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OPINION

by Prof. Teodora Atanasova Staykova, PhD
at Plovdiv University "Paisii Hilendarski", Faculty of Biology,
Department of Developmental Biology
Member of the scientific jury,
according to the order of the Director of the Institute of Oceanology at the BAS
No. 99 of 03.04.2023

regarding the materials submitted for participation in the competition to occupy the academic position "Professor" in the Institute of Oceanology at the BAS

in Area of Higher Education: 4. Natural Sciences, Mathematics and Informatics,
Professional Field: 4.3 Biological Sciences, Scientific speciality: Hydrobiology, Scientific direction "Genetics of hydrobionts"

In the competition for "Professor", announced in the State Gazette, No. 12 of 03/02/2023 and on the website of the Institute of Oceanology at the BAS, Varna, for the needs of the Institute, as the only candidate participates Assoc. Prof. Dr. Petya Pavlova Ivanova from the "Biology and Ecology of the Sea" section in the Institute of Oceanology - BAS.

1. **General presentation of the procedure and the candidate.**

The set of materials presented by Associate Professor Dr. Petya Ivanova is in accordance with the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for the terms and conditions for acquiring educational and scientific degrees and for holding academic positions at the Institute of Oceanology - BAS (PURPONSZAD IO-BAS), art. 55 (4), and includs all necessary documents for participation in the contest. These are: a set of administrative documents; lists of scientific works and the works themselves; list of established citations; documents for scientific research activity; a reference to cover the minimum national requirements for holding the academic position "professor" and evidence thereof; summaries of peer-reviewed publications and self-assessment of contributions; certificate of work experience; documents for scientific guidance of doctoral students, etc. Fifty-one scientific publications, a collective monograph chapter and a university textbook were submitted for participation in the competition for the academic position of "Professor", which were not used for the acquisition of the PhD and the academic positions of "Associate Professor". Of the presented scientific publications, 30 have IF and/or SJR and are referenced and indexed in the Web of Science and Scopus databases. Evidence of 373 citations, as well as leadership and participation in 41 research projects, 22 of which are international, are also attached.

Associate Professor Dr. Petya Pavlova Ivanova was born on October 17, 1969. In 1992 acquired the Master's degree in Biology at the Sofia University "St. Kiment Ohridski" with specialization "Hydrobiology and water protection". Her follow-up success is excellent. Since 1992 worked at the Institute of Fish Resources, Varna, as in the period 1994 - 2000 successively acquires the title scientific assistant III, II and I degree. In 2003 obtained a PhD degree in the scientific specialty "Hydrobiology", and since 2007 he is an associate professor of Genetics at the Institute of Fisheries Resources, Varna. Associate Professor Dr. P. Ivanova has indisputable qualities as a leader and administrator. From 2004 to 2010, he was the head of the "Ichthyology" section and the "Population Genetics" laboratory at the Institute of Fisheries Resources, Varna, and in the period 2007 – 2010 she is the deputy director of the same institute. Since 2010 until now he works as an associate professor at the Institute of Oceanology at the Bulgarian Academy of Sciences, Varna,

section "Biology and Ecology of the Sea". In the period 2015-2016 she has been the scientific secretary of IO. The candidate's work experience as an associate professor is 16 years.

The documents prepared by Associate Professor Ivanova for participation in the competition for the academic position of "professor" in Professional Field 4.3 Biological Sciences prove that she fully meets the minimum national requirements.

My personal impressions of the candidate date back to the time when P. Ivanova was a research assistant at the IFR, and I was an assistant at the University of Plovdiv. In connection with the preparation of my dissertation work, for several years, she and Prof. Dobrovolov accepted me in the Laboratory of Population Genetics, where they trained me and together we conducted experimental work using the methods of starch gel electrophoresis and isoelectric focusing. Exceptional responsiveness, cordiality, high professionalism and mastery of various experimental techniques are the qualities that impressed me in P. Ivanova even then. Our subsequent work together as colleagues reinforced these impressions. Assoc. Dr. P. Ivanova is a distinguished professional in the field of the genetics of hydrobionts, proof of which is her participation in the editorial boards of a number of prestigious international journals, the large number of reviews made, as well as the prepared examinations.

2. General characteristics of the activity of candidate

Scientific activity

The scientific research activity of Assoc. Prof. Petya Ivanova is mainly in the field of population genetics and molecular taxonomy, and is related to the discovery and application of genetic markers to determine the taxonomic status of marine and freshwater fish species and other hydrobionts in relation to the protection of their biodiversity; the study of the population-genetic structure of economically valuable fish species with a view to their rational use and the development of programs for genetic monitoring and control of fish resources, as well as assessment of their biodiversity; assessing the effect of environmental factors, including stress factors, on population dynamics and biodiversity; the genetic identification of offspring of endangered local fish species that are the object of stocking programs in the Danube River; study of the populations of hydrobiont species invasive to the Bulgarian Black Sea water area, in connection with the development of management mechanisms in accordance with European regulations. Part of the candidate's research is devoted to the study of the pollution of the Black Sea and the Danube River with macro- and microplastics in connection with the development of strategies to reduce waste and mitigate its potential impact on marine ecosystems and human health.

