Trakia Journal of Sciences, Vol. 3, No. 6, pp 36-40, 2005

Available online at:
http://www.uni-sz.bg

ISSN 1312-1723

Original Contribution

HELMINTH FAUNA OF THE PRUSSIAN CARP, *CARASSIUS GIBELIO* (BLOCH, 1782), FROM THE SREBARNA BIOSPHERE RESERVE

S. Shukerova*

Department of Agroecology, Agricultural University,
12 Mendeleev Street, 4000 Plovdiv, Bulgaria

ABSTRACT

Thirty-six specimens of *Carassius gibelio* from the Srebarna Biosphere Reserve were examined for helminth parasites during the period May-June 2004. The fishes were collected by fishing-nets at six localities at the Srebarna Lake and examined for presence of parasites. Two trematode species (*Posthodiplostomum cuticola* and *Diplostomum rutili*) and two nematode species (*Contracaecum microcephalum* and *Raphidascaris acus*) were recovered and the parameters of the infection of *C. gibelio* were estimated on the basis of the prevalence and mean abundance. *D. rutili*, *R. acus* and *C. microcephalum* are reported for the first time for the fish helminth fauna of the Srebarna Lake. Together with *P. cuticola,* the four species represent new host records for the Prussian Carp from Bulgaria.

Key words: Helminths, Prussian Carp, Srebarna Lake

INTRODUCTION

The current data on the helminth parasites from the fish in the Srebarna Lake are based on a single study reporting four species (Margaritov, 1959) These are the trematodes *Asymphylodora tincae* (Modeer, 1790) and *Posthodiplostomum cuticola* (Nordmann, 1832) from *Scardinius erythrophthalmus, Diplostomum confusus* Ciurea, 1930 from *Perca fluviatilis* and metacestodes identified as *Proteocephalus* sp. from *Tinca tinca.*

The aim of the study was to reveal the helminth diversity and the parameters of infection of the Prussian Carp, *Carassius gibelio*, which is frequent but unstudied fish species in the Srebarna Lake. The present results are part of a wider study on the helminth parasites from the freshwater fish in the Srebarna Biosphere Reserve.

MATERIALS AND METHODS

Thirty-six specimens of *Carassius gibelio* (Bloch, 1782) from the Srebarna Biosphere Reserve were studied for the presence of helminth parasites in the period May-June 2004. The fishes were collected using fishing-nets at six sites at the Srebarna Lake: Golyamo vodno ogledalo, Chervenka, Pristan, Ribarnika, Draganova lokva, and one located between the dikes. The fishes were dissected and the parasites were removed, fixed in 4% hot formalin, and preserved in 70% ethanol [1, 4]. The trematodes were prepared for microscopic examination by staining with iron acetocarmine [3], dehydrated in an alcohol series, cleared in eugenol and mounted in Canada balsam. The nematodes were cleared in glycerol /70% ethanol solution [7] and studied on temporary mounts. The helminth parasites were illustrated with the aid of a drawing tube. Measurements are given in millimetres unless otherwise stated. The parameters of the infection of the hosts were estimated on the basis of the prevalence (P%) and mean abundance (MA).

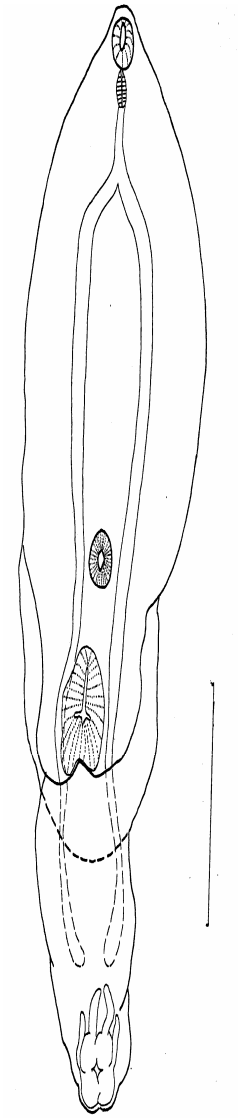
RESULTS

The present study revealed the presence of two trematode and two nematode species from *C. gibelio* from the Srebarna Biosphere Reserve. In total, the morphological studies are based on 18 and 60 specimens of trematodes and nematodes, respectively.

* **Correspondence to**: *S. Shukerova, Department of Agroecology, Agricultural University, 12 Mendeleev Street, 4000 Plovdiv, Bulgaria; E-mail: sonia_al@abv.bg*

Class Trematoda Rudolphi, 1808
Family Diplostomatidae Poirier, 1886
***Posthodiplostomum* Dubois, 1936**
***Posthodiplostomum cuticola* (Nordmann, 1832) Dubois, 1936, larvae (Figure 1)**

Location: skin and musculature. Season: spring. Infection: P=8.33%; MA=0.39.



Scale bar: 200 μm

Figure 1:.*Posthodiplostomum cuticola* (Nordmann, 1832). Larva, general view, dorsal.

Description (based on 10 specimens): metacercariae of *P. cuticola* located within spherical to oval thin-walled cysts surrounded by darkly pigmented dots. Encapsulated larvae with size 0.734-0.918 mm x 0.286-0.306 mm. Larval body divided into two parts: anterior part oval, with size 0.530-0.652 x 0.286-0.306 mm, its anterior portion sharply pointed apically; posterior part conical to pyriform, with size 0.204-0.255 x 0.143-0.184 mm.

***Diplostomum* Nordmann, 1832**
***Diplostomum rutili* Razmashkin, 1969, larvae (Figure 2)**

Location: lenses of eyes. Seasons: spring, summer. Infection: P= 8.33%; MA=0.11.

Description (based on 4 specimens): metacercariae of *D. rutili* found free in lenses of eyes. Body oval, 0.059 mm long. Oral sucker with size 0.0354 x 0.236 mm, ventral sucker 0.032 x 0.030 mm, organ of Brandes 0.047 x 0.036 mm. Oral sucker subterminal, muscular lappets reaching anterior body end.

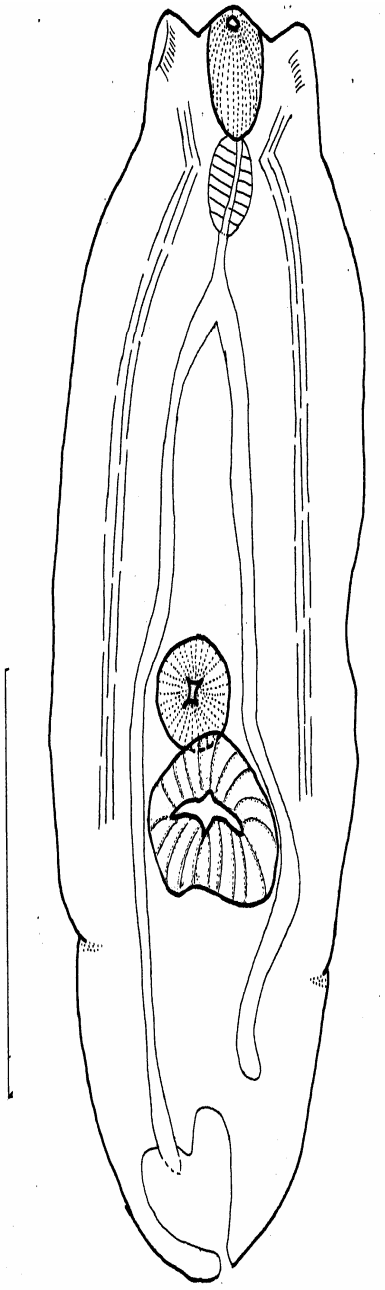


Figure 2: *Diplostimum rutili* Razmashkin, 1969, larvae. General

Class Nematoda Rudolphi, 1905
Family Anisakidae Railliet et Henry, 1912
***Raphidascaris* Railliet et Henry, 1915**
***Raphidascaris acus* (Bloch, 1799), larvae**

Location: liver, intestine and mesentery. Seasons: spring, summer. Infection: P=19.44; MA=0.94.

Description (based on 5 specimens): pale larvae with smooth cuticle; cuticle of more developed larvae with dense transverse striation. Body 2.154-4.920 long and with maximum width 0.154-0.260. Oesophagus cylindrical, muscular, 0.319-0.645 mm long. Posterior appendix 0.495-0.514 mm long. Nerve ring encircling oesophagus at its second third, excretory pore situated shortly below level of nerve ring. Tail conical, 0.714-0 0.103 mm long.

***Contracaecum* Railliet et Henry, 1912**
***Contracaecum microcephalum* (Rudolphi, 1809), larvae (Figure 3)**

Location: liver, intestine, kidney and mesentery. *Seasons*: spring, summer. Infection: P=16.67; MA 0.72.

