



ECOPHYSIOLOGY OF DESERT REPTILES

S. DONALD BRADSHAW*

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Abstract: Reptiles have radiated widely in the deserts of the world and have long been regarded as the acme of adaptation to aridity among the vertebrates, but recent ecophysiological studies question this conventional wisdom. It has proven difficult, if not impossible, to identify discrete behavioral and physiological adaptations in desert reptiles that are unique to these animals and not also found in species inhabiting temperate and mesic environments. It is suggested that this apparent paradox may be resolved by analyzing the extent to which desert reptiles maintain physiological homeostasis (homoiostasis) under natural conditions in the field, and by documenting instances of exposure to stress in field populations.

INTRODUCTION

AS HERPETOLOGISTS, WE ARE NATURALLY interested in every aspect of the life of reptiles, but physiologists primarily study them for one of two major reasons: (1) although now widely separated from the birds and mam-

mals, reptiles are nonetheless their progenitors, and the close study of living reptiles may provide heuristic insights into the factors responsible for the evolution of the more complex systems of control seen in these two classes; and (2) the spectacular radiation of reptiles in the deserts of the world, which implies the existence of novel or other mechanisms adapting them to the exigencies of life in regions normally regarded as inhospitable.

This second common assumption underlying much of the research on reptilian ecophysiology over the past two decades—that desert reptiles are uniquely adapted to the harsh environments in which they occur—has only recently been questioned in the light of detailed studies of both desert and non-desert species, comparing their physiological performance under both laboratory and field conditions (see Bradshaw 1981, 1986a, 1988). Gould and Lewontin (1979) drew attention to what they termed the Panglossian excesses of the "adaptationist programme" and the widespread tendency of biologists to interpret any measurable differences between species as adaptations per se, thereby ignoring possible non-genetic changes resulting from acclimation or acclimatization. This possibility is always entertained, but usually dismissed summarily, and most statistically significant differences that confirm one's initial hypothesis are effectively considered as heritable modifications of the phenotypes, rendered through the agency of natural selection.

* Zoology Department, University of Western Australia, Perth, Western Australia 6009, Australia.

Ecophysiology Of Desert Reptiles

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