EVALUATION REPORT

By Prof. Dr. Zarya Vasileva Rankova

from Fruit-Growing Institute – Plovdiv, a member of the Scientific Board, in accordance with Order No. RD-16-459 of 01 April 2024 of the Rector of the Agricultural University – Plovdiv, On the PhD Thesis for acquiring the educational-and-scientific degree 'DOCTOR' in Area of Higher Education 6. Agricultural Sciences and Veterinary Medicine; Professional Field 6.2. Plant Protection; Scientific Major 'Plant Protection'.

Author of the PhD Thesis: Atanas Ivanov Ivanov, self-training PhD student at the Department "Chemistry and Phytopharmacy", Agricultural University – Plovdiv

PhD Thesis Title: „Innovative methods for the control of economically important enemies of winter oilseed rape"

1. **Relevance of the PhD Thesis**

The present PhD thesis examines an important problem from an agrotechnical and plant protection point of view regarding the possibilities of applying alternative means of control corresponding to the strategy of integrated pest management, as well as the inclusion of appropriate agricultural practices contributing to the protection of beneficial entomofauna (conservation). in winter oilseed rape. Due to the growing needs of vegetable oils and protein, the economic importance of oilseed rape as a crop worldwide is constantly increasing. Control of enemies is one of the main factors in the successful cultivation of this crop. Due to the increased requirements for greening agricultural production and limiting the use of pesticides, the European Food Safety Authority (EFSA) declares neonicotinoids as products of unacceptably high risk for wild and honey bees, and the EU restricts the use of several substances belonging to the chemical category neonicotinoids. With a view to the development of sustainable agriculture in Bulgaria, it is necessary to search for alternative means of control that meet the strategy for integrated pest management. The purpose of the research is to study innovative alternative means of controlling economically important enemies of winter oilseed rape and agricultural practices corresponding to the strategy of

integrated pest management in this crop, which defines the problem developed in the dissertation as particularly relevant.

2. Aim, Objectives, Hypothesis and Methods of Study

Based on a detailed and extensive literature review, including 93 sources, the PhD student shows a good knowledge of the subject. Unsolved issues are clearly highlighted, the need to explore the possibilities of applying alternative means to control economically important enemies of winter oilseed rape and agricultural practices such as ecological approaches in the cultivation of the culture. The purpose and tasks of the research are correctly formulated. The studies were conducted during the period 2019-2023 under field conditions in the Plovdiv, Stara Zagora and Ruse regions. The research work in the dissertation was conducted at a modern scientific-theoretical and methodical level. The following were studied: Harmful and beneficial entomofauna of winter oilseed rape in the region of the city of Plovdiv; Testing of ecological means for the control of the Brassicogethes aeneus (Fabricius, 1775); Testing of ecological means for the control of Dasineura brassicae (Winnertz, 1853); Study of the influence of flowering plant species on the beneficial entomofauna of winter oilseed rape. The influence of potassium salts of aliphatic carboxylic acids C14-C20 (2.5 L/ha and 5.0 L/ha) as alternative means of control was analyzed, Decis 100 EC (100 g/L Deltamethrin) - 0.05 L/ ha and Mavrik 2 F (standard), 240 g/L taufluvalinate - 0.2 L/ha.

3. Visualization and Presenting the Results Obtained

The thesis is properly structured by sections and the experimental material is well illustrated with 43 Tables, 17 Figures and Pictures. Colour pictures show clearly the results and conclusions of the experiments.

4. Discussion of the Results and References

The section "Results and Discussion" is structured by means and methods of research, which allows the doctoral student to clearly present and discuss the results obtained. The volume of the conducted experiments and the obtained results fully correspond to the set objectives. The extensive statistical analysis and

good knowledge of the problem allow the doctoral student to successfully analyse, summarize and correctly interpret the experimental data, taking into account the information in the cited references. As a result of the conducted experiments, conclusions were formed that fully correspond to the set tasks: The harmful entomofauna in the agrocenosis of winter oilseed rape is distinguished by a rich species composition, including insects from 5 orders, 11 families. The dominant group is species of the order Coleoptera, followed by Hemiptera; The potassium salts of aliphatic carboxylic acids (fatty acids) with a carbon chain length of C14-C20 exhibit good insecticidal properties against adults of Brassicogethes aeneus and Dasineura brassicae and are a suitable alternative to pyrethroids; Strips of flowering plant species in canola crops attract beneficial insects and increase ecosystem services such as pollination and biological control; Three types of flowering plants can be recommended for creating flower strips in an agrocenosis of winter oilseed rape - Phacelia tanacetifolia, Borago officinalis and Coriandrum sativum.

5. Contributions of the PhD thesis

The conclusions drawn and the contributions – original and applied character are well substantiated and correspond to the obtained results. The indicated contributions will provide an opportunity to enrich the knowledge about the possibilities of applying alternative means of pathogen control in the cultivation of winter oilseed rape.

Based on the obtained results, the doctoral student has designed an application for risk analysis - initiation, enemy risk assessment and risk management for both studied enemies.

The obtained results present a sound basis to convince the members of the Scientific Board that the contributions are largely a personal achievement of the doctoral student. I should note that Atanas Ivanov is a well-established researcher, able to work in a team, which is especially important for modern research. She has a sound knowledge in modern entomology, statistical methods and she is able to carry out independent scientific work. The doctoral student makes good use of scientific literature and interprets it well.

The major part of the thesis is published in 2 papers (in co-authorship), presented at scientific forums with international participation and published in an foreign scientific journals, referenced and indexed in *Web of science*.

The author's abstract is prepared according to the requirements and is well-illustrated with 15 Figures and 22 Tables. The conducted research tasks, including the scientific and scientific-and-applied contributions, are all correctly described in a summarized way.

Conclusions

Analysing the thesis, I come to the conclusion that the doctoral student Atanas Ivanov has in-depth theoretical knowledge and skills for applying various research methods, reasonable approaches to evaluation and assessment of the results. The presented thesis meets the requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations of the Agricultural University – Plovdiv for Application of the Act mentioned, which gives me reason to evaluate it positively.

I allow myself to propose to the Honourable Scientific Board to vote positively for awarding the doctoral student Atanas Ivanov Ivanov the educational-and-scientific degree 'Doctor' in the Professional Field 6.2. Plant Protection, Scientific Major 'Plant Protection'.

25 April 2024
Plovdiv

Prof. Dr. Zarya Rankova