0	0	0
<i>Barbus bynni</i>	30		4	13.3	0	0	4	13.3	0	0
<i>Anguilla anguilla</i>	28		3	10.7	3	10.7	0	0	0	0
<i>Solea vulgaris</i>	194		0	0	0	0	0	0	0	0
Total	1243		219	17.6	171	13.7	4	0.32	44	3.53

Clarias lazera, *Bagrus bayad* and *Anguilla anguilla*. The highest incidence of trematodes (28.6%) was recorded in *Mugil* spp. and the lowest (10.7%) in *Anguilla anguilla*. No trematode infections were reported in *Tilapia* spp., *Barbus bynni* and *Solea vulgaris*. Saoud and Wannas (1984) reported larval trematodes in *Tilapia* spp. and adult trematodes from *Barbus bynni* caught from Aswan High Dam Lake in Upper Egypt. Hassan (1980) recorded trematodes in *Barbus bynni* in the Aswan High Dam Lake. Saoud *et al.* (1988) found trematodes in *Barbus bynni* from Sharkiya Governorate, but they reported larval stages of these parasites in *Tilapia nilotica* at the same locality.

2. CESTODE INFECTIONS:

During the present survey, cestodes were found only in *Barbus bynni*; their incidence being 13.3%. Other species of fish are negative for these parasites. Saoud and Wannas (1984) reported an incidence of 83.3% for cestodes in *Barbus bynni* caught from Aswan High Dam Lake. Moreover, they recorded cestodes in *Clarias lazera*, a host which was found to be negative for cestodes during the present work. Hassan (1980) reported cestode infections in both *Barbus bynni* and *Clarias lazera* from Lake Nasser at Aswan; their incidence being 54.0 and 62% respectively. Saoud *et al.* (1988) found no cestodes in *Barbus bynni* from Sharkiya Governorate, although they reported these parasites

from 12.7% of *Clarias lazera* examined.

3. ACANTHOCEPHALAN INFECTIONS:

These infections are reported only in *Tilapia* spp. from Lake Wadi Al-Rayyan; their incidence being 12.02%. Saoud and Wannas (1984) reported acanthocephala in *Tilapia nilotica* and *T. galilaea*, *Bagrus bayad* and *B.docmac* from Aswan High Dam Lake; their incidence being 96.6, 40.0, 11.1, and 13.3% respectively. Hassan (1980) recorded acanthocephalans in *Tilapia nilotica*, *T.galilaea* and *Bagrus docmac* from the same lake, their incidence being 45.6, 4.3 and 17.5% respectively. Saoud *et al.* (1988) reported no infections with acanthocephala in *Tilapia* spp. and *Bagrus* spp. caught from Sharkiya Governorate.

II. INCIDENCE OF HELMINTH INFECTIONS IN FISHES FROM LAKE QARUN AND LAKE WADI AL-RAYYAN

In the following account, a comparison is made between the general incidence of helminth infections as well as of various groups of helminths in fishes caught from Lake Qarun and Lake Wadi Al-Rayyan.

1. General Incidence of Helminth Infections in Fishes of Both Lakes.

The general incidence of helminths in fishes

of both Lakes is given in Table (3). The incidence of helminth infections in *Mugil* spp. is higher in Lake Qarun (30.9%) than in Lake Wadi Al-Rayyan (18.4%). *Tilapia* spp. are present in both lakes; but helminth infections have been detected only in 30.9% of fishes examined from Lake Wadi Al-Rayyan.

2. Incidence of Major Groups of Helminth Infections in Fishes of both Lakes.

A comparison between the incidence of the major groups of helminths in fishes of both lakes is given in Table (4).

The following interesting observations are evident:

- The overall incidence of trematodes is higher in fishes from Lake Qarun than those from Lake Wadi Al-Rayyan.
- No cestodes or acanthocephalans were detected in fishes from Lake Qarun, while these helminth parasites infected certain species of fishes in Lake Wadi Al-Rayyan.
- All four species of the genus *Mugil* in Lake Qarun are infected with trematodes, while only two species of the same genus of fish occurring in Lake Wadi Al-Rayyan are infected with these parasites, but at a lower incidence.

In the opinion of the present authors, the above-mentioned differences may reflect the presence or absence of the respective intermediate hosts as well as their relative population strengths

related to the population density of fishes in the two lakes. The same view was expressed by Dogiel (1962) to explain similar differences observed in the parasitic fauna of fish in some Lakes of the U.S.S.R.

III. THE INCIDENCE OF DIGENETIC TREMATODE GENERA IN FISH

The digenetic trematodes collected from fish in both Lakes are identified to the generic level and their respective incidences are shown in Tables (5) and (6).

