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Editorial

Precision Management of Fruit Trees

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The aim of the Special Issue "Precision Management of Fruit Trees" was to collect new insights to support the adoption of advanced, efficient, and sustainable management techniques in the fruit production sector. Indeed, this is an opportunity offered by the technological innovations adopted using new-generation sensors and implemented through precise management operations. This Special Issue contains 11 scientific articles contributing to our knowledge on the precision management of fruit trees, indicating the high activity of this sector and possibly leading to the application of new techniques/protocols to overcome global and rapidly changing environmental issues.

Scalisi et al. [1], in their study, aimed to (i) determine the reliability of a portable Bluetooth colour meter for fruit colour measurements; (ii) characterise the changes in quantitative skin colour attributes in a nectarine cultivar in response to time from harvest; and (iii) determine the influence of row orientation and training system on nectarine skin colour. Overall, the device proved reliable for fruit colour detection. The results of this study highlight the potential of one of the measured parameters as a quantitative index to monitor ripening prior to harvest in nectarines.

Remote sensing techniques based on images acquired from unmanned aerial vehicles (UAVs) could represent an effective tool to speed up the data acquisition process in phenotyping trials and, consequently, to reduce the time and cost of the field work. Caruso et al. [2] confirmed the ability of a UAV equipped with RGB-NIR cameras to highlight differences in geometrical and spectral canopy characteristics between eight olive cultivars planted at different planting distances in a hedgerow olive orchard.

Tree densities have increased greatly in olive orchards over the last few decades. Ladux et al. [3], in their study, found that the leaf area index (LAI) of neighbouring trees modifies the light quality environment prior to a tree being directly shaded, as well as the morphological responses of olive cultivars to changes in light quality. The results suggested that cultivar differences in response to light quality may be relevant for understanding adaptation to dense orchards and identifying cultivars best suited to them.

Saha et al. [4] found that monitoring plant vegetative growth can provide the basis for precise crop management. In this study, a 2D light detection and ranging (LiDAR) laser scanner, mounted on a linear conveyor, was used to acquire multi-temporal, three-dimensional (3D) data from strawberry plants. The results contributed to building up an approach for estimating plant geometrical features, particularly strawberry canopy volume profile based on LiDAR point cloud for tracking plant growth.

Carella et al. [5] studied the physiological and productive behaviour of different olive cultivars grown under a high-density hedgerow system and compared their fruiting and branch architecture features to determine the possibility to use 'Calatina' olive trees for intensive plantings, as a local alternative to the international reference 'Arbequina'. The study indicated that 'Calatina' is more efficient in terms of yield and harvesting than 'Arbequina'. This qualifies 'Calatina' as a superior, yield-efficient olive cultivar suitable for intensive hedgerow plantings to be harvested with straddle or side-by-side trunk shaker machines.

Sirgedaitė-Šėžienė et al. [6] used 'Rubin' apple trees grafted on dwarfing P60 rootstocks to determine the impact of canopy training treatments as a stress factor on metabolic response to obtain key information on how to improve physiological behaviour and the management of growth and development of apple trees. The results indicated that all applied canopy training treatments significantly increased the total phenol and total starch contents in apple tree leaves.

Scalisi et al. [7] in their work aimed to derive a new fruit skin colour attribute—namely, a Colour Development Index (CDI), ranging from 0 to 1, that intuitively increases as fruit becomes redder—to assess colour development in peach and nectarine fruit skin. The study found that the CDI can serve as a standardised and objective skin colour index for peaches and nectarines.

Čirjak et al. [8] summarize the automatic methods (image analysis systems, smart traps, sensors, decision support systems, etc.) used to monitor the major pest in apple production (*Cydia pomonella* L.) and other important apple pests and fruit flies to improve sustainable pest management under frequently changing climatic conditions.

Pisciotta et al. [9] released a review underlying the opportunities offered by the recently developed table-grape soil-less cultivation systems; this is an up-to-date examination of the latest experimental and applied findings of the sector's research activities. A special emphasis is given to the evolution of the applied technical solutions, varietal choice, and environmental conditions for the aims of table-grape soil-less cultivation.

Borgogno-Mondino et al. [10] evaluated a promising alternative offered by Copernicus Sentinel 2 data (S2) to midday stem water potential for monitoring the water status of pomegranate plants and for addressing irrigation management. Despite limited ground observations, the results showed the promising capability of spectral indices (NDVI, NDRE, and NDWI) and S2 bands in estimating Ψ_{stem} readings.

Boini et al. [11], in their study, used shading nets to lower irrigation requirements and make apple growing more sustainable. The encouraging results showed a comparable yield and fruit quality saving 50% of irrigation water under a classic anti-hail system compared to the control treatment.

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