

REVIEW

Of the teaching and research activities

Of Assoc. Prof., Diana Peneva Zlatanova, PhD

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About the competition for the academic position "Professor" in the field of high education 4. Natural sciences, Mathematics and informatics, professional line 4.3. Biological sciences (VERTEBRATE ZOOLOGY, GEOGRAPHIC INFORMATION SYSTEMS), for the needs of the Department „Zoology and anthropology“ at the Faculty of Biology of Sofia University "St. Kliment Ohridski", declared in State Gazette № 100/16.12.2022

The present review was prepared on the basis of an Order of the Rector of Sofia University "St. Kliment Ohridski" № RD-38-66/01.02.2023 and decision of the meeting of the scientific jury conducted on 27.02.2023.

The only candidate in the competition is Assoc. Prof. Diana Zlatanova, PhD, working lecturer on the basis of the employment contract at to the same department, who has presented all the necessary documents according to the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, and the Rules on the conditions and procedure for acquiring science degrees and holding academic positions at Sofia University "St. Kl. Ohridski". I have no joint publications with the candidate.

Brief biographical data about the candidate

Assoc. Prof. Dr. Zlatanova graduated from Sofia University "St. Kliment Ohridski" in 1991 with a master's degree in Biology by a diploma thesis on the topic: "Comparative analysis of the behavior of predatory mammals in Stara Zagora Zoo". Her career growth continued with her starting a job in 1993 at Sofia Zoo. She worked there until 2011. During this period, she carried out educational, scientific and conservation activities, management of collections of domestic and exotic species, mainly carnivores, holding various positions -

Head of the Cats sector, head of the zoo collection and head of the Carnivores sector, head of the scientific - educational sector. In the period 2006-2009 she is a PhD student at the Department of Zoology and Anthropology at the Faculty of Biology of the Sofia University. In 2010, she successfully defended her PhD thesis on "Modelling the habitat suitability for the bear (*Ursus arctos* L.), the wolf (*Canis lupus* L.) and the lynx (*Lynx lynx* L.) in Bulgaria". In 2011, she was appointed as a Chief Assistant Prof. in the same department. From 2016 to the present, the candidate is an "Associate professor" at the Department of Zoology and Anthropology at the Faculty of Biology of the SU. Here she carries out teaching and research activities in the field of vertebrate zoology, mainly large and medium-sized mammals, carnivores, performs spatial analyses and modelling in a GIS environment.

The total experience of the candidate's specialty at SU so far, according to the presented official reference, is from 01.09.2011 - Certificate 2/03.01.2023 from the Human Resources Department of SU.

Assessment of the candidate's activity

Teaching activity. The teaching activity of Assoc. Prof. Zlatanova is high, including the implementation of various lecture courses and practical classes for students of various specialties, bachelor's and master's degrees at the Faculty of Biology at Sofia University, which are very important for the formation of basic and specialized knowledge of students in the field of zoology. For the last five years, her average total and academic study employment is 820 and 461 hours, respectively. Assoc. Prof. Zlatanova leads the lecture course *Zoology of Vertebrate Animals* of bachelor students at the Faculty of Biology, which is mandatory for the Biology, Ecology and Environmental Protection, Biology and Chemistry, Biology and English Language, Geography and Biology specialties. Other courses she conducts in bachelor's degree are *Principles of rearing and breeding of wild animals in captivity*, *Conservation-Important Vertebrates in Agroecosystems*, *Application of GIS in Biological Research*. Although the latter are electives, there are always students willing to enrol in them. This shows that Assoc. Prof. Zlatanova is a competent and fascinating lecturer. In the master's degree programs of Zoology - Vertebrate Zoology and Ecology and Environmental Protection specialties - Assoc. Prof. Diana Zlatanova also teaches a set of courses *Theriology* (Compulsory), *Information Technologies for the Environment* (Compulsory), *Vertebrate Research Methods* (Elective), *Methods for Mapping and Analysing Field Data in GIS*

(Elective). In the doctoral degree program, she leads the course *Data Analysis in Geographical Information Systems*.

Under the supervision of Assoc. Prof. Zlatanova 10 graduates have successfully defended their MSc thesis. She has two full-time PhD students who have defended their PhD theses and two PhD students awarded with the right to defence. Currently, she is supervising one part-time PhD student, who is in the process of preparing his dissertation, which proves its serious commitment to the training and career development of young researchers. In conclusion, I highly appreciate the overall teaching activity of Assoc. Prof. Zlatanova.

Research activity. The scientific output of Assoc. Prof. Diana Zlatanova until January 2023, according to the presented list, is composed of 92 scientific and applied publications in the field of zoology and ecology of vertebrates and their conservation: 59 research papers, 31 book chapters and applied papers, and 2 teaching aids for practical exercises in vertebrate zoology. In the current competition, Assoc. Prof. Zlatanova participated with 25 publications in the field of the announced competition. All presented publications are co-authored, and most often she is second and third author.

