

OPINION

on a dissertation work for obtaining the educational and scientific degree "Doctor" in:
field of higher education 4. Natural Sciences, Mathematics and Informatics, professional
field 4.3. Biological Sciences, scientific specialty "Botany"

Author of the dissertation: Boryanka Dimitrova Traykova

PhD student in independent training at the Department of Plant and Fungal Diversity and Resources of the IBER-BAS, Sofia

Topic of the dissertation: "Hydroponic technologies as a means of protection and cultivation of medicinal and conservation significant plant species"

Member of the scientific jury: Assoc. Prof. Dr. Milena Hristova Yordanova,

University of Forestry, field of higher education 6. Agricultural Sciences and Veterinary Medicine, professional field 6.1. Crop production, scientific specialty "Vegetable growing", appointed as a member of the scientific jury by order No. 62/27.09.2024 by the Director of IBER-BAS.

1. Actuality of the problem.

In the context of climate change, the use of soilless technologies for growing plants is a particularly relevant topic. The significance is also enhanced by the fact that these technologies have been used for the propagation of plants listed in the Red Book for Bulgaria, as well as medicinal plants and other important species. The results obtained, as well as the protocols created for propagation and accelerating the growth of the selected experimental species, contribute to a better understanding of hydroponic cultivation methods and the possibilities for their use in valuable plant species.

2. Degree of knowledge of the state of the problem and creative interpretation of the literature review.

A total of 138 literary sources are cited in the dissertation, of which 129 are in Latin and 9 in Cyrillic. They are used both for the literature review and in the presented articles, where the author very precisely and correctly cites them, summarizes and compares them with her obtained results. This gives me reason to conclude that the PhD student is very well aware of the state of the problem.

3. Purpose, tasks, hypotheses and research methods. Compliance of the chosen research methodology with the set purpose and tasks of the dissertation work.

The main goal of the dissertation corresponds to the title of the dissertation and is clearly and precisely formulated, namely the creation of protocols for propagation and accelerating the growth of selected medicinal plant species and species of conservation importance, characterized by difficulties in propagation (low germination and/or slow growth), through the application of various hydroponic technologies. In addition, it is planned to determine whether hydroponically propagated individuals retain the species-specific biosynthetic ability with respect to secondary metabolites.

Six tasks have been developed that fully meet the set goal, and they also indicate the objects of research - economically and socially significant plant species. The tasks are related to

studying the possibilities for vegetative propagation from leaves and cuttings, by testing different hydroponic systems. The possibilities for seed propagation in some of the species again through hydroponic systems. As well as the possible acceleration of bulb growth when growing them in these systems.

Tasks related to increasing the survival rate of hydroponically grown seedlings, as well as the adaptation of plants to soil substrate, have also been set. The latter task is related to the qualitative analysis of biologically active substances of hydroponically grown plants.

Depending on the objects studied, different methods were applied, corresponding to the specific tasks. The methods, results and discussions are presented in eight publications, forming the basis of the dissertation work.

4. Visualization and presentation of the results obtained.

The results obtained are presented in eight publications, which are richly illustrated with photographs, graphs and tables, in a total of 44 figures and 17 tables. The illustration is of a very good level and excellently presents and complements the obtained results.

5. Discussion of the results and literature used.

In each of the presented articles, which form the basis of the dissertation work, the data are presented correctly, the results are discussed in depth, and the discussion also includes comparisons and references to authors cited in the literature review. This once again shows a very good knowledge of the material and interpretation of the results by the doctoral student.

6. Contributions of the dissertation work.

As a result of the results achieved from the set goal and the developed tasks, four main conclusions and four contributions have been formed.

The contributions are original, mostly of a fundamental scientific nature, which mainly concerns some of the research objects, namely those that are endangered species. However, the contributions also have an applied significance, as far as medicinal plants are concerned, which may be expanded in the future. The established plant propagation protocols can be developed into production technologies.

7. Assessment of the degree of the dissertation candidate's personal participation in the contributions.

I believe that the dissertation work presented in this way, in the form of eight articles, is the personal work of doctoral student Boryanka Dimitrova Traykova, who has carried out a large amount of research and experimental work and has thoroughly interpreted the obtained results.

8. Critical notes and questions.

I have no critical comments or questions for the doctoral student..

9. Published articles and citations.

The dissertation is presented in the form of eight articles, which present the results of the tasks set. Seven citations are given to two of the articles.

10. Assessment of publications on the dissertation work: number, nature of the editions in which they are printed. Reflections in science - use and citation by other authors.

Six of the articles have been published in journals that are referenced and indexed in the global databases of Web of Science and/or Scopus, five of which are quartiles, one article is in a conference proceedings and one in an international journal.

The presented 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 the development of the academic staff of the Republic of Bulgaria, Regulations for its implementation, as well as the specific requirements of the IBER-BAS Regulations for the implementation of the Law on the development of the academic staff of the Republic of Bulgaria, which gives me reason to evaluate it POSITIVELY..

I would like to propose to the esteemed Scientific Jury to also vote positively and award Boryanka Dimitrova Traykova the educational and scientific degree "Doctor" in the scientific specialty "Botany", in the professional field 4.3. Biological Sciences and the field of higher education 4. Natural Sciences, Mathematics and Informatics..

Date:
Sofia

PREPARED
THE OPINION:
(Assoc. Prof. Dr. Milena Yordanova)