Notes on the morphology of *Podarcis sicula coerulea* compared to other nearby islands and mainland populations of *P. sicula*

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Abstract. *Podarcis sicula* is widespread in Italy; it is mainly distributed in the peninsula and in Sicily where the species is eurytopic. A huge number of subspecies have been described. One of the most famous and the first that has been described is *P. s. coerulea* of the Faraglioni di Capri, just off the Gulf of Naples. In the present paper the morphology of these populations has been studied and the data have been analysed using multivariate statistical analysis. The analysis showed a clear differentiation between the two Faraglioni rocks and the other islets, while the two Faraglioni rocks' populations resulted almost identical to each other.

Keywords: Lacertidae, *Podarcis*, islands, morphology.

Introduction

Podarcis sicula is well distributed in Italy but mainly in the peninsula and in Sicily, where it is eurytopic, while in northern Italy it is confined to plain and coastal areas (Corti, 2006). A huge number of subspecies has been described (Henle & Klaver, 1986). One of the most famous and the first that has been described is *P. s. coerulea* (Eimer, 1872) endemic to the Faraglioni di Capri (Figure 1, 2). Since the last works on this population date back to the 50's, it is interesting to re-examine these populations studying their morphological traits using modern multivariate statistical analysis.

Material and Methods

A total of 177 specimens of *P. sicula* (89♂♂, 88♀♀) from 6 localities (Faraglione Esterno and Faraglione di Mezzo, Naples and three islands of the Gulf of Naples: Ischia, Vivara and Capri, see Figures 3, 4) have been measured.

Eleven pholidotic and 3 morphometric characters have been studied: dorsal (DORS), ventral (VENT), collar (COLL), gular (GUL), supraciliar (SCS), supratemporal and supralabial scales (SL), femoral pores (FPOR), scales under the IV toe (4TOE), supraciliar granules (SCG), scales between the masseteric shield and the supratemporal scales (SM), snout-to-vent (SVL), trunk (TRL) and head length,

Figure 1-2. *P. sicula coerulea* (photos by Luigi Esposito).

from the tip of the snout to the posterior margin of the collar (HL) (Figure 5). The pholidotic characters have been analysed (separately for ♂♂ and ♀♀) using Mahalanobis Distances analyses and AN(C)OVA, with morphometric characters eventually used as covariates.

Results

The Mahalanobis Distances analyses have shown a clear differentiation of the two Faraglioni rocks (see Figure 6) populations. The total percentages of correct classification, keeping the 6 localities separated was 66% for ♂♂ and 65% for ♀♀, showing a low capacity of discriminating among populations. When considering

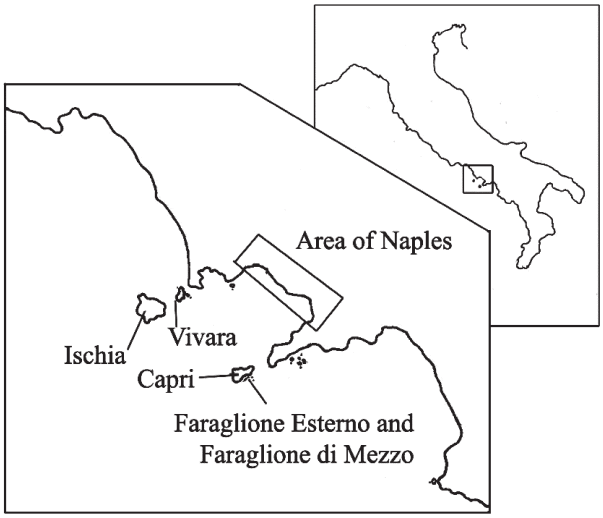

Figure 3. Sampling localities.

two groups (the first including the two Faraglioni rocks' populations and the second including the other localities), the total values rose up to 98% for ♂♂ and 97% for ♀♀. More in detail, the Faraglioni rocks showed 100% of correct classification for both sexes, while the other localities 97% for ♂♂ and 82% for ♀♀. Many subsequent ANOVAs have shown that 6 out of 11 pholidotic variables were significantly different in both sexes between the two groups (Table I): DORS,

Figure 4. The Faraglioni rocks from Scoglio Monacone (photo by Armando Nappi).

