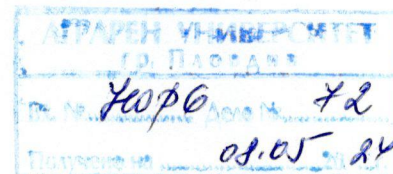


REVIEW



regarding 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 specialty Ecology and Ecosystems protection, announced in SG No. 7 of 23.01.2024.

Candidate: Ch. Assistant Professor PhD Slaveya Tencheva Petrova from the Department of Microbiology and Environmental Biotechnologies at the Agricultural University of Plovdiv (AUP)

Reviewer: Prof. Dr. Andon Vasilev Andonov, Agricultural University of Plovdiv (AUP), higher education area 4. Natural sciences, mathematics and informatics; professional direction 4.3. Biological Sciences; scientific specialty Plant Physiology, determined by Order of the Rector of AUP No. RD-16-403 / 20.03.2024.

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

Slaveya Petrova graduated from Plovdiv University "Paisiy Hilendarski" (PU) with a bachelor's degree in Ecology and Environmental Protection (2006) and a master's degree in Ecology and Ecosystem Protection (2008). She continued her studies in doctoral level and in 2012, after successfully defending her dissertation on the topic: "Passive and active phytomonitoring of atmospheric pollution in the city of Plovdiv", she obtained the degree "Doctor" in the same scientific specialty. Since 2011 she has worked as a lecturer in the Department of Ecology and Environmental Protection of the PU.

Ch. Assistant Professor Dr Slaveya Petrova works on a second employment contract in the Department of Microbiology and Environmental Biotechnologies of AUP (from 2017). She teaches a number of environmental disciplines at both universities. Continuously improves her qualification through postgraduate studies in the field of ecology, biology, pedagogy and the work with modern technical means and programs for digitization, anti-plagiarism control, artificial intelligence, etc.

The scientific interests of Dr. Slaveya Petrova are broad, but completely fall within the field of the competition's scientific specialty - Ecology and Ecosystem protection. Specifically, they are related to environmental monitoring, phytoecology, ecotoxicology, atmospheric pollution, etc.

Dr Slaveya Petrova is a member of the Union of Scientists in Bulgaria and Vice-chairman of the Biology Section of Scientists in Plovdiv. She is fluent in English and French, has good computer skills and possesses various other competencies. She is a member of the Editorial Board and technical editor of the scientific journal "Ecologia Balkanica (Q4)". She is also involved in a number of public activities as an expert on landscaping and air quality in the municipality of Plovdiv.

2. General description of the presented materials

The candidate Dr Slaveya Petrova participated in the competition with 24 works, which are beyond those presented during the defense of the dissertation work for the acquisition of the degree "Doctor". The distribution of works is as follows:

(●) scientific publications on the scientific specialty of the competition – a total of 22 issues;

(●) 1 university textbook (co-authored) and 1 university study guide (co-authored) in the field of the scientific specialty of the competition.

The candidate has also submitted the necessary references and information required by the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its implementation in AUP.

The scientific works of Dr. Slaveya Petrova, with which she participated in the competition, are published in journals with impact factor (IF) and impact rank (IR) with the following distribution by quartiles: 4 issues – Q2, 8 issues – Q3 and 10 issues – Q4. Ten works with quartile Q4 are included in the habilitation group of indicators B and 12 works in group of indicators D with total IF of 10.671. The candidate is a single author in one of the papers, leading in 9 and second author in 3, which is evidence of a high personal contribution to the conduct of research.

In the attached table, I indicate the implementation from Dr Slaveya Petrova of the minimal national requirements for the scientific output of candidates for the academic position of "Associate Professor", according to the Appendix to Article 1a, Paragraph 1 of the Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria for Professional Direction 4.3. Biological Sciences. I also provide data on indicator group E, which are not required for this academic position, but in this particular case complement the scientific activity of the candidate.

Groups	Indicators	Points	
		Requirement	Fulfilment
A	Doctoral Dissertation	50	50
B	Habilitation work (papers, referred and indexed in Web of Science и Scopus)	100	120 (B4) (10x12=120)
G	Scientific papers, referred and indexed in Web of Science и Scopus	200	200 (G7) (4x20=80) (8x15=120)
D	Citations in scientific papers in Web of Science и Scopus	50	70 (D11) (35x2=70)
E	Participation in national scientific or educational project (10 points for a project)	няма	60 (E14)
Total		400	500

On the basis of the indicated data, I believe that the scientific production, with which Dr Slaveya Petrova participated in the competition, is in accordance with the minimal national

requirements for occupying the academic position "Associate Professor". More specifically, it meets the requirements under group G and exceeds those under indicator group B and D. Since Dr Slaveya Petrova takes part in 6 national scientific projects, 60 points more under indicator E14 can be added to the specified data.

