The Physiology Of Crop Yield Full Liao

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. Abiotic stress factors frequently constrain the growth and productivity of major crop species. The single greatest abiotic stress factor that limits crop growth worldwide is water availability. While genetic increases in yield potential are best expressed in optimum environments, they are also associated with enhanced yields under drought and nitrogen deficiency. These gains are especially relevant given that further large increases in the area under irrigation are not expected, and land deterioration associated with intensive agriculture threatens those areas already irrigated. This book is intended to cover all known factors of abiotic stresses and their respective effects on some of the important aspects of physiological processes in plants.1. Abiotic Stress and Crop Yield 2. Physiology of Grain Legume Yield Under Abiotic Stress 3. Photosynthesis and Physiological Parameters Under Intercropping Condition 4. Role of Growth Regulators Under Abiotic Stress 5. Plant Water Relationship Under Abiotic Stress 6. Dry Matter Partitioning Under AbioticS tress 7. Effect of Pesticides on Physiological Processes in Plants

Explore the Relationship between Crop and Climate Agricultural sustainability has been

gaining prominence in recent years and is now becoming the focal point of modern agriculture. Recognizing that crop production is very sensitive to climate change, Climate Change Effect on Crop Productivity explores this timely topic in-depth. Incorporating contributions by expert scientists, professors, and researchers from around the world, it emphasizes concerns about the current state of agriculture and of our environment. This text analyzes the global consequences to crop yields, production, and risk of hunger linking climate and socioeconomic scenarios. Addresses Biotechnology, Climate Change, and Plant Productivity The book contains 19 chapters covering issues such as CO2, ozone on plants, productivity fertilization effect, UV (ultraviolet) radiation, temperature, and stress on crop growth. The text discusses the impact of changing climate on agriculture, environment stress physiology, adaptation mechanism, climate change data of recent years, impact of global warming, and climate change on different crops. It explores the overall global picture in terms of the effect of crops to climate change during abiotic stress and considers strategies for offsetting and adapting to ongoing climate change. Details how and why climate change occurs and how it effects crop productivity and agriculture Considers what measures should be taken to mitigate the effect of climate change on agriculture Highlights the effect of climate change on crop productivity, the invention of new technology, and strategies for agriculture practice to adapt to climate change Provides an analysis of the global warming effect on crop productivity due to climate change and long-term agriculture technique development Confirms the asymmetry between potentially severe agricultural damages such as the effect on crop yield due to variation in temperature Reports on the results of experiments to assess the effects of global climate change on crop productivity An asset to agriculturists, environmentalists, climate change specialists, policy

makers, and research scholars, Climate Change Effect on Crop Productivity provides relevant information and opportunities for productive engagement and discussion among government negotiators, experts, stakeholders, and others concerned about climate change and agriculture.

Abiotic stress adversely affects crop production worldwide, decreasing average yields for most of the crops to 50%. Among various abiotic stresses affecting agricultural production, drought stress is considered to be the main source of yield reduction around the globe. Due to an increasing world population, drought stress will lead to a serious food shortage by 2050. The situation may become worse due to predicated global climate change that may multiply the frequency and duration and severity of such abiotic stresses. Hence, there is an urgent need to improve our understanding on complex mechanisms of drought stress tolerance and to develop modern varieties that are more resilient to drought stress. Identification of the potential novel genes responsible for drought tolerance in crop plants will contribute to understanding the molecular mechanism of crop responses to drought stress. The discovery of novel genes, the analysis of their expression patterns in response to drought stress, and the determination of their potential functions in drought stress adaptation will provide the basis of effective engineering strategies to enhance crop drought stress tolerance. Although the in-depth water stress tolerance mechanisms is still unclear, it can be to some extent explained on the basis of ion homeostasis mediated by stress adaptation effectors, toxic radical scavenging, osmolyte biosynthesis, water transport, and long distance signaling response coordination. Importantly, complete elucidation of the physiological, biochemical, and molecular mechanisms for drought stress, perception, transduction, and tolerance is still a challenge to the plant biologists. The

findings presented in volume 1 call attention to the physiological and biochemical modalities of drought stress that influence crop productivity, whereas volume 2 summarizes our current understanding on the molecular and genetic mechanisms of drought stress resistance in plants.

This 1974 book was made available as a second edition in 1979. It provides an understanding of the ways in which the various physiological processes are integrated to produce the responses shown by whole plants growing in the variable environment in the field, whilst stressing the quantitative aspects of these relationships. This was the first general text to attempt such a treatment, thereby digesting much material that had been found only in research papers or detailed monographs and complementing the reductionist approach of most standard texts of plant physiology. Most of the subject matter concerns agricultural systems, but many of the concepts and approaches are applicable to more complex natural ecosystems. Emphasis is placed on integrating knowledge from many sources and on trying to assess quantitatively the importance of each component. The result is a comprehensive account making the book a valuable background for all interested in the study of plants in the field.

For quantitative improvment of crop yield, it is important to understand the physiology and genetics of individual yield-contributing characters, as productive and climatically suitable land is fast decreasing due to various factors. Though quantitative increase in grain production is important for feeding the ever-increasing population, it is critically important that the grain produced is nutritive and healthy (free of, or with reduced, undesirable and/or toxic constituents. The information presented in this book covers recent research and is globally

relevant. It is designed to cater to the needs of advanced students in crop physiology, crop genetics, crop breeding, agronomy and soil science, as well as nutritionists, progressive farmers, planners and crop managers.

The entire range of the developmental processes in plants is regulated by the shift in the hormonal concentration, tissue sensitivity and their interaction with the factors operating around the plants. Out of the recognized hormones, attention has largely been focused on five (Auxins, Gibberellins, Cytokinin, Abscisic acid and Ethylene). However, in this book, the information about the most recent group of phytohormones (Brassinosteroids) has been compiled by us. It is a class of over 40 polyhydroxylated sterol derivatives, ubiquitously distributed throughout the plant kingdom. A large portion of these steroids is restricted to the reproductive organs (pollens and immature seeds). Moreover, their strong growth-inducing capacity, recognized as early as prior to their identification in 1979, tempted the scientists to visualize the practical importance of this group of phytohormones. The brassin solution, from rape pollen, was used in a collaborative project by the scientists of Brazil and U. S. A. in a p-sowing seed treatment to augment the yield. This was followed by large-scale scientific programmes in U. S. , Japan, China, Germany and erstwhile U. S. S. R. , after the isolation of the brassinosteroids. This approach suits best in today’s context where plants are targeted only as producers and hormones are employed to get desired results. Chapter 1 of this book (which embodies a total of 10 chapters), gives a comprehensive survey of the hitherto known brassinosteroids, isolated from lower and higher plants.

A major task of our time is to ensure adequate food supplies for the world's current population (now nearing 7 billion) in a sustainable way while protecting the vital

functions and biological diversity of the global environment. The task of providing for a growing population is likely to be even more difficult in view of actual and potential changes in climatic conditions due to global warming, and as the population continues to grow. Current projections suggest that the world's temperatures will rise 1.8-4.0 by 2100 and population may reach 8 billion by the year 2025 and some 9 billion by mid-century, after which it may stabilize. This book addresses these critical issues by presenting the science needed not only to understand climate change effects on crops but also to adapt current agricultural systems, particularly in regard to genetics, to the changing conditions. Crop Adaptation to Climate Change covers a spectrum of issues related to both crops and climatic conditions. The first two sections provide a foundation on the factors involved in climate stress, assessing current climate change by region and covering crop physiological responses to these changes. The third and final section contains chapters focused on specific crops and the current research to improve their genetic adaptation to climate change. Written by an international team of authors, Crop Adaptation to Climate Change is a timely look at the potentially serious consequences of climate change for our global food supply, and is an essential resource for academics, researchers and professionals in the fields of crop science, agronomy, plant physiology and molecular biology; crop consultants and breeders; as well as climate and food scientists.

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, crop physiologists, plant breeders, and extension workers. It is also a valuable source of information for lecturers and graduate students of agronomy and plant physiology.

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.

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.

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

This book presents the state-of-the-art in plant ecophysiology. With a particular focus on adaptation to a changing environment, it discusses ecophysiology and adaptive mechanisms of plants under climate change. Over the centuries, the incidence of various abiotic stresses such as salinity, drought, extreme temperatures, atmospheric pollution, metal toxicity due to climate change have regularly affected plants and, and some estimates suggest that environmental stresses may reduce the crop yield by up to 70%. This in turn adversely affects the food security. As sessile organisms, plants are frequently exposed to various environmental adversities. As such, both plant physiology and plant ecophysiology begin with the study of responses to the

environment. Provides essential insights, this book can be used for courses such as Plant Physiology, Environmental Science, Crop Production and Agricultural Botany. Volume 2 provides up-to-date information on the impact of climate change on plants, the general consequences and plant responses to various environmental stresses.
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.
Herbicides make a spectacular contribution to modern crop production. Yet, for the development of more effective and safer agrochemicals, it is essential to understand how these compounds work in plants and their surroundings. This expanded and fully

revised second edition of Herbicides and Plant Physiology provides a comprehensive and up-to-date account of how modern herbicides interact with target plants, and how they are used to manage crop production. In addition, the text: Provides a current account of the importance of weeds to crop yield and quality; Describes how new herbicides are discovered and developed; Examines precise sites of herbicide action and mechanisms of herbicide selectivity and resistance; Reviews commercial and biotechnological applications, including genetically engineered herbicide resistance in crops; Suggests new areas for future herbicide development; Includes many specially prepared illustrations. As a summary of diverse research information, this second edition of Herbicides and Plant Physiology is a valuable reference for students and researchers in plant physiology, crop production/protection, plant biochemistry, biotechnology and agriculture. All libraries in universities, agricultural colleges and research establishments where these subjects are studied and taught will need copies of this excellent book on their shelves.

This book has been prepared for those seeking a better understanding of the functioning of crop plants, particularly the processes that lead to the genera tion 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 50 years the agricultural research community must repeat this achievement.

Disease and crop yield: the problems and prospects for agriculture. Photosynthesis in healthy and diseased plants. Energy use and metabolic regulation in plant-pathogen interactions. Patterns of translocation, storage and interconvension of carbohydrates. Transport of host assimilates to the pathogen. Effects of root-infecting fungi on structure and function of cereal roots. Effects of disease on plant water relations. The involvement of growth regulators in the diseased plant. Alterations in secondary metabolism. Disease and crop physiology: a modeller's pont of view.

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.

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 rela tionship 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. Mter 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.

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 the 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.
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 pertubation 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 highy 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.

Control of development. The leaf canopy and root system. Dry matter production by interception and conversion of solar radiation. Transpiration and dry matter production. Partition of assimilate. Environmental and physiological control of yield.

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.

Crop physiology is one of the foundationds of the improvement of crops and cropping systems, whether the aim is to increase yield or improve the efficiency of use of resources. Great strides forward have been made in the understanding of the functioning of crop plants in the field over the last decade, and this book is unique in reviewing and analysing these advances at a level which can be assimilated by degree students. The emphasis is on north–temperate cropping,

although examples are drawn from elsewhere, and the authors have used a combination of findings from the laboratory and the field. Other features include an introduction to crop simulation and consideration of the interactions between plant disease and crop physiology. Overall the book provides a clear explanation of difficult concepts, bearing in mind the complexity of crop/environment/management relationships.

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

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.

Continuous discoveries in plant and crop physiology have resulted in an abundance of new information since the publication of the third edition of the Handbook of Plant and Crop Physiology. Following its predecessors, the fourth edition of this well-regarded handbook offers a unique, comprehensive, and complete collection of topics in the field of plant and crop physiology. Divided into eleven sections, for easy access of information, this edition contains more than 90 percent new material, substantial revisions, and two new sections. The handbook covers the physiology of plant and crop growth and development, cellular and molecular aspects, plant genetics and production processes. The book presents findings on plant and crop growth in response to climatic changes, and considers the potential for plants and crops adaptation, exploring the biotechnological aspects of plant and crop improvement. This content is used to plan, implement, and evaluate strategies for increasing plant growth and crop

yield. Readers benefit from numerous tables, figures, case studies and illustrations, as well as thousands of index words, all of which increase the accessibility of the information contained in this important handbook. New to the Edition: Contains 37 new chapters and 13 extensively revised and expanded chapters from the third edition of this book. Includes new or modified sections on soil-plant-water-nutrients-microorganisms physiological relations; and on plant growth regulators, both promoters and inhibitors. Additional new and modified chapters cover the physiological responses of lower plants and vascular plants and crops to metal-based nanoparticles and agrichemicals; and the growth responses of plants and crops to climate change and environmental stresses. With contributions from 95 scientists from 20 countries, this book provides a comprehensive resource for research and for university courses, covering plant and crop physiological responses under normal and stressful conditions ranging from cellular aspects to whole plants.

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.

This Book Is A Compilation Of Appropriately Edited And Refered Articles Contributed By Scientists Working On Different Aspects Of Plant Physiology

Relevant To Enhancing Sustainable Crop Production.These Scientific Articles Cover A Wide Range Of Aspects Of Crop And Plant Physiology Including Growth And Developmental Aspects, Mineral Nutrition, P G Rs, Abiotic Stresses, Post-Harvest Physiology And Tree Physiology. The Global Climatic Changes And Their Effects On Agricultural Production And Tissue Culture Have Also Been Incorporated. Plant Physiology Is Now Reckoned As An Essential Ingredient For Improving Crop Productivity. Since The Sixties, Indian Plant Physiologists Have Contributed Significantly To The Understanding Of The Basic Parameters Of Crop Productivity Under Indian Conditions.Wheat, Rice, Rapeseed, Pulses Are Some Of The Crops Which Received Special Attention. The Topics Covered In This Book Highlight The General And Overview On Some Of The Very Important Aspects Of Physiological Research By Reputed Scientists Of The Country. The Articles Will Be Useful To Agronomists, Plant Breeders, Horticulturists, Biotechnologists,Botanists, Etc., In Furthering The Improvement Of Crop Yield Through Crop Management And/Or Conventional And Modern Molecular Breeding Practices.

This volume explores specific approaches that have shown to result in crop yield increases. Research on the physiological understanding of these methods has led to the development of practical applications of plant breeding approaches to

genetically improve crops to achieve higher yields. Authoritative entries from crop scientists shed new light on two water-conservation traits: one that is based on an initiation of the decrease in transpiration earlier in the soil drying cycle, and the second that is based on a sensitivity of transpiration rate under high atmospheric vapor pressure deficit that results in partial stomatal closure. Both these approaches involve partial stomatal closure under well-defined situations to decrease the rate of soil water loss. Readers will be able to analyze the circumstances under which a benefit is achieved as a result of the water-limitation trait; and key discussion points in the case studies presented will help answer questions such as what species, which environments, how often will yield be benefited for various crop species? Contributions also review the genetic variation for these two traits within each crop species and the physiological basis for the expression of these traits.

This book presents the state-of-the-art in plant ecophysiology. With a particular focus on adaptation to a changing environment, it discusses ecophysiology and adaptive mechanisms of plants under climate change. Over the centuries, the incidence of various abiotic stresses such as salinity, drought, extreme temperatures, atmospheric pollution, metal toxicity due to climate change have regularly affected plants and, and some estimates suggest that environmental

stresses may reduce the crop yield by up to 70%. This in turn adversely affects the food security. As sessile organisms, plants are frequently exposed to various environmental adversities. As such, both plant physiology and plant ecophysiology begin with the study of responses to the environment. Provides essential insights, this book can be used for courses such as Plant Physiology, Environmental Science, Crop Production and Agricultural Botany. Volume 1 provides up-to-date information on the impact of climate change on plants, the general consequences and plant responses to various environmental stresses. 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

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 92 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

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.