

INVESTIGATIONS ON METAZOON PARASITES OF COMMON CARP (*Cyprinus carpio* L. 1758) IN DALYAN LAGOON, KARACABEY, TURKEY

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*In this study, metazoan parasites of the common carp (*Cyprinus carpio* L. 1758) in Dalyan Lagoon were observed from September 1997 to December 1998. During this study, a total of 43 common carp were caught and metazoan parasites were investigated. A total of 3 species of metazoan parasites were found on 31 of the 43 fish examined. The following parasites were found : *Dactylogyrus extensus* (Monogenea) and *Ergasilus sieboldi* (Crustacea) on the gills of host fish and *Caryophyllaeus laticeps* (Cestoda) in the intestine of host fish. One of these species, *D. extensus*, occurred throughout all months in the study period and was the dominant parasite species found in common carp. In the 31 fish infected by *D. extensus* a total of 704 parasites were found. *Ergasilus sieboldi* was the second most dominant parasite in this study. *Caryophyllaeus laticeps* was found in 1 of the 43 fish examined. It contained one parasite.*

*Keywords: *Cyprinus carpio*, *Dactylogyrus extensus*, *Caryophyllaeus laticeps*, *Ergasilus sieboldi**

INTRODUCTION

The common carp is one of the common cyprinids in Turkey and its helminth fauna has been investigated on some occasions (Oguz, 1992, Oguz *et al.* 1996, Aydogdu 1997, Aydogdu *et al.* 1997, Ozturk, 2000.) As far as we know *Dactylogyrus* sp, *Ergasilus* sp and *Argulus foliaceus* from some fresh water of the Bursa region (Kocadere- Ekinli and Uluabat), *Dactylogyrus extensus*, *Bothriocephalus* sp from Lake Uluabat, *D. extensus*, *B.acheilognathi*, *C. laticeps*, *Neoechinohychus rutili*, *Argulus foliaceus* from Lake Iznik, *Gyrodactylus scardini*, *D. extensus*, *B.acheilognathi*, *C. laticeps* and *Pseudocapillaria tementosa* from Lake Manyas have been recorded in common carp in Turkey. Our present study aims to increase our knowledge on the occurrence of parasites of common carp in a different locality in Turkey.

MATERIALS AND METHODS

The survey was carried out from September 1997 to December 1998 in Dalyan Lagoon and 43 common carp were collected from the study area. The specimens were placed in plastic tanks with local lake water and transferred to the research laboratory where they were kept in an aquarium and sacrificed within 24 hours. Immediately after sacrifice, the external surface (skin, fins, gills) and the digestive tract (pharynx, oesophagus, stomach, intestine) were dissected out and placed in separate petri dishes with physiological solution. The inner organs (liver, gall - bladder, heart, mesentery) were studied by pressing them between two glass sheets and using x 15 magnification and a transmitting light microscope. Parasites found in the host were removed using a sharp preparation needle and pipette. To detect the presence of parasites, all parts were thoroughly examined with the scale rows under a binocular microscope. The parasite specimens were killed and fixed in Bouin's fluid and were stained with Mayer's haematoxylin. The crustacean specimens were covered with glycerine-gelatine. The following references were mainly used for species determination (Bykhovskaya -Pavlovskaya, 1962, Markevic, 1951, Yamaguti, 1963).

RESULTS AND DISCUSSION

A total of 3 parasite species was found in 43 examined specimens of common carp from studied localities. They included, two ectoparasite species on the gills and one endoparasite species in the intestine. *Dactylogyrus extensus* (Mueller and Van Cleave 1932) dominated while *Ergasilus sieboldi* and the parasite *Caryophyllaeus laticeps* (Palles 1871), were present only in very small numbers. while the other dominated. The results of the study are given in Table 1.

Table 1. The occurrence of metazoan parasites in common carp (*Cyprinus carpio*) in Dalyan Lagoon between September 1997 to December 1998.

Months	Exam. fish number	The number of parasiting fish	Total parasites number	<i>Dactylogyrus extensus</i>	<i>Caryophyllaeus laticeps</i>	<i>Ergasilus sieboldi</i>
Sep. 97	11	6	33	27	-	6
Nov. 97	7	5	56	55	-	1
Dec. 97	9	7	68	65	1	2
Feb. 98	4	4	78	76	-	2
Mar. 98	3	3	44	44	-	-
June 98	5	5	434	434	-	-
Dec. 98	4	1	3	3	-	-
Total	43	31	716	704	1	11

Dactylogyrus extensus was the most frequent and numerous in each month.. Thus, 31 of 43 fish were positive and the infection was the highest in June 1998.

Concerning *Ergasilus sieboldi* the fish were free of parasites in March, June and December. The infection was the highest in September 1997.