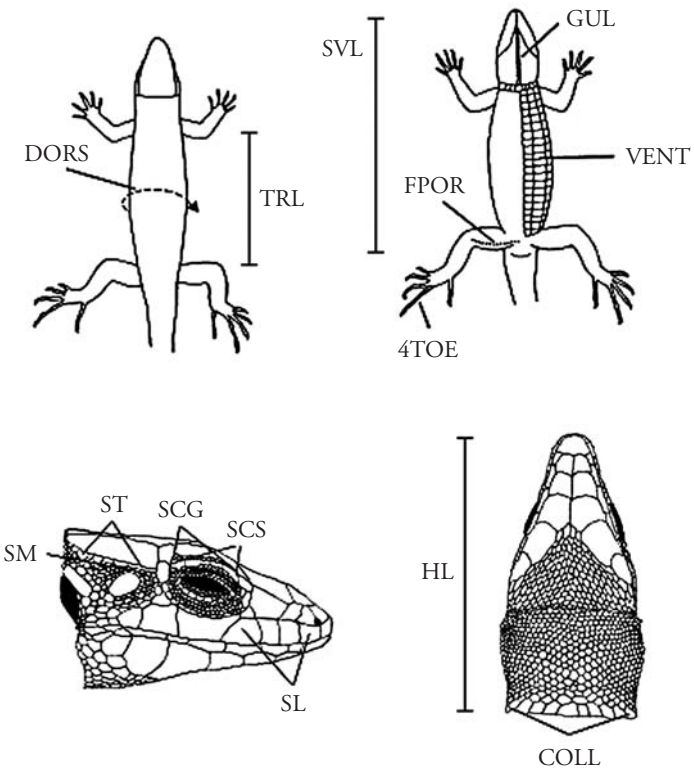

Figure 5. Analysed characters (above: from Cheylan, 1988, modified; below: original).

VENT, COLL (significant only in males), GUL, SCG and SM. Correlations have been detected (between populations) between various couples of pholidotic and morphometric variables (Table II). Consequently, ANCOVAs of the polidotic variables using the relative morphometric variable as covariate have been calculated, but the pholidotic variables still showed significant differences between the two groups (see Table I).

Conclusions

The analysis showed a clear differentiation between the two Faraglioni rocks populations and those of the other localities, where the two Faraglioni rocks' populations resulted almost identical.

As shown by the ANOVAs, the populations of *P. s. coerulea* have significantly more dorsal, ventral and gular scales, more scales between the masseteric shield and the supratemporal scales, less supraciliar granules and less collar scales (the last only in males). These differences are probably partly due to differences in size and

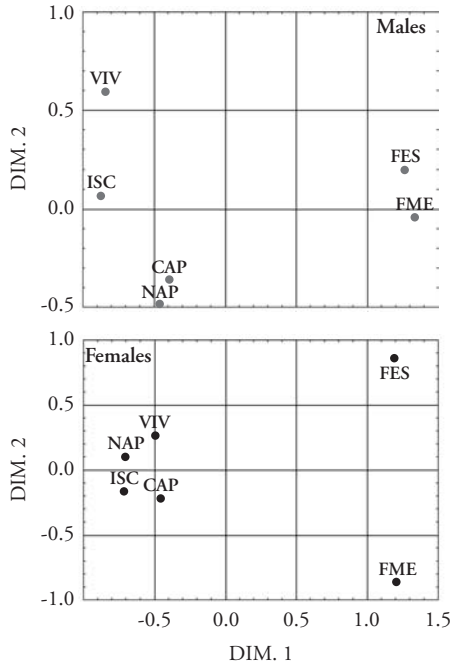

Figure 6. Plot of the results of the Mahalanobis Distances Analysis conducted on the pholidotic characters. (CAP: Capri; FES: Faraglione Esterno; FME: Faraglione di Mezzo; ISC: Ischia; NAP: Napoli; VIV: Vivara.)

relative length of body parts, but also to phylogeny: this has been proved by the fact that ANOVAs and ANCOVAs gave the same result and that the number of supraciliar granules decreases with the increase of body size. Anyway, it is still too early to give further consideration on the meaning of these differences in pholidosis: further analyses are required, both morphological and genetical.

Table I. Results of the ANOVA and ANCOVA, when significant. See text for details.

	ANOVA						ANCOVA					
	MM			FF			MM			FF		
Variables	df	F	*p*	df	F	*p*	df	F	*p*	df	F	*p*
DORS	1,87	42.16	<0.0001	1,86	26.12	<0.0001	1,86	23.95	<0.0001	1,85	19.13	0.0003
VENT	1,87	70.69	<0.0001	1,86	10.08	0.002	1,83	32.66	<0.0001	1,84	4.85	0.03
COLL	1,87	8.73	0.004	-	-	-	-	-	-	-	-	-
GUL	1,87	60.98	<0.0001	1,86	40.65	<0.0001	1,83	51.22	<0.0001	1,84	26.41	<0.0001
SCG	1,87	13.75	0.0004	1,86	13.54	0.0004	1,86	11.70	<0.0001	1,85	6.42	0.01
SM	1,87	51.35	<0.0001	1,86	22.88	<0.0001	-	-	-	-	-	-

Table II. Significant correlations between the pholidotic and morphometric characters.

	MM		FF	
Variables	R^2	*p*	R^2	*p*
DORS and SVL	0.92	0.02	0.096	0.28
VENT and TRL	0.5	0.047	0.82	0.008
GUL and HL	0.75	0.02	0.61	0.04
SCG and SVL	0.73	0.02	0.57	0.049

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