

Heat Stress In The U S Construction Industry Researchgate

Food security has always been a major global concern and is getting more attention in recent years. In fact, the global economy and stability has been severely challenged by the precarious state of food security, which was exacerbated by a combination of sharp price volatility and disastrous weather conditions related to climate change. The book aims to improve the analysis and projection of agricultural production and marketing, facilitates information exchange to better food supply and demand and ultimately contributes to enhance world food security and sustainable global agricultural development.

This book reviews the research pertaining to nutrient requirements for working in cold or in high-altitude environments and states recommendations regarding the application of this information to military operational rations. It addresses whether, aside from increased energy demands, cold or high-altitude environments elicit an increased demand or requirement for specific nutrients, and whether performance in cold or high-altitude environments can be enhanced by the provision of increased amounts of specific nutrients.

Global warming has led to renewed interest in the occurrence of heat stress in the population along with its determinants and consequences. Heat stress can create unsafe working conditions and affect the health of workers. Heat waves are also unsafe and in 2003 led to many avoidable deaths in Europe. Most heat stress research has been conducted in high-income countries in temperate latitudes. This leaves knowledge gaps regarding heat stress and its effects for tropical settings. Thailand is a tropical developing country where average temperatures have increased over the last 50 years and further increase is expected. Heat stress has been shown to be a serious problem in a variety of Thai workplaces. But several important public health questions remain and they are the focus of this thesis. The questions are as follows: are there any health impacts of heat stress i) on Thai workers? ii) on the overall population in Thailand? iii) expected for the Thai population in future due to the projected increase of temperature? To answer these research questions, five studies were carried out. They investigate the occurrence of heat stress and its association with various health outcomes, including death. The first four studies use heat exposure and morbidity data from a large national Thai Cohort Study (TCS) covering the period 2005 to 2009. The fifth study uses national weather and mortality data covering 1999 to 2008. The first study explores the relationship between self-reported heat stress and psychological distress and overall health status of Thai workers using TCS data. There was a strong association between heat stress and worse mental health outcomes among workers. The second study uses TCS data on heat stress and occupational injury among Thai workers. The evidence connects heat stress and occupational injury and also identifies several factors that increase heat exposure (male sex, rural residence, physical job). The third study relates heat stress and incident kidney disease amongst Thai workers using longitudinal TCS data that documented prolonged heat exposure. Heat stress was a significant risk factor for kidney disease among male workers, especially physical workers age 35 years or more. The fourth study shows that health and wellbeing decreased (low energy, emotional problems, and low life satisfaction) as more heat stress interfered with daily activities (sleeping, daily travel, work, housework and exercise). So heat stress has an adverse health impact on the overall population. The final study shows that Thai mortality from 1999 to 2008, adjusted for weather and air pollution, varied by air temperature. A U-shaped association between monthly maximum temperature and mortality was found for each season (hot, wet, and cold), and each region (North, Northeast, South, and Centre). The 4 degrees Celsius increase in temperature from climate change, as expected by 2100, could increase annual heat-related deaths by 32,000 as well as increasing other impacts on health and well-being.

The health impact information in this thesis points to the need to improve health surveillance and public awareness regarding risks of heat stress in Thailand.

Laser Pulse Heating of Surfaces and Thermal Stress Analysis

Advanced Thermal Stress Analysis of Smart Materials and Structures

Overview

Urban Heat Stress and Mitigation Solutions

Annual Progress Report

Proceedings of 2013 World Agricultural Outlook Conference

"The concept for this text arose from the 18th Discover Conference on Effect of the Thermal Environment on Nutrient and Management Requirements of Cattle, which was held at the Brown County Inn in Nashville, Indiana

November 2-5, 2009"--Pref.

Using work/rest schedules can decrease the risk of heat illness. Things you need to know: 1. Continuous work in the heat is not advisable—you must take rest breaks periodically to allow your body to cool down; and 2. A variety of work/rest schedules are available that can be adapted to your worksite. Relying on self-pacing alone may not be sufficient.

