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Field and selected body temperatures of the San Lucan rock lizard (*Petrosaurus thalassinus*) in Baja California, Mexico

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Temperature is a fundamental factor in the ecology of reptiles because it affects growth, survival, and reproduction (Huey, 1982). Reptiles regulate their body temperature (T_b) by combining both behaviour and physiology (Hertz et al., 1982). Data on active T_b collected in the field are the basis for most studies of thermal biology in the herpetological literature (Avery, 1982). In contrast, selected body temperatures (T_{sel}) in laboratory conditions are less reported even though they often coincide with the temperature that maximizes physiological performance in the organism (Willmer et al., 2005). Knowledge of T_{sel} is therefore essential to understand the eco-physiology of organisms. Recently, T_{sel} was a central variable in a study of the effects of global warming on lizards (Sinervo et al., 2010). The aim of this study is to present data on body temperatures of *Petrosaurus thalassinus* (San Lucan rock lizard) in both field and laboratory conditions.

Petrosaurus thalassinus is a large oviparous, saxicolous and omnivorous lizard, which has a flattened body and is restricted to the Cape Region of Baja California Sur, Mexico (Grismer, 2002). The thermal ecology of this species is largely unknown (Brattstrom, 1965). Fieldwork was carried out during September 2019, in a sarcocaulescent shrubland and tropical dry forest near San Blas, Baja California Sur, Mexico (23.8617°N, 110.1627°W, WGS 84, 437 m in elevation; León de la Luz et al., 2000). The area has abundant rock outcrops of different sizes used by other saxicolous lizard species, such as *Ctenosaura hemilopha* and *Sceloporus hunsakeri*. We recorded T_b from 39 *P. thalassinus* individuals (11 adults [6 ♀ and 5 ♂], 11 subadults [4 ♀ and 7 ♂], and 17 juveniles [11 ♀ and 6 ♂]; age class according to Grismer [2002] and Goldberg and Beaman [2004]) that were captured by noose while they were basking or active. We did not find pregnant females and hatchlings were not considered in this study. The T_b was recorded using a digital thermometer (Fluke model 52-II) with the thermocouple introduced one centimetre into the cloaca. We characterized microhabitat temperature recording substrate temperature (T_s) at the exact point of observation and air temperature (T_a) 1 cm above the substrate where the lizard was captured.

In the laboratory, trials to measure T_{sel} were conducted one day after capture in a thermal gradient. The thermal gradient consisted of two chambers (150 cm long x 100 cm wide x 100 cm deep) each divided into 5 tracks with insulated barriers (35 cm height) and filled with 3 cm of gravel soil. The barrier walls prevented behavioural interference among adjacent lizards. Each lizard was allowed unrestricted movement within its individual track. The chambers were placed in a room with controlled temperature at 27 °C. Three 150 W lamps were placed at above one end the box to create a thermal gradient (26–48 °C) along the length of the chambers. The T_{sel} of 19 individuals (females= 10 and males= 9; >63 mm as selection criteria) was measured for two consecutive hours throughout the diurnal activity period (09:00-18:00 h). Two types of thermometers were used to simultaneously measure T_{sel} of lizards. First, T_{sel} was recorded from 14 individuals, every minute using ultra-thin T-type thermocouple wires (OMEGA 5SC-TT-T-40-72; diameter= 0.076 mm) affixed with medical tape to the lizard's venter and connected to an 8-Channel USB Thermocouple Data Acquisition Module (OMEGA TC-08; Paranjpe et al., 2012). Second, T_{sel} was recorded

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from 5 individuals from cloacal temperature every 20 min using a digital thermometer (Fluke model 52-II) with the sensor introduced one centimetre into the cloaca (Kirchhof et al., 2017). We used both methods to confirm that internal body temperature was represented accurately by ventral skin readings, following Kirchhof et al. (2017). All lizards were released at the site of capture following conclusion of all laboratory experiments.

In the field, all lizards were found on rocks. The mean snout-vent-length (SVL) was 73.3 mm (SD = 3.59, range = 50–158 mm) and the mean T_b was 36.1 °C (SD = 0.33 °C, range = 29.0–39.5 °C). The mean T_s was 32.7 °C (SD = 0.42 °C, range = 21.8–45 °C) and mean T_a was 29.4°C (SD = 0.76 °C, range = 25–33.9 °C). The T_b did not show a relationship with SVL (Linear Regression: r = 0.29, P = 0.07, N = 39) or body mass (Linear Regression: r = 0.22, P= 0.18, N = 37). A positive and significant correlation was found between T_b and the microhabitat temperatures (T_s and T_a) (Linear Regression: $T_b = 30.8 + 0.16T_s$, r = 0.42, P = 0.020, N = 39, based on T_s; $T_b = 26.35 + 0.33T_a$, r = 0.37, P = 0.007, N = 39, based on T_a). There were no statistically significant differences in mean T_b between sexes (t-test, t = 0.31, P = 0.758, N = 39). On the other hand, we did not find significant differences between the two types of thermometers used to measure T_{sel} ($F_{1, 19}$ = 0,0005, P = 0.99), therefore, we analysed both data as population values. The mean T_{sel} (N = 19) was 35.2 °C (SD = 0.06 °C, range = 25.6–42.8 °C). Interquartiles of T_{sel} were 32.7 (25%) and 37.7 °C (75%), respectively.

Our findings suggest that *P. thalassinus* uses thermoregulation strategies based on conduction and convection (Huey and Slatkin, 1976). The T_{sel} data suggest that *P. thalassinus* can be considered a eurythermic species due to the wide range of selected temperatures in this species. Our results suggest that *P. thalassinus* maintain similar T_b (36.1 °C) and T_{sel} (35.2 °C) to other phrynosomatids and closely related species, as reported by Soulé (1963) and Brattstrom (1965), who determined that T_b for this genus ranged from 32.6 to 38.5 °C, with an average of 35.6 °C. Finally, considering the species particular thermal requirements reported here, in addition to its limited distribution and marked habitat association, we encourage future studies to evaluate the thermal efficiency and thermal quality of the microhabitat, in order to understand the sensitivity to habitat alterations and possible consequences of climate change.

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