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Review

for the award of the academic position of "Professor" to Dr. Yasen Mutafchiev

Reviewer: Prof. Dr. Vlada Peneva, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences

For the competition for Professor in Professional Field: 4.3. Biological Sciences, Scientific Specialty "Parasitology and Helminthology" for the needs of the research group "Taxonomy, Evolution and Ecology of Helminths", section "Biodiversity and Ecology of Parasites", department "Animal Diversity and Resources" at the Institute of Biodiversity and Ecosystem Research - BAS, announced in State Gazette issue 45 of July 3, 2025, only one candidate has declared participation and submitted the required documentation – Associate Professor Dr. Yasen Zhelyazkov Mutafchiev.

Career and Thematic Development (Brief Biographical Data)

Yasen Zhelyazkov Mutafchiev was born on January 13, 1979, in town of Lovech. He completed his undergraduate education with a Bachelor's degree in Biology at the Faculty of Biology, Sofia University "St. Kliment Ohridski" in 2003. He obtained his Master's degree in Zoology in 2005 with excellent grades, defending his thesis also with distinction. His publication activity began as a student when he co-authored an article dedicated to entomopathogenic nematodes from the families Steinernematidae and Heterorhabditidae from Vitosha Mountain. He defended his dissertation on the topic: "*Species diversity of nematodes from the superfamily Acuarioidea (Spirurida) in Bulgaria*" in 2009 and received his doctoral degree in the scientific specialty "Parasitology and Helminthology". Dr. Mutafchiev worked as a biologist-specialist at the Central Laboratory of General Ecology - BAS for 10 months in 2005 and at IBER-BAS from 2009 until January 31, 2010. In the same institution, he served as Senior Research Associate from February 1, 2010, to July 4, 2010, after which he was elected as Chief Assistant in the section "Biodiversity and Ecology of Parasites" until November 24, 2015, when he was elected Associate Professor, a position he holds to this day.

He has specialized at two renowned foreign institutions – the Natural History Museum in Paris and the University of Geneva. Research visits of varying duration to the National Museum of Natural History in Paris and the University of Bari, Italy, as well as numerous personal grants through the Synthesis program at prestigious scientific institutions in Europe (natural history

museums in Berlin, Vienna, and Paris) have contributed significantly to his methodological skills and his successful scientific career.

The candidate's main scientific interests are in the field of taxonomy, systematics, biology, and evolution of nematodes parasites on vertebrate animals.

Scientific Directions and Contributions

The candidate's research work was primarily related to nematodes of the order Spirurida at the beginning of his research career, later expanding the scope to include roundworms from the orders Ascaridida, Strongylida, and Camallanida. The more important contributions can be summarized by groups:

Scientific contributions - ***contributions in the field of taxonomy, morphology, systematics, biology, and phylogeny of:***

Order Spirurida

Family Acuariidae – with definitive hosts primarily birds, rarely mammals, with complex life cycles; more than 300 species and 40 genera are known, some monotypic.

In co-authorship, **3 new species have been described**, two from Australia and one from Bulgaria, all parasitizing birds (Publications №№**36** and **45**). The generic diagnosis of genus *Syncuaria* has been amended and supplemented (Publication №**48**), and one **new combination** has been proposed.

I highly value the research on genus *Streptocara* (Publication №**52**), which resulted in the proposal of **two new synonyms**, the development of a **key** for species identification within the genus, and the discovery of the **intermediate host** of *Streptocara incognita*, which represents a substantial original contribution to the biology of this species.

Of great scientific importance are the investigations of the phylogenetic relationships within family Acuariidae, based on new 28S rDNA sequences (Publication №**48**), utilizing new primers. Eighteen species (15 genera) were included, confirming the monophyly of this family and its close relationship with family Cystidicolidae. Based on the grouping of examined taxa, **synonymization** of subfamily Seuratiinae with subfamily Acuariinae was proposed. A thorough analysis of the evolution of certain morphological features and host range was

conducted. During the investigation, new geographical records (for 9 species) and new hosts (also for 9 species) were established.