The book is designed to provide a flowing description of the physiology of heat stress, the illnesses associated with heat exposure, recommendations on optimising health and performance, and an examination of Olympic sports played in potentially hot environmental conditions. In the first section the book examines how heat stress effects performance by outlining the basics of thermoregulation and how these responses impact on cardiovascular, central nervous system, and skeletal muscle function. It also outlines the pathophysiology and treatment of exertional heat illness, as well as the role of hydration status during exercise in the heat.

Thereafter, countermeasures (e.g. cooling and heat acclimation) are covered and an explanation as to how they may aid in decreasing the incidence of heat illness and minimise the impairment in performance is provided. A novel and particular feature of the book is its inclusion of sport-specific chapters in which the influence of heat stress on performance and health is described, as well as strategies and policies adopted by the governing bodies in trying to offset the deleterious role of thermal strain. Given the breadth and scope of the sections, the book will be a reference guide for clinicians, practitioners, coaches, athletes, researchers, and students.

Heat Shock Proteins in Veterinary Medicine and Sciences

Input Into Health Impact Assessment of Climate Change

Advances In Plant Physiology Vol. 14

Thermophysiology of Health and Performance

Working on a Warmer Planet

First Aid for Heat Illness

New employees are at the highest risk for heat illness. Acclimatization is crucial to working in hot conditions. Things you need to know: 1. Heat acclimatization is the improvement in heat tolerance that comes from gradually increasing the intensity or duration of work per formed in a hot setting; 2. The best way to acclimatize yourself to the heat is to increase the workload performed in a hot setting gradually over a period of 1-2 weeks; and 3. You begin to lose your acclimatization after about 1 week away from working in the heat.

Protective clothing protects wearers from hostile environments, including extremes of heat and cold. Whilst some types of protective clothing may be designed primarily for non-thermal hazards (e.g. biological hazards), a key challenge in all protective clothing remains wearer comfort and the management of thermal stress (i.e. excessive heat or cold). This book reviews key types of protective clothing, technologies for heating and cooling and, finally, modeling aspects of thermal stress and strain. Explores different types of protective clothing, their uses and their requirements, with an emphasis on full-scale or prototype clothing, including immersion suits, body armour and space suits Considers novel and commercial technologies for regulating temperature in protective clothing, including phase change materials, shape memory alloys, electrically heated clothing and air and water perfusion-based cooling systems Reviews the human thermoregulatory system and the methods of modelling of thermal stress in protective clothing through various conditions, including cold water survival and firefighting The welfare of egg-producing poultry is a topic of great concern to the poultry industry and to researchers in applied animal behaviour. It is also subject to increased legislation. Issues such as battery cages, space requirements, access to daylight and 'free-range' eggs have attracted public interest.

Physiology Of Nutrition And Environmental Stresses On Crop Productivity

don't let the heat get you down

Heat Stress In Food Grain Crops: Plant Breeding and Omics Research

Thermotherapy for Neoplasia, Inflammation, and Pain

From Macro-level to Micro-level Evidence

What to Do For The Most Common Health Problems

Many common health problems can be treated with simple remedies you can do at home. Even if the steps you take don't cure the problem, they can relieve symptoms and allow you to go about your daily life, or at least help you until you're

able to see a doctor. Some remedies, such as changing your diet to deal with heartburn or adapting your home environment to cope with chronic pain, may seem like common sense. You may have questions about when to apply heat or cold to injuries, what helps relieve the itch of an insect bite, or whether certain herbs, vitamins or minerals are really effective against the common cold or insomnia. You'll find these answers and more in Mayo Clinic Book of Home Remedies. In

situations involving your health or the health of your family, the same questions typically arise: What actions can I take that are immediate, safe and effective? When should I contact my doctor? What symptoms signal an emergency? Mayo

Clinic Book of Home Remedies clearly defines these questions with regard to your health concerns and guides you to choose the appropriate and most effective response.

