

## REVIEW

by Dr. Atanas Krastev Bochukov - Associate Professor, retired, former lecturer at the University of Plovdiv and the Thracian University - Stara Zagora

of the materials submitted for participation in a competition for the academic position of "Associate Professor" at the Plovdiv University "Paisiy Hilendarski" in: field of higher education: 4. Natural Sciences, Mathematics and Informatics, professional field: 4.3. Biological Sciences (Morphology).

In the competition for "associate professor", announced in the State Gazette, issue 98 of 19.11.2024 and on the website of Plovdiv University "Paisiy Hilendarski" for the needs of the Department of Developmental Biology at the Faculty of Biology, the candidate is Senior Assistant Professor Dr. Stella Georgieva Stoyanova from the same department of the aforementioned faculty.

### **1. General presentation of the received materials**

By order No. PD-22-441 of 18.02.2025 of the Rector of Plovdiv University "Paisiy Hilendarski" (PU), I have been appointed as a member of the scientific jury of a competition for the academic position of "associate professor" at PU in the field of higher education: Natural Sciences, Mathematics and Informatics, professional field: 4.3. Biological Sciences (Morphology), announced for the needs of the Department of Developmental Biology at the Faculty of Biology

Documents have been submitted for participation in the announced competition by a single candidate, Senior Assistant Professor Dr. Stella Georgieva Stoyanova from the University of Plovdiv.

The set of materials presented by Stella Georgieva Stoyanova on paper and electronic media is in accordance with the Regulations for the Development of the Academic Staff of the University of Plovdiv and includes the following documents: a sample application to the Rector for admission to participate in the competition dated 17.02.2025, a CV in European format, a diploma of higher education with an acquired educational and qualification degree "Master", a diploma of an educational and scientific degree "Doctor", a list of scientific works, scientific works (copies of publications), list of citations, reference for compliance with the minimum national and additional faculty requirements, annotations of the materials under Art. 65 of the PRASPU, self-assessment of the contributions, declaration of originality and authenticity of the attached documents, certificate of work experience, documents for academic work, documents for scientific research work, documents in accordance with additional requirements, etc., set of documents on paper, set of documents on electronic media.

The candidate Stella Georgieva Stoyanova has submitted a total of 33 scientific papers and 2 manuals for practical classes with students (in histology and in histology and pathology). I accept to review 33 scientific papers and 2 teaching aids. The scientific papers are entirely related to the field of higher education and the professional field. The teaching aids are intended for the practical classes conducted.

The submitted documents fully meet the requirements necessary for participation in the competition, are neatly arranged and contain detailed information on satisfying both the mandatory and additional requirements of the Faculty of Biology - teaching aids, graduates who

have defended their thesis, certificate of work experience, participation in scientific projects, administrative experience.

## **2. Brief biographical data of the candidate**

Stella Stoyanova was born on 26.02.1986 in the town of Chirpan. During the period 2005-2009 she was a student at the University of P. Hilendarski in the specialty "Biology", after which she graduated from the master's course "Anthropology" in 2011. She received the scientific title "Doctor" after successfully defending a dissertation on the topic "Impact of pesticides on morphophysiological indicators in commercial fish species of the Cyprinidae family" in 2015. As a part-time assistant she taught classes in the period 2009-2014, after which she was appointed as a full-time assistant in the Department of Developmental Biology. Since 2016, she has been a senior assistant professor. So, in my opinion, the teaching experience of my colleague is more than 10 years. Her teaching work is related to conducting practical classes with students in the disciplines of embryology, histology, histopathology and human developmental biology. The issued teaching certificate shows that the candidate has 3426 hours of teaching employment over the past six years. In addition, during this period she has conducted practical classes with master's students from the courses in reproductive biology and biodiagnostics. All this indicates an extremely busy academic schedule (approximately 600 hours per year, including classes in master's courses) and an opportunity to gain irreplaceable pedagogical experience. As part of her teaching commitments, Stella Georgieva was also involved in organizing a student competition in biology and joining the accreditation committee for the professional field 4.3. Biological Sciences for the Doctoral Program at the Faculty of Biology. Her scientific work is in the fields of embryology, histology, environmental toxicology, biomarkers, bioindicators, and organic pollutants in aquatic ecosystems and is discussed in the following sections of the review.

