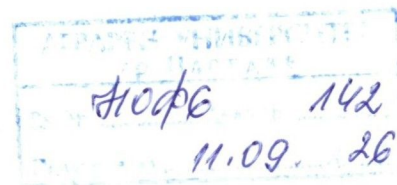


SCIENTIFIC OPINION



on the thesis for the educational and scientific degree of "**doctor**" in: field of higher education 6. Agricultural Sciences in Veterinary Medicine, professional field 6.1. Crop science, scientific specialty Ornamental Plants

Author of the dissertation: Maria Petkova Grozeva, doctoral student of independent training at the Department of "Horticulture" at the Agricultural University, Plovdiv

Topic of the thesis: " Typology and methods for noise protection through the use of green vegetation in urban environments "

Reviewer: Prof. Dr. Nikolay Dimitrov Panayotov, Agricultural University - Plovdiv, retired, field of higher education 6. Agricultural Sciences and Veterinary Medicine, professional field 6.1. Crop Science, scientific specialty Vegetable Production, appointed as a member of the scientific jury by order No. RD-16-776/23.06.2026 by the Rector of the Agricultural University - Plovdiv

1. Relevance of the problem.

The modern development of humanity, respectively the urban environment and the high degree of urbanization, is very often associated with the generation of more and more noise. This is not only an unpleasant feeling, but has become a stress factor with constantly increasing dynamics and has a strong negative impact on human health. Studying the possibility of applying different and appropriate vegetation in order to limit and reduce noise caused by various sources, especially from urban automobile traffic, is a very good approach. In this way, by creating the appropriate green system, not only an aestheticized environment and purification of polluted air are achieved, but noise discomfort is also significantly reduced. The creation of a green system, as a permanent element in urban development design, is associated with effective improvement of acoustics and ecology in the urban environment. In addition, the application of plant noise barrier belts is significantly more affordable from a financial point of view, leading to a much better aesthetic appearance of the environment and is often characterized by greater durability. In this sense, the problems developed in this dissertation are extremely relevant, both for reducing and limiting noise pollution, and for improving the urban environment and the comfort of life, especially in large urban centers.

2. Purpose, tasks, hypotheses and research methods.

The scientific hypothesis, on which the research is based is that the effectiveness of plant barriers in preventing and reducing noise pollution is in a nonlinear dependence on the structure and organization, the distance from the noise source, as well as depending on its phenological development. At the same time, it is assumed that phytoscreens would provide sufficiently effective noise protection. On this basis, a very clear goal has been formulated for developing a concept, for spatial-functional typological models and methodological guidelines for creating effective green noise protection screens and quantifying the phytoacoustic potential of specific tree and shrub species in the existing ecological conditions of the Sofia agglomeration. In connection with the stated goal, five main tasks are set for development, the implementation of which allows achieving the set goal.

The methodological part of the thesis work is developed correctly, in accordance with the

stated goal and tasks, and through the applied methods and research analyses, a very good opportunity is provided for their achievement and resolution. Nineteen suitable locations in the city of Sofia have been selected for conducting the research. The application of the relevant plant species is very well justified, as they are considered as an active engineering biosystem. There is a sequence of the study related to the identified tasks. *In situ* instrumental acoustic monitoring is applied, using a specialized digital sound level meter model SL300; comparative seasonal method and dendrological and phytosanitary expertise. The methods included in the study are modern and up-to-date.

3. Visualization and presentation of the obtained results.

The dissertation is structured correctly, in accordance with the accepted requirements for this type of scientific work. The ratio and size of the individual sections are consistent with their significance. The obtained results are presented both in tabular form and through graphic images. The dissertation is very well illustrated, contains 29 tables and 30 figures, as well as a large set of applications. In this way, the data are very clearly expressed and well understandable for the reader.

4. Discussion of the results and used literature.

The results obtained from the monitoring of the individual objects have been considered and discussed in detail and correctly. Not only a description of the data obtained is noticeable, but also an effort to analyze them, explain them and outline the relevant trends. After each section there is a brief conclusion, in which, based on the interpretation, new information is indicated and the need for such a study is outlined. It is evident that the methods used allow obtaining significant and important results, of essential importance for reducing noise pollution, and in this way they are suitable and adequate for application in an urban environment not only in the Sofia agglomeration region. Based on the discussion of the data, ten scientifically based conclusions are formulated, which fully outline the achievements of the dissertation work, as well as the possibility of their use. It is also indicated that the established results and trends are an original tool for landscape architects in the design of urban infrastructure.

The dissertation contains a comprehensive scientific literature review based on 157 titles, of which 36 are in Cyrillic and the rest in Latin. A large part of the literary sources are foreign, which indicates the relatively limited development of these problems in our country. In addition to citing the results of other authors, the doctoral student Maria Grozeva analyzes and systematizes the literature known to date, indicating the unresolved and incompletely clarified aspects in the studied area. The dissertation is written in a refined and concise scientific style with the correct use of scientific terms.

5. Contributions of the dissertation work.

I fully accept the above-mentioned reference for scientific contributions. It sufficiently fully and accurately reflects the achievements in the field of using phytoscreens to reduce noise pollution and stress.

Scientific contributions

Of the scientific contributions, I can point out the definition of the physical and biological mechanism of functioning of phytoscreens, the presence of seasonal dynamics,

as well as the developed mathematical model for quantitative calculation of the introduced loss.

Scientific and applied contributions

Among the scientific and applied contributions, those related to the development of three spatial-functional models of phytoscreens, as well as the creation of a specialized matrix for the selection of priority tree and shrub species, stand out first.

6. Critical notes and questions.

When citing literature in the text, the chronology of publication of individual editions must be kept, which is not observed in some places of the dissertation. I would like to ask the following questions:

1. For which of the studied sites is the construction of a stable phytoscreen for noise protection is most urgent to build, of which type and why?

2. Is it possible to create a constantly operating noise-insulating barrier during the individual seasons of the year and through the predominance of which plant species.

The above notes and questions do not in the least belittle the high scientific values of the dissertation.

7. Published articles and citations.

Two scientific articles have been published in the journal "Agrarian Sciences" with materials from the thesis work, of which the dissertation candidate is an independent author, thus fully meeting the minimum scientometric requirements.

The presented thesis abstract objectively reflects the structure and content of the dissertation work.

CONCLUSION:

Based on the various research methods learned and applied by the doctoral student, the correctly conducted experiments, the generalizations and conclusions made, I believe that the presented dissertation meets the requirements of the Law on Development of the Academic Staff of the Republic of Bulgaria and the Regulations of the Agraricultural University for its application, which gives me reason to evaluate it POSITIVELY.

I would like to propose that the esteemed Scientific Jury also vote positively and award Maria Petkova Grozeva the educational and scientific degree of "*doctor*" in the scientific specialty Ornamental Plants.

Date: 24. 08. 2026

Plovdiv

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