QUIRKY SCIENCE

HONEY BEE DEATHS

Honey bee colonies in the United States have been dying at high rates for over a decade, and agricultural pesticides – including fungicides, herbicides and insecticides – are often implicated as major culprits. Until now, most scientific studies have looked at pesticides one at a time, rather than investigating the effects of multiple real-world pesticide exposures within a colony.

A new study is the first to systematically assess multiple pesticides that accumulate within bee colonies. The researchers found that the number of different pesticides within a colony – regardless of dose – closely correlates with colony death. The results also suggest that some fungicides, often regarded as safe for bees, correlate with high rates of colony deaths. The study appeared online September 15, 2016, in the journal Nature Scientific Reports.

"Our results fly in the face of one of the basic tenets of toxicology: that the dose makes the poison," said Dennis vanEngelsdorp, an assistant professor of entomology at UMD and senior author on the study. "We found that the number of different compounds was highly predictive of colony death, which suggests that the addition of more compounds somehow overwhelms the bees' ability to detoxify themselves."

HOW DID EARLY EARTH STAY WARM

For at least a billion years of the distant past, planet Earth should have been frozen over but wasn't. Scientists thought they knew why, but a new modeling study from the Alternative Earths team of the NASA Astrobiology Institute has fired the lead actor in that long-accepted scenario.

Humans worry about greenhouse gases, but between 1.8 billion and 800 million years ago, microscopic ocean dwellers really needed them. The sun was 10 to 15 percent dimmer than it is today – too weak to warm the planet on its own. Earth required a potent mix of heat-trapping gases to keep the oceans liquid and livable.

For decades, atmospheric scientists cast methane in the leading role. The thinking was that methane, with 34 times the heat-trapping capacity of carbon dioxide, could have reigned supreme for most of the first 3.5 billion years of Earth history, when oxygen was absent initially and little more than a whiff later on. (Nowadays oxygen is one-fifth of the air we breathe, and it destroys methane in a matter of years.)

"A proper accounting of biogeochemical cycles in the oceans reveals that methane has a much more powerful foe than oxygen," said Stephanie Olson, a graduate student at the University of California, Riverside, a member of the Alternative Earths team and lead author of the new study published September 26 in the Proceedings of the National Academy of Sciences. "You can't get significant methane out of the ocean once there is sulfate."