Prospects and Applications for Plant-Associated Microbes, A laboratory manual - Seppo Sorvari - 2014-12-15
Research on the microbial colonization of the aerial and subterranean tissues of plants has shown an extensive scale of interactions between the hosts and a range of microbes, including bacteria and fungi. Intercellular spaces, vascular systems and even single cells can be inhabited by these endophytic microbes. Of the bacterial endophytes, only a small percentage is harmful to the plant; most are neutral, opportunistic or beneficial. These plant-based bacteria can have various important functions throughout the life
subterranean tissues of plants promote plant growth and development, others protect the plant from diseases. This ability to be able to protect plants from diseases has catalyzed numerous laboratories to search for new bacteria that could be utilized instead of the traditional plant-protective agents. Because two or more interacting organisms are involved, research and the eventual application of suitable bio-controlling microbes are challenging and often require specific skills and equipment. The purpose of this book is to provide a comprehensive review for those who are interested in the research and biotechnological applications of plant-associated bacteria. It also provides a compilation of current work conducted on plant-bacteria interactions.

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Recent Advances on Grapevine-Microbe Interactions: From Signal Perception to Resistance Response - Aziz Aziz - 2020-09-17

Biotechnological Potential of Plant-Microbe Interactions in Environmental Decontamination - Ying Ma - 2020-01-21

Plant-Microbe Interactions
- B.B. Biswas - 2013-11-11
Recent years have seen tremendous progress in unraveling the molecular basis of different plant-microbe interactions. Knowledge has accumulated on the mechanisms of the microbial infection of plants, which can lead to either disease or resistance. The mechanisms developed by plants to interact with microbes, whether viruses, bacteria, or fungi, involve events that can lead to symbiotic association or to disease or tumor formation. Cell death caused by pathogen infection has been of great interest for many years because of its association with plant resistance. There appear to be two types of plant cell death associated with pathogen infection, a rapid hypersensitive cell death localized at the site of infection during an incompatible interaction between a resistant plant and an avirulent pathogen, and a
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Diversity and Function from the Ground Up - Serena Maria Moseman - 2008

Plant-dependent functions of coastal wetlands are strongly

availability. Diazotrophs, microbes that fix nitrogen, in surface sediments and rhizospheres (roots and surrounding sediments) of plants may fundamentally affect wetland ecosystems. In testing roles of nitrogen fixing microbes in niche differentiation between two key plants, Spartina foliosa and Salicornia virginica, a mensurative experiment reveals plant-specific diel patterns of nitrogen fixation (acetylene reduction). Functional disparities in nitrogen fixation rates between late- and early-successional salt marshes in Tijuana Estuary (1 pair) and Venice lagoon, Italy (2 pairs) also show roles of diazotrophs in facilitating marsh development. Nitrogen fixation rates are consistently greater in marshes with less plant growth, which is not always a function of marsh age. Fates of fixed nitrogen are tested in isotopic enrichment experiments within an early successional marsh (Tijuana Estuary). Newly fixed nitrogen reaches
on nitrogen-fixing microbes animal consumers within 3-8 days. Thus, nitrogen fixation has broad significance for wetland ecosystem function. The role of diazotroph diversity in enhancing or conferring stability to the nitrogen fixation (acetylene reduction) rates was tested in wetlands experiencing biological invasion, restoration, and sediment and nutrient stresses, via genetic fingerprinting (T-RFLP) of the nifH gene (coding dinitrogenase reductase). The invasive mussel, Musculista senhousia, salt cedar, Tamarix spp., and mangrove, Avicennia marina each produced different effects on nitrogen fixation rates, despite maintenance of diazotroph diversity. In the early successional marsh at Tijuana Estuary, positive relationships among diazotroph diversity, nitrogen fixation rates, and S. foliosa height during one season of plant growth (Fall) demonstrate context-dependent complementarity. Effects of anthropogenic nutrient and sediment loading are tested by field manipulations. Ammonium nitrate additions decrease nitrogen fixation rates but increase diversity of surface diazotrophs within 17 days, while sediment inputs enhanced and prolonged ammonium concentrations. As nitrogen fixation is highly responsive to the range of explored environmental changes, concepts of functional redundancy may not easily extend to microbial realms. Wetland management should more fully consider the role of plant-microbe interactions in mediating ecosystem functional responses to future global changes.

