

REFeree REPORT

on a competition for the academic position “Associate Professor” in a professional field 4.3. Biological Sciences, scientific specialty “Genetics” announced in the Official Gazette № 24/17.03.2023 for the needs of the Laboratory "Genome Dynamics and Stability" at the Institute of Plant Physiology and Genetics - Bulgarian Academy of Sciences (IPPG-BAS)

Candidate: **Georgi Nicolaev Bonchev**, PhD, Assistant Professor in the "Genome Dynamics and Stability" Laboratory at IPPG-BAS

Reviewer: Professor Liliana Georgieva Gigova, PhD, IPPG-BAS

The only candidate taking part in the competition for the academic position of “Associate Professor” at the Laboratory "Genome Dynamics and Stability" was Assistant Professor Dr. Georgi Bonchev, PhD from the Institute of Plant Physiology and Genetics.

Georgi Bonchev graduated from the Faculty of Biology at Sofia University “St. Kliment Ohridski” in 1995 with a Master degree in “Biotechnological Processes and Apparatus”. In 2011, he acquired the educational and scientific degree “Doctor” in the scientific specialty “Genetics” after defending a PhD thesis titled “Molecular-genetic characterization of *sphaerococcum*-type mutant forms in *T. aestivum* and Triticale using transposons”. From March 2015 until now, Dr. Georgi Bonchev holds the academic position of “Assistant Professor” in the scientific specialty „Genetics”, at the Laboratory "Genome Dynamics and Stability" of IPPG, and since the end of 2017 he has been the Acting Leader of this Laboratory. He completed five specializations in the period 2005-2019 at renowned universities abroad (Great Britain, Switzerland and Slovakia), which helped him to enrich his knowledge, skills and competencies in the application of various transposon-based marker methods.

The total number of scientific publications of Dr. Bonchev is **23** (Q1 – 9 publications; Q2 – 5; Q3 – 3; Q4 – 3; publications in peer-reviewed journals not indexed in Web of Science and Scopus – 3; total impact factor (JCR IF): **47.248**). In the present competition Assistant Professor Georgi Bonchev participated with **16** original scientific articles, including 3 review papers, all published in journals with JCR IF and impact rang (SJR). Eight of the publications are in renowned international journals with high JCR IF (from 4.658 to 7.299) and Q1. The total IF is **44.669**. He is the first author in 9 publications, including the sole author of one of the scientific reviews, and the corresponding author in 2 other publications. His personal contribution to each of the co-authored publications is correctly described. The presented list of citations noticed in the worldwide databases (Scopus, WoS) contains **66** citations and the number of cited articles is **13**. The citing sources only for the publication in Molecular Ecology Resources, 2013, are 35. The scientific activity of Dr. Bonchev includes participation in 14 international and national scientific forums with 7 oral reports and 19 poster presentations.

Dr. Bonchev's research work is focused on studying the structural dynamics of the plant genome in natural and stress-induced conditions and is directly related to the topic of the current competition. In the investigations carried out, he introduced and successfully applied a number of marker methods based on transposable genetic elements for genotyping and assessment of natural or mutant genetic diversity of economically important species (barley, maize, sunflower, wheat), as well as a DNA barcoding marker methodology for taxonomic identification and assessment of genetic diversity of medicinal plants (thyme, catmint, representatives of the genus *Sideritis*), including endemic species, and of phytopathogenic fungi.

The scientific papers submitted by Dr. Bonchev for participation in the competition contain significant fundamental and scientific-applied contributions, among which I would highlight the following:

- New data are obtained on the genomic diversity (FISH analysis) and methylation patterns (Southern blot analysis) of Ac- (maize Activator element) homologous sequences in ethyl methanesulfonate (EMS)-induced *sphaerococcum* mutant forms of common wheat (*Triticum aestivum* L.) and triticale (*X Triticosecale* Witt.). EMS has been shown to affect wheat genome stability by increasing the dynamics of Ac-like transposons (article **B4_5**, *J Appl Genetics* 2011).
- Data contributing to the clarification of phylogenetic relationships, the patterns of genetic divergence, the stages of domestication and evolution within the genus *Hordeum*, including cultivated and wild barley species, were obtained. *Hordeum agriocrithon*, a species of debated origin and taxonomic status, was found to be characterized by a highly heterogeneous genetic structure reflecting its hybrid character. In these studies, the retrotransposon-based marker methods REMAP (Retrotransposon Microsatellite Amplified Polymorphism) and for the first time iPBS (inter-priming binding site) were successfully applied (article **B4_3**, *Genet Resour Crop Evol* 2019 and article **B4_4**, *J Mol Evol* 2017).
- In a study on the dynamics of five retrotransposon families in North American populations of *Arabidopsis lyrata* using the Transposon Insertion Display marker system, the importance of the mating system (selfing/outcrossing) in the evolution of transposons is shown. The established diversity profiles of transposable genetic elements within and among selfing populations compared to outcrossing populations support the ectopic recombination model of transposon evolution (article **F7_6**, *New Phytologist* 2018).
- Maize inbred lines were identified in which the increased degree of genetic distance (as determined by REMAP analysis) correlated positively with the heterosis effect in their hybrids (increased plant height, ear diameter, number of rows of kernels per ear). These inbred lines and their hybrids are promising for use in breeding programs (article **F7_7**, *Plant Genetic Resources* 2016).
- *Sideritis elica*, from the Rhodope Mountains, Bulgaria is described as a species new to science. The differences between *Sideritis elica* and *Sideritis scardica* established by classical morphological approaches have been confirmed at the molecular level by applying the modern methodology for genetic taxonomic identification of species, DNA barcoding (article **B4_1**, *Plants* 2022).
- Detailed species differentiation and establishment of phylogenetic relationships in a group of 26 isolates of the genus *Colletotrichum*, fungal pathogens attacking economically important vegetable crops of the Solanaceae family, have been successfully achieved by applying multilocus barcode analysis (article **F7_1**, *J Fungi* 2022).

The high-quality research work of Assistant Professor Georgi Bonchev is related to his active project, organizational and training activities. Since 2004, he has been participating in the implementation of 8 funded projects - 3 scientific and 2 educational national projects, 2 national projects under the program of the International Atomic Energy Agency (IAEA) and 1 international technical cooperation project of the IAEA. He was the mentor of two students within the frame of the "Student Practices" project. It is important to note his activity as the Project Coordinator of the BULCode project (2020-2023), under the National Program "European Scientific Networks", governed by the Ministry of Education and Science of Bulgaria. Within the frame of the BULCode project, aimed at promoting biodiversity research in Bulgaria through DNA barcoding technologies and creating collaboration networks in this field, a number

of training and exchange of scientific experience events were organized and held. The main achievement of the BULCode project is that since 2021 the Institute of Plant Physiology and Genetics, Bulgarian Academy of Sciences is the representative unit for Bulgaria of the International Barcode of Life (iBOL) Consortium and a partner of the European unit of iBOL – BIOSCAN Europe (since 2022). Dr. Georgi Bonchev is a representative member in the Science Committee of iBOL.

Note and Recommendation: I draw attention to the fact that an appropriate and effective methodology is an important means of achieving original and valuable results, but the results themselves can be of a contributory nature (except in the case of a new method developed). In this regard, I recommend a more targeted and clear formulation of the contributions contained in some of the publications (B4_2, Г7_4, Г7_5, Г7_7). Regarding article Г7_4, for example, in the "Author's Reference for the Contributions" it is written: "DNA barcoding was used to study the inter- and intraspecies genetic diversity in thyme (genus *Thymus*, article Г7_4)".

CONCLUSION

The documents presented by Dr. Georgi Bonchev for participation in the current competition show that he fulfills, and in part of the indicators exceeds the requirements for acquiring the academic position "Associate Professor", defined in the Law on the Development of the Academic Staff of the Republic of Bulgaria, as well as those specified in the Regulations of the specific conditions and procedure for acquiring scientific degrees and holding academic positions in IPPG – BAS, namely: Indicator *A* - the minimum required 50 points are fulfilled; Group of indicators *B*: the minimum required 100 points are fulfilled; Group of indicators *Г* - the candidate collects 234 points out of the minimum required 220. The number of points he collects from scientific publications in group *Г*, in which the candidate is listed as a corresponding author and/or first author, is 114, whereas the minimum required is 110 points; Group of indicators *Д* - with minimum requirements of 100 points, the candidate collects 132 points; Group of indicators *Е* - the candidate collects 341 points, which exceeds the required minimum number of 70 points almost 5 times. The valuable scientific production, the significance of the fundamental and potentially applied scientific contributions in his works and the active project and training activities indicate that Dr. Bonchev is an experienced and recognizable researcher in the field of plant genetics, capable of organizing and leading scientific investigations. All this gives me a reason **to support the awarding of** the academic position "Associate Professor" in a scientific specialty "Genetics" to Assistant Professor Dr. Georgi Nikolaev Bonchev.

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/Prof. Liliana Gigova, PhD/