growth patterns in vascular plants is available in our book collection an online access to it is set as public so you can get it instantly. Our book servers spans in multiple countries, allowing you to get the most less latency time to download any of our books like this one. Kindly say, the growth patterns in vascular plants is universally compatible with any devices to read organized into four chapters and begins with an overview of growth and development, with reference to

Growth Patterns in Vascular Plants - Muhammad Iqbal - 1994
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Inanimate Life - George M. Briggs - 2021-07-16
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Plant Physiology 7A - F.C. Steward - 2012-12-02
Plant Physiology: A Treatise, Volume VIA: Physiology of Development: Plants and Their Reproduction explores the various problems of development and reproduction that arise as plants, responsive to environmental stimuli, develop a vegetative plant body and produce seeds and fruits or organs of perennation. This book considers the morphological aspects of vegetative reproduction and flowering, and perennation and dormancy. This volume is organized into four chapters and begins with an overview of growth and development, with reference to organization and patterns of development in vascular plants and the initiation and development of plants. The discussion then shifts to vegetative, sexual, and asexual reproduction in fungi, along with heterokaryosis and morphogenesis. The next chapter explores reproduction in plant biology, focusing on vegetative and sexual reproduction, sex determination, and photoperiodism. This book concludes by considering the physiological mechanisms underlying the production of organs of perennation and the establishment of dormancy. This text will be of value both to graduate students and to established investigators with specific interest in plant physiology.

plant-structure-and-development

Pattern Formation in Plant Tissues - Tsvi Sachs - 1991-02-21
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Growth and Development in Plants (Textbook Series: 21st Century Biology and Agriculture) - K.V. Krishnamurthy - 2015-06-01
The topic of the book is covered at the cellular, tissue, organ and organism levels and inputs from all these hierarchical levels of plant organization have been carefully integrated to get a holistic picture of growth and development in plants. The book will be useful to undergraduate, post-graduate and research students, and teachers of botany/plant sciences, plant biotechnology, agriculture and forestry.

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An Introduction to Plant Structure and Development - Charles B. Beck - 2010-04-22
A plant anatomy textbook unlike any other on the market today. Carol A. Peterson described the first edition as 'the best book on the subject of plant anatomy since the texts of Esau'. Traditional plant anatomy texts include primarily descriptive aspects of structure, this book not only provides a comprehensive coverage of plant structure, but also introduces aspects of the mechanisms of development, especially the genetic and hormonal controls, and the roles of plasmodesmata and the cytoskeleton. The evolution of plant structure and the relationship between structure and function are also discussed throughout. Includes extensive bibliographies at the end of each chapter. It provides students with an introduction to many of the exciting, contemporary areas at the forefront of research in the development of plant structure and prepares them for future roles in teaching and research in plant anatomy.

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Plant Systematics - Michael G. Simpson - 2019-11-10
Plant Systematics, Third Edition, has made substantial contributions to plant systematics courses at the upper-undergraduate and first year graduate level, with the first edition winning The New York Botanical Garden’s Henry Allan Gleason Award for outstanding recent publication in plant taxonomy, plant ecology or plant geography. This third edition continues to provide the basis for teaching an introduction to the biology, evolution and classification of land plants. A foundation of the approach, methods, research goals, evidence and terminology of plant systematics are presented, along with the most recent knowledge of evolutionary relationships of plants and practical information vital to the field. In this new edition, the author includes greatly expanded treatments on families of flowering plants, as well as tropical trees (all with full-color plates), and an updated explanation of maximum likelihood and Bayesian inference algorithms. Chapters on morphology and plant nomenclature have also been enhanced with new material. Covers research developments in plant molecular biology Features clear, detailed cladograms, drawings and photos Includes major revisions to chapters on phylogenetic systematics and plant morphology

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Plant Biology and Biotechnology - Bir Bahadur - 2015-07-02
This volume offers a much-needed compilation of essential reviews on diverse aspects of plant biology, written by eminent botanists. These reviews effectively cover a wide range of aspects of plant biology that have contemporary relevance. At the same time they integrate classical morphology with molecular biology, physiology with pattern formation, growth with genomics, development with morphogenesis, and classical crop-improvement biology, thus providing the theoretical basis for plant biotechnology. It goes without saying that biotechnology has emerged as a powerful discipline of Biology in the last three decades. Biotechnological tools, techniques and information, used in combination with appropriate planning and execution, have already contributed significantly to economic growth and development. It is estimated that in the next decade or two, products and processes made possible by biotechnology will account for over 60% of worldwide commerce and output. There is, therefore, a need to arrive at a general understanding and common approach to issues related to the nature, possession, conservation and use of biodiversity, as it provides the raw material for plants biology. More than 90% of the total requirements for the biotechnology industry are contributed by plants and microbes, in terms of goods and services. There are however substantial plant and microbial resources that are waiting for biotechnological exploitation in the near future through effective bioprospection. In order to exploit plants and microbes for their useful products and processes, we need to first understand their basic structure, organization, growth and development, cellular process and overall biology. We also need to identify and develop strategies to improve the productivity of plants. In view of the above, in this two-volume book on plant biology and biotechnology, the first volume is devoted to various aspects of plant biology and crop improvement. It includes 33 chapters contributed by 50 researchers, each of which is an expert in his/her own field of research. The book begins with an introductory chapter that gives a lucid account on the past, present and future of plant biology, thereby providing a perfect historical foundation for the chapters that follow. Four chapters are devoted to details on the structural and developmental aspects of the structures of plants and their principal organs. These chapters provide the molecular biological basis for the regulation of morphogenesis of the form of plants and their organs, involving control at the cellular and tissue levels. Details on biodiversity, the basic raw material for biotechnology, are discussed in a separate chapter, in which emphasis is placed on the genetic, species and ecosystem diversities and their conservation. Since fungi and other microbes form an important component of the overall biodiversity, special attention is paid to the treatment of fungi and other microbes in this volume. Four chapters respectively deal with fungi that have a special relationship with the superfamily of plants, their genetic, species and ecosystem diversities, diversity and practical applications of mushrooms, and lichens (associated with a photobiont). Microbial endosymbionts associated with plants and phosphate solubilizing microbes in the rhizosphere of plants are exhaustively treated in two separate chapters. The reproductive strategies of bryophytes and an overview on Cycads form the subject matter of another two chapters, thus fulfilling the need to deal with the non-flowering Embryophyte group of plants from a biotechnological perspective, are examined exhaustively in this volume. The chapters on angiosperms provide an overview and cover the genetic basis of flowers development, pre-and post-fertilization reproductive growth and development, seed biology and technology, plant secondary metabolism, photosynthesis, and plant volatile chemicals. A special effort has been made to include important topics on crop improvement in this volume. The importance of pollination services, apomixis, male sterility, induced mutations, polyploidy and climate changes is discussed, each in a separate chapter. Microalgalmutra-pharmaceuticals, vegetable-oil-based nutreucuticals and the importance of alien crop resources and underutilized crops for food and nutritional security form the topics of three other chapters in this volume. There is also a special chapter on the applications of remote sensing in the plant sciences, which also provides information on biodiversity distribution. The editors of this volume believe the wide range of basic topics on plant biology that have great relevance in biotechnology covered will be of great interest to students, researchers and teachers of botany and plant biotechnology alike.

