

## STATEMENT

By: Associated Professor Maria Prokopova Geneva, PhD; IPPG-BAS,

*Regarding:* competition for the academic position "associate professor" at the Institute of Plant Physiology and Genetics (IPPG-BAS), in the professional field 4.3. Biological sciences, scientific specialty "Plant physiology", for the need of laboratory "Regulators of Plant Growth and Development"

***Information about the contest:*** The competition was announced in the State Gazette, No 22 of 15.03.2024 for the needs of the IPPG-BAS of the Laboratory "Regulators of Plant Growth and Development", in the professional field 4.3. Biological sciences, scientific specialty "Plant physiology".

***Information about the candidates in the competition:*** For participation in the announced competition for the academic position "associate professor", for the need of Laboratory "Regulators of Plant Growth and Development" documents were submitted by only one candidate assistant professor Zornitsa Ivanova Katerova-Landzhova, PhD from the IPPG-BAS. All competition documents and publications are provided accurately and on time. The set of materials is prepared according to the Rules of the Academic Staff Development in the Republic of Bulgaria (RASDRB) and the Rules for its implementation and the regulation for the specific conditions and the procedure for acquiring scientific degrees and occupying academic positions in IPPG-BAS.

The attached CV accurately explains assistant professor Z. Katerova-Landzhova education and scientific development. Since 2002 she has been a PhD student at the Laboratory "Regulators of Plant Growth and Development". In 2009 she successfully defended his PhD thesis titled "Physiological-biochemical changes in pea plants irradiated with UV-B and UV-C" with scientific supervisors Acad. Emanuil Karanov and Professor L. Iliev. From 2009 she is an assistant professor at the Laboratory "Regulators of Plant Growth and Development", IPPG -BAS.

The applicant is fluent in English, which allows her to use specialized scientific literature related to the scientific topic in her works.

***General characteristic and evaluation of scientific works to meet the minimum and specific requirements for occupying the academic position:*** The scientific publications of Assistant Professor Z. Katerova-Landzhova, presented for participation in the promotion procedure are in the field of studying the effect of radiation with ultraviolet (UV) radiation on economic significant crops and reducing the harmful effect of irradiation, through the application of growth regulators. The impact of plant pre-treatment with plant growth regulators when grown in various adverse environments (drought and waterlogging) is monitored.

The data from the applicant's research throughout his scientific career have been published in full text in a total of 43 scientific papers, for which 463 citations have been noticed in specialized international publications. This is a good indicator of the quality of scientific production. For participation in the competition, Assistant Professor Z. Katerova-Landzhova

has applied a total of 21 scientific papers, 12 of which she is the first or corresponding author. In group B - publications that are referenced and indexed in world-recognized databases of scientific information (Web of Science and Scopus), which are equated to a habilitation thesis, 6 scientific papers with a total JCR-IF (Web of Science):3.583 are applied, and in 2 of them he is the first author. Of these, 4 publications have Q2, and 2 with Q3 factors. In this group the article B4-3 was published in 2014 in the Turkish Journal of Botany. The Journal has no Q quartile factor and no IF for that year in particular. As a result, it is appropriate for B4-3 to receive 10 points for publications in an edition with SJR without IF, not 20 points for publications in Q2. The total number of points according to indicator B is reduced from 110 to 100 and it again meets the specific requirements of IPPG. In Group G7 "Scientific publications in publications that are referred to and indexed in world-renowned databases of scientific information (Web of Science and Scopus), other than habilitation thesis, included publications are 15 (3 publications are Q1, 3 with Q2, 5 with Q3 and 1 with Q4 factors with a total JCR-IF (Web of Science): 21.944). In group G8 "published chapter of a book or collective monograph" are included 3 book chapters.

The applicant fulfils the national minimum and specific requirements according to LDASRB – with a minimum threshold of 540 points, Assistant Professor Z. Katerova-Landzhova, PhD has 826 points. They are summarized as follows:

Section A — 50 points, out of the minimum required 50 points;

Section B — 100 points out of the minimum required 100 points;

Section G — 260 points out of the minimum required 220 points;

Section D — 346 points out of the minimum required 100 points.

Section E – 70 points, out of the minimum required 70

The applicant has presented some of his results in a total of 22 international and national scientific forums as oral and poster reports.

**Participation in research projects:** The applicant has been a part of the scientific members and has participated in the implementation of 15 funded scientific projects. She has been a fellow in 2 postdoc specializations in JSPS (Japan Society for the Promotion of Science).

**Scientific contributions:**

1. *Assessment of scientific publications in publications, referred to and indexed in world-renowned scientific information (Web of Science and Scopus), equalized to a habilitation thesis.*

The harmful effect of ultraviolet (UV-B) and (UV-C) radiation on important crops has been studied. The candidate's significant contribution is to find that the pretreatment of triticale seedlings with a coal extract rich in humin acid Biomin, and the tomatoes (wild variety and its isogenic Line [IL/NIL] with  $\beta$ -monomethyl ester of itaconic acid (MEIA) reduces the harmful effect of UV-B radiation. Another important contribution of the candidate is the establishment that when the pea plants have been pre-treated with polyamine spermine and the subsequent irradiation for 30 minutes with ultraviolet (UV-C) radiation, it leads to a decrease in the harmful effect of irradiation by restoring normal growth levels, stabilization of cell membranes and activation of the non-enzymatic antioxidant system.

