

RESEARCH ARTICLE

Who's there? – First morphological and DNA barcoding catalogue of the shallow Hawai'ian sponge fauna

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Data Availability Statement: All sponge specimens morphological descriptions data are within the paper and its Supporting Information files, whereas the new DNA barcoding sequences have been submitted to GenBank (<https://www.ncbi.nlm.nih.gov/genbank/>), and the accession numbers for the 2 marker genes of all the specimens sequenced are given in the paper, and are: Batch COI: KY565269 - KY565305 and Batch Ribosomal: KY565306 - KY565338.

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Abstract

The sponge fauna has been largely overlooked in the Archipelago of Hawai'i, notwithstanding the paramount role of this taxon in marine ecosystems. The lack of knowledge about Porifera populations inhabiting the Hawai'ian reefs limits the development of ecological studies aimed at understanding the functioning of these marine systems. Consequently, this project addresses this gap by describing the most representative sponge species in the shallow waters of the enigmatic bay of Kane'ohe Bay, in O'ahu Island. A total of 30 species (28 demosponges and two calcareous sponges) living associated to the reef structures are here reported. Six of these species are new records to the Hawai'ian Porifera catalogue and are suspected to be recent introductions to these islands. Morphological descriptions of the voucher specimens are provided, along with sequencing data of two partitions involving the mitochondrial cytochrome oxidase subunit 1 (COI) marker and a fragment covering partial (18S and 28S) and full (ITS-1, 5.8S and ITS-2) nuclear ribosomal genes. Species delimitations based on genetic distances were calculated to validate how taxonomic assignments from DNA barcoding aligned with morphological identifications. Of the 60 sequences submitted to GenBank ~88% are the first sequencing records for the corresponding species and genetic marker. This work compiles the first catalogue combining morphological characters with DNA barcoding of Hawai'ian sponges, and contributes to the repository of public databases through the Sponge Barcoding Project initiative.

Introduction

The Hawai'ian Archipelago lies near the centre of the north tropical Pacific Ocean. It is the most isolated land area in the world: >4300 km from North America and the South Pacific continental lands and >6400 km away from Japan. Hawai'i is actually one of the regions with the highest levels of endemism [1]. Prior to the arrival of Europeans in 1778, the biota was