

O-19 (244) Keynote Speaker**RESOURCE EFFICIENCY IN DYNAMIC AND INTENSIVE SYSTEMS:
USTAINABLE GROWING OF HORTICULTURAL CROPS IN HYDROPONICS**

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Like any other industry, agriculture in general and horticulture in particular have to face economic, environmental and social challenges such as natural resources availability, human population increases and rising food prices. Traditional culture system (TCS) in open field is high demanding in water and other natural resources and thus has driven the introduction and the development of protected cultivation systems, with innovative and high technological horticultural growing systems. Greenhouse systems and soilless culture system (SCS) can allow obtaining high yields, water and nutrient use efficiencies and growing season's expansions thanks to the implementation of standard growing conditions and high input control, nutrients and resources usage optimization. SCS have been recently introduced also in marginal and arid areas in which despite the favorable climate conditions, poor soils and/or water scarcity limit agriculture. It is currently possible to exploit specialized and standardized growing techniques in a context in which both land and water are becoming scarce. Agronomic innovation and automation are being coupled to an increasing sensitivity towards environment protection and a reduction in input losses. Consequently, modern horticulture is shifting from traditional culture systems, in the open field, to protected cultivation and soilless culture systems (SCS). Protected cultivation and SCS allow the provision of water and nutrients to the plant root system to be controlled and regulated, thus favoring root oxygenation. The punctual and real crop needs are satisfied by the hydroponic nutrient solution (HNS). Each horticultural crop has its own specific water and nutrient supply needs that arise from specific physiological responses. The HNS supply, whether continuous or discontinuous, can be supplied directly to the root using sub-irrigation or nebulisation systems, or from the aerial part using drip irrigation or sprinkling systems. The water and nutrient supply in SCS, when organized through closed-cycle hydroponic systems, in which the drainage is collected, analyzed, sanitized, integrated with the absorbed nutrients and re-inserted into the system, is efficient and sustainable both economically and environmentally. SCS introduce both resource optimization and a reduction in losses, and thus increase food security and profitability in modern dynamic and intensive systems. Also, the application of specialized growing techniques could be an efficient system to increase food security with horticulture sustainability in marginal and developing areas thanks to a synergistic interaction between growers, supply chain partners, research institutes and governmental agencies.

Keywords: soilless culture systems, sustainable growth, vegetables, aromatic plants, water consumption