

## Original papers

## Helminthofauna of Ohrid gudgeon (*Gobio ohridanus* Karaman, 1924) from the Lake Ohrid, Macedonia

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**ABSTRACT.** Total, 94 specimens of gudgeon (*Gobio ohridanus* Karaman, 1924) from the Macedonian part of the Lake Ohrid were examined and 61 fishes (64.89%) were infected with parasites. The presence of 4 parasite species was established: *Dactylogyrus cryptomeres* f. *typica* (Monogenea), *Cystidicoloides tenuissima* and *Philometra ovata* (Nematoda), and *Pomphorhynchus laevis* (Acanthocephala). The highest prevalence and intensity of infection was with *Dactylogyrus cryptomeres* f. *typica* (59.57%; mean intensity 6.07). The lowest one was with *Cystidicoloides tenuissima* and *Philometra ovata* (2.13%;1.0). *Dactylogyrus cryptomeres* f. *typica* is recorded for the first time in the ichthyoparasitofauna of Lake Ohrid and Macedonia.

**Key words:** parasite fauna, gudgeon, Lake Ohrid, Macedonia

### Introduction

Lake Ohrid occupies the farthest southwest part of Macedonia. The lake is more than 4 million years old, and it is the oldest lake in Europe. The lake is inhabited by 17 autochthonous fish species, of which 10 species (60%) are endemic; among them is *Gobio ohridanus* Karaman, 1924. Primarily investigations of the parasitofauna of the Lake Ohrid fishes were carried out by Šinžar [1], who found *Cyatocephalus truncatus* among 2% of examined belvica (*Acantholingua ochridana*) and *Metechinorhynchus truttae* in the Ohrid trout (*Salmo letnica*). Although a few studies on the parasites of the goby fish have been conducted from the Balkan Peninsula, analysis of *Gobio ohridanus* parasite fauna are virtually lacking. Gudgeon is not important fish from economical point of view but is a good food source for bigger fish. It can be also a transmitter of larval study of parasites for higher level of atrophy.

The aim of present study was to examine the parasites associated with the gudgeon in the Lake Ohrid.

### Materials and Methods

Fish material was sampled over several years, at the following localities of Lake Ohrid: Pestani, Ohrid Bay and Radozda. Total, 94 specimens of gudgeon (*Gobio ohridanus* Karaman, 1924) were examined. Gills, body cavity, viscera and eyes were studied. Collected, cleaned parasites were separated and put in certain fixatives, prepared with determined techniques of staining and clearing. The remaining parasites were fixed with 19:1 glacial acetic acid-formalin. Nematodes and acanthocephalans were stained in borax carmine and dehydrated in ethyl alcohol series. Acanthocephalans were cleared in benzyl alcohol, whereas nematodes in lactophenol and embedded in glycerol-gelatine [2–5]. Monogeneans were

Table 1. Parasite fauna of Ohrid gudgeon from the Lake Ohrid

Parasite species	n	Abundance	Prevalence (%)	Mean intensity
<i>Dactylogyrus cryptomerus f. typica</i>	340	3.61	59.57	6.07
<i>Cystidicoloides tenuissima</i>	2	0.02	2.13	1.0
<i>Philometra ovata</i>	2	0.02	2.13	1.0
<i>Pomphorhynchus laevis</i>	10	0.10	3.19	2.0
Total	354	3.76	64.89	5.57

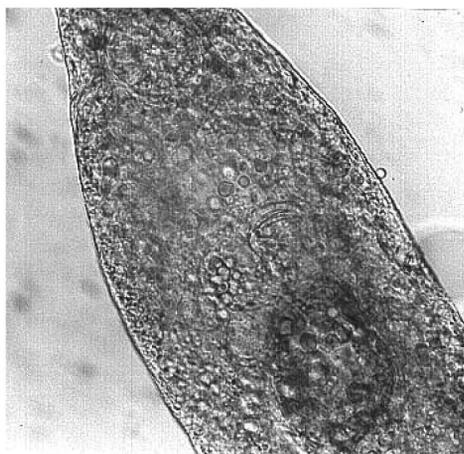
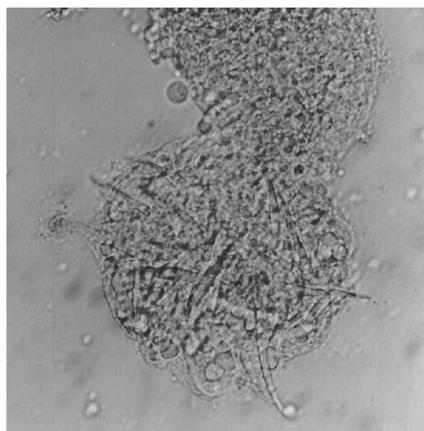


Fig. 1. *Dactylogyrus cryptomerus f. typica* (original): adhesive disk  $\times 252$  (above); copulatory organ  $\times 280$  (below)

transported to the water drop and examined alive. Fixed mounts were made in glycerogel. For identification of the parasite species the keys by Bauer [6,7] were used.