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Plant-Microbe Interactions
- Gary Stacey - 2012-12-06
Scientists are continually making exciting discoveries concerning the interactions between microbes and plants, interactions which may be damaging, in the case of plant pathogens, or beneficial, as in the case of nitrogen fixation. This new volume in the successful and well received Chapman & Hall Plant-Microbe Interaction series is an exciting and broad-ranging view of the outstanding work being done in this area.

Plant-Microbe Interaction: An Approach to Sustainable Agriculture
- Devendra K. Choudhary - 2017-02-08
The book addresses current public concern about the adverse effect of agrochemicals and their effect on the agro-ecosystem. This book also aims to satisfy and contribute to the increasing interest in understanding the co-operative activities among microbial populations and their interaction with plants. It contains chapters on a variety of interrelated aspects.
working on plant-microbe interaction with a single theme of stress management and sustainable agriculture. The book will be very useful for students, academicians, researcher working on plant-microbe interaction and also for policy makers involved in food security and sustainable agriculture.

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interaction and also for policy makers involved in food security and sustainable agriculture.

**Carbon and Nitrogen Cycling in Soil** - Rahul Datta - 2019-08-24

Several textbooks and edited volumes are currently available on general soil fertility but, to date, none have been dedicated to the study of “Sustainable Carbon and Nitrogen Cycling in Soil.” Yet this aspect is extremely important, considering the fact that the soil, as the ‘epidermis of the Earth’ (geodermis), is a major component of the terrestrial biosphere. This book addresses virtually every aspect of C and N cycling, including: general concepts on the diversity of microorganisms and management practices for soil, the function of soil’s structure-function-ecosystem, the evolving role of C and N, cutting-edge methods used in soil microbial ecological studies, rhizosphere microflora, the role of organic
broad range of topics, which productivity, C and N transformation in soil, biological nitrogen fixation (BNF) and its genetics, plant-growth-promoting rhizobacteria (PGPRs), PGPRs and their role in sustainable agriculture, organic agriculture, etc. The book’s main objectives are: (1) to explain in detail the role of C and N cycling in sustaining agricultural productivity and its importance to sustainable soil management; (2) to show readers how to restore soil health with C and N; and (3) to help them understand the matching of C and N cycling rules from a climatic perspective. Given its scope, the book offers a valuable resource for educators, researchers, and policymakers, as well as undergraduate and graduate students of soil science, soil microbiology, agronomy, ecology, and the environmental sciences. Gathering cutting-edge contributions from internationally respected researchers, it offers authoritative content on a

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**Biotrophic Plant-Microbe Interactions** - Pietro D. Spanu - 2017-04-20

Throughout their life, plants interact with all sorts of microbes. Some of these are detrimental and cause disease; some interactions are mutually beneficial for both partners. It is clear that most, if not all, of the interactions are regulated by highly complex checks and balances sustained by signalling and exchange of messengers and nutrients. The interactions where both partners are alive for a significant part of their life expectancy are known as biotrophic interactions.
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**Biology of Plant-microbe Interactions** - Federico Sánchez - 2006-01-01

**Expanding Horizon of Cyanobacterial Biology** - Prashant Kumar Singh - 2022-07-01

Expanding Horizon of Cyanobacterial Biology discusses the different aspects of cyanobacteria cyanobacterial application, providing a better understanding of cyanobacterial metabolism. Chapters deal with cyanobacteria applications and explore how to exploit cyanobacterial metabolism for industrial applications. Sections cover cyanobacterial
understanding of production of nanoparticles, cyanobacterial diversity, and the characterization of different assemblages such as cyanolichens and cyanobacterial endophytes, along with their ecological, morphological and physiological aspects. In addition, bioactive compounds and their applications are explored. Increasing attention has been paid by scientists across the globe to Cyanobacteria as they are ubiquitous microbes and, undoubtedly, an important organism in terms of carbon as well as nitrogen fixation. However, the research on these organisms is limited in terms of their diversity and distribution across the globe. Provides background knowledge for researchers concerned with cyanobacterial diversity and characterization of different assemblages. Describes the exploitation possibility of cyanobacterial species for human welfare. Discusses the different aspects of cyanobacteria, cyanobacterial application and better understanding of cyanobacterial metabolism.

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Plant Responses to Phytophagous Mites/Thrips and Search for Resistance - Raul A. Sperotto - 2019-10-14

Understanding the biology of plant diseases and the capacity for the agents of plant disease - viruses, bacteria, fungi, and oomycetes - to adapt to new conditions, overcoming disease resistance and becoming resistant to pesticides, is very great. For these reasons, understanding the biology of plant diseases...
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**Plant-pathogen Interactions** - Nicholas J. Talbot - 2004

Plant diseases are destructive and threaten virtually any crop grown on a commercial scale. They are kept in check by plant breeding strategies that have introgressed disease resistance genes into many important crops, and by the deployment of costly control measures, such as antibiotics and fungicides. However, the capacity for the agents of plant disease - viruses, bacteria, fungi, and oomycetes - to adapt to new conditions, overcoming disease resistance and becoming resistant to pesticides, is very great. For these reasons, understanding the biology of plant diseases is essential for the development of durable control strategies. Plant-Pathogen Interactions provides an overview of our current knowledge of plant-pathogen interactions and the establishment of plant disease, drawing together fundamental new information on plant infection mechanisms and host responses. The role of molecular signals, gene regulation, and the physiology of pathogenic organisms are emphasized, but the role of the prevailing environment in the conditioning of disease is...
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**Cooperative Adaptations and Evolution in Plant-Microbe Systems** - Tatiana Matveeva - 2018-11-02
Ecological and evolutionary genetics of plant-microbe interactions is of high importance for developing the plant science since the plants originated symbiotically (via incorporation of a phototrophic cyanobacterium into a heterotrophic eukaryon) and further evolve as the multipartite symbiotic systems, harboring the enormously diverse microbial communities. The Research Topic has integrated the top-level research on the genetic interactions in the plant-microbial associations required to develop the novel evolutionary approaches in

**Personalized Genetic Testing**

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**Annual Plant Reviews, Plant-Pathogen Interactions** - Nicholas J. Talbot - 2009-02-12
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Annual Plant Reviews, Plant-Pathogen Interactions - Nicholas J. Talbot - 2009-02-12 Annual Plant Reviews, Volume 11

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Phytoremediation - Rouf Ahmad Bhat - 2021-10-04
Phytoremediation: Biotechnological Strategies for Promoting Invigorating Environments focuses on phytoremediation’s history, present and future potential, remediation, different types of pollutant and polluted environs, cell signaling, biotechnology, and molecular biology, including site-directed DNA and the omics related to plant sciences. Sections focus on phytoremediation as an economically feasible and environmentally safe strategy, including its mechanisms from macroscopic to microscopic level, strategies of assisted phytoremediation, the role of omics on innovations on the field, the development of genetically modified plants (GMPs) to deal with pollutants, the future prospects of targeted genetic engineering in phytoremediation and remediation advantages and disadvantages. Other sections in the book explore the phytoremediation of specific environs (water and soil) and specific contaminants that are of major worldwide concern. Presents phytoremediation mechanisms at a microscopic level (molecular mechanisms) Covers remediation in different environs and in
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Phytoremediation:
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Environs focuses on
phytoremediation’s history,
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discussing mechanisms of
remediation, different types of
pollutant and polluted
environs, cell signaling,
biotechnology, and molecular
biology, including site-
directed DNA and the omics
related to plant sciences.
Sections focus on
phytoremediation as an
economically feasible and
environmentally safe strategy,
including its mechanisms
from macroscopic to
microscopic level, strategies
of assisted phytoremediation,
the role of omics on
innovations on the field, the
development of genetically
modified plants (GMPs) to
deal with pollutants, the
future prospects of targeted
geneic engineering in
phytoremediation and

