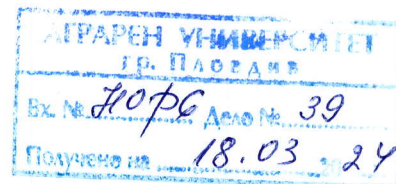


REVIEW



Regarding: The competition for the academic position "Associate professor" in the scientific specialty Plant Protection (Entomology), professional direction 6.2. Plant protection, announced in SG No. 97 of 21.11.2023 with candidate Assistant Professor Dima Mateeva Markova, PhD

Reviewer: Prof. HARRY YANKOV SAMALIEV, Dr.Sci (retired from the Department of "Entomology" at the Agricultural University - Plovdiv, habilitated in the 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 Agricultural University Plovdiv

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

In the competition for "Associate Professor" one candidate participated - Assistant Professor Dima Mateeva Markova, PhD from the Department of Entomology of the Agricultural University in Plovdiv.

Dima Mateeva Markova was born on 24/04/1982. She graduated from the Agricultural University, Plovdiv (AU) in 2000, with a bachelor's degree in "Plant Protection". In 2005, he graduated with a master's degree in "Ecology and settlement systems". Since 2006, she has been appointed to the position of research assistant III degree at Maritsa Vegetable Crops Research Institute (MVCRI), Plovdiv, department "Technologies in vegetable production", after which she successively passed through the positions – Scientific researcher II degree 2008, 2011 Assistant and 2015 - Chief assistant.

She defended her Dissertation on the topic: "Meloidogyne Goeldi root nematodes on potatoes in southern Bulgaria" in 2015" and obtained the scientific degree of "Doctor".

She completed a specialization at Akdeniz University in Antalya, Turkey in 2015. In 2018, she completed mobility for the purpose of studying under the Erasmus program in Spain.

From 06.04.2021 until now he is the Chief assistant (Assistant prof.) at the Agricultural University - Plovdiv.

She is fluent in English and Russian, as well as modern information technologies.

2. General description of the presented materials in the competition for "Associate professor".

Dr. Dima Markova participated in the competition for "Associate Professor" with a total of 83 works, of which 65 scientific, 16 popular sciences and two technologies.

Scientific works are grouped by nomenclature specialty as follows:

- Publications related to the doctoral dissertation - 4 items (dissertation's abstract and 3 articles), which are not subject to consideration;

- Publications with an impact factor (IF) / Impact Rank (SJR) – 12 items;

- Publications in peer-reviewed and refereed scientific journals – 7 items;

- Publications in proceedings of conferences – 42 items.

To prepare the opinion, 61 publications are subject to analysis.

Dima Markova's personal participation in the mentioned 61 works is as follows: in 6 publications she is the first author, in 31 issues - second, and in the remaining 24 - third and subsequent author.

To prepare the opinion, 61 publications are subject to analysis.

Of the 61 scientific papers presented, 32 are in Bulgarian and 29 in English.

I consider it necessary to point out that the candidate covers the minimum number of points required by the Law on the Development of the Academic Staff the Republic of Bulgaria for the occupation of the academic position "Associate professor" in the field of higher education 6.0. Plant breeding and veterinary medicine as the *total number of points from the mandatory indicators amounts to 594.8 with required 400*. The performance of the indicator groups is as follows:

- Group A. Dissertation work for awarding the educational and scientific degree "Doctor" - 50 points;
- Group B. Habilitation work - scientific publications (not less than 10) in publications that are referenced and indexed in world-famous databases with scientific information — 131.5 points;
- Group Г. Publications – 242.5 points;
- Group Д. Citations - 150 points.

Eight of the publications were published in journals with Impact Rank (SJR) and four in journals with Impact Factor (IF).

3. Main directions in the candidate's research work. Demonstrated skills or aptitude for leading scientific research (project management, attracted external funding, etc.).

The scientific subject of Assistant prof. Dima Markova is up-to-date and diverse, and the research results are original, with scientific and scientific-applied significance. Scientific research is directed in the following main directions:

- Evaluation of the response of susceptibility in different varieties and breeding lines of vegetable crops, potatoes and rice to plant parasitic nematodes, in connection with the selection of resistance;
- Alternative methods for controlling plant-parasitic nematode species;
- Determination of the species composition and population dynamics of the main pests and useful species in the agroecosystems of vegetable crops;
- Study of the effect of new plant protection products against enemies in vegetable crops grown outdoors and in greenhouse;
- Development of integrated and biological plant protection systems for control of main pests of vegetable crops;
- Development of *Tribulus terrestris* L. cultivation technology and identification of pests;
- Study of the influence of water deficit on growth indicators and the degree of attack by pests in pepper mutant lines.