1. Fishes of Lake Qarun (Table 5)

Six genera of digenetic trematodes: *Saccocoelium*, *Haploporus*, *Haplospalchnus*, *Neohaploporus*, *Lecithobotrys* and *Unicoelium* are recorded in *Mugil* spp. caught from Lake Qarun. It is interesting to note that all these genera of trematodes are known from mullets in the Mediterranean Sea. Accordingly, it seems plausible to assume that the original *Mugil* spp. which have been transferred from the Mediterranean to Lake Qarun by the Alexandria Institute of Hydrobiology and Fisheries must have carried with them the parasites they normally have while normally living in the Mediterranean Sea. Later on, these parasites have been apparently maintained in Lake Qarun through the presence of suitable intermediate hosts.

The general incidence of the three trematode

Table 3 General incidence of helminths in fishes from the two lakes

Species of fish	Lake Qarun			Lake Wadi Al-Rayyan		
	No. Examined	No. Infected	Incidence (%)	No. Examined	No. Infected	Incidence (%)
<i>Mugil</i> spp.	417	129	30.9	92	17	18.4
<i>Tilapia</i> spp.	224	0	0	142	44	30.9
<i>Clarias lazera</i>	0	0	0	86	15	17.4
<i>Bagrus bayad</i>	0	0	0	30	7	23.3
<i>Barbus bynni</i>	0	0	0	30	4	13.3
<i>Anguilla anguilla</i>	0	0	0	28	3	10.7
<i>Solea vulgaris</i>	194	0	0	0	0	0
Total	835	129	15.4	408	90	22.05

Table 4. Comparison between the incidence of helminth parasites in fishes caught from Lake Qarun and Lake Wadi Al-Rayyan

Fishes	Lake Qarun						Lake Wadi Al-Rayyan									
	No. Examined	Infected		Trematodes	Cestodes		Acanthocephalans	No. Examined	Infected		Trematodes	Cestodes		Acanthocephalans		
		No.	%		No.	%			No.	%		No.	%		No.	%
<i>Mugil cephalus</i>	134	36	28.6	36	26.8	0	0	50	10	20	10	20	0	0	0	
<i>Mugil chelo</i>	96	27	28.12	27	28.12	0	0	42	7	16.6	7	16.6	0	0	0	
<i>Mugil capito</i>	100	45	45	45	45	0	0	0	0	0	0	0	0	0	0	
<i>Mugil saliens</i>	87	21	24.13	21	24.13	0	0	0	0	0	0	0	0	0	0	
<i>Tilapia zillii</i>	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Tilapia nilotica</i>	0	0	0	0	0	0	0	55	16	29.09	0	0	0	16	29.09	
<i>Clarias lazera</i>	0	0	0	0	0	0	0	87	28	32.18	0	0	0	28	32.18	
<i>Bagrus bayad</i>	0	0	0	0	0	0	0	86	15	17.4	15	17.4	0	0	0	
<i>Barbus bynni</i>	0	0	0	0	0	0	0	30	7	23.3	7	23.3	0	0	0	
<i>Anguilla anguilla</i>	0	0	0	0	0	0	0	30	4	13.3	0	0	4	13.3	0	
<i>Solea vulgaris</i>	194	0	0	0	0	0	0	28	3	10.7	3	10.7	3	10.7	0	
Total	855	129	15.44	129	15.44	0	0	408	90	22.05	25	6.12	4	0.58	44	10.78

genera *Saccocelium*, *Haploporus* and *Haplospilanchnus* follow a similar pattern in three species of *Mugil* in which the incidence of infection is highest in *M. capito* and lowest in *M. cephalus*, with that of *M. chelo* in between. In *Mugil saliens*, only *Haplospilanchnus* is present, with an incidence of 24.1%.

The incidence of three other genera of trematodes, viz. *Neohaploporus*, *Lecithobotrys* and *Unicoelium*, are generally low, ranging 3–13.5%. *Lecithobotrys* is present in all three species of *Mugil*, its incidence is 13.5, 5.0 and 3.0% in *M. chelo*, *M. capito* and *M. cephalus* respectively. *Neohaploporus* is only recorded in *M. cephalus* (3.0%), while *Unicoelium* is only reported from *M. capito* (3.0%).

