STANDPOINT

on a dissertation work for obtaining the educational and scientific degree "**doctor**" in: field of higher education **6. *Agricultural sciences and veterinary medicine*** professional direction ***6.2 Plant protection***, scientific specialty ***Plant protection***

Author of the dissertation: MARIYA VALERIEVA HRISTOZOVA, full-time doctoral student at the "Entomology" Department at the Agricultural University, Plovdiv

Topic of the dissertation: Biology and control options of the southern green stink bug *Nezara viridula* (Linnaeus) and the brown marmorated stink bug *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae)

Reviewer: Assoc. Prof. Vinelina Panayotova Yankova-Mihaylova PhD, "Maritsa" Vegetable Crops Research Institute - Plovdiv, higher education field 6. Agricultural sciences and veterinary medicine, professional field 6.2 Plant Protection, scientific specialty Plant Protection

appointed as a member of the scientific jury by Order No. RD-16-1262/06.12.2023 by the Rector of Agricultural University - Plovdiv.

1. Actuality of the problem.

Invasive species are one of the great challenges to the science. The risks of changing their habitats is a prerequisite for new studies in order to have an adequate response to the changing environment. Intensive commercial exchange and social globalization create opportunities for the movement of species to new areas of the world. This poses a danger to cultivated crops and food security. In this aspect, the topic of the presented dissertation is interesting and relevant.

2. Purpose, tasks, hypotheses and research methods.

The thesis aims to study the biology and control possibilities of the southern green stink bug *Nezara viridula* (Linnaeus) and the brown marmorated stink bug *Halyomorpha halys* (Stål)) for the conditions of Bulgaria. The goal and tasks are clearly and precisely formulated. Five tasks are indicated to achieve the set purpose. The research methods are consistently described in accordance with the activities performed.

3. Visualization and presentation of the obtained results.

The dissertation consists of 126 pages and is well structured, containing all the required sections. The following 7 main sections and 1 Appendix are included: Introduction – 3 pages; Literature review – 31 pages; Purpose and tasks - 1 page; Materials and methods - 12 pages; Results and discussion – 52 pages; Conclusions - 3 pages; Literature – 19 pages; Appendix 1 - 2 pages. The obtained results are extremely well illustrated with 81 photos, 18 tables and 14 figures.

4. Discussion of results and references.

The literature review comprehensively presents the current state of the theme. It covers 152 literary sources, of which 1 in Cyrillic and 151 in Latin. The developed literature review demonstrates the good theoretical training of the doctoral student on

the problems related to the object of the study of the dissertation work. The discussion of the results is thorough and based on the experimental work carried out. The morphological and biological characteristics of the species southern green stink bug (*Nezara viridula* (Linnaeus)) and brown marmorated stink bug (*Halyomorpha halys* (Stål)) were studied, as well as the possibilities of control. Parasitoid species of *N. viridula* and *H. halys* were identified and their regulatory capabilities were determined. The interpretation of the obtained data, the comments and the discussion are presented in a very good scientific style. Thirteen conclusions were formulated based on the analysis of the results, reflecting the fulfillment of the purpose and tasks of the dissertation. The submitted dissertation shows that the candidate has theoretical knowledge, has mastered various entomological methods, which gives her the opportunity to conduct independent scientific research.

5. Contributions of dissertation.

The contributions of the dissertation are well defined. They present concretely and precisely the results achieved.

SCIENTIFIC AND SCIENTIFIC-APPLIED CONTRIBUTIONS

I. Scientific contributions of and original nature

1. For the first time in Bulgaria, different morphological forms of the southern green stink bug are reported, which are found in Pazardzhik and Plovdiv regions, as well as their percentage ratio.

2. For the first time in Bulgaria, the phenological development of *N. viridula* and *H. halys,* the duration of development of their individual stages and the number of generations per year under field conditions for the Plovdiv region have been studied.

3. For the first time in Bulgaria, the following species of parasitoids from local populations that parasitize stages of *N. viridula* are reported: *Trissolcus basalis, Ooencyrtus telenomicida,* Ooencyrtus sp., and Trichopoda pennipes.

4. For the first time in Bulgaria, the following species of parasitoids from local populations that parasitize stages of *H. halys* are reported: *Trissolcus cultratus, Trissolcus basalis, Anastatus bifasciatus, Ooencyrtus telenomicida* and *Ooencyrtus* sp.

5. The degree of parasitization of the eggs by the parasitoids established for the southern green stink bug and the brown marmorated stink bug in natural conditions in different biocenoses in the Plovdiv and Pazardzhik regions was studied.

6. The degree of parasitism of adults and nymphs of the 5th instar of the southern green stink bug in different biocenoses in Plovdiv and Pazardzhik regions was studied.

7. The biological efficacy of plant protection products based on plant extracts and microorganisms, for which there are no previous studies in our country, was tested for both pest species.

II. Scientific contributions of a confirmatory nature

1. The established species of host plants in Pazardzhik and Plovdiv regions largely confirm what was observed by other authors in European countries.

2. The studies of the life cycle parameters of both species under laboratory conditions at temperature 25 ± 2°C, RH 50 - 60% and photoperiod 16 L:18D rather confirm the findings of other authors.

3. It has been confirmed that the egg parasitoid *Anastatus bifasciatus* from natural populations in Bulgaria successfully develops on the eggs of the southern green stink bug.

APPLIED CONTRIBUTIONS

1. The obtained results on the biological efficacy of the tested plant protection products can find practical application in the development of programs for IPM or in the organic farming.

2. The data on the phenological development of the two species and more specifically on the beginning of the hatching of the nymphs can be used when choosing the moment for treatment with PPPs - for the southern green skink bug it is most suitable after the first ten days of May, and for the brown marmorated stink bug – after mid-June.

6. Critical Notes and Questions.

I have no critical remarks on the presented dissertation work. I have a recommendation for PhD student Mariya Hristozova in her future research activity to publish more of the achieved results in order to popularize the activity. This will add value and significance of her work.

7. Published articles and citations.

The doctoral student Mariya Hristozova has one publication in a refereed and edition indexed in world-renowned databases (30 points), that is relevant to the topic of the dissertation. Meets the minimum scientometric requirements.

Hristozova, M. (2020). Life Cycle Parameters of the Invasive Southern Green Stink Bug (Nezara viridula) at Laboratory Conditions. Scientific Papers. Series A. Agronomy, 63(2).

The presented author's summary of the dissertation reflects objectively the structure and content of the dissertation work. All sections of the dissertation are covered.

CONCLUSION:

Based on the various research methods learned and applied by the doctoral student, the correctly performed experiments, the generalizations and conclusions made, I consider that the presented dissertation corresponds to the requirements of the Law for the Development of Academic Staff in the Republic of Bulgaria, and the Rules of the Agrarian University - Plovdiv for its application, which gives me reason to evaluate it **POSITIVE.**

I would like to suggest to the honoured Scientific Jury to vote positively, and award **MARIYA VALERIEVA HRISTOZOVA** a full-time doctoral student at the Department of Entomology at the Agrarian University - Plovdiv, the educational and scientific degree **"Doctor"** in the scientific specialty Plant Protection.

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Plovdiv

PREPARED THE STANDPOINT:
(Assoc. prof. Vinelina Yankova)