



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Austin D. Roberts</b>	<b>Project Number</b> <b>J2317</b>
<b>Project Title</b> <b>Can Juvenile Crayfish Combat Schistosomiasis?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> QUESTION: Can juvenile crayfish, <i>Procambarus clarkii</i>, control population levels of the snail <i>Biomphalaria glabrata</i>? PURPOSE: This experiment tested the ability of juvenile crayfish to control populations of intermediate host snails that can transmit schistosomiasis to humans. HYPOTHESIS: My hypothesis was that juvenile crayfish could control population levels of <i>Biomphalaria glabrata</i> snails, reduce egg masses and 0-2mm hatchlings in aquaria over 30 days.</p> <p><b>Methods/Materials</b> Experiments had three control 1 gallon aquaria with 5 snails (2-8mm, 2-12mm and 1-15-20mm diameter snail), red leaf lettuce, 0.2 grams of calcium carbonate powder, and airstones. Size-specific Predation Ability: The maximum size of <i>Biomphalaria glabrata</i> snails consumed by different sizes of <i>Procambarus clarkii</i> crayfish was determined. One crayfish was introduced into each treatment aquarium with snails. Aquaria were checked daily for consumption of <i>B. glabrata</i> snails. Effect of Crayfish Predation on a snail population: Three 12mm carapace length (CL) crayfish were used in the population experiment. The experiment ran 30 days and snail, egg mass and hatchling (0-2mm diameter) consumption was determined.</p> <p><b>Results</b> In the size-specific experiment, crayfish 14mm CL and larger killed the largest snails offered (15-20mm diameter). The maximum size class of snail consumed by 13mm CL crayfish varied from 12mm to 15-20mm in size. No snails died in control aquaria over the same time period. In 30 day population experiments, 12mm CL crayfish significantly reduced snail populations (8-20mm diameter) to 2 compared to 4.3 in control aquaria with no crayfish. Egg masses were reduced to 7.3 compared to 41.3 in control aquaria and hatchlings were reduced to 0 compared to 10 in control aquaria.</p> <p><b>Conclusions/Discussion</b> Very small juvenile crayfish effectively reduced population levels of <i>B. glabrata</i> snails, consumed egg masses and totally blocked recruitment of 0-2mm hatchling snails into the snail population. The ability of very small crayfish to control population levels of <i>B. glabrata</i> snails is a very promising step in our knowledge of the size of crayfish that can be effective in controlling <i>B. glabrata</i> population sizes. In other field studies, fewer intermediate host <i>B. glabrata</i> snails has translated into reduced schistosomiasis transmission to humans.</p>	
<b>Summary Statement</b> My science project showed that juvenile crayfish could control a laboratory population of snails that transmit human schistosomiasis, a parasitic worm disease that infects 200 million people worldwide and kills 300,000 people annually.	
<b>Help Received</b> I discussed the experimental design with Dr. Kuris and developed how to conduct the experiment. I asked what statistical tests to run and then I went online to study statistical tests and run them in Excel.	