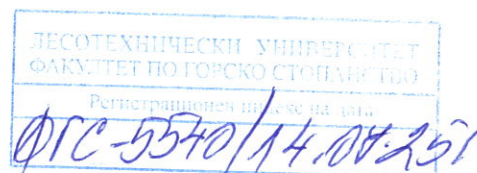**REVIEW**

on the materials submitted for participation in the competition for the academic position of "Associate Professor" in the field of higher education field 6. Agricultural Sciences and Veterinary Medicine, professional field 6.5 "Forestry," scientific specialty "Forest Reclamation, Forest Protection and Special Usage of Forests" in the discipline "Soil Science with basics of Fertilization" for the needs of the Faculty of Forestry, Department of Silviculture

The competition for Associate Professor was announced in the State Gazette, issue 28/01 April 2025 and on the University of Forestry website on 17.03.2025, procedure code FOR-AsP-0325-162, for the needs of the Department of Silviculture at the Faculty of Forestry. The sole applicant is Assistant Prof. Dr. Kamelia Georgieva Petrova, Faculty of Forestry, Department of Silviculture.

Reviewer: Ekaterina Georgieva Filcheva-Konisheva, Professor, PhD, Professional Field 6.1 "Crop Production," Scientific Specialty "Soil Science," Institute of Soil Science, Agro-technology and Plant Protection "N. Poushkarov" (retired), appointed by order of the Rector of University of Forestry No. 3PS-267/09.05.2025.

1. BRIEF BIOGRAPHICAL DATA ABOUT THE CANDIDATE

Kamelia Georgieva Petrova was born on 02.10.1987 in the town of Sliven. From 2006 to 2013, she obtained a Master of Engineering degree in Forestry with a high grade of 5.46. She was enrolled in a self-preparation PhD program for three years from 27.06.2017 to 27.06.2020 in area 6. Agricultural Sciences and Veterinary Medicine, field 6.5 Forestry, scientific specialty "Forest Reclamation, Forest Protection and Special Use of Forests" at the Department of Soil Science, Faculty of Forestry. She was discharged with the right to defend her dissertation as of 17.09.2019, with a topic change from "Study of classifiers for updating soils in the area of the Training and Experimental Forest Enterprise Petrohan" to "Updating the classification of soils in the area of the 'Petrohan'" with scientific advisor Prof. Dr. Ludmila Malinova. She passed three doctoral exams with excellent grades.

From November 2014 to September 2016, she held the position of Training Organizer in the Departments of Park and Landscape Planning and Park and Landscape Construction, which contributed to her development as a specialist in student work, educational process organization, participation in admission campaigns, thesis defenses, etc.
Since September 2016, Kamelia Petrova has been an Assistant in the Department of Soil Science, responsible for conducting exercises in the discipline "Forest Soil Science," involving direct work with students.

Her English proficiency, presentation skills, and other competencies have contributed to the well-structured materials submitted for review. During this period, she developed strong communication and teamwork skills.

Assistant Petrova holds four certificates for participation in: a. Specialization from 05-09.03.2018 at the Alice Holt Centre of Forest and Climate Change Research, Farnham, UK. b.

1

International Scientific Conference "90 Years Forest Research Institute – for Society and Nature," 24-26 October 2018, Sofia. c. Second Scientific Conference "Young Researchers and Contemporary Scientific Challenges," 8-9 November 2018, University of Forestry, Sofia. d. VII National Youth Scientific Conference "Management and Sustainable Use of Biological Resources," 30 March – 1 April 2018, Yundola.

From 2016 to 2020, she was Assistant at the Department of Soil Science, Faculty of Forestry, University of Forestry, conducting exercises in "Forest Soil Science." From 2020 to 2023, she was Assistant Prof.in the same department, delivering lectures and exercises in "Soil Science with Fundamentals of Fertilization", "Soil Pollution and Ecosystem Impact," and "Forest Soil Science."

Since 2023, Dr. Kamelia Petrova has been Assistant Prof.in the Department of Silviculture, continuing her lecture and exercise responsibilities in the above-mentioned subjects.

Her total academic service is 10 years, 4 months, and 29 days.

2. CORRESPONDANCE OF SUBMITTED DOCUMENTS AND MATERIALS OF THE APPLICANT ACCORDING TO THE RULES OF THE DEVELOPMENT OF ACADEMIC STAFF AT THE UNIVERSITY OF FORESTRY.

Assistant Prof. Dr. Kamelia Petrova is the sole candidate in the competition. She submitted 27 scientific works:

- Publications in scientific journals: 24;
- Publications and reports indexed in world-renowned databases: 27; of which 8 are in Q3 and Q4 journals.

