

REVIEW

72-58-787/16.03.2023

on the materials for participation in a competition for acquiring of academic position “Associate Professor” in scientific field 6. Agricultural science and veterinary medicine, in professional direction 6.5. Forestry, scientific specialty “Silviculture, including Dendrology”, announced by Forest Research Institute, in State Gazette № 29/31.03.2023 г.

Applicant to participate in the competition: Dr. Mira Lyubcheva Georgieva, Senior Assistant, Forest Research Institute-BAS

Author of the review: Dr. Evgeni Ivanov Tsavkov, Associate Professor, Department of Dendrology, University of Forestry.

1. Short biography of the applicant.

Senior assistant Dr. Mira Lyubcheva Georgieva was born on 18 July 1978 in Sofia. She completed her secondary education in the Professional Secondary School of Tourism in Bankya. An year later she graduated First Private Secondary School of Banking and Insurance. In the period 1996-2001 she is an MSc student on ecology and environmental protection and conservation in the University of Forestry. In the period February 2003 – August 2006 is a PhD student in the department of dendrology in the University of Forestry (mentor – Prof. Petar Zhelev). In 2017 defends her PhD thesis entitled „Investigation on the genetic diversity of *Platanus orientalis* L. in Bulgaria“ and becomes a doctor in the professional field 6.5. Forestry, scientific subject Forest Plantations, Improvement and Seed Production.

She has worked as an office manager in the Association of Business Valuers in Bulgaria (1995-1996), BK Commerce Ltd. – Sofia (2002-2003), manager of educational activities in the department of dendrology in the University of Forestry (2006-2009), inspector in the department of international collaboration (2009-2012) and inspector in the department of development of the academic staff and control of education quality (2012-2013) in the University of Forestry. Since 2017 she is engineer-ecologist in the department of forest genetics, physiology and plantations in the Forest Research Institute, BAS. Since 2018, until today, Mira Georgieva is a senior assistant in the same department. She has passed specialisations in the Technical University of Zvolen, Slovakia, Georg-August-Universität in Göttingen, Germany, University of Copenhagen, Denmark, Forest Experimental Station in Simeria, Romania.

2. Compliance of the submitted documents and materials of the applicant with those required under the Regulations on the Development of Academic Staff in the FRI-BAS

The documents submitted by Senior Assistant Mira Georgieva show that the regulations of the competition's procedure have been followed. The materials are in accordance with the Law for Development of the Academic Staff of the Republic of Bulgaria and the Regulations for obtaining of scientific degrees and occupying of academic positions in the Forest Research Institute, BAS, as well as the additional specific requirements. Dr. Georgieva participates in the competition with 10 scientific publications, which are equal to habilitation work, in reviewed journals and indexed in world-famous data base of scientific information, scientific production and determined citations, which correspond to number of points, covering the minimum national requirements for associate professor in the scientific field 6.5. Forestry.

The assessment of the conformity of parameters, presented in the reference, show the following:

- Parameter A: PhD thesis – 50 points;

- Parameter B: 10 scientific publications in issues, which are reviewed and indexed in world-famous data bases with scientific information, which, after reduction of authors number, provide 187,6 points at required minimum 100 points;
- Parameter Г: Total 38 publications presented, in Г7 – 8 (71,5 points) and Г8-30 (139,3 points), which provide for parameter Г total 210,8 points at required minimum 200 points;
- Parameter Д: The applicant participates in the competition with 11 publications and total 24 citations in sub-categories, respectively: Д13 – citations or reviews in scientific issues, reviewed and indexed in world-famous data bases with scientific information or in monographs and collective volumes – 2 (30 points); Д14 – 7 (70 points) and Д15 – 2 (10 points), which provide total 110 точки at required minimum 100 points. List of citations in each parameter is presented;
- Parameter E: The applicant participates in 3 scientific or educational projects – 1 international and 2 national, which provides 50 points at required minimum 50 points;

On the additional requirements parameters of FRI-BAS, the applicant has achieved 50 points.

Total on all parameters have been achieved 658,4 points at required minimum 500 points. Copies and summaries of all publications are presented for the competition.