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dynamics of ecosystems? This Research Topic highlights the latest discussions and research on biomes, drawing requirements for the biotechnology industry are contributed by plants and microbes, in terms of goods and services. There are however substantial plant and microbial resources that are both valuable and critical in the near future through effective bioprospection. In order to exploit plants and microbes for their useful products and processes, we need to first understand their basic structure, organization, growth and development, cellular process and overall biology. We also need to identify and develop strategies to improve the productivity of plants. In view of the above, in this two-volume book on plant biology and biotechnology, the first volume is devoted to various aspects of plant biology and crop improvement. It includes 53 chapters contributed by 50 researchers, each of which is an expert in his/her own field of research. The book begins with an introductory chapter that gives a lucid account on the past, present and future of plant biology, thereby providing a perfect historical foundation for the chapters that follow. Four chapters are devoted to details on the structural and developmental aspects of the structures of plants and their principal organs. These chapters provide the molecular biological basis for the regulation of morphogenesis of the form of plants and their organs, involving control at the cellular and tissue levels. Details on biodiversity, the basic raw material for biotechnology, are discussed in a separate chapter, in which emphasis is placed on the genetic, species and ecosystem diversities and their conservation. Since fungi and other microbes form an important component of the overall biodiversity, special attention is paid to the treatment of fungi and other microbes in this volume. Four chapters respectively deal with an overview of fungi, arbuscularmycorrhizae and their role in the sustenance of plant wealth, diversity and practical applications of mushrooms, andlichens (associated with a photobiont). Microbial endosymbionts associated with plants and phosphate solubilizing microbes in the rhizosphere of plants are exhaustively treated in two separate chapters. The reproductive strategies of bryophytes and an overview on Cycads form the subject matter of another two chapters, thus fulfilling the need to deal with the non-flowering Embryophyte group of plants. Angiosperms, the most important group of plants from a biotechnological perspective, are examined exhaustively in this volume. The chapters on angiosperms provide an overview and cover topics such as florid development, pre- and post-fertilization, seed biology and technology, plant secondary metabolism, photosynthesis, and plant volatile chemicals. A special effort has been made to include important topics on crop improvement in this volume. The importance of pollination services, apomixes, male sterility, induced mutations, polyloidy and climate changes is discussed, each in a separate chapter. Microalgal-nutra-pharmaceuticals, vegetable-oil-based nutraceuticals and the importance of crops for food and non-food use are covered in this volume. There is also a special chapter on the applications of remote sensing in the plant growth, which also provides information on biodiversity distribution. The editors of this volume believe the wide range of basic topics on plant biology that have great relevance in biotechnology covered will be of great interest to students, researchers and teachers of botany and plant biotechnology alike.

Revisiting the Biome Concept with a Functional Lens - David M. Griffith - 2019-08-02
Early biogeographers such as Alexander von Humboldt recognized the broad-scale coupling of vegetation and climate. This observation shaped the modern biome concept which organizes ecosystems by assumed relationships to environmental controls. This approach has been criticized for missing key impacts on the distribution and functioning of biomes like historical contingency, biogeographic history, disturbance ecology, and evolution. Are biomes still a convenient framework for organizing our understanding of biodiversity? What factors determine the functional differences among and within biomes, and at what spatial, temporal, and phylogenetic scales are those drivers most important? How can we better represent the functional characteristics and dynamics of ecosystems? This Research Topic highlights the latest discussions and research on biomes, drawing from a wide range of approaches spanning from macroecology and phyogeography to remote sensing and modelling ecosystem responses to global change.

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Physiology of Woody Plants - Stephen G. Pallardy - 2010-07-20
Woody plants such as trees have a significant economic and climatic influence on global economies and ecologies. This completely revised classic book is an up-to-date synthesis of the intensive research devoted to woody plants published in the two decades since the previous edition was published. The book makes it useful to a broad range of scientists and researchers from agroforesters, agronomists, and arborists to plant pathologists and soil scientists. This third edition provides crucial updates to many chapters, including: responses of plants to elevated CO2; the process and regulation of cambial growth; photoinhibition and photosynthesis under water stress; and carbon and nitrogen metabolism and internal recycling, and more. Revised chapters focus on emerging discoveries of the patterns and processes of woody plant physiology. * The only book to provide recommendations for the use of specific management practices and experimental procedures and equipment * Updated coverage of nearly all topics of interest to woody plant physiologists * Extensive revisions of chapters relating to key processes in growth, photosynthesis, and water relations * More than 50 new references * Examples of molecular-level evidence incorporated in discussion of the role of expansion proteins in plant growth; mechanism of ATP production by coupling factor in photosynthesis, the role of cellulose synthase in cell wall construction; structure-function relationships for aquaporin proteins

