

# Plant Structure And Growth

Patterns in Plant Development offers an introduction to the development of the whole plant.

Seed and seedlings; Germination of seeds; Cell structure and protoplasm; Roots; Absorption of water and mineral salts; The Soil; Stems and buds; Pruning and training plants; Propagation; Leaf structure; Food making; Transpiration; Balance of root and shoot; Fertilizers; Nitrogen.

Key Benefit: For non-majors and mixed-majors introductory botany (plant biology) courses. Plant Biology focuses readers on the function of plants and the role

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they play in our world. With evolved content and a new organization, the authors emphasize the scientific method to help readers develop the critical thinking skills they need to make sound decisions throughout life. Together, the emphasis on how plants work and the development of critical-thinking skills support the authors' goal of fostering scientific literacy. Key Topics: Introduction to Plant Biology, Plants and People, Molecules and Plants, Cells, Photosynthesis and Respiration, DNA, RNA, and Protein Synthesis, Cell Division: Mitosis and Cytokinesis, Plant Structure, Growth, and Development, Stems, Roots, Leaves, Plant Behavior, Reproduction, Meiosis, and Life Cycles,

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Genetics and the Laws of Inheritance, Genetic Engineering, Biological Evolution, Naming and Organizing Microbes, Viruses, and Plants, Prokaryotes and the Origin of Life, Protists and the Origin of Eukaryotic Cells, Fungi and Lichens, Seedless Plants: Bryophytes, Lycophytes, and Pteridophytes, Gymnosperms and the Origin of Seeds, Angiosperm Reproduction: Flowers, Fruits, and Seeds, Flowering Plant and Animal Coevolution: Pollination and Seed Dispersal, Principles of Ecology and the Biosphere, Arid Terrestrial Ecosystems, Moist Terrestrial Ecosystems, Aquatic Ecosystems, Human Impacts and Sustainability  
Market Description: For those interested in learning the

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basics of plant biology

Suitable for instructors teaching plant structure at the high school, college, and university levels, this title includes exercises that have been tested, require minimal supplies and equipment, and use plants that are readily available. It contains a glossary of terms, an index, and a list of suppliers of materials required.

Molecular Biology of the Cell

Hormones and Environment

An Introduction to Plant Structure and Development

Patterns in Plant Development

Essentials of Developmental Plant Anatomy

**Young scientists will love this nature mystery that**

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**reveals the secrets hiding in seeds, plants, flowers, and fruits throughout the life cycle of various flora. Curiosity will bloom in this introduction to botany and primary nature science. Plants come in all shapes and sizes, but they go through the same stages as they grow. Using four common plants, young readers learn about plant structure and life cycle. Simple text and colorful, detailed illustrations show the major phases of plant growth with each stage holding a “secret” for curious readers to guess. Back matter offers more information on each plant, as well as greater detail on each stage of growth. Introduction to plants; Matter and mechanics of cells; Plants and water; The transformation of energy; Mineral nutrition of plants; Introduction to plant structure;**

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**Structure of tracheophytes; Ecology; Plant growth and development; Reproduction; The plant kingdom.**

**From Galileo, who used the hollow stalks of grass to demonstrate the idea that peripherally located construction materials provide most of the resistance to bending forces, to Leonardo da Vinci, whose illustrations of the parachute are alleged to be based on his study of the dandelion's pappus and the maple tree's samara, many of our greatest physicists, mathematicians, and engineers have learned much from studying plants. A symbiotic relationship between botany and the fields of physics, mathematics, engineering, and chemistry continues today, as is revealed in Plant Physics. The result of a long-term collaboration between plant**

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**evolutionary biologist Karl J. Niklas and physicist Hanns-Christof Spatz, *Plant Physics* presents a detailed account of the principles of classical physics, evolutionary theory, and plant biology in order to explain the complex interrelationships among plant form, function, environment, and evolutionary history. Covering a wide range of topics—from the development and evolution of the basic plant body and the ecology of aquatic unicellular plants to mathematical treatments of light attenuation through tree canopies and the movement of water through plants' roots, stems, and leaves—*Plant Physics* is destined to inspire students and professionals alike to traverse disciplinary membranes. A thoroughly updated fourth edition, providing a**

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**comprehensive and well-illustrated guide to all tissues and organs of flowering plants.**

