

EXPERT OPINION

by assoc. prof. Dr. Mihaela Nikolova Nedyalkova - IBER-BAS

competition for the academic position "Associate Professor" by professional direction 4.3. Biological sciences, specialty "Ecology and ecosystem's conservation" for the needs of the division "Ecology of communities and conservation biology", department: "Ecosystem research, ecological risk and conservation biology", IBER - BAS, announced in the State Gazette, No. 38/28.04.2023.

One candidate participated in the competition - Dr. Yordan Koshev, assist. prof. in the division "Biomonitoring and ecological risk" in the department of "Ecosystem research, ecological risk and conservation biology". All documents submitted are in accordance with the LDASRB and the Regulations for its implementation, as well as with the Regulations for the procedures of BAS and the Regulations and procedures at IBER - BAS.

1. General data on the career and thematic progress of the candidate.

Assist. prof. Dr. Yordan Koshev graduated from the Faculty of Biology of the SU «St. Kl. Ohridski» in 2003 as a master's degree in biology with a specialty in "Zoology and Anthropology". In the period 2001-2002, he worked as a laboratory assistant at the Institute of Zoology. After his master's degree, he worked as a biologist up to 2010, and after the formation of IBER - BAS, he worked as an assistant. He defended his PhD in the specialty "Zoology" at IBER - BAS in 2012. After that and until now he is ch. assistant at IBER - BAS in the field of conservation biology and biomonitoring of small mammals. During these years, he has established himself as a proven specialist in the ground squirrel in Bulgaria, and in recent years he has expanded his activities in the study of invasive species.

2. Scientific metrics

The candidate participated in the competition with total of 25 publications and 15 book chapters. Five of them are related to his PhD thesis and are presented for reference only. They are not a subject of this competition. The remaining 20 publications are divided into groups "B" and "D" as follows: in group "B" - 6 of which 2 in Q1, 2 in Q2, 1 in Q3 and 1 in Q4, and with them the candidate fulfills the required 100 points for this indicator, collecting 117 points. The criteria under

indicator "G" are met with 12 publications, of which 3 in Q1, 4 in Q2, 3 in Q3 and 2 in Q4. Two non-indexed journal publications and 15 book chapters are also presented. A total of 374 points were collected with a minimum of 220. It should be noted that the submitted publications (224 points) without the book chapters as a short communication are fully sufficient to fulfill this criterion, and the candidate even exceeds the necessary requirements for this indicator. I take the nine chapters of the "Atlas of Invasive Alien Species of European Union Concern" as one chapter of the Atlas related to information on invasive mammalian species.

100 citations in IF journals are presented, which significantly exceeds the requirements of the Regulations on the terms and conditions for scientific degrees and academic positions at IBER - BAS.

3. Main areas of the candidate's research and most important scientific contributions.

The main thematic areas of the candidate's scientific research covered modern and not well-studied yet areas of behavior, interspecies relationships and adaptations in the ground squirrel, as well as phylogeographic, molecular genetics and cytogenetic studies on the species in Bulgaria. The main contributions can be divided into 4 main directions:

1. *Studies in the field of conservation biology related to translocations of individuals with an emphasis on the adaptations of the ground squirrel during the habitat changing.* Comparative studies of stress levels, infestation rates with helminths and spatial behavior of resident and translocated individuals of *S. citellus* during the first months after their replacement into the new environment were conducted. It should also be noted that the pilot radiotelemetry conducted for Bulgaria with the aim of clarifying some aspects of the spatial behavior of translocated individuals. As a result, it has been established that translocated individuals can lead to the following effects: increase stress levels in local populations, and recommendation are offered to minimize this effect; translocation may increase helminth infestation of the reinforced population; the key period for establishment of relocated individuals in the new territory is between the 5th and 10th day.
2. *Phylogeographic, molecular genetics and cytogenetic studies of *S. citellus* for the purposes of conservation biology.* A genetic diversity and variability study of *S. citellus* throughout its area distribution. Comprehensive derivation of the species phylogeography was conducted. The results show that the population on Bulgarian territory is the center of

speciation and has the largest genetic diversity. From a total of 7 haplotype lines 4 being established here. An evolutionary model of the karyotype is also proposed on the basis of sex chromosomes. Based on the Bayesian clustering method, the populations in Bulgaria are divided in two groups: northern and southern, where Stara Planina Mountain is a barrier between the two groups.

