



OPINION

on a dissertation for obtaining the educational and scientific degree "Doctor" in: field of higher education 6. Agricultural sciences and veterinary medicine, professional field 6. 1. Plant breeding, scientific specialty: Plant breeding.

Author of the dissertation: ADELINA HRISTOVA GARAPOVA

full-time regular PhD student at the Department of Crop Science at the Agricultural University, Plovdiv.

Dissertation topic: "Agronomic characteristics of express tolerant sunflower hybrids (*Helianthus annuus* L.) depending on the soil's nutrient supply

Reviewer: Assoc. Prof. Dr. Yovko Kirilov Dyulgierski, TTPI, Agricultural Academy, Prof. direction 6. 1. Plant growing, Scientific specialty: Selection and seed production,

designated for a member of the scientific jury by order № RD-16-281 / 15. 03. 2021. by the Rector of AU.

1. Relevance of the problem.

Sunflower is the most widespread and important oil-bearing crop in our country. Both in our country and around the world, the areas with sunflowers are constantly growing. Sunflower is a major crop for biodiesel production and has achieved significant success in the selection of high-yielding and high-oil hybrids. In the last 20 years the importance of sunflower for Bulgarian agriculture is grown strongly. Its position as the second largest and most important field crop in Bulgaria requires detailed research on the agronomic aspects of production, adequate to the selection achievements of this crop.

2. Purpose, tasks, hypotheses and research methods.

The main goal of the present study is to establish the influence of soil nutrient supply on some biological and economic qualities in express tolerant sunflower hybrids. To achieve this goal, the four tasks are set, whose decision detailed in the experimental part of the dissertation. To achieve the goal and to the tasks, a number of field three-year experiments with a large number of indicators are applied and a wide range of chemical analyzes, mathematical methods and software products are used, which are described in detail.

3. Visualization and presentation of the obtained results.

The presented dissertation contains 175 pages and contains sequentially: introduction, literature review, purpose and tasks, material and methods, soil-climatic

characteristics, results and discussion, conclusions, contributions and list of used literature. The content of the dissertation is well structured and very well balanced in terms of its sections. For visualization are used 27 tables, 31 figures, five photos and one application. The hybrids are very well described. This also applies to the soil-climatic characteristics in the area of study. A high scientific style is used, and at the same time the dissertation is written in an accessible language, which allows it to be used in the future by a wide range of specialists.

4. Discussion of the results and used literature.

Discussion of the results is the main and largest section of this paper. The analysis of all results is presented thoroughly and in depth. The interpretation of the obtained data is accurate and correct, as they are compared with those of other authors who worked in the same direction. The literature review includes 268 titles, showing very good theoretical preparation. Of these, 27% are published after 2010, which demonstrates the relevance of the literature review. At the same time, from the review of the literary sources, the doctoral student came to the conclusion that they are few and insufficient, which further emphasizes the relevance of the dissertation. The conclusions and contributions are very well presented and fully correspond to the obtained results.

5. Contributions to the dissertation.

Scientific contributions

In scientific terms, the most significant contributions of the doctoral student are expressed in:

- The phenological development of express-tolerant sunflower hybrids in the conditions of Plovdiv is established depending on the agro-meteorological conditions of the years of research. The dates of occurrence of the main phenological phases are described, as well as the interphase periods for the three years of the study.

- The influence of soil stock on stem height and thickness is studied in all tested hybrids.

- It is found that the better supply of soil with macronutrients has a positive effect on the diameter of the pseudanthium and the number of seeds in it, but negatively on the density of the pseudanthium.

- Positive correlations have been established between seed yield, oil yield, leaf area, number of seeds in the pie, diameter of the pie and diameter of the stem, as well as between the fat content and the harvest indices of the pie and the seeds.

Scientific and applied contributions

Some of the PhD student's contributions are of a scientifically applied nature, the most important of which are:

- The influence of soil stock on seed yield is monitored, and it is found that increased soil fertility has a positive effect on all studied sunflower hybrids. The study is foundet that the most productive express-tolerant hybrid in the conditions of Plovdiv is LG 59.580, followed by P64LE25, Subaru, Magma and Arcadia.

- The average composition of sunflower hybrids by organs (35% stems, 21% leaves, 17% pseudanthium and 27% seeds) is established, as the main contribution to the

formation of yield is the participation of seeds as an organ in the plant.

- It is found that the higher stock of soil with macronutrients increases the mass of 1000 seeds, does not affect the hectoliter mass and reduces the fat content in the seeds. The highest average fat content in the seeds has a hybrid P64LE25, followed by Subaru, LG 59.580, Magma and Arcadia.

- The studied express-tolerant sunflower hybrids contain on average 15% saturated and 85% unsaturated fatty acids. Hybrids with the lowest content of saturated and the highest of unsaturated fatty acids (Magma), as well as with the highest content of saturated and the lowest of unsaturated (Subaro) are found.

6. Critical remarks and questions.

With regard to the presented dissertation and abstract I have no significant critical remarks. The use of a wide range of methods of work and the large number of results obtained and valuable for science and practice personal contributions are an indicator of the great work done by the PhD student developing the dissertation, and that Adelina Garapova is a good young scientist and specialist in the field of agricultural sciences.

7. Published articles and citations.

In connection with the dissertation, an article was published in which the author is the sole author. The article presented by the PhD student covers the minimum 30 points required for the acquisition of educational and Scientific Degree "Doctor" according to the requirements of Law on the Development of the Academic Staff in Republic of Bulgaria.

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

CONCLUSION:

Based on the learned and applied by the doctoral student, different research methods, correctly performed experiments, summaries and conclusions, I believe that the presented dissertation meets the requirements of Law on the Development of the Academic Staff in Republic of Bulgaria and the Regulations of the Agricultural University for its application, which gives me reason to rate it **POSITIVE**.

I allow myself to suggest to the esteemed Scientific Jury also to vote positively and to award Adelina Hristova Garapova educational and scientific degree "**Doctor**" in the scientific specialty Plant Breeding.

Date: 09. 04. 2021

Plovdiv

MANUFACTURED

OPINION:

(Assoc. Prof. Dr. Y. Dyulganski)

