Вх. № 373-НО-05-06/ 28.04.2025 г.

Opinion

By **Assoc. Prof. Margarita Topashka-Ancheva**, PhD, member of the Scientific Jury, appointed by order No. 18/28.02.2025. On the basis of Art. 4 and Art. 25 of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADSRB), Art. 57 of the Regulations for the Implementation of the ADSRB, Art. 11, para. 4 of the Regulations on the Conditions and Procedure for Acquiring Scientific Degrees and for Holding Academic Positions in the Bulgarian Academy of Sciences (BAS), Art. 13, para. 2, item 25 of of the Regulations on the conditions and procedure for acquiring scientific degrees and for occupying academic positions at the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (IBER-BAS), Decision of the Scientific Council of IBER-BAS (Protocol No. 38/28.02.2025, item 6) and announcement in the State Gazette No. 110/31.12.2024 in the professional field "4.3. Biological Sciences", scientific specialty "Genetics" for the needs of the section "Environmental Mutagenesis" at the department "Ecosystem Studies, Ecological Risk and Conservation Biology" of IBER-BAS of the Regulations on the conditions and procedure for acquiring scientific degrees and for occupying academic positions at the Institute of Biodiversity and Ecosystem Studies, Bulgarian Academy of Sciences (IBER-BAS), Decision of the Scientific Council of IBER-BAS (Protocol No. 38/28.02.2025, item 6) and announcement in the State Gazette No. 110/31.12.2024 in the professional field "4.3. Biological Sciences", scientific specialty "Genetics" for the needs of the section "Environmental Mutagenesis" at the department "Ecosystem Studies, Ecological Risk and Conservation Biology" of IBER-BAS.

1. General presentation of the received materials

The only candidate, Chief Assistant Professor Petya Nikolaeva Parvanova, PhD, has applied for the competition in the scientific specialty "Genetics". The set of materials presented by the candidate is in accordance with the Regulations for the Development of the Academic Staff, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences.

2. Biographical data

Chief Assistant Professor P. Parvanova graduated from the Southwestern University "Neofit Rilski" - Blagoevgrad, majoring in ecology, and a master's degree from Sofia University "St. Kliment Ohridski" - Sofia. She began her academic career in 2005 as a biologist at the Central Laboratory of General Ecology (CLGE), Bulgarian Academy of Sciences. As a regular PhD student, P. Parvanova developed a dissertation on the topic "Influence of tropospheric ozone on the physiological activity and some biochemical indicators of seedlings of sensitive and tolerant tree species", which she successfully defended in 2011.

The total work experience of the candidate in the CLGE and its successor, IBER, Bulgarian Academy of Sciences, is more than 19 years. She is currently a chief senior assistant in the Environmental Mutagenesis Section.

3. Evaluation of the candidate's scientific and applied research activities

Chief Assistant Petya Parvanova participated in the announced competition for associate professor with a serious capital of 24 scientific articles, co-author of two chapters of scientific

books and 22 full texts and short communications from scientific forums in our country and abroad. The 8 of the mentioned publications are in group **B4 -** outside the dissertation. They are presented in the group habilitation work. Total points by group of indicators B": **110.**

The scientific publications presented by the candidate are referenced and indexed in world-renowned databases of scientific information (Web of Science and Scopus), outside the habilitation thesis (**G7**), are 13 in number. In 4 of them, the candidate is the first or second co-author. Articles No. **G1, G2, G3 and G4** are published in journals with a high impact factor and three of them have the highest rank **Q1**. The rest are in scientific publications with ranks **Q3 and Q4**. The total number of points in this group is **225**.

The results of the candidate's research work have found a response in scientific community and she has received 80 citations from scientific publications, monographs, collective volumes and patents, referenced and indexed in world-renowned databases of scientific information (Web of Science and Scopus). The total number of points in this section is 104. Total points in the group of indicators A+B+D+E 489.

The main research directions of Chief Assistant Parvanova are: Prevention of induced mutagenesis (antimutagenesis) through exogenous application of natural products; Assessment of the mutagenic and commutative properties of xenobiotics from the environment by using a complex of *in vivo* tests and criteria with different permissive capabilities: microbiological, biochemical and molecular; Analysis of the mechanisms of genotypic and induced resistance. The main contributions of the candidate are also in these directions.

The objects of her research are *Chlamydomonas reinhardtii*, but she actively participates in some of the research conducted on the other two objects - *Saccharomyces cerevisiae* and *Myzus persica* and the higher plants *Pisum sativum* L., *Phaseolus vulgaris* L. and Solanum tuberosum L. They have been used by the candidate as a suitable object in studies on environmental mutagenesis, to clarify the mechanisms and systems involved in the formation of the stress response and genotypic resistance in higher plants.

Some of the more important achievements of Chief Assistant Parvanova relate to the following:

- She has established that depending on the method of application of biologically active natural products, the response of cells to oxidative stress can be significantly modulated - from the absence of genotoxic, mutagenic and DNA damaging effects to well-expressed damaging properties [B4.1; G7.6; G7.8; G8.2**].** The obtained results have a contributing character to the mechanisms of antimutagenesis and the clarification of the role of experimental design.
- She and her co-authors have established that the DNA protective potential of natural plant products is largely due to their antioxidant potential and accelerated DNA repair [B4.1; B4.2; D7.6; D8.2]. An important contribution is the Developed System for Evaluation of the Genotoxic, Mutagenic, Carcinogenic and DNA-damaging Effects of Physical [B4.5; D7.4; D7.13] and Chemical [B4.8; D7.11;] Environmental Factors, Including Natural Products of Plant Origin [B4.3; B4.6; B4.7; D8.1] on Test Systems with Different Permissibility Options - *Chlamydomonas reinhardtii* [B4.3; B4.6; B4.7; B4.8; D7.11; D8.1]; Higher Plants [B4.5; D7.4; D7.11; D7.13; D8.1]; *Saccharomyces cerevisiae* [B4.8; D7.11] and *Myzus persicae* [B4.8; D8.1], and a set of chemical, microbiological, biochemical and molecular markers.

