

## HEALTH PROFILE OF PRUT ICHTHYOFAUNA – A BRIEF STUDY

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### Abstract

The aim of our investigation was to assess the fish health condition from wild population from the Prut River in order to evaluate the quality of its aquatic environment conditions. Analysed fish species were: *Cyprinus carpio*, *Silurus glanis*, *Stizostedion lucioperca*, *Abramis brama*. Parasitological analyses were carried out in the Research Centre MoRAS-UDJ Galati (<http://moras.ugal.ro>). Parasitological investigations were performed on fresh samples by classic methods and the obtained results were expressed in grades of extensity and intensity. In the analysed fish, 10 parasitic species were identified belonging to 7 systematic groups: Mycophyta, Monogenea, Trematoda, Cestoda, Nematoda, Acanthocephala, Crustacea. The extensity of the parasitosis varied among examined fish species, as the following *Abramis brama* > *Silurus glanis* > *Cyprinus carpio* > *Stizostedion lucioperca*. The most frequently found helminths were monogeneans and nematodes. Although a higher number of parasites has been identified in the analysed fish, the parasitic intensity was lower.

**Key words:** Prut River, wild fish, parasitological analysis

### INTRODUCTION

In many cases, the impairment of the natural fish populations is due to the impact of immediate contaminants or natural environmental stressors (e.g. temperature variation, habitat modification, sediment loading) or, more likely, as a consequence of a combination of both natural and human sources, that induce perturbations [4].

The aquatic environment can be studied either directly, by a regular monitoring of water quality parameters or indirectly by using bioindicators [11], such as fish parasites [7]. Knowledge of the biology of the parasite and its hosts, the host–parasite relationship can help to detect environmental change. Particularly, long-living species (some digenean trematode, cestode, nematode life cycle stages) provide information on the seasonal migration of their hosts and migration habits of different age groups (feeding area/spawning area) [10].

The aim of our investigation was to assess the fish health condition of wild population from the Prut River in order to evaluate the quality of its aquatic environment conditions, as part of a larger ecosystem approach study. We focused on those fish species which are the object of the pisciculture (*Cyprinus carpio*, *Silurus glanis*, *Stizostedion lucioperca*) or present commercial interest (*Abramis brama*).

### MATERIALS AND METHODS

In April 2018, we sampled the fish community from the Prut River (Frumușița, Cotul Chiului area) belonging to the following species: *Silurus glanis*, *Stizostedion lucioperca*, *Cyprinus carpio*, *Abramis brama*. The fishing area was represented by a sector of the Prut River with a surface of 0.715 km<sup>2</sup> (L=13 km, l=0.055 km). The scientific fishing activity was carried out over a length of 2 km, with the fishing net wall. The fish were weighed (g) and their total length was measured (cm). Fish were transported in Research Centre MoRAS-UDJ Galati laboratory

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(<http://moras.ugal.ro>) where parasitological analyses were carried out. The sampled fish were examined for both ectoparasites and endoparasites using standard parasitological procedures. The taxonomic classification and identification of the observed parasites were done on the basis of Munteanu [8], Bauer [1], [2], [3]. The external surface of the fish was examined thoroughly using a hand lens. Areas around the fins, nostril, operculum and the buccal cavity were examined for external parasites (monogeneans and crustaceans). Each fish was opened dorso-ventrally and its internal organs were examined for parasites. The entire digestive system was removed and placed in a Petri dish with physiological saline, and the gut was divided into sections. For isolation, selection and identification of the parasite fauna of wild fish from Prut river, we used a Zeiss microscope. The most successful preparations for each parasite were photographed with the Axio Image camera. We also analysed the extensity and intensity of parasitic infestation of the fish specimens according to Bush [5].

## RESULTS AND DISCUSSIONS

It was noted that the parasitic extensity was 100% for *Silurus glanis*, *Cyprinus carpio* and *Abramis brama*, while no parasites were identified in the analyzed *Stizostedion lucioperca*. In the examined fishes 10 species of parasites were identified, belonging to 7 systematic groups (*Mycophyta*, *Monogenea*, *Trematoda*, *Cestoda*, *Nematoda*,

*Acantocephala* and *Crustacea*). In total, 5 helminths predominantly taxa were found, including 2 nematodes, 2 monogeneans, 2 acanthocephalan, 1 cestode and 1 digenean. In table 1 information on the location of the parasites identified and intensity of parasites can be found.

Regarding the number of parasites belonging to a species, identified in a certain host, there were differences between the studied fish species. Thus, in *Silurus glanis* the monogenous worm *Ancylodiscoides siluri*, which is specific to this host, recorded an average parasitic intensity between 2 and 15 parasites/fish. Other similar studies show, in connection to this parasite, that their number is directly proportional to the age/ size of the host: while in smaller European catfish the number of parasites is insignificant, in the larger European catfish the number of parasites can even be several hundred individuals. Because this monogenous worm is hermaphroditic, on the gills of infested fish all stages of development (larvae and adults with eggs) can be found. Many parasites have complex life cycles that depend on a number of different hosts. Several parasite species are host-specific; thus, a diversity of parasites would suggest a diversity and abundance of specific host animals enough to support the parasites [9].

A similar situation is noted in the case of the nematode worm *Goezia ascaroides* which was found in all *Silurus glanis* specimens examined, between 3-10 parasites/fish.

