

## STUDIES ON PREVAILING NODULAR PARASITIC DISEASES IN SOME CULTURED FISHES

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### ABSTRACT

The present investigation was directed towards studying the nodular parasitic diseases in some cultured fishes collected from Ismailia governorate and represented as 120 *Oreochromis niloticus* and 120 *Mugil cephalus*. Infested *Mugil cephalus* showed white to yellow nodules on the skin. They were identified as myxobolus sp..Also, fishes musculature contained encysted metacercariae especially toward the tail region. In *Oreochromis niloticus*, the cysts were yellow to orange pea like, attaching to branchiostegal musculature were in grape like and identified as *Clinostomum tilapiae*, the main cause of yellow grub disease. The total and seasonal prevalence were investigated as well as the histopatholical alterations were recoded.

### INTRODUCTION

Cultured fishes are one of the most important resources of fish meat in Egypt, they have been found to be infested with several diseases, from which nodular parasitic diseases (*Eissa, 2002*).

A number of serious, disfiguring, debilitation and potentially lethal diseases of freshwater and marine fish resulting from the internal fish parasitic diseases, the nodular ones represent the majority of hazard and economical impact on fish culture and industry (*Abollo et*

*al.,2001,Kent2001, Abd El-Aal, 2002, and FAO,2008* ).

So, this work was planned to investigate the clinical picture, total and seasonal prevalence, parasitological and histopathological alterations in cultured *Oreochromis niloticus* and *Mugil cephalus* fishes.

### MATERIALS AND METHODS

#### Fishes:

A total number of 240 alive cultured fishes were represented as *Oreochromis niloticus* and *Mugil cephalus* each was 120. They were randomly and seasonally collected

from Ismailia governorate fish farms at different seasons during the period from 2008-2009.

#### **Clinical examination:**

The collected fishes were examined using the methods described by *Conoary and Herman (1980)* to investigate any lesions on the external body surface.

#### **Postmortem examination:**

The post-mortem examination was performed on all fishes according to *Stoskopf (1993)* to examine internal organs for the presence of parasitic nodules and any internal abnormalities.

#### **Parasitological examination:**

All fishes were grossly examined for detection of any external abnormality on the body surface (skin, fins, gills, eyes and mouth).

Also, internal organs were examined by naked eyes and by magnifying hand lens for any visible nodules then examined microscopically. Using dissecting fine needle, the nodules were ruptured and wet mount smears were prepared from the milky material oozing out from the nodules. The mounts were fixed by absolute methyl alcohol and left for drying, then stained by Giemsa stain for 20 min. Rinsing in distilled water and blotting until almost dry.

The encysted metacercariae were fixed by compressing between two slides, immersing the slide in 10% neutral formalin for 12-24 hours. The fixed specimens were washed severally in tap water to remove the

fixative then stained in acetic alum carmine for 12-24 hours, then dehydrated in ethyl alcohol clearing in clove oil then xylene and lastly in natural Canda balsam according to *Lucky (1977) and Schmidt (1992)*.

#### **Histopathological examination:**

Specimens were taken from the skin and musculature of infested *Mugil cephalus* and fixed in 10% formalin saline. Paraffin bees wax tissue blocks were prepared for sectioning at 4 microns. They were stained by Hematoxylin and Eosin and examined microscopically (*Banch-roft et al ; 1996*).

## **RESULTS**

#### **Clinical examination:**

The clinical signs of most examined fishes revealed no pathognomonic clinical abnormalities and were apparently normal.

#### **Postmortum examination:**

Extensive nodules appeared on the external body surface of mullet *Mugil cephalus*. They were white to yellow in color and massive near the tail and ventral regions (**Fig.1**).

Musculature of mullet contained encysted metacercariae especially toward the tail region (**Fig. 2**).

In *Oreochromis niloticus*, there were yellow to orange pea like cysts, the cysts attaching to branchiostegal musculature were in grape like leading to bulging of the gill cover (**Fig.3**).

**Parasitological examination:**

The nodules of *Mugil cephalus* revealed spores as ovoid or round. Each spore contains in one end two equal pyriform polar capsules, in which single polar filament was coiled inside each one. On the other end, a single binucleate sporoplasm was present (Fig.4). Based on the morphological and parasitological findings, the isolated parasites were related to phylum Myxozoa, class Myxosporrea, order Bivalvudia, sub-order Platysporina, family Myxobolidae, genus Myxobolus, *M. niloticus*.

Also, *Mugil cephalus* showed heavy infestation in the musculature and internal organs of unidentified encysted metacercariae. They were light grayish in color, spherical to oval in shape with thin double wall and of different sizes (Fig.5).

The macroscopic visible cysts which found in the branchial cavity in Tilapia spots were yellowish in color.

The excysted metacercariae were tongue shaped with rounded end and measured from 7-18 mm in length and 3-5mm in width. They have a terminal, smaller oral sucker than the well-developed ventral acetabulum. The digestive tract was characterized by the long tubular intestines that meet at the end of the body and open to the excretory vesicle in the posterior extremity (Fig. 6). Based on the morphological and parasitological findings, the isolated parasites were related to phylum platyhelminthes, class Malacothrii, family Clinostomidae genus Clinostomum, *C. tilapiae*.

**Total prevalence of nodular parasitic diseases:**

**Table (1): Total prevalence of nodular parasitic diseases among examined fishes.**

Fish	No. of exam. fish	No. of infested fish	%
<i>Cultured O.niloticus</i>	120	2	1.6
<i>Mugil cephalus</i>	120	27	22.5

**Table (2): Total prevalence of myxobolus,metacercariosis and Yellow grub in examined fish.**

Fish	No. of exam. fish	myxobolus		Unide. E.M.C.		Yellow grub	
		No. of infest.	%	No. of infest.	%	No. of infest.	%
<i>O. niloticus</i>	120	-	0.0	-	0.0	2	1.6
<i>M.cephalus</i>	120	17	14.6	12	10	-	0.0

N.B. Unide.E.M.C. = unidentified encysted metacercariae. 2 cases have mixed infestation (E.M.C. + Myxobolus) in *M.cephalus*

**Table (3): Seasonal prevalence of myxobolus,metacercariosis and Yellow grub in examined fish:**

season	No. of exam fish	Myxo. in <i>M.cephalus</i>		E.M.C. in <i>M.cephalus</i>		Y. grub in <i>O.niloticus</i>	
		No. of infest	%	No. of infest	%	No. of infest	%
spring	30	13	43.3	4	13.3	-	0.0
summer	30	1	3.3	6	20	-	0.0
autumn	30	2	6.6	1	3.3	-	0.0
winter	30	1	3.3	1	3.3	2	6.6

The total prevalence of Myxobolus disease in *Mugil cephalus* was 14.16%, while the seasonal prevalence revealed that the spring season had the highest infestation.

Meatocercariosis in cultured Tilapia showed total prevalence of 1.6 % while the seasonal prevalence revealed that the winter season had the highest infestation. While meatocercariosis in *Mugil cephalus* sho-

wed total prevalence of 10%, and the summer season had the highest infestation (Tables 2& 3).

### Hsitopathological findings

#### Myxobolus disease

The skin of infested *Mugil cephalus* showed vacular degeneration and necrosis of the epidermal cells with marked erosions and ulceration.

The spores were found in cross sections of skin of such fish revealing focal infiltration of mononuclear cells (Fig. 7).

#### Encysted metacercariosis

The musculature of *Mugil cephalus* revealed multiple parasitic cy-

sts. Each cyst was surrounded by thick fibrous capsule and few lymphocytes, adjacent musculature suffered from degeneration, atrophy and necrosis. Intermuscular oedema was also evident (Fig. 8).

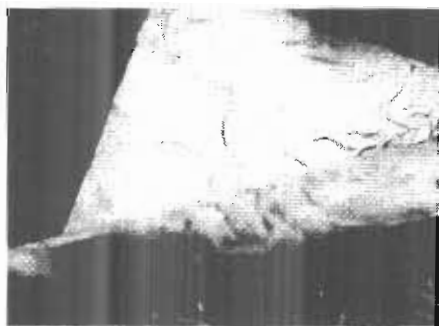


Fig. (1): *Myxobolus* nodules on Skin of *Mugil cephalus*.

