

## The Lernaeid Parasites of *Catla catla*

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**Abstract:** The present study was conducted at private fish farms in Southern Punjab to determine the prevalence of *Lernaea* species. A total of 317 *Catla catla* fish were collected by commercial net. Five species of the genus *Lernaea*; *L. cyprinacea*, *L. polymorpha*, *L. oryzophila* and *L. lophiara* and *Lernaea* spp., were recorded. The overall prevalence rates of *L. cyprinacea*, *L. polymorpha*, *L. oryzophila*, *L. lophiara* and *Lernaea* spp., were 32.17, 13.24, 3.15, 2.20 and 1.57% respectively. The relationship between body weight and lernaeid parasites of fish showed that *L. cyprinacea* had highest prevalence (38.86%) in weight group of 50-1000g, while lowest prevalence (0%) was recorded in weight group of >2900g. *L. polymorpha* had the highest prevalence (18.18%) in weight group of 1001-1950g, while the lowest prevalence (0%) was observed in >2900g weight group. *L. oryzophila* had the highest prevalence (16.66%) in weight group of 1951-2900g whereas, lowest prevalence (0%) was recorded in weight group of >2900g. *L. lophiara* and *Lernaea* spp., had the highest prevalence (9.09% and 6.49%) in weight group of 1001-1950g whereas, lowest prevalence (0%) was observed in all other fish weight groups. The relationship between body length and lernaeid spp. showed that *L. cyprinacea* had highest prevalence (44%) in length group of 9-12cm while lowest prevalence (11.11%) was recorded in >20cm length group. *L. polymorpha* had highest prevalence (25%) in length group of 13-16cm and lowest prevalence (0%) was observed in >20cm length group. *L. oryzophila* showed highest prevalence (8.88%) in length group of 17-20cm and lowest prevalence (0%) was observed in 9-12 and >20cm length group. *L. lophiara* and *Lernaea* spp., had highest prevalence (7.77%) and (5.55%) respectively in length group of 17-20cm whereas, lowest prevalence (0%) was recorded in all other length groups.

**Key words:** *Catla catla* • BodyWeight • BodyLength • Overall Prevalence • *Lernaea* Spp

### INTRODUCTION

Ectoparasites especially lernaeids have been considered the most harmful ectoparasites of cultured fishes. These are one of the most prevalent parasites of the freshwater fish as 110 species of these copepods have been classified in the family Lernaeidae [1]. The damage caused by *Lernaea* is very severe. Sometimes these parasites invade badly on major organs of the fish. Eiras [2] observed these parasites damaging the skin, eyes, gills, fins, mouth and tissues of the infected fish. The mature parasites are more harmful due to their size specially females of this family are more parasitic in nature [3] as they attack the body surface of the fish with its maxillae [1] and penetrate the internal tissue of the fish after eating its scales [4]. This way of attachment may be very pathogenic for the cultured fish [5, 6]. These

parasites not only cause wounds but may also cause a change in the structure and tissues of the fish [4]. The damaged tissue of the fish could be a cause of secondary microbial infection further. *Lernaea* spp. infested fish so severely that it also causes rotting of fins at the site of attachment. It also ceases the feeding and reproductive activities (spawning) of the fish [7]. Tonguthai [8] has reported lernaeids as vectors of many pathogens such as bacteria and fungi. Lernaeids could be a cause of outbreak of fresh water fishes; that *Lernaea* spp., causes lernaeosis in native fish species. Lernaeids could be a cause of a great economic loss in term of fish mortality.

Therefore, the present study was designed with aims to study the overall prevalence relationship between body weights, length and lernaeid parasites of *Catla catla*.

## MATERIALS AND METHODS

A total of 317 thaila (*Catla catla*) were collected from Zaidi fish farm (Multan), Asif Chisti fish farm (Mundorain) and Alipur fish farm (Muzafargarh). The fish were collected by a net. Fishes were identified by a key given by Mirza and Sharif [9] and were examined for the presence of *Lernaea* species. Parasites were removed and kept in bottles containing 5% formalin as a fixative. The standard length and weight of the fish were recorded. The collected parasites were examined in Laboratory of Parasitology, Institute of Pure and Applied Biology, Bahauddin Zakariya University, Multan.

