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OPINION

on dissertation for obtaining the educational and scientific degree "Doctor" in: field of higher education 6. 'Agricultural Sciences and Veterinary Medicine', professional field 6.5 'Forestry', scientific specialty 'Forestry (including Dendrology)'

Author of dissertation: Assist. Prof. Landscape Architect Teodora Milchova Markova
Doctoral student in independent study at the Department "Dendrology " at the University of Forestry (UF), Sofia, Bulgaria.

Dissertation Topic: "CLASSIFICATION OF FOREST VEGETATION OF THE PLANA MOUNTAIN"

Reviewer: Assoc. Prof. Dr. Nikolay Ilchev Velev, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences; Field of higher education 4. "Natural Sciences, Mathematics and Informatics", professional field 4.3. "Biological Sciences", scientific specialty "Ecology and Conservation of Ecosystems", appointed as a member of the scientific jury by Order No. ZPS-145/02.04.2026 of the Rector of the University of Forestry

1. Relevance of the problem.

Knowledge of forest vegetation and the diversity of natural habitats is of essential importance both for the development of phytosociology as a science and for the practical application of activities related to the sustainable management, conservation and development of forest ecosystems. In this sense, the topic of the thesis is distinguished by its clear scientific and practical significance.

At present, the forest vegetation of the Plana has not been fully studied, and a comprehensive phytosociological survey of forest communities, conducted using the Braun-Blanquet method (1964), is still lacking. Given the insufficient knowledge of the forest vegetation of Plana Mt., as well as of the plant communities studied using the Braun-Blanquet method in Bulgaria as a whole, the subject matter of the thesis is deemed to be of scientific significance and relevance.

2. Degree of knowledge of the state of the problem and creative interpretation of the literature review.

The 'Literature Review' chapter of the thesis is well structured and divided into four main sections. The literature review reflects the available studies on the vegetation cover of the Plana Mt., with an emphasis on forest vegetation. Studies on the following are examined separately: 1) vegetation, 2) natural habitats, 3) the application of the floristic approach to vegetation classification in Bulgaria, and 4) the mapping of vegetation and habitats. The literature review is detailed and comprehensive, with 158 sources of information cited in the thesis. The literature review presented demonstrates the doctoral candidate's high level of expertise on the subject.

3. Aim, objectives, hypotheses and research methods. Relevance of the chosen research methodology to the stated aim and objectives of the dissertation.

The aim and objectives are clearly defined. The aim of the study is to investigate the forest phytocoenoses of the Plana Mt. using Braun-Blanquet's floristic-structural approach. Six objectives have been formulated to achieve this aim.

The field surveys have been conducted correctly. A total of 187 relevés were made over four vegetation seasons (2022–2025). The size of the sample plots is in accordance with that recommended in the current literature (Chytrý and Otýpková, 2003; Dengler et al., 2008;

Pavlov and Dimitrov, 2012; Dengler, 2014). Cluster analysis was performed using the SYN-TAXA programme (Podani, 2002). Diagnostic, constant and dominant species were identified using the JUICE 7.1 software (Tichý et al. 2011). Principal Component Analysis (PCA) ordination was also applied using the JUICE and R software (R Core Team 2024).

The PhD candidate has demonstrated a creative and critical approach to the analyses carried out and the literature reviewed. The application of a set of complementary classification methods contributes to achieving results with a high degree of reliability in the taxonomic decisions. I consider that the chosen research methods are fully consistent with the stated objective.

4. Visualization and presentation of the results.

The thesis submitted to me for review comprises 130 pages, including 45 figures, 9 tables and an appendix with photographs of the studied phytocoenoses. The main text of the thesis is well structured and organized into six chapters. The results are presented in Chapter V, entitled 'Results and Discussion'. This chapter is divided into five main sections – 'V.1. Classification of forest vegetation', 'V.2. Origin and Syndynamics of Forest Vegetation", "V.3. Ordination of Forest Vegetation", "V.4. Natural Habitats" and "V.5. Mapping of Vegetation and Habitats". The text spans 62 pages. Fifteen syntaxa have been identified, classified into 5 classes, 8 orders, 9 alliances, 9 associations and 6 plant communities without rank. Figures and tables are included to present the results and aid discussion.

I consider the manner of presenting the results to be appropriate and characterized by the necessary clarity. The results obtained reflect the research conducted objectively. The PhD candidate has presented the results in a logically coherent sequence, at a high scientific level and with the correct use of scientific terminology.

5. Discussion of results and literature used.

In discussing the results, the PhD candidate has demonstrated a critical approach and the ability to make appropriate use of the relevant literature. A total of 158 sources in Cyrillic and Latin script were used in the preparation of the thesis. The presentation is distinguished by its scientific rigor, whilst being presented in a clear and accessible manner. The results obtained are significant both for the development of science and in an applied context. The thesis concludes with clearly formulated and well-structured conclusions and recommendations. The PhD candidate possesses the necessary expertise to conduct phytocoenotic analyses and vegetation classification, including the ability to interpret the results in depth.

6. Contributions of the thesis.

I accept the Summary of Contributions submitted by the PhD candidate. These are formulated based on the results obtained in the thesis and are of both scientific and applied scientific significance. All contributions are significant, and among them I would highlight the following:

Scientific contributions

- The association *Alnetum incanae* has been identified in Bulgaria for the first time
- For the first time, natural habitat 91W0 has been identified in the Plana Mountain

Scientific and applied contributions

- The elaboration of maps of forest vegetation and natural habitats in the Plana Mountain

7. Assessment of the extent of the dissertator's personal involvement in the contributions.

Having familiarized myself in detail with the materials presented for the defense, I am firmly convinced that Assist. Prof. Teodora Markova is the principal author of the thesis, the

results obtained, the conclusions drawn and the recommendations made, and that these represent the doctoral candidate's personal contribution.

8. Critical comments and questions.

My recommendations from the preliminary discussion of the thesis are reflected in the final version. I have no further comments or questions for the PhD candidate.

9. Published articles and citations.

The materials submitted by the PhD candidate include two collaborative publications related to the thesis, in both of which he is the first author. One of the publications is in a journal with an Impact Rank (SJR).

10. Assessment of the publications on the dissertation: number, nature of the publications in which they are printed. Reflections in science - use and citation by other authors.

The PhD candidate has submitted two publications related to the thesis. One of the publications is in an international journal, refereed and indexed in world-renowned scientific databases – the journal "Forestry Ideas [SJR (2025): 0.131, Q4]. The other article is in the journal "Management and Sustainable Development".

Presented abstract reflects objectively the structure and content of the dissertation.

CONCLUSION:

On the basis of the different research methods learned and applied by the PhD student, the correctly derived experiments, the made generalizations and conclusions, I consider that the presented dissertation meets the requirements of the FRAADB and the Regulations of the University of Forestry for its application, which gives me the reason to evaluate it as **POSITIVE.**

I take the liberty of suggesting that the Honourable Scientific Jury also vote in the affirmative and award the Assist. Prof. Teodora Milchova Markova the educational and scientific degree ***"Doctor"*** in the scientific specialty 'Forestry (including Dendrology)'

Date: 13 May 2026
Sofia

PREPARED THE OPINION: .....
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(Assoc. Pr... ...ikolay Velev)