

{rokbox title=|Empirical models from temperature-controlled rearing experiments performed on Atlantic bluefin tuna eggs and larvae :: Image: Authors|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-temperatura-puesta-atun-rojo-reglero-et-al-2018-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-temperatura-puesta-atun-rojo-reglero-et-al-2018.jpg{/rokbox}

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[Atlantic bluefin tuna spawn at suboptimal temperatures for their offspring.](#)

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Abstract: Life-history traits such as spawning migrations and timing of reproduction are adaptations to specific environmental constraints and seasonal cycles in many organisms' annual routines. In this study we analyse how offspring fitness constrains spawning phenology in a large migratory apex predator, the Atlantic bluefin tuna. The reproductive schedule of Atlantic bluefin tuna varies between spawning sites, suggesting plasticity to local environmental conditions. Generally, temperature is considered to be the main constraint on tuna spawning phenology. We combine evidence from long-term field data, temperature-controlled rearing experiments on eggs and larvae, and a model of egg fitness, and show that Atlantic bluefin tuna do not spawn to optimize egg and larval temperature exposure. The timing of spawning leads to temperature exposure considerably lower than optimal at all spawning grounds across the Atlantic Ocean. The early spawning is constrained by thermal inhibition of egg hatching and larval growth rates, but some other factors must prevent later spawning. Matching offspring with ocean productivity and the prey peak might be an important driver for bluefin tuna spawning phenology. This finding is important for predictions of reproductive timing in future climate warming scenarios for bluefin tuna.

Keywords: phenology, temperature, large migratory fish, apex predator, reproduction, bluefin tuna