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[Effects of temperature on embryonic development of Atlantic bluefin tuna \(*Thunnus thynnus*, L 1758\) and Atlantic bonito \(*Sarda sarda*, Bloch 1793\)](#)

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Abstract: Temperature is the most important abiotic factor controlling the very early life of fish. Data on development, hatching, and survival responses of fertilized fish eggs to varying temperatures are essential to understand fitness of Atlantic bluefin tuna (ABFT) and Atlantic bonito (AB). In this study, we investigated i) the effect of temperature on viable hatching rate and ii) the relationship between temperature and the timing necessary to reach different developmental stages. Our findings show that the thermal range for viable egg hatching is colder in AB than in ABFT. ABFT eggs hatch from 18 to 33 °C, highest around 26–27 °C; below 21 °C or above 30 °C at least 50% of the hatched larvae were abnormal, while below 19 °C and above 32 °C the larvae had no chance to survive, having highest survival chance at around 26 °C. In AB, eggs hatched from 16 °C to 28 °C, being optimal around 21–22 °C, the incidence of abnormal larvae was very high above 27 °C and at 16.5 °C, and larvae had no chance to survive above 28 °C and had the highest survival chance at around 21 °C. ABFT eggs required longer times to hatch than other tuna species. The results obtained in this study are an important tool for aquaculture; here, we describe the best temperature conditions for successful and viable hatching in ABFT and AB, which may help to improve modelling tools and to develop better indices of annual recruitment and the possible impact of future global temperature changes.

Keywords: Tuna, Bonito, Temperature, Embryo, Development