The Physiological Ecology Of Plant Succession

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The growth, reproduction, and geographical distribution of plants are profoundly influenced by their physiological ecology: the interaction with the surrounding physical, chemical, and biological environments. This textbook describes mechanisms that underlie plant physiological ecology at the levels of physiology, biochemistry, biophysics, and molecular biology.

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Plant Physiological Ecology, Second Edition is significantly updated, with full color illustrations and begins with the primary processes of carbon metabolism and transport, plant water relations, and energy balance. After considering individual leaves and whole plants, these physiological processes are then scaled up to the level of the canopy.

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The growth, reproduction, and geographical distribution of plants are profoundly influenced by their physiological ecology: the interaction with the surrounding physical, chemical, and biological environments. This textbook describes mechanisms that underlie plant physiological ecology at the levels of physiology, biochemistry, biophysics, and molecular biology.

~~Plant Physiological Ecology | Hans Lambers | Springer~~

I discuss the nature of successional environments, seed germination, seedling and mature plant development, plant growth, photosynthesis, water use, and the physiological ecology of competition and interference. THE NATURE OF SUCCESSIONAL ENVIRONMENTS The environment of a plant may vary daily, seasonally, vertically, and horizontally.

~~The Physiological Ecology of Plant Succession F. A. Bazzaz ...~~

Physiological Ecology Head of Group: Professor Howard Griffiths We investigate plant molecular, physiological and environmental processes which regulate productivity and CO2 sequestration, and aim to improve the operating efficiency of the primary carboxylase, Rubisco, and match water availability to use.

~~Physiological Ecology — Department of Plant Sciences~~

Physiological ecology (plant) The branch of plant science that seeks physiological (mechanistic) explanations for ecological observations.

~~Physiological ecology | Article about physiological ...~~

The name "physiological ecology" clearly indicates that this discipline is a hybrid of phys iology and ecology. But is physiological ecology simply another dimension of physiology or ecology alone, or is physiological ecology unique in some fundamental way from its parent

~~What Is Physiological Ecology?~~

Lambers et al. stated that the phosphate element also acts as an important component making up energy transfer compounds (ATP and Nucleoprotein) for metabolic processes in plants, especially in the...

~~(PDF) Plant Physiological Ecology, second edition~~

Plant physiology is a subdiscipline of botany concerned with the functioning, or physiology, of plants. Closely related fields include plant morphology, plant ecology, phytochemistry, cell biology, genetics, biophysics and molecular biology. Fundamental processes such as photosynthesis, respiration, plant nutrition, plant hormone functions, tropisms, nastic movements, photoperiodism, photomorphogenesis, circadian rhythms, environmental stress physiology, seed

germination, dormancy and stomata fu

Plant physiology - Wikipedia
Physiological Ecology of Tropical Succession: A Comparative Review F. A. Bazzaz and S. T. A. Pickett Annual Review of Ecology and Systematics Shade Tolerance, a Key Plant Feature of Complex Nature and Consequences Fernando Valladares and Ü lo Niinemets Annual Review of Ecology, Evolution, and Systematics The Ecology of Secondary Succession ...

The Physiological Ecology of Plant Succession | Annual ...
A certain degree of plasticity in physiological traits is ubiquitous among plants (Larcher, 1994). Apart from genetic differences among individuals, much of the observed intraspecific variation is due to modifications during ontogeny.

Small plants, large plants: the importance of plant size ...
Plant ecophysiology is concerned largely with two topics: mechanisms (how plants sense and respond to environmental change) and scaling or integration (how the responses to highly variable conditions—for example, gradients from full sunlight to 95% shade within tree canopies—are coordinated with one another), and how their collective effect on plant growth and gas exchange can be understood on this basis.

Ecophysiology - Wikipedia
Produced in 1978 by the Institute of Biology as part of its Studies in Biology series, this booklet looks at the concept of plant physiological ecology. That is, the interpretation of plant behaviour and distribution in terms of physiological responses to the environment. Subject to competition, pests, pathogens and environmental stresses, these responses are often very different from those of ...

Plant Physiological Ecology | STEM
Buy Physiological Plant Ecology: Ecophysiology and Stress Physiology of Functional Groups by Larcher, Walter, Larcher, W. (ISBN: 9783540435167) from Amazon's Book Store. Free UK delivery on eligible orders.

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Box 9E. 1 Continued FIGURE 2. The C S R triangle model (Grime 1979). The strategies at the three corners are C, competiti- winning species; S, stress-tolerating s- cies; R, ruderalspecies. Particular species can engage in any mixture of these three primary strategies, and the m- ture is described by their position within the triangle. comment briefly on some other dimensions that Grime s (1977) triangle (Fig. 2) (see also Sects. 6. 1 are not yet so well understood. and 6. 3 of Chapter 7 on growth and allocation) is a two-dimensional scheme. A C S axis (Com- tition-winning species to Stress-tolerating spe- Leaf Economics Spectrum cies) reflects adaptation to favorable vs. unfavorable sites for plant growth, and an R- Five traits that are coordinated across species are axis (Ruderal species) reflects adaptation to leaf mass per area (LMA), leaf life-span, leaf N disturbance. concentration, and potential photosynthesis and dark respiration on a mass basis. In the five-trait Trait-Dimensions space,79%ofallvariation worldwideliesalonga single main axis (Fig. 33 of Chapter 2A on photo- A recent trend in plant strategy thinking has synthesis; Wright et al. 2004). Species with low been trait-dimensions, that is, spectra of varia- LMA tend to have short leaf life-spans, high leaf tion with respect to measurable traits. Compared nutrient concentrations, and high potential rates of mass-based photosynthesis. These species with category schemes, such as Raunkiaer s, trait occur at the quick-return end of the leaf e- dimensions have the merit of capturing cont- nomics spectrum."

Growth, reproduction, and geographical distribution of plants are profoundly influenced by their physiological ecology: the interaction with the surrounding physical, chemical, and biological environments. This textbook highlights mechanisms that underlie plant physiological ecology at the levels of physiology, biochemistry, biophysics, and molecular biology. At the same time, the integrative power of physiological ecology is well suited to assess the costs, benefits, and consequences of modifying plants for human needs and to evaluate the role of plants in natural and managed ecosystems. Plant Physiological Ecology, Third Edition is significantly updated, with many full color illustrations, and begins with the primary processes of carbon metabolism and transport, plant water relations, and energy balance. After considering individual leaves and whole plants, these physiological processes are then scaled up to the level of the canopy. Subsequent chapters discuss mineral nutrition and the ways in which plants cope with nutrient - deficient or toxic soils. The book then looks at patterns of growth and allocation, life - history traits, and interactions between plants and other organisms. Later chapters deal with traits that affect decomposition of plant material and with the consequences of plant physiological ecology at ecosystem and global levels. Plant Physiological Ecology, Third Edition features several boxed entries that extend the discussions of selected issues, a glossary, and numerous references to the primary and review literature. This significant new text is suitable for use in plant ecology courses, as well as classes ranging from plant physiology to plant molecular biology.

Box 9E. 1 Continued FIGURE 2. The C – S – R triangle model (Grime 1979). The strategies at the three corners are C, competiti- winning species; S, stress-tolerating s- cies; R,ruderalspecies. Particular species can engage in any mixture of these three primary strategies, and the m- ture is described by their position within the triangle. comment briefly on some other dimensions that Grime ' s (1977) triangle (Fig. 2) (see also Sects. 6. 1 are not yet so well understood. and 6. 3 of Chapter 7 on growth and allocation) is a two-dimensional scheme. A C—S axis (Com- tition-winning species to Stress-tolerating spe- Leaf Economics Spectrum cies) reflects adaptation to favorable vs. unfavorable sites for plant growth, and an R- Five traits that are coordinated across species are axis (Ruderal species) reflects adaptation to leaf mass per area (LMA), leaf life-span, leaf N disturbance. concentration, and potential photosynthesis and dark respiration on a mass basis. In the five-trait Trait-Dimensions space,79%ofallvariation worldwideliesalonga single main axis (Fig. 33 of Chapter 2A on photo- A recent trend in plant strategy thinking has synthesis; Wright et al. 2004). Species with low been trait-dimensions, that is, spectra of varia- LMA tend to have short leaf life-spans, high leaf tion with respect to measurable traits. Compared nutrient concentrations, and high potential rates of mass-based photosynthesis. These species with category schemes, such as Raunkiaer ' s, trait occur at the ' ' quick-return ' ' end of the leaf e- dimensions have the merit of capturing cont- nomics spectrum.

Physiological plant ecology is primarily concerned with the function and performance of plants in their environment. Within this broad focus, attempts are made on one hand to understand the underlying physiological, biochemical and molecular attributes of plants with respect to performance under the constraints imposed by the environment. On the other hand physiological ecology is also concerned with a more synthetic view which attempts to under stand the distribution and success of plants measured in terms of the factors that promote long-term survival and reproduction in the environment. These concerns are not mutually exclusive but rather represent a continuum of research approaches. Osmond et al. (1980) have elegantly pointed this out in a space-time scale showing that the concerns of physiological ecology range from biochemical and organelle-scale events with time constants of a second or minutes to succession and evolutionary-scale events involving communities and ecosystems and thousands, if not millions, of years. The focus of physiological ecology is typically at the single leaf or root system level extending up to the whole plant. The time scale is on the order of minutes to a year. The activities of individual physiological

ecologists extend in one direction or the other, but few if any are directly concerned with the whole space-time scale. In their work, however, they must be cognizant both of the underlying mechanisms as well as the consequences to ecological and evolutionary processes.

This textbook is remarkable for emphasising that the mechanisms underlying plant physiological ecology can be found at the levels of biochemistry, biophysics, molecular biology and whole-plant physiology. The authors begin with the primary processes of carbon metabolism and transport, plant-water relations, and energy balance. After considering individual leaves and whole plants, these physiological processes are then scaled up to the level of the canopy. Subsequent chapters discuss mineral nutrition and the ways in which plants cope with nutrient-deficient or toxic soils. The book then looks at patterns of growth and allocation, life-history traits, and interactions between plants and other organisms. Later chapters deal with traits that affect decomposition of plant material and with plant physiological ecology at the level of ecosystems and global environmental processes.

This book contains the results of a Symposium on the physiological ecology of plants of the lowland wet tropics held in Mexico in June 1983 organized by the Instituto de Biologla of the National University of M"exico (U. N . A. M.), and sponsored by UNAM, CONACYT, NSF and UNESCO (CIET). A workshop portion of the Symposium was held at the tropical research station at Los Tuxtlas, Veracruz. This Symposium originated in response to the increasing interest in the physiological ecology of tropical plants, because of the potential. of this field to provide a basic understanding of functioning of tropical plant communities. The study of physiological ecology of tropical plants has been delayed in some cases by the lack of conceptual framework, but also by the absence of appropriate instrumentation and techniques with which to conduct precise measurements under high temperature, high humidity field conditions. Hypotheses and concepts of the physiological ecology of tropical plants have been based mainly on observational data and the analysis of growth forms and leaf anatomf. The early work of A. F. W. Schimper and o. Stocker in Asia, and the extensive surveys made by H. Walter on the osmotic potentials of plants in the tropics and subtropics, constituted, until relatively recently, the only available information on the water and carbon relations of tropical plants.

This richly illustrated text covers the ecophysiology of plants of all major tropical ecosystems, from tropical rain forests, epiphytic habitats, mangroves and savannas to salinas, inselbergs and paramos and their ecophysiological adaptation to these different tropical environments. The physiognomy of biotopes and characteristic life forms of plants are depicted with photographs.

The efficient management of trees and other woody plants can be improved given an understanding of the physiological processes that control growth, the complex environmental factors that influence those processes, and our ability to regulate and maintain environmental conditions that facilitate growth. Emphasizes genetic and environmental interactions that influence woody plant growth Outlines responses of individual trees and tree communities to environmental stress Explores cultural practices useful for efficient management of shade, forest, and fruit trees, woody vines, and shrubs

Traditional plant physiological ecology is organism centered and provides a useful framework for understanding the interactions between plants and their environment and for identifying characteristics likely to result in plant success in a particular habitat. This book focuses on extending concepts from plant physiological ecology as a basis for understanding carbon, energy, and biogeochemical cycles at ecosystem, regional, and global levels. This will be a valuable resource for researchers and graduate students in ecology, plant ecophysiology, ecosystem research, biometerology, earth system science, and remote sensing. Key Features * The integration of metabolic activities across spatial scales, from leaf to ecosystem * Global constraints and regional processes * Functional units in ecological scaling * Models and technologies for scaling

The growth, reproduction and geographical distribution of plants are profoundly influenced by their physiological ecology: the interaction with the surrounding physical, chemical and biological environments. This textbook is notable in emphasizing that the mechanisms underlying plant physiological ecology can be found at the levels of biochemistry, biophysics, molecular biology and whole-plant physiology. At the same time, the integrative power of physiological ecology is well-suited to assess the costs, benefits and consequences of modifying plants for human needs, and to evaluate the role of plants in ecosystems.Plant Physiological Ecology begins with the primary processes of carbon metabolism and transport, plant-water relations, and energy balance. After considering individual leaves and whole plants, these physiological processes are then scaled up to the level of the canopy. Subsequent chapters discuss mineral nutrition and the ways in which plants cope with nutrient-deficient or toxic soils. The book then looks at patterns of growth and allocation, life-history traits, and interactions between plants and other organisms. Later chapters deal with traits that affect decomposition of plant material and with plant physiological ecology at the level of ecosystems and global environmental processes.Plant Physiological Ecology features numerous boxed entries that provide extended discussions of selected issues, a glossary, and numerous references to the primary and review literature. The significant new text is suitable for use in plant ecology courses, as well as classes ranging from plant physiology to plant molecular biology.