



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Shrey S. Desai	Project Number S1707
Project Title Antibiotic Alternative to Radiation in the Sterile Insect Technique	
Abstract Objectives/Goals \$200 million. That is the annual costs pests like the Screwworm fly gifts to the US agricultural industry, by infecting cattle, destroying crops, and proliferating, producing a generation ten times larger than the first. That is where the Sterile Insect Technique comes into play, a method of biological control, which uses radiation to sterilize male pests, so that when they're released, they cannot compete with the wild-types and reproduce. However, radiation (its principle method) has a couple of problems including cost-effectiveness, managing, and aim. This project sets out to produce an alternative to radiation in the SIT, using the venue of antibiotics, by targeting guts inside pests # which can stop reproductive methods. I hypothesized if antibiotics can sterilize males better than status quo methods.	
Methods/Materials I used Canton S fruit flies and the antibiotic, erythromycin, to test my hypothesis. I used 15 vials in total for the experiment: 1. 5 control vials, 3 males, 3 females (per vial) 2. 5 erythromycin-1000 ug/mL, 3 males, 3 females (per vial) 3. 5 erythromycin-1500 ug/mL, 3 males, 3 females (per vial) I made two divisions of the erythromycin antibiotic to see if the concentration of antibiotic would have any appreciable effect on the progeny count. I let the fruit flies mate for 3 days in all of the vials, then took them out. I inspected and counted the progeny and compared the E1000, E1500, and Control vials.	
Results My hypothesis was supported. The total amount of progeny: Control # 23, E1000 # 8, E1500 # 4. There were more than 5 times as less progeny in the Antibiotics vs. Control.	
Conclusions/Discussion All in all, my hypothesis was supported. Antibiotics did cause sterility in male fruit flies, as I observed in the decreased progeny count when I compared the Antibiotic vials to the Control group vials. Total progeny in the Control group was 23, E1000 group was 8, and the E1500 group was 4. Also, increasing the concentration of antibiotics inside the fly media decreased the progeny count further. When comparing the E1500 group to the E1000 group, the progeny count was cut in half (8 to 4). Thus, antibiotics could further be a better alternative to radiation in the SIT.	
Summary Statement This project determines if antibiotics are a better approach to sterilizing male pests, rather than the principle method of radiation, in the Sterile Insect Technique, a method of biological population control.	
Help Received All research, experimentation, analysis, writing, graphics, and board was done by myself; My mentor assisted me in making fly media and gave me tips on how to store antibiotics and how to take care of Canton S fruit flies; Parents helped screw the nut/bolts on to fit the two backboards together	