

EFFECT ON MARKETABILITY OF ORNAMENTAL FISHES DUE TO PARASITIC INFECTION

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ABSTRACT

Present study was carried out to reveal the prevalent and unforeseen parasitic infection in commercially available ornamental fishes which may credit to their marketable value. Seven different species of ornamental fishes namely *Carassius auratus* (Gold Fish and Black Moor Gold), *Cyprinus carpio* (Koi Carp), *Poecilia reticulata* (Guppy), *Rasbora daniconius* (Slender Rasbora), *Puntius conchonicus* (Rosy Barbs), *Trichogaster lasius* (Brass gold) were screened for the occurrence of infection. *Cyprinus carpio* showed maximum infection caused by *Argulus* (Crustacean: Branchiuran) intensity=8-12 per fish. *Argulus* was observed as a primary infection which was followed by bacterial infection (dropsy) as secondary infection. While minimum infection was caused by *Lernaea* in *Carassius auratus* (intensity=1 per fish).

Keywords – *Argulus*, ornamental fishes, parasitic, *Lernaea*

INTRODUCTION

Ornamental fish culture has rapidly developed in different countries. Parasitic infestation is the most important disease affecting ornamental fish and it causes economical losses for this growing industry in intensive culture systems. Fish may be infected by the parasites as final or intermediate hosts in a parasitic life cycle (Hoffman 1999; Smith and Roberts 2010). Fish parasites and their effects have become increasingly visible during the latest decades in connection with the development of freshwater ornamental Fish industries throughout the world. Diseases caused by parasites are widespread and cause loses of fish in intensively stocked pond and aquarium. Ectoparasites of freshwater ornamental fish come in all sizes and shapes and include single-celled protozoan, and

multicellular trematodes (flatworms), crustaceans and arthropods (Roberts 2010).

The genus *Argulus* (Crustacea: Branchiura), or fish louse, are common parasites of freshwater fish (Bauer, 1991, Yildiz and Kumantas, 2002). According to Eissa (2002) and Eissa and Mohamed (2004) *Argulus* contributes most common disease Argulosis (a crustacean diseases) affecting ornamental fishes which is specifically common in goldfish and koi (Noga, 2010). Thus, present study was conducted to investigate the prevalence of parasitic infection or diseases among ornamental fishes, which may credit to their marketable value.

MATERIAL AND METHODS

Collection of Sample:

Fish samples were collected from different aquarium shops of Bhopal Region. The fishes were examined in live condition and the diseased fishes were sorted out and brought to the laboratory for further examinations.

Laboratory Examination of infected fish samples:

The fish which showed the symptoms of the parasites on the body surface, (when present) were taken out with the help of saline water (0.75%) and forceps kept in slide. Parasite was kept in 0.75% saline covered with cover slip and examined under microscope. Mucus was scraped from the skin and gills with a cover glass and fresh smears were prepared on slides in a drop of

water under a cover slip and then examined for protozoan parasites. While macro-parasites were visible to naked eyes and were collected by using fine brush, washed for several times in normal saline solution. The collected crustaceans were counted, fixed in 70% alcohol, preserved in alcohol glycerol (4:1) for permanent mounts, cleaned and mounted. The parasites were identified microscopically using dissecting microscope as described by Woo (1995).

