STATEMENT

BY Anita Georgieva Tosheva, PhD, Associate Professor, Faculty of Biology, Sofia University "St. Kliment Ohridski", a member of the Scientific Jury, appointed by Order no. 15/14.02.2025 of the Director of IBER-BAS.

ON a Doctoral thesis of **Borislava Petrova Gyosheva**, a full-time PhD student at the Department of Aquatic Ecosystems of the Institute of Biodiversity and Ecosystem Researches, BAS **(IBER-BAS)**, for the defence of the educational and scientific degree "Doctor " in the professional field in the area of Higher Education 4. Natural Sciences, Mathematics and Informatics, professional field 4.3. Biological Sciences, scientific specialty Hydrobiology, on the theme: "Composition and phytocoenotic structure of macrophytic communities in different types of water bodies in the catchment area of the Bulgarian stretch of the Danube River", with scientific supervisor Assoc. Prof. Vladimir Vassilev Valchev, PhD and scientific consultant Prof. Rosen Todorov Tsonev, PhD.

General presentation of the procedure and the PhD student

The documents submitted by Borislava Petrova Gyosheva in electronic form meet all the requirements of the Act on the development of the academic staff in the Republic of Bulgaria (ADASRB), the Regulations on the Application of the ADASRB, the Rules for the conditions and the order for acquiring scientific degrees and occupying academic positions in BAS and at IBER-BAS. The documents demonstrate the accumulation of a total of 386 credits, which exceeds the required 250 criteria for the educational and scientific degree "Doctor". The report on the similarity of the text of the thesis, resulting from the anti-plagiarism procedure, shows that the similarities found are regulated and do not show any signs of plagiarism. The thesis complies with the Requirements for Dissertations applied at IBEI-BAS. I have no critical remarks on the documents submitted by the PhD student.

Borislava Gosheva obtained her Bachelor's degree in Biology at the Faculty of Biology of Sofia University "St. Kliment Ohridski" in 2009, followed by her Master's degree in Allgology at the same institution in 2011. For the period 2014-2016 she was a full-time PhD student at IBEI-BAS, Department of Aquatic Ecosystems. Since 2010, her professional career is connected with the Department of Aquatic Ecosystems, IBEI-BAS. The enclosed CV of the PhD student shows a sustainable scientific interest in botany and aquatic ecosystems, combined with upgrading of knowledge, experience and skills, through additional training (for work with GIS, statistics and modelling) and specializations abroad (Vienna, University of Novi Sad, Oslo University). Borislava Gyosheva has participated in 18 scientific projects, the results of her research activities have been presented at 12 scientific forums and 8 publications have been published in scientific journals. She is a member of International Association for Danube Research (IAD). She has educational activities as a part-time lecturer (practical classes) at the Sofia University "St. Kliment Ohridski" and the Medical University of Sofia.

General characteristics of the thesis

The aim of the thesis is to study of the species composition and phytocoenotic structure of macrophyte communities in different hydromorphological features of water bodies located in the floodplain terrace of the Bulgarian Danube and its tributaries, and to determine the relationship of these communities to abiotic environmental factors. The present study is particularly relevant in the context of the rapidly changing environmental conditions and increasing anthropogenic pressures in the region, as well as the poorly studied macrophyte communities in Bulgaria.

The thesis consists of 263 pages, including 56 figures, 20 tables and 5 appendices (19 pages). There are 312 references cited. The significant volume of references illustrates a very good understanding of the problem and a high theoretical background. The aim and objectives are formulated with clear hypotheses. The PhD student demonstrated good research planning skills and selection of appropriate research methods and tools. The results are clearly presented and appropriately illustrated with tables and figures. The conclusions are well structured and provide answers to the objectives arising from the aim of the study. Some of the formulated conclusions represent a summary of the results obtained. The inaccuracies noted do not detract from the overall positive impression of the work. She has mastered the fundamentals, methodology and specifics of research work with macrophyte communities, their ecological characteristics and the application of diverse research methodologies.

