



## STATEMENT

By Prof. Dr. Vladislav Haralampiev Popov

Member of the scientific jury, appointed by the Rector of the Agrarian University-Plovdiv, according to **Order No. RD -16-898 / 25.09. 2023**

regarding the competition for the academic position "Professor" in the professional field 4.4. Earth Sciences, scientific specialty "Ecology and ecosystem protection", announced in the State Gazette no. 62 of 21.07.2023 with a candidate **Assoc. Professor Dr. Stefan Ivanov Shilev**.

### 1. Brief introduction of the candidate.

Candidate assoc. prof. Dr. Stefan Shilev began his career after completing his higher education in 1996 at the Department of Microbiology of the Agricultural University-Plovdiv. Since 1998, he has been an **assistant professor** at the AU-Plovdiv University, and in 2004, he obtained the PhD degree upon successful completion of a doctoral study at the University of Córdoba (Spain). Since 2010, he has been an **associate professor** in the scientific specialty "Ecology and Ecosystem Protection" at AU-Plovdiv. He is a **member** of the Faculty Council of the Faculty of Plant Protection and Agroecology (FRZA), a **Head of Master's courses** (2012-2013), member of the Erasmus Program Commission of FRZA - 2020 to date, a **Member** of Academic Council of AU-Plovdiv in the period 2007-2011, 02.2020 to date, **Chairman** of the General Assembly of AU- Plovdiv .

Simultaneously with the research and teaching work, assoc. prof. St. Shilev also holds a number of public and administrative positions: implementation of state policies in the field of environmental protection as **Director** of the "Ecology and Waste Management" Directorate, Plovdiv Municipality (2012-2014); **Director** of "Regional Environment and Water Inspection", Plovdiv, Ministry of Education and Culture (2014-2020); **Member of Parliament** in the 47th and 48th National Assembly of the Republic of Bulgaria.

### 2. General description of the presented materials

In the competition for "Professor", assoc. prof. Dr. Stefan Shilev presents an Individual Report on the fulfillment of the minimum national requirements under Art. 2b, paras. 2, 3 and 5 of ZRASRB and Annex 1 to it. It clearly states a total output of 26 works, grouped as follows:

- ❖ *Scientific publications on the nomenclature specialty - 26 issues, of which:*
  - *Scientific publications that are referenced and indexed in world recognised databases with scientific information with an impact factor - 10 items.*
  - *Scientific publications in refereed and indexed journals in recognised databases with scientific information - 10 items.*
  - *Scientific publications in non-refereed journals with scientific review or in edited collective volumes - 5 items.*
  - *Published chapter of a collective monograph – 1 item.*

The personal participation of assoc.prof. Stefan Shilev in the mentioned 26 papers is illustrated by the fact that in 14 of them, he is the first author, in 4 he is the second author, and in the remaining 8 he is the third and subsequent author. The publications are distinguished by being made in high-quartile authoritative publications in the Scopus and Web of Science databases.

- ❖ *Popular scientific articles and works outside the nomenclature specialty - popular scientific articles - 1 item.*
- ❖ *Study guides - 1 item.*

To prepare this statement, 26 items are subject to analysis .

Assoc.Prof. Shilev's works have received a wide response abroad – by about 620 citations (without the self-citations of all authors) in Scopus, as peer-reviewed articles in scientific publications with an impact factor - over 70 items.

From the presented reference, it is clear that the candidate meets and even exceeds the national minimum requirements necessary for the academic position "Professor".

Group of indicators	Minimum points required	Number of points of the candidate
A	50	50
IN	100	144.5
D	200	2 58
D	100	3100



Well	150	548.46
Total number of points from all indicators	600	4201.11

### 3. Teaching activity

The teaching activity of Assoc. Dr. St. Shilev is comprehensive and diverse. In the years after 2018, he teaches students in the following specialties in Bachelor's and Master's courses:

#### At the Agricultural University - Plovdiv:

Microbiology - in the specialty of Agronomy-Horticulture (AP) and Viticulture and Horticulture (LG) and in the Master's Degrees in Plant Medicine and " Plant Medicine", Waste Management, Utilization of Agricultural Waste, Circular Economy and Resource Utilization in the Specialty of Ecology and Conservation environment (EEA) and Master's Degree "Ecology of Settlement Systems" (ESS), Ecology of Microorganisms in Special Plant Protection (PP) and Environmental Protection, Solid Waste Processing Technology in Special Environmental Protection, Municipal Environmental Programs in Master's Environmental Protection.