**Plant-Microbe Interactions
in Agro-Ecological
Perspectives** - Dhananjaya
Pratap Singh - 2017-09-27
This books presents an
updated compilation on
fundamental interaction
mechanisms of microbial
communities with the plant
roots and rhizosphere
(belowground) and leaves and
aerial parts (aboveground).
Plant rhizosphere recruits its
own microbial composition
that survive there and help
plants grow and develop
better under biotic and abiotic
conditions. Similar is the case
with the beneficial
microorganisms which are
mechanisms behind symbiotic characteristic functions. The mechanism of plant-microbe interactions is interesting phenomenon in biological perspectives with numerous implications in the fields. The First volume focuses on the basic and fundamental mechanisms that have been worked out by the scientific communities taking into account different plant-microbe systems. This includes methods that decipher mechanisms at cellular, physiological, biochemical and molecular levels and the functions that are the final outcome of any beneficial or non-beneficial interactions in crop plants and microbes. Recent advances in this research area is covered in different book chapters that reflect the impact of microbial interactions on soil and plant health, dynamics of rhizosphere microbial communities, interaction mechanisms of microbes with multiple functional attributes, microbiome of contrasting crop production systems (organic vs conventional), and pathogenic interactions, endophytic (bacterial and fungal) interaction and benefits, rhizoplane and endosphere associations, signalling cascades and determinants in rhizosphere, quorum sensing in bacteria and impact on interaction, mycorrhizal interaction mechanisms, induced disease resistance and plant immunization, interaction mechanisms that suppress disease and belowground microbial crosstalk with plant rhizosphere. Methods based on multiphasic and multi-omics approaches were discussed in detail by the authors. Content-wise, the book offers an advanced account on various aspects of plant-microbe interactions and valuable implications in agro-ecological perspectives.

**Plant-Microbe Interactions in Agro-Ecological Perspectives** - Dhananjaya Pratap Singh - 2017-09-27
This book presents an updated compilation on fundamental interaction mechanisms of microbial
Plant rhizosphere recruits its own microbial composition that survive there and help plants grow and develop better under biotic and abiotic conditions. Similar is the case with the beneficial microorganisms which are applied as inoculants with characteristic functions. The mechanism of plant-microbe interactions is interesting phenomenon in biological perspectives with numerous implications in the fields. The First volume focuses on the basic and fundamental mechanisms that have been worked out by the scientific communities taking into account different plant-microbe systems. This includes methods that decipher mechanisms at cellular, physiological, biochemical and molecular levels and the functions that are the final outcome of any beneficial or non-beneficial interactions in crop plants and microbes. Recent advances in this research area are covered in different book chapters that reflect the impact of microbial interactions on soil and plant health, dynamics of rhizosphere microbial communities, interaction mechanisms of microbes with multiple functional attributes, microbiome of contrasting crop production systems (organic vs conventional), mechanisms behind symbiotic and pathogenic interactions, endophytic (bacterial and fungal) interaction and benefits, rhizoplane and endosphere associations, signalling cascades and determinants in rhizosphere, quorum sensing in bacteria and impact on interaction, mycorrhizal interaction mechanisms, induced disease resistance and plant immunization, interaction mechanisms that suppress disease and belowground microbial crosstalk with plant rhizosphere. Methods based on multiphasic and multi-omics approaches were discussed in detail by the authors. Content-wise, the book offers an advanced account on various aspects of
Advances in Molecular Genetics of Plant-Microbe Interactions, Vol. 2 - E.W. Nester - 1993
This volume presents the latest research findings in molecular plant-microbe interactions, based on presentations of leading international scientists at the Sixth International Symposium on this subject. From these presentations it is clear that the field has made enormous advances in the past several years. In addition to the text on plant-microbe interactions, a number of experts in fields peripherally related to the main subject of the symposium also participated, and these individuals have also contributed to the present volume. This published material is very up-to-date, representing the cutting edge of current research. For anyone interested in learning of the latest advanced in this rapidly moving field, this volume is required reading.
comprehensive information
Fernando González-Andrés - 2016-06-02
This book covers the most recent advances in all the topics with which researchers and professionals need to be familiar in order to obtain a better understanding of, and to better exploit, beneficial plant-microbe interactions. The use of microorganisms for agriculture and environmental applications is gaining importance worldwide to improve crop performance, but also for other environmental applications, such as bioremediation in chemically polluted soils. The search for an equilibrium between fundamental and applied aspects makes this book useful for professionals at various levels in the value chain of the “microbial biofertilizers”. Challenges of commercializing biofertilizers involve efficiency of the products and safety for human health and the environment, topics that have paid central attention in this book. Students, scientists and biofertilizers developers will find updated and

