Research Article

Study of various ectoparasites from *Sperata sarwari* (singharee) obtained from various areas of Lahore, Pakistan

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Abstract | Current study was conducted to check the prevalence of ectoparasites on Singhari fish (*Sperata sarwari*). Total 30 specimens of freshwater catfish, *Sperata sarwari* were collected from different areas of Lahore, Pakistan, during December 2019 to May 2020. Fish were examined for ectoparasites. Out of 30 fish, only 8 were diseased with *Lernaea*. The total prevalence of *Lernaea* was 26.66%. *Lernaea* had highest prevalence (37.5%) in 1000-1200g body weight fish group, while it was lowest (16.66%) in 100-300g body weight fish group. *Lernaea* showed highest prevalence (33.33%) in fish length group of 66-85cm, while the least prevalence (14.28%) existed in 25-45cm fish length group. It was also observed that *Lernaea* showed seasonal variations as its maximum prevalence was recorded during winter (33.33%) in January and minimum in spring and summer (20%) in March and (0%) April. The results indicated that *Singhari* fish with more weight and long length had more prevalence of infection as compared to less weight and shorter length fish. This could be due to access of greater area available to parasites for anchoring and hiding on the large sized fish.

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1. Introduction

Fishes are reflected as one of the substantial elements in aquatic ecosystem and have an important role in nation's economy (Okyere and Aggrey-Fynn, 2011) as they are a very stable part of food for many people around the world (Essetchi *et al*., 2003). Fish dwell in water. Their population in world is half of the total vertebrates. A total of 21,723 species of fish have been described so far, out of these, 8,411 species belong to freshwater category while 11,650 species belong to marine environment (Shinde *et al*., 2009).

Parasites cause physical, mental and reproductive harm to fish (Buchmann and Lindstorm, 2002; Knudsen *et al*., 2009). Knowledge about numerous fish parasites, mainly crustaceans and their communities in a particular set of fish population is essential. *Lernaea sp*., *Argulus sp*., *Dactylogyrus* and *Monogenae sp*. are common agents of parasitic infections in fish. It has been reported that fishery industry of Pakistan is facing lots of economic fatalities due to lernaeosis. Filthy water and food scarcity problems are becoming the cause of parasitic ailments (Chisholm *et al*., 2001).

Singhari fish is carnivorous in nature. It is a scavenger, feeding on dead animal remains. Singhari fish flesh is delicious and considered a delicacy due to fewer bones which is a desired consumer requirement (Saini *et al*., 2008; Rehman *et al*., 2011). Protein quality of this fish is very good and also has high nutritional significance. Flesh of Singhari contains 200 units of vitamin A per gram (Seth, 2001). The present study was designed to examine ectoparasites from Singharee fish and to assess the seasonal prevalence of ectoparasites infection in accordance with body weight and length of fish.

2. Materials and Methods

The current study was conducted in Lahore by collecting fish samples from different areas of Lahore. Examination of fish samples was done at the Department of Zoology, in Lahore College for Women University. The period of study was six months from December 2019 and continued until May, 2020. Total 30 samples of Singharee were collected. Two methods for finding ectoparasites were used during the study, direct examination of Ectoparasites and examination of ectoparasites by scraping method.

Direct examination of ectoparasites was done in order to observe the parasites with naked eye or with forceps. The procedure that was described by Tasawar *et al*. (2007) was followed. Briefly, fish were observed superficially close to eyes, gills, fins and tail area by means of magnifying glass. Lengths in (cm) were measured using a meter rule and a thread while the weight in (g) of each fish was measured using an electronic weighing balance. Forceps were used to separate the parasites from body of fish and were put in beakers having fixative (10% formalin). The collected parasites were then observed in Parasitology laboratory, Lahore College for Women University, Lahore.

Parasites were splashed away with water to get rid of fixative. For making the bodies of parasites visible and transparent, these were preserved in 10% potassium hydroxide. Then to remove this alkali (potassium hydroxide) parasites were sprinkled with water. After washing, parasites were dehydrated for 10 minutes using 30%, 50% and 70% alcohol. Staining was done for 5 minutes on parasites and dried again for 10 minutes in 90% and 100% alcohol. The ectoparasites were attached on Canada balsam and microscopically inspected.

Second method employed for the examination of ectoparasites was Scraping method. The procedure of scraping method was described by Ani *et al*. (2007). According to this procedure skin of fish was scrapped from head to tail by means of blunt scalpel blade. The scraping contained mucus along with epidermal cells which was collected in petri-dishes containing 3ml of 0.9% saline solution and agitated by using a mounted pin. Smears of scrapings were made on clean slides. Then these slides were observed under 40x magnification of a light microscope for parasitic existence and identification.

Formula given by Ekanem *et al*. (2011) for calculating prevalence of ectoparasites was followed.

$$\text{Prevalence (\%)} = \frac{\text{Number of diseased fish}}{\text{Total fish}} \times 100$$

3. Results

From 30 Singhari fish, 8 were infected with *Lernaea* and the overall prevalence was 26.66%. The present investigation revealed that prevalence to parasites was directly proportional to the weight and length of fish because of the greater surface area available for parasite attachment (Table 1).

