STUDIES ON NEMATODE PARASITES INFECTING FRESHWATER FISH IN QENA GOVERNORATE

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ABSTRACT

The present study was carried out to make a spot light on nematode parasites infecting Freshwater fish at Qena Governorate; including prevalence, seasonal dynamics of infection; intensity and morphology of the recovered parasite species.

It was found that the infection rate of different nematode among fresh-water fish in Qena Governorate was (13%). ***Lates niloticus*** *has highest infection rate (27.8%) followed by* ***Carias gariepinus (8.3%)*** *the* ***Oreochromis niloticus (2.3%).*** *Concerning the seasonal prevalence Winter has highest infection rate followed by Autumn then Summer and Spring. Four nematodes were recovered and identified as* ***Paracamallanus cyathopharynx*** *(2.8%) in Clarias lazera;* ***Procamallanus laevionchus*** *(2.8%) in Clarias lazera;* ***Contracaecum sp.*** *(2.8%) in Oreochromis niloticus and Clarias lazera and (26.4%) in Lates niloticus and* ***Dichelyne niloticus*** *(4.2%) in Lates niloticus. The mean intensity of infection of Contracaecum sp. among Oreochromis niloticus., Clarias gariepinus and Lates niloticus was 2%, 22% and 20% respectively.*

INTRODUCTION

Fish parasites and diseases constitute one of the most important problems confronting the fishery biologist today ***(Ravichandran et al. 2007).*** Pathological conditions resulting from parasites and diseases assume high magnitude of epidemics under crowded and other unnatural conditions ***(Ravichandran et al., 2010)*** Gut helminthes, such as trematodes, cestodes, nematodes don't induce severe damage to the vertebrate gastrointestinal tract ***(Dezfuli, et. al, 2003),*** unless they are found in large numbers, when they induce growth retardation ***(Tonguthai, 1997)*** or mechanical blockage at the gut lumen.

MATERIAL AND METHODS

a- Collection of fish samples:

A total of 216 fish samples representing 3 fish species 72 *Oreochromis niloticus* (Boulti), 72 *Clarias lazera* (Carmoot) and 72 *Lates niloticus* (Kishr-bayad) were collected either alive from fishermen or fresh as possible from fish markets at Qena Governorate (Qena city, Abu-Tisht and Nag-Hamady) and submitted for Nematode investigation during the period extended from the beginning of April, 2012 to the end of March, 2013. The collected fish samples were transferred to the laboratory of Parasitology Department; Faculty of Veterinary Medicine-South Valley University in ice box after packed in plastic bags, labeled with different data about the investigated fish specimens as fish species, date and the site of collection.

b- Collection and preparation of the detected parasites

The collected nematodes were killed and stretched in hot 70% ethyl alcohol. Subsequently, after preserving in 70% alcohol and 5% glyecrin solution; they were cleared in Lactophenol for several hours according to the thickness of the worms and finally mounted in glycerin jelly preparation and cover with a cover glass ***(Belding, 1965)***.

RESULTS

I-1 Prevalence of the parasitic infection among examined fish at Qena governorate:

The results of the present investigation indicated that out of 216 examined fish, 28 samples proved to be infected with Nematode parasites at Qena Governorate with total infection rate of 13 %. Concerning the fish species, the obtained results showed that *Lates niloticus* had the highest infection rate (27.8%), followed by *Carias gariepinus* (8.3%), while *Oreochromis niloticus* represented the lowest percent of infection (2.8%) as shown in **Table (1).**

I-2- Seasonal prevalence of the parasitic infection among examined fish at Qena Governorate:

Table (2) summarized the seasonal prevalence of the recovered nematodes among the examined fish at Qena Governorate. It was concluded that *Latus niloticus* has the highest infection rate in winter (44.4%) followed by Autumn (38.9%) then Summer and Spring (16.7%).The prevalence rate of nematode in *Tilapia* sp. was 0%, 0%, 5.6% and 5.6% in Winter, Spring, Summer and Autumn respectively. Dealing with the seasonal dynamics of *Clarias lazera*, the highest infection rate was recorded in Summer and Autumn (11.1%), followed by 5.6% in Winter and Spring.

