



## OPINION

from Prof. PhD Eng. Kolyo Zlatanov Onkov, Agricultural university-Plovdiv, appointed a member of the Scientific Jury according to Order № РД-16-405/ 20.03.2024 of the Rector of the Agricultural university-Plovdiv

on competition for academic position "Associate Professor" in domain of Higher education 4. Natural sciences, mathematics and computer science, professional field 4.5 Mathematics, scientific specialty "Mathematical modeling and application of mathematics", announced by Agricultural university-Plovdiv in State Gazette No 7/ 23.01.2024

Only one applicant submitted documents to participate in the announced competition:  
Chief Assist. Prof. PhD **Neli Todorova Keranova-Ivanova**,  
Department „Mathematics and computer science”, Agricultural university-Plovdiv

### 1. Brief presentation of the applicant

PhD Neli Keranova obtained master's degree in "Mathematics" at Faculty of Mathematics and Informatics, Plovdiv University „Paisii Hilendarski". During the period 2001-2008 she is teacher of mathematics, informatics and information technologies. In 2016, she has defended PhD thesis entitled „Group algebras of finite  $p$ -groups with minimal commutant" at Faculty of Mathematics and Informatics, Plovdiv University „Paisii Hilendarski". Since 2008, she has been assistant, and since 2016 chief assistant Professor at departments „Mathematics and physics" and „Mathematics and informatics", Agricultural university-Plovdiv.

### 2. General description of the presented scientific works

In the competition for "Associate Professor" PhD Neli Keranova has submitted the necessary materials in accordance with the Law of Academic Staff in Republic of Bulgaria, Regulations for its implementation as well as specific requirements of Agricultural university-Plovdiv.

Accepted for review applicant's scientific works are presented by groups of indicators as follows:

- ❖ *group of indicators A* – PhD thesis;
- ❖ *group of indicators B* – Habilitation work - monograph;
- ❖ *group of indicators Г* – 7 scientific publications;
- ❖ *group of indicators Д* – 8 citations of 6 publications in SCOPUS or Web of Science.

All seven papers are published in scientific journal. Five of them have Impact Factor (IF) and two have been published in issues with SJR without Impact Factor, referenced and indexed in at least one of the databases storing scientific information Web of Science or SCOPUS. Of the seven accepted publications, PhD Neli Keranova has no "single author" ones and she is "first author" in two of them.

After receiving the academic position of Chief Assistant Professor in 2016, PhD Neli Keranova participated in a total of eight national and international scientific conferences and in one educational project.

The table below presents the minimum national requirements in accordance with the Law of Academic Staff in Republic of Bulgaria, Regulations for its implementation, Applicant claims and acknowledged by the reviewer /number of points/.

Group of indicators	<b>A</b>	<b>Б</b>	<b>B</b>	<b>Г</b>	<b>Д</b>
Minimal points required	50	-	100	200	50
Applicant claims	50	-	100	318	64
Acknowledged by the reviewer	50	-	100	282	64

PhD Neli Keranova meets the minimum requirements of the above mentioned law, regulations and additional requirements of Agricultural university for the academic position of "Associate Professor" in domain of Higher education 4. Natural sciences, mathematics and computer science, professional field 4.5 Mathematics.

### **3. Analysis of scientific and applied results. Evaluation of the contributions**

The main results and contributions of PhD Neli Keranova's scientific and research work can be presented in the following thematic areas:

#### **3.1 Mathematical methods and models for research in agrobiolology.**

Valuable publication with a strong scientific-applied contribution is „Metrics for studying berry growth kinetics in seedless grape cultivars (*Vitis vinifera* L.)” [1] (Q1, IF=2.9). Mathematical method has been developed to determine the characteristics of the logistic (double sigmoid) curve of the grains growth of seedless grape varieties. The methodology is based on studying the geometry of this curve - speed of change of the curve and local extremes in order to determine the beginning of the growth phases and their duration. It has been proven that phenophases cannot be used as a time scale for registering the acceleration of growth processes. A time scale is developed to monitor the growth processes to establish the relationship between the visible changes in the fruits and the processes ongoing in them. There are real opportunities for applying the presented mathematical method to research the growth of other agrobiological objects.