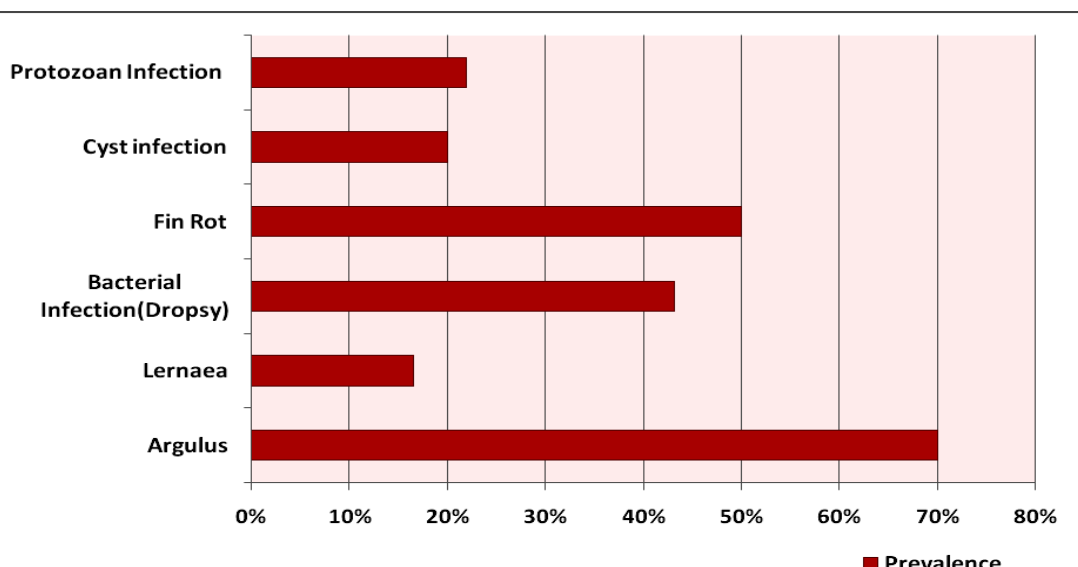
RESULTS

During the present study seven different variety of ornamental host fishes were collected *Carassius auratus* (Gold Fish), *Carassius*

Table .1 Showing a List of Parasites collected from different ornamental species

S.No.	Ornamental Fish Species	Parasites collected
Family : Cyprinidae		
1	<i>Carassius auratus</i> (Gold Fish) (N=6)	<i>Lernaea</i> and Protozoan infection
2	<i>Carassius auratus</i> (Black Moor Gold) (N=5)	Fin and Gill rot and Protozoan infection
3	<i>Cyprinus carpio</i> (Koi Carp) (N=5)	<i>Argulus</i> and Dropsy
4	<i>Puntius conchonicus</i> (Rosy Barbs) (N=5)	Skin and fin rot infection
5	<i>Rasbora daniconius</i> (Slender Rasbora) (N=5)	Skin and fin rot infection
Family: Poeciliidae		
6	<i>Poecilia reticulata</i> (Guppy) (N=5)	Skin and fin rot infection
Family: Osphrenemidae		
7	<i>Trichogaster lasius</i> (Brass gold) (N=5)	Skin and fin rot infection; Protozoan infection

Fig. 1 Showing Prevalence of different parasite infestation



auratus (Black Moor Gold), *Cyprinus carpio* (Koi Carp), *Poecilia reticulata* (Guppy), *Rasbora daniconius* (Slender Rasbora), *Puntius conchonicus* (Rosy Barbs), *Trichogaster lasius* (Brass gold). Following symptoms were observed in infected fishes observed under present study - Scraping and scratching of against objects, Excessive mucus secretion, discoloration and pale coloration of fins and scales, frayed fins, cloudy eyes, black and white spots on external skin of fish. List of Parasites collected from different ornamental species were represented in Table-1

Fig. 2 Showing Argulus specimen collected from *Cyprinus carpio*



Fig 3 Photograph showing *Lernaea* (Arrow) attached to external surface of *Carassius auratus*



Cyprinus caripo showed maximum *Argulus* infestation (P [%] = 70%; intensity=8-12 per fish). It was observed to have multiple infection

primarily by *Argulus* and secondary infection by bacteria results in dropsy condition. While minimum infection (P [%] = 16.6%; intensity=1 per fish) by *Lernaea* in *Carassius auratus* (Fig.1).

Fig. 4 Photograph showing *Lernaea*



Fig.5 Microphotograph showing enlarged anterior end of *Lernaea*

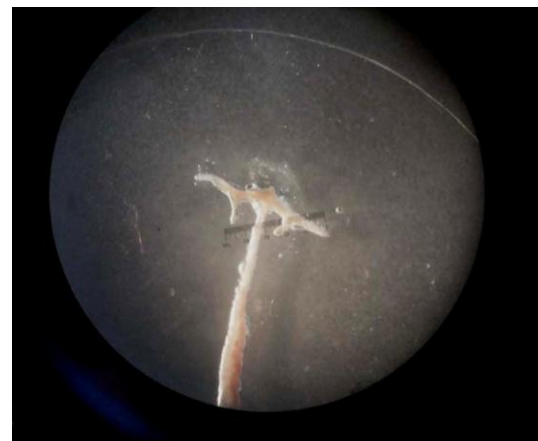


Fig. 6 Photograph showing the bacterial infection (Dropsy) in *Cyprinus carpio*



Fig.7 Photograph showing the bacterial infection (Dropsy) along with *Argulus* attached to external surface (Arrow) in *Cyprinus carpio*



DISCUSSION

During present investigation, one protozoan, two crustaceans and bacterial infections were commonly observed among seven ornamental fishes. Out of which Argulosis is the most dominating parasitic disease.

