White-nose Syndrome Threatens Bats

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Scientists from federal and state wildlife agencies, universities, and conservation groups have launched a major research effort to understand, identify, and counter a mysterious ailment that has killed perhaps a half-million insect-eating bats in the northeastern United States during the last two winters.

So far, little is known about "white-nose syndrome," named for the white fungus that grows on affected bats' muzzles, wing membranes, or other exposed skin. Researchers don't know whether to call the ailment a disease, medical condition, or syndrome. Nor do they know whether the fungus causes the illness or is a symptom of it. They don't even know what causes the fungus to grow or why it has appeared only recently.

From two caves near Albany, New York, where white-nose syndrome was first recognized in February 2007, the condition has now spread to at least 30 sites in four states (New York, Connecticut, Massachusetts, and Vermont). At least two other states (Pennsylvania and New Hampshire) may have bats with white-nose syndrome. Some biologists fear it could spread this winter to Canada, western New York, and Maryland.

What is known is that the fungus has affected six species: little brown, big brown, small-footed myotis, northern long-eared, eastern pipistrelle, and Indiana bats (an endangered species). Little brown bats, the most common species in the Northeast, constitute most of the known cases of and deaths from white-nose syndrome.

Further, white-nose syndrome attacks hibernating bats. The bats apparently deplete their fat reserves too early, rouse themselves from their torpor, and hunt for food. During northern winters, not only are temperatures cold, but few if any insects are out. People have reported seeing emaciated bats fall into snowbanks and die, says Alan Hicks, a New York Department of Environmental Conservation wildlife biologist. Thousands of others have been found dead in caves.

Are bats not finding enough food to build sufficient fat reserves for winter, or are they burning their reserves too quickly? Again, scientists don't know. Almost all bats with white-nose syndrome have died. The syndrome has killed an estimated several hundred thousand bats, Hicks says. Bat numbers in some caves have dropped more than 90 percent.

"This is unprecedented," says Merlin Tuttle, president and founder of Bat Conservation International, a conservation group. "Bats are essential to a stable ecosystem. This is a crisis we can't ignore." Paul Cryan, a research biologist at the US Geological Survey's Fort Collins Science Center in Colorado, adds: "We just don't know enough about bats or white-nose syndrome. This is a whole new situation for bats. They don't seem to have any way to fight [the syndrome]. We may be in for some big trouble."

A number of theories seek to explain the how and why of white-nose syndrome. The one most researchers favor says the fungus causes an irritation that induces hibernating bats to rouse and groom themselves. That causes them to burn more fat to keep warm in the cold, damp caves and mines where they hibernate. Hungry, the bats leave their hibernation quarters in search of food but die when they cannot find any.

To provide some answers, scientists at US universities, laboratories, and federal and state agencies have begun studying bats and white-nose syndrome. DeeAnn Reeder, for example, a biologist at Bucknell University in Lewisburg, Pennsylvania, plans to study how big brown and little brown bats hibernate. In a basement laboratory complete with three refrigerators and a cage large enough for flying, Reeder can control temperature, humidity, and other factors. And to record body temperature, she plans to glue "wee tags"—one-half-gram buttons—to the backs of wild hibernating bats in Pennsylvania and New York. Other biologists will conduct similar field studies elsewhere in the Northeast.

Meanwhile, David Blehert has identified the fungus associated with white-nose syndrome. Blehert, director of microbiology at the National Wildlife Health Laboratory in Madison, Wisconsin, used DNA analyses to isolate a cold-loving fungus from the genus *Geomyces*. The discovery offers no new way to treat white-nose syndrome, but might help prevent the spread of the fungus if land managers further restrict access to bat caves and visitors check what they carry into caves, Blehert says.

Until then—and probably well afterward—scientists will continue to be concerned about the future of bats in North America. "This threat is as real as it gets," says Hicks. "We've never seen anything like this before. All of our hibernating bats are in trouble. Let's just hope there are some survivors out there that can restore the population. We'll know more in March, but right now it does not look good."

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