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# PARASITOLOGÍA

## GASTROINTESTINAL PARASITES IN SAURIANS FROM SOME CENTRAL MEDITERRANEAN ISLANDS

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**Key words:** Parasites, saurians, Mediterranean islands.

**Resumen:** Se ha llevado a cabo un estudio helmintológico de muestras fecales de tres especies de saurios (*Podarcis filfolensis*, *Podarcis raffonei* y *Chalcides ocellatus*) en islas del Norte y Sur de Sicilia (Mediterráneo Central). Se detectaron cuatro especies de nematodos, *Parapharyngodon micipsae*, *Parapharyngodon* sp., *Pharyngodon* sp. y *Skrjabinelazia* sp. Los resultados obtenidos sugieren, para los tres hospedadores, pobreza de sus comunidades helmintianas y hábitos alimenticios esencialmente carnívoros.

The islands of Central Mediterranean harbour several lizard species, including several ones which are endemic of macro- and micro-insular systems. Parasitological studies on these populations could result of special interest due to the peculiar zoogeographical and ecological characteristics related to the hosts, such as isolation, high population densities, and feeding habits (Pérez-Mellado & Corti, 1993; Brown & Pérez-Mellado, 1994; Van Damme, 1999; Carretero, 2004).

However, the parasites of these populations have not been so far investigated and, in general, data on Mediterranean lizards are still scarce and referred mainly to the lacertids of the genus *Podarcis* (Hornero, 1991; Roca, 1993, 1995, 2004).

In this paper the results of some investigations concerning two species of Lacertidae, *Podarcis filfolensis* (Bedriaga, 1876) and *Podarcis raffonei* (Mertens, 1952), and one of Scincidae, *Chalcides ocellatus* (Forsk., 1775), are discussed.

### MATERIALS AND METHODS

#### Study area

The present research concerns the parasites of lizard populations occurring on three circum-Sicilian islets: Lampione, the smallest of the Pelagie Islands group (Channel of Sicily); Scoglio Faraglione and Strombolicchio, two tiny islets belonging to the Aeolian Archipelago (S Tyrrhenian) (Figure 1).

Lampione (35°33'00"N / 12°19'11"E Greenwich, 17 Km off the W coast of Lampedusa Island) has a surface of 21 000 m<sup>2</sup> and a maximum elevation of 36 m. The vegetation is dominated by halo-nitrophilous perennial shrubs (*Arthrocnemum macrostachyum*) and high temporal herbs (*Lavatera arborea*), due to the occurrence of a large colony of Mediterranean Yellow-legged Gull, *Larus cachinnans*, which induces a strong level of eutrophication and nutrient imbalances on the soil.



Figure 1. Localization of the searched lizard populations.

Scoglio Faraglione (38°34'77"N / 14°48'08"E, 300 m off the W coast of Salina Island) has a surface of 4900 m<sup>2</sup> and a maximum elevation of 35 m. The top of the islet is covered by a dense epi-littoral vegetation, referred to the *Senecioni-Helichrysetum litorei*.

Strombolicchio (38°49'07"N / 15°15'13"E, 1.5 Km off the NE coast of Stromboli Island) has a surface of 3000 m<sup>2</sup> and a maximum elevation of 49 m. Its perimeter is formed by very steep cliffs, sparsely covered by chasmophyllous formations referred to *Hyoseridetum taurinae-dianthetosum aeolici*, while on the top spots of maquis of *Euphorbia dendroides* also occur.

The studied islets are nowadays uninhabited, even if Lampione and Strombolicchio have been partially anthropised during the building of lighthouses.

### Studied species

The saurian hosts parasitologically investigated are *Chalcides ocellatus*, *Podarcis filfolensis* and *Podarcis raffonei*.

*C. ocellatus*, is widespread throughout N Africa, some areas of Asia (from Middle East to western Pakistan) and S Europe, where it

occurs on several islands (such as Crete, Rhodes, Maltese Archipelago, Sicily, Sardinia and their satellites: Schneider, 1997). It is one of the most common lizards in the Pelagic Islands, and the Lampione population is characterised by high density and an unusual rather high proportion of vegetal matter included in the diet (P. Lo Cascio, unpublished data).

*P. filfolensis* is endemic of the Maltese Archipelago and also occurs on some Pelagic Islands (Linosa, Lampione, and recently discovered on Lampedusa, Lo Cascio *et al.*, 2005), where it was probably introduced (Bischof, 1997). Lampione Islet represents the westernmost site of the distributional range of the species, where it shows a very high population density. Partial herbivorism is well known for this species (Lo Cascio *et al.*, 2004; Bombi *et al.*, 2005).

*P. raffonei* is endemic of the Aeolian Archipelago and is considered one of the most threatened species of the Mediterranean fauna, due to its restricted distribution, limited to three tiny islets (Strombolicchio, Scoglio Faraglione and La Canna) and to few small areas of Vulcano Island (Capula & Lo Cascio, 2006). The

islets' populations are characterised by low density. This species is known as a strictly insectivorous lizard (Luiselli *et al.*, 2004), even if further investigations suggested the occurrence of a partial herbivorism in some micro-insular environments (P. Lo Cascio, unpublished data).

**Methods**

The lizards were noosed or captured by hand, then measured and sexed. Faecal remains were obtained during their examination. No specimens were sacrificed during the present study. The faecal pellets and the parasites were preserved in alcohol and successively examined in laboratory under a stereoscope. Parasites were examined under optical microscope.

**RESULTS AND DISCUSSION**

Four nematode species were found in all of three host species examined. Three of them, *Parapharyngodon micipsae* (Seurat, 1917), *Pharyngodon* sp. and *Parapharyngodon* sp., belong to the family Pharyngodonidae, and the other, *Skrjabinelazia* sp. belongs to Seuratidae (Chabaud, 1974; Petter & Quentin, 1976).

Number of individuals, sex of the hosts and localities in which nematodes were found, are indicated in Table 1.

Nematodes belonging to these genus and species are usually found in skinks from North Africa (Ashour *et al.*, 1992; Al Deen *et al.*, 1995; Ibrahim *et al.*, 2005) and in several species of *Podarcis*, lizards from Europe (Roca, 1985; Hornero, 1991; Roca, 1995; Martin, 2005). Nevertheless, as *P. raffonei* has been helminthologically searched for the first time, it is a new host for *P. micipsae*, *Parapharyngodon* sp. and *Skrjabinelazia* sp.

Roca (1995) found homogeneous helminth fauna in Mediterranean insular lizards, in accordance with the hypothesis of Alcover (1988) regarding the common origin of these lizards. Roca (*loc. cit.*) suggested low diversity for the helminth communities of these insular hosts, in agreement with the typical pattern of helminth infection of many reptiles (Roca & Hornero, 1994), although slight differences may be found among several islands and hosts (Roca & Hornero, 1994; Roca, 1995).

This preliminary study does not include data of prevalence or intensity of helminths because the methodology used for helminthological analysis is an indirect method. But, taking into account the number

**Table 1.** Intestinal parasites found in sampled hosts.

Reference code	Host	Sex	Locality	Date	Parasite found
1	<i>P. raffonei</i>	M	Scoglio, Faraglione	02/05/05	<i>P. micipsae</i> (1 ♂; 2 ♀)
2	"	H	Strombolicchio	29/03/05	<i>Parapharyngodon</i> sp (3 ♀)
3	"	H	"	04/10/05	<i>Parapharyngodon</i> sp (1 ♀)
4	"	M	"	04/10/04	<i>Parapharyngodon</i> sp (4 ♀)
5	"	H	"	04/10/04	<i>Skrjabinelazia</i> sp (1 ♀)
6	"	M	"	04/10/04	<i>Skrjabinelazia</i> sp (2 ♀)
7	"	M	"	08/09/04	<i>Parapharyngodon</i> sp (4 ♀)
-	"	M	"	21/06/05	<i>Parapharyngodon</i> sp (1 ♀)
2	<i>P. filfolensis</i>	M	Lampione	16/09/05	<i>Pharyngodon</i> sp (1 ♀)
1	<i>C. ocellatus</i>	-	"	02/06/04	<i>Pharyngodon</i> sp (1 ♂; 1 ♀)
3	"	-	"	16/09/05	<i>Parapharyngodon</i> sp (1 ♀)
4	"	-	"	16/09/05	<i>Parapharyngodon</i> sp (1 ♀)
5	"	-	"	21/05/05	<i>Skrjabinelazia</i> sp (7 ♀)



of species and individuals found, we can also predict poor helminth communities in the tree examined hosts in agreement with the results of Roca (1995) for other Mediterranean species and islands. This typical pattern of poor helminth communities is related with several features of these reptile hosts, as ectothermy, simplicity of the alimentary canal, low vagility and simple diet (Kennedy *et al.*, 1986; Roca & Hornero, 1994).

Pharyngodonid nematodes found in searched hosts are typical of the carnivorous reptiles (Petter & Quentin, 1976; Martin *et al.*, 2005). Thus, although tendency to herbivory is reported for *P. filfolensis*, and has been reported in other insular lacertids, e.g. *Podarcis lilfordi* and *Podarcis pityusensis* from the Balearic Islands (Pérez-Mellado & Corti, 1993; Roca & Hornero, 1994), our results suggest that *P. filfolensis*, *P. raffonei* and *C. ocellatus* are primarily carnivorous being the tendency to herbivorism a secondary adaptation (Roca, 1996) related to the trophic availability and to the evolutionary age of the lizard populations on each island.

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