The candidate also has contributions in the field of genotypic variability research. On varieties and mutant lines of *Phaseolus vulgaris* L. and a complex of indicators - H_2O_2, MDA, Pro and HSP70, she proves that the strength of the induced oxidative stress strongly depends on the genotype. The conclusions that highlight the role of Pro and HSP70 are important. As a very sensitive marker, Pro can be recommended for distinguishing the stress response even in closely related genotypes and allows differentiation of the most sensitive ones. The overproduction of HSP70, which is also found in animals, is an early signal of oxidative stress and adaptation of the organism. The results are a contribution to genotoxicology with benefits for agriculture [**B4.5; D7.4; D7.12; D7.13].**

The most important contributions of Dr. Parvanova in the field of assessment of the effect of anthropogenic pollutants and environmental factors through a test system of higher plants in relation to ecotoxicology are the following: By studying in experimental conditions a set of physiological (photosynthetic rate, transpiration and stomatal conductance) and biochemical (SOD and CAT levels) parameters in the tree species Fraxinus excelsior L., it was found that the increase in antioxidant enzyme activity can be used as an indicator for assessing the effect of the atmospheric pollutant. The new and original information obtained represents a contribution to ecotoxicology [G7.2].;

По-важните приноси на д-р Първанова в направлението Оценка ефекта на антропогенни замърсители и фактори на околната среда чрез тест-система висши растения въвврьзка с екотоксикологията са следните: Чрез изследване в експериментални условия на набор от физиологични (интензивност на фотосинтеза, транспирация и проводимост на устицата) и биохимични (нива на СОД и КАТ) параметри при дървесния вид *Fraxinus excelsior* L. е установено, че повишаването в антиоксидантна ензимна активност може да се използва като индикатор за оценка на ефекта на атмосферният замърсител. Получената нова и оригинална информация представлява принос към екотоксикологията [Г7.2].;

The candidate has presented an impressive list of participation as an participant in 24 scientific projects funded by various organizations. A large number of projects are funded by the National Science Foundation, but also by the Program for Supporting Young Scientists at the Bulgarian Academy of Sciences, DFNP-66/27.04.2016, and is currently the Head of a work package (№ КР-06-N71/13) in a project funded by the "Scientific Research Fund".

In addition to active research, Chief Assistant P. Parvanova has also carried out very intensive teaching activities. She has led practical classes at the University of Forestry - over 340 hours and at the Faculty of Biology of Sofia University - over 30 hours. She has successfully supervised a graduate student from the Department of Genetics, Faculty of Biology, Sofia University, was a consultant to a full-time doctoral student at the Institute of Forestry and Ecology, Bulgarian Academy of Sciences and a reviewer of scientific articles in specialized publications. She is a Co-author of chapters of a textbook for a university – "Ecotoxicology - a small practicum" also.

As an employee at IBER (more than 19 years), Chief Assistant Professor has also held a management position - Head of the Section (acting) "Environmental Mutagenesis" by decision of the National Council of 12.05.2015 until 2019. She was also a Representative of Young Scientists in the National Council of IBER-BAS for the period 2015 - 2019, Secretary of the Section "Biology", of the Union of Scientists in Bulgaria (USB) from 2014 - until now,

Secretary of the Organizing Committee of the "Seminar on Ecology" for the period 2014 - until now.

4. Personal impressions and other data

The analysis of the submitted works, materials and data for the competition confirmed my personal impressions of the candidate in this competition as a motivated, systematic and precise in her scientific work researcher. In the years of her scientific activity dedicated to genotoxicology, she has developed from a simple accumulation of scientific facts to generalizations and scientific hypotheses.

In the section on Environmental Mutagenesis, she enjoys respect and authority as a specialist and colleague. Her active participation in the preparation and implementation of the annually held seminar on ecology and her work as secretary of the section on biology, USB, of which she has been the secretary for many years, also deserves high praise.

Conclusion:

In this competition, Chief Assistant Professor Petya Nikolaeva Parvanova presents herself as an accomplished researcher with undeniable contributions in the field of genotoxicology. This is supported by the results of her scientific research, her participation independently and in collective developments, her active participation in a large number of international forums and participation in international cooperation projects, as well as the large number of citations of her works in the scientific literature. Her scientific work is a convincing example of the fruitful application of modern methodological approaches to basic problems related to changes in the hereditary information of various organisms under the influence of various exogenous factors and the use of this knowledge in the field of biological monitoring.

With the election of Chief Assistant Professor Petya Nikolaeva Parvanova as Associate Professor, IBER, BAS will have an active and effective researcher who will not only successfully implement her own scientific program, but will also successfully unite and lead the research process in the Environmental Mutagenesis section.

The scientific contributions and active scientific and organizational activities give me sufficient grounds to confidently recommend to the Honorable Members of the Scientific Jury to unanimously vote for awarding Chief Assistant Dr. Petya N. Parvanova the academic position of Associate Professor.

27.03.2025 Prepared the opinion:

Assoc. Prof. Margarita Topashka-Ancheva, PhD