



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Joshua De Leon Olivas	Project Number S2303
Project Title The Mitey Roach Exchange: Examining the Effects of Mite Transplantation and Removal in Gromphadorhina portentosa	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project investigates whether there is a stable average number of body mites on roaches and whether mites are morphologically different for males or female roaches because mites on female roaches may have special benefit from resources during the production of an egg sac. The hypothesis is that transplanting mites between roaches will have no effect on the roaches, but that the number of mites will remain stable due to limitations of resources available on the roach's body for the mites.</p> <p>Methods/Materials While monitoring general health, roaches were labeled with small pieces of duct tape, weighed, and kept in a general terrarium. Roaches were selected based on size and sex to be brushed off body mites and exchanged with that of another roach. After the transplant, roaches were isolated into plastic drawers, to prevent transfer of mites through direct roach contact. Roaches were observed daily for either 2 or 4 week cycles. Mites were then examined at 40x and 200x magnification under a light microscope.</p> <p>Results Roaches often rest in group huddles, regardless of temperature, which included both male and females. Most mites tend to be found near the body openings ("arm-pits") of the roaches, although some are typically present on the back. Four roaches died when in isolation after mite transplants. No roaches died in the general (non-testing) habitat. One female gave birth to a full set of babies once in isolation. A chi-squared goodness of fit statistical test was originally intended to compare observed versus expected numbers of mites, however, was used to assess probability of roach death due to mite loss.</p> <p>Conclusions/Discussion Results of this experiment refute the hypothesis that the mites have no effect on the roaches. Since the roaches were handled daily, the roach deaths were not likely due to handling, and so it is believed that the mite transplant had an effect. No roaches that were kept in isolation without a transplant died. The implications of this invertebrate study is that humans also have body mites. There is belief that these mites, which are passed maternally, are not only beneficial, but that they are actually necessary for the health of the organism. This might change the way doctors deal with the delivery of babies or in monitoring the methods of sterilizing skin when treating people for surgery.</p>	
Summary Statement This study of transplanting roach mites discovered that the mites might play an essential role in the life of the roach, which is an idea that can be extended to the relationship of a human's personal microbiome to their overall health.	
Help Received My teacher helped me enter the qualifying fairs and provided me with space and equipment at school. I met with an entomology professor at Santa Clara University who helped me figure out a way to label the roaches with tape because markers and nail polish weren't working.	