



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Shannon C. Mueller</b>	<b>Project Number</b> <b>J1920</b>
<b>Project Title</b> <b>Effectiveness of Copper Banding in Preventing Brown Garden Snails (<i>Helix aspersa</i>) from Reaching Food Sources</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My objective was to determine if new copper banding, copper with patina, or irrigated copper banding would prevent brown garden snails from reaching their food sources. We grow citrus trees, and snails are always eating the fruits and leaves. Gardeners and commercial growers share the same problem. Decollate snails, predators of brown garden snails, may not be the best solution especially for agriculture, since decollate snails often cannot be shipped outside San Diego county. My goal was to find a solution for reducing the number of snails on citrus trees with limited environmental impacts.</p> <p><b>Methods/Materials</b> First, I performed preliminary trials to determine which food bait attracted the most snails. Although all baits were popular, snails were most attracted to tangerines. Next, I placed copper banding in widths of 2.5 cm, 6.5 cm with flanged tabs at the top, 6.5 cm with flanged tabs at the bottom, and 7.5 cm around 4 pots. Another pot had no copper banding to act as a control. A tangerine was placed on top of each pot as bait. I placed seven snails around each pot, multiple times, and observed and recorded their behavior. For further experimentation, I also wrapped 7.5 cm new copper banding and 7.5 cm copper banding with patina around two citrus tree trunks. Seven snails were placed around the base of each trunk and observed. After 24 hours, both 7.5 cm copper bands were irrigated. I also tested the DC voltage interaction of the copper with the snails' mucus.</p> <p><b>Results</b> The widest band of copper (7.5 cm) prevented snails from reaching the tangerine. No snails crossed the new copper bands or copper bands with patina wrapped around the tree trunks, even when irrigated. The average volt reading of the electrical reaction between the copper and the snails' mucus was 350 mV.</p> <p><b>Conclusions/Discussion</b> Wide copper banding (7.5 cm) repelled the snails from reaching the food bait and, when wrapped around a tree trunk, prevented snails from crossing. Copper banding with patina also effectively prevented the snails from crossing. The snails receive a small electric shock of 350 mV when crawling on copper. Irrigation did not interfere with the reaction between the snails' mucus and the copper. Unlike many pesticides used to kill snails, copper does not leave large quantities of scattered, toxic residues and is therefore a more environmentally friendly solution for controlling snails.</p>	
<b>Summary Statement</b> My project determined that new copper banding, copper with patina, and irrigated copper banding can be used to prevent brown garden snails from reaching their food sources.	
<b>Help Received</b> Thanks to Roberto Sanchez, entomologist at the Department of Agriculture, for discussions on snails and agriculture; Mary Chidester Borevitz for supplying copper banding and sharing her knowledge about snails; and my father for helping me construct the tubs and wood structures.	