REPORT

on doctoral thesis for awarding of the educational and the scientific degree "Doctor" in: Higher education area 6. Agricultural sciences and veterinary medicine, professional field: 6.1. Plant growing, Doctoral Programme - Plant Physiology

Author of the dissertation thesis: Rositsa Zhivkova Cholakova-Bimbalova, Assistant-Professor and PhD student at the Department of Plant Physiology and Biochemistry in the Agricultural University of Plovdiv

Dissertation topic: "Study on the response of maize (Zea mays L) to low temperatures and the effectiveness of the following leaf fertilization"

Reviewer: Prof. Dr. Veneta Mihova Kapchina-Toteva, Sofia University, Professional field 4.3. Biological Sciences, Scientific specialty: Plant Physiology, a member of the scientific consul by order № RD-16-506 / 18.06.2020 by the Rector of the Agricultural University of Plovdiv.

1. Relevance of the problem

The high content of carbohydrates, proteins, iron, vitamin B and minerals makes maize (Zea mays L.) a major cereal in many parts of the world and the second of importance (after wheat) for our country. It is grown mainly on non-irrigated areas, so the main factors that limit yields are drought and high temperatures. The possibility of avoiding the negative impact of these factors is associated with earlier sowing, but it is limited by the high sensitivity of maize to low temperatures in the early stages of growth and development. The topic of the dissertation is relevant and fully corresponds to the scientific specialty.

2. Aim, tasks, hyphotesis and methods

The purpose of this dissertation is clearly formulated - to characterise in physiological and biochemical terms the impact of chronic low-temperature effects on young maize plants and the ability to overcome the functional disorders caused by them by applying foliar fertilizers and biostimulants. It has been formulated 2 main tasks, with the corresponding subtasks, which allows to fulfill the set goal, also covering all aspects of the research.

The used methodological approaches are modern and significantly have increased the qualification of the PhD student. The described experiments are supported by diagrams and photographs which would allow repeatability and reproducibility of the results.

3. Visualization and presentation of the obtained results

The dissertation is written on 122 pages and is structured in the classical way. The results of the research are summarized in 11 figures, 21 tables and 19 photos. The literature review is extensive and in-depth, including 215 sources, of which 6 are in Cyrillic and 209 in Latin.

4. Discussion of the results and used literature

In the section "Results and discussion" (49 pages) the obtained results are arranged and thoroughly commented with the use of international scientific literature. The conclusions are based on a large volume of experimental work and statistically processed results, illustrated with 11 figures, 21 tables and 19 photos. It has been observed the influence of low temperature stress on the main physiological processes such as photosynthesis, mineral nutrition and respiration, structural and functional disorders. The use of such a significant volume of literature, much of which is from the last 10 years, is a proof of the good preparation of the doctoral student and undoubted knowledge of the problem.

5. Contributions to the dissertation

The topic of the dissertation determines the significance of the received contributions, which are of a confirmatory and original nature. The most significant are those related to: the characterization of the new Bulgarian maize hybrid Knezha 307, the impact of low temperature treatment on key photosynthetic indicators and the positive impact of biostimulants and foliar fertilizer on the growth of maize plants in the post-stress period.

Scientific contributions

The obtained results conected with the impact of low positive temperature on the light-harvesting complexes are original contribution to the scientific research field. The obtained results that the connection between the light-collecting complexes and the reaction centers of PS 2 decreases and the relative pool of the available electronic acceptors "NADP molecules" of PS1 increases are good input to the plant stress response of scientific informational literature.

Scientific and applied contributions

The application of biostimulants and foliar fertilizer in the conditions of low-temperature treatment, although not conducive to growth, stimulates faster recovery of maize plants after the period of low-temperature stress.

6. Critical notes and questions

According to the PhD student, is the Bulgarian maize hybrid Knezha 307 suitable for practical application, considering the established sensitivity of the hybrid to low positive temperatures?

7. Published articles and citations

The obtained results are presented in 5 publications. Results of the dissertation are presented at 5 scientific forums. The PhD student is in the first place in all articles, which gives me reason to believe that she has a significant contribution not only in the research, but also in their design.

The abstract fully corresponds to requirements, accurately reflects the content of the dissertation and summarizes the most important results and contributions.

CONCLUSION:

Based on the mastered and applied by the PhD student different research methods, correctly performed experiments, summaries and conclusions, I believe that the presented dissertation fully meets the requirements of ZRASRB and the Rules of the Agricultural University for its application, which makes me to give POSITIVE mark. I allow myself to give suggestion to the Scientific Jury also to vote positively and to award Rositsa Zhivkova Cholakova-Bimbalova with the educational and scientific degree "Doctor" in Professional field: 6.1 Plant growing, Scientific speciality 01.06.16 Plant Physiology.

13.08.2020
Plovdiv

Prepared the report:.....

/Prof. Dr. V. Kapchina-Toteva/