

STATEMENT OF OPINION

**by Prof. Neli Hristova Grozeva, DSc,
Trakia university – Stara Zagora**

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 protection.

Author: Nikola Stamenov Angelov

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

Scientific supervisors:

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

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

1. General presentation of the procedure and the PhD candidate

By order No. RD-21-2267 of 10.12.2024 of the Rector of Plovdiv University "Paisii Hilendarski" (PU) 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 the acquisition of the educational and scientific degree "doctor".

The author of the dissertation Nikola Angelov is a part-time doctoral student in the doctoral program "Ecology and Protection of Ecosystems" at the Department of Ecology and Environmental Protection of the Faculty of Biology.

The submitted set of materials for the procedure on an electronic medium is in accordance with Art. 36 (1) of the Regulations for the Development of Academic Staff (RAS) of PU and includes the required set of documents. Two out-of-print articles in connection with the dissertation and a list of participation in four scientific forums are also attached. The materials are formatted and arranged correctly.

2. Relevance of the topic

The protection of soil resources and their sustainable management, as well as the implementation of good practices for prevention of soil damage are among the main priorities of our time against the backdrop of global climate change. They are also the main goal of the National Program for the Protection, Sustainable Use and Restoration of Soil Functions (2020 - 2030). The development of green infrastructure in settlement systems and the improvement of the quality of life in populated areas are inextricably linked to the condition of urban soils, their protection and sustainable use. This determines the relevance of the dissertation work, which aims to study the possibilities for sustainable management of urban soils through buffer grass strips.

3. Knowledge of the subject matter

The PhD candidate is well acquainted with the problem, which is evident from the literature review, structured in three sections: soil-ecological conditions in urban environments; phytoremediation of contaminated soils; creation and maintenance of buffer grass strips.

4. Methods of the study

The PhD candidate, applying the correct methodological approaches, has precisely selected the experimental sites, plant species, and the creation and maintenance of buffer strips.

To solve the tasks set and achieve the goal, a wide range of methods have been used to analyze: the physicochemical parameters of the soils in the studied sites; analysis of the content of P, S, Mg, Fe, Al, Ca, Mn, Na, Cu, Zn, Pb, Cr, Co, Ni, As, Mo, Cd, V and U in the soils and the tested herbaceous species; the development and adaptation of the tested herbaceous species (physiological parameters, photosynthetic pigments, biochemical parameters); the properties and characteristics of the soil communities in the experimental sites; analysis of the bioremediation capabilities of the tested herbaceous species. The doctoral student has also mastered and skillfully applies statistical methods of analysis.

5. Characteristics and assessment of the dissertation and the contributions

The dissertation is written on 132 pages and contains 20 tables, 46 figures, as well as 188 literature sources. It is properly structured and contains the following sections: Introduction - 2 pages; Literature review - 10 pages; Aim and objectives - 1 page; Material and methods - 17 pages; Results and discussion - 72 pages; Conclusions - 2 pages; Contributions - 1 page; Declaration - 1 page; Literature used - 20 pages.

The dissertation has a clearly formulated goal and precisely defined tasks. The Results and Discussion section occupies the largest share. It presents sequentially the creation and maintenance of buffer grass strips in the experimental sites, the results and analysis of the physicochemical parameters of the soils, the content of selected chemical elements in the soils and the tested grass species, the properties and characteristics of the soil communities in the experimental sites, the bioremediation capabilities of the tested grass species and the possibilities for sustainable management of urban soils through buffer grass strips. A summary of each of the analyses conducted is made. Based on the results of all the studies, a model for sustainable management of urban soils through the construction of buffer green areas around transport arteries, including 5 stages, has been developed and validated. The data from the section have been skillfully used to formulate 8 conclusions.

The contributions of the dissertation work are properly structured and logically presented. I would like to note some of them: for the first time they were created for the city of Plovdiv buffer green areas around transport arteries with selected perennial legume and cereal crops with proven tolerance to urban environmental conditions and high bioaccumulation capabilities and a validated technology for building buffer green areas around transport arteries with bioremediation functions in urban soils through the study of stress responses to assess their physiological condition; a model for sustainable management of urban soils through buffer green areas around transport arteries has been tested, leading to long-term improvement of soil quality and living conditions in the city.

Undoubtedly, the developed model for sustainable management of urban soils can serve as a scientific basis for developing regulatory documents at the regional and national levels and for taking effective management decisions.

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

In connection with the dissertation work, two scientific articles have been published in the refereed and indexed in world-renowned databases (Web of Science and Scopus) journal Land with IF = 3.906, Q2, which provide doctoral student Angelov with 40 points out of the required 30 points. The author team of the first article includes scientists from Plovdiv University, the Agrarian University and the Institute of Forage Crops at the Agricultural

Academy. The PhD candidate is the fourth author of the eight-member scientific team. The second article is co-authored with scientists from four departments of Plovdiv University, three departments of the Agrarian University, from the Institute of Forage Crops at the Agricultural Academy and the Forestry University. The PhD candidate Angelov is again the fourth author of the seventeen-member team. I believe that he took an active part in the preparation of the manuscripts of the two articles, since they include results from his dissertation work, and his collaboration with scientists from three universities and one institute of Agricultural Academy shows his ability to work in a team, which is particularly appreciated in scientific circles. The PhD candidate also presents participation in four scientific forums, two of which in Bulgaria, one in the Czech Republic and one in Romania. Participation in four prestigious scientific forums, as well as in two scientific articles is evidence of the good popularization of the results of the dissertation work and indisputable evidence of his personal contribution to the development and presentation of the dissertation work to the scientific community in our country and abroad.

7. Abstract

It corresponds to the content of the dissertation and the requirements for an abstract. It includes a total of 40 pages, including 21 figures. The main stages of the study, a list of publications and participation in scientific forums, as well as the main contributions are presented.

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

I recommend that the PhD candidate provide the results of his dissertation work not only to the municipality of Plovdiv, but also to other municipalities in the country, so that they can be used in undertaking actions to protect urban soils through buffer grass strips.

CONCLUSION

The dissertation contains scientific, scientifically applied and applied results that represent an original contribution to science and meet the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the Implementation of ZRASRB and the relevant Regulations of the University "Paisii Hilendarski".

The dissertation shows that the doctoral student Nikola Stamenov Angelov possesses in-depth theoretical knowledge and professional skills in the scientific specialty Ecology and Protection of Ecosystems, demonstrating qualities and skills for independent conduct of scientific research.

Due to the above, I confidently give my POSITIVE ASSESSMENT for the conducted research, presented by the above-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, PhD Program Ecology and Ecosystem Conservation.

17.01.2025

This Statement of Opinion was executed by:

Prof. DSc Neli Grozeva