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REVIEW

under a competition for the academic position of Associate Professor in the professional field **4.3. Biological Sciences,** scientific specialty "**Ecology and Ecosystem Conservation**", for the needs of the Department **of Ecology of Communities and Conservation Biology**, Department **of Ecosystem Research, Environmental Risk and Conservation Biology** of IBER-BAS

Candidate: Assist. ace. Angel Valentinov Dyugmedzhiev MD

Reviewer: Prof. Dr. Georgi Sashev Popgeorgiev, NMNHS-BAS

In the announced competition for the academic position of "Associate Professor" in the professional field 4.3. Biological Sciences, scientific specialty "Ecology and Ecosystem Conservation", for the needs of the Department of Ecology of Communities and Conservation Biology, Department of Ecosystem Research, Environmental Risk and Conservation Biology of the Institute of Biodiversity and Ecosystem Studies, BAS (IBER-BAS), announced in State Gazette No. 32 of 15.04.2025, one candidate participates - Assist. ace. Dr. Angel Valentinov Dyugmedzhiev, Chief Assistant Professor in the Department of Community Ecology and Conservation Biology.

I have 6 joint publications with the candidate, submitted for participation in the competition.

The documents presented by Dr. Angel Valentinov Dyugmedzhiev show that the procedure for its disclosure and announcement has been complied with and they are in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its Implementation, with the Regulations on the Terms and Conditions for Acquiring Scientific Degrees and for Occupying Academic Positions at the Bulgarian Academy of Sciences, as well as the Regulations on the Terms and Conditions for Acquiring Scientific Degrees and for Occupying Academic Positions at IBER-BAS.

1. General data on the candidate's career and thematic development

Dr. Angel Dyugmendjiev was born on 10.02.1985 In 2013 he graduated from the Master's program in Zoology, module "Zoology of Vertebrate Animals" at the Faculty of Biology of Sofia University "Kliment Ohridski" with a successfully defended diploma thesis on "Ecological studies of the viper *Vipera berus* (Linnaeus, 1758) on Vitosha". From 2015 to 2020 he developed a doctoral dissertation at the NMNHS - BAS, on the topic "Spatial ecology of the viper (*Vipera ammodytes*) in Western Bulgaria", with a scientific consultant prof. Dr. Pavel Stoev. Since 2020, Dr. Angel Dyugmedzhiev has been working at IBER-BAS.

The scientific interests of the candidate are related to batrachology and herpetology, and in particular to research in the field of biology, ecology of amphibians and reptiles in Bulgaria, as well as their conservation. He has led five research projects and is involved in over twenty others focused on conservation biology, ecology and environmental protection. He is the author and co-author of more than 30 scientific publications in peer-reviewed journals, including journals with a high impact factor. His scientific activity contributes significantly to the study and conservation of biodiversity in Bulgaria. He speaks English at a working level and has excellent skills in working with statistical and GIS software. He has extensive experience in field research and actively participates in international scientific forums. He is distinguished by high organizational and communication skills, combined with sustainable academic development.

2. Scientometric indicators

In this competition, the candidate participates with 27 scientific papers, of which 15 in journals with an impact factor (except for those from the dissertation for the acquisition of the degree of Doctor and the acquired habilitation for associate professor). The remaining 12 publications have SJR, which covers and exceeds both the national requirements and those set out in the Regulations on the terms and conditions for acquiring scientific degrees and for occupying academic positions at IBER-BAS. All presented scientific publications are in specialized scientific journals and correspond to the scientific specialty "Ecology and Ecosystem Conservation".

The reference for compliance of the points of Ch. ace. Dr. Angel Dyugmendjiev with the minimum scientometric requirements, was made according to the requirements. The articles are correctly arranged, allowing for quick and easy orientation.

The fulfillment of the minimum national requirements for the position of Associate Professor is as follows:

- The indicator from group "A" is covered by the defended dissertation for the degree of Doctor and brings 50 points;
- For the indicator from group "B", points are not required for this position;
- The indicators from group "B" are covered with 116 points (out of 100 required)

Here are 8 publications from scientific journals falling into the following quartiles at the time of publication: Q2 – 1 pc., Q3 – 4 pcs., Q4 – 3 pcs. The submitted articles are co-authored with a team, and in all articles the candidate is the first author. This makes an extremely good impression of the candidate's good skills in organizing and preparing scientific products. An important clarification is that in modern studies it is very difficult to conduct a study by a small team of researchers.

- The indicators from group "D" are covered with 229 points (out of 220 required).

Here the candidate has included 19 publications, distributed as follows: Q1 – 1, Q2 – 2, Q3 – 2, Q4 – 2, SJR – 11 and a book chapter – 1 pc. It is important to note that 12 of the publications are co-authored with leading scientists from the country and abroad, and in seven the candidate is again the first author.

- The indicators from group "D" are covered with 98 points (compared to 50 required by the RASRB and 60 required according to the requirements of the Bulgarian Academy of Sciences).

The scientific publications with which the candidate participated in the competition were cited a total of 69 times, all of which were in journals referenced by SCOPUS and WEB of SCIENCE, which is proof of the importance of Dr. Dyugmendzhiev's research and the significant interest in them. The citations in journals with an impact factor are 35, which also many times exceeds the requirements of 10 pcs. Some of the most cited publications are Tsankov et al. 2014 (8 citations), Dyugmedzhiev et al. 2020 (6 citations) and 2 more publications with 5 citations each. All this speaks of a significant interest in the candidate's developments.

3. Main directions in research work and most important scientific contributions

The report of Assist. ace. Dr. Angel Dyugmedzhiev presents 26 separate contributions, structured in three main directions:

1. Scientific contributions related to research on the viper (*Vipera ammodytes*) – 8 contributions
2. Scientific contributions related to other amphibians and reptiles – 14 contributions
3. Scientific and applied contributions – 4 contributions

The contributions are based on a significant number of publications in peer-reviewed scientific journals, including journals with a high impact factor (*Molecules*, *Global Ecology and Biogeography*, *North-Western Journal of Zoology*, etc.). The research covers both basic basic science and integrated applied aspects aimed at biodiversity conservation and the development of humane methods for working with wild animals.

The candidate's scientific activity is interdisciplinary, covering herpetology, behavioral ecology, biogeography, thermobiology, chemical ecology and conservation biology.

Analysis of contributions by groups

Scientific contributions related to research on the viper (Vipera ammodytes)

This group presents eight original scientific contributions that make a significant contribution to the knowledge of the ecology, behavior and evolution of *Vipera ammodytes* – one of the key species in the herpetofauna of the Balkan Peninsula.

- Contribution 1.1: For the first time, a complex of arboreal behaviors, including copulation and ambush hunting, has been documented in a species considered strictly terrestrial. This discovery redefined the ecological profile of the species.
- Contribution 1.2: Through a series of field studies, a high degree of intraspecific variation in the spatial niche of the viper has been established, related to a number of factors (sex, age, season, time of day, etc.), and these dependencies are presented through statistical models and substantiated by field observations.
- Contribution 1.3: A genetic analysis of populations in Bulgaria has been carried out, which reveals two clearly differentiated evolutionary lineages and a contact area in need of further studies – a contribution with potential for future application in taxonomy and conservation.

- Contribution 1.4: Studies on circadian and seasonal activity reveal adaptive flexibility, including a transition to nocturnal activity at high temperatures, and interpopulation differences are also taken into account.
- Contribution 1.5: Thermoregulatory strategies have been identified demonstrating that pregnant females maintain a more stable body temperature, a contribution that complements knowledge of the reproductive physiology of the species.
- Contribution 1.6: For the first time in Bulgaria, the method "catch – mark – recatch" has been applied in snakes in order to determine the density and structure of populations – a methodological contribution of practical importance for monitoring.
- Contribution 1.7: Chemical analysis of skin secretions revealed 59 compounds, including ketones, with a probable role in chemical communication.
- Contribution 1.8: A unique case of failed pregnancy has been documented that has not been described so far in the literature in ovoviviparous snakes – a biomedically significant contribution with potential for comparison in comparative reproductive biology.

All contributions in this group are distinguished by a high degree of originality, data validity, methodological innovation and applicability. They form a comprehensive, in-depth and interdisciplinary picture of the biology of *Vipera ammodytes*, which has not been offered so far in the Bulgarian and Balkan literature.

Scientific contributions related to other amphibians and reptiles

This group includes 14 contributions covering a wide range of topics in herpetology, ecology and zoogeography. Contributions are distinguished by the use of original field data, often combined with geospatial, climate and behavioural analyses. The thematic scope is international – it includes studies from Bulgaria, the Balkan Peninsula and North Africa.

- Key areas for the conservation of four endangered species of reptiles in the Struma River valley have been identified, with the specification of anthropogenic threats – direct application in nature conservation practice (2.1).
- A global meta-analysis summarized temperature profiles of 260 reptile species from six continents, establishing a clear relationship between thermoregulation and climatic/behavioral characteristics (2.2).
- Studies on *Natrix natrix* and *N. tessellata* have shown high ecological tolerance, which is relevant in habitat modeling in the context of climate change (2.3).

