



REVIEW

Regarding the scientific activity of the candidate *Associate Professor Biser Emilov Hristov, PhD*, for holding the academic position of "Professor" in the field of higher education 6. „Agricultural sciences and veterinary medicine“, professional field 6.1. „Crop science“, scientific specialty „Soil Science“

Member of scientific jury: *Ekaterina Georgieva Filcheva-Konisheva, retired*, from Sofia, scientific specialty „Soil Science“, appointed a member of jury to the order No **3 PS 503/ 9/12/2024** of the President of University of Forestry for conducting a competition for the occupation of an academic position "Professor" in the field of higher education 6. „Agricultural sciences and veterinary medicine“, professional direction 6.1 Crop Science, scientific specialty "Soil Science", announced in State Gazette No. **60, 7/16/2024** by University of Forestry

1. Brief biographical details of the candidate

Assoc. Prof. Dr. Biser Emilov Hristov was born on 22/01/1977| in the city of Sofia. He has completed his secondary education. in 22 "Georgi S. Rakovski" Secondary School in 1995 in the town of Sofia. In the period 1995 – 2000 he obtained a Master's degree in Ecology and Environmental Protection, University of Forestry, Sofia. From 2006 to 2009 he was a full-time PhD student at the Nikola Poushkarov Institute of Soil Science, Agrotechnology and Plant Protection, Sofia and acquired the degree of Education and Science "Doctor". He was appointed as an Assistant Professor 2010 – 2011 at the "N. Poushkarov" Institute, Sofia; Chief Assistant Professor – 2011 – 2017, Nikola Poushkarov Institute, Sofia, Associate Professor since 2018 – until now at the Nikola Poushkarov, Sofia – (Second employment contract), and Associate Professor since 2020 – until now at the University of Forestry, Sofia.

Main activity: Lecturer and researcher in Soil Science, Erosion and Soil Protection, Soil Monitoring at the University of Forestry – Sofia.

Assoc. Prof. Dr. Biser Hristov has the following special skills: good presentation skills; good communication skills as a result of teaching work; very good computer skills - MS Office, ArcGIS, AutodeskMap, HTML, C. WordPress, Photoshop, SPSS, Addobe Acrobat, etc. As an advantage in the scientific development of the above is the knowledge of English and Russian at a very good level.

He has specialized on Soil Science -JRC - Ispra, Italy; Soil Science and Ecology, Sent Istvan Egeterm, Godollo Hungary; Combat Desertification CIHEAM – Bari; Italy Soil Physics - Trieste, Italy, he was included in the EIP-AGRI Focus Group (FG) Soil Sliniztion , 2019.

2. Compliance of the submitted documents and materials of the applicant with those required by the Development of Academic Staff Regulations at the University of Forestry

In the competition for the academic position of "Professor" Assoc. Prof. Dr. Biser Emilov Hristov is the only one candidate. The total number of publications of Assoc. Prof. Dr. Biser Hristov are 86.

He participated for the Academic position "Professor" with the production of 32 scientific papers, including a monograph based on the dissertation, a textbook for students, PhD students, teacher on soil science, publications in journals and reports in peer-reviewed proceedings of scientific conferences.

Publications related to the academic position of "Professor" – 32 issues, of which:

- Published monograph based on a dissertation – 1 pc;
 - Publications in scientific journals: – 31 pcs.:
 - publications and reports published in scientific journals, referenced and indexed in world-famous databases with scientific information – 23 pcs.
 - Publications in Web of Science journals with IF – 1 pc.
 - Publications in Scopus journals with SJR – 10 pcs.
 - Publications in Web of Science journals without IF – 12 pcs.
 - unreferenced in Web of Science or Scopus, with scientific peer review – 8 pcs.
 - Conference reports – 7 pcs.: of which • national – 2 pcs. • international – 5 pcs.
- Language of publication: • Bulgarian – 7 pcs. • English – 25 pcs.

