OPINION

by Assoc. Prof. Dr. Katya Spasova Uzundzalieva

Institute of Plant Genetic resources – Sadovo

of the materials submitted for awarding the academic position of Associate Professor in the field of higher education 6. "Agricultural Sciences and Veterinary Medicine", professional field **6.2 "Plant Protection", scientific speciality "Plant Protection"**

In the competition for the academic position of Associate Professor, announced in the State Paper, issue 90 of 25.10.2024 and on the website of UARD - Plovdiv for the needs of the Department of Regional Development, Agribusiness and Tourism in the Department of Economics and Management, as a candidate participates **Chief Assistant Dr. Teodora Petrova Ilieva-Pencheva**

1. Brief biographical data

Chief Assistant Doctor Teodora Petrova Ilieva-Pencheva was born on 02.11.1976 in the town of. She was born in Karlovo, Bulgaria. She graduated higher education, MSc degree at the Higher Agricultural Institute in Plovdiv. Plovdiv (Agrarian University - Plovdiv) in the specialty Agroengineering - Agroecology with acquired professional qualification "Engineer - Agronomist". In 2006 she gains PhD degree in Plant Protection after successful presentation of the dissertation on: “Aphids (Homoptera: Aphididae) on greenhouse vegetable crops in southern Bulgaria and their resistance to insecticides used”. From 01.09.2009 to 30.04.2011 she held the academic position of Assistant Professor in the Department of Technology at the Higher School "Agricultural College". During the period 01.05.2011 to 06.06.2023 he was Assistant Professor in the Department of Regional Development, Agribusiness and Tourism at the Department of Economics and Management of the University of Agribusiness and Regional Development (UARD), and from 07.06.2023 to date she has been Chief Assistant Professor in the Department of Regional Development, Agribusiness and Tourism at the Department of Economics and Management of the University of Agribusiness and Regional Development (UARD).

2. Description of the materials.

The candidate, Chief Assistant Doctor Teodora Petrova Ilieva-Pencheva, participated in the competition for Associate Professor with a total of 30 scientific publications. Among them:

- Monographs - 1;
- Papers - 10;
- Articles - 17;
- Studies - 1;
- Books - 1

3. Expression of the candidate's scientific publications in the literature.

There are 12 citations of the candidate's publications, which gather a total of 65 points against the required 50.

4. Overall characterization of the activity.

4.1. Teaching.

Chief Assistant Doctor Teodora Petrova Ilieva - Pencheva has teaching and pedagogical activity in the period 01.09.2009 - 01.07.2023 as assistant and Chief assistant.

4.2. Scientific and practical activities.

The applicant has participated in 8 projects funded by EU and national funding programs – HORIZON 2020, ERASMUS+, Rural areas and Operational programs.

4.3. Contributions.

4.3.1. Original contributions.

- For the first time in Bulgaria, 3D traps with a variety of shapes, sizes and colors have been developed and applied to monitor the western flower thrips (*Frankliniella*

occidentalis) in organic greenhouse vegetable production. The role of organic control in biodiversity conservation and safe food production is highlighted.

- For the first time in Bulgaria, a study was conducted on the resistance of two aphid species - *Myzus persicae* and *Aphis gossypii* - to different insecticides, including organophosphorus compounds, synthetic pyrethroids and neonicotinoids. This broadens the scientific basis for the resistance of these pests and offers new perspectives for their management. Furthermore, cross-resistance between peach aphid and cotton aphid populations to different groups of insecticides has been identified. This study offers a new understanding of the mechanism of development of pesticide resistance, emphasizing the dynamics of selection of resistant populations, which opens new perspectives for sustainable pest management.
- An in-depth analysis of integrated pest management (IPM) strategies and their essential role in achieving sustainable agriculture is presented. The focus is on a holistic approach that reduces dependence on synthetic pesticides while conserving biodiversity. New technologies and methods are presented that complement traditional IPM approaches, including precision agriculture, biological control agents, and digital pest monitoring tools. An integrated approach is presented that combines different monitoring and intervention methods aimed at achieving effective pest management with minimal environmental impact.
- Natural and laboratory populations of *Myzus persicae* were studied to elucidate morphological variation among them. For the first time in Bulgaria, discriminant analysis was applied to classify these populations, achieving 91.1% correct classification. Significant changes in aphid morphology were found in laboratory rearing over 24 generations, providing a new perspective on the use of morphological differences in distinguishing populations.
- The first of its kind results on the population dynamics of Aphis gossypii Glover and its impact on the yield of pumpkins cv. Hijinx in southern Bulgaria are presented. These results provide valuable data for farmers in the region on the behavior of the pest and its impact on yields.
- The role of bombs in crop pollination has been evaluated. These insects significantly increase pollination efficiency by contributing to higher and better yields in various agricultural crops.
- Measures to control bee pests are presented, including preventive actions to reduce the risk of infestation. These measures are essential for their effective implementation in beekeeping practice.
- Innovative fertilizers and formulations such as Ecosyst-Arbanassi, Aminobest, Greenfol and Bioactive are presented, which show proven effectiveness in stimulating plant growth, increasing yields and improving production quality. New seed treatment technologies and improved composting methods have been developed to achieve better results in organic fertilizer production and increased yields.
- A detailed morphometric analysis of the most important taxonomic characters of *wingless viviparous females from laboratory and natural populations of the cotton aphid (Aphis* gossypii) is presented. Variations between populations collected from Markovo, Yagodovo and Banya (Plovdiv region) and a laboratory population reared under controlled conditions were investigated.
- Innovations have been developed to implement regulatory ecosystem services, including the use of natural predators and parasitoids as an effective alternative to chemical pesticides. The key role of biodiversity and habitat complexity in the effectiveness of ecosystem services in agriculture is elucidated.

4.3.2. Confirmatory contributions.

- The bioagents Macrolophus pygmaeus, Chrysoperla carnea and Amblyseius swirskii have been confirmed to be effective against major pests in organic greenhouse vegetable production.

- Integrated pest management (IPM) strategies have been confirmed to be effective in achieving sustainable agriculture, showing how a synergistic approach can successfully manage pest populations and minimize environmental impact.
- The inapplicability of morphological characters to distinguish the nicotianae form (originally described as a distinct species and later as a subspecies of *M. persicae*) in Bulgarian populations of *Myzus persicae*.
- It has been confirmed that timely and systematic monitoring of cotton aphid population dynamics is crucial for timely decision-making on plant protection measures.
- Bombs are confirmed to be significantly more effective in pollination compared to traditional methods such as the use of hormones or hand pollination.
- The role of organic beekeeping in maintaining clean production of bee products and sustainable land use, which contributes to the preservation of the natural balance and biodiversity is confirmed.
- It has been confirmed that the application of organic fertilizers leads to a significant increase in yields and quality of various crops such as stevia, tomatoes, red pepper and wheat, while reducing dependence on synthetic fertilizers.
- Significant morphometric differences between laboratory and natural populations of the cotton aphid have been confirmed, including in body width, length of antennal III and V, length of the processus terminalis, as well as in length and width of the siphons and length of the second antennal article of the foot of the III pair of legs.
- The negative impact of chemical pesticides on biodiversity has been confirmed, while the relationship between reduced biodiversity and loss of natural pest control capacity has been established.

4.3.3. Contributions with practical application.

- It is confirmed that the results provide important guidelines for the practical application of bioagents in organic vegetable production, with a special focus on the effectiveness of *Macrolophus pygmaeus, Chrysoperla carnea* and *Amblyseius swirskii* against major pests.
- The study confirmed that the proposed methods to overcome insecticide resistance provide valuable scientific and applied guidance for the control of resistant aphid populations, especially in greenhouse vegetable production.
- Strategies are proposed for farmers to implement integrated pest management on their farms, contributing to more sustainable and ecological agriculture, reducing the negative effects of chemical pesticides and maintaining ecosystem health.
- It has been confirmed that the research can be used to improve methods for the identification of *Myzus persicae* populations, which will contribute to a more accurate classification of this pest in crop protection.
- It has been confirmed that the results of the study can be used to optimize crop protection plans in pumpkin cultivation, allowing farmers to respond to the population dynamics of A. gossypii in a way that leads to higher yields and more effective management of plant resources.
- It has been confirmed that research can be used to promote natural pollination methods in agriculture, leading to more sustainable production practices.
- The research provides practical guidance for beekeepers wishing to convert to organic beekeeping, describing the important regulatory requirements and environmental benefits.
- Specific recommendations are offered on the optimum concentrations and methods of application of various bio-preparations, such as Ecosyst - Arbanassi and Aminobest, which can be used for sustainable and efficient crop production.
- The use of a stepwise discriminant analysis to classify cotton aphid population groups, achieving 80.8% classification accuracy, offers an effective method for investigating taxonomic differences among populations.

- Studies have been conducted on farmers' awareness of ecosystem services and the development of strategies to integrate them into agroecosystems through sustainable agriculture.

5. Evaluation of the personnel contribution of the applicant. After reading the submitted evidentiary materials, I confidently state that the scientific publications are the personal contribution of the candidate, her participation in scientific and applied projects is active and has contributed to the derivation of the tasks set in them.

6. Critical remarks.

I have no critical remarks.

7. Conclusion.

Having in mind the abovesaid I consider that the applicant fully covers the minimum national requirements, according to art. 2б, al. 2 и 3 from The Academic Staff Development Act of the Republic of Bulgaria. I propose Chief Assistant Dr. Teodora Petrova Ilieva-Pencheva to be confirmed for the Academuc position Assoc. prof. in area of higher education 6. “Agricultural sciences and veterinary”, 6.2 “Plant protection”, “Plant protection” specialty for the needs of “Regional development, agribusiness and tourism” department of UARD.

12.03.2025 г. Member of the Scientific commission:
Assoc. prof. Dr. Katya Uzundzhalieva