An important point in the research work of Assistant prof. Markova is the interdisciplinary approach. She works in a team with specialists from different fields, which makes the results significant, original and complex.

She participated in 27 projects, of which 14 scientific projects funded by the Agricultural Academy, 10 scientific research projects under the Ministry of Education, Science and Technology, and 3 international projects.

facilities, ecological approaches in combating them, selection of high-quality lines and varieties of vegetable crops and potatoes, protection of soil fertility when growing vegetables in greenhouses.

As a specialist in the field of Plant Protection, Assistant prof. Markova is actively involved in determining the health status of the vegetation in various agrocoenoses, as well as the possibilities for combating pests through chemical and biological insecticides.

4. Evaluation of the pedagogical preparation and activity of the candidate. Role of the candidate for the training of young scientific personnel.

Assistant prof. Markova has a teaching experience of 2 years 9 months and 25 days. She had direct teaching employment from lectures, exercises and extracurricular employment during the period 2019/2020 to 2022/2023 of 1384.7 hours, which by year is from 108.8 to 496.9 hours.

Her teaching activity is related to the training of students from "Bachelor" and "Master", regular and part-time. She gives lectures on the discipline "Non-insect pests" in the specialty "Plant protection", on the discipline "Diseases and pests in green systems" in the specialty "Ecology and environmental protection", "Bachelor", full-time and correspondence form of education, and in the discipline "Agricultural Acarology and Nematology" in the specialty "Plant Protection", "Master".

Assistant prof. Markova leads exercises in the disciplines "General Entomology", "Special Entomology", "Diseases and pests in green systems" and "Non-insect pests".

Participates in the preparation of entomological collections from damage by pests and other visual materials for the teaching laboratories.

Providing the learning process with visual materials is a significant contribution and an important part of her activity as a teacher at Agricultural University.

In addition to direct teaching and learning activities - lectures and exercises, she works with graduate students. It has prepared 5 graduates from the Master's College of Higher Education in the field of "Plant Protection".

Assistant prof. Markova develops study programs and lecture courses with colleagues from the department, which is a significant contribution to the learning process and an integral part of the activity of every university teacher.

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

The importance for science and practice of the obtained results is confirmed by the fact that two of the publications of Assistant Markova were published in the journals *Scientia Horticulturae* and *Horticulturae* (Q1), seven – in *Acta Horticulturae*, *Biotechnology & Biotechnology Equipment*, *Bulgarian Journal of Agricultural Science* (Q3) and one – in *Ecologia Balkanica* (Q4).

The total impact factor of the publications is 7.005

The scientific research of Assistant prof. Markova have found an echo both in our and foreign literature. Data are presented for 55 citations, of which three are in Bulgarian publications, 49 in Bulgarian journals with IF and in foreign publications, and three in dissertations. Evidence is provided for all citations. The indicated data show that the research results are of good scientific merit and accepted by the scientific community.

6. Significance of contributions for science and practice. A motivated answer to the question to what extent the candidate has a clearly defined profile of research work.

The scientific research work of Assistant prof. Markova has a clearly defined profile in the field of plant protection. Scientific research is up-to-date, and its results - with significant scientific and scientific-applied contributions. She conducts her scientific research on economically important pests of agricultural crops: vegetables, potatoes, rice, legumes. The experimental work is carried out at a good methodical level, with rich experimental material. This gives grounds for obtaining objective results that are correctly interpreted. The interdisciplinary approach and teamwork skills allow for more in-depth and complex results.

Original scientific contributions:

