

OPINION

by Prof. Dr. Rosen Todorov Tsonev

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of the PhD thesis of Borislava Petrova Gyosheva - full-time PhD student in the Department of Aquatic Ecosystems of the Institute of Biodiversity and Ecosystem Researches - BAS, 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", for the award of the educational and scientific degree "PhD"

Scientific specialty: 01.06.11 Hydrobiology

Borislava Petrova Gyosheva has graduated in the Master's program "Algology and Mycology", module "Algology" in 2011. She was enrolled as a full-time PhD student in the scientific specialty 01.06.11 Hydrobiology, at IBER-BAS, Department of Aquatic Ecosystems in 2014. The supervisor of the PhD thesis is Assoc. Prof. Dr. Vladimir Vulchev from IBER-BAS, and the scientific consultant is Prof. Dr. Rosen Tsonev from the Faculty of Biology of Sofia University "St. Kliment Ohridski". Due to certain circumstances, the scientific consultant had to take on the role of the scientific supervisor, including in the procedure for defending the PhD thesis. The topic of the thesis with which Borislava Gyosheva was enrolled was "Study of species and coenotic structure, distribution and ecology of macrophyte communities in different types of reservoirs in the Svishtovsko-Belenska lowland". Subsequently, it was necessary to expand the geographical scope of the studies. Borislava Gyosheva was discharged with the right to defend her thesis in 2017. Her scientific interests are mainly related to the ecology of aquatic plants (macrophytes) and their phytocoenoses, assessment of water quality based on the macrophytes, etc.

Borislava Gyosheva has interests and skills in working with various software programs for analysis and interpretation of phytocoenological information, information obtained from the analysis of physical and chemical indicators of the aquatic environment, etc. She also has excellent knowledge of the methods of field work and gathering of various ecological information - floristic composition and population assessment of the aquatic plant

communities, measurement of various indicators of the aquatic environment, such as electrical conductivity, oxygen saturation, content of nitrogen compounds and phosphates, etc. As a result of the work on the PhD thesis, Borislava Gyosheva has published two scientific publications, one of which is in the journal *Ecohydrology & Hydrobiology*, which is referenced in SCOPUS and before the year of publication was rated Q2. It currently has an Impact Factor - 2.7. So far, this publication has collected 13 citations, which is a good proof of its importance and quality.

The PhD thesis of Borislava Gyosheva is an in-depth study of poorly known types of vegetation in Bulgaria - hydrophytic and hygrophytic communities, in selected points along the Danube River. It should be noted that the points were professionally chosen so as to reflect the diversity of these different types of natural, but also semi-natural (influenced by anthropogenic activity) and completely artificial reservoirs, in this region of the country. The results and conclusions in the thesis are based on an original and important scientific contribution - a total of 482 own phytocoenological relevés were made.

As a result of the study of the vegetation, a total of 33 associations of hydrophytic and hygrophytic plant species were established, but 16 units were left at the community level. Several of the newly established for the country associations are dominated by endangered or critically endangered species on a national level, such as *Spirodela polyrrhizae*-*Aldrovandetum vesiculosae* and *Stratiotetum aloeidi*, respectively, such species are *Aldrovanda vesiculosa* and *Stratiotes alooides*. Valuable information has also been collected and analyzed for other rare in Bulgaria species of conservation significance, such as *Trapa natans*, *Nymphoides peltata*, *Wolffia arrhiza*, *Thelypteris palustris*, etc. The paramount importance of a maintained reserve "Srebarna" for the conservation not only of a numerous conservation-significant animal species associated with the freshwater ecosystems, but also of such plant taxa and syntaxa, have been confirmed.

It has been established that the canals, and in particular drainage canals, cannot replace the natural or semi-natural aquatic habitats. They are characterized by the worst ecological potential and the lowest amount of dissolved oxygen, being inhabited by widespread macrophytic communities dominated by tolerant to the eutrophication species. The most important factors influencing these macrophytic communities are "river connectivity" and "reservoir hydromorphology", but they are also dependent on the electrical conductivity, water temperature, and for macrophytes floating in the water layer or on the surface - on the dynamics of nitrogen compounds. It has also been established that phosphates, which are

important biogens, are inversely correlated with the Reference Index (EQR) for assessing of the water quality.

The applied innovative approach of combining indices based on the abundance and species composition of macrophytes, with phytocoenological analysis, places the thesis at a higher, not only practical, but also fundamental scientific level, insofar as the relationship of ecological factors is sought not only with the population characteristics of different macrophytes, but also the interspecific relationships between them in the composition of their communities. For this reason, I recommend that this approach could be used for developing PhD thesis topics in the department and for some wetlands in other parts of the country.

The PhD thesis, of course, has its weaknesses. For example, the lengthiness of the phytocenological part has led to a shortened presentation of the results from the assessment of the ecological potential of water bodies based on reference indices of macrophyte species and their abundance. The difficulty to classifying some of the hygrophytic communities that develop along the banks of the ponds and the existence of so many classification units left at the community level with a non-determined syntaxonomic rank is due to multiple reasons. They are difficult to classify because of their short developmental period, the temporary dominance of some widespread taxa (from the genera *Persicaria* spp., *Bidens* spp., *Xanthium* spp., etc.), but also because of the insufficient phytocoenological material collected. This could of course be corrected in a future work that would be focused mainly on this group of riverine vegetation.

As a general conclusion, coming also from my joint scientific work with Borislava Gyosheva, and before that as her lecturer at the Faculty of Biology, in view of the significance of the results, conclusions and scientific contributions of the thesis, the new and original scientific information collected, I recommend to the scientific jury to support the award of the scientific and educational degree "PhD" to PhD student Borislava Petrova Gyosheva.

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