

STATEMENT

on the materials for participation in the competition for holding the academic position **Associate professor** in “**Parasitology and invasive diseases of animals and humans**”, code 04.03.07, for the the "Experimental Parasitology" section at the Institute of Experimental Morphology, Pathology and Anthropology with Museum (IEMPAM) at the Bulgarian Academy of Sciences, Sofia, announced in the State Gazette No.85 of 08.10.2024.

Candidate for participation in the competition:

Senior Assistant Professor Delka Salkova Salkova, PhD, "Experimental Parasitology" section at the Institute of xperimental Morphology, Pathology and Anthropology with Museum, Bulgarian Academy of Sciences, Sofia

Statement prepared by:

prof. Iliya Tsachev TSACHEV, DSc, professional area 6.4. Veterinary medicine, scientific specialty “Epidemiology and animal infectious diseases”, Trakia University, Stara Zagora

1. Brief biographical data of the applicant.

Delka Salkova Salkova was born in 1976 in the town of Panagyurishte. She graduated veterinary medicine in Stara Zagora, Faculty of Veterinary Medicine at the Trakia University (2000). Her academic score was very good, and her success in the state exams was excellent.

She won a competition in 2001 and was accepted as a PhD student in the “Experimental Parasitology” section at IEMPAM at the Bulgarian Academy of Sciences, Sofia. Four years later (2005) she defended a PhD dissertation “Influence of NH₄VO₃ on the development of the nematode *Meloidogyne arenaria* (Neal, 1889) Chitwood, 1949 and its host tomato”, code “Parasitology and Helminthology”. She is currently a senior assistant professor at IEMPAM, with main activities - Molecular diagnostics at population and species level; Bioinformatics processing of nucleic and protein sequences; Consulting and training of beekeepers (diagnosis and treatment of various diseases of bees and brood) and others.

Doctor Salkova has 20.9 years of experience at IEMPAM. She completed a specialization in 2013 in bee diseases - diagnostics, prevention and treatment at the Russian Research Institute of Experimental Veterinary Medicine named after Ya. R. Kovalenko in Moscow, Russia. In the same year, she participated in the following courses: “Protection and humane treatment of experimental animals used for educational or scientific purposes”; “Experimental modeling - a modern effective approach in biomedical research”; “Approaches to the evaluation of medical devices, synthetic and natural products for biomedical purposes”, “Diagnostic markers of diseases in humans and animals”, and in 2002 in “Training for the development, implementation and maintenance of the HACCP system”.

The candidate for associate professor received an award in 2024 for the best presentation on the topic: "Molecular Detection of Honey Bee Viruses in Pollen, Bee Bread and Royal Jelly", with her participation in the Third International Congress on Bee Sciences.

She is a member of the Bulgarian Parasitological Society, the European Federation of Parasitology and the World Federation of Parasitology.

2. Compliance of the submitted documents and materials of the candidate with the requirements of the Regulations on the conditions and procedure for acquiring scientific degrees and academic positions at IEMPAM-BAS, Sofia

Delka Salkova Salkova participates in the competition for associate professor with the necessary set of 14 documents required by the Regulations on the terms and conditions for acquiring scientific degrees and academic positions at IEMPAM-BAS. One copy is submitted on paper and another 8 electronic. According to the attached reference, the candidate in the competition covers the minimum required points for associate professor in the groups of indicators of IEMPAM-BAS, area 6. Agrarian Sciences and Veterinary Medicine, 6.4. Veterinary Medicine, as follows:

- *Indicator A (50):* PhD Dissertation – **50 points**
- *Indicator V (100):* Scientific publications (no less than 10) refereed and indexed in world-renowned databases of scientific information – **130.95 points**
- *Indicator G(200):* **230.95 points** are collected from
 - Articles and reports published in scientific journals, referenced and indexed in world-renowned databases of scientific information and from
 - Articles and reports published in non-refereed journals with scientific review or published in edited collective volumes
- *Indicator D (50):* On this indicator, related to citations or reviews in scientific publications, referenced and indexed in world-renowned databases of scientific information or in monographs and collective volumes, I accept the collected **105 points**, which many times exceed the required 50.

- *The candidate in the competition Delka Salkova Salkova has collected a total of 516.90 points, significantly exceeding the required minimum of 400 points for associate professor.*

3. Assessment of the candidate's scientific, applied and publication activities

In the competition for associate professor, 56 scientific papers are presented, of which 9 publications have an impact factor, and 8 of them are in the elite quartiles Q1 and Q2. The high scientific activity over the last three years (2022-2024) is excellently impressive - 10 publications in Scopus, 5 of which are from 2024. Three of the articles from 2022/2023/2023 have a total of 10 citations for the short period of their publication.

