REVIEW

on the materials for participation in a competition for the academic position of professor, area of higher education 6. "Agrarian sciences and veterinary medicine", PN 6.1. Plant breeding, scientific specialty "Soil Science", for the needs of the Faculty of Forestry, announced by the Forestry University in SG No. 60, dated 16.07.2024, Procedure Code FOR-P-0624-144.

The only candidate for participation in the competition is: Assoc. Prof. Dr. Biser Emilov Hristov

Reviewer: Prof. Dr. Eng. Nikola Vichev Kolev, DSci., pensioner, scientific specialties "Soil Science" (DrSci.) and "General Agriculture" (Professor), member of the scientific jury.

1. Biographical data for the applicant:

The candidate Biser Emilov Hristov completed his higher education at the Forestry University of Sofia in 2000 with the qualification "Master" with the specialty "Ecology and Environmental Protection". Since 2006, he has been a full-time doctoral student at the "Genesis, Geography and Classification of Soils" department of the "Pushkarov" Institute and in 2009 defended his dissertation on the topic "Pedometric nature and taxonomic affiliation of primitive soils formed on soft rocks from the Black Earth zone of Northern Bulgaria " for the educational and scientific degree "doctor" in the scientific specialty Soil Science".

In 2011 after winning a competition, he held the academic position of "chief assistant", and from 2018, after a competition, he was elected Associate Professor in the scientific specialty "Soil Science". Since 2020, he has been elected as an Associate Professor at the Forestry University in "Soil Science, Erosion, Soil Conservation and Soil Monitoring".

He has 6 years of work experience as an Associate Professor.

He specialized at the International Science Center of the European Community in Italy, at the Agricultural University of Gödöglio, Hungary, at the College of Soil Physics in Trieste, and at the COST Summer School in Bari.

Ass. Prof. Hristov is the chairman of the Bulgarian Soil Science Society, Editor-in-chief of the scientific journal "Bulgarian Journal of Soil Sciences" and editor of the international journal "Balkan Ecology", as well as the Chairman of FUNIS (FU).

Ass. Prof. Hristov is fluent in English and Russian and works with the computer programs ArcGis, AutoDeskmap, HTML, WordPress, Adobe acrobat, Photoshop and MO.

2. Correspondence of the applicant's submitted documents and materials with the requirements according to the Regulations in FU:

I carefully reviewed the documents submitted by Ass. Prof. Hristov for participation in the FU Professor competition, and found that they were prepared according to the Regulations for RAS at FU.

As for his scientific output and participation in national and international scientific projects, he has achieved 1481 points, thus exceeding the important requirement of FU to have more than the minimum number of points required by the Regulations.

The materials submitted by the candidate for participation in the contest include: creative resume; a list of scientific works, after habilitation, a list of scientific projects and contracts executed or supervised by the candidate; copies of diplomas and documents, and a list and copies of scientific publications for participation in the competition, a bibliographic reference of its citations; certificate of work experience, organizational, educational and expert activity and author's certificate of fulfillment of the scientometric indicators of FU.

3. Evaluation of the candidate's educational and teaching activities:

According to the report from the head of the Forestry Department, Associate Professor Dr. Simeon Bogdanov, Assoc. Prof. Hristov has a total horary of 372 hours of classroom and 40 hours of non-auditory employment, and in the discipline "Soil Science" there is a horary of 132 hours of lectures and practices with the students of the specialty "Agronomy" and "Plant Protection" OKS "Bachelor; 90 hours of lectures on the subject Soil Science, Soil Pollution and Impact on Ecosystems with the students of "Ecology and Environmental Protection" OCS "Bachelor", regular and part-time study; 105 hours of lectures and practices in the discipline "Erosion and soil protection" with the students of the "Agronomy" specialty of the Bachelor's College; 90 hours of lectures and practices in the discipline "Erosion and soil protection" with the students of the specialty "Agronomy" OKS "bachelor", full-time and part-time study; 45 hours of lectures with the cold ones in the discipline Abiotic Monitoring in "Ecology and Environmental Protection" OKS Master, full-time study. Prof. Hristov has prepared and published a textbook "Erosion and Soil Conservation", which contains useful knowledge from theory and practice for students, doctoral students and teachers of soil science, as well as for agricultural specialists. Prof. Hristov has also published a book, based on his dissertation on the topic "Regozemes in Bulgaria", "Avangard Prima" publishing house - Sofia. He has participated in the development or updating of curricula in the disciplines "Soil Science", "Soil Erosion and Conservation", "Soil Science, Soil Pollution and Impact on Ecosystems". In the period 2020-2024, Associate Professor B. Hristov is the thesis supervisor of 4 students and the supervisor of one full-time doctoral student, for whom the dissertation defense is pending. In the period 2018-2024, Associate Professor Hristov 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 Scientific Forum "Ecology and Agrotechnologies - Fundamental Science and Practical Implementation; October 2019; Scientific Forum "Ecology and Agrotechnologies - Fundamental Science and Practical Implementation" December 5 - 6, 2022, Sofia; Scientific Forum "Ecology and Agrotechnologies - Fundamental Science and Practical Implementation", held on December 5, 2023. He is a member of Organizational and scientific committees: member of the scientific committee of the Scientific Forum with International Participation "Ecology Agrotechnologies - Fundamental Science and Practical Implementation" 2019; member of the organizing committee of the Scientific Forum with International Participation "Ecology and Agrotechnologies - Fundamental Science and Practical Implementation", planned to be held on December 5 and 6, 2024.

