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Is Life Too Hard for Honeybees?

Researchers zero in on the culprits behind colony collapse disorder

By [Wendy Lyons Sunshine](#)

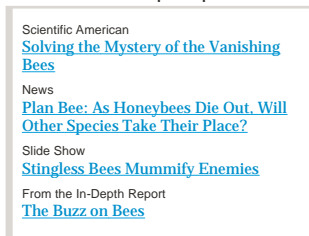


HARD-WORKING HONEYBEE: A mysterious ailment has been afflicting honeybees, responsible for pollinating many commercial crops. ©STOCKPHOTO.COM/BEVERLY GUHL DAVIS

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Commercial honeybees are tough. They get trucked cross-country to pollinate vast crops, often while fed unnatural diets such as sugar water and soy flour. Their hives are treated with chemicals to deter parasites, and they're exposed to pesticides and fungicides in the fields where they work and feed.

"I can feed you a diet of Hershey bars, keep you up all night, truck you around, and spray Raid in your face, and I guarantee you'll get sick," says Jerry Hayes, Florida's assistant chief of [apiary inspection](#). "That's kind of what's happening to bees."

Just how much physical abuse do honey bees face?

And what are the implications? Those questions inform research into [colony collapse disorder](#) (CCD), a phenomenon that has killed over a third of commercial honeybees in the U.S. and some European countries since 2006. With no obvious cause, scientists have begun examining how beekeeping practices and environmental contamination may be impairing hive immunity.

CCD research poses challenges, because stricken bees disappear, taking forensic evidence with them. Lab experiments offer clues, but translating those into reliable, controlled field studies poses difficulties, because bees roam for miles. Still, with [valuable crops](#) such as almond, apple, blueberry and others at stake, even ordinary citizens are trying to help.

"The interest from the general public has been tremendous," says entomologist Jeff Pettis, lead researcher at the [U.S. Department of Agriculture Agricultural Research Service's \(USDA-ARS\) Bee Research Laboratory](#) in Beltsville, Md. He has received phone tips and even jars of bees from people hoping to help solve the mystery. Lately, he tells them several suspects have already been ruled out,

including tracheal mites, small hive beetles, genotype differences, cell phone exposure, melamine contamination and genetically modified crops.

"For almost two years we've been documenting and sampling colonies that are dying and examining healthy colonies in the same area, trying to determine what factors are involved," Pettis says. "I think there are interactions going on, like low-level pesticide exposure and poor nutrition weakening the host honeybees and then pathogens doing the killing. It's similar to a human who might not be eating, or is frail and traveling too much, and as a result is more susceptible to pathogens. If you go into a hospital in excellent health, you don't contract pneumonia, but if you go in weakened, pneumonia kills you."

Pesticides and fungicides

How much [pesticide exposure](#) is too much for a honey bee? Traditionally, Pettis says, manufacturers seek clearance for pesticides by using the LD-50 test, which "essentially applies toxic stuff to bees and sees if half or more of them drop dead." This brute force test does not, however, gauge long-term systemic effects.

"The general feeling is that we need to move beyond mortality testing to sublethal testing that looks at the shortening of life span, disorientation, reduced vigor, and other things," says Pettis, who has been in discussions with the U.S. Environmental Protection Agency (EPA) about developing newer, more sensitive pesticide tests.

EPA spokesperson Dale Kemery says that the EPA's Office of Pesticide Programs, industry stakeholders, and academics have huddled at least twice over the past six months to discuss additional pesticide testing. He refused to provide details of the meetings.

Pesticide residues show up in a variety of ways. For example, "entombed pollen" in the hive can display pesticide and fungicide content, according to a study by Pennsylvania State University researchers and Pettis now in press at the *Journal of Invertebrate Pathology*. Pettis says he is working on additional pesticide studies that may

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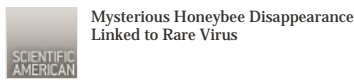
provide important new insights into hive risks.

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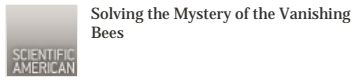
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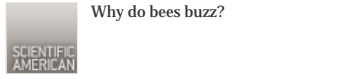
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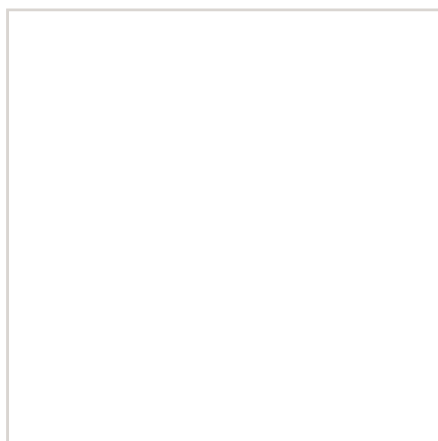


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