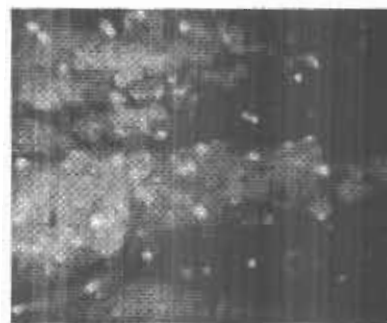


Fig. (2): Encysted metacercariae in musculature of *M. cephalus*.



Fig. (3): yellow grubs in *O. noticus*.

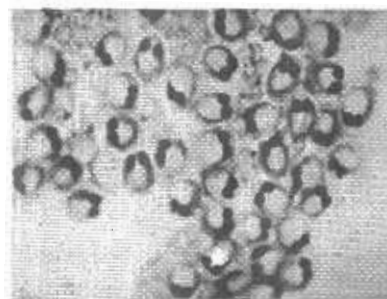


Fig. (4): *Myxobolus* spores.

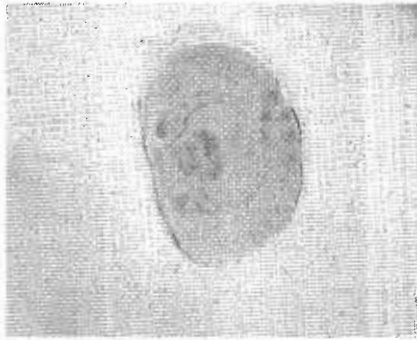


Fig. (5): encysted metacercaria.



Fig. (6): larva of *Clinostomum tilapiae*.

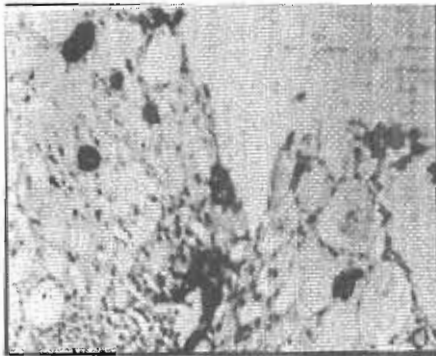


Fig. (7): Myxobolus spores in the skin of *M. cephalus*.

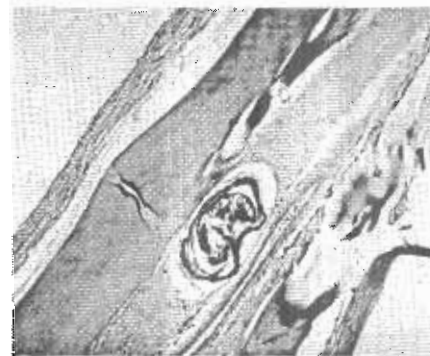


Fig. (8): encysted metacercariae in the musculature of *M. cephalus*.

## DISCUSSION

Concerning the main clinical signs of infested *Mugil cephalus* with Myxobolus disease, the parasites observed as large flat cysts developed on the surface of the apical area of the scales whitish or white to pink, raised lesions on the scales. These most common features of clinical signs agreed with the findings of *Egusa et al.*, (1990) and *Rothwell et al* (1997). Some fishes

showed small white cysts which were round in frontal view and oval in lateral view found in gill arch, liver and intestinal mesentery, these results agreed with the findings of *Brickle et al* (2006) and *Eirus et al* (2007).

The metacercariosis infestation of *Mugil cephalus* showed heavy parasitic infestations in the musculature, the encysted Metacer-

cariae appeared as pin point nodules of various sizes in the musculature and internal organs, reaching to hundreds in number in heavily infested cases. Concerning the intensity and clinical picture, it was closely similar to the results recorded by *El Aroussi (1984)*, *El-Bouhey et al., (1988)*, *Khalifa (1993)*, *Soliman (1994)*, *Mohamed (1996)*, *Dugan (2002)*, and *Amal Atwa (2006)*.

Regarding yellow grub disease in cultured *O.niloticus*, the degree of pathogenicity depended on the number of encysted metacercariae and on their place of attachment. The cysts were yellow to orange in colour, pea like cysts. The attached cysts or cyst-like (many reach up to 20/fish in number) attaching to the branchiostegal musculature, leading to bulging of gill cover, respiratory manifestations, heart displacement and inflammatory signs of the branchial tissue. These results closely agreed with the observations noticed by *Laya El-Banna (1994)*, *Eissa et al.,(1995)* and *Basiony (2002)*.

