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Original article

Food habits of the Arabian skink, *Scincus hemprichii* Wiegmann, 1837, (Sauria: Scincidae), in the Southwest Saudi Arabia

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ABSTRACT

Food and feeding habits of the Arabian skink, *Scincus hemprichii* were investigated in Jazan province, southwest of Saudi Arabia. *S. hemprichii* individuals fed during eleven months of the year. The mass of food in the stomachs indicated that a high degree of foraging success occurred during the warm spring while the lowest was during winter with January as an exception to feeding by the lizard. Analysis of the contents of 60 stomachs revealed that the diet of *S. hemprichii* in the study area consisted of arthropods, with two species of beetles of the family Dermestidae (*Dermestis vulpinus* and *Dermestis maculates*) and three type of dipteran larvae, accounting for 76% of the total volume of the food items. Specimens collected during January had empty stomachs.

1. Introduction

Documenting the diet and feeding behavior of a lizard species is often the first step in the development of an understanding of its ecology. Dietary information can be used to place an animal species in a broader ecological and evolutionary context (Greene, 1993) and to guide conservation efforts (Greene, 1994). Seasonal variation in most temperate habitats has a significant effect on several aspects of the life history (activity, reproduction, feeding and growth) of lizards (Griffiths and Christian, 1996). Likewise, seasonality has a pronounced effect on the diet composition of a lizard (Dunham, 1980; Brown, 1991; Durtsche, 1995; Griffiths and Christian, 1996; Wapstra and Swain, 1996). A lizard's diet might broaden or narrow seasonally as food abundance changes and therefore might adopt a flexible, opportunistic approach to feeding, unless the lizard is a dietary specialist (Arnold, 1987; Robinson, 1987; Diaz and Carrascal, 1990; Durtsche, 1995; Wapstra and Swain, 1996). Foraging mode associated with restricted habitat use, however, may also limit foraging opportunities and lead to a degree of specialization in diet (Wapstra and Swain, 1996). Abundant reports are available on the feeding habits of reptiles (King and Green, 1979; Stamps and Tanka, 1981; Diaz and Carrascal, 1990; Castro et al., 1991; Loumbourdis and Hailey, 1991; Vitt and Blackburn, 1991; Gil et al., 1994; Ballinger et al., 1995). Although, various studies have been undertaken on the foraging habits of the Arabian reptiles (Kevork and Al-Uthman, 1972; Al-Ogily and Hussain, 1983; Al-Sadoon and Al-Otaibi, 2014; Al-Sadoon et al., 1999, 2016), the natural history of *S. hemprichii* Wiegmann 1837 has been little explored.

Among the two species of genus Scincus inhabiting Saudi Arabia, the Arabian skink, *S. hemprichii* Wiegmann, 1837 belong to family Scincidae. This species is endemic to the Tihama region of coastal terrain of the southwest of the Arabian Peninsula extending from Sabya (Asir Province, Saudi Arabia) through western Yemen to the Aden region of Yemen (Arnold and Leviton, 1977; Arnold, 1986). Currently, no detailed information is available on the ecology, particularly regarding feeding habits, of this skink lizard in Saudi Arabia.

S. hemprichii is a diurnal species and inhabits the soft loose sandy desert of southwest Arabia. It spends most of its time under the surface of the sand searching for small arthropods. They feed on their insect prey at mid-noon in cold days or at early morning and the afternoons on warm days (Gasperettii, 1978). In Southwest region of Saudi Arabia, individuals of *S. hemprichii* have been collected during different field visits, thus providing an opportunity to increase the knowledge of its ecology. In the present study we provide information on the diet of *S. hemprichii* based on data from

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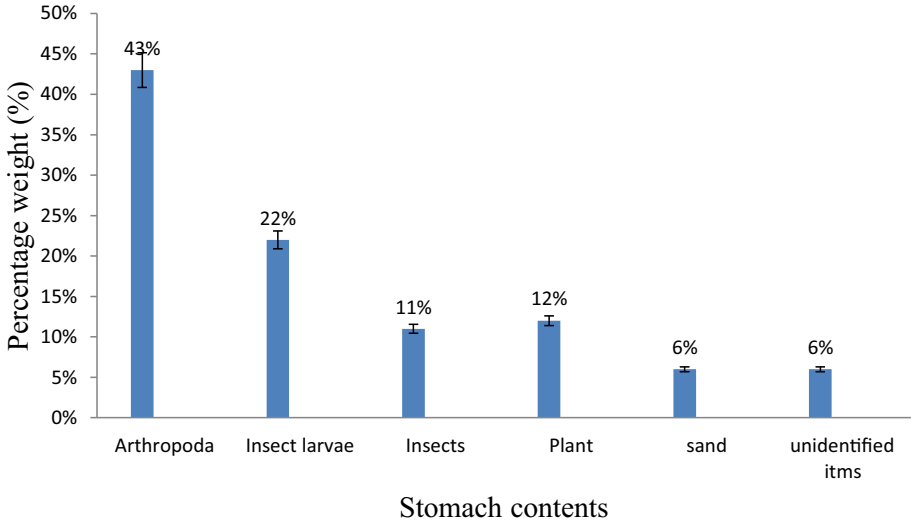

Fig. 1. Percentage of the stomach contents of *S. hemprichii*.

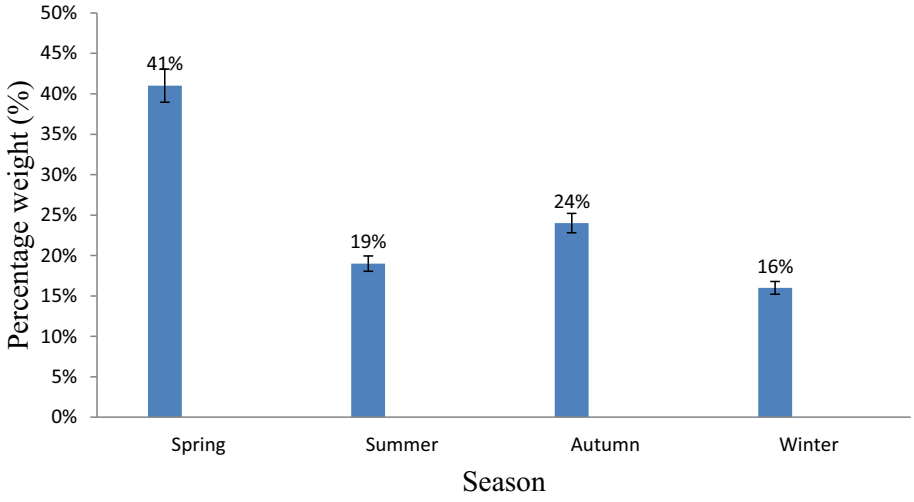

Fig. 2. Seasonal variation in the amount of food in the stomach of *S. hemprichii* expressed as percentage of the total amount recorded during different seasons of the year.

the population living in the collection area and its surroundings. We also assess whether its diet shows seasonal differences in composition, considering that the availability of potential prey varies seasonally in some areas of southwestern region of Saudi Arabia.

2. Materials and methods

We examined 60 specimens of *S. hemprichii* (30 males, 30 females) collected between November 2015 and October 2016 in the Jazan province (16°53′N; 42°32′E) situated in the southwest of Saudi Arabia. Their habitats consist of sandy dune areas. Lizards were collected by excavating them from their burrows (Van Wyk, 1992). The habitat was dominated by *Artimisia abyssinica*, a green shrub and *Panicum turgidum*, a perennial desert grasses. Plants of *Heliotrpium* sp. along with few other perennials were also seen. The common beetles present in the habitat were *Dermestes vulpinus*, *Dermests maculates* and *Carabus nenoralis*. Grasshoppers were abundant while the desert locust, *Schistocerca gregaria* was also present in lesser number. The area hosts a number of reptile species along with this skink. The most abundant were Geckos and other lizards of the Genus Acanthodactylus.

The captured lizards were transported to reptilian laboratory in Zoology department, college of science, King Saud University where all experimental procedures were performed. Lizards were killed by freezing at −2 °C for 24 h till further analysis (Al-Sadoon et al., 2016). Body weight and dimensions were recorded before dissecting the animals. Seasonal analysis of dietary composition was carried out by dividing the data into four seasons: winter (December-February), spring (March-May), summer (June-August) and autumn (September-November). The specimens were dissected and the digestive tract was removed and stored in 70% ethanol.

The stomach was cut, weight and the composition of the contents of each stomach was examined qualitatively under a dissecting microscope. The total number of each prey type found in each stomach was classified. The presence of each prey type in each stomach was used to calculate percent occurrence. All animals were euthanized in accordance with the standards set forth in the guidelines for the care and use of experimental animals by the King Saud University, Riyadh, Kingdom of Saudi Arabia.

One-way analysis of variance (ANOVA) was performed to indicate any differences in the stomach content.

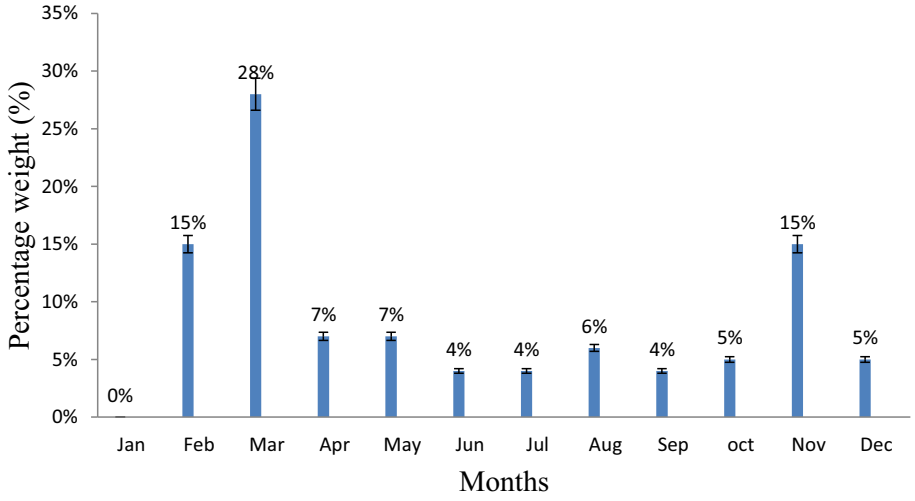

Fig. 3. Monthly variations in percentage of food in the stomach of *S. hemprichii*.

3. Results

Diet composition and seasonal variation in the monthly mean percentage of the stomach contents of *S. hemprichii* are presented in Figs. 1–3. There were significant differences ($P < .05$) between the mean percentage of food in the stomachs of lizards on comparable sampling dates. Analysis of the stomach contents of 60 lizards revealed that the diet of *S. hemprichii* was almost exclusively made up of 43% arthropods (beetles), 22% insect larvae and 11% other flying insects, with two species of beetles of the family Dermestidae (*Dermestis vulpinus* and *Dermestis maculates*) and three type of dipteran larvae, accounting for 76% of the total volume of the food items (Fig. 1). The remaining 24% content include 12% plant remains; 6% sand and 6% unidentified item (Fig. 1).

When feeding was compared in terms of different seasons, skink lizard, *S. hemprichii* contained only 16% of the total diet composition in their stomachs during the winter period (December-February). Stomachs in all specimens were generally devoid of prey items collected in the month of January. On emergence in spring (March-May), the monthly mean wet mass of the stomach contents increased significantly (Fig. 2, $P < .05$) and constitute 41% of the total diet content followed by autumn (24%) and summer (19%). The contents and type of food of the skinks were evaluated on a monthly basis (Fig. 3). The monthly mean mass of prey items showed significant ($P < .05$) seasonal variation (Fig. 3). Peak values were observed in March (28%) followed by November (15%) and February (15%) [Fig. 3].

4. Discussion

Lizards are a group of animals which are primarily insectivorous, though some do feed on larger animals (Al-Sadoon et al., 1999). Arthropod diet, principally of insects, has been recorded for the majority of lizard species, but some age-specific shifts in diet from the principally insectivorous ranging to herbivorous existence has been noted (Spellerberg, 1982). The insectivorous lizards are opportunistic feeders that capture almost any prey they happen to encounter (Mitchell, 1979; Arnold, 1984; Barbault et al., 1985; Diaz and Carrascal, 1990).

The stomach contents examined in the present study demonstrated the selectivity in food intake of *S. hemprichii*, which agrees with published reports on the diet of another skink lizard, *Scincus mitranus* (Al-Sadoon et al., 1999). Some invertebrates were not used as a food source by *S. hemprichii,* although they were common in the habitat. This is in agreement with the observation of Arnold (1984)on the same species and with most diurnal lizards of about similar size (Spellerberg, 1982; Diaz and Carrascal, 1990).

The low intake of diet in winter period is an indication of decreased activity of *S. hemprichii*, whereas, the spring period showed increase in lizard activity along with warmer ambient temperatures and an increase in food availability. Using total contents of the stomach as an index, it is clear that *S. hemprichii* undergo seasonal food stress during summer and winter months. The foraging of lizards is dependent on many factors (Van Damme et al., 1991) and the ambient temperatures will at least affect feeding during the suitable feeding days (Avery, 1971). Most temperate species are known to reduce their feeding during hot summer (Rose, 1981) or during cooler months (Wapstra and Swain, 1996).

During the months of June and July, the percentage of stomach content of *S. hemprichii* was lowest. This could be attributed to prevailing mating period when lizards lose their interest in foraging. However, feeding activity was high in November in preparation for winter, but the number of lizards was observed to decline during December. These skinks re-emerged in February and their feeding increased gradually over February and March. These findings are in agreement with the results of Al-Sadoon et al., 1999 in *S. mitranus*.

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References

Al-Ogily, S.M., Hussain, A., 1983. Studies on the ecology of the Egyptian spiny-tailed lizard, *Uromastix aegyptius* (Forskål, 1775) in the Riyadh region, Saudi Arabia. J. Col. Sci. King Saud Uni. 14, 341–351.

Al-Sadoon, M.K., Paray, B.A., Rudayni, H.A., 2016. Diet of the Worm Lizard, *Diplometopon zarudnyi* (Nikolsky, 1907), in Riyadh province, Saudi Arabia (Reptilia: Trogonophidae). Zool. Middle East. 62, 227–230.

Al-Sadoon, M.K., Al-Johany, A.M., Al-Farraj, S.A., 1999. Food and feeding habits of the sand fish lizard *Scincus mitranus*. Saudi J. Bio. Sci. 6, 91–101.

Al-Sadoon, M.K., Al-Otaibi, F.S., 2014. Ecology of the Sand Boa, *Eryx jayakari* in Riyadh region of Saudi Arabia. Saudi J. Biol. Sci. 21, 391–393.

Arnold, E.N., 1984. Ecology of low land lizards in the eastern United Arab Emirates. J. Zool. (Lond.) 204, 329–354.

