Oreochromis spp. and Clarias Lazera as a Source of Transmitting Encysted Metacercariae to Man

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ABSTRACT: A total of 135 freshwater fish samples (Oreochrmis spp. <85> and Clarias lazera <50>) were collected from different localities (shops and fish markets) in Alexandria Province-Egypt and examined for the presence of parasitic larval stages. The obtained data found the overall mean of the infestation with encysted metacercariae was 71.1% in the examined fish. The rates of infestation with encysted metacercariae were 72.9% and 68.0% in the examined Oreochromis spp. and Clarias lazera, respectively. The highest prevalence of the encysted metacercariae was found in summer (81.8%) in case of Oreochromis spp. and in winter (92.3%) in case of Clarias lazera, all these seasonal differences are statistically significant. The rate of infestation of encysted metaacercariae in the anterior third, middle third and posterior third of Oreochromis spp. was found to be 82.3%, 74.2% and 95.2%, respectively, while 88.2%, 88.2% and 91.2%, respectively, in Clarias lazera. Moreover, the rate of infestation of encysted metacercariae in eyes, gills, liver, kidney and branchial cavity of Oreochromis spp. was 91.9%, 70.9%, 20.9%, 46.8% and 32.2%, respectively. In Clarias lazera the infestation rate was found to be 47.1%, 70.6%, 8.8% and 38.2% in the gills, liver, spleen and kidney, respectively.

The zoonotic and public health importance of the encysted metacercariae are causes severe visceral pain, abdominal discomfort, intermittent bloody diarrhoea and colic after consumption of inadequately cooked fish especially Tilapia spp. (Oreochromis spp.).

(**Key Words**: Orechromis, Clarias Lazera, Metacercariae)

INTRODUCTION

As world's population is rapidly increasing, there is an increasing demand for food including animal protein. Fish protein is an important source of animal protein as it is high nutritious, palatable and easily digested (Rifaat et al., 1980). Fish may harbour many pathogens including parasites, which are not only pathogenic to fish but also may be pathogenic to human. Human may be infected by the larval stages of parasites present in fish muscles by consumption of inadequately cooked or improperly smoked and salted fish (El-Naffar, et al., 1985; El-Dally, 1988 and Tantawy, 1993).

In Egypt, many investigators have detected encysted metacercariae in Oreochromis spp. and Clarias lazera (Wells & Randall, 1956; Fahmy & Selim, 1959; Issa & Ibaid, 1969; Rifaat, et al., 1980; Antonov & Sapozhnikov 1981; El-Mokaddem 1982; Mahmoud 1983; El-Arossi 1984; Shalaby, 1985; El-Dally 1988; Muzzail, et al., 1990; Ayoub 1991 and Tantawy, 1993).

Khalil (1933) reported that the encysted metacercariae of Heterophyes heterophyes (ib Brackish water fish) could remain living in salted fish (fessikh) for at least one week and killed by freezing for 24 hours. These encysted metacercariae were found to be of zoonotic importance causing superficial necrosis of intestinal mucosa in man and in heavy infestations severe visceral pain, abdominal discomfort and diarrhoea (Hamed and Elias, 1970).

The present work was carried out to investigate the role of Bolti Oreochromis spp. and Armout catfish (Clarias lazera) in the transmission of metacercariae to humans.

MATERIALS AND METHODS

1-Collection of samples:

A total of 135 fish were collected from local fish markets and different shops in Alexandria Province, Egypt. They included 85 Oreochrmis spp. (Bolti) and 50 Clarias lazera (Armout catfish). Each sample was put in a plastic bag and chilled to the laboratory with a minimum of delay (Syme, 1966).

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2-Examination of fish for encysted metacercariae:

A-Macroscopical examination: was carried out according to (Syme, 1966).

B-Microscopical examination: was carried out to detect the encysted metacercariae or any other encysted larval stages lodged or attached to the different parts in the body of the fish. Portions of eye, gills, liver, spleen and muscle were compressed between microscope slides and the resulting squach preparation was examined under a dissecting microscope for encysted metacercariae or larval stages. The musculature was divided into equal parts, anterior, middle and posterior part. One gram of muscle was taken from each part (Morishita and Matsubayashi, 1965).

