

Rainer Matyssek · Hans Schnyder
Wolfgang Oßwald · Dieter Ernst
Jean Charles Munch
Hans Pretzsch *Editors*

Growth and Defence in Plants

Resource Allocation at Multiple Scales

Growth And Defence In Plants Resource Allocation At Multiple Scales Ecological Studies

Jessica J Manson



Growth And Defence In Plants Resource Allocation At Multiple Scales Ecological Studies:

Growth and Defence in Plants Rainer Matyssek, Hans Schnyder, Wolfgang Oßwald, Dieter Ernst, Jean Charles Munch, Hans Pretzsch, 2012-09-15 This volume gathers a timely understanding of resource allocation and its regulation in herbaceous and woody plant systems linking molecular with biochemical and physiological process levels *Emergence and Modularity in Life Sciences* Lars H. Wegner, Ulrich Lüttge, 2019-02-12 This book focuses on modules and emergence with self organization in the life sciences As Aristotle observed so long ago the whole is more than the sum of its parts However contemporary science is dominated by reductionist concepts and tends to neglect the non reproducible features of complex systems which emerge from the interaction of the smaller units they are composed of The book is divided into three major parts the essays in part A highlight the conceptual basis of emergence linking it to the philosophy of science systems biology and sustainability This is subsequently exemplified in part B by applying the concept of emergence to various biological disciplines such as genetics developmental biology neurobiology plant physiology and ecology New aspects of emergence come into play when biology meets the technical sciences as revealed in a chapter on bionics In turn part C adopts a broader view revealing how the organization of life follows a hierarchical order in terms of scalar dimensions ranging from the molecular level to the entire biosphere The idea that life is primarily and exclusively shaped by processes at the molecular level and in particular by the information encoded in the genome is refuted rather there is no hierarchy with respect to the level of causation in the cross talk between the levels In the last two chapters the evolutionary trend toward ever increasing complexity in living systems is interpreted in terms of the Gaia hypothesis sensu Lovelock the entire biosphere is viewed as a functional unit or holobiont like system organized to develop and sustain life on Earth **Progress in Botany** 77 Ulrich Lüttge, Francisco M. Cánovas, Rainer Matyssek, 2016-05-27 With one volume each year this series keeps scientists and advanced students informed of the latest developments and results in all areas of the plant sciences The present volume includes reviews on plant genetics physiology ecology and evolution *Climate Change, Air Pollution and Global Challenges*, 2013-11-19 There are significant pressures from climate change and air pollution that forests currently face This book aims to increase understanding of the state and potential of forest ecosystems to mitigate and adapt to climate change in a polluted environment It reconciles process oriented research long term monitoring and applied modeling through comprehensive forest ecosystem research Furthermore it introduces forest super sites for research for integrating soil plant and atmospheric sciences and monitoring It also provides mechanistic and policy oriented modeling with scientifically sound risk indications regarding atmospheric changes and ecosystem services Identifies current knowledge gaps and emerging research needs Highlights novel methodologies and integrated research concepts Assesses ecological meaning of investigations and prioritizing research need **Climate Change, Air Pollution and Global Challenges** Pierre Dizengremel, Yves Jolivet, Andrée Tuzet, Annamaria Ranieri, Didier Le Thiec, 2013-11-19 Ozone is a phytotoxic air pollutant

impairing photosynthesis and reducing plant growth The predicted increase in tropospheric ozone concentration could lead to an increased vulnerability of forests mitigating carbon sink strength of vegetation under the increasing atmospheric CO₂ concentration To improve European risk indices currently based on atmospheric O₃ concentration i e O₃ exposure it is necessary to assess the phytotoxic ozone dose reflecting the balance between stomatal ozone uptake and detoxification capacity of foliar cells Advancing knowledge on plant response mechanisms would allow for integrating a sub model into global ozone impact prediction models towards consolidating process based indices for risk assessment Crucial parameters are i stomatal characteristics ii constitutive detoxification potential iii capacity for antioxidant regeneration and iv cellular redox power The combination of ozone with other impacting factors drought high temperature and CO₂ will be discussed in view of the challenge of scaling tree level ozone responses to the forest ecosystem level under conditions of climate change

Progress in Botany Ulrich Lüttge,Wolfram Beyschlag,2014-09-22 With one volume each year this series keeps scientists and advanced students informed of the latest developments and results in all areas of the plant sciences The present volume includes reviews on physiology ecology and vegetation science