Table 1 shows the minimum required points and the candidate's actual points, as per the Law on the Development of Academic Staff in the Republic of Bulgaria and the Rules of Application of the Act in the and its implementation rules at University of Forestry:

Min. Points	Candidate Points
A. 50	A 50
B: 100	B: **202**
Г: 200	**Г: 212**
Д: 50	**Д: 90**
Total 400	Total: 554

The candidate exceeds all minimum requirements.

The total number of scientific publications presented in the habilitation report in journals that are refereed and indexed in world-renowned databases of scientific information is (B4) 10 (including **4 in Web of Science** and **6 in Scopus with SJR**). It should be noted that all the projects in which Assis. Prof. Kameliya Petrova participates are comprehensive, and they clearly highlight the candidate's specialized knowledge in soil science, application, and interpretation of results from the physical, chemical, and microbiological properties of soils, as well as issues related to the genesis, diagnostics, and classification of soils. The presented publications are accompanied

by very interesting illustrative material, tables, and graphs, with in-depth interpretation of the results and well-formulated conclusions.

The review analyzes all 27 publications, participation in 11 scientific projects (three) led by the candidate), and 6 citations from foreign scholars.

3. ASSESMAENT OF THE CANDIDATE'S EDUCATIONAL AND PEDAGOGICAL ACTIVITIES

In the past 5 years, Dr. Petrova has 1867.5 teaching hours. For academic year 2024/2025, 404 hours are planned (375 in-class, 29 extracurricular).
From 2016 to 2024, she supervised one bachelor thesis and reviewed two other theses.

4. ASSESMENT OF CANDIDATE'S SCIENTIFIC, SCIENTIFIC - APPLIED AND PUBLISHING ACTIVITIES

General description of the presented materials
Candidate Dr Kame;ia Petrova participated in the competition with:
- ☐ Monographs - none number (s);
- ☐ Textbooks - none number (s);
- ☐ Educational materials -none number (s);
- ☐ Books – none number (s);
- ☐ Publications 27 numbers.
- ☐ Projects - 11 numbers.

4.1 Participation in scientific, scientific-applied and educational projects

Total scientific outputs: 27 publications (10 grouped as habilitation materials). She has participated in 11 projects, leading three. She also completed a qualification course for operating an ICP-OES Spectrometer.

Project to University of Forestry, B-1329/05.03.2024 on the topic "Research on the main indicative parameters of soil health in forest areas of Western Bulgaria" Participation in educational projects BG05M20R001-2.009-004 "Building scientific capacity at the Forestry University, funded by the Operational Program "Science and Education for Smart Growth", co-financed by the EU through the European Structural and Investment Funds. Participation in training courses for skill enhancement, Completed course for operation and servicing of Automated ICP-OES Spectrometer, model Plasma Quant PQ 9100, Analitik Jena, 06.07.2023
International project participation includes monitoring air pollution's impact on forests, the "Young Scientists and Postdoctoral Researchers" national program.

Participation in an international scientific project funded by a Bulgarian institution as a member of the working team.
1.Project "Assessment and monitoring of the impact of air pollution on forest ecosystems - level I" (large-scale forest monitoring) 2024. Contract No. 16451/18.07.2024 ECOMONGOR. Funded by PUDOOS.

2. Project "Assessment and monitoring of the impact of air pollution on forest ecosystems - level II" (intensive forest monitoring) in basic trial plots and the core sampling area. 2024. Contract No. 15680/28.06.2023 ECOMONGOR. Funded by PUDOOS.

3. Participation in the National Program of the Ministry of Education and Science in Bulgaria "Young Scientists and Postdocs". 2018-2021.

4. Participation in the GLOSOLAN course for implementing standard laboratory procedures for studying organic carbon (titration and colorimetric methods), 17.11.2021, FAO, United Nations.

5. Participation in a scientific network as an associate advisor in the World Association of Soil and Water Conservation (WASWAC). 2023-2025.

In the period from 2018 to 2024, she participated in the following international scientific forums: International Scientific Conference "90 Years Forest Research Institute - for the Society and Nature" - 24-26 October 2018; International Conference "Forestry: Bridge to the Future" 05–08 May 2021 in Sofia, Bulgaria; XXII International Multidisciplinary Scientific GeoConference Surveying, Geology and Mining, Ecology and Management – SGEM Albena 2022 2 - 11 July, 2022; International Scientific Conference "95 Years Forest Research Institute – Forests without Borders" - 19-21 October 2023.

4.2 Characterization of published scientific results

By type:

☐ Publications in scientific journals - 24, one is under the seal G7–16. An official note is attached.

