REVIEW

From Dr. Mariyana Ivanova Lyubenova, Professor at Sofia University "St. Kliment Ohridski", appointed as a member of the scientific jury by order No. RD-21-1416 dated 08.07.2024, by the Rector of Plovdiv University "Paisii Hilendarski" regarding the materials submitted for participation in the competition for the academic position of "Associate Professor", announced in the State Gazette, issue 32 of 09.04.2024, and on the website of Plovdiv University "Paisii Hilendarski" for the needs of the Department of Ecology and Environmental Protection at the Faculty of Biology of Plovdiv University "Paisii Hilendarski" in the field of higher education: Natural Sciences, Mathematics, and Informatics; professional field 4. Biological Sciences (scientific specialty – Ecology and Environmental Protection).

In the competition for the position of "Associate Professor," the candidates participating are Vesela Slavcheva Yancheva and Slaveya Tencheva Petrova from Plovdiv University "Paisii Hilendarski," Department of Ecology and Environmental Protection.

1. General presentation of the submitted materials.

1.1. Dr. Yancheva's document package complies with the Regulations for the Development of the Academic Staff of Plovdiv University and generally includes 15 items and folders: A). 1. Application; 2. CV; 3. and 4. Diplomas for Master's and Doctoral degrees; 11. Employment history; 12. Documents related to teaching activities; 14. Documents according to the additional requirements of the Faculty of Biology; 15. Other documents. B). 5., 6., and 6.1 - List of scientific works, scientific works, and citations; 7. Compliance report in Bulgarian and English; 8. Summary of scientific works and habilitation report in Bulgarian and English; 9. Self-assessment of contributions in Bulgarian and English; 10. Declaration of originality; 13. Documents related to research work; Folder with scientific publications.

1.2. Dr. Petrova's document package complies with the Regulations for the Development of the Academic Staff of Plovdiv University and includes 17 items (excluding No. 15): A). 1. Application; 2. CV; 3. and 4. Diplomas for Master's and Doctoral degrees; 12.1 and 12.2. Employment certificates; 13.1. – 13.6. Reports on teaching workload, successfully defended graduates, co-authorship in textbooks and teaching aids, development of curricula and lecture courses; Certificates for conducted hours at the Smolyan and Kardzhali branches; 16.1. – 16.9. Orders for participation in committees; 17.1.-17.3. Awards and certificates; 17.4. – 17.13. Certificates; 17.14. – Membership certificate in the Union of Scientists in Bulgaria – Plovdiv, and 17.15. Extract from the protocol for the election of Associate Professor. B). 6. List of scientific works; 7.2. List of noted citations; 8. Compliance report with the requirements in Bulgarian and English; 9.1, 9.2. Summary of materials in Bulgarian and English, and 9.3. Habilitation report in Bulgarian and English; 10.1. and 10.2. Self-assessment of contributions in Bulgarian and English; 11. Declaration of originality and authenticity; 14.1 – 14.6. Reports on participation in scientific projects and a report on participation in scientific forums; Folder with scientific publications.

2. Brief Biographical Information (of the candidates)

2.1. Dr. V. Yancheva graduated from the Agricultural University – Plovdiv in 2008 with a Bachelor's degree in "Plant Protection," and in 2010, she obtained a Master's degree in Ecology from the Norwegian University of Life Sciences. In 2014, she defended her dissertation at Plovdiv University "Paisii Hilendarski" on the topic "The Impact of Heavy Metals on Fish Representatives in Topolnitsa Reservoir, Bulgaria." Since 2014, she has been a Senior Assistant Professor at the Department of Ecology and Environmental Protection at Plovdiv University, working as a lecturer

and researcher in the field of ecology and ecotoxicology. From 2005 to the present, she has also been a supervisor/assistant manager at Haygrove Ltd., a company involved in agriculture and farming. Since 2020, she has served as the Erasmus+ coordinator for the Faculty of Biology at Plovdiv University. She has participated in five Erasmus mobilities (Norway, Portugal, Hungary, Greece, and Romania) and has helped establish 17 new contracts for the Faculty of Biology, in addition to the three existing ones. She is responsible for managing outgoing and incoming mobilities of students, teaching staff, and non-teaching staff. Dr. Yancheva is fluent in English and has a working understanding of Russian, Polish, and Serbian. She possesses strong computer skills and is proficient in specialized software. Additionally, she has experience with laboratory equipment and techniques. She holds *five certificates* for completed courses in ZBUT, ZHOOG, applied computer literacy, and language courses in English and Spanish. She also *has two certificates*: one for passing the TOEFL exam and another from the Norwegian University of Life Sciences for fish dissection for toxicant analysis. According to her self-assessment, Dr. Yancheva has excellent communication skills and good organizational/managerial skills. *She also holds a category B driving license*.

2.2. Dr. S. Petrova graduated from Plovdiv University (PU) in 2006 with a Bachelor's degree in Ecology, and in 2008, she obtained a Master's degree in Ecology. In 2012, she defended her dissertation at Plovdiv University "Paisii Hilendarski" on the topic "Passive and Active Phytomonitoring of Air Pollution in the City of Plovdiv." Since 2011, she has been a Senior Assistant Professor at the Department of Ecology and Environmental Protection at Plovdiv University, working as a lecturer and researcher in the field of ecology and ecosystem conservation. From 2017 to 2024, she held a second employment contract as a Senior Assistant Professor at the Agricultural University of Plovdiv, in the Department of Microbiology and Environmental Biotechnology, and since 2024, she has been an Associate Professor at the same university. Dr. Petrova is fluent in English and has a good command of French and Russian. She possesses strong computer skills and is proficient in specialized software, as well as in working with specialized equipment. She holds *10 certificates for additional qualifications*, including courses on Air Pollution Monitoring (Romania and Slovakia, Erasmus+); Application of Artificial Intelligence in Scientific Research, Enhancing Digital Skills (PU); School in the Cloud – Creation and Content (Center for Creative Training); Innovative Educational Technologies, Training of Trainers, Training of Trainers on Tools for Early Identification of Students at Risk of Dropping Out (Ministry of Education and Science and the “Support for Success” project); Advanced Health and Safety at Work ("Doceo" Ltd. - Sofia); and Training on Combating Plagiarism (StrikePlagiarism). She has completed training under the LIFE Program – LIFE 14 CAP/BG/000013 – CAPTA BG (2018-20) and training through the Operational Programme "Human Resources Development" (Association "International Management Institute" - Varna). Dr. Petrova has also acquired *two postgraduate qualifications*: Teacher of Biology and Teacher of Ecology and Ecosystem Conservation. According to her self-assessment, the candidate has excellent social skills and competencies, including collaboration with governmental, municipal, and non-governmental organizations, schools, and others. She also has experience working with students and pupils in conducting scientific forums, seminars, trainings, competitions, environmental initiatives, field practices, visits, and more. The candidate has good organizational/managerial skills, demonstrated through the coordination, management, and administration of projects, as well as organizing and judging scientific forums, seminars, trainings, competitions, environmental initiatives, field practices, visits, and more. She serves as an *academic mentor for the "Student Practices"* project under the Ministry of Education and Science and she is the *Manager of the "EcoExpert Environmental Society*" association. *Dr. Petrova holds a category B driving license.*

