

Adaptations of Desert Organisms



R. T. Wilson

**Ecophysiology
of
the Camelidae
and Desert
Ruminants**



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Ecophysiology Of The Camelidae And Desert Ruminants

Arthur C. Gibson



Ecophysiology Of The Camelidae And Desert Ruminants:

Ecophysiology of the Camelidae and Desert Ruminants Richard T. Wilson, 2012-12-06 I have spent less time in the arid zone in the last few years than I did during the 1960 s 1970 s and early 1980 s This results from a progression through age and a career structure which gradually shifted the emphasis of my work from being essentially field oriented to essentially office hound When therefore I was asked by John Cloudsley Thompson to undertake the writing of this book I hesitated for two reasons One reason was that although I now had access to good library facilities and kept up with the literature on the arid zones and their fauna I was not sure that a sedentary and pleasant life in a temperate highland island in tropical Africa would provide a mental attitude suitable to writing a book which related to areas where life is usually nomadic and often extremely disagreeable The other reason was that I was uncertain whether I could devote the time necessary to researching and writing the book on top of my professional which now specifically excluded research in the arid zones and on camels and social new found and time consuming commitments In the event I accepted and the fates were kind to me By some peculiar combination of circumstances I was given the opportunity to spend a considerable part of the first half of 1988 in some of the driest areas of the globe I had already visited all of the locations used for the construction of Fig 2

Handbook of Mathematical Models in Computer Vision Nikos Paragios, Yunmei Chen, Olivier D. Faugeras, 2008-11-01 Abstract Biological vision is a rather fascinating domain of research Scientists of various origins like biology medicine neurophysiology engineering mathematics etc aim to understand the processes leading to visual perception process and at reproducing such systems Understanding the environment is most of the time done through visual perception which appears to be one of the most fundamental sensory abilities in humans and therefore a significant amount of research effort has been dedicated towards modelling and reproducing human visual abilities Mathematical methods play a central role in this endeavour Introduction David Marr's theory was a pioneering step towards understanding visual perception In his view human vision was based on a complete surface reconstruction of the environment that was then used to address visual subtasks This approach was proven to be insufficient by neurobiologists and complementary ideas from statistical pattern recognition and artificial intelligence were introduced to better address the visual perception problem In this framework visual perception is represented by a set of actions and rules connecting these actions The emerging concept of active vision consists of a selective visual perception paradigm that is basically equivalent to recovering from the environment the minimal piece of information required to address a particular task of interest

Ecophysiology of Small Desert Mammals Allan A. Degen, 2012-12-06 Since small mammals have a large surface to mass ratio one would expect them to quickly dehydrate and perish at high environmental temperatures Nonetheless a large number of small mammal species inhabit deserts This fascinating phenomenon is investigated by Prof A Allan Degen in his book The majority of small desert mammals are rodents but shrews of several grams and small foxes of 1 kg are also present Their survival is due mainly to

