Preface

Nitrogen Acquisition and Assimilation in Higher Plants is the third volume in the *Plant Ecophysiology* series. The main aim of this volume is to integrate different research approaches for a better understanding of the regulation of nitrogen metabolism by environmental signals. The book is divided into three parts. Chapters 1-5 mainly deal with the processes involved, while chapters 6-8 are more focussed on regulatory aspects. The significance of nitrogen metabolism for food quality and security is the topic of chapters 9 and 10.

Nitrogen can be acquired by plant roots as nitrate (chapter 1) or ammonium (chapter 2). In both chapters the physiology and molecular biology of the uptake processes and regulation of its transporters are addressed. Chapter 1 also deals with the effect of nitrate in the environment on root development, and chapter 2 with the metabolic regulation of the assimilation of ammonium, including gene manipulation. Plants can acquire atmospheric nitrogen as well, from nitrogenous air pollutants (chapter 3) or by N_2 fixation (chapter 4). Whether atmospheric nitrogen is a pollutant or a fertiliser is the main topic of chapter 3. Chapter 4 stresses the importance of N_2 fixation, and deals with the latest developments in the cloning of genes involved in the legume-*Rhizobium* interaction. To what extent modelling can help in understanding the role of nitrogen metabolism in plant adaptation to the environment is the topic of chapter 5.

The role of light in transcriptional and post-transcriptional regulation of the genes involved in nitrate uptake, reduction and assimilation is reviewed in chapter 6. Chapter 7 reviews the modulation of nitrate reductase activity by environmental and internal signals, and its effect on the production of NO. Chapter 8 deals with the metabolic pathway of polyamines, molecules involved in abiotic stress signalling, and includes advanced genomic and proteomic approaches.

Chapter 9 is focussed on the significance of secondary nitrogen compounds for food quality. Chapter 10 highlights the implementation of conventional and recombinant-DNA breeding methods to increase both yield and agronomic N-use efficiency of rice, the most important cereal for human nutrition.

This volume is of interest for advanced students and junior researchers, and provides comprehensive information and the latest developments for scientists working in the field of nitrogen metabolism and readers interested in sustainable development.

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