This book has meticulous research in some of the very sensible and stirring areas of Plant Physiology-Plant Molecular Physiology are indispensably needed for holistic development of agriculture and crop production in different agroclimatic

zones. It would be tremendously a productive reference book for acquiring advanced knowledge by post-graduate and Ph.D. scholars in response to the innovative courses in Plant Physiology, Plant Biochemistry, Plant Molecular Biology, Plant

Biotechnology, Environmental Sciences, Plant Pathology, Microbiology, Soil Science & Agricultural Chemistry, Agronomy, Horticulture, and Botany.

This books provides up-to-date reviews on current advances of the role of HSP in veterinary medicine and research. Key basic and clinical research laboratories from major universities, veterinary hospitals and pharmaceutical companies

around the world have contributed chapters that review present research activity and importantly project this field into the future. For easy readability, the book is sub divided into sections on HSP in the following aspects of Veterinary

Medicine, including, I - Domestic Animals, II - Poultry, III - Aquatic and IV - Parasites. The book is a must read for heat shock protein researchers in general and specifically those involved in clinical and research in veterinary medicine.

Nutrients in Dairy and Their Implications for Health and Disease

Physiological, Molecular and Genetic Perspectives

Heat Stress

Managing Thermal Stress

Applications for Military Personnel in Field Operations

Exertional Heat Illnesses

Cooling is key. Know the symptoms and treatment of heat illness. Thigs you need to know: 1. Heat illness can strike quickly--learn to recognize the symptoms; 2. Workers with heat illness should stop working, get cool, and drink fluids; 3. Altered mental status requires immediate attention; and 4. When treating severe heat illness, cooling is the first priority.

This is the first single volume monograph that systematically summarizes the recent progress in using non-Fourier heat conduction theories to deal with the multiphysical behaviour of smart materials and structures. The book contains six chapters and star and non-Fourier heat conduction theories. Non-Fourier heat conduction theories include Cattaneo-Vernotte, dual-phase-lag (DPL), three-phase-lag (TPL), fractional phase-lag, and nonlocal phase-lag heat theories. Then, the fundamentals of thermal wave chara reviewing the methods for solving non-Fourier heat conduction theories and by presenting transient heat transport in representative homogeneous and advanced heterogeneous materials. The book provides the fundamentals of smart materials and structur

application, and governing equations. In particular, functionally-graded smart structures made of piezoelectric, piezomagnetic, and magnetoelctroelastic materials are introduced as they represent the recent development in the industry. A series of uncouple dimensional structures are also included. The volume ends with coupled thermal stress analyses of one-dimensional homogenous and heterogeneous smart piezoelectric structures considering different coupled thermopiezoelectric theories. Last but not least

under thermal disturbance is investigated and the authors propose directions for future research on the topic of multiphysical analysis of smart materials.

Climate change is causing, and will increasingly cause, a wide range of adverse health effects, including heat-related disorders, infectious diseases, respiratory and allergic disorders, malnutrition, mental health problems, and violence. The scientific bases for r

change and health problems are evolving as are the strategies for adapting to climate change and mitigating the greenhouse gases, which are its primary cause. With contributions from 78 leading experts in climate change and in public health, this book cor

that represents a core curriculum on climate change and public health, including key strategies for adaptation and mitigation. Written primarily for students and mid-career professionals in public health and environmental sciences, the book clearly describes

health impacts of climate change. Chapters are supplemented with case studies, graphs, tables and photographs. The book's organization in 15 chapters makes it an ideal textbook for graduate and undergraduate courses in public health, environmental scien

Nutritional Needs in Cold and High-Altitude Environments

Effect of heat stress on nitrate reductase activity and growth in barley and wheat seedlings