Associate Professor P. Ivanova works with a rich toolkit of methods - morphological, biochemical-genetic and molecular-genetic (including new generation sequencing).

The contributions of her research can be grouped as scientific, scientific-applied and methodological.

As **original scientific contributions,** I would indicate:

- The establishment of phylogenetic relationships between populations of endemic fish species based on molecular genetic markers. (Publications B.1, B.3)
- The establishment of molecular genetic markers for the identification of parental species and hybrid biotypes. (Publication B.2)
- Establishing the taxonomic affiliation of marine hydrobionts and assessing their biodiversity based on biochemical-genetic and molecular markers. (Publications B.6, B.8, Г.7.1, Г.7.2, Г.7.8, Г.7.10, Г.7.12, Г.7.20, Г.23, Г.24, Г.31, Г.36, Г.38)
- The establishment of specific population-genetic characteristics as a basis for assessing the stocks of various types of hydrobionts, the effective management of

their catch and their conservation. (Publications B.4, B.7, B.8, B.9, Г.7.2, Г.7.3, Г.7.5, Г.7.7, Г.7.13, Г.7.15, Г.21, Г.25, Г.27, Г.30, Г.32, Г.37, Г.40)

The systematization and updating of the available information on the species composition of the Black Sea ichthyofauna, the assessment of invasive and alien species, and the ecological state of fish populations in the NATURA 2000 zones is a significant scientific contribution to the work of Associate Professor Petya Ivanova. (Publications Г.7.4, Г.7.6, Г.7.9, Г.7.16, Г.7.19, Г.28, Г.29, Г.7.33)

Part of the candidate's scientific research contributes to the development of mariculture in Bulgaria, as well as an assessment of the state and dynamics of living and non-living resources and their exploitation in the Black Sea region. (Publications Г.7.17, Г.8).

Scientific and applied contributions are related to:

- Completing the global genetic database for turbot and phytoplankton species with information on established genetic sequences. (Publications B.7, Г.7.10, Г.7.13, Г.7.14, Г.7.15, Г.40)

- The establishment of population-genetic parameters in turbot, which can be used as an indicator for biomonitoring and maintenance of a high degree of genetic variability in natural populations, as well as for the implementation of multidisciplinary assessments of stocks of economically valuable fish species in relation to rational exploitation and protection of fish populations. (Publications B.7, B.8., B.9, Г.7.5, Г.7.13, Г.7.15, Г.30, Г.31, Г.32, Г.35, Г.36, Г.40, Г.41).

- The establishment of markers for the genetic identification of the chiga from the Bulgarian breeding farms, which can be used in the programs to restore the populations and protect the biodiversity of the sturgeon fish in the lower part of the Danube River. (Publication Г.34)

- Next-generation sequencing was applied to study the diversity of microalgae off the Bulgarian Black Sea coast with a view to developing effective programs for plankton community monitoring and ecological risk assessment. (Publications Г.7.10, Г.7.12, Г.38 и Г.39).

- The creation of a catalog of invasive/potentially invasive alien species in the countries part of the Eastern and Southern European Network on Invasive Alien Species (ESENIAS). (Publication Г.7.11)

- A technology has been developed for obtaining biologically active components from rapana hemocyanin (Rapana thomasiana) and their application as safe immunomodulators. (Publication Г.26)

- The updating of the data on the quantities of the most common groups of marine litter and the hot spots of their deposition on the bottom in the Bulgarian sector of the Black Sea, which can be used for monitoring and the development of strategies for the protection of marine ecosystems. (Publication Г.7.18)

Methodological contributions can be summarized as follows:

- A complex of complementary methods (allozyme analysis, karyotype analysis, flow cytometry and DNA sequencing) was applied to refine the species diversity in the genus Cobitis, and new markers for restriction fragment length polymorphism were also developed. (Publication B.2.)

- For the first time, using the massively parallel sequencing (MPS) of the 18S rRNA gene, using the Illumina MiSeq 250PE platform, the plankton diversity in thirteen samples from Varna Bay was investigated. (Publications Г.7.10, Г.38)

- By applying next-generation sequencing, new data on phytoplankton diversity in sediments from different regions of the Black Sea have been obtained. (Publication Г.7.12)

- An efficient method has been developed for the isolation of preparative amounts of high purity hemocyanin from the hemolymph of *Rapana thomasiana*. (Publication B.5)

In conclusion, I could confirm that the outstanding contributions in the publication materials of Associate Professor Ivanova are indisputable and define her as a professional who works very well in a team, using modern research methods in the field of hydrobiont genetics. Categorical proof of the scientific significance of the candidate's work is the presented 373 citations in journals, which are indexed and referenced in journals with scientometric indicators, as well as the high h-index of 11 (according to Web of Science).