The personal participation of Assoc. Prof. Hristov in these 32 works is illustrated by the fact that he has publications as follows: • Independent – 7 pcs. • With one co-author – 8 pcs. • With two co-authors – 7 pcs. • With three or more co-authors – 10 pcs.

Assoc. Prof. Biser Hristov has published a textbook "Erosion and Soil Conservation", which summarizes knowledge from theory and practice and is suitable for students, PhD students and lecturers in soil science, as well as for agricultural specialists.

Order of authors: • First author/co-author – 15 pcs. • Second co-author – 8 pcs. • Third co-author or more – 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 covered.

50% of the materials submitted for participation in the competition are written in very good English, well structured, richly illustrated.

Table 1 presents the minimum number of points, according to the Law on the Development of Academic Staff in the Republic of Bulgaria, and its regulations, and the points of the candidate according to the relevant indicators.

Table 1. Number of points by indicators

Indicators	Min. Number of points	Number of points per candidate
A	50	50
B	100	187
Г	200	293.8
Д	100	690
E	100	260
	Total: 550.0	Total: 1480.8

The total number of scientific publications presented in the habilitation reference in journals, refereed and indexed in world-renowned databases with scientific information (B4) is 10 (including in 10 journals in Web of Science -CABI, and 5 in Scopus with SJR).

The data presented in Table 1 shows that the candidate for "Professor", Assoc. Prof. Dr. Biser Hristov meets and **exceeds** the minimum requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Rules to it and the Rules of the University of Forestry.

It should be noted that all publications in which Assoc. Prof. Hristov participates, are complex and well highlight the specialized knowledge of the candidate in soil science, application and interpretation of the results of physical, chemical and microbiological properties of soils, as well as issues related to the genesis, diagnosis and classification of soils, soil and climatic characteristics of regions and their suitability for crops growing.

The presented publications are accompanied by illustrative material, tables and graphs, with an in-depth interpretation of the results and well-formed conclusions.

For the preparation of the review, 32 issues (publications and reports) and participation in the implementation of 13 scientific projects as well as 46 citations, of which 34 by foreign scientists, are subject to analysis.

I do not have common publications related to the competition with the candidate

The candidate in the competition does not have plagiarism in scientific papers proven by law (Art. 24, paragraph 5 of the Law on the Development of Academic Staff in the Republic of Bulgaria).

3. Evaluation of the applicant's teaching activity

Assoc. Prof. Dr. Biser Emilov Hristov holds the position of Assoc. Prof. from 03.02.2020 and has 4 years and 6 months and 16 days of teaching experience at the University of Forestry. Table 2 indicates the norms of the candidate's teaching activity. Assoc. Prof. Biser Hristov, PhD has auditory and out-of-auditory employment in the specialty "Soil Science" with students from the specialty "Agronomy" and "Plant Protection", "Soil Pollution and Impact on Ecosystems" with students in "Ecology and Environmental Protection", lectures and practices in the discipline "Erosion and Soil Protection" with students from the specialty "Agronomy", lectures with students in the discipline "Abiotic Monitoring" from "Ecology and Environmental Protection". His overtime hours are also presented (Table 2).

**Table. 2. Implementation of the norms for educational and teaching activities
– by Assoc. Biser Hristov for the period 2020 – 2024**

School year	Reported			Overweight
	Classroom	Classroom Extracurricular	Total	
2020	339	23	362	2
2020/2021	385	27	412	52
2021/2022	366	43.4	403.4	63.4
2022/2023	338	42.6	380.6	20.6
2023/2024	325,8	52.2	378.0	18.0
Общо	1783	182.4	1965.4	156

The teaching activity of Assoc. Prof. Dr. Biser Emilov Hristov is complemented by the fact that under his scientific guidance two graduate students have successfully defended their thesis:

In the period 2020-2024, Assoc. Prof. Dr. B. Hristov is a diploma supervisor of 4 students in the specialty "Forestry", full-time and part-time education. The following two students defended their thesis: 1. Master - Kemal Kemal on the topic "Cultivation of intensive species in the municipality of Dulovo" 2022 2. Master - Mitko Iliev Angelushev on the topic "Study of the composition, properties and processes of soil degradation in the State Forestry Institution "Momchilgrad".

