

The Observations of Lernaeid Parasites of *Cirrhinus Mrigala* (Mori)

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Abstract

One hundred and twenty fish (*Cirrhinus mrigala*) were examined for lernaeid ectoparasites at private fish farms. Lernaeid ectoparasites showed an overall prevalence of 25%. Four species of genus *Lernaea* i.e. *L. cyprinacea*, *L. polymorpha*, *L. lophiara* and *L. oryzophila* were recorded. The overall prevalence of *L. cyprinacea*, *L. polymorpha*, *L. lophiara* and *L. oryzophila* was 13.33, 9.16, 1.66 and 0.83% respectively. The relationship between body weight and lernaeid parasites showed that *L. cyprinacea*, *L. polymorpha*, *L. lophiara* and *L. oryzophila* had highest prevalence of 31.81, 18.18, 4.54 and 4.54% respectively in weight group of 1501-2000g. *L. cyprinacea*, *L. polymorpha* and *L. lophiara* had lowest prevalence 3.70, 4.34 and 2.08% in weight group of 1-500g, 501-1000g and 1001-1500g respectively. *L. oryzophila* showed nil prevalence in other weight groups. The difference was statistically significant ($P < 0.05$). The present results revealed that *L. cyprinacea*, *L. polymorpha*, *L. lophiara* and *L. oryzophila* had highest prevalence 17.5, 12.5, 2 and 1% respectively in length group of 18-22cm. *L. cyprinacea* showed lowest prevalence (3.2%) in length groups of 8-12cm. *L. polymorpha* had lowest prevalence (11.11%) in length groups of 13-17cm, whereas *L. oryzophila* and *L. lophiara* were not observed in other length groups. The difference was statistically significant ($P < 0.05$).

Keyword: *Cirrhinus mrigala*, ectoparasites, *Lernaea* spp. body weight, body length, prevalence

1. Introduction

Ectoparasites, especially lernaeids are one of the most prevalent parasites of freshwater fish (Piasecki *et al.*, 2004). These ectoparasites cause a great economic loss to the fish culture as they are a source of diseases in fish farming all over the world (Kir, 2007). One of the major disease caused by the lernaea is lernaeosis. Lernaeids are the most harmful parasites attacking not only the body surface of the fish but also in mouth as well as in gills (De Magalhaes, 2006), even some are also found anchoring under the scales of the fish (Baur, 1962).

Due to their way of attack on fish, the tissues could be severely damaged, and may be a cause of hyperplasia and tissue proliferation, which could cause bacterial infection in future (Shariff *et al.*, 1986; Jalali and Barzegar, 2006). In case of severe infections by lernaea, death in fish has also been reported by Uzmann and Rayner (1958). Keeping in view the importance of these ectoparasites, the present study was designed to investigate the overall prevalence of lernaeid ectoparasites and their relationship

between the body weight and the body length of *Cirrhinus mrigala*.

2. Materials and methods

A total of 120 freshwater fish were collected. The fish were examined for the presence of ectoparasites after identification. After removing ectoparasites with the help of fine forceps they were placed in 5% formalin as a fixative. The standard length and weight of the fish were noted and the specimens were brought to the parasitology laboratory.

The parasites were washed with water to remove the fixative. The washed specimens were kept in 10% potassium hydroxide to make their bodies transparent. In order to remove the alkali the parasites were washed to properly. The parasites were dehydrated through a graded series viz. 30, 50 and 70% of alcohol for 10-20 minutes. Parasites were stained for 5-7 minutes and dehydrated in 90 and 100% alcohol for 10-15 minutes. The ectoparasites were mounted in Canada balsam and examined under the microscope (Cable, 1985). Results are expressed in percentages and the values between

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various body weight and body length groups were compared by Chi square test.

3. Results

The overall prevalence

Out of 120 fish, 30 were infested, showing an overall prevalence of 25%. The overall prevalence of different species of lernaeid ectoparasites was calculated (Table 1) and according to these results *L. cyprinacea*, *L. polymorpha*, *L. lophiara* and *L. oryzophila* had the overall prevalence of 13.33, 9.16, 1.66 and 0.83% respectively.

