

Summary of Habilitation thesis

Habilitation thesis entitled "*Scientific contributions regarding growing technology and yields quality of field crops in organic farming system*" is structured according to the norms and the regulations in force of the University of Agronomic Sciences and Veterinary Medicine of Bucharest (UASVM of Bucharest) regarding the organization and conduct of the process for obtaining the habilitation certificate.

The first part of the habilitation thesis includes the professional and academic scientific achievements in thematic directions, after the date of obtaining the PhD in Agronomy, in March 2008, and are focused on *two research themes* that I initiated and developed, namely:

- ✓ ***growing technology in organic farming system of field crops***, as a agricultural production system that brings benefits to the natural environment through:
 - *supporting biodiversity and introducing new species for Romania into the crop plant assortment, such as *Amaranthus* spp.;*
 - *combating the *Tanymecus dilaticollis* pest of maize crop in organic agriculture system in the current context of agricultural policies that promote sustainable production systems for plants and animals;*
- ✓ ***the yields quality of different species of field crops in organic farming system***, as a consequence of the agricultural production system that aims to meet the demands of consumers and current society for healthy agri-food products, without residues and with superior nutritional quality.

Within the first research direction, we addressed several topics, namely: the growing technology in organic farming system of *Amaranthus* spp. species, also highlighting data on the morphology, biology, productivity and seed production; testing the effectiveness of some insecticides for the *Tanymecus dilaticollis* pest control of maize in organic farming system.

The theme of organic farming system and the choice of specific practices to use species less known for Romania, such as *Amaranthus* spp., falls within one of the major and priority themes of current agronomic research, both at national and global level, consisting in the design, on rigorous scientific bases, of agricultural technologies that, on the one hand, ensure food safety and security, and on the other hand, be as friendly as possible to the environment and biodiversity.

Following the experiments carried out in the organic farming system, it was found that the vegetation period of the *Amaranthus* spp. was: 140 - 154 days, for the *A. cruentus*; 138 - 154 days for the *A. hypochondriacus*; 140 - 154 days for the *A. caudatus*. During this interval, 651.4 - 775.1 GGD (Growing Degree Days), ($\Sigma t > 15^{\circ}\text{C}$) were accumulated. It is recommended that the previous crop be a pulses, and sowing be carried out when the soil, in spring, has temperatures above 15°C , with densities of 100,000 grains/ha and row spacing of 50 cm. The grains yields can be 1000-2500 kg/ha.

Also, the sustainable use of plant protection products and the promotion of Integrated Pest Management (IPM), including the use of alternative approaches and non-chemical methods, are very current topics in contemporary agriculture. The problems encountered by organic farmers in controlling very damaging pests of maize crop, in the early stages of vegetation, that can completely compromise the crop, such as *Tanymecus dilaticollis*, have led to research that has attempted to find solutions through the use of crop protection products while respecting the rules of organic agriculture. Thus, regarding the control of the *Tanymecus dilaticollis* insect for organic maize crop, under the conditions of the experiments carried out in the Experimental Field at the National Institute for Research and Development in Fundulea, in collaboration with the Plant Protection Collective, it was found that insecticides applied to seeds based on Neem oil (1 l/ton of seeds) offered the best protection to maize plants, with an average of 81.30% plants saved. Also, treatments in vegetation by applying Spinosad and *Bacillus thuringiensis* products were noted, in which the percentage of plants saved was on average 78.33%.

Regarding the yields quality of field crops in organic farming system, we addressed the quality of: cereals (common wheat and maize), pseudocereals (*Amaranthus*, quinoa, buckwheat), pulses (lentils, broad beans, chickpeas, fenugreek, adzuki beans) and oil plants (camelina, flax, safflower, pumpkin for oil).

The yields quality, respectively the nutritional quality of crop, is reflected in the content of main biochemical elements found in the grains production and which can be improved by applying the principles of organic farming, which impose strict rules on the application of fertilizers and protection products against harmful organisms, as well as the control carried out on the entire flow to the consumer. On the other hand, the new rules of the European Agricultural Policies, but also at national level, as well as modern approaches to plant growing are based on the use of innovative technologies with the aim of increasing efficiency, productivity and sustainability in food

production and will contribute to mitigating economic losses caused by the deterioration of soil health and the loss of many pollinator species due to pesticides.

The habilitation thesis also includes research activity, highlighting the ability to coordinate research teams, to organize and manage teaching activities, to explain and facilitate learning and research, by presenting the main coordinated research themes, won through competitions, with the main research themes addressed and the research results.

At the same time, we also addressed *the recognition and impact of research activity* (professional prestige, by presenting data from the last 20 years of teaching and research activity).

The second section of the thesis is dedicated to the professional, scientific and academic career development plan. My professional activity, teaching and research, in the last 22 years was performed within the Department of Plant Sciences (since 2011) and the Department of Crop Production (in the period 1995-2011) until the establishment of new departments in the structure of the Faculty of Agriculture, UASVM of Bucharest. Scientific research activity has been and will remain the way of expressing creativity, as well as the way to reach knowledge and perfection of the professional personality.

The third part of the paper includes the bibliographical references associated with the first two chapters of the Habilitation Thesis, both my own publications and those of the authors cited in the paper.

The Annex contains the relevant works that support the results contained in the Habilitation Thesis.

The scientific achievements contained in the Habilitation Thesis are presented in the context of the current state of scientific research at the national and international level on the topics addressed. Through my entire teaching and research activity, I wish to contribute to increasing the scientific reputation, competitiveness and national and international visibility of the Faculty of Agriculture and the University of Agronomic Sciences and Veterinary Medicine of Bucharest.

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