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Plankton fatty acids and planktivorous fishills: Do dietary omega-3s control acclimation to decreasing temperature?

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Temperature change affects remodelling of cell membrane phospholipids in poikilothermic organisms to maintain constant cell membrane viscosity. Rapidly decreasing temperature demands rapid remodelling, and often forces poikilotherms to promptly acclimatize to a lower thermal regime. Recently published research provide evidence suggesting that dietary omega-3 fatty acid content may have a profound impact on the ability of filter-feeding Atlantic menhaden to acclimatize to a rapidly cooling environment. Temperature profiles and micro-plankton records preceding several major 2015 menhaden fishkills in the northeast United States provide additional evidence that particular omega-3 dietary fatty acids found in micro-plankton may control acclimatization to decreasing temperature in this species.

Biography

Sixto E. Portilla began his graduate studies in 1996 in water resources; earning a Master of Science degree in Environmental Engineering from Manhattan College. He began studying estuarine ecology in 2007, and shortly afterwards, in 2008, began his doctoral work at the City University of New York. A series of his recent publications articulate the role of two dietary omega-3 fatty acids, EPA and DHA, abundant yet variable in our local phytoplankton, in facilitating successful acclimation of the filter feeding bivalve, Mercenaria mercenaria, to decreasing temperature. In 2015 he began investigating the environmental factors preceding historic fishkills of Atlantic menhaden, Brevoortia tyrannus, some claiming 100s of thousands of fish per event, through the lens of cell membrane homeoviscous adaptation. His presentation today describes the development of a theory linking diet and decreasing atmospheric temperature to these massive menhaden fishkills.

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