☐ Publications in proceedings of scientific forums - 3

☐ Scientifically popular publications - none

By significants:

☐ Articles in magazines with Impact Factor and Impact Rank - 14 pcs.;

☐ Articles in journals referenced and indexed in Web of Science and SCOPUS – 26 pcs.;

☐ Articles in journals without Impact Factor - 11 pcs.;

☐ Reports in proceedings of scientific forums -3.

☐ Plenary reports - none

Place of publication:

☐ Articles in Bulgarian and foreign journals referenced in Web of Science and SCOPUS – 24 pcs.;

☐ Articles in reference Bulgarian and foreign journals referenced outside Web of Science and SCOPUS - pcs.;

☐ Articles in non-refereed Bulgarian and foreign journals - pc.;

☐ Publications in proceedings of international scientific forums - 3;

☐ Publications in proceedings of national scientific conferences, sessions and seminars - none

☐ Publications in scientific annals of universities and institutes - none

Publishing language:

☐ In Bulgarian - 2 pcs.; In English - 25 pcs.

Number of co-authors:

☐ Standalone - 2 pcs.;

☐ With one co-author - 6 pcs.;

☐ With two co-authors - 11 pcs.;

☐ With three or more co-authors - 9 pcs.

.   From these results it is evident that the requirement that the candidate must be the first, second or corresponding author in 50% of all publications with which he participates in the competition is also met. Over 50% of materials submitted for participation in the competition are written in very good English, well structured, richly illustrated.

4.3 Reflection of Candidate's Scientific Publications in Literature (known citationa)

The interest shown in the developments is assessed by the presented list of citations of articles, which number 6, which exceeds the requirements of the Regulations for the Application of the the Law on the Development of Academic Staff in the Republic of Bulgaria and the Rules of Application of the Act in the University of Forestry. The citations are in prestigious journals.

☐ Total - 6 citations.

By type of citations:

☐ In refereed journals and proceedings of scientific forums - 6 citations;

4.4 Contributions to the candidate's work

Contributions are grouped into:6 scientific from Group G7, 10 applied/research contributions from Group B4 and 5 applied contributions from Group G7 which have been corrected, and after rearrangement are presented in the review more concisely:

Scientific contributions - 6 pcs., formulated by the developments, group G7

1. For the first time in Bulgaria, an initial process of podzolization in Brown Forest soils formed under the influence of a deciduous plantation of common beech (Fagus sylvatica L.) on the territory of the Petrohan State Forest Reserve has been studied and proven (**G7_1**).

2. For the first time, basic soil parameters have been studied that have a direct connection with the growth and development of the fruiting bodies of the common black summer truffle (Tuber aestivum Vittad.) on the territory of Western Bulgaria. An assessment of the soil parameters was carried out where the largest reserves of fruiting bodies were established, compared to those in which their quantity was the smallest (**G7_9 and G7_14**).

3. An approach was proposed for studying data from the study of interrelationships in the system "soil - soil microorganisms - wood composition", using GIS. Territorial units on the territory of the Vitosha Nature Reserve have been distinguished, and conclusions have been drawn about the peculiarities of the methodology used in the GIS environment for the selection of suitable sites for conducting field studies (**G7_10**).

4. For the first time, an assessment of the C-factor values for the potential risk of erosion processes on the territory of the Petrohan State Forest Reserve has been prepared. The results obtained on the protective role of the vegetation cover allow the amount of eroded soil and the real risk of planar erosion in the studied territory to be established (**G7_3**).

5. For the first time, detailed microbiological studies of soils of the Cambisols class have been carried out on the territory of the Vitosha Nature Reserve. For the purpose of the analyses, a

correlation dependence between environmental factors on soil biogenicity has been calculated. A strong correlation was established between the change in altitude and the microbial abundance of the studied soils (**G7_6; G7_7 and G7_8**).

6. An innovative study was conducted on the catalase activity of microorganisms that develop in the litter and soils on the territory of the Vitosha Nature Park. New and original data were obtained on a strong positive correlation between catalase activity and microbial biomass carbon. It was established that this relationship is more pronounced in broadleaf plantations compared to that obtained in soils formed by conifers (**G7_11**).

Research directions, scientific-applied and applied contributions (Developments, group B4)

I. Study of accumulation coefficients and assessment of the content of heavy metals in forest soils

1. Heavy metal accumulation coefficients were obtained, which represent quantitative values of the natural accumulation of heavy metals in the surface layers of Cambisols. The maximum values of the coefficients for Mn, Pb, Cu, Zn and Cd were calculated. The obtained coefficients allow for the assessment of the risk of contamination of grass species in pastures, medicinal plants, mushrooms, etc., as well as the development of criteria for their protection (**B4_1**).

