REVIEW

by Professor Mariyana Borisova Nakova – the Agrarian University Plovdiv, in the field of Higher Education 6. Agricultural Sciences and Veterinary Medicine, Professional Direction 6.2. Plant Protection (phytopathology), determined according to Order No. RD -16-902/25.09. 2023 of the Rector of the Agricultural University Plovdiv as a member of the scientific jury

regarding a competition for an "Associate Professor", in the field of Higher Education 6. Agricultural sciences and Veterinary Medicine, Professional Direction 6.2. Plant Protection (phytopathology), announced in SG no. 62 of 21.06. 2023, with a single candidate for Chief Assistant, Neshka Georgieva Piperkova-Kiryakova.

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

In the competition for Associate Professor, one candidate participated, Assistant Dr. Neshka Georgieva Piperkova - Kiryakova from the Department of Phytopathology at the Agrarian University in Plovdiv. She is a lecturer with many years of experience, born on 22.08.1961 in the town of Panagyurishte. In 1987 she graduated from the Agricultural University (then VSI), Plovdiv as "Master Engineer – Agronomist in plant protection". In 1988, after a competition, she was appointed as an Assistant at the Department of Phytopathology, and since 1999, she she has been "Chief Assistant". She defended her Dissertation on the topic: "Study on the Peach Curl (*Taphrina deformans* /Berk/Tul.)" in 2013 and obtained the scientific degree of "Doctor". She was trained in the Electron Microscopy Courses at the Higher Institute of Agriculture Plovdiv, and in English at the Institute for Foreigh Students, Sofia. Ch. Assistant Professor Piperkova specialized at the University of Bologna, Italy (Electron Microscopy) and at the University of Leuven, Belgium (Modern Horticulture). She is fluent in written and spoken Russian and English languages.

2. General description of the presented materials.

Dr. Neshka Piperkova participated in the competition for "Associate Professor" with a total of 27 works. The dissertation's abstract and 3 /three/ articles related to it are evaluated in the procedure for obtaining the Scientific Degree of Doctor and will not be peer-reviewed. The scientific production after the doctoral studies includes one book issued on the basis of the dissertation and 24 publications in the nomenclature specialty, grouped as follows:

- *Publications with an impact factor – 6 issues;*

- *Publications in peer-reviewed and refereed scientific journals – 11 issues;*

- *Publications in conference proceedings – 2 issues;*

The personal participation of Dr. Neshka Piperkova in the mentioned scientific works is illustrated by the fact that in 3/three/ - she is the only authors, in 7 - she is the first, in 6 - she is the second, and in the rest - she is the third and subsequent author.

The total impact factor of the publications is 15.475. Two of the publications are in journals from quartile Q1 (European journal of plant pathology, Plants); one each in Plant Disease, Molecules, Acta Agrobotanica (Q2); one in Acta Universitatis Agriculture et Silviculture (Q3). Other articles have been published in Ecologia Balkanica (2014), AgroLife scientific journal, Turkish journal of agricultural science, Agrarian Sciences, Scientific Proceedings of Agricultural University Plovdiv, Scientific Agronomic Journal (Volgograd), Plant Protection and Conference Proceedings.

As a teacher of phytopathology, Dr. Piperkova has participated in the development of two study manuals: "Guide for Exercises in Phytopathology" (2000), and "Guide for Exercises in Special Phytopathology" (2015) . The last one has been reissued twice and a new edition is under preparation.

3. Main directions in the candidate's research work.

Ch. Associate Professor Neshka Piperkova carries out research in the following more important directions:

- She continues her research on The Peach curl in the area of anatomical, biochemical and physiological changes (articles 2, 6, 7, 13, 15, 16, 22).
- She works to identify the causative agents of rare diseases in different crops, reporting new pathogens and confirming others.
- She participates in research projects on Essential Oils of *Juniperus* and *Hipericum* species and their potential applications as biopesticides.

Dr. Piperkova participated in one national and one international project of the Plovdiv Agricultural University and led one internal project. She actively works on the POMZ project of the Institute of Fruit Growing, Plovdiv, financed by the SA, and on anothe project, again of the Institute of Fruit Growing, Plovdiv, financed by the Scientific Research Fund. This demonstrates her ability to work in a team and be engaged in a multidisciplinary research.

4. Evaluation of the pedagogical preparation and activity of the candidate. Her role in the training of young scientific personnel.

Chief Assistant Piperkova gives lectures on the disciplines of Phytopathology (diseases of cultivated plants) for bachelors from the Faculty of Horticulture and for the Specialty of Ecology, Diseases in Green Systems for the Specialty of ecology, on General Phytopathology and Phytopathology of Masters in Plant Protection from other areas of the Higher Education, on Diseases and Pests during the Storage for the Masters in Plant Protection. She conducts exercises on General and Special Phytopathology, Phytopathology, Plant Immunity, Diseases and Pests during the Storage, with students from all faculties of the Agricultural University Plovdiv.

Dr. Piperkova was the supervisor of 32 graduate students - masters and bachelors students. She was supervisor for the Master courses in Plant Protection at the Faculty of Plant Protection and Ecology. She worked in the Faculty's Accreditation Committee. She was a

faculty member for one term. Dr. Piperkova is teaching also at the Center for live long learning.

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

The importance for science and practice of the obtained results is confirmed by the fact that six of the publications were printed in the journals: European Journal of Plant Pathology (Q1), Plants (Q1), Plant Disease (Q2), Molecules (Q2), Acta agrobotanica (Q2), Acta Universitatis Agriculture et Silviculture (Q3).

The total impact factor of the publications is 15.475.

