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REVIEW

of the materials for participation in the competition for the academic position "Associate Professor", professional field 6.5. "Forestry", scientific specialty „Forest Melioration, Forest Protection and Special Forest Utilisations“, announced by the Forest Research Institute, BAS, SG. pcs. 12/12.02.2021

Candidate for the competition is:

1. Senior assistant Gergana Ivanova Zaemdzhikova

Reviewer: Anelya Zhivkova Pencheva PhD, professor in professional field 6.5. "Forestry" - University of Forestry, Sofia

1. Short biography of the candidate

Dr. Zaemdzhikova was born on 21 May 1983. She graduated the Yane Sandanski Secondary School of Natural Sciences and Mathematics, town of Gotse Delchev. Immediately after that she became a student at the University of Forestry, Sofia (2000 – 2005). Since graduation she has acquired the professional qualification of a Landscape architect – master’s degree. Until 2011 she worked as a manager in the Nursery at the University Botanical Gardens (UBG).

In the period 2011 - 2014 Dr. Zaemdzhikova was a full-time PhD student at the Forest Research Institute, BAS. In February 2015 she successfully defended her dissertation on „Species composition and bioecological specifics of leaf roller moths (Lepidoptera: Tortricidae) on *Quercus* spp. in Sofia region“. Until the middle of 2016 she worked as a specialist entomologist in the department "Forest entomology, phytopathology, and game fauna", FRI-BAS. In June 2016, after a successful competition, Dr. Zaemdzhikova acquired the academic position of senior assistant to the department.

Since 2019 Dr. Zaemdzhikova has been working as a part-time lecturer at the Faculty of Agronomy of the University of Forestry - Sofia.

Dr. Zaemdzhikova's biography points out a few skills, including good command of English, Microsoft Office (Word, Excel, and PowerPoint), as well as basic knowledge of graphic design (Photoshop) and AutoCAD. The work experience related to the specifics of the competition of Dr. Zaemdzhikova is 7 years by the time of submitting the documents.

2. Compliance of the submitted documents and materials of the applicant with the requirements in accordance with the Rules for the development of academic staff in the Forest Research Institute, BAS

The candidate, Dr. Zaemdzhikova presents very thoroughly selected and arranged documents for the competition. The main emphasis in them is a summarized list of her scientific works, which

includes a total of 40 scientific and 1 popular science publications; participations in science forums /18 reports and posters/; information on management and participation in 6 international and national scientific and applied research projects, habilitation reference for scientific contributions and a detailed description of citations of her scientific publications.

Three of the total number of publications are related to the PhD work and four – to the previous competition and are not considered in the current review. One publication is a popular science, and it also is not subject to assessment. The reference attached below is a scientometric expression of the materials submitted by the candidate, prepared in accordance with The Regulations on the implementation of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Rules of FRI-BAS.

Number of points by indicators

Group of indicators /accordingly DASRBA /	Minimum national requirements	Indicator	Number of points
category A	50	Dissertation work for awarding educational and scientific degree "Doctor"	50
category B	100	B4 – 10 publ. (referenced and indexed in Scopus – 5 and in Web of Science – 5)	200,07
category G	200	G7 – 17 publ. (referenced and indexed in Scopus – 6 and in Web of Science – 9)	290,8
		G8 – 6 publ. (3 articles in not referenced journals and 3 reports in edited collective volumes)	
category D	200	D13 – 10 citations in science editions, referenced and indexed in world renowned databases	185
		D14 – 2 citations in monographs	
category E	100	Total 6 participations in national and international science projects	115
		Total	840.87
additional requirements		184	908.87

From the data presented in this way it is evident that Dr. Zaemdzhikova's personal results exceed the minimum required points for acquisition an academic position of "Associate Professor". In the category B4 are presented 10 quality publications (referenced and indexed in Scopus - 5 and Web of Science - 5), which are equivalent to habilitation work or monograph. Moreover, these publications are focused on scientific problems related to a single object - the pine processionary moth. The number and quality of the presented materials set forward by the applicant fully comply with the requirements as presented in the Rules of the Forest Research Institute, for the academic position. The articles in refereed and indexed journals authored by Dr. Zaemdzhikova are indicative of her academic contributions to the field of forest protection. This is further attested by the applicant's active participation in conferences, published scientific papers etc. which all speak to the outstanding professional qualities of the candidate.

3. General characteristics of the presented materials (by type; by importance; place of publication; language in which they are published; number of co-authors, etc.)

The largest number of the presented materials is occupied by the articles in scientific journals. They are a total of 30 articles, 27 of which are publications in journals, referenced and indexed in world-famous databases of scientific information /Scopus and Web of Science/. This is a respectable result for the period in which they were published – between 2017 and 2021. The authority of these journals speaks for itself about the importance and originality of the published materials. Among them more important are:

- Acta zoologica bulgarica – 6 articles.
- Nauka za gorata (Forest Science) – 8;
- ZooNotes – 3;
- Silva Balcanica – 2;
- Acta entomologica serbica – 1;
- Ecologia Balkanica – 1;
- Ecologica Montenegrina – 1;
- Polish Journal of Entomology – 1;
- Forestry ideas – 1;
- Comptes Rendus de L'Academie Bulgare des Sciences –1;
- iForest and Šumarski list –1 article each, etc.

