

Tiny bats provide 'glimmer of hope' against a fungus that threatened entire species

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Alyssa Bennett, small mammals biologist for the Vermont Department of Fish and Wildlife, holds a dead bat in a cave in Dorset, Vt., on May 2, 2023. Scientists studying bat species hit hard by the fungus that causes white nose syndrome, which has killed millions of bats across North America, say there is a glimmer of good news for the disease. Experts say more bats that hibernate at a cave in Vermont, the largest bat cave in New England, are tolerating the disease and passing protective traits on to their young. Credit: AP Photo/Hasan Jamali

Deep in a cool, damp cave in Vermont, tens of thousands of furry, chocolate brown creatures stir.

The little brown bats, survivors of a deadly fungus that decimated their population, went into hibernation last fall. Now in early May, they're waking, detaching from their rock wall roosts and making their first tentative flights in search of the moths, beetles and flying aquatic insects they devour.

It's here, in deep passages that creep into a Vermont mountain, where scientists found one of the first North American outbreaks of the fungus that causes white nose syndrome. Bat bones litter the cave floor like dry lawn-mower cuttings. Look closer and you'll find tiny skulls.

And the bats are still dying.

White nose syndrome is caused by an invasive fungus first found in an upstate New York cave in 2006, a short bat flight from the Dorset, Vermont, colony. The fungus wakes bats from hibernation, sending them into the frigid, winter air in search of food. They die of exposure or starvation because the insect population is too sparse to support them that time of year.

Smaller than a mouse and about the weight of three pennies in the hand, the Dorset bats skitter across the cave walls or cling to one another for warmth. Their health hints that at least some species are adapting to the fungus that has killed millions of their brethren across North America.



Alyssa Bennett, small mammals biologist for the Vermont Department of Fish and Wildlife, points to a bat in a cave in Dorset, Vt., on May 2, 2023. Scientists studying bat species hit hard by the fungus that causes white nose syndrome, which has killed millions of bats across North America, say there is a glimmer of good news for the disease. Experts say more bats that hibernate at a cave in Vermont, the largest bat cave in New England, are tolerating the disease and passing protective traits on to their young. Credit: AP Photo/Hasan Jamali

"That's really significant, because it seems to be a stronghold where these bats are mostly surviving and then spreading out throughout New England in the summer," said Alyssa Bennett, a small mammal biologist for the Vermont Department of Fish and Wildlife. She has studied bats and white nose syndrome for more than a decade.

"We're hoping that it's a source population for them to recover," Bennett said as critters flitted and swooped around her.

It will take time. Little brown bat females birth only one pup a year. And while they can live into their teens or 20s, only 60% to 70% of pups make it beyond their first 12 months, Bennett said.

Scientists now estimate that between 70,000 and 90,000 bats hibernate in the Dorset cave, the largest concentration in New England. Their numbers have dwindled from an estimated winter population of 300,000 to 350,000 or more in the 1960s, the last time the location was surveyed before white nose infiltrated.



Alyssa Bennett, small mammals biologist for the Vermont Department of Fish

and Wildlife, stretches the wings of a dead bat in a cave in Dorset, Vt., on May 2, 2023. Scientists studying bat species hit hard by the fungus that causes white nose syndrome, which has killed millions of bats across North America, say there is a glimmer of good news for the disease. Credit: AP Photo/Hasan Jamali

It's unclear how far the numbers dropped after the fungus set in, but biologists who visited in 2009 or 2010 noted the ground in front of the cave was carpeted with dead bats.

The fungus that causes white nose syndrome is believed to have been brought to North America from Europe, where bats are apparently accustomed to it. Named for the white, fuzzy spots it produces on noses and other bat body parts, the fungus has killed 90% or more of the bat populations in parts of North America.

Last month, [a report by the North American Bat Conservation Alliance](#) found that 81 of the 154 known bat species in the United States, Canada and Mexico are at severe risk from white nose infection, climate change and habitat loss.

It matters. The U.S. Geological Survey estimates that bats boost U.S. agriculture by \$3.7 billion a year by eating crop-destroying insects such as larvae-laying moths, whose offspring bore into corn plants.



Bats roost in a cave in Dorset, Vt., on May 2, 2023. Scientists studying bat species hit hard by the fungus that causes white nose syndrome, which has killed millions of bats across North America, say there is a glimmer of good news for the disease. Experts say more bats that hibernate at a cave in Vermont, the largest bat cave in New England, are tolerating the disease and passing protective traits on to their young. Credit: AP Photo/Hasan Jamali

Scientists have known for years that some little brown bats seemed to survive being exposed to the fungus, despite an overall mortality rate that was feared could eradicate them. Though Dorset's little brown bats are holding on, other once common species found with them, like northern long eared or tricolor bats, are almost impossible to detect there now, Bennett said.

