Fern Ecology

O. L. LANGE, P. S. NOBEL, C. B. OSMOND, and H. ZIEGLER In the original series of the Encyclopedia of Plant Physiology, plant water relations and photosynthesis were treated separately, and the connection between phenomena was only considered in special chapters. O. STOCKER edited Vol ume III, Pjlanze und Wasser/Water Relations of Plants in 1956, and 4 years later, Volume V, Parts I and 2, Die COrAssimilation/The Assimilation of Carbon Dioxide appeared, edited by A. PIRSON. Until recently, there has also been a tendency to cover these aspects of plant physiology separately in most text books. Without doubt, this separation is justifiable. If one is specifically inter ested, for example in photosynthetic electron transport, in details of photophos phorylation, or in carbon metabolism in the Calvin cycle, it is not necessary to ask how these processes relate to the water relations of the plant. Accordingly, this separate coverage has been maintained in the New Series of the Encyclopedia of Plant Physiology. The two volumes devoted exclusively to photosynthesis are Volume 5, Photosynthesis I, edited by A. TREBST and M. AVRON, and Volume 6, Photosynthesis II, edited by M. GIBBS and E. LATZKO. When consider ing carbon assimilation and plant water relations from an ecological point of view,

however, we have to recognize that this separation is arbitrary.
We propose an edited volume on the ecology of lianas comprised of chapters written by some of the foremost ecologists in the field. We have also identified a number of junior scientists who are beginning to make an impact on the field and could contribute new research and exciting results. Ultimately, we believe that this book will address issues of importance for all ecologists, temperate and tropical alike, and will be instrumental in stimulating further research in forest ecology in general, as well as on the ecology of lianas. The main goal of this book is to present a volume on the current status of liana ecology in tropical and temperate forests. In essence, we will use this book as a forum to summarize and synthesize the most recent research in liana ecology and to address how this research fits into the broader field of ecology. In the course of reviewing what is new and exciting, we will point out liana-related issues that deserve more attention from researchers. The intended audience for this book includes advanced undergraduates, graduate students, and researchers in forest ecology at the population, community, and ecosystem levels. Ideally, each chapter will include a brief introduction of the relevant concept or theory, a review of the current state of liana-related research on this theory, including the author's own contributions. Although this book will focus on current research in liana ecology,

many of the proposed chapters will also cover theories that are applicable to all ecological systems not just tropical ones and not just focusing on lianas. Consequently, we believe that this book will target a broad audience of ecologists. Each chapter will follow a similar format. The first part of the chapter will include a concise history and review of the concept or theory at hand. The rest of the chapter will be devoted to the presentation and interpretation of empirical data addressing that concept or theory. The author of each chapter will have the leeway to use new or unpublished data or to synthesize and summarize his/her data or data of other authors. Although we believe that the way to make this book the best is as outlined above, authors will, of course, write the manuscripts in a way that reflects their approach and style.

Koa (Acacia koa) is a tree species endemic to Hawaii that is of immense ecological and economic importance. This species has been mined from local forests for its wood for more than 100 years, and extensive areas of koa-dominated forests have been converted to grazing lands. Today, in recognition of the great importance and value of koa and the forests in which it is found, there is substantial interest in restoration and management of koa forests. This report brings together knowledge on the biogeography, physiology, ecology, and silviculture of koa in an effort to assist landowners and resource stewards in

making sound decisions about restoring and managing koa forests.

A user-friendly, illustrated field-guide to the ferns, clubmosses, quillworts and horsetails native to Britain.

A pocket guide to identifying native ferns that grow in the U.S. Midwest and Northeast, and eastern Canada. Like other plant guides in the "Finders" series, "Fern Finder" is a dichotomous key, which leads the user step-by-step through a series of choices to the species being identified. Heavily illustrated with line drawings.

The Study of Plants in a Whole New Light “Matt Candeias succeeds in evoking the wonder of plants with wit and wisdom.” ?James T. Costa, PhD, executive director, Highlands Biological Station and author of Darwin's Backyard #1 New Release in Nature & Ecology, Plants, Botany, Horticulture, Trees, Biological Sciences, and Nature Writing & Essays In his debut book, internationally-recognized blogger and podcaster Matt Candeias celebrates the nature of plants and the extraordinary world of plant organisms. A botanist’s defense. Since his early days of plant restoration, this amateur plant scientist has been enchanted with flora and the greater environmental ecology of the planet. Now, he looks at the study of plants through the lens of his ever-growing houseplant collection. Using gardening, houseplants, and examples of plants around you, In Defense of

Plants changes your relationship with the world from the comfort of your windowsill. The ruthless, horny, and wonderful nature of plants. Understand how plants evolve and live on Earth with a never-before-seen look into their daily drama. Inside, Candeias explores the incredible ways plants live, fight, have sex, and conquer new territory. Whether a blossoming botanist or a professional plant scientist, In Defense of Plants is for anyone who sees plants as more than just static backdrops to more charismatic life forms. In this easily accessible introduction to the incredible world of plants, you'll find: • Fantastic botanical histories and plant symbolism • Passionate stories of flora diversity and scientific names of plant organisms • Personal tales of plantsman discovery through the study of plants If you enjoyed books like The Botany of Desire, What a Plant Knows, or The Soul of an Octopus, then you'll love In Defense of Plants.
Ferns, collectively, represent an ancient species of vascular plant which has a direct connection to the beginning of life on Earth. Today they are valued for their ornamental appeal, environmental benefit or as sources of health benefiting metabolites. Current pteridology, the study of fern, encompasses a wide range of research activities including, but not limited to, plant physiology, stress tolerance, genetics and genomics. The goal of this book is to compile the most relevant research done with ferns during the last decade. It is organized into four parts: I,

Biology and Biotechnology; II, Evolution and Conservation; III, Metabolism and Genetic Resources, and IV, Environment. Each section reveals the utilization of ferns as a tool to explore challenges unique to plant development and adaptation. This project represents our collective effort to raise the awareness of ferns as a model system to study higher plant functions. Among the distinctive features of our proposed book are: (i) a wide range of topics with contributing researchers from all around the world, and (ii) recent advances of theoretic and applied knowledge with implications to crop species of economic value.

Provides a comparative approach to plant succession among all terrestrial biomes and disturbances, helping to reveal generalizable patterns.

Despite their often dangerous and unpredictable nature, landslides provide fascinating templates for studying how soil organisms, plants and animals respond to such destruction. The emerging field of landslide ecology helps us understand these responses, aiding slope stabilisation and restoration and contributing to the progress made in geological approaches to landslide prediction and mitigation. Summarising the growing body of literature on the ecological consequences of landslides, this book provides a framework for the promotion of ecological tools in predicting, stabilising, and restoring biodiversity to landslide scars at both local and landscape scales. It explores nutrient cycling;

soil development; and how soil organisms disperse, colonise and interact in what is often an inhospitable environment. Recognising the role that these processes play in providing solutions to the problem of unstable slopes, the authors present ecological approaches as useful, economical and resilient supplements to landslide management.

The only comprehensive photographic guide to the ferns, clubmosses, quillworts and horsetails of Britain This is a comprehensive, lavishly illustrated and user-friendly photographic identification guide to the fifty-seven ferns and seventeen other pteridophytes that occur in Britain. It is the perfect companion for botanists, naturalists, professional ecologists and anyone else with an interest in this fascinating group of non-flowering vascular plants. Designed to appeal to beginners and experts alike, this authoritative book includes novel identification keys and comparison tables that have been carefully devised to present only essential, easily understood technical terms and descriptions, avoiding jargon as much as possible. Cross-referenced throughout to facilitate the comparison of similar species, this definitive field guide is the go-to source for identifying these species with confidence. Features hundreds of stunning colour photographs Comprehensive coverage of Britain's 57 species of ferns, 6 clubmosses, 3 quillworts and 8 horsetails Includes novel, easy-to-use, jargon-free identification

keys and comparison tables Beautifully designed, user-friendly and accessible Periodic comprehensive overviews of the status of the diverse organisms that make up wildlife are essential to determining trends, threats and future prospects. Just over 25 years ago, leading authorities on different kinds of wildlife came together to prepare an assessment of their status of a wide range of organisms in Great Britain and Ireland in The Changing Flora and Fauna of Britain, also edited by Professor David L. Hawksworth CBE. Now, in The Changing Wildlife of Great Britain and Ireland, he has gathered together some of the original and also new contributors to review changes since that time and look to the future. Contributions range from viruses, diatoms, fungi, lichens, mites and nematodes; through butterflies, dragonflies, flies and slugs; to flowering plants, ferns, mammals, birds and fish. The state of knowledge in different groups is assessed, and the effectiveness of statutory and other measures taken to safeguard wildlife considered. The picture is far from bleak, ameliorating sulphur dioxide levels have benefited sensitive lichens and mosses in a dramatic way, water quality improvement has been beneficial, there have been few certain extinctions and rediscoveries of species thought to have been lost. Biodiversity Action Plans have also benefited targeted species, but habitat restoration and management for some is not always good for others. But there are worrying trends in declining

populations, with an increasing number being regarded as threatened or endangered, especially in agricultural areas, and where woodland management has changed, particular threats from introduced species, and concern over the effects of climate change. Some of the smaller organisms remain poorly known, a situation unlikely to change as expertise in many is scant or being lost. This stock-check and look to the future will be a key source book to conservationists, naturalists, and professional biologists for many years to come.

Following in the footsteps of the successful first edition, Functional Plant Ecology, Second Edition remains the most authoritative resource in this multidisciplinary field. Extensively revised and updated, this book investigates plant structure and behavior across the ecological spectrum. It features the ecology and evolution of plant crowns and a

Coupled with biomechanical data, organic geochemistry and cladistic analyses utilizing abundant genetic data, scientific studies are revealing new facets of how plants have evolved over time. This collection of papers examines these early stages of plant physiology evolution by describing the initial physiological adaptations necessary for survival as upright structures in a dry, terrestrial environment. The Evolution of Plant Physiology also encompasses physiology in its broadest sense to include biochemistry, histology, mechanics, development,

growth, reproduction and with an emphasis on the interplay between physiology, development and plant evolution. Contributions from leading neo- and palaeo-botanists from the Linnean Society Focus on how evolution shaped photosynthesis, respiration, reproduction and metabolism. Coverage of the effects of specific evolutionary forces -- variations in water and nutrient availability, grazing pressure, and other environmental variables

In this compilation, the authors examine the possible effects of three aspects of global climate change (elevated atmospheric CO2, increasing temperatures, and changes in precipitation), focusing on how each of these may affect fern reproductive adaptation and success; especially with respect to: spore vitality and germination, gametophyte growth and reproductive success, and sporophyte growth and maturation. Next, the important aspects of Bracken chemical ecology are highlighted, beginning with a description of global distribution pattern of Bracken delineating its ubiquitous nature followed by its interplay with abiotic factors such as soil-nutrients and fire. The book also provides a review of modern studies based on chloroplast markers, BEAST analysis, and etc., including ecology of ferns throughout their history until recently. A study is presented that investigates the presence of allelochemical composition and content from the fern leaves of Acrostichum aureum, Stenochlaena palustris and Dicranopteris

linearis using maceration extraction method for further analysis of allelochemicals. In closing, an overview of the most important taxa of Permian ferns of Angaraland and its adjacent regions is given, supported by evidence on some Carboniferous and Triassic ferns as well. "

The current global environmental crisis is primarily the result of non-standardized parameters for environmental regulation, and is impacting e.g. clean air, safe drinking water and the quality of food, particularly in developing nations. Due to their poor/lax execution of EIA protocols, newly developing countries are preferred destinations for establishing pollution-emitting industries, which results in the degradation and depletion of their natural resources. Lack of environmental policy intervention is another major incentive to base “dirty” industries in these nations. In order to ensure sustainable development, the highest-priority issues include the monitoring and eradication of environmental problems stemming from economic development; virtually every form of economic development primarily results in the loss of forests and thus biodiversity, followed by declining air quality and the contamination of natural resources. Sustainable development ensures responsible interactions with the environment, so as to minimize the depletion or degradation of natural resources and preserve environmental quality. It involves integrated approaches to understanding the importance of environmental

management systems and policy measures that lead to improved environmental performance. This book addresses the environmental concerns associated with economic development, and with approaches to attaining sustainable economic development, which include monitoring the quality of water resources, soil erosion and degradation of the natural environment.

The book will describe the xylem structure of different plant groups, and will put the findings in a physiological and ecological context. For instance, when differences in vessel diameter are featured, then there will be an explanation why this matters for water transport efficiency and safety from cavitation. The focus is on the hydraulic function of xylem, although mechanical support and storage will also be covered. Featured plant groups include ferns (which only have primary xylem), conifers (tracheid-based xylem), lianas (extremely wide and long vessels), drought-adapted shrubs as well as the model systems poplar and grapevine. The book chapters will draw on the expertise and cutting edge research of a diversified group of internationally known researchers working in different anatomical and physiological sub-disciplines. Over the last two decades, much progress has been made in understanding how xylem structure relates to plant function. Implications for other timely topics such as drought-induced forest dieback or the regulation of plant biomass production will be discussed.

This collection of reviews by leading investigators examines plant reproduction and sexuality within a framework of evolutionary ecology, providing an up-to-date account of the field. The contributors discuss conceptual issues, showing the importance of sex allocation, sexual selection and inclusive fitness, and the dimensions of paternity and maternity in plants. The evolution, maintenance, and loss of self-incompatibility in plants, the nature of 'sex choice' in plants, and sex dimorphism are all explored in detail. Specific forms of biotic interactions shaping the evolution of plant reproductive strategy are discussed, and a taxonomically based review of the reproductive ecology of non-angiosperm plant groups, such as bryophytes, ferns, and algae, is presented. Together these studies focus on the complexities of plant life cycles and the distinctive reproductive biologies of these organisms, while showing the similarities between nonflowering plants and the more thoroughly documented flowering species.

With their team of contemporary scholars, the editors present a thorough coverage of fundamental topics necessary for obtaining an up-to-date understanding of the biology of ferns and lycophytes. The book is organized into major topics that build from the individual and its biochemistry and structure, to genetics and populations, to interactions among individuals and the conservation of species, and concludes with perspectives on evolutionary history and

classification. Each chapter is organized to review past work, explore current questions, and suggest productive directions for continued discoveries about these fascinating groups of organisms. Written for upper undergraduates, graduates and academic researchers, Biology and Evolution of Ferns and Lycophytes fills a major gap in biological, organism-level, evolutionary literature by providing a review of the biology and evolution of this important group of vascular land plants.

Forest Pattern and Ecological Process is a major synthesis of 25 years of intensive research about the montane ash forests of Victoria, which support the world's tallest flowering plants and several of Australia's most high profile threatened and/or endangered species. It draws together major insights based on over 170 published scientific papers and books, offering a previously unrecognised set of perspectives of how forests function. The book combines key strands of research on wildfires, biodiversity conservation, logging, conservation management, climate change and basic forest ecology and management. It is divided into seven sections: introduction and background; forest cover and the composition of the forest; the structure of the forest; animal occurrence; disturbance regimes; forest management; and overview and future directions. Illustrated with more than 200 photographs and line drawings, Forest Pattern and

Ecological Process is an essential reference for forest researchers, resource managers, conservation and wildlife biologists, ornithologists and mammalogists, policy makers, as well as general readers with interests in wildlife and forests. 2010 Whitley Certificate of Commendation for Zoological Text.

Ferns are an integral part of the world's flora, appreciated for their beauty as ornamentals, problematic as invaders and endangered by human interference. They often dominate forest understories but also colonize open areas, invade waterways and survive in nutrient-poor wastelands and eroded pastures. Presented here is the first comprehensive summary of fern ecology, with worldwide examples from Siberia to the islands of Hawaii. Topics include a brief history of the ecological study of ferns, a global survey of fern biogeography, fern population dynamics, the role of ferns in ecosystem nutrient cycles, their adaptations to xeric environments and future directions in fern ecology. Fully illustrated concepts and processes provide a framework for future research and utilization of ferns for graduate students and professionals in ecology, conservation and land management.

The most comprehensive guide to Michigan's ferns and related plants

Principles and Practices in Plant Ecology: Allelochemical Interactions provides insights and details recent progress about allelochemical research from the ecosystem

standpoint. Research on chemical ecology of allelochemicals in the last three decades has established this field as a mature science that interrelates the research of biologists, weed and crop scientists, agronomists, natural product chemists, microbiologists, ecologists, soil scientists, and plant physiologists and pathologists. This book demonstrates how the influence of allelochemicals on the various components of an ecosystem-including soil microbial ecology, soil nutrients, and physical, chemical, and biological soil factors-may affect growth, distribution, and survival of plant species. Internationally renowned exper†s discuss how a better understanding of allelochemical phenomena can lead to true sustainable agriculture.

Correlation between plant distribution and climate is examined over different time and space scales to determine the mechanisms of control in physiological and biochemical terms.

Issues in Ecological Research and Application: 2011 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Ecological Research and Application. The editors have built Issues in Ecological Research and Application: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Ecological Research and Application in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Ecological Research and Application: 2011 Edition has been produced by the

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A handbook of ferns and their related families in the North American continent based on visual identification

The book, "Pesticides - Use and Misuse and their Impact in the Environment", contains relevant information on diverse pesticides encountered in both anthropogenic and natural environments. This book provides valuable information about the toxicity of several agrochemicals that can negatively influence the health of humans and ecosystems.

As well as the known uses of each fern, from food and medicine, to perfume, making tools, mattresses and track markers, it also explains how to grow each fern in your own garden. The new ecological edition also identifies the insect and bird life to look for in each fern and includes details on the origins of Maori names.

Landslides are dangerous, fascinating phenomena: understanding their biological and ecological aspects is essential for achieving slope stability and habitat restoration. Palynology, the science of fossil and recent spores/pollen grains, is of high importance, both in many pure and applied fields of the natural sciences (e.g. in botany, geology,

climatology, archeology and medicine). It is not only an auxiliary science, but can certainly stand for itself. The "classical" palynology subjects, pollen morphology and systematics, are at present influenced by many modern approaches, e.g. from cell biology, analytical electron microscopy, morphometry, up to com- puter-aided-design of threedimensional reconstruction. In recent years fascinating informations have come to light, and new insights have given rise to changing scientific concepts. During the XIV International Botanical Congress, held in Berlin in 1987, a symposium was devoted to important topics of (actuo)palynology. Nine of its innovative, major contributions are presented in this volume. They cover the comparative morphology and the systematic/evolutionary significance of pollen/spores in critical taxa, aspects of pollen development (cytoskeleton), the substructure of sporopollenin, homologies between wall strata of ferns, gymnosperms and angiosperms, and important (but so far underrated) physical aspects of harmomegathy and pollen transport (fluid versus solid mechanics).

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The first systematic and comprehensive account of the vegetation types of this country.