Hemichordata: Enteropneusta (acorn worm) seasonal effects on the organic matter and nutrient dynamics witin the coral reef ecosystem

PE-21 ***Hemichordata: Enteropneusta*** **(acorn worm) seasonal effects on the organic matter and nutrient dynamics within the coral reef ecosystem**

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Bioturbation is often associated with soil enrichment as a result of elemental turnover and increased organic matter (OM) degradation. However, if a bio-turbating organism can also "impoverish" OM rich environments, then it can aid in maintaining the biogeochemical balance within oligotrophic ecosystems, such as the coral reef. In Bise, Okinawa, Japan, acorn worms are found in high densities in the sandy beach, seagrass and coral and seagrass environments. As such, we assert that the acorn worm acts as a "biopurifier," and impoverishes the coral reef ecosystem of excess nutrients and OM.

By sampling sediments in areas not inhabited by the acorn worm, near the fecal casts and fecal casts of the acorn worm, we seasonally assessed the impact of the acorn worm on the organic matter composition and nutrient cycle within the coral reef ecosystem. Regardless of season, the fatty acid (FA) content in the beach sediments was consistently less in fecal casts than in areas not inhabited by the acorn worm. In addition, C:N ratios did not significantly vary between areas in each habitat, during the fall season (5.4-9.0). However, during the winter, the C:N ratio was significantly larger in the fecal cast sediments of all habitats (8.2-8.6) in comparison to the near fecal cast, and uninhabited sediments (7.1-8.1). Nutrient analyses of the sediment and water column as well as FA biomarker assessment confirmed acorn worm diet and subsequent effect on the surrounding environment is highly dependent on season and habitat. As such, these results confirm that acorn worms have the ability to assimilate 'useful' OM and subsequently biopurify its surrounding sediments. In addition, the overall nitrate concentration shows acorn worm presence can mitigate the release of nitrates into the water column and sediments. Thus, the acorn worm aids in the facilitation and maintenance of the biogeochemical balance within the coral reef ecosystem.

Keywords: biogeochemical cycle, fatty acids, bio-markers