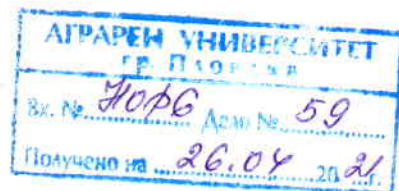


STATEMENT



on dissertation work for obtaining the educational and scientific degree "doctor" in the field of higher education 6. Agrarian sciences and veterinary medicine, professional field: 6.1. Crop science, scientific speciality: Crop science

Author of the dissertation: Adelina Hristova Garapova,
full-time 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. Miglena Atanasova Drumeva, Technical University of Varna, Plant Production Department, the field of higher education 6. Agrarian sciences and veterinary medicine, professional field: 6.1. Crop science, scientific speciality: „Plant breeding and seed production“, appointed from the Rector of the Agricultural university as a member of the Scientific Jury with Order № RD-16-281/15.03.2021.

1. Relevance of the problem.

The interest in the sunflower crop is growing worldwide, due not only to the high-quality oil obtained from its seeds but also to many additional applications of the crop in various industries. For the countries with a temperate climate, including Bulgaria, sunflower is the most important oil crop.

In the conditions of our country, sunflower has proven to be a low-responsive crop to direct fertilization, whose productive potential depends mainly on soil reserves, and not so much on direct mineral fertilization. In modern technologies for growing field crops, the rational use of available resources is becoming increasingly important, which includes the precise approach to the application of mineral fertilizers, too. In this regard, the presented dissertation is relevant, revealing the influence of soil nutrient supply on the development of basic economically valuable traits and properties of express tolerant hybrids of sunflower (*Helianthus annuus* L.) grown in our country.

2. Aim, tasks, hypotheses and methods of research.

The main goal of the doctoral research is clearly and precisely formulated and aimed to establish the influence of soil nutrient supply on some biological and economic characteristics of express tolerant sunflower hybrids. Four tasks, subordinated to the main goal of the study were planned. These included research

on phenological development; seed yield and its components; the physical qualities of the seeds, the fat content and their fatty acid composition in the conditions of different soil reserves, as well as establishing the correlations between the studied quantitative and qualitative indicators of the studied express-tolerant sunflower hybrids.

For the implementation of the goal and tasks, the methodical part was well planned. The objects of research were selected correctly. A large amount of work has been done, including precisely performed field and field-laboratory experiments. A large number of indicators were followed, which were analyzed with very well selected and logically structured statistical analyzes. A detailed soil-climatic and agrometeorological analysis of the area of the experiment, as well as the years of research, was made.

3. Visualization and presentation of the results obtained.

PhD thesis contains 175 standard pages and is very well structured into nine main sections, having met the required volume and balance between the different parts. The obtained results are summarized and illustrated in detail by 27 tables 31 figures and 1 Appendix.

4. Discussion of results and literature used.

The literature review is thorough and shows the current state of the problem. It has been developed based on 268 literary sources, of which 211 are in Latin and 57 in Cyrillic. Scientific publications concerning the origin, distribution and application of sunflower; morphological and biological characteristics of the culture were analyzed, as well as research publications related to the influence of some abiotic and agronomic factors on the productivity and quality of sunflower. In the literature review, the PhD student also examined the current state of research on the reaction of sunflower to soil storage and mineral nutrition, skillfully justifying the need for a doctoral study. The literature review made shows very good theoretical knowledge of PhD student on the issues directly related to the object of the study in the thesis.

The discussion of the results is based on the precisely conducted analyzes and their interpretation, in accordance with the results obtained by other authors. A very good scientific style was used in the presentation and discussion of the obtained results. At the end of each chapter of the section, the PhD student formulated outcomes based on the analysis of the data, which are summarized in 12 main conclusions, reflecting the implementation of the main goal and objectives of the dissertation.

5. Contributions to the thesis.

As a result of the experimental work and based on the analysis of the results 4 scientific and 4 applied contributions were formulated:

Scientific contributions

1. The phenological development of express-tolerant sunflower hybrids in the

conditions of Plovdiv has been established, depending on the agro-meteorological conditions of the years of study. The dates and periods of the main phenological phases were described, as well as the interphase periods.

2. The influence of soil reserves on the height and thickness of the stem at all tested hybrids were studied. The highest plants were messaged in hybrid Arcadia and lowest - in hybrid Magma.

3. It was found that the better supply of soil with macronutrients had a positive effect on the diameter of the sunflower head and the number of seeds in it, but on the density of the head a negative effect was observed.

4. Positive correlations were found between seed yield, oil yield, leaf area, number of seeds in the head, the diameter of the head and the diameter of the stem, as well as between the fat content and the harvest indices of the head and the seeds.

Scientific applied contributions

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

2. The average composition of sunflower hybrids by organs (35% stems, 21% leaves, 17% head and 27% seeds) was established, and it was found out that the relative share of seeds as an organ in the plant had the main contribution to the formation of yield.

3. It was found that the higher soil fertility increased the mass of 1000 seeds, did not affect the hectolitre mass and reduced the fat content in the seeds. The highest average seed fat content showed the P64LE25 hybrid, followed by Subaru, LG 59.580, Magma and Arcadia.

4. The express tolerant hybrids of sunflower contained 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) were found.

6. Critical remarks and questions.

I have no critical remarks or questions to the PhD student.

7. Published articles and citations.

Attached is one self-published article directly related to the dissertation. The total number of points is 30 and meets the minimum scientometric requirements for obtaining the educational and scientific degree "Doctor" according to the Law for the development of the academic staff. No article citations have been submitted.

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

CONCLUSION:

Based on the various research methods, learned and applied from the PhD student, the correctly performed experiments, the summaries and the conclusions made, I consider, that the submitted dissertation meets the requirements of the Law for the Development of the Academic Staff of Republic Bulgaria and the Regulations of the Agricultural University for its application, which gives me a reason to evaluate it **POSITIVE**.

I dare to suggest to the venerable Scientific Jury also to vote positively and award Adelina Hristova Garapova the educational and scientific degree "**Doctor**" in scientific speciality Crop Science.

Date: 06.04.2021 г.
Varna

STATEMENT prepared by: 

(Assoc. Prof. Dr. Miglena Drumeva)