



STATEMENT REVIEW

on a dissertation for obtaining a educational-scientific degree "doctor" (PhD) in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.4. Earth Sciences, scientific specialty "Ecology and Ecosystem Conservation".

Author of the dissertation: RADOSLAVA GEORGIEVA ZAHARIEVA, PhD student at the Department of Agroecology and Environmental Conservation at the Agricultural University, Plovdiv.

Topic of the dissertation: "Parasites and parasite communities of fish from the Danube river – ecology and biodiversity".

Reviewer: Assoc. Prof. Ivelin Aldinov Mollov, PhD, University of Plovdiv "Paisii Hilendarski", Faculty of Biology, Department of Ecology and Environmental Conservation (field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.3. Biological Sciences, scientific specialty "Ecology and Ecosystems Conservation"), appointed as member of the scientific jury by order № RD-16-1118 / 30.10.2022 by the Rector of AU.

1. Relevance of the problem.

The problem examined in the dissertation - the parasites and parasite communities of fish from the most northwestern part of the Danube River in Bulgaria is extremely relevant. Since a large part of the studied fish species are used for food by humans, and some of the recorded parasite species are pathogenic for humans as well, the dissertation has not only a purely scientific, but also an applied contribution.

2. Purpose, tasks, hypotheses and research methods.

The purpose and tasks are formulated and set correctly and reflect the topic indicated in the title of the dissertation. The research was conducted according to a modern and adequate, well-developed methodology, correctly applied, which allows the achievement of the set goal and the solution of the tasks. A total of 31 species of fish belonging to 8 families were studied, from which 34 species of parasites from 4 classes (Trematoda, Cestoda, Acanthocephala and Nematoda) were isolated. The obtained results are appropriately processed, using mathematical methods and statistical analysis.

3. Visualization and presentation of the obtained results.

The results presented in the dissertation follow the logical sequence and correspond to the set goal and tasks. They are presented on 174 pages, illustrated with the help of 105 tables and 74 figures, which also present the results of the statistical processing of the data. The presented results are quite sufficient in volume and thoroughly discussed and analyzed. A nice impression is the

presence of a "Summary" part after each chapter in the results, which makes tracking the obtained results much easier.

4. Discussion of the results and used literature.

The obtained results show that the biotopes Kudelin, Yasen, Novo selo, Koshava and Kutovo are new habitats for the recorded 34 species of parasites from 4 classes (Trematoda, Cestoda, Acanthocephala and Nematoda). *Schyzocotyle acheilognathi* is a new taxon for the helminth fauna and helminth communities of freshwater fish from the Danube River in Bulgaria. Six species of helminths (*L. confusus*, *Sph. bramae*, *N. cheilancristrotus* (larvae), *C. lacustris*, *Ph. obturans*, *K. intestinalis*) are new to the Danube River and the river basin in Bulgaria. Three species of helminths (*L. confusus*, *N. cheilancristrotus* (larvae), *Ph. obturans*) are new to the Danube River and the river basin. For 25 species of helminths, new hosts were recorded in Bulgaria, and for 29 species of helminths, new hosts were recorded for the Danube River and the river basin in Bulgaria (for 26 of them - new hosts for the Danube River and the river basin). Seasonal dynamics in species distribution were found and presented.

A total of 18 conclusions were formulated, which also follow the set goals and tasks and correctly reflect the results obtained.

The literature used in the dissertation totals of 206 titles. The literature review is detailed and adequately reflects what has been done so far on the issues of the dissertation work.

5. Contributions to the dissertation.

The contributions of the dissertation work are **scientific** and **scientific-applied** - a new species of helminth was identified for the helminth fauna and helminth communities of freshwater fish from the Bulgarian section of the Danube River (*Sch. acheilognathi*). Six species of new endohelminths have been identified for the Danube River and the river basin in Bulgaria, 3 of which are new for the Danube River and the river basin. For 25 species of helminths, new hosts have been recorded in Bulgaria. For 29 species of helminths, new hosts were recorded for the Danube River and the river basin in Bulgaria, and for 26 species of them - in total for the Danube River and the river basin. For the first time, the seasonal differences in the helminth complexes of some types of freshwater fish from the Danube River were examined, as well as the data on the species composition of the helminths and the parasite communities of fish from the freshwater ecosystem of the Danube River were enriched. New data are provided on the invasion indicators of human pathogenic parasites - *Contracaecum* sp. and *E. excisus*.

6. Critical remarks and questions.

I would address the following critical remarks and questions to the PhD student:

Critical notes:

- I recommend using the word "individuals" instead of "specimens" as it has a slightly different meaning, e.g. museum specimens.

- It is better to give the physical-geographical characteristics as a separate chapter, not as part of the "Materials and Methods" chapter.

- All websites used are cited incompletely by URL only. They are listed from #190 to #206 in the bibliography. In most cases, one can give the author, year, name of the site and then give the address. Some of these citations are incomplete, others are listed only with a web link.

- Task 1 would be more correctly formulated if the beginning "Ecological biological research on helminths..." is replaced by "Sampling of helminths from..."

Questions:

1. On page 51, about the Simpson index it is stated "When the index tends to 0, then conditions are more favorable". No reference is given - which author gives this statement?

2. Why was the weight of the fish not measured? This would have allowed to calculate body condition criteria, such as Fulton's criterion and the scaled mass index, which would provide additional information on the impact of parasite infestations on the individual body condition, from which information can be provided and, respectively the nutrition, survival and reproductive success in fish can be judged.

7. Published articles and citations.

The PhD student presents 2 publications published in Book of Proceedings, Scientific Papers. Series D. Animal Science. The presented publications reflect part of the results achieved in the dissertation work and carry the necessary number of points for PhD in professional field 4.4. from the Law.

The presented abstract objectively reflects the structure and content of the dissertation work and is prepared entirely according to generally accepted criteria.

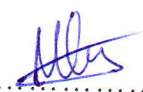
CONCLUSION:

Based on the research methods learned and applied by the PhD student, the correctly performed experiments, summaries and conclusions, I believe that the presented dissertation meets the requirements of The Act on Development of the Academic Staff in the Republic of Bulgaria and the Regulations of the Agricultural University for its application, which gives me reason to evaluate it as **POSITIVE**.

I allow myself to suggest to the esteemed Scientific Jury also to vote **positively** and to **award** RADOSLAVA GEORGIEVA ZAHARIEVA the scientific and educational degree "Doctor" (PhD) in the field of higher education 4. Natural sciences, Mathematics and Informatics, professional field 4.4. Earth Sciences, scientific specialty "Ecology and Ecosystem Conservation".

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Plovdiv

THE STATEMENT-REVIEW
WAS PREPARED BY:


(Assoc. Prof. Ivelin Mollov, PhD)