about the different aspects to be considered to address a successful introduction of biofertilizers in sustainable agriculture and environmental actions.

**Biological Nitrogen Fixation and Beneficial Plant-Microbe Interaction** - Fernando González-Andrés - 2016-06-02
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**Beneficial Plant-Bacterial Interactions** - Bernard R. Glick - 2020-06-08
This book provides a straightforward and easy-to-understand overview of beneficial plant-bacterial interactions. It features a wealth of unique illustrations to clarify the text, and each chapter includes study questions that highlight the important points, as well as references to key experiments. Since the publication of the first edition of Beneficial Plant-Bacterial Interactions, in 2015, there have been new discoveries in this area, and in recent years, scientists around the globe have begun to develop a relatively detailed understanding of many of the mechanisms used by bacteria that facilitate plant growth and development. This knowledge is gradually becoming an integral component of modern agricultural practice, with more and more plant growth-promoting bacterial strains being commercialized and used successfully in countries throughout the world. In addition, as the world’s population continues to grow, the pressure for increased food production will intensify, while at the same time, environmental concerns, mean that environmentally friendly methods of food production will need to replace many traditional agricultural practices such as the use of potentially dangerous chemicals. The book, intended for students, explores the fundamentals of this new paradigm in agriculture, horticulture, and environmental cleanup.
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Contents of the Proceedings focus on plant metabolism and biochemistry, plant genetics and evolution, and plant microbe interactions.


Contents of the Proceedings focus on plant metabolism and biochemistry, plant genetics and evolution, and plant
Plant metabolomics in full swing - - 2021-01-24
Plant Metabolics, Volume 98, the latest release in the Advances in Botanical Research series, highlights new advances in the field, with this new volume presenting interesting chapters on a variety of intriguing topics, including Developmental metabolomics to decipher and improve fleshy fruit quality, Specialized metabolites in seeds, Untangling plant immune responses through metabolomics, Plant metabolomics to the benefit of crop protection and growth stimulation, Metabolomics in plant-microbe interactions in the roots, A practical guide to implementing metabolomics in plant ecology and biodiversity research, Plant metabolomics and breeding, Plant genome-scale metabolic networks, Metabolite imaging by mass spectrometry: A new discovery tool, MS- and NMR-metabolomic tools for the discrimination of wines: Applications for authenticity
and practical insight on the metabolomics and breeding, Plant genome-scale metabolic networks, Metabolite imaging by mass spectrometry: A new discovery tool, MS- and NMR-metabolomic tools for the discrimination of wines: Applications for authenticity Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Advances in Botanical Research series Updated release includes the latest information on the Plant Metaboloms

Prospects and Applications for Plant-Associated Microbes, A laboratory manual - Anna Maria Pirttilä - 2014-12-15

Plant-associated microbes are ubiquitous organisms living in a range of interactions with their host. Involving two organisms, research and applications of plant microbes are challenging and often require specific skills. This book guides the reader in the word of plant-associated fungi, giving both theoretical and practical insight on the potential of this interaction in biotechnology. Detailed instructions and step-by-step protocols are described for isolation, identification, localization and community analysis of fungi, studies on their bioactivity, molecular plant-fungal interactions, and development of fungi as tools for biotechnology.

