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Ectoparasite fauna of cultured African catfish, *Clarias gariepinus* (Burchell, 1822), El-Behera Province, Egypt

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Abstract

During a recent investigation of parasites infesting cultured fishes, One hundred and fifty (150) cultured sharptooth African catfish, *Clarias gariepinus* were examined using routine parasitological techniques for better understanding the occurrence, distribution and diversity of ectoparasite infestations at Behera governorate (Egypt). Sampling was carried out between January and December 2014. It was found that the highest prevalence rate was for monogenean trematodes, (*Gyrodactylus* sp.) (30%), followed by three ciliate Protozoans; *Ichthyophthirius multifiliis* (20 %), *Trichodina* sp. (12%), and *Epistylis* sp. (8%). The average of the total ectoparasitic infestation in the examined catfish was 70%. There was no significant difference ($P > 0.05$) in parasitic infestation rate in male and female of *C. gariepinus*.

Keywords: *Trichodina* sp. – *Epistylis* sp. - *Ichthyophthirius multifiliis* – *Gyrodactylus* sp. – *Clarias gariepinus*

1. Introduction

The sharptooth catfish, *Clarias gariepinus* (Burchell, 1822) (Siluriformes: Clariidae) is probably the most widely distributed fish species in Africa [1]. The economic importance of this fish species has increased greatly in recent years as a result of its extensive use in aquaculture [2]. Furthermore, natural populations of *C. gariepinus* form a staple diet for many subsistence farmers throughout the African continent. Coinciding with the growing economic value of this fish is the increased interest in its parasite loads and what effect they might hold for the aquaculture industry.

In Egypt, parasitic diseases represent about 80% of fish diseases [3]. Parasites reduce fish production by affecting the normal physiology of fish [4] and can result in mass mortalities of fish, or in some cases infection of man and other invertebrates that consume them [5, 6]. However, there are few reports of parasites causing mortality or serious damage to feral fish populations, but this may be largely because such effects go unnoticed. Parasites in wild fish are usually only remarked upon when they are so obvious as to lead to rejection of fish by fishermen or consumers [7].

Ectoparasites, including protozoa, are cited as the major problem in warm water pond fish culture where high temperature and organic content accelerate the life cycles of parasites and promote their spread [8]. Ectoparasitic protozoa represent one of the most hazardous threats to fish health. These parasites attack the fish and cause massive destruction of the skin and gill epithelium [9, 10]. Therefore, the present study was designed to investigate the prevalent parasites infesting the gills of African catfish, *Clarias gariepinus* besides, clinical picture, and determination of total and seasonal prevalence.

2. Material and Methods

2. 1. Study site and sample collection

Ten (10) private fish farms were surveyed for parasites. Out of One hundred and fifty (150) live or freshly caught freshwater Specimens of the catfish, *Clarias gariepinus* belonging to family Clariidae were collected monthly in the period between January and December 2014 at Behera governorate (Egypt). Both sexes were present. The fish's total length ranged from 5 to 40 cm in total length (TL), and total weight was from <1 to 450 g.

2. 2. Fish examination

Thereafter, smears from the skin and gills were examined for ectoparasites. In fish specimens larger than 10 cm, mucus from skin scrapings and gill chips were examined for ectoparasites before dissections. All individual parasites observed were counted, fixed and sent for identification to the Department of Poultry and fish diseases, Faculty of Veterinary Medicine, University of Alexandria, Egypt.

2. 3. Parasitological examination of fish

The fish were examined for gross clinical signs and pathological lesion. The necropsy technique of parasitological examination of skin, fins and gills was carried out for the presence of external parasites with recording the average and intensity of the isolated parasites from one hundred catfish. The recovered protozoa and Monogenea were fixed, and preserved [11, 12].

3. Results and Discussion

Parasitic infections can be devastating in farmed organisms than in wild populations because of stressful conditions linked to crowding and frequent water quality deterioration [13].

3. 1. Gross macroscopic examination

The gross examination of infested fish with the isolated ectoparasitic protozoan, *Trichodina sp.*, *Epistylis sp.*, *I. multifiliis* and monogenean, *Gyrodactylus sp.* revealed pale skin and excessive mucus secretion. Skin erosion with local hemorrhagic lesions was demonstrated in some infested fish. All *ectoparasites* appear to be an important pathological stressor affecting fish populations in the water stratum. In the present study, the gross clinical appearance of infested *C. gariepinus* with ectoparasitic protozoa (*Trichodina sp.*, *Epistylis sp.* and *I. multifiliis*) and the monogenean *Gyrodactylus sp.* demonstrated pale skin, excessive mucus secretion and skin erosion with local ulcerative lesions. These results were similar to that recorded by [14, 15].

3. 2. Parasitological examination:

The parasitological examination revealed single and mixed infestation of some *C. gariepinus* with the ciliated ectoparasites, *Trichodina sp.*, *I. multifiliis* and *Epistylis sp.* in addition to monogenean ectoparasites, *Gyrodactylus sp.* (Table 1)

Table 1: Average and intensity of infestation with external parasites infested *C. gariepinus*.

Ectoparasites	No. of examined fish	% of the total infested fish	% of single infestation	% of mixed infestation	Intensity of infestation (Parasites / field) (X 10)
<i>Trichodina sp.</i>	150	70	12	30	8-10
<i>Epistylis sp.</i>			8		12-16
<i>I. multifiliis</i>			20		3-5
<i>Gyrodactylus sp.</i>			30		6-8

The total average of infestation of ectoparasites was (70%), and this result was lower than that obtained by [15], who reported that the average of parasitic infestation was (100%) for protozoa and (76%) for Monogenea in *Oreochromis niloticus*. Also, our results were higher than that recorded by [16], who mentioned that the ectoparasitic infestation was (44.4%) among cultured *C. gariepinus* in Abassa.

Concerning the parasites recorded, it was found that the average of the *Trichodina sp.* in the infested catfish was (12%) which was lower than the finding of [17] who recorded *Trichodina spp.* from gills of common carp. Furthermore, the average of infestation with *Epistylis sp.* was (8%), and this result was lower than that recorded by [18] in *Oreochromis niloticus* (25%). Similarly, the average of monogenean, *Gyrodactylus sp.* infestation was (30%) among infested *C. gariepinus* and this result was lower than that obtained by [19], while also, a higher average (100%) was recorded by [11] in the Nile fish. These variations in results might be attributed to the inhibitive quality of physical (Depth, current, temperature) and chemical (Oxygen, salinities) factors of the environment and fish species.

In the present study, the intensity of the ectoparasitic protozoa *Trichodina*, *Epistylis*, *I. multifiliis* and the monogenean *Gyrodactylus spp.* were (8-10), (12-16), (6-8) and (3-5) parasites per field, respectively (Table 1). These numbers of ectoparasites per fish were considered a moderate infestation in as mentioned by [18].

Based on the morphological examination of the isolated ectoparasites, they were identified as the following:-

3.3. Ectoparasitic protozoa

3.3.1. a. *Ichthyophthirius multifiliis*

Phylum: Ciliophora

Class: Oligohymenophorea

Order: Hymenostomatida

Family: Ichthyophthiriidae

Genus: Ichthyophthirius

Species: *I. multifiliis*

I. multifiliis is isolated from skin and gills of infested *C. gariepinus*. It is the largest known parasitic protozoan found on fishes. Adult organisms are oval to round and measure 0.5 to 1.0 mm in size. The adult is uniformly ciliated and contains a horseshoe-shaped nucleus which can be seen in older individuals.

3.3.1. b. *Trichodina sp.*

Phylum: Ciliophora

Class: Ciliata

Subclass: Peritricha

Order: Mobilina

Family: Trichodinidae

Genus: *Trichodina*

Species: *Trichodina* species

Trichodina spp. is isolated from skin, fins and gills of infested *C. gariepinus*. It is large with disc shaped body. The adhesive disc is saucer shaped. The parasite is provided with several rows of cilia at the circular periphery and the inner circle of toothed denticles. The macronucleus is horse shoe-shaped and micronucleus is small and difficult to be seen in some specimens.

3.3.1. c. *Epistylis sp.*

Phylum: Ciliophora

Class: Ciliata

Subclass: Peritricha

Order: Peritrichida

Suborder: Sessilina

Phylum: Ciliophora

Class: Ciliata
 Subclass: Peritricha
 Order: Peritrichida
 Suborder: Sessilina
 Family: Epistylidae
 Genus: *Epistylis*
 Species: *Epistylis spp.*

Epistylis spp. is isolated from skin and gills of infested catfish. It is a sessile contractile ciliate. Stalk is long and non-contractile. Often forms a branched colony. The distal end of the organism is surrounded by rapidly moving cilia which appear as a blur.

3.4. Ectoparasitic Monogenea

Phylum: Platyhelminthes
 Class: Dactylogyroidea
 Family: Gyrodactylidae
 Genus: *Gyrodactylus*
 Species: *Gyrodactylus spp.*

The monogenetic *Gyrodactylus* is detected in gills and skin of infested *C. gariepinus*. It is flat worm with one pair of projection at its anterior pole. It can be distinguished from other monogeneans by the absence of eye spots and the occurrence of the embryos in the mid-region of the body (Viviparous monogenean). Posterior end has the organ of fixation, opisthaptor, which is guarded with a number of marginal hooklets and a central one pair of hooks.

The taxonomy of the isolated *Trichodina* sp., *Epistylis* sp., *I. multifiliis* and *Gyrodactylus* sp. was typical to that reported by [20, 21]. Moreover, their morphological identification was similar to the description of [22, 23, 24].

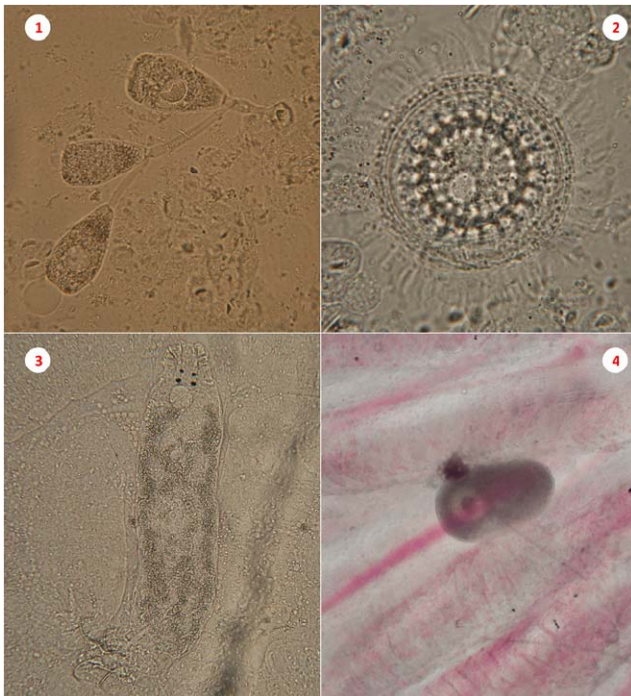


Plate 1: Light microscopic examination of ectoparasites infesting cultured *C. gariepinus*; *Epistylis* sp. (photo 1), *Trichodina* sp. (photo 2), *Gyrodactylus* sp. (photo 3) and *I. multifiliis* (photo 4).

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