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Viroids and Satellites - Ahmed Hadidi - 2017-07-18
Viroids and Satellites describes plant diseases and their causal agents while also addressing the economic impact of these diseases. The book discusses various strategies for state-of-the-art methods for the detection and control of pathogens in their infected hosts and provides pivotal information from the discovery of viroids through the analysis of their molecular and biological properties, to viroid pathogenesis, host interactions, and RNA silencing pathways. Students, researchers and regulators will find this to be a comprehensive resource on the topics presented. Provides coverage of the basic biological properties of disease, along with applied knowledge Features economic impacts, transmission, geographical distribution, epidemiology, detection, and control within each chapter. Organizes viroid diseases by viroid taxonomy and viroid species

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The Effects of Partial Cutting on Stand Structure and Growth, and Forest Plant Communities of Western Hemlock-Sitka Spruce Stands in Southeast Alaska - Robert L. Deal - 1999

This study evaluated the effects of partial cutting on stand structure and growth, patterns of conifer regeneration, stand mortality and disease, and understory plant diversity and abundance. Seventy-three 1/5 ha plots were established in 18 partially cut stands throughout southeast Alaska. These stands were partially cut 12 to 96 years ago removing 16 to 96 percent of the original stand basal area. Partial cutting resulted in stands that had complex structures and these structures appear similar to uncut old-growth stands. Sitka spruce was maintained over a wide range of cutting intensities, and conversion to hemlock-dominated stands generally did not occur. New spruce regeneration was established in 23 of 55 partially cut plots compared with new spruce found in only 2 of the 18 uncut plots. The current stand basal area, tree species composition, and stand growth were strongly related to trees left after harvest. Trees that were 10 to 70 cm d.b.h. at time of cutting had the greatest tree diameter growth. Little of the stand growth since harvest came from new regeneration or trees greater than 70 cm d.b.h. The diameter growth of residual hemlock and spruce trees were similar. The species richness of vascular plants was maintained over a wide range of cutting intensities and understory plants and bryophytes was similar among uncut and partially cut plots and did not significantly change with different cutting intensities. Overall, plant community structures were similar between the uncut and partially cut plots. However, moderate and heavy cutting intensities had a significantly different plant community composition. The abundance of most deer forage plants did not significantly change after partial cutting. It appears that silvicultural systems that use single tree selection or small openings can be successful for timber management purposes in southeast Alaska. Concerns about changing tree species composition, lack of spruce regeneration, greatly reduced stand growth and vigor, increased dwarf mistletoe infection in hemlock trees, and higher incidence of tree wounding, decay, and mortality with partial cuts were largely unsubstantiated. Stand structural diversity, species richness and understory plant abundance were all greater in partially cut stands than in young-growth stands developing after clearcutting.

Platforms on Networks - Allen G. Hunt - 2016-01-01

Order from chaos is simultaneously a mantra of physics and a reality in biology. Physicist Norman Packard suggested that life developed and thrives at the edge of chaos. Questions remain, however, as to how much practical knowledge of biology can be traced to existing physical principles, and how much physics has to change in order to address the complexity of biology. Phil Anderson, a physics Nobel laureate, contributed to popularizing a new notion of the end of “reductionism.” In this view, it is necessary to abandon the quest of reducing complex behavior to known physical results, and to identify emergent behaviors and principles. In the present book, however, we have sought physical rules that can underlie the behavior of biota as well as the geochemistry of soil development. We looked for fundamental principles, such as the dominance of water flow paths with the least cumulative resistance, that could maintain their relevance across a wide range of spatial and temporal scales, together with the approach of macroscopic fluid flow analysis of solute transport and associated with such flow paths. Thus, ultimately, we address both nutrient and water transport limitations of processes from chemical weathering to vascular plant growth. The physical principles guiding our effort are established in different, but related concepts and fields of research, so that in fact our book applies reductionist techniques guided by analogy. The fact that fundamental traits extend across biotic and abiotic processes, i.e., the same fluid flow rate is relevant to both, but that...
include all kinds of roots, not only the shoot-borne ones. The endogenous signals that control root formation, and of these nominally different disciplines of geochemistry and geobiology within the same framework. It has been our goal in writing this book to share the excitement of learning, and one of the most exciting portions to us has been the ability to bring some order to the question of the extent to which soils can facilitate plant growth, and what limitations on plant sizes, metabolism, occurrence, and correlations can be formulated thereby. While we bring order to the soil constraints on growth, we also generate some uncertainties in the scaling relationships of plant growth and metabolism. Although we have made an first attempt to incorporate edaphic constraints into allometric scaling, this is but an initial foray into the forest.

