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Editorial

Soil, Water and Nitrates Management in Horticultural Production

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The goal of this Special Issue, entitled "Soil Science and Water and Nitrate Management in Horticultural Production", is to examine recent advances in horticultural practices and strategies that can contribute to maintaining or increasing soil fertility and the efficiency of water and nitrogen use. The decrease in soil fertility, and in the quality and availability of irrigation water, is a reality that is maximized by global warming. On the other hand, nitrogen fertilization may contribute to nitrate leaching and/or the release of gases (carbon dioxide and nitrous oxide), with a great impact on global warming. Therefore, the management of soil, water, and nitrogen is critical to dealing with soil and water degradation, and with climate change. Moreover, such management has a decisive impact on plant growth and the quality of horticultural crops. In this Special Issue, seven scientific contributions were collected that can contribute to an increase in the use of these more sustainable factors. Three papers analyzed the use of organic waste materials as a way to reduce inorganic fertilization, improve soil fertility and plant growth, and promote a circular economy.

Jabborova et al. [1] reported that the addition of biochar to soil increased seed germination, total root length, plant growth, plant biomass, and the chlorophyll and carotenoid content of the ginger. Moreover, it was noted that it may improve soil nutrient availability, since it can increase the activity of soil enzymes.

Machado et al. [2] showed that the addition of municipal solid waste compost to soil, collected selectively, is a way to decrease inorganic fertilization, increase soil organic matter, and correct soil pH. The supplementation of municipal solid waste compost—collected selectively with reduced amounts of inorganic nitrogen, and applied using weekly fertigation—greatly increased spinach-shoot dry-weight and fresh yield. The addition of municipal solid waste compost to acid soil increased soil pH to values adequate for plant growth. The combined application of compost and inorganic nitrogen reduced inorganic N application, and replaced inorganic P and K fertilization to a significant extent.

Ronga et al. [3] analyzed the potential of an innovative process to produce controlled-release fertilizers using spent coffee grounds and biochar residues as raw materials to produce clay ceramic materials, in particular, lightweight aggregates. They showed that the lightweight clay ceramic aggregates containing spent coffee grounds, glass, and N fertilizers can be used for nursery grapevine production, reducing inorganic fertilization.

Badr et al. [4] analyzed the interaction of varying water-stress levels and arbuscular mycorrhizal fungi on the vegetative growth, reproductive behavior, fruit yield, water status, nutrient uptake, and soil fertility of field-grown eggplant in an arid region. They reported that the inoculation of mycorrhizal colonization increased the yield and regulated the physiological status of eggplant, associated with higher nutrient uptake at different water-stress levels. The mycorrhizal response showed better performance under severe water stress than under full irrigation conditions.

Di Mola, et al. [5] evaluated the possible effects of two mulching films (black polyethylene and brown photoselective film) and the use of a plant-growth-promoting product, containing Trichoderma spp., on the productive and qualitative traits of lettuce grown under four regimes of nitrogen (0, 30, 60 and 90 kg ha^{-1}). They concluded that the brown photoselective film increased the marketable yield of lettuce over black polyethylene. *Trichoderma* spp. did not affect the marketable yield, probably due to the short crop cycle. However, it had a positive effect on some quality traits, which, according to the authors, is an interesting starting point for further research. The nitrogen addition increased the marketable yield by up to 60 kg ha^{-1}, and improved chlorophyllous pigment biosynthesis, as well as antioxidant activities (lipophilic and hydrophilic) and bioactive compounds (phenols and total ascorbic acid).

The last two studies evaluated the influence of soil-water deficit on total sugar content in Meiwa kumquat trees (Iwasaki et al. [6]), and the potential of purslane for the phytoremediation of soils contaminated with Cr(VI) (Thalassinos et al.).

Iwasaki et al. [6] studied the influence of soil-water deficit on the accumulation of soluble sugars in the organs of Meiwa kumquat trees, and the relationship between the sugar content of each organ and the number of first-flush flowers. They reported that a soil-water deficit in Meiwa kumquat trees significantly increased the total sugar content of the xylem tissue of the scaffold branches to three times the value of the control.

Thalassinos et al. [7] analyzed the potential of purslane (Portulaca oleracea) as a phytoremediation species in Cr(VI)-contaminated soils. They concluded that purslane showed potential as a species to be successfully introduced to Cr(VI)-laden soils. Moreover, they also verified that the addition of N improved the plant's growth and physiological functions, even when exposed to high Cr(VI).

Conflicts of Interest: The authors declare no conflict of interest.

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