



Floriculture and Landscaping: Exploring Outlooks and Confronting Challenges

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Introduction:

Floriculture science encompasses the study and cultivation of flowering plants, focusing on their growth, development, propagation, and management for ornamental and commercial purposes. It delves into the science behind optimal conditions for various flower species, including factors such as soil composition, light exposure, water requirements and nutrient levels. The field also explores innovative techniques to enhance flower quality, increase yield and prolong vase life, all crucial aspects for the floriculture industry. Its product range spans cut flowers, foliage, potted plants, bedding/garden plants and propagation materials. From an economic standpoint, floriculture products fall under the category of non-essential goods and their market viability is closely tied to the consumer's financial well-being. The quality of these products is of paramount importance, primarily defined by the visual appeal achieved through optimal growing conditions and meticulous postharvest care. The floriculture market operates on a global scale and is marked by intense competition,

underscoring the significance of logistics and postharvest technologies that enable access to distant, high-yield markets.

Cultivating Methods and Practices:

Cultivation systems play a crucial role in ensuring the quality of floriculture during the growth stage. Ornamental crops are predominantly cultivated in protected environments utilizing a range of advanced technologies. These environments, usually heated greenhouses, employ innovative soilless cultivation systems, which may or may not involve recycling the nutrient solution (closed or open loop systems). Hydroponic systems offer a viable solution to mitigate soil-borne diseases and the need for soil disinfection. Monitoring and precise control of the greenhouse environment are essential to modulate crop growth and optimize production. Key factors influencing growth and flowering include temperature, light intensity and relative humidity. During winter, temperature adjustments are made to cater to the specific needs of the crop through heating systems. Choosing the right heating system is critical, considering factors such as fuel costs

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and the heating station's power. The current international crisis and the soaring prices of methane or diesel pose a significant challenge, potentially pricing floriculture products out of the market. Research efforts should focus on developing integrated production systems to reduce heating costs. Lighting holds equal importance and modern lighting solutions like LEDs are widely adopted across ornamental production systems. Lighting serves the dual purpose of enhancing photosynthesis and regulating photoperiodic responses in various flowering species. Maximizing light use efficiency is a crucial parameter for effectively scheduling production and optimizing market prices for the products. It's essential to integrate biofuel production or alternative heat-generating systems with greenhouses. Properly chosen materials for greenhouse frames and covers can significantly contribute to cost reduction in production. Developing mathematical models that take into account both agronomic and economic variables, such as fuel price, market flower price, logistics and more, is crucial. These models can aid in identifying the optimal conditions that guarantee sufficient income for floriculture growers.

Agronomic practices and management techniques:

Agronomic managements play a crucial role in optimizing crop performance

and mitigating the detrimental impacts of various stressors. One fundamental aspect involves the careful selection of superior genotypes within each species, effectively minimizing the adverse effects caused by both biotic and abiotic stresses. Genetic enhancements aimed at bolstering tolerance against these stresses have the potential to enable cultivation in sub-optimal conditions or areas vulnerable to fungal infestations and insect attacks. In sectors such as ornamental horticulture, visual appeal stands as a paramount parameter defining quality. Consequently, any signs of damage or alterations in color due to biotic or abiotic stresses are deemed unacceptable. Addressing this concern becomes increasingly challenging due to a reduction in the number of registered agrochemicals available for ornamental plant protection, posing a significant agronomic challenge in many countries. Current research endeavors emphasize the integration of tolerance traits into genetic improvement programs. However, it's imperative to recognize the pivotal role of proper agronomic management in alleviating the impacts of stresses. Employing functional fertilizers, biostimulants, or biological control agents presents a viable pathway to enhance crop performance. These innovative agronomic tools have the potential to optimize nutrient utilization efficiency and bolster tolerance

against both biotic and abiotic stressors, ultimately contributing to heightened environmental and economic sustainability.

Strategies for Logistics and Postharvest Management:

Logistic and postharvest strategies play a crucial role in the floriculture industry. Production costs vary significantly across different geographical regions, taking into account various factors such as environmental conditions and socio-economic circumstances. Many companies choose to concentrate their production in countries with optimal environmental conditions and a low cost of labor. Subsequently, transporting floriculture products to distant markets becomes a key consideration. Effective timing of harvesting and appropriate postharvest handling are essential to ensure the highest quality preservation of ornamental products. Proper storage of cut flowers or foliage is vital, necessitating low temperatures to minimize respiration and ethylene production, especially in delicate flowers. To maintain superior product quality throughout extended storage or transportation, specific postharvest treatments are employed, including providing an energy source (sugar), inhibiting ethylene, preventing leaf yellowing and reducing transpiration. Alongside temperature control, optimizing packaging is crucial to extend storage duration effectively.

Contemporary Research Demands:

Current research in the field of floriculture focuses on several essential areas that require attention and exploration:

Enhancing Ornamental Crop Resilience:

- ✓ Advancing the tolerance of ornamental crops against both biotic and abiotic stresses.

Harnessing Biodiversity for Novel Species:

- ✓ Exploring and leveraging biodiversity to identify and utilize new wild species beneficial to floriculture.

Optimizing Growth Conditions:

- ✓ Maximizing mineral nutrition and promoting soilless cultivation within protected environments.

Leveraging Natural Derivatives:

- ✓ Investigating the potential of natural derivative products, such as biostimulants and biocontrol agents, to bolster crop resilience against various stresses.

