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Editorial

Smart Strategies and Technologies for Sustainability and Biodiversity in Herbaceous and Horticultural Crops

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Current trends in modern farming systems are moving in the direction of technical solutions for improving the sustainability and biodiversity of agroecosystems. Innovative agronomical strategies and new technologies can help farmers to reduce or eliminate chemical inputs, preserve soil and water quality, decrease exhaust and greenhouse gas emissions, prevent pollution, and lower energy demand. Sustainable management also aims to enhance biodiversity in order to lengthen the "life" of agroecosystems. Herbaceous and horticultural crops are dominant crops that can contribute to achieving this goal.

This Special Issue presents contributions regarding innovative technologies, machines, and strategies for the sustainable management of herbaceous and horticultural crops, including applications in organic farming systems, conservation agriculture, integrated or non-chemical weed and pest control, cover crops and intercropping use, precision and digital farming technologies, and robotic technologies for sustainability. Moreover, this Special Issue concerns conservation agriculture, organic agriculture, cover crops, intercropping, integrated/non-chemical weed and pest control, and precision and digital agriculture for sustainability. These Special Issue is a collection of 12 papers: 5 on tree crops/orchards and 7 on herbaceous crops.

Starting on the topic of tree crops, Ran et al. [1] used local thermal damage as an innovative technique for jujube trees. After creating an appropriate heat transfer model, the authors used experimental results to show that heating the bark at a certain temperature for an appropriate time can effectively improve yield and quality. Compared with traditional girdling techniques, this method had a smaller impact on the health of jujube trees and did not cause permanent wounds.

The following three papers address the topic of weed control under tree rows. Lisek [2] studied the effect of five methods of in-row weed management on the composition and diversity of weed species in a plum orchard. *Festuca rubra* L. ssp. was sown as a cover crop. The obtained results indicated that the flora developing in the control plot, tilled and mowed plots, and plot sprayed with post-emergence herbicides showed greater potential to provide ecosystem services than the flora of mulched plots. Gagliardi et al. [3] studied an innovative method for weed control under tree rows in alley cropping farming systems; they did so using a mower, which they modified by replacing blades with chains (as they are more resistant to stones and pruning materials). No major differences emerged with the standard blade mower. The setting with a high working speed and high rotation speed resulted in a compromise, obtaining a weed biomass reduction of 59.6%. Peruzzi et al. [4] ran a two-year trial on a vineyard; they aimed to evaluate the effect of cover crops managed with an autonomous mower on *E. canadensis* weeds under a trellis. This combination induced a reduction of between 61 and 84% in *E. canadensis* when compared to conventional management techniques.

Roškarič et al. [5] studied a "0-pesticide residue" spray program in a Mediterranean vineyard scenario. The innovative strategy was compared to the standard integrated grape protection program. The level of infection of leaves and grapes by fungal pathogens did

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not significantly increase. The amount and quality of yield were not decreased significantly, but a small financial loss occurred. The zero-pesticide system enabled a significant decrease in the concentration of pesticide residues in wine (ranging from 20% to 99%).

Concerning herbaceous crops, two studies investigated the use of conservation agricultural practices on tomatoes in the Mediterranean area [6,7]. The first, from Abou Chehade et al., evaluated the impact of different cover crops and tillage systems on organic tomato processing. Rye and a mixture were the most productive and the best weed suppressor. Squarrose clover stimulated tomato growth regardless of tillage system. The results suggested that legume cover crops could be the key to developing feasible organic vegetable no-tilling systems [6]. Gagliardi et al. confirmed that organically processed tomato plants can successfully grow within a conservation farming system [7]. Benetti et al. studied the role of cover crop mulch in mitigating soil compaction [8]. Rye was chosen as a winter cover crop, and four different mulch treatments were compared within different traffic intensities. The results highlight that the cover crop maintains a lower soil penetration resistance during compaction events, helping subsequent field operations. Furthermore, roller crimpers and cover crop termination by flail mowers impact soil's capacity differently due to different soil moisture contents.

Clemente et al. and Rossi et al. carried out two interesting trials on industrial crops [9,10]. The spectral response of camelina under different regimes of N was studied in order to optimize fertilization. Positive and significant correlations were observed among several vegetation indices (obtained through UAV flights and seed yield) as well as between green canopy cover fractions and leaf N concentrations. Overall, these findings demonstrate the feasibility of utilizing remote sensing techniques from UAVs for predicting seed yield in camelina [9]. Linseed organic cultivation was also studied using different agronomic parameters. Generally, linseed showed good agronomic traits that make it suitable for introduction into organic systems. Autumn sowing coupled with milder and wetter conditions seemed to be more favorable for linseed cultivation, while the superior genotypes were Kaolin > Szafir > Galaad [10].

Two remaining articles describe the use of breeding techniques to enhance the agronomic performances of vegetable crops [11,12]. Karbarz et al. tested microalgae *Planktochlorella nurekis* clones obtained by co-treatment with colchicine and cytochalasin on four plant species (lettuce, wheat, broccoli, and radish) to check their potential use as biostimulators in agriculture. Eleven clone extracts showed both a stimulating and inhibitory effect on tested plants (depending on the concentration, plant species, and algal clone); thus, they could potentially be used as biostimulators or natural herbicides [11]. Li et al. assembled a mitochondrial genome map of *O. javanica* (watercress, a very popular vegetable in Asia) using the Illumina and Nanopore sequencing platforms. The results showed that watercress is closely related to species of *Bupleurum*, *Apium*, *Angelica*, and *Daucus*, providing a valuable resource for the study of the molecular breeding [12].

This collection of articles shows that many strategies can effectively enhance sustainability and biodiversity in herbaceous and horticultural crops within different farming scenarios. These goals can be achieved using innovative technologies developed to carry out specific tasks such as weed control, pest control, cover crop management, crop monitoring, biostimulation, and breeding.

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

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