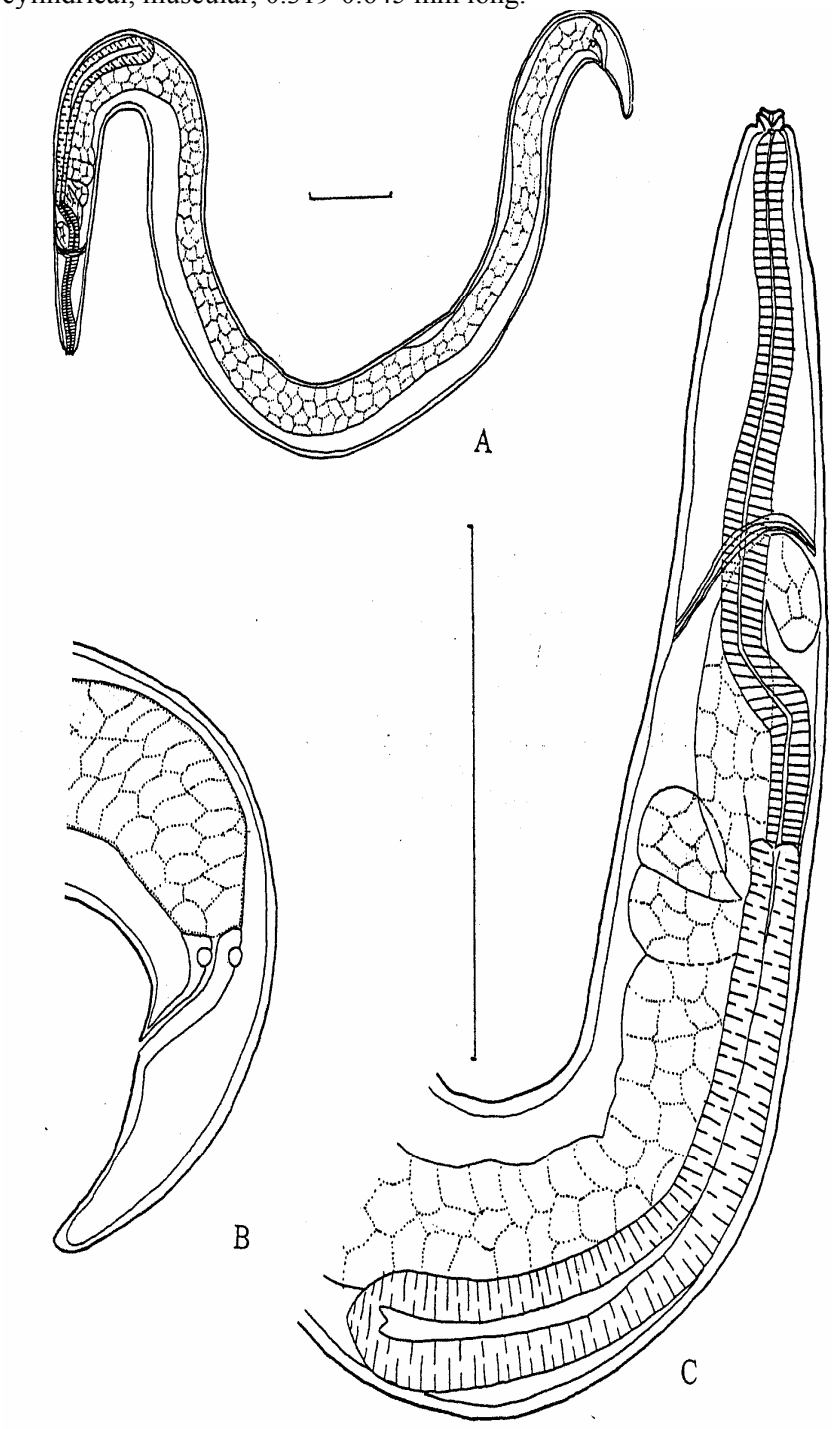


Figure 3: *Contracaecum microcephalum* (Rudolphi, 1809), larvae.
A – general view, B – anterior end of body, C –tail. *Scale-bar* 200 μm.

Description (based on 5 specimens): larvae 2.128 – 2.928 mm long and with maximum width 0.129- 0.245 mm. Anlagen of lips large, conical; larval tooth present. Oesophagus with size 0.132-0.424 x 0.020-0.030 mm; ventricular appendix 0.295-0.516 x 0.458-0.590 mm long, approximately as long as oesophagus. Anterior intestinal caecum 0.136-0.441 mm long. Distance of nerve ring 0.132-0.271 mm. Tail 0.0102-0.089 mm long.

