

#### REVIEW

by competition for the occupation of the academic position "Docent" by professional direction  
4.3. Biological sciences, scientific speciality "Ecology and ecosystem protection" (according to  
the announcement in SG, 38 of 28.04.2023) with a single candidate chief research assistant  
Yordan Spasov Koshev, PhD, Section "Biomonitoring and ecological risk", Department  
"Ecosystem studies, ecological risk and conservation biology"  
Institute of Biodiversity and Ecosystem Research at BAS

Reviewer: Prof. Vasil Valkov Popov, PhD, IBER-BAS

Dr. Koshev graduated from the Faculty of Biology, Sofia University "St. Kliment Ohridski" in 2003 with a master's degree in Vertebrate Zoology and Anthropology. During the period 2003 - 2012, he worked successively as a laboratory assistant, biologist, research assistant and chief research assistant at IZ/IBEL - BAS. In 2012, he defended his doctoral thesis on the topic: "Ecological and ethological characteristics of the European ground squirrel (*Spermophilus citellus* L. 1766) in model colonies". During the period 2005 - 2012, he attended courses at the Training Centre of BAS. He has participated in specialized schools in the field of mammalian ecology and conservation ecology at the Mammal Research Institute, Bialowieza, Poland and Rovinj, Croatia. The main directions of the candidate's research support and scientific activity are in the field of mammalogy, ecology and conservation biology with an emphasis on small mammals in accordance with the scientific directions of IBER-BAS. To participate in the competition, the candidate submitted 30 scientific publications (outside of those related to the dissertation, 5 publications, which are not reviewed but are taken into account in the overall evaluation of the candidate's scientific activity). 18 of the publications are in editions with an Impact Factor in Web of Science, 2 - in editions that are not indexed in Web of Science and/or Scopus and 10 are book chapters. The publications are independent and there is no overlap between them. In the presented documents, they are arranged according to groups of indicators, adopted by the Decision of the OS of BAS dated 22.10.2018, with amendments from 18.03.2019 and 20.05.2019. Group B4 "Habilitation Work" includes 6 articles published in reputable journals such as *Diversity*, *Mammalian Biology*, *Nature Conservation*, *Biodiversity Data Journal*, etc., which carry 117 points (minimum 100 pts). The majority of publications are assigned to group D indicators, and they are

carried 374 pts (minimum 220 pts). In this group, there are also articles published in prestigious publications such as *Acta Ethologica*, *Journal for Nature Conservation*, *European Journal of Wildlife Research*, *Biodiversity Data Journal*, *Diversity*, *Mammalian Biology*, *Molecular Ecology*, etc. In terms of subject matter, there is no discernible difference between the two groups of publications, but the first group includes several articles "which examine or summarize scientific achievements and long-term research" (according to the presented reference). The candidate meets the minimum national, academic and institute requirements according to normative documents, and there is an excess in indicator groups B and D.

The proposed statement of contributions adequately reflects the main scientific achievements of the applicant available in the submitted publications. Special mention should be made of some of them, grouped in several directions.

Suggested solutions to practical questions. In the process of carrying out a real conservation activity to strengthen a colony of *S. citellus* in South-Eastern Bulgaria, it was found that it is necessary to plan greater distances of release from the donor colony and a larger area (with a radius of about 800 m) around the place of release. To avoid increasing stress levels in local individuals, it is recommended to release translocated individuals in small groups and change the release site. Specific conservation recommendations have been made for the protection of the souslik and other species of small mammals and their habitats in protected areas. A Plan for Action and Conservation of the European ground squirrel (*Spermophilus citellus*) in Bulgaria "2022 - 2031" has been prepared.

