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OPINION

by Prof. Dr. Yordan Ivanov UZUNOV, Member of the Scientific Jury appointed by Order №26/05.03.2024 of the Director of IBER-BAS, for the defense of the doctoral (PhD) thesis

STUDY ON BENTHIC DIATOM ASSEMBLAGES IN INTERMITTENT RIVERS IN SOUTHERN BULGARIA AND THEIR APPLICATION FOR ASSESSMENT OF ECOLOGICAL STATUS,

presented by full-time (regular) PhD student Tsvetelina Yasenova Isheva for the awarding of the educational and scientific degree "Doctor" in the scientific specialty Hydrobiology (06.01.11)

Full-time doctoral student Tsvetelina Yasenova Isheva was enrolled in December 2011 with the topic "Study on benthic diatom assemblages in intermittent rivers in southern Bulgaria and their application for assessment of ecological status" (Scientific direction 4.3. Biological sciences, Scientific specialty Hydrobiology (01.06.11) with the duration of the doctoral studies 01.2012-01.2015, which was extended by one year by Order # 196/09.10.2014. In addition, she was on maternity leave twice (08.2017-09.2018 and 05.2020-06.2021). At the beginning of 2016, the doctoral student presented to the Collegium the main results of her thesis work and she was dismissed with the right of defense, according to the Order # 53/22.03.2016.

During her doctoral studies, she completed her doctoral program in its entirety, accumulating 390 credit points, which is above the required minimum. She specialized in two prestigious universities - in Ghent, Belgium (algae cultivation) and in Durham, Great Britain (identification of freshwater algae).

At the same time, she participated actively and competently in a number of research projects, financed both by national (MOEW, BAS, IFA, Proles, Lukoil, Elatsite) and international sources such as the World Bank, the Financial Mechanism of the EEA, etc. She has published a total of 7 works, some of them in international journals with an impact factor, and has also presented 6 reports at scientific forums at home and abroad; for this dissertation, she presents 2 publications and 4 full-text reports.

The dissertation was prepared in full compliance with the requirements of the IBER Rules, respectively with the national and academic regulations. The obtained results are presented on 192 pages, of which 152 are text, 31 figures, 19 tables and 7 appendices. The reference list contains 310 titles, of which 19 are in Cyrillic, the remaining 291 are in Latin. It is noteworthy that 159 titles (over 51%) were published after 2000, and another 97 (31.3%) - after 2010. This is indicative of the good knowledge of the doctoral student and the relevance of the cited literary sources. However, among them are also included normative documents (directives, resolutions, standards, regulations), whose place is not among the authors' publications.

The main goal of the research, respectively of the doctoral thesis, is to establish the taxonomic diversity, distribution, dominant structure, seasonal dynamics and ecology of diatom communities from sub-Mediterranean river courses with a drying character, distributed in Southern Bulgaria (Ecoregion 07) and to evaluate their ecological condition. The hypothesis developed was that the recognition of the composition, structure and ecological spectra of the diatom communities during the different hydrological phases will show significant differences, which will confirm the need to update the national classification methodology and the scale for assessing the ecological status of this river type according to the BQE "phytobenthos". Five main tasks have been formulated, sufficiently broad to saturate the development of this dissertation with content. It is noteworthy that both the working hypothesis and the main goal and tasks are quite applicable towards the optimization of the national regulatory framework and the methodology for determining the ecological status of this specific river type R14, which does not prevent achieving both taxonomic, floristic and ecological results, respectively, and contributions.

I will not dwell on the description of details of the well-chosen (actually determined by the current/established standards) collection methods, determination and analysis of the collected materials and data, which are the objective basis for the present dissertation work: 89 epilithic diatom samples, collected from 49 river points from the Struma, Arda, Maritsa and Tundzha basins, where the R14 type is widespread. The fact that a significant part of the selected points of the research are actually operational points of the National Water Monitoring System in Bulgaria, allows their inclusion in the inter-calibration exercise for this river type. The PhD student actively participated with 41 representative samples (from 21 points on 15 rivers) in the process, gaining access to additional data sets on land use through Corine Land Cover, on hydrochemistry (BOD₅, TP, SRP, NO₃-N, NO₂-N, NH₄-N), hydromorphology, pressure index, etc. She included those data in her research.

On this basis, the conclusions presented come directly from the data analyzed above. The conclusions drawn contains contributions in terms of taxonomic, floristic, ecological and applied field of the riverine hydrobiology. The fact that the results of the doctoral student were published in the State Gazette during the next update of our regulations and became mandatory for those involved in the bio-monitoring of rivers in our country, raises the social value of this research, which I perceive as the most significant contribution of this dissertation.

I have shared my critical notes with the doctoral student in advance; most of them have been accounted for and texts/illustrations have been corrected accordingly. It should be noted the exceptional purposefulness, organization and work ability of the doctoral student, who found both strength and time to finish her dissertation, while not stopping her participation in several significant projects of Department of the Aquatic ecosystems and of the IBER in general.

I believe that here is the place to note the seemingly unremarkable role of her scientific consultant - Dr. Plamen Ivanov, with whom she successfully collaborated and developed her research qualities and scientific expertise since the student bank. This cooperation is also expressed in several joint publications and its involvement in the issue and a number of projects for the biomonitoring and assessment of the ecological condition of the surface water bodies through the BQE "phytobenthos", in particular through the testing and introduction of diatom evaluation indices.

Conclusion: The dissertation presented by the doctoral student Tsvetelina Yasenova Isheva on the topic "Study on benthic diatom assemblages in intermittent rivers in southern bulgaria and their application for assessment of ecological status" fully meets the requirements for awarding of the educational and scientific degree "Doctor" in Hydrobiology with its proven relevance, comprehensiveness and applicable character.

I strongly urge the honorable Scientific Jury to vote FOR awarding this degree to PhD student Tsvetelina Yasenova Isheva.

Sofia, June 3, 2024

Prepared the opinion:

Prof. Dr. Y. Uzunov, Member of the Scientific Jury