

Preliminary assessment of common dolphinfish (*Coryphaena hippurus*) trophic ecology across ocean basins

Evaluación preliminar de la ecología trófica de la lampuga común (*Coryphaena hippurus*) en las cuencas oceánicas

Évaluation préliminaire de l'écologie trophique de la coryphène commune (*Coryphaena hippurus*) dans les bassins océaniques

ALEXANDRA PROUSE¹, BRENDAN GOUGH¹, ANTONIETTA QUIGG^{1,2,3}, JAY ROOKER^{1,3}

¹Department of Marine Biology, Texas A&M University at Galveston, 1001 Texas Clipper Road, Galveston, Texas, U.S.A. 77554. (alexandrayard@tamug.edu), (quigga@tamug.edu), (brendan526@tamug.edu), (rookerj@tamug.edu)

²Department of Oceanography, Texas A&M University, 797 Lamar Street, College Station, Texas, U.S.A. 77843. (quigga@tamug.edu)

³Department of Ecology and Conservation Biology, Texas A&M University, 534 John Kimbrough Boulevard, College Station, Texas, U.S.A. 77843(quigga@tamug.edu), (rookerj@tamug.edu)

EXTENDED ABSTRACT

Trophic relationships within marine food webs regulate energy transfer from primary producers to high level consumers, and changes in foraging patterns of consumers can influence ecosystem stability and resiliency (Bornatowski et al. 2018). Pelagic predators, such as common dolphinfish (*Coryphaena hippurus*), have high economic value but also influence the structure of coastal and offshore communities and associated food webs through top-down control (Collette et al. 2011). Stable isotope analysis, a widely used trophic ecology tool, can elucidate source(s) of organic matter supporting pelagic predators as well as their trophic position (Richards et al. 2020). In addition, regional variability in these dietary signatures may indicate broad foraging habits in trophic relationships and food web structure across regions or ocean basins. The purpose of the present study is to assess trophic relationships of the common dolphinfish at the ocean-basin scale using two common dietary markers: $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$. Common dolphinfish muscle biopsies were collected from the Gulf of Mexico (n = 52), Caribbean Sea (n = 26), Pacific Ocean (n = 20), and Atlantic Ocean (n = 45) (Figure 1). Biopsies were freeze dried, powdered, and tinned for $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ analysis at University of California - Davis Stable Isotope Facility.



Figure 1. The four sampling regions for common dolphinfish in 2021: Gulf of Mexico, Caribbean Sea, Atlantic Ocean, and Pacific Ocean.

Preliminary results indicated that regional variation in both dietary markers was pronounced and influenced by the size/age of individuals (Figure 2). Values for individuals from the Pacific Ocean were distinct from all three regions in the Atlantic basin. Our findings are suggestive of a consumer with a high degree of trophic plasticity or breadth, which may allow this

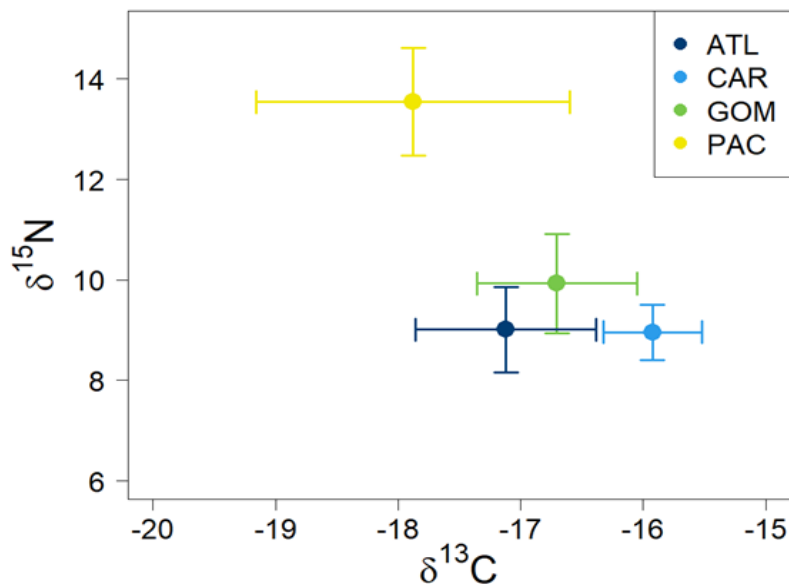


Figure 2. Mean \pm SD $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ biplot for common dolphinfish sampled during 2021 in four regions: Atlantic Ocean (ATL), Caribbean Sea (CAR), Gulf of Mexico (GOM), and Pacific Ocean (PAC).

species to opportunistically exploit a wide range of prey to promote their existence in tropical and temperate waters at the global scale. Further analysis utilizing compound specific stable isotope analysis of amino acids (CSIA-AA) will help elucidate specific sources of organic matter and/or foraging differences for dolphinfish in these regions.

KEYWORDS: dolphinfish, trophic ecology, ocean-basin scale

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