Table 1 Species of parasites identified in the Prut River fish species

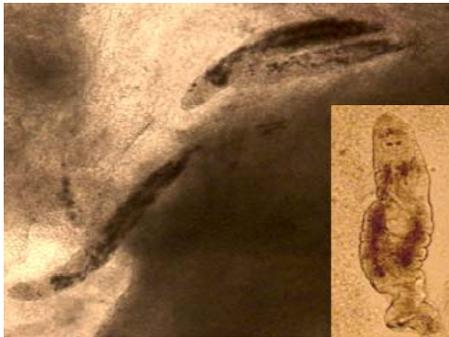
No. crt.	Systematic group	Species of parasite	Fish host	Organ/area infested	Parasitic intensity
1	<i>Mycophyta</i>	<i>Branchiomyces sanguinis</i>	<i>Abramis brama</i>	gills	medium
2	<i>Monogenea</i>	<i>Dactylogyrus extensus</i>	<i>Abramis brama</i> <i>Cyprinus carpio</i>		low
3		<i>Ancylodiscoides siluri</i>	<i>Silurus glanis</i>		medium
4	<i>Trematoda</i>	<i>Tetracotyle variegata</i>	<i>Abramis brama</i>	intestine	low
5	<i>Cestoda</i>	<i>Caryophyllaeus laticeps</i>	<i>Abramis brama</i>		Low
6	<i>Nematoda</i>	<i>Goezia ascaroides</i>	<i>Silurus glanis</i>	mesentery, intestine	Low
7		<i>Rhabdochona denudata</i>	<i>Cyprinus carpio</i>		low
8	<i>Acantocephala</i>	<i>Pomphorhynchus laevis</i>	<i>Silurus glanis</i>	intestine	low
9		<i>Neoechinorhynchus rutili</i>	<i>Cyprinus carpio</i>		low
10	<i>Crustacea</i>	<i>Argulus foliaceus</i>	<i>Abramis brama</i>	skin	low

Another interesting use of fish parasites as bioindicators concerns their potential to elucidate aspects of the biology of the host organism [6], for example feeding ecology and behaviour. Many metazoan fish parasites are transmitted through the food chain. Worms of the class *Monogenea* are important and many of them are ectoparasites of fish, exhibiting a relatively high degree of host specificity, with most fish species being infected by one or more specific parasites [12]. In the case of the acantocephalic worm *Pomphorhynchus laevis*, the analysis of the parameters of evaluation of the parasitic degree registered the same tendency, only 2 parasites being identified in a single European catfish. This aspect may be due to the fact that *Pomphorhynchus laevis* is a common acanthocephalus of fish in the Danube Delta, being a typical southern eurihaline form.

In the *Cyprinus carpio* species, the monogenic worm *Dactylogyrus extensus* was identified on the branchial scrapes, the parasitic intensity being reduced to 5-10 specimens/fish. 10 individuals of the *Rhabdochona denudate* parasite and 2 individuals of the *Acantocephalus lucii* parasite were identified in the intestine of a single fish. Intestinal parasites inhibit the digestive activity of the host and indirectly inhibit vitamin and blood sugar metabolism and growth [8].

In the *Abramis brama* species, unlike the other species examined, 5 species of parasites were identified from 5 systematic groups. However, the extensity and intensity of parasites were reduced, 1-2 parasites/host. An exception was the parasitic fungus *Branchiomyces sanguinis* whose hyphae were identified in quite large numbers on the gills of the fish examined.

Figures 1 - 8. Parasites found in the Prut River fishes



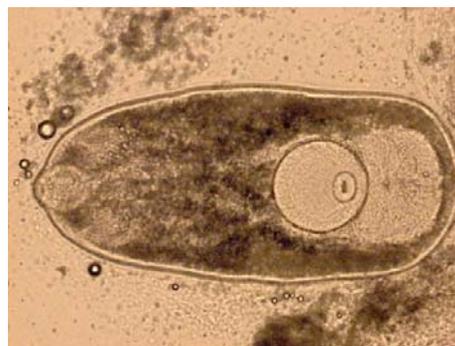
1. *Ancylo-discoides siluri*



2. *Dactylogyrus extensus*



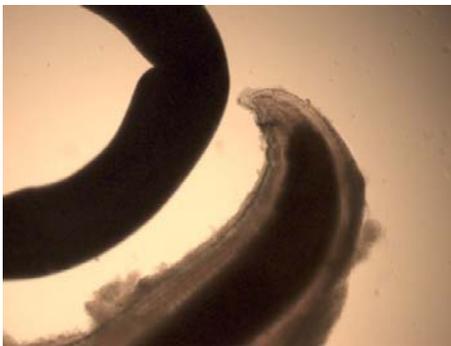
3. *Branchiomyces sanguinis* hyphae



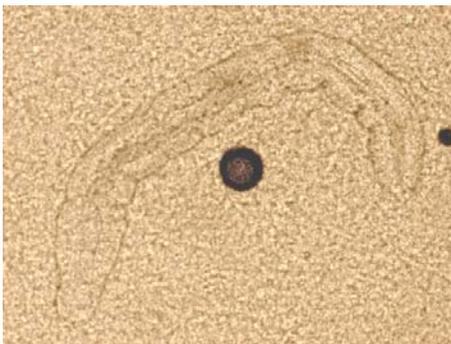
4. *Tetracotyle variegata*



5. *Caryophyllaeus laticeps*



6. *Rhabdochona denudate*



7. *Neoechinorhynchus rutili*

8. *Argulus foliaceus*

## CONCLUSION

After the investigations conducted in the researched area we can say that there were no parasitic epizootic diseases that cause loss of fish species with economic value. From the point of view of the parasites' location, they showed specificity for a certain host but also for a certain organ, indicating that both ecto- and endoparasites are in relation to their hosts as well as to their external living

environment. The fish perhaps become infested when they consume larval stages of the parasites during feeding. In this study, the parasites do not seem to affect the health status of their hosts. The findings of this paper are expected to contribute to future studies to protect and develop the ecological potential of the Prut River.

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