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**Plant Stress Physiology** - Akbar Hossain - 2021-01-20
Due to the changing climate, food security for the increasing population has raised a great threat globally. Therefore, it is imperative to find alternate solutions for enhancing agricultural sustainability through plant stress physiology. The concept of plant stress physiology has been well-established over the past 60 years due to the increasing trends of environmental stress. Researchers have found that crop stress physiology has an association with two main areas, one is concerned with agronomy, the other concerned with plant breeding. The contents of the current book emphasize the integration of both breeding and agronomy strategies to ensure agricultural productivity and environmental safety under changing climate.

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**Biological of Root Formation and Development** - Arie Altman - 2012-12-06
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**Trends in European Forest Tree Physiology Research** - Satu Huttunen - 2013-04-17
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The increasing con...ers for the serious problems of forest decline that occurred in the Northern Hemisphere in the late 1970’s and early 1980’s led to an emphasis on the necessity of promoting and setting up investigations into the basic physiological mechanisms of forest trees. Since then, the concern about rapid changes has decreased along with the increase of monitored data on European forests health status. But tree physiology has faced new questions about changing climate and increasing atmospheric carbon dioxide concentrations. Advances in plant molecular biology and forest genetics have opened up new avenues in the research on forest tree physiology. At the same time it has become evident that molecular and genetic tools give only a basis for further research on tree structure and function, which needs basic tree physiology again. On the other hand, the problems of forest decline in Europe are not over. They are no longer discussed daily in the media, but stress is an everyday phenomenon experienced by European forest trees. For instance, in southern Europe and mountainous regions, drought stress and many other abiotic or biotic factors are stressors and cause problems to forests with many important social and protective functions. Stress physiology is a branch of everyday physiology in traditional forestry. How to grow a forest with maximal carbon binding functions and optimal wood quality and rich in biodiversity.
Asymmetry in Plants - Bir Bahadur - 2019-03-25
Plants exhibit forms of asymmetry analogous to “handedness” in bilaterally symmetrical animals. This book explores the evolutionary significance and development of asymmetry. Examples of genetic control include the direction of tendril or stem coiling of many climbing plants; the so-called spiral phyllotaxy and floral taxy; and contorted petal arrangement is another kind of left-right symmetry in plants; the direction of contortion is fixed in some but not in other plants. The book will underscore the all phenomena related to handedness start during embryogenesis itself, with the occurrence of embryo rotation. Key selling features: First consolidated book on Plant Handedness Relates handedness, asymmetry and chirality to the evolution of different organizational levels in plant biology Emphasizes handedness as a vital governing force in plant functional evolution Provides a new perspective, hitherto ignored, into plant development and evolution Describes how an age-old phenomenon can give scope for investigation from a very modern interdisciplinary approach

Vascular Plants as Epiphytes - Ulrich Lüttge - 2012-12-06
In his lectures my teacher Karl Magdrefau used to say that one only becomes a real plant scientist when one enters a tropical rainforest. For me this initiation occurred in 1969 in northern Queensland, Australia, and was associated with the greatest excitement. On another level it received confirmation when I set out in 1983 together with some friends and colleagues for the first detailed ecophysiological studies of epiphytes in the wet tropics in situ in the island of Trinidad and later for similar work in Venezuela. This then promoted the idea of organizing a special symposium on “The evolution and ecophysiology of vascular plants as epiphytes” during the XIV International Botanical Congress in July 1987 in Berlin, and to ask some of the speakers to produce chapters for a small monograph on the interesting ecologically defined group of plants “epiphytes” as presented in this volume of “Ecological Studies”. The enthusiasm of the participants of the symposium giving reports and adding to the discussion was most stimulating, and it appears that epiphytes might gain well-deserved, wider consideration in the future. The cooperation with the authors of this book was very pleasant and I appreciated the new contacts established with adepts of the “epiphyte community”. The chapters were organized and arranged covering first more gen eral aspects with setting the scene in Chapter 1, the evolution of epi phytin in Chapter 2 and the role of CO-concentrating mechanisms in 2 Chapter 3.

