Environmental Science Graduate Program Student Seminar Series

Characterization of Toxicity from Pesticide Combinations on Honey

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- **Smith Lab 3150 | 9/20/19 | 2:00 - 3:00pm**

Abstract:

Honey bees are major pollinators and are crucial for both survival of the agriculture industry and maintenance of the ecosystem. Pesticides are cited as one of the major causes for large numbers of honey bee losses. The goal of this research is to characterize the toxicity of pesticide combinations on honey bees. A Potter Spray Tower was used to apply various pesticide combinations to adult honey bees in the form of a spray. Two pesticides that were determined to be significantly toxic when combined were the fungicide Tilt and the insecticide Altacor. The objective of this research was to characterize the cause for this synergistic toxicity in honey bees. It was hypothesized that the combination of Tilt and Altacor displayed synergistic toxicity in honey bees because Tilt inhibits the cytochrome P450 enzyme(s) that breaks down Altacor, making this insecticide toxic to bees. This hypothesis was supported by similar synergistic toxicity (of PBO and Altacor) when a known cytochrome P450 inhibitor, Piperonyl Butoxide (PBO), and Altacor were combined. This study suggests that the combination of the pesticides Tilt and Altacor is toxic and may be a possible explanation for large numbers of honey bee losses. Additional research will be conducted to determine if the addition of adjuvants in pesticide combinations increases toxicity and if toxicity can be reduced by the use of phytochemicals.