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Pilar Santidrián Tomillo, Keilor Cordero-Umaña, Verónica Valverde-Cantillo, 2024. [High thermal tolerance of egg clutches and potential adaptive capacity in green turtles](#)

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Abstract: Climate warming threatens sea turtles, among other effects, because high temperatures increase embryo mortality. However, not all species and populations are expected to respond the same way because they could have different thermal tolerances and capacities to adapt. We tested the effect of incubation temperature on egg mortality in a population of green turtles (*Chelonia mydas*) previously suggested to be less affected by extreme climatic events than others. We (1) assessed the relationship between temperature and hatching success, (2) defined an optimal range of temperatures that maximized hatching success and (3) assessed the variability in the response to temperature among clutches laid by different mothers, which could allow adaptation. Hatching success was consistently high in green turtle clutches with a skew toward high values, with 50 % of clutches having a success above 94 %. Yet, it was mildly affected by temperature, declining at both low and high temperatures. The optimal range of mean incubation temperatures was between ~30.5 °C and 32.5 °C. Current mean temperatures (31.3 °C) fall within the middle of the optimal range, indicating a potential resilience to further rises in mean nest temperature. Hatching success was best described by nest temperature and the interaction between female identity and temperature. This last predictor indicated a variability in thermal tolerance among clutches laid by different mothers and therefore, a capacity to adapt. The studied population of green turtles seems to be less vulnerable than others to climate warming. Understanding how different populations could respond to increasing temperatures could help complete the picture on the potential effects of climate change on sea turtles.

Keywords: Sea turtles, Hatching success, Nest temperature, Climate change, Resilience, Adaptation