3. General Overview of the Activities of the Candidates

3.1. Evaluation of Educational and Pedagogical Activity

3.1.1. The total teaching experience of Chief Ass. Professor **V. Yancheva** at Plovdiv University is **9 years, 7 months, and 23 days**. The candidate obtained the academic degree **of "Doctor" 10 years**, 0 months, and 25 days ago (as of June 24, 2024), *which exceeds the minimum requirement of 5 years.* The average in-class workload over five academic years, calculated based on the curriculum (2018/19 - 2020/21, 2022/23 - 2023/24), is **649.8** hours. For four years (2020/21 - 2023/24) at the Kardzhali branch, it is **120** hours (equivalent to practical sessions). The total average in-class workload is **769.8 hours, with lecture hours accounting for 265.7 hours** (practical sessions). Dr. Yancheva has successfully supervised **five diploma students**, *meeting the minimum requirements*. *The reported hours are not entirely accurate, as there is no official record from the Academic Office and one academic year is missing.*

Dr. Yancheva has described the following courses in the "Bachelor" degree programs to which she contributes, but has not provided official documentation from the Academic Office:

- **Ecology and Environmental Protection**: **4 mandatory courses for both full-time and part-time students**: "Climatology and Hydrology," "Water Pollution," "Ecological Toxicology," and "Aquaculture";

- **Pharmaceutical Biotechnology**: **1 mandatory course for full-time students** (Ecological Toxicology, practical sessions).

- **Geography, Technology, and Entrepreneurship**: **1 mandatory course for full-time students** (Climatology and Hydrology).

The elective courses across different bachelor's programs are **4**:

- "Methodological Guidelines for Thesis Development" for 5 specialties: "B**iology and Chemistry"** (lectures for full-time and part-time students); **"Biology"** – part-time (seminars), **"Medical Biology"** – full-time (seminars); "Microbiology and Virology" – full-time (seminars), and "**Pharmaceutical Biotechnology**" – full-time (seminars).

- "Ecological Toxicology" – lectures, and "Aquaculture" – lectures for **"Biology"** – part-time studies.

- "Management, Control, and Protection of Animal Populations in Urban Systems" – full-time studies for "**Ecology and Environmental Protection**."

In the "Master's" degree programs, she teaches:

- 1 mandatory course ("Water Resource Management" – lectures and lab sessions) for "*Ecology, Management, and Environmental Control"* – part-time.

- 2 elective courses ("Ecological Toxicology" – lectures and lab sessions and "Global Climate Change" – lectures) for "**Ecology and Ecosystem Protection**" and "Ecology, Management, and Environmental Control" – part-time, for the latter program, only in the second year.

Dr. Yancheva also teaches the course "Methodological Guidelines for Developing a Dissertation and Scientific Publication" *at the University Center for Work with Young Scientists, Doctoral Students, and Postdoctoral Fellows* at Plovdiv University.

Dr Yancheva is involved in conducting 2 mandatory internships:

- "Conservation Ecology" for the Bachelor program in "**Ecology and Environmental Protection"** – part-time.

- "Environmental Management and Control" for the **Master program** – part-time.

Additionally, she conducts 1 elective internship in "Ecology, Health, and Hygiene" for the Bachelor program in "**Medical Biology**" – full-time.

The candidate has acquired administrative experience over the past 5 years by participating in **10 committees**, with the relevant orders and decisions cited: 1. Accreditation of the professional field 4.3. Biological Sciences; 2. International Activities and Public Relations; 3. Erasmus Coordinator of the Faculty of Biology at Plovdiv University – appointed for two period; 4. Preparation and Organization of the "Journey into Biology" Competition for high school students (10th-12th grade) – orders for three competitions; 5. Student Selection and Certification of Foreign Language Proficiency; 6. International Activities for the period 2019-2023; 7. Ethical and Humane Treatment in the Use of Vertebrate Laboratory Animals at the Vivarium of the Faculty of Biology at Plovdiv

University. *The candidate fully meets the additional administrative requirements of Plovdiv University*. *Dr. Yancheva has also participated in the organizing committees of 5 conferences for young scientists, doctoral students, and students*, including the conference "Ecology – A Way of Thinking," in which she has been involved since its inception.

3.1.2. Dr S. Petrova has a total of 18 years, 4 months, and 27 days of service at Plovdiv University, with **13 years and 3 months** of teaching experience at the university. She has served as an Assistant Professor for **10 years, 11 months, and 13** days and earned her Ph.D. **11 years, 9 months, and 3 days ago** (as of July 1, 2024), *exceeding the minimum requirement of 5 years*. Her teaching experience at the Agricultural University (not adjusted to an 8-hour workday) amounts to 7 years and 2 months (as of June 20, 2024). The average in-class workload (equivalent to practical sessions) is **1,140 hours at Plovdiv University (averaged over 5 years), 311.25 hours at the Kardzhali branch (averaged over 4 years), and 101.25 hours at the Smolyan branch (averaged over 3 years)**. The corresponding average lecture workload (equivalent to practical sessions) is **356.8 hours at Plovdiv University, 285 hours at the Kardzhali branch, and 100 hours at the Smolyan branch**.

