



REVIEW

by Assoc. Prof. Dr. Atanaska Radeva Stoeva
appointed as a member of the scientific jury according to Order No.
RD 16-47/ 22.01.2023 of the Rector of the Agricultural University –
Plovdiv
regarding the competition for "associate professor" in the scientific
specialty 6.2 Plant protection (Entomology), announced in State
Gazette no. 97 of 21.11.2023 with candidate Dima Mateeva Markova

Reviewer: Associate professor Dr. Atanaska Radeva Stoeva, Agricultural University, Plovdiv, 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 No. RD-16-47/ 22.01.2024 of the Rector of the Agricultural University.

1. General data on the candidate's career and thematic development

In the competition for "associate professor" in scientific specialty 6.2 Plant protection (Entomology), announced in SG no. 97 of 21.11.2023, as a candidate participates ch. assistant Dr. Dima Mateeva Markova, teacher at AU, Plovdiv. Dima Mateeva Markova was born on April 24, 1982 in the city of Plovdiv. She graduated with a bachelor's degree at the Agricultural University, Plovdiv, majoring in Plant Protection in 2004. In 2005, she obtained a master's degree at the same university, majoring in Ecology of Settlements. From 2006 to 2021, she worked at the Maritsa Vegetable Crops Research Institute (MVCRI), Plovdiv, "Technologies in Vegetable Production" department, successively holding the positions of research assistant III degree, research assistant II degree, assistant and assistant professor. After a successfully defended dissertation on the topic "Meloidogyne Goeldi root nematodes on potatoes in South Bulgaria" she obtained the educational and scientific degree "doctor" in the scientific specialty "Plant Protection (Entomology)" in 2015. From 2021 to the present she is the assistant professor at Agricultural University, Plovdiv, Department of Entomology.

2. General description of the presented materials

In the competition for "associate professor" Dima Mateeva Markova applied with a total output of 65 works, grouped as follows:

- Scientific publications on the nomenclature specialty - 65 publications, of which:
 - Publications related to the doctoral dissertation - 4 publications, which are not subject to consideration;

- Publications with an impact factor – 12 publications (IF = 5,143; SJR = 1,507);
- Publications in peer-reviewed and refereed scientific journals – 19 publications;
- Publications in conference proceedings – 30 publications;
- Scientific publications outside the nomenclature specialty
- Scientific and popular publications – 16.

For the preparation of the review, 61 issues are subject to analysis.

The personal participation of Dr. Dima Markova in the mentioned 61 works is illustrated by the fact that in 6 of them she is the first author, in 31 she is the second author, and in the remaining 24 she is the third and subsequent author.

Regarding the bibliometric indicator for classifying scientific journals, two of the publications are in Q1 quartile journals (Horticulture, Scientia Horticulturae), nine are in Q3 quartile publications, and one is in the Q4 group.

The candidate fulfills the minimum number of points required by ZRASRB for occupying the academic position "associate professor" in the field of higher education 6. Agricultural sciences and veterinary medicine, professional field 6.2. Plant protection, with the total number of points from the mandatory indicators being 574 against the required 400. In three of the groups of indicators, the exceedance is significant.

3. Main directions in the candidate's research work

The research work of Dima Markova, PhD is focused on pests (nematodes, insects, mites) of vegetable crops (greenhouse and field production), including tomatoes, peppers, cucumbers, peas, beans, potatoes, etc.

The main directions of her research work are related to:

- Investigation of the resistance/sensitivity of vegetable crops, varieties, samples and lines to plant-parasitic nematodes;
- Study of alternative methods to control of root-knot nematodes and cyst nematodes in vegetable crops;
- Investigation of the efficacy of chemical and biological PPPs (microbial products, phytopesticides, etc.) against insect pests (aphids, thrips, whiteflies, mining moths, moths, etc.) on vegetable crops;
- Evaluation of environmentally friendly means (plant extracts, pheromone traps, grafting on resistant substrates, etc.) for plant protection against pests of vegetable crops;
- Development of integrated and biological systems for plant protection in vegetable crops.

Participation in a large number of research projects, including national (14 funded by the Agricultural Academy and 10 funded by the Bulgarian National Science Fund (BNSF)) and the Ministry of Education and Science) and international (3) confirms the competence of Dr. Dima Markova, as well as her ability to work in scientific teams, and is

a guarantee for her high professionalism.

4. Evaluation of the candidate's pedagogical preparation and activity

From April 6, 2021 to the present, Dr. Dima Mateeva Markova is an assistant professor at the Agricultural University, Plovdiv, Department of Entomology, and her academic workload amounts to more than 1300 hours. She gives lectures and laboratory classes to undergraduate and graduate students in the disciplines: General Entomology, Special Entomology, Agricultural Acarology and Nematology, Diseases and Enemies in Green Systems. During the period in which the candidate was teaching, there were five successfully defended graduate students from the master's degree.

5. Significance of the obtained results, proven by citations, publications in prestigious journals, awards, membership in international and national scientific bodies, etc.

The significance of the research activity of Dr. Dima Markova in the field of plant protection and more specifically in applied nematology and entomology is confirmed by the significant number of citations - 9 in publications referenced and indexed in world-renowned databases and 3 in non-refereed journals with scientific review. The total number of cited articles is 6, and in 3 of them the candidate is the second author.

The fact that the candidate's scientific activity is widely popular is confirmed by the significant number of additional citations in Bulgarian journals without an impact factor and in foreign publications (52), as well as in dissertations (3).

6. Significance of contributions to science and practice

The scientific works of Dr. Dima Markova submitted for review show that she is a professional in the field of plant protection, entomology in particular. The contributions of her research activities are in the following areas:

- Evaluation of the response of susceptibility of varieties, samples and lines of vegetable crops to plant-parasitic nematodes;
- Study of alternative methods to control of plant-parasitic nematodes;
- Study of the efficacy of new plant protection products against pests of vegetable crops grown outdoors and in greenhouses;
- Development of integrated and biological plant protection systems for vegetables;
- Development of technology for cultivation of *Tribulus terrestris* L. as a semi-culture and pest monitoring;
- Study of the influence of water deficit on the growth of pepper mutant lines and their attack by pests.

The candidate's contributions are closely related to the scientific specialty of the announced competition and can be grouped as follows:

I. ORIGINAL CONTRIBUTIONS

- Different rootstock genotypes from the family Cucurbitaceae were screened for resistance to root-knot nematodes (*Meloidogyne* spp.) and soil pathogens (*Fusarium* spp. и *Pythium* spp.). Resistance was found in Carotina (*Cucurbita moschata*) and Turban (*Cucurbita moschata*) to *Meloidogyne* spp. *Lagenaria siceraria*, TG (*Cucumis sativus*) and TD (*Cucumis sativus*) are resistant to *Fusarium* spp. and *Pythium* spp.;
- The resistance/tolerance of 10 potato cultivars against *Ditylenchus dipsaci* and *Ditylenchus destructor* was evaluated. Two of the tested cultivars (Spunta and Inovator) are resistant to *D. dipsaci*. The cultivars Sante and Orpheus are resistant to *D. destructor*;
- The response of rice samples to the pathogen *Fusarium culmorum* and to the nematode *Aphelenchoides besseyi* as well as the tolerance of osmotic stress were studied. The varieties CRLB 1 and Luna are resistant to *Fusarium culmorum*; No immune genotypes against *A. besseyi* were recorded. Only cultivar HG 1 is highly resistant; Line #77, Osmanchik 97, Line #19 and CRLB-1 have good tolerance to osmotic stress in the initial stages of plant development;
- Eight potato weed species were evaluated as hosts of the nematodes *Pratylenchus penetrans* and *P. neglectus*. *Apepa spica-venti*, *Elytrigia repens*, *Cirsium arvense*, *Chenopodium album*, *Solanum nigrum* and *Echinochloa crus-galli* are good host plant, *Amaranthus retroflexus* is a bad host plant, *Sorghum halepense* is not a host plant for *P. penetrans*. *Solanum nigrum* and *Elytrigia repens* are good host plant for *P. neglectus*, *Sorghum halepense*, *A. spica-venti*, *E. repens* and *Ch. album* are bad host plants;
- For the first time in Bulgaria, a technology was developed for growing *Tribulus terrestris* L. as a semi-culture on a raised bed and attack by *Phytophthora* spp., cotton aphid (*Aphis gossypii*), cotton bollworm (*Helicoverpa armigera*) and twospotted spider mite (*Tetranychus urticae*) has been reported;
- The reaction of cultivars, selection lines and local samples of pepper to attack by *Myzus persicae*, *Frankliniella occidentalis*, *Thrips tabaci*, *Helicoverpa armigera* was evaluated. CAPS-18, CAPS-57, CAPS-21, CAPS-25, CAPS-110A, CAPS-138, and CAPS-174 are poorly attacked by the pests and can be used in resistance breeding programs.

II. SCIENTIFIC AND APPLIED CONTRIBUTIONS

The main scientific and applied contributions can be summarized in the following categories:

- Alternative methods for the control of plant-parasitic nematodes and the influence of abiotic factors on the efficacy of bioagents for the control of these pests;

- Studies on the efficacy of conventional and biological plant protection products against pest on vegetable crops;
- Monitoring and control of tomato mining moth and cotton bollworm using pheromone traps;
- Development of technological solutions in the cultivation of legumes and potatoes.

