CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Title
To Speciate or Not to Speciate? Population Structure of Haminoea vesicula in the Northeast Pacific

Abstract

Objectives/Goals
Two separate populations of Haminoea vesicula (Gould, 1855) are assessed based on complete specimens and shells collected primarily in British Columbia, Canada and Southern California, United States with the purpose of determining whether there are significant differences between them to justify a speciation event for this species.

Methods/Materials
Specimens (personally collected or archived in museums) are compared using morphological and genetic characteristics. Complete specimens are from 4 different locations in the north and 4 in the south with additional dry shell specimens. Approximately 5-10 slugs are collected from each locale. Through the use of SEM micrographs, camera lucida, and digital photography, diagnostically reliable features including the external morphology, shell structure, male copulatory organs, radulae, and gizzard plates are evaluated after specimen dissection. Partial 16S rRNA genes are extracted from internal tissue using Chelex 100, Proteinase K, and/or phenol: chloroform then run in PCR. Successful extractions are sent for sequencing then analyzed using computer program Geneious.

Results
Consistent differences are found in the external morphology (coloration), radulae (rachidian teeth cusps, lateral teeth serration, outer teeth length), and gizzard plates (denticulation), while the shell structure and male copulatory organs present no variations. The 16S sequences from the three southern California specimens have low variability within the same area; two from the same location collected in different seasons are the same haplotype while the other varies in only one base pair. Thus far, none of the northern specimens have been successfully extracted due to inefficacy of all extraction protocols with long-term preserved specimens.

Conclusions/Discussion
With the presented data it is clear that the two populations show consistent variation suggesting the possibility of divergence. However, further investigation and corroboration of differences is needed before sufficient evidence is compiled to support the establishment of a new name for the northern population. Obtainment of fresh specimens from the northern population or a more effective extraction protocol for long-term preserved opisthobranchs will provide solid evidence of whether a speciation event occurred.

Summary Statement
Northern (British Columbia, Canada) and southern (Southern California, United States) populations of Haminoea vesicula are compared morphologically and genetically to determine whether or not a speciation event occurred for this species.

Help Received
Used lab equipment at California Polytechnic University, Pomona under the mentorship of Dr. Angel Valdés. Participant in the Southern California Academy of Sciences Research Training Program.