According to the provided records, Dr Petrova has conducted **10 mandatory courses** across 7 different specialties: 1. "Fundamentals of Paleontology" (**Biology**, full-time and part-time); 2. "Geology and Petrography" and "Soil Science and Soil Pollution" (**Ecology and Environmental Protection**, full-time and part-time); 3. "Ecology" (**Bioinformatics**); 4. "Geomorphology," "Soil Science," "Physical Geography of the Continents," and "Physical Geography of Bulgaria" (**Geography, Technology, and Entrepreneurship**, full-time); 5. "Human Ecology" (**Medical Biology**); 6. "Ecology and Environmental Protection" (**Biology and Chemistry, and Biology and English**). Over a 5-year period, she has also taught **4 elective courses** and **1 optional course**: "Paleoecology," "Renewable Natural Resources and Sustainable Development," "Geoecology," "Healthy and Safe Working Conditions," and "Fundamentals of Paleontology and Historical Geology", "Risks and Actions in Emergency Situations."

The candidate has provided a list of developed curricula and lecture courses. For the "Bachelor's" degree programs, she has developed a total of **31 courses across 12 specialties**, including 8 updated and 14 elective or optional courses: **13 courses for the Faculty of Biology**; **2 courses for the Faculty of Physics and Technology**, **7 courses for the Faculty of Philosophy and History**, **6 courses for the Kardzhali branch**, and **3 courses for the Smolyan branch**. For the Master's degree programs (Faculty of Biology), the candidate has developed **6 courses for 3 master's programs**.

According to the provided orders and decisions, *Dr. Petrova meets the additional administrative requirements by participating in **9 committees**:* **1**. Committee for the Development of Biology Exam Variants for prospective students (in 2020, 2023, and 2024); **2.** Committee for the Preparation and Organization of the "Journey into Biology" Competition for high school students (10th-12th grade) in 2023 and 2024; **3.** Committee for the Preparation of the 2024 Admission Campaign; **4**. Quality Assurance Committee; **5**. Committee for the Accreditation of Professional Field 4.3. Biological Sciences; 6. Committee for the Accreditation of Professional Field 4.3. Biological Sciences for the Doctoral Degree.

Both candidates meet the minimum and additional requirements, but Dr. Petrova has two years more teaching experience, participates in more mandatory and elective courses, and her total and lecture hours are higher. She has approximately seven times more graduates than the minimum requirements. The documents submitted by Dr. Petrova for her teaching activities are in accordance with the requirements, whereas those submitted by Dr. Yancheva - lack signatures and do not include records from the Academic Office.

3.2. Оценка на научната и научно-приложна дейност на кандидатките

***3.2.1. Dr.* Yancheva** has contributed a total of **73 scientific works**, including 71 scientific articles, which are separate from her dissertation *and include those submitted for her application as a Senior Assistant.* These include **45 articles** (2 of which are in press with documentation of acceptance), indexed in WoS and Scopus with a total Impact Factor (IF) of **29.410 and an SJR of 3.152**. The articles are classified as follows: **Q1 – 3 articles, Q2 – 7 (6) articles, Q3 – 8 (7) articles, and Q4 – 27 (25) articles**. Additionally, there are 22 indexed articles without IF and SJR, and 4 reports in peer-reviewed collections, 2 of which have international participation. The scientific works have been published in **25 different prestigious journals**, such as *Water, Toxics, Heliyon, Comparative Biochemistry and Physiology, Scientific Reports, Acta Zoologica Bulgarica, North-Western Journal of Zoology, Applied Ecology and Environmental Research, Brazilian Archives of Biology and Technology, Archives of Industrial Hygiene and Toxicology, Biologia*, and others. The educational aids are also presented—2 textbooks and 2 manuals (*one of which does not qualify as a university teaching manual*); participation in 52 conferences and seminars (*incorrectly listed as 51*)—35 of which were international or had international participation (8 oral presentations and 27 posters presented), and 17 national (6 oral presentations and 11 posters presented). Additionally, there have been 15 participations in research projects—1 international; 3 funded by the National Science Fund (NSF) under the Ministry of Education and Science, where she is the leader of one project and a coordinator of a research group in another; and 11 funded by the NSF of Plovdiv University, where she is the leader of one project. One national project is ongoing, while two internal projects are set to conclude in 2024.

According to the information provided by the candidate, she has reviewed publications for the following journals: *Ecologia Balkanica, Zoonotes, Archives of Polish Fisheries, Annual Research & Review in Biology, Toxin Reviews, Chemosphere, Asian Journal of Environment & Ecology, Revista Ambiente & Água - An Interdisciplinary Journal of Applied Science*, and others. Certificates from her reviewing activities have been presented for **6 journals**: *Turkish Journal of Fisheries and Aquatic Sciences, Acta Zoologica Bulgarica, Environmental Monitoring and Assessment, Folia Biologica – Krakow, Journal of BioScience and Biotechnology, and Toxics*.

Dr. Yancheva is *the secretary of the journal Ecologia Balkanica* and the *technical editor of the international journal Zoonotes*, both of which are indexed in Scopus/WOS (Zoological Record). She is also a member of the International Journal of Environmental Monitoring and Analysis and the International Journal of Zoology and Animal Biology (USA). Additionally, she is a *member of three organizations:* the "Union of Scientists – Plovdiv" (with a provided membership certificate), the Bulgarian Society for the Protection of Birds, and the student club "ESETRA" at the Faculty of Biology of Plovdiv University "Paisii Hilendarski."

