COMPARATIVE ECOLOGY AND DEMOGRAPHY OF TWO POPULATIONS OF AUSTRALIAN REPTILES (LACERTILIA, SCINCIDAE)

by

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PREFACE

I certify that the substance of this thesis has not already been submitted for any degree.

I certify that any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.

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(MALUMO PHILIP SIMBOTWE)

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ABSTRACT

The ecology and demography of *Lampropholis guichenoti* and *Hemiergis decresiensis* was studied at Newholme, Armidale, N.S.W. from 1981 to 1984. The study was carried out in spring, summer, autumn and to a limited extent over winter. The study looked at reproductive patterns of skinks of tropical versus temperate distribution, partitioning of activity time, food, habitat and temperature requirements. It emphasized similarity and differences in use of environmental resources by the two species. The other aspect that was dealt with in detail was morphology. The approach was to examine the adaptive and functional nature of body size, body shape, tail loss and individual growth. Body size was found to be influenced most by the environmental parameter, rainfall. Body shape was related to microhabitat use and *H. decresiensis* that tended to "swim" through litter and use small holes in trees was found to be more streamlined than *L. guichenoti*. Tail loss was found to occur more frequently among larger (hence older) individuals. Individual growth was found to relate to age. Young grew faster than older conspecifics.

Females of both species showed greater reproductive activity over spring and summer. By autumn, hatchlings or newborn of each species had appeared and were awaiting their first brumation. The young spent most of their time after birth or hatching eating and together with all other age/size groups built up body fat in autumn before the advent of winter. The female reproductive cycle in both species was found to be closely related to temperature and rainfall.

The male reproductive cycle of both species also was closely related to rainfall and temperature. Peak male reproductive activity occurred at the time of greatest female gravidity in both species.

Even though the two species start to ovulate at the same time, in the live bearing species (*H. decresiensis*) gestation is rapid and young start to appear at the time the oviparous species (*L. guichenoti)* starts to lay eggs.

Secondary sex ratio on the whole did not depart significantly from 1:1, but in *L. guichenoti* monthly variation in secondary sex ratio was mostly in favour of females.

Body size frequency of *L. guichenoti* and *H. decresiensis* were affected most by reproduction and rate of population turn-over. Both populations included a broad range in body size shortly after recruitment of young in the population; there were different overlapping generations in summer. By autumn both populations were composed mainly of adult animals.

The greatest density and biomass in *L. guichenoti* occurred in summer and the lowest values in autumn. Even though lowest density and biomass values in *H. decresiensis* also were recorded in autumn, maximum records were in spring. Unlike density, biomass was found to be most affected by rainfall and standing crop biomass was greater in the wetter years of 1983 and 1984 than in the drier ones of 1981 and 1982.

Many of the major conclusions of this thesis have been covered in detail already in Chapter 8.