

## REVIEW

regarding the competition for "associate professor" in the field of higher education: 6. Agricultural sciences and veterinary medicine; professional direction: 6.1. Plant breeding, scientific specialty: Plant Biochemistry, announced in SJ/State Journal/ no. 36/23.04.2024.

**Candidate:** Chief assistant Dr. Adelina Slavova Harizanova from the Department of "Plant Physiology, Biochemistry and Genetics" at the Agricultural University - Plovdiv.

**Reviewer:** Assoc. Prof. Dr. Nevena Pancheva Stoeva, Field of Higher Education 4. Natural Sciences, Mathematics and Informatics; professional field 4.3. Biological Sciences; scientific specialty Plant Physiology, designated, according to the order of the Rector of the AUP No. RD 16 – 807/ 18.06.2024 v, for a member of the scientific jury.

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

The candidate completed secondary education in 2001 at the "Plovdiv" Language School, with excellent results, German being the first foreign language, English - the second, and Russian - the third one.

In 2005 she graduated from the Agricultural University of Plovdiv with a Bachelor's degree (Plant Protection), with excellent results, 6.0. In 2006 she obtained a Master's degree in Plant Protection with an excellent grade of 6.0. From 2006 until now she has been running his own business as a manager of an agricultural pharmacy store. In addition to trading in seeds, fertilizers and crop protection substances, the candidate consults farmers on the cultivation and protection of agricultural and ornamental plant species. During the period 2009-2010 she worked as a Junior Specialist in the Department of International Cooperation at the NSRH (Currently, the BHAH), where she participated in the preparation of standard operating procedures in the field of plant protection, participated in projects, conducted translations from English, German and Russian.

In 2013, after successfully passing the exam, she was enrolled in regular doctoral studies in Plant Physiology at the Department of Plant Physiology and Biochemistry at the Agricultural University - Plovdiv. She graduated in 2017, after which she was appointed Assistant in Plant Biochemistry at the Department of Plant Physiology and Biochemistry, at AU - Plovdiv.

From 2018 until now, she works under a main employment contract as a chief assistant in Plant Biochemistry in the same department. She conducts seminars in Plant Biochemistry. She works with Bulgarian and foreign students, with graduates – with a bachelor or a master degree. She participates in projects with internal and external funding. Chief Ass. Harizanova has a total of 18 years of work experience, of which 7 years and 1 month is a teaching experience.

The scientific interests of Ch. Assistant Professor Adelina Harizanova are broad, but they are mainly in the scientific specialty of the competition - Plant Biochemistry.

Ch. Assistant Adelina Harizanova is fluent in English and German and very good in Russian. She works well in a team. She is responsive, well-intentioned and correct. She is organized and has a high level of responsibility. She works with modern equipment in the biochemical laboratory of the Faculty of Plant Physiology, Biochemistry and Genetics, where she conducts various biochemical analyses. She possesses high computer competence. In her



work she uses Microsoft Office (Word, Excel, Power Point, Acrobat 6.0 Professional, SPSS).

From 2017 till the present moment, she is a member of the Advisory board to the OSP (production certification body at "SZHS Bulgaria EOOD". From 2018 till now, she is a member of the Board of the Journal of Central European Agriculture.

**2. General description of the submitted materials:** Ch. Assistant Adelina Harizanova has submitted all necessary documents for the competition, required by the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB) and the Regulations for its application at AU - Plovdiv. The general list of publications includes 36 issues, all outside the doctoral dissertation. The distribution of the works is as follows: 5 publications with an impact factor (IF); 30 publications in peer-reviewed journals, 12 of which are in refereed and indexed journals in world databases; and one book, based on a defended dissertation.

The personal participation of Ch. Assistant Adelina Harizanova in the cited scientific works is the following: one work is independent and done all by herself, in 11 works she is the lead author; in 16 she is the second author, in 4 other works she is the third author and in other 2 - the fourth author. The distribution by quartiles is as follows: Q1- 1 pc;; Q2 – 1pc; Q3 – 1pc and Q4 -2 pcs.

