



International Journal of Fisheries and Aquatic Studies

ISSN: 2347-5129

(ICV-Poland) Impact Value: 5.62

(GIF) Impact Factor: 0.549

IJFAS 2016; 4(6): 397-399

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www.fisheriesjournal.com

Received: 23-09-2016

Accepted: 24-10-2016

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The Pathological study of gastro intestinal *Aspidogaster limacoides* Diesing, of the Caspian Sea kutum fish *Rutilus frisii kutum* (Kamenskii, 1901)

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Abstract

Caspian sea is a land-locked brackish water lake where zoologically characterized by various aquatic animals and different commercially important fish species Shariati^[15]. The fishes in the Caspian Sea and its watershed areas include 78 species, and 49 subspecies which belong to 16 fish family. The bulk of Caspian Sea fishes are anadromous and the major commercially important fish species include the bony fish, and a cyprinid fish *Rutilus frisii kutum*, dwelling mainly along the southern coastal waters of the Caspian Sea. The fish reaches maturity at the Caspian sea is a land – locked brackish water lake where zoologically characterized by variouage of 3 years. In mid-March till April when the water temperature ranges between 12-18 °C the matured fish migrate to rivers flow into sea for spawning Shariatee^[16]. They tend to feed on phytoplanktons at larval stage while at later stages they turn to shells, chironomid larvae and polychaete worms Vosoughee and Mostageer^[18] Mokhayer,^[7]. Detected certain species of digenem trematode in kutum fish caught from the sefid-Rood river including *Aspidogaster limacoides* and *Asymphylogora kubanicum* Mokhayer^[7].

Among parasites, *Aspidogaster limacoides* constitutes the most prevalent species with a wide range of hosts infesting different cyprinids in the Baltic Sea and the Sea of Azouf Molnar^[8] Rahanandeh *et al.*^[12]. The degree and intensity of such parasitic contamination in areas such as foregut, midgut and hindgut were 52%, 32% and 16% respectively (Rahanandeh *et al.*^[12]). The present study involved the catch of 25 pieces of *Rutilus frisii kutum* (800-1400_{gr}) during March-May 2015 through beach seine operations along the southern shores of the Caspian Sea. Following the landing of the sample fish, they were transferred live to the fish health laboratory which was then followed by dissection of the body, removal of their digestive tracts and storage in the 0.6% physiological serum. The samples of gut tissue were obtained based on the procedure introduced by Robert^[13]. Through microscopic observation, cases including tissue degenerati, hyperplasia, Necrosis, hemorrhage, hyperemia caused by parasite invasion within the gut mucous were identified

Keywords: Caspian Sea, Kutum fish, parasite, pathology

1. Introduction

Caspian Sea, the biggest land locked lake in the world is characterized by the greatest depth in the southern part where in the bottom layer is composed of the most complex geological compounds Shariati^[15]. Volga accounts for the bulk of incoming water (approximately 80% of inflow). The Caspian Sea productivity is highly controlled by water dynamism, and its unique hydrological and biological characteristics that are directly related to volume and quality of waters flowing into it Rahanandeh *et al.*^[12]. The aquatic and fisheries resources of the Caspian Sea are closely interrelated with hydrological as well as hydro biological conditions of the sea which in the course of time have been liable to changes Shariati^[15]. Due to the great diversity of food stocks, the Caspian Sea provides habitats for a great variety of highly valuable fishery stocks including the Kutum fish (*R.F Kutum*). Kutum fish are scattered mainly along the southern parts off the sea turning them into a semi-migrant species Shariati^[16] Jalali *et al.*^[6]. Kutum fisheries occur during March till May every year mainly because of greater multiplicity of available aquatic food such as Gammarus, Bivalves, Mollusks and Crustaceans Robert^[13]. These creatures are themselves affected by various parasites that are in larval stage or in adult form.

There have already been a number of earlier studies detecting various parasites in the Caspian Sea Kutum including Eslami *et al.*^[2] Shamsi *et al.*^[14] Jalali *et al.*^[6] Rahanandeh *et al.*^[12].

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Subclass Aspidogastrea consists of a small group of trematodes with a worldwide distribution comprising about 80 species and has not been described for Australia yet. The *Aspidogastrea parasitise* poikilothermous animals like crustacean, molluscs, fish, reptiles in marine and freshwater environments Schludermann *et al.* [17].

Among parasites, *Aspidogaster limacoides* constitutes the most prevalent species with a wide range of hosts infesting different cyprinids in the Baltic Sea and the Sea of Azouf Molnar [8].

The intensity of parasitic infestation and the degree of contamination in the guts of Kutum fish were examined by Rahanandeh *et al.* [12]. So far, there has not been any study exclusively examining the extent of gut lesions caused by these parasites.

The present study therefore, aims at investigating the histopathological damages to Kutum gut caused by *Aspidogaster limacoides*.

2. Materials & Method

A sum of 25 pieces of *Rutilus frisii kutum* were netted along the southern fishing grounds of Caspian Sea by beach seine during March- May 2011.

The fish samples were then transferred live to the fish health lab, where in their body were dissected and samples of the gut tissues obtained and placed in the Buena solution. The samples were dried, cleaned and later on mixed with paraffin which was followed by casting in the mold cutting into slices and drying. Upon placing the tissues on slide, the samples were examined under a microscope with a magnification rate of (40x100) in terms of any damages caused by *Aspidogaster limacoides* Haruelle *et al.* [4] Pavlovsky [10] Rahanandeh *et al.* [12].

