STANDPOINT
from

Assoc. Prof. Dr. Vera Zamfirova Petrova

on dissertation work for obtaining an educational and scientific degree "doctor" in: field of higher education 6. „Agrarian sciences and veterinary medicine", professional field 6.1."Plant production", scientific field "Agrochemistry ".

Author of the dissertation work: Wissam Hassan Hourani, distance doctoral student at the Department of Agronomy at the University of Forestry, Sofia.

Dissertation topic: „New approaches for saffron (*Crocus sativus L.*) fertilization in Lebanon"

Member of the scientific jury: Assoc. Prof. Dr. Vera Zamfirova Petrova, University of Forestry, Sofia, field of higher education 6. Agricultural sciences and veterinary medicine, professional field6.1. "Plant Breeding", the scientific specialty "Melioration (incl. Soil erosion)"; designated as a member of the scientific jury by order ZPS No. 641/05.12.2022 by the Rector of The University of Forestry.

1. Relevance of the problem.

Saffron is one of the most valued and expensive spices on the planet. It has been used for centuries for medical, aesthetic and culinary purposes. It is obtained from the flowers of the *saffron crocus* plant, a member of the irises family. Worldwide, saffron production is concentrated in the belt from the Mediterranean in the west to Kashmir in the east. The largest producer worldwide is Iran. The interest in the production of culture in Lebanon dates back only to the beginning of the 21st century and is dictated by the possibility of an upsurge in underdeveloped regions.

In the context of climate change, there is a decline in saffron production worldwide. The impact of climate on the quality and production of saffron determines the need to study and faint the appropriate growing areas. The present paper investigates the possibilities of saffron crop growing in northern Lebanon and Iran. Based on an analysis of the climate, soils and selection of planting material, the dissertation work offers technological guidelines for the cultivation of saffron on clay soils in Lebanon, combining the application of nano- and organic fertilizers with super-absorbent polymers (SAP). The search for opportunities to increase the water retention capacity of the soil and the reduction of fertilizer norms determines the work as very actoreal and well founded.

2. Degree of knowledge of the state of the problem and creative interpretation of the literature review.

The PhD student has read, understood and analyzed well the facts of the significant amount of scientific information. The literature review accurately reflects the state of the problem related to the production of safflower. The literature review is purposeful, well structured, presents a detailed analysis of the morphology, the climate conditions requirements and crop agrotechnics. The used literary sources is adequately comment on.

3. Purpose, tasks, hypotheses and research methods. Correspondence of the chosen research methodology with the set goal and tasks of the dissertation work.

The aim of the presented research is clearly formulated, and the PhD student set a specific tasks for its realization.

The well-developed methodological plan is impressive, the variants included in the experiment are scientifically justified and with a sufficient number of replication. The research program includes a large number of indicators – soil-agrochemical, biometric and phenological measurements and readings, biochemical indicators related to the quality of saffron. Modern and adequate methods of analysis were used.

The advantage of the disertation work is to conduct the experiment in field conditions, which enables the doctoral student to acquire practical knowledge and skills for sampling and statistical processing of data.

4. Transparency and presentation of the obtained results.

The presented dissertation contains 14 tables, 28 figures and 5 appendices, as well as detailed photographic material. The presented tabular statistical analysis of the studied factors facilitates the perception of the large volume of data.

5. Discussion of results and used literature.

The results obtained have been interpreted accurately and in detail, discussed in three successive parts. An in-depth analysis of climatic conditions, soils and phenology of crop development in the two study areas of Northern Lebanon (Douma) and Iran (Mahallat) is noteworthy. The PhD student makes a detailed analysis and interpretation of the results obtained from the influence of the tested fertilizers, SAP and the size of the planting material on a large number of indicators related to phenological observations and measurements, biometrics,

yields and quality indicators. The skillful use of supporting literature helps to consolidate the results obtained and shows its competence on the topic.

6. Contributions of the dissertation work.

The results of this study is lead to 8 logical conclusions that accurately reflect the achievements of scientific work.

Scientific contributions

New data and information of fundamental and applied importance in the field of saffron production have been obtain.

Scientific and applied contributions

The contributions are scientifically applied in nature, tracing the development and yield of saffron in Lebanon and Iran. The combined use of nano- fertilizers and polymers has been shown to improve the yield of quality bulbs. This gives rise to specific recommendations for high-quality saffron production, as well as guidelines for fertilization and SAP use.

7. Evaluation of the degree of personal participation of the dissertation student in the contributions.

The personal participation of Wissam Hassan Hourani, in the planning and setting of the experiments, their output, the processing of the results and their creative interpretation, as well as the accumulated knowledge fully covers the educational level that is awarded with the scientific degree "Doctor". All of the above gives me reason to believe that the presented work is the personaly made by doctoral student.

8. Critical Notes and Questions.

In the work are missing the irrigation rates implemented for the two soil types, no information is found on the irrigation dates, and the parameters of the drip irrigation system are not mentioned.

The difference in the amount of precipitation, temerature and mechanical composition of the soils in Douma-Lebanon in and Mahalat-Iran are a prerequisite for the application of different irrigation rates.

In these conclusions can be exported specific values from the obtained results

Recommendations: Considering that the main role of SAP is to increase the water holding capacity of soil, I believe that the work would benefit if the basic water-physical properties of the two soil types are measured.

Question: Is it possible to eliminate the irrigation need by applying SAP?

The remarks and recommendations presented do not detract from the qualities of the dissertation. The remarks and recommendations made are wishful thinking and their sole purpose is to improve and enrich the quality of future scientific resurch.

9. Published articles and citations.

The main results of the dissertation are presented in 3 scientific papers, in English in specialized scientific journals, referenced and indexed in the world database. Hourani's article has been cited 3 times.

10. Evaluation of the publications on the dissertation work: number, nature of the editions in which they are printed. Reflections in Science - Use and Citation by Other Authors.

The presented articles objectively reflect the structure and content of the dissertation work.

CONCLUSION:

Based on the various research methods learned and applied by the doctoral student, the experiments correctly carried out, the generalizations and conclusions drawn, I believe that the presented dissertation meets the requirements of Law on the development of the academic staff in the Republic of Bulgaria and the Regulations of the University of Forestry for its application, which gives me reason to evaluate it **POSITIVELY**.

I take the liberty of proposing to the honorable Scientific Jury to also vote in favor and award **Wissam Hassan Hourani**, the educational and scientific degree "Doctor" in the scientific specialty "Agrochemistry".

Date: 12.12.2022
Sofia

PREPARED THE OPINION

(Assoc. Prof. Dr. Vera Zamfirova Petrova)