**Plant Growth**

**Anatomy of Flowering Plants**

**A Workbook with an Audio Program Approach**

**Plant Development**

**Stress Physiology of Woody Plants**

The lentil is a crop primarily grown in the developing world. It has the ability to use water efficiently and grow in marginal environments as well as being high in protein. This title includes chapters that outline improvements in production, such as water and soil nutrient management,

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agronomy, mechanization, and weed management. Originally published in 1993, and long out-of-print, this book has become a classic. The book covers the developmental anatomy of large, complex plants, particularly of perennial shrubs and trees that grow and survive for decades and centuries. The book is focused on the meaning of that anatomy, the integrated structure, as a determinant of effective function. A pervading theme is that the plant structures that have "survived" evolution within the larger context of geologic and climatic evolution are well attuned to

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biochemical and biophysical principles that determine and define efficient function. This book is intended for those who have already studied the anatomy and development of plants. It is addressed to advanced students, teachers and researchers in the broad, interrelated fields of botany, forestry, horticulture and agronomy, and to others having professional interests in the culture of woody plants and the stewardship of ecosystems. It is especially addressed to those who, by study and research, seek to narrow the wide gap between the cellular and molecular

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biology approaches to understanding the format and content of inherited information, and the actual morphogenesis and integrated functioning of higher plant organisms. The book is focused on vegetative growth and development. Limitations of space precluded a treatment of reproductive development and of morphogenesis in fruits and seeds. The authors, however, have included a chapter on embryogeny as the beginning of development of the individual higher plant organism. "Plant Structure: Function and Development, first published in 1993, remained in

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print for such a short time that many of us missed the opportunity to purchase a copy (I have been working with a tattered photocopy for the past 7 years). The authors note in the preface that "complex plants, particularly woody plants . . . have survived eons of organismal evolution" and as such "are well attuned to biochemical and biophysical principles that determine and define efficient function." Too often plant anatomy has been treated in isolation from its' all-important functional significance. The authors of this book provide a welcome and well-developed bridge between

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structure and physiology, as well as providing the developmental aspects critical to a complete understanding. Not only does the book provide valuable insights for biologists studying extant plants (including applied areas of horticulture, agronomy and forest biology), but it is also, in my view, a valuable resource for paleobotanists, particularly those interested the rapidly growing area of paleo-ecophysiology. Often woody plants are given only cursory attention in plant structure texts, but not so here. Both Romberger and Hejnowicz spent their professional careers studying

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woody plants, and their insights are critical to the success of this treatise. Although the book is primarily a very turgid reference source, it could also serve as a text for advanced undergraduate or graduate courses - and then would become a valuable library addition for those students."

Richard Jagels Professor of Forest Biology  
University of Maine

Now you can tailor the Seventh Edition of Biology: The Unity and Diversity of Life specifically to the topics you cover in your course. Six paperbacks are available: Cell Biology and Genetics, Evolution of

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Life, Plant Structure and Function, Animal Structure and Function, and Ecology and Behavior...The Plant Structure and Function volume includes vascular plant tissues, growth patterns, plant nutrition and transport, reproduction, plant hormones, and development. (In hardcover version, Unit V, Chs. 29-32.)

This revision of the now classic Plant Anatomy offers a completely updated review of the structure, function, and development of meristems, cells, and tissues of the plant body. The text follows a logical structure-based organization. Beginning

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with a general overview, chapters then cover the protoplast, cell wall, and meristems, through to phloem, periderm, and secretory structures. "There are few more iconic texts in botany than Esau's Plant Anatomy... this 3rd edition is a very worthy successor to previous editions..." ANNALS OF BOTANY, June 2007

Plant Anatomy for the Twenty-First Century

Plant Secrets

The Lentil

Physiology of Plants Under Stress

A Color Atlas of Plant Structure

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**This fundamental guide to understanding plant structure offers plant scientists, plant biologists and horticulturalists - in practice, in academic life and in training - a combination of concise scientific text and superb color photographs and line drawings. It is designed as a tool for teaching and revision at undergraduate and graduate levels, as a complement to traditional textbooks and as a general reference for professionals and researchers. The book, containing over 380 illustrations, deals with the development and mature**

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**form of plants, focusing on structure at the anatomical, histological and fine structure levels. Appropriate emphasis is given to plants of economic importance.**

**Written by a team of best-selling authors, BIOLOGY: THE UNITY AND DIVERSITY OF LIFE, 14th Edition reveals the biological world in wondrous detail. Packed with eye-catching photos and images, this text shows and tells the fascinating story of life on Earth, and engages readers with hands-on activities that encourage critical thinking. Chapter opening Learning Roadmaps help**

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**you focus on the topics that matter most and section-ending Take Home Messages reinforce key concepts. Helpful in-text features include a running glossary, case studies, issue-related essays, linked concepts, self-test questions, data analysis problems, and more. Known for a clear, accessible style, BIOLOGY: THE UNITY AND DIVERSITY OF LIFE, 14th Edition puts the living world of biology under a microscope for readers from all walks of life to analyze, understand, and enjoy! Important Notice: Media content referenced within the**

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**product description or the product text may not be available in the ebook version.**

**In this book, the author analyzes plant form and how it has evolved in response to basic physical laws. He examines the ways these laws limit the organic expression of form, size, and growth in a variety of plant structures and in plants as whole organisms, drawing on both the fossil record and studies of extant species.**

**Understanding plant anatomy is not only fundamental to the study of plant systematics and palaeobotany, but is also**

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**an essential part of evolutionary biology, physiology, ecology and the rapidly expanding science of developmental genetics. This modernised new edition covers all aspects of comparative plant structure and development, arranged in a series of chapters on the stem, root, leaf, flower, pollen, seed and fruit. Internal structures are described using magnification aids from the simple hand-lens to the electron microscope. Numerous references to recent topical literature are included, and new illustrations reflect a**

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**wide range of flowering plant species. The phylogenetic context of plant names has been updated as a result of improved understanding of the relationships among flowering plants. This clearly written text is ideal for students studying a wide range of courses in botany and plant science, and is also an excellent resource for professional and amateur horticulturists.**

**Meristems, Cells, and Tissues of the Plant Body: Their Structure, Function, and Development**

**Developmental and Comparative Aspects of**

### **Plant Structure and Function** **An Introduction to Plant Anatomy** **Understanding Plant Anatomy** **Plant Biomechanics**

Plant form and function; Some uses of mathematics; Exponential growth; Relative growth rates; Net assimilation rates; Efficiency and expediency of plant growth references; Physiological determinants of plant growth; Leaf photosynthesis; The light-use efficiency; Leaf structure and growth, optical properties and positioning; Canopy structure and the plant light environment; Plant morphology; Root-shoot interactions; Plant development; Flowering; The

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environment; The analysis and synthesis of plant growth.

This book provides current information on synthesis of plant hormones, how their concentrations are regulated, and how they modulate various plant processes. It details how plants sense and tolerate such factors as drought, salinity, and cold temperature, factors that limit plant productivity on earth. It also explains how plants sense two other environmental signals, light and gravity, and modify their developmental patterns in response to those signals. This book takes the reader from basic concepts to the most up-to-date thinking on these topics. \* Provides

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clear synthesis and review of hormonal and environmental regulation of plant growth and development \* Contains more than 600 illustrations supplementary information on techniques and/or related topics of interest \* Single-authored text provides uniformity of presentation and integration of the subject matter \* References listed alphabetically in each section

This is an authoritative text/reference on the structure and development of seed plants. It presents the latest concepts in plant anatomy through experimental, histochemical, and ultrastructural approaches to the study of biological material. The book also includes new

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concepts and terms; expanded sections on flower, fruit, and seed; and a new description of characters used in keying out woods. · Development Of The Seed Plant · The Cell · Cell Wall · Parenchyma And Collenchyma · Sclerenchyma · Epidermis · Xylem: General Structure And Cell Types · Xylem: Variation In Wood Structure · Vascular Cambium · Phloem · Periderm · Secretory Structures · The Root: Primary State Of Growth · The Root: Secondary State Of Growth And Adventitious Roots · The Stem: Primary State Of Growth · The Stem: Secondary Growth And Structural Types · The Leaf: Basic Structure And Development · The Leaf: Variations In Structure · The Flower: Structure And

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Development · The Flower: Reproductive Cycle · The Fruit · The Seed · Embryo And Seedling

An Introduction to Plant Structure and Development  
Plant Anatomy for the Twenty-First Century  
Cambridge University Press

Plant Cell Walls

Plant Structure and Function

Function and Development : a Treatise on Anatomy and Vegetative Development, with Special Reference to Woody Plants

Some Interrelationships Between Leaf Structure, Function and Plant Growth in Selected C3 and C4 Pathway Plants

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The Cellular Basis

***Contemporary Problems in Plant Anatomy contains the proceedings of a plant anatomy symposium that took place at Duke University and The University of North Carolina at Chapel Hill in 1983. The symposium addressed challenges in four basic research areas in contemporary plant anatomy: leaf development, floral development, differentiation of cells and tissues, and systematic and ecological anatomy. The book highlights new techniques and approaches for dealing with problems in each of these areas. Organized into 12 chapters, this***

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***volume begins with an overview of the stem-conducting tissues in monocotyledons; the development of vascular tissue patterns in the shoot apex of ferns; the role of subsidiary trace bundles in stem and leaf development of the dicotyledoneae; and the structure of phloem. It then discusses the cellular parameters of leaf morphogenesis in maize and tobacco; alternative modes of organogenesis in higher plants; morphological aspects of leaf development in ferns and angiosperms; the origin of symmetry in flowers; and intraspecific floral variation. The reader is also introduced to structural***

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***correlations among wood, leaves, and plant habit; relationships between structure and function in trees; and the development of inflorescence, androecium, and gynoecium with reference to palms. This book is a valuable source of information for plant anatomists. This book addresses the importance woody plants have in agriculture, forestry, and the environment and how various stresses affect their performance. It reviews physiological and molecular responses of woody plants to major environmental stresses and focuses on the mechanisms involved in imparting resistance to***

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***stress. Chapters cover basics of plant physiology including plant structure and plant growth, photosynthesis, respiration, plant growth regulation, abiotic and biotic plant stresses including drought, water logging, nutrient deficiency, salinity, chilling, freezing, heat, oxidative stress, and heavy metal toxicity. 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***

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***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***

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***teaching and research in plant anatomy. In the 2007 third edition of her successful textbook, Paula Rudall provides a comprehensive yet succinct introduction to the anatomy of flowering plants. Thoroughly revised and updated throughout, the book covers all aspects of comparative plant structure and development, arranged in a series of chapters on the stem, root, leaf, flower, seed and fruit. Internal structures are described using magnification aids from the simple hand-lens to the electron microscope. Numerous references to recent topical literature are included, and new***

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***illustrations reflect a wide range of flowering plant species. The phylogenetic context of plant names has also been updated as a result of improved understanding of the relationships among flowering plants. This clearly written text is ideal for students studying a wide range of courses in botany and plant science, and is also an excellent resource for professional and amateur horticulturists.***

***Modelling Plant Growth and Development  
Teaching Plant Anatomy Through Creative  
Laboratory Exercises  
Plant Structure, Function and Adaptation***

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### **ANATOMY OF SEED PLANTS, 2ND ED** **Plant Structure**

*Written by some of the most respected innovators in the field, this comprehensive text takes an in-depth look at the environmental, cultural and social factors that influence how plants are grown and used worldwide. The newest edition cites the most recent statistics, production methods and issues concerning the production and utilization of plants. It offers several web-based resources including a free companion website with*

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*practice questions and online crop fact sheets that give information at a local level. Along with information on climate and environment, it also explores plants' tremendous economic impact in both developed and developing nations. Introduces the basics of plant science including the ecosystem; climate; managing soil, water and fertility; and pest management. Examines plant structure, chemistry, growth and development; genetics and biodiversity and their relationship to crop growing and*

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*utilization systems. Covers multiple crop types and growth settings including nursery, landscape and greenhouse. Also discusses how crops are preserved, transported and marketed. For anyone interested in how plants are cultivated and utilized.*

*Basic morphology and tissue systems. Illustrated glossary. Histology of leaf, stem and root. Meristems. Xylem and phloem: the secondary systems. Adaptive features. Flower and fruit. Economic aspects of applied plant anatomy.*

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*Plant cell walls are complex, dynamic cellular structures essential for plant growth, development, physiology and adaptation. Plant Cell Walls provides an in depth and diverse view of the microanatomy, biosynthesis and molecular physiology of these cellular structures, both in the life of the plant and in their use for bioproducts and biofuels. Plant Cell Walls is a textbook for upper-level undergraduates and graduate students, as well as a professional-level reference book. Over 400 drawings, micrographs, and*

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*photographs provide visual insight into the latest research, as well as the uses of plant cell walls in everyday life, and their applications in biotechnology. Illustrated panels concisely review research methods and tools; a list of key terms is given at the end of each chapter; and extensive references organized by concept headings provide readers with guidance for entry into plant cell wall literature. Cell wall material is of considerable importance to the biofuel, food, timber, and pulp and paper*

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*industries as well as being a major focus of research in plant growth and sustainability that are of central interest in present day agriculture and biotechnology. The production and use of plants for biofuel and bioproducts in a time of need for responsible global carbon use requires a deep understanding of the fundamental biology of plants and their cell walls. Such an understanding will lead to improved plant processes and materials, and help provide a sustainable resource for meeting the future bioenergy*

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*and bioproduct needs of humankind.*

*A comprehensive introduction to plant anatomy, incorporating basic anatomical information with contemporary ideas about the development of plant structure and form.*

*Hartmann's Plant Science*

*An Introduction to Structure and Development*

*Esau's Plant Anatomy*

*Inanimate Life*

*Botany, Production and Uses*

The main aim of this book is to provide a

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developmental perspective to plant anatomy. Authors Steeves and Sawhney provide fundamental information on plant structure and development to students at the introductory level, and as a resource material to researchers working in nearly all areas of plant biology i.e., plant physiology, systematics, ecology, developmental genetics and molecular biology. The book is focused on angiosperm species with some examples from different groups of plants. "Essentials of Developmental Plant Anatomy" starts with an introductory chapter and a brief introduction to plant cell structure, which is followed by the

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structure of the flower, plant reproduction (vegetative and sexual) and the development and structure of embryo - the precursor to the plant body. Each chapter then deals with essential information on the shoot system, diversity of plant cells and tissues, the structure and development of the stem, leaf, root, and the secondary body.

This second of a two-part treatise describes the phenomena of plants under stress, describing the relationship between plant structure, development, and growth and such environmental stresses as too much or too little water, light, heat, or cold.

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Anatomie (Histologie).

The study of plant development in recent years has often been concerned with the effects of the environment and the possible involvement of growth substances. The prevalent belief that plant growth substances are crucial to plant development has tended to obscure rather than to clarify the underlying cellular mechanisms of development. The aim in this book is to try to focus on what is currently known, and what needs to be known, in order to explain plant development in terms that allow further experimentation at the cellular and molecular levels.

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We need to know where and at what level in the cell or organ the critical processes controlling development occur. Then, we will be better able to understand how development is controlled by the genes, whether directly by the continual production of new gene transcripts or more indirectly by the genes merely defining self-regulating systems that then function autonomously. This book is not a survey of the whole of plant development but is meant to concentrate on the possible component cellular and molecular processes involved. Consequently, a basic knowledge of plant structure

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is assumed. The facts of plant morphogenesis can be obtained from the books listed in the General Reading section at the end of Chapter 1. Although references are not cited specifically in the text, the key references for each section are denoted by superscript numbers and listed in the Notes section at the end of each chapter.

Growth, Development, and Utilization of Cultivated Plants

A Thesis Submitted for The degree of Doctor of Philosophy in the Victoria University of Wellington, Botany Department

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### Plant Growth and Development Proceedings of the National Symposium

*Plant anatomy and physiology and a broad understanding of basic plant processes are of primary importance to a basic understanding of plant science. These areas serve as the first important building blocks in a variety of fields of study, including botany, plant biology, and horticulture. Structure and Function of Plants will serve as a text aimed at*

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*undergraduates in the plant sciences that will provide an accurate overview of complex plant processes as well as details essential to a basic understanding of plant anatomy and physiology. Presented in an engaging style with full-color illustrations, Structure and Function of Plants will appeal to undergraduates, faculty, extension faculty, and members of Master Gardener programs.*

*This book is a fundamental guide to understanding plant structure offering plant scientists, plant biologists and*

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*horticulturalists in practice, academic life and in training. It includes a combination of concise scientific text and superb color photographs and drawings, focusing on structure at anatomical, histological and fine structure levels.*

*Soil and Biotic Factors*

*Structure and Function of Plants*

*Plant Biology*

*Plant Science*

*Plant Physics*