The characteristics of the parasite species found are as follows:

Class: Monogenea (Beneden) Bychowsky, 1937.

1. Species: *Dactylogyrus extensus* Mueller & Cleave, 1932 (Fig.1-2).

No. of parasites studied : 15

Microhabitat : Gills

Macrohabitat : Dalyan Lagoon .

Taxonomic investigations on the genus *Dactylogyrus* began in 1892 with the description of *Dactylogyrus extensus* by Mueller and Van Cleave. Studies on the ecology of *D. extensus*, a gill parasite of wild and cultured carp (*C. carpio*) in U.S.S.R, showed that the optimal temperature for reproduction was 17 °C (Bauver and Nikolskaya, 1954). A higher temperature (20 - 25°C) is a limiting factor for population growth of this parasite since egg hatching decreases with increase of temperature beyond 17 °C. Iziumava (1958) showed that a fall in the amount of dissolved oxygen in the water significantly reduced the population of *D. extensus*. Prost (1958, 1959) noted the natural tolerance of this trematode to high salinities.

During this study infection with *D.extensus* was recorded on fish in all months. The infection with *D.extensus* was most common in June. *D.extensus* was recorded on common carp in Lake Iznik (Aydogdu *et al.*, 1997) and Lake Manyas (Öztürk, 2000). In Lake Manyas *D.extensus* was recorded on common carp in study area in all months of the study period. The infection was the highest in the summer months (per fish 45-50) with increased water temperature. In contrast, infection decreased in the autumn (per fish 5-10) and winter (per fish 3-10). The infection-fish size relationship of *D.extensus* showed a negative correlation. The smallest fish had a 100% rate of infection (per fish 86 parasites), whereas the fish (45-46 cm) exhibited a 0-10% range of infection with 0-8 parasites per host fish during the study in Lake Iznik (Aydogdu *et al.*, 1997). The present data show that *D.extensus* infection is greatest in spring and summer, although infection takes place also in other seasons of the year. Thus, *D.extensus* infection was the highest (100%) in May, and the lowest (1.3 %) in February. *D.extensus* was recorded in the host fish in Lake Uluabat (Oguz *et al.* 1996). The parasites were found in all host fish specimens and this was the most common parasite for the host fish in this locality. However, *D.extensus* was not recorded in freshwater fish in the region of Ankara. This may be explained by the finding that the embryonal development of *D. extensus* is shorter at higher temperatures but the proportion of hatched larvae is much lower. *D. extensus* could be defined as a thermolabile species. (Pojmanska, 1995, Schmahl and Mehlhorn, 1985, Silvia *et al.* 1990). The present study supports the data in the literature concerning the dynamics of the occurrence of this species.

2. Species: *Caryophyllaeus laticeps* (Cestoda, Caryophyllaeidae) (Fig. 3 - 4).

No. Of parasites studied : 1

Microhabitat : Intestine

Macrohabitat : Dalyan Lagoon

This is a characteristic and common parasite of cyprinid fishes in Europe. Adult worms occur in the gut of the definitive host and mature eggs pass to the

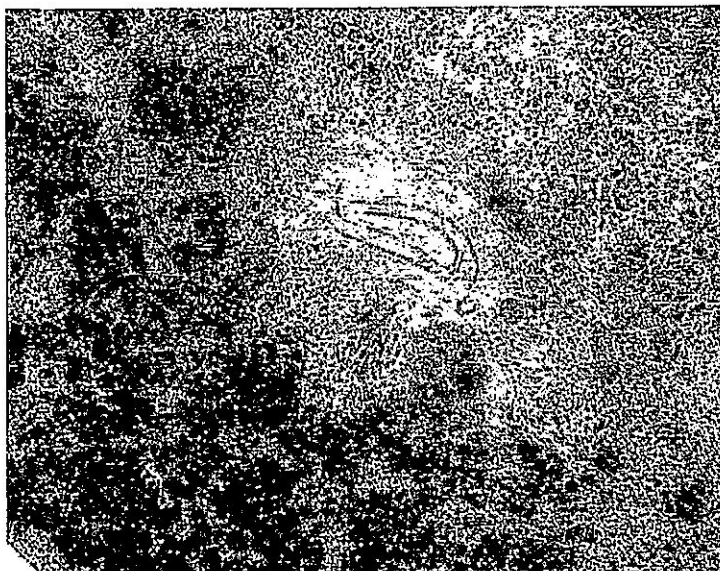


Figure 1.

