



Seasonal Variations and Prevalence of Some External Parasites Affecting Freshwater Fishes Reared at Upper Egypt

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Abstract

This study was carried out to detect prevalence and seasonal variation of external parasites affecting freshwater fishes. Three hundred and thirty *Oreochromis niloticus* and 140 *Clarias gariepinus* were collected from three different ecosystems at Kafr El Sheikh province. Obtained results revealed that, the highest infection rate was recorded among *O. niloticus* followed by *C. gariepinus*. Also, seasonal dynamics among the examined *O. niloticus* were recorded. The isolated ectoparasites among examined fishes were *Cichlidogyrus tilapiae*, *Cichlidogyrus aegypticus*, *Cichlidogyrus cirratus*, *Quadricanthus aegypticus*, *Macrogyrodactylus clarii*, *Trichodina centrostrigeata*, *Trichodina rectinucinata*, *Chillodinella hexastica*, *Ichthyophthirius multifiliis*, *Henneuguya branchialis*, *Lamproglena monody*, *Ergasilus sarsi* and *Copepodit stage* (2nd stage) of *Lerneacyprinaea*.

9.1 Introduction

Fish is one of our most valuable sources of protein food. Worldwide, people obtain about 25% of their animal protein from fish and shell fish.

By the increasing intensification of fish production and lack of health management measures have lead to many disease problems of bacterial, viral, fungal and

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parasitic origin. About 80% of fish diseases are parasitic especially in warm water fish (Eissa 2002). Ecto-parasites are the most dangerous group that causes severe mortalities (Shalaby and Ibrahim 1988). In Egypt there are a long periods of optimum warm weather that enable external parasites for more production and cause bad effects on fish. The majority of the monogenetic trematodes of fishes are ectoparasites, Monogeneans (flatworms) are among the most host-specific of parasites in general and may be the most host-specific of all fish parasites. Monogenetic trematodes usually don't cause any problems in the natural environment unless the host is continually reinvested so that massive numbers of worms build up on the fish (Woo 1995).

The most identified protozoa are belonging to ciliates. They can easily spread among most of the fish hosts. Uncontrollable or recurrent infection with ciliated protozoans is indicative of unhygienic husbandry problems (Al-Rasheid et al. 2000).

Parasitic crustaceans are increasingly serious problem in cultured fish. Most Parasitic crustacean of freshwater fish can be seen by the naked eyes as they attach to the gills, body and fins of the host and it spent a large part of their life on fish, possessing an adhesive organs and mouth parts adapted for piercing and sucking fish blood (El Moghazy 2008).

9.2 Materials and Methods Fish Samples

A total number of 470 (330 *Oreochromus niloticus* and 140 *Clarias gariepinus*) freshwater fish were collected alive from three different ecosystem in Kafr El-Shiekh governorate River Nile Branch (Bahr Nashart), Drainage canal (Damroo Drainage canal) and Fish farm supplied water from damroo Drainage canal by the aid of fisherman and then transported alive to the laboratory of parasitology department-Faculty of Veterinary Medicine-Kafr El Sheikh university where they examined immediately (Table 9.1).

9.2.1 Parasitological Examination

Parasitological examination was carried out for the detection and identification of the external parasites on the skin, gills and the accessory respiratory organs of the samples.

Table 9.1 Number of fish species examined from different localities

Fish spp.	Locality			Total fish spp.
	River Nile Branch	Drainage canal	Fish farm	
	Examined number			
<i>Oreochromus niloticus</i>	117	100	113	330
<i>Clarias gariepinus</i>	80	60	–	140
Total	197	160	113	470

9.3 Collection and Preparation of the Detected Ecto-parasites

Monogenea: Monogenea were collected under binocular dissecting microscopic by means of small pipette in small Petri-dish and cleared several times with water to remove the attached mucous and debris.

The worms were then left in refrigerator at 4C till complete relaxation. Then, they were fixed in 5% formalin for permanent preparation, worms were washed carefully in water to get rid of formalin traces and stained with Semichon's acetocarmine stain for about 5–10 min till reaching staining, the specimens were passed through ascending grades of ethyl alcohol (30, 50, 70, 90% and absolute) for dehydration. Then, cleared in clove oil, xylene and mounted in canda balsam (Pritchard and Kruse 1982), while the unstained Monogeneas were mounted in glycerin jelly (Abd EL-Hady 1998).

