STATEMENT

from DSc Dilyan Georgiev Georgiev – Associate Professor, Department of Ecology and Environmental Conservation, Faculty of Biology, Paisii Hilendarski University of Plovdiv

for a dissertation to be awarded the educational and scientific degree of "Doctor" in the field of higher education 4. Natural Sciences, Mathematics, and Informatics, professional direction 4.3. Biological Sciences, doctoral program in Morphology.

Author: Eleonora Tencheva Kovacheva

Topic: "ASSESSMENT OF POLLUTION OF AQUATIC ECOSYSTEMS WITH PRIORITY ORGANIC POLLUTANTS USING MORPHOFUNCTIONAL BIOMARKERS IN *CYPRINUS CARPIO* (LINNAEUS 1785)"

Supervisor: Professor, Dr. Elenka Stoilova Georgieva, Department of Developmental Biology, Faculty of Biology, Paisii Hilendarski University of Plovdiv

1. Overall presentation of the procedure and the doctoral candidate

The doctoral thesis of Eleonora Tencheva Kovacheva meets the criteria and indicators for obtaining the scientific-educational degree of "Doctor" according to the Higher Education Act, the Regulation for its Implementation, and the Regulation for the Development of the Academic Staff of Paisii Hilendarski University of Plovdiv.

2. The relevance of the topic

The use of pesticides has increased globally in recent decades, leading to an increased risk to the environment and organisms. Despite their benefits to agriculture, their widespread applications cause serious damage to ecosystems and human health, especially when residues remain in food. The topic of the dissertation is highly relevant, not only for the contemporary scientific community but also has broad applications in safeguarding biodiversity and human health.

3. Familiarity with the subject matter

The doctoral candidate demonstrates excellent familiarity with the issues, as evidenced by the extensive literature review covering fundamental aspects such as the general characteristics and classification of pesticides, their impacts on the environment, animals, and humans, as well as specific consequences on aquatic ecosystems and fish organisms. The candidate has meticulously examined and analyzed various studies related to the effects of pesticides on aquatic ecosystems and fish, including changes in fish organs under the influence of pesticides. They have particularly delved into histopathological, histochemical, and biochemical aspects, which are crucial for understanding the impact of pesticides on fish organisms.

4. Research methodology

The doctoral candidate has applied an appropriate and precise methodology for the research, as evidenced by the detailed description in the "Materials and Methods" chapter. They provide characteristics of the experimental subjects (common carp - *Cyprinus carpio* L.) and the pesticides used (insecticide pirimiphos-methyl, fungicide propamocarb hydrochloride, and herbicide 2,4-D), as well as their specific concentrations during application. The research methods are clearly described, including the experimental setup and protocols for histopathological, histochemical, and biochemical analysis, as well as methods for statistical data processing. This demonstrates careful planning and execution of the studies, as well as attentiveness to every step of the research process.

5. Characterization and assessment of the dissertation work and contributions

The dissertation work presents original scientific research confirming the potential use of common carp as a bioindicator for pesticide pollution in aquatic ecosystems. The discovered histopathological changes in various organs of the fish provide information on the toxic effects of the substances used on their health and well-being. The work introduces new methods for assessing the toxic effects on bioindicator species, including the use of histopathological, histochemical, and biochemical analyses. The identified changes can be successfully utilized as biomarkers for pesticide pollution in aquatic ecosystems and incorporated into models for the assessment and regulation of organic pollutants in water ecosystems.

6. Evaluation of the publications and personal contribution of the candidate

Eleonora Kovacheva has actively contributed to the publication of scientific research that significantly contributes to understanding the impact of pesticides on the health of common carp (Cyprinus carpio). Her publication in the journal "Toxics" focuses on the comparative toxicity of chlorpyrifos and cypermethrin on the fish's biomarkers. This study addresses the important issue of the toxicity of various pesticides and their consequences for aquatic ecosystems. Additionally, her works in "Ecologia Balkanica" examine the histopathological and biochemical changes in the liver and gills of common carp after treatment with different pesticides, providing valuable data for understanding the mechanisms of toxicity and adaptive responses in fish. Her contribution to these studies is of paramount importance to the scientific community, advancing knowledge in the field of ecotoxicology and the protection of water resources.

7. Summary of the thesis

The abstract meets the requirements for formatting an abstract for obtaining the respective scientific and educational degree, both in terms of volume and content. It provides a brief summary of the dissertation and covers all important aspects of it. It could have avoided citing the literature used at the end.

8. Recommendations for future utilization of the dissertation contributions and results

The successful publication and dissemination of information from the dissertation work will underscore the importance of Eleonora Kovacheva's research in the field of ecotoxicology and the

conservation of aquatic ecosystems. The publications will contribute to environmental conservation and human health.

CONCLUSION

I strongly express my positive opinion **IN FAVOR** of awarding the academic degree of "Doctor" in the field of higher education 4. Natural Sciences, Mathematics, and Informatics, professional direction 4.3. Biological Sciences, doctoral program Morphology to Eleonora Tencheva Kovacheva.

19.03.2024 г. **Signature**: .....

Assoc. Prof. DSc Dilian Georgiev