3. Main directions in the candidate's research work

Dr. Slaveya Petrova conducts scientific research that, in my opinion, can be attributed to 3 groups, namely: (1) phyto/biomonitoring in an urbanized environment, (2) ecosystem research and (3) ecotoxicological and other research.

The research from the first group represents a continuation and deepening of the candidate's research on the problem developed in his dissertation - phytomonitoring of the state of the urban environment. The emphasis in them is placed on the complex assessment of key components of the urban ecosystem in Plovdiv by using bioindicators from different systematic groups and application of phytotests with a complex of morpho-physiological parameters. This includes the majority of the presented scientific works (B2, B6, B9 and G1, G2, G3, G8, G9, G12).

The second group includes ecological studies in natural and agroecosystems. The studies include mainly the state and prospects for development of rural areas in the territory of Strandja National Park (B10), bacterial communities in the rhizosphere of the chickpea species *Cicer montbretii* Jaub. & Spach, endemic to this area (B5), the pollution and bioaccumulation of heavy metals (HM) in the water ecosystem of the Topolnitsa reservoir (G5 and G6), as well as the impact of agricultural practices on soil biodiversity in an orchard in the Agroecological Center of AUP (G11).

The third group includes model ecotoxicological studies with TM and microplastics. The dependence "HM concentration - chronic and lethal damage" in indicator fish species (G4, G7) and soil pollution with microplastics on the growth and photosynthesis of test pea plants (B8) was studied. This group can also include research on allopathic interactions between different vegetable species in connection with the possibility of their mixed cultivation (B1).

4. Significance of the obtained results, proven by publications in prestigious journals, citations, awards, etc.

The main results of the research of Dr. Slaveya Petrova, as already noted, have been published in scientific journals with high reputation, referenced and indexed in Web of Science and Scopus. They have also been presented at national and international forums in the form of 7 oral reports and 15 posters. I believe that the results of the candidate's research are significant, as they have found a wide response in the international scientific community. The candidate presented in the competition evidence of 35 citations of his works, but the reference in international databases shows that the citations are more than 140. An objective indicator of the relevance and significance of the activities conducted by Dr Slaveya Petrova research is also her high Hirsch (h) factor - 8, according to Scopus.

5. Significance of contributions to science and practice

As a result of the research conducted by Dr. Slaveya Petrova several original and confirmatory contributions have been received, the main part of which have both scientific and applied character. I accept the author's reference for the contributions, but I believe that they could be presented in a more synthesized form. I will indicate in a summarized form the more important contributions, which, in my opinion, give the clearest idea of the scientific achievements of the candidate.

Contributions related to phyto/biomonitoring in urbanized environments

1. The approach for biomonitoring of atmospheric pollution in an urbanized environment is optimized by simultaneous use of passive and active methods, parallel inclusion of organisms from different systematic groups (lichenized fungi, mosses, herbaceous plants, tree species) and sensitive physiological (photosynthetic pigments) indicators. These innovations, together with the proposed algorithm for evaluating ecosystem services in urbanized ecosystems, are contributions of a methodological nature.
2. Complex studies were conducted on the state of key components of the urban ecosystem (soils, soil communities, green infrastructure, etc.) for the first time in the city of Plovdiv, as a result of which the negative impact of polluted air on its health status and the high efficiency of phytomonitoring were scientifically proven.
3. Complex studies were carried out on the pollution of urban soils in Plovdiv with HM. For the first time, as a result of which the degree and sources of contamination with specific HM was determined together with the way of their distribution as well as the role of the urban gradient, the physicochemical properties of the elements, the ecological conditions, topography, etc. for their accumulation in soils and plants.

Contributions related to the ecology of natural and agroecosystems

4. The advantages, opportunities, vulnerabilities and threats for the protection of biodiversity and ecosystems on the territory of Strandzha Nature Park have been analyzed. For the first time, the microbial communities in the rhizosphere zone of the protected and endemic chickpea species *Cicer montbretii* were studied.
5. Seasonal monitoring of the water system of the Topolnitsa dam was carried out by assessing HM pollution and their accumulation in the organs of indicator fish species (common carp, redfin, European perch), which proved that the factors "chemical element" and "organ type" have a greater significance for the extent of HM bioaccumulation in fish than "season" and "fish species" factors. The effectiveness of liver enzymes in fish as a biomarker for functional disorders resulting from TM accumulation has also been confirmed.

