

Copepod Ectoparasites of *Labeo rohita*

¹Zahida Tasawar, ¹M. Arshad and ²Sikandar Hayat

¹Institute of Pure and Applied Biology, Bahauddin Zakaria University, Multan, Pakistan

²Faculty of Veterinary Sciences, University of Agriculture Faisalabad, Pakistan

Abstract: One hundred and twenty fishes (*Labeo rohita*) were examined for ectoparasites. Four species of the genus *Lernaea* recorded were *L. polymorpha*, *L. cyprinacea*, *L. oryzophila* and *L. lophiara*. The overall prevalence of ectoparasites was studied and observed that *L. polymorpha* had maximum overall prevalence (5.83%) followed by *L. cyprinacea* (5%), *L. oryzophila* (1.66%) and *L. lophiara* (1.66%). *L. polymorpha* and *L. cyprinacea* were the most abundant ectoparasites in mixed infestation and *L. cyprinacea* had highest parasite burden (4). Maximum intensity of infestation in *L. rohita* for *L. cyprinacea* (23), *L. polymorpha* (9), *L. oryzophila* (2) and *L. lophiara* (1) was recorded in 10-265g weight group, while minimum in 522-777g, 778-1033g, 1034-1289g and 1290-1540g weight groups. The infestation was not observed in minimum and maximum length ranges of host.

Key words: *Lernaea* spp., overall prevalence, mixed infestation, body weight, body length

Introduction

Fish parasites was related directly to the importance of the fish that they may affect. As a recreational asset, fish rank at or near the top, both for sport fishing and as one of the attractions of nature. In natural populations of plants and animals parasites are always present. The parasites are normally in a complex dynamic equilibrium with the free-living communities of plants and animals. Fishes are the apex of the predator-prey pyramid within fresh waters, and therefore tend to be infected by considerable range of parasites, which may occur in large numbers (in normal conditions).

However, if some unusual event occurs in the environment, of natural or human origin, the equilibrium between host and parasite may be disturbed, and an epizootic of one or more species of parasites may occur. A new equilibrium will be established; but in the intervening period there may be a serious loss of fishes.

It is thus important from an economic point of view, for fishing as amenity, or for fish farming that we have knowledge of the occurrence of parasites on freshwater and marine fishes. In spite of the common occurrence of *Lernaea* spp. in fishes raised at Hatcheries in Pakistan only a few investigations have been made into seasonal and factors controlling the parasite (Tasawar and Hussain, 1999; Tasawar and Khurshid, 1999; Tasawar and Naseem, 1999). It is therefore anticipated that very useful information would be available for further research in this field.

The study was designed to investigate the overall prevalence of copepod ectoparasites, mixed infestation, parasite burden, the relationship between weight, length and copepod ectoparasites of *L. rohita*.

Materials and Methods

One hundred and twenty specimens of *Labeo rohita* were examined during the 12 months from February 1999 to January 2000. The fish were caught during the third week of each month from Piroval Fish Hatchery (Punjab:Pakistan). Fishes were identified (Mirza and Sharif, 1996) and were kept alive in a plastic water container and were examined for ectoparasites. Ectoparasites were removed and preserved in 5% formalin.

After measuring length and weight of fish it was released into the pond. The collected parasites were brought to the Parasitology Laboratory Institute of Pure and Applied Biology for further examination. The permanent mounts of parasites were made (Cable, 1985) and identification of the parasites was accomplished with help of keys discussed by Kabata (1985).

Results and Discussion

The overall prevalence of copepod ectoparasites of *Labeo rohita* The percentage of infestation of copepod ectoparasites was calculated (Table 1). It was observed that all four species of ectoparasites showed considerable variations with maximum values for *L. polymorpha* (5.83%), followed by *L. cyprinacea* (5%), *L. oryzophila* and *L. lophiara* (1.66%).

