Comparing Sampling Techniques and Loci for Determining Limu (Algal) Diversity of the Intertidal Using eDNA

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OPIHI is a participatory science project where students survey the rocky intertidal, a unique coastal system in Hawai‘i connecting land and sea, to identify limu (algae) visually. Native limu holds a significant role in the culture and heritage of Hawai‘i. However, traditional limu practices have declined due to urban development, unsustainable harvesting, the introduction of invasive species, and climate change. Analysis of eDNA, genetic material shed from organisms, is often used to determine biodiversity and identify algae in water at Le?ahi Intertidal Bench. Hawai?i Limu 18S, 23S, and CO1 region DNA sequences were compiled from multiple databases into separate ULS eDNA Limu Databases, compared with those found visually by OPIHI surveys. The eDNA results from water samples collected in July and December 2025 and February 2026 from the Le?ahi Intertidal Bench indicate the presence of DNA, showing that the active sampling technique is effective and reliable for validating OPIHI data. From the July and December passive samples, there were more species found than in the active filtration ones. Additionally, the DNA algae extracts were processed, and 7 novel 23S limu extract sequences were identified, which will be submitted to GenBank to help build a more robust database of publicly available sequences. A collection of eDNA through passive and active filtration will expand knowledge of primers suitable for eDNA collection and the similarities of filtration methods.

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