

KA PILINA O NĀ HĀ‘UKE‘UKE

A Study of the Size and Genetic Connectivity of the Culturally Significant Sea Urchin  
(*Colobocentrotus atratus*) in Hawai‘i

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## ABSTRACT

Overharvesting without proper regulation is a common and growing problem for many Hawaiian invertebrates. This paper reports differences in size and the population genetic structure of the intertidal marine urchin species *Colobocentrotus atratus*, also known as *Hā'uke'uke*, from the islands of Kaua'i, O'ahu, Maui and the Big Island of Hawai'i. Individuals from the northern shores of each island were significantly larger (in terms of length, width and height) than congeners on the southern shores of the same island. Based on mitochondrial cytochrome oxidase subunit 1 (COI) sequences, genetic differentiation among sampling sites on each island were uniformly low (pairwise  $F_{ST} = 0.01$  to  $0.08$ ), with only Maui and O'ahu being significantly differentiated. In contrast, exact tests of population differentiation revealed that none of the populations are drawn from the same gene pool, and that although *hā'uke'uke* populations in Hawai'i currently exhibit high gene flow, the populations are not freely interbreeding. Thus, any massive loss of individuals from a population (such as overharvest) would have major impacts for the remaining individuals on that island. We recommend these results on *Hā'uke'uke* population structure be used to inform better management practices for this important cultural resource.