# CALIFORNIA STATE SCIENCE FAIR
# 2010 PROJECT SUMMARY

**Name(s)**
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**Project Number**
**S2409**

**Project Title**
## Effects of Density on Development of Larval Red Rock Shrimp, Lysmata californica

**Abstract**

**Objectives/Goals**
This project was conducted to determine how density of organisms affects the metamorphic development of larval red rock shrimp, Lysmata californica. Results from this project will potentially be applied to aquaculture for all crustaceans as well as larval rearing and morphological studies in related species.

**Methods/Materials**
1.A gravid female was taken from the living collections at Cabrillo Marine Aquarium and placed in a holding tank until larvae hatched.
2.Two tank designs were used to vary density: 1) a 43L pseudokreisel holding 20 larvae per 800mL in high density conditions, and 2) fourteen Tupperware containers holding only 3 larvae per 800mL each in low density conditions. All systems were kept on a warm sea water system of 21-21.7 degrees Celsius.
3.Over 5 trials, the larvae were observed daily to determine their metamorphic stage by recording the appearance or changing number of body structures.
4.All larvae were fed algae enriched Artemia nauplii (brine shrimp). The pseudokreisel was cleaned as needed and the water changes were done daily on the Tupperware containers.

**Results**
Four metamorphic stages were described over the course of 11 days. Results show that animals in the high density tank tend to develop slower than the animals in low density tanks.

**Conclusions/Discussion**
Density is a very important concept to understand when studying or raising crustaceans. It has a heavy impact in development of crustaceans in captivity. It is important to target optimum density to ensure maximum survival.
Each stage of metamorphosis observed is important in providing the larvae with additional appendages for suspension, finding food, and movement through the water column as they grow.
In future research, I would like to study effects of density on another species in the Lysmata family as well as a more distant relative.

**Summary Statement**
This project was conducted to determine how density affects morphological development and survival of larval red rock shrimp.

**Help Received**
Dr. Kiersten Darrow helped finalize my poster and revise my previous work; Cora Webber helped me become familiar with red rock shrimp and with photography; Used facility and equipment at Cabrillo Marine Aquarium Aquatic Nursery