

Preface

Homeostasis by definition is the tendency of a system, especially the physiological system of higher animals, to maintain internal stability, through coordinated response of its components to any perturbation or stimulus that would tend to disturb its normal condition or function. Animals interact with the environment in a dynamic manner. Changes in the environment, in other words stress, trigger an equal response from the animals which is known as adaptation. Thus, adaptation is an ongoing process that helps an animal to adjust to the environment. Stress, to an animal, can be physical including climatic parameters such as heat, cold, relative humidity, and changes in oxygen tension with altitude. Alternately, stress can also be physiological due to an infection, nutritional deficiency, and metabolic diseases. Whatever the etiology of stress, an animal always strives to establish a balance that would enhance its survival. However, just survival does not suffice. To be successfully adapted, an animal must survive, produce, and reproduce. Therefore, depending on its physiological status, the effect of stress on an animal varies. Although there are innate adaptive mechanisms that help the animal to overcome stress and establish homeostasis, these adaptive mechanisms can be limiting especially when the animal is being raised for production. Stress can have a serious impact on the health of the animal which in turn can reduce feed intake, feed efficiency, milk or meat production, and fertility. Therefore, as a manager, the farmer has an essential role to play in ameliorating stress in animals. It is precisely in this context that this volume is specifically devoted to several adaptive strategies which elaborate how judicious management practices can help an animal adjust and adapt to any changes in its environment. This in turn helps maintain animal health and productivity.

This volume is specifically prepared by a team of multidisciplinary scientists to be a valuable reference material for researchers as the primary target group for this compendium. In addition, the material contained in this volume is also relevant to teaching undergraduates, graduates, and other professionals involved in livestock production. Given the importance of livestock to the global economy, there is a strong need for a world class reference material on sustainable management of livestock in diverse ecoregions. With uncertain climate involving unpredictable

extreme events (e.g., heat, drought, infectious disease), environmental stresses are becoming the most crucial factors affecting livestock productivity. Reference materials pertaining to stress physiology of livestock are scanty and obsolete. By addressing systematically and comprehensively all aspects of environmental stresses and livestock productivity, this volume is a useful tool for graduates and undergraduates in understanding the various intricacies of stress physiology. Further, scholars involved in research concerning livestock and its welfare can make use of this book for conducting high quality research in the field of adaptation physiology of livestock. In addition, this volume can also guide livestock researchers in identifying researchable priorities in adaptation physiology. With information and case studies collated and synthesized by professionals working in diversified ecological zones, the volume attempts to study the influence of the environment on livestock production across global biomes.

This 17-chapter compendium provides readers with an insight into the major stress factors that livestock are exposed to and their influence on livestock physiology and production. An attempt is also made to discuss the innate adaptive mechanisms that animals exhibit to counteract the adverse effects of stress. In addition to the adaptive mechanisms, several management and feeding practices have also been established as tested methods for reduction of stress effects. This book also highlights the challenges the livestock industry faces in maintaining the delicate balance between animal welfare and production. Therefore, this book is a comprehensive resource for researchers to understand stress, stress management, and livestock productivity.

The contributors of the various chapters are world class professionals with vast experience in the chosen field supported by several peer reviewed publications. The Editorial Committee takes this opportunity to thank all the contributors from different parts of the world for their dedication in preparing these chapters, for their prompt and timely response, and for sharing their knowledge and experience with others. The efforts of many others, all of those that cannot be individually listed, were also very pertinent in completing this relevant and important volume.

15 February 2012

V. Sejian
S. M. K. Naqvi
T. Ezeji
J. Lakritz
Rattan Lal

Environmental Stress and Amelioration in Livestock
Production

Sejian, V.; Naqvi, S.M.K.; Ezeji, T.; Lakritz, J.; Lal, R. (Eds.)

2012, XXII, 570 p., Hardcover

ISBN: 978-3-642-29204-0