OPINION

Regarding the competition for the academic position "Professor" in the scientific field 4.3. Biological sciences, scientific specialty "Plant Physiology" for the needs of the "Regulators of plant growth and development" laboratory of the Institute of Plant Physiology and Genetics – BAS, announced in the issue 19/09.02.2024 of State Gazette

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of the Director of IPRG – BAS

One applicant applied for the announced competition for the academic position "Professor" in Scientific field 4.3. "Biological Sciences", scientific specialty "Plant Physiology" Assoc. Prof. Dr. Iskren Georgiev Sergiev. In 1991 Iskren Sergiev completed his higher education at the Faculty of Biology of Sofia University “St. Kliment Ohridski" with specialization in "Biochemistry and Microbiology" and "Plant Physiology". In the same year Sergiev started working as a specialist at the Institute of Plant Physiology (IPP) of the Bulgarian Academy of Sciences (BAS). Since 2006 Sergiev was holding the position of Senior Research Associate II degree at IPP, and in 2020 ¬ "Assoc. Prof." at IPPG. In 1998 Sergiev defended a PhD thesis "Cytokinin antagonists - structure-activity relationship and some physiological properties" with scientific supervisor Acad. Emanuil Karanov and scientific specialty "Plant Physiology". Since 1996 to 2005 Dr. Sergiev was a visiting scientist at the Institute of Plant Biosynthesis in Milan, Italy (4 visits) and at the University of Antwerpen, Belgium (3 visits) for performing investigations in joint scientific projects. Between 1990 and 2014 Dr. Sergiev was a member or the chairman of the Organizing Committee of 8 international conferences and symposia. Dr. Sergiev was a member of the editorial board for the publication of a Special Issue: Proceedings of the European Workshop on Environmental Stress and Sustainable Agriculture (ESSA) (2003) of the Bulgarian Journal of Plant Physiology and of the journal Botanica (Lithuania) since 2022. Dr. Sergiev supervised a doctoral course at the BAS Training Center and was a Scientific Consultant of a successfully defended PhD thesis of a student on independent training. Dr. Segriev took part in the development of 21 international and 16 national scientific and educational projects, being the principal investigator of 4 of them. The results of his research were presented as 28 posters or oral presentations at 16 scientific forums in the period 2018-2023.

In his scientific career, Dr. Sergiev has published 89 scientific papers in peer-reviewed journals, 59 of which are indexed in Scopus or WoS. He is the co-author of 9 book chapters and review articles. The overall impact factor is 75.666 and the h-index (SCOPUS) after excluding self-citations of all authors is 13.

In the current competition for "Professor", Dr. Sergiev participates with 21 publications, of which 7 were in journals with Q1, 5 articles published in journals with Q2, 3 ¬ in Q3 and 3 ¬ in Q4. Three book chapters are also included. In 5 of the publications Dr. Sergiev is the first, and in 5 ¬ the corresponding author, which is an indication of his substantial contribution. For the last 7 years (2017 ¬ 2023) the published scientific articles have been cited 1310 times in publications indexed in Scopus/WoS, which shows the importance and relevance of his scientific contributions. An article, published in Plant Cell Environment in 2001 was cited 939 times.

The applicant submitted a fulfilled table of the minimum national requirements under Art. 2b of the Law on the Development of the Academic Staff of the Republic of Bulgaria (ZRASRB) for scientific field 4.3. Biological sciences, scientific specialty "Plant Physiology" and the Regulations for the specific conditions and procedure for obtaining the academic position "Professor" at IPPG-BAS. For indicators B, D, D and E are presented more than the required points. For indicator D are required 200 points but the applicant presents 2620 points.

An extended reference of the research topics and achievements is included.

