

# Ecological Aspects of Nitrogen Metabolism in Plants

Joe C. Polacco and Christopher D. Todd



# Ecological Aspects Of Nitrogen Metabolism In Plants

**Hans Lambers, G. Stulen, J.J. Neeteson**



## **Ecological Aspects Of Nitrogen Metabolism In Plants:**

**Ecological Aspects of Nitrogen Metabolism in Plants** Joe C. Polacco, Christopher D. Todd, 2011-01-20 Ecological Aspects of Nitrogen Acquisition covers how plants compete for nitrogen in complex ecological communities and the associations plants recruit with other organisms ranging from soil microbes to arthropods The book is divided into four sections each addressing an important set of relationships of plants with the environment and how this impacts the plant's ability to compete successfully for nitrogen often the most growth limiting nutrient Ecological Aspects of Nitrogen Acquisition provides thorough coverage of this important topic and is a vitally important resource for plant scientists agronomists and ecologists Fundamental, Ecological and Agricultural Aspects of Nitrogen Metabolism in Higher Plants J.T. Lambers, G. Stulen, J.J. Neeteson, 2012-12-06 Rinie Hofstra has been a member of the Department of Plant Physiology University of Groningen the Netherlands for 24 years The nearer we came to 31 March 1985 her 65th birthday the more we all realized how we would miss her not only scientifically but also socially She left her mark on both research and teaching always with an open mind and willing to change After her PhD Thesis on Nitrogen Metabolism in Tomato Plants she first continued working in that field but soon started a joint project with the Department of Plant Ecology on hemiparasites She then became involved in carbon metabolism which resulted in her giving a Biotrop Course on C C metabolism in 3 4 Indonesia Her own research group originally working on Nitrogen Metabolism soon embraced Energy and Nitrogen Metabolism as the research on respiration became more and more important In running her group she showed all sides of her person She used to stimulate and encourage everyone around her and to integrate the various lines of research At the same time she always had an open mind for the opinion of all members of her group And together they regularly criticized and evaluated the various projects and decided how to continue **Fundamental, Ecological and Agricultural Aspects of Nitrogen Metabolism in Higher Plants**, 1986 Advances in Botanical Research, 1979-01-31 Advances in Botanical Research **Fundamental, Ecological and Agricultural Aspects of Nitrogen Metabolism in Higher Plants**, 1986 **Fundamental, Ecological and Agricultural Aspects of Nitrogen Metabolism in Higher Plants** H. Lambers, J. J. Neeteson, Ineke Stulen, 1986 **Fundamental, Ecological and Agricultural Aspects of Nitrogen Metabolism in Higher Plants** Hans Lambers, G. Stulen, J.J. Neeteson, 2011-09-26 Rinie Hofstra has been a member of the Department of Plant Physiology University of Groningen the Netherlands for 24 years The nearer we came to 31 March 1985 her 65th birthday the more we all realized how we would miss her not only scientifically but also socially She left her mark on both research and teaching always with an open mind and willing to change After her PhD Thesis on Nitrogen Metabolism in Tomato Plants she first continued working in that field but soon started a joint project with the Department of Plant Ecology on hemiparasites She then became involved in carbon metabolism which resulted in her giving a Biotrop Course on C C metabolism in 3 4 Indonesia Her own research group originally working on Nitrogen Metabolism soon embraced Energy and

Nitrogen Metabolism as the research on respiration became more and more important In running her group she showed all sides of her person She used to stimulate and encourage everyone around her and to integrate the various lines of research At the same time she always had an open mind for the opinion of all members of her group And together they regularly criticized and evaluated the various projects and decided how to continue Advances in Ecological Research ,1992-08-18

Advances in Ecological Research **Bacterial Metabolites in Sustainable Agroecosystem** Dinesh K.