6. The positive influence of agrotechnological practices on the soil microbiota in an apple orchard at the Agroecological Center of AUP has been confirmed.

Contributions related to model ecotoxicological studies

7. Relationships between the concentration of HM (Cd, Ni, Pb, Zn) in water in *ex situ* conditions and behavior, survival, respiratory disorders and oxygen consumption in fish (carp; *Cyprinus carpio* L.) were established, which are a prerequisite for the creation of a fast, cheap and reliable bioassay for the purposes of ecological monitoring.
8. The uptake of microplastics (1 μm , 5 μm and 100 μm) from artificially polluted soil by pea plants (*Pisum sativum* L.), their translocation to aboveground organs and their inhibitory effect on physiological processes was confirmed.

6. Assessment of the candidate's pedagogical training and activity. Its role in the training of young scientific personnel

Dr. Slaveya Petrova has significant teaching experience in the scientific specialty of the competition - Ecology and Ecosystem Protection. It was formed by her activity as a full-time lecturer in the Faculty of Biology of PU (over 12 years) and in the Faculty of Plant Protection and Agroecology of AUP (over 6 years as a lecturer in $\frac{1}{4}$ and $\frac{1}{2}$ full-time positions).

Dr Slaveya Petrova conducts lecture courses and exercises in AUP with students from the specialty Ecology. She gives lectures to students at Bachelor level in the compulsory discipline *Geology with Petrography*, of which she is the leading lecturer with a guaranteed lecture schedule of 30 teaching hours. He also conducts classes on the optional disciplines *Environment and Health*, *Geoecology of settlement systems* and *Biosystematics, phylogeny and evolution*. She conducts the discipline of *Environmental Ethics and Urbanization* at Magister level courses. Its lecture courses are conducted according to original curricula (3 programs), which reflect modern achievements in the specific disciplines.

Dr Slaveya Petrova taught a total of 946 teaching hours at AUP for the last 5 years. On an annual basis, the volume of her academic work is 189 hours, which covers the statutory requirement for the number of hours for a $\frac{1}{2}$ full-time position.

She is the co-author of teaching literature on the subject of the competition, which is used in the educational activity at AUP. Specifically, Dr Slaveya Petrova is the co-author of the textbook *Biological Agriculture and Agrobiodiversity* and the study guide *Pollution, Water Protection and Impact on Ecosystems*.

The candidate was the promotor of a relatively small number of diploma students in AUP - three, which is understandable given his shorter experience and study load at the university. For an objective assessment of her role in the training of young scientific personnel, it is necessary to take into account her activity at the PU. There, under the supervision of Dr. Slaveya Petrova, successfully defended 38 students, 24 of them at Bachelor and 14 in Master level. Therefore, the candidate has high achievements on this criterion.

7. Critical notes and recommendations

I have no critical notes and recommendations for the candidate.

8. Personal impressions and opinion of the reviewer

I have known Slaveya Petrova since she was a doctoral student at the PU. I believe that she has a high professional training in the field of Ecology and Biology, which along with her inherent curiosity, ability to work and persistence are a guarantee for high scientific achievements.

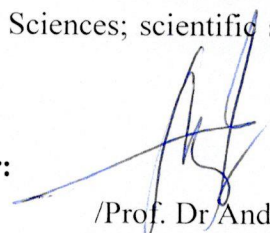
CONCLUSION

The documents and materials presented by Dr Slaveya Tencheva Petrova meet the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its application in the AUP. She has presented a sufficient number of scientific papers published in authoritative scientific journals. The candidate's works contain original scientific and applied contributions in the field of Ecology and Biology with potential for use in various fields, including ecosystem services.

The achievements of Dr. Slaveya Petrova in both educational and research activities fully correspond, and according to some criteria, exceed the minimal national requirements for holding the academic position "Associate Professor".

After thorough acquaintance with the materials and scientific works presented in the competition and analysis of the obtained results and scientific-applied contributions, I am fully convinced to give my positive evaluation and to recommend the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Plant Protection and Agroecology at AUP for electing Dr Slaveya Tencheva Petrova in 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 specialty Ecology and Ecosystems protection.

Reviewer:



/Prof. Dr Andon Vasilev/

27.04.2024 г.