



REVIEW

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of the materials submitted for participation in a competition for the occupation of the academic position 'Associate Professor' in a professional direction 6.5. Forestry, scientific specialty 'Forest improvement, forest protection and special uses in forests', discipline "Fundamentals of plant protection"

In the competition for associate professor, announced in the State Gazette, no. 102/08.12.2023 and on the website of the University of Forestry for the needs of the 'Plant Pathology and Chemistry' department at the 'Ecology and Landscape Architecture' faculty, as a candidate Nikolay Georgiev Zafirov, PhD, holding the academic position of 'chief assistant professor' at the University of Forestry.

1. Brief biographical data

Dr. Nikolay Georgiev Zafirov was born on 15.03.1979 in the town of Samokov, Sofia District. He completed his higher education at the University of Forestry - Sofia, where in 2002 he obtained the educational qualification 'Bachelor' in Forestry, and in 2003 - the 'Master' degree in Forest Protection. In 2008, he obtained an educational and scientific degree "doctor" at the same University in the scientific specialty 'Forest improvements, forest protection and special uses in forests', defending a dissertation on the topic 'Main phytopathological stressors in Scots pine (*Pinus sylvestris* L.) plantations for South-West Bulgaria'. In the period 2006-2013, he held the positions of specialist-programmer, expert-programmer, head of the 'Design and Programming' department and director of the 'Information Service and Technologies, International Cooperation and Public Relations' Directorate in the Executive Agency for the Environment of the Ministry of the Environment and Waters. Since 2013, he is currently the chief assistant at the University of Forestry at the Department of Plant Pathology and Chemistry and a member of the Faculty Council of the Faculty of Ecology and Landscape Architecture. He is a member of the National Forest Protection Commission at the Executive Forest Agency (Ministry of Agriculture and Food).

Dr. N. Zafirov has participated in national and international scientific projects in the field of forest protection, dendrochronology and forest management, as well as in international scientific networks such as the Association for Tree Annual Ring Research, 'ESENIA - East and South European Network for Invasive Alien Species', Program for European Cooperation in Science and Technology 'Studying Tree Responses to extreme Events: a Synthesis' (STReESS), etc. During the period 2005-2007, he participated in international qualification courses in Germany and France. He is the recipient of awards for his contribution to the development of research activities at the University of Forestry.

2. General description of the presented materials, according to the indicators in the relevant scientific field and professional direction

In the presented reference-self-assessment of Dr. N. Zafirov for compliance of his scientific production with the minimum national requirements in the Law on the Development of the Academic Staff of the Republic of Bulgaria and the Regulations for the Development of the Academic Staff of University of Forestry, 526.9 points are indicated, accompanied by the relevant evidentiary material, with minimum requirements of 400 points for holding the

academic position 'Assoc. professor' in the field of higher education 6. Agricultural sciences and veterinary medicine, professional direction 6.5. Forestry.

According to the individual groups of indicators, the distribution of the candidate's points is as follows:

Group of indicators A – 50 points (minimum requirements of 50 points) – defended PhD thesis.

Group of indicators B – 129.6 points (minimum requirements of 100 points), where 10 items are indicated – publications published in renowned international scientific publishers in the global databases Web of Science and Scopus. Five of the publications are in Impact Factor journals, two are SJR indexed, and the rest are indexed in the Web of Science global database;

Group of indicators D – obtained 201 points (minimum requirements of 200 points). Eleven scientific works are presented - one co-authored monograph, one book based on a dissertation work, a chapter of a collective monograph, scientific publications in refereed editions, scientific reports in non-refereed editions and edited collective volumes.

Group of indicators D – 150 points (minimum requirements of 50 points). Ten citations of scientific publications are presented, all in scientific journals and series indexed in Web of Science or Scopus.

3. Characterization and evaluation of the candidate's activity

3.1. Educational and pedagogical activity

Dr. Nikolay Zafirov is a lecturer at the University of Forestry, Department of 'Plant Pathology and Chemistry' at the Faculty of Ecology and Landscape Architecture. He is the holder of the disciplines 'Fundamentals of plant protection', 'Methods in ecological research' (module 'Dendro-ecological methods') and 'Integrated methods of plant protection' (module 'Phytopathology') for students studying in the specialty Ecology and environmental protection, as well as the disciplines 'Forest Phytopathology' and 'Forest Protection' for Forestry students, with an annual workload between 360 and 465 hours.

The published monographic work 'Statistical methods for analysis in dendrochronology with the R system' is dedicated to methods for statistical analysis of original tree growth data obtained as a result of studies of main forest tree species in Bulgaria, which could be used for teaching students or PhD students applying dendrochronological methods of analysis.

Until now, Dr. N. Zafirov is the supervisor of 18 graduates, respectively: in the Faculty of Forestry - 17 graduates and in the Faculty of Ecology and Landscape Architecture - 1 graduate.

The pedagogical and educational activities of Dr. N. Zafirov fully meet the requirements for holding the academic position of 'Assoc. professor' at the University of Forestry.