9.4 Protozoa

Some of the positive slides were stained according to Klein's dry silver impregnation method in which the slides were air-dried, covered with 2% aqueous solution of silver nitrate (AgNO_3) for 8 min, rinse thoroughly in distilled water and exposed to UV light for 20–30 min or to direct sun light for 1–2 h. The slides were allowed to dry and mount with neutral *Canada balsam*. This method is indispensable technique for staining *Trichodina* (Ali 1992).

Other positive slides were also air-dried, fixed with absolute methanol and stained with 10% Giemsa stain for 20–30 min to detect the other protozoa. (Ali 1992).

9.5 Crustacea

The detected crustacean parasites were carefully collected by a fine brush and special needle, and transferred into Petri-dish for cleaning by using preserved and cleared in lacto phenol then mounting with polyvenylalcohol (Raef et al. 2000).

9.6 Results

As shown in (Table 9.2); from 330 examined *O. niloticus* taken from different three localities, the total infected number was 226 (68.5%), While the rates of infection in the River Nile branch, the drainage canal and the fish farm were 71.8% (84/117), 69% (69/100) and 64.6% (73/113) respectively. In addition; the total infection rate among *Clarias gariepinus* was 58.6% (82/140). While the rates of infection in the River Nile branch and the drainage canal was 53.7% (43/80) and 65% (39/60) respectively.

As described in (Table 9.3); in *O. nilotica* the percentage of infection by monogenetic trematodes was higher in drainage canal than that of River Nile branch and

Table 9.2 Prevalence of ecto-parasites in examined fish spp. In different localities

Fish spp.	Locality														
	River Nile Branch				Drainage canal				Fish farm				Total		
	No ex.	No inf.	% of inf.	No ex.	No inf.	% of inf.	No ex.	No inf.	% of inf.	No ex.	No inf.	% of inf.	No ex.	No inf.	% of inf.
<i>O. niloticus</i>	117	84	71.8	100	69	69	113	73	64.6	330	226	68.5			
<i>Clarias garipienus</i>	80	43	53.7	60	39	65	–	–	–	140	82	58.6			

Table 9.3 Prevalence of different ecto-parasites in examined fish species in different localities

Parasites	Locality															
	River Nile branch				Drainage canal				Fish farm				Total			
	<i>O. Niloticus</i>		<i>C. gariepinus</i>		<i>O. Niloticus</i>		<i>C. gariepinus</i>		<i>O. niloticus</i>		<i>C. gariepinus</i>		<i>O. niloticus</i>		<i>C. gariepinus</i>	
	no = 117	%	no = 80	%	no = 100	%	no = 60	%	no = 113	%	no = 0	%	no = 330	%	no = 140	%
	No inf.		No inf.		No inf.		No inf.		No inf.		No inf.		No inf.		No inf.	
	27	23	23	28.7	41	41	36	60	43	38	-	-	111	33.6	59	42
Protozoa	76	65	29	36.3	48	48	12	20	53	46.9	-	-	177	53.6	41	29.3
Crustacean parasites	16	13.7	-	-	36	36	-	-	39	34.5	-	-	91	27.6	-	-

fish farm, in case of infection by protozoa; it was higher in River Nile branch than that of drainage canal and fish farm, while the percentage of infection by crustacea was higher in drainage canal than that of fish farm and River Nile branch.

In case of *Cl. Gariepinus*, the percentage of infection by monogenetic trematodes was higher in drainage canal than that of River Nile branch and the infection was not detected in fish farm branch, protozoal infection among *Cl. Gariepinus* was higher in River Nile than that of drainage canal and not detected in fish farm locality. Parasitic crustacean was not detected among *Cl. Gariepinus* in all localities.

Concerning the seasonal dynamics in the examined *O. niloticus* Table (9.4) revealed that the highest seasonal prevalence of ecto-parasites in examined *O. niloticus* was recorded in spring followed by summer then autumn and finally in winter. In The River Nile branch the highest prevalence of ecto-parasites was recorded in spring then winter followed by summer and autumn. But the highest prevalence of ecto-parasites in the drainage canal was recorded in summer followed by autumn then spring and winter, while in the fish farm the highest prevalence of ecto-parasites was recorded in spring then summer followed by winter finally in autumn.

