



OPINION

on a dissertation work for obtaining the educational and scientific degree "doctor" in: field of higher education 6 "Agricultural sciences and veterinary medicine", professional direction 6.1. "Plant breeding", the scientific specialty "Melioration"

Author of the dissertation: Nadia Stoyanova Hristova
PhD student at the Department of Meliorations, Land Regulation and Agrophysics at the Agricultural University, Plovdiv

Dissertation topic: REGULATED IRRIGATION REGIME

Reviewer: Assoc. prof. Dr. Radost Petrova Petrova, Agricultural University – Plovdiv, field of higher education 6 "Agricultural sciences and veterinary medicine", professional direction 6.1. "Plant breeding", the scientific specialty "Melioration"
Appointed as a member of the scientific jury by order No. RD-16-1308/19.12.2022 of the Rector of AU – Plovdiv.

1. Brief presentation of the candidate.

In 2007, PhD student Nadia Stoyanova Hristova obtained a Bachelor's degree in the specialty "Agronomy-Hydromelioration" (scientific specialty Melioration) at the Agricultural University - Plovdiv. At the same time, she acquired an additional Professional Qualification "Landscaping Designer" at the Continuing Education Center. In 2008, she graduated with a Master's degree in "Viticulture and Winemaking". The doctoral student has 14 years of work experience, from 2014 to the present, she worked at Maritsa Vegetable Crops Research Institute (MVCRI) - Plovdiv, as a senior expert agronomist (Seed production).

In 2019, she successfully passed a competition and was enrolled as a full-time PhD student in the Department of Meliorations, Land Regulation and Agrophysics at the Agricultural University, Plovdiv.

2. Actuality of the problem.

The doctoral student and her supervisor present a dissertation on the topic "Regulated irrigation regime". The scientific research is very relevant due to the decreasing water resources suitable for irrigation, the rising water prices, the lack of previous studies on the irrigation regime and the evapotranspiration of lettuce and the response of the crop during cultivation and under water deficit conditions.

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

The aim of the dissertation is to optimize the irrigation regime of lettuce with two irrigation techniques (drip and micro-sprinkling), as a field experiment. The PhD student has set herself 6 tasks, through which to establish the parameters of the irrigation regime, the dependence Water-yield and the economically optimal irrigation regime. Also to establish the total and average daily evapotranspiration (ET), its formation and the values of the biophysical coefficients of evapotranspiration.

The methodical plan is well structured, a two-year field experiment (2020-2021) is planned, divided into two one-factor experiments with different irrigation techniques, and a scheme is presented to visualize the layout of the planned variants of the experiment.

There are four variants of the experiment, two of which are controlled respectively with the implementation of 100% of the irrigation rate and without irrigation and two variants with the supply of reduced irrigation rates (implemented at the same time as the optimal variant with a rate of 60 and 80% m). This makes it possible to determine the values of the relationship "Water - Yield" according to existing formulas, presented in detail in the methodology.

4. Visibility and presentation of the results obtained.

The presented dissertation is well structured, terminology is used, and a list of used abbreviations is presented for the attention of the reader. The total thesis is 142 pages containing 6 sections and the results are well viewed through 49 graphs and 46 tables. A reference from specialized literary sources is presented, which confirms the need to study the response of lettuce to water deficit. An EU-5 capacitive sensor was used to monitor soil moisture, which was previously calibrated for the experimental conditions. A detailed analysis of the soil and water from the water source was made, as well as a characterization of the years in terms of precipitation, temperature sum and air humidity deficit, and the drought index was calculated. The obtained results are well presented and analyzed.

The dissertation meets all the requirements and criteria according to the Rules of AU-Plovdiv.

5. Discussion of results and used literature.

The literature review refers to 226 literary sources, with a very small part of them presenting studies in Bulgaria. This confirms the relevance and necessity of conducting the present study.

The PhD student achieved all the goals and fulfilled the tasks set in the methodology. She has applied familiar and new methods for collecting, processing and analyzing experimental data. She established the parameters of the optimal watering regime for lettuce during the years of experience. So is the impact of its disturbance on yield and vegetative manifestations. Through dispersion analysis of the yield data, the provenance of the differences obtained between the individual variants was determined. Through linear and power equations, the parameters of the "Water-Yield" dependence have been established.

The total values of evapotranspiration at all levels of irrigation and in both used techniques are determined, as well as its formation. The analysis of the obtained results confirms the need to irrigate lettuce, as the share of the irrigation rate is the largest in all irrigation regimes. The average daily values and the course of ET are determined and biophysical coefficients of evapotranspiration are established.

Useful relationships are derived, namely: between the leaf area index and yield; between fresh/dry leaf mass and LAI, as well as in the relationship between fresh and dry leaf biomass. A detailed economic analysis is made, recommending that, in both irrigation techniques, lettuce is found when maintaining an optimal water regime. The PhD student summarizes the obtained results in 13 conclusions and 6 scientific and scientific-applicable contributions.

All this is an indicator of the fulfillment of all educational criteria for the award of the degree "Doctor".

6. Contributions of the dissertation work.

PhD student Nadia Hristova indicates 6 contributions, 4 of which are scientific and 2 of applied importance. The most significant scientific and applied contributions are:

- The influence of the regulated irrigation regime, in two micro-irrigation techniques (drip and micro- sprinkling), on the productivity of lettuce.
- The biophysical coefficients of ET of lettuce are calculated - R, Z and Kc.

7. Critical remarks and questions – NONE

8. Published articles and citations.

The PhD student has presented a total of 3 scientific publications, which are co-authored and she is the first author. They are published in the Journal of Mountain Agriculture on the Balkans, which is on the list of refereed publications of NACID. Through these publications, Nadia Hristova collects 35 points, which covers the scientometric indicators necessary for obtaining the educational degree "Doctor".

9. CONCLUSION:

Based on the various research methods learned and applied by the doctoral student, the correctly performed experiments, the generalizations and conclusions made, I believe that the presented dissertation meets the requirements of the LDASRB and the Rules of the Agricultural University for its application, which gives me reason to evaluate it **POSITIVELY**.

I allow myself to propose to the honorable Scientific Jury to also vote positively and to award to **Nadia Stoyanova Hristova** the Educational and Scientific Degree "Doctor" in the the scientific specialty "Melioration".

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