Experimental Embryology of Vascular Plants - B. M. Johri - 2012-12-06
A long time ago botany used to be regarded as the scientia amabilis, the friendly science, eminently suitable for leisureed amateurs. Since then, and particularly in this century, it has grown tremendously in its importance and in its intimate contacts with various other disciplines of science, some of which, like plant genetics and plant physiology, at one time indeed used to be included under the broad term botany. In spite of the fact that such subjects have expanded into major scientific fields of their own, botany, the mother science, continues to maintain its central place: this is because it deals with plants which constitute one of the most vital life-supporting systems of this planet. Furthermore, interacting and benefiting from advances made in other sciences, it has steadily progressed in a number of areas. Experimental embryology of vascular plants is one such field where spectacular advances have been made in recent years. The time is therefore opportune for the publication of an authoritative book on the subject. It is very appropriate that the book has been planned and edited by Professor B. M. Johri, one of India’s foremost botanists, whose contributions in embryology, plant morphology and morphogenesis are internationally known. He was closely associated over a number of years with Professor P. Maheshwari, the great botanist and embryologist, to whom the book is dedicated.

Patterns in Plant Development - Taylor A. Steeves - 1972

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organisms are studied and interpreted and takes the student through all the relevant uses and interpretations of fossil plants. With new chapters on additional flowering plant families, paleoecology and the structure of ancient plant communities, fossil plants as proxy records for paleoclimate, new methodologies used in phylogenetic reconstruction and the addition of new fossil plant discoveries since 1993, this book provides the most comprehensive account of the geologic history and evolution of microbes, algae, fungi, and plants through time. *Major revision of a 1993 classic reference *Lavishly illustrated with 1,800 images and user-friendly for use by paleobotanists, biologists, geologists and other related scientists *Includes an expanded glossary with an extensive up-to-date bibliography and a comprehensive index *Provides extensive coverage of fungi and other microbes, and major groups of land plants both living and extinct

**Paleobotany** - Edith L. Taylor - 2009-01-21
This book provides up-to-date coverage of fossil plants from Precambrian life to flowering plants, including fungi and algae. It begins with a discussion of geologic time, how organisms are preserved in the rock record, and how organisms are studied and interpreted and takes the student through all the relevant uses and interpretations of fossil plants. With new chapters on additional flowering plant families, paleoecology and the structure of ancient plant communities, fossil plants as proxy records for paleoclimate, new methodologies used in phylogenetic reconstruction and the addition of new fossil plant discoveries since 1993, this book provides the most comprehensive account of the geologic history and evolution of microbes, algae, fungi, and plants through time. *Major revision of a 1993 classic reference *Lavishly illustrated with 1,800 images and user-friendly for use by paleobotanists, biologists, geologists and other related scientists *Includes an expanded glossary with an extensive up-to-date bibliography and a comprehensive index *Provides extensive coverage of fungi and other microbes, and major groups of land plants both living and extinct

**Plant Strategies and the Dynamics and Structure of Plant Communities. (MPB-26), Volume 26** - David Tilman - 2020-03-31
Although ecologists have long considered morphology and life history to be important determinants of the distribution, abundance, and dynamics of plants in nature, this book contains the first theory to predict explicitly both the evolution of plant traits and the effects of these traits and community structure and dynamics. David Tilman focuses on the universal requirement of terrestrial plants for both below-ground and above-ground resources. The physical separation of these resources means that plants face an unavoidable tradeoff. To obtain a higher proportion of one resource, a plant must allocate more of its growth to the structures involved in its acquisition, and thus necessarily obtain a lower proportion of another resource. Professor Tilman presents a simple theory that includes this constraint and tradeoff, and uses the theory to explore the evolution of plant life histories and morphologies along productivity and disturbance gradients. The book shows that relative growth rate, which is predicted to be strongly influenced by a plant's proportional allocation to leaves, is a major determinant of the transient dynamics of competition. These dynamics may explain the differences between successions on poor versus rich soils and suggest that most field experiments performed to date have been too short a duration to allow unambiguous interpretation of their results.

