Studies on Prevailing Cestodiasis in Wild African Catfish *Clarias Gariepinus* at Kafr El-Sheikh Governorate

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Abstract: A total number of 200 fish (50 fish in each season) were collected randomly and examined for presence of cestodes. Two species of cestodes were recovered as *Polyonchobothrium clarias* and Monobothria sp. with infestation rate of 50.5 % (101out of 200) and 14.5 % (29 out of 200) respectively. Seasonally, *P clarias* was prevalent in spring and summer while Monobothria sp. was prevalent in spring, autumn and winter with no record in summer. There was significant decrease in the total serum proteins, albumin and globulin of infested fish comparatively with non-infested fish. The histopathological alterations were manifested as destruction, desquamation and sloughing of affected tissue mucosa with presence of degenerative changes.
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1. Introduction

Fish is important as a source of protein with low cholesterol level in the diets of the human and economically as a source of subsistence income **(Aken'ova, 2000).** Fish not only provide food for immediate consumption but people rely directly or indirectly on fishing for their economic survival and a source of job. In Egypt, parasitic diseases represent about 80 % of fish diseases **(Eissa, 2006).** Parasitic infections in fish cause decreased production and economic losses through direct fish mortality, reduction in fish growth, fecundity and stamina, increase susceptibility of fish to other diseases and high cost of treatment **(Cowx, 1992).** Under natural conditions 50 – 90 % of freshwater fishes harbor at least one species of parasites **(Sineszko, 1979).**

The present study was designed to investigate the prevalent diseases caused by cestodes in wild African catfish *Clarias gariepinus* at Kafr El-Sheikh governorate. Besides, determination of total and seasonal prevalence, histopathological alterations and serum proteins were discussed.

2. Materials and Methods

Fish:

A total number of 200 *Clarias gariepinus* ranged between 45 to 315 g in body weight and from 18 to 39 cm in total length were collected randomly alive from river Nile at Kafr El – Sheikh Governorate during 2011 as 50 fish seasonally. Fish were kept in glass aquaria and supplied with chlorine free tap water with continuous aeration and filtration according to Innes (1966).

Clinical picture:

Alive fish were examined for clinical signs and postmortem lesions as described by Austin and Austin (1987).

Blood sampling:

Blood samples were collected from the caudal blood vessels and serum was obtained by centrifugation of collected blood at 5000 rpm according to Rowley (1990).

Parasitological examination:

The gastrointestinal tract was separated from the other internal organs then the stomach was separated from the intestine and each part examined. In clean Petri dish, stomach was opened and intestinal mucosa was stripped off by scalpel and washed with normal saline in another clean dry Petri dish. Gall bladder was separated, opened and examined. Cestodes were collected and preserved in alcohol formalin acetic acid and stained with Semichon's acetocarmine stain then the whole mount of collected cestodes was done according to Woodland, (2006). The collected cestodes were identified according to the identification key of Yamaguti (1958, 1959 and 1961).

Serum analysis:

In 20 fish (10 infested and 10 non-infested), serum total proteins were determined according to the method described by Peters *et al*. (1982), serum albumin was determined according to Peters (1970) and serum globulin was calculated by subtraction of albumin value from total protein value as described by Doumas and Biggs (1972). The data of serum protein analysis were statistically analyzed for variance (ANOVA) and least significant difference as described by Snedecor and Cochran (1989) using and (Med Calc. version 11, 2010) computer statistical software. Data were evaluated as significant at $P \leq 0.05$.

Histopathological examination:

The histopathological examinations of affected tissue (intestines, stomach and gallbladder) were performed as described by Drury and Wallington (1980).

3. Results and Discussion

The clinical signs appeared on the infested fish were weakness, severe emaciation, anemia, imbalanced swimming, some infested fish showed sluggish movement, loss of condition with paler coloration (Plate, 1) which was in agreement with that described by **Islam and Woo (1991), Hassen (2002), Eissa (2002)**, **Nadia Ali (2007)** and **Sabri *et al* (2010).**

Monobothrium sp. was isolated from the intestine that appeared hemorrhagic and congested leading to intestinal obstruction (plate 1). Monobothria was white in color, elongated. It has large rounded or triangular scolex Plate 2 (d). The body length ranged between 7 – 40 mm and body width ranged between 2.5 – 4.5 mm. The testis located laterally, appeared as oval follicles, the ovary laterally located in the posterior part of the worm and occupying the two lateral sides (Plate 2). The male genital pore opens slightly anterior to the female one. The female genital pore occurred in the middle of the worm. The egg was rounded in shape; these descriptions were similar to that described by **Nadia Mahfouz (1991), Mwita and Nkwengulila (2004), Oniye *et al.* (2004)** and **Oofintoye (2006)** who isolated Monobothrium sp. from the intestine of *Clarias gariepinus*.

