

Identifying Detoxification Enzymes in Navel Orangeworm

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PROJECT SUMMARY

Objectives:

- Ascertain the degree to which various enzymes (e.g., cytochrome P450s, esterases, and/or glutathione-S-transferases) are involved in NOW detoxifying pesticides, mycotoxins and phytochemicals.
- Characterize at the molecular level the genes encoding the principal detoxification enzymes responsible for metabolizing a set of ecologically important synthetic and natural toxins
- Determine the effect of host plant identity on insecticide LD50 and metabolism

Background:

This project is investigating detoxification enzyme systems found in the navel orangeworm (NOW). Previous work showed that NOW can tolerate high levels of aflatoxin as a result of the high activity of these detoxifying enzymes in the insect.

Thus the orangeworm can survive aflatoxin concentrations 100 times higher than other insects. This survival advantage makes NOW ideal vectors of *Apergillus* fungi. The high tolerance for toxic compounds helps to explain the link between NOW and aflatoxin contaminated nuts.

The same enzymes involved in detoxifying aflatoxin may also help the insect detoxify insecticides, either making the insect more tolerant of insecticides or increasing the potential for NOW insecticide resistance.

Currently, the focus of this project is to provide tools for estimating the potential for NOW to acquire resistance to pesticides and for monitoring resistance if it develops.

Furthermore, because host plant chemical composition can influence the metabolic capabilities of these enzymes, NOW sensitivity to pesticides may vary with host plant.

Accordingly the effects of feeding on almond and pistachio (co-funding this work) to the toxicity of various insecticides and plant based chemicals are being assessed.

Project Cooperator: Joe Siegel, USDA/ARS, Parlier

For More Details, Visit

- Poster location 36, Exhibit Hall, Session 2; or on the web (after January 2011) at AlmondBoard.com/AICposters
- 2009-10 Annual Report CD (09-ENTO1-Berenbaum); or on the web (after January 2011) at AlmondBoard.com/ResearchReports
- Related Projects: 10-ENTO11-Siegel