

# Preliminary data on the ecology of *Podarcis filfolensis* of Lampione Islet (Pelagian Islands, Channel of Sicily, Italy)

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*Some preliminary data on Podarcis filfolensis of Lampione Islet are given. Estimated density was 75–80 individuals per 100 m<sup>2</sup>. Most part of the lizards had the tail broken or regenerated. The diet was mainly based on arthropods, and Formicidae (42%) and Coleoptera (23%) represented the main prey-groups. Vegetal matter was found in 61% of the examined faecal pellets, and plant consumption resulted widespread at all levels of this population.*

Keywords: *Podarcis filfolensis*, population density, trophic ecology, Lampione Islet, Pelagian Archipelago.

## INTRODUCTION

An extremely "isolated" population of the Maltese Wall Lizard, *Podarcis filfolensis* (Bedriaga 1876), occurs on Lampione Islet (Pelagic Archipelago), which is the westernmost site of the distribution range of the species. This population was referred by Lanza & Bruzzone (1961) to the ssp. *laurentiimuelleri* (Fejérváry 1924), which also occurs on Linosa Island. From a zoogeographical point of view, its occurrence on Lampione could be explained with a probable introduction by man. In fact, (1) Lampione, being the closest island to Lampedusa, is part of the African continental plate and never got palaeogeographical relation with the Maltese Islands; (2) no lizards of the genus *Podarcis* seem to have occurred on Lampedusa (except for recent introduced populations on Lampedusa village, see Lo Cascio *et al.* 2005).

Only scattered data on the ecology of *Podarcis filfolensis* are available (Sorci 1990, Di Palma 1991, Moravec 1993, Corti & Lo Cascio 2002, Scalera *et al.* 2004, Bombi

*et al.* 2005), but there are no studies concerning the Lampione population specifically, even if it seems particularly interesting due to the extreme geographical and ecological features of the islet. In this paper, we present preliminary data on the ecology of this population, focusing our interest especially on the diet and the population density.

## MATERIAL AND METHODS

### *Study area*

Lampione (35°33'00"N – 12°19'11"E Greenwich) (Fig. 1) is the smallest islet of the Pelagian Archipelago (Channel of Sicily), with a surface of about 2.10 ha, 700 m of coastal perimeter, and a maximum elevation of 36 m a.s.l. It is located 17 km off the W coast of Lampedusa Island. From a geographical point of view, Lampione belongs to the African plate. It was connected with North Africa during the last marine regression (about 18,000 yrs BP). The islet is entirely calcareous, with dolomitized carbonates composed by associated wackestone and packestone, referred to the "Halk al-Menzel formation" (Tunisian offshore, 46-34 Myrs BP) (Bonnefus & Bismuth 1982, Grasso *et al.* 1985). The average annual temperature is 19 °C and the average rainfall is less than 320 mm (measured on the close island of Lampedusa). Apart from the Maltese Wall Lizard, Lampione is inhabited by the



Fig. 1. Lampione Islet. Note on the upper plateau covered by nitrophilous high herbs, a high lizard density (approximately 75-80 individuals per 100 m<sup>2</sup>) was observed.

Ocellated Skink, *Chalcides ocellatus*. Colonies of Cory's Shearwater, *Calonectris diomedea* (40-50 pairs), and Eleanor's Falcon, *Falco eleonorae* (7-8 pairs) occur on the islet, while about 250 nesting pairs of Mediterranean Yellow-legged Gull, *Larus cachinnans*, were counted during our visit. Due to the intense erosive processes and the high concentration of gulls, the soil is scarce and characterised by high level of eutrophication, acidification, and nutrient imbalances. This features strongly influence the vegetation, dominated by alo-nitrophilous perennial shrubs (as *Arthrocnemum macrostachyum*) and high annual herbs (as *Lavatera arborea*) (Corti *et al.* 2002, and references therein). An early human presence, probably only seasonal, is documented by the ruins of a building, traced back to the late Roman age by Ashby & Litt (1912). During the 20th century a lighthouse, unguarded at present, was built on the islet.

### Methods

All data were gathered during a survey in April 2001. All the captured lizards were measured with a calliper "Mauser" (accuracy 0.1 mm) and released. Data on population density are based on preliminary surveys carried out using a "line transect method".

Faecal pellets were obtained by handling specimens or collected on surfaces where lizards' activity was previously observed, in order to avoid miss identification with those of *Chalcides ocellatus*. Faecal contents were examined in the laboratory using a stereoscope. When possible, remains were identified to the lowest taxonomic rank by comparison with the arthropods' specimens kept in the private collection of one of the authors (PLC). Statistical analyses were carried out using SPSS 11.5 (alpha set at 5% and all tests being two tailed).

## RESULTS

### *Population body size, density, and frequency of regenerated (broken) tails*

Adult male SVL ranged from 68 to 71 mm ( $n = 5$ ), while two adult female SVL were respectively 63 and 66 mm. Although male size probably exceeded female size, our sample size was too small to allow statistical comparisons. Population density was generally high, especially on the upper plateau covered by nitrophilous high herbs, where 75-80 individuals per 100 m<sup>2</sup> were estimated (i.e. approximately 7500 to 8000 individuals  $\times$  ha<sup>-1</sup>, SE =  $\pm$  1326; CV = 0. 172). Among the measured specimens, three out of five males, and one of the two females had the tail broken or regenerated.

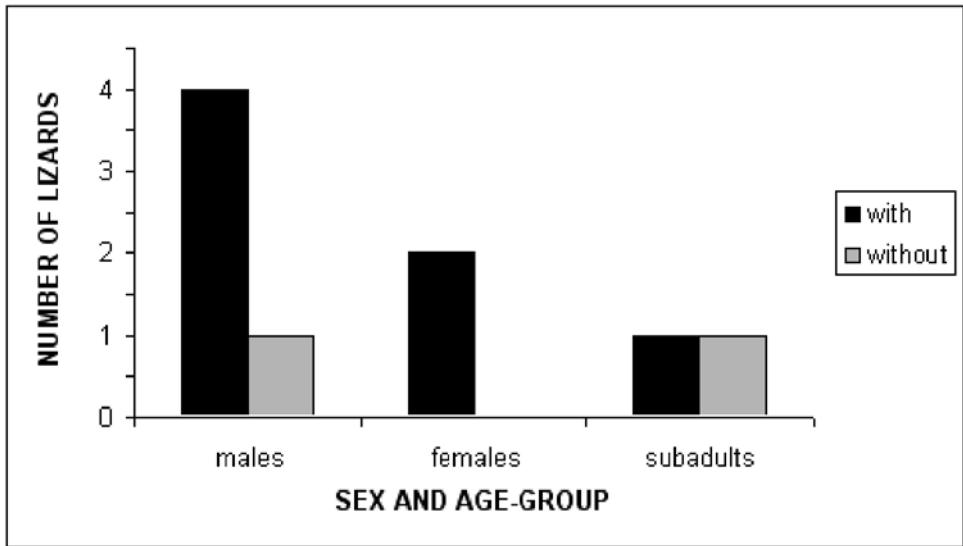


Fig. 2. Number of males, females, and subadults of *Podarcis filfolensis* whit faeces containing, or not containing plant matter residuals, analysis. Only faecal pellets collected from specimens with known identity were used for this.

### Diet

Vegetal matters were found in 60.9% of the examined faecal pellets (total  $n = 23$ ). Vegetal matters exceeded any other food category in terms of frequency of occurrence of the various prey items ( $\chi^2$  test,  $P < 0.04$ ). In particular, comparing the frequency of occurrence of vegetal matters in specimens with known sex, 4 out of 5 males, all females and 1 out of 2 subadults consumed plant matter (Fig. 2). The rest of the diet consisted mainly of arthropods (Table 1). Among these Formicidae (42.3%) and Coleoptera (22.9%) represented the main preys. Remains of a lizard (some tail scales) were found in one faecal pellet.

## DISCUSSION

The high population density observed on Lampione sounds particularly interesting when we consider i) the presumably scarce food availability and ii) the occurrence of a big yellow-footed seagull colony (see above). Gulls are doubtfully considered potential predators of lizards (Araujo *et al.* 1977, Martin & Lopez 1990, Carretero *et al.* 1993, Mayol 2004). During our investigations we never observed this bird preying lizards and no lizard remains have been found in the examined gull pellets. A similar situation was also observed by Pérez-Mellado (unpublished com-

Table 1. Dietary composition of *Podarcis filfolensis* at Lampione Islet, by number of items found in the faecal pellets.

Gastropoda	4
unidentified Arthropoda	9
Pseudoscorpiones	1
Araneae	5
Crustacea Isopoda	6
Collembola	6
Dictyoptera	1
Heteroptera	1
Coleoptera	4
Coleoptera larvae	3
Coleoptera Melolonthidae	1
Coleoptera Tenebrionidae	20
Coleoptera Cerambycidae	1
Coleoptera Curculionidae	7
Diptera	4
Lepidoptera larvae	2
Hymenoptera	1
Hymenoptera Apoidea	2
Hymenoptera Ichneumonidae	5
Hymenoptera Formicidae	61
Reptilia Lacertidae	1

munication to the authors) on the Balearic islands. On the contrary, it is plausible that the presence of seagulls could be a source of additional food remains, including carcasses and flying insects linked by the organic matter of the breeding colony. Therefore, it is possible that these birds positively affect the lizard abundance in this small islet rather than decrease it. Nevertheless, other potential predators could be kestrels (*Falco tinnunculus*) and/or other birds which occasionally visit the islet (Moltoni 1970, Fornasari & Zava 2001). On the other hand, the great percentage of lizards (both males and females) showing regenerated tails should suggest eventual high predation pressure as well as intra- and/or inter-specific competition. The remarkable plant consumption, widespread among both sexes and all age classes, exposes lizards to easy predation (Pérez-Mellado & Corti 1993, Van Damme 1999) and therefore seems to contradict the hypothesis of high predation pressure on this islet. Even if based on preliminary data, our results suggest that intra- and/or inter-specific competition, due to the small viable space and the presumably scarce food availability, can be considered the main explanation to this trait. Further investiga-

tions will be needed in order to assess if trophic niche overlap is also present on this islet between *P. filfolensis* and the syntopic skink *Chalcides ocellatus* (Capula & Luiselli 1994). Concerning the diet, mirmecophagy and herbivorous habits have been previously documented for other populations of *Podarcis filfolensis* (Sorci 1990, Bombi *et al.* 2005) but the rate observed was not so high as for the Lampione population. Analogous observations have been already reported for other Mediterranean small islands lizard populations (Pérez-Mellado 1989, Pérez-Mellado & Corti 1993).

## ACKNOWLEDGEMENTS

We thank Giusi Nicolini, director of the Natural Reserve “Isola di Lampedusa”, in facilitating our research on Lampione Islet; the colleagues Salvo Pasta and Damiano Sferlazzo for their help during fieldwork, and Valentin Pérez-Mellado for useful comments on an early draft.

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