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ADAPTATION TO ARIDITY IN LIZARDS OF THE EGERNIA WHITEI SPECIES-GROUP.

by

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C O N T E N T S

CONTENTS

Page

C O N T E N T S

S U M M A R Y

The *Egernia whitei* species-group comprises nine species, its members occupying areas of widely differing aridity in the southern two-thirds of Australia.

The adaptations to aridity of various populations within seven of the species were assessed under standardised conditions in the laboratory by measuring rate of evaporative water loss and the extent of exposure to the dehydrating conditions outside the animal's burrow or rock crevice. Both water loss and exposure varied between different populations within a species. Although the data on arid zone species were not extensive, it appeared that variability between populations was less among arid zone species.

The rates of water loss of populations from the less arid parts of any one species' range were similar. In the more arid parts, the rate of water loss was generally reduced, sometimes markedly. This pattern suggested that both genetic homeostasis and aridity control the population genotype, the former being dominant in the less arid parts of the range, the latter in the more arid parts.

There appeared to be a limit below which rate of water loss could not be reduced by decreasing skin permeability and respiratory water loss per unit body weight, and the limit was probably the same for all species. Other factors (e.g., exposure patterns) must therefore prevent the temperate and semiarid zone species occupying arid areas.

There was a tendency for the exposure of populations in the more arid parts of the temperate and semiarid zone species' ranges to be greater than exposure in less arid parts. This tendency is the reverse of what would be expected if the greater need for water conservation in the more arid parts of a species' range determined exposure, and appears to indicate that these species could not adapt to aridity by reducing exposure to dehydrating conditions in arid areas. The reasons why exposure increases in the more arid parts of these species' ranges are unknown.

In the more arid parts of their ranges, the temperate and semiarid zone species were exposed for as long as they had the

opportunity to thermoregulate - their exposure was at a maximum. The widely distributed arid zone species all showed marked restriction of exposure. Two taxa occurring in the arid zone have distributions limited to a few small localities where relief from aridity is apparently offered by high, stable burrow humidities. Both these taxa had continuous, or near continuous, exposure patterns. Restriction of exposure to dehydrating conditions appears to be essential for occupation of arid microhabitats.

The capacity of a species in the *Egernia whitei* species-group to adapt to aridity was constrained both by the inability to reduce rate of water loss below a certain level and by the inability to reduce exposure to dehydrating conditions in the more arid parts of its range.