REVIEW

FROM PROF. DR. ZDRAVKO HUBENOV – NATIONAL MUSEUM OF NATURAL HISTORY, BULGARIAN ACADEMY OF SCIENCES OF THE MATERIALS, PRESENTED FOR PARTICIPATION IN A COMPETITION FOR THE ACADEMIC POSITION OF ASSOCIATE PROFESSOR IN THE FIELD OF HIGHER EDUCATION 4. NATURAL SCIENCES, MATHEMATICS AND INFORMATICS; PROFESSIONAL DIRECTION 4.3. BIOLOGICAL SCIENCES; SCIENTIFIC SPECIALITY HYDROBIOLOGY FOR THE NEEDS OF THE DIVISION OF BIOLOGICAL DIVERSITY AND FUNCTIONING IN FRESH WATER ECOSYSTEMS OF THE DEPARTMENT OF AQUATIC ECOSYSTEMS AT THE INSTITUTE OF BIODIVERSITY AND ECOSYSTEM RESEARCH AT THE BULGARIAN ACADEMY OF SCIENCES, PUBLISHED IN THE SG, ISSUE № 48, 07.06.2024

By order № 50 from 05.08.2024 of the Director of the Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences I was appointed a member of the scientific jury in a competition for the academic position of Associate Professor in the field of higher education 4. Natural Sciences, Mathematics and Informatics; professional direction 4.3. Biological sciences (scientific speciality – Hydrobiology), for the needs of the division of Biological diversity and functioning in fresh water ecosystems (research group Bioindicators, monitoring and ecological classification of freshwater ecosystems) at the Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences.

Chief Assistant Dr. Violeta Georgieva Tyufekchieva from the Department of Aquatic Ecosystems at the Institute of Biodiversity and Ecosystem Research participates in the announced competition as a candidate.

CAREER DEVELOPMENT

Violeta Tyufekchieva graduated with a master's degree in Biology at the Sofia University St. Cl. Ohridski with specialization in Fish-breeding and ichthyology. From 1995 to 2010 she is a specialist biologist at the Institute of Zoology, Bulgarian Academy of Sciences. From 2010 to 2014 she is Assistant (researcher) in the division of the Biological diversity and functioning in fresh water ecosystems at the Institute of Biodiversity and Ecosystem Research. In 2014 she defends her dissertation "Composition, distribution and ecology of the order Plecoptera (Insecta) in Bulgaria" and acquired the educational and scientific degree Doctor of Hydrobiology. Since 2014, she has been a chief assistant. Dr. Tyufekchieva has skills and a series of specializations related to upgrading of the scientific

infrastructure, geographical information systems (ArcGIS, GIS with open code and WEB based GIS), specialized statistical programs, use of the ESENIAS database, molecular taxonomy and phylogeny, molecular and biochemical markers in the ecotoxicological studies, etc., acquired in Bulgaria and abroad. She has 30 participations (reports, posters and abstracts) in the national and international scientific forums related to Bulgaria, Germany, Greece, Spain, North Macedonia, Romania, Serbia, Montenegro and Switzerland. She participated in the organizing committees of 12 national and international scientific forums and worked on 40 national and international scientific projects. She is the author of 44 scientific publications [29 are submitted for participation in the competition (17 with IF)]. She has over 194 citations (126 in publications to Web of Science with IF and Scopus with SJR).

The set of materials presented by Dr. Violeta Tyufekchieva (on paper and electronically) is in accordance with the Law for RASRB, the Regulations of the Bulgarian Academy of Sciences for application of the Law for RASRB and the Regulations on the terms and conditions for obtaining scientific degrees and for holding academic positions at the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences. The set includes documents described in the application of the candidate (№ 1-10) to the Director of the Institute of Biodiversity and Ecosystem Research (from 31.07.2024) for admission to the announced competition for Associate Professor, scientific speciality Hydrobiology. The set contains the necessary documents and 29 scientific publications, presented for the competition. The documents are prepared precisely and clearly reflect the activities of Dr. Violeta Tyufekchieva.

The presented data show the qualification, research experience and scientific activity, required for participation in the competition for an Associate Professor.