Educational and pedagogical activity

In the period 1995-1996, the candidate led exercises in the disciplines "General Biology" and "Zoology" to students from the Technical University in the city of Varna, in the bachelor's specialty "Ecology". Associate Professor Ivanova is also the co-author of "Practical Guide for Exercises in Ichthyology: Microinvasive Methods for Field and Laboratory Studies of Fishes", which is used by students studying at the OKS "Bachelor" and "Master" in specialties from PN 4.3 Biological Sciences. Two PhD students were trained under the scientific guidance and supervision of Prof. Ivanova, one of whom successfully defended his doctoral thesis.

Expert activity

Associate Professor P. Ivanova is a professional with a highly valued opinion in the field of genetics and hydrobiology. In the period 2015 - 2023 she has prepared opinions and documents of strategic importance for various national and international institutions and organizations (IARA, Ministry of Health; Ministry of Education, Culture, Sports and Science; BG FISH, FAO). In the period 2012 - 2023 has prepared 31 reviews for prestigious international journals and for two university textbooks. She participated in the work of 18 scientific juries for the acquisition of the ONS "Doctor" (11), the scientific titles "Associate Professor" (5) and "Professor" (1), and the scientific degree "Doctor of Sciences" (1). Associate Professor Ivanova is a member of editorial boards and boards of six international journals and is the representative for Bulgaria of the European Reference Genome Atlas (ERGA).

The documents submitted by Assoc. Prof. P. Ivanova show that she fully meets the minimum national requirements for holding the academic position of "professor" in PN 4.3 Biological Sciences, according to ZRASRB, and the number of points for the individual groups of indicators is as follows:

<u>Group of indicators A</u>. Indicator 1 (min. 50 p.) – 50 points

The candidate has obtained PhD in the scientific specialty "Hydrobiology" in 2003, based on a defended dissertation on the topic "Taxonomy and population infrastructure of species of the families Cobitidae, Atherinidae and Clupeidae (Pisces) in Bulgaria".

<u>Group of indicators B</u>. Indicator 4 (min. 100 p.) – 148 points

A total of 9 publications in journals, referenced and indexed in the Web of Science and Scopus databases with quartiles are presented as follows: 2 publications with Q1 quartile (50

points), 1publication with Q2 quartile (20 points), 2 publications in journal with quartile Q3 (30 points) and 4 publications in journals with quartile Q4 (48 points).

Group of indicators G. Indicators 7 and 8 (min. 200 p.) – 369 points

A total of 21 publications are presented in journals with an impact factor that are referenced and indexed in world-renowned databases of scientific information (Web of Science and Scopus), outside of those according to indicator 4. Of them: 2 are in journals with quartile Q1 (50 points), 6 are in journals with quartile Q2 (120 points), 10 are in journals with quartile Q3 (150 points), 2 are in journals with quartile Q4 (24 points), 1 is in journal with SJR (10pts.). Also presented is 1 publication in an international author collective, including more than 30 authors, as well as 20 publications in journals that are not referenced and indexed in Web of Science and Scopus, which are not scored.

The candidate is also a co-author of a chapter of a published collective monograph (15 points).

Group of indicators D. Indicator 11 (min. 100 p.) – 546 points

Evidence is provided for 373 citations, 273 of which are in scientific journals, referenced and indexed in world-renowned databases of scientific information (Web of Science and Scopus).

Group of indicators E. Indicators 13, 14, 15, 16, 17, 18 and 20 (min. 150 p.) – 827.2 points

Associate Professor Ivanova is the scientific co-supervisor of a successfully defended doctoral student. She managed two national and three international scientific projects. She participated as a member of the scientific team in 17 national and 19 international research projects. Funds attracted from projects are in the amount of BGN 275981.26. She is also the author of a university textbook.

The total sum of points for the indicators from the separate groups A, B, G, D and E is 1940.2, with which Associate Professor Ivanova exceeds more than three times the required minimum for occupying the academic position "professor" in PN 4.3 Biological Sciences.

3. Critical notes and recommendations

I have no critical notes and recommendations for the candidate.

CONCLUSION

The documents and materials presented by Associate Professor Petya Pavlova Ivanova, Ph.D., meet all the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the Implementation of ZRASRB and the Regulations on the Conditions and Procedures for Acquiring Educational and Scientific Degrees and for holding academic positions at the Institute of Oceanology - BAS.

The candidate in the competition has presented a significant number of scientific works published after the materials used in the defense of the ONS "doctor" and the occupation of the academic position "associate professor". The candidate's works have original scientific and applied contributions that have received international recognition through their publication in journals with high scientometric indicators. The scientific research and expert activity of the candidate is undoubted.

The results achieved by associate professor Dr. Petya Ivanova are fully in line with the minimum national requirements of ZRASRB and the requirements of PURPONSZAD of IO-BAS.

of Oceanology of the BAS, Varna, for the election of associate professor Dr. Petya Pavlova Ivanova to the academic position of "Professor" at the Institute of Oceanology in: area of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.3 Biological sciences, scientific specialty "Hydrobiology", scientific direction "Genetics of hydrobionts".

15.05.2023

Prepared the opinion: .....

Prof. Teodora Staykova, PhD