Protozoans are the most common ectoparasites encountered in ornamental fish. Although some authors viz. Krier and Baker (1987), Durborow *et al.* (1998), Scholz (1999), consider them harmless, many serious fish losses are caused by protozoan ectoparasites. Protozoans are microscopic and mainly infect the gills, fins, and skin of fish.

The occurrence of parasites in ornamental fishes has been documented by Koyuncu and Cengizler (2002), Koyuncu (2009), Kayis *et al.* (2009). These studies include many protozoan and metazoan parasites and also their host fish such as *Ichthyobodo* sp., *Ichthyophthirius multifiliis*, *Chilodonella* sp., *Trichodina* spp., *Dactylogyrus extensus*, *Gyrodactylus bullatarudis*, *Lernaea cyprinacea*, *Argulus foliaceus*, *Argulus japonicus* and *Capillaria* sp. from gold fish, guppy and cichlids by Koyuncu (2009), *Ambiphyra* spp. from guppy by Kayis *et al.* (2009) and *Oodinium pillularis* from *Poeciliidae* by Koyuncu and Cengizler (2002).

Bacteria are one of an important causative agent of fish diseases in both wild and cultured fish and are responsible for serious economic losses. Many pathogenic species of bacteria can present on skin infections especially flexibacteria, aeromonads and vibrios. Fishes infection characterized by ulcer, hemorrhage, scale loss, tail and fin rot and dropsy includes several bacterial diseases (Chowdhury, 1997). Most reported dinoflagellate (Protozoan) parasites were from aquarium fish (Lom and Schubert, 1983). Many tropical fish species, such as cyprinids, are susceptible *Oodinium pillularis* from *Cyprinus carpio* and *Poecilia* spp. (Saglam, 1992; Koyuncu and Cengizler, 2002) have been reported in Turkey. While, during present study tail and fin rot and while spots were observed in *Poecilia reticulata* (Guppy), *Rasbora daniconius* (Slender Rasbora), *Puntius conchonicus* (Rosy Barbs).

Although *Vorticella* sp. are free-living ciliophorans, attacking the surface of fish skin and gills (Lom and Dykova, 1992). During present study *Vorticella* sp. were collected from *Carassius auratus* (Gold Fish), *Carassius auratus* (Black Moor Gold), *Trichogaster lasius* (Brass gold). *Argulus* sp. is reported from different fish species worldwide by Yildiz and Kumantas (2002), Buchmann and Bresciani (1997), Geldiay and Balik (1974), Molnar and Szekely (1998), Sariyyupoglu (1991), Toksen (2006). According to Eissa (2002), Noga (2010), Mousavi *et al.* (2011) *Argulus* also causes mechanically transmit fungal, bacterial or viral pathogens and acts as intermediate hosts for several fish parasitic nematodes.

Notash (2013) studied the prevalence of *Argulus* in Goldfishes (*Carassius auratus*) of east Azerbaijan province of Iran. Eissa and Mohamed (2004) and Mousavi *et al.* (2011) reported that the prevalence of infestation of argulosis in *C. auratus* were 27.5%, 26.09% with intensity of 2-7 and 2, respectively. In contract during present study, *Cyprinus carpio* are more susceptible to the infestation with *Argulus* (70%) with intensity of intensity=8-12 per fish. Abd *et al.* (2013) also revealed the prevalence of *Argulus* in *Carassius auratus* and *Cyprinus carpio* were 31.33% and

28% respectively, however, the intensity of infestation reached 2-8 and 1-5 in both species respectively.

Vimalraj *et al.* (2012) collected *Lernaea Cyprinacea* (Anchor Worm) Infestation in Gold Fishes. During present investigation *Lernaea* is collected from *Carassius auratus* (Gold Fish) and showed minimum infection (P = 16.6%; intensity=1 per fish).

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