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

4.1. Participation in scientific, scientific-applied and educational projects:

Ass. Prof. Hristov participated in 1 international project financed by sources external to Bulgaria, in 8 national scientific projects under the National Research Institute, one of which he was the head of, and in 3 scientific projects under the NIS of FU, in two of which he was the head.

4.2. Characteristics of published scientific results:

The systematized 10 scientific publications (equivalent to a monographic work) of the candidate on the topic "Studies on forest soils, felled by natural and anthropogenic impact and their modern classification" cover Brown forest soils, which are of forestry importance in Bulgaria. They are highly productive for beech, pine, spruce, fir and other trees that grow well. These soils are exclusively in areas that represent the forest zone of the country, and only a small part of them is used for agriculture. The fertility of forest soils is determined by the factors of soil formation: climate, organism world, bedrock, relief and age of the soil, but

with similar other factors, the influence of the relief, with its constituent parts: altitude, slope and exposure, is mainly emphasized. The mechanical composition of the soil, its strength and content of fine earth are also directly related to the growth of woody plants. One of the main processes in forest soils is soil acidification, which occurs naturally under the influence of anthropogenic activity. The growth of tree species leads to soil acidification and reduced amounts of basic cations at the expense of increased exchangeable aluminum. In recent years, there has been an improvement in soil conditions following a reduction in acid emissions. As soil acidity increases, the mobility of a number of trace elements increases, making them easily available to plants. Erosion limits the opportunities for plant development by reducing the depth of the root layer and the reserves of nutrients and absorbable moisture, destroys the soil structure, causes loss of organic matter and biodiversity, promotes the spread and accumulation of pollutants in the waters and in the areas of accumulation of deposits. The impact of forest fires is considered an important ecological factor in Bulgarian forests, which has a strong impact on the ability of forest soils to provide the nutrients and moisture necessary for plants. In the scientific works of Associate Professor Hristov, in addition to those with the qualities of a monograph, the state, abundance and diversity of soil microbial communities, which are one of the main indicators for the assessment and monitoring of forest ecosystems and for soil monitoring, are taken into account. In these works, for the soils, higher values of the correlation coefficient for the microbial abundance were found in the lower soil horizons with humus content compared to the upper soil horizons. Research has been carried out related to the classification of Brown forest soils (Cambisols) and their parameters in the Western Stara Planina region and the Vitosha National Park region. The studied soils are distributed in the low mountain part in the oak forests and in the mid-mountain zone of beech and conifers burns. These soils are identified in the lower parts of the Western Stara Planina and are more acid based on silicate rocks, at higher altitudes and colder and wetter climates. The article about the methodical approaches for determining the soil indicators, which helps to define the agricultural areas in this part of Bulgaria, is interesting. In one publication, a team of scientists evaluated the soils in the Dulovo region for the cultivation of fast-growing tree species such as Paulownia. Prof. Hristov also pays attention to the saline soils in Bulgaria in his scientific works, concluding that the soils affected by salinization cover about 55,000 ha of the Bulgarian territory, 35,500 ha of which are salinized by natural processes and 25,000 ha by industrial and drainage activities.

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

Assoc. Prof. Hristov registered essentially 46 citations of his scientific works by our and foreign scientists.

4.4. Contributions in the candidate's works (scientific, scientific-applied, applied):

The list of scientific publications on the basis of which the contributions were formulated includes 31 titles. I support the contributing elements of the ten publications, the projects and the rest of Prof. Hristov's activities. I think that their formulations, given by the candidate in the competition, are widely presented, and therefore, the main contributions, systematized by me, can be grouped and presented like this:

Scientific contributions in publications (10 issues) with monograph quality:

The contributing elements of the ten scientific papers with monograph qualities include:

1. The diagnostics and characteristics of the Regozems in Bulgaria have been updated, new classifiers have been given and the soil properties of Saturated and Carbonate Regozems have been summarized. A credit assessment of the Regozemites was made. (D6_1);

2. It was established that the investigated brown forests have a neutral to strongly acidic reaction, because the variable charges of the soil colloids are completely occupied by hydrogen ions, and the permanent charges of the soil colloids are in a state of incomplete neutralization with basic cations, which determines the acid instability of clay minerals (B4_2, B4_5);

3. Rendzins are found to accumulate high amounts of organic matter and the humus type is humate to humuate-fluvate with a high degree of humification, and Rendzins have a high potential for organic carbon sequestration. (B4_3. and B4_4.);

4. It has been established that Rendzini and Typical cinnamon forest (carbonate) soils are moderately suitable for the development of forest tree vegetation, as their properties favor the development of cherbor and sera crops with good dendrometric indicators. (B4_8.);

5. For the first time, they were classified as Saturated and Unsaturated sandy soils in mountain and forest areas, with over 80% sand in the soil profiles, which is the main diagnostic criterion for the classification of Sandy soils (Arenosols)..(B4_10.);

6. There is a decrease in the total amount of microorganisms with an increase in the depth of the soil profile, as in the case of the Brown forest soils compared to the Dark-colored mountain forest soils, the dominant group is the non-spore-forming bacteria. Microbial abundance in the lower soil horizons depends to a higher extent on the humus content than in the upper soil horizons. (B4_1);

7. Natural calcareous soils from Golo Burdo were found to have a moderate amount of microorganisms and a moderate level of microbial biomass carbon and a high, positive

correlation of microbial amount with total organic carbon, total nitrogen, available K, and electrical conductivity (EC), as well as the fact that high carbonate content in soils has an adverse effect on the development of microflora. (B4_7);

8. It was established that the catalase activity of the microorganisms in the dead forest litter depends on the main wood species forming the litter - in the litter of Fagus sylvatica, the enzyme values are higher than in the litter of Pinus sylvestris, and the catalase activity strongly depends on the composition and amount of organic matter and a very strong positive correlation was found between catalase values and microbial biomass carbon. (B4_9);

9. Soil research in the Vitosha region shows that the soil cover is mainly made up of Lithosems, Brown forest soils, Mountain meadow soils, with a limited coverage of Rendzini and Peat soils. The high alpine zone is characterized by soils such as Peat and Peat-marsh Lithosems and Dark-colored forest soils. In the middle and lower part of the mountain, mostly deeper soils such as Brown Forest Soils, Deluvial, Leachized Soils and Rendzins are spread. (B4_6.);

Contributions in the remaining 21 scientific works:

1. Nine soil indicators were determined to characterize the objective biophysical criteria: insufficient drainage, unfavorable texture and stony, shallow root layer and unsatisfactory chemical properties, and in this regard, areas with natural limitations in Bulgaria were identified, according to the criteria for unfavorable mechanical composition (G7_6);

2. It has been established that soils can be affected by salinization, and strategies to counteract salinization-affected soils are divided into preventive, mitigation, and adaptive, according to the types of production systems and the level of exposure to salt imbalances, summarizing the level of salinization and its effect in Europe and in Bulgaria (G7_10; G8_1; G8_3; G8_4);

3. Favorable ways of utilizing the waste products accompanying the functioning of various activities and the optimal amounts of sediments from production and economic activity have been established for the Technogenic soils. (G7_11);

4. A generalized assessment and classification of forest soils, their protection and restoration based on up-to-date information on soil types in forest ecosystems in the country is proposed (G7_9);

5. Ideas are also proposed for maintaining the natural balance of the agroecosystem and its components, which include the sustainable use of mineral fertilizers to protect water from nitrate pollution, and specialized networks have been created for the detailed study of soils, which allows monitoring of their diffuse pollution (G8_5) (G8_8);

6. An assessment of the soils in the municipality of Dulovo for the cultivation of fast-growing tree species was made and it was concluded that forest belts of the genus Paulovnia can be effective against wind erosion (G8_5).

5. Assessment of the candidate's personal contribution:

The relevance and contributions of the developments presented by the candidate in the competition are indisputable, because they enrich the methodology in the soil science.

Ass. Prof. Hristov is the Chairman of the Bulgarian Soil Science Society - from January 2024; member of the Bulgarian Society for Humic Substances; Chairman of the trade union organization at FU - the Federation of University Trade Unions (FUNIS) from April 2024; Chairman of the trade union organization at "N. Pushkarov" Institute - NFTINI KT "Support", for the period 2017 - 2019

6. Critical notes and recommendations:

1. The statement of contributions prepared by the applicant is verbose.
2. Conclusions in publications can be more comprehensive and substantive.
3. I recommend the candidate to publish independently and more in international journals.

7. Personal impressions:

I have known Biser Hristov since the years when he started working as a full-time doctoral student at the Pushkarov Institute and I am impressed by his active work on the dissertation, projects and in the scientific life of the institute. I observed how he actively participated in the workshop of young soil specialists organized in Italy by the European Soil Bureau. The writing of scientific works and participation in projects have formed the clearly expressed profile of Assoc. Prof. Hristov's research work in the field of diagnostics of the soil.

I have no publications in common with Ass. Prof. Hristov.

I have not discovered any plagiarism in the scientific works of the candidate in accordance with the law.

8. Conclusion:

Based on the analysis of the scientific and scientific-applied activity of the candidate, I believe that with the results of his teaching, research, applied and administrative work at the University, Assoc. Prof. Dr. Biser Emilov Hristov meets the requirements of the Bulgarian Law and the Regulations of the Forestry University for the academic position of "Professor" and I propose that Assoc. Prof. Dr. Biser Emilov Hristov be elected to the academic position of "Professor" in the scientific specialty "Soil Science" and in accordance with the main discipline "Soil Science" taught by him.

Reviewer Signature: