



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

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| Name(s) Christopher Fu; Daniel Pak | Project Number S2205 |
| Project Title Investigating the Relationship between Body Wall Ossicle Composition and Species in Holothuroidea | |
| Abstract Objectives/Goals As echinoderms, sea cucumbers share many characteristics with other species in their phylum, including the presence of ossicles. The objective of this experiment was to distinguish between two different sea cucumber species found on the coast of Cabo Blanco using their body wall ossicle composition. They were initially distinguished by their habitats and skin colors, red or white. Our null hypotheses were that there is no association between sea cucumber species and types of ossicles present, and that the mean rod length for red sea cucumbers is equal to that of white ones. Methods/Materials Tissue samples of approximately 1 sq. cm. in area were taken from each of 39 sea cucumbers and placed in vials of bleach to dissolve the soft body tissue, leaving behind only the ossicles. The vials were allowed to settle for a day, and each tissue sample was observed under a light microscope. The types of ossicles and the lengths of rod ossicles present in each sample were then recorded. Results A contingency table was used to record the observed occurrences of each type of ossicle in the two species of sea cucumbers. An expected ossicle distribution was calculated assuming that there is no correlation between ossicle type and species. A G test was performed to compare the observed and expected ossicle distributions, and a Student's t test was performed to compare the distributions of rod lengths in each sea cucumber. Both null hypotheses were rejected. Conclusions/Discussion From the results of the G test, we concluded that there exists a statistically significant association between ossicle type and species. Furthermore, from the results of the Student's t test, we concluded that the rod length distributions in each species of sea cucumber were significantly different. Consultation with A Field Guide to Sea Stars and Other Echinoderms of Galapagos allowed us to identify the species of the sea cucumbers as <i>Holothuria kefersteini</i> and <i>Holothuria arenicola</i> . | |
| Summary Statement Two sea cucumber species were identified as <i>Holothuria kefersteini</i> and <i>Holothuria arenicola</i> based on body wall ossicles, and there is a relationship between ossicle distribution and species as well as rod length distribution and species. | |
| Help Received School sponsored trip to Costa Rica; Used University of Georgia lab under supervision of Dr. Diana Lieberman. | |