

A ZOONOTIC TREMATODE INFECTION IN AN IMPORTED GOLDFISH, *CARASSIUS AURATUS*

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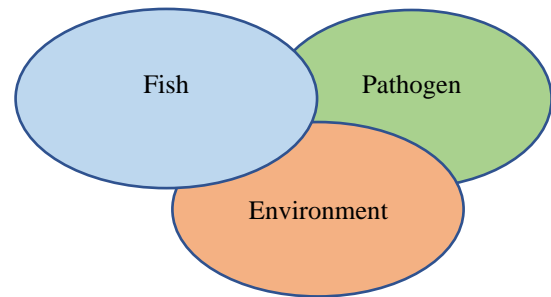
Centrocestus formosans, *Dactylogyrus*, *Ichthyobodo necatrix*, pathogen, FAO,

ABSTRACT

The study was conducted for evaluation of parasite in goldfish and rainbow shark. Fifty fish samples goldfish (n= 40) were examined. Different parasites were recorded in goldfish such as *Dactylogyrus* sp, *Centrocestus formosans*, and unidentified metacercaria, *Gyrodactylus*, *Ichthyobodo necatrix* and tetrahymena. In 38 fishes out of forty in goldfish. A total of 7,407 parasites were recorded. Most of the parasites were at the tips and middle part of the gills. The infection level having prevalence in goldfish was *Centrocestus formosans* 87.5%, *Dactylogyrus* sp. was 95%, *Gyrodactylus* was 01%, *Ichthyobodo necatrix* also called costia was 05%, tetrahymena 2.5%. Experiments were conducted in June to August 2018, and prevalence of parasites was compared with Annahita (2017) that primarily focus on prevalence of *Centrocestus formosans*.

1. INTRODUCTION

Fish is a vital source of food for people. It contains high quality protein. According to Food and Agriculture Organization (FAO) of the United Nations (1997), it provides ~16% of animal protein consumed by world's population. The FAO estimates that one billion people worldwide rely on fish as a primary animal protein source (FAO, 2000). Fish has high-quality protein and low fat. Animals kept in aquariums that include fish species, mollusks such as snails, clams, invertebrates for example corals live rocks etc. are called ornamental fish (Livengood & Chapman, 2009). The most popular ornamental fish species. Goldfish is a freshwater ornamental fish in family Cyprinidae of order Cypriniformes. It is the most common fish kept in aquarium. Disease is a result of the complex interaction between the host, the pathogen and the environment (Snieszko, 1974). Ornamental fishes have extensive connection with different pathogenic and nonpathogenic environment (Snieszko, 1974)



microorganism resulting a huge economic loss (Aly *et al.*, 2008). But among all the factors parasites are most impactful issue with major sign of disruption in weight loss, reproduction capacity, blindness, abnormal behavior, epithelial lesions, deformation of gills that result in economic loss in aquaculture industry (Jaberi *et al.*, 2016).

There are several kinds of fish diseases including.

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**Viral Diseases, Bacterial Diseases, Fungal Diseases
Parasitic Diseases**

The occurrence of parasites on ornamental fishes and their transport to other countries has been reported worldwide; in Germany (Moravec et al., 1994), Australia (Evans & Lester, 2001), Korea (Kim et al., 2002), Sri Lanka (Thilakaratne et al., 2003), Norway (Levsen et al., 2003), in Brazil (Pizza et al., 2005; Tavares-Dias et al., 2010) and Pakistan (Iqbal et al., 2014). Parasites on freshwater fishes are primarily protozoans, myxozoans, helminthes and crustacean. Several species of parasites affect marine and freshwater species of fish. These agents include protozoa (microscopic one-celled organisms), trematodes (flukes/monogenean/digenean parasites), cestodes (tapeworms), nematodes (roundworms), acanthocephalans (thorny-headed worms), and crustaceans (a large class of creatures with hard outer shells, such as lobster, crab, shrimp, woodlice, water fleas, barnacles, etc.). A number of those parasites that affect are the following.

- A) Argulosis
- B) Lerneacyprinacea
- C) Ichthyophthiriiasis:
- D) Trichodiniasis
- F) Costia
- G) Centrocestiasis:
- H) Acanthocephalan infection:
- I) Helminthiasis:
- J) Gyrodactylosis:
- K) Dactylogyrosis:

2. MATERIALS AND METHODS

The present study was conducted in the zoological lab department of zoology, university of Punjab. Fifty imported ornamental fish goldfish (n=40) were bought from three different ornamental fish shops located in Lahore (Pakistan). Morphometric measurements such as body depth (B. D), total length (T. L), Standard length (S. L), focal length (F. L) and body weight (B.W) of experimental fish specimens were calculated. Sterilized magnifying glass was used to scan their body thoroughly to identify any abnormalities or infection. Gills, fins and skin seemed to be infested by parasites. Wet mount was prepared to determine infection level organs and pathological observations were recorded. Each body part of

ornamental fish was observed carefully with magnifying glass Dorsal fin, caudal fin, anal fin, pectoral fin, pelvic fin, gills scales, skin mucus and eyes from each fish were examined. By examining lesions, wounds or any other clinical symptom, parasitic infection was carefully calculated. Parasites that can be observed with naked eye such as Argulus species were recorded and their position on mount and number was noted. Skin mucus was taken to make smear for observation under light microscope. Fins were removed from the body and placed on slides to examine any parasitic infection under a light microscope. Gill flaps from both sides of fish samples were separated and placed on glass slides to observe presence of pathological infection. At different magnifications (4X, 10X, 40X), Photographs of parasitic infection were captured using digital camera. (Hossain et al., 2007) protocol was followed for histopathological study of gills. Statistical analysis was followed by (Margolis et al. 1982). Mean intensity is calculated by formula.