Some of the more important scientific and applied contributions are:

- The effect of intercropping tomato with tagetes (*Tagetes patula* L.), basil (*Ocimum basilicum* L.), lettuce (*Lactuca sativa* L.) and white mustard (*Sinapis alba* L.) was studied and it was found that white mustard and tagetes inhibit the development of *Meloidogyne* spp.;
- The influence of cover crops - vetch (*Vicia villosa* Roth), winter pea (*Pisum sativum* L.) and white mustard (*Sinapis alba* L.) was studied and it was found that vetch and white mustard used as green manure suppressed the development of *Meloidogyne* spp.;
- Application of microbioagents containing *Bacillus amyloliquefaciens*, *Bacillus thuringiensis* and *Trichoderma viride* has been found to successfully reduce attack by root-knot nematodes and soil-borne pathogens in tomatoes and cucumbers;
- The biological activity of the product Nemguard and the microbioagent *Trichoderma asperellum*, Bulgarian strain T6, against root-knot nematodes (*Meloidogyne* spp.) in cucumbers grown in greenhouses was determined. The combined application of Nemguard + *Trichoderma asperellum*, strain T6 has the best efficacy against the nematodes;
- Good nematocidal activity of plant extracts from *Tanacetum vulgare*, *Allium ursinum*, *Juglans regia* and *Artemisia absinthium* against *Pratylenchus penetrans* was found;
- The effect of the rhizobacterium *Bacillus subtilis* on the root-knot nematode *Meloidogyne hapla* was investigated at different temperatures. In the temperature range 22-26°C, the mortality of *M. hapla* larvae is the highest and the inhibitory effect on the eggs in the egg sacs is the greatest;
- The effect of the rhizobacterium *Serratia plymuthica* and temperature on the egg hatching and mortality of 2nd instar (L2) larvae of the white potato cyst nematode *Globodera pallida* was monitored. A complete inhibition of egg hatching of the nematode was found after six days of exposure to *S. plymuthica*, at temperatures of 19°C and 24°C;
- The efficacy of mustard (*Sinapis alba* L.), hemp (*Cannabis sativa* L.) and yarrow (*Achillea millefolium* L.) vegetable oils against the cotton aphid (*Aphis gossypii*) on cucumbers grown in greenhouses was studied. Hemp and yarrow vegetable oils show good efficacy against the pest;

- The possibilities of using a Russian synthetic sex pheromone to control the tomato mining moth (*Tuta absoluta*) on tomatoes in the greenhouses have been investigated. At a dose of 0.5 mg/trap at a rate of 1 trap/20 m² significantly reduced the percentage of damaged plants, the average number of mines per leaf and the percentage of damaged fruits. It can be successfully applied in the practice for monitoring and controlling the tomato mining moth under greenhouse conditions;
- The attractiveness of pheromone traps with different pheromone content for the cotton bollworm (*Helicoverpa armigera*) in tomato field production was studied. The pheromone lure with 2.91 mg Z11-hexadecenal + 0.09 mg Z9-hexadecenal over the entire surface had the best attractiveness to the butterflies;
- The efficacy of local bacterial isolates of *Bacillus amyloliquefaciens*, *Paenibacillus polymyxa* and *Providencia rettgeri* against *Aphis fabae* and *Acyrtosiphon pisum* was evaluated. *B. amyloliquefaciens* A1 and *P. rettgeri* K10 showed good efficacy against the pests;

III. CONTRIBUTIONS OF A CONFIRMATIVE NATURE

- The efficacy of the products with the active substance azadirachtin (NimAzal T/C and BioNim Plus) against twospotted spider mite (*Tetranychus urticae* Koch.), suitable for organic and integrated field production of tomatoes and beans, has been confirmed;
- The good efficacy of the plant protection products, respectively Confidor Energy OD against pea and bean weevil and Confidor Energy OD and Pyrethro Natura EK against aphids *Aphis fabae* and *Acyrtosiphon pisi* in field production of beans and peas, has been confirmed.

7. Critical remarks and questions

I have no critical comments regarding the scientific papers submitted to me for review.

8. Personal impressions and opinion of the reviewer

I have known Dr. Dima Markova from the very beginning of her scientific career, in which she with exceptional consistency, thoroughness and precision managed to realize high-quality research activity and become a professional in the scientific specialty of Plant Protection (Entomology). The accumulated knowledge, experience and competences, as well as her excellent work in scientific teams, are a guarantee that in the future she will continue to consolidate her place as a specialist in the professional field of Plant Protection. As a person who respects the rules of scientific and academic ethics, she is a valuable partner for every working group and every academic unit.

CONCLUSION

Based on the analysis of the pedagogical, scientific and scientific-applied activity of the candidate, I believe that assistant professor Dr. Dima Mateeva Markova meets the requirements of the Law for the development of academic staff in the Republic of Bulgaria, Rules for implementation of the Law for the development of academic staff in the Republic of Bulgaria and the Regulations of the Agricultural University for its application. The presented scientific works are of a high level, fully related to the professional field 6.2 Plant protection (scientific specialty Entomology), and fully cover the required indicators for the academic position "associated professor".

All this gives me reason to **POSITIVELY** evaluate her overall activity.

I propose to the honorable Scientific Jury to also vote positively and the Faculty Council of the Faculty of Plant Protection and Agroecology at the Agricultural University - Plovdiv to elect assistant professor Dr. Dima Mateeva Markova as an "**associate professor**" in the professional field of **Plant Protection**, scientific specialty **Entomology**.

Data: 14.03.2024

Plovdiv

Reviewer:


(assoc. prof. Atanaska Stoeva)