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Plants presents the mechanism of phloem transport, the processes of symplasmic loading and unloading, as well as the influence of environmental stresses on the phloem. Besides cell-to-cell symplasmic transport, the significance of long-distance symplasmic transport of solutes in phloem elements is also reviewed. Symplasmic Transport in Vascular Plants presents the mechanism of phloem transport, the processes of symplasmic loading and unloading, as well as the role of pre- and post-phloem transport, with special attention paid to symplasmic transport in wood. Finally, the relevance of the spread of both macromolecules and viruses, via phloem, is presented.

Symplyasmic Transport in Vascular Plants - Katarzyna Sokolowska - 2013-07-25

Concentrates on symplasmic transport of small molecules, although the cell-to-cell transport of macromolecules will also be discussed. This book characterizes the efficiency of symplasmic transport, mechanisms of molecule passage via plasmodesmata, and the external and internal factors that regulate plasmodesmal conductivity. In this context, the book focused on the role of symplasmic domains in plant development, as well as the influence of environmental stresses on the plasmodesmata. Besides cell-to-cell symplasmic transport, the significance of long-distance symplasmic transport of solutes in phloem elements is also reviewed. Symplasmic Transport in Vascular Plants presents the mechanism of phloem transport, the processes of symplasmic loading and unloading, as well as the role of pre- and post-phloem transport, with special attention paid to symplasmic transport in wood. Finally, the relevance of the spread of both macromolecules and viruses, via phloem, is presented.

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predicting how the Arctic will respond to global climate change

Arctic Ecosystems in a Changing Climate - F. Stuart Chapin III - 2012-12-02
The arctic region is predicted to experience the earliest and most pronounced global warming response to human-induced climatic change. This book synthesizes information on the physiological ecology of arctic plants, discusses how physiological processes influence ecosystem processes, and explores how climate warming will affect arctic plants, plant communities, and ecosystem processes. Key Features * Reviews the physiological ecology of arctic plants * Explores biotic controls over community and ecosystems processes * Provides physiological bases for predicting how the Arctic will respond to global climate change

Embryos - Jonathan Bard - 1994
In this highly illustrated atlas, a group of internationally known authors review the development and significance of Arabidopsis, Dictyostelium discoideum, sea urchin, nematode worm, mollusc, leech, Drosophila, fish, toad, chick, mouse and human.

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Differenzierung und Entwicklung / Differentiation and Development - - 2013-11-11
Global Ecology focuses on the perception of the biosphere or the ecosphere as a unified cooperative system with numerous synergistic effects, which describe the distinctive properties of this sphere. This book is subdivided into five parts dealing with diverse aspects in global ecology. The first part of the book provides comprehensive description of the biosphere, including its unique characteristics and evolution. This part also describes various spheres in the biosphere, such as the hydrosphere, noosphere, and pedosphere as well as their composition. The next part focuses on the global cycles, including calcium, carbon, iron, microbial nitrogen, oxygen, phosphorus, sulfur, and water cycles. In addition, global balances and flows are explained. Presented in the third part are the results of the global cycles and flows as well as the patterns of the climatic factors and marine currents. There is also a part discussing the climate interactions, climatic changes, and its effect on the living organisms. The book concludes by covering the application of stoichiometry in the biosphere and in ecosystems. The book offers a comprehensive view of global ecology and ecological stoichiometry, which will aid in the processes of global ecology. Provides an overview of the theory and application of global ecology International focus and range of ecosystems makes Global Ecology an indispensable resource to scientists Based on the bestselling Encyclopedia of Ecology Full-color figures and tables support the text and aid in understanding

Differenzierung und Entwicklung / Differentiation and Development - - 2013-11-11

Plant Structure and Function - Cecie Starr - 2005-11
Designed for general, non-majors biology courses, and includes a brief history of vascular plant tissues, growth patterns, plant nutrition and transport, plant hormones, reproduction, and development. This book covers Chapters 28-32 from Biology: The Unity and Diversity of Life.

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