The reports in conferences, published in edited proceedings, are 3. From the submitted scientific papers for the competition, more than half have been published in English – 23 articles. Eight of the publications are self-written (single author). Dr. Zaemdzhikova is the first author in 11 of the collective publications, the second author is in 2 and the 3rd and next – in 12.

4. Main study directions of the candidate and the most important scientific contributions.

Although various topics are included in Dr. Zaemdzhikova's published works, they are mainly focused on forest entomology. Her scientific publications are mainly devoted to economically important forest insect pests. The in-depth and purposeful research of their bioecological features makes extremely good impression. Another significant aspect of the candidate's research is her work on the role and importance of the entomophagous complex of insect defoliants. I will review and organize Dr. Zaemdzhikova's most important scientific contributions in the following categories:

4.1. Faunistic contributions

- The following insects are reported as new to the entomofauna of Bulgaria: *Mesophleps oxycedrella* (Millière, 1871) (Lepidoptera: Gelechiidae), pest on *Juniperus* genus (Г 7.12) and *Rhimphoctona xoridiformis* (Holmgren, 1860) (Hymenoptera: Ichneumonidae), parasitoid on *Tetropium castaneum* (L.) (Coleoptera: Cerambycidae) (Г 7.14).
- A list of 59 taxa included in the superfamily Cerambycinae has been published, and new and summarised data concerning their trophic relationships with the host plants has been

provided.

4.2. Studies on important forest pests - distribution, biology, population dynamics, biotic and abiotic factors limiting the population density.

4.2.1. Most of the papers in this area are devoted to the pine processionary moth (*Thaumetopoea pityocampa*) - one of the most destructive species to pines in our country. The published data are the result of extensive research, they have an original character and clarify important theoretical aspects of the species development.

- The spatial distribution dynamics of the moth in the region of Stara Zagora (Central Bulgaria) for a long period (23 years) are established. The analysis of different ecological and forestry characteristics in the surveyed localities allows specifying the role of factors for its spread (**B 4.2** and **B 4.3**). Detailed observations in various forest plantations in the area of *T. pityocampa* (Rhodopes, Sredna Mesta region, Sandanski, etc.) clarify the distribution of the two phenological forms („winter form„ and „summer form “). Important regularities in their development are indicated, as well as variability in the new habitats. (**B 4.5**, **B 4.6**, and **D 8.2**).
- Current data on the phenology in the Gotse Delchev area have been published, which clarify the specific features of populations in the region of Sredna Mesta river. A hypothesis explaining the flight dynamics of the *T. pityocampa* in the established period of 70 - 80 days has been discussed (**D 7.3**). In the last 20 years (studies are for the Sandanski region) changes in phenological phases have been found in winter populations, which take to a hypothesis of an effect of global warming (**B 4.7**). Important findings have been made considering the culmination of moth flying in localities with winter or summer form (Asenovgrad, Sandanski and Kirkovo). According to the authors, the flight peaks of the adults are associated with the specific microclimatic conditions (predominantly summer heat). (**B. 4.6**). Also differences in the two forms are uncovered, which have to do with fecundity, percentage of sterile eggs, dead embryos, eggs parasitisation and others. (**D 7.15** and **B. 4.8**).
- The dynamics of the larval emergence of the „summer form“ and „winter form“ of *T. pityocampa* was found in both laboratory and field conditions. These data are especially important for efficient pest control. (**B. 4.7** and **Г 7.10**).
- The original data on egg parasitoids are no less contributing. (**B. 4.9**, **D 8.5**.) The summaries concern the current state of the parasitoid complex of *T. pityocampa* in newly formed areas. For the first time in Bulgaria, the egg parasitoid *Eupelmus (Macroneura) vladimiri* Fusu, 2017 (Hymenoptera: Eupelmidae) (**B. 4.10**) was isolated from summer populations of the species in the Eastern Rhodopes. The species *Oecanthus pellucens* (Scopoli, 1763) (Gryllidae) (**D 7.7**) was reported for the first time as a predator on the caterpillars of *T. pityocampa*.

4.2.2. Studies on the members of Tortricidae family. They are a continuation of the topic of the PhD thesis of Dr. Zaemdzhikova and concern novel phenological data on the development of 12 insect species of the family, established in both laboratory experiments and field observations (**D 7.1**). A summarised list of tortricid in Bulgaria, trophically related to 7 species of *Quercus* spp. has been published, too. Total 57 trophic connections have been registered with tortricids, of which 31 are new for the country (**D 7.4**).

- The parasitoid complex of tortricid has been studied in detail. The eight parasitoid-host relationships established in the Ichneumonidae family are new to science, and 7 others are new to Bulgaria. The role and significance of ichneumonids in different habitats (**D 7.2**) (**D 7.9**) were analyzed. Three parasitoid species from Chalcidoidea family by pupae of *T.*

viridana and *A. crataegana* have been identified. Two parasitoid-host relationships are new to the country and one is new to science (D 7.9).

