

Preface

Bacteria are ubiquitous in nature: some of them are harmful but majority of them are beneficial to the plants. They comprise various attributes which directly and indirectly support plant growth and their fitness against adverse conditions of both abiotic and biotic in any given environmental system.

Coordinated interactions between microbes and plants are utmost important for their healthy association. Through this book we intend to provide a total of 18 chapters which signify the added advantages of bacteria, in general, and PGPR, in particular, in nutrient uptake and triggering defense responses of the plant against deleterious phytopathogens. Probiotics for plants exhibits multifarious functional characteristics beneficial in nature which lead to sustainable microbial complex ecosystem. Due to their diverse ecology, they exhibit multifarious functional characters beneficial in nature which lead to sustainable microbial complex ecosystem favorable to the host plants. Due to their probiotic nature and sometimes because of intimate association (example endophytes), they often serve as an alternative to fertilizers, herbicides, and chemical pesticides. A brief understanding of diversity, colonization, mechanism of action formulation, and application of such bacteria inoculants facilitate their contribution in the management of sustainable agroecosystem as exemplified by studying their responses on a plant model, *Arabidopsis*. Such bacteria have also been exploited in the improvement of quality of silk production. The probiotic nature of various group of bacteria found suitable candidates for combating fungal, bacterial nematode, and other diseases which are injurious to majority of plant besides conferring health benefits to above-ground plant parts and roots deep seated in soil. Some of the chapters highlight the impact of bacteria on soil structure and microbial community function that involved rhizosphere signals (molecules) apart from mediated systemic resistance for plants, potential for phosphorus nutrition application for microbial consortium, nitrogen fixation, and biofertilizer for eco-friendly low-input sustainable crop production. The book will benefit the teachers, researches students, and those interested in strengthening the subject of Agricultural Microbiology, Biotechnology, Plant Protection, Agronomy, and Environmental Sciences.

I wish to express my gratitude to all the subject experts who have provided their masterpiece work in giving the shape of the book. The work of several reviewers is

quite commendable in improvement of the scientific merits of this volume. Thanks are also due to my students, Dr. Abhinav, Rajat and Narendra, for their help. Due credit also goes to my wife, Dr. Sadhana Maheshwari, and son, Er. Ashish, for their continuous encouragement. I owe my special thanks to Dr. Jutta Lindenborn, Springer, Heidelberg, Germany, for her keen interest and facilitation of the process in bringing out the volume in its present form.

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