Environmental Science Graduate Program Seminar Series

Determining the Mode of Action of Toxic Spray Adjuvants to Honeybees

Brandon Shannon

January 28th, 2022 | 2:00-3:00 PM

Smith Laboratory, Room 3150

Abstract

Spray adjuvants are a diverse group of agrochemicals that are added to pesticide tank mixes to improve the function of spray application. There is concern that significant honeybee colony losses that are reported during and after almond bloom in California are related to adjuvant and pesticide exposure during almond pollination. This study established the field-relevant acute toxicity, expressed as LC_{50}, of different adjuvants and adjuvant tank-mix combinations. Spray application was performed using a Potter Spray Tower on 3-day-eclosed adult worker honeybees. Tested adjuvants included Dyne-Amic, Kinetic, Surf-90, Induce, Cohere, Liberate, Activator 90, Nu Film P, LI 700, Choice, Latron B, and Attach; tested fungicides included Pristine, Tilt, Vanguard, and Luna Sensations; and tested insecticides included Intrepid. Results showed substantial bee toxicity of some adjuvants applied alone at field relevant levels. Results also showed a trend in increased toxicity of some adjuvants when applied as a tank mix with some pesticides. There is evidence that the toxicity of an adjuvant is related to a relatively higher application rate recommended on the label. The next step in this study will be to determine the mode of action for inherent adjuvant toxicity to honeybees. The aims of this research will be to determine if sprayed adjuvants increase cuticular water loss, increase pesticide penetration through the cuticle, and increase accumulation in lipid parts of the insect body. These results will help in developing adjuvants that are safer for pollinators and can determine which adjuvants would be safe and effective in formulations targeting honeybee pests.

For more information, contact Heather Lochotzki (Lochotzki.7@osu.edu) or visit https://esgp.osu.edu/