In *Mugil cephalus*, no single or double infections with trematode genera were reported. However, the following combinations of simultaneous triple and quadruple infections were observed:

Combinations of Trematode Genera	Infected Fish	
	No.	%
— Triple Infections		
<i>Saccocoelium</i> + <i>Haploporus</i> + <i>Haplospilanchnus</i>	28	20.9
— Quadruple Infections:		
<i>Saccocoelium</i> + <i>Haploporus</i> + <i>Haplospilanchnus</i> + <i>Neohaploporus</i>	4	3.0
<i>Saccocoelium</i> + <i>Haploporus</i> + <i>Haplospilanchnus</i> + <i>Lecithobotrys</i>	4	3.0

In *Mugil capito*, no single or double infections with trematode genera were reported, but the following combinations of simultaneous triple and quadruple infections were observed:

Combinations of Trematode Genera	Infected Fish	
	No.	%
— Triple infections:		
<i>Saccocoelium</i> + <i>Haploporus</i> + <i>Haplospilanchnus</i>	14	14.6
— Quadruple infections:		
<i>Saccocoelium</i> + <i>Haploporus</i> + <i>Haplospilanchnus</i> + <i>Lecithobotrys</i>	13	13.6

Table 5 Incidence of infections with trematode genera in fishes found infected with trematodes in Lake Qarun.

Species of Fish	Total No. Examined	Digenetic Trematode Infections		
		Infected NO.	Fish %	Trematode Genera
<i>Mugil cephalus</i>	134	36	26.9	<i>Saccocoelium</i>
		36	26.9	<i>Haploporus</i>
		36	26.9	<i>Haplospalchnus</i>
		4	3.0	<i>Neohaploporus</i>
		4	3.0	<i>Lecithobotrys</i>
<i>Mugil capito</i>	100	45	45.0	<i>Saccocoelium</i>
		45	45.0	<i>Haploporus</i>
		45	45.0	<i>Haplospalchnus</i>
		5	5.0	<i>Lecithobotrys</i>
		3	3.0	<i>Unicoelium</i>
<i>Mugil chelo</i>	96	27	28.1	<i>Saccocoelium</i>
		27	28.1	<i>Haploporus</i>
		27	28.1	<i>Haplospalchnus</i>
		13	13.5	<i>Lecithobotrys</i>
<i>Mugil saliens</i>	87	21	24.1	<i>Haplospalchnus</i>

Table 6 Incidence of infections with trematode genera in fishes found infected with trematodes in Lake Wadi Al-Rayyan

Species of Fish	Total No. Examined	Digenetic Trematode Infections		
		Infected No.	Fish %	Trematode Genera
<i>Mugil cephalus</i>	50	10	20.0	<i>Dicrogaster</i>
<i>Mugil chelo</i>	42	7	16.7	<i>Dicrogaster</i>
<i>Clarias lazera</i>	86	15	17.4	<i>Orientocreadium</i>
		2	2.3	<i>Sanguinicola</i>
<i>Bagrus bayad</i>	30	6	20.0	<i>Acanthostomum</i>
		1	3.3	<i>Glossidium</i>
<i>Anguilla anguilla</i>	28	3	10.7	<i>Deropristis</i>

In *Mugil-chelo*, the following combinations of simultaneous triple and quadruple infections with digenetic trematode genera were observed.

Combinations of Trematode Genera	Infected Fish	
	No.	%
— Triple Infections: <i>Saccocoelium</i> + <i>Haploporus</i> + <i>Haploplanchnus</i>	37	37.0
— Quadruple infections: <i>Saccocoelium</i> + <i>Haploporus</i> + <i>Haploplanchnus</i> + <i>Lecithobotrys</i>	5	5.0
<i>Saccocoelium</i> + <i>Haploporus</i> + <i>Haploplanchnus</i> + <i>Unicoelium</i>	3	3.0

In *Mugil saliens*, only single infections with the trematode genus *Haploplanchnus* were encountered and 21 fish (24.1%) were found infected with this genus of trematodes. No simultaneous double or multiple infections with other trematode genera were observed in any of the fish belonging to that species.

Two interesting observations become evident when the above account of trematode infections in *Mugil* spp. are considered.

First: In three species of *Mugil*, viz. *M.cephalus*, *M.capito* and *M.chelo*, single infections with one genus or simultaneous infections with two genera of trematodes are not known. On the other hand, simultaneous infections of 3 or 4 genera of trematodes are observed in all the three species, with triple infections being more common than quadruple infections except in the case of *M.chelo* where the incidence of both types of infections are almost equal.

Second: In *Mugil saliens*, only infections with a single genus of trematodes are known. In this respect *M.saliens* is different from all the other species of *Mugil* examined from Lake Qarun.