The candidate's overall impact factor is 16.681, the individual 2.67, and the h-index 2.

The most important contributions of Dr. Salkova's research work are in the following 6 areas:

- ❖ *Distribution, diagnosis and prevention of parasitic, viral, bacterial and fungal pathogens in the honey bee *Apis mellifera*. Metabarcoding of the gut microbiome, hygienic behavior in bees and their role as a bioindicator.*

1. For the first time in Bulgaria, the species diversity of bacterial communities in bees has been studied. The 16S ribosomal RNA gene from the bee microbiome from two regions – lowland –

the city of Byala, and mountainous – the city of Smolyan – was sequenced. Over 90% of the microbiome belongs to Bartonella, Bifidobacterium, Snodgrassella, Frischella, Gilliamella, Lactobacillus and Commensalibacter. Significant differences in the results between the mountainous and lowland regions were found – *original contribution*.

2. In joint research with the Estonian Academy of Sciences, the influence of the microsporidia *Nosema* spp. was studied for the first time on the development of the honey bee queen fed with royal jelly infected with *Nosema* spores. The presented original data are significant for beekeeping queen breeding farms - *original contribution*.

3. The distribution of the main pathogens in bees in countries with different climates - Bulgaria and Estonia - has been studied. The results support correct bee diagnostics - *confirmatory contribution*.

4. An in-depth study and analysis of the scientific literature on the resistance of the *Varroa destructor* mite to the most commonly used chemical acaricides in beekeeping practice, as well as its role as a vector for the spread of major viruses in bees - *confirmatory contribution*.

5. The distribution and degree of parasitism with the *Varroa destructor* mite and the invasion with *Nosema* spp. spores in bees from different regions of the country have been studied. It has been established that the invasive microsporidian parasite *Nosema ceranae*, characterized by a frequent asymptomatic course, has completely displaced and is now a dominant species compared to *Nosema apis* - *confirmatory contribution*.

6. The influence of food supplements containing cobalt on the development of bee colonies has been studied - *confirmatory contribution*.

7. The relationship between the amount of lysozyme in the hemolymph/degree of manifestation of hygienic behavior of bees has been studied. The factor analysis has an outlined tendency towards an increase in the content of lysozyme in the hemolymph in unhygienic bee colonies - *confirmatory contribution*.

8. Data on the use of the honey bee and various bee products as a bioindicator for environmental pollution with various microelements, including heavy metals and pesticides - *confirmatory contribution*.

❖ ***Molecular identification and monitoring of current bee diseases (parasitic and viral).***

Genetic diversity and origin of pathogenic agents.

1. For the first time in Bulgaria, an analysis of environmental DNA (eDNA) in honey samples from different regions of the country for molecular identification of parasites and pathogens (*Varroa destructor*, *Nosema apis* and *Nosema ceranae*) was conducted. The presence of *Nosema ceranae* and *Varroa destructor* was established - *original contribution*.

2. For the first time in Bulgaria, a new, non-invasive approach /molecular analysis of RNA (oRNA) from the environment/ for the detection of viruses in bee colonies - deformed wing virus (DWV), blister rot virus (SBV), acute bee paralysis virus (ABPV), black queen/queen virus (BQCV), Kashmir bee virus (KBV), Israeli acute paralysis virus (IAPV) and chronic bee paralysis virus (CBPV) was tested. A phylogenetic analysis of the origin and genetic diversity was performed based on homologous sequences. I highly appreciate the sequence data obtained as a result of the study. They have been deposited in GenBank: population set PopSet Acc. no.: 2721605377; PopSet: 2451841063; population set PopSet Acc. no.: 2721604885; population set PopSet Acc. no.: 2721604885; population set PopSet Acc. no.: 2721604501; population set PopSet Acc. no.: 2451841079; population set PopSet Acc. no. 2721605237 – original

❖ ***Distribution, diagnosis, prevention and treatment of current parasitosis in wild and domestic animals***

1. For the first time in Bulgaria, the presence of *Ehrlichia* spp. in *Rh. sanguineus* ticks, as well as *Rickettsia* spp. in *I. ricinus* ticks collected from red foxes, has been established. The original data obtained reveal the potential role of foxes in the epidemiology of rickettsioses in animals and humans - *original contribution*.
2. In a screening study from different regions of Bulgaria, the presence of three types of filariae was established in dogs, jackals and foxes - *Dirofilaria immitis*, *Dirofilaria repens* and *Acanthocheilonemareconditum*. In dogs, the predominant parasite is *D. repens*, and in jackals and foxes - *D. immitis*. - *confirmatory contribution*.
3. In in vitro studies, the oncogenic potential of *Fasciola hepatica* on the proliferation of leukocyte cells of specially isolated heat-resistant biologically active substances (BASes) was assessed. An analysis was made of the relationship between combinations of trematodes (opisthorchiasis and clonorchiasis) and the development of tumors in animals and humans - *confirmatory contribution*.

❖ ***Influence of vanadium, various glycosides and radiation irradiation on the development of root-knot nematodes***

1. The adaptogenic effect of glycosides extracted from *Dioscorea deltoidea* on the content of trace elements and the development of tomato plants invaded by *Meloidogyne arenaria* was evaluated. The content of Zn, Cu, Mn, Fe and Mg in the leaves, stems and roots of tomato plants was analyzed under the simultaneous influence of *Meloidogyne* invasion and treatment with an adaptogen - *original contribution*.
2. The influence of different doses of α -rays and γ -rays on the development of eggs, ovarian sacs and hatching of second-stage larvae of *Meloidogyne arenaria* was studied. It was found that the exposure of the ovarian sacs to γ -rays disrupts the development of the helminths - *original contribution*.
4. New data were obtained on the impact of different concentrations of ammonium vanadate on the development of the plant nematode *Meloidogyne arenaria*, the host planthopper and the seeds treated before planting, as well as on the changes in the mineral composition of uninfested and infested plants - *original contribution*.

❖ ***Molecular-phylogenetic and genetic studies of local animal breeds***

1. In Bulgaria, the genetic diversity and population structure of existing paternal lines of Arabian horses were studied for the first time using 15 microsatellite markers. Arabian horses (537) from 9 genealogical lines were included. It was found that the population is not affected by inbreeding processes - *original contribution*.
2. For the first time in Bulgaria, the genetic diversity and population structure of 2 local Bulgarian goat breeds were studied by genotyping a panel of 14 microsatellite markers. A high level of genetic polymorphism was revealed in terms of the average number of alleles - *original contribution*.
5. The genetic diversity and population structure of 3 Bulgarian sheep breeds (Rhodope Tsigai, Middle Rhodope and Karakachan) were studied based on 11 microsatellite markers. The data show a high percentage of genetic admixture in the three populations - *original contribution*.

❖ *Scientifically applied studies*

1. High efficiency of the preparation Varostop against varroaosis in bees was established (over 90%, and in individual families over 99%). Ecostop and Mentotim show relatively lower efficiency, 97% and 91%, respectively - *scientifically applied contribution*
2. The plant extract IMMUNOSTART HERB (Extractpharma Ltd.) effectively improves the development of bee colonies during the period of shortage of honey plants - *scientifically applied contribution*

The recommendations for beekeeping practice in our country by Dr. Salkova, with the assistance of the Primavet company, presented at 8 training lectures to the members of beekeeping societies from Pleven, Bankya, Panagyurishte, Troyan, Kyustendil, Plovdiv and Blagoevgrad, make a very good impression.

Delka Salkova is also very well represented with her participation in scientific projects of the European Development Bank, the National Research Fund and in the framework of multilateral cooperation. She was the leader of 3 and a participant in 5, including 3 international ones and was also part of the team in 4 external projects.


The candidate for associate professor has participated in 57 conferences abroad and in Bulgaria, with a total of 83 reports presented.

4. Assessment of the candidate's personal contribution

✦ *I am convinced of the high personal contribution of the candidate for associate professor, in his overall scientific and expert activity.*

5. Conclusion

Covering the requirements of the law on the development of the academic staff in the Republic of Bulgaria, as well as the required criteria of the Institute of experimental morphology, pathology and anthropology with a museum at the Bulgarian Academy of Sciences, and considering all the arguments stated in the review, I propose to the esteemed scientific jury to award **Senior Assistant Professor Dr. Delka Salkova Salkova** the academic position of "Associate Professor" in "Parasitology and Invasive Diseases of Animals and Humans", code 04.03.07, "Experimental Parasitology" section at the Institute of experimental morphology, pathology and anthropology with a museum at the Bulgarian Academy of Sciences in Sofia.

Statement prepared by: 

prof. Iliya Tsachev, DVM, DSc

January 6, 2025

Stara Zagora