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Prevalence of *Argulus* sp. in mrigal fish (*Cirrhinus mrigala*) from the bheries of West Bengal, India

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Abstract

Fishes from the bheries of West Bengal are generally not affected by severe diseases but still some common parasitic diseases may occur time to time. The present study has been carried out to investigate the Mrigal fish for the prevalence of *Argulus* sp. A total of two hundred adult Mrigal fish (*Cirrhinus mrigala*) from the different bheries of West Bengal were randomly sampled and examined for ectoparasites. *A. foliaceus*, and *A. japonicus* were the species of *Argulus* which found in all the cases. Out of 200 examined fish 32 (16%) were infested with ectoparasites. *A. foliaceus* (12%) parasite was found predominant in the study followed by *A. japonicus* (9.50%). Most of the infested fishes indicate the prevalence of *A. foliaceus*.

Keywords: *Argulus*, Freshwater fishes, ectoparasites, *Cirrhinus mrigala*

1. Introduction

Argulus species more commonly known as fish lice are crustacean ectoparasite and members of large group of brachiuran parasites that infest and cause disease in fish. Argulosis is one of the economically important parasitic diseases causing heavy mortality in Indian major carps [1]. Although *Argulus* fish lice are widely distributed and able to parasitize and thrive off a wide range of host species, Argulosis have rarely been found to have severe effects on naturally occurring fish populations [2, 3]. It is responsible for epizootic outbreaks which lead to the collapse of aquaculture operations [4]. There are approximately 100, different species of *Argulus* distributed worldwide that, depending upon species, can infest fresh water and salt water fishes [5]. Fresh water fishes like Koi, goldfish and other cyprinids are mostly affected by the *Argulus* infection either in wild or cultured pond condition. There are reports of *Argulus* infection in sunfishes, salmons and trouts. In general *Argulus* appear to have a wide host tolerance and have been recorded on most species of fish found in the UK [6]. *A. foliaceus* has also been previously reported in frogs and toads [7]. As *Argulus* species are obligate parasite they need a host to attach for their survival and for this attachment they need to locate a host. 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 [8]. Parasite attaches to the host with the help of their suction cups, pierce the skin with stylet and get the nutrition from the host, generally fish. Location of attachment area gets injured and formed lesions and inflammation on the skin invites the secondary infection by bacteria. Ecto-parasites attaches to skin and gills resulting in localized hyperplasia which disturbs the osmo regulation process of the host and ultimately neutralizes the host [9]. Parasitic infection reduces the growth of the fish and thus leads to the reduced fish production. The incidence and intensity of parasite also varied with season [10]. Younger fishes are more likely to be infected than old ones [11]. The crowded culture conditions, temperature and slow water flow increases the parasites multiplication and infestation [12]. The present study addresses the lack of knowledge regarding prevalence and the degree of infection of *Argulus* ectoparasites in Mrigal fish (*Cirrhinus mrigala*) from the bheries of West Bengal, India.

2. Materials and Methods

Two hundred samples of adult Mrigal fish (*Cirrhinus mrigala*) were collected randomly from the different bheries of West Bengal during the month of November, 2018 to March, 2019.

Hosts were kept alive in a water container as described by Hopla, Durden, and Keirans, (1994) [5]. The ectoparasites were collected manually from the gills, skins and fins with the help of fine forceps and preserved in 70% ethanol or 5% formalin for morphological identification [13]. The fishes were dissected and examined under stereomicroscope. Permanent mounts of ectoparasites were prepared for further morphological identification [14].

3. Results and Discussion

In the present study a total of 200 samples comprising adult Mrigal Fish (*Cirrhinus mrigala*) were obtained randomly from the different bheries of West Bengal to quantify the prevalence of *Argulus* ectoparasite. The examined specimens of *Argulus* were identified as *A. foliaceus* (12%) and *A. japonicus* (9.50%) [Table 1]. Out of these two *A. foliaceus* was found most abundant in all the cases. The *Argulus* species found were attached mostly on the skin & fins followed by gills. These two identified *Argulus* species along with *A. coregoni* have previously been reported in Common Carp fish in Pakistan [15]. Morphologically the two species *A. foliaceus* and *A. japonicus* are very similar [16, 17], and it may be impossible to determine the species of certain specimens [17]. These two species were also previously recorded from Scotland but less commonly than in England and Wales, reason may be due to the unfavourable weather condition or fewer studies [18], further they described *A. japonicus* as being restricted to south of the central Highlands. *A. coregoni* was not found in any of the sample examined in the current study. *A. coregoni* is mostly recorded from rivers, streams and cool oligo trophic lakes with a large flow [18, 19, 20], although mixed