The highest prevalence of *Lernaea* (37.5%) was in 1000-1200g fish weight group while it was lowest in 100-300g. Prevalence of

Lernaea was highest (33.33%) in 65-85cm long fish and lowest (14.28%) in smaller length 25-45cm fish (Table 1). During study period, it was also observed that *Lernaea* showed seasonal variations and it was maximum in winter (33.33%) in January and minimum in spring and summer (20%) in March and (0%) in April (Table 1).

Table 1: Prevalence of *Lernaea* ectoparasite according to fish body weight, fish body length and season

Sr.	Parameters		No. of samples observed	No. of fish infected	Prevalence (%)
1	Body weight of fish (g)	100-300g	06	01	16.66
2		400-600g	08	02	25
3		700-900g	08	02	25
4		1000-1200g	08	03	37.5
Total			30	08	26
Sr.					
1	Body length of fish (cm)	25-45cm	07	01	14.28
2		46-65cm	11	03	27.3
3		66-85cm	12	04	33.33
Total			30	08	26.66
Sr.					
1	Sampling seasons	December	07	02	28.5
2		January	09	03	33.3
3		February	07	02	28.5
4		March	05	01	20
5		April	02	00	0
Total			30	08	26.66

4. Discussion

Present study on Singharee (*Sperata sarwari*) was conducted in order to examine the prevalence of ectoparasites. The results revealed that from the sample of 30 fish, 8 were infected with *Lernaea* and the overall prevalence of infection was 26.66%. This percentage was close to the finding of Tassawar *et al*. (2009) who determined 17.59%, the overall prevalence of ectoparasites. Filthy contaminated water and food deficiency are causes for fish diseases (Cengizler *et al*., 2001; Chisholm *et al*., 2001). During several epizootics the financial losses due to lernaeosis have increased among world's main fish species (Kir, 2007). The mature *Lernaea* parasites are devastating to larger sized fish because of their wide body, mode of attaching and feeding. Eyes of fish are damaged by these parasites and become the source of blindness to fish. Fish gills also become retarded and lead to epithelial proliferation due to which gaseous exchange is damaged and bacterial infection also spreads. Heart and gut cavity can also be badly affected by these parasites and even lead to death of fish (Kabata, 2000; Shariff *et al*., 2004; Jalali and Barzegar, 2006).

In present study highest prevalence of *Lernaea* parasites was detected in weight group of 1000-1200g. Our results revealed

that Lernaea had highest prevalence (33.33%) in 65-85cm and lowest (14.28%) in 25-45cm length group of fish. It is obvious from this that number of parasites increase by the increase in length of fish. Several authors (John *et al*, 2000; Tasawar *et al*., 2001; Fernandes *et al*., 2006; Tasawar *et al*., 2007) have reported similar results. The absence of parasites on small sized fish was due to less surface area for parasitic attachment and settlement.

In this study extreme influx of parasites was detected in larger fish. A contradicting result was reported by a study conducted by Tasawar *et al*. (2009) on the occurrence of *Lernaea* in grass carp (*Ctenopharyngodon idella*). In the aforementioned study, a total of 597 fishes were inspected of which 105 were found to be infected with *Lernaea*. This study showed that parasites decreased in number with the increase in weight. This was due to the reason that fish attained immunity against such infectious parasites (Kir, 2007).

Our results revealed that *Lernaea* had highest prevalence in winter months i.e., December (28%) and January (33.33%) and lowest prevalence was in spring months i.e., March (20%) and April (0%). Our results are more consistent with Tasawar *et al*. (2001) who reported the occurrence of ectoparasites in Mori fish. According to this study, *Lernaea* expressed seasonal variation and it was found to be maximum in winter months viz; December (50%) and January (40%) and lowest in July (10%).

5. Conclusion

It was concluded from present study that the prevalence of ectroparasites on Singharee fish depended on their size and seasonal variation. Size is directly proportional to prevalence of ectoparasites on Singharee fish. It was also revealed from the study that large sized Singharee fishes were more vulnerable to ectoparasites in winter season.

Further studies on the prevalence of ectoparasites on Singharee should also be carried out in different regions of Pakistan. Overcrowding should be avoided in pond to maintain proper health of fish. Water quality should also be good and maintained continually. Sellers of fish should be well aware of all the health risks and diseased fish. Anti-parasitic drugs mixed in pond water like copper sulphate, ferrous sulphate, Iodine, Potassium permanganate can be used to eradicate the parasites from fish body.

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7. Author's Contribution

All authors contributed equally to the entire research work and article write-up.

8. Conflict of Interest

There was no conflict of interest among authors regarding the publication of this article.

9. Novelty Statement

Various studies have been done on the prevalence of ectoparasites in different fishes like major carps, cat fishes and some ornamental fishes also. Present study focused on the effect of ectoparasites on the body of Singharee fish *(Sperata sarwari*) and found the more prevalence of *Lernaea* parasite in larger size fishes as compared to smaller ones.

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