



REVIEW

on the materials submitted for participation in a competition for the occupation of an academic position 'Professor', in the field of higher education 6. Agrarian sciences and veterinary medicine, professional area 6.5. Forestry, scientific specialty 'Forest melioration, Forest protection and Special forest uses', in the discipline 'Forest pathology', announced by the University of Forestry, published State Gazette 37/7.05.2019, procedure code ELA-P-0419-08.

The only candidate for the competition is: Assoc. Prof. Sonja Hristova Bencheva, Ph.D

Reviewer: Dr. Margarita Ilieva Georgieva, Associate Professor in a professional field 6.5. 'Forestry' at Forest Research Institute, Bulgarian Academy of Sciences.

1. Brief biographical data of the candidate

Assoc. Prof. Sonja Hristova Bencheva Ph.D was born on 7 December 1959 in Gabrovo. She completed a higher education as an engineer of Forestry at the Higher University of Forestry - Sofia, in 1992. Her research career started as an assistant at the Experimental station for highly growing forest tree species - Svishtov, working in two directions: 'Genetics, selection and introduction of poplars and willows' and 'Plant protection'. In 1996, she occupied the academic position as a senior assistant and in 1999 - Chief assistant, at the University of Forestry - Sofia (UF). In 2000, S. Bencheva successfully defended her Ph.D Thesis 'Research on the growth and sustainability of poplar cultivars for early selection opportunities' and received her doctorate degree. Since 2003 - until now, she has fully occupied the position Associate professor in the scientific specialty 'Forest melioration, Forest protection and Special forest uses' and conducted lecturers in the discipline 'Forest phytopathology'.

Since 2016, Dr. Bencheva has held the position Head of the Department of Plant Pathology and Chemistry at UF. The scientific interests of the candidate reflects in the field of plant protection (forest phytopathology), wood destroying and staining fungi, resistance of poplars to diseases, long-term monitoring of forest ecosystems, agroforestry and biologically active substances. She is a member of the Union of Scientists in Bulgaria and the National Forestry Commission, an expert in the International Cooperative Program 'Forests' (ICP Forests).

2. Correspondence of the submitted documents and materials of the applicant in accordance with the Rules the Development of the Academic Staff at the University of Forestry.

In the announced competition, Assoc. Prof. S. Bencheva is the only candidate that obtained her educational and scientific degree 'Doctor of Philosophy' in 2001, and has been habilitated as an Associate Professor at the University of Forestry since 2003. The presented self-assessment report for the scientific production is in compliance of with the minimum national requirements under Art. 2b of the Low of the Development of the Academic Staff in the Republic of Bulgaria, and Art. 2a, p. 1 of the Rules of the Development of the Academic Staff in the University of

Forestry. A total of 948.5 points were indicated, with a minimum national requirement of 550 points. The relevant supporting materials accompany all presented titles in the table.

According to the submitted documents and self-assessment report of the minimum national requirements for the occupation of the scientific and teaching activities in the field of higher education 6. Agrarian science and veterinary medicine, professional field 6.5. Forestry, and those defined in the Rules for the development of the academic staff of the University of Forestry, Assoc. Prof. Dr. S. Bencheva completely fulfil the required quantitative indicators.

Minor inaccuracies noted in the report could be noted, concerning article No. 27, published in the journal *Forest Science* in 2017. According to the list of referenced and indexed journals of the National Center for Information and Documentation (NACID), in 2017, that journal was referenced by Web of Science during that year, the article has to be moved in the category of scientific publications, referenced and indexed in world-famous scientific information databases.

In addition to presented self-assessment report, the candidate Dr. Bencheva has performed an enclosed reference for her participation in national and international scientific forums and conferences, published scientific-applied papers, a participation in national committees and scientific juries, prepared expert reports and reviews, curriculum preparation, etc.

3. Assessment of the candidate's teaching activity

Assoc. Prof. Sonja Bencheva started working as an assistant at the University of Forestry in 1996. Since 2004, she has been a habilitated lecturer at the Department of Plant Pathology and Chemistry at the Faculty of Ecology and Landscape Architecture (FELA). Dr. Bencheva holds lectures for Bachelor's and Master's students in the disciplines of Forestry, Ecology and Environmental Protection, Agronomy and Plant Protection, with 382 to 543 hours annually. According to the enclosed references (No 7 of applied documents), she has twenty-three years of pedagogical and educational work experience at the University of Forestry - Sofia.

Dr. Bencheva is the author of new and updated disciplines in the fields of Forest Phytopathology, Forest Protection (module Phytopathology), Fundamentals of Plant Protection (module Phytopathology), Integrated Plant Protection Methods (module Phytopathology), Sustainable Land Management, Pests of Forest and Ornamental Plants (module Forest Phytopathology), Fundamentals of Agroforestry and Agroforestry Systems for both Bachelor's and Master's students.

In 2017, Dr. S. Bencheva published the university textbook on *Forest Phytopathology* [39], and is a co-author of the textbook on *Agroforestry* [38]. The textbook on *Forest phytopathology* summarizes, updated and systematized knowledge about main diseases on forest tree species, the pathogens as causers of the disease, the peculiarities of the pathological process, and is intended for students of the University of Forestry. The published textbook on *Agroforestry* is intended for students of the University of Forestry studying the subjects 'Fundamentals of Agroforestry', 'Agroforestry systems', 'Agroforestry' and 'Sustainable land use management'. She also co-authored two university textbooks that are used by students, Ph.D students, and professionals in the field of forestry: *A Guide to Forest Protection. Part II. Methods for monitoring, signaling,*

forest pathological examination, prognosis and organization of forest diseases and pests and *Atlas of wood decaying fungi*, illustrated with high quality photographs.

To date, Assoc. Prof. Bencheva is a supervisor of 66 graduates: in the specialty Forestry - 63, specialty Agronomy - 2 and specialty EEP, Urban Ecology - 1 graduate. She is a scientific supervisor of two PhD students in the scientific specialty 'Forest melioration, Forest protection and Special forest uses'.

The pedagogical and teaching activities of Assoc. Prof. S. Bencheva are at a high level and completely cover the requirements of occupying the academic position 'Professor' at University of Forestry.

4. Assessment of the applicant's scientific, applied and publication activities

4.1. Participation in scientific, applied and educational projects

According to the presented reference (No8), Assoc. Prof. Bencheva PhD is involved in the implementation of four national scientific and applied projects, as only one of them being awarded the funders – Ministry of education and Science. It is also reported that she was a leader of two national projects funded by the Scientific Center of the University of Forestry. At the same time, the official note (25.1) issued by the FELA at UF shows, that the candidate is involved or is a leader in 11 research and education projects. Still more, she has been a participant in five international research networks, which is essentially 'participation' in international projects such as 'Long-term Monitoring of Forest Ecosystems' - Level I and II under ICP 'Forests' (2007-2019), 'Establishment of an inventory and large-scale monitoring of forest ecosystems' FutMon under the LIFE07 program (2009-2010) and others. Assoc. Prof. Bencheva participation in the above mentioned scientific and applied research projects reveals her expertise in the field of forest phytopathology and entomology, monitoring and conservation of forest ecosystems in Bulgaria.

4.2. Characteristics of published scientific results

For participation in current competition for the occupation of the academic position 'Professor, Dr. S. Bencheva has presented a list of 39 published scientific materials. Among them, as a habilitation work, the candidate has performed one the monograph work, 6 articles published in scientific publications, abstracted and indexed in world-famous data bases with Impact Factor (*Ecological Engineering* and *Acta zoologica bulgarica* (incorrectly represented only by its SJR index only), and SJR index (*Silva Balcanica*). Twelve articles were published in non-refereed journals with scientific peer review and 10 reports published in edited collective volumes in international and national proceedings. The rest of the publication includes studies (2), chapters of a collective monograph (4), and university textbooks (4).

The monograph work *Wood-destroying fungi* refers to a habilitation monograph includes of knowledge of wood-destroying fungi in Bulgaria, their hosts range in both forest and orchard tree species, and distribution localities in the country. It presents a new, extremely valuable scientific information on identified 225 species of wood-destroying fungi belonging to the phylum Basidiomycota (174), Ascomycota (34) and Myxomycota (17). They were found in 91 localities in Bulgaria, as well as the condition of the substrate on which they have been discovered, their

importance and biological characteristics as factors that influence the development of host rotting processes. In the separate parts of the monograph, the species composition and taxonomic identity of the fungi and their localities are systematically outlined. The species are presented in a structured and well-organized scheme that includes the identified fungal organisms. All identified species are presented with high quality illustrations in the edition, which could serve as a guide and atlas for identifying them. The last part of the work presents control guidelines and damage reduction measures in forest ecosystems and in horticulture, in order to maintain good phytosanitary status in forest and orchard management.

Outside the presented monograph work, Assoc. Prof. S. Bencheva PhD has submitted publications in referred journals, scientific reports in conference attendances, charts of monographs, textbooks etc. In the published materials, the candidate is: the only or first author in 15 publications; second author - in 12 publications; third and subsequent author - in 11 articles or reports. The cooperation with specialists from other fields of science has allowed a comprehensive clarification of the studied problems related to the protection of forests against insect pests and fungal pathogens, monitoring and protection of forest ecosystems, development of new areas such as agroforestry and others.

