

Book looks at interrelationships among nitrogen, plants and the environment

May 2 2011

Nitrogen is essential for plant growth. Despite the abundance of nitrogen in the atmosphere as N₂ gas, plants must rely on a series of chemical reactions to convert atmospheric and other forms of nitrogen into usable forms. Plants have achieved this goal primarily by evolving relationships with associated organisms. The varied, complex interactions involving nitrogen, plants, and the environment are the focus of a new book co-edited by University of Missouri professor of biochemistry Joseph C. Polacco.

Ecological Aspects of Nitrogen Metabolism in Plants looks first at the global nitrogen cycle and the positive and negative impacts of nitrogen on the environment. It explores, in particular, how human interference, through massive amounts of introduced nitrogen, has altered the pre-industrial natural nitrogen cycle and the ramifications for plants, humans, and the environment. All non-N₂ forms of nitrogen are defined as reactive nitrogen (Nr, with a non-zero valence), and Nr can variously be pollutants, [greenhouse gases](#), ozone depleters, signaling molecules, and nutrients.

"One goal of this book is an attempt to address aspects of plant roles in the (new) global [nitrogen cycle](#)," write Polacco and co-editor Christopher D. Todd in their preface.

The remaining 16 chapters of the book are divided into four sections. The chapters in sections 2 through 4 describe the complex relationships – both competitive and mutualistic -- plants have established with the

diverse organisms with which they share the soil, including parasitic and friendly microbes, fungi, plants, and arthropods. The chapters in the final section look "inward" at the intracellular signaling events that choreograph the nitrogen acquisition by plants in association with microbes and other organisms.

The picture that emerges from these chapters is a need for "integrating the complexities inherent in plant performance, environmental interactions, and [nitrogen] inter-conversions," write the editors. "A greater appreciation of these interactions will lead to a better understanding of our place, and that of plants, in our shared environment."

Ecological Aspects of [Nitrogen](#) Metabolism in [Plants](#) will serve as a timely reference for plant biologists, ecologists, soil scientists, breeders, and microbiologists.

More information: For more information, see www.wiley.com/WileyCDA/WileyTi...cCd-description.html

Provided by University of Missouri-Columbia

Citation: Book looks at interrelationships among nitrogen, plants and the environment (2011, May 2) retrieved 10 April 2024 from <https://phys.org/news/2011-05-interrelationships-nitrogen-environment.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.
