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## Preface

Plants require a range of essential macro and micronutrients for their growth and development. For terrestrial plants, all mineral nutrients derive from the soil. Although research into the roles and functions of such minerals stretches back more than 150 years, there are still many unresolved questions, even where the definition of “essential mineral” is concerned.

The study of plant mineral nutrition has both academic and applied aspects to it. The simple fact that the human diet is, directly or indirectly, plant based has obvious and profound implications in this respect. Today, research into plant mineral nutrition is more pertinent than ever in the face of a growing world population and the increasing need for sustainable agriculture.

The study of plant mineral research touches on many biological disciplines such as biophysical techniques to follow uptake and distribution of mineral ions, analytical methods to measure minerals in soil and tissue, whole plant physiology to assess growth and development in different conditions, and, more recently, the whole gambit of molecular approaches to characterize the relevant genes and proteins. Furthermore, it spans a large spatiotemporal range from subcellular to whole plants and from msec to months.

This volume contains a comprehensive collection of methodologies that are routinely used in plant mineral nutrition research. It describes easy-to-follow protocols that will allow the researcher to study the most relevant aspects of plant mineral nutrition, including growth parameters, ion contents and composition, soil analyses, flux measurements, and the use of public facilities for high-throughput analyses. As such this volume should be of great use to plant scientists at every level but particularly to plant physiologists, crop scientists, and horticulturalists.

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<http://www.springer.com/978-1-62703-151-6>

Plant Mineral Nutrients

Methods and Protocols

Maathuis, F.J.M. (Ed.)

2013, XI, 297 p., Hardcover

ISBN: 978-1-62703-151-6

A product of Humana Press