3.2.2. The candidate, Dr. Petrova, has submitted a list of **49 scientific works**, of which **40 are subject to review**, as 3 are publications related to her dissertation, and 6 were used in her application for Senior Assistant. The publications subject to review include **1 scientific monograph, 1 scientific study, 1 book, 3 book chapters, and 34 articles** (one of which is in press, *without a supporting document*). These are indexed in WoS and Scopus with a total Impact Factor (**IF) of 37.835** and an **SJR of 2.172**. The quartile distribution is as follows: **Q1 – 5 articles, Q2 – 7 articles, Q3 – 8 articles, and Q4 – 14 articles**. The scientific works have been published in **13 different prestigious journals**, such as *Biologia, Forests, Life, Land, Plants, Environmental Science and Pollution Research, Atmospheric Pollution Research*, and others.

Additionally, **13 educational aids** have been presented—**3 textbooks (plus 1 revised edition) and 8 manuals (plus 1 revised edition and 1 edition in English)**. She has participated in **71 conferences and seminars—61 of which were international** or had international participation (45 oral presentations and 9 posters presented) and 10 national (7 oral presentations and 3 posters

presented). She has also participated in **32 research projects**—4 international and 14 national projects, where she is the leader of 3 national projects; 14 projects are under the NSF at Plovdiv University/Agricultural University, where she leads 3 projects. Among the national projects, 3 are set to conclude in 2024, and 4 are ongoing; of the internal projects, 2 will conclude in 2024, and 2 are ongoing, indicating that the candidate's research activity will continue to be at a high level.

The candidate has provided information (websites) regarding her participation in *the editorial board of Ecologia Balkanica* (as Technical Editor) and as a *Guest Editor* for Forests (MDPI) for the Special Issues "Ecosystem Services of Urban Forest" and "Ecosystem Services of Urban Forest," as well as for Land (MDPI) for the Special Issue "Sustainable Management of Urban Soils and Improving the Quality of Life."

Dr. S. Petrova *is a member of the Union of Scientists in Bulgaria* (Vice-Chair of the Biology Section); MENSA Bulgaria; *the Public Expert Council on Greening for the Municipality* of Plovdiv (Vice-Chair); and *the Public Expert Council on Air Quality for the Municipality* of Plovdiv.

3.2.3. Contributions (scientific, scientific-applied, applied - methodological) and citations

3.2.3.1. Dr. Yancheva's habilitation report has been developed professionally and at a high scientific level. The candidate's contributions are in the field of freshwater ecotoxicology. The histological and biochemical changes identified in various organs of three species of freshwater fish can be applied as potential biomarkers in environmental risk assessment programs and in monitoring pollution of aquatic ecosystems in Bulgaria with heavy metals and pesticides. The publications attached to the report contain the following studies: **1.** An original toxicological study on the concentration of metals (As, Cu, Cd, Ni, Pb, Zn) in samples from the surface waters of the Topolnitsa Reservoir and the liver of the little-studied species perch (*Perca fluviatilis* L.) during three different seasons, where various histological alterations and changes in enzyme activity were identified; **2.** An original toxicological study on the concentration of metals (As, Cu, Cd, Ni, Pb, Zn) in samples from the surface waters of the Topolnitsa Reservoir and five organs of common carp (*Cyprinus carpio* L.) and rudd (*Scardinius erythrophthalmus* L.)—gills, liver, kidney, spleen, and muscle—across three seasons, with recommendations for the consumption of carp species from the reservoir; **3**. Original studies on the morphological structure of the liver and the activity of hepatic enzymes LDH, ALAT, and ASAT in a poorly studied species, the rudd (*Scardinius erythrophthalmus* L.), in the Topolnitsa Reservoir over three seasons. Bioaccumulation of pollutants, degenerative changes in the liver, and elevated enzyme levels were observed; **4.** Investigation of the impact of chronic pollution in the Topolnitsa Reservoir (with six metals) on the gill structure of perch over three seasons. This provides the first information on the effect of metals on gill morphology, showing metal bioaccumulation in the gills, proliferative and degenerative changes, as well as alterations in blood vessels; **5.** Acute and chronic studies on the toxicological effect of the insecticide thiamethoxam (a less-studied substance in Bulgaria) on the histological structure of the gills of common carp (*Cyprinus carpio* L.). Various histological changes in the gill epithelium were found, which intensified with increasing concentration; **6.** Study of the toxicological effects of the herbicide glyphosate on the histological and biochemical parameters of the liver in common carp (*Cyprinus carpio* L.). Degenerative and necrotic histological lesions were observed in the liver parenchyma and histological changes in the hepatic blood vessels (lymphocyte proliferation and hyperemia), proportional to increasing glyphosate concentrations. An increased enzyme activity of LDH was found in the treated liver, while ASAT and ALAT activities were reduced and **7.** Investigation of the toxicological effects of a fungicide containing fosetyl-Al and fenamidone on the gills of common carp. Various histological changes in gill structure were observed, proportional to increasing concentrations of the fungicide**.**

Dr. Yancheva's total scientific contributions are in the field of aquatic ecotoxicology and amount to around **23, including 15 applied research studies and 8 methodological contributions**. All of these contributions are original. She has outlined her work in three main areas: **1.** Application

of a multi-biomarker approach to analyze changes in bioindicators—fish—under the influence of various inorganic and organic toxicants for the purposes of ecotoxicological studies and integrated monitoring programs; **2.** Application of a multi-biomarker approach to analyze changes in bioindicators—mollusks—under the influence of various inorganic and organic toxicants for the purposes of toxicological studies and integrated monitoring programs and **3.** Investigation of the negative effects of some new or poorly studied toxicants in the country **– Appendix 1.**

Dr. Yancheva has reported **323 and 247 citations from the Scopus and Web of Science (WoS)** databases, respectively (excluding self-citations). She has provided links to two other databases—Google Scholar and ResearchGate—*but has not compiled a citation list from these sources.* The only list available is from secondary databases, which includes **61 citations for 21 publications, or 29.6% of her scientific output**. The average citation per publication in this list is **2.7, with a maximum of 18 citations**. Some of the citing journals include *Applied Ecology and Environmental Sciences, Journal of Aquatic Science, Journal of Fisheries, Journal of Agricultural Research Advances*, *Technology*, *Biological and Applied Environmental Research, Journal of Life Sciences, Journal of Basic and Applied Zoology, and Journal of Biotechnology Research,* and others. This list was not included in the scoring.

