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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