The cicadas are coming: An entomologist's take on a once-in-200-years event

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Get ready. Billions of trillions of singing, winged insects with big red eyes are about to emerge from more than a decade of sleep underground.

For the first time since 1803, these two broods, or generations, of cicadas—Brood XIX and Brood XIII—will rise up from the earth simultaneously in 15 states across the Southeast and Midwest.

While some cicadas emerge every summer, Brood XIX and Brood XIII are among the seven existing species of so-called "periodical cicadas" that emerge only every 13 or 17 years in North America.

Once they surface, the adult cicadas only live for a few more weeks. They have one goal during their short adult life: Mate and reproduce. To attract females, the male cicadas flex their muscles to vibrate their abdomen, producing loud cicada "love songs" that can drown out the sound of a lawn mower. Female cicadas lay eggs in tree trunks and branches. After hatching, the nymphs burrow underground to wait for their turn to emerge more than a decade later.

"A lot of people think there's an impending doom on the way when they think about cicada emergence," said Sammy Ramsey, assistant professor of entomology at the Department of Ecology and Evolutionary Biology and the BioFrontiers Institute. "But this natural thing has been happening since before recorded history. And this love song is breathtaking. There's nothing about them that we should be frightened of."

CU Boulder Today spoke with Ramsey about what these insects do during that decade underground, the terrifying fungus that makes their genitals fall off, and how climate change and habitat loss could threaten their serenade.

When and where should we expect to see the cicadas this year?

Climate change has made it very difficult for us to say when the cicadas

will emerge. We do know that they come out when the ground temperature reaches 64°F—normally around late April or May in the south and late May to early June in the North. But this year, the winter has been very warm in much of the U.S. and very cold in some other areas. So we may see cicadas come out at different times across the country.

Unfortunately, Colorado doesn't have periodical cicadas, so they're not going to be bringing this beautiful symphony to us. But other places in the U.S. will be serenaded. We will see them in states on the East Coast, in the Midwest and down into the South.

Do periodical cicadas have a particularly long lifespan among insects?

Yes, cicadas are considered some of the longest-lived insects on the planet.

In biology, most insects belong to a group that is short-lived and has a lot of babies. This strategy has allowed them to be very successful—three-quarters of all animals are insects.

Well, cicadas have decided to modify the system. They have placed a bet on one specific idea: If all of us emerge at the same time, nothing could possibly eat all of us. That is wild. Your method of dealing with predators is not to have a defense, it's not to grow a stinger or be able to spit acid. Instead, it's to have millions of us that no creature could possibly eat us all.

How are other animals affected?

My gosh, this whole cicada thing, it's so easy for people to freak out about it and be like, "The last time the cicadas came out, I got them in

my hair, and it was the worst thing ever." But the biological world gets so happy, because pretty much anything can eat them. Birds, racoons and squirrels go wild; their populations can get larger as a result of having so much.

What other ecological benefits do cicadas provide?

They contribute greatly to plant life. Carcasses are going to litter the ground and be absorbed. Those nutrients will be returned to the soil and utilized by soil microbes and plants.

By supporting the plant life, cicadas are supporting the pollinators. If they're supporting the pollinators, they're supporting the creatures that eat those fruits and vegetables, and they're supporting us. We are all connected.

Can people eat them?

We, in the United States, tend not to eat insects. But other parts of the world actually love the fact that this insect protein is widely available and is good for you.

I know several restaurants have tried putting cicadas on their menu, but people aren't always down for it. They taste kind of earthy. If you sauté them, especially with chili oil and soy sauce, they make a pretty good complement to food like rice and noodles.

How do cicadas keep track of time underground?

Cicada babies, or nymphs, attach to the root of a tree and feed on plant sap when they're underground. Trees have a nutrient cycle that goes around inside these plants every year, and cicadas use that to learn when

a year has started. They can do that count enough times to recognize that "guys, this is the big year. All this preparation has been for this one moment." And then they all emerge and they party.

I hear there is a fungus turning cicadas into zombies. Can you explain?

Consider for a moment that you're a cicada. After spending so many years underground, you have finally turned into a teenager and it's time to emerge. You go above ground as a hormonal teenager, and there's a rave all around you—individuals singing and trying to mate. It's great. Then all of a sudden, your genitals fall off. It's a really rough life. But for some reason, the idea of mating seems even more attractive than before. That is the weirdness of massospora.

Massospora is a fungus that attacks creatures like cicadas that have one single biological mandate, which is to mate. When this fungus gets into their body, it causes the cicadas' backends to fall off—their butt and their genitals just pop right off—and replace the space with a fungal lump that looks like a fuzzy pencil eraser.

But the fungus doesn't stop there. Because it's a sexually transmitted infection, it "wants" the cicadas to mate so it can spread. This transmits the fungus to more and more cicadas and to their babies, which would start the whole process over.

The good news is, it is just a natural process, and biological checks and balances keep this infection from going off the rails. But if you accidentally ate an infected cicada, good luck to you. It tastes terrible.

How does human activity impact cicadas' life cycle?

We've had a few weird situations where a portion of a brood emerge a couple of years early. We have not had enough time to fully study the impact of climate change, but we are looking into it.

Besides climate change, other human activities can also affect cicadas. Cicadas, when they're first born, burrow into the ground and attach themselves to a root. If that tree is cut down, the nymphs have limited capacity to move to another tree. So if we cut down trees in an area to build a shopping mall or parking lot, all of those cicadas die. Now consider how many development projects there are every 17 years.

Unfortunately, we've lost two entire broods, Brood XI and Brood XXI, in the past 150 years, and we might lose more.

What can we learn from cicadas?

With all the changes that we have made so far, dramatically impacting the environment, many cicadas have still figured out how to exist in this space. I think it's worthwhile to consider evolution can do some really wild things given enough time. It gives me a glimmer of hope.

Provided by University of Colorado at Boulder

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