Вх. № 644/НО-05-06/01.07.2024 г.

REVIEW
by competition for the academic position "professor"
specialty "Hydrobiology" for the needs
of Research group "Bioindicators, monitoring and ecological classification of freshwater ecosystems", “Division of Biological Diversity and Processes in Fresh Water Ecosystems", " Department of Aquatic Ecosystems" of IBER, BAS

Candidate: Associate Professor Emilia Dobrinova Varadinova, Ph.D
Reviewer: Prof. Dr. Daniela Kirilova Pilarska, IBER – BAS

In the announced competition for the specialty "Hydrobiology" for the needs of the "Biodiversity and functioning of freshwater ecosystems" section of the "Aquatic Ecosystems" department, announced in the State Gazette, no. 27 of 29.03.2024, only one candidate participated - Associate Professor Dr. Emilia Varadinova - a researcher in the same unit. The documents for the competition have been precisely prepared and meet the requirements of the Law on the development of the academic staff in the Republic of Bulgaria and the criteria of IBER for occupying the academic position "Professor".

1. General data on the candidate's career and thematic development

Assoc. Prof. Emilia Varadinova was born on 21.08.1967. In 1991, she completed her higher education at the Faculty of Biology of the SU "Kl. Ohridski" and obtained the Master's qualification in the specialty "Biochemistry and Microbiology", and in 2006 she successfully defended a dissertation work of independent preparation in the Central Laboratory of General Ecology, BAS, in the scientific specialty "Hydrobiology". In 2000, she held the position of Research Assistant in the "Biological diversity" section of the Central Laboratory of General Ecology. In 2010, she was the Chief assistant at the "Ichthyology and Fish Resources" section, Department of "Aquatic Ecosystems" of IBER, and in 2014 she was elected as an Associate Professor at the Department of "Aquatic Ecosystems" of IBER, BAS.

In her research work, Assoc. Prof. Varadinova successfully applies many modern methods. It has competences in the field of water management and environmental legislation, assessment of ecological status/potential, atmospheric air status and monitoring of environmental components. She speaks English and Russian and uses various software programs.

Assoc. Prof. Varadinova is a member of the council of site coordinators of the European and global networks for long-term research, the LTER network in Bulgaria, site coordinator of the MESTA RIVER site, member of the Union of Scientists in Bulgaria, Biology Section, member of IAD - International Association for Danube Researcher and is on the Editorial Board of the journal Ecologia Balkanica.

Assoc. Prof. Varadinova's scientific experience in the specialty is 33 years, and her research activity is thematically related to the announced competition.

2. Submitted materials for the competition

Assoc. Prof. Emilia Varadinova presented a total of 87 scientific publications and 6 chapters of a book or collective monograph, of which 54 are related to the acquisition of the scientific and educational degree "Doctor" and Associate Professor and 36 are after the last habilitation and are related to the current competition. Of them, 20 are publications in refereed and indexed journals with an impact factor according to Journal Citation Reports on Web of Science, 11 – in journals with an impact rank (SJR) according to Scopus, but without IF. Two articles have been published in conference proceedings. It is worth noting that one of the mentioned articles in co-authorship was published in the highly prestigious journal Nature with an extremely high Impact factor - 69.54.

Assoc. Prof. Varadinova is the lead author in 24 scientific publications, 9 of which are after the last habilitation. In 25 scientific articles she is in 2nd place, and in the rest in third or next place.

The candidate has submitted a report on the achieved scientometric indicators according to the Law on the development of the academic staff in the Republic of Bulgaria and the Regulations for the academic growth of IBER, BAS, which unequivocally proves that the minimum requirements for occupying the position of "Professor" according to the Regulations for the acquisition of scientific degrees and for holding academic positions at IBER, BAS are not only fulfilled, but also repeatedly exceeded. The minimum number of points in categories A, V, G, D and E for a Professor is 640 points, and the total number of points for the candidate is 1334, i.e. 2 times and more than the required minimum. The presented indicators are distributed as follows: group A – 50 points; group V – 128 points, here are included scientific publications in publications that are referenced and indexed in world-famous databases with scientific information (Web of Science and Scopus); group G – 392 points, of which 2 are with quartile Q1, 1 with Q2, 4 with Q3, 6 with Q4 and 11 in editions with SJR; group D – 294 points; group E – 470 points.

In the materials for the competition, there is a report on the participation of Assoc. Prof. Varadinova in 8 international scientific forums and 3 in Bulgaria with published summaries of 23 reports and posters. She participated in organizational and scientific committees of 8 international and national scientific forums.

Assoc. Prof. Varadinova was a member of scientific juries for the defense of doctoral students (7), for the selection of a Chief Assistant (1), for the selection of an Associate Professor (4) and a Professor (2).

3. Main directions in the candidate's research work and most important scientific contributions

As a result of the successfully implemented research work of Assoc. Prof. Varadinova, significant scientific results of an original nature have been achieved. The most important scientific contributions of the candidate were received in the following areas:

1. Biodiversity of macrozoobenthos in surface continental waters

2. Bioindication and assessment of ecological status

3. Methodology of biological water monitoring

4. Preservation of biodiversity and the ecological condition of water bodies and wetlands

They can be briefly summarized as follows:

In the first direction, research was carried out on the taxonomic composition and structure of the macrozoobenthos in different types of rivers, lakes and reservoirs located on the territory of Bulgaria, and the trophic structure of the macrozoobenthos was studied and analyzed:

- In relation to leading factors of the aquatic environment and under the influence of various types of water pollution, the composition and distribution of benthic invertebrates were assessed and key taxonomic groups were analyzed (69,74, 78, 79, 81, 84**).**

- A complete taxonomic list of the aquatic invertebrate fauna (81) in 51 of the largest stagnant water bodies in the country is presented, the taxonomic composition of the macrozoobenthos (56) is established, and the species diversity of aquatic invertebrates in 139 river and 79 lake sites, representative for all types of standing and flowing water bodies on the territory of Bulgaria (69, 79, 80). In the process of studying the macrozoobenthos in different types of rivers, more detailed data on the distribution of aquatic invertebrates (59), incl. invasive species (71, 75). A comparative analysis of the species composition of the macrozoobenthos in the Maritsa and Han Rivers (South Korea) was carried out (85).
- Elevation, correlated with lower values of water temperature, oxygen concentration, saturation, and electrical conductivity, and with low biogen content, has been shown to have a structuring role in natural and undisturbed lentic and lotic ecosystems (78, 81), and anthropogenic pressure negatively affects habitat characteristics by causing a redistribution in the composition of the main taxonomic groups (74).
- The trophic structure of the macrozoobenthos in the larger lakes and reservoirs in Bulgaria was studied and analyzed, and a comparative analysis of the functional groups of the macrozoobenthos in defined type-specific water bodies, identified in the Pontic Province and Eastern Balkans ecoregions, different watersheds, was carried out (64, 60 , 57, 76).
- The influence on the structuring of the trophic groups of the river macrozoobenthos of the heterogeneity of the bottom substrate and the amount of organic carbon in the sediments has been analyzed (65), and the impact of eutrophication and water level fluctuations on the trophic groups of aquatic invertebrates in selected highly modified water bodies has been studied (68).

In the second direction, research was carried out on the bioindicative potential of the macrozoobenthos in lotic and lentic ecosystems and the ecological condition of flowing and stagnant water bodies was assessed:

➢ Changes in aquatic invertebrate composition have been shown to be a direct reflection of habitat characteristics and can characterize the state of aquatic lotic and lentic ecosystems (55, 61, 63, 67, 74, 84, 58, 62, 66, 81).

➢ It has been established that there is a gradual change of the dominant species within the individual functional groups and a redistribution of the abundance and the relative share of the groups in the composition of the trophic structure of the macrozoobenthos (57, 60, 64, 76).

➢ The ecological status of 11 lakes and 39 reservoirs in Bulgaria was determined by the application of three indices based on the macrozoobenthos (64).

➢ The ecological condition of the Batova, Vladaiska, Boyanska, Vitoshka Bistrica and Yanchovska, Maritsa, Strumeshnica rivers was assessed using the Biotic Index (based on the macrozoobenthos biological element quality) (60, 61, 63, 74, 67).

➢ The accuracy of the assessment of the ecological status of flowing water bodies was analyzed, benthological and physicochemical studies were carried out at points affected by various types of anthropogenic pressure (70) and the applicability of trophic indices (RETI/PETI, ITC) in the assessment of the ecological status was analyzed of standing and flowing surface water (57, 60, 64, 76).

➢ Classification systems for assessing the status of surface water have been compared between countries located in different ecoregions in Europe (Bulgaria and Ireland) and on different continents (Bulgaria and South Korea) (55, 77).

In the third direction, a study of the methodology of the biological monitoring of waters was carried out:

➢ Validation of the typology and classification system in Bulgaria for the assessment of the ecological status of surface water bodies has been carried out and various experimental metrics have been tested for the assessment of the ecological status in standing waters by biological element for macrozoobenthos quality in Bulgaria (62).

➢ Expert participation was taken in the development of a methodological framework for mapping and assessment of ecosystem services in internal wetlands in Bulgaria (86, 87, 88, 89), as well as assessment of the state and ecosystem services of freshwater and marine ecosystems in Bulgaria (90, 91).

The fourth direction includes expert participation in the protection of biodiversity and the ecological state of water bodies and wetlands:

➢ In order to study the biodiversity, biological invasions, services, functioning and management of aquatic ecosystems, an analysis of the diversity of habitats in the Danube wetlands of Hungary and Bulgaria was carried out, and a biological and ecological study of the state of freshwater ecosystems in target lakes was carried out, with the aim preparing a methodology for limiting and maintaining the levels of eutrophication in them, as well as conducting monitoring.

➢ The draft text of the "Strategy for Biological Diversity in the Republic of Bulgaria" has been updated and supplemented.

➢ Participation was taken in the development of the Management Plan for Pirin National Park and the Bistrishko Branishte, Torfeno Branishte, Bogdan and Uchilishtna Gora reserves, as

well as the ecological assessments of the River Basin Management Plans of the Danube, Black Sea, East Aegean Sea coast and West Aegean Sea regions.

- The condition of the waters of the rivers Mochurica, after Karnobat, Syutliyka/Azmaka and Byala reka was analyzed by biological elements for the quality of phytobenthos, macrozoobenthos and supporting physicochemical indicators of the water.

4. Evidence of the significance of the research conducted

The scientific publications of Assoc. Prof. Emilia Varadinova have received international recognition. A list of 261 citations is presented, of which 130 are in Impact factor journals and 25 are in SJR journals. This is indisputable proof of the relevance and significance of the scientific research conducted by Assoc. Prof. Varadinova.

5. Most significant scientific and applied achievements

Assoc. Prof. Varadinova's scientific and applied developments in support of institutions and governing bodies deserve high praise. The type-specific scales for assessing the ecological state of surface running water in Bulgaria have been calibrated and standardized, and a new methodology for assessing the state of standing surface water using the biological quality element "macrozoobenthos" has been developed and published. Assoc. Prof. Varadinova has also prepared reports on the national intercalibration of biological elements for surface water quality and biological classification.

6. Demonstrated skills or aptitude for leading scientific research

The candidate participates in an extremely large number of scientific and scientific-applied projects, a total of 55, financed by the Ministry of Environment and Water, Scientific Research Fund, Ministry of Education and Science, Fisheries and Aquaculture Executive Agency, LIFE+ Program of the EU, the Financial Mechanism of the European Economic Area, Sustainable Management of a National Park "Rila" Phase II" OPE, World Bank, National Trust Ecofund, BIO2CARE, program for European Territorial Cooperation, INTERREG V-A "Greece – Bulgaria 2014-2020, Horizon 2020. Assoc. Prof. Varadinova was the head or led a work package in 9 of these projects and is a participant in five international projects.

Assoc. Prof. Varadinova participated in the mapping and assessment of the conservation status of species in the Natura 2000 network as a field expert, as well as in the Pirin National Park Management Plan for the period 2014-2023 as an expert on the assessment of the ecological status of lotic water bodies, as an expert hydrobiologist when preparing an Opinion on competence on the proposed scope and content of the EIA for the investment proposal "Improvement of the route of Lot 3.2 of the Struma motorway", the Management Plan of the "Bistrishko Branishte" Nature Reserve, the Management Plan of the "Torfeno Branishte" Nature Reserve ", the Management Plan of the Nature Reserve "Bogdan", the Management Plan of the Nature Reserve "Uchilishna Gora". She also participated in the preparation of an expert assessment of the Environmental Impact Assessment Report (EIA) of the investment proposal "Improving the conditions for navigation in

the Romanian-Bulgarian common sector of the Danube River", on behalf of IBER. She was the team leader for the preparation of the Environmental Assessment of the Flood Risk Management Plan (2016-2021) of the West Aegean Sea Region. All of this demonstrates her skills in engaging in collective research and teamwork.

7. Profile of the research work

Assoc. Prof. Varadinova has a clearly outlined profile of the research work, which fully corresponds to the announced competition. She is a renowned hydrobiologist conducting studies on macrozoobenthos communities in various categories of surface waters, lotic and lentic, natural and influenced to varying degrees by diverse types of human activity. This is evidenced by the candidate's original results on/about the composition and structure of aquatic invertebrates, bioindication of macrozoobenthos and assessment of the condition of different types of surface water bodies.

8. Role of the candidate for the training of young scientific personnel

Assoc. Prof. Emilia Varadinova was the scientific supervisor of two full-time doctoral students: Maria Kerakova, who successfully defended her dissertation in 2015 on the topic: "Trophic structure of the macrozoobenthos in native and affected lotic ecosystems" (professional direction 4.3. Biological sciences, scientific specialty "Hydrobiology) and Jiyoung Park, who successfully defended his thesis in 2024 on the topic: "Ecological status of model lotic ecosystems from South Korea and Bulgaria" (professional direction 4.4. Earth Sciences, scientific specialty "Ecology and environmental protection"). She has lead students who successfully defended their Diplomas and has been a mentor and supervisor of interns.

During the period 2015-2024, Assoc. Prof. Varadinova is a tenured teacher at the Southwestern University "Neofit Rilski" Blagoevgrad on the academic disciplines "Water pollution and impact on ecosystems", "Water resources management", "Methods for analysis and assessment of water status", "Ecological monitoring", "Air pollution and impact on ecosystems", " Pollution of air and water", "Environmental requirements and standards", "Environmental protection management", "EIA", "Environmental assessments", "Environmental project management", "Environmental programs".

During the period 2014-2024, she was a part-time teacher in the course "Biological monitoring and participation in major projects" for masters at Plovdiv University "P. Hilendarski", and from 2017 to 2019 she was a guest lecturer at the Faculty of Forestry on the course "Water Pollution and Impact on Ecosystems", in the Department of "Ecology and Environmental Protection".

Assoc. Prof. Varadinova has developed her own original electronic lecture courses for bachelor's and master's students from the Southwestern University "Neofit Rilski" Blagoevgrad and Plovdiv University "P. Hilendarski" in a number of study disciplines in the field of ecology and hydrobiology.

9. Personal impressions of the candidate

I have known Assoc. Prof. Emilia Varadinova since 2010 and I would like to express my positive impression of her deep knowledge in the field of hydrobiology and ecology, her ethics, correctness, ability to work in a team, ability to work and modesty, which have contributed to the achieved results and contributions, and for establishing her as an excellent specialist in the field of Bulgarian and world hydrobiology.

Conclusion

The candidate of the announced competition, Assoc. Prof. Emilia Varadinova, is an established scientist with outstanding scientific research and organizational qualities, who not only meets, but also exceeds the requirements of the Law on the development of the academic staff in the Republic of Bulgaria and the criteria of IBER for occupying the academic position "Professor". Her scientific works have received high recognition from our and foreign specialists and have a scientific-fundamental and scientific-applied contribution. All this gives me the reason to vote "FOR" her candidacy and to propose with full conviction to the respected Scientific Jury and the members of the Scientific Council to unanimously elect Assoc. Prof. Varadinova to the academic position of "Professor" in the scientific specialty "Hydrobiology".

Signature: Date: 01.07.2024
D. Pilarska