Family Spirocercidae – parasites primarily of mammals, but also utilizing birds and reptiles as definitive hosts.

Research on this family has been expanded with contributions on genus *Cylicospirura*, with **one new species described**, descriptions of two other species supplemented, and **one species redescribed** (Publication №**53**). The surface ultrastructure of the cuticle in the four investigated species was studied for the first time using SEM.

Family Physalopteridae – parasites of all major groups of vertebrates, but more commonly of fish, lizards, and snakes, with insects as intermediate hosts.

Substantial contributions to the taxonomy of the family include an analysis of species from genus *Thubunaea* in the Palearctic and Indo-Malayan regions, with **one species** from Turkey **redescribed** and **5 new combinations** proposed for species from Afghanistan, India, and Vietnam (Publication №**50**).

Family Aproctidae – parasites of birds, with arthropods as intermediate hosts.

Research on the family led to the description of **one new species** from genus *Aprocta* from the USA, based on morphological, including ultrastructural, and molecular data (Publication №**56**). Phylogenetic analysis revealed a close relationship with another North American species published as *Aprocta* sp.

Order Ascaridida

Family Heterocheilidae – parasites of reptiles (crocodiles) and some fish.

Contributions to the taxonomy and systematics of the family include the description of one **new genus** (*Ingwenascaris*) and **species** of nematode isolated from Nile crocodile from South Africa, with **a new combination** proposed for another species from the same genus (Publication №**41**). From the same host species and geographical region, a **new species** from genus *Typhlophoros* was described (Publication №**42**), and a detailed description of the poorly studied species *Multicaecum agile* was made using light and scanning electron microscopy (Publication №**47**).

Order Camallanida

Family Micropleuridae – parasites of fish and reptiles, primarily crocodiles.

A **new species** from genus *Micropleura* was described from the body cavity of Nile crocodile; another species from the genus was designated as a species with uncertain taxonomic position - *species incertae sedis* (Publication №**43**).

As a result of the candidate's research, the morphology of 21 species of zoonematodes from various taxonomic groups has been studied, including 7 new species and one new genus. The descriptions are detailed, based on modern taxonomic standards, excellently illustrated with drawings and photographs, data on the surface ultrastructure of the cuticle (SEM) are presented, and molecular methods have been employed. These contributions to zoonematode diversity were made using materials from Bulgaria and various countries in Europe, Asia, America, Africa, and Australia based on new or museum collections. I would also like to note his merit in creating and cataloging the collection of nematodes parasitic on vertebrates at IBER – a good foundation for future research and successors.

Applied Scientific Contributions

Applied scientific contributions are in the field of veterinary and human parasitology or are related to conservation biology and nature conservation practice. They are expressed through research conducted on important parasites for animals and humans in various aspects or for species of conservation significance, invasive species, and others. The results of these studies provide a scientific basis for identification, diagnosis, and help in combating these pathogens.

The discovery of the nematode *Onchocerca boehmi* for the second time in Europe after its original description is a significant finding. This parasite causes a disease in horses known as onchocerciasis. Morphological and molecular data (cox1 gene fragment) support the species' belonging to genus *Onchocerca* (Publication №**37**).

A phylogenetic analysis of family **Onchocercidae** was conducted – parasites of vertebrates that cause serious diseases in humans and domestic animals. Forty-eight species were included - representatives of seven of the eight subfamilies, based on 7 nuclear and mitochondrial loci. The results confirm its monophyletic origin. The hypothesis for the early divergence of subfamilies Oswaldofilariinae, Waltonellinae, and Icosiellinae is supported, as well as the monophyly of three other subfamilies (Onchocercinae, Dirofilariinae, and Splendidofilariinae)

(Publication №**35**). In subsequent studies based on 7 genes, the phylogenetic relationships of 13 species from genus *Onchocerca* of the same family were analyzed, and their division into 3 groups with high support was established (Publication №**44**). They provide information about the evolution of these parasites through adaptation to new hosts and show the role of domestication in these processes. As in other cases of symbiosis between nematodes and endosymbiotic bacteria, in this case *Onchocerca* and *Wolbachia*, a strong co-evolutionary relationship resulting from joint evolution was established.