## Results and Discussion

The parasitological examination of 94 specimens of gudgeon (*Gobio ohridanus* Karaman, 1924) from the Macedonian part of the Lake Ohrid showed that 61 fishes (64.89%) were infected with parasites. A total, 354 specimens of 4 parasite species: *Dactylo-*



Fig. 2. *Cystidicoloides tenuissima* (original): anterior part (left); posterior part (right)

*gyrus cryptomerus f. typica* (Monogenea), *Cystidicoloides tenuissima* and *Philometra ovata* (Nematoda), and *Pomphorhynchus laevis* (Acanthocephala) were established (Table 1).

The dominant species was *Dactylogyrus cryptomerus f. typica* (56 specimens infected; prevalence 59.57% and mean intensity 6.07) (Fig. 1). Two fishes were infected with both nematode species, *Cystidicoloides tenuissima* and *Philometra ovata* (2.13%; 1.0) (Fig. 2,3). In five fishes *Pomphorhynchus laevis* was found (3.19%; 2.0) (Fig. 4).

The greatest pathological influence is associated with the parasites *Philometra ovata* and *Pomphorhynchus laevis*.

The parasite fauna of *Gobio ohridanus* from the Lake Ohrid is in common with that of the fishes of the family Cyprinidae from the Balkan Peninsula and more widely [4,5,8–14], with exception of *Cystidicoloides tenuissima*, which is found mainly among salmonid fish. Gudgeon in Lake Ohrid has no larval stages of parasites and does not act as paratenic host. This is due presumably to the specifics of the waters of Lake Ohrid affecting the limited possibilities of development of helminths

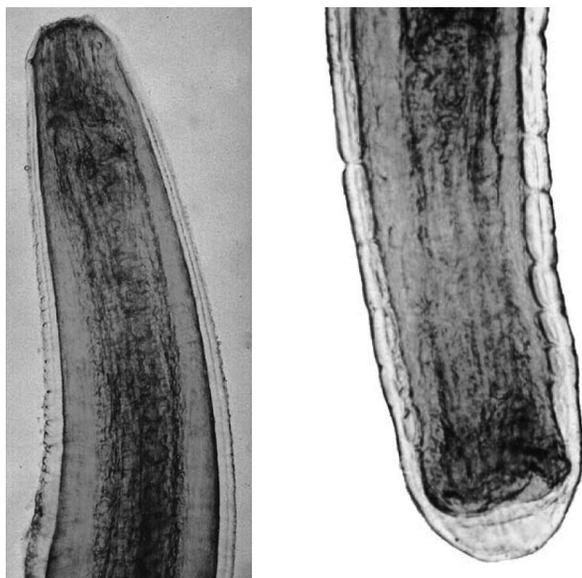


Fig. 3. *Philometra ovata* (original): anterior part (left); posterior part (right)

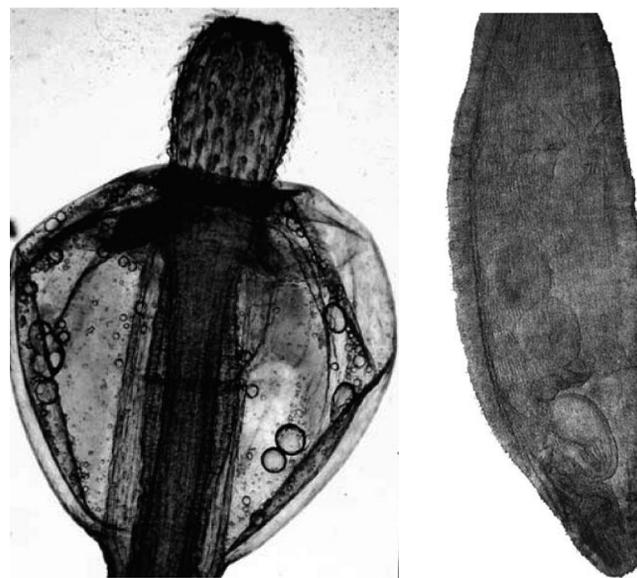


Fig. 4. *Pomphorhynchus laevis* (original): proboscis (left); body (right)

and the poverty of parasite fauna occurring here. In our study, *Dactylogyrus cryptomeres f. typica* (Monogenea), is recorded for the first time in the ichthyoparasitofauna of Lake Ohrid and Macedonia.

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