

Pesticides deliver a one-two punch to honey bees

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Researchers conduct semi-field experiments on honey bees. Credit: Lang Chen

Adjuvants are chemicals that are commonly added to plant protection products, such as pesticides, to help them spread, adhere to targets, disperse appropriately, or prevent drift, among other things. There was a

widespread assumption that these additives would not cause a biological reaction after exposure, but a number of recent studies show that adjuvants can be toxic to ecosystems, and specific to this study, honey bees.

Jinzhen Zhang and colleagues studied the effects on [honey](#) bees when adjuvants were co-applied at "normal concentration levels" with neonicotinoids. Their research, recently published in *Environmental Toxicology and Chemistry*, found that the mixture of the pesticide and the [adjuvant](#) increased the mortality rate of honey bees in the lab and in semi-field conditions, where it also reduced colony size and brooding.

When applied alone, the three pesticide adjuvants caused no significant, immediate toxicity to honeybees. However, when the pesticide acetamiprid was mixed with adjuvants and applied to honeybees in the laboratory, the toxicity was quite significant and immediate. In groups treated with combined pesticide-adjuvant concentrates, mortality was significantly higher than the control groups, which included a blank control (no pesticide, no adjuvant, only water) and a control with only pesticide (no adjuvant). Further, flight intensity, colony intensity and pupae development continued to deteriorate long after the application comparative to the control groups.

Zhang noted that this study, "contributed to the understanding of the complex relationships between the composition of pesticide formulations and bee harm," and stressed that "further research is required on the environmental safety assessment of adjuvants and their interactions with active ingredients on non-target species."

More information: Lang Chen et al, Joint Toxicity of Acetamiprid and Co-Applied Pesticide Adjuvants on Honeybees under Semifield and Laboratory Conditions, *Environmental Toxicology and Chemistry* (2019). [DOI: 10.1002/etc.4515](https://doi.org/10.1002/etc.4515)

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