3. *Study of interspecific relationships of S. citellus.* Aggressive behavior against *Lacerta trilineata*, *Corvus frugilegus* and *Mustela nivalis* has been documented. A unique case of active predation of the ground squirrel to a field sparrow (*Passer montanus*) is described. Probably it relates to the needs of high-energy food closely to the end of the breeding period. Very possible symbiosis between *S. citellus* and yellow meadow ant (*Lasius flavus*) was established in "Vrachanski Balkan" and "Bulgarka" natural parks. This interspecific relationship offers multiple advantages to *S. citellus* and is largely neutral to the ants. The benefits for *S. citellus*, including reduction of energy for digging, as well as additional observation sites and shelters. It could facilitate the post-translocation adaptation process of individuals in these areas.

4. *Studies of the distribution and impact of invasive alien mammals in Bulgaria.*

An area expansion of three invasive foreign mammalian species in Bulgaria - muskrat (*Ondatra zibethicus*), nutria (*Myocastor coypus*) and raccoon dog (*Nyctereutes procyonoides*) has been established. The most common invasive mammal in Bulgaria is the nutria. Also, additional Information has been obtained that the muskrat crossed the Stara Planina Mountain as physico-geographical barrier. The raccoon dog is widespread all over the country. Predominantly invasive alien mammals are distributed in national protected areas and zones, with an impact on the biological diversity there.

In addition the work of the candidate includes also activities related to the study and management of *S. citellus* in two protected "NATURA 2000" areas. The population density was calculated using an innovative not previously applied to this species method using Distance 5.0 software. The results show that the population number and the size of colonies' area drastically decreased after the accession of Bulgaria to the EU, which relates to the destruction of its habitats often as a result of the country's agricultural policies. Specific environmental protection recommendations are given for species protection and

the habitats in protected areas. All this served as a basis for the preparation of the Action and Conservation Plan for *Spermophilus citellus* in Bulgaria "2022-2031".

I do not accept the results presented in contribution 6 as original. The content in this point does not correspond to the wording of the contribution and the data presented are mostly confirmatory and are a logical continuation of the many years of research by mammalogists both at the Institute of Zoology and IBER, as well as at various institutes and universities in Bulgaria.

4. Additional activities.

In addition to the mandatory materials to I fulfill the requirements of the competition, the candidate also submitted information on activities under group E of the LDASRB, where he collected 373 points. These are not required when applying for the academic position of "associate professor "and therefore they are accepted for information only.

I have **two questions**:

- What is the probable reason that alien mammals in Bulgaria are mostly distributed in national protected territories and zones?
- Are there any data on the state and size of the ground squirrel colonies before 2007 in Bulgaria and can it not be assumed that this process started in the 1990s. What data are you used for comparison in order to reach similar conclusions?

I recommend in his future work at the IBER - BAS, assist. prof. Y. Koshev to participate more actively in projects included in the IBER-BAS plan, where his qualifications, experience and knowledge would be extremely useful.

5. Conclusion

On the basis of the documents presented from assist. prof. Yordan Koshev, I am convinced that he fully meets the criteria for the procedures for academic positions at LDASRB, the Regulations at BAS and the Regulations at IBER - BAS. His research profile is fully in line with the expectations of the advertised position. The research areas of his interests are very important for further development of IBER - BAS and are of great scientific and applied importance. I strongly recommend the members of the Scientific Jury to support

the selection of assist. prof. Yordan Koshev for the academic position "Associate Professor" in the field of science: 4.3. "Biological Sciences", scientific specialty "Ecology and Protection of Ecosystems" for the needs of IBEI - BAS.

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Sofia

Prepared the opinion:

/ assoc. prof. dr. Mihaela Nedyalkova/