3. Results

In the microscopic examination of the gut mucus among the Kutum fish a high concentration of *Aspidogaster limacoides* were observed which was associated with hyperplasia, degeneration, tissue displacement, tissue adhesion, parasite replacing and inflammations surrounding parasite Fig. (1-2). Accumulations the microscopic analysis of the sample layers from the intestine tissues showed instances of histopathological lesions such as degeneration of intestine, hemorrhage, hyperplasia, cellular necrosis, tissue damages and hyperemia within the gut mucus which induced by parasitic infestation Fig. (2-4).

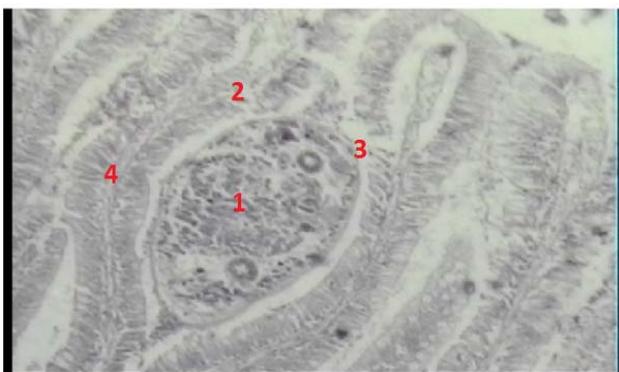


Fig 1: (1-Replacing of parasite, 2-Hyperplasia, Degeneration, 3-Tissue displacement, 4-Tissue adhesion and Inflammation)



Fig 2: (1-Replacing of parasite, 2-Hyperplasia, 3-Degeneration, 4-Tissue displacement 5-Tissue adhesion and Inflammation)



Fig 3: (1-Mucosal damage, 2-Hemorrhage, 3-Necrosis, 4-Hyperemia)

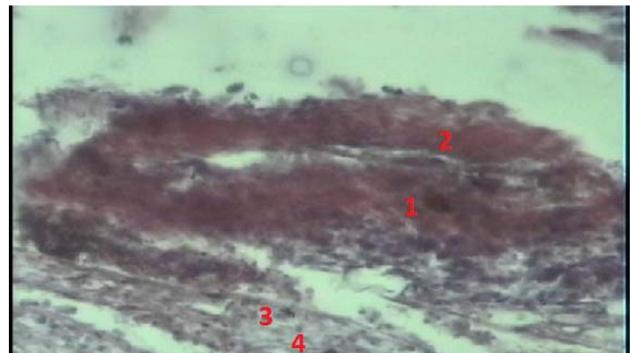


Fig 4: (1-Hyperemia, 2-Hemorrhage, 3-Necrosis, 4-Inflammation)

4. Discussion

The close relationship among the different aquatic animals, the great biodiversity and the land – locked state of Caspian sea provide a suitable condition for the emergence and the subsequent conveyance of various parasitic forms. The presence of various intermediate hosts as shells, Gamarus, crustaceans, and worms consumed by *Rutilus frisii kutum* as well as the relatively wide range of fish either as the main host or intermediate ones for the parasites, added by the interaction of many seabirds and mammals have all together provided the necessary grounds for a full range of parasites (Jallali) [5]. There have been extensive studies on the Caspian sea fish parasites particularly on *Rutilus frisii kutum* which resulted in the identification of a wide range of parasites living both in the sea and rivers flowing into the Caspian sea. *Aspidogaster limacoides* are flatworm and living in intestines of different species of fish. These parasites have two hosts. Diesing [1]. This parasite was found to reside in the intestine of various fish species including the Caspian sea *R. frisii*

kutum Eslami and Kohneshari [2] Gao *et al* [3] Haruelle *et al* [4]. Rahanandeh *et al* [12]. The degree and intensity of such parasitic contamination in areas such as foregut, midgut and hindgut were 52%, 32% and 16% respectively Rahanandeh *et al*. [12]. *A. limacoides* as a parasites of *Dreissena polymorpha* PALLAS that concludes its life cycle without a vertebrate host while cyprinid fish could act as facultative hosts when feeding on mussels Zhokov [19]. The bivalve hosts harboured the parasite in the kidneys, the pericardial and renal cavity, but *A. Limacoides* was mass and inside the gonads of *D. polymorpha* Molloy *et al*. [9] Zhokov [19]

Anatomically, the parasite body is composed of a shield-like sticky plate with four longitudinal Bothria extending from anterior to the posterior section. The mouth section is mostly comprised of such sticky plates playing a sucking role whereby feeding is accomplished through these parts Eslami and Kohneshari, [2] Jalali and Shamsi and Barzegar [6] Molnar [8]. Rahanandeh *et al*. [11] Gao *et al* [3]. Haruelle *et al* [4] Pavlovsky *et al* [10] Rahanandeh *et al* [12].

In the present study, however, different damages to tissues with high rates of infestation intensities were observed among the sampled fish Fig. (1-4). Most noticeably, these damages included hyperemia, hemorrhage, Inflammation, cellular degeneration, mucosal damage, tissue adhesion, tissue displacement, hyperplasia, necrosis and damages to the tissues particularly in or around the parasitic accumulations within the fish gut Fig. (1-4).

5. Acknowledgement

Hereby, the authors deem it necessary to thank all those who helped us in the execution of this study including Mr. Halajian, Mr. Pourshafie, Mr. Khadivinia and Mr. Nazmi

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