Progress in Botany Vol. 84 Ulrich Lüttge,Francisco M. Cánovas,María-Carmen Risueño,Christoph Leuschner,Hans Pretzsch,2024-01-01 With one volume each year this series keeps scientists and advanced students informed of the latest developments and results in all areas of the plant sciences This latest volume includes reviews on plant physiology biochemistry genetics and genomics forests and ecosystems

Climate Change, Air Pollution and Global Challenges Rainer Matyssek,Nicholas Clarke,Pavel Cudlin,Teis Nørgaard Mikkelsen,Juha-Pekka Tuovinen,Gerhard Wieser,Elena Paoletti,2013-11-19 This chapter outlines the aims and scope of the book An introduction is given to the current status of knowledge which is presented on the topic of the book Arguments are presented for writing the book in view of continued long term and process based research needed for mitigating ecological and socio economic risks to forests under global change The book will conclude on suggestions for decision making and reasons for continued funding of related research

Ecosystem Services, Biodiversity and Environmental Change in a Tropical Mountain Ecosystem of South Ecuador Jörg Bendix,Erwin Beck,Achim Bräuning,Franz Makeschin,Reinhard Mosandl,Stefan Scheu,Wolfgang Wilcke,2013-07-09 An interdisciplinary research unit consisting of 30 teams in the natural economic and social sciences analyzed biodiversity and ecosystem services of a mountain rainforest ecosystem in the hotspot of the tropical Andes with special reference to past current and future environmental changes The group assessed ecosystem services using data from ecological field and scenario driven model experiments and with the help of comparative field surveys of the natural forest and its anthropogenic replacement system for agriculture The book offers insights into the impacts of environmental change on various service categories mentioned in the Millennium Ecosystem Assessment 2005 cultural regulating supporting and provisioning ecosystem services Examples focus on biodiversity of plants and animals including trophic networks and abiotic biotic parameters such as soils regional climate water nutrient and sediment cycles

The types of threats considered include land use and climate changes as well as atmospheric fertilization. In terms of regulating and provisioning services, the emphasis is primarily on water regulation and supply as well as climate regulation and carbon sequestration. With regard to provisioning services, the synthesis of the book provides science-based recommendations for a sustainable land use portfolio including several options such as forestry, pasture management, and the practices of indigenous peoples. In closing, the authors show how they integrated the local society by pursuing capacity building in compliance with the CBD ABS Convention on Biological Diversity Access and Benefit Sharing in the form of education and knowledge transfer for application.

Ecophysiology of root systems-environment interaction Boris Rewald, Omer Falik, Douglas Godbold, Shimon Rachmilevitch, 2014-09-03. There is a scarcity of detailed information regarding the ecophysiology of root systems and the way root system functioning is affected by both internal and external factors. Furthermore, global climate change is expected to increase the intensity of climate extremes such as severe drought, heat waves, and periods of heavy rainfall, in addition to other stresses such as salinization of soils, which are increasing worldwide. Recently, an increasing awareness has developed that understanding plant traits will play a major role in breeding of future crop plants. For example, there is increasing evidence that the traits of root systems are defined by the properties of individual roots. However, further knowledge on the functional importance of root segments and the molecular physiological mechanisms underlying root system functioning and persistence is needed and would specifically allow modifying crop root system functionality and efficiency in the future. Another major gap in knowledge is localized at the root-soil interface and, in regard to the potential adaptive plasticity of root rhizosphere interactions under abiotic stress and/or competition. It is currently unknown whether adaptations in microbe communities occur, for example, due to modified exudation rates and what are the subsequent influences on nutrient mobilization and uptake. Furthermore, uncovering the mechanisms by which roots perceive neighboring roots may not only contribute to our understanding of plant developmental strategies but also has important implications on the study of competitive interactions in natural communities and in optimizing plant performance and resource use in agricultural and silvicultural systems. In this Research Topic, we aimed to provide an online open access snapshot of the current state of the art of the field of root ecology and physiology with special focus on the translation of root structure to function and how root systems are influenced by interplay with internal and external factors such as abiotic stress, microbes, and plant-plant interaction. We welcomed original research papers but reviews of specific topics, articles formulating opinions, or describing cutting edge methods were also gladly accepted.