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**Bacterial Membrane Vesicles** - Maria Kaparakis-Liaskos - 2020-03-31

This book focuses on the multitude of functions bacterial membrane vesicles perform in bacterial ecology and pathogenesis as well as in emerging medical and biotechnological applications. Both Gram-negative and Gram-positive bacteria produce membrane-bound nanostructures, known as membrane vesicles, which have a range of functions that include serving as delivery vehicles, providing a means of communication over both spatial and temporal scales, and contributing to bacterial survival and evolution. Topics covered in this book range from the biogenesis and composition of bacterial membrane vesicles to their abundance and biological roles in microbial ecosystems, such as marine environments. In the individual chapters, the membrane vesicles in host-pathogen interactions, promoting virulence and in facilitating the establishment of infection is explained. In addition, current knowledge regarding membrane vesicles produced by commensal bacteria and their role in the maturation of the host immune system, as well as the therapeutic potential of bacterial membrane vesicles as delivery systems and innovative nanotechnology-based therapeutics are discussed. This work appeals to a wide readership of students and researchers interested in microbial ecology, mechanism underlying pathogenesis and new avenues in applied microbiology and nanotechnology.

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**Biology of Plant-microbe Interactions** - International Society for Molecular Plant-Microbe Interactions - 2000

These proceedings from the July 1999 Amsterdam conference include 80 papers describing the interactions between plants and rhizobium, nematodes, microbes, agrobacterium, pathogenic fungus, viruses, and bacterium. They also cover topics like signal transduction, virulence and avirulence of bacteria and fungi, secretion and transport of virulence and avirulence factors, perception of microbial signals, mycorrhizae, plant disease resistance genes, local and systemic resistance, biological control, plant biotechnology,
developmental biology, programmed cell death, and functional genomics. Indexed only by name. c. Book News Inc.

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**Handbook of Bioremediation** - Mirza Hasanuzzaman - 2020-10-18

Handbook of Bioremediation: Physiological, Molecular and Biotechnological Interventions discusses the mechanisms of responding to inorganic and organic pollutants in the environment using different approaches of phytoremediation and bioremediation. Part One focuses specifically on inorganic pollutants and the use of techniques such as metallothionein-assisted remediation, phytoextraction and genetic manipulation. Part Two covers organic pollutants and consider topics such as plant enzymes, antioxidant defense systems and the remediation mechanisms of different plant species. This comprehensive volume is a must-read for researchers interested in plant science, agriculture, soil science and environmental science. The techniques covered in this book will ensure scientists have the knowledge to practice...
mechanisms of different plant techniques themselves. Provides a comprehensive review of the latest advances in bioremediation of organic and inorganic pollutants. Discusses a range of different phytoremediation techniques. Evaluates the role of genomics and bioinformatics within bioremediation.

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**Plant-Bacteria Interactions** - Iqbal Ahmad - 2008-09-08

Here, an extremely experienced team of authors from five different continents provides a timely review of progress in the use and exploitation of soil bacteria to improve crop and plant growth. They present novel ideas on how to grow better, more successful crops, in an environmentally sound way, making this invaluable.
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Beneficial Plant-microbial Interactions - M. Belén Rodelas González - 2016-04-19
Beneficial Plant-microbial Interactions: Ecology and Applications provides insight into the mechanisms underlying the interactions of plants and microbes, the ecological relevance and roles of these symbioses, the adaptive mechanisms of plant-associated microorganisms to abiotic stress and their contribution to plant stress tolerance, and the potential of these symbioses for improving crop productivity.

The plant microbiome and its importance for plant and human health - Martin Grube - 2015-01-22
The study of plant-microbe associations by new techniques has significantly improved our understanding of the structure and specificity of the plant microbiome. Yet, microbiome function and the importance of these interactions for plant health and productivity remain largely unexplored.

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plant-microbe-interactions-by-maria-j-harrison

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of the plant’s microbiome in the context of human and plant health are largely unexplored. Comparable with our human microbiome, millions of microbes inhabit plants, forming complex ecological communities that influence plant growth and health through its collective metabolic activities and host interactions. Viewing the microbiota from an ecological perspective can provide insight into how to promote plant health and stress tolerance of their hosts or how to adapt to a changing climate by targeting this microbial community. Moreover, the plant microbiome has a substantial impact on human health by influencing our gut microbiome by eating raw plants such as lettuce and herbs but also by influencing the microbiome of our environment through airflow. This research topic comprising reviews, original and opinion articles highlights the current knowledge regarding plant microbiomes, their specificity, diversity and function as well as all aspects of their management to enhance plant growth, health quality and stress tolerance.

