



# How a fungus is turning some cicadas into sex-crazed ‘zombies’

Trillions of cicadas from two broods are simultaneously emerging for the first time since 1803. Some have a fungus that replaces their genitals while making them sex-crazed.

By [Rachel Pannett](#) and [Ben Brasch](#)

June 10, 2024 at 2:58 p.m. EDT

Trillions of cicadas from two different broods are emerging simultaneously in the United States for the first time since 1803. This rare double emergence is drawing attention to a mind-bending fungus that turns some cicadas into sex-crazed “zombies.”

Experts say cicadas infected with *Massospora cicadina* are cropping up across the eastern and southern United States. Scientists have known about *Massospora*’s effects on cicadas since the mid-19th century, but recent studies have shed new light on its amphetamine-like properties and how it is spread.

“It feels good to be able to talk about this stranger-than-fiction mycological oddity that nobody really cared about for 100-plus years,” Matt Kasson, a mycologist and forest pathologist at West Virginia University, told The Washington Post.

## The facts

- The yellow-white fungus grows inside cicadas, distending their abdomens. Their genitals and rear ends fall off, replaced by the fungus. But the mind-altering chemicals in the fungus keep them looking for a mate despite not being able to reproduce.
- Bugs infected with *Massospora* fungus have been found in at least half a dozen states, from Alabama to Tennessee.
- The fungus doesn't kill its host but causes it to act in a way that promotes the fungus's spread. Infected bugs attempt to mate with both male and female cicadas. The chemical stimulant tricks male cicadas into flicking their wings like females: a mating invitation that attracts unsuspecting male cicadas and infects them, according to a 2020 study co-written by Kasson.
- The infected bugs are sometimes called "flying salt shakers of death" because as they beat their wings together, they deposit saltlike spores onto the ground that can infect future generations that emerge from the soil years later.

## Background

Brood XIII cicadas — concentrated mostly in Illinois, Iowa and Wisconsin — come out of the ground every 17 years. Their Brood XIX cousins emerge every 13 years and are spread across the Midwest and Southeast. The Post mapped their simultaneous emergence this spring, a rare double-whammy event.

Trillions of cicadas pop up during these emergences, and scientists estimate that only a small percentage are infected with the zombie fungus. Kasson said the rate of infection is between 2 and 5 percent nationwide. That varies, such as with an emergence he saw in southwest Pennsylvania in 2019 where between 20 and 25 percent were infected. But in Chicago this year, about 1 percent were infected.

“It’s almost always present in the population,” said Chris Simon, senior research scientist in the Ecology and Evolutionary Biology Department at the University of Connecticut.

Simon said she saw her first cicada infected with the fungus in 1974. She said the fungus doesn’t start to harden with filled spores until about two weeks into an emergence.

The first cases emerge when the cicadas emerge from underground, as the insects climb from tree roots to the soil’s surface, coming into contact with the fungus that has germinated from spores dispersed by previous generations of infected cicadas.

## What does the fungus do?

Scientists describe the zombie cicadas as “docile” — easy to pick up and check for the yellow fungus. Kasson said that’s because of an effect he and a student discovered: The fungus produces an amphetamine named cathinone. The

chemical gives them “the focus of someone on Adderall,” Kasson said. “They are just loaded with amphetamine.”

The stimulant distracts the cicada as the fungus gnaws away at, and eventually replaces, the abdomen, genitals and rear. The lower third of their body ends up looking like a chalky gumdrop, Kasson said. The fungus evolved to keep the cicadas flying around, thereby perpetuating itself by spreading the spores as the host cicada flaps its wings.

“The fungus is the puppet master, and it is pulling the strings on its unsuspecting host. It is optimizing its spread,” he said.

But the main way the fungus spreads is through mating, making this a sexually transmitted disease despite no reproduction occurring.

## Important context

Experts say the *Massospora* fungus is not harmful to humans or animals. Even if a person were to consume an infected cicada, the exposure to any chemicals that drive cicadas wild would probably be too small a dose to have an effect, *The Post* reported in 2021, the same year the D.C. region experienced an enormous Brood X emergence.

Kasson said someone would have to eat dozens or hundreds of infected cicadas to be affected by the stimulant, noting that’s a bad idea in part because scientists have no idea what the other chemicals present will do to people.

“It’s not worth the risk,” he said.

*Marisa Iati, Tim Meko and Bonnie Berkowitz contributed to this report.*