Our interest in aestivation was initially subsidiary, even if marked by deep admiration to the pioneering herpetologists of the 1960s and the founders of metabolic control theory. However, when we became interested in real problems such as the metabolic annual cycles of tegu lizards or the colonization of the Brazilian semi-arid (Caatingas) by amphibians, our readings of older literature gained a new dimension. Our research in the Caatingas had the pros and cons typical of highly underexplored areas, and began, literally, with the search for aestivating frogs digging rather randomly in huge landscapes. As our knowledge of basic natural history progressed, we perceived obvious differences among individuals captured in the middle of the dry season. Species differed in microhabitat choice, inclination for activity, characteristics of the skin, and several other behavioral and morphological aspects that, together, suggested remarkable ecological and physiological diversity. We induced that ecology should modify deeply the type and magnitude of the physiological challenge experienced by aestivating frogs in such semi-arid environment and, as a corollary, that aestivation could involve a complex array of physiological states. As our field work progressed, we confirmed the immense value of the integrative eco-physiological approach that was proposed by early researchers of anuran aestivation. In parallel, we appreciated the importance of understanding the mechanisms leading to metabolic arrest, and opened our eyes to newer approaches and problems that emerged later in the field of aestivation. It was pretty much at this state of reflection that we were contacted by the Springer Series editor regarding the possibility of editing a book on the topic of aestivation, a proposal that we soon accepted.

When we accepted to be editors of this volume, we were conscious of the difficulties to fully track the advances on aestivation physiology, given that the field focuses on questions that concern different levels of biological organization, and the dialogue between such levels is not always fluid. Moreover, information about physiological mechanisms and their control involve only a few systematic groups and even so results are rather disperse in the specialized literature. Thus, our goal was to produce a book in which authors through the world were represented, and in which chapters covered a substantial part of the approaches, levels of organization and systematic groups, and that characterize the field’s state of art. Our quest to produce a truly international volume and to increase topical diversity was very
fruitful, yet we regret that this editorial policy, together with limits in the number of chapters that could be included, restrained our ability to invite all possible leading authors working in the fascinating topic of aestivation. Even within this constraints, this volume does include many of the different problems that characterize current views on aestivation, and we hope very much it appeals to a broad audience, not only researchers of aestivation but also graduate students and researchers who have collateral interests in this topic.

This book includes topics ranging from the study of the fossil register by Daniel Hembree, to control of gene expression by Kenneth Storey. In the first chapter, Phil Withers and Chris Cooper provide a historical overview of the concept of metabolic depression, a central aspect in aestivation. Next, Marlize Cravo, Alexis Welker, and Marcelo Hermes-Lima discuss the protective mechanisms against oxidative stress in aestivating animals, whereas Ip Yuen Kwong and Shif Fun Chew address nitrogen metabolism and other aspects of excretion in several aestivalators. The morphological plasticity of vertebrates organ is discussed by Stephen Secor and Jean-Herve Lignot, and Rob James reviews muscular function during aestivation. Jeff Richards presents a chapter on the occurrence of aestivation in fishes, and us, together with Isabel Pereira, review amphibian aestivation. Current concepts on endotherm aestivation are analyzed by Fritz Geiser, while Stephen Loomis discusses aestivation in sponges, and Joshua Benoit presents a paper on water management in dormant insects. We are very thankful to all these authors and hope that their intense work is rewarded with a book that will become a good general reference in the area. We also appreciate the feedback of Márcio Reis Custódio, the series editor, and the Springer-Verlag staff. To the reader, we wish a pleasant journey through the world of aestivation.
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