- Different rootstock genotypes from the family Cucurbitaceae were screened for resistance to root-knot nematodes (*Meloidogyne* spp.) and soil pathogens (*Fusarium* spp. and *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. (B7; D41).
- The resistance/tolerance of 10 potato varieties against *Ditylenchus dipsaci* and *Ditylenchus destructor* was evaluated. Of the varieties tested, 2 varieties (Spunta and Innovator) are resistant to *D. dipsaci*. The varieties Sante and Orpheus are resistant to *D. destructor* (G25).
- The reaction of rice breeding lines to the *Fusarium culmorum* and *Aphelenchoides besseyi* and tolerance to osmotic stress was studied. CRLB 1 and Luna varieties have resistance to *Fusarium culmorum*. No immune genotypes against *A. besseyi* were established. 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 (G9; G36).
- Eight weed species, commonly found in potato fields in Bulgaria, were evaluated as hosts of the root-lysing nematodes *Pratylenchus penetrans* and *P. neglectus*. *Apepa spica-venti* (L.) P.B., *Elytrigia repens* (L.) Nevski, *Cirsium arvense* (L.) Scop., *Chenopodium album* L., *Solanum nigrum* L. and *Echinochloa crus-galli* L are good hosts, *Amaranthus retroflexus* L. is poor host, and *Sorghum halepense* (L.) Pers. not host to *P. penetrans*. *Solanum nigrum* and *Elytrigia repens* are good hosts for *P. neglectus*, and *Sorghum halepense*, *A. spica-venti*, *E. repens* and *Ch. album* are bad hosts (G23).
- A technology has been developed for growing *Tribulus terrestris* L. as a semi-culture on a raised bed- single-row and double-row, with drip irrigation. For the first time in Bulgaria, in natural habitats and established crops, an attack by *Phytophthora* spp., *Aphis gossypii* Glov., *Helicoverpa armigera* Hb., *Leucanithis stolidus* F., *Tetranychus urticae* Koch. (B2; B3).
- The influence of water deficit on growth indicators and attack by enemies in pepper mutant lines was studied. A strong reduction in first-quality fruit mass under drought conditions was found in pepper mutant lines. An increase in thrips density was observed in them (G4).
- Screening for attack by pests (*Myzus persicae* Sulz.; *Frankliniella occidentalis* Perg. and *Thrips tabaci* Lindeman; *Helicoverpa armigera* Hubn.) was carried out in different samples of pepper

(*Capsicum* spp.) - varieties, breeding lines, local samples and varieties grown on detected in a natural attack background. Samples CAPS-18, CAPS-57, CAPS-21, CAPS-25, CAPS-110A, CAPS-138 and CAPS-174 are weakly attacked by the three enemies - aphids, thrips, nightshades and can be used in breeding programs for sustainability (G5; G7).

Scientific and applied contributions:

- The possibility of using plant extracts and bacterial isolates for biocontrol of some of the most pathogenic plant parasitic nematodes of the genus *Meloidogyne*, genus *Globodera* and genus *Pratylenchus* was studied. Plant extracts of *Tanacetum vulgare*, *Allium ursinum*, *Juglans regia* and *Artemisia absinthium* were found to exhibit good efficacy against *P. penetrans*, and an extract of *Tanacetum vulgare* against *Meloidogyne hapla* in strawberries (D31, D34).
- The influence of temperature on the effectiveness of the rhizobacterium *Bacillus subtilis* against *Meloidogyne hapla* and the rhizobacterium *Serratia plymuthica* against the *G. rostochiensis* has been experimentally proven. In the temperature range 22-26°C, *B. subtilis* caused the highest mortality of larvae of *Meloidogyne hapla*, also exhibiting an inhibitory effect on eggs, and *S. plymuthica* inhibited the hatching of larvae of the pale potato cyst nematode (*Globodera pallida*) at six days exposure in temperature range 19°C and 24°C (G10, G12).
- The application of bioproducts containing *Bacillus amyloliquefaciens*, *B. thuringiensis* and *Trichoderma viride*, the application of *Nemguard* and the microbioagent *Trichoderma asperellum* Bulgarian strain T6 reduce the attack of *Meloidogyne* spp. for tomatoes and cucumbers grown in greenhouses (B6; B9; D20; D 28).
- In experiments intercropping tomatoes with *Tagetes patula* L., *Ocimum basilicum* L., *Lactuca sativa* L. and *Sinapis alba* L. it was found that *S. alba* and *T. patula* suppressed the development of *Meloidogyne* spp. (B5).
- Of the cover crops *Vicia villosa* Roth, *Pisum sativum* L. and *Sinapis alba* L. in tomatoes, *V. villosa* and *Sinapis alba* used as green manure suppress the development of *Meloidogyne* spp. (G3).
- The biological activity of local bacterial isolates of *Bacillus amyloliquefaciens*, *Paenibacillus polymyxa* and *Providencia rettgeri* was determined. *Bacillus amyloliquefaciens* A1, *Paenibacillus polymyxa* AB3 and *Providencia rettgeri* K10 against *Aphis fabae* Scop. and *Acyrtosiphon pisum* Harris in growing peas and beans under field conditions. *Bacillus amyloliquefaciens* A1 and *P. rettgeri* K10 showed good aphid activity against *A. fabae* and *A. pisum* when these cultures were grown (D6).
- The changes in the aberrations of the cotton *Aphis gossypii* Glover during the cultivation of cucumbers in greenhouses were monitored. The three color aberrations - yellow, green and black - have been identified. The yellow aberration develops during the July-August period, gradually being replaced by the green aberration. The black aberration dominates the population from the end of September when temperatures drop in the autumn period (G27).
- Parasitism by *Aphidius* spp. in *Myzus persicae* Sulz.) and *Aphis gossypii* Glov. populations in pepper and cucumber greenhouse production. The possibility of biological control of these pests is discussed (G18).