3-Preparation of the encysted metacercariae:

The recovered metacercariae were prepared for further study by applying the tissue digestion method recommended by Oshima et al. (1966), Yokogawai and Sano (1968) for exocystation and isolation of the cysts.

4-Tissue digestion method: was carried out according to the Yokogawai and Sano (1968).

5-Fiation, staining and mounting of encysted and excysted metacercariae: which was carried out according to Lucky (1977) and Soulsby (1982).

RESULTS AND DISCUSSION

Fish act as carriers for many parasitic zoonoses. The results show that the incidence of the infested fish with trematode metacercariae was 71.1% (table 1). These results are in agreement with Abdel-Azim (1938) and Tantawy (1993) and lower than that obtained by Antonov and Sapozhinkove (1981) and Mahmoud (1983). The incidence of the encysted metacercaria in Oreochromis spp. was found to be 72.9% (table 1). These results are in agreement with Rifaat et al. (1980), Shalaby (1982), El-Naffar and El-Shahawy (1986), El-Sherbiny (1988) and Al-Bassel (1990) and higher than those obtained by Wells and Randall (1956), Fahmy and Selim (1959), Gharib and Hamdy (1969), Boulos (1979), El-Dally (1988) and Shalaby et al. (1989) and lower than the results obtained by El-Mokaddem (1982), Ayoub (1991) and Tantawy (1993). The incidence of encysted metacercariae in examined Clarias lazera was 68.0% (table 1). These results was found to be in agreement with Fahmy et al. (1976) and higher than El-Arossi (1984) and lower than that those obtained by Issa and Ibaid (1969, Mahmoud (1983), Shalaby (1985), El-Naffar and El-Shahawy (1986), El-Dally (1988) and Tantawy (1993).

The incidence and distribution of the encysted metacercariae in the muscles of infested fish (Oreochromis spp. and Clarias lazera) was higher in the posterior third than anterior third and lower in the middle third of the body of fish which were 93.8%. 84.4% and 79.2%, respectively (table 1). These results are coincided with El-Dally (1988) in Clarias lazea and these results are in disagreement with Shalaby (1985), El-Naffar and El-Shahawy (1986), El-Dally (1988) in case of Oreochromis spp. El-Bouhy et al. (1988), Al-Bassel (1990) and Tantawy (1993) in Oreochromis spp. only.

Table 1. The incidence and distribution of the encysted metacercariae in the muscles of the infested fish

Type of fish	No. of exam.	No. of infested	%	Muscles					
				A. T.		M. T.		P. T.	
				No.	%	No.	%	No.	%
Oreochromis spp. (Bolti)	85	62	72.9	51	82.3	46	74.2	59	95.2
Clarias lazera (Armout catfish)	50	34	68.0	30	88.2	30	88.2	31	91.2
Total	135	96	71.1	81	84.4	76	79.2	90	93.8

*A. T. = Anterior Third. *M. T. = Middle Third.
*P. T. = Posterior Third.

The results showed the incidence and distribution of the encysted metacercariae infested in the infested Oreochromis spp. and Clarias lazera in gills, eyes, kidney, liver, branchial cavity and spleen 62.5%, 59.4%, 43.8%, 38.5%, 20,8% and 3.1%, respectively. These results were higher than those obtained by Mahmoud (1983), El-Dally (1988) and Ayoub (1991). These variations might be due to the extent of water pollution with animal and human excreta which may vary from locality to another. Coliform counts on the water could support this statement.

The highest incidence of encysted metacercariae in infested Oreochromis spp. was occurred in summer (81.8%) (table 3). This finding was in agreement with Ayoub (1991) and Tantawy (1993) and in disagreement with Shalaby (1982), who recorded that the highest seasonal incidence of encysted metacercariae in Oreochronis spp. was in winter. The highest incidence of encysted metacercariae in Clarias lazera occurred in winter (92.3%) and these results agreed with those obtained by Ayoub (1991) and Tantawy (1993).

