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Editorial

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Horticulture in transition: applied science, data and resilience for 2026

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Christian Michel Cuello
Facultad de Estudios Profesionales Zona Media, Universidad Autónoma de San Luis Potosí, Mexico

Correspondence: Dr. Christian Michel Cuello, Coordinación Ingeniería Agroindustrial, Facultad de Estudios Profesionales Zona Media, Universidad Autónoma de San Luis Potosí, Mexico. Tel 872 9120 ext. 4520

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Editorial

The final 2025 issue of our journal brings together four lines of progress that illustrate the vitality and diversity of contemporary horticulture. First, cold plasma treatments in raspberries are emerging as a post-harvest technology capable of reducing microbial load without raising the temperature, preserving texture, color, and safety. Second, research on bacterial diversity in citrus under climate change positions the microbiome as a strategic factor for resilience: understanding how variations in temperature and precipitation reconfigure beneficial and pathogenic communities allows for the design of management practices that protect yield and quality in critical regions. Third, transcriptomic analysis of *Botrytis cinerea* provides a detailed map of the pathogen's virulence and adaptation pathways, opening opportunities for more precise control in fruit and vegetables highly susceptible to gray mold. Finally, the digital transformation of the wine market—traceability, demand analysis, e-commerce, direct-to-consumer experiences—foreshadows a paradigm that transcends viticulture: verifiable data and more transparent markets for all horticultural products.

Against this backdrop, 2026 is shaping up to be a turning point that demands turning scientific findings and digital tools into tangible adaptability.

Adapting to new climate scenarios. Heat waves, droughts, and floods not only increase yield variability but also alter phenological windows, quality profiles, and pest and pathogen pressure. In horticulture, the response must be comprehensive: tolerant varieties and rootstocks; physical protection (shade, hail nets, stress-reducing irrigation); high-resolution forecasts; and risk models to guide planting, thinning, harvesting, and post-harvest handling. Anticipation—not reaction—must become the standard operating procedure.

Water efficiency as the backbone. Water scarcity, amplified by intersectoral competition and watershed degradation, demands a shift from "calendar-based irrigation" to demand-driven irrigation: soil and plant sensors, fertigation adjusted to extraction curves, drainage recovery, network sectorization and automation, and the use of indicators (application efficiency, water productivity, energy costs per m^3) as management metrics. Horticulture that systematically measures, compares, and improves its water - product ratio will be the one that maintains quality and margins in a price-pressured environment.

Soil: From Resource to Strategic Asset. Soil degradation—erosion, carbon loss, salinization—already compromises yield, system stability, and ecosystem services. Regenerative practices (living and inert cover crops, reduced tillage, composting, biochar, salinity and sodicity management) must be integrated with indicator monitoring (organic carbon, aggregation, infiltration, functional microbiome) and with incentive schemes linked to verifiable results. In intensive horticultural systems, where crop rotation is limited, soil health is the primary guarantee of medium-term productivity.

Food security and hunger reduction. Horticulture provides nutritional density, short cycles, and local employment; therefore, it should be included in the portfolio of responses to food insecurity: peri-urban production and modular greenhouses, short supply chains, local seed and bio-input programs, and nutritious public procurement schemes. Efficiency and sustainability are not a luxury: they are the path to increasing availability and access with a smaller footprint.

Technology gaps and adoption. The innovation ecosystem (AI, sensors, drones, biotechnology, blockchain) is growing faster than the adoption capacity of small and medium-sized producers. 2026 demands appropriate technology: modular, interoperable, and bankable solutions; "platform - based" services (climate, soil, traceability) that avoid prohibitive upfront investments; and technical extension focused on decision-making (what, when, and how much to apply, irrigate, harvest). Technical excellence must translate into operational simplicity.

Geopolitics and trade strategies. Trade fragmentation and subsidy policies are reshaping flows and prices. For perishable goods, the strategy must combine diversification of destinations, supply contracts with risk clauses, robust certifications, and direct-to-consumer digital channels that mitigate volatility. Traceability—from batch to shelf—will be a competitive differentiator, not just a requirement.

A call to implementation. The achievements we celebrate today—cold plasma, functional microbiomes, applied transcriptomics, digital markets—will only have their full meaning if integrated into resilient, measurable, and scalable horticultural systems. 2026 must be the year of climate plans by crop and region; of smart water infrastructure; of soil managed with metrics; of technology that empowers and does not exclude; and of business intelligence that navigates uncertainty. Horticulture has the knowledge and the tools: the challenge is to transform them into installed capacity that sustains quality, competitiveness, and a real contribution to food security. Science has already shown the way; now it is time to walk it with cooperation, investment, and disciplined execution.

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