It has been always assumed that related hosts are infected with related members of the parasitocoenosis (Dogiel, 1962). The validity of this assumption has been verified in certain species of fish from the Red Sea and the Arabian Gulf (Saoud and Ramadan, 1983 and Saoud *et al.* 1986). The above-mentioned qualitative similarities between the parasitocoenosis of three

species of *Mugil* from Lake Qarun is also another proof of the validity of this assumption. It is also the view of the present authors that the quantitative similarities or variations of the entire parasite population in related hosts may prove to be an important tool in solving certain problems which are frequently encountered in the identification of morphologically similar hosts which belong to different biological entities.

2. Fishes of Lake Wadi Al-Rayyan (Table 6)

Six genera of digenetic trematodes: *Dicrogaster*, *Orientocreadium*, *Sanguinicola*, *Acanthostomum*, *Glossidium* and *Deropristis* are reported from five species of fish from Lake Wadi Al-Rayyan.

Amongst fishes infected with trematodes, both *Mugil cephalus* and *M. chelo* are present in both Lake Qarun and Lake Wadi Al-Rayyan. However, the trematode genera present in these two species of *Mugil* in both lakes are different. *M. cephalus* and *M. chelo* from Lake Qarun have infections of *Saccocoelium*, *Haploporus*, *Haploplanchnus*, *Lecithobotrys* and *Neohaploporus*. All these trematode genera are absent in both species of fish from Lake Wadi Al Rayyan, but instead, the trematode genus *Dicrogaster* is present.

In the opinion of the present authors, this difference in the parasitic fauna of the two species of fish may be related to the presence or absence of the respective intermediate hosts which are necessary for the establishment of the life cycle of these trematodes in the two Lakes. Future work on this line will help in verifying this explanation.

It is also worth mentioning that the genus *Dicrogaster* has been originally reported from fishes in the Mediterranean Sea (Looss, 1902). This genus has apparently reached the area with *Mugil* spp, which have been deliberately transferred to water bodies in Fayoum (Khalil, 1978).

The other three species of the fish viz. *Clarias lazera*, *Bagrus bayad* and *Anguilla anguilla*, are mainly freshwater and are also present in Lake Wadi Al-Rayyan. The incidence of trematode genera in these fish varies from 2.3 to 20.0%. In these fish the trematode genera *Orientocreadium*,

Sanguinicola, *Acanthostomum*, *Glossidium* and *Deropristis* are recorded. All these genera of trematodes are originally known from the River Nile and apparently have reached the Lake with their host fish as well as their respective intermediate hosts.

The trematode genus *Acanthostomum* is recorded in 20% of *Bagrus bayad* at Wadi Al-Rayyan. This incidence is much lower than that recorded in the same species of fish caught from the Nile in certain localities in Egypt. Hassan (1980) and Saoud and Wannas (1984) reported an incidence of 81.38% and 87.5% in the same species at Lake Nasser respectively. Saoud *et al.* (1988) recorded an incidence of 94.1% in fish at Sharkiya Governorate.

The trematode genus *Orientocreadium* is reported in 17.4% of *Clarias lazera* at Lake Wadi Al-Rayyan. Mohammed (1978) reported an incidence of 79.9% in fishes of the same species caught from the Nile near Cairo. Saoud *et al.* (1988) recorded an incidence of 95.9% for that genus in Sharkiya Governorate. The picture in Upper Egypt, however, is completely different. Saoud and Wannas (1984) did not find that genus of trematodes in *Clarias lazera* from The Aswan High Dam Lake although Hassan (1980) reported it in 2% of the same species of fish in the Lake.

The genus *Deropristis* is recorded in 10.7% *Anguilla anguilla* from Wadi Al-Rayyan. The same genus was recorded twice before in the same host by Fischthal and Kuntz (1963c) and Moravec (1977).

The genus *Sanguinicola* is reported in 2.3% of *Clarias lazera* at Wadi Al-Rayyan. Imam *et al.* (1984) reported a much higher incidence of 97.3% in *Clarias lazera* examined from Cairo and Giza fish markets.

The genus *Glossidium* is reported in 3.3% of *Bagrus bayad* from Wadi Al-Rayyan. Recent surveys of the helminth parasites of *B. bayad* failed to demonstrate this trematode (Hassan, 1980 and Saoud and Wannas, 1984). The genus was reported originally by Looss (1899) from *Bagrus bayad* caught from the Nile near Cairo, but the exact incidence was not determined.

Each of the trematode genera *Acanthostomum*, *Glossidium* and *Deropristis* occurs in fish

in pure (single genus) infections. The majority of *Orientocreadium* infections (13) are pure; only in two cases simultaneous double infections of *Orientocreadium* and *Sanguinicola* are observed during the present work.

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