CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
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Project Number
S1716

Project Title
Repelling Bemisia tabaci through the Infiltration of Natural Extracts into Verbena x hybrida "Babylon White"

Abstract

Objectives/Goals
This project aims to determine if anti-pest environments created by commercial pesticides can also be developed by infiltrating the liquid extracts of companion plants known to repel whiteflies and the implications of such methods. It also serves to provide discussion regarding the potential of substituting commercial pesticides with organic components in order to reduce environmental side effects.

Methods/Materials
Verbena plants were stripped down to 2 leaves, each of which was infiltrated with a designated liquid volatile plant extract (calendula, marigold, mint, and pepper/garlic.) Water infiltrated verbena and untreated verbena served as the negative controls. 25 whiteflies from a raised colony were collected then gently applied to each of the testing chambers before they were sealed. Surveillance was conducted via remotely operated webcams for 10 hours, and images were taken at 30 minute intervals. Constant overhead illumination was employed in order to eliminate the effects of day/night cycles. Five replications of the experiment were conducted.

Results
Since results from the untreated control were very similar to those produced by the water infiltrated control indicating that the act of infiltration had no effect on whitefly occupation, the data from this set were omitted from further. Throughout the 5 replications, the water infiltrated verbenas had an average of 26.9% whitefly occupation, and this value was used as the baseline to compare repellency of the other extracts. The average reductions in whitefly occupancy were 86% with Calendula, 53% with Marigold, 49% with Mint, and 31% with the garlic and pepper infiltrated verbenas.

Conclusions/Discussion
My results not only demonstrated that Calendula is an effective natural insect repellent but that it is possible to repel pests by infiltrating organic extracts into the mid-vein of verbena plants. This experiment illustrated a possible large scale application of natural liquid plant extracts as agricultural pest repellants. The objectives of further project developments include mass-reduction of commercial pesticide side effects present in our environment. Further phases of this project include the development of a more efficient method for repellent application in large-scale agriculture and the investigation of other possible plant extracts to be used for varying crops or ornamental plants as repellents.

Summary Statement
This experiment tested the potential of extracted calendula, marigold, mint, and pepper/garlic as whitefly repellents when infiltrated into

Help Received
Dr. Deborah Mathews from UCR supplied the white flies and verbenas that I used to experiment with. She also helped construct the white-fly capturing device and served as an adviser throughout the experiment. Mother provided transportation.