

# Local Distribution and Thermal Ecology of Two Intertidal Fishes

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## **Abstract**

Geographic variability in the physiological attributes of widely distributed species can be a result of phenotypic plasticity or can reflect evolutionary responses to a particular habitat. In the field, we assessed thermal variability in low and high intertidal pools and the distribution of resident fish species *Scartichthys viridis* and transitory *Girella laevis* along this vertical intertidal gradient at three localities along the Chilean coast: Antofagasta (the northernmost and warmest habitat), Carrizal Bajo (central coast) and Las Cruces (the southernmost and coldest habitat). In the laboratory, we evaluated the thermal sensitivity of fish captured from each locality. The response to temperature was estimated as the frequency of opercular movements and as thermal selectivity in a gradient; the former being an indirect indicator of energy costs in a particular environment and the latter revealing differential occupation of habitat. Seawater temperature in intertidal pools was greatest at Antofagasta, and within each site was greatest in high intertidal pools. The two intertidal fish species showed opposite patterns of local distribution, with *S. viridis* primarily inhabiting the lower sectors of the intertidal zone, and *G. laevis* occupying the higher sectors of the intertidal zone. This pattern was consistent for all three localities. Locality was found to be a very important factor determining the frequency of opercular movement and thermal selectivity of both *S. viridis* and *G. laevis*. Our results suggest that *S. viridis* and *G. laevis* respond according to: (1) the thermal history of the habitat from which they came, and (2) the immediate physical conditions of their habitat. These results suggest local adaptation rather than plasticity in thermoregulatory and energetic mechanisms.

**Keywords:** Physiological diversity, Intertidal fish, Thermal sensitivity, Rock pool.