



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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Project Title Biorational Solutions of a Re-emerging Pest, the Western Grapeleaf Skeletonizer	
<p style="text-align: center;">Abstract</p> <p>Objectives WGLS has become and increasingly prevalent pest, especially in organic vineyards and backyard wines because of limited availability of pesticides for these situations. The main objective of this study is to test multiple microbial and botanical alternatives in order to find one or more effective non-chemical options to control WGLS. These environmentally-friendly non-chemical alternatives can also be helpful in conventional farms in promoting sustainable crop protection practices. This study will identify options that can be used as a part of integrated pest management program, which strives to find a balance between chemical and non-chemical pest control options in order to find the most environmentally and economically effective pest management.</p> <p>Methods Larvae were collected from the infested, untreated vines and maintained in one gallon plastic tubs with screened lids. Fresh, untreated grape leaves were provided daily for 3 days before starting the assay. For each treatment, five 4-5 instar larvae were placed on a grape leaf disc (rinsed in water and dried) in a Petri plate (100 mm dia) with a moist filter paper. Larvae were treated by spraying 1 ml of treatment solution (containing Dyne-Amic, a surfactant, at 0.125% vol/vol). Application rates for commercial formulations were determined based on the label recommendations for 100 gallons of spray volume/acre. Entomopathogenic fungal concentrations were also determined based on the label rates for similar commercial products. Treatments were replicated four times and the assay was repeated twice. Larval mortality was observed daily and dead larvae were removed and incubated separately. Fresh leaf discs were provided as need to the remaining larvae. Data were arcsine-transformed for statistical analysis using Statistix software. Significant means were separated using Tukey's HSD test.</p> <p>Results We find that Entrust and <i>M. anisopliae</i> had an average mortality of 100%. <i>B. bassiana</i> had a mortality of 92.5%, Neemix had a mortality of 85%, Agree had a mortality of 81.3%, and Deliver had a mortality of 70%. The untreated control had a mortality of 37.5%. To correct our data for death not a result of a pesticide via Abbott's formula. We still find that Entrust and <i>M. anisopliae</i> cause a 100% mortality. <i>B. bassiana</i> had a corrected mortality of 81.3%, Neemix had a corrected mortality of 78.3%, Agree has a corrected mortality of 73.3%, and Deliver has a corrected mortality of 45%. We find that the California isolates of <i>B. bassiana</i> and <i>M. anisopliae</i> were effective and thus should be developed into commercial formulations to be used against WGLS.</p>	
Summary Statement Our project analyzes the effects of various microbial and botanical products on the western grapeleaf skeletonizer, and we found that 2 California isolates of <i>B. bassiana</i> and <i>M. anisopliae</i> have the potential to be developed as pesticides.	
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