

Protecting Pearl Harbor: Sequencing Native and Invasive Anthozoans to Identify Presence of Invasive Species

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Invasive Anthozoan species, including the Octocorallia *Unomia stolonifera* and *Capnella*, and the Hexacorallia *Fimbriaphyllia paraancora*, *Rhodactis*, and *Anemonia manjano*, are proliferating within Pearl Harbor, Hawaii, posing a significant threat to native coral ecosystems. Notably, *U. stolonifera* exhibits rapid growth, displacing indigenous Hawaiian corals and obstructing navigational channels for the Navy. The absence of a significant genetic database for Hawaiian Anthozoans impedes effective species monitoring. This study aims to establish a database reference library utilizing targeted gene sequencing to facilitate species identification. Due to the slow evolutionary rates characteristic of Anthozoan cnidarians, developing species-specific eDNA markers present a challenge. To construct the database, DNA was extracted from tissue samples, and the mitochondrial Cytochrome Oxidase I (CO1) and *MutS* genes, along with the nuclear 28S rRNA gene, were amplified using PCR. Sanger sequencing was performed on successful amplicons. Initial CO1 sequence analysis revealed insufficient interspecific divergence for reliable identification. The *MutS* gene demonstrated greater differentiation, but with primer inconsistencies and limited applicability to only Octocoral species. Amplifying the 28S gene is a new approach that needs more optimization. Further sequencing efforts and expanded sample collection are necessary to construct a robust genetic database. This database will be crucial for monitoring invasive Anthozoans and safeguarding endangered native reef species through eDNA surveying.

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