Table (9.5) showed the peak of seasonal dynamic of Monogenea in total examined *O. niloticus* was during autumn followed by summer then winter and spring. While parasitic Protozoans recorded highest infection during spring followed by summer then winter and autumn. The highest seasonal prevalence of Crustaceans among total examined *O. niloticus* was recorded during summer then spring followed by autumn and finally in winter.

9.7 Discussion

The present investigation revealed that *Monogenetic trematodes* recorded an incidence of (33.6%) which is nearly similar to those obtained by Abd El-Maged (2009) among examined *O. niloticus* was infected on the other hand higher value (80.76) was recorded by Abd El-Gawad (2004) which may be due to different of sample collection and changes in water quality in different localities.

In total examined *Clarias gariepinus*, our study revealed (42%) prevalence of *Monogenetic trematodes* which is considered higher than obtained by Ramadan (2000) 36.28%. and lower than recorded by Abd El-Maged (2009) (51.7%).

Parasitic protozoa recorded an incidence of (55.5%) among total examined *O. niloticus*. This result is found higher than that recorded by Abd El-Maged (2009) who recorded an infection rate of (6.3%). The prevalence of parasitic protozoa among total examined *Clarias gariepinus* reached (29%). This result was in contrary with Abd El-hady (1998) who did not detect parasitic protozoans among *Clarias gariepinus* in River Nile and other water branches. This result may be related to different localities of sample collection.

The prevalence of Parasitic crustaceans in this study was (27%) in total examined *O. niloticus*. This result is higher than obtained by Abd El-Khalek (1998) who recorded that the prevalence was (24.73%), while being lower than that recorded

Table 9.4 Seasonal prevalence of ecto-parasites in examined *O. niloticus* in different localities

Season	Locality													
	River Nile branch				Drainage canal				Fish farm				Total	
	No. ex.	No. inf	%	No. ex.	No. inf.	%	No. ex	No. inf	%	No. ex.	No. inf	%	No. ex.	No. inf
Autumn	25	16	64	25	19	76	23	14	60.9	73	49	67	49	67
Winter	25	17	68	30	17	56.6	37	23	62	92	57	62	57	62
Spring	31	27	87	20	13	65	26	19	73	77	59	76.9	59	76.9
Summer	36	24	66.6	25	20	80	27	17	63	88	61	69	61	69

Table 9.5 Seasonal dynamics of different ectoparasites among examined *O. niloticus*

Season	Parasites					
	Monogenea		Protozoa		Crustacea	
	No. infected	%	No. infected	%	No. infected	%
Autumn (<i>N</i> = 73)	28	38.4	32	43.8	19	26
Winter (<i>N</i> = 92)	29	31.5	46	50	21	22.8
Spring (<i>N</i> = 77)	22	28.6	51	66	22	28.6
Summer (<i>N</i> = 88)	32	36.4	48	54.7	29	33

N Number examined

by El-Moghazy (2008) who mentioned that the prevalence was (80%) While parasitic crustaceans not recorded is among *Clarias gariepinus*, being coincided with Abd El-Hady (1998). This is may be due to differences in localities and water quality in these localities.

With regard to the effect of the seasonal variation on the prevalence of *Monogenetic trematodes* in the present study, the highest rate of infection was during autumn. This result agreed with Ramadan (2000) and Abd El-Gawad (2004) Mean while, this result was in contrary with Abd El-Maged (2009) who recorded the lowest infection rate was obtained during autumn.

Regarding the seasonal dynamics of external protozoa, the highest infection rate was in spring. This result was in agreement with El-Sayed (1993) stated that the seasonal incidence of protozoal infection was high in spring.

Concerning the seasonal dynamics of crustacean's infection the maximum rate of infection was during summer. This result agreed El-Moghazy (2008) mentioned that the highest incidence was recorded during summer. But this result did not agree with Hassan (1992) who detected the crustacean during winter.

These differences in the rates and seasonal dynamics of infection between the different localities may be attributed to the differences in environmental conditions, fish species, and the differences in the degree of water pollution as well as number of examined samples.

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