Arnold, E.N., 1986. Ecology of lowland lizards in the eastern United Arab Emirates. J. Zool. (Lond.) 204, 329–354.
Arnold, E.N., 1987. Recourse partition among lacertid lizards in southern Europe. J. Zool. (Lond.) 1, 739–782.
Arnold, E.N., Leviton, A.E., 1977. A revision of the lizard genus *Scincus* (Reptilia: Scincidae). Bull. Br. Mus. Nat. Hist, 31187–31248.
Avery, R.A., 1971. Estimates of food consumption by the lizard *Lacerta vivipara* Jacquin. J. Anim. Ecol. 40, 351–365.
Ballinger, R.E., Lemose-Espinal, J., Sanja-Sarabia, S., Coady, N.R., 1995. Ecological observation of the lizard, *Xenosaurus grandis* in Cuautalapan, Veracurz Mexico. Biotropica 27, 128–132.
Barbault, R.A., Ortega,, Maury, M., 1985. Food partitioning and community structure in a mountain lizard guild of northern Mexico. Oecologia (Berlin) 65, 550–554.
Brown, G.W., 1991. Ecological feeding analysis of south-eastern Australian scincids (Reptilia: Lacertilia). Aust. J. Zool. 39, 9–29.
Castro, S.A., Jaimenez, J.E., Jaksic, F.M., 1991. Diet of the racerunner *Callopistes palluma* in north-central Chile. J. Herpetol. 25, 127–129.
Diaz, J.A., Carrascal, L.M., 1990. Prey size and food selection of *Psammodromus algirus* (Lacertidae) in central Spain. J. Herpetol. 24, 342–347.
Dunham, A.E., 1980. An experimental study of interspecific competition between the iguanid lizards *Sceloporus merriami* and *Urosaurus ornatus*. Ecol. Monogr. 50, 309–330.
Durtsche, R.D., 1995. Foraging ecology of the fringe-toed lizard, *Uma inornata,* during periods of high and low food abundance. Copeia, 915–926.
Gasperettii, J., 1978. A review of A revision of the lizard genus *Scincus*. (Reptilia: scincidae). J. Sau. Arab. Nat. Hist. Soc. 22, 25–33.
Gil, M.J., Guerero, F., Perez-Mellado, V., Mellado, V.P., 1994. Seasonal variation in diet composition and prey selection in the Mediterranean gecko *Tarentola mauritanica*. Isr. J. Zool. 40, 61–74.
Greene, H.W., 1993. What's good about *good* natural history? Herp. Nat. Hist. 1, 3.
Greene, H.W., 1994. Systematics and natural history, foundations for understanding and conserving biodiversity. Amer. Zool. 34, 48–56.
Griffiths, A.D., Christian, K.A., 1996. Diet and habitat use of frillneck lizards in a seasonal tropical environment. Oecologia 106, 39–48.
Kevork, K.O., Al-Uthman, H.S., 1972. Ecological Observations on the Egyptian Spiny tailed Lizard *Uromastyx Aegyptius*: On Food and Feeding Habits, with Notes on the Climate and Vegetation of the Study Area. Bull. Iraq Nat. Hist. Mus. 5, 26–44.
King, F.H., Green, B., 1979. Notes on diet and reproduction of the Sand Goanna, *Varamus goldii rosenbergi*. Copeia 1979, 64–70.
Loumbourdis, N.S., Hailey, A., 1991. Food consumption of the lizard *Agama stellio stellio*. J. Arid Environ. 21, 353–356.
Mitchell, J.C., 1979. Ecology of southeastern Arizona whiptail lizards (Cnemidophorus: Teiidae): population densities, resource partitioning, and niche overlap. Can. J. Zool. 57, 1487–1499.
Robinson, M.D., 1987. Diet diversity and prey utilization by the omnivorous Namib Desert dune lizard, *Aporosaura anchietae* (Bocage), during two years of very different rainfall. J. Arid Environ. 13, 279–286.
Rose, B., 1981. Factors affecting activity in *Sceloporus virgatus*. Ecology 62, 706–716.
Spellerberg, I.F., 1982. Biology of Reptiles, An Ecological Approach. Blackie and Sons Ltd., London.
Stamps, J., Tanaka, S., 1981. The relationship between selectivity and food abundance of a juvenile lizard. Ecology 62, 1079–1092.
Van, D.R., Bauwens, D., Verheyen, R.F., 1991. The thermal dependence of feeding behaviour, food consumption and gut-passage time in the lizard *Lacerta vivipara* Jacquin. Funct. Ecol. 5, 507–517.
Van Wyk, J.H., 1992. Life history and physiological ecology of the lizard, Cordylus giganteus. Ph.D. thesis, University of Cape Town.
Vitt, L.J., Blackburn, D.N., 1991. Ecology and life history of the viviparous lizard *Mabuya bistriata* (Scinicidae) in the Brazilian Amazon. Copeia, 916–927.
Wapstra, E., Swain, R., 1996. Feeding ecology of the Tasmanian spotted skink, *Niveoscincus ocellatus* (Squamata: Scincidae). Aust. J. Zool. 44, 205–213.