Parasites were washed with water to remove the fixative. The washed specimens were kept in 10% potassium hydroxide to make their bodies transparent then washed with water to remove the alkali. After washing, the parasites were dehydrated through 30, 50 and 70% of alcohol for 10 minutes. Parasites were stained for 5 minutes and dehydrated in 90 and 100% alcohol for 10 minutes. The ectoparasites were mounted in Canada balsam and examined under the microscope [10]. The chi-square test was used to compare the different age and weight groups.

## RESULTS

The overall prevalence of *Catla catla* was 52.36%. The overall prevalence of different species of lernaeid ectoparasites was calculated (Table 1) and according to these results *L. cyprinacea*, *L. polymorpha*, *L.*

*oryzophila*, *L. lophiara* and *Lernaea* spp., had the overall prevalence of 32.17, 13.24, 3.15, 2.20 and 1.57% respectively.

**Relationship Between Body Weight and Lernaeid Parasites:** *L. cyprinacea* had highest prevalence (38.86%) in weight group of 50-1000g whereas lowest prevalence (0%) was observed in >2900g weight group. *L. polymorpha* had the highest prevalence (18.18%) in weight group of 1001-1950g, while it was lowest (0%) in >2900g weight group. *L. oryzophila* had the highest prevalence (16.66%) in 1951-2900g weight group whereas lowest prevalence (0%) was observed in >2900g weight group. *L. lophiara* and *Lernaea* spp., had the highest prevalence 9.09% and 6.49% in weight group of 1001-1950g respectively, whereas lowest prevalence (0%) was observed in all other weight groups (Table 2).

**Relationship Between Body Length and Lernaeid Ectoparasites:** *L. cyprinacea* showed highest prevalence (44%) in length group of 9-12cm whereas lowest prevalence (11.11%) was recorded in length group of >20cm. *L. polymorpha* had highest prevalence (25%) in 13-16cm length group and lowest prevalence (0%) was recorded in >20cm length group. *L. oryzophila* showed highest prevalence (8.88%) in 17-20cm length group whereas lowest prevalence (0%) was observed in length group of 9-12 and >20cm. *L. lophiara* and *Lernaea* spp., had highest prevalence of 7.77 and 5.55% respectively in length group of 17-20cm whereas, lowest prevalence (0%) was observed in all other length groups (Table 3). The difference in prevalence among fish weight groups was statistically non-significant ( $P>0.05$ ).

Table 1: The overall prevalence of lernaeid ectoparasites of *Catla catla*

Parasite name	No. of hosts examined	No. of infested hosts	Prevalence (%)
<i>L. cyprinacea</i>	317	102	32.17
<i>L. polymorpha</i>	317	42	13.24
<i>L. oryzophila</i>	317	10	3.15
<i>L. lophiara</i>	317	7	2.20
<i>Lernaea</i> spp.	317	5	1.57
Total	317	166	52.36

Table 2: Relationship between body weight and lernaeid ectoparasites

No of examined host	Parasite name	Body weight (g) groups			
		50-1000n=211	1001-1950n=77	1951-2900n=24	> 2900n=5
317	<i>L. cyprinacea</i>	82(38.86%)	19(24.67%)	1(4.16%)	0(0%)
	<i>L. polymorpha</i>	25(11.84%)	14(18.18%)	3(12.5%)	0(0%)
	<i>L. oryzophila</i>	2(0.94%)	4(5.19%)	4(16.66%)	0(0%)
	<i>L. lophiara</i>	0(0%)	7(9.09%)	0(0%)	0(0%)
	<i>Lernaea</i> spp	0(0%)	5(6.49%)	0(0%)	0(0%)

The difference was statistically significant ( $P<0.05$ )

Table 3: Relationship between body length and lernaeid ectoparasites

No. of examined host	Parasite name	Body length(cm) groups				
		5-8n=181	9-12n=25	13-16n=12	17-20n=90	>20n=9
317	<i>L.cyprinacea</i>	71(39%)	11(44%)	5(41.66%)	14(15.55%)	1(11.11%)
	<i>L.polymorpha</i>	22(12.15%)	2(8%)	3(25%)	15(16.66%)	0(0%)
	<i>L.oryzophila</i>	1(0.55%)	0(0%)	1(8.33%)	8(8.88%)	0(0%)
	<i>L.lophiara</i>	0(0%)	0(0%)	0(0%)	7(7.77%)	0(0%)
	<i>Lernaea</i> spp.	0(0%)	0(0%)	0(0%)	5(5.55%)	0(0%)