Plant Respiration: Metabolic Fluxes and Carbon Balance Guillaume Tcherkez, Jaleh Ghashghaie, 2018-02-20. There are currently intense efforts devoted to understand plant respiration from genes to ecosystems and its regulatory mechanisms. This is because respiratory CO₂ production represents a substantial carbon loss in crops and in natural ecosystems. Thus, in addition to manipulating photosynthesis to increase plant biomass production, minimization of respiratory loss should be considered in plant science.

and engineering However respiratorymetabolic pathways are at the heart of energy and carbon skeleton production and therefore it is an essential component of carbon metabolism sustaining key processes such as photosynthesis The overall goal of this book is to provide an insight in such interactions as well as an up to date view on respiratory metabolism taking advantage of recent advances and concepts from fluxomics to natural isotopic signal of plant CO₂ efflux It is thus a nonoverlapping complement to Volume 18 in this series Plant Respiration From Cell to Ecosystem which mostly deals with mitochondrial electron fluxes and plant scale respiratory losses

Forest Systems ,2014 **Tropical Forest Ecology and Management for the Anthropocene** Grizelle González,Ariel E. Lugo,2019-12-18 This Special Issue looks forward as well as backward to best analyze the forest conservation challenges of the Caribbean This is made possible by 75 years of research and applications by the United States Department of Agriculture International Institute of Tropical Forestry the Institute of Puerto Rico It transforms Holocene based scientific paradigms of the tropics into Anthropocene applications and outlooks of wilderness managed forests and urban environments This volume showcases how the focus of the Institute's programs is evolving to support sustainable tropical forest conservation despite uncertain conditions The manuscripts showcased here highlight the importance of shared stewardship and a long term hands on approach to conservation research programs and novel organizations intended to meet contemporary conservation challenges Policies relevant to the Anthropocene as well as the use of experiments to anticipate future responses of tropical forests to global warming are reexamined in these pages Urban topics include how cities can co produce new knowledge to spark sustainable and resilient transformations Long term results and research applications of topics such as soil biota migratory birds tropical vegetation substrate chemistry and the tropical carbon cycle are also described in the volume Moreover the question of how to best use land on a tropical island is addressed This volume is intended to be of interest to all actors involved in long term sustainable forest management and research in light of the historical lessons and future directions that may come out of a better understanding of tropical cities and forests in the Anthropocene epoch

Life History Evolution Michal Segoli,Eric Wajnberg,2025-03-10 Provides a timely and authoritative account of Life History Evolution by a multidisciplinary team of scholars and researchers from around the world Life History Evolution Traits Interactions and Applications presents a cutting edge synthesis of the mechanisms driving life history strategies that span the breadth of taxa from bacteria to humans Integrating classical and contemporary perspectives this comprehensive volume addresses how organisms evolve traits in response to diverse ecological pressures Editors Michal Segoli and Eric Wajnberg bring together leading experts to explore the intersection of evolutionary biology ecology and applied research focusing on the evolving complexity of life history traits and their implications In depth yet accessible chapters cover a broad spectrum of life history traits from classical traits of lifespan and reproduction to more complex interactions like social behaviour predator prey dynamics and human induced evolutionary processes The contributing authors explain essential concepts identify critical knowledge gaps discuss future research

directions and demonstrate the relevance of life history evolution in addressing climate change species invasion pollution and more Providing a well balanced understanding of life history traits and their implications Life History Evolution Incorporates recent advances in evolutionary theory including eco evolutionary feedback loops and anthropogenic impacts Offers diverse perspectives and original research from leading experts in fields such as evolutionary biology ecology entomology zoology agriculture and veterinary medicine Discusses life history evolution in the context of co evolved interactions such as predator prey parasite host plant herbivore and endosymbiont host relationships Provides an overview of the foundational theory recent developments and current thinking in the field Features numerous case studies that highlight real world applications in biological control wildlife management climate change adaptation and others Revealing how life history traits shape the evolutionary strategies of organisms Life History Evolution Traits Interactions and Applications is an essential resource for undergraduate and graduate students researchers industry professionals and policymakers in ecological science It is an ideal textbook for courses in evolutionary ecology evolutionary biology conservation biology environmental science and environmental management

Tropospheric Ozone S.B. Agrawal, Madhoolika Agrawal, Anita Singh, 2021-09-20 This book presents updated and relevant information on the tropospheric ozone problem and its effects on the plants and human health The contributions here present in depth knowledge about history pattern sources environmental factors and other necessary aspects of the tropospheric ozone problem The book provides a balanced view of current developments on the effects of the tropospheric ozone on plant and human health crop production and ecosystem services In addition to the effects of the tropospheric ozone on growth and physiological and biochemical traits it also considers the molecular basis of plant responses to ozone The book encompasses a holistic view on various interconnected issues of ozone pollution and will appeal to scientists from all over the world

Socioeconomic Environmental Studies Series ,1973 *Plant Diversity Patterns and Drivers* Qing Zhang, Gang Feng, Jinliang Liu, 2024-09-20 Biodiversity can provide a series of important ecosystem functions and ecosystem services which meet the needs of human beings Plants are the biological group with the highest carbon content on earth their diversity has attracted increased attention The interpretation of plant diversity patterns and drivers is crucial for the conservation and utilization of plant resources and is also one of the hot topics in plant science and ecology There are already many studies on the patterns and drivers of plant diversity including different diversity dimensions e.g taxonomic phylogenetic and functional diversity and spatial scales different plots sites watershed country continent and globe The mechanisms underlying plant diversity patterns are also quite complex For example many hypotheses are related to contemporary climate and soil conditions with temperature precipitation and soil nutrient being the most discussed drivers In addition paleoclimate and geological events may also have a strong legacy on current plant diversity patterns Except for these natural factors many anthropogenic activities including agriculture deforestation grazing urbanization and coal mining are also important drivers of plant diversity These anthropogenic activities can affect plant diversity patterns not only

directly but also indirectly through their effects on habitat loss and habitat fragmentation Therefore the current plant diversity patterns are the result of many interacting factors and need to be interpreted from a more comprehensive perspective This Research Topic will therefore provide a platform for sufficient communication aiming to integrate the research from different fields and deepen the understanding of the patterns and drivers of plant diversity We encourage the submission of theoretical and experimental studies on different plant groups such as seed plants ferns mosses and algae Studies based on new methods and technology such as genomics and drones are also welcomed We welcome the following specific topics Effects of historical factors such as paleoclimate geological events on plant diversity Plant diversity that driven by contemporary climate and anthropogenic activities The effect of habitat loss and fragmentation on plant diversity New methods of research on the patterns and drivers of plant diversity

Insect Ecology Timothy D. Schowalter, 2016-07-29
Insect Ecology An Ecosystem Approach Fourth Edition follows a hierarchical organization that begins with relatively easy to understand chapters on adaptive responses of insect populations to various environmental changes disturbances and anthropogenic activities how insects find food and habitat resources and how insects allocate available energy and nutrients Chapters build on fundamental information to show how insect populations respond to changing environmental conditions including spatial and temporal distribution of food and habitat The next section integrates populations of interacting species within communities and how these interactions determine structure of communities over time and space Other works in insect ecology stop there essentially limiting presentation of insect ecology to evolutionary responses of insects to their environment including the activities of other species The unique aspect of this book is its four chapters on ecosystem structure and function and how herbivores pollinators seed predators and detritivores drive ecosystem dynamics and contribute to ecosystem stability Provides the most advanced synthesis of insect ecology with updated material throughout and new chapters Presents the roles of insects in delivery of ecosystem services and applications to pest management and conservation Features full coverage of ecosystem structure and function balanced with essential background on evolutionary aspects Includes case studies highlighting practical and theoretical applications for topics covered in each chapter

Theories, Methods, and Practices of Wetland Degradation and Restoration Zhenguo Niu, Yijian Zeng, Haitao Wu, Guangxuan Han, Sheel Bansal, 2023-07-07

The Ecological Consequences of Environmental Heterogeneity
British Ecological Society. Symposium, 2000-08 The last decade has seen countless advances in the measurement and interpretation of the impacts of environmental heterogeneity upon organisms and ecological processes Progress has been made at a variety of scales of organisation Following a Symposium on Ecological Consequences of Environmental Heterogeneity a team of international experts has collaborated to produce this volume It discusses the effects of environmental heterogeneity the effects of spatial and temporal heterogeneity on individuals populations communities and biodiversity and the management and conservation implications of environment heterogeneity This book will prove to be an

invaluable reference work not only to advanced students but also established researchers working in the field

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