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Philometra ovata (Zeder, 1803) (Philometridae) in European Chub (*Leuciscus cephalus* L., 1758) Living in Çamkoru Lake (Çamlidere-Ankara)

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Abstract: In this study, concentrating upon the population of *Philometra ovata* (Zeder,1803) observed in chub (*Leuciscus cephalus* L., 1758) living in Çamkoru Lake (Çamlýdere –Ankara), it was found that the number of individuals infected by *P. ovata* was 17 and totally 39 *P. ovata* were observed. It constitutes 4. 62 % of the population of *L. cephalus*. *P. ovata* infection in *L. cephalus* population was found just in III and IV age classes. While the infection was observed generally in male individuals, *P. ovata* was not encountered in other periods except May-June-July. In July, the infection of *P. ovata* was observed as 20%. It was found that fork length of *L. cephalus*, in which infection was observed, was between 15, 3 and 21 cm, as for the average length of *P. ovata* it was 55. 9 mm.

Key words: *Leuciscus cephalus*, *Philometra ovata*, çamkoru lake

INTRODUCTION

The number of studies, related to Nematodes belonging to Dracunculoid superfamily, has increased recently throughout the world. Especially with the promotion and improvement of aquaculture conditions in sea environment *Philometra* sp. was observed in a number of fish species. As host Copepods, Ostracods, and Branchiurids take place in the life cycle of Dracunculoid Nematodes. The transformation of this parasite into a vertebra and its existence is relevant with aquatic environment. Therefore, most of Dracunculoid Nematodes are present in fish. It was reported that they exist in 300 fish species belonging to 84 families living in fresh and brackish waters, and sea environments. In addition to being pathogenic, some of them may cause serious diseases giving rise to economic loss. They cause great loss under aquaculture conditions. *Philometra sp* reduces the reproduction number by ruining the gonads in the production of sea fish and they cause parasitic constractions[1].

The number of studies done with Philometra in Turkish fresh waters are quite limited and for the first time on this issue, *Philometra abdominalis (= P. ovata)* in *L. cephalus* inhabiting in Seydisuyu (Sakarya) was observed by Keskin[2]. Burgu et al reported *Philometra intestinalis* in *L. cephalus* and Koyun[3] in Enne Lake recorded the *Philometra ovata* in *L. cephalus*.

According to the records of Keskin, fish are infected, in June and July, by feeding on Cyclops carrying the larvae of *P. ovata*. The parasites that have completed their growth during the summer settle under the serosa layer of swimming cyst. And the population increases here, in this phase. Developed females move on to the abdominal cavity in August and September. Males and fecundated females stay under the layer of serosa of swimming cyst and do not grow or develop there. The length of those moving to the abdominal cavity differs between 22 and 26 mm in autumn and 60 and 72 mm in the next autumn. In the middle of June, uterus is filled with fully developed larvae and the length of parasite may get 77-110 mm. at the end of June females get out of the main base of host and leave the host. On the grounds of hypotonic environment, parasites that are able to reach the water explode and the released larvae may stay 3-5 days alive. During this time, they attract the attention of Cyclops with their movements and they are eaten eventually. Cyclops functions as host. On the condition that the parasite does not leave the host the parasite either dies or stays in the abdominal cavity of the fish until next year by feeding on products of reproduction organs or its cuticles.

MATERIAL AND METHODS

In this study, comprising August 2002 and August 2003 period, fish exemplifying was done by using 50 m-long nets with 10 x 10, 17 x 17, 23 x 23, 30 x 30, 40 x 40, 50 x 50 mm mesh sizes. Necessary measures for the fish species that were caught were carried out in Hacettepe University's Çamkoru Natural Researches Laboratory. The measures of the total and fork length of the sample fish were done with measure board upon which mm-spaced ruler. In order find the age fish, scales were used as they are practical and can be kept for a long time. Adequate number of fish scale were gathered in scale envelops upon which the qualities of the fish were written

Table 1. The number of *L. cephalus* individuals, examined according to months and its infection percentage.

	Number of individuals								
	Months								
Sex type	Aug.02	Sep.02	Oct.02	Nov.02	Apr.03	May.03	Jun.03	Jul.03	Aug.03
female	31	10	33	10	13	23	17	23	40
male	10	13	7	7	9	5	25	30	5
immature	7	5	6	0	6	6	8	12	7
total	48	28	46	17	28	34	50	65	52
infected						1	10	6	
inf %						4.35	20	9.23	

and their sexes were found microscopically by dissecting the samples. In the study area temperature degrees were done in two stations monthly. The parasite type was identified according to[2,4]. *P. abdominalis*' individual number and individuals' length were recorded.

RESULTS

368 *L. cephalus* samples were examined. The population of *L. cephalus*, caught by hunting, differs between I-X age classes. Sex distinction of 57 individuals belonging to I age class could not be done. 200 and 111 individuals were identified as females and males respectively. In Table 1, as well as the number of female, males, their total number with the infected individual number and its percentage, examined according to months, are given.

From the table it is obvious that the number of individuals, observed *P. ovata*, is 17 and it comprises the 4.62 % of *L. cephalus* population. *P. ovata* was not encountered in other exemplification periods except May-June-July. The infection rate was found out to be 4.35% in May, 20% in June, and 9.23% in July. The number of infected individuals depending upon temperature, age and sex and their percentage is shown in Table 2.

