



## Use of bomb radiocarbon to validate otolith section ages of red snapper *Lutjanus campechanus* from the northern Gulf of Mexico

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**ABSTRACT:** The red snapper *Lutjanus campechanus* is an important recreational and commercial fish species in the northern Gulf of Mexico. Management approaches have varied in part because of uncertainty of their longevity. Snapper ages have been based on presumed otolith annuli; however, this methodology has not been validated for all age classes. A recent technique to validate otolith age utilizes the increase in oceanic  $^{14}\text{C}$  resulting from atmospheric testing of nuclear bombs during the 1950s and 1960s. Analyses of annuli from living corals and fish otoliths from 1900 to the present have documented that elevated  $^{14}\text{C}$  input has occurred throughout the world's oceans. We validated otolith section age estimates through accelerator mass spectrometry analysis of bomb-produced  $^{14}\text{C}$  in red snapper (otoliths) hatched before, during, and after the nuclear testing periods. Delta  $^{14}\text{C}$  data from the otoliths of red snapper with presumed birth dates between 1960 and 1973 clearly reflect the sharp increase in oceanic radiocarbon attributable to previous nuclear testing. Similarities between the otolith and nearby coral  $^{14}\text{C}$  chronologies suggest that annulus-based age estimates of red snapper are valid on average to within 1-3 yr. In addition, this study provides the first carbonate bomb radiocarbon time series from the northern Gulf of Mexico.

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