

STATEMENT

by **Gana Minkova Gecheva**, PhD – Assoc. Prof., Department of Ecology and environmental conservation, Faculty of Biology, PU „P. Hilendarski “considering PhD thesis for the educational and scientific degree “doctor”

in the area of higher education 4. Natural sciences, mathematics and informatics,
professional field 4.3. Biological Sciences,
scientific specialty Ecology and ecosystem protection

Author: Elitsa Valentinova Hineva

PhD thesis title: Ecological factors limiting the distribution of the seagrasses of the genus *Zostera* in the sublittoral zone of the Burgas Bay (the Black Sea): importance of wind waves and epiphyte abundance

Scientific consultant: Prof. Snejana Moncheva PhD, Institute of oceanology - BAS

1. Overview of the procedure and the candidate

By order № 268 from 10.12.2020 of the Director of the Institute of oceanology - BAS (IO-BAS), I am appointed a member of the Scientific jury for the selection procedure for holding the PhD position of thesis „Ecological factors limiting sea grass from genus *Zostera* distribution in sublittoral zone of Burgas Bay (Black Sea): importance of wind wave and epiphytic abundance“. Author of the PhD thesis is Elitsa Valentinova Hineva – self-study PhD student, enrolled by order №71 from 26.02.2020.

The set of materials submitted by PhD student Hineva is in accordance with the minimum national requirements and requirements laid down in the article 1a, paragraph (2) from the Regulation for the implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria (PPZRASRB), as well as the regulation for the conditions and the procedure for acquiring academic degrees and occupying academic positions in the Bulgarian Academy of Sciences and IO – BAS (PURPONSZAD).

Elitsa Hineva acquired her Master Degree in Ecology and environmental protection at VVMU "N. Y. Vaptsarov" in 2002. She was appointed a technical assistant at the Institute of fisheries and aquacultures in 2003 and an ecology expert at the Black Sea River Basin Directorate (MoEW) in the period 2004-2012. She has been an ecologist since 2012 at IO-BAS. The candidate completed five international teaching courses (Ukraine, Nederland, Georgia, Monaco, Bulgaria) and one specialization (Bulgaria) in leading research institutions. The above courses and specializations allow Hineva to develop as a very good scientist with extensive knowledge.

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PhD student Hineva hold successfully three exams according her Individual plan and received 258 credits (at minimum 200). The presented articles are distributed as follows: 2 are published in journals, indexed in Web of Science (Q4 and Q3) and Scopus; 1 article is accepted for publication in Q2 journal; 3 additional are in conference proceedings and 1 is under review. Six of the articles are related to the selection procedure's theme. The PhD candidate participated in 3 scientific forums. She is proficient in English and at using computer programs.

2. Significance of the topic

The topic of the thesis has underlined and clear significance due to the fact this is the first complete research in the field of the wind wave effect on the sea grass distribution in Black Sea. The experimental results obtained contribute to the better understanding of their specific distribution and to possible measures that could be implemented towards protection.

3. Knowledge on the research problem

The chapter Literature review impresses with the content of literature sources, which were well resumed and analyzed. The author summarised the available literature in the field of modelling of assessment of exposition and wave parameters, as well as the processes of eutrophication in sea macrophyte communities. Based on the presented literature analysis, detailed characteristics of the Burgas Bay, and the total structure of the thesis, I can state that the candidate has a clear vision for the research problem, has self-opinion and analytical skill for summarizing data.

4. Research methods

The applied approaches for assessment and analytical methods guarantee the accomplishment of the stated aim and objectives, and the answers to the 3 hypotheses respectively. In addition, they impressed with their broad scope. Data for wind direction and strength from a 6-year period were analyzed. Software package SMC v. 2.5 was applied for calculation of the wave parameters. Modelling of the link between the bottom orbital speed and sea grass presence was done with the Real Statistics Resource Pack software. Double logistic regression was used for the estimation of the possible presence of rooted higher aquatic plants. Based on ESRI ArcGIS 10.2 prognostic taxa distribution was assessed.

Sea macrophyte species, approximate surface area and speed leave exchange (188 samples) were identified. Nitrogen, P and C content in leaves were analyzed and field experiment on periphyton cover was accomplished. The thesis incorporates rich statistical processing, as well as excellent illustrative material, maps and images.

5. Assessment of the PhD thesis and contributions

The PhD thesis has a classical structure, consists of 247 pages and includes chapters Introduction, Literature review, Aim and objectives, Material and methods, Results and discussion, Summarized results and conclusions, Contributions, List of publications, References (37 in Cyrillic and 174 in English), and Appendices.

The stated aim has a clear formulation and its achievement was based on 3 working hypothesis and 4 objectives, which are logically connected with the topic and outline the research structure.

Results are discussed on a high scientific level. The wind wave importance and the regions with limited boarder were established. The presented empirical models can be applied for prognosing the sea grass presence. Higher leave exchange speed and productivity of *Z. noltei* in comparison with *Z. marina* was recorded. In total 63 attached periphytic taxa were registered, dominated by the *Bacillariophyceae* representatives. These communities' character was related to the period of substrate stability. Two reliable periphytic indicators were established. Thresholds were assessed for maximum acceptable epiphytic load. Discussion at each subchapter is precise, results were discussed in the light of the available scientific literature. Formulated 12 conclusions not only reply to the stated hypothesis, but are beyond the frame of the aim of the study.

Two groups of contributions were formulated: 3 scientific and 3 with scientific-practical character. I accept the contributions as they are formulated. Nevertheless, in my opinion the outcomes of the thesis are more than listed, e.g. the two new reliable periphytic indicators and the assessed higher leave exchange speed of *Z. noltei* should be included.

6. Publications and self-contribution of the PhD student

The presented 6 articles include results, discussion and outcomes, which confirmed the successful accomplishment of the research objectives. The articles are based on scientifically significant and to a high extent new studies.

The thesis incorporates authors statements, there is a skillful manner of conclusion formulation. The self-contribution of the PhD candidate is visible not only in the thesis, but also in the publications. Thus, I can conclude that the self-contribution is undoubtful.

7. Autoreferat

The presented autoreferat is in line with the requirements and reflects the main results achieved.

8. Recommendations

The PhD thesis is dedicated on actual problems and achieved important results in research environment difficult for field study. I would like to underline the broad spectrum of methods and

programs which contributes to the original style of the thesis. I can only recommend to Elitsa Hineva to proceed her work on the same high scientific level and with the same devotion.

CONCLUSION

The PhD thesis includes **scientific and scientific-practical results which are original contribution to the science** and together with the presented materials are **in accordance with the national requirements laid down in PPZRASRB and requirements in PURPONSZAD**. The thesis demonstrates that Elitsa Hineva **possess** deep theoretical knowledge and professional skills in the scientific specialty Ecology and ecosystem protection. The candidate has the ability for self-conducting and interpretation of a scientific study.

Based on the above, **I convincingly give my positive evaluation and recommend to the Scientific Jury to confer to Elitsa Valentinova Hineva the educational and scientific degree ‘doctor’** in the area of higher education 4. Natural sciences, mathematics and informatics, professional field 4.3. Biological Sciences, scientific specialty Ecology and ecosystem protection.

3.03. 2021 г.

Assessor:

(Assoc. Prof. Gana Gecheva)