populations of *A. foliaceus* and *A. Coregoni* have been noted in Finland [21]. Most of the host fish are infected with multiple *Argulus* species but some are infected with single *Argulus* species. Carp infections with *A. japonicus* have been described in several studies [22, 16, 23]. *A. japonicus* was also reported to be found in common carp fish samples and *A. foliaceus* in Samples from Pike-perch and Brook trout in Slovakia [24]. During the review of water bodies in Scotland several *Argulus* species were found [19]. Inflammation scars were found on the attachment sites made due to mechanical injury by stylet of *Argulus* species. Results of the current study clearly suggested that the prevalence of *Argulus* species in Mrigal fishes is increases with the increase in atmospheric temperature more precisely incidence of occurrence of *Argulus* species in Mrigal fish was found more in summer season than in winter [Table 2]. Similar results were recorded in Pakistan where prevalence of *Argulus* species in Common Carp was more in summer season [15]. *Argulus* infection in fishes can be intensified very rapidly and can cause mass mortality leads to serious damage to the standing biomass. So it is important to take necessary actions for its control, like use of effective chemotherapeutics as soon as the infestation is detected or recognized. To avoid the *Argulus* infestation many preventive measures are recommended like good biosecurity comprising quarantine and screening of incoming fishes, disinfection of nets after every use in bleaching powder, use of good quality water i.e., free from any argulid eggs and close observation of all the fishes. The present study will help in the effective timely management and treatment of the condition

Table 1: The overall prevalence of *Argulus* ectoparasites of *Cirrhinus mrigala* from West Bengal, India

S. No	Parasites	No of fish examined	Infested	Prevalence (%)
1.	<i>A. foliaceus</i>	200	24	12
2.	<i>A. japonicus</i>	200	19	9.5

Table 2: Month-wise prevalence rate of *Argulus* ectoparasites of *Cirrhinus mrigala* from West Bengal, India

S. No.	Months	<i>A. foliaceus</i> (%)	<i>A. japonicus</i> (%)
1.	November	3(12.5)	1(5.27)
2.	December	5(20.84)	0(0)
3.	January	2(8.4)	3(15.79)
4.	February	6(25)	6(31.58)
5.	March	8(33.34)	9(47.37)

4. Conclusion

Argulus infection in fishes can be intensified very rapidly and can cause mass mortality leads to serious damage to the standing biomass. So it is important to take necessary actions for its control, like use of effective chemotherapeutics as soon as the infestation is detected or recognized. To avoid the *Argulus* infestation many preventive measures are recommended like good biosecurity comprising quarantine and screening of incoming fishes, disinfection of nets after every use in bleaching powder, use of good quality water i.e., free from any argulid eggs and close observation of all the fishes. The present study will help in the effective timely management and treatment of the condition.

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6. References

1. Rahman AKA. A note on *Argulus* species which caused mortality in carps in the experimental cistern of the Freshwater research Station, Chandpur, East Pakistan. Pakistan J SciIndust Res. 1968; 11:115-118.
2. Kern GC the Common fish louse - *Argulus*. In Leeches, Lice and Lampreys: A Natural History of Skin and Gill Parasites of Fishes. Dordrecht, the Netherlands, Springer. 2007; 237-264.
3. Taylor NGH, Sommerville C, Wootten RA. Review of *Argulus* sp. occurring in UK freshwaters. Bristol, UK, Environment Agency, 2005, 30.
4. NEW-Walker PD. *et al.* The off host survival and viability of a native and non-native fish louse (*Argulus*, Crustacea: Branchiura). Current Zoology. 2011; 57(6):828-835.
5. Hopla CE, Durden LA, Keirans JE. Ectoparasites. Classification Rev. Sci. tech. off. int. Epiz. 1994; 13(4):985-1017.