At the moment, Assoc. Prof. Dr. B. Hristov is the scientific supervisor of a full-time PhD student: Master - Agronomist Krastena Valerieva Ilieva. Defended date: 29.11.2024, scientific specialty: "Soil Science". PhD Thesis titled: "Analysis and Assessment of Soil Resources from the Botevgrad Valley".

In the period 2018-2024, Assoc. Prof. Dr. Hristov has participated in the following international scientific forums with published works: The 19th International Conference "Humic Substances and their contribution to the climate change mitigation", Albena Resort, Varna Region, Bulgaria, September 16-21, 2018; 1st International Electronic Conference on Agronomy, 3–17 May 2021, MDPI: Basel, Switzerland, doi:10.3390/IECAG2021-10022; International Conference "Forestry: Bridge to the future" 05–08 May 2021 in Sofia, Bulgaria; Global Symposium on Salt-affected Soils-21 October-online-FAO. Rome; Global symposium on soils for nutrition, FAO Rome (online) 26 - 29 July 2022; XXII International Multidisciplinary Scientific GeoConference Surveying, Geology and Mining, Ecology and Management – SGEM Albena 2022 2 - 11 July, 2022; The 2024 9th International Conference on Energy Efficiency & Agricultural Engineering - 27.06.2024 - 29.06.2024 Ruse, Bulgaria; Participation in the Scientific Forum "Ecology and Agrotechnology – Fundamental Science and Practical Realization; October 2019; Scientific Forum "Ecology and Agrotechnologies - Fundamental Science and Practical Realization" 5 - 6 December 2022, Sofia; Scientific Forum "Ecology and Agrotechnologies – Fundamental Science and Practical Realization", held on 5. 12. 2023.

Assoc. Prof. Dr. Hristov is a member of the following Organizing and Scientific Committees:

Member of the Scientific Committee of the Scientific Forum with International Participation "Ecology and Agrotechnology – Fundamental Science and Practical Realization" 2019; B. Member of the Organizing Committee of the Scientific Forum with International Participation "Ecology and Agrotechnology - Fundamental Science and Practical Realization", scheduled to be held on December 5 and 6, 2024 at NBU, Sofia.

4. Evaluation of the scientific, applied and publication activities of the candidate

4.1. Participation in scientific, applied and educational projects

From the attached report for participation in projects, it becomes clear that Assoc. Prof. Dr. Biser Hristov participated in 13 projects, grouped as follows: Project Manager at the National Science Fund, Ministry of Education and Science – 1; Participant in National – 12, of which 6 at the Ministry of Education and Science and International – 1, which is a confirmation of the

candidate's ability to successfully cope with conducting research with external funding outside of teaching and the ability to work in a team.

4.2. Characteristics of the published scientific results

The published results mainly on forest areas represent an important part of the research in our country. As many authors emphasize, they represent a significant soil resource encompassing different types of soils. The latter are an important part of the development of a significant part of the agricultural and mountainous regions of Bulgaria. In recent years, forests have gained great importance and scientific research has developed and considered forest soils separately.

As mentioned above, the published scientific results present the knowledge and skills of the candidate in soil science, application and interpretation of the results of physical, chemical and microbiological properties of soils, as well as issues related to the genesis, diagnosis and classification of soils, soil and climatic characteristics of regions and determination of their suitability for growing different crops.

4.3. Reflection of the candidate's scientific activity in the literature (citation)

The review of the documents of Assoc. Prof. Dr. Biser Hristov shows that the materials have been prepared very thoroughly and the procedural and legal requirements arising from the Law on the Development of Academic Staff in the Republic of Bulgaria, the Rules to it and the Rules of the University of Forestry (Article 29, paragraph 1).

More important journals in which Assoc. Dr. Biser Hristov has published are *Ecologia Balkanica*, *Ecological Engineering and Environment Protection*, *Journal of Balkan Ecology*, *Bulgarian Journal of Soil Science*, *Journal of Environmental Protection and Ecology*, *Italian journal of agronomy*, *Forestry Ideas*, *Forest Science*, *Plant Sciences*, *Soil Science*, *Agrochemistry and Ecology*.

Documents for participation in the competition for "Professor" are attached, confirming 46 citations (without self-citations), of which 44 in refereed and indexed journals, and 2 in non-refereed journals with scientific peer review. Total number of points D- 690.

As a President of the Bulgarian of Humic Substances Society (BHSS), I would like to present additional information, namely that, Assoc. Prof. Dr. Biser Hristov is a member of the Control and Revision Commission of the BHSS and conscientiously fulfills his duties.

4.4. Contributions to the candidate's works (scientific, scientific-methodological and scientific-applied)

I accept the Scientific, Scientific-Methodological and Scientific-Applied Contributions from the research work of the candidate. With the corrections made and rearranged in the groups, the contributions look like this:

I. Scientific contributions

1. Brown forest soils that have a neutral to highly acidic reaction has been examined. There is a destructive process due to the impact of exchangeable aluminum on the secondary minerals of the soil. It was found that the variable charges of soil colloids are entirely occupied by hydrogen ions, and the permanent charges of soil colloids are in a state of incomplete neutralization with basic

- cations, which determines the acid instability of clay minerals. The ongoing destructive processes direct clay formation to secondary minerals with lower cation-exchange capacity (B4_2; B4_5).
- 2 Redzinas, Rendzic or Calcaric Leptosols and Endocalcic; Phaeozems and Rendzic Phaeozems were studied. They accumulate high amounts of organic matter. Rendzinas are characterized by a good granular structure. The type of humus is humic to humic-fulvic. Rendzinas have a high potential for accumulation (sequestration) of organic carbon (B4_3; B4_4).
3. For the first time, sandy soils in mountainous and forest areas have been studied, with over 80% sand in soil profiles, which is the main diagnostic criterion for classification of Sandy soils (Arenosols). They are classified as Saturated and Unsaturated sandy soils (B4_10).
4. The diagnostics and characteristics of Regozems in Bulgaria have been updated, new classifiers have been given and the soil properties of Saturated and Carbonate Regozems have been summarized. Land evaluation of the Regozems was made (G6_1).
5. Correlations between the physical, chemical and microbiological parameters of Luvisols have been established. The possibility of applying microbiological analyses is pointed out and proven as a very sensitive indicator of the ongoing changes in the soil, which have occurred as a result of degradation processes (water erosion and loss of organic matter) and the way of land use (G7_5; G7_4).
6. The distribution in depth of the mobile forms of heavy metals Cu, Zn, Cd, and Pb and their relationships with the main chemical characteristics of contaminated soils has been investigated (G7_2).

II. Scientific - methodological

1. From the analysis of the forest vegetation properties for the two main types of soils, Rendzic Leptosols and Typical cinnamonic forest (carbonate) soils (Chromic Cambisols), it is found that both types of soils are medium rich and medium forest - suitable for the development of forest tree vegetation. These properties favor the development of Austrian pine and Turkish oak with good dendrometric indicators. Scots pine crops show good growth and development (B4_8).
2. There is a decrease in the total amount of microorganisms with an increase in the depth of the soil profile, regardless of the type of soil. This decrease is more pronounced in Brown Forest soils compared to Dark-colored Mountain Forest soils. The group of non-spore-forming bacteria is dominant. The soil reaction has the strongest effect on the group of micromycetes (mold fungi). With a more acidic reaction, the amount of mold fungi increases. A statistically significant relationship between the total nitrogen content and the total microflora exists only in the Bw horizon of Brown Forest soils. The microbial abundance in the lower soil horizons depends to a higher extent on the humus content compared to the upper soil horizons (B4_1).
3. The catalase activity of microorganisms in the forest litter depends on the main tree species forming the litter - in the litter of *Fagus sylvatica*, the enzyme values are higher than in the litter of *Pinus sylvestris*. The activity of catalase is slightly higher in the fermentation FH layer compared to fresh litter (L layer). Catalase activity and organic carbon of microbial origin decrease in depth of the soil profile by about 3–4 times for enzymatic activity and about 2 times for microbial biomass carbon from forest litter to soil horizon A, and a weaker and more gradual decrease of these indicators to lower soil horizons. Catalase values are higher in soils covered with common beech, compared to soils with Scots pine. Catalase activity strongly depends on the composition

and amount of organic matter. A very strong positive correlation was found between the values of catalase and microbial biomass carbon (B4_9).

4. Natural calcareous soils from Golo Bardo have a moderate number of microorganisms and a moderate level of microbial biomass carbon. A high, positive correlation of the microbial quantity with total organic carbon, total nitrogen, assimilable K, as well as with electrical conductivity (EC) and exchanged Ca has been established. The high content of carbonates in soils has an adverse effect on the development of microflora (B4_7).

5. The main properties of Luvisols, Vertisols and the physicochemical properties of Phaeozems have been studied. It has been found that they have a high sorption capacity and high saturation with bases. New data on their distribution, properties and composition have been obtained (G7_1; G7_4; G7_7).

6. The influence of an imported microbiological additive on the microbial number of compost mixtures has been studied. The specific parameters related to the composting process and the specific activity of microorganisms are taken into account (G8_7).

III. Scientific - applied contributions

1. The soil cover of Vitosha is mainly made up of Lithosoils, Brown Forest Soils, Mountain Meadow Soils, with limited coverage of Rendzinas and Peat soils. The high alpine zone is characterized by soils such as Peat and Peat-Marsh Lithosoils and Dark-colored Forest soils. In the middle and lower parts of the mountain, predominantly deeper soils such as Brown Forest soils, Deluvial, Forest soils and Rendzinas (B4_6).

2. Nine soil indicators have been identified for characterizing the objective biophysical criteria: insufficient drainage, unfavorable texture and stoniness, shallow root layer and unsatisfactory chemical properties. Areas with natural constraints in Bulgaria have been identified according to the criteria for unfavorable texture and is necessary for data harmonization in relation to the application of Regulation 1305/2013 (G7_6).

3. The properties and fertility of the Botevgrad valley are determined, showing a comparative variation in values. Geostatistical interpolation of soil properties has been made using distance back weighted maps (IDW maps). The risk of water erosion has been identified. A basic evaluation category, characteristic of the region and the possibility of growing main crops has been made (G7_3; G7_8; G7_12; G7_13).

4. It has been established how soils can be affected by salinity in different ways. Strategies to counteract soils affected by salinization are divided into preventive, mitigating and adaptive. Possibilities are proposed to identify strategies for dealing with saline soils in Europe, according to the types of production systems and the level of exposure to salt imbalances. The level of salinization and its effect in Europe and in Bulgaria are summarized (G7_10, G8_1, G8_3, G8_4)

5. A characteristic of favorable ways of utilization of waste products accompanying the functioning of various activities has been established. The optimal quantities for the beneficial impact of the sludge from production and economic activity, physical and agrochemical properties of Technogenic soils have been established (G7_11).

6. A generalized assessment and classification of Forest soils, their conservation and restoration has been made. Up-to-date information on soil types in forest ecosystems in the country has been received (G7_9).

7. Objectives for maintaining the natural balance of the agroecosystem and its components are proposed, including the determination of the sustainable use of mineral fertilizers for the protection of water from nitrate pollution. Specialized networks have been created for detailed soil research, which allows monitoring of diffuse pollution (G8_5; G8_8).

8. An assessment of the soils in the municipality of Duloovo for the cultivation of fast-growing tree species has been made. Forest belts of the genus Paulownia can be effective against wind erosion (G8_5).

5. Assessment of the candidate's personal contribution

I believe that the personal participation of the candidate is mainly in the formation of the conclusions and contributions, which is also evident from the published articles that comply with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Rules to it and the Rules of the University of Forestry

Assoc. Prof. Biser Hristov is a President of the Bulgarian Soil Science Society - since January 2024; Member of the Bulgarian Humic Substances Society; Chairman of a Trade Union organization at the University of Forestry - the Federation of University Trade Unions since April 2024; Chairman of the Trade union organization at the Institute of Soil Science, Agrotechnologies and Plant Protection "N. Poushkarov", Confederation of "Podkrepa", for the period 2017 - 2019.

6. Critical remarks and recommendations

A. A little more diligence was needed in translating the abstracts from English into Bulgarian.

B. The pages of publication G7_12 are not listed in the list of publications.

C. To the article B4_4 I have the following comments:

1. In Table 1, it should be given what part of the pyrophosphate extract is humic and fulvic acids, respectively;

2. The amount of organic carbon in pyrophosphate extract, alkaline extract and extract with 0.1N H_2SO_4 shall be presented as a percentage of total carbon;

3. The amount of "free" and R_2O_3 -bound humic acids must also be presented in absolute percentage;

4. The type of humus (C_x/C_f) in the soil samples examined (p. 323) is defined as Fulvic-humic to Humic, and in the conclusion (p. 325) Humic-fulvic to Humic, which is clearly a contradiction.

5. According to the values for the degree of humification, $C_x/C_{total} \times 100$ does not correspond to a high degree of humification.

I have no other special critical remarks on the materials of the competition. I recommend in future developments Assoc. Prof. Dr. Biser Hristov to choose his narrower field of research.

The notes mentioned above can be taken more as recommendations and do not reduce the value of the materials submitted for review.

7. Personal impressions

My personal impressions of Assoc. Prof. Dr. Biser Hristov date back to the years of his PhD studies at the Institute of Soil Science, Agrotechnologies and Plant Protection "N. Poushkarov" as a serious young scientist. After the defense, as an assistant and Assoc. Prof. later, he also took on additional commitments as Editor-in-Chief of the journal Bulgarian Journal of Soil Science, since January 2024, indexed in Web of Science (CABI), the Editorial Board of the Journal of Balkan Ecology, Coordinator of relations between IUSS, ECSSS and the Bulgarian Soil Science Society.

As a Member of the Control and Revision Commission of BHSS, Assoc. Prof. Dr. Biser Hristov seriously fulfills his duties.

Assoc. Prof. Dr. Biser Hristov participates in National and International Forums and Conferences, Organizing Committees and Scientific Juries. He is Chairman of the Bulgarian Soil Science Society from 2024. Chairman of FUNIS (LTU).

8. Conclusion

The documents submitted for participation in the competition show that the researcher, the applied and organizational activities of Assoc. Prof. Biser Emilov Hristov, PhD meets the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Rules to it and the Rules of the University of Forestry for Occupying Academic Positions at the University of Forestry. It covers and exceeds the minimum requirements of the Law and the Regulations for its Implementation as the total number of points collected by Assoc. Prof. Dr. Biser Hristov is 1480.8 with a minimum required 550 points. This gives me grounds to positively evaluate the overall activity of the candidate and to propose to the honorable Scientific Jury to vote positively, and the Faculty Council of the Faculty of Forestry to elect Assoc. Prof. Dr. Biser Emilov Hristov and to propose to be appointed to the academic position of "Professor" in the field of higher education 6." Agricultural Sciences and Veterinary Medicine", professional field 6.1. "Crop Science", scientific specialty "Soil Science" at the Faculty of Forestry, University of Forestry.

Review submitted on: 10/21/2024

Prof. Dr. Ekaterina Filcheva

Reviewer's Signature: