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REVIEW

for a competition for the academic position of "Associate Professor" in professional field 4.3. Biological Sciences, scientific specialty "Ecology and Ecosystem Conservation," for the needs of the "Community Ecology and Conservation Biology" section, department of "Ecosystem Research, Ecological Risk and Conservation Biology" at the Institute of Biodiversity and Ecosystem Research – Bulgarian Academy of Sciences (IBER-BAS)

Candidate: Dr. Angel Valentinov Dyugmedzhiev

Reviewer: **Assoc. Prof. Dr. Ivelin Aldinov Mollov**, University of Plovdiv "Paisii Hilendarski", Faculty of Biology, Department of Ecology and Environmental Conservation

In the announced competition for the academic position of Associate Professor in professional field 4.3. Biological Sciences, scientific specialty "Ecology and Ecosystem Conservation," for the needs of the "Community Ecology and Conservation Biology" section, department of "Ecosystem Research, Ecological Risk and Conservation Biology" at the Institute of Biodiversity and Ecosystem Research – Bulgarian Academy of Sciences (IBER-BAS), published in State Gazette No. 32 of April 15, 2025, one candidate has applied – Dr. Angel Valentinov Dyugmedzhiev.

The documents submitted by Dr. Angel Dyugmedzhiev demonstrate that the procedure for announcing and conducting the competition has been duly followed and that all materials comply with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, as well as with the Regulations on the Conditions and Procedures for Awarding Academic Degrees and Occupying Academic Positions at BAS and at IBER-BAS.

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

Dr. Angel Valentinov Dyugmedzhiev is an established researcher in the fields of zoology and ecology, with eight years of experience in scientific research at the Institute of Biodiversity and Ecosystem Research of the Bulgarian Academy of Sciences (IBER-BAS). He obtained his Master's degree in Zoology from Sofia University "St. Kliment Ohridski" and later defended a PhD with a dissertation entitled "Spatial Ecology of the Nose-horned Viper (*Vipera ammodytes*) in Western Bulgaria." His scientific interests are focused on herpetology, particularly the biology, ecology, and behavioral patterns of snakes in their natural habitats. He was a project superviser on five scientific projects and participated in more than twenty others, with emphasis on conservation biology, ecology, and environmental protection. Dr. Dyugmedzhiev is the author and co-author of over 30 peer-

reviewed scientific publications, including articles in high-impact journals. His work has made a significant contribution to the study and conservation of biodiversity in Bulgaria. He possesses working proficiency in English and advanced skills in statistical and GIS software. He has extensive fieldwork experience and has actively participated in numerous international scientific forums. His academic development is marked by strong organizational and communication competence, combined with steady and focused professional growth.

2. Scientometric indicators and significance of the obtained results

In the present competition, the candidate participates with 29 scientific works, excluding those from his PhD dissertation. One publication has been voluntarily withdrawn by the candidate due to the presence of a large author group (65 co-authors), which makes the delineation of his individual contribution challenging - an assessment with which I concur. Additionally, one work - a widely used field guide for the amphibians and reptiles of Vitosha Mountain from 2014, does not contribute points in the current competition. The remaining 27 scientific publications are published in specialized journals relevant to the academic specialty "Ecology and Ecosystem Conservation." Of these, 15 are published in journals indexed with an impact factor, and the other 12 are listed in SJR-ranked journals, thereby meeting and exceeding both national scientometric standards and those stipulated in the IBER-BAS Regulations on the Conditions and Procedures for Acquiring Academic Degrees and Occupying Academic Positions.

A compliance assessment was conducted regarding Dr. Angel Valentinov Dyugmedzhiev's scientometric scores relative to the national minimum requirements for occupying the academic position of Associate Professor. The results are as follows:

- Criterion Group "A" is fulfilled by the defended PhD thesis, which carries 50 points.

- Criterion Group "C" is fulfilled with a total of 116 points (exceeding the minimum national requirement of 100 points).

Within this group, eight publications are in scientific journals classified in the following quartiles for their respective years of publication: one in Q1, four in Q3, and three in Q4. In all of these publications, the candidate is listed as the lead author.

- Criterion Group "D" is fulfilled with 229 points (exceeding the 200 points required by the Law on the Development of the Academic Staff in the Republic of Bulgaria and the 220 points required by the Bulgarian Academy of Sciences, which imposes stricter standards for this criterion).

The candidate has included 19 publications under this group, distributed as follows: Q1 – 1, Q2 – 2, Q3 – 2, Q4 – 2, SJR – 11, and one book chapter. Twelve of these publications are co-authored with leading researchers from Bulgaria and abroad, while in seven of them, Dr. Dyugmedzhiev is the first author. It should be noted, however, that a significant proportion of the publications (more than

half) are in journals indexed only in SJR and not assigned an official impact factor. Six of these are published in two Bulgarian journals (Historia Naturalis Bulgarica and Ecologia Balkanica), which specialize in articles of regional significance; the remaining five appear in international journals such as Herpetological Bulletin, Herpetology Notes, and Herpetological Review. Among the total of 27 publications presented in the competition, only four are published in journals ranked within the first two quartiles. One publication, documenting a case of self-inflicted injury in a brown bear following capture in a snare trap, stands apart from the candidate's predominantly herpetological focus; nevertheless, it remains fully relevant to the declared scientific specialty of the competition.

- Criterion Group “E” is fulfilled with 98 points (exceeding the 50 points required by national regulations and the 60 points stipulated by BAS, which again imposes higher standards).

The candidate reports a total of 49 citations of 17 of his publications, all in journals indexed in Scopus and Web of Science, which attests to the scientific relevance and visibility of Dr. Dyugmedzhiev’s work. Thirty-five of these citations are in journals with an official impact factor, thereby meeting the specific requirements of IBER’s internal rules (a minimum of 20 citations, at least 10 of which in impact factor journals).

A query in the Scopus database shows that Dr. Dyugmedzhiev has an h-index of 5, which reflects a solid balance between the number of publications and the citations they have received.

3. Main research areas and key scientific contributions

In his submitted summary, Dr. Angel Dyugmedzhiev organizes his contributions into the following thematic areas:

1. “Scientific contributions related to research on the Nose-horned Viper (*Vipera ammodytes*)”.
2. “Scientific contributions related to research on other amphibian and reptile species”.
3. “Applied scientific contributions”.

The candidate formulates a total of 26 contributions, all derived from the publications submitted as part of this competition and within the scope of the announced academic position.

Contributions from Group 1: “Scientific contributions related to research on the Nose-horned Viper (*Vipera ammodytes*)”.

In this group, the candidate presents eight contributions focusing on the ecology, behavior, genetic diversity, and cutaneous secretions of the Nose-horned Viper (*Vipera ammodytes*) in Bulgaria. Dr. Dyugmedzhiev identifies four major types of arboreal behavior previously understudied or overlooked in this predominantly terrestrial species, including courtship and ambush predation. He demonstrates notable intraspecific variation in the species' spatial niche, influenced by factors such as sex, age, reproductive status, diel period, and season. Genetic analyses reveal two distinct evolutionary lineages with contact zones that merit further investigation. Seasonal and circadian

activity patterns display behavioral plasticity, including crepuscular and nocturnal shifts under elevated temperatures. Thermoregulatory behavior is well pronounced, with gravid females maintaining more stable body temperatures. The method of "mark-recapture" is applied for the first time in Bulgaria to snakes, enabling estimates of population density and spatial organization. The chemical analysis of skin secretions identifies 59 compounds, some of which are likely involved in pheromonal communication during the mating season. A unique case of failed pregnancy in a female viper is also documented - an observation not previously reported for ovoviviparous or viviparous snake species. Overall, this body of work highlights the species' ecological plasticity and its biological significance within the Balkan herpetofauna. I accept all contributions in this group and assess them as original.

Contributions from Group 2: "Scientific contributions related to research on other amphibians and reptiles".

This group of contributions encompasses a broad spectrum of zoological and ecological studies that enhance the current understanding of the distribution, ecology, and behavior of amphibians and reptiles in both Bulgaria and abroad. Based on original field data, key conservation areas for four threatened reptile species in the Struma River Valley have been identified, with particular emphasis on the ecological importance of the Kresna Gorge and the threat posed by heavy traffic along the international E79 road. A global meta-analysis of body temperatures in reptiles across six continents reveals strong dependence on climatic and behavioral factors, with heliothermic species consistently exhibiting higher and more stable body temperatures. The distribution of aquatic snakes (*Natrix natrix* and *N. tessellata*) in Bulgaria has been thoroughly studied, demonstrating both species' resilience to diverse climatic conditions. An analysis of skin secretions from 13 snake species shows a rich chemical diversity, likely serving both protective and communicative functions.