Maheshwari,2015-11-10 There has been a resurgence of interest in environmental friendly sustainable and organic cultural practices that warrants high yield and quality in agricultural crops To enhance sustainable agricultural production and alleviate food scarcity spoor of majority of microorganisms especially plant growth and health promoting bacteria of eminent characteristics that allow them for exploitation in agro ecosystem Plant growth promoting rhizobacteria are the soil bacteria inhabiting around on the root surface and are directly or indirectly involved in promoting plant growth and development via production and secretion of various regulatory chemicals in the vicinity of rhizosphere Among various beneficial bacteria mediated mechanisms include direct production of phytohormones and biosurfactants experiencing quest of research and concept up gradation that can built emerging paradigm agriculture model Research on bacteria mediated phytohormones is crucially important provides key understanding of the plant growth and development Various genera including PGPR group of bacteria are potential source of plant growth regulators Application of such organism allow plants to survive under abiotic and biotic stress conditions besides govern phytohormone mediated immune response and manage to regulate hormones Such group of bacteria also produce another important metabolite i e biosurfactants which are involved in many important functions to bacteria itself as well as for the plants and their ecosystem Biosurfactants may alter nutrient availability endogenous metabolites such as antibiotics production root colonization imparting protection from phytopathogens besides eradicating soil contaminants and other pollutants The role and activities of surfactants produced by bacteria are multifarious in nature Thus bacterial phytohormones and biosurfactants are identified as effector molecules in plant microbe interactions in pathogenesis and phyto stimulation which can either be beneficial for the bacteria itself or for the crops This book highlights current applications and research on bacterial hormones and surfactants to provide a timely overview The chapters have been contributed by subject experts from around the world and include topics of varied importance which include phytohormones production by rhizospheric and endophytic bacteria their role in rhizosphere competence plant growth regulation bioremediation biosurfactants as antibiofilm agents and other aspects This major new work represents a valuable source of information to all those scientists interested in microbial technology with respect to the microbial innovative products and applications towards sustainable agroecosystem **Microbial Based Land Restoration**

**Handbook, Volume 2** Vimal Pandey,Umesh Pankaj,2022-12-07 Microorganisms are a good indicator of soil health Plant growth promoting microorganisms protect plants from the stresses of water salt metal biotic and so on and are well known

for strategically modulating the plant mechanisms to defend and mitigate environmental stresses Taking a multidisciplinary approach this volume explores the role of plant microorganisms in ecological and agricultural revitalization beyond normal agriculture practices and offers practical and applied solutions for the restoration of degraded lands to fulfill human needs with food fodder fuel and fiber It also provides a single comprehensive platform for soil scientists agriculture specialists ecologists and those in related disciplines Features Presents cutting edge microbial biotechnology as a tool for restoring degraded lands Explores the aspects of sustainable development of degraded lands using microorganism inspired land remediation Highlights sustainable food production intensification in nutrient poor lands through innovative use of microbial inoculants Explains the remediation of polluted land for regaining biodiversity and achieving United Nations Sustainable Development Goals Includes many real life applications from South Asia offering solutions to today s agricultural problems This book will be of interest to professionals researchers and students in environmental soil and agricultural sciences as well as stakeholders policy makers and practitioners with an interest in this field

Plants and Nitrogen O. A. M. Lewis, Owen A. M. Lewis, 1986 This book discusses the association that exists between plants and their most important dietary component nitrogen The author combines ecological physiological and biochemical approaches to provide the reader with an overall view of nitrogen in the biosphere and a specific view of nitrogen processing in plants The processes which make up the nitrogen cycle including mineralization immobilization by microbes and nitrification are discussed and the losses and gains of combined nitrogen from and to the cycle The part which plants play in this cycling by their processing of inorganic nitrogen into compounds which are required by plants and animals alike and the chemistry and production of those compounds is also covered Transport of nitrogen compounds within the plant and the fate of these compounds is discussed The final chapter considers the part which humans play in the cycling of nitrogen with special reference to the nitrogen fertilizers used in agriculture

**Plant Physiological Ecology** Hans Lambers, F. Stuart Chapin III, Thijs L. Pons, 2013-04-17 The individual is engaged in a struggle for existence Darwin That struggle may be of two kinds The acquisition of the resources needed for establishment and growth from a sometimes hostile and meager environment and the struggle with competing neighbors of the same or different species In some ways we can define physiology and ecology in terms of these two kinds of struggles Plant ecology or plant sociology is centered on the relationships and interactions of species within communities and the way in which populations of a species are adapted to a characteristic range of environments Plant physiology is mostly concerned with the individual and its struggle with its environment At the outset of this book the authors give their definition of ecophysiology arriving at the conclusion that it is a point of view about physiology A point of view that is informed perhaps by knowledge of the real world outside the laboratory window A world in which shall we say the light intensity is much greater than the  $2 \times 10^{20}$  to  $5 \times 10^{21}$  photons  $m^{-2} s^{-1}$  used in too many environment chambers and one in which a constant 20 C day and night is a great rarity The standard conditions used in the laboratory are usually regarded as treatments Of course there is

