Insights in the Stock Mixing Dynamics of Atlantic Bluefin Tuna in the North Atlantic [†]

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†   Presented at the IX Iberian Congress of Ichthyology, Porto, Portugal, 20–23 June 2022.
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Abstract: Effective fisheries management requires accurate stock identification, which can be challenging in mixed stock fisheries such as the Atlantic bluefin tuna (*Thunnus thynnus*). This species is currently managed considering two stocks known to spawn in the Mediterranean Sea and Gulf of Mexico, respectively. However, recent studies have shown that individuals from both spawning components can interbreed at a recently discovered spawning ground, located in the Slope Sea. A better understanding of the mixing patterns, as well as the proportion in which both stocks interbreed in the Slope Sea are valuable for a reliable Atlantic bluefin tuna stock assessment. With this aim, we assigned genetic origin of 2000 individuals captured at feeding aggregates across the North Atlantic using a 96 SNP panel and analyzed the genetic profile of 500 individuals including 200 potential Slope Sea spawners (i.e., spawning capable individuals captured in this area at the spawning season), using a 8000 SNP array. We confirmed that stock mixing occurs across different feeding aggregates in the North Atlantic, being stronger in the Northwest Atlantic, where the Mediterranean component was a majority at some locations within and near the Slope Sea spawning ground. The analysis of Slope Sea spawner candidate individuals showed nearly equal representation from both Mediterranean and Gulf of Mexico genetic origin individuals, suggesting similar contribution to the Slope Sea origin offspring. Our findings constitute an important progress towards the understanding of the Atlantic bluefin tuna stock mixing dynamics and the relevance of the recently discovered Slope Sea spawning ground for the conservation of the species.

Keywords: Atlantic bluefin tuna; stock mixing dynamics; genetic assignment

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.