3. General description of the applied materials

For her participation in the competition, Dr. Georgieva has submitted 48 publications. They could be classified, as follows: 1) **10** scientific publications in issues, which are reviewed and indexed in world-famous database with scientific information (parameter B); 2) **8** articles published in scientific journals reviewed in the data bases of Web of Science and Scopus (parameter Г7) and 3) **30** articles and papers published in non-reviewed journals and proceedings from scientific conferences and symposia (parameter Г8). The materials presented in the parameter B4 are published in 3 scientific journals: Nauka za gorata (Forest Science) (B4.7, B4.8, B4.9, B4.10), Ecologia Balkanica (B4.1, B4.2, B4.3, B4.5), Silva balcanica (B4.4.), Botanikai Közlemények (B4.6). Publications in Г7 are in the following specialised issues: Nauka za gorata (Forest Science) (Г7.1, Г7.3, Г7.8), Silva balcanica (Г7.2, Г7.7), Phytologia Balcanica (Г7.4, Г7.5) and ZooNotes (Г7.6). In Г8 are published in: Ecological Engineering and Environmental Protection (Г8.4, Г8.5, Г8.11, Г8.15, Г8.16, Г8.17), International Journal of Scientific Engineering and Applied Science (IJSEAS) (Г8.29 and Г8.30) and papers, which are published in reviewed collective volumes and in proceedings of scientific conferences – Г8.1-Г8.3; Г8.6-Г8.10; Г8.12-Г8.14; Г8.18-Г8.28).

Seven publications are self-written (1 in B4 and 6 in Г8), and in another 14 the candidate is a leading author. Twelve publications are with one co-author, 8 publications are with two co-authors and 28 publications are with 3 and more authors. From the publications, 18 are in English, and the same number is reviewed in Web of Science. For the time being of the development of research activities, I don't consider a fault the domination of publications with large number of authors and do not consider it failing of the candidate.

Dr. Georgieva has presented total 25 papers and 4 posters at 17 scientific forums, 12 of which – international.

4. Characteristics of the research work of the applicant and the most important scientific contributions.

Basic fields of the research activities of the candidate are as follows:

- Investigation on tree species mutability;
- Studies on the flora and dendroflora of geographically differentiated objects;
- Studies on the ecological requirements and biological peculiarities of determined plant groups, incl. invasive species;
- Chorological investigations and determining of new habitats of various species;

- Phytocoenological investigations in various plant communities;

The research activities of the candidate are interdisciplinary, which I consider normal for the contemporary development of research activities. The various directions of a considerable part of the candidate's investigations are a sign that Dr. Georgieva is capable to participate in thematically various research projects. Part of the publications are a result from her previous investigations, incl. the work on her PhD thesis.

In the submitted habilitation reference to the 10 scientific publications, replacing habilitation work (monograph), the scientific contributions are in three directions: 1/ genetic mutability and health status of species from the genus *Platanus* in Bulgaria; 2/ investigations in flooded forests along the Danube river and 3/ dendro-floristic analysis of Lozenska Mt. The contributions in the habilitation reference are not clearly outlined as scientific and scientific-and-applicable, both on parameters B and Г.

The generalised analysis of the submitted scientific production gives me the reason to outline as more significant the following scientific and applied contributions in the above-mentioned subjects:

- Entire population-genetic investigation of *Platanus orientalis* L. in Bulgaria (B4.1, Г8.1, Г8.4, Г8.5, Г8.9 and Г8.10). This species is very interesting for the Bulgarian dendroflora. Its limited and fragmented habitat, as well as the conservation significance, make it interesting object for investigation. For the first time in Bulgaria, the mutability on the basis of neutral genetic markers has been studied (13 isosyme gen loci) and morphometric parameters of leaves. The genetic indices of 9 autochthonous populations were determined, as well as their inter- and intra-population mutability. High level of genetic differentiation was proved, which is supposed to be a result from the small area of populations and their spatial isolation; the mutability of leaves of 8 populations and 8 morphometric indications of the leaf lamina (Г8.4) shows relatively low level of mutability, which makes impossible the differentiation of the individuals according to their provenance. The basic conclusion is that applying these two methods (neutral markers and quantitative indications of leaves) at a species with limited habitat is of a big importance for determination of the conservation strategy of this species.
- Investigation of the health status and sustainability of species from genus *Platanus* (B4.2). Species from genus *Platanus* are of big importance for the urban green infrastructure and I consider the questions about their sustainability to urban environment important and actual. The investigation is with leading author Dr. Georgieva and outlines the significant damages caused by sycamore lace bug, cancer, anthracnose disease, various fungal pathogens, causing rotting of wood, etc. The pathogen *Ceratocystis platani*, determined in co-authorship, supposes serious losses and high mortality of naturally spread and street trees.
- The floristic and plant variety in nine natural habitats of *Platanus orientalis* was investigated (Г8.3). An attempt has been made to analyse the influence on the genetic variability and spread of the populations in nine natural habitats of the species. The complex assessment of the obtained results and the relationship with previous investigations determines the populations in Petrich, Kresna, Ivaylovgrad and Melnik as main objects of the future conservation attempts.
- Floristic and dendrofloristic investigations of various geographical objects. Dr. Georgieva participates in numerous publications dealing with the analysis of the dendroflora of Lozenska Mt. according to various parameters (B4.5-B4.10, Г8.13, Г8.14, Г8.15, Г8.16). According to literature data, an attempt was made for analysis of the taxonomic structure, phytogeographical belonging and ecological peculiarities of plants with biological type semi-shrubs (8.26). The species composition and quantitative participation of lianas in forest communities on the Danube islands Vetren and Chayka was investigated (B4.3).
- Investigations on the ecological needs and biological peculiarities of determined plant groups, incl. invasive species. The focal point is mainly on three invasive species: *Impatiens glandulifera*, *Lupinus polyphyllus* and *Opuntia humifusa*. The biological and ecological