The scientific production of the candidate can be evaluated as significant, reflecting the results of large-scale research carried out in the field of protection of forest, orchard and ornamental tree and shrub species, and identifies the researcher as important for the development of mycological science in Bulgaria. The scientific works are perfectly executed and maintained in scientific and technical terms, including descriptions of the morphological features of new species of fungal pathogens in Bulgaria, as well as new for the Bulgarian fauna and Balkan Peninsula insect species. The developed scientific production contributes to the enrichment of knowledge related to the protection of health status and biodiversity in the forest ecosystems of Bulgaria, the reviling of new agro-forestry systems for the preservation of the low-productive and desert lands in the country.

4.3. Candidate's scientific activity in literature (Citations)

The number of 41 known citations of the scientific contributions and achievements of Assoc. Prof. Bencheva reveal the received notoriety, positive appreciation and recognition from a large number of foreign and Bulgarian scientific works in the field of forest phytopathology, entomology, agroforestry and others. Of the full list of 41 citations submitted, 12 were found in journals indexed by Impact Factor (*Forest pathology, Microbiology, Mycotaxon, Transactions of the American Entomological Society, Biologia, Phytopathologia Mediterranea, Agroforestry Systems*, etc.), 3 - in journals with SJR index (*Silva Balcanica, Forestry ideas*), 13 - respectively in refereed and non-refereed international and Bulgarian editions. The above quotations go beyond the accepted criteria for occupying the academic position of 'Professor' at the University of Forestry.

4.4. Contributions to the applicant's work (scientific, scientific-applied, applied)

The submitted list for participation in the announced competition includes only scientific papers for occupying the academic position of 'Professor', which includes 39 publications, monographs and textbooks. It is noteworthy that the research activity of the candidate is extremely diverse and important, include different fields of interest - forest phytopathology (identification and reporting of fungal pathogens new to the mycology science in Bulgaria); researches on wood-destroying fungi - taxonomy, systematics and distribution, but also studies on the taxonomy and ecology of insect pests, assessment of health status and conservation of biodiversity in forest ecosystems, and agroforestry. The achieved scientific results are grouped into five main areas:

- Forest phytopathology.
- Wood-destroying fungi.
- Forest entomology.
- Monitoring of forest ecosystems.
- Agroforestry.

In each of these areas, the following important scientific and applied contributions are highlighted:

1. In the first area – *forest pathology*, Assoc. Prof. S. Bencheva PhD presents twelve scientific papers, which present original contributions related to the study of pathogens as causes of important diseases of woody and shrub species. Among them, the most important are the contributions related to the reporting of new for the Bulgarian mycota pathogenic species: *Cryptostroma corticale*, causing irreversible damages to the stems of *Acer platanoides* used for landscaping in parks and causing health problems in humans - allergies and inflammation of the lungs [5]; *Delphinella abietis*, causing wilting of shoots and needles of *Abies alba* [7], and *Ramularia ligustrina*, damaging the leaves of *Ligustrum vulgare* [13].

For the first time in Bulgaria the species composition of ophiostomatic fungi causing staining of coniferous wood has been studied and their relationship with the bark beetles infested *Pinus sylvestris* has been demonstrated [22].

Economically important fungal pathogens of nine genera causing damage to the cultivation of poplars along the main inland rivers in Bulgaria, were diagnosed - *Cytospora*, *Phomopsis*, *Fusarium*, *Gibberella*, *Dothichiza*, *Pleospora*, *Pestalotiopsis*, *Platystomum* and *Cryptosphaeria*. It was proved that the most pathogenic are fungi of the genus *Cytospora* causing necrosis on poplar stems. Their impact on the growth and physiological status of various poplar cultivars was established [24, 27, 29]. The obtained data have contributed to the expansion of knowledge about the biological and environmental features of important pathogens affecting the phytosanitary status of poplars in the country.

The reasons for the deterioration of the health status of economically significant forest species as coniferous plantations [26] and beech (*Fagus sylvatica*) stands [33] have been identified, and the role of the main abiotic and biotic factors for their condition and the expanding drying of plantations in the country has been outlined. A system of forestry, prophylactic and organizational

measures has been proposed aimed at deforestation and improving the sanitary and health status of forests [26].

