SCIENTIFIC OPINION

on the PhD thesis for obtaining the scientific degree "**Doctor**" in the field of higher education 6. *Agrarian sciences and veterinary medicine*, professional field 6.1 *Plant growing*, scientific specialty *Vegetable crops*

Author of the dissertation: **Alexander Kirilov Trayanov**, regular PhD student at the Department of Horticulture at the Agricultural University, Plovdiv

Topic of the PhD thesis: Productivity and quality of seeds of carrot by optimization of nutrient regime in their seed production

Prepared the opinion: Prof. Galina Todorova Pevicharova, PhD, Maritsa Vegetable Crops research Institute, Plovdiv, Field of higher education 6. *Agrarian sciences and veterinary medicine*, professional area 6.1 *Plant growing*, scientific specialty *Vegetable crops*

Prof. Dr. Pevicharova was appointed as a member of the scientific jury with order RD-16-282/15.03.2021 by the Rector of the Agricultural University, Plovdiv.

1. Relevance of the problem

The use of quality seeds is an important premise for ensuring high yields in vegetable crops. An essential step for obtaining seeds with good life potential is the optimization of each element of their production technology. In this context, the problem developed in the PhD thesis is related to the scientific and scientific-applied aspects. The lack of targeted research in the field of carrot seed production in recent years has been filled by in-depth research focused on finding the right levels and methods for applying mineral fertilizers to obtain good yields of high quality seeds. The results of the PhD thesis can serve as a basis on which the scientists dealing with the peculiarities of seed production in carrots to upgrade their knowledge, as well as to be directly used in practice.

2. Purpose, tasks, hypotheses and research methods

The aim of the PhD thesis is formulated clearly and precisely. Three tasks are developed to achieve it. They follow a logical sequence and correspond to the chosen topic. The working hypothesis of the study is based on the possibility to increase the productivity and quality of carrot seeds and to reduce their heterogeneity through changes in the levels and methods of application of nitrogen, phosphorus and potassium introduction into the soil.

A multifactorial experiment is carried out including eight levels of fertilization and two methods of fertilizer application in carrot seed production. Standard methods are used to assess the seed productivity, the phenological and morphological characteristics, to perform the agrochemical analysis of soil,

chemical analysis of seeds and their quality, as well as the economic analysis of production in different variants. Reliable approaches are applied in data analysis.

3. Visualization and presentation of the obtained results

The PhD thesis contains 218 standard pages. It is structured correctly and is written in a good scientific style with the correct use of specific scientific terms. Includes 60 tables and 21 figures. The selected disign of tables and figures provides a real opportunity to illustrate and present the results in details.

4. Discussion of the results and used titerature

The results of three-year studies are analyzed and presented in nine logically related sections. They are processed precisely using analysis of variance (one-way and two-way), correlation analysis and regression analysis. The data are interpreted correctly which allows the PhD student to make a competent assessment of the effect of the applied levels and regimes of fertilization on the productivity and quality of carrot seeds and to formulate recommendations for practical application of the acquired knowledge. It should also be noted the economic assessment giving the overall integrity of the study. Fifteen conclusions are presented which reflect objectively the obtained results.

The PhD thesis is a personal work of the PhD student.

The good awareness about the state of the problem is presented with an analysis of 158 literature titles, 37 of which are in Cyrillic. Scientific publications, books, reports, dissertations, reference books, etc. are cited. Only 23% of the cited literature has been published in the last ten years.

5. Contributions to the PhD thesis

Scientific contributions

I accept and appreciate positively the formulated five scientific contributions. They are a logical conclusion of a large, in-depth and professionally performed research work. I could add one more, defined as follows: "The optimal combination between the level of fertilization and the method of application of NPK fertilizers which achieves maximum economic effect in the seed production of carrots was determined."

Scientific-applied contributions

The presented scientific-applied contributions correspond to the results of the experimental activity and are a good basis for the development and implementation of practical models related to the mineral fertilization in carrot seed production.

6. Critical remarks and questions

I have no significant critical notes on the applicant's scientific production. I would recommend to use more correctly the scientific terms conserning the

studied chemical components.

I have the following question to the PhD student: What is the reason for the higher values of dry matter and crude protein contents in the carrot seeds during the first experimental year?

7. Published articles and citations

The results of the PhD thesis are presented in four scientific publications: one in *International Journal of Innovative Approaches in Agricultural Research,* one in *Agricultural science and Technology* and two in *Scientific works of the Union of Scientists in Bulgaria*. The PhD student is the self-standing author of three of them and is a leading author of the fourth. One of the publications is in a journal indexed in the world's database (WoS - All Databases).There are no citations of these publications.

The extended summary objectively reflects the structure and content of the dissertation.

CONCLUSION:

Based on the different research methods learned and applied by the candidate, the correctly performed experiments, the summaries and conclusions made, I believe that the PhD thesis submitted meets the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria and the Regulations of the Agricultural University for its implementation which gives me a reason to give a **POSITIVE** evaluation.

I allow myself to suggest to the esteemed Scientific Jury also to vote positively and to award **Alexander Kirilov Trayanov** the educational and scientific degree "**Doctor**" in the scientific specialty *Vegetable crops*.

Date: 6th of April, 2020
Plovdiv

Prepared the opinion:.....
(prof. Galina Pevicharova, PhD)