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# Review

From Associate Professor Dr. Vladislav Stanislavov Vergilov, IBER-BAS

**Regarding:** competition for academic position "Professor", announced in SG No. 63 from 01.08.2025, 4. Biological sciences, mathematics and informatics; Professional field: 4.3. Biological sciences; Scientific specialty: "Ecology and Ecosystem Conservation" for Division of Community Ecology and Conservation Biology, Department of Ecosystem Research, Environmental Risk Assessment and Conservation Biology, Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences.

Only one candidate applied at the announced competition – **Dr. Simeon Petrov Lukanov**, Associate Professor at the Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences. The certificate of compliance of the candidates with the legal requirements, including the National minimum requirements, according to the Law on the Development of the Academic Staff of the Republic of Bulgaria and the Regulations for its implementation, as well as the Regulations on the terms and conditions for acquiring scientific degrees and for employment of academic positions at BAS and IBER-BAS shows that the candidate fully covers them.

**General data on the candidate's career and thematic development**

Dr. Lukanov was born on 07/06/1984 in Sofia city. He graduated as a "Master" in Vertebrate Zoology (2009) in Sofia University "St. Kliment Ohridski". In the period 2011–2014 he was s PhD student at the Faculty of Biology, Sofia University, where he obtained the educational and scientific degree "doctor (PhD)", profile "Ecology and ecosystem protection – Behavioral ecology". In 2014, he started working at the Institute of Biodiversity and Ecosystem Research at the BAS, and subsequently in 2020 he held the position of Associate Professor (Docent) at the Department of Ecosystem Research, Environmental Risk Assessment and Conservation Biology.

**The main directions in the candidate's research work** are related to research on the batrachian and herpetofauna in the country, in particular on the fauna, biology, bioacoustics and

population ecology of the amphibians of Bulgaria and the Balkan Peninsula. Another important part of his research has more fundamental focus, with contributions to the protection of Bulgaria's biodiversity.

In the competition for professor, the candidate participated with **21** scientific publications, referenced and indexed in the *Web of Science* and *Scopus databases*.

The fulfillment of the minimum national requirements in terms of indicators for the position of "Professor" presented by the candidate are:

Indicator "A": **50 points**.; Indicator "B": not required for this position; Indicator "C": **100 points**; Indicator "D": **266 т.,** Indicator "E": **328 т.**; Indicator "F": **389 т. (50 points for "F13", 170 points for "F14", 80 points for "F16", 50 points for "F17" and 39 points for "F18").**

**The habilitation thesis (indicator "C")** of the candidate consists of **4** publications in renowned scientific journals with IF, all of which in collective and with **Q1**. In three of the publications, Dr. Lukanov is leading author. The publications in indicator "C" are united in one general herpetological topic, which covers various aspects of the biology, systematics and biochemical ecology of amphibian and reptile species from Bulgaria. It is interesting, that the candidate has exactly 100 points out of the 100 required, which is the legal requirement, but I would recommend that in the future, when other scientometric criteria are covered, the points be above the minimum in case of a possible discrepancy or error when reporting the scientometric data of the publications.

**Indicator "D"** consists of **17** publications: Q1 – 2 pcs; Q2 – 3 pcs; Q3 – 6 pcs; Q4 – pcs; publications with SJR only – 3 pcs. There is no discrepancy between the points presented by the candidate and the reference made by me.

In most modern scientific fields, research is carried out in a team of collectives, and not in independent activities, due to the specifics of modern research, requiring the combination of different methods, as well as the high level of analysis. For this reason, I believe that the candidate's participation in the most diverse scientific collectives proves the high level of his scientific output, as well as opportunities for collective work.

The candidate's contributions can be divided into contributions on the habilitation work and such outside the habilitation work, being united under the following subheadings: 1) *Population ecology*; 2) *Faunistics and Biogeography;* 3) *Systematics and Methodology*; 4) *Biochemical ecology;* 5) *Ecotoxicology*.

Here, I think the division of contributions is well done, but it would be more correct if *Systematics and Methodology* were in two separate categories, due to their specificity.

**Most important contributions from the thesis and beyond**

***Population ecology***

The candidate studies the population characteristics of two large newts in the country – *Triturus ivanbureschi* and *Triturus cristatus*. His contributions to these studies are significant and complex.

By setting live traps and individually identifying captured crested newts by photo using software, the influence of environment, seasonality and body condition on population parameters of the species *Triturus ivanbureschi* was analyzed, with recapture in all studies exceeding 50% of a total of several thousand individuals. The effects of air and water temperature, dissolved oxygen level, acidity and redox potential on populations of newts from neighboring reservoirs were also analyzed. A portion of the captured newts was measured and weighed in order to compare newts from the two reservoirs by body condition index (BCI).

Data on the diet of the northern crested newt (*Triturus cristatus*) are virtually lacking for the southernmost populations in Europe, and this gap has been filled in a study by Dr. Lukanov by analyzing the food spectrum in the aquatic phase and comparing it with the available prey in three reservoirs in the Balkan Mountains, Northwestern Bulgaria. The diversity of prey in each reservoir was determined by hydrobiological sampling. The seasonal activity and sex ratio of the species from its southernmost distribution limit were also revealed.

***Faunistics and Biogeography***

Most of the candidate's contributions fall into this category. A significant one is his participation in a collective study to clarify the biogeography of the yellow-bellied bombina (*Bombina variegata*). By combining data from cytochrome b DNA barcoding (1238 individuals from 355 localities), mitogenome phylogenetics (17.2 kb), gene-based nuclear phylogenetics (3.7 kb from four gene fragments), and multilocus phylogenomics (4759 loci / ~554 kb, obtained by double-digest restriction-associated DNA sequencing; ddRAD-seq), a comprehensive assessment of the speciation of *B. variegata* was performed, including a revision of its nomenclatural history and the scientific names of the phylogeographic lineages. Spatiotemporal diversification models have been developed, suggesting a role for a Late Miocene invasion in the Pannonian Plain as the initial cause of the divergence, followed by similar events in the Apennines and the Balkan Peninsula. The results of the study, in which the candidate participated, show that the two lineages of *B. v. scabra* differ significantly in

morphology and ventral coloration, and thus the Rhodope lineage is described as a new subspecies, *B. v. rhodopensis*.

The candidate is involved in clarifying the distribution of various species of the country's batrachian and herpetofauna, such as *Triturus cristatus*, *Podarcis erhardii* and species of the genus *Natrix*. I believe that a significant contribution not only to the distribution, but also to nature conservation is represented by the publications in which he is a co-author and which concern the distribution of protected amphibian species in arable lands in Bulgaria and the distribution of protected reptile species in the Kresna Gorge. The data in these articles show that a large percentage of the populations of protected amphibian species throughout Bulgaria are potentially exposed to agricultural practices such as the use of pesticides or the aggregation of arable lands and the important importance of the Kresna Gorge as a region with high species diversity.

***Systematics and Methodology***

The candidate's research on the *Hyla* genus complex is very impressive. The results presented in several publications concern bioacoustic and morphometric characteristics of trees. The effectiveness of a method for non-invasive individual recognition by the shape of the lateral stripe in the common tree frog has been proven. The analysis of the coloration of different populations of *H. arborea* and *H. orientalis* from across the country did not reveal significant differences between the species, but significant differences were registered in terms of bioacoustics. After analyzing 390 mating calls by six parameters, the results show that the studied populations form two well-defined groups that correspond to the known distribution areas of *H. arborea* and *H. orientalis*. The most important variables for the differentiation between the species are the number of calls, the duration of the series, the peak frequency and entropy. One of these interesting studies was published in *PeerJ*, where the candidate is the sole author, and the other study is in *Zoologischer Anzeiger*, where Dr. Lukanov is the first author.

The candidate also made an important contribution to a publication on individual recognition in vipers.

***Biochemical ecology***

The composition of the skin secretions of adult *Vipera ammodytes* individuals, analyzed by gas chromatography/mass spectrometry, was studied, where the results show that chemical communication in this species involves fewer compounds compared to literature data for other snake species. The contribution is published in the prestigious scientific journal *Molecules*.

Dr. Lukanov is also involved in a study that also concerns the composition of skin secretions in other species of Old World snakes. The composition of skin secretions of 13

species of snakes was described, using samples from undressed, as well as living or dead individuals. By standard coupled gas chromatography-mass spectrometry (GC-MS) and analysis of the samples in the skin secretions, 88 compounds were identified, with alkanes being the most common type. The identified compounds likely play a role in skin water permeability, host defense, and chemical communication.

***Ecotoxicology***

The candidate is the first author of a study determining the role of rice fields as habitats for tailless amphibians. The results of the study demonstrate that all recorded frog species have higher activity in rice fields compared to natural water bodies and this should be taken into account during the process of using and approving pesticides in order to minimize the negative impact of toxic substances on amphibians.

In addition to the aforementioned study, Dr. Lukanov, together with his doctoral student, is participating in a study determining the effect of ammonium nitrate on the development and behavior of the agile frog (*Rana dalmatina*) and the common toad (*Bufo bufo*).

It can also be noted that some of the contributions cover broader topics and some of the studies themselves can be considered as falling into other categories. This is partly related to the diverse methods used in many of the candidate's publications. It can also be noted the importance of some of Dr. Lukanov's contributions to the conservation of species in the country – both faunal contributions and ecological and methodological ones.

**Significance of the results obtained**, proven by citations, publications in prestigious scientific journals, awards, membership in international and national scientific organizations, etc.

The candidate Dr. Simeon Lukanov is the author of a total of 54 scientific publications, 43 of which have an impact factor and impact rank; 11 of them are in Q1, of which he is the lead author. In connection with this competition, the candidate presents 21 publications in indexed databases (*Web of Science* and *Scopus*). He has participated in **18** international scientific forums with **28** participations.

Regarding indicator "E", the candidate has provided **164** citations corresponding to **328** points in referenced databases (with 120 points required). The candidate exceeds the points for this indicator.

The candidate has also participated in **17** national scientific or educational projects and has led 4 learned ones, thus collecting a total of **389** points on the "F" indicator (out of 150

required). It is important to mention that Dr. Lukanov is the editor-in-chief of the scientific journal *Acta Zoologica Bulgarica* and is a thematic editor in another international one – *North-Western Journal of Zoology*.

**Most significant scientific and applied achievements**

In general, it is difficult to classify a scientific or applied scientific achievement as "most significant", this is more of a matter of subjectivity. However, when combining the achievements, it is striking that the candidate has exceptional ones in the field of population ecology of amphibians, bioacoustics of tailless amphibians and the fauna of representatives of the batrachian and herpetofauna in the country and on the Balkan Peninsula. Of particular importance are his complex studies on representatives of the genus *Hyla* and in general on frogs on the territory of the Republic of Bulgaria.

**Demonstrated research management skills**

Dr. Lukanov participates in a significant number of scientific and applied projects, as well as those with a conservation focus, funded through ministries and departments, as a coordinator, field expert, consultant, etc. The candidate has exceptional expert knowledge and in-depth practical experience in planning, managing, coordinating and administering a wide variety of national and international conservation projects, such as COST Action No. 18221 ADB: PERIAMAR Pesticide Risk Assessment for Amphibians and Reptiles; Limiting the population of the invasive species of red-eared slider turtle (*Trachemys scripta elegans*) for Bulgaria in a maintained reserve "Velyov Vir". 2022, RIEW-Burgas, contract 741/21.07.2022; Studying the impact of noise from road traffic on model species of tailless amphibians (Amphibia: Anura) in Bulgaria. 2017-2019, BAS, contract DFNP-17-94/28.07.17 and others. In addition, Dr. Lukanov develops independently or as a supervisor a large number of scientific tasks, which he has managed to successfully publish over the years.

**A motivated answer to the question to what extent the candidate has a clearly defined profile of the research work**

All of the above-listed scientific, applied science and conservation contributions of the candidate, the leadership of scientific research of importance to the scientific community and his participation in numerous conservation projects, give me reason to assert that Dr. Simeon Lukanov has a clearly outlined scientific research profile as a population ecologist and is an established scientist in his field of research.

**Role of the candidate in the training of young professionals**

**The candidate has led one successfully defended full-time doctoral student:**

1) **Blagovesta Dimitrova Dimitrova,** base organization: IBEI-BAS, Department of "Ecosystem Research, Ecological Risk and Conservation Biology" of IBER-BAS, professional field: "Biological Sciences", doctoral program "Ecology and Ecosystem Conservation", topic: "*Impact of pesticides on amphibian species from water bodies with varying degrees of anthropogenic impact in Central Bulgaria*".

From the above, it is clear that Dr. Simeon Lukanov has proven qualities in leading young staff, managing to pass on his experience to them, but also to get the most out of the opportunities of young and future researchers and successfully motivates and guides them. I myself have participated together with the candidate in projects, which I emphasize from personal experience.

**In conclusion**

Dr. Simeon Lukanov is the author of high-quality scientific production, which meets the requirements for holding the academic position of "professor". Dr. Lukanov's contributions are at a very high scientific level and are visible and recognizable by the Bulgarian and international scientific communities.

I highly evaluate the scientific, applied science, as well as the administrative results of the candidate and recommend to the scientific jury to approve the selection of Assoc. Prof. Dr. Simeon Petrov Lukanov for the academic position of "Professor" in the specialty "Ecology and Ecosystem Conservation" for the needs of the Department of Ecosystem Research, Environmental Risk Assessment and Conservation Biology at the IBER-BAS.

Sofia,

25.11.2025

/Associate Prof. Dr. Vladislav Vergilov, IBER-BAS/