

5th International Conference on

OCEANOGRAPHY AND MARINE BIOLOGY

October 18-20, 2017 Seoul, South Korea



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Environmental effects on abundance of albacore tuna (*Thunnus alalunga*) off the west coast of North America

North Pacific albacore (*Thunnus alalunga*) are a highly migratory species. They start to mature at 5 years of age. Spawning occurs in tropical and sub-tropical waters between Hawaii and the east coast of Taiwan and the Philippines primarily in March and April. Juvenile albacore undertakes trans-Pacific movements between western and eastern Pacific Ocean. There has been a long history of exploitation of albacore tuna by many countries in the North Pacific Ocean. The Canadian tuna fishery catches juvenile albacore of 2-4 years of age using troll gear along the North American coast, primarily from the southern Oregon coast to the northern tip of Vancouver Island. The fishing season lasts from May to October with the peak of fishing effort in August and September. Canadian catches varied considerably primarily due to changes in albacore abundance. I used the catch rate (mean annual catch per vessel-fishing day) as an indication of the abundance. I examined impacts of local water temperatures and two climatic variables, the Pacific Decadal Oscillation (PDO) and the North Pacific Gyre Oscillation (NPGO), on the fluctuation of albacore abundance off the west coast of North America. The PDO is the dominant mode of variability of North Pacific sea surface temperature anomalies, while the NPGO closely reflects inter-annual and decadal variations in salinity, nutrient upwelling and surface chlorophyll-a in the Northeast Pacific. Mean water temperature in the fishing area during July-September was not found to be correlated with the abundance, statistically. The PDO, however, had a statistically significant ($p < 0.05$) negative impact on the abundance with a lag period of 2 and 3 years. The NPGO had statistically significant positive impact on the abundance with a lag period of 2, 3 and 4 years. The current study helps in studying mechanisms of albacore recruitment fluctuations.

Biography

Zane Zhang has his expertise in stock assessment of fish population dynamics and environmental impacts on fished populations. He has used statistical models to provide scientific advices to fisheries managers, playing some key roles in successful management of several fishing stocks.

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