The fulfilment of the minimum national requirements for holding the position of "Professor" by scientometric indicators given in Bulgarian language are as follows:

The indicator from group "A" is fulfilled (50 points).

The indicators from group "B" bring the candidate 126 points, out of the required 100. Here are included 8 publications with the following quartiles /according to the metrics SJR of scientific journals/: 3 research papers with Q2 - published in the prestigious scientific journals *Nature Conservation Research*, *Mammalia*, *Ecologica Montenegrina*; 2 with Q3 and 3 with Q4 mostly in *Acta Zoologica Bulgarica* journal.

According to group "Г" indicators, Assoc. Prof. Zlatanova has presented publications for 284 points out of the required 200, distributed as follows:

Г5. Published monograph, which has not been represented as a habilitation work - 1 issue (30 points). It refers to a framework document - Action plan for the conservation of the Balkan chamois (*Rupicapra rupicapra balcanica*, Bolkay, 1925) in Bulgaria for the period 2023-2032", MOEW, Sofia, prepared together with E. Popova. In this document, Assoc. Prof. Zlatanova is the first author. However, in my opinion, this document does not fit into the

definition of a monograph according to the Act on the Development of the Academic Staff in the Republic of Bulgaria - Additional provisions, § 1., 10. (new - SG No. 30 of 2018, in force from 05.05.2018), where it is said that a monograph is a scientific work that has a scientific editor and/or scientific reviewers, has an ISBN. Therefore, it will not be considered.

Г7. Selected scientific publications in refereed and indexed editions of world-famous databases with scientific information (Web of Science and Scopus) from group I (journals with Q1 and Q2) - a total of 2 issues with Q1 x 25 pts. (total 50 pts.). The publications are in the prestigious scientific journals *Sustainability* and *Journal of Environmental Management*. They are co-authored, with the candidate taking 7th and 21st place.

Г7. Selected scientific publications in refereed and indexed editions of world-famous databases with scientific information (Web of Science and Scopus) from group II (journals with Q3 and Q4) - a total of 9 issues: 2 issues with Q3 x 15 pts. (total 30 pts.) and 7 issues with Q4 x 12 pts. (total 84 pts.) = 114 pts. Of the mentioned 9 publications, 7 are in the *Acta Zoologica Bulgarica* journal and two in *Ecologia Balkanica* and *Biotechnology & Biotechnological Equipment*. In 2 of the 9 publications, the candidate takes 2nd place, in 4 publications - 3rd, and in the rest, lower positions.

Г8. Published chapter of a book or collective monograph. A total of 6 documents are presented, mostly of an applied character, in which Assoc. Prof. Zlatanova is a co-author - Publication report from 42nd meeting of Standing Committee on the Convention on the Conservation of European Wildlife and Natural Habitats about the conservation status of the Wolf (*Canis lupus*) in Europe, prepared by Large Carnivore Initiative for Europe, a Specialist Group of the IUCN Species Survival Commission; Action plan for the European wolf (*Canis lupus lupus* L.) in Bulgaria 2022-2031; a new assessment of the European wildcat (*Felis silvestris*) to the *IUCN Red List of Threatened Species 2022*; Ornithological important places in Bulgaria and Natura 2000 - Bakarlaka and Osogovo. Here, some omissions and inaccuracies were noticed: 1. In the documents presented, in the publication for *Felis silvestris* published in The IUCN Red List of Threatened Species it is not given the International Standard Serial Number - ISSN 2307-8235 (online); 2. The "Action Plan for the European wolf (*Canis lupus lupus* L.) in Bulgaria 2022 - 2031", like to the above-mentioned Action Plan for the protection of the Balkan chamois, cannot be accepted as a monograph, as well as the published report of the 42nd meeting of the Standing Committee to the Convention for the Conservation of European Wild Flora and Fauna and Natural Habitats (Bern Convention)

neither for a “monograph” nor for a “studio”, as classified by the candidate in the submitted reference generated by the "Authors" system. According to the definition given in the Act on the Development of the Academic Staff in the Republic of Bulgaria - Additional provisions, § 1., 12. (new - SG No. 30 of 2018, in force from 05.05.2018), the "studio", like the "monograph", is a published scientific study that has a scientific editor and/or scientific reviewers and has an ISSN or ISBN. The same applies to the "chapter of a book" (Act for the Development of the Academic Staff in the Republic of Bulgaria - Additional provisions, § 1., 11.). Given the arguments presented, 3 of the 6 publications under indicator Г8, I believe should not be considered. Thus, the total number of points to the indicators of group "Г" becomes 209 from a required minimum of 200 points.