behavioural adaptations and habitat selection however physiological adaptations also contribute to the success Interestingly many small mammals that live in different deserts of the world show similarities in their adaptive traits although they have different taxonomic affinities Ecophysiology of Desert Birds Gordon L. Maclean, 2013-12-11 In the Preface to his volume on Ecophysiology of the Camelidae and Desert Ruminants in this series Trevor Wilson mentions his hesitation at the invitation from John Cloudsley Thompson to write the book because he had been out of direct touch with desert biology for some years My response to John s invitation to write Ecophysiology of Desert Birds was much the same and for the same reasons However with his encouragement and taking account of the fact that a colleague of mine who is much better suited to do the job had turned it down because of pressure of work I accepted the challenge and have enjoyed it immensely It has been my privilege to spend much time in the deserts of North and South America southern Africa and Australia some of it with my wife Cherie whose editing of the entire text has improved the work immeasurably Indeed I believe it would have been proper for her to accept coauthorship but she graciously declined the offer I owe her a debt of gratitude which I hope will be repaid in part by her seeing the text finally between covers The chapters on water regulation Chap 5 and thermo regulation Chap 6 have benefited from the refereeing of my colleague Dr Barry Lovegrove of the Department of Zoology and Entomology University of Natal Pietermaritzburg **Physiological Ecology of North American Desert Plants** Stanley D. Smith, Russell Monson, Jay E. Anderson, 2012-12-06 This book begins with the physical and biological characterization of the four North American deserts and a description of the primary adaptations of plants to environmental stress In the following chapters the authors present case studies of key species representing dominant growth forms of the North American deserts and provide an up to date and comprehensive review of the major patterns of adaptations in desert plants One chapter is devoted to several important exotic plants that have invaded North American deserts The book ends with a synthesis of the adaptations and resource requirements of North American desert plants Further it addresses how desert plants may respond to global climate change **Ecophysiology of Amphibians Inhabiting Xeric Environments** Michael Warburg, 2012-12-06 Scarcity of water has brought about a number of structural behavioural physiological and ecological adaptations in amphibians inhabiting seasonally xeric habitats This book describes structural and functional adaptations of key organs such as skin kidneys bladder lungs and ovaries Behavioural responses to high temperatures mainly involve thermoregulation and the selection of optimal temperatures and humidity Special emphasis is placed on physiological adaptations water electrolyte nitrogen and thermal balance and their endocrine control are treated in detail Development and metamorphosis larval competition for food resources and reproductive strategies are only a few of the exciting topics in the chapter on ecological aspects Ecophysiology of Economic Plants in Arid and Semi-Arid Lands Gerald E. Wickens, 2013-04-17 This book deals with arid and semi arid environments and their classification and the physiological restraints and adaptations of plants to the environment Further it discusses economic botany and the needs and methods of

conserving economic plants A broad view is taken regarding the definition of economic plants taking into account their value to the environment as well as to man and to livestock The individual deserts and associated semi arid regions are described in separate chapters providing background information on the regional environments in terms of climate and major plant formations The economic plants within these formations their usages geographical distribution together with their morphological and physiological adaptations are treated in detail *Nomadic Desert Birds* W. Richard J. Dean, 2013-06-29 My interest in the behaviour and movements of birds of arid and semi arid ecosystems began when my wife Sue Milton and I were Roy Siegfried Director at that time of the Percy approached by Prof FitzPatrick Institute of African Ornithology to set up a project to investigate granivory in the South African Karoo Sue and I spent some time finding a suitable study site setting up accommodations and an automatic weather station at Tierberg in the southern Karoo near the village of Prince Albert and planning projects Among our first projects was a transect where we noted plant phenology measured seed densities on the soil surface counted birds observed ant activity measured soil surface temperatures and collected whatever climate data we could at 40 sites along a 200 km oval route Along the way we became interested in the marked presence and absence of birds at certain sites abundant birds one day and very few birds at the same site a month later Subsequent counts along fixed transects through shrublands confirmed that a number of bird species were highly nomadic over short and long distances locally and regionally leading to speculation on how widespread these movements were in the arid ecosystems of the world

Survival Strategies of Annual Desert Plants Yitzchak Gutterman, 2012-12-06 Annual desert plant species of unrelated taxa in the Negev Desert of Israel have developed complementary sets of adaptations and survival strategies as ecological equivalents with physiological morphological and anatomical resemblances in the various stages of their life cycles After 40 years of research in hot deserts Yitzchak Gutterman provides a comprehensive treatise of such adaptations and strategies In doing so he covers the following topics post maturation primary seed dormancy which prevents germination of maturing seeds before the summer seed dispersal mechanisms with escape or protection strategies cautious or opportunistic germination strategies seedling drought tolerance The day length is an important factor in regulating flowering as well as the phenotypic plasticity of seed germination which is also affected by maternal factors *Desert Arthropods: Life History Variations* Fred Punzo, 2013-03-14 It is difficult for me to recollect a time when I was not fascinated with the very notion of a desert Walt Disney's film *The Living Desert* which I initially saw when I was 8 years of age provided me with my first glimpse of this wondrous yet seemingly hostile environment The images were hypnotic and captivating I looked on in amazement at the promenade Cl de ux of the male and female scorpions during courtship Their rhythmic and coordinated movements as they grasped one another made them appear to glide in unison over the surface of the sand each individual totally absorbed with its partner In the next minute the female had suddenly and utterly transformed herself like some Jekyll and Hyde act into an aggressive predator whose prior gregarious embrace was now a hold of death for the male The indomitable desert

grasshopper mouse the ever sentient kit fox the graceful shovel nosed snake swimming in an endless sea of sand *Spatial Ecology of Desert Rodent Communities* Georgy I. Shenbrot, Boris R. Krasnov, Konstantin A. Rogovin, 2012-12-06 Rodents are conspicuous and important components of the desert biome Many general concepts in modern community and behavioral ecology use them as a main model This volume compiles and generalizes data on the spatial structure of desert rodent communities taking into account both global biogeographic and local ecological patterns It is based on studies of rodents in different deserts of the Northern Hemisphere Karakum Kyzylkum Bet Pak Dala Gobi Thar Chihuahua Negev and North Caspian deserts as well as on a thorough analysis of the literature

Dispersal Biology of Desert Plants Karen van Rheede van Oudtshoorn, Margaretha W. van Rooyen, 2013-03-09 Dispersal processes have important effects on plant distribution and abundance Although adaptations to long range dispersal telechory are by no means rare in desert plants many desert plant species do not possess any features to promote dispersal atelechory while others have structures that hamper dispersal antitelechory The high frequency with which atelechorous and antitelechorous mechanisms are present in plants inhabiting arid areas indicates the importance of these adaptations Among the benefits derived from these adaptations are the spreading of germination over time the provision of suitable conditions for germination and subsequent seedling establishment and the maintenance of a reservoir of available seeds seed bank This book describes the ways and means anatomical morphological and ecological by which dispersal in desert plants has evolved to ensure the survival of these species in their harsh and unpredictable environment

Plants in the Deserts of the Middle East Kamal H. Batanouny, 2013-11-11 Usually authors write introductions for their books although they know that not many readers will read it Despite this authors insist on writing an introduction and no publisher will publish a book without one I would like to inform my dear readers that I have spent almost all of the first quarter of my life in a village in the Nile Delta 65 km north of Cairo The everyday scenery there was the beautiful green landscape dissected with canals full of running water All of these were bordered with the huge sycamore mulberry and acacia trees The desert was something unknown to me at that time except for the very basic information given in geography books which explained that the desert is a place without water or cultivation Some of my ideas about the desert came to me from the stories in the history of Islam and the desert lands where Islam originated My real attraction to the desert developed in the last year of my under graduate studies This was during the field courses in Ecology Prof A M

Avian Desert Predators William E. Cook, 2012-12-06 Birds are not particularly well suited to desert life Unlike mammals they are generally active during the day and do not usually go underground to escape the intense desert heat Among the few types of birds that have successfully invaded the desert ecosystem are the predators Many species of hawks owls roadrunners vultures and shrikes survive very well in deserts What attributes make this group especially suited to desert life How have they augmented their abilities to cope with the harsh constraints imposed by the desert habitat These are among the issues explored in this new volume which brings together much of the current research

on adaptations of avian desert predators **Homeostasis in Desert Reptiles** Sidney Donald Bradshaw, 2012-12-06 Deserts whether hot or cold are considered to be one of the most difficult environments for living systems lacking the essential free water which accounts for approximately 60-70% of their body mass and more than 98% of their constituent atoms Macfarlane 1978 Amongst vertebrates reptiles are usually thought of as the animals most adapted or suited to such environments because of their diurnal habit based on a need for external heat and their ability to survive far from obvious sources of water This impression is reinforced when one examines the composition of vertebrate faunas characteristic of deserts and arid zones reptiles predominate and they are often the only vertebrates to be found in hyper arid areas such as some parts of the Sahara Monod 1973 I recently had occasion to examine this assumption carefully however and was led inexorably to the conclusion that reptiles represent a particularly successful desert group not because of their evolution of superior adaptations but because of their possession of a basic suite of behavioural and physiological characteristics that suit them uniquely to this very resource limited environment Bradshaw 1986a These fundamental reptilian characteristics are 1 their low rates of metabolism compared with birds and mammals which result in extremely low rates of resource utilisation and lead to considerable economy in the handling of water 2 **Structure-Function Relations of Warm**

Desert Plants Arthur C. Gibson, 2012-12-06 For centuries biologists have been extremely interested in the structure of desert plants as examples of natural selection to harsh environmental conditions Indeed desert plants are frequently used as examples in many biology classes and textbooks to illustrate natural selection but this has led to an unfortunate litany of errors and misconceptions about desert plant adaptations This new synthesis focuses on plants of lowland tropical and subtropical arid deserts Readers will be surprised to discover that many features commonly ascribed to desert plants are rarely observed in the most common species Instead the typical structural adaptations of nonsucculent warm desert plants are now viewed as ways to maximize photosynthetic rate **Arthropods of Mediterranean-Type Ecosystems** George P. Stamou, 2012-12-06 G P Stamou describes the adaptive strategies that allow arthropods to cope with the severity of Mediterranean environments After an introduction to the structure and function of Mediterranean type ecosystems ecophysiological adaptations to water stress and varying temperature are considered Further activity patterns and life cycle tactics are discussed in relation to the peculiarity of Mediterranean environments Phenological patterns and population dynamics as well as community structures are also presented The volume ends with a synthesis of life history tactics

Energetics of Desert Invertebrates Harold Heatwole, 2012-12-06 Desert invertebrates live in an environment where resources alternate unpredictably between brief periods of plenty and prolonged scarcity This book describes the adaptive strategies of desert invertebrates in acquiring energy and sustaining life under such vicissitudes Some cooperate in foraging others compete for resources Some are nomadic and migrate to more favorable sites as conditions change Others conserve energy by going into a deep dormancy until better conditions return Still others store food during plenty and retreat

underground during less favorable times The adaptive modes of husbanding scarce energy resources are diverse and lead to an appreciation of the intricate interactions of animals living near their environmental limits **Plants of Desert Dunes** Avinoam Danin, 2012-12-06 Based on three decades of field experience in southwest Asia southern Africa and the southwest United States the author summarizes the major adaptations of plants to desert dunes This integrative study of plant and diaspore morphology reactive growth life cycles and environmental factors explains and predicts plant distribution Many kinds of dune syndromes plant case studies and vegetation transects are discussed and illustrated to clarify the significance of adaptations to specific habitat factors Although the focus is on vascular plants the development of microbiotic soil crust its function and its composition are discussed as well **Encyclopedia of Deserts** Michael A. Mares, 2017-01-19 Encyclopedia of Deserts represents a milestone it is the first comprehensive reference to the first comprehensive reference to deserts and semideserts of the world Approximately seven hundred entries treat subjects ranging from desert survival to the way deserts are formed Topics include biology birds mammals reptiles amphibians fishes invertebrates plants bacteria physiology evolution geography climatology geology hydrology anthropology and history The thirty seven contributors including volume editor Michael A Mares have had extensive careers in deserts research encompassing all of the world s arid and semiarid regions The Encyclopedia opens with a subject list by topic an organizational guide that helps the reader grasp interrelationships and complexities in desert systems Each entry concludes with cross references to other entries in the volume inviting the reader to embark on a personal expedition into fascinating previously unknown terrain In addition a list of important readings facilitates in depth study of each topic An exhaustive index permits quick access to places topics and taxonomic listings of all plants and animals discussed More than one hundred photographs drawings and maps enhance our appreciation of the remarkable life landforms history and challenges of the world s arid land

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