

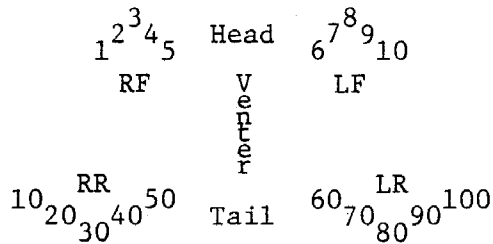
Size Classes, Sex Ratio, and Body Temperatures of
Sceloporus malachiticus at Monteverde, Costa Rica

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Sceloporus is a wide-ranging genus throughout North America, Mexico, and Central America. "Fence lizards" are common in many habitats and frequently occur on or around human habitations. Temperate species are seasonally active, but tropical species such as *S. malachiticus* are active year-round. Walter James' house in Monteverde, Costa Rica, supports an unusually high density of this species, and hence afforded the opportunity to study a (presumably) rather discrete population.

Methods

Individual *S. malachiticus* were captured by slip noose or by hand on 25-28 July, 1981. All captures occurred between 10:12 and 15:30. Deep cloacal (body) temperatures (T_b) were measured to the nearest 0.1°C with a Wesco quick-registering mercury thermometer, immediately after capture. Ambient temperatures (T_a) were recorded with a mercury thermometer placed exposed to the sun. T_a ranged between 21.0 and 27.0°C during times of capture. Snout-vent lengths were measured to the nearest mm. Body weights were measured to the nearest 0.5 g on a Pesola spring scale (0-100 g). The sex of each animal was determined based on the presence of enlarged post-anal scales in males. Each individual was toe clipped using the following system:



Some individuals captured were already toe clipped, presumably by Richard K. Laval, a Monteverde resident who has studied this population previously. Each individual was also given a unique mark with red nail polish to facilitate subsequent casual observations of behavior.

Results

A total of 40 individuals were captured and marked. This apparently represented a large proportion of the resident population on Walter James' house, and is considered a representative sample of the population in terms of size classes and sex ratio. Significantly more females ($N=29$) than males ($N=11$) were captured ($X^2= 8.10$; $0.01 > P > 0.001$). Size distributions are presented in Figure 1. Snout-vent lengths may be related to body mass by the following allometric equation:

$$SV(\text{mm}) = 30.99 M(\text{g})^{0.322} \quad N = 40; R^2 = 0.98$$

Considering juveniles (individuals < 65 mm SV (Fitch, 1973b, Fig. 15) and < 10 g), an even sex ratio was recorded. Considering individuals ≥ 65 mm and ≥ 10 g, which are probably all sexually mature, significantly more females ($N = 25$) than males ($N = 7$) were captured ($X^2 = 10.125$; $0.01 > P > 0.001$).

Body temperatures are presented in Figure 2, which includes only the first T_b recorded for each individual. Eleven individuals were recaptured once or twice. The range of T_b 's recorded in some individuals (e.g., 24.4 - 31.6, 24.3 - 35.4, 24.3 - 35.6, 24.4 - 36.3) was nearly as great as the range recorded among all individuals (22.5 - 37.7°C). There was no significant difference between either the mean or range of T_b 's recorded from males vs. females.

Discussion

Territoriality is prevalent among iguanid lizards (Stamps, 1977), and frequently one or more females live within the territory of an adult male. Most of the S. malachiticus captured on the James' house were adults (32 or 40). Among the eight juveniles, a 1:1 sex ration was found; however, among adults, 3.57 females per male were captured. Males of this population are probably defending territories larger than necessary to meet their energetic requirements (male territories appeared much larger than those of females), presumably for the purpose of mate acquisition. The James' house may represent an "island" of relatively more favorable habitat amidst a sea of pastures and forest. Basking sites (walls and roof) are abundant, predation is presumably reduced, and perhaps insects are superabundant at the house. During recruitment, juvenile males are apparently differentially excluded from entering the James' house population. This presumably results from resident males exhibiting increased territorial aggression towards juvenile males, as compared with their aggression towards juvenile females. The result is a skewed sex ratio among resident adults. Presumably then, mortality among juvenile males is greater than among juvenile females, although it is possible that the "excess" excluded males survive in surrounding, less favorable habitat.

Males were observed to display aggressively at other males and at females (presumably courtship). Females displayed aggressively towards other females. Juveniles were displayed at by both adult males and females. No quantification of social behavior was attempted; however, this would be a good subject for further study.

Inspection of Figure 2 demonstrates that some individuals were active at relatively low body temperatures (down to 22.5°C). Most individuals, however, maintained T_b 's between 34 and 38°C. Further, nine of ten T_b 's less than 26.0°C were recorded during the afternoon when it was overcast, and hence less favorable for thermoregulation. Therefore, the modal frequency (36.0 - 37.9°C) is perhaps most representative of the T_b that S. malachiticus attempts to maintain while active.

Literature cited

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Figure 1. Size classes and sex ratio of 40 Sceloporus malachiticus captured at Walter James' house, Monteverde, Costa Rica on 25-28 July, 1981.

Snout-Vent Length (mm)

Juvenile	45-54 mm	FFFFMMM	Range: 48 - 86 mm
	55-64 mm	M	
Adult	65-74 mm	FFFFFFFFF	
	75-84 mm	FFFFFFFFFFFFFFMMMMM	
	85-94 mm	FFFM	

Body Mass (g)

Juvenile	0-4.9 g	FFMM	Range: 3.5 - 23 g
	5-9.9 g	FFMM	
Adult	10-14.9 g	FFFFFFFFF	
	15-19.9 g	FFFFFFFFFFFFFFMMMM	
	20-24.9 g	FFFFFMMM	

Size	Number of		X ²	P	Sex Ratio
	Males	Females			
<65 mm, <10 g	4	4	0	-	1:1
≥65 mm, ≥10 g	7	25	10.125	<0.01	1:3.57

Figure 2. Body temperatures of Sceloporus malachiticus. All captures occurred between 10:12 and 15:30, and ambient temperatures ranged from 21.0 to 27°C.

Body Temperature (°C)	Sex	
22.0 - 23.9	FF	Range: 22.5 - 37.7°C
24.0 - 25.9	FFFMMM	\bar{X} : 32.72°C
26.0 - 27.9		Variance: 21.0092
28.0 - 29.9	M	Median: 34.45°C
30.0 - 31.9	F	Mode: 36.0 - 37.9°C
32.0 - 33.9	FFFFFMM	N: 40
34.0 - 35.9	FFFFFFFFMMM	
36.0 - 37.9	FFFFFFFFFFFFMM	