Enhancing Postharvest Treatments:

- ✓ Enhancing and refining postharvest treatments to mitigate postharvest disorders effectively.

Innovating Packaging for Storage and Transportation:

- ✓ Pioneering the development of innovative packaging solutions by evaluating new materials for prolonged storage and efficient transportation.

Extending Vase Life and Postproduction Display:

- ✓ Improving the vase life of cut flowers, foliage and ornamental displays postproduction, ensuring a longer-lasting aesthetic appeal for consumers.

Floriculture, being a highly competitive sector with a global market presence, necessitates an optimized production chain. To achieve economic success, a holistic approach is crucial, encompassing the genetic potential of planting material, innovative cultivation strategies and effective postharvest storage and marketing logistics. The future of floriculture is intricately tied to research and innovation, empowering growers to attain high production quality and compete at a superior level within the market.

Urban Arboreal Design and Landscaping:

Urban forestry is a specialized field within forest sciences that focuses on the management of trees in urban areas, encompassing both naturally occurring and planted trees. The term "urban forest" typically refers to the vegetation present in and around populated areas, ranging from small settlements to metropolitan regions. In essence, urban forestry involves the planting and management of wooded areas within urban and peri-urban environments. Some definitions expand urban forestry to encompass the art, science and technology of

managing plants and forest resources in and around urban communities. This management is pursued to derive physiological, social, economic and aesthetic benefits that trees offer to society. Additionally, ornamental plants in urban and peri-urban areas contribute valuable ecosystem services, including climate mitigation, pollution reduction (such as heavy metal removal) and air purification. Landscape architecture is fundamentally concerned with the design of outdoor spaces, landmarks and structures to achieve specific environmental, social, behavioral, or aesthetic objectives. This discipline involves systematic design and engineering of various structures for construction and human use, considering existing social, ecological and soil conditions and processes in the landscape. Landscape architects design interventions that align with desired outcomes and cover everything from planning and designing public spaces to smaller-scale private projects. Moreover, landscape architecture entails designing spaces for a diverse range of plant and animal species, while also considering anthropology and human diversity in space design. The ultimate goal is to create safe, diverse and culturally rich places through landscape heterogeneity, addressing the limitations of singular approaches to designing in culturally diverse communities. Furthermore, landscape architecture aims to maintain a balanced

landscape heterogeneity within cities, with designs influenced by all sectors of the community affected by it.

The strategic issues surrounding landscape architecture research hold a longstanding and central position within the discipline. Debates concerning the legitimacy of various research paradigms have been fervent over recent decades. Each paradigm carries its unique set of assumptions and researchers passionately advocate for their respective positions. Interdisciplinary inquiry is on the rise, yet the delineations between fields of knowledge and the validation of diverse knowledge creation methods are becoming increasingly contentious, especially within the realm of landscape architecture.

Given the interdisciplinary nature of the discipline, encompassing knowledge ranging from plants, landscapes, history and civil/environmental engineering (including paving, construction materials and stormwater management) to socio-psychological and economic aspects, gaps in knowledge and research activity have emerged. This fragmentation prompts critical questions: How does the inquiry into 'how we acquire knowledge' shape the discipline? What inquiries, evidence and ideas get excluded? And what are the implications for practical application?

Considerable parallels exist between research categories utilized in applied design disciplines, such as landscape architecture and those employed in more traditional research fields. Establishing a versatile and inclusive classification for landscape architectural research necessitates not a complete reinvention of research strategies, but rather an enhancement and expansion of existing practices and procedures. The goal of this journal section is to position, broaden and amplify current practices, amalgamating diverse traditions and attitudes from numerous fields of study into a comprehensive framework of research strategies for landscape architecture. The ultimate aim is to fortify knowledge while affording greater tolerance and freedom in the choices individuals, companies and landscape architecture institutions can make.

This initiative will ultimately pave the way for the development of decision support tools vital for fostering circular urban metabolism, promoting resource-sensitive urban and landscape design and effectively addressing the anticipated periods of severe drought resulting from climate change, which will affect various regions across the globe.

Contemporary Research Demands:

- ✓ Expanding research into the various roles of biodiversity within urban landscapes, including its capacity to

- provide habitat for a diverse array of organisms, enhance resilience against pests and diseases and contribute to local biodiversity preservation.
- ✓ Quantifying the advantages of trees and wooded areas within urban environments.
 - ✓ Exploring innovative methods for pest management in urban settings.
 - ✓ Advocating for the pivotal role of urban forests in enhancing both human and community health.
 - ✓ Investigating the potential of different species in bioremediation to effectively mitigate toxins and pollutants.
 - ✓ Broadening our understanding of the relationship between nature, community well-being and various aspects of the economy, such as crime prevention, transportation safety, business growth, and workforce attraction.
 - ✓ Advancing knowledge on tree selection, placement, growth factors (including soil conditions) and other relevant factors to bolster the resilience of urban ecosystems, particularly in response to the challenges posed by climate change.
 - ✓ Developing models and decision-support tools, leveraging AI and other technologies, to facilitate optimal integration and configuration of urban forests, green infrastructure and gray infrastructure.
 - ✓ Assessing the threats faced by urban forests and their impacts on both local and national scales, encompassing invasive plant species, insect pest invasions, land use development, urban wildfires and climate-related scenarios.