Relationship between body weight and lernaeid ectoparasites

The present investigation showed that *L. cyprinacea*, *L. polymorpha*, *L. lophiara* and *L. oryzophila* had highest prevalence 31.81, 18.18 and 4.54 respectively in weight group of 1501-2000g. *L. cyprinacea*, *L. polymorpha* and in weight group of 1-500g, 501-1000g and 1001-1500g *L.*

lophiara had lowest prevalence 3.70, 4.34 and 2.08% respectively. *L. oryzophila* showed nil prevalence in other weight groups (Table 2). The difference was statistically significant (P<0.05).

Table 1 Overall prevalence of lernaeid parasites of *Cirrhinus mrigala*

Name of parasite	No. of host examined	No. of host infested	Prevalence (%)
<i>L. cyprinacea</i>	120	16	13.33
<i>L. polymorpha</i>	120	11	9.16
<i>L. lophiara</i>	120	2	1.66
<i>L. oryzophila</i>	120	1	0.83

Table No 2 Relationship between body weight and lernaeid parasites of fish

No of host examined	Name of parasite	Body weight(g) groups			
		1-500	501-1000	1001-1500	1501-2000
120		n=27	n=23	n=48	n=22
	<i>L.cyprinacea</i>	1(3.70%)	1(4.34%)	7(14.58%)	7(31.81%)
	<i>L.polymorpha</i>	0(0%)	1(4.34%)	6(12.5%)	4(18.18%)
	<i>L. lophiara</i>	0(0%)	0(0%)	1(2.08%)	1(4.54%)
	<i>L. oryzophila</i>	0(0%)	0(0%)	0(0%)	1(4.54%)

The difference was statistically significant (P<0.05).

Table No 3 Relationship between body length and lernaeid parasites of fish

No. of host examined	Name of parasite	Body length(cm) groups		
		08-12	13-17	18-22
120		n=31	n=9	n=80
	<i>L.cyprinacea</i>	1(3.2%)	1(11.11%)	14(17.5%)
	<i>L.polymorpha</i>	0(0%)	1(11.11%)	10(12.5%)
	<i>L. lophiara</i>	0(0%)	0(0%)	2(2%)
	<i>L. oryzophila</i>	0(0%)	0(0%)	1(1%)

The difference was statistically significant (P<0.05).

4. Discussion

During the present study four species of genus *Lernaea* i.e. *L. cyprinacea*, *L. polymorpha*, *L. lophiara* and *L. oryzophila* were recorded. Various researchers have reported different species of genus *Lernaea* from various parts of the world. Tasawar and Hussain (1999) reported *L. cyprinacea*, *L. polymorpha*, *L. lophiara* and *L. oryzophila* and *L. arcuata* on *Labeo rohita*. Tasawar and Naseem (1999) recorded *L. cyprinacea*, *L. polymorpha*, *L. oryzophila* and *L. lophiara* on grass carp. Tasawar et al. (2001) reported *L. cyprinacea*, *L. polymorpha*, *L. oryzophila* and *L. lophiara* on *Labeo rohita* fish. Jones et al. (2006) recovered *L. salmonis*. The present results agreed with the study conducted by Tasawar et al. (2001).

The present study recorded the overall prevalence of *L. cyprinacea* (13.33%) followed by *L. polymorpha* (9.16%), *L. lophiara* (1.66%) and *L. oryzophila* (0.83%). Many studies have been conducted to find out the overall prevalence of different species of genus *Lernaea*. Tasawar et al. (2001) reported the overall prevalence of *L. polymorpha* (5.83%), *L. cyprinacea* (5%), *L. oryzophila* and *L. lophiara* (1.66%). Tasawar and Shahzad (2001) recorded the prevalence of *L. cyprinacea* 9.16%, followed by that of *L. polymorpha* (6.66%), *L. lophiara* (3.33%), *L. ctenopharyngodonis* (2.5%) and *L. areuata* (1.6%) on *H. molitrix*. Khan et al. (2003) observed *L. cyprinacea* on freshwater fish. Tasawar et al. (2009), reported the overall prevalence of lernaeids ectoparasites and observed the overall prevalence of *L. cyprinacea*, *L. polymorpha*, *L. oryzophila* and *L. lophiara*., 6.53, 7.54, 0.67, and 0.67% respectively.

In the present study the highest prevalence of *Lernaea* species was observed and among these parasites *L. cyprinacea* and *L. polymorpha* were the most prevalent ectoparasites. These parasites might be more adapted to host. (Nobel and Noble, 1982). It is reported that the parasitic infestation may depend upon its host preference. It is observed that host preferences may differ according to different population (Fryer, 1959; Fryer, 1968a; Fryer, 1968b). It is reported by Paperna (1964) that some species of *Lernaea* may be very critical or demanding about the selection of the host for the development of their larvae and the adult stages, as it has been observed that the adult females of *L. cyprinacea* mostly infect cyprinid fish (Paperna, 1964).

The prevalence of the parasites may be variable according to the size of the pond. Bulow et al. (1979) reported high rate of infection in fish from small water bodies, however negligence of proper sanitary conditions during the shifting of fish in ponds (Boeher and Santos-Neto, 1993), water temperature, water velocity and the stream order (Bulow et al., 1979) may effect on the prevalence of *Lernaea*. The highest prevalence of *Lernaea* spp., might be due to the habitat of the fish, as it

has been reported by Whitefield et al. (1988) that the way of living of the fish may determine the infestation of parasites, the bottom dweller fish are more infested by the parasites as compare to others. As *Cirrhinus mrigala* is a bottom feeder fish so, this could be a reason of infestation of parasites. The present results are in agreement of the studies conducted by (Tasawar and Shahzad, 2001; Khan et al., 2003; Tasawar et al., 2009).

In present study maximum prevalence of lernaeid parasites was observed in weight group of 1501-2000g and either less or no prevalence was recorded in other weight groups. Same parameters have been studied by Tasawar et al. (2001); Fernandes et al. (2006); Tasawar et al. (2007a) and Tasawar et al. (2007b). According to these investigations, the parasitic infestation increases as the weight of the fish increases. The present results are in agreement with these studies. Less prevalence of parasites observed on small fish could be due to more resistance.

In the present study maximum infestation of parasites is observed in large fish. Different studies have been conducted to find out the relationship between the length of the fish and parasitic infestation. It is reported that *Lernaea* is more abundant on larger fish

(John et al., 1975) and lernaeid infection increases by increase in the length of the fish. (Tasawar et al., 2001; Dorovskikh, 2002; Fernandes, 2006; Tasawar et al., 2007b). The present results are in agreement with the studies conducted by (John et al, 1975; Tasawar et al., 2001; Dorovskikh, 2002; Fernandes, 2006; Tasawar et al., 2007b). This could be because of the provision of more surface area for parasites to anchor and hide between the big scales.

References

1. Baur, O. (1962), Parasites of freshwater fish and the Biological Basis for their control, *Bulletin of the State Scientific Institute of lake and river fisheries*, 49: 108-112.
2. Boeher, W. A. and Santo Netos-Neto. (1993) *Lernaea cyprinacea*, melhor prevenir panoramada *Agricultura*, May/June. 12: 13
3. Bulow, F. J., Winningham, J. R. and Hooper, R. C. (1979), Occurrence of the copepod parasite *Lernaea cyprinacea* in a stream fish population., *Trans. Amer. Fish. Soc.* 108: 100-102.
4. Cable, R. M. (1985) An Illustrated Laboratory Manual of Parasitology 5th ed. Surjeed Publication Dehli. 242-246.
5. De Magalhaes, A. L. B. (2006), First record of lernaeosis in a native fish species from a natural environment in Minas Gerais state, *Brazil. Pan-Amer. J. Aq. Sci.* 1: 8-10.
6. Dorovskikh, G. N. (2002), The distribution of *Lernaea cyprinacea* (Copepoda: *Lernaeidae*) in a crucian carp population. *J. Parasitol.* 27: 90-96.
7. Fernandes, G. Q., M. A. V. D. C. Pereira, D. G. D. Mattos and G. Souza. (2006), Survey of parasites in intrapopulation of cultures Brycon insignis Stenind achner, 1876 (Pisces Characidae) from the north fluminense region. Rio. De., *J. Braz. Zool.* 7: 309-313.