Concerning prolonged low-dose (LD) and high doses (HD) UV-C radiation of pea plants, it has been found that growth parameters and stress markers change depending on the dose of radiation.

Using neutral comet assay has confirmed the hypothesis that plants with a smaller genome are more sensitive to UV-C irradiation. For this purpose, isolated nuclei from monocot (*Pisum sativum* L.) and dicot (*Triticum aestivum* L. and *Hordeum vulgare* L.) crops of different genome sizes (wheat >> barley > peas) are extended with HD UV-C radiation and lower levels of double-breasted DNA in wheat are found than in barley and peas.

2. *Assessment of the other publications presented in Group G, not used in the appointment of the academic position "Assistant Professor"*

In some of the results represented in Group G, the influence of 21-day treatment with UV UV-C radiation in LD and HD is studied, on peas, by measuring in the fourth leave of MDA, H<sub>2</sub>O<sub>2</sub>, proline, spermidine and putrescine levels. It has been sustained that irradiation with LD UV-C radiation damages biomembranes more significantly than HD radiation. HD radiation increases the levels of the proline, which protects biomembranes. The increase of the connected polyamine fractions when plants are treated with prolonged LD radiation plays the role of a protective mechanism.

Pre-treatment with MEIA has been found to have a protective effect at 60-minute radiation with UV-C radiation, as well as for 5 days, of *Triticum aestivum* L. (cv. Sadovo 1) plants. In her scientific work, the applicant examined the impact of pre-treatment with auxin-like compounds 1-[2-chloroethoxycarbonylmethyl]-4-naphthalenesulfonic acid calcium salt (TA-12) и 1-[2-dimethylaminoethoxycarbonylmethyl]naphthalene chlormethylate (TA-14), on the reduction of the harmful effect of ultraviolet (UV-B) radiation on pea plants, resulting in reducing oxidative stress by reducing lipid peroxidation, increasing UV absorbing compounds levels and the activity of antioxidant enzymes.

Another important contribution of the applicant is the study of an antioxidant response at 7-day waterlogging or drought of young wheat (*Triticum aestivum* L., cv. Sadovo-1) and triticale (×*Triticosecale* Wittm., cv. Rozhen) plants, when plants are treated with Serrate® herbicide (Syngenta). The treatment of wheat only with herbicide causes slight oxidative stress. In wheat plants grown in waterlogging or drought conditions, as well as in combined treated with herbicide and exposure to water-stress plants a significant reduction in polyamines levels has been observed. In drought plants, the reduction is more significant than in waterlogging plants. However, treatment with the herbicide, in waterlogging conditions, further enhances their harmful effect, increasing the levels of oxidative stress. At the same time, this synergistic response is not observed when plants are drought-stressed.

Triticale spraying with the studying herbicide does not cause significant oxidative stress - it resulted in slight changes to the antioxidant status and a decrease in the content of polyamines. The triticale is more resistant to drought than to waterlogging. When exposed to drought or waterlogging of herbicide-treated plants, no synergism has been observed again, the herbicide does not cause additional damage to the Triticale plants. However, in plants treated with herbicide and subjected to water deficiency, the accumulation of active forms of oxygen and stress markers as well as the activity of enzymes with antioxidant potential is increased, but the content of polyamines decreases. The polyamine levels increase in waterlogging plants.

### ***Recommendations***

I have only one recommendation to Assistant Professor Z. Katerova-Landzhova, it is aimed at teaching young scientists in the future. The candidate scientific study area is up-to-date and promising, and it is important to teach young scientists, to apply the latest

achievements in the influence of UV-B and UV-C radiation on plants. Assistant Professor Zornitsa Katerova-Landzhova has all the qualities for the active teaching of such staff.

*Conclusion:* The applicant in the competition Assistant Professor Z. Katerova-Landzhova has presented a sufficient number of documents and scientific materials excluding the materials used for the defense of the ONS "doctor", published in reputable journals, meeting the minimum national requirements of the ZRASRB and the Rules for the Implementation of the ZRASRB, as well as the specific requirements in the IPPG-BAS regulations for its application adopted by the Scientific Council of IPPG-BAS. Based on the analysis of the scientific papers presented in the competition and the contributions contained in them, I believe that the candidate fully responds to the profile of the announced competition and gives my **positive assessment** and recommend the respected Scientific Jury to prepare a report-proposal to the Scientific Council of IPPG-BAS for awarding the academic position "Associate Professor" of assistant professor Zornitsa Ivanova Katerova-Landzhova in IPPG-BAS in professional field 4.3. Biological sciences, specialty Plant Physiology.

June 21, 2024 / Sofia

Signature: .....

(Associate Prof. Maria Geneva, PhD)