OPINION

by Associate Professor Grigor Traykov Zehirov (IFRG-BAS) regarding the competition for the academic position of "Professor" in the professional field 4.3. Biological Sciences, specialty "Plant Physiology", for the needs of the "Plant Growth and Development Regulators" laboratory at IFRG-BAS, announced in State Gazette issue no. 12/09-02-2024

1. General data on the career and thematic development of the candidate

In the current competition for the academic position of "Professor" at the "Plant Growth and Development Regulators" laboratory at IFRG-BAS, documents have been submitted by one candidate – Dr. Iskren Georgiev Sergiev. At present, Associate Professor Dr. Sergiev holds the academic position of "Associate Professor" in the same laboratory. After completing his higher education at the Faculty of Biology of Sofia University "St. Kliment Ohridski" in 1991, the candidate began his scientific work at IFR-BAS. During his career progression, he has successively held positions from "biologist specialist" (1991-1995) to habilitation as a senior research associate (2006-2010). In 2000, he acquired a Ph.D. in the field of "Plant Physiology" – Code 01.06.16. Since 2010, he has been an "Associate Professor" at the "Plant Growth and Development Regulators" laboratory. An autobiographical reference shows that the candidate has numerous specializations abroad (Italy, Belgium) related to improving his skills in determining the content of phytohormones through modern methods.

The candidate's scientific activity is reflected in the publication of 89 scientific articles, with 59 of them indexed in Scopus or WoS. The candidate has 9 participations in review articles in book chapters. His research activity is mainly associated with studying the effects of applying growth regulators and phytohormones on plants grown under normal and stress conditions to enhance the efficiency of basic physiological processes. This includes studying changes in the endogenous content of growth regulators from the polyamine group. The importance of these studies is confirmed by the high citation rate of his key publications, reflecting the interest in the researched topics today. A quick check in the Scopus database shows a large number of citations of his publications – 1933 (2017-2024), attesting to the quality of his scientific work. His total impact factor is 75.666 and his h-index is 13. He has numerous participations in international scientific forums where important results are presented.

2. Assessment of compliance with the requirements for the academic position of "Professor"

The submitted information by Dr. Sergiev meets the minimum requirements set by the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB) and the Regulations of IFRG-BAS for the academic position of "Professor." The points collected for each of the indicators A, B, C, D, and E, as outlined in the author's summary, have been correctly calculated based on the criteria and conditions specified in Appendix 1 of the IFRG-BAS Regulations, with some indicators exceeding the requirements (C and D). It is noteworthy that for indicator C, an additional 135 points for first or corresponding author can be added to the 287 points already calculated, as detailed below.

3. Analysis of the main research directions of the candidate and the most important results

In the submitted documents, Assoc. Prof. I. Sergiev has well-defined four research directions reflected in the publications presented for the competition:

1. Physiological action of herbicides on some components of plant metabolism and the functional activity of photosynthesis under optimal and suboptimal growing conditions, as well as treatment with growth regulators and natural metabolites – Publications № 1, 4, 6, 7, 11, 20, 21.
2. Modulating action of synthetic auxins in forming the physiological response of plants to abiotic stress – Publications № 13, 14, 16, 17, 19.
3. Inducing stress tolerance in plants through natural and synthetic growth regulators – Publications № 5, 9, 10, 12, 15, 18.
4. Interaction between natural and synthetic growth regulators in Arabidopsis under normal and stress conditions – Publications № 2, 3, 8.

Direction 1

Finding and identifying structural analogs of natural phytohormones is a complex procedure involving a long process of testing their effects on plants under both normal and stress conditions. Positive effects have been found from pre-treatment of plants with peroxide and the application of the synthetic cytokinin 4-PU30 when using the herbicides paraquat and glyphosate. The physiological aspects of the action of many herbicides are still not fully studied, despite the obvious necessity to do so. Therefore, this direction is relevant, and continuing work in this area is well-justified.

Direction 2

Finding structural analogs of natural phytohormones is a complex procedure involving a long process of testing their effects on plants under normal and stress conditions. This work is conducted in inter-academic cooperation with the Nature Research Center of the Lithuanian Academy of Sciences (Vilnius, Lithuania). The physiological action of two supposed auxin analogs, 1-[2-chloroethoxycarbonyl-methyl]-4-naphthalenesulfonic acid dicalcium salt (TA-12) and 1-[2-dimethyl methoxycarbonylmethyl] naphthalene chloromethylate (TA-14), has been tested. Their effects have been examined both alone and in combination with herbicides in monocotyledonous and dicotyledonous plants subjected to heat stress and drought. The results are reflected in publications № 13, 14, 16, 17, 19, showing that synthetic auxin analogs have a protective effect against herbicides, maintaining plant growth under stress and reducing stress marker levels.

Directions 3 and 4

In my opinion, these two directions can be combined into one, reflecting the search for natural and synthetic phytohormones to overcome the negative impacts of environmental changes due to newly emerging climate changes. Overcoming stressful conditions inevitably leads plants to adjust their phytohormonal capacity, which can be triggered by abiotic stress or exogenous treatment with phytohormones or their

analogs. Therefore, determining the content of endogenous phytohormones under different growing conditions can be part of direction 3. This does not diminish the significance and relevance of such research.

4. Relevance of the candidate's research topics and importance for science and society

The relevance of the research topics being pursued is related to the study of plant physiology and biochemistry under various abiotic stress conditions. The study of stress markers, non-enzymatic antioxidants, enzymatic activities, and functional parameters of photosynthesis will contribute to a better understanding of stress physiology and the factors that regulate it. These topics are current and align with the national strategy for Health and Quality of Life. Constantly changing climatic conditions necessitate the development of new agrochemical approaches to mitigate the harmful effects of the environment on crop yields. Future research directions are well-formulated and scientifically grounded, representing a natural continuation of the results achieved so far.

5. Organizational and educational activities

The candidate is the head of the doctoral course "Natural and Synthetic Growth Regulators" at the Training Center of BAS. To date, 5 doctoral students have successfully completed the course. He has also been the scientific advisor for Dr. Irina Moskova, who defended her Ph.D. with independent preparation. Assoc. Prof. Sergiev has been actively involved in organizing numerous international symposia and conferences. He is a member of the Federation of European Societies of Plant Biology (FESPB) and the Union of Scientists in Bulgaria, section "Plant Physiology and Biochemistry."

6. Conclusion

Based on the materials presented for review and additional checks conducted, I believe that Assoc. Prof. Iskren Sergiev fully meets the regulatory requirements for the academic position of "Professor" at IFRG-BAS. His long-term scientific research in the field of phytohormones and their effects on plants under various abiotic stress conditions is fully in line with the topics in the "Plant Growth and Development Regulators" laboratory at IFRG-BAS. The results obtained so far provide a solid foundation for future developments in promising directions.

For the above reasons, I vote positively for Assoc. Prof. Iskren Sergiev to be awarded the academic position of "Professor" in the Professional Field 4.3. Biological Sciences, Scientific Specialty "Plant Physiology."

May 22, 2024

Prepared by:
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