

Advances in Olericulture

Series editor

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The book series *Advances in Olericulture* provides a state-of-the-art account of research in olericulture, the applied life science of production and utilization of vegetable crops. The series focuses on various aspects of vegetable science and technology covering primarily but not exclusively species where the vegetative organ is the economically important component. The series of books spans current topics from sustainable fertilization to organic production; from open field cultivation to advanced soilless growing techniques; from vegetable seed and seedling physiology to vegetable quality and safety; from environmental stresses to phyllosphere communities interaction with vegetables; from postharvest biology and technology to minimally processing of vegetables. The series is designed to present the most advanced scientific information available linking basic and applied research for serving olericulturists, research workers, teachers and advanced students.

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Francesco Tei • Silvana Nicola • Paolo Benincasa
Editors

Advances in Research on Fertilization Management of Vegetable Crops

 Springer

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Preface

In the last decades, research on fertilization management in vegetables aimed at producing economical yields with reduced fertilizer inputs by the development and implementation of cropping systems, nutrient management approaches and crop varieties. Examples of the interventions in cropping systems include adequate crop rotations, intercropping, double cropping and other strategies for a better soil organic matter management; nutrient management approaches include modelling, decision support systems, crop nutritional status testing and precision agriculture technologies; amelioration of crop varieties has been directed towards higher nutrient/fertilizer use efficiency. Hence, the aim of this book is to review the recent literature on the key scientific and technical subjects of fertilization management in vegetable crops.

The book consists of ten chapters.

Chapter “[The Role of Research for a Sustainable Fertilization Management in Vegetables: Future Trends and Goals](#)”, by the editors of the book, is the introduction to the book, presenting the importance of the fertilization as one of the agricultural practices in vegetable production and the rationale of the need for enhancing efficient fertilization strategies for the twenty-first century.

Chapter “[Tools and Strategies for Sustainable Nitrogen Fertilisation of Vegetable Crops](#)”, by Thompson et al., presents and discusses the tools and strategies for sustainable nitrogen fertilization, including methods for soil analysis or estimation of the soil N supply, N balance calculations, methods based on plant analysis, methods based on monitoring crops with optical sensors and the use of computerized decision support systems based on simulation models.

Chapter “[Organic Matter Mineralization as a Source of Nitrogen](#)”, by De Neve, is focused on the organic matter mineralization as a source of nitrogen. It provides details on the biotic and abiotic factors governing the process, introducing simple empirical equations that allow making rapid estimates of N mineralization, describing the different types of organic materials with respect to expected N availability and pointing out the importance of synchronizing N mineralization with crop N demand.

Chapter “[Fertilizers: Criteria of Choice for Vegetable Crops](#)”, by Sambo and Nicoletto, reviews the main mineral fertilizers and traditional and innovative organic materials (i.e. compost, sewage sludge, anaerobic digestion residues and spent mushrooms compost) and the criteria of choice for vegetable crops.

Chapter “[Crop Rotation as a System Approach for Soil Fertility Management in Vegetables](#)”, by Benincasa et al., deals with crop rotation as one of the key strategies of conservative agriculture, aimed at guaranteeing the long-term productivity and sustainability of vegetable cropping systems. Mineral and organic fertilization, crop residue management, cover cropping and green manuring and intercropping are examined in the frame of crop rotations in conventional and organic systems for either specialized or non-specialized vegetable production.

Chapter “[Localized Application of Fertilizers in Vegetable Crop Production](#)”, by Simonne et al., focuses on principles and practices of the localized application (i.e. modified broadcast method, banding application method, fertigation method) in vegetable crop production in order to increase the uptake rate of applied nutrients, thereby reducing the application rates, the fertilization cost and the environmental impact of vegetable production.

Chapter “[Water and Nutrient Supply in Horticultural Crops Grown in Soilless Culture: Resource Efficiency in Dynamic and Intensive Systems](#)”, by Pignata et al., analyses fertilization management for the different soilless culture systems for efficient and effective control of product quality and environmental sustainability in vegetable crop production. The chapter presents the characteristics and the controls of the substrate-based and liquid-based soilless culture systems in relation to irrigation and fertigation applications, both in open-cycle and closed-cycle hydroponic systems.

Chapter “[Plant Breeding for Improving Nutrient Uptake and Utilization Efficiency](#)”, by Ferrante et al., deals with physiological, biochemical and molecular traits affecting nitrogen uptake by roots and new plant breeding approaches for improving nutrient uptake and utilization efficiency in plants.

Chapter “[Water Management for Enhancing Crop Nutrient Use Efficiency and Reducing Losses](#)”, by Gabriel and Quemada, covers water management strategies oriented towards improving nutrient use efficiency, reducing nutrient losses and maintaining farm profitability in horticultural systems.

Chapter “[An Economic Analysis of the Efficiency and Sustainability of Fertilization Programmes at the Level of Operational Systems, with Case Studies on Table Tomato, Carrot and Potato in Central Italy](#)”, by Martino et al., presents an economic analysis of the efficiency and sustainability of fertilization programmes conducted at the farm level and framed into a conceptualization of the relationship between the decisional and operational systems.

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