For the first time, courtship behavior in the little-known species *Xerotyphlops vermicularis* has been documented, including the characteristically brief copulation interval. Newly discovered localities for the Turkish boa (*Eryx jaculus*) along the Bulgarian Black Sea coast significantly expand the known range of this species. Rare ecological and behavioral phenomena have also been recorded, such as interspecific amplexus in frogs and predation of newts by European pond turtles (*Emys orbicularis*). Nocturnal activity in *Dolichophis caspius* and unusual tail-vibrating defensive behavior in *Zamenis longissimus* have also been observed. The largest known sizes for certain Bulgarian snake species, including *Platyceps najadum*, have been documented. Studies of syntopic communal hibernation among five snake species have revealed spatial and temporal partitioning patterns. The presence of dozens of amphibian and reptile species has been confirmed along the Bulgarian Danube and in Vitosha Nature Park, while fieldwork in Morocco has produced the first known evidence of syntopic occurrence between two species of Viperidae, alongside new distributional data for 11

species in the region. All these findings underscore the value of integrated field and laboratory approaches in advancing herpetological research and reflect the candidate's substantial contributions to the field. I accept all contributions in this group and consider them original.

Contributions from Group 3: "Applied scientific contributions".

In this group, the candidate presents four contributions involving the development and application of innovative, non-invasive methods for individual identification of Nose-horned Vipers (*Vipera ammodytes*) and tree frogs (*Hyla arborea* complex), based on morphological markers and analysis using the "Hotspotter" software. The software has been shown to be highly effective compared to traditional manual photo comparison, particularly when distinct anatomical traits are utilized. Additionally, two methods for the extraction of skin secretions from snakes have been tested, revealing significant methodological differences that highlight the importance of selecting the appropriate protocol according to specific research objectives. A unique case of self-inflicted injury in a brown bear (*Ursus arctos*) following capture with a snare trap has also been documented, with no observed long-term health consequences for the animal. All presented findings contribute meaningfully to the advancement of herpetological and zoological field methodologies, emphasizing ethical wildlife handling and effective monitoring strategies. I accept all contributions in this group and consider them original.

4. Scientific profile and professional skills of the candidate

Based on the evidence presented, it is clear that Dr. Angel Dyugmedzhiev possesses a well-defined and consistent scientific profile in the field of herpetology, with only one of the submitted publications falling outside this thematic scope. His primary research interests are focused on snakes, and in particular on the species *Vipera ammodytes*. Dr. Dyugmedzhiev demonstrates extensive knowledge in herpetology, strong skills in both fieldwork and laboratory research, and a capacity for effective teamwork - an essential asset in contemporary herpetological studies, which often require collaborative efforts. He skillfully applies modern methodologies and even develops novel techniques, further confirming his excellent professional qualifications.

5. Questions and Recommendations

I may offer the following recommendations to the candidate:

1. In future research, he should consider broadening his thematic scope to include other reptile groups beyond snakes, which currently constitute the core of his work, as well as amphibians.

2. He is encouraged to further expand his ecological research, with continued emphasis on population ecology, ethology, and the biology of understudied species within the Bulgarian batrachofauna and herpetofauna.

I have no questions for the candidate.

Conclusion

The candidate, Dr. Angel Valentinov Dyugmedzhiev, fully meets and exceeds all scientometric criteria required for occupying the academic position of Associate Professor, as defined by the Law on the Development of the Academic Staff in the Republic of Bulgaria and its Regulations, as well as by the Regulations of the Bulgarian Academy of Sciences (BAS) and the internal rules of the Institute of Biodiversity and Ecosystem Research (IBER-BAS). I do not know the candidate personally, and therefore my evaluation is based solely on the materials submitted in the competition. I can confidently state that Angel Dyugmedzhiev is establishing himself as a recognized scientist with a clearly defined academic profile and proven scientific and applied contributions. His expertise and motivation place him among the leading herpetologists in Bulgaria.

Based on the above, I give my unequivocal **POSITIVE** evaluation of his work and strongly recommend that the esteemed Scientific Council of IBER-BAS elect Dr. Angel Valentinov Dyugmedzhiev to the academic position of "Associate Professor" in professional field 4.3. Biological Sciences, scientific specialty "Ecology and Ecosystem Conservation," for the needs of the "Community Ecology and Conservation Biology" section, Department of "Ecosystem Research, Ecological Risk and Conservation Biology" at IBER-BAS.

Reviewer: .....

(Assoc. Prof. Dr. Ivelin A. Mollov)

Date: July 27, 2025