The content of antioxidants and the antioxidant activity of raisins from seedless vine varieties have been studied [3] (Q3, IF=1.774). The applied mathematical models provide an opportunity to theoretically study the chemical composition of raisins of different varieties by presenting the relationships between them in an analytical form.

### 3.2 Application of statistical and information methods for analysis of experimental data in agricultural science and research.

Statistical methods have been used to analyze experimental data: a) Correlation and regression analysis to study the influence of plantation age and density on Cornel-Tree yields [2] (Q3, IF=0.793); b) Dispersion analysis of blossom freezing resistance in 14 varieties of peaches [6] and the resistance to virus infection of three main tobacco varieties [7].

Cluster analysis has been successfully applied to extract important information and knowledge from datasets as follows: a) Nine Cornel-Tree genotypes have been grouped and evaluated according to their genetic distance [4] (Q3, IF=0.691). An appropriate measure of similarity is chosen and the main parameters influencing the genotype are established; b) Cluster and factor analysis have been combined in the study of hen lines [5] (Q4, IF=0.18). The indicators that have the greatest influence on the formation of individual clusters have been determined.

Software systems have been successfully used to process experimental data and analysis of the obtained results has been carried out.

PhD Neli Keranova's publications are of a "hybrid" type, with elements of mathematics and agrarian science/research as an applied field. I claim that, in principle, in such cases the applied mathematical methods largely determine the value of the obtained results and contributions.

In the publications analyzed above, PhD Neli Keranova is the only mathematician in the authors' team, i.e. her contribution in the mathematical part of the conducted scientific studies is indisputable. Regarding the effect of these studies on agricultural science and practice, I can judge from the high professionalism of the co-authors in the articles and the prestige of the scientific journals in which these articles have been published. It is a fact that PhD Neli Keranova has successfully worked in various research teams of scientists in the thematic areas of viticulture, fruit growing, tobacco production, etc. One citation of an article with an author from abroad is visible and the other seven are from Bulgarian scientists.

The results and contributions of PhD Neli Keranova's scientific and research work have scientific and applied significance.

Based on the above presented arguments, I assess the scientific and research work of PhD Neli Keranova as very well in the domain of Higher education and professional field of the competition for academic position "Associate Professor".

#### **4. Evaluation of the teaching activity**

I know PhD Neli Keranova from our work at "Mathematics and computer science" department of the Agricultural University, Plovdiv. She has over 15 years of experience as a university teacher in mathematics. She lectures on "Modeling of regional systems", "Statistics", "Applied mathematics", "Financial mathematics", "Biostatistics" and conducts practical classes in "Higher mathematics", "Mathematical analysis", etc. The teaching work of PhD Neli Keranova is characterized by skills and sense to adapt the complex mathematical matter in the training of students from the Agricultural University.

I find the teaching activity of PhD Neli Keranova valuable therefore I evaluate it very highly.

## 5. Notes and recommendations

The critical notes are mainly aimed at the scientific activity of PhD Neli Keranova:

❖ After defending PhD thesis, emphasis is placed on the application of mathematics in the study of various agricultural crops and publications in prestigious journals in the agrarian field. But there is not any one paper whose content is entirely in the professional field 4.5. Mathematics.

❖ There are no single author publications in those submitted for participation in the competition.

I would categorically advise PhD Neli Keranova to develop her research work more independently and to focus on the publication of papers in Bulgarian and foreign journals in the professional field of the competition for "Associate professor" 4.5 Mathematics.

## 6. Conclusion

The scientific and applied results, contributions and high quality teaching work are in the base of my **POSITIVE** opinion regarding all academic activities of **PhD Neli Todorova Keranova-Ivanova**. She meets the requirements of the Law of Academic Staff in Republic of Bulgaria, Regulations for its implementation and the Regulations of the Agricultural University for the academic position "Associate Professor".

I recommend to the members of honorable Scientific Jury to vote **positively** for **PhD Neli Todorova Keranova-Ivanova** to receive academic position "Associate Professor" in domain of Higher education **4. Natural sciences, mathematics and computer science, professional field 4.5 Mathematics, scientific specialty "Mathematical modeling and application of mathematics"**

April 23, 2024

Opinion prepared by:

/ Prof. PhD Kolyo Onkov /