MAIN DIRECTIONS AND CONTRIBUTIONS

The scientific contributions are significant, original and mostly fundamentally theoretical and scientific applied. The main part of them are hydrobiological, ecological, taxonomical, faunistic and conservation. Some of the contributions are zoogeographical and methodological. The contributions represent a new direction and prove with new means significant aspects of existing scientific fields. Some of them can be taken as the formulation of a new hypothesis and can contribute to obtaining a number of confirmatory facts. The contributions from the research presented in the publications of Dr. Violeta Tyufekchieva are in several directions.

Taxonomic contributions. The taxonomic status of 6 species has been clarified. One species has been transferred to another genus. The taxonomic position of 3 subspecies has been changed and they have been transferred to the species group. A number of features for the determination of some taxa have been specified

and appended (B4.1). The corrections are made according to the recommendations of the International Code of the Zoological Nomenclature.

Faunistic contributions. The species composition of Plecoptera in the river systems of Bulgaria was studied (109 species). An review of the order is presented for the first time and the ranges of some taxa are expanded. For more than 30 species, faunistic data have been appended (B4.1, B4.2, B4.5). Taxa have been reported from the mountains of Bulgaria and North Macedonia (B4.2, B4.5). New species were established for the Pirin and Western Rhodope Mts. (B4.4, B4.3). Plecoptera species were found in the karst springs (B4.6). Data on Plecoptera from the last 40 years for the watersheds of the rivers Struma, Mesta, Maritsa, Tundzha, Arda and the Bulgarian sector of the Danube River are generalized (G7.4 - G8.6). The ecotone zones of the glacial lakes were studied and a rare vulnerable species was identified (B4.7). The faunistic diversity of the Smolyan and Chair Lakes was studied and new benthic representatives were found (G7.10). A total of 38 types of Plecoptera has been found in the Rila Mts. (G8.7). The European TREAM database has been appended with data on the Plecoptera from Bulgaria (B4.9). The zoobenthic communities of 51 dams and lakes were studied, which included 297 species from 22 systematic groups (B4.6). In the karst ecosystems of Bulgaria, 148 species from 74 families have been established (B4.6). Data are presented for the distribution of rare taxa of Heteroptera and Trichoptera (G7.12, G8.4) and invasive foreign species of macroinvertebrates from the waters of Bulgaria (G7.11).

Ecological contributions. The complex ecological assessment of Plecoptera was made as indicators of the ecological condition of the river coenoses – the water quality (B4.3-B4.9, G7.3, G8.5). The distribution of species is determined depending on the main ecological factors of the environment. It has been clarified that taxon richness is localized between 800 and 1500 m a.s.l. in cold and clear waters. The response of the zoobenthos in the model river systems to anthropogenic impact (B4.6, B4.8, G7.3-G8.8) was analyzed in relation to the Water Framework Directive. The specific ecological conditions in periodically drying rivers of the sub-Mediterranean type with a rich faunistic diversity were studied - highly vulnerable ecosystems from anthropogenic impact (G7.6). The structure of the benthic communities in the karst springs was investigated (B4.6). Attention was paid to the changes in the composition of the communities in the unaffected anthropogenic localities, probably related to climate changes (B4.2-B4.7, G7.1, G7.2). The trophic structure of 3 dams was determined based on plankton, benthos and fish communities (G7.8).

Zoogeographical contributions. Endemics from the Plecoptera order were scrutinized (28.4%), distributed among the Balkan, Bulgarian, regional and local ones (B4.1). The areographical belonging of Plecoptera from the mountain ecosystems is determined. Five complexes are presented, among which the European and Palaearctic forms prevail (B4.2). The orders Ephemeroptera, Plecoptera and Trichoptera from the Struma River system are distributed in 6 zoogeographical

complexes, of which the European and Mediterranean taxa prevail (B4.3). The distribution of 2 rare species from North Macedonia defines them as Balkan endemic forms (B4.5). Studies on the vertical distribution of Plecoptera are important for clarifying their zoogeographical characteristics. The composition, distribution and endemics in the benthic communities of the Strandzha Mts. rivers were examined (G8.8).

Conservation of the fauna. The elaborations related to the conservation status of the order Plecoptera are interesting. Thus, of 109 species, 57 have a conservation status according to the IUCN criteria (B4.1-B4.7, G7.4, G8.1-G8.7). The most vulnerable are the Plecoptera communities in the Danube River, where 3 species have disappeared (G8.1). Of these, *Oemopteryx loewii* has not been reported for over 100 years. The conservation status of Plecoptera in a number of river systems of Bulgaria and North Macedonia was assessed (B4.1-B4.7, G7.4, G8.1-G8.7). Conservation areas have been outlined in which the rare and endemic taxa are concentrated (G8.3). Attention is paid to the spring communities (B4.6) and some specific river types [such as R14] that are vulnerable to anthropogenic impact (G7.6).

Invasive taxa. The presence of the species of the genus *Dreissena* in stagnant waters around the Danube River was scrutinized and is related to certain hydrobiological indicators (G7.5). The role of the invasive mussels in the trophic structure of the dams is reported (G7.8). The presence of *Dreissena polymorpha* was confirmed in 4 dams (G7.9). The invasive mussel *Corbicula fluminea* has been found in the river systems of Maritsa, Tunja and Kamchia. The ways of invasion and the possibilities for its distribution are analyzed (G7.11). The invasive snail *Potamopyrgus antipodarum* has been found in the Black Sea rivers. Data on the invasive species from 86 Bulgarian water bodies are presented and the invasive potential of some rivers is specified.

Scientific applied and methodical contributions. The methods for assessing the ecological condition of the Danube tributaries were calibrated after researching of the 43 river sections (G7.7). For the first time, calibration of the methods for assessing the ecological condition in the tributaries of type R7 and R8 in Northern Bulgaria was carried out. The differences between the river types, the indicative potential under different anthropogenic impact and the border between the excellent and good ecological status are established (G7.7). The ecological status of drying water bodies of type R14 was assessed based on the biotic index and number of taxa (G7.6). Research on the surface waters in Bulgaria have been conducted to achieve a good ecological status according to the accepted normative documents (EU Water Framework Directive). The benthic communities in the model river systems were studied in relation to the anthropogenic impact (B4.6, B4.8, G7.3-G7.11, G8.8). Species diversity is an established indicator of the water quality (G7.2). Assessments of the ecological status of a number of dams were tested based on the macrozoobenthos and chemical indicators (G7.5, G7.8) - recommended by the Bulgarian legislation. Active

participation in the Pan-European research to the quantitative changes in the communities (G7.1).

THE REFERENCE OF THE CONTRIBUTIONS correctly and accurately reflects the achievements of the participant in the competition. It contains the most important results and conclusions from the scientific research.

SIGNIFICANCE OF THE OBTAINED RESULTS

The research activity is well reflected in the documents of the competition (Table 1). Dr. V. Tyufekchieva has presented 44 publications. She participated in the competition with 29 publications, of which 17 works with an impact factor, 21 in Web of Science or Scopus (4 without IF with SJR) and 8 chapters of monographs (or books). The publications that are not part of the competition are 12. Noteworthy is that 5 of the publications with an impact factor are in journals of the highest category – Q 1. The refereed publications are distributed as follows: Acta zoologica bulgarica – 12, Diversity – 1, Ecologia Balkanica – 3, Ecologica Montenegrina – 1, Nature – 1, Nature Ecology & Evolution – 1, Scientific Data – 1, Water – 1. All publications are co-authored as she is a first author of 4, second – of 5 and third and next – of 20 posts. Dr. V. Tyufekchieva has published in 14 foreign and international editions, and all publications (including those not presented for the competition) are in English. She participated with reports, posters and presentations in 6 national and 24 international scientific forums.

Indicators		Number of points	Number of the candidate's points
Α	1 – dissertation Doctor	50	50
В	4 – monographs or publications [Q4 (3), Q3 (3), Q1 (2); SJR (1)]	100	141
G	7 – publications in the referenced journals [SJR (3), Q4 (4), Q3 (2), Q1 (3)]	10-25	183
	8 – book chapters or monographs, peer-reviewed editions [8]	15	120
	Total required minimum	220	303
D	194 – citations: in publications with IP – 126	126 x 2	252
	refereed and indexed – 68		
	Total required minimum	60	252
Е	14 – Participation in the national scientific projects [32]	10 x 32	320
	15 – Participation in the international scientific projects [8]	20 x 8	160
	Total		480
Total sum of the indicators [exceeded 2.3 times (3.7 times with E)]		330	746 (1226)

Table 1. Minimum number of points required for the scientific position Associate Professor and the indicators achieved by the candidate according to the presented documents

The achievements of Dr. V. Tyufekchieva are well accepted by the specialists and are cited. Her publications have been cited more than 200 times as 63% of the citations are in the prestigious refereed editions (with an impact factor or equivalent). In the documents, she presented 194 citations according to the requirements of the competition, and in publications with Web of Science and Scopus there are 126 citations. The most cited (45 citations) is paper No. G7.1 published in Nature (examines changes in the faunistic diversity in Europe under the influence of the environmental factors and their quantification). The citations are from specialists working in related fields and cover the main part of her articles. In the publications with citations of the works of Dr. V. Tyufekchieva, there are no ones with critical content. They were used to get acquainted with the biology of species from the investigated benthic communities, to specify problems with monitoring, fauna conservation, familiarization with some taxa, methodological problems, etc. The number of citation points exceeds the accepted requirements by 4.2 times.

The research work of Dr. V. Tyufekchieva's is in the field of hydrobiology. It does not engage in direct implementation and implementation activities due to the nature of the field in which she works. However, the calibration of methods for assessing the ecological status of water bodies, the study of invasive species (threats from them, their distribution and impact on the local fauna), the determination of the conservation significance of a large number of hydrobionts, the preservation of the biodiversity in macrozoobenthos communities and methods for quantifying changes in the communities are of significant practical importance.

LEADERSHIP AND PARTICIPATION IN PROJECTS

The materials of the competition reflect the work of Dr. V. Tyufekchieva on 40 projects (32 national and 8 international). The total amount of scoring related to the projects reaches 480 (Table 1).

The projects have a scientific and scientific-applied character, international or national funding and concern a validation of the system for assessing the ecological condition of waters; the indicator role of the biodiversity; improvement of the monitoring information system; threats to the Danube and Black Sea regions from invasive species; climate change and alien species; management plans for the protected areas; protecting the environment and reducing the risk of adverse effects; comparing wetlands from Bulgaria and Hungary; determination of a maximum ecological potential for the rivers and lakes in Bulgaria; selection of reference points and biological indicators according to the Water Framework Directive, etc.

EVALUATION OF THE PERSONAL CONTRIBUTION

The hydrobiological investigations of the natural ecosystems require teamwork. At the same time, the constant participation of many authors in a large number of common publications makes it difficult to assess the individual contribution of the each one (whether it is methodological, experimental, expert, analytical or synthetical). It should be noted that in some cases it is not easy to establish the real personal contribution of the candidates. From the presented documents for the competition, a high personal contribution of Dr. V. Tyufekchieva in the implementation of the research work and the publication of the materials is established. This contribution is evident in the publications related to the macrozoobenthos, in water bodies typification, Plecoptera studies, hydrobiont and water bodies conservation where her work is well outlined and often methodical.

CLEARLY OUTLINED PROFILE OF SCIENTIFIC RESEARCH

The scientific qualification of Dr. V. Tyufekchieva is undoubted. The results achieved by her in the scientific research activity exceed more than 2 times the requirements of the Bulgarian Academy of Sciences, accepted in connection with the Regulations for the Application of ZRASRB (Table 1). The work of Dr. V. Tyufekchieva is in the field of hydrobiology and covers several areas: influence of the environmental factors on the model communities of hydrobionts; their distribution according to the type of reservoir, hydrological regime and geographical location; existence and adaptations of the aquatic communities in modern conditions and their development under climatic changes; creation, calibration and testing of methods for assessing the ecological status of the river and stagnant ecosystems; conservation problems of the hydrofauna, faunistic and taxonomic studies on Plecoptera; clarification of the conservation status of the vulnerable Plecoptera communities and taxa.

CONCLUSION. The candidate for the competition Chief Assistant Dr. Violeta Tyufekchieva has presented a sufficient number of scientific papers. Her works include original scientific and applied contributions that have received international recognition, most of them in journals and scientific series published by international academic publishers. After getting acquainted with the materials and scientific works presented for the competition, analyzing their significance as well as the scientific and scientific Jury and the Scientific Council to vote for the acquisition of Chief Assistant Dr. Violeta Georgieva Tyufekchieva, PhD, to the academic position Associate Professor at the Institute of Biodiversity and Ecosystem Research, the Bulgarian Academy of Sciences in the field of higher education 4. Natural sciences, mathematics and informatics; professional direction 4.3. Biological Sciences; scientific specialty Hydrobiology.

Sofia, 30.09.2024

Reviewer:

/Prof. Dr. Zdravko Hubenov/