4.2.3. Studies on different groups of significant forest pests.

- The economic importance of insect pests in the forests of the country for a thirty-year period (1990 - 2002 and 2003 - 2018) has been determined. On this basis, the conclusion about a growing role of bark beetles (Coleoptera: Curculionidae: Scolytinae) and pine sawfly (*Neodiprion sertifer* (Geoffroy) and *Diprion pini* (L.)) for decline of coniferous plantations in our country) is made (D 7.6 and D 8.1).
- Summarised list of insect's xylophages, trophically related to *Carpinus orientalis* Mill. and *Fraxinus ornus* L. is presented (D 7.16).

5. The most significant scientific and applied achievements

Part of Dr. Zaemdzhikova's research mainly concerns bioecological aspects of the pine processionary moth: timing of the eggs hatching in separate habitats, organization of its monitoring and effectiveness of 3 types of pheromone traps. (D 7.10, D 8.6, and D 8.4). The results have an important significance in practice related to the efficacy of forest protection measures. The fact that the data on most publications were collected in field studies in forests with different structure and composition, allows the identification of other scientific and applied contributions, which could be summarized as follows:

- A well-founded proposal has been made concerning the monitoring and the of forest protection measures against a pine processionary moth. (D 7.17).
- Of practical interest are the conclusions regarding the importance of silvicultural activities related to the transformation of coppice oak forests into seed forests to improve their health status (D 7.6).
- The role of forest protection measures against insect forest pests in recent years has been summarized and important findings have been made about the reasons for the continuing forest drying (D 7.6). The author is emphasizing the need of economic evaluation of coniferous growth losses caused by insects (Г 7.6; Г 8.1).

6. A reflection on the candidate's scientific publications in the literature (citations).

Over 54% (18 publications) of the peer-reviewed articles and reports were published mainly in the period 2020 - 2021. This is a noticeably short period for familiarizing the scientific community with the results and scientific hypotheses presented in them. The candidate, Dr. Zaemdzhikova, provides citations of her scientific papers in a reference, which includes a total of 15 citations. Ten of them are in journals, referenced and indexed in world-famous databases of scientific information /Web of Science or Scopus/, and two - in collective volumes with scientific review. The other three issues are citations from unrefereed publications/. Their number indicates the appreciation of the professional society for the scientific creativity and knowledge of the applicant.

7. Participation in scientific and applied projects.

The research activity of Dr. Zaemdzhikova is backed by work in various projects. Her total participation includes 6 national and foreign projects; one of them was managed by herself. Among the most notable projects of the applicant stands out is a project “Standardizing automated large-scale monitoring to understand atypic phenologies at both ends (France and Bulgaria) of the climate-driven expansion front of a European urticating pest, the pine processionary moth.”

So important is also her annual participation in the team carrying out the "Evaluation and Monitoring of Forest Ecosystems – within the project "Future Development and Construction of a unified Monitoring system for Forests" programme. The database created as a result makes it possible to characterize comprehensively the processes related to the dynamics of the phytosanitary status of forest ecosystems. The work of the team has directly laid the groundwork for national and international management decisions regarding the conservation of forest ecosystems.

8. Teaching and learning activities (supervisor/consultant of doctoral students, student training, etc.)

From the academic year 2018 – 2019, Dr. Zaemdzhikova is a part-time lecturer at the Faculty of Agriculture at the University of Forestry – Sofia. She conducts exercises in the subject "Pests of cultivated plants" on the specialty: "Agronomy" – Bachelor's degree and specialty "Plant Protection" – "Master's degree". Her total annual workload at the University is over 120 hours.

9. Assessment of the applicant's personal contribution

I am confident of the personal contribution of the candidate in the submitted works. In most of the publications (19), Dr. Zaemdzhikova is the single (8) or the leading author (11). Her participation is also felt in the collective works – the main part of the data and analyzes presented and discussed in them concern problems and topics related to her scientific interests.

10. Critical notes and recommendations

The scientific creativity of the candidate is diverse and includes analysis and results obtained using precise and modern scientific methods. Her scientific output of the years is respectful. I did not find the peer-reviewed gaps to be the basis for critical remarks. I would like her to continue working with the same perseverance and motivation.

11. Personal impressions.

I have known Dr. Zaemdzhikova since a relatively long time (as her professor at the university), although I have not worked with her. In my opinion, she is serious and consistent in her actions. She shows enviable diligence and responsibility, so she is respected by her colleagues.

12. Conclusion

It is evident that the candidate is a well-rounded scientist with comprehensive specialized skills and knowledge in forest entomology and forest protection. My review of her scientific contribution leads me to the conclusion that the volume and content of her work meet all the requirements for the academic title of "Associate Professor", in accordance with The Regulations on the implementation of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Rules of the FRI – BAS.

I recommend that the candidate senior assistant Gergana Ivanova Zaemdzhikova be promoted to an academic position "Associate Professor", professional field 6.5. "Forestry", scientific specialty „Forest Melioration, Forest Protection and Special Forest Utilisations“.

Date: 30.05.2021

Reviewer: