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*Anexa nr.6*

## **SUMMARY OF THE HABILITATION THESIS**

**TITLE VEGETATION DIVERSITY AND DYNAMICS AT  
NATIONAL AND EUROPEAN LEVEL: CLASSIFICATION  
METHODS AND ECOLOGICAL ANALYSIS**

Habilitation Domain: Biology

Author: **Nicolae Daniela Claudia**



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The habilitation thesis of the undersigned, **Claudia Daniela Nicolae**, scientific researcher, grade III, at the Institute of Biology in Bucharest, entitled "Vegetation Diversity and Dynamics at National and European Level: Classification Methods, Ecological Analysis, and Applications in Nature Conservation," presents the professional and scientific activity carried out after obtaining the title of Doctor of Biology (2005, Romanian Academy). The paper synthesizes her research, professional career and development, as well as her future development aims in the field of vegetation ecology and biodiversity conservation. My scientific activity, carried out over more than two decades, has focused on the study of vegetation and related fields, as phytosociology, plant taxonomy, ecology, biodiversity and habitat conservation, and climate change.

I obtained my Ph.D. in Biology from the Romanian Academy under the supervision of Academician Nicolae Boşcaiu, by defending my thesis *Flora and Vegetation of the Upper Prahova River Basin* in June 2005. This work combined floristic–phytosociological analysis, ecological characterization, and assessment of habitat conservation status, providing essential data for developing management measures in mountain areas with high biodiversity.

- My research activity lies at the intersection of fundamental and applied studies, pursuing several major directions:
- Inventorying and characterizing plant communities using standardized methods based on the Zürich–Montpellier school, adapted to the biogeographical particularities of Romania;
- Assessing the conservation status of vascular plant species and habitats of community interest in accordance with the Habitats and Birds Directives, as well as with national legislation;
- Applying multivariate analyses to identify floristic and structural patterns of vegetation;
- Developing management plans and defining conservation strategies aimed at maintaining or improving the conservation status of habitats and higher plant species.

A central direction of my research has been the integration of scientific results into conservation policies and strategies, through the development of management plans and recommendations for the sustainable use of plant resources. In this regard, my



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research has contributed to the implementation of national and international projects, including Romania's participation in the *European Red List of Habitats* project (2014–2016). I have also contributed to the development of conceptual and methodological tools for biodiversity assessment and for supporting the legislative and institutional framework.

To date, I have published a total of 88 scientific papers, including 28 ISI-indexed articles and one editorial. Among these, 13 papers were authored as first, corresponding, or last author, and 14 as co-author. In addition, I have published 15 papers indexed in international databases (BDI), including 7 as first author, and 45 additional valuable papers, which, although not meeting the current indexing standards, remain scientifically relevant.

The impact of my work is reflected by a significant number of citations: 559 according to Web of Science (1365 according to Google Scholar) as of October 31, 2025. Regarding journal impact, 10 papers were published in Q1 journals and 18 in Q2 journals, highlighting the international visibility and relevance of my contributions. The Hirsch index is  $H = 11$  (Web of Science) and  $H = 14$  (Google Scholar) as of the same date.

My editorial and peer-review activity, including the evaluation of over 130 manuscripts for prestigious international journals (Wiley, Elsevier, Springer, PeerJ, Pensoft, Frontiers, MDPI), has been recognized through the *Diversity 2023 Outstanding Reviewer Award* and my inclusion among the *Top 1000 MDPI Reviewers* in 2024. I have also served as guest editor for special issues dedicated to plant diversity and ecosystem adaptation to global change.

Participation in international conferences and workshops (International Botanical Congress, European Congress of Conservation Biology, European Vegetation Survey meetings, conferences on Red Lists and ecological restoration) has ensured the visibility and integration of my research within the European and global scientific context. Furthermore, my involvement in international biodiversity governance processes — such as the *Convention on Biological Diversity (CBD)*, *IPBES*, and the *Global Strategy for Plant Conservation (GSPC)* — has enabled contributions to the development of indicators, policies, and recommendations for implementing the objectives of the *Global Biodiversity Framework (GBF)*.

The first chapter of this work is devoted to my academic and professional trajectory, presenting the main stages in the formation and consolidation of my career in



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vegetation ecology and environmental sciences. It highlights research activities, participation in national and international projects, contributions to scientific networks, as well as teaching and mentoring of young researchers.

The second chapter provides an integrative synthesis of published research results that comprehensively address the diversity, classification, and dynamics of vegetation — first at the national level, then at the European scale. The chapter brings together a portfolio of representative studies covering diverse habitats — from alpine and subalpine vegetation to riparian, wetland, nitrophilous, and anthropogenic communities — reflecting the biogeographical and ecological diversity of Romania and its connections to European vegetation typologies.

This chapter emphasizes contributions to the systematization and harmonization of vegetation typology through the integration of phytosociological data into a unified, comparable European framework. These efforts have included clarifying the syntaxonomic affiliation of controversial communities, defining new associations and subassociations, and updating nomenclature in accordance with the International Code of Phytosociological Nomenclature. In this context, my research contributes to strengthening the framework for vegetation classification in Romania in line with international standards.

A major focus is placed on the use of ecological indicator values to interpret relationships between plant communities and environmental factors. By applying the *Ecological Indicator Values for Europe (EIVE)* system and multivariate statistical analyses, key ecological gradients structuring vegetation were identified, highlighting the roles of light, moisture, soil reaction, temperature, and nitrogen availability in determining floristic composition. These approaches have improved the understanding of spatial diversity patterns and the factors influencing community stability and succession.

The results are discussed within the broader context of biodiversity knowledge and the development of modern phytosociological methodology, underscoring their relevance for habitat evaluation and conservation. By integrating field analyses with ecological modeling and European databases, this research contributes to updating knowledge of Romania's vegetation and situating it within a continental perspective, facilitating the use of data in conservation policies and ecological planning.

The third chapter presents future professional development objectives, focusing on the integration of multisource remote sensing technologies (satellite imagery, drones, and



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proximal sensors) and artificial intelligence methods in the analysis and functional assessment of habitats. These directions aim to develop modern and flexible tools for biodiversity monitoring and for identifying ecological patterns at broad spatial scales. By combining field data with information from complex remote sensing sources and machine learning algorithms, future research will contribute to more accurate characterization of vegetation dynamics, assessment of climate change impacts on natural and semi-natural ecosystems, and optimization of conservation and ecological restoration strategies. In this way, the proposed directions strengthen the applied dimension of ecological research and contribute to its integration within the current framework of the green transition and sustainable natural resource management.