

{rokbox title=|Olive ridley. Playa Grande :: Image: Trevor Proctor. Purdue University|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-tolerance-incubation-sea-turtle-hatching-santidrian-et-al-2024-thumb.jpg|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-tolerance-incubation-sea-turtle-hatching-santidrian-et-al-2024.jpg{/rokbox}

Matthew L. Rutledge, Frank V. Paladino, James R. Spotila and **Pilar Santidrián Tomillo**, 2024.
[Shifting thermal tolerance windows throughout incubation affects sea turtle hatching success: implications for hatchery management and conservation](#)

Marine Biology (2024) 171:94. <https://doi.org/10.1007/s00227-024-4417-2>

Abstract: Thermal conditions in the nest affect the development of sea turtle clutches, with high temperatures potentially reducing reproductive success and the quality of hatchlings. In a warming climate, increasing temperatures could become a threat to sea turtles in many locations. This has prompted the implementation or recommendation of climate mitigation strategies in nests that incubate in hatchery conditions. Here, olive ridley turtle (*Lepidochelys olivacea*)

) clutches relocated to a beach hatchery in Playa Grande, Costa Rica (10° 20 N, 85° 51 W) were used to study the effect of temperature on hatching success and hatchling size. Data from 5 nesting seasons (2017/18 to 2022/23, excluding 2020/21) were tested to determine the effect of mean incubation temperature by thirds of development, as well as over the whole incubation period. Hatching success was lower at low and high temperatures and higher at intermediate ones during the second and last thirds of development. Optimal mean temperature ranges were 29–32 °C and 32–35 °C across the second and last thirds of development respectively, and 30–32.5 °C during the whole incubation period. There was no statistically significant effect of temperature on hatching success during the first third of development. High temperature resulted in shorter carapace width but did not statistically affect mass or carapace length. The temperature effect on carapace width occurred in all thirds of development. Studying temperature effects on target species nests at the local level, throughout incubation, and over multiple years is important for applying climate mitigation strategies properly.

Keywords: Olive ridley, *Lepidochelys olivacea*, Hatching success, Climate mitigation, Hatcheries