Universitatea Transilvania din Brașov

HABILITATION THESIS

SUMMARY

Title: **Culture and importance of acacia (*Robinia pseudoacacia* L.) and some fruit shrubs in western Romania**

Domain: FORESTRY

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The habilitation thesis entitled *"The Cultivation and Importance of Black Locust (Robinia pseudoacacia L.) and of Certain Fruit Shrubs in Western Romania"* synthesizes the scientific and professional achievements of Associate Professor Dr. Eng. Ruben Budău, obtained after the conferral of the PhD title in 2014 and up to the moment of submitting the habilitation dossier, in accordance with the requirements of the CNATDCU Guidelines.

The work is structured around two major research directions: the cultivation and importance of black locust, and the cultivation of certain fruit shrubs in western Romania, including the analysis of the properties of their fruits.

The first part of the thesis addresses the cultivation of black locust (*Robinia pseudoacacia* L.), a tree species of exceptional ecological, economic, and social value. A detailed analysis of the biological and ecological characteristics of this species is provided, emphasizing its adaptability to harsh pedoclimatic conditions, its nitrogen-fixing capacity in the soil, and its role in the rehabilitation of degraded lands. The establishment process of black locust plantations is described, covering key stages such as land preparation, the selection of high-quality planting material, planting techniques, and necessary agrotechnical measures to ensure optimal establishment and growth of the plantations.

The thesis highlights the importance of black locust as a forestry species used in the development of protective forest belts, anti-erosion plantations, and for stabilizing sandy soils. Its value as a source of durable timber is also emphasized, with applications in construction, furniture manufacturing, parquet industry, and other industrial uses. Additionally, black locust is presented as an exceptional melliferous species, being considered the most important forest tree for honey production due to its nectar-rich flowers. Other uses of the species are also mentioned, including applications in phytotherapy, ornamental landscaping, forage production, and as a potential biomass source in agroforestry systems.

The chapter dedicated to black locust also includes a presentation of the author's research regarding biomass production capacity, adaptability to various soil types, and its impact on local biodiversity. Aspects concerning natural and artificial regeneration, as well as plantation maintenance in the context of climate change, are also discussed.

The second major theme of the work focuses on the cultivation of fruit shrubs in western Romania, with an emphasis on species such as blackberry (*Rubus* spp.), Saskatoon berry (*Amelanchier alnifolia* Nutt.), and blackthorn (*Prunus spinosa* L.). The diversity of these crops is analyzed, as well as their acclimatization potential and their value in the specific pedoclimatic conditions of the hilly areas of the Codru-Moma Mountains. Research results are presented on fruit production, varietal adaptability, and the behavior of seedling progenies of Saskatoon berry, which led to the registration of a new variety in Romania in 2020.

The thesis also includes detailed phytochemical studies on the fruits of these shrubs, highlighting their high content of bioactive compounds, particularly natural antioxidants, which have significant health benefits. The impact of harvest timing on fruit quality is

analyzed, and comparisons between cultivated and wild fruits provide valuable perspectives for species selection and improvement. In the case of blackthorn, both the food uses of the fruits and the therapeutic applications of other plant parts, such as leaves and flowers, are presented.

In the chapter dedicated to academic and professional development, the author emphasizes his main educational achievements, his teaching activity in higher education, and his involvement in national research projects. Participation in scientific conferences, the publication of articles in journals indexed in international databases, and contributions to the advancement of the forestry domain are also noted.

Finally, the author outlines his vision for future research directions, proposing the expansion of studies on the identification, selection, and registration of new forest and horticultural plant varieties adapted to current climatic conditions and socio-economic demands. There is a strong emphasis on integrating applied research with the real needs of rural communities and promoting sustainable practices in the management of natural resources.

This thesis demonstrates the author's multidisciplinary approach, combining silviculture, agroforestry, horticulture, and phytochemistry, with the goal of supporting ecological restoration, rural development, and the efficient use of underutilized plant resources. It reflects a sustained effort over a period of more than a decade, involving both fundamental and applied research, educational commitment, and the dissemination of knowledge within the academic and professional communities.

With a focus on regional specificity and practical applicability, the research contributes to the broader understanding of plant resource management in the context of climate change and environmental challenges, aiming to offer innovative, sustainable solutions for forest ecosystems and agricultural landscapes in Romania and beyond.