8. Fryer , G. (1959) A report on the parasitic Copepoda and Branchiura of the fish of Lake Bangweulu (Northern Rhodesia). *Proc. Zool. Soc. Lond.*, 132: 517-550.
9. Fryer, G. (1968a), The parasitic Crustacea of African freshwater fish: their biology and distribution, *J. Zool. London*. 156: 35-43.
10. Fryer, G. (1968b), A new parasitic isopod of the family Cymothoidae from the clupeid fish of Lake Tanganyika - a further Lake Tanganyika enigma.,*J. Zool. London*. 156: 35-43.
11. Jalali, B. and Barzegar. (2006) Fish parasites in Zarivar lake. *J. Arg. Tech*. 8: 47-58.
12. John, O., Whitaker, Jr. and Raymond, A., Schlueter. (1975), Occurrence of the Crustacean Parasite, *Lernaea cyprinacea* on Fishes from the White River at Petersburg, Indiana.,*American Midland Naturalist*. 93: 446-450.
13. Jones, S. R. M., Prosperi-Porta, G., Kim, E., Callow, P. and Hargreaves Brent, N. (2006), The occurrence of *Lepeophtheirus salmosis* and *Caligus clemensi* (copepod: caligidae) on three spine sticklebrack *Gasterosteus aculeatus* in coastal British Columbia, *J. Parasitol*. 92: 473-480.
14. Khan, M. N., Aziz, F., Afzal, M., Abdul Rab., Sahar, L., Ali, Ramzan and Mehdi Naqvi, S. M. H. (2003), Parasitic infestation in different freshwater fishes of mini dams of Potohar region, Pakistan, *Pak. J. Bio. Sci*. 6: 1092-1095.
15. Kir, I. (2007) The effects of parasites on the growth of the crucian carp (*Carassius carassius* L., 1758), Inhabiting the Kovada Lake, *Turkiye Parazitol. Derg*. 31: 162-166.
16. Nobel, E. R. and Noble, G. A. (1982), Parasitology, The Biology of Animal Parasites, 5th Ed., *Lea and Febiger, Philadelphia, USA*.
17. Paperna, I. (1964), Parasitic Crustacea (Copepoda and Branchiura) from inland water fish of Israel, *Israel. J. Zool*. 13: 58-68.
18. Piasecki, W., Goodwin, A. E., Eiras, J. C. and Nowak, B. F. (2004), Importance of copepoda in fresh water aquaculture.,*Zool. Stud*. 43: 193-205.
19. Shariff, M., Kabata, Z. and Sommerville, C. (1986), Host susceptibility to *Lernaea cyprinacea* , *J. Fish. Dis*. 9: 393-401.
20. Tasawar, Z and Naseem. R. (1999), Observation on lernaeids parasites of *Ctenopharyngodon idell.*, *Acta. Sci*. 9: 33-38.
21. Tasawar, Z. and Hussain, L. (1999), Seasonal variation in the lernaeid parasites of *Labeo rohita* from fish hatchery Mian Channu, *Acta. Sci*. 9: 25-31.
22. Tasawar, Z. and Shahzad, M. F. (2001), Seasonal prevalence of copepod ectoparasites of silver carp (*Hypophthalmichthys molitrix*), *Punj. Univ. J. Zool*. 16: 49-54.
23. Tasawar, Z., Arshad, M. and Hayat, C. S. (2001), Copepod ectoparasite of *Labeo rohita*, *Online J. Biol. Sci*. 1: 676-677.
24. Tasawar, Z., Hanif, M., Lashari, M. H. and Hayat, C. S. (2007a), The prevalence of lernaeid ectoparasites in Mori (*Cirrhinus mrigala*) fish, *Pak. Vet. J*. 27: 176-178.
25. Tasawar, Z., Umer, K. and Hayat, C. S. (2007b), Observations on lernaeid parasites of *Catla catla* from a fish hatchery, Muzaffargarh, *Pak. Vet. J*. 27: 17-19.
26. Tasawar, Z., Zafar, S., Lashari, M. H and Hayat, C. S. (2009), The prevalence of lernaeid ectoparasites in grass carp (*Ctenopharyngodon idella*). *Pak. Vet. J*. 29: 95-96.
27. Uzman, J. R., and H. J. Rayner. (1958), Record of the parasitic copepod *Lernaea cyprinacea* L, Oregon and Washington fishes. *J. Parasitol*. 44: 452-453.