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NEW RECORD OF TWO HELMINTH PARASITES FROM *Cyprinus carpio* L. IN SOUTHERN REGION OF IRAQ

Muna Mohammed Jori* and Azhar Hamid Rasool

Veterinary Public Health/Veterinary Collage - Basrah University, Basrah, Iraq.

Abstract

During the study period from October 2015 to June 2016, a total of 339 specimens of common carp *Cyprinus carpio* L. were collected from fish farms in Basrah and Nasryia provinces. The microscopic examination of fish detected presence of two parasites, one of them belonging to monogenetic trematode *Diplozoon diporpa* on gills of one fish specimen from Nasryia fish farm. While the other parasite related to Anisakid nematode *Hysterothylacium* sp. The 3rd larval stages were isolated from intestinal wall of one specimen of fish from Basrah fish farm. The recorded of marine parasite *Hysterothylacium* sp. in the present study considered as a new record in fresh water fishes of Iraq. The detection of *Diplozoon diporpa* for the first time in Nasryia fish farm regarded Nasryia as a new locality for *Diplozoon diporpa*. In addition, the common carp *C. carpio* was considered as a new host for both *Diplozoon diporpa* and *Hysterothylacium* sp.

Key words: Helminth parasites, *Cyprinus carpio*, *Diplozoon diporpa* and *Hysterothylacium* sp.

1. Introduction

Fish represents a valuable source of micronutrients, minerals, essential fatty acids and proteins in the diet especially in the countries where there is a lack of alternative protein food, since the fishes contributes up to 180 Kilocalories per capita per day (Sofia, 2004). Cyprinids are highly important food fish; it is the largest family of fresh-water fish, with about 2,420 species of cyprinids in about 220 genera (Wikipedia, 2007).

Diplozoids are monogenean parasites that inhabit the gills of fish, and generally considered as parasites of Cyprinid fishes. They are fish ectoparasites with a unique, direct life cycle in which a free-swimming Oncomiracidium hatches from the egg, and invades a fish host where it develops into the larval stage called diporpa. Then, two diporpae contact each other and twist their bodies and remain in permanent copula, which grows into an adult stage (Pecinkova *et al.*, 2007).

The nematode family Anisakidae presently includes a wide range of parasites of aquatic organisms (fish, marine mammals, piscivorous birds and even reptiles), some of which have considerable economic or medical importance (Anderson 2000). *Anisakis* sp. larvae is a worldwide distribution parasite commonly found in the flesh and the body cavity of many species of marine fishes as well as cephalopods that act as paratenic or transport hosts (Eissa, 2002). The infective third larval stage (L3) of *Anisakis* is common in commercially main marine fishes and its existence is of great concern for both public health and commercial reasons (Chou *et al.*, 2011).

Corresponding author*: **Muna Mohammed Jori
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Larvae of anisakid nematodes can be seen in the muscles or observed to the internal organs of marine and freshwater fish. Moravec (2007) referred that various nematode species are recognized as the agents of severe fish illnesses causing huge harms in fish cultures in some regions and some of them cause chief public health problems such as anisakiosis, gnathostomosis or paracapillariosis. Nematodes of this genus use fishes as both intermediate and definitive hosts (Costa *et al*., 2004).

Species of the genus *Hysterothylacium* are parasitic in together larval and adult stage and can be initiate parasitizing the visceral cavity, mesentery and intestine of marine and freshwater fishes (Khaleghzadeh - Ahangar *et al*., 2011). In natural situations, they spread their maturity in the intestine of fish and mammals and have copepods, polychaeta and other invertebrates as intermediate hosts (Moravec, 1998). Humans can be fortuitously infected upon eating raw ill fishes (Shamsi *et al*., 2013).

The region of Basrah is the only province in Iraq which has an overseeing on the Arab Gulf. In this province, dissimilar variations of aquatic environments. These involved the low marshy area in the north, Shatt Al-Arab River, its rivers and inlet, Shatt Al-Basrah canal as well as the marine habitats of the northwest part of the Arab Gulf (Mhaisen *et al*., 2013). Data about nematodes of fishes of Basrah province are dispersed in altered local scientific references. Fish of the fact that an important food source, especially in the southern regions of Iraq, so the study was designed to detect parasites that infect fish farms.

2. Materials and Methods

During the study period from October 2015 to June 2016, a total of 339 specimens of common carp *Cyprinus carpio* L. were collected from fish farms in Basrah and Nasryia provinces. Fish sample collected by using hand nets. Small ice pieces were extra to the water of the boxes in the hot period to prevent the deciding of the dead fishes, or to increase the survival rates of the alive fishes. The total length and weight were measured for each fish and upon the gonads separating, the sex of fish was determined. The inspection procedures for ectoparasites and endoparasites were explained by Amlacher (1970) and Lucky (1977).

As mentioned by Fattohy (1975), the Monogenean were fixed directly by pressing them alive or lately dead, between two slides containing Vaseline in each edge of the slide to decrease the pressure on the parasites. Ethanol (70 %) was used over night to fixed the trematodes and then it stained by using acetocarmine. By using the method of Cable (1967), the Nematoda were killed by hot Bouins solution, and then stable and conserved with A. F. A. (Alcohol, Formalin and Glacial acetic acid) solution. Lactophenol was used to pure the inner constructions of nematodes through the measurements and sketch. It has been depending on ITIS (2013) for identification of the monogenean parasite and Worms (2016) for identified nematode parasite. Drawing and measurements of the detected parasites were done by using camera lucida fixed on the microscope.

3. Results and Discussion

Diplozoon diporpa

Phylum - Platyhelminthes
Class - Monogenea
Subclass - Polyopisthocotylea
Order - Mazocraeidea
Family - Diplozoidae
Genus - *Diplozoon*
Species - *diporpa*
Sit: Gills

Description and measurements

The body smooth and elongated, divided into two parts, an anterior part (Prohaptoral portion) looks like a long finger carrying genital glands. While the posterior part Haptor (Cotylophore), a quadrilateral form and has four pairs of similar quadrate attachment clamps arranging in two longitudinal parallel rows.

Suckers spherical, in similar sizes and shape and located near the end of the prohaptoral portion of the body. Pharynx globular and clearly defined. Intestine characterized by narrow branching and discrimination covers most of the body larva. Genitalia is distinct. Vitellaria multi-lobed and spread longitudinally from central area of the bottom of the pharynx to cotylophore. Total body length 1164.4. Prohaptoral sucker length 121.8 and its width 33.6. Prohaptoral portion length 861 and its width 319.8. Pharynx length 48.3. Genital pore (unclear). Length of clamps is 82 and its width 131.2. Haptor (Cotylophore) length180.4 and width 451.

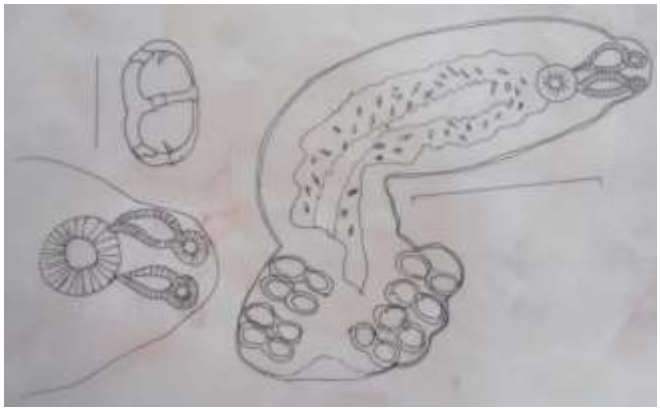

Fig - 1: *Diplozoon diporpa* (Camera Lucida)

The first detection of the diplozoid species from fishes in Iraq by Fattohy (1975), while AL-Daraji (1986) for the first time in Iraq found the *Diplozoon diporpa* larva on the gills of *Aspius vorax*. AL-Salim and AL-Ali (2000) recorded the larva *Diplozoon diprpa* on the gills of *Aspius vorax* collected from Garment Ali River. Larval stages (diporpa) of unidentified *Diplozoon* species were reported from *B. luteus*, which is a synonym of *C. luteus* (Al-Nasiri, 2000) and *Silurus glanis* (Rahemo and Al-Niaeemi, 2001). The recorded larva of *Diplozoon diprpa* from *C. carpio* in the present study is not resembles the specimens described by other specimens of *Diplozoon diprpa* recorded previously by other authors in morphological features and in its measurements. And the detection of this parasites for the first time in Nasryia fish farm regarded Nasryia as new locality for *Diplozoon diporpa*.

2. *Hysterothylacium* sp.3rd larval stage.

Phylum - Nematoda
Class - Secernentea
Order - Ascaridida
Superfamily - Ascaridoidea
Family - Anisakidae
Genus - *Hysterothylacium* Ward *et* Magath, 1917
Site: Intestinal wall (serosa)

This Nematoda was obtained from the Intestinal wall of *C. carpio* collected from Basrah province.

Description and measurements

Whitish large larva 7200 in total length and maximum width 200 at appendage level. Esophagus length 800 and its width 86 in width, comprising 11.11 % of body length. Nerve ring not observed, excretory pore opened at 120 from anterior end. Ventricles spherical its length 95 and 86 in width. Intestinal caecum short and curved laterally around anterior of ventricles, its length 267 and 55 in width. Length of Appendage 600 and width 50. Ratio of appendage to esophagus 1:1.33, ratio of caecum to appendage 1:2.2, ratio of caecum to esophagus 1: 1:3. Tail was conical with smooth tip 120 mm in length.

Hysterothylacium, one of the anisakid nematodes which may cause anisakidosis, includes 59 species (Moravec and Nagasawa, 2000). They were reported from several parts of the world such as New Zealand (Bruce *et al.*, 1994), Japan (Moravec and Nagasawa, 2000).

Hysterothylacium includes parasites of marine, estuarine and freshwater fishes (Gibbons, 2010). Isolated of Nematode was based on morphology and morphometric parameters following Moravec (1998). Moravec *et al.* (1993) reported *Hysterothylacium* sp. larvae from eight fish species of the Paraná River, Brazil.

One juvenile male of *Hysterothylacium* sp. 2 was isolated from the intestine of *Drepane*

longimana from Khor Al-Ummaia (Ali, 2008; Al-Salim and Ali, 2010). Females of *Hysterothylacium* sp. 1 (misidentified as *Contracaecum* sp. were recorded from the intestine of *J. belangerii* from Khor Al-Zubair estuary (Al-Daraji, 1995). Bannai (2002) recorded the same females of *Hysterothylacium* sp.1 (also misidentified as *Contracaecum* sp.) from three species of marine fishes (*A. hians*, *Saurida undosquamis* and *Sillago sihama*) from Khor Abdullah.

The type species of the third larval stages of *Hysterothylacium* sp. were reported from six marine fishes from Khor Al-Ummaia. These were: *C. arel* (Ali, 2008; Al-Salim and Ali, 2010; Ali and Al-Salim, 2013) as well as from the intestine of two sharks: *Chiloscyllium arabicum* and *Sphyrna mokarran* (Ali, 2008; Al-Salim and Ali, 2010) and *Hysterothylacium* sp. type BA larva from the body cavity of two teleosts: *Acanthopagrus arabicus*, reported as *A. latus* (Ali, 2008; Al-Salim and Ali, 2010). *Hysterothylacium* sp. type BB larvae from the body cavity of both *C. arabicum* (Ali, 2008; Al- Salim and Ali, 2010) and *C. arel* (Ali, 2008; Al-Salim and Ali, 2010; Ali and Al-Salim, 2013), *Hysterothylacium* sp. type BC larvae from the stomach serosa of *C. arabicum* (Ali, 2008; Al-Salim and Ali, 2010) and the body cavity of *C. arel* (Ali, 2008; Al-Salim and Ali, 2010; Ali and Al-Salim, 2013).

The morphological features and measurements of the present recorded parasite different from the morphological features and measurements of other specimens recorded in previous studies by other researchers. So obtained data indicated that appearance of *Hysterothylacium* sp. 3rd larval stage in the present study from common carp in Basrah fish farm regarded as a new record in Iraqi fresh waters and *C. carpio* regarded as a new host for *Hysterothylacium* sp.

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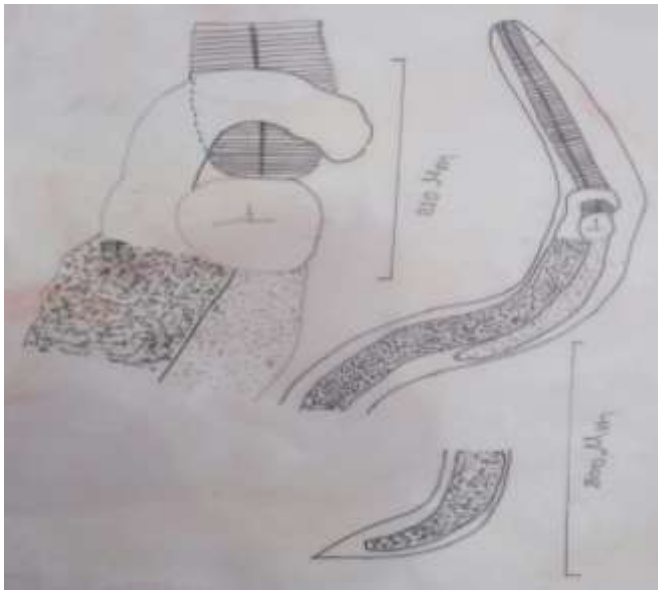

Fig - 2: *Hysterothylacium* sp. 3rd larval stage (camera Lucida)

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