The parasitological examination of the nodules from the examined *Mugil cephalus* when stained by Gimsa stain revealed many spores; that were extremely variable in shape, ellipsoidal, ovoid or round in valvular view and biconvex in situ view. In one end, each spore contains two equal pyriform or oviform polar capsules that were refractile in live spores, in which

single polar filament was coiled inside each one. On the other end, a single binucleate sporoplasm was present. Based on the morphological and parasitological findings, the isolated parasites were related to Phylum Myxozoa, class Myxosporrea, order bivalvulida, suborder platysporina, family Myxobolidae, genus Myxobolus; *M. niloticus*. The detected myxospores were morphologically identical to the descriptions of *Lom and Dykova (1992)* and *Fomena and Boux (1997)*.

The cysts which found in the branchial cavity of Tilapia were macroscopic visible, yellowish in colour, the excysted metacercariae were tongue shaped with round ends and measured from 7-18 mm in length and 3-5 mm in width. They have a terminal, smaller oral sucker.

The well-developed ventral acetabulum, the digestive tract characterized by the long tubular intestines that meet at the end of the body and open to excretory vesicle in the posterior extremity. Based on the morphological and parasitological findings, the isolated parasites were related to Phylum Platyhelminthes, class Malacobothrii, family Clinostomidae and genus Clinostomum; *C. tilapiae*. This description nearly similar with the findings of *Maa-ther Elamie (2001)*, *Abd El-Aal(2002)*, *Eissa (2002b)* and *Noor El-Deen (2007)*.

Myxobolus disease in *Mugil cephalus* showed a total prevalence

of 14.16%, the peak of prevalence among examined fishes was in spring 43.3%, the result is somewhat nearly met with those reported by *Rothwell et al* (1997) who recorded the peak of Myxosporial infection in *Mugil cephalus* was in spring 56%.

Regarding the results of yellow grub disease in cultured *O. niloticus*, it was revealed that winter season only appeared the disease prevalence of 6.6%. This nearly met the results recorded by *Osman* (2001) and *Noor El-Din* (2007) who mentioned that the winter season to be the highest prevalence. This may be due to presence of chronic cases present in the pond culture. on the other hand, our findings disagree with *Maather El Lamie* (2001) that reached up to 100% infestation in the summer and 28% in the winter season. This may be due to the low availability of aquatic snails and wild birds as farm management routine work (periodic drianage, dryness, control of snails and wild birds).

Regarding the histopathological examination of the skin of infested *Mugil cephalus*, it was show in vacular degeneration and necrosis of the epidermal cells with marked erosions and ulceration. The spores were found in cross section of skin showing focal infiltrations of mononuclear cells. These results nearly agree with the findings of *Rothwell et al* (1997).

Concerning the alterations of yellow grub disease in *O. niloticus*, the parasitic cysts of *Clinostomum tilapiae* were seen in between the muscle bundles of the branchiostegal musculature; surrounded by slight oedema. This result nearly met the findings of *Eissa* (2002b), *Noor El-Deen* (2007) and *Wallaa El-Shaer* (2008).

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### المخلص العربي

دراسات عن الأمراض الطفيلية العقدية السائدة في بعض الأسماك المستزرعة

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تمت هذه الدراسة للاستقصاء عن الامراض الطفيلية العقدية فى الاسماك المستزرعة وتم تجميع العينات من محافظة الاسماعيلية وكانت 120 سمكة بورى مستزرع و120 سمكة بلطى مستزرع. فى اسماك البورى ظهرت عقد بيضاء الى صفراء اللون على الجلد وتم التعرف على انها مرض الميكزوبولس وفى عضلات اسماك البورى ظهرت حويصلات الميتاسيركاريا خاصة ناحية للذيل فى اسماك البلطى المستزرع ظهر مرض البرقات الصفراء فكانت الحويصلات صفراء ملاصقة لعضلات التجويف الخيشومى. كما تم دراسة الاصابة الموسمية وكذلك التغيرات النسيجية مرضية.