Significance and cogency of the results, interpretations and conclusions, nature of scientific contributions

The aim and the objectives establish the structure of the study to reveal the patterns of macrophyte community formation from an ecological point of view, using simultaneously two different approaches: standard methodology for assessment of the ecological status of the water body with biological quality element macrophytes, and phytosociological approach (Braun-Blanquet) for classification of these macrophyte communities.

Surveys were conducted at 31 stations in 26 water bodies, natural, semi-natural and artificial. The study of macrophytes was carried out in 462 transects, 482 phytocoenological releves were made. A total of 115 macrophyte taxa were identified, including species of conservation status and invasive species. A description was made of 33 associations of hydrophytic and helophytic species belonging to 11 alliances, 7 orders and 4 classes, and 17 communities. The swamps were found to have the highest macrophyte species diversity, the highest number of syntaxa, and the highest ecological status/potential. The multivariate analyses showed that the macrophyte species, their life forms and the phytocenoses spatially were related to similar environmental factors, the most important of which were connectivity with the river and hydromorphology of the water basins.

Consequently, based on the results of the conducted research, the PhD student was able to formulate the main contributions with both a fundamental and a scientifically applied nature. The contributions of the present work are of important pioneering significance for the application of simultaneous assessment to study macrophyte communities in different water bodies in maximum detail and diversity. A detailed study of the species composition and structure of macrophyte communities was carried out, and the current phytocoenotic structure of hydrophytic and helophytic syntaxa in the Danube floodplain terrace was investigated. Data on new localities of species rare for Bulgarian flora and new data for floristic regions North-Eastern Bulgaria and Danube Plain are reported. Five associations are described for the first time in Bulgaria: *Potamo-Ceratophylletum submersi; Spirodelo polyrhizae-Aldrovandetum vesiculosae; Najadetum*

marinae; Ceratophyllo demersi-Elodeetum nuttallii; Potametum graminei. The factors with the highest impact, as well as the influence of the hydromorphological characteristics of the water bodies and their connectivity with the river, on the composition and structure of the macrophyte communities and their life forms, and on the structure of the hydrophytic and helophytic cenoses in the studied water bodies are highlighted. The scientific and applied contributions include the analyses in the context of water quality assessment using the methodology applied in the European Union. The study can contribute to the implementation of combined practices for the protection and restoration of water quality and biodiversity.

I accept the applied contributions. The abstract has been prepared as required and correctly reflects the essence and results of the thesis.

Quality assessment of scientific works

On the subject of the thesis 3 scientific publications are presented - one in a journal referenced and indexed in world-famous scientific information databases (Ecohydrology & Hydrobiology, Q2, $SJR_{2020} = 0.531$, $IF_{2020} = 3.215$), one in a journal without references in world-famous scientific information databases (Phytologia Balcanica) and one in conference proceedings (Proceedings "Seminar of Ecology – 2015, with International Participation"). In all publications the PhD student Borislava Gosheva is the first author. Proof of the significance of the published results are the 15 citations found on the publication of Gyosheva et al. (2020). The results of the research activities have been reported at international and national scientific forums.

CONCLUSION

he doctoral thesis of Borislava Gosheva is a scientific research on an actual problem, related to a detailed study of the current status of macrophytes and their communities in different water bodies, containing sufficient scientific and applied results that represent an original contribution to science. It is a personal work of the PhD student, demonstrating in-depth theoretical knowledge and practical skills, as well as the ability to conduct independent scientific research. The thesis and the documents submitted by Borislava Gosheva are **in accordance with all the requirements** of the Act for the development of the academic staff in the Republic of Bulgaria and the Rules for the conditions and the order for acquiring scientific degrees and occupying academic positions in BAS and at IBER-BAS.

The data and facts presented, the analysis of their significance and the scientific and applied contributions contained, give me grounds to evaluate the presented thesis **positively** and to recommend to the honourable Scientific Jury and the Scientific Council of IBER-BAS to award the Borislava Petrova Gosheva the educational and scientific degree "Doctor" in the professional field 4.3. Biological Sciences, scientific specialty **Hydrobiology**.

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