### **3. General characteristics of the candidate's activities**

#### **Assessment of educational and pedagogical activities and preparation of the candidate**

Within the framework of educational and pedagogical activities, in addition to the already mentioned academic workload, Stella Stoyanova participated in the development of 2 manuals for practical classes with students - in histology and in histology and pathohistology, co-authored with Prof. Georgieva. These tools deserve high praise because the way they were developed allows for active participation of students in the learning process and independent work. In her previous work as a lecturer, the colleague has successfully defended 10 Bachelor's degree students from various specialties of the Faculty of Biology. Everything we have mentioned about the teaching activity shows that over the years the candidate has grown and deservedly claims to move into the category of habilitated teachers of the faculty.

#### **Assessment of the candidate's scientific and applied research activities**

The candidate's scientific activities can be divided into three main areas - participation in scientific projects, participation in scientific forums and publication of research results.

### **3.1. Participation in scientific projects**

From the submitted documents for the competition, it is evident that Stella Stoyanova has actively participated in 10 scientific projects. Five of them are funded by the Bulgarian University, and 3 are related to the study of the pollution of water bodies with various types of

pollutants (pesticides, xenobiotics and microplastics) in their influence on certain biomarkers of selected bioindicator species. Three of the projects were funded by the Ministry of Education and Science (KP-06-M26/3, KP-06-N33/9, KP06-N51/12) Under various national programs, she has participated in two projects, one of which is not yet finished. In addition to solving specific practical problems, the results of participation in these projects are reflected in scientific publications and participation in scientific forums.

### **3.2. Participation in scientific forums**

One of the forms of contact with the scientific community is the participation of teachers in various scientific events. Since 2017, the candidate has co-authored 37 scientific reports and posters (in seven of them he is the lead author) in scientific congresses, conferences and seminars held in Bulgaria, Romania and Turkey. The results of the scientific research have become available to the scientific community not only through publications in journals, but also through direct contact during such forums. The reports presented in them and The posters are related to both studying the impact of various types of pollutants on hydrobionts in the water, but also to studies related to male subfertility.

### **3.3. Scientific papers**

33 scientific papers were submitted for participation in the competition, which were not used in the procedures for acquiring the ONS "Doctor" and occupying the academic position "chief assistant".

In accordance with the minimum national requirements of the Law on Scientific Research and Development of the Republic of Bulgaria and the Regulations for its implementation, scientific works are qualified as follows:

- By indicator B4 – 10 pcs. (Q2 -1, Q3 – 6, Q4 - 3)
- By indicator G7 - 23 pcs. (Q1 -2, Q2 -3, Q3 – 2, Q4 - 16)

The scientific papers are published in English and are all co-authored, with the colleague being the first author in 8 of them (2 scientific publications in indicator B4 and 6 such in relation to indicator G7). According to indicator B4, scientific publications in journals that are referenced and indexed in Scopus and Web of Science have a total SRJ = 2.64 and a total IF = 4.87. The points that these works provide for the candidate are 146, with a minimum requirement of 100. The works included under this indicator examine the changes that occur in morphological and biochemical indicators in various species of fish and shellfish found in polluted aquatic environments. Based on the results obtained, it is recommended that the studied parameters serve as reliable biomarkers for monitoring polluted aquatic ecosystems subjected to metal pollution. Particularly valuable in my opinion are the studies of the aquatic ecosystem of the Topolnitsa dam, which is the main source of irrigation in the Plovdiv and Pazardzhik regions. In publication B4-2, changes in the gills of hydrobionts and the presence of compensatory-adaptive mechanisms are traced in detail (intensive proliferation of the gill epithelium, fusion of the secondary lamellae) upon exposure to heavy metals. For each biomarker, a degree of expression was determined according to a proposed scale for assessing histopathological changes. The pathology caused in the liver has been studied in detail – various types of parenchymal degeneration, changes in the glycogen and lipid content. In this and

several other scientific works, the the multi-marker approach in assessing the toxic impact of heavy metals in seafood.