According to indicators from group "Д", the candidate declared a total of 3513 points, with the required 100. According to this indicator, Assoc. Prof. Zlatanova repeatedly exceeds the necessary minimum national requirements. The high number of citations of the scientific works is proof of the importance of her scientific research, as well as the relevance of the field in which she works. The total number of noticed citations of all publications of Assoc. Prof. Diana Zlatanova (without self-citations) in referenced and indexed in world-famous databases with scientific information (Web of Science and Scopus) according to Scopus are 2393 and 2275 according to Web of Science, h- index = 8. After habilitation for the period 2017-2022, according to the Scopus database, h-index = 7.

For the period 2017-2022, the noticed citations of Assoc. Prof. Zlatanova in indexed and refereed in Scopus editions are 1756. The cited works are 23, but the disproportion in the number of citations of her publications is noticeable. Thus, two of them, which have about 70-80 co-authors - The IPBES Conceptual Framework — connecting nature and people, published in *Current Opinion in Environmental Sustainability* and Recovery of large carnivores in Europe's modern human-dominated landscapes, published in *Science*, collect 1641 citations or 93% of all candidate citations for the specified period. Of the remaining cited publications, 4 have between 10 and 30 citations, and 17 between 1 and 7.

Regarding the candidate's place in cited publications, the distribution is as follows: Lead author in 5 publications published in *Acta Zoologica Bulgarica*, *Bulgarian Journal of Agricultural Science*, *Biodiversity and Conservation*, *Nature Conservation Research*, *Ecologica Montenegrina* journals, second place in 7 publications, third place in 5

publications, 5th, 6th and 7th place in one publication each. In three publications, the candidate ranks 21st, 75th and 80th respectively.

According to the indicators of group "E", 150 points are required to meet the minimum national requirements for the position of "Professor". Assoc. Prof. Zlatanova was the supervisor of 2 successfully defended PhD students (100 points). She participated in the implementation of 10 national scientific or educational projects (100 points) and in 2 international scientific or educational projects (40 points). She was also the head of 7 national scientific or educational projects (140 points). Thus, the sum of the points for the indicators from group "E" of Assoc. Prof. Zlatanova is 380 points.

Main research areas of the candidate and the scientific contributions

In the habilitation reference, 8 publications are presented, which are in the field of mammal research, mainly large mammals (wolf, bear, red deer, etc.) and include three main directions: 1). Studying the relationships of mammals with other species (predation, competition or cooperation); 2). Behavioural aspects of mammals related to habitat use and avoidance of threats; 3) Testing new approaches to the study of species diversity. They are arranged and explained in detail.

The candidate's research advances knowledge of species composition and relationships among mammals. Thus, by applying a complex approach to clarifying the wolf's diet confirms that the species does not always select its prey opportunistically, but can also show an anti-apostatic prey selection (B4-1), unusual non-agonistic relationships between the wolf and feral dogs (B4-4) are revealed, as well as the relationships of 14 mammal species at feeding stations (B4-7), which are the first of their kind. Of high scientific value is the study on the separation of the trophic, spatial and temporal ecological niches of the sympatric – red fox *Vulpes vulpes* L. and genus *Martes*, represented in our country by the stone marten *Martes foina* (Erxleben) and the pine marten *Martes martes* (L.), (B4-8). The results in the proposed publications provide depth in the knowledge of the sizes of home ranges and core areas of the brown bear and red deer, their mobility, distribution and habitat use (B4-3, B4-5), behavioural response to approaching anthropogenic structures (B4-2), hibernation location and hibernation time dependence on the density of feeding stations in the brown bear (B4-3), with many of the studies being pioneered.

All research was carried out with suitable and modern methods, such as the use of camera traps, GPS-GSM telemetry. An important aspect of the works are the GIS tools used (the ArcGIS Desktop software and spatial analyses through the ArcMet software upgrade). The ability to apply the mentioned GIS tools allows insight into the details of the ecology and behaviour of animal species and their distribution, which few zoologists master and Assoc. Prof. Zlatanova is one of them.

For the most part, the research carried out has not only scientific, but also high applied value in the field of zoology and conservation biology. Notable contributions in this area include the recent reassessment of the European wildcat (*Felis silvestris*) according to the IUCN Red List category and criteria (Г8-3), the assessment of the status of ungulate management in European national parks, in line with the aims of protected area management as set by IUCN guidelines (Г7-5), the testing of new approaches to estimate the density of ungulates (Г7-6), as well as of new approaches to survey biodiversity enabling rapid ecological assessments (B4-6).