3.2.3.2. Dr. Petrova's habilitation report is written professionally and at a high scientific level. It summarizes extensive research and observations on: **1.** The Antioxidant Defense System of Plants. Research has been conducted on *Tilia tomentosa* Moench, *Fraxinus excelsior* L., and *Pinus nigra* and their response to induced stress. The report addresses oxidative stress resulting from exposure to adverse environmental conditions, which leads to the accumulation of reactive oxygen forms (ROF) in various cellular structures. The balance between the production and detoxification of accumulated ROF is maintained by a complex system involving antioxidant enzymes, non-enzymatic antioxidant molecules, and ROF-producing enzymes; ***2***. Molecular Markers and Gene Expression. The search for molecular markers that indicate changes in gene expression under the influence of an urbanized environment is discussed to clarify the adaptive mechanisms in plants. For representatives of the genus *Tilia* and the genus *Pinus*, the microsatellite-based marker system is more suitable for genotyping, while for the genus *Fraxinus*, the retrotransposon-based marker system is more appropriate; **3.** Investigating the Potential of *Pinus nigra* for Pollutant Accumulation. The potential of *Pinus nigra* for accumulating pollutants from soil and atmospheric air was studied in selected areas of Plovdiv, characterized by varying degrees of anthropogenic load. The accumulation and translocation of elements in the examined plant organs of Pinus nigra were determined by calculating the Bioaccumulation Factor (BCF), Translocation Factor (TF), and Translocation Index (Rl/b); 4. Development of Linear Regression Models. Linear regression models were created to analyze the relationships between the measured element content in roots and needles. It was found that in the three peripheral zones of Plovdiv (Zone 1, Zone 8, and Zone 9), nearly 94.6-98.6% of the foliar content is a result of root accumulation, while in the remaining city zones, around 82.7-88.6% of the variation can be explained by soil uptake; **5**. Ecosystem Services Provided by Tree Species. Some of the regulating ecosystem services provided by tree species, which are crucial for the urban green system, were examined. The configuration consisting solely of evergreen trees provides three times greater air purification effects against ozone, particulate matter, NO2, etc., compared to a configuration consisting only of deciduous trees and **6.** Comparison of Plant Groups for Air Pollution Control. The effectiveness of different plant groups in purifying the atmospheric air from pollutants was compared. The synergy between anthropogenic and natural processes in the application of plant-based remedies (PBR) reveals lower costs and maintenance, and it may even be more effective in achieving urban resilience.

Dr. Petrova's total contributions in her scientific works pertain to three main areas: Ecology of Urbanized Ecosystems, Ecology of Natural Ecosystems, and Organic Agriculture. Her research outlines a total of **41 contributions**, which are categorized as follows: **4 Scientific contributions (3 original and 1 confirmatory), 22 Applied Scientific contributions (13 original and 9**

confirmatory), and 15 Methodological contributions. *These contributions reflect Dr. Petrova's extensive work and impact in her fields of expertise.* For details, please refer to **Appendix 2.**

Dr. Petrova has reported **265 citations (my count is 264) across 35 publications**, which means that **71.4%** of her scientific output is cited. This is a notably high percentage, demonstrating her established reputation in the scientific community. Her publications have been cited by **16 different journals with a total Impact Factor (IF) of 46.69.** Some of the indexed and peer-reviewed citing journals include: *Environmental Pollution, Atmospheric Pollution Research, Environmental Science and Pollution Research, Ecotoxicology and Environmental Safety, Transport and Environment, and Biological Trace Element Research*,

The average citation per publication is **7.5, with several publications having exceptional citation counts: 50, 25, 21, 19, and 18 citations.**

4. Evaluation of the personal contributions of the candidates

4.1. Although the scientific publications do not have separator protocols, among the 48 peer-reviewed publications of **Dr. Yancheva**, she is the **first author in 31 (64.6%)**, and **the second and third author in 10 and 7 publications, respectively**. In the reports and posters presented at i**nternational or internationally participated forums (35), she is listed as first to third author in 31 contributions**, **or 88.6%** (with 16 as the first author, 6 as the second, and 9 as the third). At **national conferences (17),** she is the first author in 3, and second and third author in 6 and 3 contributions, respectively. In published textbooks, she is the first author of one and the third author of another, while in educational aids, she is the first author of one and the third author of one guide. All these facts highlight *Dr. Yancheva's leading role in scientific work and her significant contributions to educational work.*

The application for the competition includes **3 letters of appreciation and 3 recommendations**, which are also noted in the biographical reference. For her professional work, Dr. Yancheva has received three letters of appreciation: from L'Oreal Bulgaria, the National Commission for UNESCO-Bulgaria, and Sofia University "St. Kliment Ohridski" for her participation in the "For Women in Science" program in 2018; from Elsevier for publishing two open-access articles during the period 2020-2022; and from the University Center for Work with Young Scientists, PhD Students, and Postdoctoral Researchers, signed by Prof. Dr. Lyubka Prandzheva. She has also submitted **three recommendations**: from Haygrove Ltd. (2018), Norway Park (2010), and the Norwegian University – from Prof. in Ecotoxicology Bjorn Rosseland (2010).

4.2. Among the 34 peer-reviewed publications of **Dr. Petrova**, she is **the first author in 22 (55%)**, and **second and third author in 4 publications each**. **Her personal contribution (as first to third author in scientific publications) is 70%**. In reports and posters presented at international or internationally participated forums (61), she **is listed as first to third author in 49 contributions, or 80.3%** (with 23 as the first author, 18 as the second, and 8 as the third). **At national conferences (10), she is the first author in 4, and second and third author in 1 contribution each**. In published textbooks, she is the first author of one and the third author of another, while in educational aids, she is the first author of one and the third author of one guide.

These achievements highlight Dr. Petrova's leading role in scientific work and her significant contributions to educational activities. Over the years, this has been reflected in her receiving **3 awards and 1 certificate**, as well as *being appointed as an associate professor at the Agricultural University*, as noted in the biographical reference.