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

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

In the submitted references (Appendices 11.19-11.21 and 11.41-11.48) it is stated that Dr. N. Zafirov participated in the implementation of six national scientific and six scientific and applied projects, financed by Bulgarian institutions, as well as in two international research networks - COST Action STReESS and ESENIAS. He is a participant as an expert on the health of forest ecosystems in the international project 'Assessment and monitoring of the impact of polluted air on forest ecosystems' - first and second level of the ICP 'Forests' program (2017-2024). Participation in the working teams of the mentioned scientific and scientific-applied

projects reveals the candidate's long-term expertise in the field of forest protection and dendrochronology, monitoring and protection of forest ecosystems in Bulgaria, etc.

4.2. Scientific, scientific-applied and innovative activity

The candidate ch. assistant professor Dr. N. Zafirov participated in the competition with 21 items of scientific works, which can be classified as follows:

- *Publications with Impact Factor* – 5 pcs. (B4.1; B4.4; B4.7; B4.8 and B4.9);
- *Publications with SJR Index* – 4 pcs. (B4.5; B4.6; D7.1 and D7.2);
- *Publications in Web of Science* – 5 nos. (B4.2; B4.3; B4.10; D4.3 and D4.4);
- *Monograph* – 1 pc. (G5.1);
- *Book based on dissertation work* – 1 pc. (D6.1);
- *Reports in non-refereed scientific publications* – 4 nos. (G8.1; G8.2; G8.3 and G8.4);
- *Chapter of a collective monograph* – 1 pc. (D11.1).

Five of the publications were published in scientific publications, referenced and indexed in world-renowned databases with Impact Factor: Scientific Reports, Dendrochronologia, Global Change Biology, IAWA Journal and Frontiers of Plant Science, 4 issues with SJR index (Silva Balcanica, Ecologia Balkanica), 5 articles published in refereed journals in the global database Web of Science, with scientific review - 4 reports published in edited collective volumes in Bulgaria. The rest of the publication activity includes a monograph 'Statistical methods for analysis in dendrochronology with the R system', a chapter of a collective monograph 'Mountain coniferous forests of Bulgaria - structure and natural dynamics', a book based on a dissertation work 'Main phytopathological stressors in crops from Scots pine (*Pinus sylvestris* L.) for Southwest Bulgaria.

The candidate took part with reports, posters and presentations in 17 national and international scientific forums in the country, as well as in the organization and holding of three international scientific conferences.

The scientific output can be assessed as significant, reflecting the results of large-scale research in the field of dendrochronology - analysis of the dynamics of radial growth and of the annual variations in the density of wood in different forest tree species, in the field of forest protection - highlighting the main biotic or abiotic stress factors leading to the deterioration of the health of forest ecosystems, thereby contributing to the enrichment of knowledge related to the preservation of health and biological diversity in the forest ecosystems of Bulgaria.

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

The scientific contributions and achievements of Dr. N. Zafirov have gained fame and have been cited by a large number of foreign and Bulgarian scientists working in the field of ecology of forest ecosystems, dendrochronology, forest management, etc. (286 positive citations found, listed in Appendix 10.5). In the competition for 'Assoc. Prof.', however, the candidate presents a list and supporting material of only 10 citations, eight of them found in journals indexed with Impact Factor (Forests, Dendrochronologia, Agricultural and Forest Meteorology, etc.), and the remaining two in refereed Bulgarian edition, indexed in Web of Science - Forest Science.

4.4. Contributions

I accept the habilitation reference and the reference for contributions of Dr. N. Zafirov for participation in the competition. The scientific contributions that stand out in the presented

scientific materials can be grouped in the following areas related to dendrochronology and forest protection:

1. Dynamics in the health status of forests and impact of main stress factors

During long-term studies, the main groups of stress factors causing the deterioration of the health status of plantations of various tree species have been identified. Average growth chronologies were compiled for the radial growth of coniferous forests (B4.3, B4.4, Г5.1, Г6.1, Г7.4, Г8.1, Г11.1), common fir and spruce (B4.2, D11.1); in oak forests (B4.5, B4.6, D5.1, D7.1, D8.1, D8.3); in a natural stand of horse chestnut (B4.10); in beech forests (G8.4), etc. The chronological stress periods in the growth of the trees in the individual woody species have been established.

For the first time in Bulgaria, dendrochronological analysis was applied as a method to study the influence of the leafmining moth (*Cameraria ohridella* Deschka et Dimič) on the growth of the horse chestnut (*Aesculus hippocastanum* L.) (B4.10).

When preparing multifactorial regression analyses, the main stress factors affecting the dynamics of the radial growth of the studied tree species were highlighted, including abiotic factors (temperature-moisture regime), biotic factors (fungal pathogens and insect pests), as well as anthropogenic factors (air pollution with ozone, application of various forestry practices).

When comparing growth rates between completely dead plants and those that survived an event but are still alive, it has been shown that radial growth decreases prior to tree death (B4.7).

2. Study of intra-annual variations in wood density of forest tree species

Intra-annual variations in wood density were found for different tree species (in a climatic gradient from the Mediterranean Sea to Northern Europe), which prove that trees have the ability to adapt to the occurring climate changes (B4.1). Precipitation has been found to play a significant role in inducing intra-annual variation in species exhibiting drought tolerance. The occurrence of intra-annual variation in wood density was found to increase non-linearly with tree-ring width in both coniferous and broad-leaved species and to decrease with altitude and age.

The critical indicative value of various anatomical characteristics in tree rings, which served for the ecological reconstruction of events related to past periods of drought, frosty periods, floods, etc., was evaluated. (B4.1, B4.4, B4.8, B4.9).

3. Study of biotic factors damaging forest plantations

The main fungal pathogens and insect pests that led to the deterioration of the health status of pine forests in Stara Planina (B4.3), oak stands in Western Bulgaria (B4.5 and D8.1), beech and spruce were found plantations in protected areas in North-West Bulgaria (B4.2). The frequency of occurrence of fungal pathogens and insect pests, as well as the degree of damage they cause in the studied plantations, are reported.

Scientific and applied contributions

1. Monitoring of forest ecosystems

An innovative integrated approach (based on remote sensing and ground validation technologies) was applied to assess the health status of forests in protected areas in the Gornata Korina Reserve and the Chuprene Biosphere Reserve, mainly in plantations with dead trees and in those with a deteriorated health status (B4.2, D7.1). The application of remote sensing with unmanned aerial systems combined with orthophoto imagery, GIS methods and classic terrestrial entomological and phytopathological studies has been shown to be a reliable tool for

assessing the health status of hard-to-reach forest stands, and can serve in the management of protected natural areas territories.

2. Statistical analyzes with specialized software and compilation of databases

Methods for statistical analyzes of specialized open-source software have been applied in dendrochronological studies (G5.1), which is an important contribution to the development of dendrochronological studies in Bulgaria.

Methods of dendrochronology were applied to create databases by measuring tree ring widths (B4.1, B4.7, B4.8, D5.1), preparation of long growth chronologies for dating material and cultural heritage (B4. 3, B4.4, D5.1) etc.

Variation curves of distribution of Douglas-fir trees by diameter, height and volume were prepared (G7.2 and G7.3).

5. Evaluation of the candidate's personal contribution and check for plagiarism

In the submitted materials for the competition of 21 scientific works, the candidate Dr. N. Zafirov is the only author in 2 studies (a chapter of a collective monograph and a book based on a dissertation work). 19 items are co-authored. of the presented publications, reports and monograph, as in 5 nos. of these he is the first author. In all presented materials, the personal contribution of the candidate is highlighted, proving the scientific interests in the field of forest protection and dendrochronology. No plagiarism was detected in the submitted materials.

6. Critical Notes

In reference 10.5 of the attached documents for participation in the competition, the candidate indicates a list of 286 citations of the publications participating in the current competition for the academic position of 'associate professor'. However, these citations are not listed in the table of minimum national requirements (Annex 8.2) and have therefore not been peer-reviewed. The candidate could present a greater number of citations, which would reflect to a higher degree and with greater conviction the indisputable significance of the scientific contributions achieved by the candidate, reflected in his works.

In the reference to scientific and scientific-applied contributions, the directions in which the contributions are grouped are too fragmented. They could be summarized into three or four groups that outline the main directions in the candidate's research, namely: *the study of the stress factors responsible for the deterioration of the health status of coniferous and broad-leaved plantations; application of dendrochronological methods for analysis of growth dynamics of different tree species; monitoring of the health status of forest ecosystems; creating database.*

A repetition of the contributions indicated in the habilitation report (Appendix 9.2) and the contribution report (Appendix 9.1) is noted. It would be better if the contributions of publications indicated as habilitation work (group of indicators B4) are excluded from the summary statement of contributions.

The publication of a book based on a defended dissertation implies an upgrade of some of the results obtained and a change of the structure to which a monograph should correspond, rather than maintaining that of the defended dissertation.

7. Personal impressions

My personal impressions of Dr. Nikolay Zafirov dates back many years. They are built on the basis of our joint research interests in the field of phytopathology and projects developed in the field of forest protection and preservation of forest ecosystems. He is a scientist and

teacher with high competences in the field of phytopathology and the application of dendrochronological methods for the analysis of the influence of various abiotic and biotic stress factors leading to the deterioration of the health of forest ecosystems.

8. Conclusion:

The candidate in the competition Dr. Nikolay Zafirov has presented a sufficient number of scientific works, in which the achieved scientific and scientific-applied contributions are outlined. After getting acquainted with the presented scientific publications and analyzing their significance, I propose Dr. Nikolay Georgiev Zafirov, to be elected as an 'Associate professor' in professional direction 6.5. Forestry, scientific specialty 'Forest improvement, forest protection and special uses in forests' in the discipline 'Basics of plant protection'.

10/04/2024

Reviewer:

/Prof. Dr. Margarita Georgieva/