Polyonchobothrium clarias was isolated from the gall bladder that appeared enlarged with thickened bile duct and containing pale colored watery bile. It was long ranged from 60 - 100 mm in length, 0.5 – 1 mm in width. The scolex was elongated, triangular in shape and carries one raw of hooks and bears laterally two shallow bothria Plate 1 (h), segmentation begin directly after the scolex with immature stages then mature stages. The ovary is rounded to oval in shape and centrally located in the segment Plate 2 (a).The eggs are spherical and containing a mass of rounded cells. The worm attached mainly inside the gall bladder near the neck of bile duct. These findings agree with that recorded by **Wabuke – Bunoti (1980)** who isolated *Polyonchobothrium clarias* from the gall bladder of naturally infested *Clarias mossambicus*.

P clarias was isolated also from the glandular stomach which appeared congested. The parasites were attached mainly at the junction between muscular and glandular stomach. Also, it was attached near the opening of bile duct in the glandular stomach that was in agreement with the results described by **Shotter and Medaiyedu (1977)** as they found *P clarias* concentrated in the spiral valve in the area close to the entry of the bile duct. Moreover, **Nadia Mahfouz (1991)** and **Moyo *et al.* (2009)** isolated *P clarias* from the stomach of *Clarias gariepinus*.

The seasonal prevalence of cestode infestation was peaked during spring (96 %) followed by summer (80) then winter (46) and reach the lowest in autumn (38 %), also, **Noor Eldin (1981)** and **Negm Eldin (1987)** also recorded the highest prevalence with cestode infestation was during spring and summer.

Concerning, *P clarias* was isolated from the gall bladder only during spring and season while it was isolated from the glandular stomach allover the year with a total prevalence of 50.5 % that was near that described by **Imam (1971)** who recorded, that the infestation rate with *P clarias* was 41% in *Clarias lazera* collected from the Nile while, **Sahlab (1982)** recorded that the infestation rate with *P clarias* was 22.22% in ***Clarias*** *lazera* from Manzala. This variation may be attributed to the difference in locality, time of collection, water temperature and size of fish.

The seasonal prevalence of *P clarias* was peaked during spring (82 %) followed by summer (80 %) then winter (32 %) and reached the lowest infestation in autumn (8 %) (Table 1 & 2). These results were nearly similar with that recorded by **Abd Elaal (1996)** who recorded the highest prevalence in spring and low prevalence in autumn. Also, was nearly similar to **Aml Atwa (2006)** who recorded the highest prevalence in spring and the lowest prevalence occur in winter and **Sahlab (1982)** who recorded increase prevalence of cestodes in spring and summer. On the other side, **Nadia Mahfouz (1991)** recorded the highest seasonal prevalence in winter and the lowest prevalence occurred in autumn in cultured *C gariepinus*. This may be explained to that our fish are wild.

Monobothria sp was isolated from the intestine of *C gariepinus* with a total prevalence of (14.5 %) which was higher than that described by other researchers as **Negm Eldin (1987)** , **Khattab (1990)** and **Nadia Mahfouz (1991)** as they isolated it with an infestation rate as 6.33 , 4.82 and 1.5 % respectively. This may be attributed to the difference in locality and breeding. The highest seasonal prevalence of monobothria sp was recorded in autumn (30 %), spring, winter (14 %) and lowest prevalence occurred in summer (0 %) Table (2).

Table (3) shows that the serum total proteins, albumin and globulins were significantly decreased in heavily infested fish in comparison with non-infested fish which was similar to that described by **Steinhagen *et al.* (1997)** and **Hamouda (2011).** This decrease may be as a result of consumption of nutrient material by the parasite, also can be resulted from destruction occurred in intestinal mucosa that allow leakage of plasma protein and destruction of intestinal villi which are responsible for absorption of nutrients and protein from food materials. These findings may act as immunodepressants and open the gate to secondary infection.

