



## REVIEW

regarding the competition for "professor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional specialty 4.3. Biological sciences, scientific specialty "Genetics", announced in SG no. 36 of 23.04.2024 with candidate Assoc. Dr. Bozhin Maksimov Bozhinov from Agrarian University - Plovdiv, Faculty of Agronomy, determined according to Order No. RD-16-808/18.06.2024 of the Rector of Agrarian University - Plovdiv for member of the scientific jury

**Reviewer:** *acad. Atanas Ivanov Atanasov, Joint Genome Center at SU "St. Kl. Ohridski", area of higher education 4. Natural sciences, mathematics and informatics, professional specialty 4.3. Biological sciences, scientific specialty "Genetics", appointed as a member of the scientific jury by order No. RD-16-808/18.06.2024 of the Rector of the Agricultural University.*

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

After receiving the educational degree "Engineer-agronomist" from VSI "V. Kolarov", Plovdiv, now Agrarian University - Plovdiv /AU-Plovdiv/ in 1990, associated professor Bozhin Bozhinov continued his academic career at the Institute of Cotton and Durum Wheat /now the Institute of Field Crops / Chirpan as a research assistant III - I deg. In 1995, he joined the academic staff of the Agricultural University - Plovdiv successively as an assistant and head. assistant. From 2005 until now, he has been an associate professor in the scientific specialty "Genetics" at AU-Plovdiv. In 2000, he defended his dissertation and obtained the scientific and educational degree "doctor". During the period 2008 – 2016 Associate Professor Dr. Bozhin Bozhinov was the Dean of the Faculty of Agronomy, AU-Plovdiv. During the period 2016 - 2020, he was the head of the Department of Genetics and Plant Breeding at the same faculty, and from 2024 he is the head of the Department of Plant Physiology, Biochemistry and Genetics. He speaks very good English, Russian and well - French. He was always very active in the organization and implementation of educational and teaching activities of AU-Plovdiv, related to accreditation of bachelor's, master's and doctoral programs and implementation of research projects. Associate Professor Dr. Bozhinov was particularly active in the activities of the Scientific Research Fund, for three terms as Chairman of Temporary and Permanent Scientific Expert Committees (VNEK and PNEK), and currently as a member of its Executive Board. responsible for the "Agricultural Sciences" thematic area. His intensive activity outside the educational and experimental process extends outside AU as a member of the leadership of the non-profit NGO "Institute for AgroStrategies and Innovations"; to several international scientific consortia and organizations such as FAO Inter-regional cooperative research network on cotton; ICGI (International Cotton Genome Initiative); EFB (European Federation of Biotechnology); PRRI (Public Research and Regulation Initiative). **Here I would like to note that there are few scientists in the field of agricultural science in Bulgaria, who have been shown such interest by**

**international organizations and where he has been well accepted for his knowledge and authority, some of which I am a witness to.**

Participates in the authors' collectives of a total of four cotton varieties and one lavender variety.

The candidate is the author and co-author of a total of two textbooks, two exercise guides and one test book. I would single out one of the textbooks, called "Modern Genetics", published in 2023 by ed. Polygraph Commerce Ltd., although it failed to reflect the Bulgarian contribution to the development of modern biotechnology in the world, in which he himself and two of his current reviewers are active participants.

The results of his research activities are reflected in a total of fifty scientific publications, of which a total of thirty-eight in refereed editions, and twelve of them in journals with IF. From the materials provided, it is established that Associate Professor Dr. Bozhinov is distinguished by high organizational and teaching abilities related to bachelor's and master's courses, including: lecture courses and student exercises; supervision of the theses of two defended and five current students, as well as three successfully defended doctoral students at AU-Plovdiv.

## **2. General description of the presented materials.**

The documents of Assoc. Dr. Bozhin Bozhinov for participation in the competition for a professorship are submitted according to the requirements of the RSARB and the Agrarian University - Plovdiv.

In the competition for "**Professor**" Assoc. Dr. Bozhin Bozhinov from a total of 52 publications participated with a total output of 18 works, distributed as follows:

*Scientific publications – 13 issues, of which:*

*- Monograph (habilitation thesis) – 1 issue*

*- Publications in peer-reviewed and refereed scientific journals – 12 issues, all publications being in scientific journals with impact rank (SJR) and/or impact factor (IF), which can be grouped as follows: quartile Q1 – 3 items; quartile Q3 – 8 items; and quartile Q4 – 1 item;*

In the mentioned 13 papers, Prof. Bozhinov participated with 2 independent works, in 2 he was the first and in 2 he was a corresponding author.

