



OPINION

on a dissertation for obtaining an educational and scientific degree "Doctor" in:
field of higher education - 6. Agricultural sciences and veterinary medicine,
professional field - 6.1. Crop science, scientific specialty - Crop science

Author of the dissertation: Adelina Hristova Garapova, regular PhD student at the Department of Crop science of the Agricultural University, Plovdiv.

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

Reviewer: Prof. Dr. Ivan Hristov Yanchev,

Department of Crop science at the Agricultural University - Plovdiv;
field of higher education - 6. Agricultural sciences and veterinary medicine,
professional field - 6.1. Crop science, scientific specialty - Crop science;
designated for a member of the scientific jury with order number RD - 16-281 /
15.03.2021 by the Rector of the Agricultural University – Plovdiv

1. Relevance of the problem.

Sunflower has established itself as the main oil-bearing plant for culinary purposes due to the quality of the synthesized fats, the good ecological plasticity and the high economic yields.

Over the last decade, average sunflower yields have increased by about 150 kg/ha from 180 to 350 kg/ha. The world selection is constantly improving the morphology and physiology of the demonstrated hybrids, such as positioning the inflorescences perpendicular to the stems, shortening the stems, as well as higher absorption of nutrients from the soil complex.

Fertilizing sunflower against its predecessor, which is most often wheat, shows not only the economic effect of the event but also the better absorption of sparingly soluble phosphorus and potassium macronutrients, a practice long used in agriculture.

By express-tolerant hybrids and in the trend towards direct sowing technologies without reversing the arable soil layer, storage fertilization raises many questions related to the import and distribution of nutrients in sunflower.

The dissertation work, which reveals the reaction of sunflower to the stock of soil with nutrients complements the current knowledge and meets modern technological aspects, which makes the development relevant.

2. Purpose, tasks, hypotheses and research methods.

The aim is to establish the influence of soil nutrient supply on biological and economic qualities by express tolerant sunflower hybrids. A three-year experiment with a triticale predecessor was arranged, through which different soil nutritional regimes were formed. Precise soil tests were performed to establish the movement, composition and quantities of nutrients in layers. The tasks were performed and are presented in detail in the experimental part of the development. A large number of indicators have been reported, which have a direct effect on the nutritional regime of the soil, both in quantitative and qualitative terms. A mathematical analysis of the obtained results is made, which confirms some hypotheses arising from the in-depth literature review.

3. Visualization and presentation of the obtained results.

The dissertation is developed on 175 pages and contains 10 sections, which are very well balanced. The illustration is through 27 tables, 31 figures and 5 photos. The detailed climatic characteristics and the soil analyzes are presented graphically, which shows their essential importance by the data analysis. The selection of hybrids is specified according to the effects that are characteristic for them, which is evident from their detailed description. The style is scientific and the speech is accessible, which leads to easy perception of the presented theses.

4. Discussion of the results and used literature.

The literature review is based on 268 literature sources, which show the problems on which a number of Bulgarian and foreign authors have worked. Studies related to the origin, distribution, fertilization, morphological and biological characteristics, productivity and quality of hybrids distributed over time have been registered. All this allows the PhD student to analyze the condition and problems associated with the reaction of sunflower to storage fertilization and to justify the need for the present study. The discussion of the results is analytical, as the synthesized ones are compared with the results obtained by the authors published in the literature review. On this basis, 12 conclusions are consolidated, which reflect the implementation of the purpose and tasks of the dissertation.

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 founded 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 critical remarks.

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 the 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 Crop Science.

Date: .23. 04. 2021

Plovdiv

MANUFACTURED
OPINION 
(Prof. Dr. I. Yanchev)