

Food and Feeding Habits of the Sand Fish Lizard *Scincus mitranus*

Mohamed K. Al-Sadoon, *Awadh M. Al-Johany and Saud A. Al-Farraj*

**Department of Zoology, College of Science,
King Saud University, P.O. Box 2455, Riyadh 11451, Saudi Arabia.*

***Department of Biology, Teacher's College,
P.O. Box 4341, Riyadh 11491, Saudi Arabia.*

Abstract: Food and feeding habits of the skink (*Scincus mitranus*), were investigated in the Riyadh region of Saudi Arabia. A marked diet seasonal preference and variation was observed. The skink feeds selectively from the available resources. The stomach contents contained six categories; three of which were exclusively insects and the rest were plant remains, sand and unidentified materials. The highest amount of food was recorded during spring, while the lowest was during summer. Plant materials were mostly consumed during autumn and insect larvae intake was common during winter. This lizard is an active hunter. During summer the activity is bimodal, while it is unimodal during spring.

Key Words: Arabia, feeding habits, food, lizards, *Scincus mitranus*, sand fish lizard, skink.

Introduction

Numerous studies have been undertaken on the feeding behaviour of reptiles (Avery, 1966; Pianka and Parker, 1972; Pough, 1973; King and Green, 1979; Stamps and Tanaka, 1981; Greene, 1982; Diaz and Carrascal, 1990; Castro *et al.*, 1991; Loumbourdis and Hailey, 1991; Vitt and Blackburn, 1991; Gil *et al.*, 1994; Ballinger *et al.*, 1995; Rodriguez-Schettino and Martinez-Reyes, 1966). However, few works have been done on the diet of

Arabian reptiles with the exception of the Egyptian spiny-tailed lizard, *Uromastyx* sp. (Mandaville, 1965; Kevork and Al-Uthman, 1972; Al-Ogily and Hussein, 1983). Apart from the ecological studies of Arnold 1984, on various species of lizards including the skink, *Scincus mitranus*, in the coastal low lands of the Arabian peninsula, no other studies have been carried out on food and feeding habits of this species which is common in the central region of Saudi Arabia. Hence, an attempt was made in the present study to determine the type of food,

diet seasonal variations, and the feeding habits of the sand fish skink *S. mitranus*.

This study is a small integral part of a much larger investigation on the biology and ecology of this species. The study was undertaken as two main integrated parts, field study supplemented with laboratory investigation.

Materials and Methods

This study was carried out adjacent to Khuzam plantation, north-east of King Khalid International Airport which lies 60 Km north capital of the Riyadh city, Saudi Arabia. This place is sandy dunes with slipface typical for the life of skinks. The habitat was dominated by *Artimisia abyssinica*, a green shrub and *Panicum turgidum*, a perennial desert grass. Plants of *Heliotropium* sp. along with few other perennials were also seen. The common beetles present in the habitat were *Dermestes vulpinus*, *Dermestes maculatus* and *Carabus nemoralis*. Grasshoppers, *Poeciloceris bufonius* were abundant while the desert locust *Schistocerca gregaria* was also present in lesser numbers.

Observations on feeding behavior of *S. mitranus* in the study area were carried out for 10 days during the summer and spring, using binoculars within an optimum range of 25 meters to avoid disturbance

factors. Specimens of *S. mitranus* were collected every month from March to February. The animals of each collection were divided into groups, placed inside cloth bags and were taken to the laboratory, then were killed by hypothermia and kept in a freezer.

The frozen animals were taken out and thawed for about 30 minutes. They were then dissected and the alimentary canal was removed. The stomach was cut and weighted, and then its food content was weighed and analyzed. All types of food were identified and each of the isolated material was classified.

Results

The stomach contents of the lizards contained six categories, three of which were exclusively insects and the rest were plant remains, sand and unidentified materials (Fig. 1). The percentage weight of these types of food were: 37.5% Coleoptera (beetles); 19.8% insect larvae; 1.6% Diptera and other flying insects; 28.5% plant remains; 8% sand and 4.6% unidentified food materials. The beetles were of the family Dermestidae. *Dermestis vulpinus* was found throughout March, while *Dermestis maculatus* occurred throughout the rest of the year. The former species was 10-15 mm long comprising 76.4% of the total food contents, and usually 5-12 individuals were

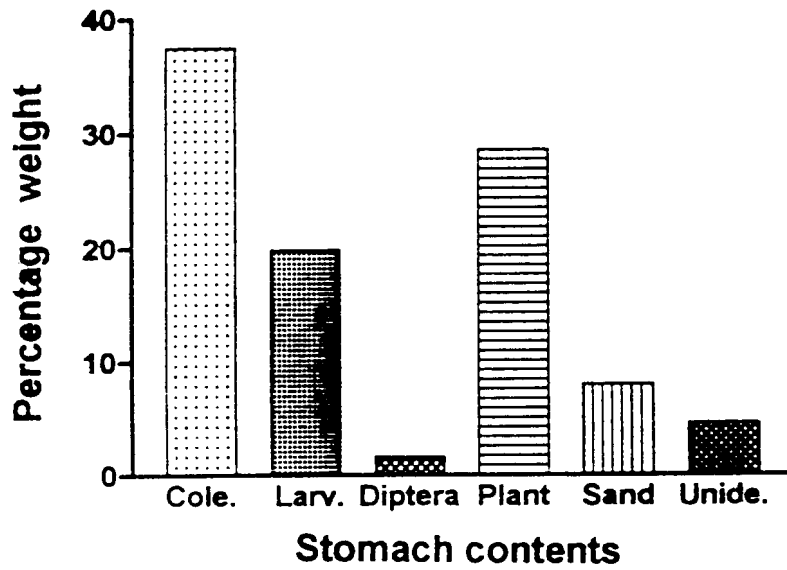


Fig 1. Percentage of the six categories of the stomach content of *S. mitranus* (Cole=Coleoptera, Larv.=Insect larvae, Diptera, Plant=Plant remains, Unide=Unidentified food material).

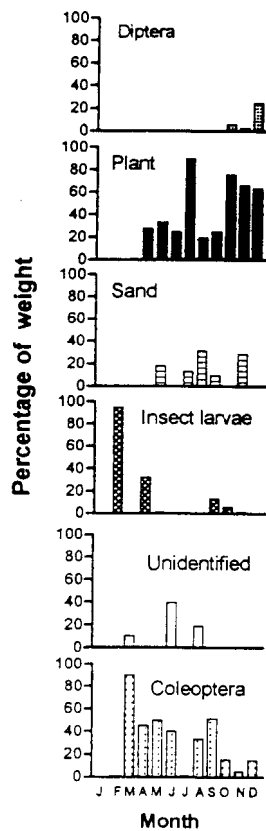


Fig 2. Monthly distribution of the six categories of the stomach contents in *S. mitranus*.

taken together as a meal, while only 1-3 individuals of the latter species were usually taken as meal. A single species of Diptera was found in all animals during October, and a single species of termites (Isoptera) was found in the stomach of only one animal in December. Two types of insect larvae were encountered including large (30 mm in length) Coleopteran larvae and small (2 mm in length) but numerous Dipteran larvae. The bulk of the plant food were seeds, followed by stems and dry leaves. On the other hand, only red sand was found filling the whole stomach of some individuals, while spongy or plastic-like objects comprised the unidentified objects and were of limited occurrence in the lizards.

Seasonal changes in food selection: The contents and type of food of the skinks were evaluated on a monthly basis (Fig. 2). The highest amount of food (39.6%) was recorded during spring (Fig. 3) especially in March (26.8%) (Fig. 4) and most of the food (76.4%) consists of *Dermestis* beetles (Fig. 5). The lowest food amount (16.4%) was recorded during summer (Fig. 3), especially in June (3.4%) (Fig. 4). The summer food contents were mainly plants (53.5%) followed by beetles (18.7%) (Fig. 5). The amount of food during autumn was (23%) (Fig. 3). This percentage was distributed throughout the autumn months as follows: 3.7% in each of September and

October, and 15.6% in November (Fig. 4). Plant food was the commonest during autumn (59%), followed by sand (19%) and beetles (14%) (Fig. 5).

