

SUMMARY

The habilitation thesis entitled "Sustainable horticultural technologies and the importance of germplasm in the context of climate change" presents the most important academic and scientific achievements that I have achieved after obtaining my doctorate in 2011 and even before this date.

Prepared in accordance with the legislation and regulations of the University of Agronomic Sciences and Veterinary Medicine of Bucharest, it reflects the experience and skills accumulated, having a significant impact on the horticultural sector.

The work is structured in several chapters that refer to the components of my professional activity, the research results and my vision for the future of my career as a teacher and researcher.

Sustainable horticultural technologies represent a set of practices and methods that integrate scientific research and technological innovations to ensure efficient horticultural production, with a reduced impact on the environment.

Climate change brings new threats to plant health, including fruit trees and shrubs. The sustainability challenge requires their protection from harmful organisms and specific diseases. New innovative techniques, including genetic improvement, can play a role in increasing sustainability, provided that they are safe for both consumers and the environment. Also, the creation of varieties resistant or tolerant to biotic and abiotic stress factors ensures the development, implementation and promotion of crop technologies that protect the environment, water, soil, air, biodiversity and other natural resources.

The improvement of fruit species is carried out in well-defined stages, the essential ones being: extensive information on the species (genetic, physiological, productive characters), the formation of a gene bank or germplasm fund based on the exchange of biological material at a global level, the expansion of genetic variability through inter- and intraspecific hybridization, mutagenesis, genetic engineering, the selection of important combinations, the confirmation under production conditions of the agronomic qualities of the new genotypes, the validation of new varieties, respectively their homologation and patenting. These stages are part of the action of avoiding genetic erosion and ensuring resources for future creation of new varieties. The evaluation of genetic resources is of great importance, since the lack of knowledge or partial knowledge of morphological, physiological, genetic characteristics, etc., determines their partial use or non-use in improvement programs.

Fruit variety is of great economic importance, being the means of production capable of capitalizing on the pedoclimatic conditions of a given place and ensuring large and quality harvests. Variety value is given by two basic characteristics: productivity and quality.

Productivity represents the ability of fruit trees and shrubs to capitalize on the conditions offered by the biotope in order to obtain maximum fruit production of good quality. Productivity is a characteristic of the variety, with large differences from one variety to another. In order to highlight the value of some varieties in terms of productivity, comparative studies are carried out with several varieties in the same environmental conditions, and the varieties that perform well are recommended for spread in production. Productivity is a characteristic determined by a complex of agrobiological characteristics such as: precocity of fruiting, ability to differentiate fruit buds, percentage of flower setting, number and size of fruits, resistance to stress, diseases and pests, and last but not least, the way in which the variety reacts to the applied cultivation technology.

The quality of the fruit harvest of a variety is assessed according to the destination of production. Fruits used for fresh consumption as dessert fruits must have a pleasant external appearance, a certain size depending on the species, the pulp must be fine, juicy, aromatic, with a pleasant taste and a high storage capacity. Fruits used as raw material for industry must have a high content of soluble dry matter, in order to have a good yield during processing, contain large amounts of pectic substances, the pulp must be unicolor, etc.

Productivity and quality are two attributes that cannot be considered separately, the variety being viewed as a whole. It is not enough for a variety to have a high production if the fruits are of poor quality, just as varieties with very low production are not acceptable, even if they are of very good quality.

Consumer demands regarding the nutraceutical, sanogenic properties of fruits, especially those of fruit bushes, can be satisfied only by creating new varieties and developing research on obtaining nutritional compounds (functional foods) from fruits. At the same time, by-products from the wine industry (pomace) represent a considerable source of bioactive compounds (total polyphenols), with high antioxidant activity and a large amount of polyunsaturated fatty acids, with applicability in animal feed.

Romania has a particularly rich genetic base, consisting of varieties, biotypes and populations, with a resistance or tolerance to diseases and pests, with high adaptability to biotic and abiotic stress factors.

Romanian fruit research has generated and continues to generate new biological creations that possess valuable productivity and quality characteristics in a constantly changing

environmental conditions, new technologies for growing, preserving and processing fruits in order to increase the added value of primary production.