peculiarities of the species were studied, as well as measures for control and limiting of spreading (Г8.12), analysis of the resource potential (Г8.17), investigations on measures for control and limiting of spreading (Г8.8, Г8.22, Г8.24, Г8.27). For the first time, proved trophic relationship has been determined and reported - *Chrysolina herbacea* – *Impatiens glandulifera* (Г8.23) and new for Bulgaria trophic relationship - *Pristerognatha fuligana*- *Impatiens glandulifera* (Г7.6). The biological and ecological peculiarities of the potentially invasive species *Lupinus polyphyllus* on the territory of Lozenska Mt. were studied (Г8.6). The only one habitat on the territory of Lozenska Mt. of the invasive species *Opuntia humifusa* was studied (Г7.3).

- Phytocoenological investigations. The synanthropisation in forest protection belts in the region of Knezha was assessed (Г7.1). A map of the potential vegetation (Г8.18) along the Iskar river gorge between Plana Mt. and Lozenska Mt. was suggested. Classification is presented according the floristic approach of indigenous societies in the studied region (Г8.19). Thirteen associations and 1 sub-association from 11 alliances, 7 orders and 6 classes were differentiated. Phytocoenotic investigations after the floristic method in Austrian black pine plantations with understorey *Fraxinus ornus* in the region of Vitosha, Plana, Lozenska Mt. and Balkan range determine significant similarity between investigated objects and considerable changes in the share of syntaxa were determined (Г8.21).

5. Most important applied contributions.

As applied and methodical contributions I assess the following ones:

- Chorological investigations and determining of new habitats of various species. New habitats were determined of 12 (4 tree and 8 grass) species for the territory of Lozenska Mt. (floristic region Western Sredn agora Mt. (Г7.4), 1 species for the territory of Plana Mt. (floristic region Vitosha Mt.) (Г7.5.), 1 liana shrub - *Periploca graeca*, for the territory of the Danube islands Aydemir and Vetren (floristic region Danube plain) (Г7.8.). Significant part of the determined species are invasive and others have nature conservation status.
- Morphological-and-anatomical investigations. Changes in the anatomical and morphological indices of *Ligustrum vulgare* L. were followed in relation with study and search of indirect proofs for determination of the exact date of a road accident.
- Methods for monitoring of natural forests on the Danube river islands and impact of invasive species on them (B4.4.). The aim of this investigation is to determine the spreading and impact of invasive species and communities they form and to follow the dynamics of succession processes on the vegetation on islands;
- Methods for conservation of genetic resources of rare species (Г8.9 and Г8.10). Literature analysis of methods (*in-situ* and *ex-situ*), which are applied in genetic conservation of endangered plant species, is suggested.
- Methodology for assessment of the ecological risk of *Impatiens glandulifera*, which would have value for the management and control of spreading and influence of this invasive species for Bulgaria (Г8.30);
- Monitoring of the health status of forests in urban territories in the municipalities Etropole and Pravets based on data from remote observation and field-work assessment (Г7.2).
- Joint data base has been developed, including information about biodiversity in the trans-border area between Republic of Bulgaria and Republic of Serbia (Г8.28).

6. Citation of the applicant's work in literature.

During the period 2018-2020, the candidate has submitted 11 positive citations of 8 publications, from which 2 citations in issues with IF, 7 citations in monographs and collective volumes with scientific reviewing and 2 citations in non-refereed journals with scientific reviewing. The total number of points is 110 at required minimum 100.

7. Project activity.

The candidate has submitted information about participation (as a team member) in 3 research projects. One of them is international - „Invasive alien plant species in protected territories and zones on the Danube islands of Bulgaria and Romania“ (2019-2021), the two other projects are national – one with the Bulgarian National Science Fund „Investigation on the spread and impact of the invasive alien species *Impatiens glandulifera* on natural habitats in the Iskar river gorge between the mountains Lozenska and Plana ” (2019-2021) and one with the Bulgarian Academy of Sciences – „Tree species, genotypes and technologies for acceleration of the biomass and quality wood production, for improving the landscape and environmental protection“ (2017 – 2019).

