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Journal of Arid Environments 60 (2005) 611–625

Journal of Arid Environments

www.elsevier.com/locate/jnlabr/yjare

The ecology of *Lerista labialis* (Scincidae) in the Simpson Desert: reproduction and diet

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Received 14 July 2003; received in revised form 28 June 2004; accepted 26 July 2004
Available online 25 September 2004

Abstract

This study investigated the diet and reproductive cycle of the southern sandslider skink *Lerista labialis*, in the dunefields of the Simpson Desert, central Australia. We dissected preserved specimens to obtain gut contents and measure gonad volume, and also live-captured animals from 1999 to 2000 to assess the impact of rainfall on population structure and body condition. This skink breeds during the austral summer. Males start spermatogenesis in July and testes volume is largest in December. Females have enlarged ovarian follicles in November and produce oviducal eggs from November to February. One or more clutches of two eggs are produced per breeding season. *L. labialis* specializes on termites, which represent 78% of the diet by percentage occurrence. The remaining 22% of this skink's diet comprises Hemiptera, Neuroptera and unknown prey items. Body condition, and probably increased reproduction and juvenile survival, were higher in 2000 (wet year) than 1999 (relatively dry year); proportion of juveniles also increased in the population in autumn, winter and summer 2000 compared to the previous year. Late rainfall in autumn 2000 may have triggered these demographic changes by increasing prey accessibility. Long-term research is required into growth rates, longevity and inter-annual population dynamics of *L. labialis* to fully evaluate its life history strategy.

Keywords: Reproduction; Termites; Arid zone; Diet; Gut contents; Scincidae; Bet hedging; Rainfall

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doi:10.1016/j.jaridenv.2004.07.010

1. Introduction

Reptiles are well equipped to exploit arid environments due to their usually low requirements for food and water, ability to aestivate, and dietary opportunism (Pough, 1980; Bradshaw, 1986, 1997). However, many arid environments have highly variable rainfall, both spatially and temporally, hence the population dynamics of desert reptiles are likely to exhibit spatial and temporal variability also (Dickman et al., 1999). Flexibility in reproductive and dietary strategies may be expected in such variable environments, and should be associated with observed fluctuations in the population dynamics of desert-dwelling species.

Reptile populations are regulated by combinations of temperature, photoperiod, prey availability, rainfall, and other factors (Fuentes, 1976; Maury, 1981; Bradshaw, 1986; Henle, 1990; James, 1991a), but in arid environments the most important single cue for activity is often rainfall. Rainfall may influence the timing of reproduction (Goldberg, 1975), number of clutches produced per female each year (Vitt et al., 1978), clutch size (Vinegar, 1975; Martin, 1977) and recruitment (James, 1991a). In arid Australia, rainfall is particularly variable in space and time, and is often suggested to be the most important stimulus for reproduction of lizards (James, 1991a). As a consequence, population structure may shift between drought and mesic years as lizards alter reproductive effort or show changes in juvenile survival or recruitment. As rainfall stimulates primary productivity it could usually be expected to increase lizard populations. However, even though rainfall is sporadic, most species of lizards are seasonal breeders and do not breed continuously (James, 1991a; Dickman et al., 1999). Hence, the timing of rainfall may not correspond to the lizard's breeding season, or period of juvenile recruitment and thus provide little benefit to the population. In addition, prolonged wet seasons may curtail opportunities for foraging and deplete populations via reduced survival or reproductive opportunities (Haynes, 1996).

In arid Australia, members of the scincid genus *Lerista* appear particularly responsive to the climatic regime. In general, species within this genus tend to breed in the dry season in northern arid regions (James and Shine, 1985) and in spring and summer in more temperate southern regions (Greer, 1989). Brood size in *Lerista* ranges from 1 to 7 in the 31 species for which information is available (Greer, 1989). In many lizards, as female size increases so too does egg or clutch size (Pianka, 1986; Cox et al., 2003), but no clear trend has been found for *Lerista* (Greer, 1989).

Some species of arid zone *Lerista* have unspecialized diets, such as *L. punctatovittata* and *L. xanthura*, which feed on araneida, coleoptera, heteroptera, formicidae and insect larvae (Henle, 1989). Other species of arid zone *Lerista* are more specialized in their diet, with termites representing up to 55% of the prey consumed (Abensperg-Traun, 1994). Two foraging modes are usually described for reptiles: active predators (widely foraging) or sit-and-wait predators (Huey and Pianka, 1981). Widely foraging lizards eat more sedentary and unpredictably distributed prey (e.g. termites) in comparison to sit-and-wait predators, which usually eat active prey items (Huey and Pianka, 1981). In some species, both diet and