Number of parasites counted ÷ Total number of fish host infected.

Abundance of parasites is calculated by the following.
Number of parasites counted ÷ Total number of fish host examined.

3. RESULTS AND DISCUSSION

The study was conducted to parasitic evaluation for parasites in goldfish and rainbow sharks. Fifty fish samples goldfish (n= 40) were examined. Different parasites were recorded in goldfish such as *Dactylogyrus* sp, *Centrocestus formosans*, and unidentified metacercaria, *Gyrodactylus*, *ichthyobodo necatrix* and tetrahymena. In 38 fishes out of forty in goldfish. A total of 7,407 parasites were recorded. Most of the parasites were at the tips and middle part of the gills. Infection level having prevalence in goldfish was *Centrocestus formosans* 87.5%, dactylogyrous sp. was 95%, gyrodactylus was 01%, *ichthyobodo necatrix* also called costia was 05%, tetrahymena 2.5%,

Experiments were conducted in June 2018 to August 2018. And prevalence of parasites was compared with (Annahita 2017) that primarily focus on prevalence of *Centrocestus formosans*. Parasites in host fish population is set made of parasite species in that

environment. (Marcogliese, 2016) and influenced by climate, external factors, larval stages, food structure and the presence of it in the environment.

4. CONCLUSION

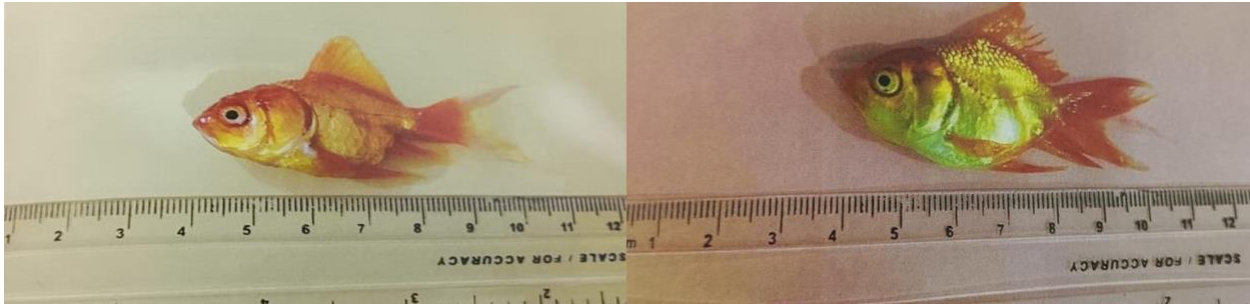
The study shows high parasitic diversity in goldfish. And due to this fish mortality increases. There should be strict check for importation of infected fish into Pakistan. Otherwise, infected exotic fishes may cause infection to native species.

5. CONFLICT OF INTEREST

All authors have declared that there is no conflict of interests regarding the publication of this article.

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(A)

(B)

(A) Goldfish, *Carassius auratus* with healthy fins (B) Goldfish, *Carassius auratus* with eroded fins.



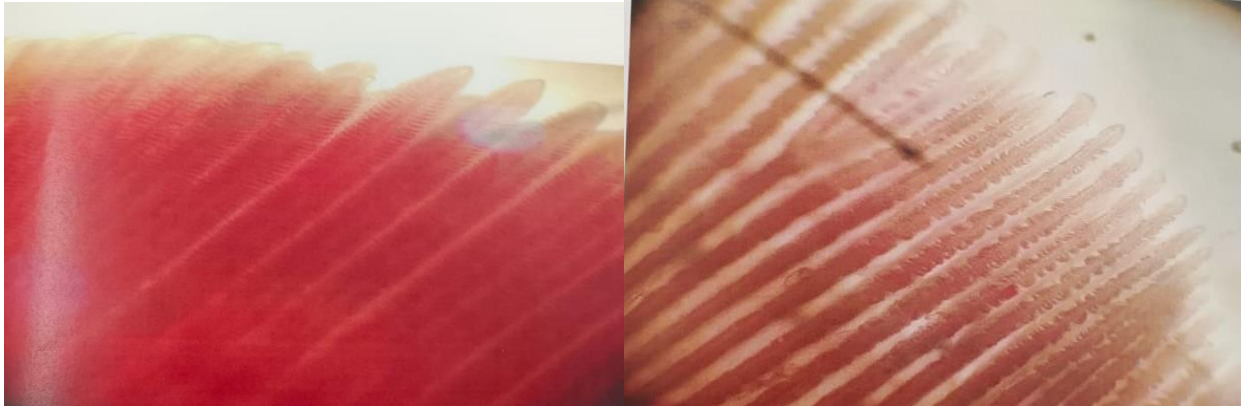
(A)

(B)



(A)

(B)



(A)

(B)

Table 4.3. Parasitic fauna observed in goldfish, *Carassius auratus*.

Parasites	No. of fish examined	No. of fish infected	No. of Parasites	Prevalence (%)	Abundance	Mean intensity	Location
<i>Centrocestus formosans</i>	40	35	3102	87.5	77.55	88.62	Gills
<i>Dactylogyrus sp.</i>	40	38	4305	95	107.6	113.2	Gills
<i>unidentified metacercariae</i>	40	02	02	05	0.05	01	Gills
<i>Gyrodactylus sp.</i>	40	04	05	01	0.125	1.25	Fins
<i>ichthyobodo necatrix</i>	40	02	04	05	0.1	02	Gills
<i>tetrahymena</i>	40	01	03	2.5	0.075	03	Gills
<i>Argulus</i>	40	02	02	05	0.05	01	Skin