Of particular interest is the study of the nematode fauna of the Nile crocodile in **Kruger National Park**, where 11 species were identified. The diversity of genera and species was analyzed, and the type of faunistic elements was characterized in terms of specificity (Publication №**47**). Two species are new geographical records, and one species was redescribed.

Various ecological characteristics of the helminth fauna of one alien species (umpkinseed sunfish) and three native endangered fish species in Bulgaria (Caucasian dwarf goby, Three-spined Stickleback, and black-striped pipefish) from the Atanasovsko Lake maintained reserve were studied (Publications №№**40, 46, 51** and **54**). The research contributes to revealing the impact of alien species on local helminth fauna (Publication №**40**), as well as the characteristics of helminth communities of organisms with conservation status (Publications №№**46, 51, and 54**).

The garden snail *Cornu aspersum* was established for the first time as a potential intermediate host for the nematode species *Crenosoma vulpis*. The invasive stages (first and third) for the intermediate and definitive host of this metastrongyloid nematode species were morphologically described and documented (Publication №**38**).

Based on coprological samples collected during over 4 years, the dynamics of intestinal parasites in two groups of European ground squirrel (a vulnerable species in our country) –i) translocated (relocated) and ii) ground squirrels during and after population reinforcement (Publication №**39**), were monitored. The obtained results confirm epidemiological models and other studies on the positive relationship between host population density and the distribution and species richness of parasites, however this does not lead to a negative effect of parasites on ground squirrels.

The reviewed works for this competition, as well as previous ones, demonstrate that the candidate has thorough and diverse scientific activity and achievements. I accept the summary of contributions regarding content, but I believe the contributions and achievements could be presented in a more generalized and structured manner. The new genus *Ingwenascaris* is not noted in the summary of taxonomic acts, and Publication №17 is incorrectly marked in bold.

Significance of the Obtained Results

Dr. Yasen Mutafchiev presents himself in this competition with a total of 56 scientific works, distributed in the following categories:

- Book chapter published abroad - 1;
- Articles in journals with impact factor – 51; after dissertation defense - 27; for **this competition – 22**;
- Articles in journals without impact factor – 3;
- Dissertation abstract;

The reference for compliance of Assoc. Prof. Dr. Yasen Mutafchiev's points with the minimum scientometric requirements for holding the academic position "Professor" meets the requirements. The fulfillment of minimum national requirements by indicators for the position "Professor" is: The indicator from **group "A"** is covered with the defended dissertation for the educational and scientific degree "Doctor"; for the indicator from **group "B"** there are no points, as the candidate has not defended a dissertation for the scientific degree "Doctor of Sciences"; indicators from **group "C"** have 150 points (with 100 required according to national requirements). Seven publications in scientific journals are presented here, falling into the following quartiles: Q1 – 4, Q2 – 1, Q3 – 2. In 6 of these publications, the candidate is the leading or sole author. Dr. Mutafchiev's co-authors are prominent foreign and Bulgarian scientists. **Group "D"** includes only indicator 7 with 271 points (with 220 required according to BAS requirements). Fifteen publications are included, distributed by quartiles: Q1 – 5, Q2 – 1, Q3 – 6, Q4 – 3. All publications have an impact factor. The publications are in co-authorship with authoritative foreign scientists as well as Bulgarian ones. In one of the works, Dr. Mutafchiev is the leading author. For indicators in **group "E"** there are 678 points (with 120 required according to BAS requirements), from a total of 339 citations. For indicators from **group "F"** there are 169 points (with 150 required according to national requirements).