The candidate's contributions related to the protection of biological diversity and rare and endangered animal species are also reflected in research on other groups of vertebrates - birds, amphibians. Such are the determination of the species composition of the birds and their nature conservation status at the national and European level in the Ornithological Important Sites of Bakarlak and Osogovo (Г8-5, Г8-6), the disclosure of peculiarities in the breeding behavior of the griffon vultures (*Gyps fulvus*) and its intra- and interspecies relations (Г7-8), analysis of wolf-vulture relationship and proposals to reduce the negative effect of human-wolf conflict on vulture populations in Europe (Г7-7), modelling the spatial distribution of prey species of the golden eagle (*Aquila chrysaetos*), long-legged buzzard (*Buteo rufinus*) and peregrine falcon (*Falco peregrinus*) in relation to their choice of nesting habitat (Г7-2), key microhabitat characteristics of the poorly studied Balkan subspecies of the sand lizard – *Lacerta agilis bosnica* (Г7-3) were evaluated.

In the materials for the competition, a list of participation in 38 scientific forums after holding the academic position of "Associate Professor" is presented as well, of which 24 are international (20 sectional reports and 4 posters) and 14 are national (3 sectional reports and 11 posters). All 38 participations were in a team, which testifies to Assoc. Prof. Zlatanova's ability to work in a team. Her participation in the mentioned scientific forums completes her scientific research achievements and activity.

Assoc. Prof. Diana Zlatanova's professional skills are most clearly confirmed by her project and expert work. She participated in the implementation of 10 national scientific or educational projects and in 2 international scientific or educational projects, all in the field of the competition. 6 of the 10 national scientific or educational projects are financed by the Scientific Research Fund of Sofia University "St. Kliment Ohridski, and the remaining 4 are under the Operational Programme "Environment 2007-2013" through the Executive Environmental Agency (EEA). One of the international projects in which the candidate participates is under the "Life+" program. In addition, Associate Professor Zlatanova has coordinated 7 national scientific or educational projects, most of them financed by the Scientific Research Fund of Sofia University "St. Kliment Ohridski".

From the presented CV of the candidate and from my personal impressions, it is clear that Assoc. Professor Zlatanova has a very intensive expert activity. Her more than 20 years of field experience related to mammal's research make her a sought-after expert. She participates in the preparation of action plans for species and management plans for protected areas, performing GIS analyses, preparation of nature conservation expertise, author of methodologies for large and medium-sized mammals, evaluator in the preparation of a new assessment of the state of the wild cat in Europe for the IUCN World Red List. Since 2009, Assoc. Prof. Zlatanova has been a full member of the Large Carnivore Initiative for Europe Specialist Group-SSC/IUCN, a member of the European Bear Expert team, Bear Specialist Group - SSC/IUCN), of the Captive Bear Expert Group - SSC/IUCN, of the Cat Specialist Group - SSC/IUCN, of the Infra Eco Network Europe (IENE) - Initiative for harmonizing the transport infrastructure with the environment and others. To all this we must add the active organizational and administrative activity of the candidate. Assoc. Prof. Zlatanova is an editor (mammals) at *Acta Zoologica Bulgarica* - a journal indexed and refereed in Scopus and Web of Science. She had been elected as a member of scientific juries in competitions for the acquisition of academic positions and educational and scientific degree "PhD", for preparing reviews of scientific publications in specialized journals such as *Acta Zoologica Bulgarica*, *Nature Conservation*, *Forests*, *Scientific Reports*, *Biodiversity Data Journal*, etc. She also takes participation in organizing and conducting scientific forums as a member of the organizational / scientific committee such as the 6th Congress of Ecologists of the Republic of North Macedonia, with International Participation. At the Faculty of Biology she is a member of the Quality Commission and the Council of binary specialties (Biology and English, Biology and Chemistry and Geography and Biology). This exceptional activity of the

candidate should be highly appreciated in connection with the upcoming occupation of the academic position "Professor".

Conclusion

Based on the materials submitted by Assoc. Prof. Diana Zlatanova, I am convinced that she fully meets the national criteria for holding the academic position "Professor", defined by the Act for the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, and the Rules on the conditions and procedure for acquiring science degrees and holding academic positions at Sofia University "St. Kl. Ohridski". Assoc. Prof. Diana Zlatanova is a recognizable scientist at European level with proven scientific and scientific-applied contributions and a teacher with indisputable qualities. Her teaching activity is intensive and is entirely in the field of the competition. In conclusion, I strongly recommend the members of the Scientific jury to support the election of Associate Professor Diana Zlatanova for the academic position "Professor" in professional field 4.3. Biological Sciences (VERTEBRATE ZOOLOGY, GEOGRAPHIC INFORMATION SYSTEMS), for the needs of the Department "Zoology and Anthropology" at the Faculty of Biology of Sofia University "St. Kliment Ohridski".

04.04.2023 г.

Reviewer: