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Editorial

Special Issue: Feature Papers 2020

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The goal of this Special Issue is to highlight, through selected works, frontier research in basic to applied horticulture among those published in Horticulturae in 2020. Exhibiting a diversity in topic areas, the following papers are noteworthy.

1. Improving the Sustainability of Horticultural Crop Production Systems Is Key for the Future

The maintenance of soil quality and the reclamation of marginal soils are urgent priorities in sustainable systems. Interest in the use of biochar, a carbon-rich, porous material thought to improve various soil properties, has increased. Tenic et al. [1] reviewed the literature and reported that the source of organic material, or 'feedstock', used in biochar production and different parameters of pyrolysis determine its chemical and physical properties. The incorporation of biochar impacts soil–water relations and soil health, and has been shown to have an overall positive impact on crop yield. However, the pre-existing physical, chemical, and biological soil properties influence the outcome and the effects of long-term field application of biochar on the soil microcosm need to be understood.

Miceli et al. [2] showed that tomato and sweet pepper seedlings suffered negative effects of salinity on plant growth, relative water content, and stomatal conductance. However, the foliar application of GA_3 was successful in increasing salinity tolerance of tomato seedlings up to 25 mM NaCl and up to 50 mM NaCl by sweet pepper seedlings. GA_3 treatment could represent a sustainable strategy, enabling the use of saline water in vegetable nurseries when it is the only water quality available.

Strawberry growers have used different materials to mulch, but the most widely used is black polyethylene mulch films which are not biodegradable. The increasing focus on environmentally sustainable agricultural practices requires a transition to biodegradable mulch films. Ten biodegradable mulch films were used to compare their effectiveness to black polyethylene in covering the soil during a cultivation cycle of strawberry by Giordano et al. [3]. Several of the biodegradable films were comparable to black polyethylene in their effects on yield and fruit number, indicating that sustainable alternatives to black polyethylene may serve as replacements.

The effect of extracts of *Nerium oleander*, *Eucalyptus chamadulonsis* and *Citrullus colocynthis* against bacterial spot disease in tomato and the induction of resistance were assessed by Abo-Elyousr et al. [4]. Application of the plant extracts at 15% (v/v) to tomato plants significantly reduced disease severity, significantly increased total phenol and salicylic acid content, and in some instances significantly increased peroxidase activity and polyphenol oxidase after infection with the causal agent. These plant extracts showed promising antibacterial activity and could become an effective tool in integrated management programs for sustainable tomato bacterial spot control.

In sustainable cropping systems, the management of herbivorous arthropods is a challenge to tomato production. The development of resistant cultivars is critical for a transition to a sustainable system. The host selection of *Tetranychus urticae*, *Bemisia tabaci*, and *Tuta absoluta* was evaluated by de Oliveira et al. [5], characterizing their preference for high zingiberene content (HZC) or low zingiberene content (LZC) tomato leaves. Tomato genotypes with HZC showed repellency to pests and induced a nonpreference for

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oviposition. Genotypes selected for HZC may be considered sources of resistance genes to arthropod pests for tomato breeding programs, and therefore have excellent potential for the development of resistant cultivars for sustainable cropping systems.

2. Integrating New Technologies and New Crops into Existing Production Systems Is Growing

The level of agricultural productivity in sub-Saharan Africa remains far below the global average, due in part to the scarce use of production- and process-enhancing technologies. Steffens et al. [6] studied the driving forces and effects of adopting innovative agricultural technologies in food value chains in the region and determined that access to credit, experience of environmental shocks and social capital were the main drivers for the adoption of improved practices. Thus, the promotion of social capital and access to financial capital can be pivotal in enhancing the adoption of innovative agricultural technologies.

The European market for fresh Asian vegetables is expected to expand across the EU member states, and the introduction of new vegetable crops has enormous potential according to Hong and Gruda [7]. Demand for diversified, nutritious, and exotic vegetables has been increasing, and four Asian vegetables, Korean ginseng sprout, Korean cabbage, Coastal hog fennel and Japanese (Chinese or Korean) angelica tree, were discussed. All possess several health benefits, are increasingly in demand, are easy to cultivate, and align with current trends of the European vegetable market. Thus, studies of production systems of these and other Asian vegetables in different European environments are required to expand their production and market availability.

3. Managing Fruit Set and Ripening Remain Challenges Especially in Relation to Climate Change

Domingues et al. [8] observed that 'Valencia' orange ripening and quality characteristics were affected by the type of rootstock on which the scion was grafted, and by a rootstock/scion interaction with a tropical versus temperate climate, giving growers something they may need to consider when planting new orchards.

Climate change associated with a warm autumn often hampers the development of the coloration of many fruits including late ripening apple varieties in New Zealand. Funke and Blanke [9] found that an exposure of at least two weeks of reflective mulch was sufficient for enhancing coloration for outside-, inside- and down-facing sides of the fruit of 'Fuji' and 'Pacific Rose' apple cultivars, increasing the portion of fruit harvested in the first pick and improving fruit storability and export quality, potentially increasing financial returns to growers. The short exposure time was considered surprising, but could be cost effective in commercial settings.

Youssef and Roberto [10] determined the incidence and possible causal pathogen(s) of premature apple fruit drop (PAFD) in Egypt, and also assessed some fungicides for controlling the disease organisms, in order to promote a sustainable system in orchards. Phytopathogenic fungi were isolated from the dropped apple fruit, and four fungicides were tested against the diseases in vitro and under naturally occurring infections in the field. All of the fungicides, applied at fruit set, significantly reduced PAFD in the field and could be useful in commercial settings.

Plums can suffer from small fruit size, premature fruit drop and alternate bearing. Lammerich et al. [11] demonstrated that European plum fruit size could be improved by either mechanical (Bonn/Baum at 380 rpm at 5 km/h) or chemical thinning with either ammonium thiosulfate or ethephon, or a combination of both, increasing likely financial returns to growers.

4. Postharvest Storage and Handling Techniques Continue to Evolve

Youssef et al. [12] compared the efficacy of different types of SO_2-generating pads on the incidence of gray mold band on the physicochemical properties of the quality of seeded table grapes grown under protected cultivation. The SO_2-generating pads with a dual release of 5 or 8 g completely inhibited the development of gray mold at all evaluation times. A high reduction of the disease incidence was also achieved by using a slow release of 4 g. In addition, the SO_2-generating pads did not alter the physicochemical properties of the grapes. Thus, these types of pads should be considered for the effective control of the gray mold of table grapes grown under protected cultivation, while maintaining grape quality.

Raspberries are a rich source of bioactive phytochemicals, but these can be altered by postharvest storage and processing techniques before human consumption. In an in-depth review, Piccolo et al. [13] reported that the content of bioactive phytochemicals is relatively stable during cold (5 °C) or frozen storage. Processing techniques such as juicing or drying negatively affect bioactive phytochemical content. Among drying techniques, hot air (oven) drying alters the content of bioactive compounds the most. For this reason, new drying technologies such as microwave and heat pumps have been developed. These novel techniques are more successful in retaining bioactive phytochemicals with respect to conventional hot air drying.

5. Expanding Our Knowledge of Unique and Underutilized Species Is Key to Their Conservation and Horticultural Use

Conservation of unique plant species has significant ecological and horticultural implications. Marler and Calonje [14] observed that male Cycas and Zamia plants produced more branches than female plants, and cycad species with determinate female strobili produced more branches on female plants than species with indeterminate female strobili. Horticultural and conservation decisions may be improved with this sexual dimorphism knowledge.

The literature containing which chemical elements are found in cycad leaves was reviewed by Deloso et al. [15] to determine the range in values of concentrations reported for essential and beneficial elements. The leaf element concentrations were influenced by biotic factors such as plant size, leaf age, and leaflet position on the rachis; by environmental factors such as incident light and soil nutrient concentrations within the root zone. These influential factors were missing from many reports, rendering the results ambiguous and comparisons among studies difficult. Future research should include the addition of more taxa, more in situ locations, the influence of season, and the influence of herbivory to understand more fully leaf nutrition for cycads.

Fruit and seed shape are important taxonomic characteristics providing information on ecological, nutritional, and developmental aspects, but their use requires quantification. Del Pozo et al. [16] proposed a method for seed shape quantification based on the comparison of the bidimensional images of the seeds with geometric figures. The diversity of the seed shape in the Arecaceae makes this family a good model system to study the application of geometric models in morphology.

Fragaria vesca L. has become a model species for the genomic studies relevant to important crop plant species in the Rosaceae family, but generating large numbers of plants from non-runner-producing genotypes is slow. Sarker et al. [17] developed an in vitro protocol that illustrated that in vitro culture of shoot axillary bud explants could generate high numbers of clonal shoots from a single seedling plant in vitro.

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

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