# Unsuspected dietary habits of hydrothermal vent shrimp: bacterivorous *Rimicaris hybisae* can be carnivorous or even cannibalistic

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Two hydrothermal vent fields have been described at the ultra-slow spreading ridge of the Mid-Cayman Rise (MRC), including the world's deepest (Piccard ~4985m) and the nearby Von Damm vent field (~2300m). Both vent fields support a localized high-biomass. The food web has chemoautotrophic bacteria at the base and includes bacterivorous shrimp as well as carnivores: shrimp and anemones.

The alvinocaridid shrimp *Rimicaris hybisae* is abundant at both vent fields and shows spatial variability in population structure. So far it has been considered bacterivorous. Large variations in tissue $\delta^{13}C$ values remained largely unexplained, and it has been argued that $\delta^{13}C$ values are not a good food web tracer in hydrothermal vent ecosystems.

We observed that shrimp tended to be either in dense aggregations on active chimneys, or more sparsely distributed and peripheral in (near) ambient temperatures. With the hypotheses that varying $\delta^{13}C$ values show real differences in food sources and that shrimp in different locales might have different diets, we collected shrimp from both environments at the Von Damm site during an Ocean Exploration Trust Expedition with E/V Nautilus (NA034, 08/2013) and examined their gut contents.

Gut contents of all shrimp from dense aggregations consisted of white, amorphous material that resembled bacteria. Sparsely distributed shrimp (~1m from dense aggregations) had guts filled with fragments of crustacean exoskeleton, a mixture of bacteria-like material and crustacean exoskeleton, or bacteria-like material only.

We analyzed stable isotope compositions of the shrimp and their gut contents. Shrimp $\delta^{13}C$, $\delta^{15}N$ and $\delta^{34}S$ values reflect those of their gut contents +1 trophic level. Sparse shrimp have dramatically lower $\delta^{13}C$ and $\delta^{34}S$ values, and slightly elevated $\delta^{15}N$ values, in comparison to dense shrimp. Sparse and dense *R. hybisae* clearly have different diets. Ongoing work is determining what exactly is this crustacean food source, whether diet changes occur during life history, and if this is linked to the molting cycle.