The Effects of Zequanox on the Eastern Elliptio (Elliptio complanata)

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D. polymorpha and other invasive bivalves are causing a myriad of ecological and economic problems; many treatments have either failed or led to native mussel mortality. Marrone Bio Innovations created Zequanox, which contains a killed strain of Pseudomonas fluorescens (Pf-CL145A) to exterminate invasive bivalves without harming native species by targeting the epithelial cells in their digestive system. Numerous studies have concluded that Zequanx doesn't cause mortality in native mussels, so I wanted to see if it causes cellular stress. I added Zequanox of varying concentrations to six 10-gallon tanks, each with four E.complanata. Two tanks were my controls with no Zequanox added (0 ppm); two had half the recommended dosage of Zequanox (100 ppm); and two had the recommended dose (200 ppm). After an 8-hour exposure, I performed a Lysosomal Assay using Ringwood et al. (2003) as my reference. After scoring a minimum of fifty cells per sample, I calculated the percentage of destabilization. The highest amount of destabilization was 20%, which, according to Ringwood et al. (2003), is in the normal range. Meaning, although there is cellular stress, there's not enough to be cause for concern, so Zequanox is not only effective but I would also deem it safe for use in the environment. This is important because most treatments before this have either failed or wiped out all living mussels, including the native ones. In the future, I'd love to study the anatomical differences between native and non-native species and how that might affect treatments.

Awards Won:

NC State College of Engineering: Alternates (not read aloud)