Winter assessment of food type and contents were carried out on animals collected during December and February; no animals were collected during January as they were scarce to avoid the extreme cold and rain. The food contents during winter was (21%) (Fig. 3), distributed as follows: 3.6% in December and 17.4% in February (Fig. 4). Insect larvae were the commonest (80%), during winter followed by plant food (12.2%) (Fig. 5).

Feeding habits: The skink is an active hunter on the periphery of sand areas. However, it becomes cautious and slow in the middle of sandy surfaces where it usually sniffs through the sand for prospective prey. It also investigates and probes the half-buried plants and shrubs, and chases any object moved by the wind between the sand dunes. The animal usually covers a distance of 50 meters every morning looking for food. It usually prefers stationary and coherent sand to loose ones for the ease of fast running in chasing its prey.

Discussion

Lizards are a group of animals which are primarily insectivorous, though some do feed on larger animals, and others on

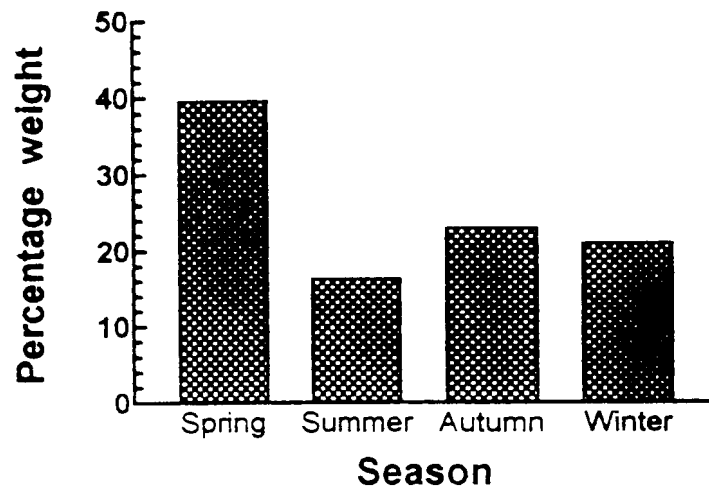


Fig 3. Seasonal variation in the amount of food in the stomach of *S. mitranus* expressed as percentage of the total amounts recovered during the year.

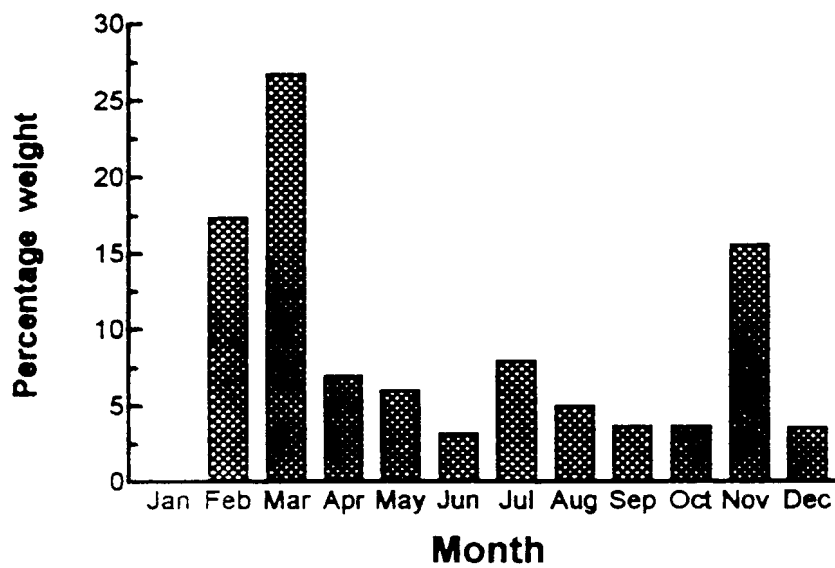


Fig 4. Monthly variations in the amount of food in the stomach of *S. mitranus* expressed as percentage of the total amounts recovered during the year.

carrion. 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 (Spellerber, 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 analysis of the stomach contents undertaken in the present study demonstrated the selectivity in food intake of *S. mitranus* which, as reported by Arnold (1984) ranged from a diet of beetles (37.5%) through insect larvae (19.8%) to plant food (28.5%). Some invertebrates were not used as a food source by *S. mitranus*, 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 (Greene, 1982; Spellerberg, 1982; Diaz and Carrascal, 1990).

Pefaur and Tejada (1983), reported that the most important items in lizards of Peru were adult Coleoptera, Formicidae, larval Coleoptera and Diptera. Adult beetles were the only food item that remained important throughout the year except for the spring when leafhoppers replaced them.

The variation in the diet of *S. mitranus* can be explained by the fact that desert predators have to vary their diet according to availability of the usually scarce desert food preys (Pefaur and Tejada, 1983). This is also governed by the need for water by such desert predators which is compensated for by consuming the right prey (Seely and Louw, 1980). The most selected prey by these desert communities of reptiles are arthropods (Greene, 1982; Pianka, 1986 and Diaz and Carrascal, 1990) and in the case of *S. mitranus*, Dermestid beetles are the selected prey, especially during spring when these beetles are most abundant. When those beetles are scarce during summer through autumn, the animal feeds on plants which actually form part of their diet all year round, but in times of scarcity of its preferred beetles, it feeds almost exclusively on plants. Arnold (1984) mentioned that *S. mitranus* took significant amount of plant material in a manner which was unlikely to be accidental, and in one instance it had ingested a small lizard *Phrynocephalus arabicus*.

In winter, *S. mitranus* feeds almost on insect larvae when these larvae are most abundant. This is similar to the finding of Shea (1989) on the diet of the skink *Tiliqua rugosa* in western Australia, where the diet consisted of insect larvae when they were most common in winter.

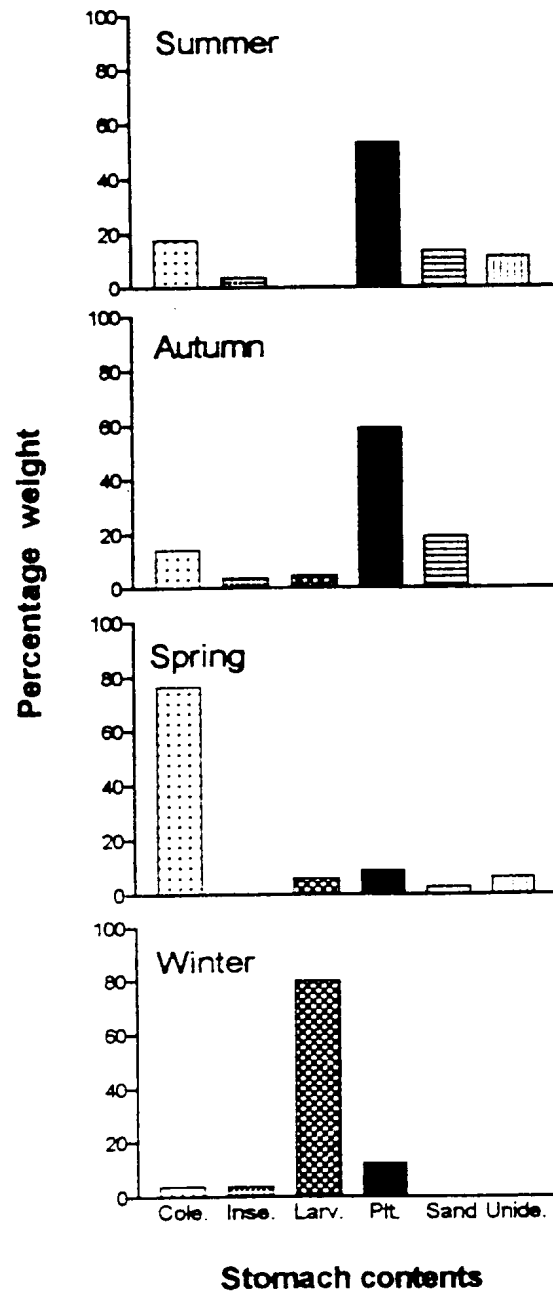


Fig 5. Seasonal variations in the type of food found in the stomach of *S. mitranus* expressed as percentage of the total weight of the six categories of food recovered each season.

During June, it was observed that the amount of stomach content of *S. mitranus* is the lowest, a situation which could be due to the intervening mating period when lizards lose interest in feeding. During November, however, feeding was rationally high in preparation for winter, but the number of lizards was observed to decline during December, before disappearing altogether by January. They re-emerged in February and their feeding increased gradually over February and March. Al-Gandour (1979) mentioned that the spiny tailed lizards, *Uromastyx aegyptius* had a seasonal cycle of feeding falling between late March and early September reaching its maximum in May and June.

The sand fish, *S. mitranus* hunts actively on the periphery of sandy areas and adopts a similar feeding technique to *Acanthodactylus schmidii*, but differs from *P. arabicus* which adopts a "sit and wait" behaviour (Arnold, 1984). In summer, *S. mitranus* has bimodal activities, in the morning extending for 180-210 minutes and in the afternoon for 60-120 minutes. According to our observations, morning period of activity is for more important than the afternoon one as it coincides with the period of activity of its most preferred beetles food prey. However, in spring the animals have a single session of activity, about mid-day, that extends for 180-250

minutes. In summer, when the number of beetles decline, the animal is usually seen active near small shrubs and herbs on which it feeds. Lizards actively hunt their preferred beetles, whose numbers are increased during spring.

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References

- Al-Gandour, M.H. 1979. Histological and histochemical studies on *Uromastyx aegyptia*. M.Sc. thesis, Alazher University, Egypt.
- Al-Ogily, S.M. and Hussein, A. 1983. Studies on the ecology of the Egyptian spiny-tailed, *Uromastyx aegyptius* (Forsk., 1775) in Riyadh region, Saudi Arabia. *Journal of College of Science, King Saud University* 14: 341-351.
- Arnold, E.N. 1984. Ecology of low land lizards in the eastern United Arab Emirates. *Journal of Zoology* (London) 204: 329-354.
- Avery, R.A. 1966. Food and feeding habits of the common lizard *Lacerta vivipara* in the west of England. *Journal of Zoology* (London) 149: 115-121.
- Ballinger, R.E., Lemos-Espinal, J., Sanoja-Sarabia,

- S. and Coady, N.R. 1995. Ecological observations of the lizard, *Xenosaurus grandis* in Cuautalapan, Veracruz, Mexico. *Biotropica* 27: 128-132.
- Barbault, R.A., Ortega, and Maury, M. 1985. Food partitioning and community structure in a mountain lizard guild of northern Mexico. *Oecologia* (Berlin) 65: 550-554.
- Castro, S.A., Jaimenez, J.E. and Jaksic, F.M. 1991. Diet of the racerunner *Callopiastes palluma* in north-central Chile. *Journal of Herpetology* 25: 127-129.
- Diaz, J.A. and Carrascal, L.M. 1990. Prey size and food selection of *Psammodromus algirus* (Lacertidae) in central Spain. *Journal of Herpetology* 24: 342-347.
- Gil, M.J., Guerero, F., Perez-Mellado, V. and Mellado, V.P. 1994. Seasonal variation in diet composition and prey selection in the Mediterranean gecko *Tarentola mauritanica*. *Israel Journal of Zoology* 40: 61-74.
- Greene, H.W. 1982. Diet and phenotypic diversity in lizards: why are some organisms specialized?. In: Mossakowski, D. and Roths, G. (Eds). *Environmental adaptation and evolution*. pp. 107-128. Gustav Fischer, Stuttgart.
- Kevork, O.K. and Al-Uthman, H.S. 1972. Ecological observations on the Egyptian spiny-tailed lizard *Uromastix aegyptius*: 1. On food and feeding habits, with notes on the climate and vegetation of the study area. *Bulletin of Iraq Natural History Museum* 5: 26-44.
- King, F.H. and Green, B. 1979. Notes on diet and reproduction of the Sand Goanna, *Varamus goldii rosenbergi*. *Copeia* 1979: 64-70.
- Loumbourdis, N.S. and Hailey, A. 1991. Food consumption of the lizard *Agama stellio stellio*. *Journal of Arid Environments* 21: 353-356.
- Mandaville, J.P.J. 1965. Plants eaten by *Uromastix microlepis* Blandford and other notes on this lizard in eastern Arabia. *Journal of Bombay Natural History Society* 61: 161-163.
- Mitchell, J.C. 1979. Ecology of southeastern Arizona whiptail lizards (Cnemidophorus: Teiidae): Population densities, resource partitioning, and niche overlap. *Canadian Journal of Zoology* 57: 1487-1499.
- Pefaur, J.E. and Tejada, E.L. 1983. Ecological notes on the lizard *Tropidurus peruvianus* in southern Peru. *Journal of Arid Environments* 6: 155-160.
- Pianka, E.R. 1986. Ecology and natural history of desert lizards. Princeton University Press, Princeton, New Jersey.
- Pianka, E.R. and Parker, W.S. 1972. Ecology of horned lizards: a review with special reference to *Phrynosoma platyrhinos*. *Copeia*, 493-508.
- Pough, F.H. 1973. Lizard energetics and diet. *Ecology* 54: 837-844.
- Rodriguez-Schettino, L. and Martinez-Reyes, M. 1996. Some aspects of the feeding ecology of *Anolis argenteolus* (Sauria: polychridae) at a

- site on the southern coast of Cuba. *Biotropica* 28: 252-257.
- Seely, M.K. and Louw, G.N. 1980. First approximation of the effects of rainfall on the ecology and energetics of a Namib desert dune ecosystem. *Journal of Arid Environments* 3: 25-54.
- Shea, G.M. 1989. Diet and reproductive biology of the Rottesnest island Bobtail, *Tiliqua rugosa konowi* (Lacertilia: Scincidae). *Herpetological Journal* 1: 366-369.
- Spellerberg, I.F. 1982. *Biology of Reptiles, an ecological approach*. Blackie and Sons Ltd. London.
- Stamps, J. and Tanaka, S. 1981. The relationship between selectivity and food abundance of a juvenile lizard. *Ecology* 62: 1079-1092.
- Vitt, L.J. and Blackburn, D.N. 1991. Ecology and life history of the viviparous lizard *Mabuya bistrriata* (Scincidae) in the Brazilian Amazon. *Copeia* 1991: 916-927.

عادات التغذية والغذاء لسحلية السمكة
الرملية (السقنقور) من نوع *Scineus mitranus*

محمد بن خالد السعدون* ، عوض بن متريك الجهني*

سعود بن عبد العزيز الفراج**

* قسم علم الحيوان - كلية العلوم - جامعة الملك سعود ،

ص. ب. ٢٤٥٥ الرياض ١١٤٥١

** قسم الإحياء - كلية المعلمين بالرياض

ص. ب. ٤٣٤١ الرياض ١١٤٩١ - المملكة العربية السعودية

المخلص: لقد درست عادات التغذية ونوعية الغذاء لسحلية السقنقور من نوع *Scineus mitranus* في منطقة الرياض بالمملكة العربية السعودية . أظهرت النتائج درجة ملحوظة من التنوع والتفضيل الغذائي الموسمي . فقد وجد أن هذا السقنقور يتغذى بطريقة انتقائية من المصادر المتاحة له . كانت محتويات المعدة تتكون من ست أصناف ، ثلاثة منها عبارة عن حشرات بينما البقية كانت عبارة عن فضلات نباتية ورمال ومواد مجهولة . لقد تم تسجيل أكبر كمية من الطعام في فصل الربيع بينما أقلها كانت في فصل الصيف . لقد كان إستهلاك المواد النباتية بكثرة في فصل الخريف بينما كان إستهلاك يرقات الحشرات عادياً أثناء فصل الشتاء . تعتبر هذه السحلية صياداً نشطاً . ولقد كان النشاط ذو طبيعة ثنائية في الصيف بينما كان آحادياً في فصل الربيع .

كلمات دالة :

سكينكس ميرانس ، سحلية ، سقنقور ، سحلية السمكة الرملية ، الغذاء ، عادات التغذية ، الجزيرة العربية .