ABSTRACT HABILITATION THESIS

Methodology for studying the health and nutritional status of plants in climatic context

Domain: Agronomy

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(A) Summary

The habilitation thesis "Methodology for studying the health and nutritional status of plants in climatic context” highlights the professional results that concern both, scientific and the academic activities achieved in the field of agronomy, after obtaining the Ph.D title, from 2010 until now, respectively, as well as the plan of evolution and development of my professional academic and scientific career.

The most important personal scientific achievements in the field of agronomy, which represented the major research preoccupation after defending the PhD thesis, are included in the structure of the habilitation thesis, synthesized in six ISI-quoted papers and an invention patent. The habilitation thesis begins with (A) Summary, followed by (B) Scientific and professional achievements and career evolution and development plans. The second part of the habilitation thesis, preceded by an introduction, comprises two subdivisions. First subdivision (B-i) Scientific and professional achievements, presents the main research topics, synthesized as follows: 1 - Phytosanitary protection methods of potato and tomato crops; 2 - Methods for the use of ash obtained from the combustion of wood residues as a fertilizer/amendment; 3 - Methodology for the study of the interaction between climate change indicators and the state of health of urban ornamental trees; 4 - Methodology for valuation and enrichment of the nutritional properties of genuine Allium sativum L. varieties. The second subdivision, (B-ii), is dedicated to the presentation of the Career evolution and development plans.

In Chapter 1 - "Phytosanitary protection methodologies against Phytophthora infestans Mont. Bary attack on potato culture in the climatic context of Transylvania, respecting the rules of cross-compliance” are described the researches in the field, aiming at both pathogen attack modeling depending on the implementation of some climate scenarios, and those regarding the phytosanitary protection methods with respect to rules of cross-compliance. The most important research results refer to the identification of an obvious interrelation between temperature, rainfall regime and the attack degree (GA,%) of Phytophtora infestans Mont. De Bary in Transylvanian climatic conidions, as well as the good results obtained with the Redsec and Roclas potato varieties when rules of cross-compliance are respected, respectively compost fertilization and phytosanitary treatments with active substances 80% extract of Mimosa tenuifolia + 20% citrus seed extract.

Chapter 2 - "Methodology for the study of the suitability of the ashes resulting from the combustion of the oak debris, to be used as a mineral fertilizer/amendment based on its composition”, emphasizes the experimetal, which show a dry matter content of over 99%, but also
the presence of the burned organic matter, both in the ash fractions and in the klinker resulting from the combustion. Acid neutralization values range from 28 to 34 Ca equivalents, which suggests the possibility of using ash as commercial lime replacement for soil amendment. The case study conducted in a nursery producing pear seedlings confirms the potential of using it as a mineral fertilizer.

Chapter 3 - ”Methodology of study of the interaction between some climate change indicators and the health status of ornamental urban trees” highlights that the tree studied species (Tilia cordata Mill., Pinus nigra JF Arnold and Aesculus hippocastanum L.) have a significant potential to be used as nitrogen pollution bioindicators, although they exhibit a different behavior against nitrogen fixation from environmental air, where it is found as nitrogen oxides (NO, N₂O and NO₂), of which the nitrogen protoxide graction - N₂O - is an important component of climate change indicators.

Regarding Chapter 4 - ”Methodology of valuation and enrichment of the nutritional properties of genuine varieties of Allium sativum L.”, it is emphasized that the selenium supplementation of a genuine variety of garlic (Allium sativum L.) has as consequence an increase in both, dry matter and main nutrients - crude protein and crude ash, as well as the decrease in moisture and crude fat. Also, research conducted to an experimental model of a product based on genuine varieties of Allium sativum L.

In the last part of this habilitation thesis, respectively (B-ii) Career evolution and development plans, there are presented aspects of research and publishing activity, research projects, scientific articles published in ISI quoted, ISI and IDB indexed journals, as well as patents and patent applications, respectively. Beginning with 2011, I coordinated/coordinate 3 national research projects and I was/am a member of other projects, including 2 national and 2 international. The publishing activity, after defending the Ph.D thesis, resulted in: 1 book chapter in a book edited by an international publishing house, 4 scientific books, 5 university textbooks, 8 ISI quoted papers, 3 ISI indexed papers and 99 IDB indexed papers. The results of the research were awarded by International Invention Salons (3 Diplomas of Excellence and the Golden Medals).

Bibliometric indicators: