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OPINION

of Prof. Dr. Petar Hristov (IBEI-BAS)

regarding awarding the academic position "Associate Professor" in the professional direction "4.3. Biological Sciences", scientific field "Parasitology and Helminthology", for the needs of the research group "Taxonomy, evolution and ecology of helminths", section "Biodiversity and ecology of parasites", at department "Animal diversity and resources" of IBEI-BAS.

Dr. Simona Georgieva Georgieva is the only candidate in the announced competition for associate professor in the scientific specialty "Parasitology and Helminthology" for the needs of the research group "Taxonomy, Evolution and Ecology of Helminths". The candidate graduated a bachelor's degree of the "Saint Kliment University of Ohrid" in 2006, and a master's degree in "Biology" majoring in "Parasitology" in 2008 at the same university. During the period 2005-2006 the candidate works as a biologist specialist at the "Central Laboratory of General Ecology" at the BAS. In 2007, Dr. Georgieva entered the "Institute of Experimental Pathology and Parasitology" at the BAS as a biologist, and until 2010 holds the scientific title research associate 3rd degree. In the same year, Dr. Georgieva joined the "Institute of Biodiversity and Ecosystem Studies" at the BAS as a chief assistant. In 2011, the candidate was a PhD student at the University of South Bohemia (České Budějovice, Czech Republic), where in 2015 successfully defended a dissertation on the topic "Integrative taxonomic approach for studying trematode diversity and their life cycles in freshwater ecosystems" in the scientific specialty "Parasitology". To date, Dr. Georgieva is a biologist at the "Institute of Biodiversity and Ecosystem Research" at the BAS, with 8 years and 6 months experience.

The candidate participated in the competition with 23 scientific papers, of which 21 articles in refereed and indexed journals with an impact factor (IF) according to Journal Citation Reports on Web of Science and (SJR) according to Scopus, 1 article in a journal without SJR and IF, and 1 – chapter of a book. The list of citations is remarkable - 670 in reputable IF journals.

The scientific interests of Dr. Georgieva's are directed in several topics related to the study of the species diversity and evolution of helminths from different habitats, as well as revealing their life cycles using an integrative taxonomic approach. Logically, the main contributions indicated by the candidate are also formed from the stated interests.

In this relation, in several studies covering diverse freshwater habitats from the Southern parts of Europe to sub-polar latitudes, 27 trematode species from 7 widespread families were

characterized: Allocreadiidae, Diplostomatidae, Echinostomatidae, Notocotylidae, Plagiorchiidae, Schistosomatidae, and Strigeidae. Morphological descriptions have been made and identification keys have been prepared to refine the taxonomy and ensure reliable identification of these parasites in freshwater ecosystems (papers 1–3, 5–11, 15, 19, 22). On the based of an integrative approach, the structure of the *Echinostoma* "*revolutum*" species complex was revised, as a result of which 6 species were identified, 2 of which are new to science (*E. nasincovae* and *Echinostoma* sp. (papers 3, 8, 11). As a result of an innovative barcode approach, a large-scale survey was conducted to reveal the species diversity of the problematic genus *Diplostomum* in Europe. New molecular data have been generated for both *D. phoxini* and its first intermediate host *A. balthica*, and species identification keys have been made for the different stages of the parasite's development (paper 2, 3, 7, 9, 10, 18). Due to difficulties in distinguishing larval forms of the genus *Plagiorchis*, a *cox1*- barcode approach was applied, resulting in the first study of the genetic diversity of parasites of this genus (paper 5).

Other studies are pointing out into genetic diversity in trematodes in extreme ecosystems. A large-scale survey was performed to uncover parasite diversity in freshwater sub-Arctic systems in Iceland and Norway. 24 trematode species/lineages have been identified, including 16 probable independent species belonging to 6 families (papers 1,3, 9, 10, 11, 19). Based on newly generated sequences and bioinformatic analysis, the main intermediate hosts (mollusks) were established: *Radix balthica*, *Pisidium casertanum* and *Sphaerium* sp. of the groups above mentioned trematodes (papers 1, 3, 9, 10, 8). Based on the phylogeny and phylogenetic reconstruction, Dr. Georgieva proposes hypotheses regarding the diversity and evolution of 8 species of digenean trematodes from three families: Hemiuridea, Opecoelidae and Lepidapedidae on fish from the Southern Arctic Ocean (publication 8).

