

**Advanced Technologies
Transforming Horticultural Science**

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Preface

Horticultural science is undergoing a remarkable transformation driven by rapid advances in technology, innovation, and interdisciplinary research. In an era marked by climate variability, resource constraints, and the growing demand for high-quality fruits, vegetables, flowers, and ornamental plants, traditional horticultural practices alone are no longer sufficient. The integration of advanced technologies has emerged as a powerful catalyst for improving productivity, sustainability, precision, and resilience in horticultural systems worldwide.

Advanced Technologies Transforming Horticultural Science is conceived as a comprehensive and forward-looking volume that explores the role of modern tools and techniques in reshaping horticultural research and practice. The book brings together contemporary knowledge on precision horticulture, sensor-based monitoring, Internet of Things (IoT) applications, artificial intelligence and machine learning, biotechnology, nanotechnology, protected cultivation, and digital decision-support systems. These technologies are enabling site-specific management, efficient resource utilization, real-time crop monitoring, and enhanced quality and post-harvest management.

This book is designed to serve students, researchers, academicians, extension professionals, and progressive growers by bridging the gap between fundamental horticultural principles and cutting-edge technological applications. Each chapter has been structured to provide clear concepts, practical insights, recent developments, and future perspectives, making the content both accessible and scientifically robust.

We hope this volume will inspire readers to adopt innovative approaches, foster interdisciplinary collaboration, and contribute to the sustainable intensification of horticulture. By embracing advanced technologies, horticultural science can play a pivotal role in ensuring food and nutritional security, environmental stewardship, and economic viability in the years to come.

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Dr. Medha Saha
Dr. Pawan Kumar Anand

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