PART 5

SUMMARY AND CONCLUSIONS

The ecology of the skink, Ctenotus taeniolatus, was studied using mark-recapture techniques, through behavioural observations and through collection, dissection and biochemical analysis of large samples from the New England Tablelands of NSW.

C.taeniolatus is distributed from northern Queensland to Victoria where it inhabits coastal and highland habitats. Within these habitats it occurs under rocks (occasionally logs), where it constructs shallow burrows, the structure of which are not altered seasonally, and are not different between males and females. Burrows are used as refuges and as ovipositional sites. Although lizards were occasionally observed in pairs under the same rock, no larger congregations were observed. Temperature and moisture regimes of these microhabitats in the New England Tablelands are presented.

C.taeniolatus, like many other Australian lizards, is insectivorous, although it occasionally eats small lizards, including conspecifics. The insects most important in its diet are coleopterans, orthopterans and lepidopterans, with the maximum size of prey increasing with the size of lizard, although there is considerable overlap between different lizard size classes. Lizards do not feed overwinter. Contrary to popular belief and the work of Pianka (1969), C.taeniolatus were found not to be wide foragers. Adult lizards spent more time waiting for prey than actively searching even though they were more successful per hour while searching, and hatchlings spent equal amounts of time waiting and searching; their success rate when searching was much greater than that of adults.

C.taeniolatus in the New England Region hatch at approximately 33 mm (SV length) with females growing to a maximum snout-vent length of 75 mm, reaching sexual maturity at 52 mm, and males growing to 70 mm,

reaching sexual maturity at 43 mm. Growth is seasonal and discontinues over the winter period. Growth rates of males and females were not found to be significantly different, because of the large variation within each group. This may indicate that females either live longer or grow for longer than males. It is probable that females reach sexual maturity in their second year (third summer), while it is possible that some males could attain it in their first year (second summer), with lizards living for at least 5 years. These data indicate that for a small lizard, C.taeniolatus is relatively long-lived and late maturing.

C.taeniolatus is oviparous and reproduces once per year, with little variation in breeding time. The development of ovaries and testes commences in early spring with pre-ovulatory mating occurring in late spring. A clutch of 1 to 7 eggs is laid approximately one month later in summer (January), with the number and weight of the clutch being dependent on the size of the female. It is unlikely that C.taeniolatus could produce more than one clutch per year.

C.taeniolatus stores lipid in the general carcass and tail only. Unlike most other temperate lizards it possesses no abdominal fat bodies. Throughout the year only tail lipid showed any marked seasonality, with lipid levels reaching a maximum prior to winter inactivity, with low points being reached first at the end of winter and then at the end of the ovulation and mating period, indicating that tail lipids were used for overwintering and reproduction. Predictive equations allowed for determination of lipid levels at any time throughout the year. Females had greater levels of tail lipids than males which in turn had greater ones than juveniles, while carcass lipids were similar in all sexes and age groups. In all cases there was little variation between years. The liver components, glycogen and lipid, also showed seasonal cycling throughout a year, and although

these values provided insights into the metabolism of lizards, it is unlikely that such deposits are useful as energy stores.

Analysis of the costs of overwintering and reproduction and experiments examining the effect of tail autotomy on the ability of lizards to survive overwinter and to reproduce indicated that the tail was necessary for survival. Further examination of tail break frequencies showed that as high as 60% of lizards had lost their tails at some time during their lives. Taken together, these results suggested that lizards could indeed be making a great sacrifice when they shed their tails - an evolutionary paradox. However, when the distribution of lipid within the tail was examined in conjunction with the position of autotomy it was apparent that lizards could lose up to 70% of their tail and still have enough lipid stored to provide energy for overwintering and reproduction.

PART 6

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APPENDIX 1

Some observations on the behaviour of C.taeniolatus

C.taeniolatus escapes from predation primarily by running to a refuge. Although running speed was not measured, C.taeniolatus are generally thought to be among the faster species of skinks in Australia. In the final stages of escape before the refuge is entered, C.taeniolatus often flicks the tail sideways in the direction of the head, thus allowing for a sudden movement of the tail and the distal portion of the body away from the pursuer. When captured lizards invariably spin, an action which, because of their very shiny smooth scales, could allow a lizard to escape after capture. Further, if lizards are captured by the tail they invariably shed the tail, which then wriggles vigorously for up to 5 minutes. In one instance, a juvenile lizard was observed to return within 2 minutes to the site of capture and ingest the writhing tail.

Cannibalism was observed in C.taeniolatus once when an adult lizard, chased and ingested a hatchling of the same species.