The candidate has participated in several international and national scientific forums with 3 oral presentations, in 2 of which she is the first author, and in 16 poster presentations, in 6 of which she is the first author. These have been printed in a collection of conference works and articles. In addition, she has participated in one international project (2019-2023), one project with external AU funding (2017-2022), and one internal project (2015-2017).

The number of scientific works of study with which Ch. assistant Adelina Harizanova participates in the competition, is in accordance with the minimum national requirements for occupying the academic position "associate professor", and exceeds the requirements for indexes in group B, G and D (see the table).

GROUPS	Indexes	Points	
		Requirement	Fulfilment
A	Doctoral Dissertation	50	50
B	Habilitation thesis (publications, referenced and indexed in Web of Science and Skopus	100	146
G	Publications, referenced and indexed in Web of science and Skopus	200	302
D	Citations in scientific publications in Web of science and Skopus	50	120
	<b>Total</b>	<b>400</b>	<b>618.833</b>



### 3. Main fields in the candidate's research work.

Ch. Assistant Harizanova has a clearly defined profile in her research work. Her scientific research can be referred to three groups, namely: 1) research on the application of silicon for the purpose of reducing the negative effect of soil salinization and infestation with common spider mite; 2) research aimed at improving the quality of the production and increasing the yield, through the use of biostimulants, microorganisms, etc. and 3) research, related to the management of various pests in crop plants.

The publications of **the first group** represent the candidate's time-consuming and in-depth study on the problem, developed in the dissertation work. Young cucumber and zucchini plants, salted with NaCl or infected with common spider mite, were used. Si in the form of orthosilicic acid ( $\text{H}_4\text{SiO}_4$ ) was applied as a means of reducing the effect of plant stress.

On the basis of voluminous experimental material, by means of the skillful application of morphological, physiological and biochemical methods and the use of modern equipment, it was established that Si positively affects the physiological-biochemical status of the studied plants, subjected to salinization and infection with a common spider mite such as: increases the rate of photosynthesis and the content of plastid pigments (B.4,4; D.4,4; D.4,5; D.6; D.7,9; D.7,10), lowers the population of common spider mite (B.4,3; D.8,3; D.8,9) and pest density (D.9,1), reduces the activity of stress enzymes GPOD and SPOD (B.4,5 D.4, 5; D.7,9 and D.7.10); less damage to the lipid membranes is observed (D.8,4 and D.8,15), the antioxidant capacity of the cells is strengthened (D.7,10; D.8.12) and the content of salicylic acid is increased (B. 4,3).

**The second group** of studies, carried out with the protein hydrolyzate Naturamin WSP, reported a reduction of damage, caused by low-temperature stress, and at the same time increasing the antioxidant defense in plants (B.4,1), improving the biological value of proteins in favour of essential amino acids (B.4 ,8); the activity of nitrogen metabolism enzymes increases (B.4,9), which in turn increases the nutritional value of forage. The applied products protect the plants from diseases and enemies (D.8,11). The application of microorganisms in soils, contaminated with petroleum products, reduces the negative effect of pollution (B.4,6; B.4,7; B.4,10; D.7; D.9,1). The method represents a biological strategy for the improvement of soils affected by oil pollution.

**The third group** of publications deals with the toxic effect of some groups of bacterial substances and fungal products that cause accelerated respiration and block the formation of ATP in cells (D.8,2). Leaf fleas in fruit crops (D.8,5) and flat aphids (D.8,7) lead to acceleration of respiration and transpiration, which has been proven to exhaust plants and reduce the flow of flexible substances from the crown of trees to the roots and of water and nutrients to the crown (D.8,7). Cycads influence the growth, development and fruiting of plants (D.8,8). The damage caused by the red fruit mite, the grape mite and the grape scab and the possibilities of combating them are presented in detail (D.8,9). Various substances were used - fungicides (G.7,1), pesticides (G.7,2), selective herbicides (G.7,3), etc., for the purpose of reducing the negative effects of various enemies in a number of agricultural plants. In the case of some diseases and enemies, inorganic products with a biostimulant effect were applied, which expanded the possibility of plant protection (D.8.11). Some of them are included in the list of organic farming products.