The difference was statistically non-significant ( $P>0.05$ )

## DISCUSSION

Five species of *Lernaea* i.e. *L. cyprinacea*, *L. polymorpha*, *L. oryzophila*, *L. lophiara* and *Lernaea* spp., have been collected during the present study. Tasawar and Shahzad [11] recovered 6 species of *Lernaea* i.e. *Lernaea cyprinacea*, *L. polymorpha*, *L. oryzophila*, *L. lophiara*, *L. ctenopharyngodonis* and *L. arcuata*. Tasawar *et al.* [12] recorded four species i.e. *L. polymorpha*, *L. cyprinacea*, *L. oryzophila* and *L. lophiara* on *Labeo rohita*. Bozorgnia *et al.* [13] found *Lernaea* spp. in Kurdistan Province, Iran. Piasecki *et al.* [14] reported *Lernaea cyprinacea* in Brazil. Tasawar *et al.* [15] reported 4 species of *Lernaea* i.e. *L. polymorpha*, *L. cyprinacea*, *L. oryzophila* and *Lernaea* spp., in *Catla catla*. The present study added a fifth species (*L.lophiara*) to the previously identified ones in *Catla catla*.

Many studies have been conducted to find out the overall prevalence of different species of genus *Lernaea*. Tasawar *et al.* [12] reported the overall prevalence of *L. polymorpha* (5.83%) followed by *L. cyprinacea* (5%), *L. oryzophila* and *L. lophiara* (1.66%). Khan *et al.* [16] observed the overall prevalence of *Lernaea cyprinacea* 3.33% on *C. idella*. The present study showed the highest prevalence of *Lernaea* and *Lernaea cyprinacea* was the most prevalent parasite. This might be due to the considerable variation in environmental conditions in which fish live [17]. It has been observed that infestation with ectoparasites may also depend upon temperature. Anjum [18] reported that lernaeids parasites are normally found in warm waters. It is recorded that temperature ranging between 20°C and 30°C may be suitable for the development of parasites [19]. The infestation of parasites may depend upon the water quality as well as the stocking density of the pond. It is reported that there is more risk of ectoparasites and diseases caused by them if the conditions of water are not satisfied and the ponds are over stocked with fingerling [17]. It was observed that these parasites propagate more in small ponds [20] with

unhealthy conditions such as polluted water [21]. The present results are according to studies of [14], they reported the same species of *Lernaea* in Brazil.

During the present study *L. cyprinacea* and *L.oryzophila* had highest prevalence in weight group of 50-1000g and 1951-2900g respectively. *L. polymorpha*, *L. lophiara* and *Lernaea* spp., had maximum prevalence in weight group 1001-1950g. No parasite was observed in weight group of >2900g whereas, *L. lophiara* and *Lernaea* spp., were only observed in weight group of 1001-1950g. Many studies have been conducted to find out the relationship between the weight of the fish and the infestation by *Lernaea*. Tasawar and Shahzad [11] and Tasawar *et al.* [12] recorded a decrease in the prevalence of *Lernaea* by increase in the weight of the fish. Tasawar *et al.* [22] recorded an increase in the prevalence of *Lernaea* by increase in weight of the mori fish. The present results are in agreement with the studies conducted by Tasawar *et al.* [12]. Accordingly, the parasitic infestation decreases as the weight of the fish increases. It might be due to the immunity acquired by the host against parasites [23].

The maximum parasitic infestation was observed in medium sized fish 9-16cm and minimum infestation was found in maximum sized fish >20cm in length. The same parameter has been observed in previous studies. Tasawar *et al.* [15] observed that the prevalence of *Lernaea* increases by increase in the length of the fish. The results of present study are according to the studies conducted by Tasawar *et al.* [16]. A decrease in the infestation of ectoparasites with the increase in length of the fish might be due to the development of acquired immunity by the older fishes.

Please, write a conclusion of the current study.

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