Impacts of ocean acidification on otolith development in larval *Haemulon chrysargyreum*

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The ocean has absorbed approximately 30% of anthropogenic CO_2 emissions, contributing to the process of ocean acidification. Increasing pCO_2 reduces pH and affects the dissolved inorganic carbon balance of the surface ocean. Ocean acidification is expected to have myriad consequences for calcifying biota, including impaired mineralization of calcified structures and dissolution of existing structures. To date, most research has investigated the effects of ocean acidification on externally calcified taxa, while comparatively little considers its effects on internal calcifiers. Of particular interest is the mineralization of (internally calcified) otoliths in teleost finfish. In fish, otoconial malformation is associated with behavioral abnormalities, and removal of otoliths impairs navigation. Thus, ocean acidification could have profound consequences for hearing and gravisense. Previous research focused on otolith morphology and mineralization in larval clownfish reared in high pCO_2 treatments, and observed increasing sagittae circularity and decreasing perimeter and area with increasing pCO_2. This study investigates the morphological development of otoliths in the Caribbean reef fish *Haemulon chrysargyreum* (Günther, 1859) under acidified conditions. Using a novel method for pH-stat CO_2 dosing controllers, we reared fish in four pCO_2 treatments for approximately 30 days until settlement. We extracted and imaged otoliths with both stereomicroscopy and scanning electron microscopy. We analyzed stereomicrographs for circularity, area, and perimeter with custom computer software. We analyzed scanning electron micrographs qualitatively for crystal core development. We observed decreasing somatic growth, increasing circularity of sagittae and asterisci, and decreasing circularity of right lapilli with increasing pCO_2. Our study represents the longest trial of its kind ever conducted for a reef fish, and the first of its kind to observe an effect of acidification on asterisci in fish of any type.