#### **4. Significance of the obtained results, publications in prestigious journals, citations.**

The main results of Ch. Ass. Adelina Harizanova's research work, as mentioned before, are published in prestigious journals, which are refereed and indexed in world-famous databases, containing scientific information (Web of science и Skopus). The applicant's personal IF is 7.8 and SJR is 2.152.

I believe that the results of the candidate's research work are significant, as they have resonated in the international scientific community. Evidence of 8 citations of 2 scientific papers is presented. Citations are in prestigious scientific journals: Plant Physiology and Biochemistry, Biomolecules, International Journal of Molecular Science, Agronomy, Agrobotanica, etc. All citations possess quartile Q1 and have a total SJR of 9.15.

#### **5. Significance of the contributions to science and practice.**

I accept the reference made with respect to the scientific contributions of Chief Ass. Adelina Harizanova. It was prepared on the basis of the presented list of scientific works, which do not repeat publications submitted for the acquisition of the ONS "doctor" and cover the national minimum scientometric requirements for the acquisition of the academic position "associate professor". As a result of the conducted research, significant contributions have been made, which are of scientific and applied character. I will point out the more important ones, that provide the clearest idea of the candidate's scientific achievements.

##### **5.1. Scientifically-applied contributions, related to the study of the effect of the application of silicon.**

5.1.1. It was established that the application of silicon in the form of  $H_4SiO_4$  to young zucchini and cucumber plants, infected with a common spider mite, has the following effects: a) it increases the intensity of photosynthesis, through an increase in the parameters of leaf gas exchange and the content of photosynthetic pigments (chlorophyll "a" and carotenoids); b) it stimulates the enzymatic antioxidant defense system of plants through the activity of the enzymes guaiacol peroxidase and phenylalanine ammonia-lyase; c) it increases the content of salicylic acid and d) it reduces the population of the pest by changing the sex index.

5.1.2. Silicon, applied to young cucumber plants, grown under conditions of salinization with NaCl, positively affects a) the rate of photosynthesis, chlorophyll fluorescence and the content of photosynthetic pigments; b) increases the antioxidant capacity of plants, changes the activity of the antioxidant enzymes guaiacol peroxidase (GPX), syringaldazine peroxidase (SPX), the content of polyphenols; c) changes the antiradical activity and the degree of lipid peroxidation in stressed plants.

##### **5.2. Scientifically-applied contributions, related to the study of the effect of the application of biostimulants (protein hydrolysates) under conditions of stress, caused by the effect of low positive temperatures and the quality and quantity of alfalfa yield:**

5.2.1. The foliar application of the biostimulant Naturamin WSP in young cucumber plants, grown in conditions of low temperature stress, has a positive effect on: a) the water exchange of the plants by increasing the proline content; b) it improves the state of cell



membranes by lowering the degree of lipid peroxidation and c) it activates the body's anti-oxidative defense system expressed through the increased activity of the guaiacol peroxidase enzyme in cells.

5. 2.2 The application of new biostimulants to alfalfa in a changing climate a) causes an increase in the content of essential amino acids/there are differences with regard to individual amino acids in the varieties/; b) activates the nitrogen metabolism enzymes nitrogenase, glutamine synthetase and asparagine synthetase in alfalfa and c) increases the content of crude protein and sugars in varieties Prista 3 and Dorine and increase the content of cellulose in variety Dorine.

### **5.3. Scientifically-applied contributions, related to the study of the effect of the application of microalgae to plants, grown on contaminated soils:**

5. 3.1. It was established that the application of a suspension of microalgae to barley plants, grown on soil, contaminated with petroleum products a) improves the water exchange of plants, expressed by increasing the content of proline and the state of cell membranes and by the decreased degree of lipid peroxidation; b) has a positive effect on net photosynthesis, the intensity of transpiration, the content of photosynthetic pigments and the quantum yield of Photosystem 2.

