

INFECTIOUS DISEASE

Are Bats Spreading Ebola Across Sub-Saharan Africa?

The first cases went unrecognized. Ebola had never been seen in Guinea before, so when people became ill with fever, muscle pain, vomiting, and diarrhea, health workers initially assumed Lassa fever or yellow fever—both endemic in the region—were to blame. No one put the pieces together until late March. By then, the virus had been spreading for months. Now, health workers are struggling to contain the outbreak, which has already killed more than 100 and has affected at least two neighboring countries. At the same time, scientists are combing the forests, and the genome of the virus itself, looking for clues to how this strain—well known in Central Africa—ended up so far west, and whether its spread suggests people in forested areas all across sub-Saharan Africa are at risk.

Ebola is not a complete stranger to West Africa. In the mid-1990s, two outbreaks hit chimpanzees in Taï National Park in the Ivory Coast, and one researcher studying the animals was infected. (She survived.) “We expected to find the Taï strain,” says Sylvain Baize, a virologist at the Institut Pasteur in Lyon, France, who with his colleagues sequenced some of the first samples of the virus from Guinea. To their surprise, it turned out to be Ebola Zaire, the deadliest of the five known Ebola species.

“We have no idea how it’s moved from Central Africa to Guinea,” says primatologist Christophe Boesch of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. A leading suspect is fruit bats. In Central African rainforests, several species have shown evidence of infection with Ebola without getting sick. And at least one of the species, the little collared

fruit bat, *Myonycteris torquata*, has a range that stretches as far west as Guinea. “We’ve always been very suspicious of bats,” says William Karesh of EcoHealth Alliance in New York City, who studies the interactions among humans, animals, and infectious diseases.

“We need to see if [Ebola Zaire] is circulating in bats in the Guinean forest,” Baize says. If so, he says, then bats throughout the forests of West Africa are likely harboring the virus, which would put about 150 million more people than previously thought at risk of the disease. The threat isn’t particularly high, as outbreaks are rare. But people across the region should be warned about potential dangers of eating bats and other bush meat, and health workers would need to be trained to spot Ebola symptoms so outbreaks could be stopped more quickly.

On 1 April, a team assembled by Boesch and Fabian Leendertz, a wildlife epidemiologist at the Robert Koch Institute in Berlin, began surveying six sites in southern Guinea. Leendertz, with three more German veterinarians and eight Guinean biosurvey experts from the nonprofit Wild Chimpanzee Foundation, will capture and test bats for Ebola while at the same time looking for recent dips in the populations of chimpanzees, monkeys, forest antelopes, or other animals—a sign that the disease could be circulating in those species.

The researchers will also use a relatively new technique for monitoring forested areas: collecting blow flies, which feed on carrion, and analyzing the DNA that persists from their recent meals. If monkey flesh, for example, is common in the

blow flies’ diets, then monkeys might have been hit by Ebola.

Even with a dozen researchers combing the forest for a month, Leendertz says, the odds are long of finding solid answers. “Our biggest challenge will be to find the right spot,” he says, especially because it isn’t clear where the first human cases originated. “We will have to be lucky.”

Although bats may have carried the virus west from Central Africa, they may not be infecting humans directly. No clear case of bat-to-human transmission of Ebola has ever been proven, Karesh notes, and intermediate species may transmit the virus from bats to humans. Other human outbreaks have been associated with outbreaks in great apes, monkeys, and duikers, a kind of forest antelope. It is also possible that the virus has been in the region for decades but never sparked a noticeable outbreak.

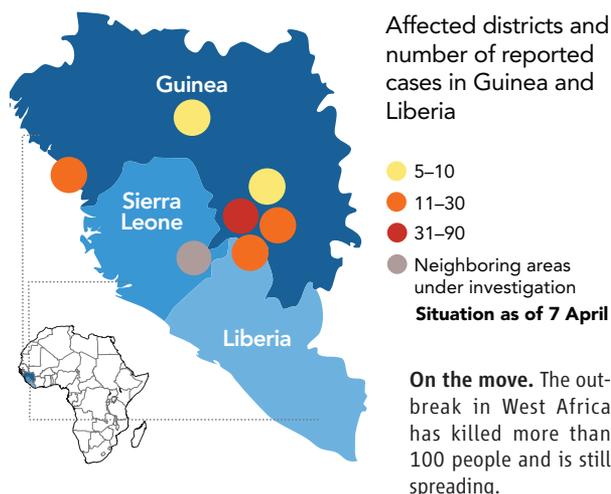
Another clue to the virus’s origin will come when its full genome is available. By determining how closely it is related to the viruses found in other outbreaks, Baize and others will try to estimate whether the Guinean outbreak is part of a relatively recent wave of Ebola Zaire moving across the continent or whether it has more likely been circulating silently in West Africa for years.

Meanwhile, health workers can only give supportive care to patients and try to stop the spread to new victims. Researchers are close to a vaccine and treatments that could be used in an outbreak, says virologist Heinz Feldmann of the National Institute of Allergy and Infectious Diseases’ Rocky Mountain Laboratories in Hamilton, Montana. But the difficulties of conducting clinical trials or introducing experimental techniques in an emergency setting are daunting. An outbreak-ready vaccine or treatment “is achievable” in as little as 2 years, he says. “But I’m almost afraid that the next time an outbreak happens, we’re going to say the same thing.”

—GRETCHEN VOGEL



Leading suspect. Researchers have found evidence of Ebola infections in the little collared fruit bat, *Myonycteris torquata*, but the bats don’t seem to get sick from the virus.



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