

STATEMENT

**By Slaveya Tencheva Petrova, PhD – Associate Professor at the Faculty of Biology,
University of Plovdiv “Paisii Hilendarski”**

on a dissertation for awarding the educational and scientific degree “Doctor”

Field of higher education: 4. Natural sciences, mathematics and informatics

Professional field: 4.3. Biological sciences

Doctoral program: Ecology and ecosystem conservation

Author: Nikola Stamenov Angelov

Topic: “Opportunities for sustainable management of urban soils through buffer grass strips”

Scientific supervisors:

Prof. PhD Iliana Georgieva Velcheva - University of Plovdiv “Paisii Hilendarski”

Assoc. Prof. PhD Ekaterina Georgieva Valcheva – Agricultural University, Plovdiv

1. General presentation of the procedure and the PhD candidate

By order No. RD-21-2267 from 10.12.2024 of the Rector of University of Plovdiv "Paisii Hilendarski" I have been appointed as a member of the scientific jury for ensuring a procedure for the defense of a dissertation on the topic: "Possibilities for sustainable management of urban soils through buffer grass strips" with author Nikola Stamenov Angelov for awarding the educational and scientific degree “Doctor” in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.3. Biological Sciences, doctoral program "Ecology and Ecosystem Conservation.". The author of the dissertation is Nikola Stamenov Angelov – a part-time doctoral student in the doctoral program "Ecology and Ecosystem Conservation” at the Department of Ecology and Environmental Conservation with scientific supervisors Prof. PhD Iliana Georgieva Velcheva - University of Plovdiv “Paisii Hilendarski” and Assoc. Prof. PhD Ekaterina Georgieva Valcheva – Agricultural University, Plovdiv.

The presented set of materials for the procedure by Nikola Stamenov Angelov is in accordance with Art. 36 (1) of the Regulations for the Development of Academic Staff (RAS) of the University of Plovdiv “Paisii Hilendarski” and includes :

- Application to the Rector of the University of Plovdiv for the initiation of the procedure for the defense of the dissertation;
- Curriculum vitae in European format;
- Protocol from the department council regarding the report on the readiness for initiating the procedure and the preliminary discussion of the dissertation;

- Dissertation;
- Abstract of a dissertation
- List of scientific publications related to the dissertation topic;
- Copies of the scientific publications
- Declaration of originality and authenticity of the attached documents;
- – certificate of compliance with the minimum national requirements;
- opinion of a scientific supervisor.

The doctoral candidate has included two publications related to the dissertation, that have been published in the journal Land, which is ranked in Q2 and has a high impact factor, Q2, IF=3.9.

2. Relevance of the topic

Soils represent an irreplaceable, limited and non-renewable natural resource, which puts the activities of their protection, sustainable use and management in the foreground. Soils are the receiver of almost all harmful impacts in urbanized areas and as such can become a potential risk for biodiversity and population health. The degree of soil pollution is determined by the intensity of impacts and local characteristics, with transport being one of the leading sources of pollution in urbanized areas.

In this context, the topic of the dissertation work is extremely relevant, even more so because of the systematized research and experiments in a real urban environment (in the conditions of the city of Plovdiv). The obtained results and the model developed based on them have not only a scientific, but also a notable practical significance in the development of municipal greening projects, programs and plans for soil management in populated areas, as well as for other stakeholders who are interested in sustainable soil management.

3. Knowledge of the topic

The doctoral candidate is thoroughly familiar with soil problems in populated areas, as well as with phytoremediation practices as an effective way to deal with these problems. This is clearly evident not only from the structuring of the dissertation work, but also from the chosen research approach and the experiments carried out in real conditions. The nature-based solutions on which the developed model for sustainable urban soil management is based have in recent years been increasingly recognized as one of the most reliable tools for addressing global challenges, which also confirms its competence in the field under consideration.

4. Research methodology

The research methodology is actual, scientifically based and corresponds to the set goals and objectives of the dissertation work. Thanks to the well-formulated criteria for the selection

of experimental sites and types of plants for the construction of the buffer green areas, the expected results were achieved and the developed model was validated.

The rich set of analyzes carried out in the course of the research work is impressive - chemical, physiological, biochemical, microbiological, mathematical-statistical, etc. Standard methods were used for each of them, which ensures the reliability and significance of the obtained results.

5. Characteristics and evaluation of the dissertation and its contributions

The dissertation contains 132 pages, 20 tables, 46 figures, as well as 188 literary sources, of which 30 are in Cyrillic and 158 are in Latin. It is structured according to the requirements, maintaining the necessary ratio between the volume of the main sections - Introduction (2 pages), Literature review (12 pages), Aim and tasks (1 page), Material and methods (18 pages), Results and Discussion (72 pages), Conclusions (2 pages), Contributions (1 page), References (17 pages).

In the Introduction, emphasis is placed on the problem of protecting the quality of soils in populated areas. The Literature review presents a systematic review of phytoremediation research and the challenges associated with building and maintaining buffer greenbelts. The goal is well formulated, and the set tasks enable its realization. In the Materials and methods section, the methods used are described in sufficient detail, which ensures the reproducibility of the study. The section Results and discussion presents chronologically the construction and maintenance of buffer green areas, the results and analyzes of soil parameters, the content of chemical elements in soils, below- and above-ground biomass, the dynamics of soil microbiota, concluding with an analysis of the bioaccumulation potential of the tested herbaceous plant species and the possibilities for sustainable management of urban soils through buffer grass strips. Based on these data, 8 conclusions were formulated. The contributions are properly structured, and two of them have a significant potential for application in solving a wide range of challenges related to increasing the sustainability of urban ecosystems.

6. Assessment of the publications and personal contribution of the doctoral candidate

Part of the results of the dissertation work were published in two scientific articles, which were printed in the journal Land, Q2, IF=3.9, and they provide the doctoral student with 40 points out of the required 30 points according to the Law on the Development of the Academic Staff in the Republic of Bulgaria (RSARB) and the Regulations for the implementation of RSARB. He is the fourth consecutive co-author in the author collectives, which indicates that he took an active part in the preparation of both manuscripts. The results of the dissertation work were popularized by the doctoral student through his participation in two scientific forums in Bulgaria and two scientific forums abroad.

7. Abstract of a dissertation

The abstract contains 36 pages and 21 figures. It meets the requirements for preparing one and includes a summary of the main sections of the dissertation with its contributions, a list of publications and participation in scientific forums.

8. Recommendations for future use of the dissertation contributions and results

The validated technology for the construction of buffer green areas around transport arteries, as well as the approved model for sustainable management of urban soils, have great potential for solving a wide range of environmental challenges related to the intensification of urbanization and deterioration of the quality of life in settlements. It is recommended that they be popularized among the competent authorities as a scientific basis for updating management approaches and policies.

CONCLUSION

The dissertation *contains scientific, applied scientific, and practical results that represent an original contribution to science* and **meet all the requirements** of the Law on the development of academic staff in the Republic of Bulgaria (ZRASRB), the Regulations for the application of ZRASRB, and the corresponding Regulations of the University of Plovdiv "Paisii Hilendarski."

The dissertation demonstrates that the doctoral candidate Nikola Stamenov Angelov **possesses** in-depth theoretical knowledge and professional skills in the scientific specialty "Ecology and ecosystem conservation", **showing** qualities and abilities for independently conducting scientific research.

Therefore, based on the above, I confidently give my *positive evaluation* of the research presented in the reviewed dissertation, abstract, achieved results and contributions, and **I propose to the esteemed scientific jury to award the educational and scientific degree "doctor"** to Nikola Stamenov Angelov in the field of higher education: 4. Natural sciences, mathematics and informatics, professional field 4.3. Biological sciences, doctoral program "Ecology and ecosystem conservation".

18.01.2025

Signature:

(Assoc. Prof. Slaveya Petrova, PhD)