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Prevalence of *Argulus* in Common Carp (*Cyprinus carpio*) From D.I. Khan (Khyber Pakhtunkhwa) Pakistan

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Abstract

One hundred and fifty common carp (*Cyprinus carpio*) from district D.I. Khan Khyber Pakhtunkhwa were examined for ectoparasites. The *Argulus* ectoparasites found were *A. foliaceus*, *A. japonicus*, and *A. coregoni*. Out of 150 fish 17 (11.33%) were infested with ecto parasites. The predominant parasite was *A. foliaceus* (10%) followed by *A. japonicus* (8.66%). *A. coregoni* (6.66%) *A. foliaceus* is the most abundant ectoparasite in overall study.

Keywords: Freshwater fishes, fish *Argulus*, ecto parasite, *Cyprinus carpio*

1. Introduction

External parasites are the most common parasites encountered in aquatic animals raised in both ponds and aquaria. The major groups of parasites include protozoans, monogenes and crustaceans [1]. Among these, *Argulus* species (Family: Argulidae), more commonly known as fish lice, are members of a large group of branchiura parasites that infest and cause disease in fish. The argulids are crustaceans and are related to crabs, lobsters, and shrimp. There are approximately 100, different species of *Argulus* distributed worldwide that, depending upon species, can infest freshwater and saltwater fishes [2]. Infections with these are most common in wild and pond-raised freshwater fish, particularly goldfish, koi, and other cyprinids (carps and minnows); centrarchids (sunfishes) and salmonids (salmon and trout). *Argulus* are obligate parasites and must therefore be able to locate and attach to a host in order to survive. To locate a host, *Argulus* must have good host finding mechanisms, but the chance of finding a host can be further increased by having a wide range of host species suggests that some African species of *Argulus* are more selective than others, but this may be due to a lack of other suitable hosts in their habitat [3]. In general *Argulus* appear to have a wide host tolerance and have been recorded on most species of fish found in the UK [4]. *A. foliaceus* has also been found in frogs and toads [5]. *Argulus* which parasitize fish are the most commonly known pathogenic parasites of fresh water fish in many Asian countries including Pakistan. Their injurious effects on the host are believed to be direct or indirect as their infestation causes formation of lesions and inflammation at the site of attachment which often leads to secondary infections by bacteria. Parasitic infection not only effects the normal growth of fish but also reduce fish population by increasing mortalities. Ecto-parasites attaches to gills and skin resulting in localized hyperplasia disturb osmoregulation and ultimately kill the host [6]. The incidence and intensity of parasite also varied with season [7]. Young fishes are more prone to infection than old ones [8]. For cultured fish population, the parasites are reported as to involve in the serious outbreak of disease. The crowded culture conditions, temperature and slow water flow increases the parasites multiplication and infestation [9]. The present study aims to investigate the prevalence and variance of infection of *Argulus* ectoparasites in *Cyprinus carpio* from district D.I. Khan Khyber Pakhtunkhwa, Pakistan.

2. Materials and Methods

One hundred and fifty fish were collected monthly between May, 2014 and October 2014 from district D.I. Khan Khyber Pakhtunkhwa. They were kept alive in a water container identified with the description given by Hopla, Durden, and Keirans, (1994) [10]. The ectoparasites were picked up from the gills, scales and fins with the help of fine forceps and transferred to 5%

formalin. Permanent mounts of ectoparasites were prepared cable (1985) ^[11], examined and identified under the microscope Mirza and Shafir (1996) ^[12].

3. Results and Discussion

A total of 150, common carp (*Cyprinus carpio*) were examined in order to study the prevalence of *Argulus* ectoparasites. A sum of 3, different spp, *A. foliaceus* (10 %) *A. japonicas* (8.66%) *A. coregoni* (6.66%) were identified collectively, *A. foliaceus* is the most abundant ectoparasite in all as well were found. Most of the fish species were only infected by a single *Argulus* species. However, some host species acquired up to 5, *Argulus* species. The different species of the genus *Argulus* have also been reported from different parts of the world. For example two of the species of *Argulus* found in Britain can be regarded as native; these are *A. foliaceus* and *A. coregoni*. *A. foliaceus* is a widely recorded species found largely in mesotrophic and eutrophic lakes Pasternak (2000) ^[13], also notes that *A. foliaceus* can reach epizootic proportions in brackish waters, *A. coregoni* is mostly recorded from rivers, streams and cool oligotrophic lakes with a large flow and Rushton-Mellor (1992) ^[14], Campbell (1971) ^[15], Okland (1985) ^[16], although mixed populations of *A. foliaceus* and *A. coregoni* have been noted in Finland Mikeev (2000) ^[17]. *A. foliaceus* and *A. coregoni* are both widely distributed and frequently recorded in England and Wales. Both species are recorded from Scotland but less commonly than in England and Wales, possibly due to the harsher climate or fewer studies Rushton Mellor (1992) ^[18], described *A. japonicus* as being restricted to south of the

central, Highlands and Campbell (1971) ^[19]. Reviewed water bodies in Scotland where *Argulus* has been found. More recent work by Northcott (1997) ^[20], Described the occurrence of several epizootics of lice in Scotland. *Argulus* infestations are not uncommon in wild or freshwater fish. Because infections can rapidly escalate, causing disease and mortalities, management and treatment are recommended as soon as *Argulus* is identified. While several effective treatments are possible, availability, legalities, logistics and fish species' sensitivities should be considered. The best way to avoid an *Argulus* infestation is through good biosecurity, including screening and quarantine of incoming fish, and continuous observation of all fish. The difference in currently results may be due to climatic variation between the different localities and also due to different host examined.

4. Conclusion

All of the fishes (n=17) examined were suffered from *Argulus* infestation. The predominant parasite were *A. foliaceus* (10%) followed by *A. japonicus*, (8.66%) and *A. coregoni* (6.66%). Furthermore, the results suggest that *Argulus* infestations tend to peak in the summer. The lice can be found attached to the skin, gill chamber, and mouth. Localized inflammation occurs at the contact site because of mechanical damage from hooks and spines on the stylet and appendages, and irritation from digestive enzymes. The present study will help in the effective timely management and treatment of the condition. However, further studies based on molecular and phylogenetic techniques are recommended.

Table 1: The overall prevalence of *Argulus* ectoparasites of *Cyprinus carpio* from district D.I. Khan Khyber Pakhtunkhwa Pakistan

Parasites	No of fish examined	Infested	Prevalence (%)
<i>A. foliaceus</i>	150	15	10
<i>A. japonicus</i>	150	13	8.66
<i>A. coregoni</i>	150	10	6.66

Table 2: Month wise rates of *Argulus* ectoparasites from district D.I. Khan Khyber Pakhtunkhwa Pakistan

Months	<i>A. foliaceus</i> (%)	<i>A. japonicas</i> (%)	<i>A. coregoni</i> (%)
May	1 (50)	1 (50)	0(0)
June	2 (75)	1 (25)	0(0)
July	2 (40)	2 (40)	1 (20)
August	5 (45.45)	4 (36.36)	2(18.18)
September	3 (33.33)	3 (33.33)	3(33.33)
October	2 (25)	2 (25)	4(50)

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