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## POSTURE

on PhD thesis for the award of the educational and scientific degree "Doctor of Philosophy" in: Field of higher education 6. Agricultural sciences and Veterinary Medicine, Professional field 6.1 Plant production, scientific specialty 01.06.16. Plant physiology

**Author of the PhD thesis: Rositsa Zhivkova Cholakova-Bimbalova**

Full-time PhD student at the Department of Plant Physiology and Biochemistry at the Agricultural University of Plovdiv

**Topic of the dissertation:** "Research of the reaction of maize (*Zea mays* L) to low temperatures and the effectiveness of the following leaf fertilization"

**Reviewer:** Prof. Svetla Stoyanova Kostadinova, PhD - Agricultural University of Plovdiv, Department of Agrochemistry and Soil Science, Field of higher education 6. Agricultural sciences and Veterinary Medicine, Professional field 6.1 Plant production, scientific specialty 04.01.04. Agrochemistry, member of the Scientific Jury appointed pursuant to order № RD-16-506 / 18.06.2020 of the Rector of the Agricultural university of Plovdiv.

### **1. Actuality of the problem.**

Low temperatures in the early stages of growth and development of the corn are an important abiotic stress factor to limit its productivity. Functional disorders and damage from low temperatures are associated with damage to cell membranes, water regime, mineral nutrition, photosynthesis and others. Modern agrotechnologies in maize nutrition include the use of foliar fertilizers and various biostimulating products as an effective means of influencing the physiological status of plants under stress conditions. In this regard, studies of the physiological response of the modern maize hybrids to the effects of low temperatures and the effect of various biostimulants (protein hydrolysates) and foliar fertilizers for plant recovery is relevant and important for obtaining high yields of maize.

### **2. Purpose, tasks, hypotheses and research methods.**

The main aim of the dissertation is to study the influence of chronic low temperature impact on the physiological status of young maize plants and the possibility of overcoming the functional disorders caused by them by applying foliar fertilizers and biostimulants. To achieve this goal, six specific tasks have been completed. The influence of low positive temperatures on the physiological and biochemical parameters of young maize plants and the effect of foliar products on the physiological and biochemical parameters of young maize plants have been

established. The goal and tasks are clearly and precisely formulated. The study is well conducted methodically. Modern methods of analysis have been used.

### **3. Visualization and presentation of the results obtained.**

The dissertation is written on 121 standard pages. It is correctly structured and includes 9 main chapters, which in terms of volume and distribution fully meet the requirements for the award of educational and scientific degree "Doctor of Philosophy". The results of the research are presented in 21 tables and 11 figures, which shows the ability of the PhD student to properly systematize the scientific information. The dissertation is illustrated very well with 19 color photos. The experimental data were processed statistically using ANOVA and Duncan's multivariate comparison test.

### **4. Discussion of the results and the literature cited.**

The obtained results are interpreted in a good scientific style, analytically and thoroughly, indicating the relationships between the individual indicators. The literature review is in-depth and extensive, arranged thematically in five sections, which indicates a good awareness of the doctoral student on the research problem. It cites 215 authors, of which 6 in Cyrillic and 209 in Latin. The experimental work, the statistical processing of the data and the analysis of the obtained results are a personal work of the PhD student, which is an assessment for good theoretical and practical preparation.

### **5. Contributions to the PhD thesis.**

The obtained results can be grouped into scientific and applied scientific contributions.

#### **Scientific contributions**

By analyzing the induction kinetics of chlorophyll fluorescence according to Strasser et al. (2004), for the first time in studies of maize plants, it has been shown that low positive temperatures reduce the connectivity between light-collecting complexes (CCC2) and reaction centers (RCs) of photosystem 2 (FS2) and increase the relative pool of available electronic acceptors of FS 1 ( NADP molecules) and its relative content.

By using the electrophysiological method of Panichkin et al. (2009), for the first time the bioelectrical reaction of maize plants to low temperature influence was observed, as a result of which it was found that their functional activity decreases on the first day, the decrease increases to the third day and stabilizes at this level in the next period due to the occurrence of acclimatization processes.

#### **Applied scientific contributions**

Through a complex of physiological and biochemical parameters it is shown that the new Bulgarian hybrid corn Knezha 307 has a high sensitivity to low positive temperatures in the initial period of growth and development of the crop.

It was found that foliar application of biostimulants Terra-Sorb Foliar, Naturamin - WSP and Amino Expert Impuls and foliar fertilizer Polyplant during low temperature exposure does not improve the growth of maize plants, but has a positive effect on their physiological status, which is prerequisite for faster recovery of growth in the post-stress period.

## **6. Published articles and citations.**

In connection with the dissertation, five scientific articles have been published, four of which are co-authored and one as an independent author. The total number of points is a total of 43. The doctoral student meets and exceeds the minimum scientometric requirements for obtaining the educational and scientific degree "Doctor", according to the Law for the development of the academic staff in the Republic of Bulgaria.

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

## **CONCLUSION:**

Based on the different research methods learned and applied by the PhD student, the correctly performed experiments, the summaries and conclusions made, I believe that the presented PhD thesis meets the requirements of ZRASRB and the Regulations of the Agricultural University for its application, which gives me reason to evaluate it **POSITIVE**.

I allow myself to suggest to the esteemed Scientific Jury also to vote positively and to award Rositsa Zhivkova Cholakova-Bimbalova the educational and scientific degree "Doctor" in the scientific specialty 01.06.16. Plant physiology.

Date: July, 29, 2020  
Plovdiv town

POSTURE PREPARED BY:   
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(Prof. Svetla Kostadinova, PhD)