Parasitological studies on the isopoda (*Cymothoidae*) parasites infesting some marine fishes at Suez Canal area at Ismailia Province, Egypt with a key to the *cymothoid* genera.

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Abstract: A total of 150 different marine fish species represented as 50 fish from each *Sardinella* species, *Morone labrax* and *Sciaena umbra* were collected from Suez Canal area at Ismailia Province, Egypt. The infested marine fishes revealed no pathognomonic signs or lesions. They were investigated for detection of the Isopoda parasites, It was revealed that (4%) of the examined fishes were infected. The detected species were *Anilocra meridionalis* from *sardinella* species with prevalence of (4%); *Renocila thresherorum* from *Morone labrax* with prevalence of (6%) and *Cymothoa exigua* from *Sciaena umbra* with prevalence of (2%). The histopathological alterations were recorded and discussed.

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1. Introduction:

Isopoda is an order of *peracarid* crustaceans including familiar animals such as woodlice and pill bugs. The name isopoda derives from the Greek roots, iso meaning same and podo meaning foot; they lack an obvious carapace, which is reduced to a cephalic shield covering only the head (***Keable et al., 2002***). *Cymothoid* isopods are permanent ectoparasites of marine and freshwater fishes, surviving primarily on hematophagus diet (***Trills, 1994 and Heckmann, 2003***). Mouth parts comprised of a pair of maxillipeds, two pairs of maxillae and mandible (***Rachael, 2004***). The first body of the thorax is fused to the head and the last abdominal segment is fused to the telson forming pleotelson (***Schotte et al., 2010***). Some species of isopods release the fertilized eggs into a brood chamber (marsupium) where they protected until they are mature enough to be released, other species brood their eggs internally. Isopods are never released as larva (***Racheal, 2004***). *Cymothoid* isopods cause serious problems to host fishes either directly or indirectly affecting the physiological status of the host ***(Ravichandran, 2007 & Ravichandran et al., 2009)***. They feed on blood and macerated tissues (***Woo, 2006***), causing anaemia and death in small fish (***Ravi and Rajkumar, 2007***). *Cymothoa exigua* female, or the tongue –eating louse destroys the fish's tongue, and then attaches itself to the stub of what was once its tongue and becomes the fish's new tongue (***Brusca & Gilligan, 1983***). In Egypt, culturist collect feral fingerlings marine fishes to be cultured. The isopods have been transferred from feral fish to the farmed fish species (***Ramadane et al., 2007***). ***Badawy (1994)*** described *Rocinela lethrini* from gills of *Lethrinus nebulosus*. (***Abd El Aal and El Ashrum, 2011)*** described *Cymothoa spinipalpa* from *Argryrops filamentosis* using light and scaning electron microscopy. Because of low literatures on isopoda except those recorded by ***Eissa, (2002) and Ali and Aboesa, (2007)***

Therefore, the aim of this work was to present knowledge of the Isopoda parasites of some marine fishes in Suez Canal area at Ismailia Province, Egypt including prevalence, its morphological description and histopathological changes with a key for diagnosis.

2. Material and methods

Fishes:

150 marine fishes were collected from Suez Canal area at Ismailia Province, Egypt represented as 50 fish of each species *Sardinella* species, *Morone labrax* and *Sciaena umbra* with an average body weight 120+10g.

Clinical examination:

The collected fishes were examined clinically according to the methods described by ***Noga (1996).***

Parasitological examination:

The specimens were thoroughly checked for parasitic isopodal infection in the body surface; fins, head, gills and oral cavities. The isopod parasites were removed from the fish and preserved in 70% ethanol. The parasites were examined and identified according to ***Brusca (1981*).**

Histopathological examination:

The affected skin and gills were fixed in 10% phosphate buffered formalin, then dehydrated in ascending grades of alcohol and cleaned in xylol, then embedded in paraffin wax, cut into thin sections and floated on warm water. The sections were left from the water bath on microscope slides, coated with a minimal amount of Myers albumin, allowed to dry thoroughly and then stained with (H&E) stain according to ***Carleton et al,. (1967)***

3. Results

As in table (1) the examination of different marine species revealed that 6 (4%) out of 150 were infected with isopods, the detected species with its prevalence were: *Anilocra meridionalis* from *sardinella* species with prevalence of 2 (4%); *Renocila thresherorum* from *Morone labrax* with prevalence of 3 (6%) and *Cymothoa exigua* from *Sciaena umbra* with prevalence of 1 (2%).

Morphological description:-

Anilocra meridionalis female (Fig.1& Plate.1): Isolated from base of orbital cavity and the operculum of *Serdinella sp*. It is narrow, somewhat more compressed and dorsally convex with body length (11-35 mm) and width (4-6 mm). Eyes moderately large. Cephalon narrows anteriorly to triangular, apex folded down (ventrally) between bases of first antennae; downward folded gives anterior margin of cephalon truncate appearance in dorsal aspect. First antenna reaching about midline of pereonite1, second antenna reaching posterior margin of pereonite 2. Cephalon not immersed in pereonite1.Pereon; posteriolateral angles of all pereonites evenly rounded, not extended. Coxal plates small and compact, failing to reach posterior margins of their respective pereonites. Pleon not immersed in pleonites 7, decreasing gradually in width posteriorly; subequal in length. Prepods gradually increasing in length posteriorly. Pleotelson and pleonite 5 are subequal in width. Uropodal rami evenly ovate, reaching barely beyond posterior margin of pleotelson.

Renocila thresherorum female (Fig.2): Isolated from base of dorsal and pectoral fins, gills and mouth cavity of M*orone labrax*.Body generally more depressed, 12-30 mm length and 7-14 mm width. Dorsal surface with scattered chromatophores, concentrated on posterior borders of segments. Cephalon width 1.3 times length; posterior border weakly immersed in pereonite. Eyes well developed. Antenna 1 of eight articles, barely reaching anterior margin of pereonite1; maxilliped with two terminal, and one subterminal spines. Maxilla 1 with four terminal spines. Pereon: Pereonites 1 and 5 longest; 2,3 and 7 shortest and 4,6 subequal. Posteriolateral agle of pereonite 5 not produced, of pereonite 6 moderete and of pereonite 7 is completely produced. Pereopods increasing in length gradually posteriorly and all without carinae. Pleonites of pleon are subequal in width and length. Posterior magin of pleotelson evenly rounded and complete fusion between it and pleonite5. Uropodal endopod ovate; exopode elongate, longer than endopod; uripods extended beyond posterior margin of pleoteson.

Cymothoa exigua female (Fig,3): Isolated from mouth cavity of *Sciaena umbra*, body length 8-30 mm and its width 4-15 mm, dorsal surface without scattered chromatophores. Cephalon is moderately immersed into pereonite 1.Eyes well developed. Antenna 1 not reach to the end of anterior third of pereonite 1, antenna 2 reaching to half of pereonite 1.In peron, pereonite 1 longest; 2-4 subequal in length; 5-7 decreasing in length posteriorly and pereonite 7 is the shortest, pereonite 5&6 are the widest. All coxae fail to reach posterior margin of their respective segment. Pereopods from1 to7 without spine. In pleon, pleonites 1-5 with medial elevation; 4-5 widest and pleonite 5 is the longest. Pleotelson wider than longer. Uropodal rami narrow and elongate not extended beyond posterior border of pleotelson.

Clinical picture and Histopathological findings:

The infested marine fishes revealed no pathognomonic signs or lesions. The skin and gills showed focal erosion and as shown in the figures (4 & 5), the parasites induced severe inflammatory reactions, degenerative and hyperplastic changes in skin. The gills revealed congestion of lamellar vessels and adhesion of most gill filaments and lamellae.

Table (1) Showing the prevalence of isopoda infection among the examined fishes

Isopoda	Fish exam.	Number	No. infect. Fish	% of infect. Fish
Anilocra meridionalis	***Sardinella sp***	**50**	**2**	**4**
Renocila thresherorum	***Morone labrax***	**50**	**3**	**6**
Cymothoa exigua	***Sciaena umbra***	**50**	**1**	**2**
Total		**150**	**6**	**4**

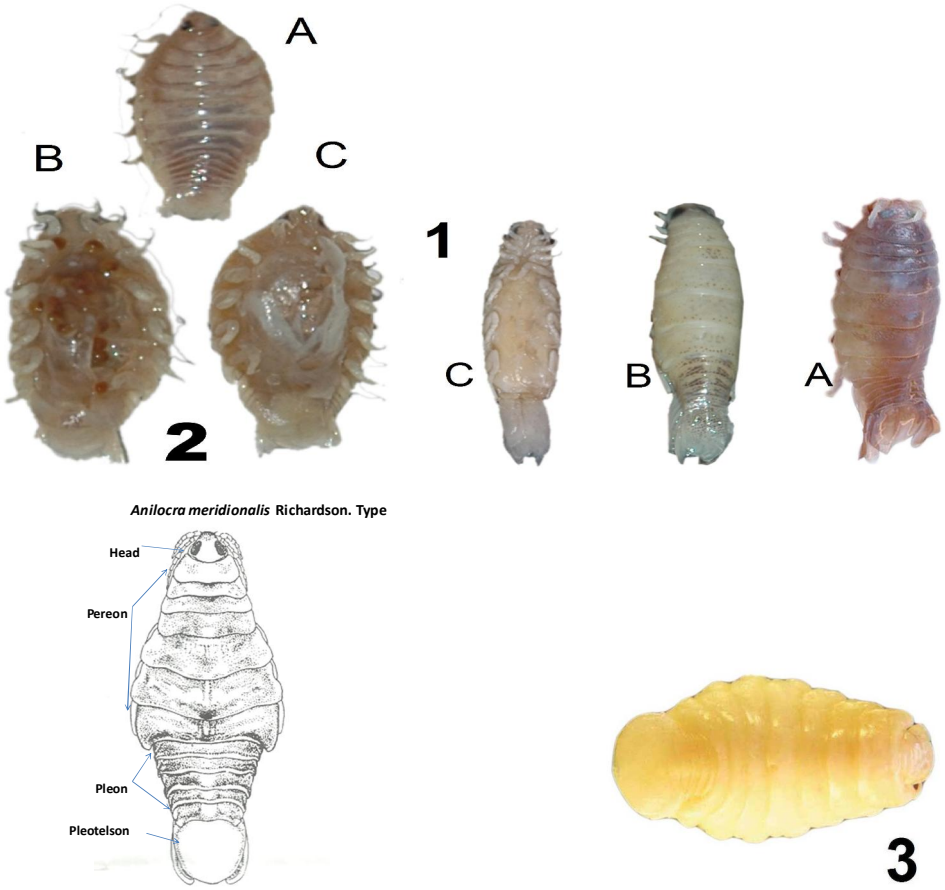

Fig. (1):*Anilocra meridionalis* female: A.showing fresh, live specimen appearing length of antenna-B,preserved dorsal view- C. ventral view
Fig.(2): *Renocila thresherorum* female A, dorsal view, B, ventral view showing marsupium filling with eggs-C. ventral view showing open marsupium
Fig (3): *Cymothoa exigua* (female): dorsal view.

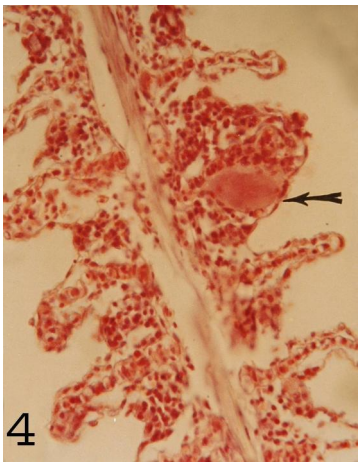

Fig. (4) Gill filaments showing oedema in secondary lamellae, the epithelial lining sloughed out in some area.

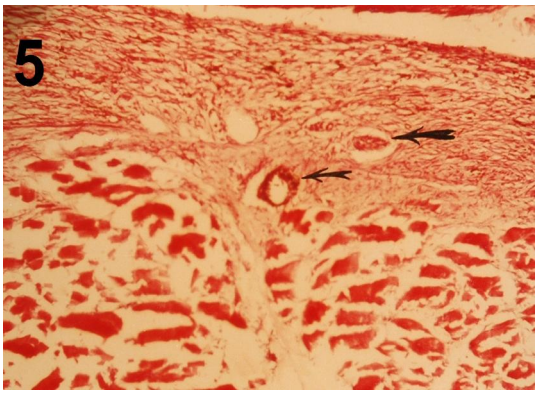

Fig (5) Skin showing destruction of the epidermis, which appeared replaced by C.T. proliferation, inflammatory cells, dilated and thrombosis in blood vessels.

4. Discussion

The present study revealed that (4%) out of 150 were infected with isopods, the detected species with its prevalence were: *Anilocra meridionalis* from *sardinella* species with incidence of (4%); *Renocila thresherorum* from *Morone labrax* with incidence of (6%) and *Cymothoa exigua* from *Sciaena umbra* with prevalence of (2%). These results nearly agreed with that given by ***Badawy (1994)*** who recorded 8.62% from Mediterranean Sea at Port Said province, and ***Abd El Aal and El Ashrum (2011)*** as 9% from *Agrgyrops filamentosus* from Mediterranean Sea at Matrouh province. In respect to morphological view, the study showed that *Anilocra meridionalis* differentiated from other cymothoid by its narrow and more dorsally convex body; large eyes. Cephalon folded down, not immersed in pereonite1. Coxal plates small and compact, failing to reach posterior margins of their respective pereonites. Pleon decreasing gradually posteriorly and subequal in length..Prepods gradually increasing in length posteriorly. Pleoteson and pleonite 5 subequal in width. This description in agreement with ***Richardson, (1914) and Brusca, (1981)*.**Also**, Williams &Williams (1999)** who recoded these parasites have a wide variety of fish hosts in two classes, 10 orders and 20 families. In **(2003) *Williams &Williams*** synonomized *A. meridionalis* with *A. gigantea* except its very large size reaching to 10cm. Genus *Renocila* differentiated from other cymothoid by its more depressed body, scattered chromatophores, concentrated on posterior borders of segments, all pleopods without lateral accessory lamella on basis and uropodal rami narrow and elongated extended beyond posterior border of pleotelson, and from other *Renocila* species by posteriolateral angle of pereonite 7 only produced. This in agreement with ***Williams & Williams (1980), Brusca, (1981) and Brain & Marilyn, (1996).*** Genus *Cymothoa* is distinguished from other Cymothoid by antenna1 widely separated at the base, pereonite 1 broadly excavated to receive cephalon, anterior coxal plate not reaching posterior border of the pereonite, pleon abruptly narrower than and deeply immersed in pereon, in agreement with that given by ***Brusca,(1981).*** *Cymothoa exigua* is known to parasitize eight species in two orders and four families of fishes, 7 species of order *Perciformes* and one species of order *Atheriniformes* ***(Williams &Williams, 2003)***. From these results, it appeared that isopods having a low host specify. Absence of male in this study duo to short live span upon the fish turned to female **(*Brusca, 1981; Klaus, 2005* and *Vernon et al., 2007*).** The clinical examination of skin and gills and histopathological findings included inflammation of the skin which may be attributed to that such parasites penetrate skin for feeding. This agreed with ***Lester and Hayward (2006), Yambot and Lopez (1977***). Gills revealed congestion, oedema and necrosis and this nearly similar to that recorded by ***Noor El-Dean et al., (2012).***

Key to the cymothoid genera according to *(Brusca, 1981):*

1- Uropods and pleopods heavily setose. Juveniles-Uropods and pleopods not setose-2

2-Antenna1 broader and usually longer than antenna 2; cephalon very weakly immersed in pereonite 1; anterior margin of pereonite1 not trisinuate Renocila-Antenna 1 not broader or longer than antenna 2, usually the reverse; cephalon distinctly immersed in pereonite1 or not at all immersed; anterior margin of pereonite 1 distinctly trisinuate, or not at all trisinuate3

3-Cephalon not immersed in pereonite 1; posterior margin of cephalon distinctly trisinuate 4-Cephalon more or less immersed in pereonite 1; posterior margin of cephalon not trisinuate 5

4-Cephalon generally narrowing anteriorly forming an acute projection produced ventrally between first antenna; posteriolateral angles of pereonites2-4 not produced; coxal plates short, barely reaching or falling short of posterior border of respective segments. Anilocra-Cephalon not as above, frontal margin without acute projection; bases of antenna 1 separated by clypeus; posterior-lateral angles of pereonites2-6 manifestly produced, increasingly so posteriorly; coxal plates long, usually extended to or falling just short of posterior border of respective segment Nerocila

5-Basal articles of antenna1 expanded and touching Ceratothoa

6-Pleon continuous with lateral magins of pereon, forming a more -or -less continuous and symmetrical body margin; pleonites 1-2 occasionally somewhat immersed in pereon. Lironeca-pleon slightly or abruptly narrower than pereon, disrupting continuity of body margins; pleon generally deeply immersed in pereon 7

7- Body compressed laterally, dorsum strongly convex (hunched); bases of antenna 1 nearly touching; pleon weakly but distinctly narrower than pereon. Idusa-Body not compressed laterally; bases of antenna 1 widely separated; pleon strongly and abruptly narrower than pereon Cymothoa

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