

Sexual dimorphism in italian wall lizard (*Podarcis sicula* (Rafinesque-Schmaltz, 1810))

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Introduction

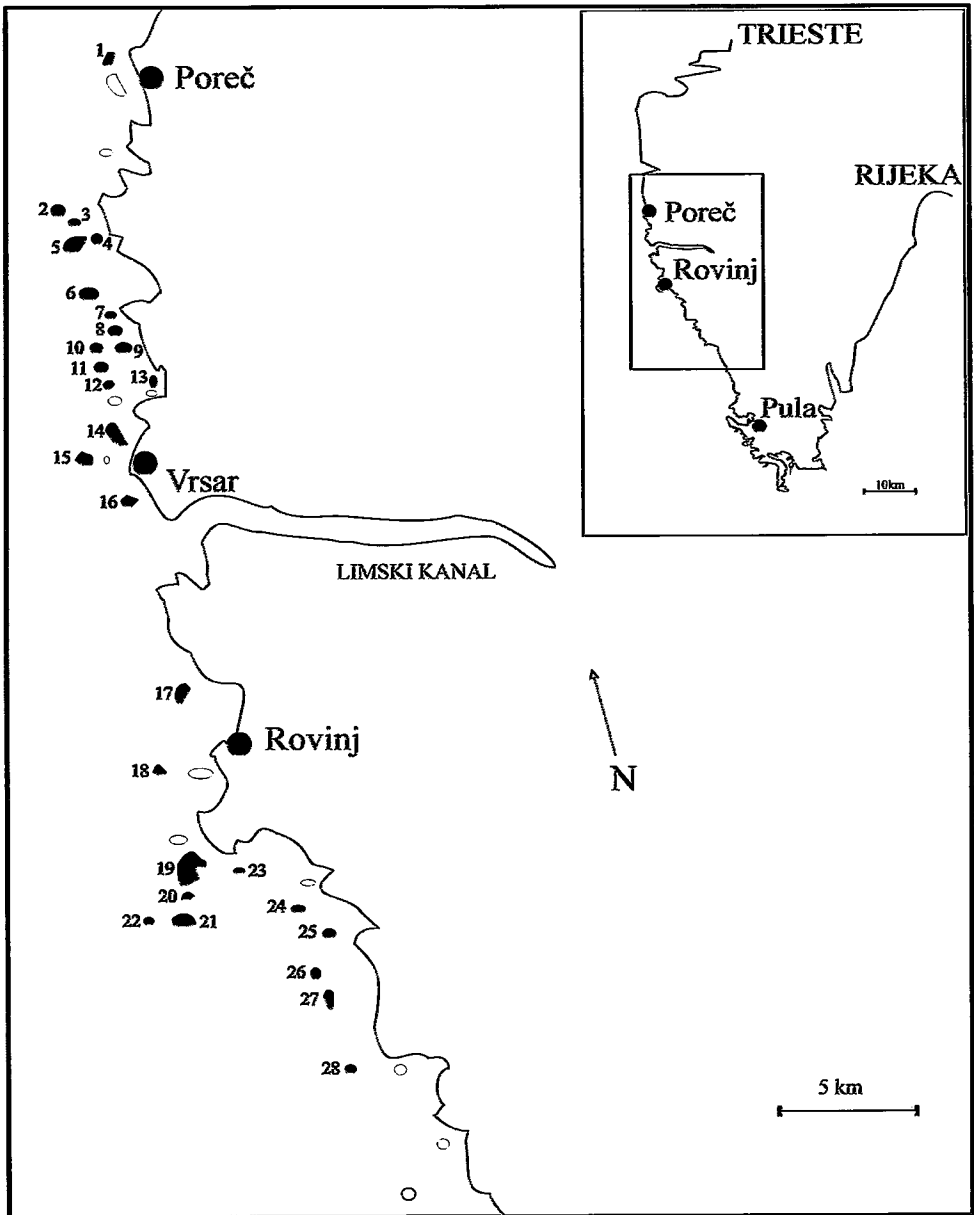
Differences in morphology between adult females and males exist in most reptiles. In Italian wall lizard (*Podarcis sicula*) males are bigger than females, they have more dorsal scales, less ventral scales and less femoral pores than females (Henle in Klaver, 1986). The extend of dimorphism varies within species, but these patterns and their causes have not been investigated. The aim of my work was to investigate the extend of sexual dimorphism in different populations of Italian wall lizard and to compare it with island environmental features.

Material and methods

Sexual dimorphism was studied in twenty eight island populations and a mainland population of *Podarcis sicula* in Istria (Croatia) (Fig. 1). Thirty three morphological traits were obtained as follows: snout – vent length, tail length (if not regenerated), width, length and height of head, width and length of pileus, internasal, frontal, interparietal, anal and occipital scales, width between occipital and interparietal, number of supraciliaries, supraciliary granules, postokulars, preanals, temporals, supratemporals, supralabials, sublabials, submaxillaries, gular scales, collar scales, ventrals, dorsals, femoral pores and number of scales between masseteric and supratemporals. Differences between sexes for each trait in each population were tested by Mann-Whitney U test in variables that are not normally distributed and by Student's t-test for normally distributed variables. Intrapopulation difference in extend of sexual dimorphism was expressed by Mahalanobis distance (D^2) between sexes for each population sample using only the traits in which difference between sexes was significant ($p < 0,01$). Correlation between D^2 and island size, its distance from mainland and channel depth between island and mainland were tested by Kendall tau since some variables are not normally distributed.

Results and Discussion

Difference between sexes was significant in body length, head measures, number of dorsal and ventral scales and number of femoral pores as already found by Wettstein



(1926), Kramer & Mertens (1938), Radovanovi (1956) and others. In most population samples the greatest discriminatory power between sexes (the lowest partial Wilk's lambda) was in body size (Table 1). D2 was smallest in mainland population (Fig. 1), indicating smallest intersexual differences. Only negative correlation between D2 and island size was significant ($p < 0,05$) (Table 2). It means that sexual dimorphism is higher on smaller islands.

On Istria mainland Italian wall lizard lives sympatric with other lacertid species

	Kendall tau	Z	p
D² / island size	-0,31	-2,27	0,02
D² /distance from mainland	-0,07	-0,52	n. s.
D² /channel depth between island and mainland	0,04	0,31	n. s.

Table 2: Correlation between D2 and island size, its distance from mainland and channel depth between island and mainland.

(*Podarcis melisellensis*, *Podarcis muralis*, *Lacerta viridis*, *Lacerta trilineata*, *Algyroides nigropunctatus*) while on the islands it is the only lizard species. It is likely that *P. sicula* on islands, in a situation of reduced interspecific competition, undergone a “competitiv release” (MacArthur, 1972; Schoener, 1967, Fuentes, 1981) and become more sexual dimorphic. In the situation of reduced inter-specific competition *P. sicula* expanded its resource base by becoming size-polymorphic. My results also support hypothesis that sexual dimorphism in size is more developed in relatively predator-free populations than in populations where predation risks are high (Williams, 1966). Sexual dimorphism in size in males entails a relative delay in the age of first reproduction. This trait is selected against when predator risks are high, as it is a situation in Istria mainland, where a lot of Italian wall lizard predator species are present (*Coluber viridiflavus*, *Coluber gemonensis*, *Malpolon monspessulanus*, *Coronella austriaca*, *Vipera ammodytes*, *Falco tinnunculus*, *Corvus sp.*, *Buteo buteo*, *Tyto alba*, cats, dogs, rats...). On the islands some of them are present only on bigger ones. On Sveti Juraj we found Western Whip Snake, one of the most important lizard predators. The rats (*Rattus sp.*) lives on Figarola (Henle in Klaver, 1986), Brelih (in litt.) found the cub of this species also on Sveti Ivan. During visits on other islands in years 1989-1999 we newer saw any lizard predator species. It is more likely that we overlooked some of the predator species, especially snakes, on bigger islands with dencevegetation then on smaller islands covered with only scarce herbal vegetation. Therefore I assume, that predation risks are high on mainland and higher on bigger than on smaller islands.

Conclusions

Because of reduced interspecific competition and predation risk sexual dimorphism in Italian wall lizard in western Istria is greater on islands then on mainland and also greater on smaller then on bigger islands.

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