### **5.4. Scientifically-applied contributions, related to the study of the effect of the predecessor-crop and the levels of nitrogen fertilization in coriander.**

4.1. An assessment of the optimal level of nitrogen was carried out and a more suitable predecessor of coriander was determined for the purpose of obtaining the highest yield with better quality in the region of South-Eastern Bulgaria. Winter wheat was found to be a more suitable predecessor for coriander than sunflower.

## **6. Evaluation of the pedagogical work of the candidate and her role in the training of young scientific personnel.**

The teaching experience of Chief assistant Adelina Harizanova as of 01.06.2024 is 07 years, 1 month and 10 days. In the period 2018 - 2023 in OCS "Bachelor" and OCS "Master" she had classroom engagement in lectures and seminars, and extra-classroom employment of a total of 2548.75 hours, including lectures - 126 hours, seminars - 1984 hours and extracurricular activities - 438.75 hours. The candidate has completed 75 hours under the Erasmus programme.

Ch. assistant Adelina Harizanova was an academic supervisor of 2 graduates with "Bachelor's" degree and 3 graduates with "Master's" degree, who successfully defended their diploma theses. One of the master's degree graduates is a foreigner.

Ch. assistant Adelina Harizanova is the Erasmus + coordinator of the Faculty of Agronomy for the university management body mandate 2020-2024. She was elected the faculty Erasmus + coordinator of the Faculty of Agronomy for the term 2024-2028. She conducted Erasmus mobilities in 2018 -2019 at the University of Zagreb – Croatia (teaching) and Mansoura University – Egypt (teaching).

Ch. assistant Adelina Harizanova also conducted seminars for incoming Erasmus + students in Biochemistry - 30 hours, and Enzymology in Coimbra - Portugal - 30 hours,



Szëdlec - Poland - 15 hours, Kragujevac - Serbia - 60 hours, Sukeava - 15 hours and Perugia - Italy - 30 hours.

Ch. assistant Adelina Harizanova is a member of the team working on the New Professional in Plant Clinic and Phytosanitary Technologies Project under the Erasmus + program, Capacity Building measure, which ended in 2019.

#### **7. Critical notes and recommendations.**

I have no critical notes and recommendations with regard to the candidate.

#### **8. Personal impressions and opinion of the reviewer.**

I personally know Ch. assistant Adelina Harizanova from the position of being her doctoral supervisor, and later when she was an assistant in the Department of Plant Physiology and Biochemistry. Her scientific and pedagogical achievements result from her persistence, work experience, professional expertise, unceasing curiosity and ability to work.

#### **CONCLUSION**

Based on the analysis of the candidate's pedagogical, scientific and scientifically-applied activities, I believe that Ch. Assistant Adelina Harizanova meets the requirements of the RASRB and the Regulations of the Agrarian University for its application. The candidate has 7 years of teaching experience at the AU in the disciplines Plant Biochemistry and Enzymology. The required hours of lectures and exercises are available. She has also supervised graduates who have successfully defended their diplomas. She has participated in research and educational projects. There are 5 publications with IF (7.8), in 4 of which she is first author. She is well-recognized in the scientific community - she has 8 citations in the prestigious journals as I have mentioned above. She has made significant contributions to science. She has 618 points, exceeding the minimum requirements. All these facts give me reason to POSITIVELY evaluate her overall activity. I allow myself to propose to the honorable Scientific Jury, in turn, to vote positively in favour of the candidate, and as well to the Faculty Council of the Faculty of Agronomy at the Agricultural University - Plovdiv to elect Chief assistant Adelina Harizanova as "associate professor" in the scientific specialty "Biochemistry of Plants".

Date:

/ 08 .08. 2024 r./

Reviewer:

/Assoc. prof. Dr.N.Stoeva/