

Contents

1	Plant-Environment Interactions: The Dynamics of the Skill and Beyond	1
	Misbah Naz and Muhammad Rahil Afzal	
2	Plant-Environment Interactions: Proteomics, Metabolomics and Genetic Engineering Perspective	15
	Shakinaz Desa, Syazwan Saidin, J. Azi Azeyanty, Khalid H. Alobaidi, Bilal Salim Al-Taie, Mohammed Yahya Allawi, E. I. Ahmad-Kamil, A. B. Adibah, and Jameel R. Al-Obaidi	
3	How Environment-Plant Interactions Regulate Vascular Architecture and Ecological Adaptation	53
	Roni Aloni	
4	Modern Approaches in Studying the Role of Plant-Microbial Interactions: A Way Towards the Development of Sustainable Agriculture	69
	Ankita Kumari, Archana Kumari, Himanshu Sharma, Priyanka Sharma, Sayan Bhattacharya, Tulika Mishra, Abdel Rahman Al-Tawaha, Milan Kumar Lal, Rahul Kumar Tiwari, Sayanti Mandal, and Abhijit Dey	
5	Emerging Roles of Nanomaterials in Plant-Salinity Interaction	93
	Soheila Abdoli and Kazem Ghassemi-Golezani	
6	Exploring the Critical Function and Molecular Mechanism of WRKY Transcription Factor Family in Regulating Plant Response Under Abiotic Stress Conditions	121
	Samrat Banerjee, Arnab Mukherjee, Mousumi Khatun, Pinaki Roy, Shreyashi Nandi, and Sujit Roy	

7	CRISPR/Cas Mediated Genome Editing for Improving Stress Resilience in Plants	143
	Deepu Pandita	
8	Impact of Abiotic Stresses on Production of Secondary Metabolites in Medicinal and Aromatic Plants	169
	Josef Jampílek and Katarína Kráľová	
9	Seed Bio-priming: An Emerging Tool Towards Improved Germination and Agricultural Sustainability	253
	Mina Bayanati, Behnam Asgari Lajayer, Abdel Rahman Al-Tawaha, and Tess Astatkie	
10	Effects of Drought Stress on Agricultural Plants, and Molecular Strategies for Drought Tolerant Crop Development	267
	Shashi Ranjan, Aman Prakash, Raj Bahadur Singh, Pragalbh Tiwari, Sayan Bhattacharya, Potshangbam Nongdam, Abdel Rahman Al-Tawaha, Milan Kumar Lal, Rahul Kumar Tiwari, Sayanti Mandal, and Abhijit Dey	
11	The Rhizosphere—A Hub of Emerging Importance for Plant Biotic Interactions	289
	Martin Raspor, Tanja Berić, Tatjana Ćosić, and Slaviša Stanković	
12	Genomic and Proteomic Approaches to Enhance Stress Tolerance in Plants for Creating Stress-Resilient Species	329
	Santanu Samanta and Aryadeep Roychoudhury	
13	Biochar-Assisted Phytoremediation for Heavy Metals-Contaminated Soils	359
	Shazma Muzammal, Asma Akram, Muhammad Bilal Shakoor, Sajid Rashid Ahmad, Mujahid Farid, and Muhamamd Hassan Shakoor	
14	Impact of Changing Abiotic Environment on Photosynthetic Adaptation in Plants	385
	Noman Ahmad, Anees Irfan, Hamaad Raza Ahmad, Hafiza Salma, Manahil Tahir, Solaima Akhter Tamimi, Zainab Sajid, Ghousia Liaquat, Muhammad Nadeem, Muhammad Ali, Ghulam Hassan Abbasi, and Muhammad Ashar Ayub	
15	Use of Tissue Culture Methods to Improve Stress Tolerance in Plants	425
	Mouaad Amine Mazri, Meriyem Koufan, Ikram Rham, Hassna Radi, and Ilham Belkoura	

16	Research Challenges in Sustainable Cultivation of Important Medicinal Plants in Oman; Insight into the Plant Environment Interactions Based on Different Climatic Zones	461
	Shamshad Ahmad Khan, Aahd Mohammed, and Priyanka Verma	
17	Impacts of Particulate Matter Pollution on Plants	483
	Devendra Singh and Sunil Kumar Verma	
18	Physiological Approaches to Improve the Productivity of Crops Under the Climate Change Conditions	501
	Mohammad Javad Ahmadi-Lahijani	
19	Redesigning Root Architecture for Improved Performance of Plants Under Stress	515
	Goutam Kumar Dash, Shampa Purkaystha, Soumya Kumar Sahoo, Awadhesh Kumar, Jagdish Jena, Lopamudra Nayak, Priyanka Lal, Ravinder Kumar, Rahul Kumar Tiwari, and Milan Kumar Lal	
20	Plant–Microbe Interaction in Developing Climate-Resilient Crop Species	535
	Kashif Hayat, Saiqa Menhas, Sajid Ullah, Sikandar Hayat, Amir Abdullah Khan, Tariq Aftab, and Weiping Liu	
21	Traditional and Emerging Climate-Resilient Agricultural Practices for Enhancing Food Production and Nutritional Quality	551
	Ravinder Kumar, Milan Kumar Lal, Rahul Kumar Tiwari, Awadhesh Kumar, Biswaranjan Behera, Lopamudra Nayak, Goutam Kumar Dash, Soumya Kumar Sahoo, Jagdish Jena, Priyanka Lal, and Muhammad Ahsan Altaf	