

Food habits of the Ruin Lizard,  
*Podarcis sicula* (RAFINESQUE-SCHMALTZ, 1810),  
from a coastal dune in Central Italy  
(Squamata: Sauria: Lacertidae)

Die Nahrungsgewohnheiten der Ruineneidechse, *Podarcis sicula*  
(RAFINESQUE-SCHMALTZ, 1810), von einer Küstendüne in Mittelitalien  
(Squamata: Sauria: Lacertidae)

LORENZO RUGIERO

KURZFASSUNG

Die Zusammensetzung der Nahrung von Ruineneidechsen, *Podarcis sicula* (RAFINESQUE-SCHMALTZ, 1810), einer Küstendüne in Mittelitalien wurde untersucht. Die Analyse der Kotpillen von 31 im Februar und März gefangenen Individuen (7 Weibchen, 24 Männchen) ergab: Anzahl Beutetiere pro Eidechse ( $\bar{x} = 3,13 \pm 2,71$  SD); Breite der trophischen Nische nach SIMPSON (3,15); Nahrungsanteil in % Anzahl Futtermittel (Gastropoda 8, Arachnida 9, Isopoda 48, Insecta 23, andere 12; davon flugunfähige Formen 90).

ABSTRACT

Composition of the prey in Ruin Lizards, *Podarcis sicula* (RAFINESQUE-SCHMALTZ, 1810), from a coastal dune in Central Italy was studied. Analysis of the fecal pellets of 31 lizards (7 females, 24 males) captured in February and March revealed: number of prey items per lizard ( $\bar{x} = 3,13 \pm 2,71$  SD); trophic niche breadth according to SIMPSON (3,15); proportional number of prey items (Gastropoda 8%, Arachnida 9%, Isopoda 48%, Insecta 23%, others 12%; 90% of them all being flightless forms).

KEYWORDS

*Podarcis sicula*, Lacertidae; food, prey, ecology, Mediterranean habitat; Italy

The present work is a preliminary study on the diet of *Podarcis sicula* (RAFINESQUE-SCHMALTZ, 1810), from a coastal sandy dune area in Central Italy. The Ruin Lizard, widespread and very common in the Italian Peninsula, inhabits a great variety of flat and hilly habitats. In Central Italy coastal dunes provide a typical habitat for *P. sicula*, which is the most common lizard species there.

Data were collected in February and March 1994 at the border of the "Forest of Castel Fusano", a woody zone covering about 1000 ha [see chart F 149 II SE "Castel Porziano" - Istituto Geographico Militare (IGM)]. The dune itself is characterized by sandy soil and Mediterranean evergreen vegetation (*Arbutus unedo*, *Pistacia lentiscus*, *Juniperus oxycedrus*, *Rosmarinus officinalis*).

For analysis of the food items the fecal pellets of 24 male and 7 female adult *P. sicula* were examined. The lizards were noosed or caught by hand between about 12.00 a. m. and 2.30 p. m. The fecal pellets were spread in a Petri dish, the prey remains were separated and identified to the lowest taxon possible.

Trophic niche breadth was calculated according to SIMPSON's (1949) equation:

$$B = \frac{1}{\sum_{i=1}^N P_i^2}$$

where  $P_i$  is the proportional share of the prey types in the diet and  $N$  is the total number of prey types.

Remains of 97 prey items were obtained from the fecal pellets of all 31 lizards examined (mean number of prey items

Table 1: Number (N) and proportional share (%) of prey items in the fecal pellets of 31 *Podarcis sicula* from the study area. L - larvae.

Tab. 1: Anzahl (N) und prozentueller Anteil (%) der Futtertiere in den Kotpillen von 31 *Podarcis sicula* des Untersuchungsgebietes. L - Larven.

Category	N	%
Gastropoda		
Pulmonata	8	8.24
Arachnida		
Araneae	9	9.27
Chilopoda	1	1.03
Crustacea		
Isopoda	47	48.45
Insecta		
Dermaptera	1	1.03
Coleoptera	9	9.27
Neuroptera (L)	1	1.03
Lepidoptera (L)	10	10.30
Diptera	1	1.03
Hymenoptera (Formicoidea)	1	1.03
Vertebrata		
Reptilia ( <i>P. sicula</i> )	1	1.03
Unidentified	8	8.24
Total	97	100.00

per lizard:  $\bar{x} = 3.13 \pm 2.71$  SD). The prey items were determined and assigned to 12 taxonomical groups (table 1), including conspecific and unidentified items. Niche breadth was 3.15. Isopoda were found most frequently, accounting for nearly half of the prey items. Four other invertebrate groups were present frequently: lepidopteran larvae, coleoptera, spiders and snails. Four other taxa (Dermaptera, Neuroptera, Diptera, Hymenoptera) were found only once in the diet; a single juvenile *P. sicula* was preyed upon by a male of 12 gr total body weight and 74 mm snout-vent length.

The main bulk of prey consisted of arthropods (89.88% of the number of identified prey items). This value confirms a rather constant trend in small diurnal lizard species, the diet of which is usually com-

posed of insects and other arthropods (AVERY 1966; QUAYLE 1983; BUSACK & VISNAW 1989; DOMINGUEZ & SALVADOR 1990; HOWLAND & al. 1990; CAPULA & al. 1993).

It may be different in lizard species with a different diurnal activity pattern. The Slow Worm (*Anguis fragilis* LINNAEUS, 1758), for instance, is a partially fossorial species with peak activities during twilight. *A. fragilis* proved to prey on slugs and earth-worms rather than on arthropods (LUISELLI 1992). Moreover, the present data indicate that the prey of *P. sicula* consists primarily of flightless organisms (Chi<sup>2</sup>-test,  $p < 0.05$ ).

The data given cannot permit firm conclusions as precise estimates on prey availability at the study site are not yet at hand. However, some hypotheses on this issue shall be formulated.

The high percentage of arthropods in the dietary spectrum may be mainly caused by the relative abundance of these organisms in the places and times of activity of the Ruin Lizard. Other invertebrates seem to be active at different hours than the lizards (e. g. at night or after rain).

Regarding the case of cannibalism, one should consider that this behaviour has been observed in lizards which occasionally prey upon small reptiles (VALVERDE 1967; ARNOLD & BURTON 1978; DE JUANA & DE JUANA 1982; FRETEY 1987; BUSACK & VISNAW 1989). In this respect it appears justified to hypothesize that only the adult males of *P. sicula* (due to their greater head size) but not the females can forage on young of their own species.

Furthermore, it seems likely that flightless taxa were preyed on more frequently because (1) they are seized more easily by the lizards, and (2) they are abundant on the surface of the soil.

#### REFERENCES

- ARNOLD, E. N. & BURTON, J. A. (1978): Reptiles and amphibians of Britain and Europe. London (Collins & Sons). 272 pp.
- AVERY, R. A. (1966): Food and feeding habits of the Common Lizard (*Lacerta vivipara*) in the west of England. - J. Zool., London; 149: 115-121.
- BUSACK, S. D. & VISNAW, J. A. (1989): Observations on the natural history of *Lacerta lepida* in Cadiz Province, Spain. - Amphibia-Reptilia, Leiden; 10: 201-213.
- CAPULA, M. & LUISELLI, L. & RUGIERO, L. (1993): Comparative ecology in sympatric *Podarcis muralis* and *P. sicula* (Reptilia: Lacertidae) from the historical centre of Rome: What

about competition and niche segregation in an urban habitat? - Boll. Zool. (Italian J. Zool.), Modena; 60: 287-291.

DE JUANA, E. & DE JUANA, F. (1982): Observacion de *Lacerta lepida* depredando un nido de *Alectoris rufa*. - Doñana Acta Vertebrata, Sevilla; 9: 374-375.

DOMINGUEZ, J. F. & SALVADOR, A. (1990): Disponibilidad y uso de recursos troficos por *Lacerta schreiberi* y *Podarcis bocagei* en simpatria en una localidad de la Cordillera Cantabrica, España. - Amphibia-Reptilia, Leiden; 11: 237-246.

FRETEY, J. (1987): Guide des reptiles et batraciens de France; Paris (Hatier), 255 pp.

HOWLAND, J. M. & VITT, L. J. & LOPEZ, P. T. (1990): Life on the edge: the ecology

and life history of the tropidurine iguanid lizard *Uranoscodon superciliosum*. - Canadian J. Zool., Ottawa; 68: 1366-1373.

LUISELLI, L. (1992): The diet of the Slow Worm, *Anguis fragilis* LINNAEUS, 1758, in the Tarvisio Forest (Carnic Alps, NE Italy). - Herpetozoa, Wien; 5 (3/4): 91-94.

QUAYLE, A. (1983): Notes on the diet of Erhard's Wall Lizard, *Podarcis erhardii*. - British J. Herpet., London; 6: 309-310.

SIMPSON, E. H. (1949): Measurement of diversity. - Nature, London; 163: 688.

VALVERDE, J. A. (1967): Estructura de una comunidad mediterranea de vertebratos terrestres; Consejo Superior de Investigaciones Cientificas, Madrid.

DATE OF SUBMISSION: April 18th, 1994

AUTHOR: Dr. Lorenzo RUGIERO, via Cimarosa n. 13, I-00198 Roma, Italy