DISCUSSION

This is the first study on the helminth fauna of *C. gibelio* from the Srebarna Biosphere Reserve. *P. cuticola*, *D. rutili***,** *R. acus* and *C. microcephalum* represent new host records for Bulgaria. The latter three species are reported for the first time from Srebarna Biosphere Reserve. *R. acus* shows the highest prevalence and mean abundance (19.44% and 0.94, respectively), followed by *C. microcephalum* (16.67% and 0.72). *P. cuticola* and *D. rutili* showed the least prevalence (8.33%), while *P. cuticola* had higher MA than *D. rutili* (0.39 and 0.11, respectively). The definitive hosts of *P. cuticola* are birds of the genera *Ardea* and *Nycticorax*. The first intermediate hosts are the freshwater snails *Planorbis planorbis* and *P. carinatum*, and the second intermediate hosts are fishes of the families Cyprinidae, Percidae, Esocidae, Acipenseridae, Siluridae and others [2]. The definitive hosts of *D. rutili* are various fish-eating birds *Larus munutus*, *L. canus*, *L. ridibundus*, *L argentatus*, *Chlidonias hybrida*, *Sterna albifrons*, *Pelecanus crispus*, etc. [8]. The definitive hosts of *C. microcephalum* are various fish-eating birds in Eupore: *Ardea cinerea*, *A. purpurea*, *A. ralloides*, *Nycticorax nycticorax*, *Pelecanus onocrotalus*, *Ciconia ciconia, C. nigra* etc., in which the adult nematodes are in the stomach and intestine. The first intermediate hosts are copepods and the further development of larvae occurs when the first intermediate host is swollen up by fish serving as the second intermediate host reported by Moravec (1994) [7]. The definitive hosts of *R. acus* are some species of predatory fishes (*Esox lucius, Lota lota, Salmo trutta* and others), which acquire infection by ingestion of other fishes harbouring the nematode third stage larvae. The variety of the helminth life cycles including *C. gibelio* as an obligate host reveals the important role of this fish species for the ecosystem functioning in the protected area studied.

CONCLUSIONS

1. This is the first study on the helminth fauna of *C. gibelio* from the Srebarna Biosphere Reserve. *P. cuticola*, *D. rutili***,** *R. acus* and *C. microcephalum* represent new host records for Bulgaria. The latter three species are reported for the first time from Srebarna Biosphere Reserve.
2. *P. cuticola* was found during spring period of examination. Other three species of helminthes during spring and summer periods were reported.
3. *R. acus* shows the highest prevalence and mean abundance (19.44% and 0.94, respectively), followed by *C. microcephalum* (16.67% and 0.72). *P. cuticola* and *D. rutili* showed the least prevalence (8.33%), while *P. cuticola* had higher MA than *D. rutili* (0.39 and 0.11, respectively).

ACKOWLEDGEMENTS

I am grateful to Dr D. Kirin (Agricultural University – Plovdiv) for guidance and encouragements for this research. My thanks also go to Dr B.Georgiev, Dr A.Kostadinova and Dr V.Biserkov (Central Laboratory of General Ecology, Bulgarian Academy of Sciences) for their valuable assistance, consultations and advice in the course of the study. And, lastly but by no means the least, I would like to thank Dr P. Nikolov for assisting in illustrating the helminthes with the aid of a drawing tube.

REFERENCES

1. Bauer, O., V. Musselius, J. Strelkow. Disease of pond fishes. Second Edition. *Light and Food Industry,* Moscow, 1981 (in Russian).
2. Bykhovskaya-Pavlovskaya et al.. Parasites of freshwater fishes of USSR. *Academy of Sciences of USSR*, Moscow – Leningrad, 1962 (in Russian).
3. Georgiev B., V. Biserkov, T. Genov. *In toto* staining method for cestodes with iron acetocarmine. *Helminthologia*, 23: 279-281, 1986
4. Zashev, G., N. Margaritov. Diseases of fish. *Nauka i izkustvo,* Sofia, 1966 (in Bulgarian).
5. Margaritov, N. Helminths of some our freshwater fishes. Publication of the Institute of Fisheries and Fish Industry, Varna, 1:1-20, 1959 (in Bulgarian).

6. Michev, T. et al. Biodiversity of the Srebarna Biosphere Reserve, Checklist and Biblography. *Pensoft*, Sofia, 1998.
7. Moravec, F. Parasitic nematodes of freshwater fishes of Europe, 1994.
8. Shigin, A.A. Trematode fauna of the USSR. Genus *Diplostomum*. Metacercariae. *Nauka*, Moscow, 1986 (in Russian).