
Preface

We analyzed the stress imposed by soil pollution from the perspective of animal ecology concentrating on terrestrial invertebrates. When studying the subject of stress in animals, it became clearer and clearer how broad this subject is and what a great impact it has on animal life. We further noticed that up to now the information on this subject has been rather fragmentary and lacks an up-to-date overview and analysis. This book aims to fill this gap. We realized, however, that in order to make a solid contribution to this field of science, we had to establish boundaries for the types of stresses and the animal species. We therefore concentrated on the interaction between arthropods and their environment and the relationship with environmental stress. Consequently, we had to exclude certain aspects from this review, such as pathological and other endogenous factors causing stress.

Although environmental stress is primarily related to the fitness and subsequent performance of the whole organism, the underlying biochemical reactions and physiological effects occur at the cellular level. To present the differences in effects from the various environmental stressors, this book provides a thorough analysis of these underlying mechanisms and how various cellular defense systems respond to different stressors in order to restore cellular homeostasis. When we analyzed these effects and responses, it became apparent that the individual systems are interdependent and cooperate in their responses, leading to an integrated reaction. This topic therefore merits special attention and is extensively reviewed in this book. Sophisticated defense systems notwithstanding, a return to cellular homeostasis is not always possible, and therefore issues such as cell death, tolerance, and aging are discussed in the second part of the book. The latter processes exhibit their effects at the organismal level. In this way, a connection between physiology and ecology is established.

This book describes environmental stress in arthropods and tries to analyze this process in all its aspects, from biochemical mechanisms to effects on the whole organism. We hope it will attract the interest of a variety of scientists, such as biochemists, physiologists, cell biologists, and ecologists.

We thank Marianne H. Donker, Paul. J. Hensbergen, Jan E. Kammenga, Heinz R. Köhler, Jos A.C. Verkleij, and Saskia M. van der Vies for their comments on an earlier version of the manuscript. We also thank Els A. Korsloot-van Gernerden for preparing the manuscript, Paul Robert Korsloot and Nico Schaefer for the artwork, and Désirée Hoonhout for general assistance.

André Korsloot
Cornelis A.M. van Gestel
Nico M. van Straalen