Dr. Mutafchiev applies high contemporary standards in the study of nematode species; the drawings are precise and illustrate species descriptions in the best possible way; the

photographs are of high quality and informative. The candidate's works are of undoubted scientific value, published in the most prestigious specialized parasitological and zoological journals, with about half falling in the first quartile (Q1). This is evidence of the candidate's scientific activity, who is the leading author in about one-third of the reviewed scientific works. Dr. Mutafchiev's fruitful collaboration with prominent Bulgarian and foreign scientists proves his authority as a scientist and his integration into our national and global scientific community in his areas of competence.

Besides publishing scientific results in specialized scientific journals, all with impact factor in this competition, the significance of the candidate's scientific achievements is also demonstrated by citations of his works – 339 indexed in Web of Science and Scopus, total number – 589, H-index according to WOS - 14.

Management and Participation in Projects

According to the reference presented in the candidate's CV, Dr. Mutafchiev has participated in six national scientific, applied scientific, and infrastructure projects funded by the Scientific Research Fund, National Roadmap for Scientific Infrastructure of the Republic of Bulgaria, and other Bulgarian institutions. The international projects in which the candidate has participated are 3, one of which is under a bilateral cooperation program. He is the leader of an ongoing project funded by the NSF. It is important to note the candidate's high activity in the European SYNTHESIS program, where he has prepared and successfully completed 5 projects.

Profile of Research Work

The scientific activity and production present Dr. Mutafchiev as a specialist-zoonematologist. A central place in his expertise as a taxonomist is occupied by nematodes of the order Spirurida; the predominant part of his scientific works is dedicated to studies of this group, but alongside this, the candidate has serious achievements in the field of biology and ecology, as well as in the systematics of other nematode groups and other helminth groups.

It is important to note also the candidate's excellent methodological skills and experience, with application of both light and scanning electron microscopy.

The candidate is a globally recognized specialist in the taxonomic groups he studies (spirurids, ascarids, etc.) and contributes substantially to revealing their diversity, biology, evolution, and biogeography.

Training of Scientific Personnel

Dr. Mutafchiev was the scientific supervisor of M. Kachamakova, who defended her dissertation in 2021 in professional field 4.3. Biological Sciences, scientific specialty "Ecology and Ecosystem Conservation"; Topic: "Adaptation of the European ground squirrel (*Spermophilus citellus*) during translocations of individuals in Bulgaria". He was also supervisor of diploma student K. Bachvarov -- who defended his thesis in 2017 for obtaining a Master's degree in "Parasitology", Department of Zoology and Anthropology, Faculty of Biology, Sofia University "St. Kl. Ohridski"; Topic "Helminths of dogs raised under different conditions in the surroundings of Sofia and neighboring areas".

Personal Impressions

I have known Yasen Mutafchiev since his employment in the Biodiversity section of the former CLGE-BAS. His dedication to work, thoroughness, precision, and high work capacity are impressive. An excellent scientific illustrator, motivated and organized scientist. During these almost 20 years dedicated to nematology, he demonstrates high publication activity and has significant achievements and international recognition. Nematodes are a difficult group of organisms that requires complete concentration, persistence, and much work to achieve good results.

Conclusion

Dr. Yasen Mutafchiev fully meets and greatly exceeds most of the criteria for holding the academic position "Professor" according to the Law on the Development of Academic Staff in the Republic of Bulgaria and the Criteria of the Scientific Council of IBER - BAS: defended doctoral degree, very good scientific production in terms of volume and quality, a large number of citations in prestigious scientific journals, and above all, substantial and original scientific and applied scientific contributions. Dr. Mutafchiev is a talented and productive scientist, a recognized authority with an international reputation. This is due to his exceptional diligence and work capacity, precision, dedication to science, the extensive geographical scope of his research, as well as his ability to work in various scientific teams.

In conclusion, highly evaluating the candidate's overall scientific activity, I give a positive assessment of his candidacy for the academic position "Professor" and recommend to the Scientific Council of IBER to elect Dr. Yasen Mutafchiev to the stated position.