What You Should Know about Heat Disorders

Environmental Stress and Amelioration in Livestock Production

Welfare of the Laying Hen

Heat Stress and Animal Productivity

Nutrients in Dairy and Their Implications for Health and Disease addresses various dairy products and their impact on health. This comprehensive book is divided into three sections and presents a balanced overview of the health benefits of milk and milk products. Summaries capture the most salient points of each chapter, and the importance of milk and its products as functional foods is addressed throughout. Presents various dairy products and their impact on health Provides information on dairy milk as an important source of micro-and macronutrients that impact body functions Addresses dietary supplements and their incorporation into dairy products

The USAF's Combined Advanced Technology Enhanced Design U-Ensemble (COMBAT EDGE-CE) uses positive pressure breathing (PPB) to enhance acceleration tolerance. A counter-pressure vest is worn to balance intra-thoracic pressure during PPB. Airerew have reported an increased thermal burden with wear of the CE vest. Thus, this study was designed to compare the heat load of wearing the USAF's standard anti-U system (STD) to that of CE, and to determine if the heat stress had any adverse effect on U-tolerance. Results: Mean weight loss was 1.10+/-0.24kg with CE and 1.08+/-0.28kg with STD (no significant difference). Maximal rectal temperature was the same for CE and STD (38.1+/-0.4 OC). Maximal attained relaxed, gradual onset +Uz tolerances after heat stress were 7.1+/-1.3 for CE and 6.3+/-0.9 for STD (p

This book introduces laser pulse heating and thermal stress analysis in materials surface. Analytical temperature treatments and stress developed in the surface region are also explored. The book will help the reader analyze the laser induced stress in the irradiated region and presents

solutions for the stress field. Detailed thermal stress analysis in different laser pulse heating situations and different boundary conditions are also presented. Written for surface engineers.

An Engineering Perspective

Heat Stress in Sport and Exercise

The Mayo Clinic Book of Home Remedies

Metabolic Effects of Centrifugation and Heat Stress

Published under the Sponsorship of the Association for Institutional Research (AIR) and the Association for the Study of Higher Education (ASHE)

Heat Stress Tolerance in Plants

This book provides the reader with an understanding of the impact that different morphologies, construction materials and green coverage solutions have on the urban microclimate, thus affecting the comfort conditions of urban inhabitants and the energy needs of buildings in urban areas. The book covers the latest approaches to energy and outdoor comfort measurement and modelling on an urban scale, and describes possible measures and strategies to mitigate the effects of the mutual interaction between urban settlements and local microclimate. Despite its relevance, only limited literature is currently devoted to appraising—from an engineering perspective—the intertwining relationships between urban geometry and fabrics, energy fluxes between buildings and their surroundings, outdoor microclimate conditions and building energy demands in urban areas. This book fills this gap by first discussing the physical processes that govern heat and mass transfer at an urban scale, while emphasizing the role played by different spatial arrangements, manmade materials and green infrastructures on the outdoor microclimate. The first chapters also address the implications of these factors on the outdoor comfort conditions experienced by pedestrians, and on the buildings' energy demand for space heating and cooling. Then, based upon cutting-edge experimental activities and simulation work, this book demonstrates current and forthcoming adaptation and mitigation strategies to improve the urban microclimate and its impact on the built environment, such as cool materials, thermochromic and retroreflective finishing materials, and green infrastructures applied either at a building scale or at the urban scale. The effect of these solutions is demonstrated for different cities worldwide under a range of climate conditions. Finally, the book opens a wider perspective by introducing the basic elements that allow fuel poverty, raw materials consumption, and the principles of circular economy in the definition of a resilient urban settlement.