According to indicator G7, scientific publications in journals that are referenced and indexed in Scopus and Web of Science have a total SRJ =6.607 and a total IF = 19.619. The points that these works provide for the candidate are 332, with a minimum requirement of 200. Scientific works under this indicator mainly include again research into the impact of various types of pollutants on the aquatic environment (heavy metals, pesticides, herbicides, dyes) on different types of hydrobionts in natural basins and laboratory conditions in Bulgaria and Hungary. The results show that hydrobionts can be used as reliable indicators of pollution of the aquatic environment and ecological changes in it. The changes found in their organisms have made it possible to determine the toxicity of the water associated with anthropogenic substances entering it. It is proposed with the help of a complex biomarker approach, including histochemical, pathohistological and biochemical changes to monitor the environment by studying changes in specific target organs. In their entirety, the presented scientific works have a scientific and scientifically applied nature. The histological studies used have allowed the identification of specific morphological changes caused by environmental factors. These changes have been successfully discussed as biomarkers at the tissue level. All scientific papers submitted for the competition have the participation of several co-authors. The morphological part of them is presented convincingly in my opinion. Reliable histological and histochemical methods for processing the biological material were used, the target organs are correctly identified, the morphological finding is well documented and correctly interpreted. Thus, morphological methods have justified their place in the comprehensive assessment of pollution of aquatic ecosystems.

### **Contributions and citations**

The contributions of the submitted materials for participation in the competition can be divided into several areas:

1. Contributions regarding the use of hydrobionts (freshwater fish species, freshwater and marine species) as suitable bioindicator species for monitoring the pollution of aquatic ecosystems with organic pollutants and heavy metals.

The study of changes in the organism of the hydrobionts used has shown the presence of a series of biological reactions, each of which can serve as a biomarker of pollution. However, monitoring only one biomarker cannot provide a complete information about the action of pollutants. Therefore, based on the results obtained, the use of a multi-marker approach (including pathohistological, histochemical and biochemical studies) for the diagnosis of polluted ecosystems is proposed. Studies on the impact of various toxicants on freshwater fish species as reliable indicators of pollution of the aquatic environment are given in several publications (from group B4 – 1, 2, 3, 7 and G7 – 2, 5, 6, 8, 10,14, 16, 1719,21). For the first time, the health status of the Caucasian sedge (*Knipowitschia caucasica*) from an anthropogenically influenced site in Hungary has been studied using histopathological biomarkers in various target organs. The advantages of using mussels as bioindicators of pollution has been reported in several publications (from group B4 – 6, 9 and G7 – 1, 3, 4). The results of the experiments show that the application of the neutral red retention test can be used as a reliable method for reporting the influence of Cd and PAHs on freshwater molluscs.

Publication 20 of the G7 on the assessment of water pollution of the Black Sea with plastics proposes the mussel *Mytilus* sp. as a biomarker.

## 2. Contributions to the study of the impact of organic pollutants in aquatic ecosystems

The negative effects of plant protection products on aquatic organisms have been studied in a number of studies (B4 – 7 and G7 – 2, 6, 8,10, 14, 16). Based on this, it is proposed to build a conceptual model of the composition of the plant protection products used, their fate in the aquatic environment and the potential for toxicity to non-target organisms.

## 3. Contributions to the study of the impact of heavy metals in aquatic ecosystems.

Using complex biomarkers, the negative impact of various types of heavy metals in naturally polluted aquatic environments and in laboratory conditions on Several bioindicator species, such as the studies presented in some of the publications, are proposed. The studies were conducted for several metal pollutants in natural aquatic ecosystems and laboratory conditions at different concentrations and combinations of them and at short-term and chronic exposure. For the first time, the effect of 12 trace elements and organic priority substances on moss and mussel transplants (G7 – 15, 18) was studied.

## 4. Contributions to the study of the effect of nutritional supplements on male infertility

In recent years, nutritional supplements have been used to treat male infertility. In the presented study (G7 - 7), the effect of nutritional supplements on male infertility was studied for the first time. PARA® supplement on the level of sperm chromatin maturity using an aniline blue staining test in men with reproductive problems.

## 5. Contribution to the study of metabolic syndrome (MetS) and the influence of the hormone ghrelin

The established histological changes together with other biochemical indicators allow to determine the influence of the hormone ghrelin during dietary induction of MetS in rats, showing the positive effect of diet plus exercise. Sexual dimorphism was also established.

## 6. Contributions to the Cloud of Educational Activity

The participation of teachers in the publication of teaching aids is in most cases part of their teaching activities. In this case, however, the two guides published in co-authorship carry several innovations. Their structure predetermines the active independent student participation in the learning process, independent work with a light microscope, filling in diagrams. Each section ends with test tasks for independent work and assessment of student knowledge. The Histology and Pathology Manual, which is intended for various specialties of the Faculty of Biology as a contribution complements the students' knowledge regarding the manifestation of pathological processes in bioindicator species used in ecotoxicological studies and in humans in clinical practice.

The results of the contributions need to be taken into account when developing monitoring and risk assessment programs and when updating legislation for the protection of water bodies from pollution and when implementing the Water Framework Directive using multi-biomarker approaches. The presented works provide new and systematized information on the impact of various types of toxicants on freshwater indicator species.

The total number of citations indexed in world-renowned databases of scientific information are Scopus – 534 in 63 publications and WoS – 366 in 31 publications. The review of the competition documentation shows that Stella Stoyanova covers the minimum national and additional requirements of the Faculty of Biology for holding the academic position of "associate professor". I accept the contributions given in the self-assessment in the scientific and educational partly because they are related to the inclusion of morphological indicators as part of a complex approach to assessing the impact of different types of pollutants of the aquatic ecosystem on the organism of hydrobionts in it.

#### **4. Assessment of the candidate's personal contribution**

For people familiar with the specifics of histological work, the work carried out by Stella Stoyanova on the processing of the histological material, its observation, description and documentation represents a huge amount of work. Given the responsibility in writing scientific publications, I assume that the morphological part was carried out in coordination with Prof. Georgieva. I accept this as normal and as a way of growth in scientific and educational work. I consider a significant part of the work done to be the personal merit of the candidate. An undoubted personal success is the fact that she was accepted as the lead author by her other colleagues in 8 of the submitted scientific papers.

#### **5. Critical remarks and recommendations**

Knowing the requirements imposed in recent years for scientific publications to be in a foreign language, I believe that some of them should also be in the language sacred to our ancestors. I have no comments regarding the presented materials and their content.

#### **6. Personal impressions**

Due to the fact that I have been involved for several years in conducting classes in a master's course in reproductive biology, I know Stella Georgieva personally. In cases when assistance in providing these classes was required, I have benefited from her selfless support and shown a sense of respect and collegial goodwill.

#### **CONCLUSION:**

The documents and materials submitted by Stella Georgieva Stoyanova meet all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LAADRB), the Regulations for the Implementation of the LAADRB and the relevant Regulations of the PAISI Hilendarski University. The candidate in the competition has presented a sufficient number of scientific works published after the materials used in the defense of the ONS "doctor" and chief assistant. The candidate's works contain original scientific and applied contributions that have received international recognition. recognition as a representative part of them are published in journals issued by national and international academic publishing houses. His theoretical developments have scientific and practical applicability, as some of them are directly oriented towards academic work. The scientific and teaching qualifications of Stella Georgieva Stoyanova are undoubted.

The results achieved by Stella Georgieva Stoyanova in academic and research activities fully comply with the minimum national and additional requirements of the Faculty of Biology, adopted in connection with the Regulations of the University for the implementation of the Law

on the Protection of the Rights of Persons with Disabilities and the Rights of Persons with Disabilities.

After reviewing the materials and scientific papers presented in the competition, analyzing their significance and the scientific, applied scientific and applied contributions contained in them, I find it reasonable to give my positive assessment and recommend to the Scientific Jury that prepared a report-proposal to the Faculty Council of the Faculty of Biology for the election of Stella Georgieva Stoyanova to the academic position of "Associate Professor" at the "Paisii Hilendarski" University in: field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.3. Biological Sciences (specialty Morphology).

20.03. 2025

Reviewer: .....

(signature)

Assoc. Prof. Dr. Atanas Bochukov