Table 2. The incidence and distribution of encysted metacercariae in different organs in the infested fish/gram

Type of fish	No. of infested	Organs											
		Eye		Gills		Liver		Spleen		Kidney		Bran. Cavity	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Oreochromis spp. (Bolti)	62	57	91.9	44	70.9	13	20.9	–	–	29	46.8	20	32.3
Clarias lazera (Armout catfish)	34	–	–	16	47.1	24	70.6	6	3	13	38.2	–	–
Total	96	57	59.4	60	62.5	37	38.5	3	3.1	42	43.8	20	20.8

*Bran. cavity = Branchial cavity.

Table 3. Seasonal incidence of encysted metacercariae in examined fish samples

Season	No. of examined	No. of infested	%	Oreochromis spp.			C. lazera		
				No. of examined	No. of infested	%	No. of examined	No. of infested	%
Autumn	27	20	74.1	20	14	70.0	7	5	71.4
Winter	23	20	86.9	13	10	76.9	13	12	92.3
Spring	49	34	69.4	30	20	66.7	19	12	63.2
Summer	36	22	61.1	22	18	81.8	15	5	33.3
Total	135	96	71.1	85	62	72.9	54	34	62.9

Prohemistomatid metacercariae was present in Oreochromis spp. (46.8%) and Clarias lazera (88.2%) (table 4) was a similar finding to those reported by Fahmy and Selim (1959), El-Dally (1988) and Tantawy (1993). The Diplostomatid metacercarias were detected only in Oreochrmis spp. (27.4%). The highest infestation of Diplostomatid metacercariae was in tissues of eyes, then in the anterior third of the muscles with fewer in the middle and posterior third in muscles of fish a similar finding to Whyte et al. (1991) in trout. Al-Alousi et al. (1988) found that Diplostomatid metacercariae caused opacity of the eye in freshwater fish. The Heterophyid metacercariae found in the present study was detected only in Oreochromis spp. (4.8%). The cysts were more abundant in the superficial muscle layers than those in the deep muscles and in the tissue around eye. The majority of the infested muscles showed fine streaks of black colouration (melanin pigment). These metacercariae are of zoonotic importance and cause visceral pain, diarrhoea and superficial necrosis of the intestinal mucosa in infested human. (Hamed and Elias, 1970). The Haplorchid metacercariae was detected in Oreochromis spp. (12.9%) and Clarias lazera (14.7%) in the present study. These results agree with those obtained by Mahmound et al. (1989), Ayoub (1991) and Tantawy (1993). The Clinostomatid metacercariae were detected in of Oreochromis spp. only (12.9%) in branchial cavity. Moreover, Clinostomatid metacercariae are transmitted to man by eating raw fish and cause Halazoun disease (Watson, 1960 and Ulner, 1975).

For the prevention of fish infestation in man, the following instructions, precautions and suggested recommended points must be taken into consideration which includes: the source of water used for fish farming should be examined periodically to be sure that it is free from any infestation, treating such raw sewage effluent before being poured into surface water, periodical examination of fisherman and treatment of diseased ones, evisceration of fish will reduce the number of Ascaridae larvae which penetrating from the mesentries into muscles,

freezing of fish for about 36 hours will destroy all of the encysted metacercariae, salting of fish for about 14 days kills all encysted metacercariae in fish, adeqate cooking, grilling, frying of fish and environmental sanitary measures which include (snail control, hygienic disposal of human and animal excreta as well as water and sewage treatment).

Table 4. Indentification of encysted metacercariae in the examined fish samples

Type of fish	No. of examined	No. of infested	%	Types of metacercariae	No. of infested fish with E. M. C.	%
Oreochromis spp.	85	62	72.9	1 – Prohemistomatid m.	29	46.8
				2 – Haplorchid m.	8	12.9
				3 – Heterophid m.	3	4.8
				4 – Diplostomatid m.	17	27.4
				5 – Clinostomatid m.	8	12.9
Clarias lazera	50	34	68.0	1 – prohemistomatid m.	30	88.2
				2 – Haplorchid m.	5	14.7

*E. M. C. = Encysted Metacercariae.

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