This anthology provides readers of scientific literature on socioeconomic factors and working conditions with the newest knowledge in this field. Since our world is subjected to constant change in accelerating speed, scientific reviews and updates are needed. Fortunately, research methodology in epidemiology, physiology, psychology and sociology is also developing rapidly and therefore the scientific community can provide politicians and policy makers with increasingly sophisticated and exact descriptions of societal factors in relation to work. The anthology starts in the macro level sphere – with international perspectives and reviews related to working conditions in relation to political change (the fall of the Soviet Union) gender, age, precarious employment, national economy and retirement. Two chapters relate to national policies and activities in international organizations. The second part of the book relates to the meso level sphere – with reviews on social patterns in distributions of psychosocial and physical risks at work in general as well as reviews on noise, shift work, under/overemployment, occupational physical activity, job intensity (which may be a particularly important problem in low income countries), digitization in modern work, climate change, childhood determinants of occupational health in adult years and theoretical models currently used in occupational epidemiology – demand/control, effort/reward, organizational justice, psychosocial safety climate, conflicts, bullying/harassment. This part of the book ends with two chapters on interventions (one chapter on the use of cultural interventions and one on interventions and their evaluation in general) and two chapters on financial aspects of poor/good work environments and evaluations of interventions. In the third part of the book the micro level is addressed. Here mechanisms translating working conditions into physiology are discussed. This starts in general theory relating basic theories regarding energy storage and release to psychosocial theory (extension of demand control theory). It also includes regeneration physiology, autonomic nervous system function, immunology and adverse behaviour. Sections in the Textbook: Macro-level determinants of occupational health: Akizumi Tsutsumi, Meso-level determinants of occupational health: Morten Wahrendorf and Jian Li, Micro-level determinants of occupational health:

Bradley J. Wright

This book provides a comprehensive overview of the multitude of different forms of thermotherapy in connection with aspects of thermal physiology and cell biology. The aim is to elucidate

the scientific background of therapeutic actions and to promote effective new applications at the beginning of the 21st century. Significant to these purposes is cooperation between experts in the fields of thermal biology, hyper thermic oncology, rheumatology, and balneology, as represented by the editors. Emphasis has been placed on a balanced choice of contributions, in the hope that this will enable the reader to draw helpful connections between the principles and practice of thermotherapy. It is apparent that a wealth of published data exists concerning thermotherapy on the one hand and thermal physiology on the other. However, in the former field empirical aspects of therapeutic usefulness prevail, while in the latter, aspects of basic science are in the foreground. Accordingly, the sources where published data may be found are quite different and as a consequence many findings of potential mutual interest published in medical journals have gone unnoticed by readers of physiological journals, and vice versa. It is hoped that this book will bridge the gap and encourage researchers' efforts to integrate the available knowledge to attain optimal coordination of clinical and theoretical aspects.

Research in Biological and Medical Sciences

Developmental Programming in Livestock Production, An Issue of Veterinary Clinics of North America: Food Animal Practice

Work/rest Schedules

Road & Rec

Current Approaches to Resolving the Physiological Heat Stress Problems Imposed by Chemical Protection Clothing Systems U.

Heat stress

The only text to focus exclusively on heat-related illnesses. Full of practical advice for professionals in a variety of medical, academic, & commercial settings. Learn how to identify, treat & prevent exertional heat illnesses & ensure your sporting events are safe.

Given the importance of livestock to the global economy, there is a substantial need for world-class reference material on the sustainable management of livestock in diverse eco-regions. With uncertain climates involving unpredictable extreme events (e.g., heat, drought, infectious disease), environmental stresses are becoming the most crucial factors affecting livestock productivity. By systematically and comprehensively addressing all aspects of environmental stresses and livestock productivity, this volume is a useful tool for understanding the various intricacies of stress physiology. With information and case studies collected and analyzed by professionals working in diversified ecological zones, this book explores the influence of the environment on livestock production across global biomes. The challenges the livestock industry faces in maintaining the delicate balance between animal welfare and production are also highlighted.

Understanding heat stress can help you to stay safe while working in hot environments. Things you need to know: 1. Heat exposure can cause a range of effects on your body, from irritating rashes to heat stroke; 2. Heat exposure can cause confusion and poor judgment—use the buddy system to monitor coworkers for heat illness; 3. Drinking enough water is critical to preventing heat illness. Stay hydrated; and 4. Cooling is the treatment for all heat illness.

Climate Change and Public Health

Environmental Physiology of Livestock

Did You Know?.