nothing wrong with this in principle one always needs a baseline when making comparisons The idea however that the laboratory control is the norm is false and can lead to misunderstanding and poor predictions of behavior Classic Papers,2004-07-02 Advances in Ecological Research was first published in 1962 and has become one of Academic Press most prestigious and successful series In 1999 the Institute for Scientific Information released figures indicating this serial has an impact factor of 9.6 and a half life of 10.0 years ranking it first in the highly competitive category of Ecology This volume continues to publish topical and important reviews and interprets ecology to include all material that contributes to our understanding of the field Advances in Ecological Research presents a wide range of papers on all aspects of ecology Topics include the physiology populations and communities of plants and animals as well as landscape and ecosystem ecology

**The Phytochemical Landscape** Mark D. Hunter,2016-08-09 The dazzling variation in plant chemistry is a primary mediator of trophic interactions including herbivory predation parasitism and disease At the same time such interactions feed back to influence spatial and temporal variation in the chemistry of plants In this book Mark Hunter provides a novel approach to linking the trophic interactions of organisms with the cycling of nutrients in ecosystems Hunter introduces the concept of the phytochemical landscape the shifting spatial and temporal mosaic of plant chemistry that serves as the nexus between trophic interactions and nutrient dynamics He shows how plant chemistry is both a cause and consequence of trophic interactions and how it also mediates ecosystem processes such as nutrient cycling Nutrients and organic molecules in plant tissues affect decomposition rates and the fluxes of elements such as carbon nitrogen and phosphorus The availability of these same nutrients influences the chemistry of cells and tissues that plants produce In combination these feedback routes generate pathways by which trophic interactions influence nutrient dynamics and vice versa mediated through plant chemistry Hunter provides evidence from terrestrial and aquatic systems for each of these pathways and describes how a focus on the phytochemical landscape enables us to better understand and manage the ecosystems in which we live Essential reading for students and researchers alike this book offers an integrated approach to population community and ecosystem level ecological processes Selected Papers From: Fundamental, Ecological and Agricultural Aspects of

Nitrogen Metabolism in Higher Plants Hans Lambers,1986 **Challenges and Solutions of Climate Impact on Agriculture** Shah Fahad,Muhammad Adnan,Iqbal Munir,Rattan Lal,Taufiq Nawaz,Shah Saud,2024-10-08 Challenges and Solutions of Climate Impact on Agriculture explores issues arising from the changing climate for agricultural plants with a soil focused approach Addressing the impacts on a range of important global food crops it looks at issues of water and temperature and their impact on soil quality for production Presented by a global team of experts this book will be important for researchers seeking to understand specific challenges and means of addressing those challenges effectively and efficiently The agriculture sector is arguably one of the most sensitive to changes in the climate Because the climate of a region determines the nature and characteristics of vegetation and crops any change in the mean seasonal temperature and

