



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

<b>Name(s)</b> Marie G. Huitt	<b>Project Number</b> 38027
<b>Project Title</b> Walnut Crown Gall: The Effect of Removal and Treatment	
<b>Objectives/Goals</b> My objective is to determine if I can cure walnut crown gall with a chemical method or by using a natural torch sterilization method without harming the environment and getting my walnut trees back to full production, and healed from any galls growing back. <b>Abstract</b> <b>Methods/Materials</b> During the course of this two-year study, I observed 20 Chandler walnut trees that had been damaged with root and crown galls formed. One half of the trees(10) had galls cut and burned using the natural torching sterilization method, the other (10) trees had chemical Gallex applied. I removed the dirt away from the crown and roots using an air compressor to not harm the trees. I cut galls off with an ax and pruning knife back to the new wood so the bacteria won't spread to new tissue. When trees were free of galls I replaced original soil that had Agrobacterium Tumfaciens with a sterilized peat around the roots and crown. <b>Results</b> After a 2 year study the best results I had were by using the hot propane natural sterilization torch method and by first cutting off all the root and crown galls with an ax and pruning knife, then torching a 2 inch ring past the gall area into the new wood. This sterilized the area so no bacteria spread to the surrounding tissues. I had a 95% success rate with the torch method and 40% using Gallex a bacterial application that produces antibiotics toxic to the pathogen and kills it. I observed galls kept returning where I used Gallex. <b>Conclusions/Discussion</b> In conclusion this experiment after 6 months showed that by using the natural sterilization torch method I had a 95% cure rate, especially if galls were found early and treated. The chemical Gallex was expensive and had to be reapplied many times as the galls kept returning even though I painted and overlapped the chemical so it penetrated into the bark to kill the bacteria. Early detection and treatment had the best success rate. All treatments were done in spring during growing season so the tissues could callus and heal. On average torching method calluses closed 7.5 inches in 6 months, Gallex 4.5 inches in 6 months. I removed contaminated dirt and replaced it with sterilized peat which stopped reinfections. This was a safe, easy, inexpensive and effective method to remove crown gall without putting harmful chemicals into the tree, ground or ground water supply.	
<b>Summary Statement</b> I tested if natural torch sterilization or chemical method was the most effective way to treat and cure crown galls and get your walnut trees back to full production.	
<b>Help Received</b> My mother provided the walnut trees and helped me to apply the Gallex and supervise use of the propane torch.	