Accumulation of new empirical data in a poorly known scientific field. Extensive data has been collected on the factors that influence the success of souslik relocation and subsequent adaptation activities. In translocation, individuals from the same genetic lines should be selected; to carry out long-term monitoring and long-term management of habitats; to avoid periods of poor weather conditions during release; to select larger territories due to the independent displacement of souslik colonies; to avoid moving individuals at large differences in altitude between the donor colony and the release site, etc. Knowledge of interspecies relationships supports species conservation and is key in selecting release sites. New data on the distribution and negative impact of invasive species of mammals in Bulgaria have been accumulated and

summarized, which has scientific and applied importance for the development of national documents, plans and management and prevention strategies.

Testing an existing theory or hypothesis with a new methodological approach. On the basis of phylogeographic, molecular-genetic and cytogenetic studies of a large number of populations, an attempt was made to reconstruct the phylogeography of *S. citellus*. The presence of two phylogeographic groups - northern and southern - is confirmed. The genetic diversity in the territory of Bulgaria is the greatest, which corresponds to the existing information, but a strong diversification of the populations is found, which is an indication of their significant genetic isolation.

Critical notes. The calibration of the "molecular clock" to estimate time frames of the genetic evolution of European Ground Squirrel in Europe (Říčanová et al, 2013 - publication no. 7) is flawed due to uncritical and incorrect use of information sources. Although this was noted in a recently published review (Popova et al., 2019), cited in Koshev et al. (2023), some false statements such as "...the oldest fossil records being found nearby in the Yarimburgaz Cave [52]" remain in use (Koshev al. 2023, publication #1). This critical note is relevant to the interpretation of the genetic results and does not affect the main contributions of the study related to the geographical aspects of the genetic differentiation of souslik populations.

The scientific articles that are the basis of the contributions have gained prominence and international recognition. According to the presented report, 200 pts were collected under this indicator (E). Scopus H-index: 5. A total of 14 publications were cited 74 times. The article from 2013 on Multilocus phylogeography of the European ground squirrel: cryptic interglacial refugia of continental climate in Europe. *Molecular Ecology*, 22: 4256–4269 has the most citations (22). The scientific research was conducted at a high professional level, and described clearly, logically and precisely. The candidate's personal contribution to the works presented is undeniable. In 24 of the 30 publications, he is the single, first or second author. Regardless of the collective nature of the works, Dr Koshev's leading contribution can easily be singled out. The articles also demonstrate the candidate's ability to work in a team, taking a leading and organizing role in many aspects. Dr Koshev is an established specialist who has gained extensive experience in the field of conservation ecology. The candidate involves graduate and doctoral students in the

subject of his research. He was the scientific supervisor of a successfully defended PhD student, as well as four graduate students (Faculty of Biology, SU and University of Leeds, UK). He managed 6 projects financed by international and national foundations (LIFE Program of the European Union, a Bilateral grant agreement between the Bulgarian Academy of Sciences and Aristotle University of Thessaloniki, Greece, MATRA/KNIP Small Royal Netherlands Embassy Nature Projects, The Whitley Laing Foundation for International Nature Conservation - Rufford Small Grant program, NFNI-MON, etc.).

A bibliographic reference containing 40 titles of presentations at national and international conferences is presented. They cover a wide range of issues related to the conservation ecology of small mammals, the role of climate change and anthropogenic activity, souslik reintroduction, invasive species threat assessment, and more. Special mention should be made of the numerous popular science publications and media appearances related to nature protection. Recognition of Dr. Koshev's scientific authority is his membership on the review board of the journal Land (MDPI) and on the editorial board of Journal of Wildlife and Biodiversity.

Based on the review of the presented scientific works, a list of citations, and participation in scientific forums, projects, editorial and teaching activities, I express my firm opinion that Dr Koshev is a scientist with a clearly defined profile and significant achievements in the field of conservation ecology, and he meets the requirements for holding the academic position of "Docent". I propose to the Honourable Jury to formulate a proposal for chief research assistant Yordan Spasov Koshev, PhD to be elected to the academic position "Docent" by the Scientific Council of IBER-BAS.

31 August 2023

Reviewer: .....

/Prof. Vasil Popov, PhD/