"There's something special about those bats," Bennett said of Dorset's little browns. "We can't tell exactly what that is, but we have genetic research that we've collaborated on that suggests those bats do have factors that are related to hibernation and immune response that are allowing them to tolerate this disease and pass those features on to their young."

Winifred Frick, chief scientist at Bat Conservation International, who has followed white nose syndrome's march across North America, said the fungus has been found in 38 states so far. She says it's a "gut punch" each time she hears of a new outbreak.

Colorado reported its first infected bats earlier this year.



Alyssa Bennett, small mammals biologist for the Vermont Department of Fish and Wildlife, inspects a dead bat in a cave in Dorset, Vt., on May 2, 2023. Scientists studying bat species hit hard by the fungus that causes white nose syndrome, which has killed millions of bats across North America, say there is a glimmer of good news for the disease. Experts say more bats that hibernate at a cave in Vermont, the largest bat cave in New England, are tolerating the disease and passing protective traits on to their young. Credit: AP Photo/Hasan Jamali

Frick is relieved that bats are beginning to repopulate some areas where carcasses once piled up, even if the rebound is so far only a fraction of earlier numbers.

"That's a real glimmer of hope," she said.

In addition to Vermont, other areas near where white nose was first discovered also report stable, possibly rising numbers of little brown bats.

Pennsylvania lost an estimated 99.9% of its population after white nose struck, said Greg Turner, the state mammal expert for the Pennsylvania Game Commission. While the numbers are still low, they're slowly increasing in some places. One old mine in Blair County had just seven bats in 2016. This year, there were more than 330.

"I'm feeling pretty comfortable," Turner said. "We're not going to be stuck staring down the barrel of extinction."

His research shows bats that hibernate at colder temperatures do better against white nose because the fungus grows more slowly.



Researchers shine light on clusters of bats roosting in a cave in Dorset, Vt., on May 2, 2023. Scientists studying bat species hit hard by the fungus that causes white nose syndrome, which has killed millions of bats across North America, say more bats that hibernate at the Vermont cave are tolerating the disease and passing protective traits on to their young. Credit: AP Photo/Hasan Jamali

That may mean the bats are less likely to wake up from the irritation it causes, though scientists still don't understand the mechanism that allows some animals to survive while so many succumb.

"By selecting colder temperatures, they're helping themselves in two ways, they're helping themselves preserve fat and preserve their energy and they're also getting less disease," Turner said.

Still, there are worrying trends. Pennsylvania's bat population is a tiny fraction of what it was before white nose invaded. In some locations, Turner and his colleagues see more bats, but inexplicably few females.

In Virginia, populations have plummeted more than 95%, though the state is starting to see some colonies stabilize or slightly grow their numbers. However, that's happening at only a fraction of the sites once monitored, said Rick Reynolds, a non-game mammal biologist with the Virginia Department of Wildlife Resources.



Laura Kloepper, a visiting assistant professor at the University of New Hampshire in the Department of Biological Sciences and the Center for Acoustics Research and Behavior Lab, carries out research in a bat cave in Dorset, Vt., on May 2, 2023. Scientists studying bat species hit hard by the fungus that causes white nose syndrome, which has killed millions of bats across North America, say there is a glimmer of good news for the disease. Credit: AP Photo/Hasan Jamali



Laura Kloepper, right, a visiting assistant professor at the University of New Hampshire in the Department of Biological Sciences and the Center for Acoustics Research and Behavior Lab, carries out research with unidentified students in a bat cave in Dorset, Vt., on May 2, 2023. Scientists studying bat species hit hard by the fungus that causes white nose syndrome, which has killed millions of bats across North America, say there is a glimmer of good news for the disease. Credit: AP Photo/Hasan Jamali



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Alyssa Bennett, small mammals biologist for the Vermont Department of Fish and Wildlife, reaches toward roosting bats in a cave in Dorset, Vt., on May 2, 2023. Scientists studying bat species hit hard by the fungus that causes white nose syndrome, which has killed millions of bats across North America, say there is a glimmer of good news for the disease. Experts say more bats that hibernate at a cave in Vermont, the largest bat cave in New England, are tolerating the disease and passing protective traits on to their young. Credit: AP Photo/Hasan Jamali

"We remain positive, but there is a long road ahead with much uncertainty," Reynolds said in an email.

Back in Vermont, where temperatures in the Dorset cave fall into the low 40s (around 4.4 degrees Celsius) in winter, the bats seem to have

found a sweet spot cold enough to slow growth of the fungus.

Bennett is working with Laura Kloepper, a bioacoustics expert from the University of New Hampshire, to get a better handle on the population count. Using acoustic modeling, they're working to get a baseline population estimate this year by comparing sound recordings with thermal imaging. They'll survey using the same method again next year to try to determine the change.

"We want to try to understand what we can possibly do to save not only the species of bat, not only the bats at this cave, but really bats around the world," Kloepper said.

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