In the Table 2 it is obvious that *P. ovata* infection in *L. cephalus* population was found just in III and IV age classes. In female individuals the infection was observed just in III age class. The percentages of *P. ovata* infection were observed in female individuals as 4.35% in May, 12% in June, 4.35% in July and in male individuals as 32% in June, 16.67% in July. Not any infected male individual was encountered in May. *P. ovata* was observed in 4 (3.54%) of 113 female individuals and in 10 (15.15%) of 66 male individuals belonging to III age class; in 3 (16.67) of 18 male individuals belonging to IV age class. The average temperature measure degree, taken in two stations in July, in which the most intensity was observed, was measured as 21 °C. In Table 3, the number of *L. cephalus* individuals and infected individuals, examined according to months and sexes and the number of examined *P. ovata* individuals and their length.

Table 2. The number of *L. cephalus* individuals according to ages and their percentage

	Temp.		Age	Inf.	Intensity	age	Inf.	Intensity
Months	°c	sex	III	%		IV	%	
May.03	18	female	1		4.35			
		male						
June.03	21	female	2		12			
		male	7		28	1		4
July.03	24	female	1		4.35			
		male	3		10	2		6.7

In Table 3, it is obvious that in 17 infected individuals 39 *P. ovata* were observed. Average parasite number in a fish was found out to be 2, 3. Average parasite number in a fish in June was 2, 5, in male individuals it was 2.38. When the body length of *P. ovata* according to months is concerned, the shortest and longest of them were observed in May and June respectively. Body length of 39 *P. ovata* was found minimum 44 mm and maximum 70 mm, thus the average length was 55.9mm. in Table 4, information about the length of *P. ovata* that are observed and about average fork body length of infected individuals according to age and sex are given.

In Table 4, *P. ovata* was observed in individuals having body length between 15.3 and 21 cm. Average body length of females and males belonging to III age class and in which infection was observed was 16.45 cm and it was 19,7 cm in male individuals belonging to IV age class. As for the length of the parasite, it was 54.78 mm in female individuals, 54 mm in male individuals of III age class, 67.2 mm in male individuals of IV age class. In this study, comprising August 2002 and August 2003 period, 368 *L. cephalus* individuals, whose ages were identified as I – X, were examined. Sex distinction of 57 individuals of I age class could not be done. The number of individuals, observed *P. ovata* infection, was 17 and this number constitutes 4. 62% of the *L. cephalus* population. This intensity is higher than that of Keskin (1988); 2.7%.

Not any *P. ovata* was observed in other exemplification periods except May-June-July. *P. ovata* infection was found out to be 4.35% in May 20% in June, and 9.23% in July. In many studies, which were carried out with nematodes, it was reported that parasites were observed

Table 3. The number of infected individual and *P. ovata* individuals according to months and sexes and their length.

		L. cephalus		*P. ovata*		
Months	Sex	Total individual	Infected individual	Total individual	Average length (mm	Min-mak length (mm)
May.03						
	female	23	1	2	50	48-52
	male					
June.03						
	female	17	2	5	57.4	48-64
	male	25	8	19	58.4	47-70
July.03						
	female	23	1	2	53	52-54
	male	30	5	11	52.5	44-69

Table 4. Length data of Infected *L. cephalus* and *P. ovata*

		infected *L. cephalus*		*P. ovata*	
Age	Sex	average length (cm)	min-mak length (cm)	average length (mm)	min-mak length (mm)
III	female	16 18	15.8-16.6	54.78	48-64
	male	16.45	15.3-18.1	54	44-66
IV	female				
	male	19.7	18.7-21	67.2	62-70

just in maturation period[1]. In their studies on *Philonema oncorhynchi*, a nematode parasite type, Bashirullah and Adams reported that fish's sex hormones cause the maturation of parasites.

The number of infected according to ages and their percentages are given in Table 2. 368 *L. cephalus* individuals caught by hunting differ between I – X age classes. *P. ovata* was observed just in III and IV age classes. In female individuals *P. ovata* infection was 4. 35% in May, 12% in June, and 4. 35% in July: the infection was 32% in June and 16.67% in July in male individuals. No infected male individual was observed in May. *P. ovata* was observed in 4 (3.54%) of 113 female and in 10 (15.15%) of 66 male individuals belonging to III age class; in 3 (16.67%) of 18 male individuals belonging to IV age class. Of 200 female and of 111 male individuals caught by hunting 4 (2%) and 13 (11. 71%) of them were infected respectively. The percentage, 2%, which[5] found for the female in *P. lateolabracis* infection, observed in *Pagrus auratus* was similar; however, 55% percentage for the males is higher than the one found in this study. In the study that Olivia *et al.*,[6], did the proportion of the *Philometra sp.* infection, observed in *Paralichthys adspersus,* in females was higher than the males. In spite of the fact that the number of males, examined in Çamkoru Lake, is fewer than the females the infection was denser. That parasite type may have relationship with the ecology or the feeding differences of female and male individuals may be the reason of this infection intensity. The fact that infection of *L. intestinalis*, another parasite type is observed may lead *P. ovata* infection to male individual.

P. ovata infection was observed in individuals with body length between 15,3 and 21 cm. Average length in females belonging to III age class was 16. 18 cm and it was 16. 45 in males; in IV age class it was 19. 7 cm in male individuals. 39 *P. ovata* were observed in 17 infected individuals. Average parasite number in a fish was found out to be 2. 3. The length of *P. ovata* individuals was minimum 44 mm and maximum 70 mm; therefore the average length was 55. 9 mm. These numbers were lower than those that[2] measured. In a fish average parasite number in females in June was 2. 5 and it was 2. 38 in males. As for the length of the parasite it was 54. 78 mm in females belonging to III age class and 67. 2 mm in males belonging to IV age class. As far as the body length of *P. ovata* is concerned according to months, the shortest was measured in May and the longest in June.

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