decrease in effective precipitation can reduce productive periods for crops risking outbreaks of pests and disease and negatively affecting global food security Explains the impact of climate change on soil properties productivity and microbial diversity Provides detailed information regarding the impact of climate change on yields of cereal grains and other crops Enables agricultural scientists to design policies and management strategies for sustainable agriculture Ethylene's Role in Plant Mineral Nutrition Francisco Javier Romera,Aaron P. Smith,Rafael Pérez-Vicente,2016-09-07 Terrestrial plants are sessile organisms that differently from animals can not move in searching of the nutrients and water they need Instead they have to change continuously their physiology and morphology to adapt to the environmental changes When plants suffer from a nutrient deficiency they develop physiological and morphological responses mainly in their roots aimed to facilitate the acquisition and mobilization of such a nutrient Physiological responses include some ones like acidification of the rizhosphere and release of chelating agents into the medium and morphological responses include others like changes in root architecture and development of root hairs The regulation of these responses is not totally known but in the last years different plant hormones and signaling substances such as auxin ethylene cytokinins and nitric oxide have been involved in their control Besides hormones oxidative stress has also been related with most of the nutrient deficiencies The relationship of ethylene with the regulation of responses to nutrient deficiencies came from the nineties when some works presented data suggesting its involvement in the regulation of responses to Fe and P deficiency In the last years the role of ethylene has been extended to many other nutrient deficiencies such as K deficiency Mg deficiency S deficiency N deficiency and others In most of the cases it has been found that ethylene production as well as the expression of ethylene synthesis genes increases under these nutrient deficiencies Furthermore it has also been found that ethylene controls the expression of genes related to responses to different deficiencies The involvement of ethylene in so many deficiencies suggests that it should act in conjunction with other signals that would confer nutrient specificity to the distinct nutrient responses These other signals could be plant hormones auxin cytokinins etc as well as other substances nitric oxide microRNAs peptides glutathione etc either originated in the roots or coming from the shoots through the phloem The role of ethylene in the mineral nutrition of plants is even more complex that the one related to its role in the responses to nutrient deficiencies Ethylene has also been implicated in the N<sub>2</sub> fixation of legume plants in salt tolerance responses and in responses to heavy metals such as Cd toxicity All these processes are related to ion uptake and consequently are related to plant mineral nutrition We consider a good opportunity to review all this information in a coordinated way This Research Topic will provide an overview about the role of the plant hormone ethylene on the regulation of physiological and morphological responses to different nutrient deficiencies In addition it will cover other aspects of ethylene related to plant nutrition such as its role on salinity N<sub>2</sub> fixation and tolerance to heavy metals *Microbiomes and Plant Health* Manoj Kumar Solanki,Prem Lal Kashyap,Rizwan Ali Ansari,Baby Kumari,2020-08-28 Microbiomes and Plant Health Panoply and Their Applications includes the most recent

advances in phytobiome research The book emphasizes the use of modern molecular tools such as smart delivery systems for microbial inoculation next generation sequencing and genome mapping Chapters discuss a variety of applications and examples including the sugarcane microbiome rhizoengineering nutrient recycling sustainable agricultural practices and bio potential of herbal medicinal plants Written by a range of experts with real world practical insights this title is sure to be an essential read for plant and soil microbiologists phytopathologists agronomists and researchers interested in sustainable forestry and agriculture practices Offers readers a one stop resource on the topic of plant and soil microbiome and their applications in plant disease sustainable agriculture soil health and medicinal plants Addresses the role of phytobiome to combat biotic and abiotic factors Emphasizes the use of modern molecular tools such as smart delivery systems for microbial inoculation next generation sequencing and genome mapping

### **Abiotic Stress Signaling in Plants: Functional**

**Genomic Intervention** Girdhar K. Pandey, Manoj Prasad, Amita Pandey, Maik Boehmer, 2016-08-08 Abiotic stresses such as high temperature low temperature drought and salinity limit crop productivity worldwide Understanding plant responses to these stresses is essential for rational engineering of crop plants In Arabidopsis the signal transduction pathways for abiotic stresses light several phytohormones and pathogenesis have been elucidated A significant portion of plant genomes Arabidopsis and rice were mostly studied encodes for proteins involves in signaling such as receptor sensors kinases phosphatases transcription factors and transporters channels Despite decades of physiological and molecular effort knowledge pertaining to how plants sense and transduce low and high temperature low water availability drought water submergence microgravity and salinity signals is still a major question for plant biologist One major constraint hampering our understanding of these signal transduction processes in plants has been the lack or slow pace of application of molecular genomic and genetics knowledge in the form of gene function In the post genomic era one of the major challenges is investigation and understanding of multiple genes and gene families regulating a particular physiological and developmental aspect of plant life cycle One of the important physiological processes is regulation of stress response which leads to adaptation or adjustment in response to adverse stimuli With the holistic understanding of the signaling pathways involving not only one gene family but multiple genes or gene families plant biologist can lay a foundation for designing and generating future crops which can withstand the higher degree of environmental stresses especially abiotic stresses which are the major cause of crop loss throughout the world without losing crop yield and productivity Therefore in this e Book we intend to incorporate the contribution from leading plant biologists to elucidate several aspects of stress signaling by functional genomics approaches

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United States. Environmental Protection Agency. Library Systems Branch, 1974



## **Ecological Aspects Of Nitrogen Metabolism In Plants** Book Review: Unveiling the Magic of Language

In an electronic era where connections and knowledge reign supreme, the enchanting power of language has become much more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is truly remarkable. This extraordinary book, aptly titled "**Ecological Aspects Of Nitrogen Metabolism In Plants**," written by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound effect on our existence. Throughout this critique, we will delve into the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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