- Analysis of the skin secretions of 13 snake species from three regions (Europe, North Africa, Middle East) reveals chemicals with a potential role in protection and communication (2.4).
- The mating behavior of *Xerotyphlops vermicularis*, a poorly studied species in which a short copulative interval has been described (2.5), has been documented.
- New localities of *Eryx jaculus* significantly expand its range along the Bulgarian Black Sea coast (2.6).
- Rare behavioral phenomena have been presented, including interspecific amplexus (2.7), predation by *Emys orbicularis* on newts (2.9), nocturnal activity in *Dolichophis caspius* (2.10), and an unusual defensive response in *Zamenis longissimus* (2.11).
- The maximum sizes of snakes in Bulgaria were studied – contribution to biometric databases (2.12), as well as interactions during syntopic hibernation of five snake species (2.13).
- The rich species diversity of amphibians and reptiles along the Danube River and in Vitosha Nature Park has been confirmed, with field data for 35 species, including invasive ones (2.14).

The presented contributions reflect exceptional field activity, in-depth scientific analysis and the ability for interdisciplinary interpretation of data. Many of them have direct application in conservation biology and species diversity conservation policies.

Scientific and applied contributions

The group includes four contributions, all of which demonstrate innovations in the methodology of field and laboratory research, as well as an ethical approach to working with wild animals.

- A non-invasive method for individual identification of *Vipera ammodytes* by automated software analysis (*Hotspotter*) of morphological features has been developed – with proven higher efficiency compared to manual methods (3.1).
- A similar method was applied to frogs of the *Hyla arborea* complex, using the lateral stripe as a visual marker (3.2).
- A comparative analysis of two methods for extraction of skin secretions shows significant methodological differences – a result of high value for future laboratory studies (3.3).

- A unique case of self-harm in a brown bear (*Ursus arctos) has been documented*, followed by a long-term successful follow-up – a contribution to humane treatment in the capture and monitoring of large mammals (3.4).

The presented contributions are innovative, practically applicable and demonstrate a high level of methodological culture, with the potential for adaptation in other scientific disciplines.

The report with scientific contributions of Dr. Angel Dyugmedzhiev presents an impressive scientific contribution in the field of herpetology, ecology and conservation biology. The contributions formulated are:

- clearly structured and justified,
- based on a solid empirical basis,
- published in peer-reviewed and prestigious scientific journals,
- with a high degree of originality and applicability.

The candidate demonstrates independence, interdisciplinarity, international activity and commitment to biodiversity conservation, which fully meets the requirements for an academic position.

4. Participation in research projects, preparation of expert assessments, participation in editorial boards

Dr. Angel Dyugmedzhiev has been the head of 5 projects. He has taken part in more than 27 projects with national and international funding, mainly in the field of research and conservation of amphibians and reptiles in Bulgaria. My direct impressions of the candidate's work on the projects are that he is very organized, correct, efficient and purposeful.

5. Scientific profile of the candidate and professional skills

From the analysis of the presented materials, it is established that Dr. Angel Dyugmedzhiev has an established and focused scientific profile in the field of herpetology, with the exception of only one publication with a different thematic focus. His main research interests are focused on snakes. He has extensive knowledge in the field, combining field and laboratory skills, as well as effective teamwork abilities, which is essential for the successful conduct of modern herpetological research. In addition, Dr. Dyugmedzhiev successfully

applied modern methods and in some cases contributed to the development of innovative approaches, which emphasized his high professional and scientific level.

6. Questions and recommendations

I have no critical remarks about the candidate.

Conclusion

The candidate Chief Assistant Dr. Angel Dyugmedzhiev covers all scientometric indicators (508 points), significantly exceeding them in each criterion. Based on the materials presented in the competition, I am convinced that it fully meets, and in a number of indicators exceeds, the national criteria for occupying the academic position of Associate Professor, defined by the Law on the Development of the Academic Staff in 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 Occupying Academic Positions at the Bulgarian Academy of Sciences and the Regulations on the Terms and Conditions for Acquiring Scientific Degrees and for Occupying Academic Positions at IBER-BAS. I have known the candidate for many years of joint work and I can confidently say that the colleague is a motivated, hard-working and established scientist, with a clearly defined scientific profile and with proven scientific and applied scientific contributions.

On the basis of the above, I strongly recommend the members of the scientific jury to support the election of Chief Assistant Dr. Angel Dyugmedzhiev to occupy the academic position of Associate Professor in the professional field 4.3. Biological Sciences, scientific specialty "Ecology and Ecosystem Conservation", for the needs of the Department of Ecology of Communities and Conservation Biology, Department of Ecosystem Research, Environmental Risk and Conservation Biology of IBER-BAS.

Sofia: Prepared by:

08.08.2025 /G. Popgeorgiev/