2. In the area of **wood-destroying fungi**, 11 publications related to studies on the species composition, distribution and parasitic activity of different species of wood-destroying fungi from the phylum Myxomycota, Ascomycota and Basidiomycota developing on alive and dead wood of orchard and forest hosts [1] are presented. The phylogenetic specialization was analyzed, as well as the degree of parasitic activity of fungies based on the species found repeatedly in the study of wood-destroying fungi [1, 15-18].

Because of long-term years of researches, an Atlas of 149 species of wood-destroying fungi has been created, incorporating synthesized information on biology, ecology and taxonomic identifications, illustrated with high quality photographs [37].

3. The contributions in the third direction (**forest entomology**) are also significant, as a result of studies that have found new data for the Bulgarian entomofauna as *Callidium coriaceum* Paykull (Coleoptera: Cerambycidae) on spruce (*Picea abies* (L.) Karst.) - reported for the first time in Bulgaria, which is noted as the southernmost habitat for the species in Europe [3].

For the first time in Bulgaria and the Balkan Peninsula, the subfamily Histeromerinae, genus *Histeromerus*, and species *Histeromerus mystacinus* Wesmael have been reported during the study of saproxil organisms in the Biosphere Reserve 'Bistrishko Branishte' [4]. One-hundred and one species of family Coleoptera (Cerambycidae) have been identified in Vitosha Nature Park and the 'Bistrishko Branishte' Biosphere Reserve [21]. New host plants have been established as feed species for *Rhagium inquisitor* - *Salix caprea*, for *R. bifasciatum* - *S. caprea* and *Prunus avium*, for *Xylosteus bartoni* - *Corylus avellana* and *Betula pendula*.

4. In the area of **monitoring of forest ecosystems** studies, the contributions have been carried out related to the long-term monitoring of forest ecosystems conducted in Bulgaria under the International Co-operative Programme 'Forest'. The results revealed the main abiotic and biotic factors affecting the health status of major forest tree species cultivated in Bulgaria [30, 31 and 35].

5. The benefits of **agroforestry** as a new production system in biological, ecological, economic and social aspects have been explored in comparison to pure agriculture or forest lands [2, 8, 9, 10, 11, 14, 32 and 38]. New knowledge for the technological scheme has been developed - establishment and cultivation of short-lived willow plantation, which aims to integrate biomass production with a protective effect against adverse environmental factors in adjacent crops [11].

The analysis of the scientific production of Assoc. Prof. S. Bencheva undoubtedly confirms that the candidate is a specialist in the field of forest protection, and in particular of forest phytopathology. The achieved results clearly highlighted her personal contribution to the achievements of scientific and applied contributions expanding the Bulgarian mycological and pathological science with new knowledge of the taxonomy and distribution of different species of fungal organisms, supplement and expand knowledge of important new entomological species, and validate new forest and agroforest technologies to put into practice.

The reference for the scientific contributions of Assoc. Prof. Sonja Bencheva was prepared correctly, with the majority of the mentioned scientific and applied contributions that are original and clearly outlining her research activity. Presentation of the contributions, however, could be more systematic and summarized in order to allow the candidate's significant scientific and scientific-applied achievements to be featured in different fields of science.

5. Assessment of the applicant's personal contribution

The personal contribution of Assoc. Prof. Dr. S. Bencheva is clearly expressed and allows me to give a positive assessment in all aspects of the research activity of the candidate.

6. Critical notes and recommendations

I have no critical notes on the materials presented, but some recommendations are suggested in the separate sections.

7. Personal impressions

Since the years, I have known Associate Professor Sonja Bencheva as a responsive, correct and ethical person. In her scientific and teaching career, she is distinguished with her serious scientific interests, original contributions and methodological decisions. The candidate is hardworking, consistent and extremely precise to her professional responsibilities.

8. Conclusion

The candidate for the occupation of the academic position 'Professor' Assoc. Prof. Sonja Hristova Bencheva, Ph.D appears at the competition with quality scientific production, which exceeds the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria, the Rules for its application and the accepted criteria for that academic position at the University of Forestry. Based on the evaluation of the submitted significant researches, teaching and expert activities, it could be concluded that Assoc. Prof. Sonja Bencheva is a purposeful, eroded and dedicated scientist with a clearly defined profile good phytopathologic, taxonomic and environmental expert, which is fully in line with the scientific specialty in which the competition was announced. The scientific achievements and high professionalism of the candidate give me the full conviction to **RECOMMEND Associate Professor Sonja Hristova Bencheva** for the academic position '**Professor**' in professional area 6.5. Forestry, scientific specialty 'Forest melioration, Forest protection and Special forest uses', the discipline 'Forest phytopathology'.

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