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OPINION

From Assoc. prof. Galina Simeonova Radeva, PhD. Roumen Tsanev Institute of Molecular Biology, BAS

Conserning: Competition for the academic position of 'Associate Professor' in professional field 4.3. Biological Sciences, scientific specialty "Genetics", for the needs of the "Environmental Mutagenesis" Section, Department of "Ecosystem Research, Ecological Risk and Conservation Biology" at the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (IBER-BAS), announced in the State Gazette No. 110 of 31.12.2024, with the sole candidate being Assis. Prof. Dr. Petya Nikolaeva Parvanova.

The present opinion has been prepared on the basis of Order No. 18/28.02.2025 of the Director of IBER-BAS and the decision of the meeting of the scientific jury held on 14.03.2025. The submitted documents and complete set of materials by Assis. Prof. Dr. Petya Nikolaeva Parvanova have been prepared accurately and in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), its implementing regulations, as well as the Rules for the Development of the Academic Staff of the Bulgarian Academy of Sciences. They meet the criteria of IBER-BAS for holding the academic position of "Associate Professor".

Brief biographical information about the candidate

Dr. Petya Parvanova holds a Bachelor's degree in Ecology from South-West University "Neofit Rilski" and a Master's degree in Ecology from Sofia University "St. Kliment Ohridski". In 2011, she earned a PhD in "Ecology and Ecosystem Conservation" from IBER- BAS, where she has held the positions of Assistant and Assis.Prof. since then.

Review of the candidate's scientific activity and fulfillment of the requirements for holding the academic position of "Associate Professor".

Throughout her creative period, Dr. Părvanova has presented 48 scientific works, of which 21 have been published in peer-reviewed and indexed journals (including Q1 quartiles such as Toxicology (IF 4.5), Environ Sci Process Impacts (IF 2.225), Water, Air, and Soil Pollution (IF 1.765)), 2 chapters in books, 1 monograph, and 24 publications in non-refereed journals and others.

n the competition, Dr. Părvanova presents 21 publications in peer-reviewed and indexed journals, of which she is the first author in two, and the second author in 7 (33%), which ensures her primary contribution to their development. She has co-authored one monograph and two book chapter. Her work has She participates in the competition with 21 such publications, some in high received 52 citations in Scopus and Web of Science, with an additional 28 elsewhere. Her scientometric indicators include a total impact factor of 11.449 and an h-index of 4.

According to the report submitted by the candidate, the evaluation indicators are as follows: Group A: 50 points, Group B: Publications – 1 in Q2 (20 points), 4 in Q3 (60 points), and 3 with SJR (30 points); Total: 110 points; Group G: Publications – 3 in Q1 (75 points), 1 in Q2 (20 points), 2 in Q3 (30 points), 7 with SJR (70 points), and 2 book chapters (15 points); Total: 225 points; Group D: Cited works – Total: 104 points.

The total number of points exceeds the minimum national and institutional requirements for the academic position of Associate Professor.

Dr. Parvanova's submitted documents emphasize her active participation in scientific forums, with 29 presentations at national events and 25 contributions at international conferences, either through oral presentations or posters.

Significant scientific and applied achievements of the candidate.

The habilitation report of Dr. Parvanova encompasses research in the fields of antimutagenesis involving natural products, genotoxicology, and the mechanisms underlying genotypic resistance. Her scientific contributions also extend to ecotoxicological investigations aimed at assessing the impact of anthropogenic pollutants and environmental factors, utilizing a range of test systems — from unicellular organisms to higher plants.

The main results of these studies can be summarized as follows:

1.It was established that the exogenous application of natural products derived from *Clinopodium vulgare* L., *Amorpha fruticosa*, *Ailanthus altissima*, as well as kaempferol and jatropham extracted from *Lilium candidum* induces distinct cellular responses to oxidative stress and reveals differential DNA protective potential in the test systems *C. reinhardtii* and *S. cerevisiae*.