6. Kabata Z. Diseases of Fishes, Book 1: Crustacea as Enemies of Fishes. T.F.H. publications, Jersey City, New Jersey, U.S.A, 1970.
7. Pasternak AF, Mikheev VN, Valtonen ET. Life history characteristics of *Argulus foliaceus* L. (Crustacea: Branchiura) populations in Central Finland. *Annales Zoologici Fennici*. 2000; 37:25-35.
8. Fryer G. A report on parasite copepoda and brachiura of the fishes of Lake Nyasa. *Proc. Zool. Soc. London*. 1956; 127:293-344.
9. Piasecki W, Andrew EG, Jorge CE, Barbara FN. Importance of copepod in fresh water aquaculture. *Zoological Studies*. 2004; 43(2):193-205.
10. Bichi AH, Bawaki SSA. survey of ectoparasites on the gill, skin, and fins of *Oreochromis niloticus* at Bagauda Fish Farm, Kano, Nigeria, Bayero. *Journal of Pure and Applied Science*. 2010; 3(1):83.
11. Ozturk MO. An investigation on metazoan parasites of common carp (*Cyprinus carpio*) in Lake Eber. *Turkiye Parazit Derg*. 2005; 29(3):204-210.
12. Kayis S, Ozceplep T, Capkin E, Altinok I. Protozoan and metazoan parasites of cultured fish in Turkey and their applied treatments. *The Israel Journal of Aquaculture-Bamidgeh*. 2009; 61:93-102.
13. Thomas MM, Devraj M. Two new species of *Argulus muller* (Crustacean: Branchiura) from river Cauvery with a key to Indian species. *Indian Journal of Fisheries*. 1975; 22:215-220
14. Cable RM. An illustrated laboratory manual of parasitology. Surjeet publication Delhi, 1985, 255.
15. Khan S, Ali W, Javid M, Ullah I, Hussain G, Shahnaz Z *et al.*, Prevalence of *Argulus* in Common Carp (*Cyprinus carpio*) From D.I. Khan (Khyber Pakhtunkhwa) Pakistan, *Journal of Entomology and Zoology Studies*. 2017; 5(1):203-205
16. Rushton-Mellor SK, Boxshall GA. The development sequence of *Argulus foliaceus* (Crustacea: Branchiura). *Journal of Natural History*. 1994; 28:763-785.
17. Soes DM, Walker PD, Kruijt DB. The Japanese fish louse *Argulus japonicus* new for Theetherlands. *Lauterbornia*. 2010; 70:11-17.
18. Rushton-Mellor SK. Discovery of the fish louse, *Argulus japonicas* Thiele (Crustacea: Branchiura), in Britain *Aquaculture & Fisheries Management*. 1992; 23:269-271.
19. Campbell AD. The occurrence of *Argulus* (Crustacea: Branchiura) in Scotland. *Journal of Fish Biology*. 1971; 3:145-146.
20. Okland KA. Fish lice *Argulus* - morphology, biology and records from Norway. *Fauna Blindern*. 1985; 38:53-59.
21. Mikheev VN, Mikheev AV, Pasternak AF, Valtonen ET. Light-mediated host searching strategies in a fish ectoparasite, *Argulus foliaceus* L. (Crustacea: Branchiura). *Parasitology*. 2000; 120:409-416.
22. Rahman M. Effects of a freshwater fish parasite, *Argulus foliaceus* Linn. infection on common carp, *Cyprinus carpio* Linn. *Bangladesh Journal of Zoology*. 1996; 24:57-63.
23. Walker PD, Russon IJ, Haond Ch, Bonga SEW. Feeding in adult *Argulus Japonicus* Thiele, 1900 (maxillopoda, Branchiura), an ectoparasite on fish. *Crustaceana*. 2011; 84:307-318.
24. Aalberg K, Koscova L, Smiga L, Kosuth P, Kosco J, Oros M, Barcak D, Lazar PA study of fish lice (*Argulus* sp.) infection in freshwater food fish. *Folia Veterinaria*. 2016; 60 (3):54-59.