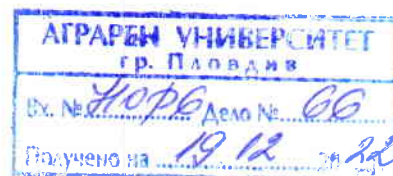


## OPINION



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

**Author of the dissertation:** Hristina Atanasova Nedeva, PhD student of self-study at the Department of "Plant Science" at the Agricultural University, Plovdiv

**Dissertation topic:** Effect of nitrogen fertilization and harvest time on productivity and quality of triticale green biomass used for energy purposes.

**Reviewer:** Prof. Dr. Antoniya Stoyanova, Trakia University, Stara Zagora, area of higher education: 6. Agricultural sciences and veterinary medicine, professional field 6.1 Plant breeding, scientific specialty Land reclamation (including soil erosion and its control), appointed as a member of the scientific jury by order No. RD-16-1100/27.10.2022 by the Rector of AU.

### 1. Actuality of the problem.

Triticale is a crop with high potential. The high productive potential and versatile application of triticale also supports the increasing trends in the areas planted with the crop worldwide. The topic of biofuels, as an alternative energy source, is particularly topical at this time. In recent years, alternative sources have been sought for biogas production. Triticale is an artificially obtained crop as a result of the hybridization between rye and wheat, and is therefore a carrier of the potential capabilities of these two crops. The problem under consideration is part of the circular bioeconomy, where a major part of plant growing is the production of plant raw materials.

The study is particularly topical and brings new and useful information in a scientific and applied aspect.

### 2. Aim, tasks, hypotheses and methods of research.

The main objective of the study is formulated clearly and precisely after a rich and analytical literature review that preceded it. The aim is to determine the effect of the application of different nitrogen fertilizer rates and harvesting phases on the yield and quality of the green mass of triticale intended for biogas production. Five tasks have been formulated to achieve the set goal. Classical methods are applied for derivation of the field study and for chemical analysis of the green mass. By means of destructive methods, some parameters of the leaf petura were determined. Modern statistical methods have been applied in the processing of the results.

### 3. Transparency and presentation of the obtained results.

As a result of the conducted research, a rich experimental material was obtained. Results are presented in 48 tables and 6 figures. The data is accompanied by a detailed analysis and comparison with results from similar studies.

Statistical processing was carried out with modern software products, using

several methods and processing programs.

#### **4. Discussion of results and literature used.**

The results of the conducted studies were studied and analyzed, making logical connections between individual indicators. Scientific information from 231 literary sources was used in the development, of which only 1/3 are in the Bulgarian language. The cited modern scientific information is presented in an informative and analytical manner. Each section ends with conclusions drawn, which are summarized at the end of the thesis in 15 main conclusions.

#### **5. Contributions of the thesis.**

As a result of the carried out scientific research work, important conclusions were drawn, which are divided into five scientific-theoretical and five scientific-applied contributions.

Contributions are of high scientific value.

##### **Scholarly contributions**

The scientific contributions are related to varietal differences in the phenological development and physiological characteristics of the triticale cultivars studied. The efficiency of nitrogen assimilation was calculated, as well as the chemical composition of the biomass for the two varieties. A theoretical formulation shows the trends in determining the yields of silage, biogas and methane.

##### **Scientific and applied contributions**

Five contributions with scientific-applied significance are indicated. Refinement of the genotypic specificity of the varieties to the nitrogen fertilization levels and establishing the harvesting phases. Tendencies to increase the biomass after application of the nitrogen fertilizer rates have been established, and it has been recorded that the highest yields are obtained with fertilization with a nitrogen rate of 20 kg/da.

#### **6. Critical remarks and questions.**

The research is carried out at a modern level. The presented dissertation work is formatted according to the requirements. I have no critical remarks about the PhD student.

#### **7. Published articles and citations.**

The doctoral student meets the scientometric criteria for obtaining the educational scientific degree "doctor". The PhD student presented three publications in connection with the dissertation, one of which is independent, and the other two she is the first author of.

No citation information was provided.

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

#### **CONCLUSION:**

Based on the various research methods learned and applied by the PhD student, the correctly performed experiments, the generalizations and conclusions made, I believe that the presented dissertation meets the requirements of the ŽARSRB and the Regulations of the Agrarian University for its application, which gives me grounds to

evaluate it **POSITIVE**.

I take the liberty of proposing to the honorable Scientific Jury also to vote positive and to award Hristina Atanasova Nedeva the educational and scientific degree "**Doctor**" in the scientific specialty **Plant Breeding**, professional direction 6.1 Plant Breeding, field of higher education 6. Agricultural sciences and veterinary medicine.

**Date:** 07/12/2022

Stara Zagora

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