

{rokbox title=[a] Capture, on a barbless hook, of a juvenile Atlantic bluefin tuna (approx. 500g in mass) and placement into a Steffensen-type swim tunnel respirometer (volume 90 L) :: Image: Authors|thumb=[images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-swimming-respirometry-provides-reglero-2026-thumb-et-al.jpg]}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-swimming-respirometry-provides-reglero-2026-et-al.jpg{/rokbox}

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Swimming respirometry provides insights into the physiological energetics of juvenile Atlantic bluefin tuna *Thunnus thynnus*

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Abstract: Swimming respirometry was performed on juvenile (age 0+) Atlantic bluefin tuna, mass 565 ± 90 g (mean $\pm$ s.d., $n=6$), to measure elements of respiratory metabolism and exercise performance. At 19°C, the mean standard metabolic rate (106 ± 48 mg O₂ h⁻¹) maximum metabolic rate (555 ± 51 mg O₂ h⁻¹) and absolute aerobic scope (449 ± 83 mg O₂ h⁻¹) were lower than mass-corrected rates of adult Pacific bluefin, but considerably higher than values in other active sympatric Mediterranean fishes at similar mass and temperature. The tuna ceased swimming at a speed of 2.0 ± 0.2 body lengths s⁻¹ (BL s⁻¹). Video analysis revealed that the juvenile tuna cruised spontaneously at 3.1 ± 0.6 BL s⁻¹ ($n=8$) in their rearing tank, significantly faster than achieved in the tunnel. Extrapolation of respirometry data to 3 BL s⁻¹ estimated a routine metabolic rate for swimming of over 650 mg O₂ h⁻¹. The results indicate that juvenile Atlantic bluefin tuna are high performance animals with elevated metabolic costs for their lifestyle of ceaseless swimming.

Keywords: Atlantic bluefin tuna, Kinematics, Routine metabolic rate, Spontaneous activity, Standard metabolic rate, Swimming respirometry