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Symbioses and Stress - Joseph Seckbach - 2010-09-21
Symbioses and Stress examines how organisms in tight symbiotic associations cope with abiotic and biotic stress. Presenting new findings on symbioses by experts and leading scholars in the field, this volume complements courses and lectures in biology and genetics.

Plant-Microbial Interactions and Smart Agricultural Biotechnology - Swati Tyagi - 2021-09-23
Considering the ever-increasing global population and finite arable land, technology and sustainable agricultural practices are required to improve crop yield. This book examines the interaction between plants and microbes and considers the use of advanced techniques such as genetic engineering, revolutionary gene editing technologies, and their applications to understand how plants and microbes help or harm each other at the molecular level. Understanding plant-microbe interactions.
agriculture and environmental editing technologies will provide new possibilities for sustainable agriculture. The book will be extremely useful for researchers working in the fields of plant science, molecular plant biology, plant-microbe interactions, plant engineering technology, agricultural microbiology, and related fields. It will be useful for upper-level students and instructors specifically in the field of biotechnology, microbiology, biochemistry, and agricultural science. Features: Examines the most advanced approaches for genetic engineering of agriculture (CRISPR, TALAN, ZFN, etc.). Discusses the microbiological control of various plant diseases. Explores future perspectives for research in microbiological plant science. Plant-Microbial Interactions and Smart Agricultural Biotechnology will serve as a useful source of cutting-edge information for researchers and innovative professionals, as well as upper-level undergraduate and graduate students taking related science courses.

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**Aboveground-Belowground Linkages** - Richard D. Bardgett - 2010-07-29
Synthesises and evaluates recent advances concerning how species and their interactions influence terrestrial ecosystem processes, such as productivity, decomposition, nutrient cycling, and fluxes.

**Microbiome in Plant Health and Disease** - Vivek Kumar - 2019-08-10
The book discusses the complex interactions between plants and their associated microbial communities. It also elucidates the ways in which these microbiomes are connected with the plant system, and how they affect plant health. The different chapters describe how microbiomes affect plants with regard to immunity, disease conditions, stress management and productivity. In addition, the book describes how an ‘additional plant genome’ functions as a
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Moreover, the book includes a dedicated section on using omics tools to understand these interactions, and on exploiting them to their full potential.

**Microbiome in Plant Health and Disease** - Vivek Kumar - 2019-08-10

**Handbook of Metal-Microbe Interactions and Bioremediation** - Surajit Das - 2017-04-07

Around the World, metal pollution is a major problem. Conventional practices of toxic metal removal can be ineffective and/or expensive, delaying and exacerbating the crisis. Those communities dealing with contamination must be aware of the fundamentals advances of microbe-mediated metal removal practices because these methods can be easily used and require less remedial intervention. This book describes innovations and efficient applications for metal bioremediation for environments polluted by metal contaminates.
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New and Future Developments in Microbial Biotechnology and Bioengineering - Jay Shankar Singh - 2019-07-18

New and Future Developments in Microbial Biotechnology and Bioengineering: Microbes in Soil, Crop and Environmental Sustainability reviews the exploitation of microbial biodiversity in soil with respect to nutrient-use efficiency, also discussing the improvement and maintenance of certain physical and chemical conditions in soil that can provide economic and environmental benefits toward agricultural sustainability. The utilization of microbes ranges from applications in biotechnology, marginal land restoration, the formulation of microbial inoculants, the enhancement of crop productivity, and the mitigation of global warming gases. Finally, various uses for microbial resources in crop disease management, bioenergy production, and income based on microbial cultivation are explored. Highlights the developments and achievements of microbial resources and their role in the sustainable management of soil fertility and agriculture productivity Outlines the role of microbial resource and biotechnology in sustainability to industry, agriculture, forest and management of environment Provides up-to-date information on the application of microbial resources and the role of biotechnology to meet the ever increasing demand of
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**Emerging Tools for Emerging Symbioses—Using Genomics Applications to**
Plants are typically colonized by numerous endophyte species symbiotically without any noticeable disease symptoms. These microbes are abundant, diverse and play critical ecological roles across natural and agricultural ecosystems. Endophytes have attracted the attention of researchers due to their various beneficial effects on plants, especially in agricultural crop species. Genomic tools will enhance our understanding on the growth and nutrition requirements of this host-symbiont relationship. Recent advances in DNA sequencing technologies and bioinformatic pipelines have allowed analyzing the plant microbiome and host-endophyte interaction more effectively with limited bias. Furthermore, various studies have employed and utilized transcriptomic and genomic tools to understand the role of endophytes and their interaction with plant hosts. This electronic book covers highlighting the important developments on endophytes using transcriptomics, next generation sequencing and genomic tools.

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**The Barley Genome** - Nils Stein - 2018-08-18
This book presents an overview of the state-of-the-art in barley genome analysis, covering all aspects of sequencing the genome and translating this important information into new knowledge in basic and applied crop plant biology and new tools for research and crop improvement. Unlimited access to a high-quality reference sequence is removing one of the major constraints in basic and applied research. This book knowledge of the composition of the barley genome, its genes and the much larger non-coding part of the genome, and how this information facilitates studying the specific characteristics of barley. One of the oldest domesticated crops, barley is the small grain cereal species that is best adapted to the highest altitudes and latitudes, and it exhibits the greatest tolerance to most abiotic stresses. With comprehensive access to the genome sequence, barley’s importance as a genetic model in comparative studies on crop species like wheat, rye, oats and even rice is likely to increase.

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**Phytobiont and Ecosystem Restitution** - Vivek Kumar - 2018-12-31
This book offers present-day retrospectives and future perspectives on ‘phytobiont’ studies in the context of phyto-micro restitution, filling some of the information gaps in this promising research field. It discusses several ecosystem restitution strategies using dissimilar groups of microbes alone or in association with plants, as well as advances in metagenomics technology for studying in situ micro and macro communities in contaminated soil. It addresses topics such as the status quo, and the perspectives of microbial researchers and scientists, foresters, students, environmentalists, agriculturists and professional engineers. The rising pollution levels caused by xenobiotics is one of the biggest problems of our times, and as such the book comprehensively elaborates the latest research in this field and describes how the issue can be tackled using micro-organisms. With detailed diagrams and illustrations, the book is a valuable resource for experts.
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and fungal biology. symbiosis and root nodule symbiosis, the two most prevalent systems. AM symbiosis involves the most extensive interaction between plants and microbes, in the context of phylogeny and ecology. As more than 90% of all known species of plants have the potential to form mycorrhizal associations, the productivity and species composition, as well as the diversity of natural ecosystems, are frequently dependent upon the presence and activity of mycorrhizas. In turn, root nodule symbiosis includes morphogenesis and is formed by communication between plants and nitrogen-fixing bacteria. The biotechnological application of plant-microbe symbiosis is expected to foster the production of agricultural and horticultural products while maintaining ecologically and economically sustainable production systems. Designed as a hands-on guide, this book offers an essential resource for researchers and students in the areas of agri-biotechnology, soil biology

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**Soil Microbiology and Sustainable Crop Production** - Geoffrey R. Dixon - 2010-09-08

Soils into which crop plants root and from which they obtain essential minerals and water contain huge arrays of microbes. Many have highly beneficial effects on crop others are pathogens causing diseases and losses to yield and quality, a few microbes offer protection from these pathogenic forms and others have little or no effect. These intimate and often complex inter-relationships are being explored with increasing success providing exciting opportunities for increasing crop yields and quality in sustainable harmony with the populations of beneficial soil microbes and to the detriment of pathogens. This book explores current knowledge for each of these aspects of soil microbiology and indicates where future progress is most likely to aid in increasing crop productivity by means which are environmentally benign and beneficial.

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