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*Editorial*

# Wild Plant Species as Potential Horticultural Crops: An Opportunity for Farmers and Consumers, 2nd Edition

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Increasing pressure on global food systems, driven by climate change, biodiversity loss, and rising demand for nutritious foods, has intensified interest in alternative, climate-resilient, and underutilized crop resources. In this context, wild plant species are the subject of renewed scientific and agronomic attention for their potential to diversify horticultural production, enhance sustainability, and provide novel economic opportunities for farmers while satisfying evolving consumer preferences. Traditionally gathered from natural ecosystems, many wild edible and medicinal plants possess valuable nutritional and phytochemical properties, as well as adaptive traits that make them promising candidates for sustainable horticulture. Their domestication and integration into modern horticultural systems create new opportunities for farmers to diversify production and income sources while enabling consumers to access novel, health-promoting products aligned with local food traditions and environmentally responsible diets. Moreover, their cultivation may reduce harvesting pressure on wild populations and support biodiversity conservation efforts. In line with this perspective, recent research has progressively moved beyond descriptive ethnobotanical studies toward tackling the practical challenges of domestication and commercialization, with increasing consideration of cultivation feasibility, agronomic management, product quality, and the functional traits of wild species.

Building on the framework proposed by Chrysargyris et al. [1], the contributions to this second edition demonstrate how wild and underutilized species can move from conceptual opportunities to applied horticultural innovations while preserving their functional and cultural value.

Several contributions in this Special Issue highlight the potential of wild leafy vegetables as alternative crops for diversified and climate-smart horticulture, with promising applications in fresh markets and functional food development. Botella et al. [2] demonstrated the cultivation potential and nutritional profile of *Sanguisorba verrucosa* (Link ex G.Don) Ces., *Eruca vesicaria* (L.) Cav., and *Scorzonera laciniata* L. Sensory acceptance was good for all three species, and all exhibited high concentrations of bioactive compounds, including phenolics, organic acids, vitamin C, and β-carotene, often exceeding levels found in many commonly consumed vegetables. Although domestication resulted in a partial reduction in certain phytochemicals, the overall nutritional quality remained significant, supporting their introduction into horticultural production systems. Complementarily, Paschoalinotto et al. [3] investigated the effects of different water regimes (rain-fed, deficit, and full supply) and legume-based crop rotation on the growth performance and biochemical profile of *Cichorium spinosum* L., a species strongly linked to Mediterranean culinary



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heritage. The results demonstrated that deficit irrigation combined with crop rotation enhances fatty-acid quality, phenolic content, and antioxidant activity while maintaining yield performance. These findings highlight the potential of integrating sustainable agronomic practices to valorize wild edible species within a climate-resilient and resource-efficient horticultural system. The integration of wild taxa into intensive horticultural systems was further explored by Ntanasi et al. [4], who evaluated the performance of *Portulaca oleracea* L., *Mesembryanthemum crystallinum* L., and *Valerianella locusta* L. under hydroponic cultivation. By balancing the $NH_4$-N/total-N ratio and applying protein hydrolysates and seaweed extracts, the authors demonstrated species-specific responses in yield, nitrogen assimilation, micronutrient uptake, and nitrate accumulation. Notably, tailored nitrogen management and biostimulant application improved product quality and reduced leaf nitrate levels without compromising yield. These findings are particularly relevant for commercial soilless systems, for which food safety and production efficiency are essential requirements.

Several contributions in this Special Issue also focus on aromatic and medicinal plants, emphasizing their importance for both horticultural production and high-value markets. Ložiene [5], by analyzing 124 *Thymus pulegioides* L. plants belonging to distinct chemotypes and sexual morphs sampled from 23 natural populations, identified peltate glandular trichome density and diameter in the upper leaf epidermis as reliable anatomical markers for predicting essential oil content. The author concluded that these traits may serve as cost-effective screening tools to support the selection and domestication of essential oil-rich genotypes, although further investigations are required before extending this strategy to other species. The study by Tzortzakis et al. [6] investigated the effects of organic and conventional fertilizers, combined with foliar applications of iron (Fe) and zinc (Zn), on the development and quality of two Mediterranean aromatic species of emerging interest. The findings clearly demonstrate species-specific nutritional responses. *Sideritis cypria* Post maintained comparable yields under both fertilization systems, highlighting its suitability for low-input cultivation systems, whereas *Origanum dubium* L. showed a significantly higher biomass under conventional fertilization. Foliar Fe and Zn applications differentially affected phenolic content, antioxidant activity, mineral uptake, and stress-related parameters, with responses strongly dependent on the fertilization regime. Zinc in particular enhanced water use efficiency under certain conditions, while conventional fertilization improved nutrient use efficiency. Overall, their study demonstrates that the integration of fertilization regimes with targeted micronutrient applications can substantially influence both productivity and phytochemical quality in aromatic crops. These findings underscore the importance of species-specific nutrient management, especially within sustainable and organic cultivation systems.