*- Textbooks - 2 copies.*

*- Study guides – 3 items, including 2 exercise manuals and 1 collection of tests*

**3. Main directions in the candidate's research work. Demonstrated skills or aptitude for leading scientific research (project management, attracted external funding, etc.).**

### **• Main directions in the research work of Assoc. Dr. Bozhin Bozhinov:**

- Characterization and assessment of genetic diversity by molecular markers at
  - genetic resources of tomato, cotton, paulownia, and their segregating and mutant populations
  - populations of indigenous goat breeds
  - multilocus sequence typing of pathogenic strains of *E. coli* and analysis of

- toxins produced by them, as well as identification of potato cyst nematodes
- Creation of genetic maps and their application to analyze genome structure and selection in cotton
  - Creation of new tomato genotypes with increased antioxidant content by effective application of an integrated approach based on phenotypic characteristics, biochemical and genetic markers
  - Comparative analysis regarding the possibilities of application of non-GE methods compared to GI, with a view to solving the increasing problems of biotic and abiotic negative impacts through a database of internet accessible sources

**• Demonstrated research management skills (project management and attracted (genetic engineering) external funding):**

The scientific capacity of associate professor B. Bozhinov is additionally very well proven by the winning and successful implementation of a number of research projects, both with external (International Atomic Energy Agency, America Foundation for Bulgaria) and with national funding (Scientific Research Fund). . Since 2004, Assoc. Dr. Bozhinov has led a total of 7 projects, the funding of which amounts to a total of BGN 890,000. With the modern development of science, this certificate strongly supports the skills and capacity of Assoc. Dr. Bozhinov, that he is able to create teams for the successful creation of competitive projects, which is a very important condition for the further successful activity and development of the scientists who are from the school he is currently creating

**4. Evaluation of the pedagogical preparation and activity of the candidate. Its role in the training of young scientific personnel.**

The pedagogical and training activity and the training of young staff of Associate Professor Dr. Bozhinov is directly related to the development of the Agricultural University - Plovdiv. These activities cover:

- For the period 2018-2023, the total employment with teaching and training activities at AU-Plovdiv includes 2130.7 hours, of which 1459 hours of lectures and 53 hours of exercises for the university's Bachelor's and Master's programs.
- Creation and publication of textbooks and manuals on genetics. Prof. Dr. Bozhinov is an independent author of two textbooks on "Genetics" and participates in an author's collective for the publication of two manuals for exercises in genetics and one collection of tests in biology. As mentioned above, I would particularly value his second textbook "Modern Genetics" from 2023, which stands out for its originality in the way genetic information is reflected and compared so that it is easily digested and understood. The latter is a significant contribution to the teaching and learning of genetics and biology in general at the Agricultural University - Plovdiv, as well as for other universities in the country.
- Associate Professor Dr. Bozhinov is the supervisor of three successfully defended doctoral students. The topics of their doctoral studies include research on important cultures for the country: a. selection-genetic analysis of quantitative and qualitative traits in malting barley; b. quantitative fiber quality analysis in cotton mutant population; and c. characterization of genes responsible for capsaicin synthesis in pepper. In parallel with

this, Associate Professor Dr. Bozhinov has successfully supervised two cold OCs "Master", and is currently the supervisor of five students who are preparing their diploma theses.

All this supports the impression created in me that the previous teaching and training activity of Assoc. Dr. Bozhinov proves that he is a well-built and successful teacher and scientific leader in the field of the current competition - genetics.

**5. Significance of the obtained results, proven by citations, publications in prestigious journals, awards, membership in international and national scientific bodies, etc.;**

The review of the databases provided in the competition documents for the scientific publications of Prof. B. Bozhinov shows that the indicated 314 citations cover and even exceed the required number of points according to the requirements of this criterion (without self-citations) of 16 publications of Prof. Bozhinov in the database with data Scopus (<https://www.scopus.com/authid/detail.uri?authorId=6504149893>) and 249 citations 13 publications in the database Web of science (<https://www.webofscience.com/wos/author/record/H-7820-2016>). H – the index determined on the basis of the citations in both databases is 5. A substantial part of the citations are in scientific publications in prestigious international journals. The publication in the journal Genome, 2003, 46(4), 612-626, is of particular value in the competition which is cited 53 times.

**6. Significance of contributions for science and practice. A motivated answer to the question to what extent the candidate has a clearly defined profile of research work;**

**7. Contributions**

**7.1. Scientific contributions with original character:**

1. A comparative analysis of a set of marker systems (RFLP, SSR, AFLP, ISSR) was performed in terms of their applicability for the identification of genetic diversity in different types of populations - a set of tomato species (Bojinov & Danailov, 2009) and paulownia (Ivanova et al., 2012), interspecific cross cotton (Lacape et al., 2003), intraspecific cross tomatoes (Bojinov et al., 2024), a segregating cotton mutant population (Bojinov, 2019), small-sized populations of indigenous goat breeds (Kostova & Bojinov, 2018). The results of these analyzes are integrated and presented in a monograph in English (Bojinov, 2020).
2. A partial revision of the arrangement of the 13 pairs of homeologous A/D chromosomes in the  $2n = 4x = 52$  tetraploid cotton genome is proposed. The main changes include: c 3– c 17, c 4– c 22, c 5– D 08 and c 10– c 20 homoeologous pairs and are based on the mapping of 68 SSR and RFLP loci with known chromosomal locations as well as comparative analyzes with the arrangement of various markers in previously published maps of *G. hirsutum* × *G. barbadense* (Lacape et al. 2003).
3. An integrated and almost fully saturated genetic map was developed in cotton, combining RFLP, SSR and AFLP loci (Lacape et al., 2003), which serves the

international genetics community as a starting point for hundreds of complementary and building studies.

