

TRENDS IN BOTANY KNOWLEDGE AND PROCESS TECHNOLOGIES FOR A SUSTAINABLE FLORICULTURE

G. SERRA

Scuola Superiore Sant'Anna, Piazza Martiri della Libertà 33, 56127 Pisa. g.serra@sss.it

In the last few years, floriculture has faced a number of emergencies due to internal and external pressures. Competition from new producing countries, rising production costs and increasingly stringent regulations for environmental protection have been the main causes of these pressures. This has led to a series of reactions from growers, both strategic and tactical, even imaginative. Apart from radical reactions, such as delocation or disengagement, growers have implemented a series of measures, even improvised, which focused on both the facilities and especially on the production processes. Growers ask plant scientists for knowledge, instruments and methods suitable – directly or indirectly - to increase the efficiency of resources used in the production process. It can be said that efficiency is virtually synonymous with sustainability. This is nothing new: floriculture has always plundered botany knowledge, in the broad sense. After an overview of floriculture scenario and the meaning of sustainability, the main critical points of floriculture related to its sustainability are reviewed. But, entering the actual point, what can botany, seen as the core of plant science, do to improve the sustainability of floriculture? To answer this question you must first refer to the three so called pillars of the sustainability: economic, social, environmental. Quite simply, the acquisitions of plant science can contribute to reduce production costs, to improve workers well-being, and to safeguard the environment as a whole. But through which research topics these goals can be achieved? All those helpful to improve the efficiency of floriculture, and hence its sustainability, by targetting at shortening cultivation time, accurate and timely planning, minimizing plant spacing; to use the least amount of energy, water, nutrients, pesticides and growth regulators per product unit; to minimize waste; to ensure a consistent quality product. Floriculturists cannot expect, nor demand, that plant scientists run on time research on the thousands of their crops; instead, they expect that scientists provide more basic knowledge, tools and methods to address specific issues. Some kind of 'plants wind tunnel' could be key tools to estimate crops performance under varying environmental conditions. Approaches and platforms like Plant Accelerator®, Virtual Plants Network and plant/crop models, Algorithmic Botany, FSPM (Functional-Structural Plant Modelling), Phenomics and Phenotyping, Speaking Plants, Phytomonitoring and Sensing, and other like them, represent useful tools to improve production technologies in all their aspects. At more specific level, subjects of great interest concerning, for example, manipulation of plant architecture for aesthetic and functional purposes; better understanding and improvement of roots ability to uptake water and nutrients; VOCs dynamics for sensing biotic and abiotic stress; and the most imaginative subjects such as those which lead to new 'ears' to listen to the plants. Concluding, it can be stated that efficiency is really synonym with sustainability. Becoming more efficient, floriculture will turn more sustainable with all positive consequences on economic, social and environmental mentioned pillars. To reach this goal it is necessary a growing cooperation along the research chain from the basic until the application stage. Integration would clearly be effective if we could establish a platform, virtual or actual, in which the chain rings meet regularly.

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