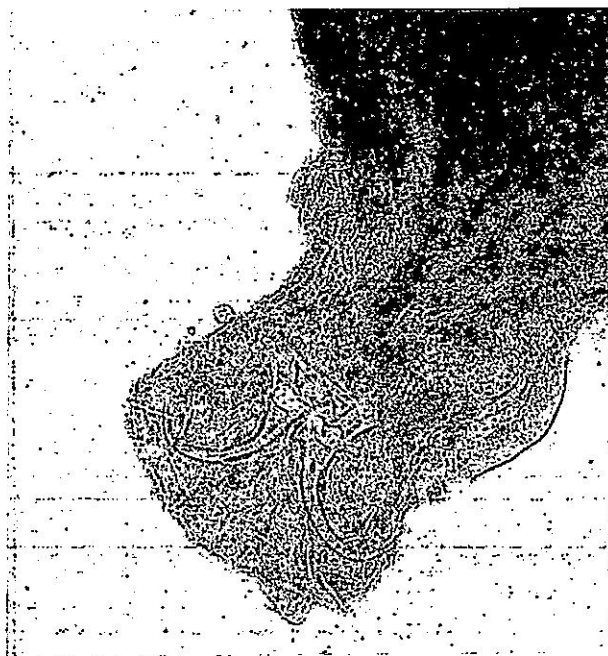


Figure 2.

exterior with the faeces. The eggs are ingested by a tubificid oligochaete. Further development of the larvae up to and including the formation of genital organs takes place in the body cavity of the tubificid. The larvae become infective in the intermediate host but are not produced until the parasite is ingested by a fish.

The seasonal occurrence *C. laticeps* in carp has also been recorded in Iznik (Aydogdu *et al.* 1997) and Lake Manyas (Ozturk, 2000). During the study, in the Lake Iznik the host fish were free of parasites from July until November. The infection commenced in November with a rapid rise in March (25.4%). There was a rapid decline in intensity in April (2.8 %). In contrast *C. laticeps* was never recorded in winter and spring in common carp in Lake Manyas but 1-2 specimens were found per fish in summer and 2-3 specimens per fish in autumn. The existence of seasonal occurrence of parasites in freshwater fish of temperate regions has been reported many times. Seasonal variations in host endocrine balance have been suggested as initiators of the annual maturation rhythm in parasites (Kennedy, 1968). The change in *C. laticeps* may be related to the reproduction cycle of carp. Seasonal variation of *C. laticeps* occurrence is obviously only one aspect of the seasonal incidence cycle. The factors generally held to be responsible for seasonal periodicity are: variations in host feeding habits, seasonal variations in availability of infective larvae and changes in physiological resistance of hosts to infection (Kennedy, 1968).

Only one specimen of *Caryophyllaeus laticeps* was only recorded in December during the whole study period. Further investigations are obviously

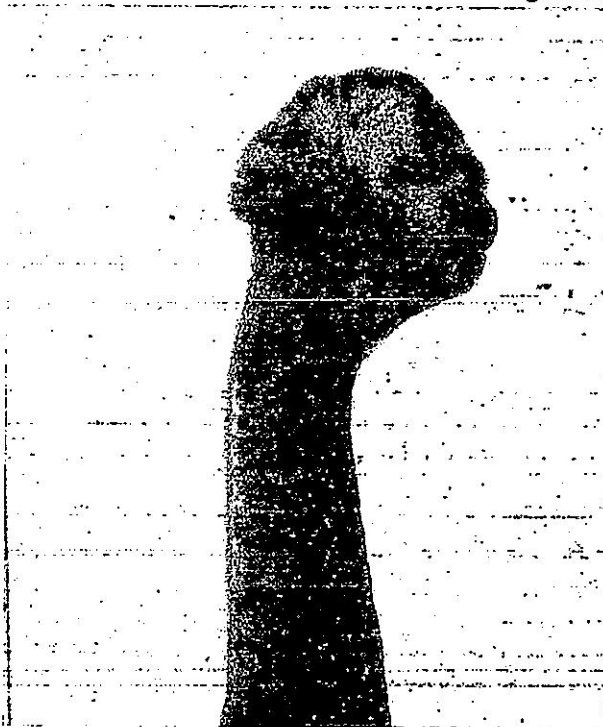


Figure 3.

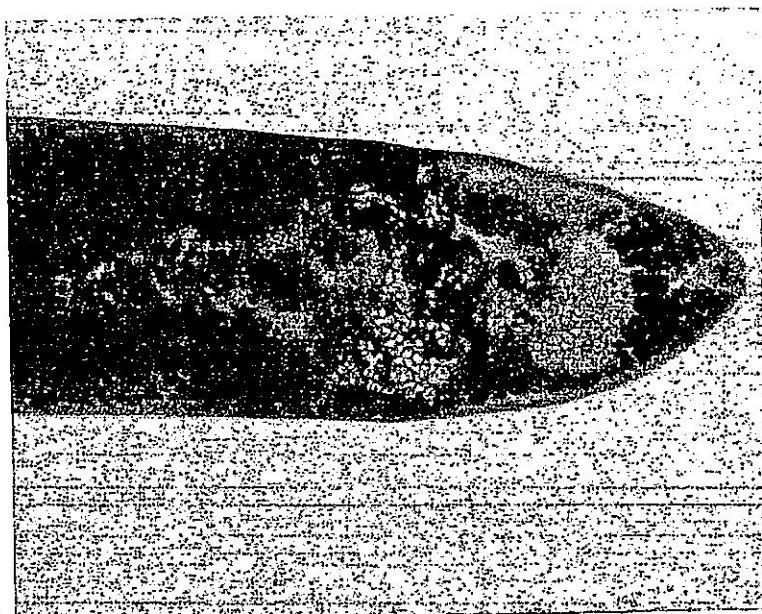


Figure 4.

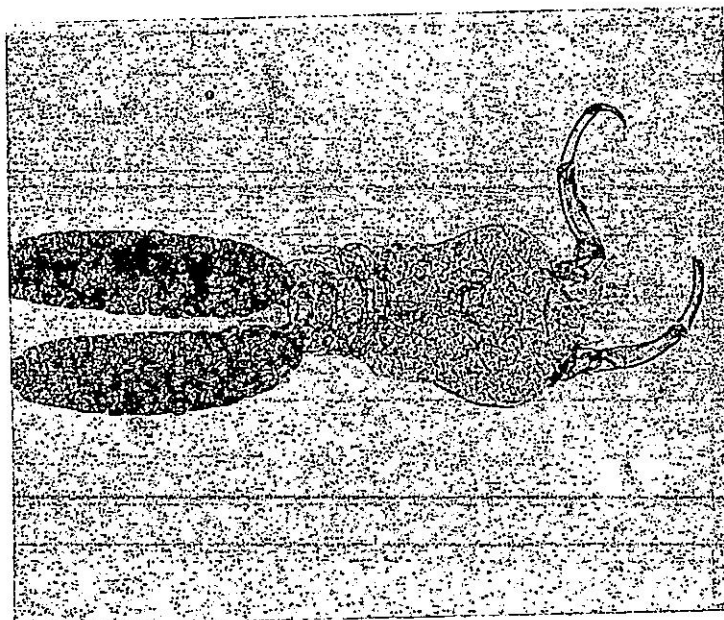


Figure 5.

necessary in Dalyan Lagoon before the causes of this seasonal occurrence of *C. laticeps* can be ascertained.

3. Species: *Ergasilus sieboldi*, Nordmann, 1832. (Crustacea, Copepoda) (Fig. 5).

No. Of parasites studied : 10

Microhabitat : Gills

Macrohabitat : Dalyan Lagoon

The crustacean specimen, *E.sieboldi* was recorded as the water temperature decreased. Infection with this species was the highest in September (Table 1). *E. sieboldi* has previously been found on *C.carpio* in Turkey (Oguz , 1992) and on *Alburnus alburnus* (Appleby and Sterud, 1997). *E. sieboldi* females parasitise the gills of various fish and are exceptionally found on other body parts. Hundreds and even thousands of specimens may parasitise a single fish (Markevic, 1951). In addition this species has been reported in others parts of the world (eg. the former USSR) which show a that the species is a common parasite in fish (Markevic, 1951).

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ISPITIVANJE ZASTUPLJENOSTI PARAZITA METAZOA KOD ŠARANA (*Cyprinus carpio* L. 1758) U DALYAN LAGOON-I, KARACABEY, TURSKA

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SADRŽAJ

U ovoj studiji je proučavana zastupljenost parazita iz metazoa kod običnog šarana (*Cyprinus carpio* L. 1758) na lokalitetu Dalyan Lagoon od septembra 1997 to decembra 1998 godine. Ukupno je izloženo 43 primerka i u njima je utvrđivano prisustvo parazita. Otkrivene su tri parazitske vrste i to kod 31 ribe od ukupno 43 pregledane. Pronađeni su sledeći paraziti: *Dactylogyrus extensus* (Monogenea), *Ergasilus sieboldi* (Crustacea) na škrigama ribe domaćina i *Caryophyllaeus laticeps* (Cestoda) u crevima. Jedna od ovih vrsta (*D. extensus*) je otkrivena u toku celog perioda ispitivanja. *D. extensus* je bio dominantna parazitska vrsta i otkriven je kod 31 primerka šarana. Ukupno je kod svih ispitivanih riba izbrojano 704 primerka ovog parazita. *Ergasilus sieboldi* je bio drugi parazit po dominantnosti u ovom ispitivanju a *Caryophyllaeus laticeps* je pronađen samo kod jedne ribe od 43 pregledane i to samo jedan njegov primerak.