Biochemical and Genetic Mechanisms Used by Plant Growth Promoting Bacteria

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PREFACE

Plant growth-promoting bacteria are of interest to a wide range of individuals from agronomists and plant physiologists to microbial biochemists and ecologists, and from soil scientists to molecular biologists. This fascinating area of research has an impact on the study of a number of fundamental aspects of both plant growth and development and the strategies employed by soil microorganisms, while at the same time promises to provide us with approaches that have the potential to dramatically alter both agricultural and horticultural practices.

The conflicting and often inconsistent field results that were obtained by workers employing plant growth-promoting bacteria in agriculture on a large scale in the early and middle part of the twentieth century probably reflect an incomplete understanding of the mechanisms that these organisms employed. However, researchers who study and attempt to utilize plant growth-promoting bacteria have come a long way since those early days. Current research with plant growth-promoting bacteria includes a large number of scientists from dozens of countries around the world employing a range of different techniques and approaches.

This small volume endeavors to provide an overview, at a biochemical and molecular biological level, of the most important mechanisms that are utilized by plant growth-promoting bacteria. The assumption underlying this endeavor is that a more profound understanding of these fundamental mechanisms will eventually permit scientists to manipulate these bacteria and to use them more effectively as a regular component of agricultural and/or horticultural practice. Therefore, while all of the topics in this volume are discussed in as comprehensive a manner as possible, the book emphasizes a critical overview of the field rather than a mere compendium of data. Moreover, we have made every effort to make this information accessible to as wide a range of readers as possible by writing this book in a clear, concise, and easy to follow style with complex concepts explained using simple jargon-free language.

Since this is a dynamic and growing field, it is inevitable, as new knowledge is acquired and new studies are published, that some of the information that we have presented will go out of date. While this is unavoidable, we trust that most of the examples that we have chosen to illustrate particular points will continue to stand up to scrutiny with time.

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March 1999

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