Thermoregulation of the lizard *Barisia imbricata* at altitudinal extremes

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Abstract. Ambient temperature is a primary factor affecting the physiology and activity of reptiles. Thermoregulation involves a series of mechanisms to maintain an organism's body temperature within a narrow range. The study of thermal ecology of lizards is relevant for understanding their distribution, life history, ecology and thermal requirements. Moreover, determining how species are able to attain physiologically active body temperatures in challenging environments is necessary for assessing the risk of extinction due to climate change, especially for threatened endemic species. We evaluated and compared the thermal ecology of two populations of the viviparous lizard *Barisia imbricata*, at contrasting elevations (2,200 and 3,700 m). We obtained variation in thermal data from winter through autumn for multiple years. We determined thermal efficiency indices based on field active body temperatures, preferred temperatures (in a thermal gradient), and operative environmental temperatures (according to null models). We also recorded substrate and air temperatures at the time of capture. Mean body temperature of both populations showed a positive correlation with environmental temperatures. We found significant seasonal differences in body temperature in both populations, and between body temperatures of the two populations. Our results suggest that *B. imbricata* is an eurythermic species and can thermoregulate actively at any given time. However, when environmental temperatures are within the range of preferred temperatures, the species does not engage in thermoregulatory behavior. This information expands knowledge on the range of possible thermal responses to environmental variation within a species.

Keywords: body temperature, eurythermic, seasonal variation, thermal efficiency.

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Supplemental material

Table S1. Number of organisms collected for category and for season of both populations. Means and Standard Deviations.

2,200 m	Juveniles *n* (T_b ± SD °C)	Pregnants *n* (T_b ± SD °C)	Females *n* (T_b ± SD °C)	Males *n* (T_b ± SD °C)
Spring	24 (20.5 ± 4.49)	0	4 (20.1 ± 5.45)	9 (22.7 ± 4.23)
Summer	10 (21.4 ± 5.38)	0	10 (22.1 ± 6.02)	6 (20.7 ± 5.96)
Autumn	10 (22.4 ± 5.22)	0	7 (17.6 ± 2.85)	8 (19.5 ± 3.78)
Winter	10 (18.2 ± 5.84)	0	5 (17.0 ± 9.03)	8 (17.2 ± 6.74)
3,700 m				
Spring	3 (22.0 ± 10.57)	10 (18.1 ±2.38)	12 (20.4 ± 6.92)	13 (17.8 ± 5.29)
Summer	3 (25.5 ± 4.12)	0	15 (24.3 ± 3.63)	10 (25.3 ± 4.69)
Autumn	4 (26.2 ± 2.80)	0	35 (26.4 ± 2.60)	19 (23.7 ± 5.71)
Winter	2 (27.3 ± 4.66)	4 (26.1 ± 1.95)	1 (20.4)	5 (23.64 ± 4.87)

Table S2. Comparison of distribution of effectiveness of thermoregulation for season, by Kolmogorov-Smirnov test.

2,200 m	**Spring**	**Summer**	**Autumn**	**Winter**
Spring	-	0.0236, $P = 0.972$	0.1706, $P < 0.01$	0.0970, $P < 0.01$
Summer	-	-	0.1582, $P < 0.01$	0.0859, $P < 0.01$
Autumn	-	-	-	0.0836, $P < 0.01$
Winter	-	-	-	-
3,700 m				
Spring	-	0.3212, $P < 0.01$	0.1470, $P < 0.01$	0.3370, $P < 0.01$
Summer	-	-	0.2080, $P < 0.01$	0.0986, $P < 0.01$
Autumn	-	-	-	0.2417, $P < 0.01$
Winter	-	-	-	-