Scientists Find new migratory patterns for Mediterranean and Western Atlantic bluefin tuna

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New research into the life cycle of Atlantic bluefin tuna shows, for the first time, that Mediterranean and North American bluefin mix substantially as juveniles, but return to their place of birth to spawn. These new research findings have critical implications for how bluefin tuna are managed on both sides of the Atlantic.

Research appearing in the journal *Science* by a team of scientists led by Dr. Jay Rooker of Texas A&M University and Dr. David Secor of the University of Maryland Center for Environmental Science, draws three important conclusions about tuna migratory patterns. When combined, these conclusions provide a strong foundation for revising fisheries management measures in place for Atlantic bluefin tuna.

First, the study shows that juveniles that begin their lives in either North American coastal waters or the Mediterranean Sea are destined to return to these regions to spawn as adults (North American bluefin tuna spawn in the Gulf of Mexico). Secondly, juvenile bluefin tuna from the Mediterranean Sea show up in substantial numbers in North American fisheries. Finally, commercially harvested bluefin (commonly called "giants" and weighing over several hundred pounds) in New England and Canada are comprised almost exclusively of fish that originated from North America.

"We have learned that U.S. recreational fisheries focusing on small

bluefin tuna are heavily subsidized by Mediterranean fish. North American commercial fisheries, on the other hand, depend exclusively on fish that are spawning in the Gulf of Mexico," said Secor. "Juveniles are not conforming to the principal premise of how they've been managed – that fish keep to their own side of the Atlantic. This could be particularly troubling if North American juveniles head to the Mediterranean. High exploitation there might mean that few make it back. Evaluating where Mediterranean juveniles originate should be our next highest priority."

The authors use a novel approach to investigate migratory behaviors. "We examined the chemical composition of the fish's ear stone—the otolith—to identify individuals from different nurseries," said Rooker. "Chemical signatures in the form of stable carbon and oxygen isotope ratios served as a 'birth certificate' and we used these natural tags to determine the origin of adolescent and adult bluefin tuna from several spawning and foraging areas." The international study relied upon bluefin tuna collections made throughout the Mediterranean, Gulf of Mexico, and U.S. and Canadian Atlantic waters.

It is well known that breeders often return to their place of origin but this study is the first to document natal homing for a large, highly migratory fish. "Our study clearly shows that bluefin tuna possess remarkable natal homing abilities that rival those of Pacific salmon and migratory birds. Nearly all of the adults from both the Gulf of Mexico and Mediterranean Sea returned to their place of origin to spawn," noted Rooker.

This new information comes at a time when most bluefin tuna fisheries are in steep decline and global fishery managers are preparing for the annual meeting of the International Commission for the Conservation of Atlantic Tunas (ICCAT) November 17 in Morocco. A significant portion of the meeting will address diminishing stocks and ways to better

manage the economically vital species. In a recent independent review by international experts, ICCAT received strong criticism for past mismanagement of bluefin tuna fisheries, specifically those in the eastern Atlantic and Mediterranean.

Source: University of Maryland Center for Environmental Science