

The Physiology Of Crop Yield By Hay Robert K M Porter John R Wiley Blackwell 2006 Paperback 2nd Edition Paperback

This single volume explores the theoretical and the practical aspects of crop physiological processes around the world The marked decrease over the past century in the land available for crop production has brought about mounting pressure to increase crop yields, especially in developing nations. Physiology of Crop Production provides cutting-edge research and data for complete coverage of the physiology of crop production, all in one source, right at your fingertips. This valuable reference gives the extensive in-depth information soil and crop professionals need to maximize crop productivity anywhere the world. Leading soil and plant scientists and researchers clearly explain theory, practical applications, and the latest advances in the field. Crop physiology is a vital science needed to understand crop growth and development to facilitate increases of plant yield. Physiology of Crop Production presents a wide range of information and references from varying regions of the world to make the book as complete and broadly focused as possible. Discussion in each chapter is supported by experimental data to make this book a superb resource that will be used again and again. Chapter topics include plant and root architecture, growth and yield components, photosynthesis, source-sink relationship, water use efficiency, crop yield relative to water stress, and active and passive ion transport. Several figures and tables accompany the extensive referencing to provide a detailed, in-depth look at every facet of crop production. Physiology of Crop Production explores management strategies for: Ideal plant architecture maximizing root systems ideal yield components maximizing photosynthesis maximizing source-sink relationship sequestration of carbon dioxide reducing the effects of drought improving N, P, K, Ca, Mg, and S nutrition improving micronutrient uptake Physiology of Crop Production is an essential desktop resource for plant physiologists, soil and crop scientists, breeders, agronomists, agronomy administrators in agro-industry, educators, and upper-level undergraduate and graduate students.

Growth and development of the rice plant. Climatic environments and its influence. Mineral nutrition of rice. Nutritional disorders. Photosynthesis and respiration. Rice plant characters in relation to yielding ability. Physiological analysis of rice yield. This book presents a simple, straightforward discussion of the principles and processes involved in the production of grain yield by agronomic crops, and how these processes underlie and influence management decisions. The focus is on grain crops, principally maize and soybean, although the general principles apply equally well to cereals, grain legumes and oil crops. Intended for researchers in crop science, agronomy and plant science, and crop production practitioners, this book will enable readers to make better, more informed management decisions; decisions that will help maintain a well-fed world in the future.

First published in 1989, Physiology of Crop Yield was the first student textbook to digest and assimilate the many advances in crop physiology, within a framework of resource capture and use. Retaining the central core of the first edition, this long-awaited second edition draws on recent developments in areas such as phenology, canopy dynamics and crop modelling, and the concepts of sustainable crop production. A broad perspective is developed, from the gene through the plant and crop to the ecosystem, covering: Advances in molecular biology relating to crop science Limitation of crop yield by the supply of water or nitrogen Global climate change and its impact on crop modelling Physiological aspects of crop quality A wider range of species, with emphasis on wheat, maize and soybean This book will be a valuable tool for advanced undergraduate and postgraduate students of agricultural science, plant science, applied ecology and environmental science. It will be an essential addition to all libraries in universities and relevant research establishments.

Physiological Aspects of Crop Yield

Understanding the Fundamentals of Grain Crop Management

Crop Physiology

Physiological Determinants of Crop Growth

Physiology and Biotechnology Integration for Plant Breeding

Physiological Processes Limiting Plant Productivity presents the proceedings of the Thirtieth University of Nottingham Easter School in Agricultural Science held at Sutton Bonington in England on April 2-5, 1979. Contributors focus on physiological processes limiting plant growth and development in the context of agricultural productivity. Emphasis is placed on the fundamental mechanisms that underlie crop production and their control. This text is comprised of 20 chapters; the first of which discusses the genetics of crop physiology in relation to agricultural production. The range of problems that plant physiologists must address is considered, followed by an assessment of what is happening in crop physiology. A number of chapters are devoted to the utilization of light by crop plants, plant nutrition, water relations, and the effects of an adaptation to unfavorable conditions including those imposed by air pollution. The reader is also introduced to the influence of photoperiodism on crop production; gas exchange in water-stressed plants; and the use of water, solar energy, and fossil fuels in crop production. This book will be of interest to agriculturists, plant breeders, and researchers working in relevant aspects of plant biochemistry, physiology, and genetics.