In the period 2018-2022 Dr. Georgieva has participated in 17 scientific forums, from which 12 international (with 18 reports and 3 posters) and 5 national (with 7 reports and 1 poster).

8. Teaching activities

There are no teaching activities documents submitted but as a member of the department of dendrology I would mention that the candidate has carried out such activity when she was a PhD student, including practical exercises in forest genetics and improvement and in dendrology with students on forestry and on ecology and environmental protection.

9. Assessment of the applicant's personal contribution.

The personal contribution of Dr. Georgieva is clearly evident in her self-written publications (total 7) and in the ones she is a leading author (14 publications). These publications are more than 40% of her creative work, which determines her personal contribution. In the rest mutual publications, where she is second or next author, I consider her participation equivalent. The fact that Dr. Georgieva has participated in 13 training courses, from which 7 in abroad (Germany, Denmark, Romania, Czechia, Slovakia, Russia, Turkey), also deserves attention. I assess this as an important part for improving her professional qualification and it would be of significant importance for her future development as researcher.

10. Critical remarks and recommendations.

I have the following critical remarks, opinions and recommendations to the materials submitted by the applicant Dr. Mira Georgieva:

I accept the contributions but I consider that they should be more clearly and detailed presented, as well as to be classified according to the regulations of FRI-BAS. I find particularly important the determination of a contribution when using the combination of words “for the first time ...”. There are also some terminological laxities, which should be corrected, and in the future the applicant should have more critical and motivated use of special terminology. For example, the term ‘shrub species’ (page 8 of the habilitation reference) about *Carpinus orientalis* and *Fraxinus ornus* I consider incorrect. As early as in the first prints of textbooks of dendrology it is mentioned that the biological type for these two species is ‘tree’. It would be nice to use adequate Bulgarian names of some terms instead loan-words. There are some cross-purposes in the methodic approach in the analysis of similar data. For example, the classification of species according to ecological groups – once used Pavlov (1998) (publication B4.8) as basic source, in other publications with same aims and tasks another basic source used – the web-site Tela Botanika (publication Г7.1). I think that using the first author, further development and enrichment of the information in the approach will be a positive moment in the future research activity. To the terminological specifying I would also mention the necessity of clear expression of determination of conclusions and recommendations. The contention that “the spreading and variety of lianas on the territory of Aydemir island depends to some extent on well-defined and balanced structure of forest communities and their rich biodiversity” is evasive and unclear (p. 6 of the habilitation reference,

publication B4.3). Such expressions should contain more clarity of the message to those who would “determine and balance” the structure of these forest communities. I would use this critical mark as recommendation, as well, to the future associate professor to increase the number of popular articles, which would contribute to the useful application of scientific results in the forestry staff. I accept as technical error the assertion on page 7 of the scientific contributions that “the share of semi-shrubs from the higher flora of Bulgaria is less than 1/10” (article Г8.26). This should mean that “semi-shrubs” are about 400 species, which corresponds approximately to the entire dendroflora of Bulgaria. Unfortunately, this assertion is not only in the reference but in the article itself, as well.

In conclusion, I recommend to Dr. Georgieva to be more critical, profound and precise in the use of basic methodological publications both in the analysis of the dendroflora and in analysing of obtained results.

11. Personal impressions.

I know Mira Georgieva since 1997, in my capacity of a lecturer in dendrology in the University of Forestry. As early as a student, she showed studiousness, conscientiousness and staunchness in acquiring of knowledge and with her diligence achieved excellent results in education process. Very logical continuation of her interests was her doctorate in the department of dendrology, me being part of it. The carrying out of the tasks was ever in time and with the necessary thoroughness. Mira Georgieva is a positive person, with a sense of humour, fellow-feeling and organisation, which are valuable personal features in the team work and one of the pre-requisites for achieving of significant results in the research activities. Now very well-known but positive personal features are her artistic skills and participation in theatre performances of the Via verde theatrical company at the community centre “Dobri Chintulov – 1935” in Sofia.

12. Conclusion.

On the basis of the complex assessment of the qualities of the applicant senior assistant Mira Georgieva, her research activities, as well as on my personal impressions, I can make the conclusion that senior assistant Mira Georgieva suits the requirements of the Law for Development of the Academic Staff of the Republic of Bulgaria and the Regulations for obtaining of scientific degrees and occupying of academic positions in the Forest Research Institute, BAS, as well as the additional specific requirements for the position of associate professor. All this gives me the reason to SUGGEST senior assistant Dr. Mira Lyubcheva Georgieva to be elected for “Associate professor” in the professional direction 6.5. Forestry, scientific specialty “Silviculture, including Dendrology”.

Date: 15.08.2023
Sofia

Reviewer:
/Assoc. Prof. Dr. Evgeni Tsavkov/