

## ABSTRACT

## Population Dynamics of Benthonic Foraminifera in Mangal Swamps and Marshes

Ashley-Rose Costelloe

Foraminiferal population dynamics of tropical mangal swamps in Trinidad were investigated at Caroni Swamp (March 2011 to May 2013) and Claxton Bay (July 2012 to 2013). These were compared to population dynamics of temperate, UK marshes: Cowpen Marsh (May 1995 to 1996) and Brancaster Marsh (November 1995, March, May and August 1996). The seasonality of live foraminiferal densities (LFDs) was examined by statistical comparisons of monthly LFDs within seasons, time series analysis (TSA), cross correlations with abiotic variables, the assemblage turnover index (ATI) and conditioned on-boundary index (CoBI). The foraminiferal metacommunity (all stations) were examined along with the foraminiferal assemblages (groups of stations populated by similar species) defined by cluster analysis.

Foraminiferal population dynamics of the temperate intertidal environments displayed seasonal population growth in warmer seasons (summer and spring) and decline in cooler seasons (autumn and winter). For example, TSA of the Cowpen Marsh metacommunity and assemblages displayed intra-annual periodicity and population growth occurred in warmer months. Major assemblage turnovers (measured by ATI) coincided

with seasonal change, and turnovers at higher elevations coincided with summer and that of lower elevations coincided with spring and winter.

At the tropical intertidal environments, population growth was aseasonal and TSA displayed random fluctuations but peak ATIs, indicating major assemblage turnovers, coincided with seasonal change. At Claxton Bay, preferential growth of agglutinated species occurred during the dry season and of calcareous species during the wet season. This pattern was related to higher sediment OC and lower sediment pH concentrations during the wet season. However, at Caroni Swamp, the seasonal assemblage turnovers of 2011 to 2012 were not reproduced in the following year, and neither agglutinated or calcareous species showed seasonal preference.

The population dynamics of intertidal foraminiferal communities at one location cannot be inferred for another location with geographic differences that may result in different hydrodynamic features, such as flushing and retention times. It is recommended that natural fluctuations in tropical foraminiferal communities, which may or may not be related to seasonality, be accounted for by implementing seasonal sampling schedules. Long-term regime shifts caused by either anthropogenic activity or climate change can then be confidently differentiated from short-term fluctuations that occur due to natural changes in environmental conditions.

Keywords: Ashley-Rose Costelloe, foraminifera, intertidal, seasonal, trends, Trinidad