For her professional work, **Dr. S. Petrova** has received **three awards and one certificate of recognition**: The EVRIKA Award for Achievements in Science from the EVRIKA Foundation; An Award for High Scientific Achievements in her Doctoral Dissertation from the Union of Scientists in Bulgaria (2013); The "Bearers of Enlightenment" Award as a member of the Organizing Committee and Scientific Jury of the student conference "Ecology: A Way of Thinking" (Ministry of Education and Science, 2014);

Jubilee Certificate for active participation in the activities of the Union of Scientists in Bulgaria (2014).

4.3. Dr. Yancheva initially proposed a total of **1518.66** points for the competition. After my adjustments, the points are **1389.66**, which is approximately **3.5 times** the minimum requirement of 400 points. However, under criterion B4, she does not meet the requirements because two of her publications were also included in the competition for the position of Assistant Professor. For the other criteria, the excess is as follows: Criterion Г 318 points; Criterion Д 596 points, and Criterion E 90.66 points. See Table 1 for details.

Table. 1. Indicators and Points According to the National Requirements for Dr. Vesela Yancheva

Indicator	Points
A1.	**50**
B4. – 7 бр.: 2 Q2+ 3 Q3	**85**
Г.	**518**
Г7. – 36 бр.: 3 Q1, 4 Q2, 5 Q3 и 24Q4.	518
Д11.	**646**
E.	**90.66**
E 14.– 2 бр.	20
E15. – 1 бр.	20
E16.– 1 бр.	20
E19.– 2 бр.	26.66
E 20. – 1 бр.	4

4.4. Dr. Petrova initially proposed a total of **1635.5 points** for the competition (according to my calculations, **1558.5** points). The points are detailed by sections in Table 2. Dr. Petrova's points exceed the national requirements by approximately **3.9 times**. The excess points by criteria are as follows: Criterion B4 20 points, Criterion G 310 points, Criterion D 478 points, and Criterion E 350.5 points. See Table 2 for detailed breakdown.

Table 2. . Indicators and Points According to the National Requirements for Dr. Slaveja Spasova

Indicator	Points
A1.	**50**
B4. – 5 бр.: 4 Q1+ Q2	**120**
Г.	**510**
Г 5. – 1 бр.	30
Г6.	20
Г7. – 28 бр.: Q1, Q2 – 6 бр., Q3 – 6 бр. и Q4 – 15 бр.	415
Г 8. – 3 бр.	45
Д11.	**528**
E.	**350.5**
E 14.– 11 бр.	110
E15. – 4 бр.	80
E16.– 3 бр.	60
E18.	12
E19.– 4 бр.	46,67
E 20. – 9 бр.	41.83

Both candidates have significant scientific achievements and contributions, although in different fields, and they exceed the necessary points required for the position of Associate Professor according to national standards. They also play an important role in educational activities and meet or exceed some of the additional requirements of Plovdiv University.

However, despite Dr. Yancheva's scientific achievements surpassing the requirements for the academic position of Associate Professor, she falls short by 25 points in Criterion B4 (after adjustments based on the list of publications used for the Assistant Professor competition). The reported citation metrics are considered inaccurate since no citation lists have been provided except those from secondary databases. Additionally, Dr. Yancheva has not submitted the necessary documentation from the Academic Department regarding courses taught and employment for the past five years. The submitted documents are also not signed by the candidate.

On the other hand, Dr. Petrova's scientific contributions are more substantial both in terms of points according to national requirements and content. Dr. Petrova has a broader range of interests and has submitted more comprehensive works such as a scientific monograph, a scientific study, book, book chapters, and numerous educational aids. She has proposed scientific publications beyond those included in her application for the Assistant Professor competition, with higher involvement in Q1 journals. Dr. Petrova has greater participation in scientific projects, including as a project leader, and has been involved in a wider range of conferences. Her teaching activities are also more significant in terms of the number of courses taught and the number of thesis defenses. Given her scientific and teaching activities, she clearly exceeds the requirements for the academic position of Associate Professor. It is no surprise that she has already been appointed as Associate Professor at the Agricultural University of Plovdiv.

5. Critical Remarks and Recommendations

5.1. Technical Notes for Dr. Yancheva

The documents submitted by Dr. Yancheva are not signed by the candidate, which could be perceived as a lack of respect for the committee or suggest that the documents do not have an official status; There is no list provided of the scientific works that were included in Dr. Yancheva's previous competition for the position of Assistant Professor; The scientific works are listed in chronological order, but not according to the national requirements, which may lead to confusion during the evaluation process; The original articles are not numbered or aligned with the submitted list—two article titles differ from the originals, and one article listed is missing from the provided list; In section 8, different files share the same numbering, which can create confusion; The list of projects is missing periods or identification numbers for some of them, making it difficult to verify their details; No report from the Academic Department is provided to confirm the teaching hours for the past five years; The information provided by Dr. Yancheva is missing one academic year (2021/2022) and includes years 2018/2019 and 2024/2025, which fall outside the five-year evaluation period; The second teaching guide submitted does not seem to have the characteristics of a university-level guide

and was published in a scientific journal. Nevertheless, it could be assumed that Dr. Yancheva might use it in her teaching activities. For these reasons, the guide was excluded during the evaluation of the submitted materials; Publication No. 10 is listed as Q3 instead of Q2; No. 17 is listed as Q3 instead of Q4; publication No. 22 does not have a quartile ranking, and No. 40 does not appear on the website - (https://www.scimagojr.com/); The candidate did not compile an overall list of citations, which could have included selected citations. The provided websites are likely to have duplicates and overlaps in the databases, and the citing works should have been listed. For this reason, only citations from secondary databases were analyzed, and the points awarded were based on citations in SCOPUS.

The omissions in the documents submitted by Dr. Yancheva are significant and numerous, which complicates the work of the reviewer and reflects poorly on her diligence regarding the competition and the jury. Although Dr. Yancheva meets the requirements for the position of Associate Professor, she needs to pay more attention to and refine her documentation in future applications.

5.2. Technical Notes for Dr. Petrova

The scientific works of Dr. Petrova are organized according to national requirements; however, within individual sections, the chronological order is not consistently maintained. Additionally, the research projects are not listed chronologically. The international project BG161PO003-1.2.02-0042-C0001, contract No. BG161PO003-1.2.02-0042-C0001/Se-06, is missing from the documentation. The final year of project BF 004/ and the start years of projects SP15BF14/ and SP15BF16/ differ between the file and the documentation provided. The title of project BF 004/ 2013-2014 also varies between the file and the documentation. For projects associated with other organizations (Nos. 2, 3, 5, and 6), the periods are not provided, and there are no supporting certificates. One of the monographs listed is actually a scientific study. Two ofs the projects listed as international are actually national projects. Two works, G.5.2 and G7.28, are not included in the electronic copy—one contains a presentation of ecosystem services, and G.7.2 is repeated. G.7.9 is listed as Q4, not Q3, and G7.11 does not have a quartile ranking. No note has been provided to confirm that article G7.29 has been accepted for publication.

These technical omissions do not fundamentally affect the overall submission, as Dr. Petrova still exceeds the minimum national requirements.

6. Personal impressions

I do not personally know the candidate Vesela Yancheva, but it must be noted that she has a substantial scientific and teaching record, with achievements that exceed the requirements for the academic position of Associate Professor. However, she has made significant omissions in the submitted documentation, which should be avoided in the future.

I am familiar with Dr. Petrova's scientific work from my participation as a reviewer for two projects under the National Science Fund (NSF) and in the competition for Associate Professor at the Agricultural University (AU). My personal impressions are that she is organized, ambitious, has diverse interests, and is an effective and promising member of the faculty at Plovdiv University. I would recommend that she engage in the supervision of doctoral students, who would be a valuable addition to the university.

CONCLUSION

After reviewing the materials and scientific works submitted in the competition, analyzing their significance and the scientific, scientific-applied, and applied contributions contained within, I find it reasonable to give my positive evaluation and recommend to the Academic Committee to prepare a report-proposal to the Faculty Council of the Faculty of Biology for the selection of Slaveya Tencheva Petrova to the academic position of "Associate Professor" at "Paisii Hilendarski" University of Plovdiv in the field of Higher Education 4. Natural Sciences, Mathematics, and Informatics, professional field 4.3. Biological Sciences (specialty Ecology and Ecosystem Conservation).

09.09.2024 Reviewer: .....

/Prof. Dr Mariyana Lyubenova/

Appendix 1. Contributions to the Scientific Works of Dr. Vesela Yancheva

Scientific-Applied Contributions – *Original*

1. Investigation of the mechanisms of toxicological effects of heavy metals and toxic elements on the gills, liver, and kidneys of common carp (*Cyprinus carpio*).
2. Investigation of the mechanisms of toxicological effects of heavy metals and toxic elements on the gills, liver, and kidneys of bighead carp (*Hypophthalmichthys nobilis*).
3. Investigation of the mechanisms of toxicological effects of heavy metals and toxic elements on the gills, liver, and kidneys of rudd (*Scardinius erythrophthalmus*).
4. Investigation of the mechanisms of toxicological effects of pesticides from different classes on the gills, liver, and kidneys of common carp (*Cyprinus carpio*).
5. Investigation of the mechanisms of toxicological effects of pesticides from different classes on the gills, liver, and kidneys of bighead carp (*Hypophthalmichthys nobilis*).
6. Investigation of the mechanisms of toxicological effects of pesticides from different classes on the gills, liver, and kidneys of rudd (*Scardinius erythrophthalmus*).
7. Investigation of the mechanisms of toxicological effects of heavy metals and toxic elements on the invasive freshwater species zebra mussel (*Dreissena polymorpha*).
8. Investigation of the mechanisms of toxicological effects of heavy metals and toxic elements on the invasive freshwater species Chinese pond mussel (*Sinanodonta woodiana*).
9. Investigation of the mechanisms of toxicological effects of heavy metals and toxic elements on the marine black mussel (*Mytilus galloprovincialis*).
10. Investigation of the mechanisms of toxicological effects of pesticides from different classes on the invasive freshwater species zebra mussel (*Dreissena polymorpha*).
11. Investigation of the mechanisms of toxicological effects of pesticides from different classes on the invasive freshwater species Chinese pond mussel (*Sinanodonta woodiana*).
12. Investigation of the mechanisms of toxicological effects of pesticides from different classes on the marine black mussel (*Mytilus galloprovincialis*).
13. Toxicological information has been presented for the common carp (*Cyprinus carpio*), a commercially important species in freshwater aquaculture.
14. Toxicological information has been presented for the commercially valuable species black mussel (*Mytilus galloprovincialis*).
15. Opportunities for comparing the bioindicator properties of fish and mussels for the purposes of ecotoxicology and biomonitoring have been presented.

Methodological – *Original*

1. Application of a multi-biomarker approach—histopathological, histochemical, and biochemical analyses—in toxicological studies.
2. Proposal for using less common carp species, such as bighead carp and rudd, for aquatic toxicology purposes.
3. For the first time in Bulgaria, data on the application of classical medical methods, such as PAS reaction (for glycogen) and SUDAN method (for lipids) on fish, have been presented and proposed as unconventional but reliable biomarkers.
4. For the first time in Bulgaria, the method of neutral red staining (lysosomal destabilization) has been applied for aquatic toxicology.
5. For the first time in Bulgaria, an experiment with transplanted mussels (Mussel Watch Programme) has been conducted.
6. Investigation of unknown or poorly studied organic pollutants in the country—polycyclic aromatic hydrocarbons, polybrominated diphenyl ethers, and short-chain chlorinated paraffins.
7. Parallel study of acute and subchronic effects of toxicants.
8. Introduction of a new methodology for experimental work with microplastics.

Appendix 2. Contributions to the Scientific Works of Dr. Slaveya Petrova

Scientific – *Original*

1. For the first time, microbial communities in the rhizosphere zone of the Strandzha endemic species *Cicer montbretii* have been studied.
2. Information on the geology and morphotectonic development of the Sredna Gora region has been systematized, and the connections between geology, paleontology, and soils in the area have been analyzed.
3. New data on fossil communities in the area of the village of Perunika, Eastern Rhodopes, have been published, and a paleoecological reconstruction of ancient ecosystems and communities has been made.