Data on 42 citations for 9 of the articles are presented, 35 of which are in journals indexed in Scopus..

6. *Significance of contributions to science and practice.*

Dr. Piperkova is an established teacher and researcher in the field of plant protection - plant pathology. The main directions of her research work are as follows:

* Studies on the Peach Curl, focusing on Morphological and Physiological Changes in diseased plants associated with the pathological process;

* Studies of new diseases and the etiology of their causal agents;

* Collaborative studies on the potential of using essential oils of *Juniperus* and *Hypericum* species as biocides to control disease agents.

All submitted papers are in the area in which the competition was announced.

Original contributions.

1. For the first time in Bulgaria, the causal agent of Black Root Rot on Grapevine (black foot) and Plum, namely *Dactylonectria pauciseptata*, has been identified on the basis of morphological and cultural features, and molecular methods (sequencing) (1).
2. For the first time in the world, a new virus has been isolated and reported in Cherry from the Central South region of Bulgaria, named Cherry virus Trakiya (CVT). The authors suggest that it belongs to the order Picornavirales based on Next Generation Sequencing (NGS) of total RNA.
3. *Pestalotiopsis* sp. was identified for the first time in Bulgaria as the causal agent of Leaf Spot and Cankers on American blueberry twigs. The identification was based on symptoms and morphological characteristics of the causal agent. Molecular identification of the pathogen is planed (14).
4. Powdery mildew symptoms have been reported for the first time on a Myrobalan 29C (Prunus cerasifera Ehrh.) rootstock (9). On the basis of morphological characterization of the chasmothecia and conidia, it was determined that the species belongs to the genus *Podosphaera* sp.

Contributions of a confirmatory and scientific-applied nature

1. Dr. Piperkova thoroughly has researched the Peach Curl Disease, which over the years continues to be economically significant for the culture. She conducts a research on morphological and physiological changes in diseased plants related to the pathological process. Various biochemical parameters were studied, such as the activity of antioxidant enzymes: guaiacol peroxidase, syringaldazine peroxidase and catalase; the total content of polyphenols and anthocyanins, as well as the amount of plastid pigments, were determined. All of them were measured both in leaves with typical disease symptoms and in distal leaves of the same plant without signs of infection. It is proven that the pathogen causes significant biochemical changes in the enzyme systems that are related to the defense reactions of the plants. It is assumed that this fungus also provokes a systemic response in the tissues, without the appearance of visible symptoms. These studies confirm the studies of other authors from the world literature, being new for the Bulgarian Phytopathology.
2. The ultrastructural changes in the mesophyll cells of the Fayette variety and degradation of the membrane structures of the chloroplasts, plant-host system and pathogen of peach leaves (6) were studied, which is the first study on the problem in our country. Another publication in the same direction presented data on the changes in the epidermal cells (7).
3. Leaf gas exchange and water exchange of *T. deformans* infected leaves were studied. Increased water content and water potential were found. Potassium and phosphorus are elevated, that can be explained with changes in permeability of the cell membranes and with potassium-calcium pumps (15).
4. Various fungicides have been tested for the leaf curl control (13) in vitro as well as the antagonistic activity against *Trichoderma viridae*.
5. The biological activity of essential oils from *Juniperus* and *Hypericum* species has been tested. In vitro studies were performed of their antifungal activity to different pathogens. Results received are prerequisite for micro tests and field test.
6. Fungicides have been studied in vitro for the control of sooty spot and fly spot in apples (18), anthracnose on almonds (11), sunflower diseases caused by *Macrophomina phaseolina* and *Fusarium* sp.(8).
7. The sporadic occurrence of sunflower diseases caused by *Macrophomina phaseolina* and *Fusarium* sp. has been confirmed (8).
8. Diseases during storage of bananas and ginger were investigated, and their causative agents were isolated and morphologically determined (19).
9. The complex effect of nematodes and fungal disease agents in orchards has been studied. The development of nematodes and the damage caused is a factor favoring the penetration of fungal pathogens (20).

7. *Critical comments and recommendations.*

I have no critical remarks to Dr. Piperkova. After reading her articles, I am convinced that she should have written and published the results of her research earlier.

It would also be good if she concentrated on research in a particular field where she could go into depth, as she has done with the Peach Curl study. I recommend taking the time to pass on her experience, training a PhD student or Assistant Professor in Plant Pathology.

8. *Personal impressions and reviewer's opinion*

I am familiar with the Chief Assistant Neshka Piperkova since she has joined the Department of Phytopathology and Microbiology at the University of Agriculture Plovdiv. She is responsible and thorough in her teaching work, she shows precision in her research work. She has the qualities of teamwork.

CONCLUSION

On the basis of the analysis of the teaching, scientific and applied activities of the candidate, I believe that Chief Assistant Dr. Neshka Georgieva Piperkova meets the requirements of the Law on growth and development of the researchers in Bulgaria, the Regulations of the Agricultural University of Plovdiv for its implementation. From the made reference it is seen that she has 594,8 points on the required indicators; she has publications in journals with high rating and impact factor, she has published also in Bulgarian journals refereed and indexed; she has participated in scientific conferences in Bulgaria and abroad. She is a good teacher with a lot of experience.

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

I take the liberty to propose to the Honorable Scientific Jury to vote positively and the Faculty Council of the Faculty of Plant Protection and Ecology, at the Agrarian University Plovdiv, to elect Ch. Assistant professor Dr. Neshka Georgieva Piperkova as "Associate Professor" in the scientific specialty "Plant Protection" (Plant Pathology).

Date: 23.11.2023

Plovdiv

Reviewer Prof. Dr. Mariyana B. Nakova

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