Crops and world food supply, crop evolution, and the origins of crop physiology. Maize, Sugar cane, Rice, Wheat, Soybean, Pea, Potato, Sugar beet, Cotton. The physiology basis of crop yield.

Respiration is a large and important component of the carbon economy of crops. There are already several good books dealing with the biochemistry and physiol ogy of plant respiration, but there are none I know of that are devoted to the relationship between respiration and crop productivity, although this relationship is more and more frequently being studied with both experiment and simulation. Crop physiology books do cover respiration, of course, but the treatment is limited. The purpose of the present book is to fill this void in the literature. The approach taken here is to use the popular two-component functional model whereby respiration is divided between growth and maintenance components. Mer thoroughly reviewing the literature, I came to the conclusion that at present this is the most useful means of considering respiration as a quantitative compo nent of a crop's carbon economy. This functional distinction is used as the frame work for describing respiration and assessing its role in crop productivity. Discussions and critiques of the biochemistry and physiology of respiration serve primarily as a means of more fully understanding and describing the functional approach to studying crop respiration. It is assumed that the reader of this book is familiar with the fundamentals of plant physiology and biochemistry. The research worker in crop physiology should find this an up-to-date summary of crop respiration and the functional model of respiration. This book is not, however, a simple review of existing data.

Crop Physiology: Case Histories of Major Crops updates the physiology of broad-acre crops with a focus on the genetic, environmental and management drivers of development, capture and efficiency in the use of radiation, water and nutrients, the formation of yield and aspects of quality. These physiological process are presented in a double context of challenges and solutions. The challenges to increase plant-based food, fodder, fiber and energy against the backdrop of population increase, climate change, dietary choices and declining public funding for research and development in agriculture are unprecedented and urgent. The proximal technological solutions to these challenges are genetic improvement and agronomy. Hence, the premise of the book is that crop physiology is most valuable when it engages meaningfully with breeding and agronomy. With contributions from 82 leading scientists from around the world, each chapter deals with a crop: maize, rice, wheat, barley, sorghum and oat; quinoa; soybean, field pea, chickpea, peanut, common bean, lentil, lupin and faba bean; sunflower and canola; potato, cassava, sugar beet and sugarcane; and cotton. A crop-based approach to crop physiology in a G x E x M context Captures the perspectives of global experts on 22 crops

Methods and case studies

Physiology and Determination of Crop Yield

Potato Physiology

Climate Change

Editorial Committee: Jerry D. Eastin [and Others].

This new edition of an established title examines the determination of grain crop yield from a unique perspective, by concentrating on the influence of the seed itself. As the food supply for an expanding world population is based on grain crops harvested for their seeds, understanding the process of seed growth and its regulation is crucial to our efforts to increase production and meet the needs of that population. Yield of grain crops is determined by their assimilatory processes such as photosynthesis and the biosynthetic processes in the seed, which are partly regulated within the seed itself. Substantially updated with new research and further developments of the practical applications of the concepts explored, this book is essential reading for those concerned with seed science and crop yield, including agronomists, plant breeders, and extension workers. It is also a valuable source of information for lecturers and graduate students of agronomy and plant physiology.

Global demand for wheat, rice, corn, and other essential grains is expected to steadily rise over the next twenty years. Meeting this demand by increasing production through increased land use is not very likely; and while better crop management may make a marginal difference, most agriculture experts agree that this anticipated deficit must be made up through increased crop yields. The first resource of its kind, Physiology and Biotechnology Integration for Plant Breeding assembles current research in crop plant physiology, plant biotechnology, and plant breeding that is aimed toward improving crop plants genetically while supporting a productive agriculture ecosystem. Highly comprehensive, this reference provides

access to the most innovative perspectives in crop physiology – with a special emphasis on molecular approaches – aimed at the formulation of those crop cultivars that offer the greatest potential to increase crop yields in stress environments. Surveys the current state of the field, as well as modern options and avenues for plant breeders and biotechnologists interested in augmenting crop yield and stability With contributions of plant scientists from all corners of the globe who are actively involved in meeting this important challenge, Physiology and Biotechnology Integration for Plant Breeding provides readers with the background information needed to understand this cutting-edge work, as well as detailed information on present and potential applications. While the first half of the book establishes and fully explains the link between crop physiology and molecular biology, the second part explores the application of biotechnology in the effective delivery of the high yield and environmentally stable crop plants needed to avert the very real possibility of worldwide hunger. Climate change is a serious threat to field crop production and food security. It has negative effects on food, water, and energy security due to change in weather patterns and extreme events such as floods, droughts, and heat waves, all of which reduce crop productivity. Over six chapters, this book presents a comprehensive picture of the importance of agronomy as it relates to the United Nations' Sustainable Development Goals. With an emphasis on the goals of Zero Hunger and Climate Change, this volume examines sustainable agronomic practices to increase crop productivity and improve environmental health.

This book has been prepared for those seeking a better understanding of the functioning of crop plants, particularly the processes that lead to the generation of products valued by human beings. The contributors, who are among the world's foremost experts on the important crops upon which humanity depends for food or fibre, address the relevant processes for their specific crop. Currently, the world population is continuing to increase. It is projected to plateau around the middle of the next century, and while there is considerable controversy regarding the population level when this plateau is achieved, most estimates are in the area of 10 000 000 000. At present, there are about 800000000 people in the world who do not have secure access to food. Over the last 50 years various aspects of agricultural research have been combined to increase the output of world crops approximately 2.5-fold. Given the need to feed the increasing population, and to provide better access, it is predicted that during the next 10 000 000 years the agricultural research community must repeat this achievement.

Problems and Modern Approaches

The Sugar Beet Crop

Yield gap analysis of field crops

Agronomy

Physiology and Processes

Completely updated and revised, this bestselling book continues to explain the growth and developmental processes involved in the formation of vegetables. Since the publication of the successful first edition significant discoveries, particularly in the area of molecular biology, have deepened and broadened our knowledge and understanding of these processes. This new edition brings the topic up-to-date and is presented over two sections: the first provides general knowledge on germination, transpiration, flowering, the effects of stress and modelling, whilst the second section details the physiology of specific crops or crop groups.

Explore the many benefits of alternative land-use systems with this incisive resource Humanity has become a victim of its own success. While we've managed to meet the needs—to one extent or another—of a large portion of the human population, we've often done so by ignoring the health of the natural environment we rely on to sustain our planet. And by deteriorating the quality of our air, water, and land, we've put into motion consequences we'll be dealing with for generations. In the newly revised Third Edition of North American Agroforestry, an expert team of researchers delivers an authoritative and insightful exploration of an alternative land-use system that exploits the positive interactions between trees and crops when they are grown together and bridges the gap between production agriculture and natural resource management. This latest edition includes new material on urban food forests, as well as the air and soil quality benefits of agroforestry, agroforestry's relevance in the Mexican context, and agroforestry training and education. The book also offers: A thorough introduction to the development of agroforestry as an integrated land use management strategy

Comprehensive explorations of agroforestry nomenclature, concepts, and practices, as well as an agroecological foundation for temperate agroforestry Practical discussions of tree-crop interactions in temperate agroforestry, including in systems such as windbreak practices, silvopasture practices, and alley cropping practices In-depth examinations of vegetative environmental buffers for air quality benefits, agroforestry for wildlife habitat, agroforestry at the landscape level, and the impact of agroforestry on soil health Perfect for environmental scientists, natural resource professionals and ecologists, North American Agroforestry will also earn a place in the libraries of students and scholars of agricultural sciences interested in the potential benefits of agroforestry.

Model studies focus experimental investigations to improve our understanding and performance of systems. Concentrating on crop modelling, this book provides an introduction to the concepts of crop development, growth, and yield, with step-by-step outlines to each topic, suggested exercises and simple equations. A valuable text for students and researchers of crop development alike, this book is written in five parts that allow the reader to develop a solid foundation and coverage of production models including water- and nitrogen-limited systems.

D.A. Cooke and R.K. Scott Sugar beet as one of just two crops (the other being sugar cane) which constitute the only important sources of sucrose - a product with sweeten ing and preserving properties that make it a major component of, or additive to, a vast range of foods, beverages and pharmaceuticals. Sugar, as sucrose is almost invariably called, has been a valued compo nent of the human diet for thousands of years. For the great majority of that time the only source of pure sucrose was the sugar-cane plant, varieties of which are all species or hybrids within the genus Saccharum. The sugar-cane crop was, and is, restricted to tropical and subtropical regions, and until the eighteenth century the sugar produced from it was available in Europe only to the privileged few. However, the expansion of cane production, particularly in the Caribbean area, in the late seventeenth and the eighteenth centuries, and the new sugar-beet crop in Europe in the nineteenth century, meant that sugar became available to an increasing proportion of the world's population.

Water and Plant Life

Physiology of Crop Production

Crop Yield

Foundations for Agroecosystem Resilience

Fundamentals of Rice Crop Science

With contributions from over 70 international experts, this reference provides comprehensive coverage of plant physiological stages and processes under both normal and stressful conditions. It emphasizes environmental factors, climatic changes, developmental stages, and growth regulators as well as linking plant and crop physiology to the production of food, feed, and medicinal compounds. Offering over 300 useful tables, equations, drawings, photographs, and micrographs, the book covers cellular and molecular aspects of plant and crop physiology, plant and crop physiological responses to heavy metal concentration and agrichemicals, computer modeling in plant physiology, and more.

Effect of High Temperature on Crop Productivity and Metabolism of Macro Molecules presents a comprehensive overview on the direct effect of temperatures defined as "high", a definition which increasingly includes a great number of geographic regions. As temperature impacts the number of base growth days, it is necessary to adapt plant selection, strategize planting times, and understand the expected impact of adaptive steps to ensure maximum plant health and crop yield. Global warming, climate change and change in environmental conditions have become common phrases in nearly every scientific seminar, symposium and meeting, thus these changes in climatic patterns constrain normal growth and reproduction cycles. This book reviews the effect of high temperature on agricultural crop production and the effect of high temperature stress on the metabolic aspects of macro molecules, including carbohydrates, proteins, fats, secondary metabolites, and plant growth hormones. Focuses on the effects of high temperature on agriculture and the metabolism of important macro-

molecules Discusses strategies for improving heat tolerance, thus educating plant and molecular breeders in their attempts to improve efficiencies and crop production Provides information that can be applied today and in future research Efforts to increase efficient nutrient use by crops are of growing importance as the global demand for food, fibre and fuel increases and competition for resources intensifies. The Molecular and Physiological Basis of Nutrient Use Efficiency in Crops provides both a timely summary of the latest advances in the field as well as anticipating directions for future research. The Molecular and Physiological Basis of Nutrient Use Efficiency in Crops bridges the gap between agronomic practice and molecular biology by linking underpinning molecular mechanisms to the physiological and agronomic aspects of crop yield. These chapters provide an understanding of molecular and physiological mechanisms that will allow researchers to continue to target and improve complex traits for crop improvement. Written by leading international researchers, The Molecular and Physiological Basis of Nutrient Use Efficiency in Crops will be an essential resource for the crop science community for years to come. Special Features: coalesces current knowledge in the areas of efficient acquisition and utilization of nutrients by crop plants with emphasis on modern developments addresses future directions in crop nutrition in the light of changing climate patterns including temperature and water availability bridges the gap between traditional agronomy and molecular biology with focus on underpinning molecular mechanisms and their effects on crop yield includes contributions from a leading team of global experts in both research and practical settings

Plant physiology is now considered as an essential ingredient for improving crop productivity, a continuing necessity with today's ever-increasing world population. This new volume provides an understanding of the physiological basis of the various plant processes and their underlying mechanisms under fluctuating environments, which is of great importance for sustainable crop production. Further advances in cellular and molecular biology hold promise to modify physiological processes, thereby improving the quality and quantity of major food crops and ensuring stability in yield of the produce even under severe abiotic stress. This book covers the latest information on the physiological basis of plant productivity, including abiotic stress adaptation and management, plant nutrition, climate change and plant productivity, transgenic and functional genomics, and plant growth regulators and their applications. The chapters in this volume tackle some of these key issues of sustainable plant production and evolve future strategies in overcoming challenges faced by the agricultural sector as a whole. The topics covered in this book presents important from research reputed scientists. This volume is a rich source of information in one place. It will be a useful resource for researchers and extension workers involved in plant physiology and related disciplines. Key features: Provide the latest information on developments in plant physiology Covers abiotic and biotic stress on economically important crop species Presents a detailed collection of biotechnological approaches in plant physiology Covers plant growth regulators, secondary metabolites, germination, crop growth and development of different crop species Provides research from experts at internationally renowned institutes

Climate Change and Crop Production

Crop Evolution, Adaptation and Yield

Physiological Processes Limiting Plant Productivity

Wheat

Reviews and analyzes recent advances in in our knowledge of the functioning of crop plants in the field. Emphasis is on north-temperate cropping (although examples are included from other regions), material being drawn from both the laboratory and the field. Also covered are crop simulation and interactions between plant disease and plant physiology, with thoughtful discussion of the complexity of crop/environment/management relationships.

Highlighting effective, analytical functions that have been found useful for the comparison of alternative management techniques to maximize water and nutrient resources, this reference describes the application of viable mathematical models in data analysis to increase crop growth and yields. Featuring solutions to various differential equations, the book covers the characteristics of the functions related to the phenomenological growth model. Including more than 1300 literature citations, display equations, tables, and figures and outlining an approach to mathematical crop modeling, Mathematical Models of Crop Growth and Yield will prove an invaluable resource.

The book is a compilation of articles on various issues, presented at the workshop on the Influence of Environment on Growth, Production, Physiology and Disease of Crops that was held at the University of Helsinki, Finland, December 2000. The main focus of the book is a review of the environmental factors influencing the growth, development and yield of food crops grown under various conditions. The book will be useful to scientists, researchers, students or experts dealing with agronomy, plant physiology, plant nutrition, plant pathology and crop cultivation.

Potato Physiology provides perspective and knowledge on the biological behavior and potentials of the potato plant. Organized into 15 chapters, this book focuses on tuber development physiology, biochemistry, and anatomy. This text also covers topics on physiological and biochemical aspects of photosynthesis, photoassimilate partitioning, respiration, tuberization, as well as carbohydrate and protein metabolisms. It elucidates potato's rest period, the stage when growth is inhibited as a result of endogenous causes, and the tubers' disorders, environmental responses, frost hardiness, and tissue culture. This text provides a

worldwide perspective and is organized and presented to be useful to graduate students, teachers, and potato investigators.

Crop Physiology Case Histories for Major Crops

Modeling Physiology of Crop Development, Growth and Yield

Seed Biology and Yield of Grain Crops, 2nd Edition

Applications for Genetic Improvement and Agronomy

The Physiology of Vegetable Crops, 2nd Edition

This book summarizes recent research on the physiology of yield of all the world's major field crops. The authors focus on the development of crop yield, the physiology underlying this process and the interactions between this physiology and the environment in which the crops develop. The need for the integration of the knowledge available for each of these crops has never been greater. In view of the increasing demand for food supplies of the world's growing population, the development and improvement of crop yield will play a crucial role in the future.

Discussing the latest processes involved in researching yield generation, Wheat: Ecology and Physiology of Yield Determination will help you design various types of crop production systems for maximum yield. Featuring information on developing high-yielding, low-input, and quality-oriented systems, this book offers you both physiological and ecological approaches that will help you understand the crop as well as increase its production. Discussing aspects of wheat growth for specific regions around the world, Wheat provides you with information that will improve the size and quality of your crops, including: how temperature, vernalization, and the photoperiod affect the development of wheat using the correct amount of nitrogen fertilizers for wheat crops an explanation of the reproduction and nitrogen cycles of wheat how elements and conditions such as lipids, proteins, nitrogen, and climate enhance grain quality estimating and determining optimal sowing dates examining factors that may affect wheat yield-density relationships, such as planting arrangement and date of sowing preventing seed decay and examining effects of mildews and leaf blights examining historical trends of the crop to see what further research needs to be done You'll also receive information on the genetic gains in wheat research that are improving the physiological traits and numerical components of this essential grain. Within Wheat, you'll find data and methods from international experts in the field that will improve the yield and growth of the world's most important crop.

The knowledge of plant responses to various abiotic stresses is crucial to understand their underlying mechanisms as well as the methods to develop new varieties of crops, which are better suited to the environment they are grown in. Environmental Stress Physiology of Plants and Crop Productivity provides readers a timely update on the knowledge about plant responses to a variety of stresses such as salinity, temperature, drought, oxidative stress and mineral deficiencies. Chapters focus on biochemical mechanisms identified in plants crucial to adapting to specific abiotic stressors along with the methods of improving plant tolerance. The book also sheds light on plant secondary metabolites such as phenylpropanoids and plant growth regulators in ameliorating the stressful conditions in plants. Additional chapters present an overview of applications of genomics, proteomics and metabolomics (including CRISPR/CAS techniques) to develop

abiotic stress tolerant crops. The editors have also provided detailed references for extended reading to support the information in the book. Environmental Stress Physiology of Plants and Crop Productivity is an informative reference for scholars and researchers working in the field of botany, agriculture, crop science and physiology, soil science, and environmental sciences.

Organization and conduct of plant stress research to increase agricultural productivity. Disease tolerance: reducing the impact of disease-induced stress on crop yields. Thigmomorphogenesis: the effect of mechanical perturbation on the growth of plants, with special reference to anatomical changes, the role of ethylene, and interaction with other environmental stresses. Differential aluminum tolerance in crop plants. Comparative responses of field grown crops to phosphate concentrations in soil solutions. Production of food plants in areas supplied with highly saline water: problems and prospects. Salt resistance in agricultural crops. Effects of freezing and cold acclimation on membrane structure and function. Cold resistance and injury in winter cereals. Strategies for altering chilling sensitivity as a limiting factor in crop production. Frost hardiness: a discussion of possible molecular causes of injury with particular reference to deep supercooling of water. Breeding potatoes for tolerance to stress: heat and frost. Selecting for drought and heat resistance in grain sorghum. Drought stress of cowpea and soybean under tropical conditions. Effects of water and heat stress on carbon metabolism of plants with C3 and C4 photosynthesis. Air pollution stress. Drought resistance and adaptation to water deficits in crop plants. Drought resistance in cereals - rice: a case study. Stomatal behavior and breeding fro drought resistance. Genetic improvement of drought resistance in crop plants: a case for sorghum. Testing and selecting for drought resistance in wheat. Growth and development of chickpeas under progressive moisture stress.

The Physiology of Crop Yield

Some Case Histories

Handbook of Plant and Crop Physiology

Applied Crop Physiology

Ecology and Physiology of Yield Determination

The Physiology of Crop YieldWiley-Blackwell

In this major 1993 work, Lloyd Evans provides an integrated view of the domestication, adaptation and improvement of crop plants, bringing together genetic diversity, plant breeding, physiology and aspects of agronomy. Considerations of yield and maximum yield provide continuity throughout the book. Food, feed, fibre, fuel and pharmaceutical crops are all discussed. Cereals, grain legumes and root crops, both temperate and tropical, provide many of the examples, but pasture plants, oilseeds, leafy crops, fruit trees and others are also considered. After the introductory chapter, the increasing significance of crop yields to the world's food supply is highlighted. The next three chapters consider changes to crop plants over the last ten thousand years, including domestication, adaptation and improvement.

Aimed at research workers and advanced students in crop physiology and ecology, agronomy and plant breeding, this book also reaches conclusions of relevance to those concerned with developmental policy, agricultural research and management, environmental quality, resource depletion and human history.

To feed a world population that will exceed 9 billion by 2050 requires an estimated 60% increase over current primary agricultural productivity. Closing the common and often large gap between actual and attainable crop yield is critical to achieve this goal. To close yield gaps in both small and large scale cropping systems worldwide we need (1) definitions and techniques to measure and model yield at different levels (actual, attainable, potential) and different scales in space (field, farm, region, global) and time (short and long term); (2) identification of the causes of gaps between yield levels; (3) management options to reduce the gaps where feasible and (4) policies to favour adoption of sustainable gap-closing solutions. The aim of this publication is to critically review the methods for yield gap analysis, hence addressing primarily the first of these four requirements, reporting a wide-ranging and well-referenced analysis of literature on current methods to assess productivity of crops and cropping systems.

From climate change to farming systems to genetic modification of organisms, Crop Physiology, Second Edition provides a practical tool for understanding the relationships and challenges of successful cropping. With a focus on genetic improvement and agronomy, this book addresses the challenges of environmentally sound production of bulk and quality food, fodder, fiber, and energy which are of ongoing international concern. The second edition of Crop Physiology continues to provide a unique analysis of these topics while reflecting

important changes and advances in the relevant science and implementation systems. Contemporary agriculture confronts the challenge of increasing demand in terms of quantitative and qualitative production targets. These targets have to be achieved against the background of soil and water scarcity, worldwide and regional shifts in the patterns of land use driven by both climate change and the need to develop crop-based sources of energy, and the environmental and social aspects of agricultural sustainability. Provides a view of crop physiology as an active source of methods, theories, ideas, and tools for application in genetic improvement and agronomy Written by leading scientists from around the world Combines environment-specific cropping systems and general principles of crop science to appeal to advanced students, and scientists in agriculture-related disciplines, from molecular sciences to natural resources management

Stress Physiology in Crop Plants

The Molecular and Physiological Basis of Nutrient Use Efficiency in Crops

Effect of High Temperature on Crop Productivity and Metabolism of Macro Molecules

Respiration and Crop Productivity

Mathematical Models of Crop Growth and Yield

Crops and world food supply, crop evolution, and the origins of crop physiology; maize; sugar cane; rice; wheat; soybean; pea; potato; sugar beet; cotton; The physiological basis of crop yield.

Key features: Describes the effects and responses of the macro and micro levels of crops under the different components of climate change Reports on the adaptation and resilience of food production systems within the changing climate Covers how plants cope with the changing climate including physiological, biochemical, phenotypic, and ecosystem responses Provides an in-depth discussion on the importance of agricultural education connected to climate change Presenting an overview of agroecology within the framework of climate change, this book looks at the impact of our changing climate on crop production and agroecosystems, reporting on how plants will cope with these changes, and how we can mitigate these negative impacts to ensure food production for the growing population. It explores the ways that farmers can confront the challenges of climate change, with contributed chapters from around the world demonstrating the different challenges associated with differing climates. Examples are provided of the approaches being taken now to expand the ecological, physiological, morphological, and productive potential of a range of crop types. Giving readers a greater understanding of the mechanisms of plant resilience to climate change, this book provides new insights into improving the productivity of an individual crop species as well as bringing resistance and resiliency to the entire agroecosystem. It offers a strong foundation

for changing research and education programs so that they build the resistance and resilience that will be needed for the uncertain climate future ahead.

Environmental Stress Physiology of Plants and Crop Productivity

Crop Physiology : Some Case Histories

North American Agroforestry

Environment and Crop Production

Emerging Trends of Plant Physiology for Sustainable Crop Production