Scientific – *Confirmatory*

4. The negative impact of pollutants manifests at an earlier stage in the photosynthetic process compared to the damage to the leaf blade.

Scientific-Applied – *Original*

1. Active biomonitoring using moss and lichenized fungi collectors to assess atmospheric pollution has been applied for the first time in the city of Plovdiv.
2. It has been proven that the air quality in the city of Plovdiv is deteriorated, with more pronounced pollution in the central zone and in residential areas located to the east and southeast of it.
3. The first-ever comprehensive studies on the state of key components of the urban ecosystem (soils, soil communities, green infrastructure, etc.) have been conducted in the city of Plovdiv.
4. Studies on the mobile forms of identified pollutants and the assessment of environmental conditions and the state of urban soils have been conducted for the first time in the city of Plovdiv.
5. The first buffer green spaces around transportation arteries in Plovdiv have been created, utilizing highly adaptive perennial legumes and grasses with strong bioremediation capabilities. This was based on research into ecological and physiological parameters and biomarkers.
6. Risk zones within the city of Plovdiv have been identified concerning environmental quality and the development of the green system.

7. Based on monitoring, analysis, and evaluation of the condition of key tree species in Plovdiv's green system (2010-2024), the first systematic studies on the physiology and phenology of widely distributed urban dendroflora species have been conducted. The necessary characteristics of the green system have been determined according to the climatic and soil conditions of Plovdiv—xeromesophytes that are gas-resistant, capable of withstanding high summer temperatures, and tolerant to soil and air drought. An appropriate species composition has been proposed for urban planning in the context of urbanization and climate change.

8. Доказано е негативното въздействие на води от водосбора на р. Тополница върху някои видове риби въз основа на акутни биотестове за токсичност.

9. A comparative analysis of behavior, survival, and respiratory processes in fish under single and combined exposures to heavy metals (Cd, Ni, Pb, Zn) in laboratory conditions, with consideration of the time factor, has been conducted.

10. The transfer of microplastics from soil into cultivated plants via the root system and their deposition in above-ground organs has been proven.

11. The influence of Cycocel as a growth regulator on cultivated sorghum varieties has been tested for the first time.

12. *Sorghum* varieties possessing genes with specific desirable qualities have been selected to serve as donors in breeding programs.

13. The advantages, opportunities, vulnerabilities, and threats to the conservation of biodiversity and ecosystems within the Strandzha Nature Park have been analyzed. Sensitive zones have been identified, and recommendations for their sustainable management have been made.

Scientific-Applied – *Confirmatory*

1. The potential of certain tree species to purify air from pollutants (regulating ecosystem services) has been evaluated.
2. The applicability of *Acer platanoides, Acer heldreichii, Aesculus hippocastanum, Betula pendula,* and *Plantago lanceolata* for biomonitoring atmospheric pollution with heavy metals and toxic elements in urban environments has been confirmed.
3. The negative impact of polluted air in Plovdiv on the phytosanitary condition of urban tree species has been confirmed based on 15 years of research (2010-2024).
4. The advantages of biomonitoring over instrumental methods for conducting systematic observations to assess and predict possible changes in air quality have been confirmed.
5. It has been confirmed that the factors "chemical element" and "organ type" are more significant for the level of bioaccumulation of heavy metals in fish from polluted water bodies compared to the factors "season" and "fish species."
6. Histological and histochemical changes have been confirmed as compensatory-adaptive mechanisms for fish survival in waters contaminated with heavy metals.
7. The dynamics of liver enzyme activity in fish have been confirmed as an effective biomarker for assessing the state of aquatic ecosystems under complex heavy metal pollution.
8. The key role of allelopathy in regulating weed density in agroecosystems has been confirmed, and the potential for correlation between allelopathic potential and physiological and morphological traits of crops, important from an agronomic perspective, has been investigated.
9. Species from the genus *Tagetes* have been confirmed as promising test organisms for biotests in laboratory conditions.

Methodological

1. Passive and active biomonitoring of atmospheric pollution in urban environments has been conducted, using organisms from different taxonomic groups simultaneously (lichenized fungi, mosses, herbaceous plants, tree species).
2. Various anatomical-morphological, physiological, and biochemical parameters have been used for the purposes of biomonitoring and the assessment of atmospheric pollution in urban environments.
3. A comprehensive model has been proposed for analyzing physiological and morphological changes in tree species in urban environments, along with a reference scale for early diagnosis.

4. A model for the quantitative assessment of anthropogenic impact in urban landscapes has been developed, along with the identification of risk zones regarding environmental quality in the city of Plovdiv.
5. An urban gradient has been applied in comprehensive ecological studies of urban soils to identify major pollutants and their sources.
6. A set of specific coefficients has been used to assess anthropogenic impact on urban soils and the migration of elements within the urban environment.
7. A methodological framework has been proposed for integrating nature-based solutions into the sustainable management of urban soils**.**
8. A model has been developed and applied for assessing the development and adaptation of tree species to urban environments. For this purpose, the first permanent plots in the country have been established in Plovdiv for long-term systematic monitoring of vegetation.
9. A system of indicators has been selected, some of which are being applied for the first time to these tree species (including molecular markers). A reference scale for early diagnosis of developmental imbalances in saplings used in urban greening projects has been constructed and verified, with a view to the sustainable development and management of green systems in urban areas.
10. An algorithm for assessing ecosystem services in urban ecosystems has been developed.
11. A system for continuous noise monitoring in urban environments has been constructed and validated.
12. An innovative approach has been proposed for conducting laboratory biotests through the addition of nanosilver, increasing their effectiveness.
13. Biomarkers have been proposed for detecting the impact of microplastics on plants.
14. Opportunities for applying various agricultural practices aimed at sustainable management of soil biodiversity have been presented.
15. A methodological framework for integrating nature-based solutions has been proposed, which, in combination with foresighted municipal policy, professional expertise, and financial resources, is expected to lead to qualitative and quantitative improvements in the green system of urban areas in the coming years. This will enhance the potential for providing ecosystem services and support its sustainable development.