

## OPINION

on dissertation work for the award of the scientific degree "Doctor of Sciences" in Area of Higher Education 4. "Natural Sciences, Mathematics and Informatics", Professional Field 4.3. Biological Sciences, Scientific specialty "Molecular Biology"

**Dissertation topic:** "Influence of biotic and abiotic factors on the parasitism of stem holoparasitic plants of genus *Cuscuta* L. (family Convolvulaceae) "

**Author:** Associate Professor Lyuben Ivanov Zagorchev, PhD

**The statement was prepared by:** Acad. Roumen Georgiev Pankov, PhD, D.Sc., Faculty of Biology, Sofia University "St. Kliment Ohridski", member of the scientific jury, appointed by order of the Rector of the Sofia University No. RD 38-157/04/03/2023

### Documentation

The presented dissertation and the accompanying documentation fully meet the requirements of the Law on Development of the Academic Staff in the Republic of Bulgaria (LDASRB) and the Regulations for the terms and conditions for acquiring scientific degrees and occupying academic positions at Sofia University "St. Kliment Ohridski".

The abstract is prepared according to the requirements and reflects the content and achievements of the dissertation.

### Biographical data for the candidate

Associate Professor Lyuben Zagorchev was born in 1981 in the city of Sofia. He completed his higher education at the Faculty of Biology of the Sofia University "St. Kl. Ohridski", where he received a bachelor's degree in Molecular Biology (2004) and a master's degree in Biochemistry (2006). In 2012, he defended his PhD degree in the same specialty as a doctoral student at the Department of Biochemistry at the Faculty of Biology of the Sofia University. His professional career began in 2010, when he was appointed as an assistant at the Department of Biochemistry. He works in the same department to this day, successively passing through the positions of chief assistant (2013) and associate professor (2017). He has specialized in leading molecular plant biology laboratories in Australia, Austria, China and England.

As a teacher in the Faculty of Biology, Assoc. Prof. Zagorchev is involved in scientific and active pedagogical and administrative activities. He gives lectures on the subjects of Biochemistry, Molecular Biology of the Plant Cell, Omics Technologies, Molecular Biological Methods and has supervised the preparation of 5 master's and 9 bachelor's theses. The dissertation work of a full-time doctoral student is also being developed under his supervision. He led 7 and participated in 13 research projects, financially supported by Sofia University "St. Kliment Ohridski", Bulgarian Science Fund and various international organizations, some of which provided funding for the presented dissertation research. Currently Assoc. Prof. Zagorchev is Vice-Dean of the Faculty of Biology with responsibility for Quality Management, Research and Project activities, Accreditation.

## **Dissertation and scientific contributions**

The relevance of the selected topic - "Influence of biotic and abiotic factors on the parasitism of stem holoparasitic plants of genus *Cuscuta* L. (family Convolvulaceae)" is indisputable and is determined by the widespread distribution of these parasites and the damage they cause to cultural plants of economic importance. The scarce data on their distribution, their taxonomic status and the molecular mechanisms of their parasitism, as well as the influence of abiotic and biotic factors on the parasite-host relationship logically determine the purpose of the research presented in the dissertation.

The aim of the study was achieved by verifying the validity of three clearly formulated hypotheses: 1) The introduced species *Cuscuta campestris* has a higher invasive and parasitic potential than the native species; 2) The parasite-host interaction is influenced by abiotic and biotic stress factors; 3) Parasites of the genus *Cuscuta* are influenced by biotic factors changing their metabolism. By using an extremely wide palette of modern and classical methodological approaches (laboratory cultivation of plants, protein electrophoresis, zymogram analysis, immunoblotting, DNA sequencing, transcriptome, metagenomic, proteome and metabolome analyses, photosynthetic measurements, etc.), Assoc. Prof. Zagorchev confirms all three hypotheses. The professional execution, the detailed documentation and the thorough interpretation of the obtained results makes a very good impression. The multitude of data obtained through various methodical approaches enable Associate Professor Zagorchev to obtain answers to the questions posed, which do not raise doubts about their credibility. As a result of the conducted research, 10 conclusions and 8 contributions were formulated (4 of a fundamental nature, 3 of a scientific-applied nature and 1 of a methodological nature) with which I fully agree. Among them, I would like to emphasize the establishment of a new scientific direction, investigating the effects of abiotic stress on the parasitism of stem holoparasites of the genus *Cuscuta* and the substantial enrichment of the available information about this parasite on Bulgarian territory.

## **Scientometric data**

Assoc. Prof. Zagorchev has presented a list of 20 publications on the topic of the dissertation work. Of these, 14 are in IF journals, 3 in IF-ranked journals, and 3 are chapters of monographs. The total impact factor of these publications is 51.88, and their citations are 351. Taking into account the distribution by quartiles, it should be noted that more than half of the papers are in journals with Q1 (12 items), 3 are in Q2 and 2 in Q3. The fact that Assoc. Prof. Zagorchev has a leading role in the authorship of 16 of these articles (80%) is unarguable proof of his active participation in the conducted research. The achieved high scientometric indicators lead to obtaining considerably more points than the minimum values envisaged in LDASRB. In group "G" Assoc. Prof. Zagorchev achieved 450 points, instead of the required 100, and in group "D" - 556 points instead of the obligatory 100. Thus, the total number of points is 1156, or more than 3 times higher than the necessary minimum number of 350 points.

## **Conclusion**

In the dissertation work of Assoc. Prof. Zagorchev, a series of pioneering studies are presented, the results of which have found a wide response, both in our and in the international scientific community. Important results have been achieved, which represent

a significant and original contribution to science and thus fully meet the requirements of Art. 75, Para. 1 of the Regulations of the Sofia University on the terms and conditions for acquiring scientific degrees and academic positions. These studies characterize their author as a highly qualified and productive scientist working in the field of plant molecular biology. Everything noted above gives me the reason to give my positive assessment and recommend to the esteemed members of the Scientific Jury to award Assoc. Prof. Lyuben Ivanov Zagorchev, PhD, the scientific degree "Doctor of Sciences" in Professional Field 4.3 Biological Sciences (Molecular Biology).

Sofia  
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Acad. R. Pankov, PhD, D.Sc.