2. Two sets of test systems based on *C. reinhardtii* and *S. cerevisiae*, along with criteria for evaluating the damaging potential of xenobiotics, have been developed. It was established that, due to genotypic differences, *C. reinhardtii* represents a sensitive test system for the detection of low

concentrations of PbCl₂ during treatment. It was demonstrated that PbCl₂ damages photosynthetic pigments and DNA indirectly through induced oxidative stress.

3.Original results have been obtained regarding the influence of the developmental stage, mitotic cycle, and DNA repair capacity on the formation of genotypic resistance in various test systems — *C. reinhardtii*, *S. cerevisiae*, *Phaseolus vulgaris* L., *Pisum sativum* L., and *Myzus persicae*. The studies were conducted in the context of investigating the stress response and resistance to chemical inducers of oxidative stress of different nature.

4. It was established that natural products of plant origin — a total leaf extract from *Narcissus* cv. *Hawera* and essential oil (carvacrol in the non-polar fraction) from *Origanum vulgare* subsp. *hirtum*— exhibit a pronounced genotoxic and DNA-damaging effect on *C.reinhardtii*.

5. Seven higher plant test systems (*Fraxinus excelsior* L., *Lactuca sativa* L., *Lepidium sativum* L., *Raphanus sativus* var. *radicula*, *Medicago sativa* L. (Pleven variety), *Zea mays* L., and *Triticum vulgare* Host (Sadovo variety)) were studied for the assessment of various anthropogenic pollutants and environmental factors, due to their clearly expressed stress response. The tested natural compounds demonstrated a pronounced potential to reduce the genotoxic effects of direct mutagens.

The results obtained could find applications in the fields of ecotoxicology, phytoremediation, and agroecology.

Additional activities of the candidate

Dr. Parvanova has participated in 15 national projects funded by the Research Fund of the Ministry of Education and Science or through budget subsidies, serving as work package or task leader in four of them. As a young scientist, she was the principal investigator of a project funded by the Bulgarian Academy of Sciences' Program for Supporting Young Scientists (2016–2017), as well as principal investigator of a grant funded by the Operational Programme "Human Resources Development" and co-financed by the European Social Fund of the EU for a specialization in Portugal (2013). She has been actively involved in international research through seven projects under the European Biodiversity Research (EBR) framework and one COST project. Her participation in these projects demonstrates her continuous development of knowledge, skills, and professional competencies, her collaboration with diverse scientific partners, and her establishment as an ecologist with broad expertise in ecotoxicology, environmental mutagenesis, antimutagenesis, and mechanisms of genotypic resistance at a high professional level.

Dr. Parvanova has also made a notable contribution as editor and compiler of the abstract books and programs of the annual Ecology Seminar organized by IBER-BAS, a role she has held from 2014 to the present.

Dr. Parvanova has also held administrative positions, including Head of the "Environmental Mutagenesis" Section (2015–2019) and representative of young scientists on the Scientific Council of IBER-BAS. Her performance in these responsible roles demonstrates her leadership qualities, teamwork skills, and ability to organize and coordinate research activities within a collective. I recommend that Dr. Parvanova continue teaching students and young specialists and in the future, and in the future, develop an independent research topic and take on the supervision of PhD students.

Conclusion. Dr. Parvanova's scientific research, achievements, and activities provide a solid basis for me to highly and positively evaluate her overall scientific work. I therefore confidently recommend to the esteemed Scientific Jury and the Scientific Council of IBER-BAS to appoint Dr. Petya Parvanova to the academic position of Associate Professor in the scientific specialty "Genetics", within professional field 4.3 Biological Sciences, for the needs of the "Environmental Mutagenesis" Section, Department of "Ecosystem Research, Ecological Risk and Conservation Biology", IBER-BAS.

27.04.2025

Signed by: /Assoc. Prof. G. Radeva/