- The possibility of using mineral (Akarzin 0.4%) and essential oils (Turpentine 1% and Eucalyptus 1%), applied alone or in combination with insecticides in reduced concentration (Mospilan 20 SP 0.009%+Akarzin 0.25%) was studied, to control the *Myzus persicae* Sulz. in pepper. Vegetable oils from mustard (*Sinapis alba* L.), hemp (*Cannabis sativa* L.) and yarrow (*Achillea millefolium* L.) against cotton aphid (*Aphis gossypii* Glov.) in pepper (B1, D21).
- The biological activity of the product "Naturalis" against the adults of the greenhouse whitefly, the cotton aphid, thrips and the motile forms of the common spider mite in tomatoes and cucumbers, as well as the products "Rapax" and "Helicovex" against the caterpillars of the cotton nightshade in tomatoes (G32; G40).
- The possibilities of using a synthetic sex pheromone of the tomato mining moth (*Tuta absoluta*) to control the enemy on tomatoes grown under greenhouse conditions have been studied. It was established that in a dose of 0.5 mg/trap at a rate of 1 trap/20 m², it significantly reduced the percentage of damaged plants, the average number of mines per leaf and the percentage of damaged fruits. (D33; D38).
- The attractiveness of pheromone traps with different pheromone content to the cotton bollworm ? (*Helicoverpa armigera* Hb.) on tomatoes produced in Poland was established. The pheromone lure with a content of 2.91 mg Z11-hexadecenal + 0.09 mg Z9-hexadecenal over the entire surface had the best attractiveness to the cotton nightshade adults (G49).

The scientific and applied scientific contributions complement entomological/helminthological science with new facts and are valuable for plant protection science and practice.

7. Critical notes and recommendations.

In publications No. I.2, II.5, III. 32, III.34, III.38 the abstracts are very short and do not reflect the methodology of the experiment/exactly obtained results.

I recommend the candidate: to concentrate on research in a certain direction, where to go in depth; to also target publication in reputable journals with a higher than Q4 quartile, which will contribute to more active citation in reputable journals; to issue a teaching aid as well as take time to pass on his experience teaching a PhD student in Phytohelminthology.

The specified recommendations should be perceived as correct. They do not detract from the scientific achievements and contributions reflected in the candidate's scientific output.

8. Personal impressions and opinion of the reviewer.

Assistant Professor Markova is a researcher and teacher who stands out for his intellect, motivation and responsibility. She has a strong desire to improve her professional development. Assistant Professor Markova is self-demanding and self-critical, which is confirmed by her worthy performance in the competition for "Associate professor" and the precisely prepared documents. He has the qualities to work in a team. I am sure that her selection as an associate professor will motivate her to work even more actively and creatively, especially with regard to her future research activities in Phytohelminthology.

CONCLUSION

Based on the analysis of the candidate's pedagogical, scientific and scientific-applied activities, I believe that Assistant prof. Dima Mateeva Markova, PhD, meets the requirements of the Law on the Development of Academic staff in the Republic of Bulgaria, the Regulations for its Implementation, and the Regulations for Implementation of the Agricultural University.

I believe that the candidate's personal contribution is indisputable. Assistant professor Markova appeared in the competition for "Associate professor" with a scientific production significant in terms of volume and content and fully meets the requirements according to the criteria of the Agricultural University, Plovdiv.

In the majority of criteria, such as total number of publications, publications in peer-reviewed journals, number of citations, participation in scientific forums and participation in scientific projects, it significantly exceeds the requirements.

The original scientific and scientific-applied contributions as a result of her research activity are valuable for plant protection science and practice.

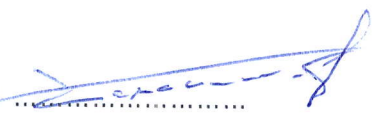
All this gives me reason to evaluate her overall activity **POSITIVELY**.

I take the liberty of proposing to the Honorable Members of the Scientific Jury to also vote positively, and the Faculty Council for Plant Protection and Ecology at the Agricultural University Plovdiv, to elect Assistant professor Dima Mateeva Markova, PhD as "Associate Professor" in professional field 6.2. Plant protection, scientific specialty "Entomology".

Date: 12.03.2024.

Plovdiv

PREPARED THE REVIEW:


/ Prof. H. Samaliev, D.Sc./