In addition, woody and perennial wild species are emerging as promising candidates for crop diversification, contributing to improved food security and enhanced resilience of food systems under environmental change. Bai et al. [7] evaluated the physical and chemical characteristics of *Terminalia catappa* L., a traditional Pacific Forest nut, across the Solomon Islands, Vanuatu, and Fiji to assess their potential for commercialization. Significant geographic variation in kernel size and kernel-to-fruit ratios, key attributes for economic viability, has been observed. Across all regions, kernels contained higher proportions of unsaturated than saturated fatty acids, particularly oleic and linoleic acids, indicating potential health benefits. However, an accelerated aging test showed rapid oil oxidation, suggesting potential shelf-life limitations under high-temperature storage. Overall, the results highlight the Solomon Islands populations as promising candidates for selection and breeding and indicate *T. catappa* as a nutritionally valuable indigenous tree species with potential to enhance food and nutrition security and rural livelihoods. Similarly, Shahbazian et al. observed morphological and biochemical intraspecific diversity among eight wild black myrtle (*Myrtus communis* L.) populations in southwestern Iran [8].

Fruit size and seed traits varied significantly among populations. All populations showed high phenolic content, elevated antioxidant capacity, and strong radical scavenging activity, with these patterns strongly influenced by altitude and soil characteristics. Together, these studies demonstrate that natural genetic diversity in forest and wild fruit species represents a strategic resource for horticulture.

Beyond primary production, this collection also addresses value-chain development and product differentiation. Ma et al. [9] compared the volatile and non-volatile profiles of Kujingcha, a traditional Chinese substitute tea obtained from the fresh leaves of *Ilex dabieshanensis* K. Yao and M. B. Deng, with those of green tea (*Camellia sinensis* L.). Although processed using green tea techniques, Kujingcha differs substantially in both flavor profile and bioactive composition. Using an integrated metabolomic approach combining HPLC, UPLC-QQQ-MS, and HS-SPME-GC-MS, the study identified high flavonoid and water-soluble sugar contents, together with low levels of amino-acids, as key determinants of its intense bitter taste and sweet aftertaste, while heterocyclic compounds contribute to its characteristic bean-like aroma. This research not only strengthens knowledge of the distinctive biochemical profile and health-related potential of Kujingcha but also supports its further valorization as a cultivated alternative tea product with a distinct geographical and cultural identity.

In addition to these applied studies, two comprehensive reviews further expand the perspective on Mediterranean wild edible Asteraceae. Mandriota and Renna [10] critically synthesized current knowledge on *Urospermum dalechampii* (L.) Scop. ex F.W. Schmidt, highlighting its nutritional composition, phytochemical profile, biological activities, and agronomic potential and identifying research gaps due to the lack of standardized cultivation and post-harvest protocols and limited understanding of consumer acceptance. Similarly, Ruiz-Rocamora et al. [11] provided an extensive overview of *Sonchus* species. By integrating taxonomy, geographical distribution, traditional knowledge, and bioactive composition, their review underscores the agronomic feasibility and nutraceutical relevance of these taxa while emphasizing the need for coordinated conservation and development strategies.

Collectively, the contributions included in this Special Issue demonstrate that the transition from wild harvesting to structured cultivation is technically feasible when supported by genotype selection, adaptive agronomic practices, and quality-oriented management. However, important knowledge gaps persist, including limited long-term assessments of domestication effects, insufficient understanding of genotype × environment interactions, and a lack of standardized cultivation protocols. Furthermore, post-harvest performance, shelf life, food safety, and consumer acceptance also remain underexplored for many of these emerging crops. Addressing these gaps will be essential to ensuring that wild plant species can be reliably integrated into commercial horticulture. Future research should adopt integrated and multidisciplinary approaches that combine agronomy, breeding, food science, and sustainability assessment. Particular emphasis should be placed on low-input and organic cultivation systems, conservation of genetic diversity, and the development of resilient value chains that align ecological sustainability with cultural heritage. In this way, wild and underutilized plant resources can move beyond their marginal status to serve as key components of a diversified, resilient, and quality-oriented production system.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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