

Robust Ivory Coral: The Tree of Life By Cole Kolasa, Challenger K-8

My science fair project focused on the little studied branching tree coral of the eastern Gulf of Mexico called Robust Ivory Tree coral or *Oculina robusta*. Very little is known about the ecology of this coral and not enough information is known about the coral to determine if it is endangered or threatened. The purpose of my science fair project was to determine if there is a relationship between the size and volume of coral colonies and the number fish and crabs that inhabit each coral colony. My hypothesis was that if volume of the coral colony is high then a greater number of fish and crabs will inhabit it.



The coral I examined was at three reef sites all within similar distances from shore. All sites were approximately 13 nm to 14 nm offshore and all sites had similar bottom depths at 14 ft to 15 ft. Using SCUBA equipment I (and dive buddies for safety) examined 24 coral colonies. Most all medium to large size coral colonies contained fish and crabs. The fish commonly observed were the Belted Sandfish, Crested Blenny, Zebra Tail Blenny, and Cocoa Damselfish. Several clinging crabs within the *Mithrax* family were observed with one of most common identified as *Mithrax hispidus*. My hypothesis was supported. The data showed that the higher the coral volume was the more fish and crabs inhabited it. At each of the reef sites a linear relationship was observed when plotting the individual coral volume and fish and crab count. No fish or crabs were observed at the control which was a bare area of rock and sand within each reef. When all the data was combined from all three of the reef sites a stronger linear relationship was also observed ($r^2 = 0.92$). Using data from all three sites, I also grouped the coral colonies by similar size volumes and computed the average fish and crab count. The average number of fish and crabs observed for the coral ranging from 65 to 1000 cubic centimeters was low at 0.1 fish and crabs. For coral ranging from 2000 to 4000 cubic centimeters the average was 1, and for coral ranging from 5000 to 9000 cubic centimeters the average number of fish and crabs was 4.0. For the largest coral that was approximately 27000 cubic centimeters a total of 12 fish and crabs were observed.

My results could apply in the real world since it be used to predict the population of Crested Blennies, Belted Sandfish, and *Mithrax hispidus* (crabs). If a sudden drop in Robust Ivory coral occurred, such as from global warming or an oil spill, then we it is possible that these fish populations would also decrease. The relationship I observed helps demonstrate the habitat value of Robust Ivory Coral and why protection of this coral is important for maintaining a productive fisheries and habitat for crustaceans.



In the future, I would like to determine if coral with more inhabitants are healthier and if they grow faster making the relationship a symbiotic relationship. I would also like to measure the coral sizes over the next few years to determine the coral growth rate. Little is known about the growth rates of Robust Ivory Coral. The larger coral colonies I observed in my project might quite possibly be 50 to 200 years old. Little information is known about its growth rates.