The research of Assoc. Prof. Sergiev's is focused on the study of effects of growth regulators and phytohormones on various physiological processes in higher plants, with special attention being paid to the ability of the studied substances, natural and synthetic, to reduce the stress effects of various extreme environmental conditions and possibilities of their application aiming to increase the efficiency of physiological processes in plants. The research was mainly conducted in the Laboratory "Regulators of plant growth and development" at IPPG-BAS, as well as a result of cooperation with national and foreign academic and scientific organizations. From the point of view of the negative effects of climate changes on the yield of agricultural crops and the growing needs for food for the increasing human population, the research of Assoc. Prof. Dr. Sergiev is particularly relevant.

The presented scientific achievements are arranged in four main topics:

1. Physiological action of herbicides on some components of plant metabolism and the functional activity of photosynthesis under optimal and suboptimal plant grow conditions and when treated with growth regulators and natural metabolites.

In this section are summarized the results of investigation of the effect of herbicides (paraquat, atrazine, glyphosate, zerate) on the physiological and photosynthetic processes of a number of agricultural crops (peas, corn, wheat) under normal and stress conditions. Pretreatment of pea plants by H_2O_2 exerts a protective effect against paraquat-induced oxidative stress by stabilizing membrane stability, increasing pigment content and activity of antioxidant enzymes. Based on the established suppression of the development and growth of pea plants after long-term treatment by atrazine, a recommendation was proposed to re-evaluate long-term treatment with herbicides of agricultural fields. A protective role of phenylurea cytokinin against glyphosate treatment was established. The effects of the herbicide zerate on the photosynthetic performance of wheat and triticale after exposure to drought or waterlogging were shown to be dependent on the tolerance to the respective stress factor.

2. Modulating action of synthetic auxins in the physiological response of plants to abiotic stress.

A substantial part of the research was focused on the physiological effects of two new structural analogues of a synthetic auxin (naphthylacetic acid) in respect to treatment of pea plants with three different herbicides (Gleen-75, Glyphosate and 2,4-D), or subjected to drought or high temperature exposure. Pretreatment with both analogues reduced the degree of herbicides-induced oxidative stress and preserved the levels of antioxidants (enzymatic and non-enzymatic) to the values of untreated plants. A similar protective effect of both analogs was reported in wheat and corn after exposure to high temperature or after treatment by polyethylene glycol.

3. Induction of stress tolerance in plants by application of natural and synthetic growth regulators.

Investigation of possibilities of natural growth regulators with different structure and mechanism of action to increase the resistance of plants to various stress conditions is of great importance. Foliar application of abscisic acid and phenylurea cytokinin (4PU-30) increased the adaptive capacity of wheat plants to drought and elevated the amount of polyamines as part of the plant's endogenous defense system. A review was published [12_Г8-03], which summarized the role of endogenous polyamines in mitigating the severity of a number of abiotic and biotic stress factors. The possible mechanisms of action of polyamines under salt stress were also discussed (10_Г8-02).

4. Interaction between natural and synthetic growth regulators in Arabidopsis under normal and stress conditions.

Special attention was paid to the interactions between the phytohormonal system and endo- and exogenous growth regulators in plants grown under normal and stress conditions. A dependence between the physiological role of polyamines and ethylene in regulating the processes of plant growth and development was shown.

The future research plants of Dr. Sergiev include expanding and deepening of investigations as described in the listed four main research topics.

In conclusion, I believe that Associate Professor Dr. Iskren Georgiev Sergiev participates in the announced competition for the academic position "Professor" with sufficient number and quality of scientific articles and contributions that exceed the minimum national requirements for acquiring the academic position of "Professor" laid down in the Law for the Development of the Academic Staff of the Republic of Bulgaria, as well as the specific requirements in the Regulations of IPPG-BAS for scientific field 4. Natural sciences, mathematics and informatics, scientific direction 4.3. Biological sciences, scientific specialty "Plant Physiology". The scientific achievements of Dr. Sergiev are up-to-date and performed at a high scientific level. I strongly recommend the Scientific Council of IPP-BAS to approve the promotion of Associate Professor Dr. Iskren Georgiev Sergiev as a "Professor" for the needs of the "Regulators of Plant Growth and Development" Laboratory of IPPG-BAS.