The teaching programmes developed in AU-Plovdiv "Waste Management" and "Technologies for the purification of solid waste" are extremely important for the graduating specialist ecologists, and gives priority in their implementation.

The teaching activity is complemented by 12 successfully defended graduates in the Bachelor's degree and 4 in the Master's degree in the field of the current competition.

The high level of teaching and scientific activity of assoc. prof. St. Shilev was also built during internships and specialisations in the country and abroad i.e. in the Faculty of Biology of SU (1998), University of Córdoba, Spain (1999-2000), NATO Advanced Study Institute : "Phytoremediation of contaminated soils", Czech Republic (2002), post - doc on "Bacterial Proteomics" with a scholarship from the Ministry of Foreign Affairs of Spain at the University of Córdoba (2007), TC 2 Waste, European Commission, Marie Curie Action , Project No. MSCF - CT -2004-516617, (2007), WISE (Waste In Social Environment ) course 1 (TC 1), "Substrate cycle of waste management, waste management and recycling", European Commission, Marie Curie Action , Processing and Recycling of Solid Waste Materials (I.A.R.) at RWTH Aachen University , Germany, (2008), "Building Capacity to Work on Environmental Pollution Issues: Bio- and Phytoremediation Techniques for the Restoration of Mining Areas" (2009), Monteponi, Iglesias, Sardinia, Italy, UNESCO.

### 4. Scientific research activity.

From the presented report on the scientific, scientific-applied, applied and methodical contributions of Assoc. Dr. St. Shilev is distinguished by his research work in the field of ecology and the protection of ecosystems and, in particular, environmental biotechnologies. This direction, developed for the first time at the university, concerns the targeted use of beneficial bacteria in biotechnological approaches and their importance for soil and plant health. This direction was initially applied in the direction of restoring soils contaminated with heavy metals and supporting phytoremediation processes through populations of beneficial bacteria. It develops towards establishing the fundamental mechanisms and dependencies in the system contaminated soil - beneficial microorganisms - plant, which is of particular importance for managing the system with a view to overcoming the stress in plants caused by heavy metals. Part of this direction is clarifying the role of these microorganisms in mitigating stress in agricultural crops caused by drought, increased salt concentrations, etc. The candidate's other direction of investigations is the recovery of organic waste as an important part of the circular bioeconomy aiming to turn waste into a resource, including the recovery of sewage sludge, biodegradable waste from agriculture, gardens and parks.

The overall research directions of assoc. prof. St. Shilev, in which she makes a significant contribution up-to-date are following:

- **PHYTOREMEDIATION OF SOILS CONTAMINATED WITH HEAVY METALS WITH THE PARTICIPATION OF BENEFICIAL MICROORGANISMS.**

A comprehensive study of the influence of compost, beneficial bacterial populations and their communities on the development and growth of agricultural crops and also on the bioavailable fractions of heavy metals in the soil was carried out. The combined application of organic ameliorants and beneficial bacterial populations has been shown to have properties that stimulate plant growth.

- **APPLICATION OF BENEFICIAL MICROORGANISMS TO IMPROVE AGRICULTURAL CROP GROWTH AND YIELD.**

The effect of organic, mineral and combined fertilisation in potatoes on the yield and the development of the soil microbiome was investigated. Fertilisation has a significant positive effect on the activation of different physiological soil communities, according to the type, concentration and combination of soil additives.

- **RECOVERY OF BIO-WASTE THROUGH COMPOSTING.**



For the first time in Bulgaria and AU-Plovdiv, a complex study of the treatment of Waste-water treatment plant (WWTP) sludge by composting and vermicomposting has been carried out. An improvement has been made in the vermicomposting technology, using composters instead of so-called beds. Models were prepared for the utilisation of WWTP sludge in agriculture, landscaping activities and for the reclamation of degraded areas. The research has a direct application in the economy to solve a problem of great public interest, which is the accumulation of biowaste. The action of the principles of the circular economy is clearly demonstrated by recycling production waste and turning it into final products compost and vermicompost applied in agriculture.

- **NEXT-GENERATION SEQUENCE IN INVESTIGATING CHANGES IN THE SOIL AND COMPOST MICROBIOM.**

For the first time in Bulgaria, metagenomic analysis was applied to reveal the diversity of the compost microbiome. The microbiome is investigated during composting of WWTP sludge, biodegradable waste from urban landscaping activities and agricultural waste. The main features of the prokaryotic microbiome in mesophilic and thermophilic habitats during biowaste composting on sites with different microclimatic characteristics are revealed.

- **CLIMATE CHANGES AND ENVIRONMENTAL PROTECTION.**

The possibilities of water reuse in Bulgarian agriculture have been investigated based on analyses describing more than 50 internal and external factors influencing water reuse. Inclusion of the reuse of waste water after treatment as part of the Strategic objective "Green and competitive economy", Specific objective 1.1 in the Strategy for the transition to a circular economy in Bulgaria. An analysis of the air quality in the city of Plovdiv was carried out based on data from the Air Quality Management System.

*Participation in research and educational projects.*

The significant publication activity of the candidate is largely related to his active participation and leadership in national and international projects - financed by the Scientific Research Fund (FNI): 5 items, financed by the Ministry of Education and Culture: 2 items, financed by the AU- Plovdiv: 3 items. He was leading as a Component-coordinator and Head of a Work package in the implementation of the National Science Program of the Ministry of Education and Culture "Healthy foods for a strong bioeconomy and quality of life" (2018-2022) and in "Circular agriculture in mixed systems for growing agricultural production and animal husbandry with an emphasis on reducing greenhouse gases", doc. KP-06-DO 02/5 under ERA-NET of the National Institute of Scientific Research (2021-2024). Among the international projects (total of 7 items), the *SuWaNu Europe* "Network for effective knowledge transfer on safe and economic wastewater reuse in agriculture in Europe", EU Horizon 2020 and the *ConnectFarms* "Circularity in mixed crops and livestock farming systems with emphasis" can be distinguished on climate change mitigation and adaptation", ERA-NET Co-fund, EC (2021-2024) can be distinguished.

## **5. Notes and recommendations.**

The candidate should use the accumulated experience and know-how from his participation in numerous projects, research and publication activity, to continue research in the field of modern methods for the study and monitoring of contaminated soils and soil health in general, soil microbiome and the relationship with quality of water and the circular bioeconomy, and the training of young scientists.

## **6. Conclusion.**

Based on the analysis of the candidate's pedagogical, scientific and scientific-applied activities, I do consider that **the candidate assoc. prof. Stefan Shilev** meets the requirements of the Law for of Academic Staff in the Republic of Bulgaria, The Regulation for the Application of the Law for Development of Academic Staff in the Republic of Bulgaria and the Rules of its Application of the Agricultural University of Plovdiv regarding his application. The candidate has a deep and analytical approach to modern problems in ecosystems and the circular bioeconomy, focuses on ecological challenges important to society, has a contribution to the application of new analytical methods for the assessment and analysis of ecosystems, has significant scientific and applied contributions to the world science. His contribution to educational programs and accumulated experience in national international projects provide an opportunity to fill the programmes with new educational content, to use good contacts with science and practice, and society in general.

All this gives me arguments to **positively evaluate** the overall activity of the candidate.

I would suggest to the honorable Scientific Jury to also vote **positively**, and to the Faculty Council of the Faculty of Plant Protection and Agroecology at AU-Plovdiv to recognise **the candidate Stefan Ivanov Shilev** as "**Professor**" in the scientific specialty "Ecology and ecosystem protection".

Date: 30. 10.20 23.

Plovdiv

REVIEWER: .....

/Prof. Dr. Vladislav Popov/