I-3- Identification of the recovered parasites among examined fish at Qena Governorate:

Table (3) show that four nematodes recovered were identified as *Paracamallanus cyathopharynx*(2.8%)in *Calarias lazera;Procamallanus laevionchus* (2.8%) in *Calarias lazera; Contracaecum* sp. (2.8% in *Oreochromis niloticus.* and *Calarias lazera and* 26.4% in *Lates*

niloticus) and *Dichelyne niloticus* (4.2%) in *Lates niloticus.* The mean intensity of infection of *Contracaecum* sp. among *Oreochromis niloticus., Carias gariepinus and Lates niloticu* was 2%, 22% and 20% respectively.

Table (1): Prevalence of different nematode parasites among the examined fish at Qena Governorate:

Fish species	No. of Examined fish	Nematodes	
		No.	%
Oreochromis niloticus.	72	2	2.8
Clarias gariepinus	72	6	8.3
Lates niloticus	72	20	27.8
Total	**216**	**28**	**13**

Table (2): Monthly and seasonal prevalence of nematodes among Freshwater fish at Qena Governorate:

	Oreochromis niloticus			***Lates niloticus***		***Clarias gariepinus***	
	No. of Examined fish	**No.**	**%**	**No.**	**%**	**No.**	**%**
December	6	0	0	2	33.3	0	0
January	6	0	0	4	66.7	0	0
February	6	0	0	2	33.3	1	16.7
Winter	**18**	**0**	**0**	**8**	**44.4**	**1**	**5.6**
March	6	0	0	2	33.3	0	0
April	6	0	0	1	16.7	1	16.7
May	6	0	0	0	0	0	0
Spring	**18**	**0**	**0**	**3**	**16.7**	**1**	**5.6**
June	6	0	0	2	33.3	0	0
July	6	1	16.7	1	16.7	0	0
August	6	0	0	0	0	2	33.3
Summer	**18**	**1**	**5.6**	**3**	**16.7**	**2**	**11.1**
September	6	1	16.7	3	50	1	16.7
October	6	0	0	3	50	1	16.7
November	6	0	0	1	16.7	0	0
Autumn	**18**	**1**	**5.6**	**7**	**38.9**	**2**	**11.1**

Table (3): Prevalence of different species of nematode parasites among examined fish at Qena Governorate:

Helminth species	Fish species	No. of examined fish	No. of infected	%
Paracamallanus cyathopharynx	Clarias lazera	72	2	2.8
Procamallanus laevionchus	Clarias lazera	72	2	2.8
Contracaecum sp	Oreochromis niloticus	72	2	2.8
	Clarias lazera	72	2	2.8
	Lates niloticus	72	19	26.4
Dichelyne niloticus	Lates niloticus	72	3	4.2

Table (4): Morphological description of the recovered Nematodes from the examined fish:

Parasites	Habitat	Common morphological features	Remarks
Paracamallanus cyathopharynx (Female) (Baylis, 1923)	Intestine of *Clarias gariepinus*	- worm was yellowish in color, provided with well cleared transverse cuticular striations. - The oral opening was marked by nine longitudinal chitinous ribs that extended to the base of tridents; the buccal capsule was large, funnel-shaped and was moderately sclerotized posterior ends. Pharynx was sub-globular followed by the cylindrical oesophagus. - In the female, the uterus of gravid females was filled with larvae and the vulva opening nearly at the middle of the worm. Tail was conical in shape, ending in three small cone-shaped processes.	Plate (1) Fig. A, B & C
Procamallanus laeviconchus (Female) (Wedl, 1862)	Stomach of *Clarias gariepinus*	- The buccal capsule was chitinous. - The mouth opening was quadripapillated and its margin was provided with fine cuticular membrane. In female; the uterus of gravid female was filled with first stage larvae. - The tail was conical in shape.	Plate (2) Fig. (A)&(B)
Contracaecum sp. (Rudolphi, 1809)	Intestine of *Oreochromis niloticus*, *Clarias gariepinus* and *Lates niloticus*	- The cuticle was finely serrated; it had one boring tooth anteriorly. - Intestinal caecum run anteriorly and was longer than ventricular appendix which runs posteriorly. Tail was short, had retractile tip bearing small spines at the posterior end. Anal opening was sub-terminal and laying anterior to the end of the body	Plate (3) Fig. A, B & C Fig. (1)
Dichelyne niloticus (Mohamadain, 1989)	Intestine of *Lates niloticus*	- It had a small, elongated body and covered with transversally striated cuticle. The oesophagus was entirely muscular, dilated anteriorly to form a false buccal capsule. The intestine was extend posteriorly and was provided with a single intestinal caecum which was blind. In male; the tail was conical, sharply pointed and slightly curved ventrally and had two equal copulatory spicules.	Plate (4) Fig. (A) & (B)

DISCUSSION

The present investigation idicated that out of 216 examined fish, 28 samples proved to be infected with nematode parasites at Qena Governorate with total infection rate of 13 %. Concerning the fish species, the obtained results showed that *Lates niloticus*. had the highest infection rate (27.8%), followed by *Clarias gariepinus* (8.3%), while *Oreochromis niloticus* represented the lowest percent of infection (2.8%).

I- *Tilapia sp.:*

The prevalence rate of nematode in *Tilapia* sp. (*Contracaecum* sp.) was 2.8%. This result was nearly similar to that recorded by ***Aloo (2002)*** (2.0%) and not in accordance with that reported by ***Momen (1992)*** (8.9%), ***Al-Bassel (2003)*** (6.22%), ***Yimer (2000)*** (15.56%), ***Mokhtar (2000)*** (17.9%), ***Yimer and Enyew (2003***) 59.8% at Lake Tana, Ethiopia, and ***Kaddumukasa et al. (2006)*** 62% at Lake Wamala, Uganda. On contrary, it was higher than that found by ***Daniela (2009)*** (1.6%) in Ethiopia.This might be due to the maturation of parasites in large number of piscivorous birds around the lakes which allow parasites to reproduce more and infect large number of fish hosts. Additionally, almost all fish caught were eviscerated along the shore and washed into the lake causing recontamination of the lake that in turn increases parasite burden per fish.

In respect to their seasonal dynamics, the present results showed that the prevalence of nematode was 0%, 0%, 5.6% and 5.6% in Winter, Spring, Summer and Autumn respectively. This result was not in line with that revealed by ***Walaa (2004)*** who found that nematodes infection reached their maximum infection rate during Summer (12.6%) and their minimum rate in Autumn (2.5%). Seasonal changes in the Water environment (such as temperature, conductivity and pH) can affect the occurrence of aquatic host parasites and infection rate of the parasites ***Moller (1978)***.

II- *Clarias lazera*:

With reference to of nematode in *Clarias lazera*, the obtained results showed that the prevalence rate was 8.3%. Similar results for some extent were obtained by ***Ismail (1980)*** (6%), ***Hoda (1989)***, (5.5%), ***Mokhtar (2000)*** 9.4% in El-Abassa farm, ***Ayanda (2009b)*** (6.25%) in Ilorin. However, the present study was lower than that recorded by ***Aboul-hag (1985)*** (12.5%), ***Walaa (2004)*** 14.7% in Sharkia Governorate, and ***Rasha (2010)*** who mention that the overall prevalence was 21.7% in Assuit Governorate .This may attributed to the reverse environmental factors affecting the infecting stage of these nematodes as well as was due to environmental factors such as feeding habits and changes in temperature.

Dealing with their seasonal dynamics, the highest infection rate was recorded in Summer and Autumn (11.1%), followed by 5.6% in Winter and Spring. This result was nearly in accordance with ***Alyan et al.(1994)*** who recorded the prevalence of nematodes in different seasons were 5% ,3.5% , 3.5% and 3% in Summer ,Autumn , Spring and Winter respectively**.** Also agree with results of ***Walaa (2004)*** who found that nematodes reach their maximum infection rate during summer (12.6%) and reach their minimum infection rate in autumn (2.5%), while that of ***Rasha (2010)*** concluded that the prevalence rate of infection with nematodes in *C. gariepinus* was higher in Summer (25%) than Spring, Autumn (23.3%) and Winter (15%). This may reflect a reduced feeding activity of the fish at low temperatures, reducing the chances of infection via copepods as well as to physico-chemical factors of the water body

In respect to the nematode species, 3 species were identified in this study infecting *Clarias lazera* at Qena Governorate.

The prevalence of *Paracamallanus cyathopharynx* in *Clarias lazera* was 2.8%. This result was nearly in line with that reported by ***Ayanda*** and ***Opeyemi Isaac (2009)*** who found the infection rate was

5.6% and ***Akisanya (2013)*** who found the infection rate was 4.75%. ***Eissa et al (2010)*** who found the infection rate was 31% from Ismailia Province. While, the prevalence of *Procamallanus laeviconchus* in *Clarias lazera* was 2.8%. This result was higher than that mentioned by ***Oniye et al. (2004)*** who recorded the prevalence was 0.83% in Zaria, Nigeria and ***Sudhir kumal (2013)*** who recorded the prevalence was 3.33%. On the contrary, the present investigation was lower than that recorded by ***Imam (1971)*** who recorded the prevalence was 20.45% and ***Eissa et al. (2010)*** who recorded the prevalence was 26% from Ismailia Province.

But the prevalence rate of *Contracaecum* sp. was 2.8%; this result was agreed for some extent with ***Yimer (2000)*** who recorded the prevalence 5.33% and not agreed with that obtained by ***Yimer and Enyew (2003)*** who recorded the prevalence 41.94% at Lake Tana, Ethiopia.

III- *Lates niloticus*

In respect to the parasite recovered from *Lates niloticus*, only 2 species of nematodes. The prevalence rate of nematode was 27.8%. The obtained data was higher than that recorded formerly ***Momen (1992***) (5.7%) in Sohag Governorate, ***Mokhtar (2000)*** (19.1%) in El-Abassa farm, ***Onyedineke et al (2010)*** (0%) in and ***Ahmed et al (2012)*** (0%) in Al-Rahad River.

So the obtained results showed that the prevalence of *Dichelyne niloticus* in *Lates niloticus* was 4.2%. This result was agreed with that reported by ***Momen (1992)*** who recorded the prevalence of *Dichelyne niloticus* in *Lates niloticus* was 5.7% in Sohag Governorate.

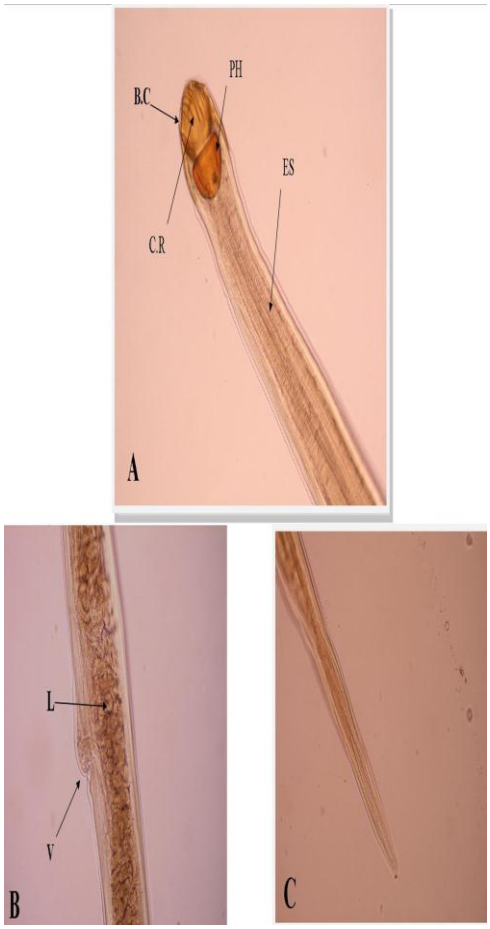
In respect to *Contracaecum* sp.; the prevalence rate was 26.4%. No available data about the host fish species. *Contracaecum* larvae were difficult to differentiate into species because the reproductive organs of

the worms, which are used for characterization, were not yet fully developed except when using molecular analysis or alternatively infecting experimental hosts to obtain adult worms.

In respect to the morphological description of the recovered parasites in this study were similar to that previously illustrated by ***Rudolphi (1819); Wedl, Paperna, (1960); Ukoli, (1966); Khalifa et al., (1972); Mandour et al., (1988); Lamarck, (1801)***.

LEGENDS TO FIGURES

Abbreviation	Explanation
Nematode	
A	Apex
An	Anus
B.C	Buccal capsule
B.T	Boring tooth
C.R	Cutical striation
C.S	Copulatory spicules
Es	Esophagus
F.B.C	False buccal capsule
I	Intestine
I.C	Intestinal caecum
L	Larvae
Ph	Pharynx
V	Vulva
V.A	Ventricular appendix
Ve	Ventriculus
C.G	Cement gland
E	Eggs
G.L	Genital ligament
H	Hooks
L	Lemnisci
P	Proboscis
P.R	Proboscis receptacle
T	Testes
Name	**Syn**
Clarias lazera	= *Carias gariepinus*
Tilapia sp	= *Oreochromis niloticus*



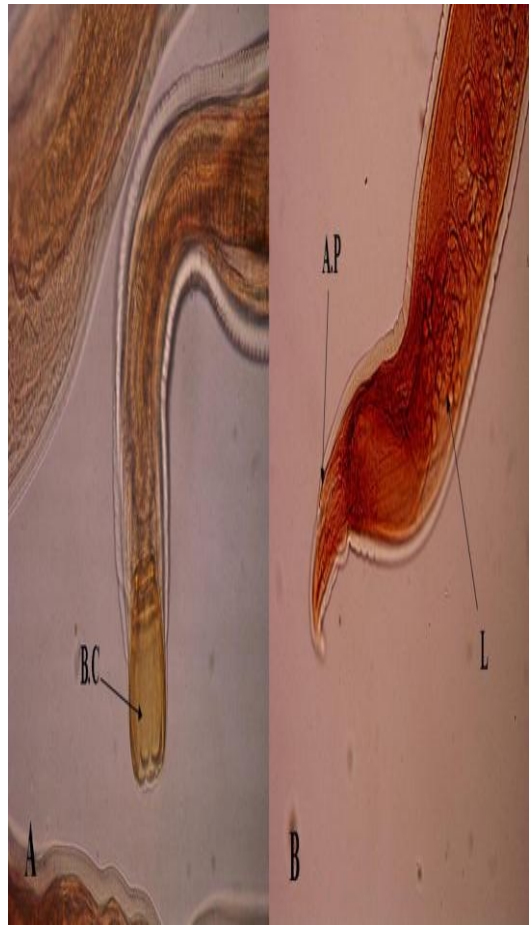


Plate (1)

Fig. (A): ***Paracamallanus cyathopharynx*** ***(Ant.end x 40)***

Fig. (B): ***Paracamallanus cyathopharynx*** ***(Female x 40)***

Fig. (C): ***Paracamallanus cyathopharynx***

Plate (2)

Fig. (A): ***Procamallanus laevionchus*** ***(Ant. end x 40)***

Fig. (B): ***Procamallanus laevionchus*** **(Post. end Female x 40)**

Fig. (B): ***Procamallanus laevionchus*** **(Post. end Female x 40) (Post. end female x 40)**

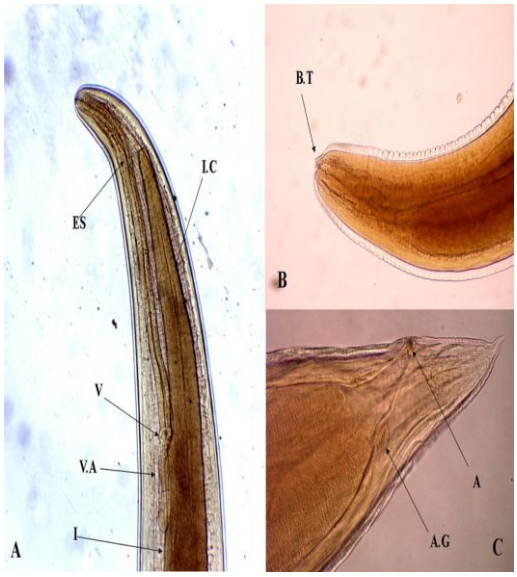


Plate (3)

Fig. (A): *Contracaecum* sp. (x 4)

Fig. (B):*Contracaecum* sp.(Ant.end) (x10)

Fig.(C):*Contracaecum* sp.(Post.end) (x40)

Fig.(1): *Contracaecum* sp. larvae in *Lates niloticus* in:

1- Stomach wall

2- Body cavity

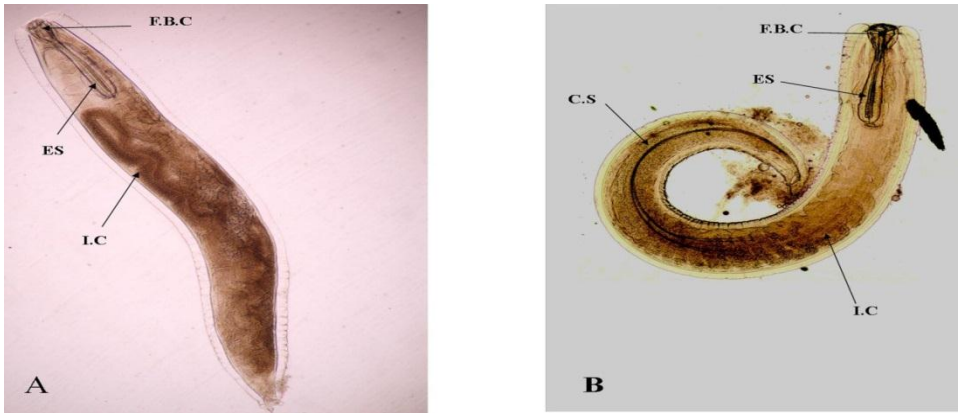


Plate (4)

Fig. (A): *Dichelyne niloticus* (Female) (x4)

Fig. (B): *Dichelyne niloticus* (Male) (x4)

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دراسات حول الديدان الاسطوانية التي تصيب أسماك المياه العذبة في محافظة قنا

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قد أجريت هذه الدراسة على الديدان الاسطوانية التي تصيب أسماك المياه العذبة في محافظة قنا. بما في ذلك الإنتشار الموسمى . كثافة الإنتشار ومعرفة الأنواع المختلفة.

تبين أن "معدل العدوى من مختلف الديدان الخيطية الطفيليات بين أسماك المياه العذبة في محافظة قنا كان (13٪). وكان لاتس النيلي لديه أعلى معدل العدوى (27.8٪)، يليه القرموط (3.8٪) ثم البلطي النيلي (2.3٪). وفيما يتعلق انتشار الشتاء الموسمية لديها أعلى معدل العدوى تليها الخريف ثم الصيف والربيع. تم التعرف على أربع أنواع من الديدان الاسطوانية. وسجلت دودة الباراكمالينيس نسبة(2.8٪) كما سجلت دودة البروكمالينيس نفس النسبة وذلك فى سمكة القرموط. وسجلت يرقات الكونترا سيكم نسبة (2.8٪) في أسماك البلطي النيلي والقرموط و (26.4٪) في الاتس النيلي وديشلان النيلى(4.2٪) في الاتس النيلي.وكانت متوسط الكثافة للإصابة ليرقات الدودة الخيطية بين أسماك البلطي النيلي، القرموط والاتس النيلي 2% و 22 % و 20 % على التوالي.