Concerning histopathological examination of the intestine of monobothria sp. infested *Clarias gariepinus* revealed presence of atrophy of the intestinal villi that became shorten and compressed under the pressure caused by the parasite that completely occupying the intestinal lumen. The glandular stomach infested with *Polyonchobothrium clarias* showing presence of hyperplasia and sloughing of gastric mucosa with presence of sub mucosal inflammation and mononuclear cell infiltration. There was observed desquamation of lining gastric mucosa with presence of transverse section in gastric lumen near the site of attachment of the parasite while, multiple longitudinal and cross sections of the parasite was observed in the gall bladder that showed degeneration and sloughing of the lining mucosa, as well as mucinous degeneration demonstrating goblet cell hyperplasia with lymphocytic infiltration. The mucosa of gall bladder showed multifocal thickening of the lining epithelium giving a feature of squamous like epithelium as a result of parasite attachment. These descriptions were nearly similar to the description given by **Nadia Mahfouz (1991)** and **Eissa *et al.* (2010).**

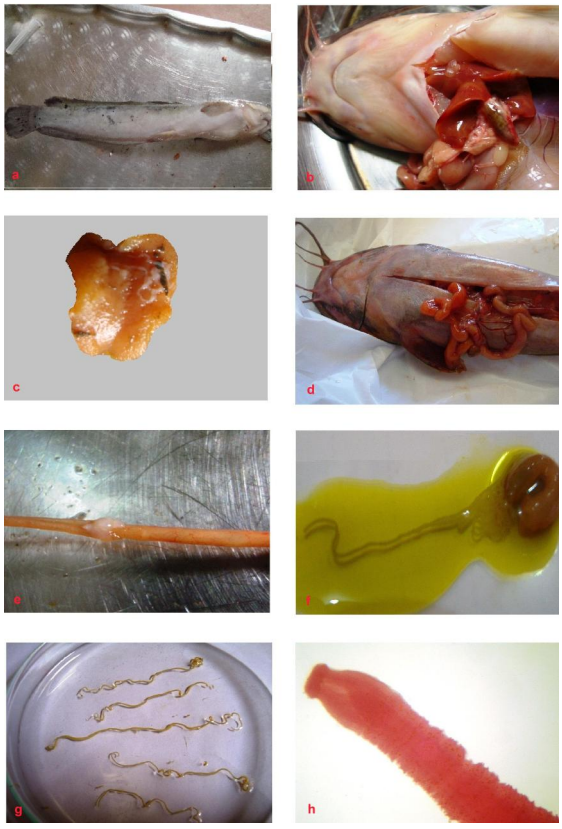

Plate 1

a Heavily infested fish showing fading coloration.
b Enlarged distended gall bladder containing *Polyonchobothrium clarias.*
c Glandular stomach containing *Polyonchobothrium clarias.*
d Congested intestine of infested fish with Monobothria sp.
e Intestine of heavily infested fish occluded with great number of Monobothria sp.
f Gall bladder containing great number of *Polyonchobothrium clarias.*
g five *Polyonchobothrium clarias* collected from one gall bladder of heavily infested fish
h Scolex of *Polyonchobothrium clarias* isolated from gall bladder and stained with carmine stain.

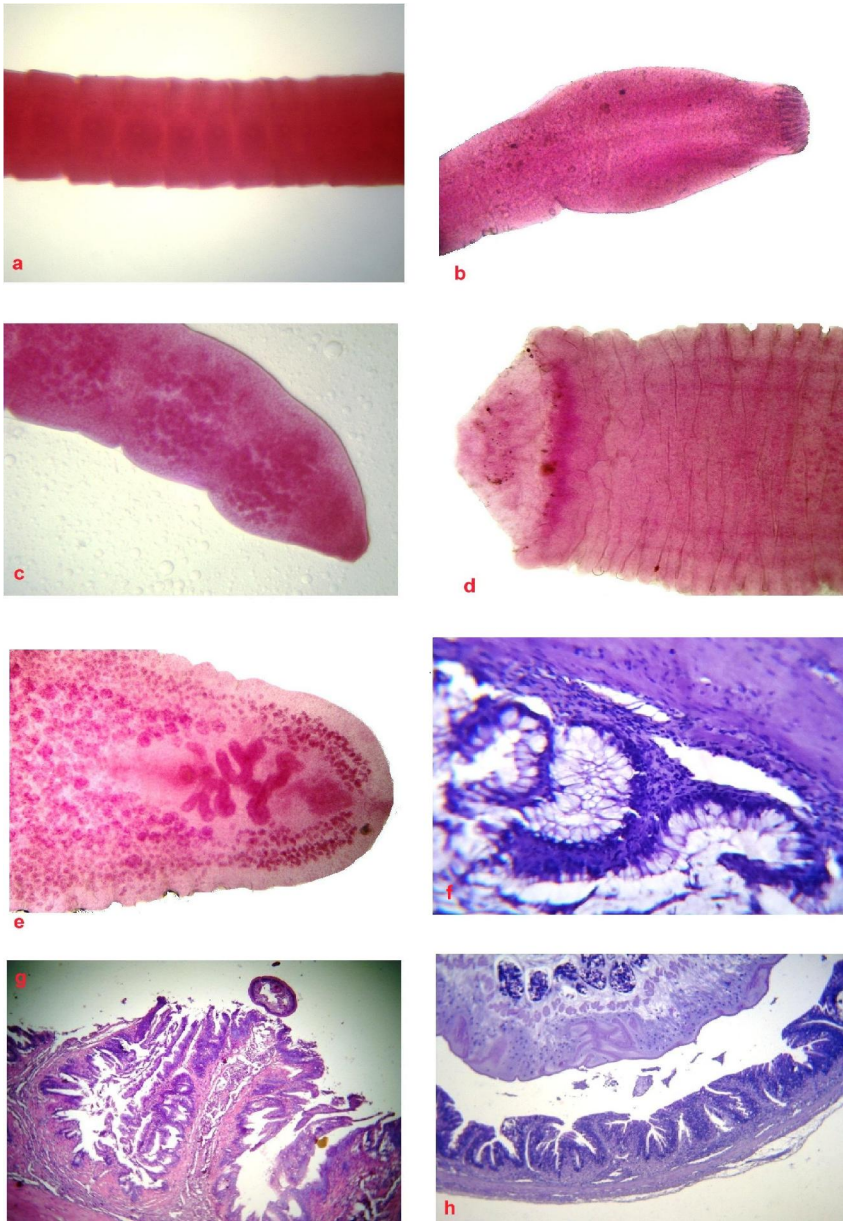

Plate 2

a **Immature segments of *Polyonchobothrium clarias* isolated from gall bladder.**

b **Scolex of *Polyonchobothrium clarias* isolated from glandular stomach.**

c **Posterior part of *Polyonchobothrium clarias* isolated from glandular stomach.**

d **Anterior end of monobothria sp. isolated from intestine of infested fish.**

e **Posterior end of monobothria sp. isolated from intestine of infested fish.**

f **Mucinous degeneration demonstrating goblet cell hyperplasia with lymphocytic infiltration observed in the gall bladder of infested fish.**

g **Hyperplasia and sloughing of gastric mucosa of glandular stomach with presence of sub mucosal inflammation and mononuclear cell infiltration.**

h **Atrophy of the intestinal villi that became shorten and compressed under the pressure caused monobothria parasite.**

Table (1): Showing the seasonal prevalence of cestode infestation in *C gariepinus*.

Season	No. of examined fish	No. of infested fish	Infestation %
Spring	50	48	96
Summer	50	40	80
Autumn	50	19	38
Winter	50	23	46
Total	200	130	65

Table (2): Showing the seasonal prevalence of *Polyonchobothrium clarias* and Monobothria sp.

Cestode type		*Polyonchobothrium clarias*		Monobothria sp.	
Season	No. of examined fish	No. of infested fish	%	No. of infested fish	%
Spring	50	41	82	7	14
Summer	50	40	80	0	0
Autumn	50	4	8	15	30
Winter	50	16	32	7	14
Total No.	200	101	50.5	29	14.5

Table (3): Showing serum protein analysis of non-infested and infested *Clarias gariepinus* (No. 10 fish).

Parameter (g / dl)	Non-infested	Infested
Total protein	3.82 ± 0.25	3.28 ± 0.13
Albumin	1.72 ± 0.08	1.52 ± 0.13
Globulin	2.1 ± 0.27	1.76 ± 0.18

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