No less valuable are the indicated contributions regarding genetic and species diversity in trematodes from deep-sea ecosystems. A targeted study carried out on the biodiversity and population-genetic structure of species of the genus *Lepidapedon* parasitizing deep-sea fish in the Mediterranean Sea. Evidences has been presented that combining population-genetic and ecological approaches represents a reliable approach for assessing factors and possible mechanisms in parasite populations in deep-sea marine ecosystems (papers 13, 32). For the first time, the life cycle of *Ornithobilharzia canaliculata* (Rudolphi, 1819) is revealed, based on molecular analysis of nuclear and mitochondrial genetic markers, a large-scale phylogenetic

analysis of family Schistosomatidae in hypersaline and highly anthropogenically impacted ecosystems (papers 31). The candidate also investigated trematode diversity in the marine gastropod *Austrolittorina unifasciata* from the coast of Australia based on newly generated *cox1* and 28S rDNA sequences. In the large number of the studied gastropod individuals (over 2000), 5 species of trematodes belonging to 5 families were found (paper 16).

An interesting direction in the research activity of the candidate is the research on parasite diversity in hosts of priority importance (papers 18, 24). Dr. Georgieva also studies trematodes in species of conservation importance, and 2 newly species - *N. spathulatum* and *N. sunameri*, were redescribed in the endangered species of East Asian porpoise *Neophocaena asiaeorientalis sunameri* (paper 22). Other studies have characterized the helminths of the Magellanic penguin *Spheniscus magellanicus* and pinnipeds from the coasts of Brazil and Argentina, with Dr. Georgieva indicating that the presence of mature *C. australe* in the Magellanic penguin can be interpreted as adaptive colonization of a new avian host through favorable mutations (papers 23, 26). Following the application of an integrative approach, the candidate describes a new species for science, *Skoulekia erythrini*, parasitizing on the coral *Pagellus erythrinus* - a species of important commercial importance (ppaper 21). The candidate established a new species of hemiurid *Saturnius gibsoni* in the sea mullet *Mugil cephalus* from the coast of Algeria (paper 14), as data on the genetic diversity on the family Diplostomidae from freshwater habitats in Africa were also presented (paper 4). Dr. Georgieva also presents contributions related to the fauna, taxonomy and evolution of monogeneans (papers 27, 30). Here, the first researches on the phylogenetic hypotheses on the Microcotylidae stand out most significantly (paper 30).

As a strong point regarding the candidacy of Dr. Georgieva, I would point out the training of young staff from bachelors to postdoctoral students. The candidate presents data on co-supervision of two doctoral students, 4 masters and one bachelor, which characterizes her as a sought-after and desirable specialist in the field she is developing.

Teaching activity as a mandatory part of her doctoral studies is no less impressive. The candidate has given practical exercises to undergraduate and postgraduate students in Helminth Biology and Parasitology courses; she has led practical exercises to postgraduate students in Ichthyology and Biodiversity: Conservation and Evolution in Spain.

The list of memberships in a number of scientific societies and associations is also impressive. Dr. Georgieva participated in the editorial board of a number of prestigious and renowned journals

such as Parasites & Vectors, Scientific Reports, Heliyon, Canadian Journal of Zoology, etc. Also noteworthy is the list of participation in projects, as well as presentation of the results of her research at prestigious international scientific forums.

Detailed reference for conformity of the points of Dr. Simona Georgieva's with the minimum scientific requirements of the BAS and the national criteria for the competition for the academic position of "Associate Professor" in the professional direction 4.3. "Biological Sciences" shows a total number of points of 1825. This shows that the candidate not only meets, but far exceeds the requirements for obtaining the academic position "Associate Professor".

Conclusion: Dr. Simona Georgieva is an established young specialist, successfully applying a number of contemporary molecular genetic, morphological and ecological methods. This integrative approach is the basis of the problems that she investigate - studies of the species diversity and evolution of helminths from different habitats, as well as revealing their life cycles in a large number of different host taxa. Almost all scientific papers are published in specialized prestigious international journals. The candidate has a clear scientific profile and visibility in the international scientific space. All of the above allows me to highly evaluate the scientific research and scientific organizational activity of Dr. Georgieva and with full conviction to propose to the Scientific Jury fof the competition and the members of the National Assembly at IBEI to award Dr. Simona Georgieva the academic position of "Associate Professor" in the scientific field "Parasitology and Helminthology".

29. 11.2024 Prof. Dr. Peter Hristov