Handbook of Socioeconomic Determinants of Occupational Health

The Effect of Heat Stress on Productivity and Decent Work

This issue of Veterinary Clinics: Food Animal Practice, edited by Dr. Rick Funston and Dr. J. Travis Mullinix, is dedicated to Developmental Programming in Livestock Production. Topics include: Fetal Growth and Development; Cellular Mechanisms and Epigenetic Changes; Overgrowth Syndrome; Effects on Progeny and Nutrient Partitioning; Effects on Neonatal Mortality; Effects on Tissue Growth and End Product; Effects on Fertility; Effects on Animal Health and Immune Function; Effects on Dam and Progeny Milk Production; Multigenerational Effects; Developmental Resiliency: in utero Adaptation to Environmental Stimuli; and Developmental Programming in a Beef Production System.

In view of changes in the global environment, it is important to determine and developing technologies to ameliorate metabolic limitations by biological processes most sensitive to abiotic stress factors warning crop productivity. It is reaffirmed that publishing the important Treatise Series has been undertaken with a view to identify the inadequacies under varied environments and to scientifically extend precise and meaningful research so that the significant outcomes including new technologies are judiciously applied for requisite productivity, profitability and sustainability of agriculture. Besides this, meticulous research in some of the very sensible and stirring areas of Plant Physiology-Plant Molecular Physiology are indispensably needed for holistic development of agriculture and crop production in different agro-climatic zones. Ardently, this is also to focus upon excellent new ideas ensuring the best science done across the full extent of modern plant biology, in general, and plant physiology, in particular. In Volume 14, with inventive applied research, attempts have been made to bring together much needed eighteen remarkable review articles distributed in three appropriate major sections of Nutriophysiology and Crop Productivity, Plant Responses to Changing Environment and Environmental Stresses and Technological Innovations in Agriculture written by thirty four praiseworthy contributors of eminence in unequivocal fields mainly from premier institutions of India and abroad. In reality, the Volume 14 of the Treatise Series is wealth for interdisciplinary exchange of information particularly in the field of nutriophysiology and abiotic stresses for planning meaningful research and related education programmes in these thrust areas. Apart from fulfilling the heightened need of this kind of select edition in different volumes for research teams and scientists engaged in various facets of research in Plant Physiology/Plant Sciences in traditional and agricultural universities, institutes and research laboratories throughout the world, it would be tremendously a productive reference book for acquiring advanced knowledge by post-graduate and Ph.D. scholars in response to the innovative courses in Plant Physiology, Plant Biochemistry, Plant Molecular Biology, Plant Biotechnology, Environmental Sciences, Plant Pathology, Microbiology, Soil Science & Agricultural Chemistry, Agronomy, Horticulture, and Botany.

Demystifies the genetic, biochemical, physiological, and molecular mechanisms underlying heat stress tolerance in plants Heat stress—when high temperatures cause irreversible damage to plant function or development—severely impairs the growth and yield of agriculturally important crops. As the global population mounts and temperatures continue to rise, it is crucial to understand the biochemical, physiological, and molecular mechanisms of thermotolerance to develop ‘climate-smart’ crops. Heat Stress Tolerance in Plants provides a holistic, cross-disciplinary survey of the latest science in this important field. Presenting contributions from an international team of plant scientists and researchers, this text examines heat stress, its impact on crop plants, and various mechanisms to modulate tolerance levels. Topics include recent advances in molecular genetic approaches to increasing heat tolerance, the potential role of biochemical and molecular markers in screening germplasm for thermotolerance, and the use of next-generation sequencing to unravel the novel genes associated with defense and metabolite pathways. This insightful book: Places contemporary research on heat stress in plants within the context of global climate change and population growth Includes diverse analyses from physiological, biochemical, molecular, and genetic perspectives Explores various approaches to increasing heat tolerance in crops of high commercial value, such as cotton Discusses the applications of plant genomics in the development of thermotolerant ‘designer crops’ An important contribution to the field, Heat Stress Tolerance in Plants is an invaluable resource for scientists, academics, students, and researchers working in fields of pulse crop biochemistry, physiology, genetics, breeding, and biotechnology.

Effects of Heat Stress on Human Health

Acclimatization

Protective Clothing

A Guide to Heat Stress in Agriculture

Heat Stress Effects With Two USAF G-Protection Systems

Dr. Anjali Aggarwal is working as a Senior Scientist at National Dairy Research Institute, Karnal (India). She holds a PhD degree in Animal Physiology and is involved in research and teaching at post-graduate level. Her area of research work is stress and environmental physiology. She has more than 50 publications, two technical bulletins, four manuals and many book chapters to her credit. She has successfully guided many post-graduate and PhD students. Her major research accomplishments are on microclimatic modification for alleviation of heat and cold stress, mist and fan cooling systems for cows and buffaloes, and use of wallowing tank in buffaloes. Her work involves the use of technology of supplementing micronutrients during dry period and early lactation to crossbred and indigenous cows for alleviating metabolic and oxidative stress and improved health and productivity. Studies are also done in her lab on partitioning of heat loss from skin and pulmonary system of cattle and buffaloes as a result of exercise or exposure to heat stress. Dr. R.C. Upadhyay is working as Head, Dairy Cattle Physiology Division at National Dairy Research Institute, Karnal (India). He graduated in Veterinary Sciences and obtained his PhD degree in Animal Physiology. His area of recent research is climate change, stress, and environmental physiology. His major research accomplishment is on climate change impact assessment of milk production and growth in livestock. His work also involves studying methane conversion and emission factors for Indian livestock and use of IPCC methodology of methane inventory of Indian livestock. Heat shock protein-70 expression studies in cattle and buffaloes are also done in his lab. Draught animal power evaluation, fatigue assessment, work-rest cycle and work limiting factors form the highlights of his work. Studies on partitioning of heat loss from skin and pulmonary system of cattle and buffaloes and electrocardiographic studies in cattle, buffalo, sheep and goat are also undertaken in his lab. He has more than 75 research papers, four books and several book chapters to his credit. Technologies developed and research done by him include methodology of methane measurement: open and closed circuit for cattle and buffaloes; inventory of methane emission from livestock using IPCC methodology; livestock stress index: thermal stress measurement based on physiological functions; and draught power evaluation system and large animal treadmill system. He received training in Radio-nuclides in medicine at Australian School of Nuclear Technology, Lucas heights, NSW, Australia in 1985 and Use of radioisotopes in cardiovascular investigations at CSIRO, Prospect, NSW, Australia, during 1985-86. He has guided several post-graduate and PhD students. He is recipient of Hari Om Ashram Award-1990 (ICAR) for outstanding research in animal sciences.

Heat StressWhat You Should Know about Heat DisordersMetabolic Effects of Centrifugation and Heat StressHeat stressdon't let the heat get you downHeat StressDid You Know?.Nutritional Needs in Cold and High-Altitude EnvironmentsApplications for Military Personnel in Field OperationsNational Academies Press

Heat Stress In Food Grain Crops: Plant Breeding and Omics Research is a timely compilation of advanced research on heat stress affecting crop yield, plant growth & development of common food grain and cereal crops. Chapters in the book cover several aspects of crop science including the identification of potential gene donors for heat tolerance, physiological mechanisms of adaptation to heat stress, the use of conventional and modern tools of breeding for imparting tolerance against terminal temperature stress and precise mapping of heat tolerant QTLs through biparental and genome wide association mapping. The use of genomics and phenomics methods is focused on through chapters dedicated to important crops such as groundnut, pearl millet, maize, chickpea, mungbean and wheat. Authors of the respective chapters explain the importance of harnessing a diverse crop gene pool for sustaining crop production under conditions of increasing heat stress. Readers will be able to understand the relevance of functional genomics in elucidating candidate genes and their regulatory functions contributing to heat tolerance