



STATEMENT

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

Author of PhD thesis: Kostadin Kirilov Trayanov - full-time doctoral student at the Department of Entomology, at the Agricultural University - Plovdiv, with supervisor Prof. Hari Yankov Samaliev.

Topic of the dissertation: "Plant parasitic nematodes of the genus *Globodera* Skarbilovich, 1959 on potatoes in Bulgaria"

Statement prepared by: by Prof. Dr. Veselin Alexandrov Arnaudov, Shumen University "Bishop Konstantin Preslavski", Field of higher education: 6. "Agricultural Sciences and Veterinary Medicine", Professional field 6.2 Plant protection, Scientific specialty "Plant Protection" (Entomology), appointed as a member of the scientific jury by Order № 16-211/05.03.2021 signed by the Rector of AU - Plovdiv.

1. Relevance of the problem

The presented dissertation deals with important issues related to the study of species diversity and distribution of potato cyst nematodes (PCN) of the genus *Globodera*, considered one of the most economically important and most harmful species of potato nematodes in Bulgaria.

Given the great social and economic importance of *Globodera* in our country, as well as the need to update existing information on species diversity and distribution of these pests in the agroecosystem of potatoes and the development of modern alternative approaches to control their populations, I find the current development for very topical and significant. It is in full compliance with the growing requirements for obtaining clean and uncontaminated by pesticides and agrochemicals production, guaranteeing human health, protection of biological diversity and the environment, which gives it high ecological and social significance.

2. Purpose, tasks, hypotheses and research methods

Based on a thorough, accurate literature review, including 248 sources, a detailed and in-depth analysis of the results obtained at home and abroad, which allows the doctoral student to define the main unsolved problems and justify the need for new research for their solving.

The purpose of the dissertation is clearly defined, and specific tasks are set for its implementation. Appropriate methods and working methods have been selected, allowing confirmation of the working hypothesis. All experiments are set methodologically correct, and conducted with the necessary accuracy and precision in the appropriate volume and number of repetitions.

3. Structure of the dissertation and presentation of the obtained results

The dissertation is well formed and properly structured and all sections have the necessary proportions. It is written on 128 pages, which include 24 tables and 16 figures. The information in the tables and figures is well systematized and easily accessible. A huge amount of research work has been done. In each section the PhD student demonstrates knowledge and competence, as well as skills to present his own results in an appropriate way and to compare them with those of other authors.

4. Discussion of the results and used literature

The results are presented in 4 subsections: determination of the species composition and distribution of *Globodera* PCN in the potato agroecosystem; study of the reaction (resistance/sensitivity) of potato varieties/lines to *G. pallida* and *G. rostochiensis*; establishment of the efficacy of various bacterial isolates and plant extracts to the invasive larvae of *Globodera* spp.; establishing the effect of concentration/temperature and exposure of plant extracts of *Juglans regia*, *Ruta graveolens* and *Plantago major* and of bacterial suspension (BS) of *Serratia plymuthica* isolate 72 on L₂ of *G. pallida*.

The correct structuring of the content allows the doctoral student to present the obtained results in a logical sequence and to interpret them in an appropriate way. The exhibition is concise, stylish and scientifically sound. The obtained data are statistically processed, which guarantees the reliability of the obtained results. The research was conducted at a high scientific level. They enrich the knowledge about the species composition and distribution of PCN of the genus *Globodera* and their control capabilities through the use of plant extracts or bacterial suspensions of *Serratia plymuthica* isolate 72, which define the dissertation as extremely relevant and useful not only scientifically but practically.

5. Scientific contributions

I accept the conclusions and contributions that are in full accordance with the topic of the dissertation, the goals and objectives and are a consequence of the research. I believe that they are the personal work of the doctoral student. In summary, they can be defined as contributions of original and confirmatory nature.

Contributions of original character

- The species diversity and distribution of *Globodera* species in the Sofia, Pazardzhik, Smolyan and Burgas regions have been studied and a gene bank of the most common species has been established.
- For the first time in Bulgaria, a PCR method was applied to identify the species affiliation of PCN *G. rostochiensis* and *G. pallida*, using gene-specific primers.
- The possibilities of using plant extracts (*Juglans regia*, *Ruta graveolens* and *Plantago major*) and isolates of rhizobacteria (*Serratia plymuthica*) as agents for biological control of PCNs of the genus *Globodera* were studied and for the first time their metabolic profile, optimal concentrations and parameters at which they show the highest nematicidal activity against *G. pallida*.
- The duration of the nematicidal and preventive action of *Serratia plymuthica* against the invasive larvae of *G. pallida* and its effect on the development and reproduction of *G. pallida* in the roots of potato plants has been established.

Contributions of a confirmatory nature

• The morphological and morphometric characteristics of the identified species of PCN genus *Globodera* (*G. rostochiensis* and *G. pallida*) were studied.

6. Critical remarks and questions

In the presented dissertation some technical omissions and inaccuracies can be found (for example in the section "Literary review" when writing the Latin names of some plant and animal species the name of the author is not mentioned, in the section "Cited literature" there is an incorrect or incomplete citation of some literature sources). These omissions, however, do not reduce the scientific significance of the dissertation and do not underestimate the results and conclusions.

7. Published articles and citations.

Kostadin Kirilov Trayanov has 4 scientific publications related to the dissertation, in which the results of these researches are published.

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

Conclusion:

Based on the mastered and applied by the PhD research methods, experiments, correct comments on the results and conclusions, I believe that the presented dissertation meets the requirements of ZRASRB and the rules of the Agricultural University for its application, which gives me reason to rate it **POSITIVE**.

I allow myself to suggest to the esteemed Scientific Jury also to vote positively and to award **Kostadin Kirilov Trayanov** the educational and scientific degree "Doctor" in the scientific specialty "Plant Protection".

Date: 15.04.2021

Prepared by:
/prof. Veselin Arnaudov, PhD/