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192-10 - HOLOCENE TREMATODE PARASITE PREVALENCE AMONG SHALLOW MARINE BIVALVES LINKED TO HIGHER, MORE STABLE TEMPERATURES

Tuesday, 11 October 2022

4:10 PM - 4:25 PM

Colorado Convention Center - Mile High Ballroom 4A

Abstract

How are parasitism and disease likely to respond to anthropogenic climate and environmental change? The prevalence of Holocene complex life cycle digenean trematode parasites among bivalve mollusk hosts in deltaic and estuarine environments has been linked to sea-level rise on centennial and millennial time scales. Previous efforts have ruled out the influence of changing salinity, diversity, community structure, and taphonomy on this pattern but, until now, we have not been able to address the role of temperature. We serially sampled shell carbonate along the dorso-ventral growth axis (in an offset stair-step pattern for nearly continuous sampling across the valve) of 51 specimens of *Chamelea gallina* collected from Middle to Late Holocene core samples from the Po plain and modern death assemblages from the northwest Adriatic coast (Italy). We measured the $\delta^{18}O$ and $\delta^{13}C$ values of these samples and compiled published data from three modern locations in the Adriatic resulting in data for 1,297 samples from 57 valves. At the geographic scale of observation, variation in $\delta^{18}O$ and $\delta^{13}C$ values can be explained as negative excursions in proximity to freshwater and terrestrial organic matter input. At the individual scale of observation, many valves display cyclic variation in $\delta^{18}O$ values that we interpret primarily as annual temperature variation. We constructed a Generalized Linear Model (GLM) to relate the stable isotope values of individual valves to the parasite prevalence values of the samples from which they were derived. Trematode prevalence is significantly correlated with median $\delta^{18}O$ values (-), the range of $\delta^{18}O$ values (-), and the correlation values between $\delta^{18}O$ and $\delta^{13}C$ within a valve (+). We interpret these results to indicate that trematode prevalence is associated with higher, stable temperatures (and to a lesser extent freshwater input), consistent with the hypothesis that increasing global temperatures can lead to an increase in the prevalence of parasites and disease.

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