4. Due to the specificity of the Bulgarian cotton samples, a separate genetic map was constructed for them, which consists of 5 linkage groups and in which are grouped markers related to all the investigated characteristics of the fiber and explaining between 4 and 15% of the total variation of the signs.
5. An integrated approach has been developed for the creation of new tomato genotypes with increased antioxidant content, based on the complex use of phenotypic, biochemical and genetic markers (Bojinov, 2020; Bojinov et al., 2024).
6. A team of international experts has developed and used for the first time a method for in-depth analysis of large arrays of Internet-based scientific information related to the application of genetic engineering (GE) approaches and the comparative results of their application versus non- GE breeding methods of the challenges of increasing biotic and abiotic stress impacts in the EU (Ricroch et al., 2016).
7. Through multilocus sequencing typing, the genetic profiles of the circulating pathogenic strains of *E. coli* in the entire biotope and the various members of the respective biocenosis have been completed. The data are supplemented with their antimicrobial susceptibility and the type of intimin toxin they produce (Sirakov et al., 2019).

## **7.2. Scientific and applied contributions**

1. A system for the selection of ISSR markers, suitable for use in the identification of genotypes of different tomato species, has been developed and proposed for implementation (Bojinov and Danailov, 2009; Angelov et al., 2017), paulownia (Ivanova et al., 2012), goats (Kostova & Bojinov, 2018).
2. The combined tracking of several phenotypic characteristics with the behavior of a set of genetic markers allowed the identification of a region affecting simultaneously several fiber quality characteristics (namely strength, microner and elasticity) in Bulgarian cotton samples. The detection of this locus with pleiotropic action allows direct applicability in national selection programs actively using molecular markers (Bojinov, 2020).
3. A set of loci for quantitative traits in cotton has been identified and put into practical use (Bojinov, 2019; Lacape et al., 2003) and tomatoes (Angelov et al., 2017; Todorovska et al. 2014).
4. Intra-breed genetic variation has been established in autochthonous goat breeds for the preservation of local genetic diversity and development of future selection programs in goats (Kostova & Bojinov, 2018).
5. Environmental epidemiological typing of pathogenic *E. coli* strains affecting biosafety, human and animal health was carried out in order to control their spread (Sirakov et al., 2019).
6. In co-authorship with an international team, a set of biotechnological approaches for the creation and rapid propagation of promising energy plant

species have been analyzed and proposed for implementation (Schroeder et al., 2008).

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

In essence, I have no critical remarks about the original materials for the professorship of Prof. B. Bozhinov. Knowing his career closely, I believe there is some delay in his candidacy. I would advise him to make every effort to extend the practical application of the cotton and lavender varieties he has created.

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

...I have known Associate Professor Bozhin Bozhinov since the early stages of his career development. His qualities as an erudite and incessantly seeking scientific knowledge, which were demonstrated from the beginning, he managed to preserve and develop until this moment. For him, the true understanding of the essence of the ever-renewing and changing genetic knowledge and its skillful practical application have made his life a cause that he constantly proves and defends. Skillfully, persuasively and systematically represents our country at the level of international organizations and various forums and thus raises its authority. His strict individuality and views concerning the way modern genetic-selection research should develop and how science and university education should develop make him a sought-after and desirable scientist and teacher with his own face and appearances. I am convinced that in the active period of research that lies ahead, he will further develop his scientific potential, which would contribute to increasing the scientific and educational capacity of the Agrarian University of Plovdiv and thus of our country

### **CONCLUSION**

Based on the analysis of the pedagogical, scientific and scientific-applied activities of the candidate, I believe that Assoc. Dr. Bozhin Maksimov Bozhinov meets the requirements of ZRASRB, PPZRASRB and the Regulations of the Agrarian University for its application. His overall activity is convincingly supported by the necessary facts, referring to the relevant necessary-applied contributions, as well as that related to his educational and training activity and make him one of the well-recognized scientist in the field of plant genetics in this country and in the world

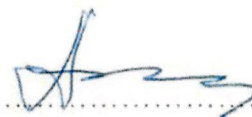
All this gives me reason to **positively evaluate** his overall activity.

I take the liberty of proposing to the honorable Scientific Jury to also vote positively, and the Faculty Council of the Faculty of Agriculture at the Agrarian University - Plovdiv to elect Assoc. Dr. Bozhin Maksimov Bozhinov for "professor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.3. Biological sciences, scientific specialty "Genetics" .

Date: August 22<sup>nd</sup> 2024

Sofia

REVIEWER : .....

A handwritten signature in blue ink, appearing to be 'Atanas', written over a dotted line.

(Acad. Atanas Atanasov)