Tasawar *et al.* (1999) reported five species of the genus *Lernaea* i.e. *L. polymorpha* (26.6%) *L. cyprinacea* (25.83%), *L. oryzophila* (20%), *L. arcuata* (5%) and *L. lophiara* (5%) from *Labeo rohita*. While the following species of the genus *Lernaea* i.e. *L. cyprinacea* (21.66%), *L. polymorpha* (15.38%), *L. lophiara* (4.16%) and *L. oryzophila* (2.5%) were recovered from hybrid fish (Nazli, 1999). *Lernaea* i.e. *L. cyprinacea* (26.67%), *L. polymorpha* (25.83%), *L. oryzophila* (4.17%) and *L. lophiara* (2.5%) were reported from *Catla catla* (Razaq, 1999). *Lernaea* i.e. *L. cyprinacea* (9.16%), *L. polymorpha* (6.66%), *L. lophiara* (3.33%), *L. oryzophila* (2.5%), *L. ctenopharyngodonis* (2.5%) and *L. arcuata* (1.6%) were recorded from silver carp (Shahzad, 1999).

Above comparison showed that prevalence of parasites is minimum as compared to other fishes. It is easy to explain the differences when the results of the present study are compared with (Nazli, 1999), (Razaq, 1999) and (Shahzad, 1999), on the basis that Rohu is the most resistant fish and less susceptible to parasitic infestation, but difficulty is faced when comparison is made with Tasawar *et al.* (1999) who reported higher prevalence of *Lernaea* spp. from the same fish collected from Mian Channu Fish Hatchery. The lower prevalence of *Lernaea* spp. could be due to the chemical control measures, which were taken at Piroval Hatchery in order to kill the parasites. This is supported by the fact that initially the prevalence of *Lernaea* spp. during the present study was similar to those recorded by Tasawar and Hussain (1999), and declined was observed after the chemical control.

Mixed infestation of copepod ectoparasites of *Labeo Rohita*

Mixed infestation of copepod ectoparasites of Rohu was studied (Table 2) and the results showed that *L. polymorpha* and *L. cyprinacea* were the most abundant species than other ectoparasites of Rohu. Mixed infestation of copepod ectoparasites has been studied by some workers in Pakistan. Tasawar and Hussain (1999) reported *L. oryzophila* as the dominant species while *L. polymorpha* was the dominant species by Tasawar and Naseem (1999). *L. polymorpha* and *L. cyprinacea* were reported as the dominant species by Tasawar and Khurshid, (1999); Shahzad, (1999); Nazli, (1999). While *L. cyprinacea* was reported as the dominant

Table 1: The overall prevalence of copepod ectoparasites of *L. rohita*

Name of parasite	No. of fish examined	No. of fish infested	Prevalence (%)
<i>Lernaea polymorpha</i>	120	7	5.83
<i>L. cyprinacea</i>	-do-	6	5.00
<i>L. oryzophila</i>	-do-	2	1.66
<i>L. lophiara</i>	-do-	2	1.66

Table 2: Mixed infestation of copepod ectoparasites of *Labeo rohita*

Species combination	No. of fish examined	No. of fish infested
<i>Lernaea polymorpha</i>	120	2
<i>L. cyprinacea</i>	-do-	1
<i>L. oryzophila</i>	-do-	1
<i>L. lophiara</i>	-do-	1
<i>L. polymorpha</i> + <i>L. cyprinacea</i> + <i>L. lophiara</i>	-do-	1
<i>L. cyprinacea</i> + <i>L. polymorpha</i> + <i>L. lophiara</i>	-do-	1
<i>L. polymorpha</i> + <i>L. cyprinacea</i>	-do-	3

Table 3: The parasite burden of *Labeo rohita*

Name of parasite	No. of parasites found	No. of fish infested	No. of parasites per fish
<i>L. cyprinacea</i>	24	6	4
<i>Lernaea polymorpha</i>	10	7	1.42
<i>L. oryzophila</i>	2	2	1
<i>L. lophiara</i>	2	2	1

Table 4: Relationship between body weight and copepod ectoparasites of *Labeo rohita*

Body weight of fish (gm)	<i>Lernaea cyprinacea</i>	<i>L. Polymorpha</i>	<i>L. oryzophila</i>	<i>L. Lophiara</i>
10-265	23	9	2	1
266-521	1	1	-	1
522-777	-	-	-	-
778-1033	-	-	-	-
1034-1289	-	-	-	-
1290-1540	-	-	-	-

