

THE PREVALENCE OF LERNAEID ECTOPARASITES IN GRASS CARP (*CTENOPHARYNGODON IDELLA*)

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ABSTRACT

The present study was conducted to investigate the prevalence of lernaeid ectoparasites in grass carp (*Ctenopharyngodon idella*). For this purpose, 597 fishes (*Ctenopharyngodon idella*) were examined for lernaeid ectoparasites at a private fish farm located in Multan, Pakistan. Four species of the genus *Lernaea* i.e. *L. cyprinacea*, *L. polymorpha*, *L. oryzophila*, and *L. lophiara* were recorded. It was observed that *L. polymorpha* had the highest ($P < 0.05$) overall prevalence (7.54%), followed by *L. cyprinacea* (6.53%), *Lernaea* species which were not identified (2.18%), *L. oryzophila* and *L. lophiara* (0.67% each). The relationship between body weight and *Lernaea* infestation showed that the infection of *Lernaea* species was significantly ($P < 0.05$) more prevalent in the weight group of 2501-4500g, while the parasites were not found in the weight groups of 4500-6500 and 6501-8500g. Relationship between body length and *Lernaea* species in fish was also calculated. According to these results, the *Lernaea* species had significantly ($P < 0.05$) highest prevalence in length group of 9-14 cm and lowest in length groups of 15-20 and > 20 cm.

Key words: Prevalence, body length, body weight, *C. idella*, lernaeid parasites.

INTRODUCTION

Economic losses due to ectoparasite infestation not only result from direct harm to the fish, but also from disfigurement which renders fish grown for food and ornamental fish unsuitable for sale, and thus imposes a big loss to fishing industry (Piasecki *et al.*, 2004).

The adult parasites are particularly harmful to large fish because of their large size, mode of attachment and feeding. Lernaeid species preferentially aggregate around the eyes, causing destruction of the lens and blindness. Gill infections cause some localized hyperplasia of the epithelial tissues and also cause intense epithelial proliferation which may seriously interfere with respiration and also support spread of bacterial infection (Shariff *et al.*, 1986; Jalali and Barzegar, 2006). The economic importance of the lernaeid ectoparasites has increased due to numerous epizootics occurring among the most important farmed fish in various parts of the world (Kir, 2007). Therefore, the present project was designed to investigate the overall prevalence, relationship between body length and body weight of *Ctenopharyngodon idella* and lernaeid ectoparasites.

MATERIALS AND METHODS

A total of 597 specimens of *Ctenopharyngodon idella* were examined during the present study. Fishes were caught with the help of a drag net from private fish farm around Multan. Fishes were identified (Mirza and Sharif, 1996), kept alive in a plastic water container and examined for the presence of *Lernaea* species. The parasites were removed with the help of fine forceps

and placed in vials containing 5% formalin. After measuring length and weight of the fish, it was released into the pond. The permanent mounting of the parasites was accomplished with help of keys discussed by Kabata (1985). Results are expressed in percentages and the values between various body weight and body length groups were compared by χ^2 test (Chaudhry and Kamal, 2000).

RESULTS AND DISCUSSION

The overall prevalence

Out of 597 fish examined, 105 were found to be infested with the parasites. Thus, the overall prevalence of copepod ectoparasites was 17.59% (Table 1). The prevalence of *Lernaea* species showed significant variations ($P < 0.05$), with maximum values being for *L. polymorpha* (7.54%), followed by *L. cyprinacea* (6.53%), *L. oryzophila* (0.67%), *L. lophiara* (0.67%) and unidentified *Lernaea* species (2.18%). Tasawar and Naseem (1999) reported four species of the genus *Lernaea* from a fish hatchery in Mian Channu, Pakistan i.e. *L. cyprinacea* was maximum (26.67%), followed by *L. polymorpha* (25.83%), *L. oryzophila* (4.17%) and *L. lophiara* (2.50%). Ho and Kim (1997) reported 10 species of lernaeid copepods from freshwater fishes of Thailand. Four species of the genus *Lernaea* i.e. *L. cyprinacea* (21.66%), *L. polymorpha* (15.18%), *L. lophiara* (4.16%) and *L. oryzophila* (2.14%) were recovered from *Catla catla* (Tasawar *et al.*, 2007a). In *Cirrhinus mrigala*, the prevalence of *L. cyprinacea* and *L. polymorpha* were 10.50 and 12.33%, respectively (Tasawar *et al.*, 2007b).