2. The concentrations of Fe, Mn, Zn, Pb, Cu and Cd in forest soils of the Western Stara Planina were estimated. Clear dependencies between the content of Cu, pH_{H2O} and the amount of humus in the surface horizon were proven. The concentration of Cd in the studied soils was found to exceed the background and precautionary concentrations for Cd in Bulgarian soils (**B4_8**).

3. The content of heavy metals on the territory of the Petrohan State Agricultural Research Center was studied and assessed. It was found that in the studied Cambisols, intensive migration processes of manganese in the soil occur, as a result of the strongly acidic reaction of the soil solution (**B4_3**).

4. The concentrations of Pb, Cu, Zn, Mn, Cd were determined in forest soils with different land use, which were used in the past for gold mining. It was found that as a result of ore mining, the concentrations of Pb, Zn and Cd exceed the MAC in the Pasishte 2 site (**B4_4**).

II. Study of basic soil parameters, classification and soil fertility of Acrisols and Lixisols

5. For the first time, the soil fertility of Acrisols on the territory of the Petrohan State Forest Reserve was assessed by applying a classification system developed for soils in forest areas, with 4 indicators - soil depth, organic carbon stocks, total nitrogen stocks and active moisture capacity, and it was found that Acrisols are characterized as low to medium fertile. Clarification of the degree of fertility should be carried out with studies on the biological cycle of nutrients in the soil-plant system (**B4_2**).

6. Soils on the territory of Strandzha Mountain were studied and classified by applying the diagnostic criteria of WRB (2006, 2007). At the first taxonomic level, they were defined as Lixisols and Acrisols in areas that, according to the national classification of soils in Bulgaria, are occupied by Yellow Earth-Podzolic soils and Cinnamonnic Forest Soils. At the second taxonomic level, a prefix qualifier haplic and a suffix qualifier – hypereutric were applied for Lixisols. A prefix qualifier haplic was applied for Acrisols. A faster transformation of soil organic matter was

established under the influence of plantations of Fagus orientalis Lipsky compared to those developing under Quercus frainetto Ten. and Quercus petraea Liebl. (**B4_5**).

III. Study of basic characteristics of wood litter and lysimeter waters, Yundola.

7. Basic parameters of the aboveground mass of wood litter by fractions (leaf mass, wood and reproductive organs, and seeds) were studied as a quantity for the period from 2010 to 2019. The content of basic nutrients in the individual fractions for 2019 was estimated, as for Ca, Mg and P in leaf mass they are with high concentrations. A weak transport of basic cations into the soil depth was established. In addition, the main groups of microorganisms in the litter and soil horizons were studied, with non-spore-forming bacteria dominating in the litter and A horizon, and the amount of actinomycetes increasing significantly with increasing soil depth (**B4_6**).

IV. Study and classification of Brown Forest soils

8. Brown Forest soils from the territory of Western Stara Planina were studied, with the aim of studying basic soil parameters and classification. The studied soils are distributed in the lower forest vegetation zone of oak forests (from 0 to 600 m above sea level) and in the middle forest vegetation zone of beech, fir and spruce forests (from 600 to 2000 m above sea level). These soils are characterized by a shallow surface A horizon and a deeper Bw horizon. Low pH values were found, which are the result of leaching of basic cations in the profile, organic acids washed from the soil surface, and acidic base rocks. The results show that the majority of the soil profiles are classified as unsaturated with bases (Dystric Cambisols). They are developed on more acidic silicate rocks, higher altitudes and are accordingly formed in the conditions of a colder and wetter climate on the territory of the Western Stara Planina. (**B4_7**).

V. Erosion risk assessment

9. For the first time, an IntEro model has been applied to the territory of Vitosha National Park to study the risk of erosion processes for the Vladayska River catchment area. It was found that the studied territory belongs to category IV – a zone with weak erosion. As a result of applying the model, although the area has weak erosion, the presence of surface (area) erosion was found. The amount of eroded soil in the studied part of the catchment area is Wgod = 7539.89 m3 y-1, but the actual soil losses are Ggod = 2761.75 m3 y-1. When studying some characteristics of the catchment area, it was found that during intense rainfall, the shape of the catchment area allows the formation of a high wave, which can lead to significant damage (**B4_9**).

VI. Study of basic soil parameters of forest soils associated with permanent growth depression established in spruce plantations

10. Basic soil parameters of soils of the Cambisols class were studied on the territory of Pirin, Vitosha and Stara Planina in order to establish relationships with the proven growth depression of spruce plantations. It was established that in soils with a very strong acidic reaction, the plantations have a more pronounced growth depression, expressed in reduced radial growth and the formation of narrow annual rings. No relationships were established with the amount of humus or the nitrogen

content in the soil. All studied soils are unsaturated with bases, which can also be considered as a prerequisite for unbalanced nutrition of woody vegetation, which can lead to growth depression in combination with other environmental factors. Based on over moistened surface horizons in places, it can be assumed that in these cases of the studied spruce plantations, one of the main reasons leading to permanent growth depression may also be over moistening of the soil, which leads to reduction processes and death of fine roots located in the 30 cm soil layer (**B4_10**).

Scientific and applied contributions (developments from G7_1 to -G7_17 (5 issues)

1. A study of basic soil parameters of peat soils from the "Torfeno Branishte" reserve was conducted. The stocks of org. C in the studied soils were calculated and estimated. The results show that the values of org. C depend directly on the bulk density of the samples taken for analysis (**G7_2**).

2. An assessment of the chemical composition of the different fractions (leaf mass, wood, reproductive organs and seeds) of the wood litter was prepared. The chemical composition of the soil solution for the permanent sample area in Vitinya was also studied and estimated, within the framework of Intensive Monitoring in Bulgaria. An excess of the amounts of manganese in leaf mass and that of cadmium in reproductive organs and seeds was established. Their amount exceeds the maximum values specified in the ICP Forests, 2020 manual (**G7_4; G7_12**).

3. The main soil parameters directly related to the fertility of soils in the Botevgrad Basin have been specified. Geostatistical interpolation between basic nutrients in the soil solution using inverse distance weighting (IDW maps) has been performed. The results show relatively low values for the studied macronutrients (**G7_15**).

4. The main microbiological indicators of soils in spruce (Picea abies Karst.) plantations have been studied, in which a permanent growth depression has been established by dendrochronological analysis. Based on the results obtained, it can be said that the growth depression of these plantations directly affects the standard distribution of a large part of the soil groups of microorganisms. An atypical distribution of actinomycetes has been established in some of the studied soil profiles (**G7_16**).

5. The main components of the forest landscape have been studied, such as the diversity of soil-forming rocks and the morphometric characteristics of the relief on the territory of the NP "Pirin" in relation to the soil health of the Cambisols class. It was found that the resulting homogeneous territorial units have a fragmented horizontal structure. (**G7_17**).

5. ASSESMENT OF THE APPLICANR'S PERSONAL CANDIDATE

Dr. Petrova's role is primary in the development of the publications. The work meets all acts the Law on the Development of Academic Staff in the Republic of Bulgaria and the Rules of Application of the Act in the University of Forestry.

I believe that the personal participation of the candidate is fundamental in the formation of the contributions, which is also evident from the published works, which comply with the

requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria and the Rules of Application of the Act in the University of Forestry.

I have no common publications related to the competition with the candidate.

The candidate in the competition has no proven plagiarism in scientific works (Art. 24. para. 5) of the Law on the Development of Academic Staff in the Republic of Bulgaria and the Rules of Application of the Act in the University of Forestry.

6. CRITICAL REMARKS

Some recommendations:

- 1. **B4_2** Use "organic carbon stocks" instead of "organic C stock"
- 2. Analyze organic matter extracts for heavy metals (**B4_1 to B4_4, B4_8**)
- 3.Analyze litter organic matter composition for **B4_6**
- 4.The candidate has to focus on the narrow research and to increase single-author publications

These are recommendations, not criticisms.

7. PERSONAL IMPRESSIONS

The reviewer has known Dr. Petrova since her dissertation defense. She demonstrates excellent preparation, integrity, and experience. She is a methodical and persistent researcher and educator. She is on the editorial board of the Bulgarian Journal of Soil Science and received a 2023 award from FUNIS for outstanding scientific achievement.

8. CONCLUSION

The documentation and activities submitted by Assistant Prof. Dr. Kamelia Petrova meets and exceeds the requirements for" Associate Professor" the Law on the Development of Academic Staff in the Republic of Bulgaria and the Rules of Application of the Act in the University of Forestry, totaling 554 points (min. required: 400).

The reviewer recommends that the Scientific Jury vote in favor and that the Faculty Council of the Faculty of Forestry propose her appointment to the academic position of "Associate Professor" in the specialty "Forest Reclamation, Forest Protection and Special Use of Forests" in the discipline "Soil Science with Fundamentals of Fertilization."

Reviewer's Signature:

Submitted on: July 15, 2025