Table 5: Relationship between body weight and copepod ectoparasites of *Labeo rohita*

Body weight of fish (gm)	<i>Lernaea cyprinacea</i>	<i>L. Polymorpha</i>	<i>L. oryzophila</i>	<i>L. Lophiara</i>
6-12.1	-	-	-	-
12.2-18.3	1	4	-	-
18.4-24.5	18	5	2	-
24.6-30.7	5	1	-	2
30.8-36.9	-	-	-	-
37-43	-	-	-	-

species in studies conducted by Razaq, (1999). According to all these studies *L. polymorpha* and *L. cyprinacea* seem to be the dominant species. Fewer combinations made by other parasites could be due to the reason that *L. polymorpha* and *L. cyprinacea* limit survival of other species of *Lernaea* on the body of fish.

Parasite burden of *Labeo rohita*: The parasite burden of *L. rohita* was studied (Table 3) and it was observed that *L. cyprinacea* had highest parasite burden (4) followed by *L. polymorpha* (1.42), *L. oryzophila* (1) and *L. lophiara* (1). According to Tasawar and Hussain (1999) *L. oryzophila* had highest parasite burden. Tasawar and Khurshid (1999), Tasawar and Naseem (1999) reported that *L. polymorpha* had highest parasite burden while *L. cyprinacea* had highest parasite burden and according to Nazli, (1999), Razaq, (1999) and Shahzad, (1999).

Above comparison shows that *Lernaea cyprinacea* and *L. oryzophila* are more adapted to *L. rohita* (Tasawar and Hussain, 1999; the present study), while *L. polymorpha* is more prevalent on *C. idella*, *Cirrhinus mrigala*, silver carp, and *L. cyprinacea* is more prevalent on *Catla catla* and Hybrid. These adaptations could be morphological or physiological.

Relationship between body weight and copepod ectoparasites of *Labeo rohita*: In *Labeo rohita* intensity of infestation for *L. cyprinacea* was (23), followed by *L. polymorpha* (9), *L. oryzophila* (2) and *L. lophiara* (1) in 10-265g-weight group. The intensity of infestation was (1) for *L. cyprinacea*, *L. polymorpha* and *L. lophiara* in weight group 266-521g while *L. oryzophila* was not observed in the same weight group (266-521g). *L. cyprinacea*, *L. polymorpha*, *L. oryzophila* and *L. lophiara* were not found in 522-777g, 778-1033g, 1034-1289g and 1290-1540 weight groups (Table 4). Studies have been carried out on relationship between body weight and copepod ectoparasites of fish in Pakistan (Tasawar and Hussain, (1999); Tasawar and Khurshid, (1999); Tasawar and Naseem, (1999); Nazli, (1999); Razaq, (1999); Shahzad, (1999). According to all these studies as the weight of the host increases parasitic infestation decreases. This could be due to the acquired immunity of fish against these parasites.

Relationship between body length and copepod ectoparasites of *Labeo rohita*: Maximum intensity of infestation of *Labeo rohita* was recorded for *L. cyprinacea* (18), followed by *L. polymorpha* (5) and *L. oryzophila* in 18.4-24.5 cm length groups. 24.6-30.7 cm and 12.2-18.3 cm length groups had 5 and 1 *L. cyprinacea*, while 4 and 1 *L. polymorpha* were present in 12.2-18.3 cm and 24.6-30.7 cm length groups. *L. lophiara* (2) was present only in 24.6-30.7 cm length group. The parasites were not found in 6-12.1 cm, 30.8-36.9 and 37-43 cm length groups (Table 5).

It was observed that as the length of the fish increased infestation of copepod ectoparasites decreased. It may be due to the development of acquired immunity in fish as reported by Tasawar and Hussain, (1999), Tasawar and Khurshid, (1999), Tasawar and Naseem, (1999), (Nazli, 1999), (Razaq, 1999) and (Shahzad, 1999).

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