Table 1: The overall prevalence of lernaeid ectoparasites in grass carp (*Ctenopharyngodon idella*)

Name of parasite	No. of hosts examined	No. of hosts infested	Prevalence (%)
<i>L. cyprinacea</i>	597	39	6.53 ^a
<i>L. polymorpha</i>	597	45	7.54 ^a
<i>L. lophiara</i>	597	04	0.67 ^b
<i>L. oryzophila</i>	597	04	0.67 ^b
<i>Lernaea spp</i>	597	13	2.18 ^c
Total	597	105	17.59

The values with different superscripts differ significantly (P<0.05).

Relationship between body weight and lernaeid ectoparasites

Relationship between body weight and lernaeid ectoparasites in *C. idella* was calculated. According to these results, *Lernaea* species were significantly (P<0.05) more prevalent in the body weight group of 2501-4500g, while the parasites were not found in both weight groups of 4501-6500g and 6501-8500g (Table 2). However, the number of fish included in the latter two groups was too small to draw any conclusion. It seems that parasitic load decreases as the weight increases. This sequence of presence of parasites according to weight of fish could be due to the acquired immunity of fish against these parasites (Kir, 2007; Tasawar and Naseem, 1999).

Relationship between body length and lernaeid ectoparasites

The relationship between body length and *Lernaea* species in *C. idella* was calculated and according to these results, *Lernaea* species had significantly (P<0.05) highest prevalence in length group of 9-14 cm (42.86%) and lowest in length group 15-20 cm (Table 3).

Table 2: Relationship between body weight and lernaeid ectoparasites in grass carp (*Ctenopharyngodon idella*)

Name of parasite	Body weight (g) groups of fish			
	200-2500 (n=584)	2501-4500 (n=10)	4501-6500 (n=2)	6501-8500 (n=1)
<i>L. cyprinacea</i>	40(6.85)	0	-	-
<i>L. polymorpha</i>	41(7.02)	-	-	-
<i>L. lophiara</i>	4(0.68)	3(30)	-	-
<i>L. oryzophila</i>	4(0.68)	-	-	-
<i>Lernaea spp</i>	11(1.88)	2(20)	-	-
Total	100(17.12) ^a	5(50.00) ^b	-	-

The values in parentheses are percentages. Values with different superscripts differ significantly (P<0.05).

Table 3: Relationship between body length and lernaeid ectoparasites in grass carp (*Ctenopharyngodon idella*)

Name of parasite	Body length (cm) groups of the host observed		
	9-14 (n=28)	15-20 (n=444)	>20 (n=125)
<i>L. cyprinacea</i>	4(14.29)	27(6.08)	9(7.20)
<i>L. polymorpha</i>	6(21.43)	31(6.98)	11(8.80)
<i>L. lophiara</i>	1(3.57)	2(0.45)	1(0.8)
<i>L. oryzophila</i>	-	4(0.90)	-
<i>Lernaea spp.</i>	1(3.57)	7(1.58)	1(0.8)
Total	12(42.86) ^a	71(15.99) ^b	22(17.60) ^b

The values in parentheses are percentages. Values with different superscripts differ significantly (P<0.05).

It appears that as the length of the fish increased, infestation of copepod ectoparasites decreased. It may be due to the development of acquired immunity in old fish, as reported by Tasawar *et al.* (2007a).

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